

APX™ TWO-WAY RADIOS



# APX MOBILE RADIOS & 02,03,05,07 & 09 CONTROL HEAD BASIC SERVICE MANUAL





# Foreword

This manual covers all models of the ASTRO® 25 Subscribers, APX 5500 / 6500 / 7500 / 6500Li / 2500 / 4500 / 4500Li Mobile Radios, unless otherwise specified. They will be called as APX Mobile Radios throughout this manual, unless they are categorized specifically. It includes all the information necessary to maintain peak product performance and maximum working time, using levels 1 and 2 maintenance procedures. This level of service goes down to the board replacement level and is typical of some local service centers, self-maintained customers, and distributors.

For details on radio operation or component-level troubleshooting, refer to the applicable manuals available separately. A list of related publications is provided in the section “[Related Publications](#)”, on page xxviii.

## Product Safety and RF Exposure Compliance

**ATTENTION! Before using this radio, read the guide enclosed with your radio, which contains important operating instructions for safe usage and RF energy awareness and control for compliance with applicable standards and regulations.**

For a list of Motorola-approved antennas, batteries, and other accessories, visit the following web site, which lists approved accessories: <http://www.motorolasolutions.com>.

## Manual Revisions

Changes which occur after this manual is printed are described in PMRs (Publication Manual Revisions). These PMRs provide complete replacement pages for all added, changed, and deleted items. To obtain PMRs, go to <https://businessonline.motorolasolutions.com>.

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## Notes

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## Document History

The following major changes have been implemented in this manual since the previous edition:

Edition	Description	Date
6875964M01-A	Initial Release	Oct. 2009
6875964M01-B	Added O9 Control Head information	Jun. 2010
6875964M01-C	Added APX 6500, UHF R1 and 700–800 MHz, UHF R2, 700–800 model charts	Dec. 2010
6875964M01-D	-Added UHF R2, 700–800 model charts -Added APX 5500, UHF and VHF model charts	Sept. 2011
6875964M01-E	Updated model charts	Dec. 2011
6875964M01-F	Added APX 6500Li in model charts	Jan. 2012
6875964M01-G	Added O2 and O7 Control Head	Jun. 2012
6875964M01-H	Added APX 2500 / 4500 World Wide Mobile radio information.	Nov. 2012
6875964M01-J	-Added APX 2500 / 4500 U1 and U2 information -Added APX 4500Li information. -Added new service kit part number for O3 Control Head, in table 11-3	Jun. 2013

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## Related Publications

ASTRO APX Mobile Radios And O3,O5 & O9 Detailed Service Manual .....	6875963M01
ASTRO APX Mobile Radio O3 Control Head User Guide .....	6875946M01
ASTRO APX Mobile Radio O5 Control Head User Guide .....	6875947M01
ASTRO APX Mobile Radio O9 Control Head User Guide .....	68007024014
ASTRO APX Mobiles O2, O3, O5, O7 & O9 Control Head Installation Manual .....	6878215A01
Product Safety and RF Energy Exposure Booklet for Mobile Two-Way Radios .....	6881095C99
CPS Programming Installation Guide .....	6881095C44

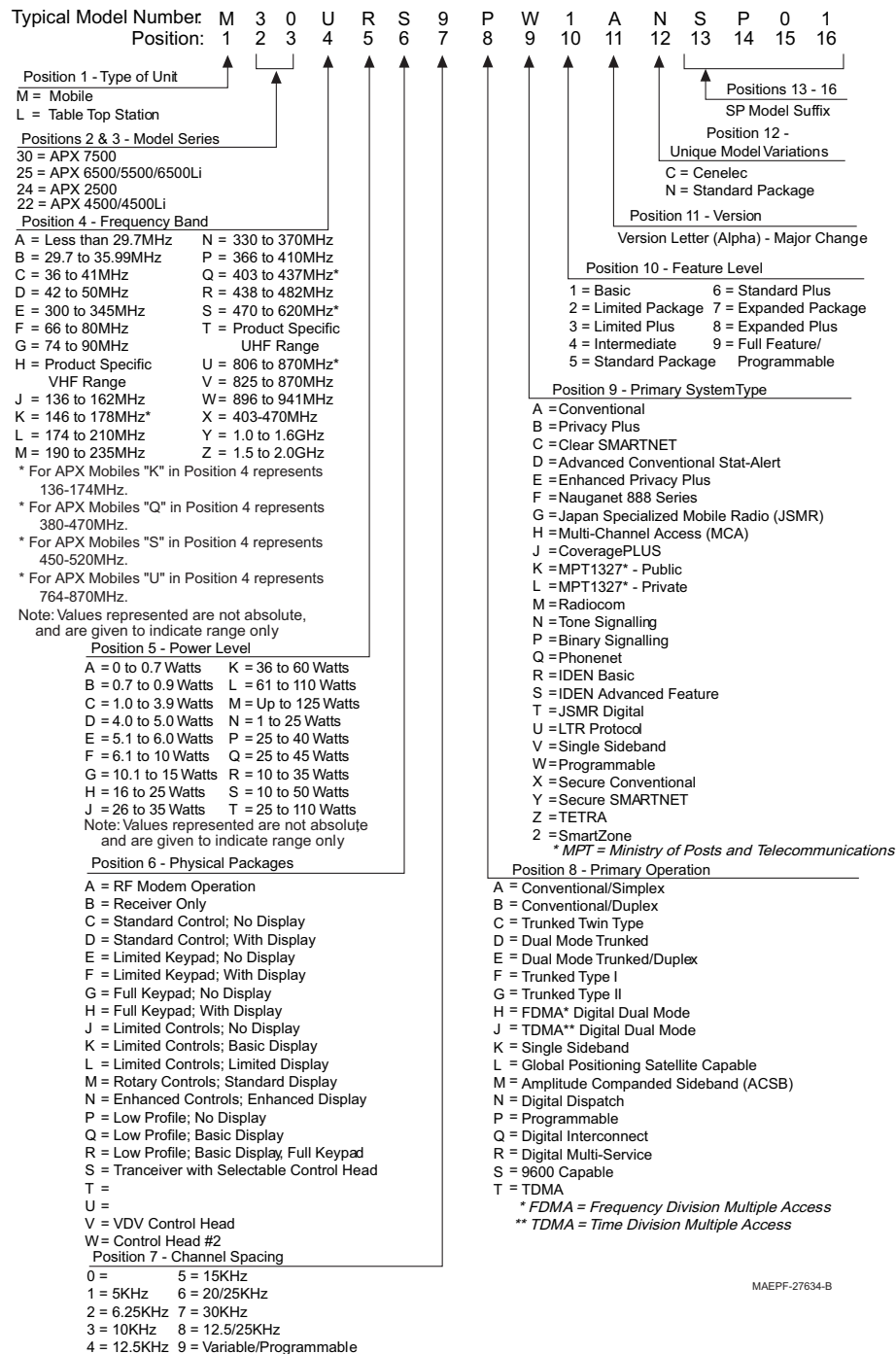
# Commercial Warranty

For details on the regional Motorola Service Centers, Replacement Parts Ordering, and Technical Support assistance, see relevant regions in the Appendix sections of this manual.

## Notes

# Model Numbering, Charts, and Specifications

## Mobile Radio Model Numbering Scheme



## ASTRO APX 5500/APX 6500/APX 6500 Li 700–800 MHz 10–35 W Model Chart

M25URS9PW1_NI (APX 5500)/ M25URS9PW1_N (APX 6500)						
Option						Description
					G174AD	ADD: ANT 3 dB LOW-PROFILE 762–870 MHz
					G175AD	ADD: ANT 3 dB ELEVATED FEED 762–870 MHz
					G335AW	ADD: ANT 1/4 WAVE 762–870 MHz
					W484AF	ADD: ANT 3 dB COLLINEAR 762–870 MHz
					GA00226AA	ADD: GPS ANT THROUGH HOLE MOUNT
					GA00270AA	ADD: GPS ANT GLASS MOUNT
					GA00268AA	ADD: RFID
						<b>Item No.</b>
						<b>Description</b>
X						HAF4013_ ANT 3 dB LOW-PROFILE 762–870 MHz
	X					HAF4014_ ANT 3 dB ELEVATED FEED 762–870 MHz
		X				HAF4016_ ANT 1/4 WAVE 762–870 MHz
			X			HAF4017_ ANT 3 dB COLLINEAR 762–870 MHz
				X		HAG4000_ APX 6500 ROOF MT GPS ANTENNA
				X		PMAN4001_ GPS ANT GLASS MOUNT
					X	HLN7014_ RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 5500/APX 6500/APX 6500 Li 700–800 MHz 10–35 W Model Chart (Cont.)

M25URS9PW1_NI (APX 5500)/ M25URS9PW1_N (APX 6500)						
Option					Description	
				G66AL	ADD: DASH MOUNT 03	
				G66AM	ADD: DASH MOUNT 05	
				G67BE	ADD:SCREW, REM MT NO CH MP	
				G67BB	ADD: REMOTE MOUNT O3 MID POWER	
				G67BC	ADD: REMOTE MOUNT O5 MID POWER	
				W81AQ	ADD: KEY LOCK MOUNT APEX	
Item No.					Description	
	X	X	X	X	0364332H02	SCREW ASSY, SEALING
	X		X	X	3264059H03	SEAL, OVERMOLDED FRAME
		X			HKN4191_	MOBILE PWR CBL LO/MED PWR
	X		X	X	HKN4192_	MOBILE PWR CBL HIPWR 20'
				X	HKN6186_	TRUNNION, CH REMOTE MOUNT
				X	HKN6188_	CABLE, CH POWER AND SPEAKER
				X	HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
	X		X	X	HKN6205_	REMOTE FLEX KIT
		X			HKN6206_	DASH FLEX KIT
				X	PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
				X	HLN6372_	KEYLOCK MT
	X	X	X	X	HLN6863_	ACCESSORY CONNECTOR XTL5000
	X		X	X	HLN6980_	DUST CAPS KIT
		X			HLN7025_	DUST CAP KIT
	X	X	X	X	HLN7002_	TRUNNION HARDWARE KIT
				X	PMLN4958_	O3 CAN 17' EXTENSION CABLE
				X	PMLN4959_	O3 ACCESSORY CABLE
	X		X	X	PMUN1038_	APX 7500 STANDARD TIB MP

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li 700–800 MHz 10–35 W Model Chart (Cont.)

M25URS9PW1_NI (APX 5500)/ M25URS9PW1_N (APX 6500)						
Option			Description			
			G442AJ		ADD: APX 7500 O5 CONTROL HEAD	
			G72AD		ADD: APX 7500 O3 HANDHELD CH	
			GA00092AC		ADD: APX 7500 DUAL-CONTROL HARDWARE	
			GA00804		ADD: APX 7500 O2 CONTROL HEAD	
			GA00805		ADD: APX 7500 O7 CONTROL HEAD	
			MHLN6979AS		ADD: MACK CONTROL BOARD	
				<b>Item No.</b>	<b>Description</b>	
		X		PMHN4193_	O2 FRONT HOUSING ( Grey )	
		X		PMHN4195_	O2 FRONT HOUSING ( Green )	
			X	PMHN4194_	O7 CONTROL HEAD ( English )	
			X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )	
			X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )	
			X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )	
			X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )	
X	X			PHCN4000_	O5 CONTROL HEAD	
	X			PMUN1034_	O3 CONTROL HEAD	
				X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION
				X	NNTN7919_	ADP/DVP-XL ENCRYPTION
				X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION
				X	NNTN7921_	ADP/AES ENCRYPTION
				X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION
				X	NNTN7923_	ADP ENCRYPTION
	X			HKN6186_	TRUNION, CH REMOTE MOUNT	
	X			HKN6188_	CABLE, CH POWER AND SPEAKER	
	X			HLN6980_	COVER, DUST, KIT	
	X			0364332H02	SCREW, M3X.5	
	X			3364430H03	NEW LABEL FOR MOBILE RADIO	
	X			HKN6191_	FLEX, CNTR HEAD TO CHIB	
	X			PHLN1000_	REMOTE ASSY, CHIB	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 5500/APX 6500/APX 6500 Li 700–800 MHz 10–35 W Model Chart (Cont.)

M25URS9PW1_NI (APX 5500)/ M25URS9PW1_N (APX 6500)											
Option								Description			
W374AJ								ADD: STATUS/MESSAGE 16 APEX			
W355AS								ADD: STATUS/MESSAGE 8 APEX			
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX			
W599BF								ADD: 8 MODE DIRECT ENTRY APEX			
W614AT								ADD: 16 MODE DIRECT ENTRY APEX			
W615AW								ADD: 24 MODE DIRECT ENTRY APEX			
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX			
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX			
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX			
W589BD								ADD: PUBLIC ADDRESS APEX			
								Item No.	Description		
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN		
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUIDE		
						X	X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA		
						X	X	X	X	HKN4265_	FUSE CABLE
						X	X	HKN4363_	CBL SPECTRA TO SIREN		
						X		HKN6145_	CABLE W3 SIREN DEK		
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX		
								X	HLN1196_	WILDCARD	
								X	HLN1228_	DEK STATUS SYS 9000	
								X	HLN1229_	DEK STATUS/MESSAGE SYS 9000	
								X	HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA	
								X	HLN1338_	DEK SIREN PA	
								X	HLN1339_	DEK PA	
								X	HLN1362_	DEK 8 MODE SYS 9000	
								X	HLN1363_	DEK 16 MODE SYS 9000	
								X	HLN1364_	DEK 24 MODE SYS 9000	
								X	HLN1439_	SIREN ASTRO MOBILE	
								X	HLN5157_	DEK MOUNTING HARDWARE	
								X	HLN5331_	DEK 9000E SIREN/PA SPARE BUT	
								X	HLN6819_	SIREN SWITCH BOX	
								X	HKN6189_	CABLE, CH DEK	
								X	HLN6938_	HDWR DEK MOUNTING	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li 700–800 MHz 10–35 W Model Chart (Cont.)

M25URS9PW1_NI (APX 5500)/ M25URS9PW1_N (APX 6500)									
Option						Description			
					GA00238AA	INT: REMOVABLE MEMORY BRD APX			
					GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX			
					B116BD	ADD:BUZZER 110 MA APEX			
					W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX			
					G235AC	ADD:PTT FOOTSWITCH APEX			
					W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX			
					W688AR	ADD: EXT EMERG PUSHBUTTON APEX			
						Item No.		Description	
	X	X				0310909A33	SCREW		
	X					MHLN7000_	1G MEMORY EXPANSION BRD		
		X				MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY		
			X			HLN6953_	BUZZER KIT 110 MA		
				X		HKN4258_	CABLE RELAY		
				X		HLN6969_	EXTERNAL ALARM RELAY		
					X	GLN7278_	PTT FOOTSWITCH		
					X	HLN5113_	EMERGENCY FOOTSWITCH		
					X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li 700–800 MHz 10–35 W Model Chart (Cont.)

M25URS9PW1_NI (APX 5500)/ M25URS9PW1_N (APX 6500)											
Option									Description		
G303AB									ADD: RS232 DATA INTFC CBL DASH APEX		
G304AC									ADD: RS232 DATA INTFC CBL TRK APEX		
G308AD									ADD:USB DATA INTFC CABLE-DASH APEX		
G309AC									ADD:USB DATA INTFC CABLE-TRK APEX		
G582AC									ADD: REMOTE MOUNT CABLE 131 FT APEX		
G879AC									ADD: REMOTE MOUNT CBL 115 FEET APEX		
G607AC									ADD:CBL REMOTE MOUNT 75 FEET APEX		
G609AC									ADD: REMOTE MOUNT CBL 50 FEET APEX		
G610AC									ADD: REMOTE MOUNT CBL 30 FEET APEX		
G628AC									ADD: REMOTE MOUNT CABLE 17 FT APEX		
G927AB									INT:CONNECTOR RM MT APEX		
									Item No.	Description	
X									HKN6160_	CABLE KIT 6' DASH MOUNT DATA	
	X								HKN6161_	CABLE KIT 20' RS232/J2 DATA	
		X							HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M	
			X						HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN	
				X					HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT	
					X				HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT	
						X			HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT	
							X		HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT	
								X	HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT	
									X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li 700–800 MHz 10–35 W Model Chart (Cont.)

M25URS9PW1_NI (APX 5500)/ M25URS9PW1_N (APX 6500)										
Option					Description					
				G892AB	ENH: HAND MIC,GCAI WTR RESISTANT APX					
				W20CA	ADD: KEYPAD MIC GCAI APEX					
				W22BA	ADD: STD PALM MICROPHONE APEX					
				W872AB	ADD: MIC VISOR STD APEX					
				W874AB	ADD: HANDSET/HANGUP MIC ARMR CBL APX					
				W382AM	ADD: CNTRL STATION PALM MIC GCAI APX					
				GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET					
				GA00304AA	ADD: PUSHBUTTON PTT APX					
					Item No. Description					
	X				HMN1089_	HAND MIC,GCAI (WATER RESISTANT)				
		X			HMN4079_	KEYPAD MICROPHONE				
			X		HMN1090_	STD PALM MICROPHONE (GCAI)				
				X	RMN5054_	VISOR MIC				
				X	HKN1018_	HSET/HANGUP NORMAL ARMOURED CABLE				
					X	RMN5070_	DESKTOP MICROPHONE			
					X	HMN4097_	MODEL III GCAI KEYPAD HANDSET			
					X	RLN5926_	PUSH BUTTON PTT			

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li 700–800 MHz 10–35 W Model Chart (Cont.)

M25URS9PW1_NI (APX 5500)/ M25URS9PW1_N (APX 6500)						
Option					Description	
				G133AJ		INT: SAFETY DATA SHEET APEX
				G146AF		INT: SAFETY LEAFLET EMEA/MCIL APEX
				G146AE		INT: SAFETY LEAFLET WEEE APEX
				G657AD		INT: USER/INSTALL MANUAL CD APEX
				W665BF		ADD: BASE STATION OP W/PS APEX
				G91AE		ADD: CNTRL STATION PWR SUPPLY APEX
				W947AT		ADD:RS232 PACKET DATA INTERFACE APX
					<b>Item No.</b>	<b>Description</b>
X					NNTN7851_	SAFE & EFFICIENT OP OF MOT RDS
	X				6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X			6866537D90	WEEE SAFETY SUPPLEMENT
			X		PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
				X	6880101W87	SPECTRA CTL STA INSTR MANUAL
				X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
				X	HLN6042_	DESK TRAY WITH SPEAKER
				X	HLN7024_	HDW INSTALLATION BASE TRAY
				X	HPN4007_	PS 14V 15A UNI 117/240 VAC
				X	NVN5424_	DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 5500/APX 6500/APX 6500 Li 700–800 MHz 10–35 W Model Chart (Cont.)**

M25URS9PW1_NI (APX 5500)/ M25URS9PW1_N (APX 6500)				
Option			Description	
		B18CR		ADD: AUXILIARY SPKR 7.5 W APEX
		G832AD		ADD: SPKR 7.5 W WTR RST
		W432AG		ENH: SPKR INCREASED AUDIO POWER APX
		G831AD		ADD: SPKR 13 W WATER RESISTANT
			Item No.	Description
	X		HSN4031_	EXT SPKR 7.5 W
		X	HSN4038_	EXT SPKR 7.5 W
		X	HSN4032_	EXT SPKR 13 W
		X	HSN4040_	EXT SPKR 13 W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 10–40 W Model Chart

M25QSS9PW1_NI (APX 5500)/ M25QSS9PW1_N (APX 6500)										
Description										
G426AD										
ADD: ANT 1/4 WAVE WHIP 450-470 MHZ										
G428AD										
ADD: ANT 3.5DB 450-470 MHZ										
G427AB										
ADD: ANT 3.5 dB GAIN 380-433 MHz										
G429AB										
ADD: ANT 5.0 dB GAIN 380-433 MHz										
G425AC										
ADD: ANT 1/4 WAVE WHIP 380-420 MHZ										
G431AC										
ADD: ANT WIDEBAND 380-470 MHZ MAXRA										
GA00505AA										
ADD: ANT 2DB WIDEBAND 380–520 MHz										
G430AC										
ADD: ANT 5.0DB 445-470 MHZ										
GA00226AA										
ADD: GPS ANTENNA										
GA00270AA										
ADD: GPS GLASS MOUNT ANTENNA										
GA00268AA										
ADD: RFID										
					Item No.					
					Description					
X									HAE4003_	ANTENNA, QUARTERWAVE, 450-470
	X								HAE4011_	ANTENNA ROOF TOP 3.5DB UHF
		X							HAE6010_	ANT 3.5 dB GAIN 380-433MHz
			X						HAE6011_	ANT 5.0 dB GAIN 380-433MHz
				X					HAE6012_	ANT 5.0DB GAIN 445-470MHZ
					X				HAE6013_	ANT WIDEBAND 2.0DB GAIN 380-470 MHz
						X			HAE6031_	ANT, 2DB WIDEBAND 380–520 MHz
							X		RAE4014AR_	ANT 5.0 dB GAIN 445-470MHz
								X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
								X	PMAN4001_	GPS ANT GLASS MOUNT
								X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 10–40 W Model Chart (Cont.)

M25QSS9PW1_NI (APX 5500)/ M25QSS9PW1_N (APX 6500)						
Option					Description	
				G66AL	ADD: DASH MOUNT 03	
				G66AM	ADD: DASH MOUNT 05	
				G67BE	ADD: SCREW, REM MT NO CH MP	
				G67BB	ADD: REMOTE MOUNT 03 MID POWER	
				G67BC	ADD: REMOTE MOUNT 05 MID POWER	
				W81AQ	ADD: KEY LOCK MOUNT APEX	
					Item No.	Description
	X		X	X	PMUN1038_	APX7500 STANDARD TIB MP
	X	X	X	X	HLN7002_	TRUNNION HARDWARE KIT
	X		X	X	HKN6205_	REMOTE FLEX KIT
	X		X	X	HLN6980_	DUST CAPS KIT
	X	X	X	X	0364332H02	SCREW ASSY, SEALING
	X		X	X	3264059H03	SEAL, OVERMOLDED FRAME
	X	X	X	X	HLN6863_	ACCESSORY CONNECTOR XTL5000
	X		X	X	HKN4192_	MOBILE PWR CBL HIPWR 20'
		X			HKN6206_	DASH FLEX KIT
		X			HKN4191_	MOBILE PWR CBL LO/MED PWR
		X			HLN7025_	DUST CAP KIT
				X	PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
					0715044C01	BRKT, MOTORCYCLE MOUNTING (O5/M5)
					3075217A01	CABLE, MOTORCYCLE REMOTE (O5/M5)
				X	HKN6186_	TRUNNION, CH REMOTE MOUNT
				X	HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
			X		PMLN4959_	O3 ACCESSORY CABLE
			X		PMLN4958_	O3 CAN 17' EXTENSION CABLE
			X		HKN6188_	CABLE, CH POWER AND SPEAKER
					PMUN1042	APX7500 HIROSE TIB MP
					PMLN4983	HIROSE TIB DUST COVER KIT
				X	HLN6372_	KEYLOCK MT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 10–40 W Model Chart (Cont.)

M25QSS9PW1_NI (APX 5500)/ M25QSS9PW1_N (APX 6500)						
Option						Description
					G442AJ	ADD: APX 7500 O5 CONTROL HEAD
					G72AD	ADD: APX 7500 O3 HANDHELD CH
					GA00092AC	ADD: APX 7500 DUAL-CONTROL HARDWARE
					GA00093AB	ADD: APX 7500 TRI-CONTROL HARDWARE
					GA00094AB	ADD: APX 7500 QUAD-CONTROL HARDWARE
					GA00245AA	ADD: APX7500 O9 CONTROL HEAD
					GA00804	ADD: APX7500 O2 CONTROL HEAD
					GA00805	ADD: APX7500 O7 CONTROL HEAD
					MHLN6979AS	ADD: MACK CONTROL BOARD
Item No.						Description
X	X			X	PMHN4193_	O2 FRONT HOUSING ( Grey )
				X	PMHN4195_	O2 FRONT HOUSING ( Green )
	X			X	PMHN4194_	O7 CONTROL HEAD ( English )
				X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )
				X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )
				X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )
				X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )
					PHCN4000_	O5 CONTROL HEAD
					PMUN1034_	O3 CONTROL HEAD
				X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION
				X	NNTN7919_	ADP/DVP-XL ENCRYPTION
				X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION
				X	NNTN7921_	ADP/AES ENCRYPTION
				X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION
				X	NNTN7923_	ADP ENCRYPTION
	X				HKN6186_	TRUNION, CH REMOTE MOUNT
	X				HKN6188_	CABLE, CH POWER AND SPEAKER
	X				HLN6980_	COVER, DUST, KIT
	X				0364332H02	SCREW, M3X.5
	X				3364430H03	NEW LABEL FOR MOBILE RADIO
	X				HKN6191_	FLEX, CNTR HEAD TO CHIB
	X				PHLN1000_	REMOTE ASSY, CHIB

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 10–40 W Model Chart (Cont.)

M25QSS9PW1_NI (APX 5500)/ M25QSS9PW1_N (APX 6500)									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUID
						X	X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X	HKN4265_	FUSE CABLE
						X	X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
		X						HLN1196_	WILDCARD
	X							HLN1228_	DEK STATUS SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA
						X		HLN1338_	DEK SIREN PA
							X	HLN1339	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE SYS 9000
			X	X				HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
				X	X	X	X	HLN1439_	SIREN ASTRO MOBILE
				X				HLN5157_	DEK MOUNTING HARDWARE
				X				HLN5331_	DEK 9000E SIREN/PA SPARE BUT
							X	HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 10–40 W Model Chart (Cont.)

M25QSS9PW1_NI (APX 5500)/ M25QSS9PW1_N (APX 6500)									
Option						Description			
					GA00238AA	INT: REMOVABLE MEMORY BRD APX			
					GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX			
					B116BD	ADD:BUZZER 110MA APEX			
					W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX			
					G235AC	ADD:PTT FOOTSWITCH APEX			
					W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX			
					W688AR	ADD: EXT EMERG PUSHBUTTON APEX			
						Item No.		Description	
	X	X				0310909A33	SCREW		
	X					MHLN7000_	1G MEMORY EXPANSION BRD		
		X				MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY		
			X			HLN6953_	BUZZER KIT 110 MA		
				X		HKN4258_	CABLE RELAY		
				X		HLN6969_	EXTERNAL ALARM RELAY		
					X	GLN7278_	PTT FOOTSWITCH		
					X	HLN5113_	EMERGENCY FOOTSWITCH		
					X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 10–40 W Model Chart (Cont.)

M25QSS9PW1_NI (APX 5500)/ M25QSS9PW1_N (APX 6500)												
Option										Description		
G303AB										ADD: RS232 DATA INTFC CBL DASH APEX		
G304AC										ADD: RS232 DATA INTFC CBL TRK APEX		
G308AD										ADD:USB DATA INTFC CABLE-DASH APEX		
G309AC										ADD:USB DATA INTFC CABLE-TRK APEX		
G582AC										ADD: REMOTE MOUNT CABLE 131 FT APEX		
G879AC										ADD:REMOTE MOUNT CBL 115 FEET APEX		
G607AC										ADD:CBL REMOTE MOUNT 75 FEET APEX		
G609AC										ADD: REMOTE MOUNT CBL 50 FEET APEX		
G610AC										ADD: REMOTE MOUNT CBL 30 FEET APEX		
G628AC										ADD: REMOTE MOUNT CABLE 17 FT APEX		
G628AD										INT: REMOTE MOUNT CABLE 17 FT APEX		
G618AC										ADD:CBL REMOTE MOUNT 10 FEET APEX		
G927AB										INT:CONNECTOR RM MT APEX		
										Item No.	Description	
X											HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X										HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X									HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X								HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X							HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X						HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
									X	X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
										X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
										X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 10–40 W Model Chart (Cont.)

M25QSS9PW1_NI (APX 5500)/ M25QSS9PW1_N (APX 6500)									
Option						Description			
G892AB						ENH:HAND MIC,GCAI WTR RESISTANT APX			
W20CA						ADD: KEYPAD MIC GCAI APEX			
W22BA						ADD: STD PALM MICROPHONE APEX			
W872AB						ADD:MIC VISOR STD APEX			
W874AB						ADD:HANDSET/HANGUP MIC ARMR CBL APX			
W382AM						ADD:CNTRL STATION PALM MIC GCAI APX			
GA00221AC						ADD: MODEL III GCAI KEYPAD HANDSET			
GA00304AA						ADD:PUSHBUTTON PTT APX			
						Item No.		Description	
X						HMN1089_	HAND MIC,GCAI (WATER RESISTANT)		
	X					HMN4079_	KEYPAD MICROPHONE		
		X				HMN1090_	STD PALM MICROPHONE (GCAI)		
			X			RMN5054_	VISOR MIC		
				X		HKN1018_	HSET/HANGUP NORMAL ARMOURED CABLE		
					X	RMN5070_	DESKTOP MICROPHONE		
					X	HMN4097_	MODEL III GCAI KEYPAD HANDSET		
					X	RLN5926_	PUSH BUTTON PTT		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 10–40 W Model Chart (Cont.)

M25QSS9PW1_NI (APX 5500)/ M25QSS9PW1_N (APX 6500)							
Option						Description	
					G133AJ	INT: SAFETY DATA SHEET APEX	
					G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
					G146AE	INT: SAFETY LEAFLET WEEE APEX	
					G657AD	INT: USER/INSTALL MANUAL CD APEX	
					W665BF	ADD: BASE STATION OP W/PS APEX	
					G91AE	ADD: CNTRL STATION PWR SUPPLY APEX	
					W947AT	ADD: RS232 PACKET DATA INTERFACE APX	
						Item No.	Description
X						6881095C99	CGISS MOB RADIO SAFETY BKLT
	X					6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X				6866537D90	WEEE SAFETY SUPPLEMENT
			X			PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
				X		6880101W87	SPECTRA CTL STA INSTR MANUAL
				X		6880102W93	SPECTRA MXTRC CTRL BASE MAN
				X		HLN6042_	TRAY BASE SPECTRA
				X		HLN7024_	HDW INSTALLATION BASE TRAY
					X	HPN4007_	PS 14V 15A UNI 117/240 VAC
					X	NVN5424_	SOFTWARE,ASSEMBLY,INF FILE CD

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 10–40 W Model Chart (Cont.)

M25QSS9PW1_NI (APX 5500)/ M25QSS9PW1_N (APX 6500)				
Option			Description	
		B18CR		ADD: AUXILIARY SPKR 7.5 W APEX
		G832AD		ADD: SPKR 7.5 W WTR RST
		W432AG		ENH: SPKR INCREASED AUDIO POWER APX
		G831AD		ADD: SPKR 13 W WATER RESISTANT
			Item No.	Description
	X		HSN4031_	EXT SPKR 7.5 W
		X	HSN4038_	EXT SPKR 7.5 W
		X	HSN4032_	EXT SPKR 13 W
		X	HSN4040_	EXT SPKR 13 W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 2 10–45 W Model Chart

M25SSS9PW1_NI (APX 5500)/ M25SSS9PW1_N (APX 6500)											
Option										Description	
G426AD										ADD: ANT 1/4 WAVE WHIP 450-470 MHZ	
G428AD										ADD: ANT 3.5 dB 450-470 MHZ	
G486AC										ADD: 5 dB GAIN ANT 494-512 MHZ	
G490AD										ADD: ANT 1/4 WAVE 470-512 MHZ	
G493AD										ADD: ANT 3 dB ROOF TOP 470-495 MHZ	
G494AD										ADD: ANT 3 dB ROOF TOP 494-512 MHZ	
G510AB										ADD:ANT LOW PROFILE 450-512 MHZ	
G511AB										ADD:2 dB ANT WIDEBAND 450-520 MHZ	
GA00505AA										ADD: ANT 2 dB WIDEBAND 380-520 MHZ	
GA00652AA										ADD: ANT ROOF TOP 5 dB 470–494 MHZ	
GA00226AA										ADD: GPS ANT THROUGH HOLE MOUNT	
GA00270AA										ADD: GPS ANT GLASS MOUNT	
GA00268AA										ADD: RFID	
										Item No.	Description
X										HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ
	X									HAE4011_	ANT 3.5 dB GAIN 450-470 MHZ
		X								RAE4016AR_	ANT ROOF TOP 5 dB, 494-512 MHZ
			X							HAE4004_	ANTENNA 1/4 WAVE 470-512 MHZ
				X						HAE4012_	ANT ROOF TOP 3.5 dB 470-495 MHZ
					X					HAE4013_	ANT ROOF TOP 3.5 dB 494-512 MHZ
						X				HAE6016_	ANT LOW PROFILE 450-512 MHZ
							X			HAE6015_	ANT 2 dB WIDEBAND 450-520 MHZ
								X		HAE6031_	ANT 2 dB WIDEBAND 380-520 MHZ
									X	RAE4015AR_	ANT ROOF TOP 5 dB 470-494 MHz
									X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
									X	PMAN4001_	GPS ANT GLASS MOUNT
									X	HLN7014_	RFID

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 2 10–45 W Model Chart (Cont.)

M25SSS9PW1_NI (APX 5500)/ M25SSS9PW1_N (APX 6500)					
Option					Description
				G66AL	ADD: DASH MOUNT O3
				G66AM	ADD: DASH MOUNT O5
				G67BE	ADD:SCREW, REM MT NO CH MP
				G67BB	ADD: REMOTE MOUNT O3 MID POWER
				G67BC	ADD: REMOTE MOUNT O5 MID POWER
				W81AQ	ADD: KEY LOCK MOUNT APEX
Item No.					Description
X	X	X	X	X	0364332H02 SCREW ASSY, SEALING
					0715044C01 BRKT, MOTORCYCLE MOUNTING (O5)
					3075217A01 CABLE, MOTORCYCLE REMOTE (O5)
X		X	X	X	3264059H03 SEAL, OVERMOLDED FRAME
	X				HKN4191_ MOBILE PWR CBL LO/MED PWR
X		X	X	X	HKN4192_ MOBILE PWR CBL HIPWR 20'
					HKN6032_ MCYCLE POWER CABLE
				X	HKN6186_ TRUNNION, CH REMOTE MOUNT
				X	HKN6188_ CABLE, CH POWER AND SPEAKER
				X	HKN6191_ CBL, REAR REMOTE FLEX ASSY (CHIB)
X		X	X	X	HKN6205_ REMOTE FLEX KIT
	X				HKN6206_ DASH FLEX KIT
				X	PHLN1000_ ASSY,KIT,CTRL HD END REM ASSY APX
				X	HLN6372_ KEYLOCK MT
X	X	X	X		HLN6863_ ACCESSORY CONNECTOR XTL5000
X		X	X	X	HLN6980_ DUST CAPS KIT
	X				HLN7025_ DUST CAP KIT
X	X	X	X	X	HLN7002_ TRUNNION HARDWARE KIT
			X		PMLN4958_ O3 CAN 17' EXTENSION CABLE
			X		PMLN4959_ O3 ACCESSORY CABLE
X		X	X	X	PMUN1038_ APX7500 STANDARD TIB MP
					PMUN1042_ APX7500 HIROSE TIB MP
					PMLN4983_ HIROSE TIB DUST COVER KIT
					HLN7026_ MCYCLE HEADSET CBL & LEAFLET

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 2 10–45 W Model Chart (Cont.)

M25SSS9PW1_NI (APX 5500)/ M25SSS9PW1_N (APX 6500)									
Option							Description		
						G442AJ	ADD: APX 7500 O5 CONTROL HEAD		
						G72AD	ADD: APX 7500 O3 HANDHELD CH		
						GA00092AC	ADD: APX 7500 DUAL-CONTROL HARDWARE		
						GA00093AB	ADD: APX 7500 TRI-CONTROL HARDWARE		
						GA00094AB	ADD: APX 7500 QUAD-CONTROL HARDWARE		
						GA00245AA	ADD: APX 7500 O9 CONTROL HEAD		
						GA00804	ADD: APX 7500 O2 CONTROL HEAD		
						GA00805	ADD: APX 7500 O7 CONTROL HEAD		
						MHLN6979AS	ADD: MACK CONTROL BOARD		
							<b>Item No.</b>	<b>Description</b>	
					X		PMHN4193_	O2 FRONT HOUSING ( Grey )	
					X		PMHN4195_	O2 FRONT HOUSING ( Green )	
					X		PMHN4194_	O7 CONTROL HEAD ( English )	
					X		PMHN4192_	O7 CONTROL HEAD ( English_Chinese )	
					X		PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )	
					X		PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )	
					X		PMHN4191_	O7 CONTROL HEAD ( Siren and Light )	
X		X					PHCN4000_	O5 CONTROL HEAD	
		X					PMUN1034_	O3 CONTROL HEAD	
						X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION	
						X	NNTN7919_	ADP/DVP-XL ENCRYPTION	
						X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7921_	ADP/AES ENCRYPTION	
						X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7923_	ADP ENCRYPTION	
			X				HKN6186_	TRUNION, CH REMOTE MOUNT	
			X				HKN6188_	CABLE, CH POWER AND SPEAKER	
			X				HLN6980_	COVER, DUST, KIT	
			X				0364332H02	SCREW, M3X.5	
			X				3364430H03	NEW LABEL FOR MOBILE RADIO	
			X				HKN6191_	FLEX, CNTR HEAD TO CHIB	
			X				PHLN1000_	REMOTE ASSY, CHIB	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 2 10–45 W Model Chart (Cont.)

M25SSS9PW1_NI (APX 5500)/ M25SSS9PW1_N (APX 6500)									
Option								Description	
								W374AJ	ADD: STATUS/MESSAGE 16 APEX
								W355AS	ADD: STATUS/MESSAGE 8 APEX
								W591AQ	ADD: AUXILIARY SWITCH PANEL APEX
								W599BF	ADD: 8 MODE DIRECT ENTRY APEX
								W614AT	ADD: 16 MODE DIRECT ENTRY APEX
								W615AW	ADD: 24 MODE DIRECT ENTRY APEX
								W269BQ	ADD: SIREN/PUBLIC ADDRESS O3 CH APEX
								W269BP	ADD: SIREN/PUBLIC ADDRESS O5 CH APEX
								W271AS	ADD: SIREN PA/SWITCH BOX O3 APEX
								W589BD	ADD: PUBLIC ADDRESS APEX
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUID
						X	X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X	HKN4265_	FUSE CABLE
						X	X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
		X						HLN1196_	WILDCARD
	X							HLN1228_	DEK STATUS SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA
							X	HLN1338_	DEK SIREN PA
							X	HLN1339	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE SYS 9000
			X	X				HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
					X	X	X	HLN1439_	SIREN ASTRO MOBILE
					X			HLN5157_	DEK MOUNTING HARDWARE
					X			HLN5331_	DEK 9000E SIREN/PA SPARE BUT
							X	HLN6819_	SIREN SWITCH BOX
X	X		X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X		X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 2 10–45 W Model Chart (Cont.)

M25SSS9PW1_NI (APX 5500)/ M25SSS9PW1_N (APX 6500)									
Option					Description				
				GA00238AA					INT: REMOVABLE MEMORY BRD APX
				GA00239AA					INT: REM MEM 3 DAY KEY RET BRD APX
				B116BD					ADD:BUZZER 110MA APEX
				W116AQ					ADD: EXTERNAL ALARM RELAY AND CABLE APX
				G235AC					ADD:PTT FOOTSWITCH APEX
				W470AT					ADD: EMERG ID EXT. FOOTSWITCH APEX
				W688AR					ADD: EXT EMERG PUSHBUTTON APEX
					Item No.		Description		
	X	X				0310909A33	SCREW		
	X					MHLN7000_	1G MEMORY EXPANSION BRD		
		X				MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY		
			X			HLN6953_	BUZZER KIT 110 MA		
				X		HKN4258_	CABLE RELAY		
				X		HLN6969_	EXTERNAL ALARM RELAY		
					X	GLN7278_	PTT FOOTSWITCH		
					X	HLN5113_	EMERGENCY FOOTSWITCH		
					X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 2 10–45 W Model Chart (Cont.)

M25SSS9PW1_NI (APX 5500)/ M25SSS9PW1_N (APX 6500)											
Option										Description	
G303AB										ADD: RS232 DATA INTFC CBL DASH APEX	
G304AC										ADD: RS232 DATA INTFC CBL TRK APEX	
G308AD										ADD:USB DATA INTFC CABLE-DASH APEX	
G309AC										ADD:USB DATA INTFC CABLE-TRK APEX	
G582AC										ADD: REMOTE MOUNT CABLE 131 FT APEX	
G879AC										ADD: REMOTE MOUNT CBL 115 FEET APEX	
G607AC										ADD: CBL REMOTE MOUNT 75 FEET APEX	
G609AC										ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC										ADD: REMOTE MOUNT CBL 30 FEET APEX	
G628AC										ADD: REMOTE MOUNT CABLE 17 FT APEX	
G628AD										INT: REMOTE MOUNT CABLE 17 FT APEX	
G618AC										ADD: CBL REMOTE MOUNT 10 FEET APEX	
G927AB										INT: CONNECTOR RM MT APEX	
										Item No.	Description
X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X					HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
							X	X		HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
									X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 2 10–45 W Model Chart (Cont.)**

M25SSS9PW1_NI (APX 5500)/ M25SSS9PW1_N (APX 6500)									
Option					Description				
				G892AB	ENH:HAND MIC,GCAI WTR RESISTANT APX				
				W20CA	ADD: KEYPAD MIC GCAI APEX				
				W22BB	ADD: HAND MIC (MTRCYCLE WP MIC) APX				
				W22BA	ADD: STD PALM MICROPHONE APEX				
				W872AB	ADD:MIC VISOR STD APEX				
				W874AB	ADD:HANDSET/HANGUP MIC ARMOR CBL APX				
				W382AM	ADD:CNTRL STATION PALM MIC GCAI APX				
				GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET				
				GA00304AA	ADD:PUSHBUTTON PTT APX				
					Item No.	Description			
	X				HMN1089_	HAND MIC,GCAI (WATER RESISTANT)			
		X			HMN4079_	KEYPAD MICROPHONE			
			X		HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9			
				X	HMN1090_	STD PALM MICROPHONE (GCAI)			
				X	RMN5054_	VISOR MIC			
				X	HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE			
				X	RMN5070_	DESKTOP MICROPHONE			
				X	HMN4097_	MODEL III GCAI KEYPAD HANDSET			
				X	RLN5926_	PUSH BUTTON PTT			

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 5500/ APX 6500/APX 6500 Li UHF Range 2 10–45 W Model Chart (Cont.)

M25SSS9PW1_NI (APX 5500)/ M25SSS9PW1_N (APX 6500)						
Option					Description	
				G133AJ		INT: SAFETY DATA SHEET APEX
				G146AF		INT: SAFETY LEAFLET EMEA/MCIL APEX
				G146AE		INT: SAFETY LEAFLET WEEE APEX
				G657AD		INT: USER/INSTALL MANUAL CD APEX
				W665BF		ADD: BASE STATION OP W/PS APEX
				G91AE		ADD: CNTRL STATION PWR SUPPLY APEX
				W947AT		ADD: RS232 PACKET DATA INTERFACE APX
					<b>Item No.</b>	<b>Description</b>
X					NNTN7851_	SAFE & EFFICIENT OP OF MOT RDS
	X				6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X			6866537D90	WEEE SAFETY SUPPLEMENT
			X		PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
				X	6880101W87	SPECTRA CTL STA INSTR MANUAL
				X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
				X	HLN6042_	DESK TRAY WITH SPEAKER
				X	HLN7024_	HDW INSTALLATION BASE TRAY
				X	HPN4007_	PS 14V 15A UNI 117/240 VAC
				X	NVN5424_	DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 2 10–45 W Model Chart (Cont.)**

<b>M25SSS9PW1_NI (APX 5500)/ M25SSS9PW1_N (APX 6500)</b>					
<b>Option</b>			<b>Description</b>		
	B18CR			ADD: AUXILIARY SPKR 7.5 WATT APEX	
		G832AD		ADD: SPKR 7.5W WTR RST	
			W432AG	ENH: SPKR INCREASED AUDIO POWER APX	
			G831AD	ADD: SPKR 13W WATER RESISTANT	
			<b>Item No.</b>	<b>Description</b>	
	X		HSN4031_	EXT SPKR 7.5W	
		X	HSN4038_	EXT SPKR 7.5W	
			X	HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li VHF 10–50 W Model Chart

M25KSS9PW1_NI (APX 5500)/ M25KSS9PW1_N (APX 6500)									
Option								Description	
G296AD								ADD: ANT 1/4 WAVE 136-144 MHz	
G297AD								ADD: ANT 1/4 WAVE 144-150.8 MHz	
G299AE								ADD: ANT 1/4 WAVE 150.8-162 MHz	
G300AE								ADD: ANT 1/4 WAVE 162-174 MHz	
W652AN								ADD: ANT 1/4 WV BD-BAND 136-162 MHz	
G629AB								ADD: ANT 1/4WV BD-BAND 146-174 MHz	
G792AB								ADD: ANT VHF WIDEBAND 136-174 MHz	
G301AC								ADD:3BD ANT 136-174MHZ	
GA00226AA								ADD: GPS ANTENNA	
GA00270AA								ADD: GPS ANTENNA GLASS MT	
GA00268AA								ADD: RFID	
								Item No.	Description
X								HAD4006_	ANT 1/4 WAVE 136-144 MHz
	X							HAD4007_	ANT 1/4 WAVE 144-150.8 MHz
		X						HAD4008_	ANT 1/4 WAVE 150.8-162 MHz
			X					HAD4009_	ANT 1/4 WAVE 162-174 MHz
				X				HAD4016_	ANT 1/4 WAVE BD-BAND 136-162 MHz
					X			HAD4017_	ANT 1/4 WAVE BD-BAND 146-174 MHz
						X		HAD4021_	ANT VHF WIDEBAND 136-174 MHz
							X	RAD4010AR_	ANT 3dB TUNABLE 132–174 MHz
							X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
							X	PMAN4001_	GPS ANT GLASS MOUNT
							X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li VHF 10–50 W Model Chart (Cont.)

M25KSS9PW1_NI (APX 5500)/ M25KSS9PW1_N (APX 6500)						
Option					Description	
				G66AL	ADD: DASH MOUNT 03	
				G66AM	ADD: DASH MOUNT 05	
				G67BE	ADD: SCREW, REM MT NO CH MP	
				G67BB	ADD: REMOTE MOUNT 03 MID POWER	
				G67BC	ADD: REMOTE MOUNT 05 MID POWER	
				W81AQ	ADD: KEY LOCK MOUNT APEX	
					Item No.	Description
	X		X	X	PMUN1038_	APX7500 STANDARD TIB MP
	X	X	X	X	HLN7002_	TRUNNION HARDWARE KIT
	X		X	X	HKN6205_	REMOTE FLEX KIT
	X		X	X	HLN6980_	DUST CAPS KIT
	X	X	X	X	0364332H02	SCREW ASSY, SEALING
	X		X	X	3264059H03	SEAL, OVERMOLDED FRAME
	X	X	X	X	HLN6863_	ACCESSORY CONNECTOR XTL5000
	X		X	X	HKN4192_	MOBILE PWR CBL HIPWR 20'
		X			HKN6206_	DASH FLEX KIT
		X			HKN4191_	MOBILE PWR CBL LO/MED PWR
		X			HLN7025_	DUST CAP KIT
				X	PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
					0715044C01	BRKT, MOTORCYCLE MOUNTING (O5/M5)
					3075217A01	CABLE, MOTORCYCLE REMOTE (O5/M5)
				X	HKN6186_	TRUNNION, CH REMOTE MOUNT
				X	HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
			X		PMLN4959_	O3 ACCESSORY CABLE
			X		PMLN4958_	O3 CAN 17' EXTENSION CABLE
			X		HKN6188_	CABLE, CH POWER AND SPEAKER
					PMUN1042	APX7500 HIROSE TIB MP
					PMLN4983	HIROSE TIB DUST COVER KIT
				X	HLN6372_	KEYLOCK MT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li VHF 10–50 W Model Chart (Cont.)

M25KSS9PW1_NI (APX 5500)/ M25KSS9PW1_N (APX 6500)						
Option				Description		
			G442AJ		ADD: APX7500 O5 CONTROL HEAD	
			G72AD		ADD: APX7500 O3 HANDHELD CH	
			GA00092AC		ADD: APX7500 DUAL-CONTROL HARDWARE	
			GA00804		ADD: APX7500 O2 CONTROL HEAD	
			GA00805		ADD: APX7500 O7 CONTROL HEAD	
			MHLN6979AS		ADD: MACK CONTROL BOARD	
				Item No.	Description	
			X	PMHN4193_	O2 FRONT HOUSING ( Grey )	
			X	PMHN4195_	O2 FRONT HOUSING ( Green )	
				X	PMHN4194_	O7 CONTROL HEAD ( English )
				X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )
				X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )
				X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )
				X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )
X		X		PHCN4000_	O5 CONTROL HEAD	
	X			PMUN1034_	O3 CONTROL HEAD	
				X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION
				X	NNTN7919_	ADP/DVP-XL ENCRYPTION
				X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION
				X	NNTN7921_	ADP/AES ENCRYPTION
				X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION
				X	NNTN7923_	ADP ENCRYPTION
		X		HKN6186_	TRUNION, CH REMOTE MOUNT	
		X		HKN6188_	CABLE, CH POWER AND SPEAKER	
		X		HLN6980_	COVER, DUST, KIT	
		X		0364332H02	SCREW, M3X.5	
		X		3364430H03	NEW LABEL FOR MOBILE RADIO	
		X		HKN6191_	FLEX, CNTR HEAD TO CHIB	
		X		PHLN1000_	REMOTE ASSY, CHIB	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li VHF 10–50 W Model Chart (Cont.)

M25KSS9PW1_NI (APX 5500)/ M25KSS9PW1_N (APX 6500)													
Option										Description			
W374AJ										ADD: STATUS/MESSAGE 16 APEX			
W355AS										ADD: STATUS/MESSAGE 8 APEX			
W591AQ										ADD: AUXILIARY SWITCH PANEL APEX			
W599BF										ADD: 8 MODE DIRECT ENTRY APEX			
W614AT										ADD: 16 MODE DIRECT ENTRY APEX			
W615AW										ADD: 24 MODE DIRECT ENTRY APEX			
W269BQ										ADD: SIREN/PUBLIC ADDRESS O3 CH APEX			
W269BP										ADD: SIREN/PUBLIC ADDRESS O5 CH APEX			
W271AS										ADD: SIREN PA/SWITCH BOX O3 APEX			
W589BD										ADD: PUBLIC ADDRESS APEX			
										Item No.		Description	
X	X						X	X		6880103W09	DIRECT ENTRY KEYBOARD INST MAN		
							X	X		6881093C18	SERVICE MANUAL AND USER GUIDE		
							X	X		6881094C81	INSTR MAN FOR HLN1439B SIREN PA		
							X	X	X	HKN4265_	FUSE CABLE		
							X	X		HKN4363_	CBL SPECTRA TO SIREN		
							X			HKN6145_	CABLE O3 SIREN DEK		
								X		HKN6146_	CABLE, O3 SIREN SWITCH BOX		
			X							HLN1196_	WILDCARD		
		X								HLN1228_	DEK STATUS SYS 9000		
X										HLN1229_	DEK STATUS/MESSAGE SYS 9000		
						X				HLN1241_	DEK HSNG ASEM SIREN/PA SYS 9000		
							X			HLN1338_	DEK SIREN PA		
								X		HLN1339_	DEK PA		
			X	X	X					HLN1362_	DEK 8 MODE SYS 9000		
			X	X						HLN1363_	DEK 16 MODE SYS 9000		
				X						HLN1364_	DEK 24 MODE SYS 9000		
					X	X	X	X		HLN1439_	SIREN ASTRO MOBILE		
					X					HLN5157_	DEK MOUNTING HARDWARE		
					X					HLN5331_	DEK SIREN/PA SPARE BUTTON		
								X		HLN6819_	SIREN SWITCH BOX		
X	X		X	X	X	X	X		X	HKN6189_	CABLE, CH DEK		
X	X		X	X	X	X	X		X	HLN6938_	HDWR DEK MOUNTING		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li VHF 10–50 W Model Chart (Cont.)

M25KSS9PW1_NI (APX 5500)/ M25KSS9PW1_N (APX 6500)						
Option						Description
					GA00238AA	INT: REMOVABLE MEMORY BRD APX
					GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX
					B116BD	ADD:BUZZER 110MA APEX
					W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX
					G235AC	ADD:PTT FOOTSWITCH APEX
					W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX
					W688AR	ADD: EXT EMERG PUSHBUTTON APEX
	X	X				0310909A33 SCREW
	X					MHLN7000_ 1G MEMORY EXPANSION BRD
		X				MHLN6999_ 1G MEM EXPANSION BRD W/ 3 DAY KEY
			X			HLN6953_ BUZZER KIT 110 MA
				X		HKN4258_ CABLE RELAY
				X		HLN6969_ EXTERNAL ALARM RELAY
					X	GLN7278_ PTT FOOTSWITCH
					X	HLN5113_ EMERGENCY FOOTSWITCH
					X	HLN5131_ EMERGENCY PUSH BUTTON SWITCH

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li VHF 10–50 W Model Chart (Cont.)

M25KSS9PW1_NI (APX 5500)/ M25KSS9PW1_N (APX 6500)														
Option										Description				
										G303AB	ADD: RS232 DATA INTFC CBL DASH APEX			
										G304AC	ADD: RS232 DATA INTFC CBL TRK APEX			
										G308AD	ADD:USB DATA INTFC CABLE-DASH APEX			
										G309AC	ADD:USB DATA INTFC CABLE-TRK APEX			
										G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX			
										G879AC	ADD: REMOTE MOUNT CBL 115 FEET APEX			
										G607AC	ADD:CBL REMOTE MOUNT 75 FEET APEX			
										G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX			
										G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX			
										G628AC	ADD: REMOTE MOUNT CABLE 17 FT APEX			
										G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX			
										G618AC	ADD:CBL REMOTE MOUNT 10 FEET APEX			
										G927AB	INT:CONNECTOR RM MT APEX			
										Item No.	Description			
	X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA		
		X									HKN6161_	CABLE KIT 20' RS232/J2 DATA		
			X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M		
				X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN		
					X						HKN6164_	CAN CABLE, REMOTE MOUNT, 131 FT		
						X					HKN6165_	CAN CABLE, REMOTE MOUNT, 115 FT		
							X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT		
								X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT		
									X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT		
										X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT		
											X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT	
												X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 5500/APX 6500/APX 6500 Li VHF 10–50 W Model Chart (Cont.)

M25KSS9PW1_NI (APX 5500)/ M25KSS9PW1_N (APX 6500)						
Option					Description	
					G133AJ	INT: SAFETY DATA SHEET APEX
					G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX
					G146AE	INT: SAFETY LEAFLET WEEE APEX
					G657AD	INT:USER/INSTALL MANUAL CD APEX
					G91AE	ADD: CNTRL STATION PWR SUPPLY APEX
					W947AT	ADD:RS232 PACKET DATA INTERFACE APX
					W665BF	ADD: BASE STATION OP W/PS APEX
	X					NNTN7851_
		X				6866537D37
			X			6866537D90
				X		PMLN5336_
					X	HPN4007_
					X	NVN5314_
					X	6880101W87
					X	6880102W93
					X	HLN6042_
					X	HLN7024_

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li VHF 10–50 W Model Chart (Cont.)

M25KSS9PW1_NI (APX 5500)/ M25KSS9PW1_N (APX 6500)									
Option					Description				
G892AB					ENH:HAND MIC,GCAI WTR RESISTANT APX				
W20CA					ADD: KEYPAD MIC GCAI APEX				
W22BA					ADD: STD PALM MICROPHONE APEX				
W872AB					ADD:MIC VISOR STD APEX				
W874AB					ADD:HANDSET/HANGUP MIC ARMR CBL APX				
W382AM					ADD:CNTRL STATION PALM MIC GCAI APX				
GA00221AC					ADD: MODEL III GCAI KEYPAD HANDSET				
GA00304AA					ADD:PUSHBUTTON PTT APX				
					Item No. Description				
X					HMN1089_	HAND MIC,GCAI (WATER RESISTANT)			
	X				HMN4079_	KEYPAD MICROPHONE			
		X			HMN1090_	STD PALM MICROPHONE (GCAI)			
			X		RMN5054_	VISOR MIC			
				X	HKN1018_	HSET/HANGUP NORMAL ARMOURED CABLE			
				X	RMN5070_	DESKTOP MICROPHONE			
				X	HMN4097_	MODEL III GCAI KEYPAD HANDSET			
				X	RLN5926_	PUSH BUTTON PTT			

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li VHF 10–50 W Model Chart (Cont.)

M25KSS9PW1_NI (APX 5500)/ M25KSS9PW1_N (APX 6500)				
Option			Description	
		B18CR		ADD: AUXILIARY SPKR 7.5 W APEX
		G832AD		ADD: SPKR 7.5 W WTR RST
		W432AG		ENH: SPKR INCREASED AUDIO POWER APX
		G831AD		ADD: SPKR 13 W WATER RESISTANT
			Item No.	Description
	X		HSN4031_	EXT SPKR 7.5 W
		X	HSN4038_	EXT SPKR 7.5 W
		X	HSN4032_	EXT SPKR 13 W
		X	HSN4040_	EXT SPKR 13 W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 100W Model Chart

M25QTS9PW1_NI (APX 5500)/ M25QTS9PW1_N (APX 6500)									
Option								Description	
G426AD								ADD: ANT 1/4 WAVE WHIP 450-470 MHZ	
G428AD								ADD: ANT 3.5 dB 450-470 MHZ	
G425AC								ADD: ANT 1/4 WAVE WHIP 380-433 MHZ	
G431AC								ADD: ANT 2 dB WIDEBAND 380-470 MHZ	
GA00505AA								ADD: ANT 2 dB WIDEBAND 380-520 MHZ	
G430AC								ADD: ANT 5.0 dB 445-470 MHZ	
G427AB								ADD: ANT 3.5 dB GAIN 380-433 MHZ	
G429AB								ADD: ANT 5.0 dB GAIN 380-433 MHZ	
GA00226AA								ADD: GPS ANT THROUGH HOLE MOUNT	
GA00270AA								ADD: GPS ANT GLASS MOUNT	
GA00268AA								ADD: RFID	
								Item No.	Description
X								HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ
	X							HAE4011_	ANT 3.5 dB GAIN 450-470 MHz
		X						HAE6012_	ANT 1/4 WAVE WHIP 380-433 MHZ
			X					HAE6013_	ANT WIDEBAND 2.0 dB GAIN 380-470 MHZ
				X				HAE6031_	ANT 2 dB WIDEBAND 380-520 MHZ
					X			RAE4014AR_	ANT 5.0 dB GAIN 445-470MHz
						X		HAE6010_	ANT 3.5 dB GAIN 380-433MHz
							X	HAE6011_	ANT 5.0 dB GAIN 380-433MHz
							X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
							X	PMAN4001_	GPS ANT GLASS MOUNT
							X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 100W Model Chart (Cont.)

M25QTS9PW1_NI (APX 5500)/ M25QTS9PW1_N (APX 6500)				
			Option	Description
			G655AJ	INT: QUICK, HP REMOTE MOUNT O5 CH
			G655AK	INT: QUICK, HP REMOTE MOUNT O3 CH
			G655AM	INT: QUICK, HP REMOTE MOUNT NO CH
			Item No.	Description
X	X	X	0364332H02	SCREW ASSY, SEALING
X	X	X	3264059H03	SEAL, OVERMOLDED FRAME
X	X	X	HKN6110_	CABLE, POWER, 100W
X			HKN6186_	TRUNNION, CH REMOTE MOUNT
X			HKN6188_	CABLE, CH POWER AND SPEAKER
X			HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X	X	X	HKN6205_	REMOTE FLEX KIT
X			PHLN1000_	REMOTE ASSY, CHIB
X	X		HLN6863_	ACCESSORY CONNECTOR XTL5000
X	X	X	HLN6980_	DUST CAPS KIT, CH + TRNS
X	X	X	HLN7003_	INSTALLATION HARDWARE HP KIT
X	X	X	HLN7017_	DC CONNECTOR BRACKET KIT
	X		PMLN4958_	O3 CAN 17' EXTENSION CABLE
	X		PMLN4959_	O3 ACCESSORY CABLE
X	X	X	PMUN1040_	APX 7500 STANDARD TIB HP

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 100W Model Chart (Cont.)

M25QTS9PW1_NI (APX 5500)/ M25QTS9PW1_N (APX 6500)					
Option				Description	
G442AJ				ADD: APX7500 O5 CONTROL HEAD	
G72AD				ADD: APX7500 O3 HANDHELD CH	
GA00092AC				ADD: APX7500 DUAL-CONTROL HARDWARE	
GA00804				ADD: APX7500 O2 CONTROL HEAD	
GA00805				ADD: APX7500 O7 CONTROL HEAD	
MHLN6979AS				ADD: MACK CONTROL BOARD	
				Item No.	Description
			X	PMHN4193_	O2 FRONT HOUSING ( Grey )
			X	PMHN4195_	O2 FRONT HOUSING ( Green )
			X	PMHN4194_	O7 CONTROL HEAD ( English )
			X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )
			X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )
			X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )
			X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )
X	X			PHCN4000_	O5 CONTROL HEAD
	X			PMUN1034_	O3 CONTROL HEAD
			X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION
			X	NNTN7919_	ADP/DVP-XL ENCRYPTION
			X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION
			X	NNTN7921_	ADP/AES ENCRYPTION
			X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION
			X	NNTN7923_	ADP ENCRYPTION
	X			HKN6186_	TRUNION, CH REMOTE MOUNT
	X			HKN6188_	CABLE, CH POWER AND SPEAKER
	X			HLN6980_	COVER, DUST, KIT
	X			0364332H02	SCREW, M3X.5
	X			HKN6191_	FLEX, CNTR HEAD TO CHIB
	X			PHLN1000_	REMOTE ASSY, CHIB

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 100W Model Chart (Cont.)

M25QTS9PW1_NI (APX 5500)/ M25QTS9PW1_N (APX 6500)									
Option								Description	
								W374AJ	ADD: STATUS/MESSAGE 16 APEX
								W355AS	ADD: STATUS/MESSAGE 8 APEX
								W591AQ	ADD: AUXILIARY SWITCH PANEL APEX
								W599BF	ADD: 8 MODE DIRECT ENTRY APEX
								W614AT	ADD: 16 MODE DIRECT ENTRY APEX
								W615AW	ADD: 24 MODE DIRECT ENTRY APEX
								W269BQ	ADD: SIREN/PUBLIC ADDRESS O3 CH APEX
								W269BP	ADD: SIREN/PUBLIC ADDRESS O5 CH APEX
								W271AS	ADD: SIREN PA/SWITCH BOX O3 APEX
								W589BD	ADD: PUBLIC ADDRESS APEX
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUID
						X	X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X	HKN4265_	FUSE CABLE
						X	X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
								HLN1196_	WILDCARD
		X						HLN1228_	DEK STATUS SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA
							X	HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE SYS 9000
			X	X				HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
					X	X	X	HLN1439_	SIREN ASTRO MOBILE
					X			HLN5157_	DEK MOUNTING HARDWARE
					X			HLN5331_	DEK 9000E SIREN/PA SPARE BUT
							X	HLN6819_	SIREN SWITCH BOX
X	X		X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X		X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 100W Model Chart (Cont.)**

M25QTS9PW1_NI (APX 5500)/ M25QTS9PW1_N (APX 6500)					
Option				Description	
			GA00238AA	INT: REMOVABLE MEMORY BRD APX	
			GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX	
			B116BD	ADD:BUZZER 110MA APEX	
			W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX	
			G235AC	ADD:PTT FOOTSWITCH APEX	
			W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
				Item No.	Description
	X	X		0310909A33	SCREW
	X			MHLN7000_	1G MEMORY EXPANSION BRD
		X		MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
			X	HLN6953_	BUZZER KIT 110 MA
			X	HKN4258_	CABLE RELAY
			X	HLN6969_	EXTERNAL ALARM RELAY
			X	GLN7278_	PTT FOOTSWITCH
			X	HLN5113_	EMERGENCY FOOTSWITCH
			X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



# ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 100W Model Chart (Cont.)

M25QTS9PW1_NI (APX 5500)/ M25QTS9PW1_N (APX 6500)									
Option								Description	
G304AC								ADD: RS232 DATA INTFC CBL TRK APEX	
G309AC								ADD:USB DATA INTFC CABLE-TRK APEX	
G582AC								ADD: REMOTE MOUNT CABLE 131 FT APEX	
G607AC								ADD:CBL REMOTE MOUNT 75 FEET APEX	
G609AC								ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC								ADD: REMOTE MOUNT CBL 30 FEET APEX	
G618AC								ADD:CBL REMOTE MOUNT 10 FEET APEX	
G628AC								ADD: REMOTE MOUNT CABLE 17 FT APEX	
G879AC								ADD:REMOTE MOUNT CBL 115 FEET APEX	
G927AB								INT:CONNECTOR RM MT APEX	
								Item No.	Description
X								HKN6161_	CABLE KIT 20' RS232/J2 DATA
	X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
		X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
			X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
				X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
					X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
						X		HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
							X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
							X	HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
							X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 100W Model Chart (Cont.)**

M25QTS9PW1_NI (APX 5500)/ M25QTS9PW1_N (APX 6500)					
Option				Description	
			G133AJ	INT: SAFETY DATA SHEET APEX	
			G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
			G146AE	INT: SAFETY LEAFLET WEEE APEX	
			G657AD	INT: USER/INSTALL MANUAL CD APEX	
			W947AT	ADD: RS232 PACKET DATA INTERFACE APX	
				Item No.	Description
X				6881095C99	CGISS MOB RADIO SAFETY BKLT
	X			6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X		6866537D90	WEEE SAFETY SUPPLEMENT
			X	PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
			X	NVN5424_	SOFTWARE,ASSEMBLY,INF FILE CD

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 100W Model Chart (Cont.)

M25QTS9PW1_NI (APX 5500)/ M25QTS9PW1_N (APX 6500)							
Option					Description		
				G892AB	ENH: HAND MIC,GCAI WTR RESISTANT APX		
				W20CA	ADD: KEYPAD MIC GCAI APEX		
				W22BA	ADD: STD PALM MICROPHONE APEX		
				W872AB	ADD: MIC VISOR STD APEX		
				W874AB	ADD: HANDSET/HANGUP MIC ARMOR CBL APX		
				GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET		
				GA00304AA	ADD: PUSHBUTTON PTT APX		
					Item No.	Description	
	X				HMN1089_	HAND MIC,GCAI (WATER RESISTANT)	
		X			HMN4079_	KEYPAD MICROPHONE	
			X		HMN1090_	STD PALM MICROPHONE (GCAI)	
				X	RMN5054_	VISOR MIC	
					X	HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
					X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
					X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 5500/APX 6500/APX 6500 Li UHF Range 1 100W Model Chart (Cont.)**

<b>M25QTS9PW1_NI (APX 5500)/ M25QTS9PW1_N (APX 6500)</b>					
		<b>Option</b>	<b>Description</b>		
		B18CR	ADD: AUXILIARY SPKR 7.5 WATT APEX		
		G832AD	ADD: SPKR 7.5W WTR RST		
		W432AG	ENH: SPKR INCREASED AUDIO POWER APX		
		G831AD	ADD: SPKR 13W WATER RESISTANT		
			<b>Item No.</b>	<b>Description</b>	
	X		HSN4031_	EXT SPKR 7.5W	
		X	HSN4038_	EXT SPKR 7.5W	
			X	HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

### ASTRO APX 5500/APX 6500/APX 6500 Li VHF 100W Model Chart

M25KTS9PW1_NI (APX 5500)/ M25KTS9PW1_N (APX 6500)									
Option								Description	
G296AD								ADD: ANT 1/4 WAVE 136-144 MHz	
G297AD								ADD: ANT 1/4 WAVE 144-150.8 MHz	
G299AE								ADD: ANT 1/4 WAVE 150.8-162 MHz	
G300AE								ADD: ANT 1/4 WAVE 162-174 MHz	
W652AN								ADD: ANT 1/4 WV BD-BAND 136-162 MHz	
G629AB								ADD: ANT 1/4WV BD-BAND 146-174 MHz	
G792AB								ADD: ANT VHF WIDEBAND 136-174 MHz	
G301AC								ADD:3 dB ANT 136-174MHZ	
GA00226AA								ADD: GPS ANTENNA	
GA00270AA								ADD: GPS ANTENNA GLASS MT	
GA00268AA								ADD: RFID	
								Item No.	Description
X								HAD4006_	ANT 1/4 WAVE 136-144 MHz
	X							HAD4007_	ANT 1/4 WAVE 144-150.8 MHz
		X						HAD4008_	ANT 1/4 WAVE 150.8-162 MHz
			X					HAD4009_	ANT 1/4 WAVE 162-174 MHz
				X				HAD4016_	ANT 1/4 WAVE BD-BAND 136-162 MHz
					X			HAD4017_	ANT 1/4 WAVE BD-BAND 146-174 MHz
						X		HAD4021_	ANT VHF WIDEBAND 136-174 MHz
							X	RAD4010AR_	ANT 3 dB TUNABLE 132-174 MHz
							X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
							X	PMAN4001_	GPS ANT GLASS MOUNT
							X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li VHF 100W Model Chart (Cont.)

<b>M25KTS9PW1_NI (APX 5500)/ M25KTS9PW1_N (APX 6500)</b>				
			<b>Option</b>	<b>Description</b>
			G655AJ	INT: QUICK, HP REMOTE MOUNT O5 CH
			G655AK	INT: QUICK, HP REMOTE MOUNT O3 CH
			G655AM	INT: QUICK, HP REMOTE MOUNT NO CH
			<b>Item No.</b>	<b>Description</b>
X	X	X	0364332H02	SCREW ASSY, SEALING
X	X	X	3271902H01	FRAME SEAL, OVERMOLDED
X	X	X	HKN6110_	CABLE, POWER, 100W
X			HKN6186_	TRUNNION, CH REMOTE MOUNT
X			HKN6188_	CABLE, CH POWER AND SPEAKER
X			HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X	X	X	HKN6205_	REMOTE FLEX KIT
X			PHLN1000_	REMOTE ASSY, CHIB
X	X		HLN6863_	ACCESSORY CONNECTOR XTL5000
X	X	X	HLN6980_	DUST CAPS KIT, CH + TRNS
X	X	X	HLN7003_	INSTALLATION HARDWARE HP KIT
X	X	X	HLN7017_	DC CONNECTOR BRACKET KIT
	X		PMLN4958_	O3 CAN 17' EXTENSION CABLE
	X		PMLN4959_	O3 ACCESSORY CABLE
X	X	X	PMUN1040_	APX 7500 STANDARD TIB HP

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 5500/APX 6500/APX 6500 Li VHF 100W Model Chart (Cont.)

M25KTS9PW1_NI (APX 5500)/ M25KTS9PW1_N (APX 6500)					
Option			Description		
				G442AJ	ADD: APX 7500 O5 CONTROL HEAD
				G72AD	ADD: APX 7500 O3 HANDHELD CH
				GA00092AC	ADD: APX 7500 DUAL-CONTROL HARDWARE
				GA00804	ADD: APX 7500 O2 CONTROL HEAD
				GA00805	ADD: APX 7500 O7 CONTROL HEAD
				MHLN6979AS	ADD: MACK CONTROL BOARD
			Item No.	Description	
		X		PMHN4193_	O2 FRONT HOUSING ( Grey )
		X		PMHN4195_	O2 FRONT HOUSING ( Green )
			X	PMHN4194_	O7 CONTROL HEAD ( English )
			X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )
			X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )
			X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )
			X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )
X		X		PHCN4000_	O5 CONTROL HEAD
	X			PMUN1034_	O3 CONTROL HEAD
			X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION
			X	NNTN7919_	ADP/DVP-XL ENCRYPTION
			X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION
			X	NNTN7921_	ADP/AES ENCRYPTION
			X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION
			X	NNTN7923_	ADP ENCRYPTION
		X		HKN6186_	TRUNION, CH REMOTE MOUNT
		X		HKN6188_	CABLE, CH POWER AND SPEAKER
		X		HLN6980_	COVER, DUST, KIT
		X		0364332H02	SCREW, M3X.5
		X		HKN6191_	FLEX, CNTR HEAD TO CHIB
		X		PHLN1000_	REMOTE ASSY, CHIB

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li VHF 100W Model Chart (Cont.)

M25KTS9PW1_NI (APX 5500)/ M25KTS9PW1_N (APX 6500)										
Option							Description			
W374AJ							ADD: STATUS/MESSAGE 16 APEX			
W355AS							ADD: STATUS/MESSAGE 8 APEX			
W591AQ							ADD: AUXILIARY SWITCH PANEL APEX			
W599BF							ADD: 8 MODE DIRECT ENTRY APEX			
W614AT							ADD: 16 MODE DIRECT ENTRY APEX			
W615AW							ADD: 24 MODE DIRECT ENTRY APEX			
W269BQ							ADD: SIREN/PUBLIC ADDRESS O3 CH APEX			
W269BP							ADD: SIREN/PUBLIC ADDRESS O5 CH APEX			
W271AS							ADD: SIREN PA/SWITCH BOX O3 APEX			
W589BD							ADD: PUBLIC ADDRESS APEX			
							Item No.		Description	
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN	
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUIDE	
						X	X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA	
						X	X	X	HKN4265_	FUSE CABLE
						X	X		HKN4363_	CBL SPECTRA TO SIREN
						X			HKN6145_	CABLE W3 SIREN DEK
							X		HKN6146_	CABLE, W3 SIREN SWITCH BOX
		X							HLN1196_	WILDCARD
	X								HLN1228_	DEK STATUS SYS 9000
X									HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X			HLN1241_	DEK HSNB ASEM SYS9000 SIREN/PA
							X		HLN1338_	DEK SIREN PA
							X		HLN1339_	DEK PA
		X	X	X					HLN1362_	DEK 8 MODE SYS 9000
			X	X					HLN1363_	DEK 16 MODE SYS 9000
				X					HLN1364_	DEK 24 MODE SYS 9000
						X	X	X	HLN1439_	SIREN ASTRO MOBILE
						X			HLN5157_	DEK MOUNTING HARDWARE
						X			HLN5331_	DEK 9000E SIREN/PA SPARE BUT
							X		HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING



### ASTRO APX 5500/APX 6500/APX 6500 Li VHF 100W Model Chart (Cont.)

M25KTS9PW1_NI (APX 5500)/ M25KTS9PW1_N (APX 6500)							
Option					Description		
				GA00238AA	INT: REMOVABLE MEMORY BRD APX		
				GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX		
				B116BD	ADD:BUZZER 110 MA APEX		
				W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX		
				G235AC	ADD:PTT FOOTSWITCH APEX		
				W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX		
				W688AR	ADD: EXT EMERG PUSHBUTTON APEX		
					Item No.	Description	
	X	X			0310909A33	SCREW	
	X				MHLN7000_	1G MEMORY EXPANSION BRD	
		X			MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY	
			X		HLN6953_	BUZZER KIT 110 MA	
				X	HKN4258_	CABLE RELAY	
				X	HLN6969_	EXTERNAL ALARM RELAY	
					GLN7278_	PTT FOOTSWITCH	
					X	HLN5113_	EMERGENCY FOOTSWITCH
					X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 5500/APX 6500/APX 6500 Li VHF 100W Model Chart (Cont.)

M25KTS9PW1_NI (APX 5500)/ M25KTS9PW1_N (APX 6500)									
Option								Description	
G304AC								ADD: RS232 DATA INTFC CBL TRK APEX	
G309AC								ADD: USB DATA INTFC CABLE-TRK APEX	
G582AC								ADD: REMOTE MOUNT CABLE 131 FT APEX	
G607AC								ADD: CBL REMOTE MOUNT 75 FEET APEX	
G609AC								ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC								ADD: REMOTE MOUNT CBL 30 FEET APEX	
G618AC								ADD: CBL REMOTE MOUNT 10 FEET APEX	
G628AC								ADD: REMOTE MOUNT CABLE 17 FT APEX	
G879AC								ADD:REMOTE MOUNT CBL 115 FEET APEX	
G927AB								INT:CONNECTOR RM MT APEX	
								Item No.	Description
X								HKN6161_	CABLE KIT 20' RS232/J2 DATA
	X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
		X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
			X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
				X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
					X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
						X		HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
							X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
							X	HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
							X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 5500/APX 6500/APX 6500 Li VHF 100W Model Chart (Cont.)**

M25KTS9PW1_NI (APX 5500)/ M25KTS9PW1_N (APX 6500)					
Option				Description	
			G133AJ	INT: SAFETY DATA SHEET APEX	
			G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
			G146AE	INT: SAFETY LEAFLET WEEE APEX	
			G657AD	INT: USER/INSTALL MANUAL CD APEX	
			W947AT	ADD: RS232 PACKET DATA INTERFACE APX	
				Item No.	Description
X				6881095C99	CGISS MOB RADIO SAFETY BKLT
	X			6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X		6866537D90	WEEE SAFETY SUPPLEMENT
			X	PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
			X	NVN5424_	SOFTWARE,ASSEMBLY,INF FILE CD

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 5500/APX 6500/APX 6500 Li VHF 100W Model Chart (Cont.)**

M25KTS9PW1_NI (APX 5500)/ M25KTS9PW1_N (APX 6500)							
Option					Description		
				G892AB	ENH:HAND MIC,GCAI WTR RESISTANT APX		
				W20CA	ADD: KEYPAD MIC GCAI APEX		
				W22BA	ADD: STD PALM MICROPHONE APEX		
				W872AB	ADD:MIC VISOR STD APEX		
				W874AB	ADD:HANDSET/HANGUP MIC ARMOR CBL APX		
				GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET		
				GA00304AA	ADD:PUSHBUTTON PTT APX		
					Item No.	Description	
	X				HMN1089_	HAND MIC,GCAI (WATER RESISTANT)	
		X			HMN4079_	KEYPAD MICROPHONE	
			X		HMN1090_	STD PALM MICROPHONE (GCAI)	
				X	RMN5054_	VISOR MIC	
					X	HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
					X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
					X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 5500/APX 6500/APX 6500 Li VHF 100W Model Chart (Cont.)**

<b>M25KTS9PW1_NI (APX 5500)/ M25KTS9PW1_N (APX 6500)</b>					
<b>Option</b>			<b>Description</b>		
		B18CR	ADD: AUXILIARY SPKR 7.5 W APEX		
		G832AD	ADD: SPKR 7.5W WTR RST		
		W432AG	ENH: SPKR INCREASED AUDIO POWER APX		
		G831AD	ADD: SPKR 13W WATER RESISTANT		
			<b>Item No.</b>	<b>Description</b>	
	X		HSN4031_	EXT SPKR 7.5W	
		X	HSN4038_	EXT SPKR 7.5W	
			X	HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

### ASTRO APX 7500 VHF 10–50 W Model Chart

M30KSS9PW1_N																		
Option											Description							
											G296AD	ADD: ANT 1/4 WAVE 136-144 MHz						
											G297AD	ADD: ANT 1/4 WAVE 144-150.8 MHz						
											G299AE	ADD: ANT 1/4 WAVE 150.8-162 MHz						
											G300AE	ADD: ANT 1/4 WAVE 162-174 MHz						
											W652AN	ADD: ANT 1/4 WV BROADBAND 136-162 MHz						
											G629AB	ADD: 1/4 WAVE BROADBAND ANT 146–174 MHz						
											G792AB	ADD: VHF ANT WIDEBAND 136–174 MHz						
											G301AC	ADD:3BD ANT 136-174MHZ						
											GA00510AA	ADD: ANT MTCL 1/4 WAVE WHIP 136-144						
											GA00511AA	ADD: ANT MTCL 1/4 WAVE WHIP 144-150						
											GA00512AA	ADD: ANT MTCL 1/4 WV WHIP 150.8-162						
											GA00513AA	ADD: ANT MTCL 1/4 WV WHIP 162-174						
											GA00226AA	ADD: GPS ANTENNA						
											GA00269AA	ADD: GPS ANT MCYCLE MOUNT						
											GA00270AA	ADD: GPS ANTENNA GLASS MT						
											GA00268AA	ADD: RFID						
												<b>Item No.</b>	<b>Description</b>					
	X											HAD4006_	ANT 1/4 WAVE 136-144 MHz					
		X										HAD4007_	ANT 1/4 WAVE 144-150.8 MHz					
			X									HAD4008_	ANT 1/4 WAVE 150.8-162 MHz					
				X								HAD4009_	ANT 1/4 WAVE 162-174 MHz					
					X							HAD4016_	ANT 1/4 WAVE BD-BAND 136-162 MHz					
						X						HAD4017_	ANT 1/4 WAVE BD-BAND 146-174 MHz					
							X					HAD4021_	ANT VHF WIDEBAND 136-174 MHz					
								X				RAD4010AR_	ANT 3dB TUNABLE 132–174 MHz					
									X			HAD4023_	ANT MTCL 1/4 WAVE WHIP 136-144					
										X		HAD4024_	ANT MTCL 1/4 WAVE WHIP 144-150.8					
											X	HAD4025_	ANT MTCL 1/4 WAVE WHIP 150.8-162					
												X	HAD4026_	ANT MTCL 1/4 WAVE WHIP 162-174				
													X	HAG4000_	GPS ANT THROUGH HOLE MOUNT			
														X	HAG4001_	GPS ANT MCYCLE MOUNT		
															X	PMAN4001_	GPS ANT GLASS MOUNT	
																X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 10–50 W Model Chart (Cont.)

M30KSS9PW1_N										
Option								Description		
G66AL								ADD: DASH MOUNT 03		
G66AM								ADD: DASH MOUNT 05		
G67BE								ADD:SCREW, REMOTE MOUNT NO CH MP		
G67BD								ADD:REMOTE MOUNT NO CH MCYCLE		
G67BA								ADD:REMOTE MOUNT MOTORCYCLE		
G67BB								ADD: REMOTE MOUNT O3 MID POWER		
G67BC								ADD: REMOTE MOUNT O5 MID POWER		
GA00187AB								INT: O5 SHIELD, SUN, MOTORCYCLE		
W81AQ								ADD: KEY LOCK MOUNT APEX		
G67BK								ADD: REMOTE MOUNT O9 MID POWER		
								Item No.	Description	
X	X	X	X	X	X	X	X	X	0364332H02	SCREW ASSY, SEALING
				X					0715044C01	BRKT, MOTORCYCLE MOUNTING (O5/M5)
				X					3075217A01	CABLE, MOTORCYCLE REMOTE (O5/M5)
X		X	X	X	X	X		X	3264059H03	SEAL, OVERMOLDED FRAME
	X								HKN4191_	MOBILE PWR CBL LO/MED PWR
X		X			X	X		X	HKN4192_	MOBILE PWR CBL HIPWR 20'
			X	X					HKN6032_	MCYCLE POWER CABLE
				X	X				HKN6186_	TRUNNION, CH REMOTE MOUNT
					X			X	HKN6188_	CABLE, CH POWER AND SPEAKER
				X	X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X		X	X	X	X	X		X	HKN6205_	REMOTE FLEX KIT
	X								HKN6206_	DASH FLEX KIT
			X	X					PHLN1000_	ASSY,KIT,CONTROL HEAD END REM ASSY APX
							X	X	HLN6372_	KEYLOCK MT
X	X	X			X				HLN6863_	ACCESSORY CONNECTOR XTL5000
X		X	X	X	X	X		X	HLN6980_	DUST CAPS KIT
	X								HLN7025_	DUST CAP KIT
X	X	X	X	X	X	X		X	HLN7002_	TRUNNION HARDWARE KIT
							X		NNTN7279_	SHIELD, SUN, MOTORCYCLE
				X					PMLN4958_	O3 CAN 17' EXTENSION CABLE
				X					PMLN4959_	O3 ACCESSORY CABLE
X		X	X	X	X	X		X	PMUN1038_	APX 7500 STANDARD TIB MP
									PMUN1042_	APX7500 HIROSE TIB MP
									PMLN4983_	HIROSE TIB DUST COVER KIT
							X	X	PMLN5420_	O9, STD TILTING MOUNT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 10–50 W Model Chart (Cont.)

M30KSS9PW1_N									
Option						Description			
G442AJ						ADD: APX 7500 O5 CONTROL HEAD			
G72AD						ADD: APX 7500 O3 HANDHELD CH			
GA00092AC						ADD: APX 7500 DUAL–CONTROL HARDWARE			
GA00093AB						ADD: APX 7500 TRI–CONTROL HARDWARE			
GA00094AB						ADD: APX 7500 QUAD–CONTROL HARDWARE			
GA00245AA						ADD: APX7500 O9 CONTROL HEAD			
GA00804						ADD: APX 7500 O2 CONTROL HEAD			
GA00805						ADD: APX 7500 O7 CONTROL HEAD			
MHLN6979AS						ADD: MACK CONTROL BOARD			
						Item No.		Description	
					X	PMHN4193_	O2 FRONT HOUSING ( Grey )		
					X	PMHN4195_	O2 FRONT HOUSING ( Green )		
					X	PMHN4194_	O7 CONTROL HEAD ( English )		
					X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )		
					X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )		
					X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )		
					X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )		
X	X	X	X			PHCN4000_	O5 CONTROL HEAD		
	X					PMUN1034_	O3 CONTROL HEAD		
					X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION		
					X	NNTN7919_	ADP/DVP-XL ENCRYPTION		
					X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7921_	ADP/AES ENCRYPTION		
					X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7923_	ADP ENCRYPTION		
				X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT		
	X	X	X			HKN6186_	TRUNNION, CH REMOTE MOUNT		
	X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER		
	X	X	X			HLN6980_	COVER, DUST, KIT		
	X	X	X			0364332H02	SCREW, M3X.5		
	X	X	X			3364430H03	NEW LABEL FOR MOBILE RADIO		
	X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB		
	X	X	X			PHLN1000_	REMOTE ASSY, CHIB		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 7500 VHF 10–50 W Model Chart (Cont.)

M30KSS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE O3 SIREN DEK
							X	HKN6146_	CABLE, O3 SIREN SWITCH BOX
		X						HLN1196_	AUX SWITCH PANEL
	X							HLN1228_	DEK STATUS
X								HLN1229_	DEK STATUS/MESSAGE
						X		HLN1241_	DEK HSNB ASEM SIREN/PA
							X	HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE
			X	X				HLN1363_	DEK 16 MODE
				X				HLN1364_	DEK 24 MODE
					X	X	X X X	HLN1439_	SIREN ASTRO MOBILE
						X		HLN5157_	DEK MOUNTING HARDWARE
						X		HLN5331_	DEK SIREN/PA SPARE BUTTON
							X	HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 10-50 W Model Chart (Cont.)

M30KSS9PW1_N											
Option									Description		
									W15AJ	ADD:WETHR PROOF HSNG ENCLD BLK APEX	
									W620AE	ADD:NO MTRCYCLE ENCL NEEDED APEX	
									GA00238AA	INT: REMOVABLE MEMORY BRD APX	
									GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX	
									B116BD	ADD: BUZZER 110MA APEX	
									W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX	
									G235AC	ADD: PTT FOOTSWITCH APEX	
									W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
									W688AR	ADD: EXT EMERG PUSHBUTTON APEX	
									GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER	
									GA00260AA	ADD: CABLE URC TO TRANSCEIVER	
									GA00261AA	ADD:PEDESTAL MOUNT BALL JOINT	
									GA00281AA	ADD: PEDESTAL MOUNT LOW SWIVEL	
										<b>Item No.</b>	<b>Description</b>
X										HLN7022_	Black Motorcycle Enclosure
	X									HLN6179_	MCYCLE ADPTR CTRL HD SPKR
	X									HLN6889_	MOTORCYCLE MOUNTING KIT
		X	X							0310909A33	SCREW
		X								MHLN7000_	1G MEMORY EXPANSION BRD
			X							MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
				X						HLN6953_	BUZZER KIT 110 MA
					X					HKN4258_	CABLE RELAY
					X					HLN6969_	EXTERNAL ALARM RELAY
						X				GLN7278_	PTT FOOTSWITCH
							X			HLN5113_	EMERGENCY FOOTSWITCH
								X		HLN5131_	EMERGENCY PUSH BUTTON SWITCH
									X	3064153H02	ASSEMBLY,CABLE,SHIELDED
									X	40012006001	CIRCUIT BREAKER, 60A
									X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
									X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
								X		PMLN5436_	O9 HUB, STD TILTING MOUNT
								X		PMKN4109_	WIRE, AWG 14
								X		PMUN1046_	O9 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 10–50 W Model Chart (Cont.)

M30KSS9PW1_N											
Option										Description	
G303AB										ADD: RS232 DATA INTFC CBL DASH APEX	
G304AC										ADD: RS232 DATA INTFC CBL TRK APEX	
G308AD										ADD: USB DATA INTFC CABLE–DASH APEX	
G309AC										ADD: USB DATA INTFC CABLE–TRK APEX	
G582AC										ADD: REMOTE MOUNT CABLE 131 FT APEX	
G879AC										ADD: REMOTE MOUNT CBL 115 FEET APEX	
G607AC										ADD: CBL REMOTE MOUNT 75 FEET APEX	
G609AC										ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC										ADD: REMOTE MOUNT CBL 30 FEET APEX	
G628AC										ADD: REMOTE MOUNT CABLE 17 FT APEX	
G628AD										INT: REMOTE MOUNT CABLE 17 FT APEX	
G618AC										ADD: CBL REMOTE MOUNT 10 FEET APEX	
G927AB										INT: CONNECTOR RM MT APEX	
GA00589AA										ADD: GCAI EXTENSION CABLE 2 FT	
										Item No.	Description
X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X					HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
							X	X		HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
									X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
									X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 10–50 W Model Chart (Cont.)

M30KSS9PW1_N						
Option						Description
					G133AJ	INT: SAFETY DATA SHEET APEX
					G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX
					G146AE	INT: SAFETY LEAFLET WEEE APEX
					G657AD	INT: USER/INSTALL MANUAL CD APEX
					G91AE	ADD: CNTRL STATION PWR SUPPLY APEX
					W947AT	ADD: RS232 PACKET DATA INTERFACE APX
					W665BF	ADD: BASE STATION OP W/PS APEX
Item No.						Description
X						NNTN7851_ SAFE & EFFICIENT OP OF MOT RDS
	X					6866537D37 SAFETY INFO MOBILE ANALOG EMEA
		X				6866537D90 WEEE SAFETY SUPPLEMENT
			X			PMLN5336_ APX 7500 CDROM O5 & O3 CH UG'S
				X		HPN4007_ PS 14V 15A UNI 117/240 VAC
					X	NVN5314_ DATA LINK MANAGER APPLICATION
					X	6880101W87 SPECTRA CTL STA INSTR MANUAL
					X	6880102W93 SPECTRA MXTRC CTRL BASE MAN
					X	HLN6042_ DESK TRAY WITH SPEAKER
					X	HLN7024_ HDW INSTALLATION BASE TRAY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 10–50 W Model Chart (Cont.)

M30KSS9PW1_N									
Option								Description	
G892AB								ENH: HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD: MIC VISOR STD APEX	
W874AB								ADD: HANDSET/HANGUP MIC ARMOR CBL APX	
W382AM								ADD: CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD: PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (GCAI)
				X				RMN5054_	VISOR MIC
					X			HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
						X		RMN5070_	DESKTOP MICROPHONE
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 VHF 10–50 W Model Chart (Cont.)

M30KSS9PW1_N					
Option					Description
				B18CR	ADD: AUXILIARY SPKR 7.5 W APEX
			G832AD		ADD: SPKR 7.5W WTR RST
			W432AG		ENH: SPKR INCREASED AUDIO POWER APX
			G831AD		ADD: SPKR 13W WATER RESISTANT
			B18CS		ADD: AUXILIARY SPKR SPEC MCYCL APEX
Item No.					Description
X				HSN4031_	EXT SPKR 7.5W
	X			HSN4038_	EXT SPKR 7.5W
		X		HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W
			X	HSN6003_	13 W SPEAKER (MOTORCYCLE)

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

## ASTRO APX 7500 VHF 100 W Model Chart

M30KTS9PW1_N									
Option								Description	
G296AD								ADD: ANT 1/4 WAVE 136–144 MHz	
G297AD								ADD: ANT 1/4 WAVE 144–150.8 MHz	
G299AE								ADD: ANT 1/4 WAVE 150.8–162 MHz	
G300AE								ADD: ANT 1/4 WAVE 162–174 MHz	
W652AN								ADD: ANT 1/4 WV BD-BAND 136–162 MHz	
G629AB								ADD: ANT 1/4WV BD-BAND 146–174 MHz	
G792AB								ADD: ANT VHF WIDEBAND 136–174 MHz	
G301AC								ADD: ANT 3 dB TUNABLE 132–174 MHz	
GA00226AA								ADD: GPS ANTENNA	
GA00270AA								ADD: GPS ANTENNA GLASS MT	
GA00268AA								ADD: RFID	
								Item No.	Description
X								HAD4006_	ANT 1/4 WAVE 136–144 MHz
	X							HAD4007_	ANT 1/4 WAVE 144–150.8 MHz
		X						HAD4008_	ANT 1/4 WAVE 150.8–162 MHz
			X					HAD4009_	ANT 1/4 WAVE 162–174 MHz
				X				HAD4016_	ANT 1/4 WAVE BD-BAND 136–162 MHz
					X			HAD4017_	ANT 1/4 WAVE BD-BAND 146–174 MHz
						X		HAD4021_	VHF ANT WIDEBAND 136–174 MHz
							X	RAD4010AR_	ANT 3dB TUNABLE 132–174 MHz
							X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
							X	PMAN4001_	GPS ANT GLASS MOUNT
							X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 100 W Model Chart (Cont.)

M30KTS9PW1_N					
				Option	Description
				G655AJ	INT: QUICK, HP REMOTE MOUNT O5 CH
				G655AK	INT: QUICK, HP REMOTE MOUNT O3 CH
				G655AM	INT: QUICK, HP REMOTE MOUNT NO CH
				G655AN	INT: QUICK, HP REM MT 09 CH
				Item No.	Description
X	X	X	X	0364332H02	SCREW ASSY, SEALING
X	X	X	X	3271902H01	FRAME SEAL, OVERMOLDED
X	X	X	X	HKN6110_	CABLE, POWER, 100W
X				HKN6186_	TRUNNION, CH REMOTE MOUNT
X			X	HKN6188_	CABLE, CH POWER AND SPEAKER
X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X	X	X	X	HKN6205_	REMOTE FLEX KIT
X				PHLN1000_	REMOTE ASSY, CHIB
X	X			HLN6863_	ACCESSORY CONNECTOR XTL5000
			X	HLN6961_	ASSEMBLY,ACCESSORY,CONNECTOR (CHIB)
X	X	X	X	HLN6980_	DUST CAPS KIT, CH + TRNS
X	X	X	X	HLN7003_	INSTALLATION HARDWARE HP KIT
X	X	X	X	HLN7017_	DC CONNECTOR BRACKET KIT
		X		PMLN4958_	O3 CAN 17' EXTENSION CABLE
		X		PMLN4959_	O3 ACCESSORY CABLE
			X	PMLN5420_	BRACKET,O9, STD TILTING MOUNT,FINISHED GOOD
X	X	X	X	PMUN1040_	APX 7500 STANDARD TIB HP

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 7500 VHF 100 W Model Chart (Cont.)

M30KTS9PW1_N									
Option						Description			
G442AJ						ADD: APX 7500 O5 CONTROL HEAD			
G72AD						ADD: APX 7500 O3 HANDHELD CH			
GA00092AC						ADD: APX 7500 DUAL-CONTROL HARDWARE			
GA00093AB						ADD: APX 7500 TRI-CONTROL HARDWARE			
GA00094AB						ADD: APX 7500 QUAD-CONTROL HARDWARE			
GA00245AA						ADD: APX7500 O9 CONTROL HEAD			
GA00804						ADD: APX 7500 O2 CONTROL HEAD			
GA00805						ADD: APX 7500 O7 CONTROL HEAD			
MHLN6979AS						ADD: MACK CONTROL BOARD			
						Item No.		Description	
					X	PMHN4193_	O2 FRONT HOUSING ( Grey )		
					X	PMHN4195_	O2 FRONT HOUSING ( Green )		
					X	PMHN4194_	O7 CONTROL HEAD ( English )		
					X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )		
					X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )		
					X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )		
					X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )		
X		X	X	X		PHCN4000_	O5 CONTROL HEAD		
	X					PMUN1034_	O3 CONTROL HEAD		
					X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION		
					X	NNTN7919_	ADP/DVP-XL ENCRYPTION		
					X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7921_	ADP/AES ENCRYPTION		
					X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7923_	ADP ENCRYPTION		
				X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT		
	X	X	X			HKN6186_	TRUNNION, CH REMOTE MOUNT		
	X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER		
	X	X	X			HLN6980_	DUST CAPS KIT, CH + TRNS		
	X	X	X			0364332H02	SCREW, M3X.5		
	X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB		
	X	X	X			PHLN1000_	REMOTE ASSY, CHIB		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 100 W Model Chart (Cont.)

M30KTS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX 03 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE, O3 SIREN DEK
							X	HKN6146_	CABLE, O3 SIREN SWITCH BOX
		X						HLN1196_	AUX SWITCH PANEL
	X							HLN1228_	DEK STATUS
X								HLN1229_	DEK STATUS/MESSAGE
						X		HLN1241_	DEK HSNB ASEM SIREN/PA
							X	HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE
			X	X				HLN1363_	DEK 16 MODE
			X					HLN1364_	DEK 24 MODE
						X	X X X X X	HLN1439_	SIREN ASTRO MOBILE
						X		HLN5157_	DEK MOUNTING HARDWARE
						X		HLN5331_	DEK SIREN/PA SPARE BUTTON
							X	HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 100 W Model Chart (Cont.)

M30KTS9PW1_N										
Option								Description		
								GA00238AA	INT: REMOVABLE MEMORY BRD APX	
								GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX	
								B116BD	ADD: BUZZER 110MA APEX	
								W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX	
								G235AC	ADD: PTT FOOTSWITCH APEX	
								W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
								W688AR	ADD: EXT EMERG PUSHBUTTON APEX	
								GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER	
								GA00260AA	ADD: CABLE URC TO TRANSCEIVER	
								GA00261AA	ADD: PEDESTAL MOUNT BALL JOINT	
								GA00281AA	ADD: PEDESTAL MOUNT LOW SWIVEL	
								Item No.	Description	
	X	X						0310909A33	SCREW	
	X							MHLN7000_	1G MEMORY EXPANSION BRD	
		X						MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY	
			X					HLN6953_	BUZZER KIT 110 MA	
				X				HKN4258_	CABLE RELAY	
					X			HLN6969_	EXTERNAL ALARM RELAY	
						X		GLN7278_	PTT FOOTSWITCH	
							X	HLN5113_	EMERGENCY FOOTSWITCH	
							X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH	
								X	3064153H02	ASSEMBLY,CABLE,SHIELDED
							X	40012006001	CIRCUIT BREAKER, 60A	
								X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
								X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
							X	PMLN5436_	O9 HUB, STD TILTING MOUNT	
							X	PMKN4109_	WIRE, AWG 14	
							X	PMUN1046_	O9 RELAY CONTROL BOX	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 100 W Model Chart (Cont.)

M30KTS9PW1_N										
Option									Description	
G304AC									ADD: RS232 DATA INTFC CBL TRK APEX	
G309AC									ADD: USB DATA INTFC CABLE-TRK APEX	
G582AC									ADD: REMOTE MOUNT CABLE 131 FT APEX	
G607AC									ADD: CBL REMOTE MOUNT 75 FEET APEX	
G609AC									ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC									ADD: REMOTE MOUNT CBL 30 FEET APEX	
G618AC									ADD: CBL REMOTE MOUNT 10 FEET APEX	
G628AC									ADD: REMOTE MOUNT CABLE 17 FT APEX	
G879AC									ADD: REMOTE MOUNT CBL 115 FEET APEX	
G927AB									INT:CONNECTOR RM MT APEX	
GA00589AA									ADD: GCAI EXTENSION CABLE 2 FT	
									Item No.	Description
X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
	X								HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
		X							HKN6164_	CAN CABLE, REMOTE MOUNT, 131 FT
			X						HKN6165_	CAN CABLE, REMOTE MOUNT, 115 FT
				X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
					X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
						X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
							X		HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
								X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
								X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
								X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 100 W Model Chart (Cont.)

M30KTS9PW1_N					
Option				Description	
			G133AJ		INT: SAFETY DATA SHEET APEX
			G146AF		INT: SAFETY LEAFLET EMEA/MCIL APEX
			G146AE		INT: SAFETY LEAFLET WEEE APEX
			G657AD		INT: USER/INSTALL MANUAL CD APEX
			W947AT		ADD: RS232 PACKET DATA INTERFACE APX
				Item No.	Description
	X			6881095C99	CGISS MOB RADIO SAFETY BKLT
		X		6866537D37	SAFETY INFO MOBILE ANALOG EMEA
			X	6866537D90	WEEE SAFETY SUPPLEMENT
			X	PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
			X	NVN5424_	SOFTWARE,ASSEMBLY,INF FILE CD

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 100 W Model Chart (Cont.)

M30KTS9PW1_N									
Option						Description			
G892AB						ENH: HAND MIC,GCAI WTR RESISTANT APX			
W20CA						ADD: KEYPAD MIC GCAI APEX			
W22BB						ADD: HAND MIC (MTRCYCLE WP MIC) APX			
W22BA						ADD: STD PALM MICROPHONE APEX			
W872AB						ADD: MIC VISOR STD APEX			
W874AB						ADD: HANDSET/HANGUP MIC ARMOR CBL APX			
GA00221AC						ADD: MODEL III GCAI KEYPAD HANDSET			
GA00304AA						ADD: PUSHBUTTON PTT APX			
						Item No.		Description	
X						HMN1089_	HAND MIC,GCAI (WATER RESISTANT)		
	X					HMN4079_	KEYPAD MICROPHONE		
		X				HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9		
			X			HMN1090_	STD PALM MICROPHONE (GCAI)		
				X		RMN5054_	VISOR MIC		
					X	HKN1018_	HSET/HANGUP NORMAL ARMOURD CABLE		
					X	HMN4097_	MODEL III GCAI KEYPAD HANDSET		
					X	RLN5926_	PUSH BUTTON PTT		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 VHF 100 W Model Chart (Cont.)

M30KTS9PW1_N					
Option			Description		
		B18CR	ADD: AUXILIARY SPKR 7.5 W APEX		
		G832AD	ADD: SPKR 7.5W WTR RST		
		W432AG	ENH: SPKR INCREASED AUDIO POWER APX		
		G831AD	ADD: SPKR 13W WATER RESISTANT		
			Item No.	Description	
	X		HSN4031_	EXT SPKR 7.5W	
		X	HSN4038_	EXT SPKR 7.5W	
			X	HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 700–800 MHz 10–35 W Model Chart

M30URS9PW1_N									
Option								Description	
G174AD								ADD: ANT 3 dB LOW-PROFILE 762–870	
G174AE								ADD: ANT 3 dB LOWPRO MCYC 762–870	
G175AD								ADD: ANT 3 dB ELEVATED FEED 762–870	
G335AW								ADD: ANT 1/4 WAVE 762–870MHZ	
G335AX								ADD: ANT 3 dB MCYCLE 762–870MHZ	
W484AF								ADD: ANT 3 dB COLLINEAR 762–870 MHz	
GA00226AA								ADD: GPS ANT THROUGH HOLE MOUNT	
GA00269AA								ADD: GPS ANT MCYCLE MOUNT	
GA00270AA								ADD: GPS ANTENNA GLASS MT	
GA00268AA								ADD: RFID	
								Item No.	Description
X								HAF4013_	ANT 3 dB LOW-PROFILE 762–870
	X							HAF4018_	ANT 3 dB LOW PRO MCYC 762–870MH
		X						HAF4014_	ANT 3 dB ELEVATED FEED 762–870
			X					HAF4016_	ANT 1/4 WAVE 762–870MHZ
				X				HAF4015_	ANT 3DB MCYCLE 762–870MHZ
					X			HAF4017_	ANT 3DB COLLINEAR 762–870MHZ
						X		HAG4000_	GPS ANT THROUGH HOLE MOUNT
							X	HAG4001_	GPS ANT MCYCLE MOUNT
							X	PMAN4001_	GPS ANT GLASS MOUNT
							X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 7500 700–800 MHz 10–35 W Model Chart (Cont.)

M30URS9PW1_N												
Option										Description		
G66AL										ADD: DASH MOUNT O3		
G66AM										ADD: DASH MOUNT O5		
G67BE										ADD: SCREW, REM MT NO CH MP		
G67BD										ADD: REM MT NO CH MCYCLE		
G67BA										ADD: REMOTE MOUNT MOTORCYCLE		
G67BB										ADD: REMOTE MOUNT O3 MP		
G67BC										ADD: REMOTE MOUNT O5 MP		
GA00187AB										INT: O5 SHIELD, SUN, MOTORCYCLE		
W81AQ										INT:O5 SHIELD, SUN, MOTORCYCLE		
G67BK										ADD: REMOTE MOUNT O9 MID POWER		
										Item No.		Description
X	X	X	X	X	X	X	X	X	X	X	0364332H02	SCREW ASSY, SEALING
				X							0715044C01	BRKT, MOTORCYCLE MOUNTING (O5)
				X							3075217A01	CABLE, MOTORCYCLE REMOTE (O5)
			X	X							3080010R04	CABLE, ACCESSORY, MOTORCYCLE
X		X	X	X	X	X	X	X	X	X	3264059H03	SEAL, OVERMOLDED FRAME
	X										HKN4191_	MOBILE PWR CBL DASH
X		X			X	X				X	HKN4192_	MOBILE PWR CBL REMOTE 20'
			X	X							HKN6032_	MCYCLE POWER CABLE
				X		X					HKN6186_	TRUNNION, CH REMOTE MOUNT
						X			X	X	HKN6188_	CABLE, CH POWER AND SPEAKER
				X	X						HKN6191_	FLEX, CNTR HEAD TO CHIB
X		X	X	X	X	X	X	X	X	X	HKN6205_	REMOTE FLEX KIT
	X										HKN6206_	DASH FLEX KIT
				X	X						PHLN1000_	REMOTE ASSY, CHIB
									X		HLN6372_	KEYLOCK MT
X	X	X			X						HLN6863_	ACCESSORY CONNECTOR XTL5000
X		X	X	X	X	X	X	X	X	X	HLN6980_	DUST CAPS KIT - REMOTE
	X										HLN7025_	DUST CAPS KIT - DASH
			X	X							HLN7026_	MCYCLE HEADSET CBL & LEAFLET
X	X	X	X	X	X	X	X	X	X	X	HLN7002_	TRUNNION HARDWARE KIT
								X			NNTN7279_	SHIELD, SUN, MOTORCYCLE
					X						PMLN4958_	O3 CAN 17' EXTENSION CABLE
					X						PMLN4959_	ACCESSORY CABLE, J600
X		X	X	X	X	X	X	X	X	X	PMUN1038_	APX7500 STANDARD TIB MP
										X	PMLN5420_	O9, STD TILTING MOUNT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 700–800 MHz 10–35 W Model Chart (Cont.)

M30URS9PW1_N									
Option						Description			
G442AJ						ADD: APX 7500 O5 CONTROL HEAD			
G72AD						ADD: APX 7500 O3 HANDHELD CH			
GA00092AC						ADD: APX 7500 DUAL-CONTROL HARDWARE			
GA00093AB						ADD: APX 7500 TRI-CONTROL HARDWARE			
GA00094AB						ADD: APX 7500 QUAD-CONTROL HARDWARE			
GA00245AA						ADD: APX7500 O9 CONTROL HEAD			
GA00804						ADD: APX 7500 O2 CONTROL HEAD			
GA00805						ADD: APX 7500 O7 CONTROL HEAD			
MHLN6979AS						ADD: MACK CONTROL BOARD			
						Item No.		Description	
					X	PMHN4193_	O2 FRONT HOUSING ( Grey )		
					X	PMHN4195_	O2 FRONT HOUSING ( Green )		
					X	PMHN4194_	O7 CONTROL HEAD ( English )		
					X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )		
					X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )		
					X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )		
					X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )		
X		X	X	X		PHCN4000_	O5 CONTROL HEAD		
	X					PMUN1034_	O3 CONTROL HEAD		
					X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION		
					X	NNTN7919_	ADP/DVP-XL ENCRYPTION		
					X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7921_	ADP/AES ENCRYPTION		
					X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7923_	ADP ENCRYPTION		
				X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT		
		X	X	X		HKN6186_	TRUNNION, CH REMOTE MOUNT		
		X	X	X		HKN6188_	CABLE, CH POWER AND SPEAKER		
		X	X	X		HLN6980_	DUST CAPS KIT, CH + TRNS		
		X	X	X		0364332H02	SCREW, M3X.5		
		X	X	X		HKN6191_	FLEX, CNTR HEAD TO CHIB		
		X	X	X		PHLN1000_	REMOTE ASSY, CHIB		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 700–800 MHz 10–35 W Model Chart (Cont.)

M30URS9PW1_N									
Option								Description	
								W374AJ	ADD: STATUS/MESSAGE 16 APEX
								W355AS	ADD: STATUS/MESSAGE 8 APEX
								W591AQ	ADD: AUXILIARY SWITCH PANEL APEX
								W599BF	ADD: 8 MODE DIRECT ENTRY APEX
								W614AT	ADD: 16 MODE DIRECT ENTRY APEX
								W615AW	ADD: 24 MODE DIRECT ENTRY APEX
								W269BQ	ADD: SIREN/PUBLIC ADDRESS O3 CH APEX
								W269BP	ADD: SIREN/PUBLIC ADDRESS O5 CH APEX
								W271AS	ADD: SIREN PA/SWITCH BOX O3 APEX
								W589BD	ADD: PUBLIC ADDRESS APEX
								W271AR	ADD: SIREN/PUBLIC ADDRESS 09 CH APX
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE, O3 SIREN DEK
							X	HKN6146_	CABLE, O3 SIREN SWITCH BOX
			X					HLN1196_	AUX SWITCH PANEL
		X						HLN1228_	DEK STATUS
X								HLN1229_	DEK STATUS/MESSAGE
						X		HLN1241_	DEK HSNB ASEM SIREN/PA
						X		HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE
			X	X				HLN1363_	DEK 16 MODE
				X				HLN1364_	DEK 24 MODE
					X	X X X X X		HLN1439_	SIREN ASTRO MOBILE
					X			HLN5157_	DEK MOUNTING HARDWARE
					X			HLN5331_	DEK SIREN/PA SPARE BUTTON
						X		HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 700–800 MHz 10–35 W Model Chart (Cont.)

M30URS9PW1_N											
Option									Description		
									W15AJ	ADD: WETHR PROOF HSNG ENCLD BLK APEX	
									W620AE	ADD: NO MTRCYCLE ENCL NEEDED APEX	
									GA00238AA	INT: REMOVABLE MEMORY BRD APX	
									GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX	
									B116BD	ADD: BUZZER 110MA APEX	
									W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX	
									G235AC	ADD: PTT FOOTSWITCH APEX	
									W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
									W688AR	ADD: EXT EMERG PUSHBUTTON APEX	
									GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER	
									GA00260AA	ADD: CABLE URC TO TRANSCEIVER	
									GA00261AA	ADD: PEDESTAL MOUNT BALL JOINT	
									GA00281AA	ADD: PEDESTAL MOUNT LOW SWIVEL	
									Item No.	Description	
X										HLN7022_	BLACK M/C ENCLOSURE & HDW
	X									HLN6179_	M/CYCLE ADPTR CTRL HD SPKR
	X									HLN6889_	MOTORCYCLE MOUNTING KIT
		X	X							0310909A33	SCREW
		X								MHLN7000_	1G MEMORY EXPANSION BRD
			X							MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
				X						HLN6953_	BUZZER KIT 110 MA
				X						HKN4258_	CABLE RELAY
				X						HLN6969_	EXTERNAL ALARM RELAY
					X					GLN7278_	PTT FOOTSWITCH
						X				HLN5113_	EMERGENCY FOOTSWITCH
							X			HLN5131_	EMERGENCY PUSH BUTTON SWITCH
								X		3064153H02	ASSEMBLY,CABLE,SHIELDED
									X	40012006001	CIRCUIT BREAKER, 60A
									X	PMLN5421_	09, LOW SWIVEL MOUNT, G.JOHNSON
									X	PMLN5422_	09, 360 DEG SWIVEL MOUNT, RAM
							X			PMLN5436_	09 HUB, STD TILTING MOUNT
							X			PMKN4109_	WIRE, AWG 14
							X			PMUN1046_	09 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 700–800 MHz 10–35 W Model Chart (Cont.)

M30URS9PW1_N														
Option										Description				
G303AB										ADD: RS232 DATA INTFC CBL DASH APEX				
G304AC										ADD: RS232 DATA INTFC CBL TRK APEX				
G308AD										ADD: USB DATA INTFC CABLE–DASH APEX				
G309AC										ADD: USB DATA INTFC CABLE–TRK APEX				
G582AC										ADD: REMOTE MOUNT CABLE 131 FT APEX				
G879AC										ADD: REMOTE MOUNT CBL 115 FEET APEX				
G607AC										ADD: CBL REMOTE MOUNT 75 FEET APEX				
G609AC										ADD: REMOTE MOUNT CBL 50 FEET APEX				
G610AC										ADD: REMOTE MOUNT CBL 30 FEET APEX				
G628AC										ADD: REMOTE MOUNT CABLE 17 FT APEX				
G618AC										ADD: CBL REMOTE MOUNT 10 FEET APEX				
G927AB										INT: CONNECTOR RM MT APEX				
GA00589AA										ADD: GCAI EXTENSION CABLE 2 FT				
Item No.										Description				
X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA			
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA			
		X								HKN6163_	CABLE, 1.5M USB DATA ACCESS, DASH			
			X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN			
				X						HKN6164_	CAN CABLE, REMOTE MOUNT, 131 FT			
					X					HKN6165_	CAN CABLE, REMOTE MOUNT, 115 FT			
						X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT			
							X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT			
								X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT			
									X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT			
										X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT		
											X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)	
												X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 7500 700–800 MHz 10–35 W Model Chart (Cont.)**

M30URS9PW1_N						
Option					Description	
G133AJ					INT: SAFETY DATA SHEET APEX	
G146AF					INT: SAFETY LEAFLET EMEA/MCIL APEX	
G146AE					INT: SAFETY LEAFLET WEEE APEX	
G657AD					INT: USER/INSTALL MANUAL CD APEX	
W665BF					ADD: BASE STATION OP W/PS APEX	
G91AE					ADD: CNTRL STATION PWR SUPPLY APEX	
W947AT					ADD: RS232 PACKET DATA INTERFACE APX	
					Item No.	Description
X					6881095C99	CGISS MOB RADIO SAFETY BKLT
	X				6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X			6866537D90	WEEE SAFETY SUPPLEMENT
			X		PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
				X	6880101W87	SPECTRA CTL STA INSTR MANUAL
				X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
				X	HLN6042_	TRAY BASE SPECTRA
				X	HLN7024_	HDW INSTALLATION BASE TRAY
				X	HPN4007_	PS 14V 15A UNI 117/240 VAC
				X	NVN5424_	SOFTWARE,ASSEMBLY,INF FILE CD

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 700–800 MHz 10–35 W Model Chart (Cont.)

M30URS9PW1_N									
Option								Description	
G892AB								ENH: HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD: MIC VISOR STD APEX	
W874AB								ADD: HANDSET/HANGUP MIC ARMOR CBL APX	
W382AM								ADD: CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD: PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (MMP)
				X				RMN5054_	VISOR MIC, IMPRESS
					X			HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
						X		RMN5070_	DESKTOP MIC (MMP)
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 7500 700–800 MHz 10–35 W Model Chart (Cont.)**

M30URS9PW1_N					
Option			Description		
	B18CR		ADD: AUXILIARY SPKR 7.5 W APEX		
		G832AD	ADD: SPKR 7.5 W WTR RST		
			W432AG	ENH: SPKR INCREASED AUDIO POWER APX	
				G831AD	ADD: SPKR 13 W WATER RESISTANT
			Item No.	Description	
X			HSN4031_	EXT SPKR 7.5 W	
	X		HSN4038_	EXT SPKR 7.5 W	
		X	HSN4032_	EXT SPKR 13 W	
		X	HSN4040_	EXT SPKR 13 W	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



# ASTRO APX 7500 700–800 MHz 10–35 W & VHF 10–50 W Model Chart

M30TSS9PW1_N											
Option											
Description											
G296AD										ADD: ANT 1/4 WAVE 136-144 MHz	
G297AD										ADD: ANT 1/4 WAVE 144-150.8 MHz	
G299AE										ADD: ANT 1/4 WAVE 150.8-162 MHz	
G300AE										ADD: ANT 1/4 WAVE 162-174 MHz	
W652AN										ADD: ANT 1/4 WV BD-BAND 136-162 MHz	
G629AB										ADD: ANT 1/4WV BD-BAND 146-174 MHz	
G792AB										ADD: ANT VHF WIDEBAND 136-174 MHz	
G301AC										ADD:3BD ANT 136-174MHz	
GA00510AA										ADD: ANT MTCL 1/4 WAVE WHIP 136-144	
GA00511AA										ADD: ANT MTCL 1/4 WAVE WHIP 144-150.8	
GA00512AA										ADD: ANT MTCL 1/4 WV WHIP 150.8-162	
GA00513AA										ADD: ANT MTCL 1/4 WV WHIP 162-174	
G174AD										ADD: ANT 3 DB LOW-PROFILE 762-870	
G174AE										ADD: ANT 3 DB LOWPRO MCYC 762-870	
G175AD										ADD: ANT 3DB ELEVATED FEED 762-870	
G335AW										ADD: ANT 1/4 WAVE 762-870MHZ	
G335AX										ADD: ANT 3DB MCYCLE 762-870MHZ	
W484AF										ADD: ANT 3dB COLLINEAR 762-870 MHz	
GA00226AA										ADD: GPS ANT THROUGH HOLE MOUNT	
GA00269AA										ADD: GPS ANT MCYCLE MOUNT	
GA00270AA										ADD: GPS ANT GLASS MOUNT	
GA00268AA										ADD: RFID	
										Item No.	Description
X										HAD4006_	ANT 1/4 WAVE 136-144 MHz
	X									HAD4007_	ANT 1/4 WAVE 144-150.8 MHz
		X								HAD4008_	ANT 1/4 WAVE 150.8-162 MHz
			X							HAD4009_	ANT 1/4 WAVE 162-174 MHz
				X						HAD4016_	ANT 1/4 WAVE BD-BAND 136-162 MHz
					X					HAD4017_	ANT 1/4 WAVE BD-BAND 146-174 MHz
						X				HAD4021_	ANT VHF WIDEBAND 136-174 MHz
							X			RAD4010AR_	ANT 3dB TUNABLE 132–174 MHz
								X		HAD4023_	ANT MTCL 1/4 WAVE WHIP 136-144 MHz
									X	HAD4024_	ANT MTCL 1/4 WAVE WHIP 144-150.8
										HAD4025_	ANT MTCL 1/4 WAVE WHIP 150.8-162
										HAD4026_	ANT MTCL 1/4 WAVE WHIP 162-174
										HAF4013_	ANT 1/4 WAVE WHIP 450-470 MHz
										HAF4018_	ANT 3 DB LOW-PROFILE 762-870
										HAF4014_	ANT 3 DB LOW PRO MCYC 762-870MH
										HAF4016_	ANT 3 DB ELEVATED FEED 762-870
										HAF4015_	ANT 1/4 WAVE 762-870MHZ
										HAF4017_	ANT 3 dB COLLINEAR 762-870 MHz
										HAG4000_	GPS ANT THROUGH HOLE MOUNT
										HAG4001_	GPS ANT MCYCLE MOUNT
										PMAN4001_	GPS ANT GLASS MOUNT
										X HLN7014_	RFID

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 700–800 MHz 10–35 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N										
Option								Description		
G66AL								ADD: DASH MOUNT 03		
G66AM								ADD: DASH MOUNT 05		
G67BE								ADD:SCREW, REM MT NO CH MP		
G67BD								ADD:REM MT NO CH MCYCLE		
G67BA								ADD:REMOTE MOUNT MOTORCYCLE		
G67BB								ADD: REMOTE MOUNT O3 MID POWER		
G67BC								ADD: REMOTE MOUNT O5 MID POWER		
GA00187AB								INT:O5 SHIELD, SUN, MOTORCYCLE		
W81AQ								ADD: KEY LOCK MOUNT APEX		
G67BK								ADD: REMOTE MOUNT O9 MID POWER		
								Item No.	Description	
X	X	X	X	X	X	X	X	X	0364332H02	SCREW ASSY, SEALING
				X					0715044C01	BRKT, MOTORCYCLE MOUNTING (O5)
				X					3075217A01	CABLE, MOTORCYCLE REMOTE (O5)
X		X	X	X	X	X		X	3264059H03	SEAL, OVERMOLDED FRAME
		X							HKN4191_	MOBILE PWR CBL LO/MED PWR
X		X			X	X		X	HKN4192_	MOBILE PWR CBL HIPWR 20'
			X	X					HKN6032_	MCYCLE POWER CABLE
				X	X				HKN6186_	TRUNNION, CH REMOTE MOUNT
					X		X		HKN6188_	CABLE, CH POWER AND SPEAKER
				X	X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X		X	X	X	X	X		X	HKN6205_	REMOTE FLEX KIT
		X							HKN6206_	DASH FLEX KIT
				X	X				PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
							X		HLN6372_	KEYLOCK MT
X	X	X			X				HLN6863_	ACCESSORY CONNECTOR XTL5000
X		X	X	X	X	X		X	HLN6980_	DUST CAPS KIT
		X							HLN7025_	DUST CAP KIT
X	X	X	X	X	X	X		X	HLN7002_	TRUNNION HARDWARE KIT
							X		NNTN7279_	SHIELD, SUN, MOTORCYCLE
				X					PMLN4958_	O3 CAN 17' EXTENSION CABLE
				X					PMLN4959_	O3 ACCESSORY CABLE
X		X	X	X	X	X		X	PMUN1038_	APX7500 STANDARD TIB MP
									PMUN1042_	APX7500 HIROSE TIB MP
									PMLN4983_	HIROSE TIB DUST COVER KIT
							X		PMLN5420_	O9, STD TILTING MOUNT
		X	X						HLN7026_	MCYCLE HEADSET CBL & LEAFLET

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N										
Option							Description			
						G442AJ	ADD:	APX 7500 O5 CONTROL HEAD		
						G72AD	ADD:	APX 7500 O3 HANDHELD CH		
						GA00092AC	ADD:	APX 7500 DUAL-CONTROL HARDWARE		
						GA00093AB	ADD:	APX 7500 TRI-CONTROL HARDWARE		
						GA00094AB	ADD:	APX 7500 QUAD-CONTROL HARDWARE		
						GA00245AA	ADD:	APX7500 O9 CONTROL HEAD		
						GA00804	ADD:	APX 7500 O2 CONTROL HEAD		
						GA00805	ADD:	APX 7500 O7 CONTROL HEAD		
						MHLN6979AS	ADD:	MACK CONTROL BOARD		
							Item No.	Description		
					X		PMHN4193_	O2 FRONT HOUSING ( Grey )		
					X		PMHN4195_	O2 FRONT HOUSING ( Green )		
						X	PMHN4194_	O7 CONTROL HEAD ( English )		
						X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )		
						X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )		
						X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )		
						X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )		
X		X	X	X			PHCN4000_	O5 CONTROL HEAD		
		X					PMUN1034_	O3 CONTROL HEAD		
						X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION		
						X	NNTN7919_	ADP/DVP-XL ENCRYPTION		
						X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION		
						X	NNTN7921_	ADP/AES ENCRYPTION		
						X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION		
						X	NNTN7923_	ADP ENCRYPTION		
						X	PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT		
		X	X	X			HKN6186_	TRUNNION, CH REMOTE MOUNT		
		X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER		
		X	X	X			HLN6980_	COVER, DUST, KIT		
		X	X	X			0364332H02	SCREW, M3X.5		
		X	X	X			3364430H03	NEW LABEL FOR MOBILE RADIO		
		X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB		
		X	X	X			PHLN1000_	REMOTE ASSY, CHIB		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MANUAL
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
		X						HLN1196_	WILDCARD
	X							HLN1228_	DEK STATUS SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA
						X		HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE SYS 9000
			X	X				HLN1363_	DEK 16 MODE SYS 9000
			X					HLN1364_	DEK 24 MODE SYS 9000
				X	X	X	X X	HLN1439_	SIREN ASTRO MOBILE
				X				HLN5157_	DEK MOUNTING HARDWARE
				X				HLN5331_	DEK 9000E SIREN/PA SPARE BUT
						X		HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N											
Option									Description		
									W15AJ	ADD:WETHR PROOF HSNG ENCLD BLK APEX	
									W620AE	ADD:NO MTRCYCLE ENCL NEEDED APEX	
									GA00238AA	INT: REMOVABLE MEMORY BRD APX	
									GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX	
									B116BD	ADD: BUZZER 110MA APEX	
									W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX	
									G235AC	ADD: PTT FOOTSWITCH APEX	
									W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
									W688AR	ADD: EXT EMERG PUSH BUTTON APEX	
									GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER	
									GA00260AA	ADD: CABLE URC TO TRANSCEIVER	
									GA00261AA	ADD:PEDESTAL MOUNT BALL JOINT	
									GA00281AA	ADD: PEDESTAL MOUNT LOW SWIVEL	
									Item No.	Description	
	X									HLN7022_	Black Motorcycle Enclosure
		X								HLN6179_	MCYCLE ADPTR CTRL HD SPKR
			X							HLN6889_	MOTORCYCLE MOUNTING KIT
			X	X						0310909A33	SCREW
			X							MHLN7000_	1G MEMORY EXPANSION BRD
				X						MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
					X					HLN6953_	BUZZER KIT 110 MA
						X				HKN4258_	CABLE RELAY
							X			HLN6969_	EXTERNAL ALARM RELAY
								X		GLN7278_	PTT FOOTSWITCH
									X	HLN5113_	EMERGENCY FOOTSWITCH
									X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH
									X	3064153H02	ASSEMBLY,CABLE,SHIELDED
									X	40012006001	CIRCUIT BREAKER, 60A
									X	PMLN5421_	09, LOW SWIVEL MOUNT, G.JOHNSON
									X	PMLN5422_	09, 360 DEG SWIVEL MOUNT, RAM
									X	PMLN5436_	09 HUB, STD TILTING MOUNT
									X	PMKN4109_	WIRE, AWG 14
									X	PMUN1046_	09 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N											
Option										Description	
G303AB										ADD: RS232 DATA INTFC CBL DASH APEX	
G304AC										ADD: RS232 DATA INTFC CBL TRK APEX	
G308AD										ADD: USB DATA INTFC CABLE-DASH APEX	
G309AC										ADD: USB DATA INTFC CABLE-TRK APEX	
G582AC										ADD: REMOTE MOUNT CABLE 131 FT APEX	
G879AC										ADD: REMOTE MOUNT CBL 115 FEET APEX	
G607AC										ADD: CBL REMOTE MOUNT 75 FEET APEX	
G609AC										ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC										ADD: REMOTE MOUNT CBL 30 FEET APEX	
G628AC										ADD: REMOTE MOUNT CABLE 17 FT APEX	
G628AD										INT: REMOTE MOUNT CABLE 17 FT APEX	
G618AC										ADD: CBL REMOTE MOUNT 10 FEET APEX	
G927AB										INT: CONNECTOR RM MT APEX	
GA00589AA										ADD: GCAI EXTENSION CABLE 2 FT	
										Item No.	Description
X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X					HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
						X	X			HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
								X		HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
									X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N							
Option						Description	
					G133AJ	INT: SAFETY DATA SHEET APEX	
					G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
					G146AE	INT: SAFETY LEAFLET WEEE APEX	
					G657AD	INT: USER/INSTALL MANUAL CD APEX	
					G91AE	ADD: CNTRL STATION PWR SUPPLY APEX	
					W947AT	ADD: RS232 PACKET DATA INTERFACE APX	
					W665BF	ADD: BASE STATION OP W/PS APEX	
						Item No.	Description
	X					NNTN7851_	SAFE & EFFICIENT OP OF MOT RDS
		X				6866537D37	SAFETY INFO MOBILE ANALOG EMEA
			X			6866537D90	WEEE SAFETY SUPPLEMENT
				X		PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
					X	HPN4007_	PS 14V 15A UNI 117/240 VAC
					X	NVN5424_	DATA LINK MANAGER APPLICATION
					X	6880101W87	SPECTRA CTL STA INSTR MANUAL
					X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
					X	HLN6042_	DESK TRAY WITH SPEAKER
					X	HLN7024_	HDW INSTALLATION BASE TRAY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 700–800 MHz 10–35 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N									
Option								Description	
G892AB								ENH:HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD:MIC VISOR STD APEX	
W874AB								ADD:HANDSET/HANGUP MIC ARMR CBL APX	
W382AM								ADD:CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD:PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (GCAI)
				X				RMN5054_	VISOR MIC
					X			HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
						X		RMN5070_	DESKTOP MICROPHONE
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N					
Option				Description	
	B18CR				ADD: AUXILIARY SPKR 7.5 WATT APEX
		G832AD			ADD: SPKR 7.5W WTR RST
			W432AG		ENH: SPKR INCREASED AUDIO POWER APX
				G831AD	ADD: SPKR 13W WATER RESISTANT
				B18CS	ADD: AUXILIARY SPKR SPEC MCYCL APEX
				Item No.	Description
X				HSN4031_	EXT SPKR 7.5W
	X			HSN4038_	EXT SPKR 7.5W
		X		HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W
			X	HSN6003_	13 Watt Speaker (Motorcycle)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 10–40 W & VHF 10–50 W Model Chart

M30TSS9PW1_N		Option	Description			
		G296AD	ADD: ANT 1/4 WAVE 136-144 MHz			
		G297AD	ADD: ANT 1/4 WAVE 144-150.8 MHz			
		G299AE	ADD: ANT 1/4 WAVE 150.8-162 MHz			
		G300AE	ADD: ANT 1/4 WAVE 162-174 MHz			
		W652AN	ADD: ANT 1/4 WV BD-BAND 136-162 MHz			
		G629AB	ADD: ANT 1/4WV BD-BAND 146-174 MHz			
		G792AB	ADD: ANT VHF WIDEBAND 136-174 MHz			
		G301AC	ADD:3BD ANT 136-174MHz			
		GA00510AA	ADD: ANT MTCL 1/4 WAVE WHIP 136-144			
		GA00511AA	ADD: ANT MTCL 1/4 WAVE WHIP 144-150.8			
		GA00512AA	ADD: ANT MTCL 1/4 WV WHIP 150.8-162			
		GA00513AA	ADD: ANT MTCL 1/4 WV WHIP 162-174			
		G426AD	ADD: ANT 1/4 WAVE WHIP 450-470 MHz			
		G428AD	ADD: ANT 3.5 dB 450-470 MHz			
		G427AB	ADD: ANT 3.5 dB GAIN 380-433 MHz			
		G429AB	ADD: ANT 5.0dB GAIN 380-433 MHz			
		G425AC	ADD: ANT 1/4 WAVE WHIP 380-433 MHz			
		G431AC	ADD: ANT 2 dB WIDEBAND 380-470 MHz			
		GA00505AA	ADD: ANT 2 dB WIDEBAND 380-520 MHz			
		G430AC	ADD: ANT 5.0 dB 445-470 MHz			
		G210AB	ADD: ANT MCYCLE 1/4 WAVE WHIP 380-433			
		GA00506AA	ADD: ANT MCYCLE 1/4 WAVE WHIP 425-470			
		GA00226AA	ADD: GPS ANT THROUGH HOLE MOUNT			
		GA00269AA	ADD: GPS ANT MCYCLE MOUNT			
		GA00270AA	ADD: GPS ANT GLASS MOUNT			
		GA00268AA	ADD: RFID			
		Item No.	Description			
X		HAD4006_	ANT 1/4 WAVE 136-144 MHz			
	X	HAD4007_	ANT 1/4 WAVE 144-150.8 MHz			
		X	HAD4008_	ANT 1/4 WAVE 150.8-162 MHz		
			X	HAD4009_	ANT 1/4 WAVE 162-174 MHz	
				X	HAD4016_	ANT 1/4 WAVE BD-BAND 136-162 MHz
				X	HAD4017_	ANT 1/4 WAVE BD-BAND 146-174 MHz
				X	HAD4021_	ANT VHF WIDEBAND 136-174 MHz
				X	RAD4010AR_	ANT 3dB TUNABLE 132–174 MHz
				X	HAD4023_	ANT MTCL 1/4 WAVE WHIP 136-144 MHz
				X	HAD4024_	ANT MTCL 1/4 WAVE WHIP 144-150.8
				X	HAD4025_	ANT MTCL 1/4 WAVE WHIP 150.8-162
				X	HAD4026_	ANT MTCL 1/4 WAVE WHIP 162-174
				X	HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHz
				X	HAE4011_	ANT 3.5 dB GAIN 450-470 MHz
				X	HAE6010_	ANT 3.5DB GAIN 380-433MHz
				X	HAE6011_	ANT 5.0DB GAIN 380-433MHz
				X	HAE6012_	ANT 1/4 WAVE WHIP 380-433MHz
				X	HAE6013_	ANT 2 dB WIDEBAND 380-470 MHz
				X	HAE6031_	ANT 2DB WIDEBAND 380-520 MHz
				X	RAE4014AR_	ANT 5.0DB GAIN 445-470MHz
				X	HAE6014_	ANT,MCYCLE 1/4 WAVE WHIP 380-433
				X	HAE6032_	ANT,MCYCLE 1/4 WAVE WHIP 425-470
				X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
				X	HAG4001_	GPS ANT MCYCLE MOUNT
				X	PMAN4001_	GPS ANT GLASS MOUNT
				X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 10–40 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N										
Option								Description		
G66AL								ADD: DASH MOUNT 03		
G66AM								ADD: DASH MOUNT 05		
G67BE								ADD:SCREW, REM MT NO CH MP		
G67BD								ADD:REM MT NO CH MCYCLE		
G67BA								ADD:REMOTE MOUNT MOTORCYCLE		
G67BB								ADD: REMOTE MOUNT O3 MID POWER		
G67BC								ADD: REMOTE MOUNT O5 MID POWER		
GA00187AB								INT:O5 SHIELD, SUN, MOTORCYCLE		
W81AQ								ADD: KEY LOCK MOUNT APEX		
G67BK								ADD: REMOTE MOUNT O9 MID POWER		
								Item No.	Description	
X	X	X	X	X	X	X	X	X	0364332H02	SCREW ASSY, SEALING
				X					0715044C01	BRKT, MOTORCYCLE MOUNTING (O5)
				X					3075217A01	CABLE, MOTORCYCLE REMOTE (O5)
X		X	X	X	X	X	X	X	3264059H03	SEAL, OVERMOLDED FRAME
	X								HKN4191_	MOBILE PWR CBL LO/MED PWR
X		X			X	X		X	HKN4192_	MOBILE PWR CBL HIPWR 20'
			X	X					HKN6032_	MCYCLE POWER CABLE
				X	X				HKN6186_	TRUNNION, CH REMOTE MOUNT
					X			X	HKN6188_	CABLE, CH POWER AND SPEAKER
				X	X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X		X	X	X	X	X		X	HKN6205_	REMOTE FLEX KIT
	X								HKN6206_	DASH FLEX KIT
				X	X				PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
							X		HLN6372_	KEYLOCK MT
X	X	X			X				HLN6863_	ACCESSORY CONNECTOR XTL5000
X		X	X	X	X	X		X	HLN6980_	DUST CAPS KIT
	X								HLN7025_	DUST CAP KIT
X	X	X	X	X	X	X		X	HLN7002_	TRUNNION HARDWARE KIT
							X		NNTN7279_	SHIELD, SUN, MOTORCYCLE
				X					PMLN4958_	O3 CAN 17' EXTENSION CABLE
				X					PMLN4959_	O3 ACCESSORY CABLE
X		X	X	X	X	X		X	PMUN1038_	APX7500 STANDARD TIB MP
									PMUN1042_	APX7500 HIROSE TIB MP
									PMLN4983_	HIROSE TIB DUST COVER KIT
							X		PMLN5420_	O9, STD TILTING MOUNT
		X	X						HLN7026_	MCYCLE HEADSET CBL & LEAFLET

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 10–40 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N									
Option							Description		
						G442AJ	ADD: APX 7500 O5 CONTROL HEAD		
						G72AD	ADD: APX 7500 O3 HANDHELD CH		
						GA00092AC	ADD: APX 7500 DUAL-CONTROL HARDWARE		
						GA00093AB	ADD: APX 7500 TRI-CONTROL HARDWARE		
						GA00094AB	ADD: APX 7500 QUAD-CONTROL HARDWARE		
						GA00245AA	ADD: APX7500 O9 CONTROL HEAD		
						GA00804	ADD: APX 7500 O2 CONTROL HEAD		
						GA00805	ADD: APX 7500 O7 CONTROL HEAD		
						MHLN6979AS	ADD: MACK CONTROL BOARD		
							<b>Item No.</b>	<b>Description</b>	
					X		PMHN4193_	O2 FRONT HOUSING ( Grey )	
					X		PMHN4195_	O2 FRONT HOUSING ( Green )	
					X		PMHN4194_	O7 CONTROL HEAD ( English )	
					X		PMHN4192_	O7 CONTROL HEAD ( English_Chinese )	
					X		PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )	
					X		PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )	
					X		PMHN4191_	O7 CONTROL HEAD ( Siren and Light )	
X		X	X	X			PHCN4000_	O5 CONTROL HEAD	
		X					PMUN1034_	O3 CONTROL HEAD	
					X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT	
					X		NNTN7918_	ADP/AES/DVP-XL ENCRYPTION	
					X		NNTN7919_	ADP/DVP-XL ENCRYPTION	
					X		NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION	
					X		NNTN7921_	ADP/AES ENCRYPTION	
					X		NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION	
					X		NNTN7923_	ADP ENCRYPTION	
		X	X	X			HKN6186_	TRUNNION, CH REMOTE MOUNT	
		X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER	
		X	X	X			HLN6980_	COVER, DUST, KIT	
		X	X	X			0364332H02	SCREW, M3X.5	
		X	X	X			3364430H03	NEW LABEL FOR MOBILE RADIO	
		X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB	
		X	X	X			PHCN4000_	APX7500 CONTROL HEAD	
		X	X	X			PHLN1000_	REMOTE ASSY, CHIB	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 10–40 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MANUAL
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
								HLN1196_	WILDCARD
	X							HLN1228_	DEK STATUS SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA
							X	HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE SYS 9000
			X	X				HLN1363_	DEK 16 MODE SYS 9000
			X					HLN1364_	DEK 24 MODE SYS 9000
					X	X X X X X		HLN1439_	SIREN ASTRO MOBILE
					X			HLN5157_	DEK MOUNTING HARDWARE
					X			HLN5331_	DEK 9000E SIREN/PA SPARE BUT
						X		HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 10–40 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N											
Option									Description		
									W15AJ	ADD:WETHR PROOF HSNG ENCLD BLK APEX	
									W620AE	ADD:NO MTRCYCLE ENCL NEEDED APEX	
									GA00238AA	INT: REMOVABLE MEMORY BRD APX	
									GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX	
									B116BD	ADD: BUZZER 110MA APEX	
									W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX	
									G235AC	ADD: PTT FOOTSWITCH APEX	
									W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
									W688AR	ADD: EXT EMERG PUSH BUTTON APEX	
									GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER	
									GA00260AA	ADD: CABLE URC TO TRANSCEIVER	
									GA00261AA	ADD:PEDESTAL MOUNT BALL JOINT	
									GA00281AA	ADD: PEDESTAL MOUNT LOW SWIVEL	
									Item No.	Description	
	X									HLN7022_	Black Motorcycle Enclosure
		X								HLN6179_	MCYCLE ADPTR CTRL HD SPKR
			X							HLN6889_	MOTORCYCLE MOUNTING KIT
				X	X					0310909A33	SCREW
					X					MHLN7000_	1G MEMORY EXPANSION BRD
						X				MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
							X			HLN6953_	BUZZER KIT 110 MA
								X		HKN4258_	CABLE RELAY
									X	HLN6969_	EXTERNAL ALARM RELAY
							X			GLN7278_	PTT FOOTSWITCH
								X		HLN5113_	EMERGENCY FOOTSWITCH
									X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH
									X	3064153H02	ASSEMBLY,CABLE,SHIELDED
									X	40012006001	CIRCUIT BREAKER, 60A
									X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
									X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
									X	PMLN5436_	O9 HUB, STD TILTING MOUNT
									X	PMKN4109_	WIRE, AWG 14
									X	PMUN1046_	O9 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 1 10–40 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N											
Option											
Description											
G303AB											
ADD: RS232 DATA INTFC CBL DASH APEX											
G304AC											
ADD: RS232 DATA INTFC CBL TRK APEX											
G308AD											
ADD: USB DATA INTFC CABLE-DASH APEX											
G309AC											
ADD: USB DATA INTFC CABLE-TRK APEX											
G582AC											
ADD: REMOTE MOUNT CABLE 131 FT APEX											
G879AC											
ADD: REMOTE MOUNT CBL 115 FEET APEX											
G607AC											
ADD: CBL REMOTE MOUNT 75 FEET APEX											
G609AC											
ADD: REMOTE MOUNT CBL 50 FEET APEX											
G610AC											
ADD: REMOTE MOUNT CBL 30 FEET APEX											
G628AC											
ADD: REMOTE MOUNT CABLE 17 FT APEX											
G628AD											
INT: REMOTE MOUNT CABLE 17 FT APEX											
G618AC											
ADD: CBL REMOTE MOUNT 10 FEET APEX											
G927AB											
INT: CONNECTOR RM MT APEX											
GA00589AA											
ADD: GCAI EXTENSION CABLE 2 FT											
Item No.											
Description											
X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X					HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
						X	X			HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
								X		HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
									X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 10–40 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N									
Option								Description	
G892AB								ENH:HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD:MIC VISOR STD APEX	
W874AB								ADD:HANDSET/HANGUP MIC ARMOR CBL APX	
W382AM								ADD:CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD:PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (GCAI)
				X				RMN5054_	VISOR MIC
					X			HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
						X		RMN5070_	DESKTOP MICROPHONE
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 7500 UHF Range 1 10–40 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N						
Option					Description	
				G133AJ		INT: SAFETY DATA SHEET APEX
				G146AF		INT: SAFETY LEAFLET EMEA/MCIL APEX
				G146AE		INT: SAFETY LEAFLET WEEE APEX
				G657AD		INT: USER/INSTALL MANUAL CD APEX
				W665BF		ADD: BASE STATION OP W/PS APEX
				G91AE		ADD: CNTRL STATION PWR SUPPLY APEX
				W947AT		ADD: RS232 PACKET DATA INTERFACE APX
					Item No.	Description
X					NNTN7851_	SAFE & EFFICIENT OP OF MOT RDS
	X				6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X			6866537D90	WEEE SAFETY SUPPLEMENT
			X		PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
				X	6880101W87	SPECTRA CTL STA INSTR MANUAL
				X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
				X	HLN6042_	DESK TRAY WITH SPEAKER
				X	HLN7024_	HDW INSTALLATION BASE TRAY
				X	HPN4007_	PS 14V 15A UNI 117/240 VAC
				X	NVN5424_	DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 1 10–40 W & VHF 10–50 W Model Chart (Cont.)

M30TSS9PW1_N					
Option				Description	
	B18CR				ADD: AUXILIARY SPKR 7.5 WATT APEX
		G832AD			ADD: SPKR 7.5W WTR RST
			W432AG		ENH: SPKR INCREASED AUDIO POWER APX
				G831AD	ADD: SPKR 13W WATER RESISTANT
				B18CS	ADD: AUXILIARY SPKR SPEC MCYCL APEX
				Item No.	Description
X				HSN4031_	EXT SPKR 7.5W
	X			HSN4038_	EXT SPKR 7.5W
		X		HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W
			X	HSN6003_	13 Watt Speaker (Motorcycle)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 1 40 W & 700-800 35 W Model Chart

<b>M30TSS9PW1_N</b>																				
Option												Description								
G426AD												ADD: ANT 1/4 WAVE WHIP 450-470 MHz								
G428AD												ADD: ANT 3.5 dB 450-470 MHz								
G427AB												ADD: ANT 3.5 dB GAIN 380-433 MHz								
G429AB												ADD: ANT 5.0 dB GAIN 380-433 MHz								
G425AC												ADD: ANT 1/4 WAVE WHIP 380-433 MHz								
G431AC												ADD: ANT 2 dB WIDEBAND 380-470 MHz								
GA00505AA												ADD: ANT 2 dB WIDEBAND 380-520 MHz								
G430AC												ADD: ANT 5.0 dB 445-470 MHz								
G210AB												ADD: ANT MCYCLE 1/4 WAVE WHIP 380-433 MHz								
GA00506AA												ADD: ANT MCYCLE 1/4 WAVE WHIP 425-470 MHz								
G174AD												ADD: ANT 3 dB LOW-PROFILE 762-870 MHz								
G174AE												ADD: ANT 3 dB LOWPRO MCYC 762-870 MHz								
G175AD												ADD: ANT 3 dB ELEVATED FEED 762-870 MHz								
G335AW												ADD: ANT 1/4 WAVE 762-870 MHz								
G335AX												ADD: ANT 3 dB MCYCLE 762-870 MHz								
W484AF												ADD: ANT 3 dB COLLINEAR 762-870 MHz								
GA00226AA												ADD: GPS ANT THROUGH HOLE MOUNT								
GA00269AA												ADD: GPS ANT MCYCLE MOUNT								
GA00270AA												ADD: GPS ANT GLASS MOUNT								
GA00268AA												ADD: RFID								
												Item No.		Description						
X														HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHz					
	X													HAE4011_	ANT 3.5 dB GAIN 450-470 MHz					
		X												HAE6010_	ANT 3.5 dB GAIN 380-433 MHz					
			X											HAE6011_	ANT 5.0 dB GAIN 380-433 MHz					
				X										HAE6012_	ANT 1/4 WAVE WHIP 380 433MHz					
					X									HAE6013_	ANT 2 dB WIDEBAND 380-470 MHz					
						X								HAE6031_	ANT 2 dB WIDEBAND 380-520 MHz					
							X							RAE4014AR_	ANT 5.0 dB GAIN 445-470 MHz					
								X						HAE6014_	ANT,MCYCLE 1/4 WAVE WHIP 380-433 MHz					
									X					HAE6032_	ANT,MCYCLE 1/4 WAVE WHIP 425-470 MHz					
										X				HAF4013_	ANT 3 dB LOW-PROFILE 762-870 MHz					
											X			HAF4018_	ANT 3 dB LOW PRO MCYC 762-870 MHz					
												X		HAF4014_	ANT 3 dB ELEVATED FEED 762-870 MHz					
													X	HAF4016_	ANT 1/4 WAVE 762-870 MHz					
														X	HAF4015_	ANT 3 dB MCYCLE 762-870 MHz				
															X	HAF4017_	ANT 3 dB COLLINEAR 762-870 MHz			
																X	HAG4000_	GPS ANT THROUGH HOLE MOUNT		
																	X	HAG4001_	GPS ANT MCYCLE MOUNT	
																		X	PMAN4001_	GPS ANT GLASS MOUNT
																		X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 40 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N										
Option								Description		
G66AL								ADD: DASH MOUNT 03		
G66AM								ADD: DASH MOUNT 05		
G67BE								ADD:SCREW, REM MT NO CH MP		
G67BD								ADD:REM MT NO CH MCYCLE		
G67BA								ADD:REMOTE MOUNT MOTORCYCLE		
G67BB								ADD: REMOTE MOUNT O3 MID POWER		
G67BC								ADD: REMOTE MOUNT O5 MID POWER		
GA00187AB								INT:O5 SHIELD, SUN, MOTORCYCLE		
W81AQ								ADD: KEY LOCK MOUNT APEX		
G67BK								ADD: REMOTE MOUNT O9 MID POWER		
								Item No.	Description	
X	X	X	X	X	X	X	X	X	0364332H02	SCREW ASSY, SEALING
				X					0715044C01	BRKT, MOTORCYCLE MOUNTING (O5)
				X					3075217A01	CABLE, MOTORCYCLE REMOTE (O5)
X		X	X	X	X	X		X	3264059H03	SEAL, OVERMOLDED FRAME
	X								HKN4191_	MOBILE PWR CBL LO/MED PWR
X		X			X	X		X	HKN4192_	MOBILE PWR CBL HIPWR 20'
			X	X					HKN6032_	MCYCLE POWER CABLE
				X		X			HKN6186_	TRUNNION, CH REMOTE MOUNT
						X		X	HKN6188_	CABLE, CH POWER AND SPEAKER
				X	X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X		X	X	X	X	X		X	HKN6205_	REMOTE FLEX KIT
	X								HKN6206_	DASH FLEX KIT
			X	X					PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
							X	X	HLN6372_	KEYLOCK MT
X	X	X			X				HLN6863_	ACCESSORY CONNECTOR XTL5000
X		X	X	X	X	X		X	HLN6980_	DUST CAPS KIT
	X								HLN7025_	DUST CAP KIT
X	X	X	X	X	X	X			XHLN7002_	TRUNNION HARDWARE KIT
							X		NNTN7279_	SHIELD, SUN, MOTORCYCLE
				X					PMLN4958_	O3 CAN 17' EXTENSION CABLE
				X					PMLN4959_	O3 ACCESSORY CABLE
X		X	X	X	X	X		X	PMUN1038_	APX7500 STANDARD TIB MP
									PMUN1042_	APX7500 HIROSE TIB MP
									PMLN4983_	HIROSE TIB DUST COVER KIT
								X	PMLN5420_	O9, STD TILTING MOUNT
		X	X						HLN7026_	MCYCLE HEADSET CBL & LEAFLET

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 1 40 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N									
Option							Description		
						G442AJ			ADD: APX 7500 O5 CONTROL HEAD
						G72AD			ADD: APX 7500 O3 HANDHELD CH
						GA00092AC			ADD: APX 7500 DUAL-CONTROL HARDWARE
						GA00093AB			ADD: APX 7500 TRI-CONTROL HARDWARE
						GA00094AB			ADD: APX 7500 QUAD-CONTROL HARDWARE
						GA00245AA			ADD: APX7500 O9 CONTROL HEAD
						GA00804			ADD: APX 7500 O2 CONTROL HEAD
						GA00805			ADD: APX 7500 O7 CONTROL HEAD
						MHLN6979AS			ADD: MACK CONTROL BOARD
							<b>Item No.</b>		<b>Description</b>
						X	PMHN4193_		O2 FRONT HOUSING ( Grey )
						X	PMHN4195_		O2 FRONT HOUSING ( Green )
						X	PMHN4194_		O7 CONTROL HEAD ( English )
						X	PMHN4192_		O7 CONTROL HEAD ( English_Chinese )
						X	PMHN4197_		O7 CONTROL HEAD ( English_Cyrillic )
						X	PMHN4196_		O7 CONTROL HEAD ( English_Hebrew )
						X	PMHN4191_		O7 CONTROL HEAD ( Siren and Light )
X		X	X	X			PHCN4000_		O5 CONTROL HEAD
	X						PMUN1034_		O3 CONTROL HEAD
						X	NNTN7918_		ADP/AES/DVP-XL ENCRYPTION
						X	NNTN7919_		ADP/DVP-XL ENCRYPTION
						X	NNTN7920_		ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION
						X	NNTN7921_		ADP/AES ENCRYPTION
						X	NNTN7922_		ADP/DES/DES-XL/DES-OFB ENCRYPTION
						X	NNTN7923_		ADP ENCRYPTION
					X		PMUN1045_		ODYSSEY 9 CONTROL HEAD REMOTE MOUNT
		X	X	X			HKN6186_		TRUNNION, CH REMOTE MOUNT
		X	X	X			HKN6188_		CABLE, CH POWER AND SPEAKER
		X	X	X			HLN6980_		COVER, DUST, KIT
		X	X	X			0364332H02		SCREW, M3X.5
		X	X	X			3364430H03		NEW LABEL FOR MOBILE RADIO
		X	X	X			HKN6191_		FLEX, CNTR HEAD TO CHIB
		X	X	X			PHLN1000_		REMOTE ASSY, CHIB

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 40 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MANUAL
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
								HLN1196_	WILDCARD
		X						HLN1228_	DEK STATUS SYS 9000
	X							HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNB ASEM SYS9000 SIREN/PA
							X	HLN1338_	DEK SIREN PA
								HLN1339_	DEK PA
			X	X	X			HLN1362_	DEK 8 MODE SYS 9000
				X	X			HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
					X	X X X X X		HLN1439_	SIREN ASTRO MOBILE
						X		HLN5157_	DEK MOUNTING HARDWARE
						X		HLN5331_	DEK 9000E SIREN/PA SPARE BUT
							X	HLN6819_	SIREN SWITCH BOX
	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 40 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N												
Option												
Description												
W15AJ										ADD:WETHR PROOF HSNQ ENCLD BLK APEX		
W620AE										ADD:NO MTRCYCLE ENCL NEEDED APEX		
GA00238AA										INT: REMOVABLE MEMORY BRD APX		
GA00239AA										INT: REM MEM 3 DAY KEY RET BRD APX		
B116BD										ADD: BUZZER 110MA APEX		
W116AQ										ADD: EXTERNAL ALARM RELAY AND CABLE APX		
G235AC										ADD: PTT FOOTSWITCH APEX		
W470AT										ADD: EMERG ID EXT. FOOTSWITCH APEX		
W688AR										ADD: EXT EMERG PUSH BUTTON APEX		
GA00259AA										ADD: UNIVERSAL RELAY CONTROLLER		
GA00260AA										ADD: CABLE URC TO TRANSCEIVER		
GA00261AA										ADD:PEDESTAL MOUNT BALL JOINT		
GA00281AA										ADD: PEDESTAL MOUNT LOW SWIVEL		
										Item No.		
											Description	
X											HLN7022_	Black Motorcycle Enclosure
	X										HLN6179_	MCYCLE ADPTR CTRL HD SPKR
	X										HLN6889_	MOTORCYCLE MOUNTING KIT
		X	X								0310909A33	SCREW
		X									MHLN7000_	1G MEMORY EXPANSION BRD
			X								MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
				X							HLN6953_	BUZZER KIT 110 MA
					X						HKN4258_	CABLE RELAY
					X						HLN6969_	EXTERNAL ALARM RELAY
						X					GLN7278_	PTT FOOTSWITCH
							X				HLN5113_	EMERGENCY FOOTSWITCH
								X			HLN5131_	EMERGENCY PUSH BUTTON SWITCH
									X		3064153H02	ASSEMBLY,CABLE,SHIELDED
										X	40012006001	CIRCUIT BREAKER, 60A
										X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
										X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
								X			PMLN5436_	O9 HUB, STD TILTING MOUNT
								X			PMKN4109_	WIRE, AWG 14
								X			PMUN1046_	O9 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 40 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N												
Option											Description	
G303AB											ADD: RS232 DATA INTFC CBL DASH APEX	
G304AC											ADD: RS232 DATA INTFC CBL TRK APEX	
G308AD											ADD: USB DATA INTFC CABLE–DASH APEX	
G309AC											ADD: USB DATA INTFC CABLE–TRK APEX	
G582AC											ADD: REMOTE MOUNT CABLE 131 FT APEX	
G879AC											ADD: REMOTE MOUNT CBL 115 FEET APEX	
G607AC											ADD: CBL REMOTE MOUNT 75 FEET APEX	
G609AC											ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC											ADD: REMOTE MOUNT CBL 30 FEET APEX	
G628AC											ADD: REMOTE MOUNT CABLE 17 FT APEX	
G628AD											INT: REMOTE MOUNT CABLE 17 FT APEX	
G618AC											ADD: CBL REMOTE MOUNT 10 FEET APEX	
G927AB											INT: CONNECTOR RM MT APEX	
GA00589AA											ADD: GCAI EXTENSION CABLE 2 FT	
											Item No.	Description
X											HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X										HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X									HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X								HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X							HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X						HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
									X	X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
										X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
										X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
										X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 7500 UHF Range 1 40 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N									
Option								Description	
G892AB								ENH:HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD:MIC VISOR STD APEX	
W874AB								ADD:HANDSET/HANGUP MIC ARMOR CBL APX	
W382AM								ADD:CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD:PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (GCAI)
				X				RMN5054_	VISOR MIC
					X			HKN1018_	HSET/HANGUP NORMAL ARMOURD CABLE
						X		RMN5070_	DESKTOP MICROPHONE
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 7500 UHF Range 1 40 W & 700–800 35 W Model Chart (Cont)**

M30TSS9PW1_N						
Option					Description	
				G133AJ		INT: SAFETY DATA SHEET APEX
				G146AF		INT: SAFETY LEAFLET EMEA/MCIL APEX
				G146AE		INT: SAFETY LEAFLET WEEE APEX
				G657AD		INT: USER/INSTALL MANUAL CD APEX
				W665BF		ADD: BASE STATION OP W/PS APEX
				G91AE		ADD: CNTRL STATION PWR SUPPLY APEX
				W947AT		ADD: RS232 PACKET DATA INTERFACE APX
					Item No.	Description
X					NNTN7851_	SAFE & EFFICIENT OP OF MOT RDS
	X				6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X			6866537D90	WEEE SAFETY SUPPLEMENT
			X		PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
				X	6880101W87	SPECTRA CTL STA INSTR MANUAL
				X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
				X	HLN6042_	DESK TRAY WITH SPEAKER
				X	HLN7024_	HDW INSTALLATION BASE TRAY
				X	HPN4007_	PS 14V 15A UNI 117/240 VAC
				X	NVN5424_	DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 7500 UHF Range 1 40 W & 700–800 35 W Model Chart (Cont)**

M30TSS9PW1_N					
Option				Description	
			B18CR	ADD: AUXILIARY SPKR 7.5 WATT APEX	
			G832AD	ADD: SPKR 7.5W WTR RST	
			W432AG	ENH: SPKR INCREASED AUDIO POWER APX	
			G831AD	ADD: SPKR 13W WATER RESISTANT	
			B18CS	ADD: AUXILIARY SPKR SPEC MCYCL APEX	
				Item No.	Description
X				HSN4031_	EXT SPKR 7.5W
	X			HSN4038_	EXT SPKR 7.5W
		X		HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W
			X	HSN6003_	13 Watt Speaker (Motorcycle)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 40 W & UHF Range 2 45 W Model Chart

M30TSS9PW1_N																								
Option					Description																			
G426AD					ADD: ANT 1/4 WAVE WHIP 450-470 MHZ																			
G428AD					ADD: ANT 3.5 dB 450-470 MHZ																			
G427AB					ADD: ANT 3.5dB GAIN 380-433 MHZ																			
G429AB					ADD: ANT 5.0dB GAIN 380-433 MHZ																			
G425AC					ADD: ANT 1/4 WAVE WHIP 380-433 MHZ																			
G431AC					ADD: ANT 2 dB WIDEBAND 380-520 MHZ																			
GA00505AA					ADD: ANT 2DB WIDEBAND 380-520 MHZ																			
G430AC					ADD: ANT 5.0DB 445-470 MHZ																			
G210AB					ADD: ANT MCYCLE 1/4 WAVE WHIP 380-433																			
GA00506AA					ADD: ANT MCYCLE 1/4 WAVE WHIP 425-470																			
G486AC					ADD: 5 dB GAIN ANT 494-512 MHZ																			
G490AD					ADD: ANT 1/4 WAVE 470-512 MHZ																			
G493AD					ADD: ANT 3 DB ROOF TOP 470-495 MHZ																			
G494AD					ADD: ANT 3 DB ROOF TOP 494-512 MHZ																			
G510AB					ADD:ANT LOW PROFILE 450-512 MHZ																			
G511AB					ADD:2DB ANT WIDEBAND 450-520 MHZ																			
GA00652AA					ADD: ANT ROOF TOP 5 dB 470-494 MHZ																			
GA00507AA					ADD: ANT MTCL 1/4 WAVE WHIP 450-482																			
GA00508AA					ADD: ANT MTCL 1/4 WAVE WHIP 482-512																			
GA00509AA					ADD: ANT MTCL LO PRO UNITY 450-512																			
GA00226AA					ADD: GPS ANT THROUGH HOLE MOUNT																			
GA00269AA					ADD: GPS ANT MCYCLE MOUNT																			
GA00270AA					ADD: GPS ANT GLASS MOUNT																			
GA00268AA					ADD: RFID																			
					Item No. Description																			
X					HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ																		
	X				HAE4011_	ANT 3.5 dB GAIN 450-470 MHZ																		
		X			HAE6010_	ANT 3.5DB GAIN 380-433MHZ																		
			X		HAE6011_	ANT 5.0DB GAIN 380-433MHZ																		
				X	HAE6012_	ANT 1/4 WAVE WHIP 380-433MHZ																		
					X	HAE6013_	ANT 2 dB WIDEBAND 380-470 MHZ																	
						X	HAE6031_	ANT 2DB WIDEBAND 380-520 MHZ																
							X	RAE4014AR_	ANT 5.0DB GAIN 445-470MHZ															
								X	HAE6014_	ANT,MCYCLE 1/4 WAVE WHIP 380-433														
									X	HAE6032_	ANT,MCYCLE 1/4 WAVE WHIP 425-470													
										X	RAE4016AR_	ANT ROOF TOP 5 dB, 494-512 MHZ												
											X	HAE4004_	ANTENNA 1/4 WAVE 470-512 MHZ											
												X	HAE4012_	ANT ROOF TOP 3.5 dB 470-495 MHZ										
													X	HAE4013_	ANT ROOF TOP 3.5 dB 494-512 MHZ									
														X	HAE6016_	ANT LOW PROFILE 450-512 MHZ								
															X	HAE6015_	ANT 2DB WIDEBAND 450-520 MHZ							
																X	RAE4015AR_	ANT ROOF TOP 5 dB 470-494 MHZ						
																	X	HAE6033_	ANT,MCYCLE 1/4 WAVE WHIP 450-482					
																		X	HAE6034_	ANT,MCYCLE 1/4 WAVE WHIP 482-512				
																			X	HAE6035_	ANT,MCYCLE LO PRO UNITY 450-512			
																				X	HAG4000_	GPS ANT THROUGH HOLE MOUNT		
																					X	HAG4001_	GPS ANT MCYCLE MOUNT	
																						X	PMAN4001_	GPS ANT GLASS MOUNT
																						X	HLN7014_	RFID

X = Item Included

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# ASTRO APX 7500 UHF Range 1 40 W & UHF Range 2 45 W Model Chart (Cont.)

M30TSS9PW1_N										
Option								Description		
G66AL								ADD: DASH MOUNT 03		
G66AM								ADD: DASH MOUNT 05		
G67BE								ADD:SCREW, REM MT NO CH MP		
G67BD								ADD:REM MT NO CH MCYCLE		
G67BA								ADD:REMOTE MOUNT MOTORCYCLE		
G67BB								ADD: REMOTE MOUNT O3 MID POWER		
G67BC								ADD: REMOTE MOUNT O5 MID POWER		
GA00187AB								INT:O5 SHIELD, SUN, MOTORCYCLE		
W81AQ								ADD: KEY LOCK MOUNT APEX		
G67BK								ADD: REMOTE MOUNT O9 MID POWER		
								Item No.	Description	
X	X	X	X	X	X	X	X	X	0364332H02	SCREW ASSY, SEALING
				X					0715044C01	BRKT, MOTORCYCLE MOUNTING (O5)
				X					3075217A01	CABLE, MOTORCYCLE REMOTE (O5)
X		X	X	X	X	X	X	X	3264059H03	SEAL, OVERMOLDED FRAME
		X							HKN4191_	MOBILE PWR CBL LO/MED PWR
X		X			X	X		X	HKN4192_	MOBILE PWR CBL HIPWR 20'
			X	X					HKN6032_	MCYCLE POWER CABLE
				X	X				HKN6186_	TRUNNION, CH REMOTE MOUNT
					X			X	HKN6188_	CABLE, CH POWER AND SPEAKER
				X	X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X		X	X	X	X	X		X	HKN6205_	REMOTE FLEX KIT
		X							HKN6206_	DASH FLEX KIT
				X	X				PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
							X		HLN6372_	KEYLOCK MT
X	X	X			X				HLN6863_	ACCESSORY CONNECTOR XTL5000
X		X	X	X	X	X		X	HLN6980_	DUST CAPS KIT
		X							HLN7025_	DUST CAP KIT
X	X	X	X	X	X	X			XHLN7002_	TRUNNION HARDWARE KIT
							X		NNTN7279_	SHIELD, SUN, MOTORCYCLE
				X					PMLN4958_	O3 CAN 17' EXTENSION CABLE
				X					PMLN4959_	O3 ACCESSORY CABLE
X		X	X	X	X	X		X	PMUN1038_	APX7500 STANDARD TIB MP
									PMUN1042_	APX7500 HIROSE TIB MP
									PMLN4983_	HIROSE TIB DUST COVER KIT
							X		PMLN5420_	O9, STD TILTING MOUNT
		X	X						HLN7026_	MCYCLE HEADSET CBL & LEAFLET

X = Item Included

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# ASTRO APX 7500 UHF Range 1 40 W & UHF Range 2 45 W Model Chart (Cont.)

M30TSS9PW1_N																																																																																	
Option							Description																																																																										
G442AJ							ADD: APX 7500 O5 CONTROL HEAD																																																																										
G72AD							ADD: APX 7500 O3 HANDHELD CH																																																																										
GA00092AC							ADD: APX 7500 DUAL-CONTROL HARDWARE																																																																										
GA00093AB							ADD: APX 7500 TRI-CONTROL HARDWARE																																																																										
GA00094AB							ADD: APX 7500 QUAD-CONTROL HARDWARE																																																																										
GA00245AA							ADD: APX7500 O9 CONTROL HEAD																																																																										
GA00804							ADD: APX 7500 O2 CONTROL HEAD																																																																										
GA00805							ADD: APX 7500 O7 CONTROL HEAD																																																																										
MHLN6979AS							ADD: MACK CONTROL BOARD																																																																										
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## ASTRO APX 7500 UHF Range 1 40 W & UHF Range 2 45 W Model Chart (Cont.)

M30TSS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MANUAL
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
		X						HLN1196_	WILDCARD
	X							HLN1228_	DEK STATUS SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNB ASEM SYS9000 SIREN/PA
						X		HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE SYS 9000
			X	X				HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
					X	X	X X X	HLN1439_	SIREN ASTRO MOBILE
					X			HLN5157_	DEK MOUNTING HARDWARE
					X			HLN5331_	DEK 9000E SIREN/PA SPARE BUT
						X		HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

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### ASTRO APX 7500 UHF Range 1 40 W & UHF Range 2 45 W Model Chart (Cont.)

M30TSS9PW1_N										
Option									Description	
W15AJ									ADD:WETHR PROOF HSNG ENCLD BLK APEX	
W620AE									ADD:NO MTRCYCLE ENCL NEEDED APEX	
GA00238AA									INT: REMOVABLE MEMORY BRD APX	
GA00239AA									INT: REM MEM 3 DAY KEY RET BRD APX	
B116BD									ADD: BUZZER 110MA APEX	
W116AQ									ADD: EXTERNAL ALARM RELAY AND CABLE APX	
G235AC									ADD: PTT FOOTSWITCH APEX	
W470AT									ADD: EMERG ID EXT. FOOTSWITCH APEX	
W688AR									ADD: EXT EMERG PUSH BUTTON APEX	
GA00259AA									ADD: UNIVERSAL RELAY CONTROLLER	
GA00260AA									ADD: CABLE URC TO TRANSCEIVER	
GA00261AA									ADD:PEDESTAL MOUNT BALL JOINT	
GA00281AA									ADD: PEDESTAL MOUNT LOW SWIVEL	
									<b>Item No.</b>	
									<b>Description</b>	
X									HLN7022_	Black Motorcycle Enclosure
	X								HLN6179_	MICYCLE ADPTR CTRL HD SPKR
		X							HLN6889_	MOTORCYCLE MOUNTING KIT
			X	X					0310909A33	SCREW
			X						MHLN7000_	1G MEMORY EXPANSION BRD
				X					MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
					X				HLN6953_	BUZZER KIT 110 MA
						X			HKN4258_	CABLE RELAY
							X		HLN6969_	EXTERNAL ALARM RELAY
						X			GLN7278_	PTT FOOTSWITCH
							X		HLN5113_	EMERGENCY FOOTSWITCH
								X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH
								X	3064153H02	ASSEMBLY,CABLE,SHIELDED
								X	40012006001	CIRCUIT BREAKER, 60A
								X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
								X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
								X	PMLN5436_	O9 HUB, STD TILTING MOUNT
								X	PMKN4109_	WIRE, AWG 14
								X	PMUN1046_	O9 RELAY CONTROL BOX

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## ASTRO APX 7500 UHF Range 1 40 W & UHF Range 2 45 W Model Chart (Cont.)

M30TSS9PW1_N											
Option											
Description											
G303AB											
ADD: RS232 DATA INTFC CBL DASH APEX											
G304AC											
ADD: RS232 DATA INTFC CBL TRK APEX											
G308AD											
ADD: USB DATA INTFC CABLE-DASH APEX											
G309AC											
ADD: USB DATA INTFC CABLE-TRK APEX											
G582AC											
ADD: REMOTE MOUNT CABLE 131 FT APEX											
G879AC											
ADD: REMOTE MOUNT CBL 115 FEET APEX											
G607AC											
ADD: CBL REMOTE MOUNT 75 FEET APEX											
G609AC											
ADD: REMOTE MOUNT CBL 50 FEET APEX											
G610AC											
ADD: REMOTE MOUNT CBL 30 FEET APEX											
G628AC											
ADD: REMOTE MOUNT CABLE 17 FT APEX											
G628AD											
INT: REMOTE MOUNT CABLE 17 FT APEX											
G618AC											
ADD: CBL REMOTE MOUNT 10 FEET APEX											
G927AB											
INT: CONNECTOR RM MT APEX											
GA00589AA											
ADD: GCAI EXTENSION CABLE 2 FT											
Item No.											
Description											
X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X					HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
						X	X			HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
								X		HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
									X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

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### ASTRO APX 7500 UHF Range 1 40 W & UHF Range 2 45 W Model Chart (Cont.)

M30TSS9PW1_N									
Option								Description	
G892AB								ENH:HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD:MIC VISOR STD APEX	
W874AB								ADD:HANDSET/HANGUP MIC ARMOR CBL APX	
W382AM								ADD:CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD:PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (GCAI)
				X				RMN5054_	VISOR MIC
					X			HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
						X		RMN5070_	DESKTOP MICROPHONE
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 40 W & UHF Range 2 45 W Model Chart (Cont.)

M30TSS9PW1_N							
Option						Description	
					G133AJ	INT: SAFETY DATA SHEET APEX	
					G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
					G146AE	INT: SAFETY LEAFLET WEEE APEX	
					G657AD	INT: USER/INSTALL MANUAL CD APEX	
					W665BF	ADD: BASE STATION OP W/PS APEX	
					G91AE	ADD: CNTRL STATION PWR SUPPLY APEX	
					W947AT	ADD: RS232 PACKET DATA INTERFACE APX	
						Item No.	Description
	X					NNTN7851_	SAFE & EFFICIENT OP OF MOT RDS
		X				6866537D37	SAFETY INFO MOBILE ANALOG EMEA
			X			6866537D90	WEEE SAFETY SUPPLEMENT
				X		PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
					X	6880101W87	SPECTRA CTL STA INSTR MANUAL
					X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
					X	HLN6042_	DESK TRAY WITH SPEAKER
					X	HLN7024_	HDW INSTALLATION BASE TRAY
					X	HPN4007_	PS 14V 15A UNI 117/240 VAC
					X	NVN5424_	DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 1 40 W & UHF Range 2 45 W Model Chart (Cont.)

M30TSS9PW1_N					
Option				Description	
	B18CR				ADD: AUXILIARY SPKR 7.5 WATT APEX
		G832AD			ADD: SPKR 7.5W WTR RST
			W432AG		ENH: SPKR INCREASED AUDIO POWER APX
				G831AD	ADD: SPKR 13W WATER RESISTANT
				B18CS	ADD: AUXILIARY SPKR SPEC MCYCL APEX
				Item No.	Description
X				HSN4031_	EXT SPKR 7.5W
	X			HSN4038_	EXT SPKR 7.5W
		X		HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W
			X	HSN6003_	13 Watt Speaker (Motorcycle)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W Model Chart

M30SSS9PW1_N											
Option					Description						
G426AD					ADD: ANT 1/4 WAVE WHIP 450-470 MHz						
G428AD					ADD: ANT 3.5 dB 450-470 MHz						
G430AC					ADD: ANT 5.0 dB 445-470 MHz						
G486AC					ADD: 5 dB GAIN ANT 494-512 MHz						
G490AD					ADD: ANT 1/4 WAVE 470-512 MHz						
G493AD					ADD: ANT 3 DB ROOF TOP 470-495 MHz						
G494AD					ADD: ANT 3 DB ROOF TOP 494-512 MHz						
G510AB					ADD:ANT LOW PROFILE 450-512 MHz						
G511AB					ADD:2DB ANT WIDEBAND 450-520 MHz						
GA00505AA					ADD: ANT 2DB WIDEBAND 380-520 MHz						
GA00652AA					ADD: ANT ROOF TOP 5 dB 470-494 MHz						
GA00507AA					ADD: ANT MTCL 1/4 WAVE WHIP 450-482						
GA00508AA					ADD: ANT MTCL 1/4 WAVE WHIP 482-512						
GA00509AA					ADD: ANT MTCL LO PRO UNITY 450-512						
GA00226AA					ADD: GPS ANT THROUGH HOLE MOUNT						
GA00269AA					ADD: GPS ANT MCYCLE MOUNT						
GA00270AA					ADD: GPS ANT GLASS MOUNT						
GA00268AA					ADD: RFID						
					Item No. Description						
X										HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHz
	X									HAE4011_	ANT 3.5 dB GAIN 450-470 MHz
		X								RAE4014AR_	ANT 5.0DB GAIN 445-470MHZ
			X							RAE4016AR_	ANT ROOF TOP 5 dB, 494-512 MHz
				X						HAE4004_	ANTENNA 1/4 WAVE 470-512 MHz
					X					HAE4012_	ANT ROOF TOP 3.5 dB 470-495 MHz
						X				HAE4013_	ANT ROOF TOP 3.5 dB 494-512 MHz
							X			HAE6016_	ANT LOW PROFILE 450-512 MHz
								X		HAE6015_	ANT 2DB WIDEBAND 450-520 MHz
									X	HAE6031_	ANT,2DB WIDEBAND 380-520 MHz
										RAE4015AR_	ANT ROOF TOP 5 dB 470-494 MHz
										HAE6033_	ANT,MCYCLE 1/4 WAVE WHIP 450-482 MHz
										HAE6034_	ANT,MCYCLE 1/4 WAVE WHIP 482-520 MHz
										HAE6035_	ANT,MCYCLE LO PRO UNITY 450-512 MHz
										HAG4000_	GPS ANT THROUGH HOLE MOUNT
										HAG4001_	GPS ANT MCYCLE MOUNT
										PMAN4001_	GPS ANT GLASS MOUNT
										X HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W Model Chart (Cont)

M30SSS9PW1_N										
Option								Description		
G66AL								ADD: DASH MOUNT 03		
G66AM								ADD: DASH MOUNT 05		
G67BE								ADD:SCREW, REM MT NO CH MP		
G67BD								ADD:REM MT NO CH MCYCLE		
G67BA								ADD:REMOTE MOUNT MOTORCYCLE		
G67BB								ADD: REMOTE MOUNT O3 MID POWER		
G67BC								ADD: REMOTE MOUNT O5 MID POWER		
GA00187AB								INT:O5 SHIELD, SUN, MOTORCYCLE		
W81AQ								ADD: KEY LOCK MOUNT APEX		
G67BK								ADD: REMOTE MOUNT O9 MID POWER		
								Item No.	Description	
X	X	X	X	X	X	X	X	X	0364332H02	SCREW ASSY, SEALING
				X					0715044C01	BRKT, MOTORCYCLE MOUNTING (O5)
				X					3075217A01	CABLE, MOTORCYCLE REMOTE (O5)
X		X	X	X	X	X		X	3264059H03	SEAL, OVERMOLDED FRAME
	X								HKN4191_	MOBILE PWR CBL LO/MED PWR
X		X			X	X		X	HKN4192_	MOBILE PWR CBL HIPWR 20'
			X	X					HKN6032_	MCYCLE POWER CABLE
				X		X			HKN6186_	TRUNNION, CH REMOTE MOUNT
						X		X	HKN6188_	CABLE, CH POWER AND SPEAKER
				X	X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X		X	X	X	X	X		X	HKN6205_	REMOTE FLEX KIT
	X								HKN6206_	DASH FLEX KIT
			X	X					PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
							X	X	HLN6372_	KEYLOCK MT
X	X	X			X				HLN6863_	ACCESSORY CONNECTOR XTL5000
X		X	X	X	X	X		X	HLN6980_	DUST CAPS KIT
	X								HLN7025_	DUST CAP KIT
X	X	X	X	X	X	X			XHLN7002_	TRUNNION HARDWARE KIT
							X		NNTN7279_	SHIELD, SUN, MOTORCYCLE
				X					PMLN4958_	O3 CAN 17' EXTENSION CABLE
				X					PMLN4959_	O3 ACCESSORY CABLE
X		X	X	X	X	X		X	PMUN1038_	APX7500 STANDARD TIB MP
									PMUN1042_	APX7500 HIROSE TIB MP
									PMLN4983_	HIROSE TIB DUST COVER KIT
							X	X	PMLN5420_	O9, STD TILTING MOUNT
		X	X						HLN7026_	MCYCLE HEADSET CBL & LEAFLET

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W Model Chart (Cont)

M30SSS9PW1_N									
Option							Description		
						G442AJ			ADD: APX 7500 O5 CONTROL HEAD
						G72AD			ADD: APX 7500 O3 HANDHELD CH
						GA00092AC			ADD: APX 7500 DUAL-CONTROL HARDWARE
						GA00093AB			ADD: APX 7500 TRI-CONTROL HARDWARE
						GA00094AB			ADD: APX 7500 QUAD-CONTROL HARDWARE
						GA00245AA			ADD: APX7500 O9 CONTROL HEAD
						GA00804			ADD: APX 7500 O2 CONTROL HEAD
						GA00805			ADD: APX 7500 O7 CONTROL HEAD
						MHLN6979AS			ADD: MACK CONTROL BOARD
							<b>Item No.</b>		<b>Description</b>
					X		PMHN4193_		O2 FRONT HOUSING ( Grey )
					X		PMHN4195_		O2 FRONT HOUSING ( Green )
						X	PMHN4194_		O7 CONTROL HEAD ( English )
						X	PMHN4192_		O7 CONTROL HEAD ( English_Chinese )
						X	PMHN4197_		O7 CONTROL HEAD ( English_Cyrillic )
						X	PMHN4196_		O7 CONTROL HEAD ( English_Hebrew )
						X	PMHN4191_		O7 CONTROL HEAD ( Siren and Light )
X		X	X	X			PHCN4000_		O5 CONTROL HEAD
	X						PMUN1034_		O3 CONTROL HEAD
						X	NNTN7918_		ADP/AES/DVP-XL ENCRYPTION
						X	NNTN7919_		ADP/DVP-XL ENCRYPTION
						X	NNTN7920_		ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION
						X	NNTN7921_		ADP/AES ENCRYPTION
						X	NNTN7922_		ADP/DES/DES-XL/DES-OFB ENCRYPTION
						X	NNTN7923_		ADP ENCRYPTION
					X		PMUN1045_		ODYSSEY 9 CONTROL HEAD REMOTE MOUNT
		X	X	X			HKN6186_		TRUNNION, CH REMOTE MOUNT
		X	X	X			HKN6188_		CABLE, CH POWER AND SPEAKER
		X	X	X			HLN6980_		DUST CAPS KIT, CH + TRNS
		X	X	X			0364332H02		SCREW, M3X.5
		X	X	X			HKN6191_		FLEX, CNTR HEAD TO CHIB
		X	X	X			PHLN1000_		REMOTE ASSY, CHIB

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W Model Chart (Cont)

M30SSS9PW1AN									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MANUAL
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
								HLN1196_	WILDCARD
		X						HLN1228_	DEK STATUS SYS 9000
	X							HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNB ASEM SYS9000 SIREN/PA
							X	HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
			X	X	X			HLN1362_	DEK 8 MODE SYS 9000
				X	X			HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
					X	X X X X X		HLN1439_	SIREN ASTRO MOBILE
						X		HLN5157_	DEK MOUNTING HARDWARE
						X		HLN5331_	DEK 9000E SIREN/PA SPARE BUT
							X	HLN6819_	SIREN SWITCH BOX
	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 7500 UHF Range 2 45 W Model Chart (Cont)

M30SSS9PW1AN											
Option										Description	
W15AJ										ADD:WETHR PROOF HSNQ ENCLD BLK APEX	
W620AE										ADD:NO MTRCYCLE ENCL NEEDED APEX	
GA00238AA										INT: REMOVABLE MEMORY BRD APX	
GA00239AA										INT: REM MEM 3 DAY KEY RET BRD APX	
B116BD										ADD: BUZZER 110MA APEX	
W116AQ										ADD: EXTERNAL ALARM RELAY AND CABLE APX	
G235AC										ADD: PTT FOOTSWITCH APEX	
W470AT										ADD: EMERG ID EXT. FOOTSWITCH APEX	
W688AR										ADD: EXT EMERG PUSH BUTTON APEX	
GA00259AA										ADD: UNIVERSAL RELAY CONTROLLER	
GA00260AA										ADD: CABLE URC TO TRANSCEIVER	
GA00261AA										ADD:PEDESTAL MOUNT BALL JOINT	
GA00281AA										ADD: PEDESTAL MOUNT LOW SWIVEL	
										Item No.	Description
X										HLN7022_	Black Motorcycle Enclosure
	X									HLN6179_	MCYCLE ADPTR CTRL HD SPKR
	X									HLN6889_	MOTORCYCLE MOUNTING KIT
		X	X							0310909A33	SCREW
		X								MHLN7000_	1G MEMORY EXPANSION BRD
			X							MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
				X						HLN6953_	BUZZER KIT 110 MA
					X					HKN4258_	CABLE RELAY
					X					HLN6969_	EXTERNAL ALARM RELAY
						X				GLN7278_	PTT FOOTSWITCH
							X			HLN5113_	EMERGENCY FOOTSWITCH
								X		HLN5131_	EMERGENCY PUSH BUTTON SWITCH
									X	3064153H02	ASSEMBLY,CABLE,SHIELDED
									X	40012006001	CIRCUIT BREAKER, 60A
									X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
									X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
								X		PMLN5436_	O9 HUB, STD TILTING MOUNT
								X		PMKN4109_	WIRE, AWG 14
								X		PMUN1046_	O9 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W Model Chart (Cont)

M30SSS9PW1AN															
Option													Description		
													G303AB	ADD: RS232 DATA INTFC CBL DASH APEX	
													G304AC	ADD: RS232 DATA INTFC CBL TRK APEX	
													G308AD	ADD: USB DATA INTFC CABLE-DASH APEX	
													G309AC	ADD: USB DATA INTFC CABLE-TRK APEX	
													G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX	
													G879AC	ADD: REMOTE MOUNT CBL 115 FEET APEX	
													G607AC	ADD: CBL REMOTE MOUNT 75 FEET APEX	
													G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX	
													G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX	
													G628AC	ADD: REMOTE MOUNT CABLE 17 FT APEX	
													G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX	
													G618AC	ADD: CBL REMOTE MOUNT 10 FEET APEX	
													G927AB	INT: CONNECTOR RM MT APEX	
													GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT	
														<b>Item No.</b>	<b>Description</b>
	X													HKN6160_	CABLE KIT 6' DASH MOUNT DATA
		X												HKN6161_	CABLE KIT 20' RS232/J2 DATA
			X											HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
				X										HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
					X									HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
						X								HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
							X							HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
								X						HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
									X					HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
										X	X			HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
												X		HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
													X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
													X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W Model Chart (Cont)

M30SSS9PW1AN									
Option								Description	
G892AB								ENH:HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD:MIC VISOR STD APEX	
W874AB								ADD:HANDSET/HANGUP MIC ARMOR CBL APX	
W382AM								ADD:CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD:PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (GCAI)
				X				RMN5054_	VISOR MIC
					X			HKN1018_	HSET/HANGUP NORMAL ARMOURD CABLE
						X		RMN5070_	DESKTOP MICROPHONE
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W Model Chart (Cont)

M30SSS9PW1AN							
Option						Description	
					G133AJ	INT: SAFETY DATA SHEET APEX	
					G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
					G146AE	INT: SAFETY LEAFLET WEEE APEX	
					G657AD	INT: USER/INSTALL MANUAL CD APEX	
					W665BF	ADD: BASE STATION OP W/PS APEX	
					G91AE	ADD: CNTRL STATION PWR SUPPLY APEX	
					W947AT	ADD: RS232 PACKET DATA INTERFACE APX	
						Item No.	Description
X						NNTN7851_	SAFE & EFFICIENT OP OF MOT RDS
	X					6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X				6866537D90	WEEE SAFETY SUPPLEMENT
			X			PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
				X		6880101W87	SPECTRA CTL STA INSTR MANUAL
				X		6880102W93	SPECTRA MXTRC CTRL BASE MAN
				X		HLN6042_	DESK TRAY WITH SPEAKER
				X		HLN7024_	HDW INSTALLATION BASE TRAY
					X	HPN4007_	PS 14V 15A UNI 117/240 VAC
					X	NVN5424_	DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W Model Chart (Cont)

M30SSS9PW1AN					
Option					Description
				B18CR	ADD: AUXILIARY SPKR 7.5 WATT APEX
			G832AD		ADD: SPKR 7.5W WTR RST
			W432AG		ENH: SPKR INCREASED AUDIO POWER APX
			G831AD		ADD: SPKR 13W WATER RESISTANT
			B18CS		ADD: AUXILIARY SPKR SPEC MCYCL APEX
Item No.					Description
X					HSN4031_ EXT SPKR 7.5W
	X				HSN4038_ EXT SPKR 7.5W
		X			HSN4032_ EXT SPKR 13W
			X		HSN4040_ EXT SPKR 13W
				X	HSN6003_ 13 Watt Speaker (Motorcycle)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 2 45 W & 700-800 35 W Model Chart

M30TSS9PW1_N										
Option					Description					
G426AD					ADD: ANT 1/4 WAVE WHIP 450-470 MHZ					
G428AD					ADD: ANT 3.5 dB 450-470 MHZ					
G430AC					ADD: ANT 5.0 dB 445-470 MHZ					
G486AC					ADD: 5DB GAIN ANT 494-512 MHZ					
G490AD					ADD: ANT 1/4 WAVE 470-512 MHZ					
G493AD					ADD: ANT 3 dB ROOF TOP 470-495 MHZ					
G494AD					ADD: ANT 3 dB ROOF TOP 494-512 MHZ					
G510AB					ADD:ANT LOW PROFILE 450-512 MHZ					
G511AB					ADD:2 dB ANT WIDEBAND 450-520 MHZ					
GA00505AA					ADD: ANT 2 dB WIDEBAND 380-520 MHZ					
GA00652AA					ADD: ANT ROOF TOP 5 dB 470-494 MHZ					
GA00507AA					ADD: ANT MTCL 1/4 WAVE WHIP 450-482					
GA00508AA					ADD: ANT MTCL 1/4 WAVE WHIP 482-512					
GA00509AA					ADD: ANT MTCL LO PRO UNITY 450-512					
G174AD					ADD: ANT 3 dB LOW-PROFILE 762-870					
G174AE					ADD: ANT 3 dB LOWPRO MCYC 762-870					
G175AD					ADD: ANT 3 dB ELEVATED FEED 762-870					
G335AW					ADD: ANT 1/4 WAVE 762-870MHZ					
G335AX					ADD: ANT 3 dB MCYCLE 762-870MHZ					
W484AF					ADD: ANT 3 dB COLLINEAR 762-870 MHz					
GA00226AA					ADD: GPS ANT THROUGH HOLE MOUNT					
GA00269AA					ADD: GPS ANT MCYCLE MOUNT					
GA00270AA					ADD: GPS ANT GLASS MOUNT					
GA00268AA					ADD: RFID					
Item No.	Description									
X	HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHz								
X	HAE4011_	ANT 3.5 dB GAIN 450-470 MHz								
X	RAE4014AR_	ANT 5.0DB GAIN 445-470MHZ								
X	RAE4016AR_	ANT ROOF TOP 5 dB, 494-512 MHz								
X	HAE4004_	ANTENNA 1/4 WAVE 470-512 MHZ								
X	HAE4012_	ANT ROOF TOP 3.5 dB 470-495 MHz								
X	HAE4013_	ANT ROOF TOP 3.5 dB 494-512 MHz								
X	HAE6016_	ANT LOW PROFILE 450-512 MHZ								
X	HAE6015_	ANT 2 dB WIDEBAND 450-520 MHZ								
X	HAE6031_	ANT,2 dB WIDEBAND 380-520 MHZ								
X	RAE4015AR_	ANT ROOF TOP 5 dB 470-494 MHz								
X	HAE6033_	ANT,MCYCLE 1/4 WAVE WHIP 450-482 MHz								
X	HAE6034_	ANT,MCYCLE 1/4 WAVE WHIP 482-520 MHz								
X	HAE6035_	ANT,MCYCLE LO PRO UNITY 450-512 MHz								
X	HAF4013_	ANT 3 dB LOW-PROFILE 762-870 MHz								
X	HAF4018_	ANT 3 dB LOW PRO MCYC 762-870 MHz								
X	HAF4014_	ANT 3 dB ELEVATED FEED 762-870 MHz								
X	HAF4016_	ANT 1/4 WAVE 762-870 MHZ								
X	HAF4015_	ANT 3 dB MCYCLE 762-870 MHZ								
X	HAF4017_	ANT 3 dB COLLINEAR 762-870 MHz								
X	HAG4000_	GPS ANT THROUGH HOLE MOUNT								
X	HAG4001_	GPS ANT MCYCLE MOUNT								
X	PMAN4001_	GPS ANT GLASS MOUNT								
X	HLN7014_	RFID								

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N										
Option								Description		
G66AL								ADD: DASH MOUNT 03		
G66AM								ADD: DASH MOUNT 05		
G67BE								ADD:SCREW, REM MT NO CH MP		
G67BD								ADD:REM MT NO CH MCYCLE		
G67BA								ADD:REMOTE MOUNT MOTORCYCLE		
G67BB								ADD: REMOTE MOUNT 03 MID POWER		
G67BC								ADD: REMOTE MOUNT 05 MID POWER		
GA00187AB								INT:05 SHIELD, SUN, MOTORCYCLE		
W81AQ								ADD: KEY LOCK MOUNT APEX		
G67BK								ADD: REMOTE MOUNT 09 MID POWER		
								Item No.	Description	
X	X	X	X	X	X	X	X	X	0364332H02	SCREW ASSY, SEALING
				X					0715044C01	BRKT, MOTORCYCLE MOUNTING (05)
				X					3075217A01	CABLE, MOTORCYCLE REMOTE (05)
X		X	X	X	X	X	X	X	3264059H03	SEAL, OVERMOLDED FRAME
	X								HKN4191_	MOBILE PWR CBL LO/MED PWR
X		X			X	X		X	HKN4192_	MOBILE PWR CBL HIPWR 20'
			X	X					HKN6032_	MCYCLE POWER CABLE
				X		X			HKN6186_	TRUNNION, CH REMOTE MOUNT
						X		X	HKN6188_	CABLE, CH POWER AND SPEAKER
				X		X			HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X		X	X	X	X	X	X	X	HKN6205_	REMOTE FLEX KIT
	X								HKN6206_	DASH FLEX KIT
			X		X				PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
								X	HLN6372_	KEYLOCK MT
X	X	X			X				HLN6863_	ACCESSORY CONNECTOR XTL5000
X		X	X	X	X	X		X	HLN6980_	DUST CAPS KIT
	X								HLN7025_	DUST CAP KIT
X	X	X	X	X	X	X			XHLN7002_	TRUNNION HARDWARE KIT
								X	NNTN7279_	SHIELD, SUN, MOTORCYCLE
					X				PMLN4958_	03 CAN 17' EXTENSION CABLE
					X				PMLN4959_	03 ACCESSORY CABLE
X		X	X	X	X	X		X	PMUN1038_	APX7500 STANDARD TIB MP
									PMUN1042_	APX7500 HIROSE TIB MP
									PMLN4983_	HIROSE TIB DUST COVER KIT
								X	PMLN5420_	09, STD TILTING MOUNT
		X	X						HLN7026_	MCYCLE HEADSET CBL & LEAFLET

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N									
Option							Description		
G442AJ							ADD: APX 7500 O5 CONTROL HEAD		
G72AD							ADD: APX 7500 O3 HANDHELD CH		
GA00092AC							ADD: APX 7500 DUAL-CONTROL HARDWARE		
GA00093AB							ADD: APX 7500 TRI-CONTROL HARDWARE		
GA00094AB							ADD: APX 7500 QUAD-CONTROL HARDWARE		
GA00245AA							ADD: APX7500 O9 CONTROL HEAD		
GA00804							ADD: APX 7500 O2 CONTROL HEAD		
GA00805							ADD: APX 7500 O7 CONTROL HEAD		
MHLN6979AS							ADD: MACK CONTROL BOARD		
							Item No.		
							Description		
						X	PMHN4193_	O2 FRONT HOUSING ( Grey )	
						X	PMHN4195_	O2 FRONT HOUSING ( Green )	
						X	PMHN4194_	O7 CONTROL HEAD ( English )	
						X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )	
						X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )	
						X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )	
						X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )	
X		X	X	X			PHCN4000_	O5 CONTROL HEAD	
	X						PMUN1034_	O3 CONTROL HEAD	
						X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION	
						X	NNTN7919_	ADP/DVP-XL ENCRYPTION	
						X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7921_	ADP/AES ENCRYPTION	
						X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7923_	ADP ENCRYPTION	
					X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT	
		X	X	X			HKN6186_	TRUNNION, CH REMOTE MOUNT	
		X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER	
		X	X	X			HLN6980_	COVER, DUST, KIT	
		X	X	X			0364332H02	SCREW, M3X.5	
		X	X	X			3364430H03	NEW LABEL FOR MOBILE RADIO	
		X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB	
		X	X	X			PHLN1000_	REMOTE ASSY, CHIB	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 7500 UHF Range 2 45 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N									
Option								Description	
								W374AJ	ADD: STATUS/MESSAGE 16 APEX
								W355AS	ADD: STATUS/MESSAGE 8 APEX
								W591AQ	ADD: AUXILIARY SWITCH PANEL APEX
								W599BF	ADD: 8 MODE DIRECT ENTRY APEX
								W614AT	ADD: 16 MODE DIRECT ENTRY APEX
								W615AW	ADD: 24 MODE DIRECT ENTRY APEX
								W269BQ	ADD: SIREN/PUBLIC ADDRESS O3 CH APEX
								W269BP	ADD: SIREN/PUBLIC ADDRESS O5 CH APEX
								W271AS	ADD: SIREN PA/SWITCH BOX O3 APEX
								W589BD	ADD: PUBLIC ADDRESS APEX
								W271AR	ADD: SIREN/PUBLIC ADDRESS 09 CH APX
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MANUAL
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
								HLN1196_	WILDCARD
		X						HLN1228_	DEK STATUS SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNB ASEM SYS9000 SIREN/PA
						X		HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE SYS 9000
			X	X				HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
				X	X	X	X X	HLN1439_	SIREN ASTRO MOBILE
				X				HLN5157_	DEK MOUNTING HARDWARE
				X				HLN5331_	DEK 9000E SIREN/PA SPARE BUT
						X		HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N										
Option								Description		
								W15AJ	ADD:WETHR PROOF HSNG ENCLD BLK APEX	
								W620AE	ADD:NO MTRCYCLE ENCL NEEDED APEX	
								GA00238AA	INT: REMOVABLE MEMORY BRD APX	
								GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX	
								B116BD	ADD: BUZZER 110MA APEX	
								W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX	
								G235AC	ADD: PTT FOOTSWITCH APEX	
								W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
								W688AR	ADD: EXT EMERG PUSH BUTTON APEX	
								GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER	
								GA00260AA	ADD: CABLE URC TO TRANSCEIVER	
								GA00261AA	ADD:PEDESTAL MOUNT BALL JOINT	
								GA00281AA	ADD: PEDESTAL MOUNT LOW SWIVEL	
								Item No.	Description	
	X							HLN7022_	Black Motorcycle Enclosure	
		X						HLN6179_	MCYCLE ADPTR CTRL HD SPKR	
		X						HLN6889_	MOTORCYCLE MOUNTING KIT	
			X	X				0310909A33	SCREW	
			X					MHLN7000_	1G MEMORY EXPANSION BRD	
				X				MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY	
					X			HLN6953_	BUZZER KIT 110 MA	
					X			HKN4258_	CABLE RELAY	
					X			HLN6969_	EXTERNAL ALARM RELAY	
						X		GLN7278_	PTT FOOTSWITCH	
						X		HLN5113_	EMERGENCY FOOTSWITCH	
							X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH	
							X	3064153H02	ASSEMBLY,CABLE,SHIELDED	
							X	40012006001	CIRCUIT BREAKER, 60A	
								X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
								X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
							X	PMLN5436_	O9 HUB, STD TILTING MOUNT	
							X	PMKN4109_	WIRE, AWG 14	
							X	PMUN1046_	O9 RELAY CONTROL BOX	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N											
Option										Description	
G303AB										ADD: RS232 DATA INTFC CBL DASH APEX	
G304AC										ADD: RS232 DATA INTFC CBL TRK APEX	
G308AD										ADD: USB DATA INTFC CABLE–DASH APEX	
G309AC										ADD: USB DATA INTFC CABLE–TRK APEX	
G582AC										ADD: REMOTE MOUNT CABLE 131 FT APEX	
G879AC										ADD: REMOTE MOUNT CBL 115 FEET APEX	
G607AC										ADD: CBL REMOTE MOUNT 75 FEET APEX	
G609AC										ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC										ADD: REMOTE MOUNT CBL 30 FEET APEX	
G628AC										ADD: REMOTE MOUNT CABLE 17 FT APEX	
G628AD										INT: REMOTE MOUNT CABLE 17 FT APEX	
G618AC										ADD: CBL REMOTE MOUNT 10 FEET APEX	
G927AB										INT: CONNECTOR RM MT APEX	
GA00589AA										ADD: GCAI EXTENSION CABLE 2 FT	
										Item No.	Description
X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X					HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
							X	X		HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
									X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
									X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

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### ASTRO APX 7500 UHF Range 2 45 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N									
Option								Description	
G892AB								ENH:HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD:MIC VISOR STD APEX	
W874AB								ADD:HANDSET/HANGUP MIC ARMOR CBL APX	
W382AM								ADD:CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD:PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (GCAI)
				X				RMN5054_	VISOR MIC
					X			HKN1018_	HSET/HANGUP NORMAL ARMOURD CABLE
						X		RMN5070_	DESKTOP MICROPHONE
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 45 W & 700–800 35 W Model Chart (Cont)

M30TSS9PW1_N						
Option						Description
					G133AJ	INT: SAFETY DATA SHEET APEX
					G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX
					G146AE	INT: SAFETY LEAFLET WEEE APEX
					G657AD	INT: USER/INSTALL MANUAL CD APEX
					W665BF	ADD: BASE STATION OP W/PS APEX
					G91AE	ADD: CNTRL STATION PWR SUPPLY APEX
					W947AT	ADD: RS232 PACKET DATA INTERFACE APX
Item No.						Description
X						NNTN7851_ SAFE & EFFICIENT OP OF MOT RDS
	X					6866537D37 SAFETY INFO MOBILE ANALOG EMEA
		X				6866537D90 WEEE SAFETY SUPPLEMENT
			X			PMLN5336_ APX 7500 CDROM O5 & O3 CH UG'S
				X		6880101W87 SPECTRA CTL STA INSTR MANUAL
				X		6880102W93 SPECTRA MXTRC CTRL BASE MAN
				X		HLN6042_ DESK TRAY WITH SPEAKER
				X		HLN7024_ HDW INSTALLATION BASE TRAY
				X		HPN4007_ PS 14V 15A UNI 117/240 VAC
				X		NVN5424_ DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 7500 UHF Range 2 45 W & 700–800 35 W Model Chart (Cont)**

M30TSS9PW1_N					
Option					Description
				B18CR	ADD: AUXILIARY SPKR 7.5 WATT APEX
			G832AD		ADD: SPKR 7.5W WTR RST
			W432AG		ENH: SPKR INCREASED AUDIO POWER APX
			G831AD		ADD: SPKR 13W WATER RESISTANT
			B18CS		ADD: AUXILIARY SPKR SPEC MCYCL APEX
Item No.					Description
X				HSN4031_	EXT SPKR 7.5W
	X			HSN4038_	EXT SPKR 7.5W
		X		HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W
			X	HSN6003_	13 Watt Speaker (Motorcycle)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 2 10–45 W & VHF 10–50 W Model Chart

M30QTS9PW1_N		Option	Description
		G296AD	ADD: ANT 1/4 WAVE 136–144 MHz
		G297AD	ADD: ANT 1/4 WAVE 144–150.8 MHz
		G299AE	ADD: ANT 1/4 WAVE 150.8–162 MHz
		G300AE	ADD: ANT 1/4 WAVE 162–174 MHz
		W652AN	ADD: ANT 1/4 WV BROADBAND 136–162 MHz
		G629AB	ADD: 1/4 WAVE BROADBAND ANT 146–174 MHz
		G792AB	ADD: ANT VHF WIDEBAND 136–174 MHz
		G301AC	ADD: 3 dB ANT 136–174MHz
		GA00510AA	ADD: ANT MTCL 1/4 WAVE WHIP 136–144
		GA00511AA	ADD: ANT MTCL 1/4 WAVE WHIP 144–150.8
		GA00512AA	ADD: ANT MTCL 1/4 WV WHIP 150.8–162
		GA00513AA	ADD: ANT MTCL 1/4 WV WHIP 162–174
		G426AD	ADD: ANT 1/4 WAVE WHIP 450–470 MHz
		G428AD	ADD: ANT 3.5 dB 450–470 MHz
		G430AC	ADD: ANT 5.0 dB 445–47 MHz
		G486AC	ADD: 5.0 DB GAIN ANT 494–512 MHz
		G490AD	ADD: ANT 1/4 WAVE 470–512 MHz
		G493AD	ADD: ANT 3 dB ROOF TOP 470–495 MHz
		G494AD	ADD: ANT 3 dB ROOF TOP 494–512 MHz
		G510AB	ADD: ANT LOW PROFILE 450–512 MHz
		G511AB	ADD: 2 dB ANT WIDEBAND 450–520 MHz
		GA00505AA	ADD: ANT 2 dB WIDEBAND 380–520 MHz
		GA00652AA	ADD: ANT ROOF TOP 5 dB 470–494 MHz
		GA00507AA	ADD: ANT MTCL 1/4 WAVE WHIP 450–482 MHz
		GA00508AA	ADD: ANT MTCL 1/4 WAVE WHIP 482–512 MHz
		GA00509AA	ADD: ANT MTCL LO PRO UNITY 450–512 MHz
		GA00226AA	ADD: GPS ANT THROUGH HOLE MOUNT
		GA00269AA	ADD: GPS ANT GLASS MOUNT
		GA00268AA	ADD: RFID
		Item No.	Description
X		HAE4003	ANT 1/4 WAVE WHIP 450–470 MHz
	X	HAE4011	ANT 3.5 dB GAIN 450–470 MHz
		RAE4014AR	ANT 5.0 dB GAIN 445–470 MHz
	X	RAE4016AR	ANT ROOF TOP 5 DB 494–512 MHz
		HAE4004	ANTENNA 1/4 WAVE 470–512 MHz
	X	HAE4012	ANT ROOF TOP 3.5 DB 470–495 MHz
		HAE4013	ANT ROOF TOP 3.5 DB 494–512 MHz
	X	HAE6016	ANT LOW PROFILE 450–512 MHz
		HAE6031	ANT 2 dB WIDEBAND 380–520 MHz
	X	RAE4015AR	ANT ROOF TOP 5 DB 470–494 MHz
		HAE6033	ANT MCYCLE 1/4 WAVE WHIP 450–482
	X	HAE6034	ANT MCYCLE 1/4 WAVE WHIP482–512
		HAE6035	ANT MCYCLE LO PRO UNITY 450–512
	X	HAD4006	ANT 1/4 WAVE 136–144 MHz
		HAD4007	ANT 1/4 WAVE 144–150.8 MHz
	X	HAD4008	ANT 1/4 WAVE 150.8–162 MHz
		HAD4009	ANT 1/4 WAVE 162–174 MHz
	X	HAD4016	ANT 1/4 WAVE BD-BAND 136–162 MHz
		HAD4017	ANT 1/4 WAVE BD-BAND 146–174 MHz
	X	HAD4021	ANT VHF WIDEBAND 136–174 MHz
		RAD4010AR	ANT 3dB TUNABLE 132–174 MHz
	X	HAD4023	ANT MTCL 1/4 WAVE WHIP 136–144
		HAD4024	ANT MTCL 1/4 WAVE WHIP 144–150.8
	X	HAD4025	ANT MTCL 1/4 WAVE WHIP 150.8–162
		HAD4026	ANT MTCL 1/4 WAVE WHIP 162–174
	X	HAG4000	GPS ANT THROUGH HOLE MOUNT
		HAG4001	GPS ANT MCYCLE MOUNT
	X	PMAN4001	GPS ANT GLASS MOUNT
		HLN7014	RFID

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 2 10–45 W & VHF 10–50 W Model Chart (Cont.)

M30QTS9PW1_N													
Option										Description			
G66AL										ADD: DASH MOUNT 03			
G66AM										ADD: DASH MOUNT 05			
G67BE										ADD:SCREW, REM MT NO CH MP			
G67BD										ADD:REM MT NO CH MCYCLE			
G67BA										ADD:REMOTE MOUNT MOTORCYCLE			
G67BB										ADD: REMOTE MOUNT O3 MID POWER			
G67BC										ADD: REMOTE MOUNT O5 MID POWER			
GA00187AB										INT:O5 SHIELD, SUN, MOTORCYCLE			
W81AQ										ADD: KEY LOCK MOUNT APEX			
G67BK										ADD: REMOTE MOUNT O9 MID POWER			
										Item No.		Description	
X	X	X	X	X	X	X	X		X	0364332H02	SCREW ASSY, SEALING		
				X						0715044C01	BRKT, MOTORCYCLE MOUNTING (O5)		
				X						3075217A01	CABLE, MOTORCYCLE REMOTE (O5)		
X		X	X	X	X	X			X	3264059H03	SEAL, OVERMOLDED FRAME		
		X								HKN4191_	MOBILE PWR CBL LO/MED PWR		
X		X			X	X			X	HKN4192_	MOBILE PWR CBL HIPWR 20'		
			X	X						HKN6032_	MCYCLE POWER CABLE		
				X	X					HKN6186_	TRUNNION, CH REMOTE MOUNT		
					X			X		HKN6188_	CABLE, CH POWER AND SPEAKER		
				X	X					HKN6191_	CABLE, REAR REMOTE FLEX ASSY (CHIB)		
X		X	X	X	X	X			X	HKN6205_	REMOTE FLEX KIT		
		X								HKN6206_	DASH FLEX KIT		
				X	X					PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX		
								X		HLN6372_	KEYLOCK MT		
X	X	X			X					HLN6863_	ACCESSORY CONNECTOR XTL5000		
X		X	X	X	X	X			X	HLN6980_	DUST CAPS KIT		
		X								HLN7025_	DUST CAP KIT		
			X	X						HLN7026_	MCYCLE HEADSET CBL & LEAFLET		
X	X	X	X	X	X	X			X	HLN7002_	TRUNNION HARDWARE KIT		
								X		NNTN7279_	SHIELD, SUN, MOTORCYCLE		
					X					PMLN4958_	O3 CAN 17' EXTENSION CABLE		
					X					PMLN4959_	O3 ACCESSORY CABLE		
X		X	X	X	X	X			X	PMUN1038_	APX7500 STANDARD TIB MP		
									X	PMLN5420_	O9, STD TILTING MOUNT		

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 7500 UHF Range 2 10–45 W & VHF 10–50 W Model Chart (Cont.)

M30QTS9PW1_N										
Option							Description			
G442AJ							ADD: APX7500 O5 CONTROL HEAD			
G72AD							ADD: APX7500 O3 HANDHELD CH			
GA00092AC							ADD: APX7500 DUAL-CONTROL HARDWARE			
GA00093AB							ADD: APX7500 TRI-CONTROL HARDWARE			
GA00094AB							ADD: APX7500 QUAD-CONTROL HARDWARE			
GA00245AA							ADD: APX7500 O9 CONTROL HEAD			
GA00804							ADD: APX 7500 O2 CONTROL HEAD			
GA00805							ADD: APX 7500 O7 CONTROL HEAD			
MHLN6979AS							ADD: MACK CONTROL BOARD			
							Item No.	Description		
						X	PMHN4193_	O2 FRONT HOUSING ( Grey )		
						X	PMHN4195_	O2 FRONT HOUSING ( Green )		
						X	PMHN4194_	O7 CONTROL HEAD ( English )		
						X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )		
						X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )		
						X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )		
						X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )		
X		X	X	X			PHCN4000_	O5 CONTROL HEAD		
	X						PMUN1034_	O3 CONTROL HEAD		
						X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION		
						X	NNTN7919_	ADP/DVP-XL ENCRYPTION		
						X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION		
						X	NNTN7921_	ADP/AES ENCRYPTION		
						X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION		
						X	NNTN7923_	ADP ENCRYPTION		
					X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT		
		X	X	X			HKN6186_	TRUNION, CH REMOTE MOUNT		
		X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER		
		X	X	X			HLN6980_	COVER, DUST, KIT		
		X	X	X			0364332H02	SCREW, M3X.5		
		X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB		
		X	X	X			PHLN1000_	REMOTE ASSY, CHIB		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 2 10–45 W & VHF 10–50 W Model Chart (Cont.)

M30QTS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUID
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
		X						HLN1196_	WILDCARD
	X							HLN1228_	DEK STATUS SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA
						X		HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE SYS 9000
			X	X				HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
					X	X X X X X		HLN1439_	SIREN ASTRO MOBILE
					X			HLN5157_	DEK MOUNTING HARDWARE
					X			HLN5331_	DEK 9000E SIREN/PA SPARE BUT
						X		HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 2 10–45 W & VHF 10–50 W Model Chart (Cont.)

M30QTS9PW1_N											
Option									Description		
										ADD:WETHR PROOF HSNQ ENCLD BLK APEX	
										ADD:NO MTRCYCLE ENCL NEEDED APEX	
										INT: REMOVABLE MEMORY BRD APX	
										INT: REM MEM 3 DAY KEY RET BRD APX	
										ADD:BUZZER 110MA APEX	
										ADD: EXTERNAL ALARM RELAY AND CABLE APX	
										ADD:PTT FOOTSWITCH APEX	
										ADD: EMERG ID EXT. FOOTSWITCH APEX	
										ADD: EXT EMERG PUSHBUTTON APEX	
										ADD: UNIVERSAL RELAY CONTROLLER	
										ADD: CABLE URC TO TRANSCEIVER	
										ADD:PEDESTAL MOUNT BALL JOINT	
										ADD: PEDESTAL MOUNT LOW SWIVEL	
									Item No.	Description	
	X									HLN7022_	Black Motorcycle Enclosure
		X								HLN6179_	MCYCLE ADPTR CTRL HD SPKR
		X								HLN6889_	MOTORCYCLE MOUNTING KIT
			X	X						0310909A33	SCREW
			X							MHLN7000_	1G MEMORY EXPANSION BRD
			X							MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
				X						HLN6953_	BUZZER KIT 110 MA
				X						HKN4258_	CABLE RELAY
				X						HLN6969_	EXTERNAL ALARM RELAY
					X					GLN7278_	PTT FOOTSWITCH
					X					HLN5113_	EMERGENCY FOOTSWITCH
						X				HLN5131_	EMERGENCY PUSH BUTTON SWITCH
							X			3064153H02	ASSEMBLY,CABLE,SHIELDED
							X			40012006001	CIRCUIT BREAKER, 60A
								X		PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
								X		PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
							X			PMLN5436_	O9 HUB, STD TILTING MOUNT
							X			PMKN4109_	WIRE, AWG 14
							X			PMUN1046_	O9 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 2 10–45 W & VHF 10–50 W Model Chart (Cont.)

M30QTS9PW1_N											
Option										Description	
G303AB										ADD: RS232 DATA INTFC CBL DASH APEX	
G304AC										ADD: RS232 DATA INTFC CBL TRK APEX	
G308AD										ADD:USB DATA INTFC CABLE-DASH APEX	
G309AC										ADD:USB DATA INTFC CABLE-TRK APEX	
G582AC										ADD: REMOTE MOUNT CABLE 131 FT APEX	
G879AC										ADD:REMOTE MOUNT CBL 115 FEET APEX	
G607AC										ADD:CBL REMOTE MOUNT 75 FEET APEX	
G609AC										ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC										ADD: REMOTE MOUNT CBL 30 FEET APEX	
G628AC										ADD: REMOTE MOUNT CABLE 17 FT APEX	
G618AC										ADD:CBL REMOTE MOUNT 10 FEET APEX	
G927AB										INT:CONNECTOR RM MT APEX	
GA00589AA										ADD: GCAI EXTENSION CABLE 2 FT	
										Item No.	Description
X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X					HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
									X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
									X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
									X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 2 10–45 W & VHF 10–50 W Model Chart (Cont.)

M30QTS9PW1_N							
Option						Description	
					G133AJ	INT: SAFETY DATA SHEET APEX	
					G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
					G146AE	INT: SAFETY LEAFLET WEEE APEX	
					G657AD	INT:USER/INSTALL MANUAL CD APEX	
					W665BF	ADD: BASE STATION OP W/PS APEX	
					G91AE	ADD: CNTRL STATION PWR SUPPLY APEX	
					W947AT	ADD:RS232 PACKET DATA INTERFACE APX	
						Item No.	Description
	X					6881095C99	CGISS MOB RADIO SAFETY BKLT
		X				6866537D37	SAFETY INFO MOBILE ANALOG EMEA
			X			6866537D90	WEEE SAFETY SUPPLEMENT
				X		PMLN5336_	APX7500 CDROM O5 & O3 CH UG'S
					X	6880101W87	SPECTRA CTL STA INSTR MANUAL
					X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
					X	HLN6042_	DESK TRAY WITH SPEAKER
					X	HLN7024_	HDW INSTALLATION BASE TRAY
					X	HPN4007_	PS 14V 15A UNI 117/240 VAC
					X	NVN5424_	DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 2 10–45 W & VHF 10–50 W Model Chart (Cont.)

M30QTS9PW1_N									
Option								Description	
G892AB								ENH:HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD:MIC VISOR STD APEX	
W874AB								ADD:HANDSET/HANGUP MIC ARMOR CBL APX	
W382AM								ADD:CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD:PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (GCAI)
				X				RMH5054_	VISOR MIC
					X			HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
						X		RMN5070_	DESKTOP MICROPHONE
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 2 10–45 W & VHF 10–50 W Model Chart (Cont.)

M30QTS9PW1_N				
Option				Description
			B18CR	ADD: AUXILIARY SPKR 7.5 WATT APEX
			G832AD	ADD: SPKR 7.5W WTR RST
			W432AG	ENH: SPKR INCREASED AUDIO POWER APX
			G831AD	ADD: SPKR 13W WATER RESISTANT
Item No.				Description
X			HSN4031_	EXT SPKR 7.5W
	X		HSN4038_	EXT SPKR 7.5W
		X	HSN4032_	EXT SPKR 13W
			X HSN4040_	EXT SPKR 13W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 10–40 W Model Chart

M30QSS9PW1_N										Description	
G426AD										ADD: ANT 1/4 WAVE WHIP 450-470 MHZ	
G428AD										ADD: ANT 3.5 dB 450-470 MHZ	
G427AB										ADD: ANT 3.5 dB GAIN 380-433 MHZ	
G429AB										ADD: ANT 5.0 dB GAIN 380-433 MHZ	
G425AC										ADD: ANT 1/4 WAVE WHIP 380-433 MHZ	
G431AC										ADD: ANT 2 dB WIDEBAND 380-470 MHZ	
GA00505AA										ADD: ANT 2 dB WIDEBAND 380-520 MHZ	
G430AC										ADD: ANT 5.0 dB 445-470 MHZ	
G210AB										ADD: ANT MCYCLE 1/4 WAVE WHIP 380-433	
GA00506AA										ADD: ANT MCYCLE 1/4 WAVE WHIP 425-470	
GA00226AA										ADD: GPS ANT THROUGH HOLE MOUNT	
GA00269AA										ADD: GPS ANT MCYCLE MOUNT	
GA00270AA										ADD: GPS ANT GLASS MOUNT	
GA00268AA										ADD: RFID	
										Item No.	Description
X										HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ
	X									HAE4011_	ANT 3.5 dB GAIN 450-470 MHZ
		X								HAE6010_	ANT 3.5 dB GAIN 380-433MHz
			X							HAE6011_	ANT 5.0 dB GAIN 380-433MHz
				X						HAE6012_	ANT 1/4 WAVE WHIP 380-433MHz
					X					HAE6013_	ANT 2 dB WIDEBAND 380-470 MHZ
						X				HAE6031_	ANT 2 dB WIDEBAND 380-520 MHZ
							X			RAE4014AR_	ANT 5.0 dB GAIN 445-470MHz
								X		HAE6014_	ANT,MCYCLE 1/4 WAVE WHIP 380-433
									X	HAE6032_	ANT,MCYCLE 1/4 WAVE WHIP 425-470
									X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
									X	HAG4001_	GPS ANT MCYCLE MOUNT
									X	PMAN4001_	GPS ANT GLASS MOUNT
									X	HLN7014_	RFID

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 7500 UHF Range 1 10–40 W Model Chart (Cont.)

M30QSS9PW1_N										
Option								Description		
G66AL								ADD: DASH MOUNT 03		
G66AM								ADD: DASH MOUNT 05		
G67BE								ADD:SCREW, REM MT NO CH MP		
G67BD								ADD:REM MT NO CH MCYCLE		
G67BA								ADD:REMOTE MOUNT MOTORCYCLE		
G67BB								ADD: REMOTE MOUNT O3 MID POWER		
G67BC								ADD: REMOTE MOUNT O5 MID POWER		
GA00187AB								INT:O5 SHIELD, SUN, MOTORCYCLE		
W81AQ								ADD: KEY LOCK MOUNT APEX		
G67BK								ADD: REMOTE MOUNT O9 MID POWER		
								Item No.	Description	
X	X	X	X	X	X	X	X	X	0364332H02	SCREW ASSY, SEALING
				X					0715044C01	BRKT, MOTORCYCLE MOUNTING (O5)
				X					3075217A01	CABLE, MOTORCYCLE REMOTE (O5)
X		X	X	X	X	X	X	X	3264059H03	SEAL, OVERMOLDED FRAME
	X								HKN4191_	MOBILE PWR CBL LO/MED PWR
X		X			X	X		X	HKN4192_	MOBILE PWR CBL HIPWR 20'
			X	X					HKN6032_	MCYCLE POWER CABLE
				X		X			HKN6186_	TRUNNION, CH REMOTE MOUNT
					X	X		X	HKN6188_	CABLE, CH POWER AND SPEAKER
				X		X			HKN6191_	CABLE, REAR REMOTE FLEX ASSY (CHIB)
X		X	X	X	X	X	X	X	HKN6205_	REMOTE FLEX KIT
	X								HKN6206_	DASH FLEX KIT
			X	X					PHLN1000_	ASSY,KIT,CTRL HD END REM ASSY APX
								X	HLN6372_	KEYLOCK MT
X	X	X			X				HLN6863_	ACCESSORY CONNECTOR XTL5000
X		X	X	X	X	X		X	HLN6980_	DUST CAPS KIT
	X								HLN7025_	DUST CAP KIT
X	X	X	X	X	X	X		X	HLN7002_	TRUNNION HARDWARE KIT
								X	NNTN7279_	SHIELD, SUN, MOTORCYCLE
					X				PMLN4958_	O3 CAN 17' EXTENSION CABLE
					X				PMLN4959_	O3 ACCESSORY CABLE
X		X	X	X	X	X		X	PMUN1038_	APX7500 STANDARD TIB MP
									PMUN1042_	APX7500 HIROSE TIB MP
									PMLN4983_	HIROSE TIB DUST COVER KIT
								X	PMLN5420_	O9, STD TILTING MOUNT
			X	X					HLN7026_	MCYCLE HEADSET CBL & LEAFLET

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 10–40 W Model Chart (Cont.)

M30QSS9PW1_N									
Option							Description		
G442AJ							ADD: APX7500 O5 CONTROL HEAD		
G72AD							ADD: APX7500 O3 HANDHELD CH		
GA00092AC							ADD: APX7500 DUAL-CONTROL HARDWARE		
GA00093AB							ADD: APX7500 TRI-CONTROL HARDWARE		
GA00094AB							ADD: APX7500 QUAD-CONTROL HARDWARE		
GA00245AA							ADD: APX7500 O9 CONTROL HEAD		
GA00804							ADD: APX 7500 O2 CONTROL HEAD		
GA00805							ADD: APX 7500 O7 CONTROL HEAD		
MHLN6979AS							ADD: MACK CONTROL BOARD		
							Item No. Description		
						X	PMHN4193_	O2 FRONT HOUSING ( Grey )	
						X	PMHN4195_	O2 FRONT HOUSING ( Green )	
						X	PMHN4194_	O7 CONTROL HEAD ( English )	
						X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )	
						X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )	
						X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )	
						X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )	
X							PHCN4000_	O5 CONTROL HEAD	
	X						PMUN1034_	O3 CONTROL HEAD	
						X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION	
						X	NNTN7919_	ADP/DVP-XL ENCRYPTION	
						X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7921_	ADP/AES ENCRYPTION	
						X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7923_	ADP ENCRYPTION	
						X	PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT	
		X	X	X			HKN6186_	TRUNION, CH REMOTE MOUNT	
		X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER	
		X	X	X			HLN6980_	COVER, DUST, KIT	
		X	X	X			0364332H02	SCREW, M3X.5	
		X	X	X			3364430H03	NEW LABEL FOR MOBILE RADIO	
		X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB	
		X	X	X			PHLN1000_	REMOTE ASSY, CHIB	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 10–40 W Model Chart (Cont.)

M30QSS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER'S GUID
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
								HLN1196_	WILDCARD
		X						HLN1228_	DEK STATUS SYS 9000
	X							HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNB ASEM SYS9000 SIREN/PA
							X	HLN1338_	DEK SIREN PA
								HLN1339_	DEK PA
			X	X	X			HLN1362_	DEK 8 MODE SYS 9000
				X	X			HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
					X	X X X X X		HLN1439_	SIREN ASTRO MOBILE
					X			HLN5157_	DEK MOUNTING HARDWARE
					X			HLN5331_	DEK 9000E SIREN/PA SPARE BUT
							X	HLN6819_	SIREN SWITCH BOX
	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 10–40 W Model Chart (Cont.)

M30QSS9PW1_N											
Option									Description		
									W15AJ	ADD:WETHR PROOF HSNG ENCLD BLK APEX	
									W620AE	ADD:NO MTRCYCLE ENCL NEEDED APEX	
									GA00238AA	INT: REMOVABLE MEMORY BRD APX	
									GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX	
									B116BD	ADD:BUZZER 110MA APEX	
									W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX	
									G235AC	ADD:PTT FOOTSWITCH APEX	
									W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
									W688AR	ADD: EXT EMERG PUSHBUTTON APEX	
									GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER	
									GA00260AA	ADD: CABLE URC TO TRANSCEIVER	
									GA00261AA	ADD:PEDESTAL MOUNT BALL JOINT	
									GA00281AA	ADD: PEDESTAL MOUNT LOW SWIVEL	
										<b>Item No.</b>	<b>Description</b>
X										HLN7022_	Black Motorcycle Enclosure
	X									HLN6179_	MCYCLE ADPTR CTRL HD SPKR
	X									HLN6889_	MOTORCYCLE MOUNTING KIT
		X	X							0310909A33	SCREW
		X								MHLN7000_	1G MEMORY EXPANSION BRD
			X							MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
				X						HLN6953_	BUZZER KIT 110 MA
					X					HKN4258_	CABLE RELAY
						X				HLN6969_	EXTERNAL ALARM RELAY
							X			GLN7278_	PTT FOOTSWITCH
								X		HLN5113_	EMERGENCY FOOTSWITCH
									X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH
									X	3064153H02	ASSEMBLY,CABLE,SHIELDED
									X	40012006001	CIRCUIT BREAKER, 60A
									X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
									X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
								X		PMLN5436_	O9 HUB, STD TILTING MOUNT
								X		PMKN4109_	WIRE, AWG 14
								X		PMUN1046_	O9 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 10–40 W Model Chart (Cont.)

M30QSS9PW1_N													
Option										Description			
										G303AB	ADD: RS232 DATA INTFC CBL DASH APEX		
										G304AC	ADD: RS232 DATA INTFC CBL TRK APEX		
										G308AD	ADD:USB DATA INTFC CABLE-DASH APEX		
										G309AC	ADD:USB DATA INTFC CABLE-TRK APEX		
										G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX		
										G879AC	ADD:REMOTE MOUNT CBL 115 FEET APEX		
										G607AC	ADD:CBL REMOTE MOUNT 75 FEET APEX		
										G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX		
										G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX		
										G628AC	ADD: REMOTE MOUNT CABLE 17 FT APEX		
										G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX		
										G618AC	ADD:CBL REMOTE MOUNT 10 FEET APEX		
										G927AB	INT:CONNECTOR RM MT APEX		
										GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT		
										Item No.	Description		
X											HKN6160_	CABLE KIT 6' DASH MOUNT DATA	
	X										HKN6161_	CABLE KIT 20' RS232/J2 DATA	
		X									HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M	
			X								HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN	
				X							HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT	
					X						HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT	
						X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT	
							X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT	
								X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT	
									X		HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT	
										X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT	
											HLN6961_	ACCESSORY CONNECTOR RM (CHIB)	
											X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 10–40 W Model Chart (Cont.)

M30QSS9PW1_N									
Option								Description	
G892AB								ENH:HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BB								ADD: HAND MIC (MTRCYCLE WP MIC) APX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD:MIC VISOR STD APEX	
W874AB								ADD:HANDSET/HANGUP MIC ARMOR CBL APX	
W382AM								ADD:CNTRL STATION PALM MIC GCAI APX	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
GA00304AA								ADD:PUSHBUTTON PTT APX	
								Item No.	Description
X								HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9
			X					HMN1090_	STD PALM MICROPHONE (GCAI)
				X				RMH5054_	VISOR MIC
					X			HKN1018_	HSET/HANGUP NORMAL ARMOURD CABLE
						X		RMN5070_	DESKTOP MICROPHONE
							X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 10–40 W Model Chart (Cont.)

M30QSS9PW1_N						
Option						Description
					G133AJ	INT: SAFETY DATA SHEET APEX
					G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX
					G146AE	INT: SAFETY LEAFLET WEEE APEX
					G657AD	INT:USER/INSTALL MANUAL CD APEX
					W665BF	ADD: BASE STATION OP W/PS APEX
					G91AE	ADD: CNTRL STATION PWR SUPPLY APEX
					W947AT	ADD:RS232 PACKET DATA INTERFACE APX
Item No.						Description
X						NNTN7851_ SAFE & EFFICIENT OP OF MOT RDS
	X					6866537D37 SAFETY INFO MOBILE ANALOG EMEA
		X				6866537D90 WEEE SAFETY SUPPLEMENT
			X			PMLN5336_ APX7500 CDROM O5 & O3 CH UG'S
				X		6880101W87 SPECTRA CTL STA INSTR MANUAL
				X		6880102W93 SPECTRA MXTRC CTRL BASE MAN
				X		HLN6042_ DESK TRAY WITH SPEAKER
				X		HLN7024_ HDW INSTALLATION BASE TRAY
				X		HPN4007_ PS 14V 15A UNI 117/240 VAC
				X		NVN5424_ DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 7500 UHF Range 1 10–40 W Model Chart (Cont.)**

M30QSS9PW1_N					
Option				Description	
			B18CR	ADD: AUXILIARY SPKR 7.5 WATT APEX	
			G832AD	ADD: SPKR 7.5W WTR RST	
			W432AG	ENH: SPKR INCREASED AUDIO POWER APX	
			G831AD	ADD: SPKR 13W WATER RESISTANT	
			B18CS	ADD: AUXILIARY SPKR SPEC MCYCL APEX	
				Item No.	Description
X				HSN4031_	EXT SPKR 7.5W
	X			HSN4038_	EXT SPKR 7.5W
		X		HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W
			X	HSN6003_	13 Watt Speaker (Motorcycle)

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 7500 UHF Range 1 100 W Model Chart

M30QTS9PW1_N												
Option										Description		
G426AD										ADD: ANT 1/4 WAVE WHIP 450-470 MHZ		
G428AD										ADD: ANT 3.5DB 450-470 MHZ		
G427AB										ADD: ANT 3.5dB GAIN 380-433 MHZ		
G429AB										ADD: ANT 5.0dB GAIN 380-433 MHZ		
G425AC										ADD: ANT 1/4 WAVE WHIP 380-433 MHZ		
G431AC										ADD: ANT 2 dB WIDEBAND 380-470 MHZ		
GA00505AA										ADD: ANT 2 dB WIDEBAND 380-520 MHZ		
G430AC										ADD: ANT 5.0 dB 445-470 MHZ		
GA00226AA										ADD: GPS ANT THROUGH HOLE MOUNT		
GA00270AA										ADD: GPS ANT GLASS MOUNT		
GA00268AA										ADD: RFID		
										Item No.	Description	
X											HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ
	X										HAE4011_	ANT 3.5 dB GAIN 450-470 MHZ
		X									HAE6010_	ANT 3.5 dB GAIN 380-433MHZ
			X								HAE6011_	ANT 5.0 dB GAIN 380-433MHZ
				X							HAE6012_	ANT 1/4 WAVE WHIP 380-433MHZ
					X						HAE6013_	ANT WIDEBAND 2.0 dB GAIN 380-470 MHZ
						X					HAE6031_	ANT 2.0 dB WIDEBAND 380-520 MHZ
							X				RAE4014AR_	ANT 5.0 dB GAIN 445-470 MHz
								X			HAG4000_	GPS ANT THROUGH HOLE MOUNT
									X		PMAN4001_	GPS ANT GLASS MOUNT
										X	HLN7014_	RFID

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W Model Chart (Cont.)

M30QTS9PW1_N					
				Option	Description
				G655AJ	INT: QUICK, HP REMOTE MOUNT O5 CH
				G655AK	INT: QUICK, HP REMOTE MOUNT O3 CH
				G655AM	INT: QUICK, HP REMOTE MOUNT NO CH
				G655AN	INT: QUICK, HP REM MT 09 CH
				Item No.	Description
X	X	X	X	0364332H02	SCREW ASSY, SEALING
X	X	X	X	3271902H01	FRAME SEAL, OVERMOLDED
X	X	X	X	HKN6110_	CABLE, POWER, 100W
X				HKN6186_	TRUNNION, CH REMOTE MOUNT
X			X	HKN6188_	CABLE, CH POWER AND SPEAKER
X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X	X	X	X	HKN6205_	REMOTE FLEX KIT
X				PHLN1000_	REMOTE ASSY, CHIB
X	X			HLN6863_	ACCESSORY CONNECTOR XTL5000
			X	HLN6961_	ASSEMBLY,ACCESSORY,CONNECTOR (CHIB)
X	X	X	X	HLN6980_	DUST CAPS KIT, CH + TRNS
X	X	X	X	HLN7003_	INSTALLATION HARDWARE HP KIT
X	X	X	X	HLN7017_	DC CONNECTOR BRACKET KIT
		X		PMLN4958_	O3 CAN 17' EXTENSION CABLE
		X		PMLN4959_	O3 ACCESSORY CABLE
			X	PMLN5420_	BRACKET,O9, STD TILTING MOUNT,FINISHED GOOD
X	X	X	X	PMUN1040_	APX 7500 STANDARD TIB HP

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W Model Chart (Cont.)

M30QTS9PW1_N									
Option						Description			
G442AJ						ADD: APX 7500 O5 CONTROL HEAD			
G72AD						ADD: APX 7500 O3 HANDHELD CH			
GA00092AC						ADD: APX 7500 DUAL-CONTROL HARDWARE			
GA00093AB						ADD: APX 7500 TRI-CONTROL HARDWARE			
GA00094AB						ADD: APX 7500 QUAD-CONTROL HARDWARE			
GA00245AA						ADD: APX7500 O9 CONTROL HEAD			
GA00804						ADD: APX 7500 O2 CONTROL HEAD			
GA00805						ADD: APX 7500 O7 CONTROL HEAD			
MHLN6979AS						ADD: MACK CONTROL BOARD			
						Item No.		Description	
					X	PMHN4193_	O2 FRONT HOUSING ( Grey )		
					X	PMHN4195_	O2 FRONT HOUSING ( Green )		
					X	PMHN4194_	O7 CONTROL HEAD ( English )		
					X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )		
					X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )		
					X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )		
					X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )		
X		X	X	X		PHCN4000_	O5 CONTROL HEAD		
	X					PMUN1034_	O3 CONTROL HEAD		
					X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION		
					X	NNTN7919_	ADP/DVP-XL ENCRYPTION		
					X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7921_	ADP/AES ENCRYPTION		
					X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7923_	ADP ENCRYPTION		
				X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT		
	X	X	X			HKN6186_	TRUNNION, CH REMOTE MOUNT		
	X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER		
	X	X	X			HLN6980_	DUST CAPS KIT, CH + TRNS		
	X	X	X			0364332H02	SCREW, M3X.5		
	X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB		
	X	X	X			PHLN1000_	REMOTE ASSY, CHIB		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W Model Chart (Cont.)

M30QTS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE O3 SIREN DEK
							X	HKN6146_	CABLE, O3 SIREN SWITCH BOX
		X						HLN1196_	AUX SWITCH PANEL
	X							HLN1228_	DEK STATUS
X								HLN1229_	DEK STATUS/MESSAGE
						X		HLN1241_	DEK HSNG ASEM SIREN/PA
							X	HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE
			X	X				HLN1363_	DEK 16 MODE
			X					HLN1364_	DEK 24 MODE
						X	X X X X X	HLN1439_	SIREN ASTRO MOBILE
						X		HLN5157_	DEK MOUNTING HARDWARE
						X		HLN5331_	DEK SIREN/PA SPARE BUTTON
							X	HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 1 100 W Model Chart (Cont.)

M30QTS9PW1_N												
Option								Description				
GA00238AA								INT: REMOVABLE MEMORY BRD APX				
GA00239AA								INT: REM MEM 3 DAY KEY RET BRD APX				
B116BD								ADD: BUZZER 110MA APEX				
W116AQ								ADD: EXTERNAL ALARM RELAY AND CABLE APX				
G235AC								ADD: PTT FOOTSWITCH APEX				
W470AT								ADD: EMERG ID EXT. FOOTSWITCH APEX				
W688AR								ADD: EXT EMERG PUSHBUTTON APEX				
GA00259AA								ADD: UNIVERSAL RELAY CONTROLLER				
GA00260AA								ADD: CABLE URC TO TRANSCEIVER				
GA00261AA								ADD: PEDESTAL MOUNT BALL JOINT				
GA00281AA								ADD: PEDESTAL MOUNT LOW SWIVEL				
								Item No.		Description		
X	X							0310909A33	SCREW			
X								MHLN7000_	1G MEMORY EXPANSION BRD			
	X							MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY			
		X						HLN6953_	BUZZER KIT 110 MA			
			X					HKN4258_	CABLE RELAY			
			X					HLN6969_	EXTERNAL ALARM RELAY			
				X				GLN7278_	PTT FOOTSWITCH			
					X			HLN5113_	EMERGENCY FOOTSWITCH			
						X		HLN5131_	EMERGENCY PUSH BUTTON SWITCH			
							X	3064153H02	ASSEMBLY, CABLE, SHIELDED			
							X	40012006001	CIRCUIT BREAKER, 60A			
								X	PMLN5421_	O9, LOW SWIVEL MOUNT, G. JOHNSON		
								X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM		
							X	PMLN5436_	O9 HUB, STD TILTING MOUNT			
							X	PMKN4109_	WIRE, AWG 14			
							X	PMUN1046_	O9 RELAY CONTROL BOX			

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W Model Chart (Cont.)

M30QTS9PW1_N										
Option									Description	
G304AC									ADD: RS232 DATA INTFC CBL TRK APEX	
G309AC									ADD: USB DATA INTFC CABLE-TRK APEX	
G582AC									ADD: REMOTE MOUNT CABLE 131 FT APEX	
G607AC									ADD:CBL REMOTE MOUNT 75 FEET APEX	
G609AC									ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC									ADD: REMOTE MOUNT CBL 30 FEET APEX	
G618AC									ADD:CBL REMOTE MOUNT 10 FEET APEX	
G628AC									ADD: REMOTE MOUNT CABLE 17 FT APEX	
G879AC									ADD:REMOTE MOUNT CBL 115 FEET APEX	
G927AB									INT:CONNECTOR RM MT APEX	
GA00589AA									ADD: GCAI EXTENSION CABLE 2 FT	
									Item No.	
									Description	
X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
	X								HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
		X							HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
			X						HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
				X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
					X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
						X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
							X		HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
								X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
								X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
								X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W Model Chart (Cont.)

M30QTS9PW1_N					
Option					Description
				G133AJ	INT: SAFETY DATA SHEET APEX
				G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX
				G146AE	INT: SAFETY LEAFLET WEEE APEX
				G657AD	INT: USER/INSTALL MANUAL CD APEX
				W947AT	ADD: RS232 PACKET DATA INTERFACE APX
Item No.					Description
	X				6881095C99 CGISS MOB RADIO SAFETY BKLT
		X			6866537D37 SAFETY INFO MOBILE ANALOG EMEA
			X		6866537D90 WEEE SAFETY SUPPLEMENT
			X		PMLN5336_ APX 7500 CDROM O5 & O3 CH UG'S
			X		NVN5424_ SOFTWARE,ASSEMBLY,INF FILE CD

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W Model Chart (Cont.)

M30QTS9PW1_N									
Option						Description			
G892AB						ENH: HAND MIC,GCAI WTR RESISTANT APX			
W20CA						ADD: KEYPAD MIC GCAI APEX			
W22BB						ADD: HAND MIC (MTRCYCLE WP MIC) APX			
W22BA						ADD: STD PALM MICROPHONE APEX			
W872AB						ADD: MIC VISOR STD APEX			
W874AB						ADD: HANDSET/HANGUP MIC ARMOR CBL APX			
GA00221AC						ADD: MODEL III GCAI KEYPAD HANDSET			
GA00304AA						ADD: PUSHBUTTON PTT APX			
						Item No.		Description	
X						HMN1089_	HAND MIC,GCAI (WATER RESISTANT)		
	X					HMN4079_	KEYPAD MICROPHONE		
		X				HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9		
			X			HMN1090_	STD PALM MICROPHONE (GCAI)		
				X		RMN5054_	VISOR MIC		
					X	HKN1018_	HSET/HANGUP NORMAL ARMOURD CABLE		
					X	HMN4097_	MODEL III GCAI KEYPAD HANDSET		
					X	RLN5926_	PUSH BUTTON PTT		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 7500 UHF Range 1 100 W Model Chart (Cont.)

M30QTS9PW1_N					
Option			Description		
		B18CR	ADD: AUXILIARY SPKR 7.5 W APEX		
		G832AD	ADD: SPKR 7.5W WTR RST		
		W432AG	ENH: SPKR INCREASED AUDIO POWER APX		
		G831AD	ADD: SPKR 13W WATER RESISTANT		
			Item No.	Description	
	X		HSN4031_	EXT SPKR 7.5W	
		X	HSN4038_	EXT SPKR 7.5W	
			X	HSN4032_	EXT SPKR 13W
			X	HSN4040_	EXT SPKR 13W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 700–800 MHz 10–35 W & VHF 100 W Model Chart

M30TXS9PW1_N															
Option													Description		
													G296AD	ADD: ANT 1/4 WAVE 136–144 MHz	
													G297AD	ADD: ANT 1/4 WAVE 144–150.8 MHz	
													G299AE	ADD: ANT 1/4 WAVE 150.8–162 MHz	
													G300AE	ADD: ANT 1/4 WAVE 162–174 MHz	
													W652AN	ADD: ANT 1/4 WV BD-BAND 136–162 MHz	
													G629AB	ADD: ANT 1/4WV BD-BAND 146–174 MHz	
													G792AB	ADD: ANT VHF WIDEBAND 136–174 MHz	
													G301AC	ADD: ANT 3 dB TUNABLE 132–174 MHz	
													G174AD	ADD: ANT 3 dB LOW-PROFILE 762–870	
													G175AD	ADD: ANT 3 dB ELEVATED FEED 762–870	
													G335AW	ADD: ANT 1/4 WAVE 762–870MHZ	
													W484AF	ADD: ANT 3 dB COLLINEAR 762–870 MHz	
													GA00226AA	ADD: GPS ANT THROUGH HOLE MOUNT	
													GA00270AA	ADD: GPS ANT GLASS MOUNT	
													GA00268AA	ADD: RFID	
														<b>Item No.</b>	<b>Description</b>
	X													HAD4006_	ANT 1/4 WAVE 136–144 MHz
		X												HAD4007_	ANT 1/4 WAVE 144–150.8 MHz
			X											HAD4008_	ANT 1/4 WAVE 150.8–162 MHz
				X										HAD4009_	ANT 1/4 WAVE 162–174 MHz
					X									HAD4016_	ANT 1/4 WAVE BD-BAND 136–162 MHz
						X								HAD4017_	ANT 1/4 WAVE BD-BAND 146–174 MHz
							X							HAD4021_	ANT VHF WIDEBAND 136–174 MHz
								X						RAD4010AR_	ANT 3dB TUNABLE 132–174 MHz
									X					HAF4013_	ANT 3 dB LOW-PROFILE 762–870
										X				HAF4014_	ANT 3 dB ELEVATED FEED 762–870
											X			HAF4016_	ANT 1/4 WAVE 762–870MHZ
												X		HAF4017_	ANT 3 dB COLLINEAR 762–870 MHz
													X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
													X	PMAN4001_	GPS ANT GLASS MOUNT
													X	HLN7014_	RFID

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N				
Option				Description
			G655AJ	INT: QUICK, HP REMOTE MOUNT O5 CH
			G655AK	INT: QUICK, HP REMOTE MOUNT O3 CH
			G655AM	INT: QUICK, HP REMOTE MOUNT NO CH
			G655AN	INT: QUICK, HP REM MT 09 CH
Item No.				Description
X	X	X	X	0364332H02 SCREW ASSY, SEALING
X	X	X	X	3271902H01 FRAME SEAL, OVERMOLDED
X	X	X	X	HKN6110_ CABLE, POWER, 100W
X				HKN6186_ TRUNNION, CH REMOTE MOUNT
X			X	HKN6188_ CABLE, CH POWER AND SPEAKER
X				HKN6191_ CBL, REAR REMOTE FLEX ASSY (CHIB)
X	X	X	X	HKN6205_ REMOTE FLEX KIT
X				PHLN1000_ REMOTE ASSY, CHIB
X	X			HLN6863_ ACCESSORY CONNECTOR XTL5000
			X	HLN6961_ ASSEMBLY,ACCESSORY,CONNECTOR (CHIB)
X	X	X	X	HLN6980_ DUST CAPS KIT, CH + TRNS
X	X	X	X	HLN7003_ INSTALLATION HARDWARE HP KIT
X	X	X	X	HLN7017_ DC CONNECTOR BRACKET KIT
		X		PMLN4958_ O3 CAN 17' EXTENSION CABLE
		X		PMLN4959_ O3 ACCESSORY CABLE
			X	PMLN5420_ BRACKET,O9, STD TILTING MOUNT,FINISHED GOOD
X	X	X	X	PMUN1040_ APX 7500 STANDARD TIB HP

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 700–800 MHz 10–35 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N									
Option							Description		
						G442AJ	ADD: APX 7500 O5 CONTROL HEAD		
						G72AD	ADD: APX 7500 O3 HANDHELD CH		
						GA00092AC	ADD: APX 7500 DUAL-CONTROL HARDWARE		
						GA00093AB	ADD: APX 7500 TRI-CONTROL HARDWARE		
						GA00094AB	ADD: APX 7500 QUAD-CONTROL HARDWARE		
						GA00245AA	ADD: APX7500 O9 CONTROL HEAD		
						GA00804	ADD: APX 7500 O2 CONTROL HEAD		
						GA00805	ADD: APX 7500 O7 CONTROL HEAD		
						MHLN6979AS	ADD: MACK CONTROL BOARD		
							<b>Item No.</b>	<b>Description</b>	
					X		PMHN4193_	O2 FRONT HOUSING ( Grey )	
					X		PMHN4195_	O2 FRONT HOUSING ( Green )	
					X		PMHN4194_	O7 CONTROL HEAD ( English )	
					X		PMHN4192_	O7 CONTROL HEAD ( English_Chinese )	
					X		PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )	
					X		PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )	
					X		PMHN4191_	O7 CONTROL HEAD ( Siren and Light )	
X		X	X	X			PHCN4000_	O5 CONTROL HEAD	
		X					PMUN1034_	O3 CONTROL HEAD	
						X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION	
						X	NNTN7919_	ADP/DVP-XL ENCRYPTION	
						X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7921_	ADP/AES ENCRYPTION	
						X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7923_	ADP ENCRYPTION	
					X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT	
		X	X	X			HKN6186_	TRUNNION, CH REMOTE MOUNT	
		X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER	
		X	X	X			HLN6980_	DUST CAPS KIT, CH + TRNS	
		X	X	X			0364332H02	SCREW, M3X.5	
		X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB	
		X	X	X			PHLN1000_	REMOTE ASSY, CHIB	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 700–800 MHz 10–35 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE O3 SIREN DEK
							X	HKN6146_	CABLE, O3 SIREN SWITCH BOX
		X						HLN1196_	AUX SWITCH PANEL
	X							HLN1228_	DEK STATUS
X								HLN1229_	DEK STATUS/MESSAGE
						X		HLN1241_	DEK HSNG ASEM SIREN/PA
						X		HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE
			X	X				HLN1363_	DEK 16 MODE
				X				HLN1364_	DEK 24 MODE
				X	X	X	X X	HLN1439_	SIREN ASTRO MOBILE
				X				HLN5157_	DEK MOUNTING HARDWARE
				X				HLN5331_	DEK SIREN/PA SPARE BUTTON
						X		HLN6819_	SIREN SWITCH BOX
X	X		X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X		X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N										
Option									Description	
GA00238AA									INT: REMOVABLE MEMORY BRD APX	
GA00239AA									INT: REM MEM 3 DAY KEY RET BRD APX	
B116BD									ADD: BUZZER 110MA APEX	
W116AQ									ADD: EXTERNAL ALARM RELAY AND CABLE APX	
G235AC									ADD: PTT FOOTSWITCH APEX	
W470AT									ADD: EMERG ID EXT. FOOTSWITCH APEX	
W688AR									ADD: EXT EMERG PUSHBUTTON APEX	
GA00259AA									ADD: UNIVERSAL RELAY CONTROLLER	
GA00260AA									ADD: CABLE URC TO TRANSCEIVER	
GA00261AA									ADD: PEDESTAL MOUNT BALL JOINT	
GA00281AA									ADD: PEDESTAL MOUNT LOW SWIVEL	
									Item No.	Description
X	X								0310909A33	SCREW
X									MHLN7000_	1G MEMORY EXPANSION BRD
	X								MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
		X							HLN6953_	BUZZER KIT 110 MA
			X						HKN4258_	CABLE RELAY
				X					HLN6969_	EXTERNAL ALARM RELAY
					X				GLN7278_	PTT FOOTSWITCH
						X			HLN5113_	EMERGENCY FOOTSWITCH
							X		HLN5131_	EMERGENCY PUSH BUTTON SWITCH
								X	3064153H02	ASSEMBLY,CABLE,SHIELDED
							X		40012006001	CIRCUIT BREAKER, 60A
								X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
								X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
							X		PMLN5436_	O9 HUB, STD TILTING MOUNT
							X		PMKN4109_	WIRE, AWG 14
							X		PMUN1046_	O9 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N											
Option									Description		
									G304AC	ADD: RS232 DATA INTFC CBL TRK APEX	
									G309AC	ADD: USB DATA INTFC CABLE-TRK APEX	
									G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX	
									G607AC	ADD:CBL REMOTE MOUNT 75 FEET APEX	
									G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX	
									G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX	
									G618AC	ADD:CBL REMOTE MOUNT 10 FEET APEX	
									G628AC	ADD: REMOTE MOUNT CABLE 17 FT APEX	
									G879AC	ADD:REMOTE MOUNT CBL 115 FEET APEX	
									G927AB	INT:CONNECTOR RM MT APEX	
									GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT	
									Item No.	Description	
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X								HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
			X							HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
				X						HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
					X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
						X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
							X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
								X		HKN6169_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HKN6170_	CAN CABLE, REMOTE MOUNT, 17 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
									X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 7500 700–800 MHz 10–35 W & VHF 100 W Model Chart (Cont)**

<b>M30TXS9PW1_N</b>					
<b>Option</b>				<b>Description</b>	
			G133AJ	INT: SAFETY DATA SHEET APEX	
			G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
			G146AE	INT: SAFETY LEAFLET WEEE APEX	
			G657AD	INT: USER/INSTALL MANUAL CD APEX	
			W947AT	ADD: RS232 PACKET DATA INTERFACE APX	
				<b>Item No.</b>	
				<b>Description</b>	
	X			6881095C99	CGISS MOB RADIO SAFETY BKLT
		X		6866537D37	SAFETY INFO MOBILE ANALOG EMEA
			X	6866537D90	WEEE SAFETY SUPPLEMENT
			X	PMLN5336_	APX 7500 CDROM O5 & O3 CH UG'S
			X	NVN5424_	SOFTWARE,ASSEMBLY,INF FILE CD

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N									
Option						Description			
					G892AB	ENH: HAND MIC,GCAI WTR RESISTANT APX			
					W20CA	ADD: KEYPAD MIC GCAI APEX			
					W22BB	ADD: HAND MIC (MTRCYCLE WP MIC) APX			
					W22BA	ADD: STD PALM MICROPHONE APEX			
					W872AB	ADD: MIC VISOR STD APEX			
					W874AB	ADD: HANDSET/HANGUP MIC ARMOR CBL APX			
					GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET			
					GA00304AA	ADD: PUSHBUTTON PTT APX			
						Item No.		Description	
	X					HMN1089_	HAND MIC,GCAI (WATER RESISTANT)		
		X				HMN4079_	KEYPAD MICROPHONE		
			X			HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9		
				X		HMN1090_	STD PALM MICROPHONE (GCAI)		
					X	RMN5054_	VISOR MIC		
					X	HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE		
					X	HMN4097_	MODEL III GCAI KEYPAD HANDSET		
					X	RLN5926_	PUSH BUTTON PTT		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 700–800 MHz 10–35 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N				
Option			Description	
	B18CR			ADD: AUXILIARY SPKR 7.5 W APEX
		G832AD		ADD: SPKR 7.5W WTR RST
			W432AG	ENH: SPKR INCREASED AUDIO POWER APX
			G831AD	ADD: SPKR 13W WATER RESISTANT
			Item No.	Description
X			HSN4031_	EXT SPKR 7.5W
	X		HSN4038_	EXT SPKR 7.5W
		X	HSN4032_	EXT SPKR 13W
			X HSN4040_	EXT SPKR 13W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 100 W & 700–800MHz 35 W Model Chart

M30TSS9PW1_N																
									Description							
G426AD									ADD: ANT 1/4 WAVE WHIP 450-470 MHZ							
G428AD									ADD: ANT 3.5DB 450-470 MHZ							
G425AC									ADD: ANT 1/4 WAVE WHIP 380–433 MHZ							
G431AC									ADD: ANT 2 dB WIDEBAND 380–470 MHZ							
GA00505AA									ADD: ANT 2 dB WIDEBAND 380–520 MHZ							
G430AC									ADD: ANT 5.0 dB 445–470 MHZ							
G427AB									ADD: ANT 3.5 dB GAIN 380-433 MHZ							
G429AB									ADD: ANT 5.0 dB GAIN 380-433 MHZ							
G174AD									ADD: ANT 3 dB LOW–PROFILE 762–870							
G175AD									ADD: ANT 3 dB ELEVATED FEED 762–870							
G335AW									ADD: ANT 1/4 WAVE 762–870MHZ							
W484AF									ADD: ANT 3 dB COLLINEAR 762–870 MHZ							
GA00226AA									ADD: GPS ANT THROUGH HOLE MOUNT							
GA00270AA									ADD: GPS ANT GLASS MOUNT							
GA00268AA									ADD: RFID							
									Item No.	Description						
X									HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ						
	X								HAE4011_	ANT 3.5 dB GAIN 450-470 MHZ						
		X							HAE6012_	ANT 1/4 WAVE WHIP 380-433MHz						
			X						HAE6013_	ANT 2 dB WIDEBAND 380-470 MHZ						
				X					HAE6031_	ANT 2 dB WIDEBAND 380-520 MHz						
					X				RAE4014AR_	ANT 5.0 dB GAIN 445-470 MHZ						
						X			HAE6010_	ANT 3.5 dB GAIN 380-433MHz						
							X		HAE6011_	ANT 5.0 dB GAIN 380-433MHz						
								X	HAF4013_	ANT 3 dB LOW–PROFILE 762–870 MHz						
									X	HAF4014_	ANT 3 dB ELEVATED FEED 762–870 MHz					
										X	HAF4016_	ANT 1/4 WAVE 762–870 MHz				
											X	HAF4017_	ANT 3DB COLLINEAR 762–870MHz			
												X	HAG4000_	GPS ANT THROUGH HOLE MOUNT		
													X	PMAN4001_	GPS ANT GLASS MOUNT	
														X	HLN7014_	RFID

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 1 100 W & 700–800MHz 35 W Model Chart (Cont.)

M30TSS9PW1_N					
Option					Description
				G655AJ	INT: QUICK, HP REMOTE MOUNT O5 CH
				G655AK	INT: QUICK, HP REMOTE MOUNT O3 CH
				G655AM	INT: QUICK, HP REMOTE MOUNT NO CH
				G655AN	INT: QUICK, HP REM MT 09 CH
Item No.					Description
X	X	X	X	0364332H02	SCREW ASSY, SEALING
X	X	X	X	3271902H01	FRAME SEAL, OVERMOLDED
X	X	X	X	HKN6110_	CABLE, POWER, 100W
X				HKN6186_	TRUNNION, CH REMOTE MOUNT
X			X	HKN6188_	CABLE, CH POWER AND SPEAKER
X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X	X	X	X	HKN6205_	REMOTE FLEX KIT
X				PHLN1000_	REMOTE ASSY, CHIB
X	X			HLN6863_	ACCESSORY CONNECTOR XTL5000
			X	HLN6961_	ASSEMBLY,ACCESSORY,CONNECTOR (CHIB)
X	X	X	X	HLN6980_	DUST CAPS KIT, CH + TRNS
X	X	X	X	HLN7003_	INSTALLATION HARDWARE HP KIT
X	X	X	X	HLN7017_	DC CONNECTOR BRACKET KIT
		X		PMLN4958_	O3 CAN 17' EXTENSION CABLE
		X		PMLN4959_	O3 ACCESSORY CABLE
			X	PMLN5420_	BRACKET,O9, STD TILTING MOUNT,FINISHED GOOD
X	X	X	X	PMUN1040_	APX 7500 STANDARD TIB HP

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 100 W & 700–800MHz 35 W Model Chart (Cont.)

M30TSS9PW1_N									
Option							Description		
						G442AJ	ADD: APX 7500 O5 CONTROL HEAD		
						G72AD	ADD: APX 7500 O3 HANDHELD CH		
						GA00092AC	ADD: APX 7500 DUAL-CONTROL HARDWARE		
						GA00093AB	ADD: APX 7500 TRI-CONTROL HARDWARE		
						GA00094AB	ADD: APX 7500 QUAD-CONTROL HARDWARE		
						GA00245AA	ADD: APX7500 O9 CONTROL HEAD		
						GA00804	ADD: APX 7500 O2 CONTROL HEAD		
						GA00805	ADD: APX 7500 O7 CONTROL HEAD		
						MHLN6979AS	ADD: MACK CONTROL BOARD		
							<b>Item No.</b>	<b>Description</b>	
					X		PMHN4193_	O2 FRONT HOUSING ( Grey )	
					X		PMHN4195_	O2 FRONT HOUSING ( Green )	
					X		PMHN4194_	O7 CONTROL HEAD ( English )	
					X		PMHN4192_	O7 CONTROL HEAD ( English_Chinese )	
					X		PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )	
					X		PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )	
					X		PMHN4191_	O7 CONTROL HEAD ( Siren and Light )	
X		X	X	X			PHCN4000_	O5 CONTROL HEAD	
		X					PMUN1034_	O3 CONTROL HEAD	
						X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION	
						X	NNTN7919_	ADP/DVP-XL ENCRYPTION	
						X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7921_	ADP/AES ENCRYPTION	
						X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION	
						X	NNTN7923_	ADP ENCRYPTION	
					X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT	
		X	X	X			HKN6186_	TRUNNION, CH REMOTE MOUNT	
		X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER	
		X	X	X			HLN6980_	COVER, DUST, KIT	
		X	X	X			0364332H02	SCREW, M3X.5	
		X	X	X			3364430H03	NEW LABEL FOR MOBILE RADIO	
		X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB	
		X	X	X			PHLN1000_	REMOTE ASSY, CHIB	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 100 W & 700–800MHz 35 W Model Chart (Cont.)

M30TSS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE W3 SIREN DEK
							X	HKN6146_	CABLE, W3 SIREN SWITCH BOX
		X						HLN1196_	WILDCARD
	X							HLN1228_	DEK STATUS SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
						X		HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA
							X	HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
		X	X	X				HLN1362_	DEK 8 MODE SYS 9000
			X	X				HLN1363_	DEK 16 MODE SYS 9000
				X				HLN1364_	DEK 24 MODE SYS 9000
					X	X X X X X		HLN1439_	SIREN ASTRO MOBILE
					X			HLN5157_	DEK MOUNTING HARDWARE
					X			HLN5331_	DEK 9000E SIREN/PA SPARE BUT
							X	HLN6819_	SIREN SWITCH BOX
X	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
X	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 100 W & 700–800MHz 35 W Model Chart (Cont.)

M30TSS9PW1_N									
Option								Description	
								GA00238AA	INT: REMOVABLE MEMORY BRD APX
								GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX
								B116BD	ADD: BUZZER 110MA APEX
								W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX
								G235AC	ADD: PTT FOOTSWITCH APEX
								W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX
								W688AR	ADD: EXT EMERG PUSHBUTTON APEX
								GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER
								GA00260AA	ADD: CABLE URC TO TRANSCEIVER
								GA00261AA	ADD: PEDESTAL MOUNT BALL JOINT
								GA00281AA	ADD: PEDESTAL MOUNT LOW SWIVEL
								Item No.	Description
	X	X						0310909A33	SCREW
	X							MHLN7000_	1G MEMORY EXPANSION BRD
		X						MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY
			X					HLN6953_	BUZZER KIT 110 MA
				X				HKN4258_	CABLE RELAY
					X			HLN6969_	EXTERNAL ALARM RELAY
						X		GLN7278_	PTT FOOTSWITCH
							X	HLN5113_	EMERGENCY FOOTSWITCH
							X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH
							X	3064153H02	ASSEMBLY,CABLE,SHIELDED
							X	40012006001	CIRCUIT BREAKER, 60A
							X	PMLN5421_	09, LOW SWIVEL MOUNT, G.JOHNSON
							X	PMLN5422_	09, 360 DEG SWIVEL MOUNT, RAM
							X	PMLN5436_	09 HUB, STD TILTING MOUNT
							X	PMKN4109_	WIRE, AWG 14
							X	PMUN1046_	09 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 7500 UHF Range 1 100 W & 700–800MHz 35 W Model Chart (Cont.)

M30TSS9PW1_N											
Option										Description	
G304AC										ADD: RS232 DATA INTFC CBL TRK APEX	
G308AD										ADD:USB DATA INTFC CABLE-DASH APEX	
G309AC										ADD: USB DATA INTFC CABLE-TRK APEX	
G582AC										ADD: REMOTE MOUNT CABLE 131 FT APEX	
G879AC										ADD:REMOTE MOUNT CBL 115 FEET APEX	
G607AC										ADD:CBL REMOTE MOUNT 75 FEET APEX	
G609AC										ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC										ADD: REMOTE MOUNT CBL 30 FEET APEX	
G628AC										ADD: REMOTE MOUNT CABLE 17 FT APEX	
G628AD										INT: REMOTE MOUNT CABLE 17 FT APEX	
G618AC										ADD:CBL REMOTE MOUNT 10 FEET APEX	
G927AB										INT:CONNECTOR RM MT APEX	
GA00589AA										ADD: GCAI EXTENSION CABLE 2 FT	
										Item No.	Description
X										HKN6161_	CABLE KIT 20' RS232/J2 DATA
	X									HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
		X								HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
			X							HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
				X						HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
					X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
						X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
							X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
								X		HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
									X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
									X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 7500 UHF Range 1 100 W & 700–800MHz 35 W Model Chart (Cont.)

M30TSS9PW1_N						
Option					Description	
				G892AB	ENH:HAND MIC,GCAI WTR RESISTANT APX	
			W20CA	ADD: KEYPAD MIC GCAI APEX		
			W22BA	ADD: STD PALM MICROPHONE APEX		
			W872AB	ADD:MIC VISOR STD APEX		
			W874AB	ADD:HANDSET/HANGUP MIC ARMR CBL APX		
			GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET		
			GA00304AA	ADD:PUSHBUTTON PTT APX		
					Item No.	Description
	X				HMN1089_	HAND MIC,GCAI (WATER RESISTANT)
		X			HMN4079_	KEYPAD MICROPHONE
			X		HMN1090_	STD PALM MICROPHONE (GCAI)
				X	RMN5054_	VISOR MIC
				X	HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
				X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
				X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 7500 UHF Range 1 100 W & 700–800MHz 35 W Model Chart (Cont.)**

<b>M30TSS9PW1_N</b>				
<b>Option</b>				<b>Description</b>
			G133AJ	INT: SAFETY DATA SHEET APEX
			G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX
			G146AE	INT: SAFETY LEAFLET WEEE APEX
			G657AD	INT: USER/INSTALL MANUAL CD APEX
			W947AT	ADD: RS232 PACKET DATA INTERFACE APX
<b>Item No.</b>				<b>Description</b>
X				NNTN7851_ SAFE & EFFICIENT OP OF MOT RDS
	X			6866537D37 SAFETY INFO MOBILE ANALOG EMEA
		X		6866537D90 WEEE SAFETY SUPPLEMENT
			X	PMLN5336_ APX 7500 CDROM O5 & O3 CH UG'S
			X	NVN5424_ DATA LINK MANAGER APPLICATION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 1 100 W & 700–800MHz 35 W Model Chart (Cont.)

M30TSS9PW1_N				
Option				Description
			B18CR	ADD: AUXILIARY SPKR 7.5 W APEX
			G832AD	ADD: SPKR 7.5W WTR RST
			W432AG	ENH: SPKR INCREASED AUDIO POWER APX
			G831AD	ADD: SPKR 13W WATER RESISTANT
			Item No.	Description
	X		HSN4031_	EXT SPKR 7.5W
		X	HSN4038_	EXT SPKR 7.5W
		X	HSN4032_	EXT SPKR 13W
		X	HSN4040_	EXT SPKR 13W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W & VHF 100 W Model Chart

M30TXS9PW1_N														
Option											Description			
												G296AD	ADD: ANT 1/4 WAVE 136-144 MHz	
												G297AD	ADD: ANT 1/4 WAVE 144-150.8 MHz	
												G299AE	ADD: ANT 1/4 WAVE 150.8-162 MHz	
												G300AE	ADD: ANT 1/4 WAVE 162-174 MHz	
												W652AN	ADD: ANT 1/4 WV BD-BAND 136-162 MHz	
												G629AB	ADD: ANT 1/4 WV BD-BAND 146-174 MHz	
												G792AB	ADD: ANT VHF WIDEBAND 136-174 MHz	
												G301AC	ADD: ANT 3 dB TUNABLE 132-174 MHz	
												G426AD	ADD: ANT 1/4 WAVE WHIP 450-470 MHZ	
												G428AD	ADD: ANT 3.5DB 450-470 MHZ	
												G427AB	ADD: ANT 3.5dB GAIN 380-433 MHz	
												G429AB	ADD: ANT 5.0dB GAIN 380-433 MHz	
												G425AC	ADD: ANT 1/4 WAVE WHIP 380-433 MHZ	
												G431AC	ADD: ANT 2 dB WIDEBAND 380-470 MHZ	
												GA00505AA	ADD: ANT 2DB WIDEBAND 380-520 MHZ	
												G430AC	ADD: ANT 5.0DB 445-470 MHZ	
												GA00226AA	ADD: GPS ANT THROUGH HOLE MOUNT	
												GA00270AA	ADD: GPS ANT GLASS MOUNT	
												GA00268AA	ADD: RFID	
											Item No.	Description		
X													HAD4006_	ANT 1/4 WAVE 136-144 MHz
	X												HAD4007_	ANT 1/4 WAVE 144-150.8 MHz
		X											HAD4008_	ANT 1/4 WAVE 150.8-162 MHz
			X										HAD4009_	ANT 1/4 WAVE 162-174 MHz
				X									HAD4016_	ANT 1/4 WAVE BD-BAND 136-162 MHz
					X								HAD4017_	ANT 1/4 WAVE BD-BAND 146-174 MHz
						X							HAD4021_	VHF ANT WIDEBAND 136-174 MHz
							X						RAD4010AR_	ANT 3dB TUNABLE 132-174 MHz
								X					HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHz
									X				HAE4011_	ANT 3.5 dB GAIN 450-470 MHz
										X			HAE6010_	ANT 3.5DB GAIN 380-433MHZ
											X		HAE6011_	ANT 5.0DB GAIN 380-433MHZ
												X	HAE6012_	ANT 1/4 WAVE WHIP 380-433MHZ
												X	HAE6013_	ANT 2 dB WIDEBAND 380-470 MHZ
												X	HAE6031_	ANT 2 dB WIDEBAND 380-520 MHZ
												X	RAE4014AR_	ANT 5.0 dB GAIN 445-470MHZ
												X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
												X	PMAN4001_	GPS ANT GLASS MOUNT
												X	HLN7014_	RFID

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 7500 UHF Range 1 100 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N					
				Option	Description
				G655AJ	INT: QUICK, HP REMOTE MOUNT O5 CH
				G655AK	INT: QUICK, HP REMOTE MOUNT O3 CH
				G655AM	INT: QUICK, HP REMOTE MOUNT NO CH
				G655AN	INT: QUICK, HP REM MT 09 CH
				Item No.	Description
X	X	X	X	0364332H02	SCREW ASSY, SEALING
X	X	X	X	3271902H01	FRAME SEAL, OVERMOLDED
X	X	X	X	HKN6110_	CABLE, POWER, 100W
X				HKN6186_	TRUNNION, CH REMOTE MOUNT
X			X	HKN6188_	CABLE, CH POWER AND SPEAKER
X				HKN6191_	CBL, REAR REMOTE FLEX ASSY (CHIB)
X	X	X	X	HKN6205_	REMOTE FLEX KIT
X				PHLN1000_	REMOTE ASSY, CHIB
X	X			HLN6863_	ACCESSORY CONNECTOR XTL5000
			X	HLN6961_	ASSEMBLY,ACCESSORY,CONNECTOR (CHIB)
X	X	X	X	HLN6980_	DUST CAPS KIT, CH + TRNS
X	X	X	X	HLN7003_	INSTALLATION HARDWARE HP KIT
X	X	X	X	HLN7017_	DC CONNECTOR BRACKET KIT
		X		PMLN4958_	O3 CAN 17' EXTENSION CABLE
		X		PMLN4959_	O3 ACCESSORY CABLE
			X	PMLN5420_	BRACKET,O9, STD TILTING MOUNT,FINISHED GOOD
X	X	X	X	PMUN1040_	APX 7500 STANDARD TIB HP

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N									
Option						Description			
G442AJ						ADD: APX 7500 O5 CONTROL HEAD			
G72AD						ADD: APX 7500 O3 HANDHELD CH			
GA00092AC						ADD: APX 7500 DUAL-CONTROL HARDWARE			
GA00093AB						ADD: APX 7500 TRI-CONTROL HARDWARE			
GA00094AB						ADD: APX 7500 QUAD-CONTROL HARDWARE			
GA00245AA						ADD: APX7500 O9 CONTROL HEAD			
GA00804						ADD: APX 7500 O2 CONTROL HEAD			
GA00805						ADD: APX 7500 O7 CONTROL HEAD			
MHLN6979AS						ADD: MACK CONTROL BOARD			
						Item No.		Description	
					X	PMHN4193_	O2 FRONT HOUSING ( Grey )		
					X	PMHN4195_	O2 FRONT HOUSING ( Green )		
					X	PMHN4194_	O7 CONTROL HEAD ( English )		
					X	PMHN4192_	O7 CONTROL HEAD ( English_Chinese )		
					X	PMHN4197_	O7 CONTROL HEAD ( English_Cyrillic )		
					X	PMHN4196_	O7 CONTROL HEAD ( English_Hebrew )		
					X	PMHN4191_	O7 CONTROL HEAD ( Siren and Light )		
X		X	X	X		PHCN4000_	O5 CONTROL HEAD		
	X					PMUN1034_	O3 CONTROL HEAD		
					X	NNTN7918_	ADP/AES/DVP-XL ENCRYPTION		
					X	NNTN7919_	ADP/DVP-XL ENCRYPTION		
					X	NNTN7920_	ADP/AES/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7921_	ADP/AES ENCRYPTION		
					X	NNTN7922_	ADP/DES/DES-XL/DES-OFB ENCRYPTION		
					X	NNTN7923_	ADP ENCRYPTION		
				X		PMUN1045_	ODYSSEY 9 CONTROL HEAD REMOTE MOUNT		
	X	X	X			HKN6186_	TRUNNION, CH REMOTE MOUNT		
	X	X	X			HKN6188_	CABLE, CH POWER AND SPEAKER		
	X	X	X			HLN6980_	DUST CAPS KIT, CH + TRNS		
	X	X	X			0364332H02	SCREW, M3X.5		
	X	X	X			HKN6191_	FLEX, CNTR HEAD TO CHIB		
	X	X	X			PHLN1000_	REMOTE ASSY, CHIB		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N									
Option								Description	
W374AJ								ADD: STATUS/MESSAGE 16 APEX	
W355AS								ADD: STATUS/MESSAGE 8 APEX	
W591AQ								ADD: AUXILIARY SWITCH PANEL APEX	
W599BF								ADD: 8 MODE DIRECT ENTRY APEX	
W614AT								ADD: 16 MODE DIRECT ENTRY APEX	
W615AW								ADD: 24 MODE DIRECT ENTRY APEX	
W269BQ								ADD: SIREN/PUBLIC ADDRESS O3 CH APEX	
W269BP								ADD: SIREN/PUBLIC ADDRESS O5 CH APEX	
W271AS								ADD: SIREN PA/SWITCH BOX O3 APEX	
W589BD								ADD: PUBLIC ADDRESS APEX	
W271AR								ADD: SIREN/PUBLIC ADDRESS 09 CH APX	
								Item No.	Description
X	X					X	X	6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X	X	6881093C18	SERVICE MANUAL AND USER GUIDE
						X	X X	6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X X X X	HKN4265_	FUSE CABLE
						X	X X	HKN4363_	CBL SPECTRA TO SIREN
						X		HKN6145_	CABLE O3 SIREN DEK
							X	HKN6146_	CABLE, O3 SIREN SWITCH BOX
			X					HLN1196_	AUX SWITCH PANEL
		X						HLN1228_	DEK STATUS
	X							HLN1229_	DEK STATUS/MESSAGE
						X		HLN1241_	DEK HSNB ASEM SIREN/PA
							X	HLN1338_	DEK SIREN PA
							X	HLN1339_	DEK PA
			X	X	X			HLN1362_	DEK 8 MODE
				X	X			HLN1363_	DEK 16 MODE
				X				HLN1364_	DEK 24 MODE
					X	X X X X X		HLN1439_	SIREN ASTRO MOBILE
					X			HLN5157_	DEK MOUNTING HARDWARE
					X			HLN5331_	DEK SIREN/PA SPARE BUTTON
							X	HLN6819_	SIREN SWITCH BOX
	X	X	X	X	X	X	X	HKN6189_	CABLE, CH DEK
	X	X	X	X	X	X	X	HLN6938_	HDWR DEK MOUNTING

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N										
Option								Description		
								GA00238AA	INT: REMOVABLE MEMORY BRD APX	
								GA00239AA	INT: REM MEM 3 DAY KEY RET BRD APX	
								B116BD	ADD: BUZZER 110MA APEX	
								W116AQ	ADD: EXTERNAL ALARM RELAY AND CABLE APX	
								G235AC	ADD: PTT FOOTSWITCH APEX	
								W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
								W688AR	ADD: EXT EMERG PUSHBUTTON APEX	
								GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER	
								GA00260AA	ADD: CABLE URC TO TRANSCEIVER	
								GA00261AA	ADD: PEDESTAL MOUNT BALL JOINT	
								GA00281AA	ADD: PEDESTAL MOUNT LOW SWIVEL	
								Item No.	Description	
	X	X						0310909A33	SCREW	
	X							MHLN7000_	1G MEMORY EXPANSION BRD	
		X						MHLN6999_	1G MEM EXPANSION BRD W/ 3 DAY KEY	
			X					HLN6953_	BUZZER KIT 110 MA	
				X				HKN4258_	CABLE RELAY	
					X			HLN6969_	EXTERNAL ALARM RELAY	
						X		GLN7278_	PTT FOOTSWITCH	
							X	HLN5113_	EMERGENCY FOOTSWITCH	
							X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH	
								X	3064153H02	ASSEMBLY,CABLE,SHIELDED
								X	40012006001	CIRCUIT BREAKER, 60A
								X	PMLN5421_	O9, LOW SWIVEL MOUNT, G.JOHNSON
								X	PMLN5422_	O9, 360 DEG SWIVEL MOUNT, RAM
								X	PMLN5436_	O9 HUB, STD TILTING MOUNT
								X	PMKN4109_	WIRE, AWG 14
								X	PMUN1046_	O9 RELAY CONTROL BOX

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 7500 UHF Range 1 100 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N										
Option									Description	
G304AC									ADD: RS232 DATA INTFC CBL TRK APEX	
G309AC									ADD: USB DATA INTFC CABLE-TRK APEX	
G582AC									ADD: REMOTE MOUNT CABLE 131 FT APEX	
G607AC									ADD:CBL REMOTE MOUNT 75 FEET APEX	
G609AC									ADD: REMOTE MOUNT CBL 50 FEET APEX	
G610AC									ADD: REMOTE MOUNT CBL 30 FEET APEX	
G618AC									ADD:CBL REMOTE MOUNT 10 FEET APEX	
G628AC									ADD: REMOTE MOUNT CABLE 17 FT APEX	
G879AC									ADD:REMOTE MOUNT CBL 115 FEET APEX	
G927AB									INT:CONNECTOR RM MT APEX	
GA00589AA									ADD: GCAI EXTENSION CABLE 2 FT	
									Item No.	Description
X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
	X								HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
		X							HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
			X						HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
				X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
					X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
						X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
							X		HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
								X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
								X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
								X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 7500 UHF Range 1 100 W & VHF 100 W Model Chart (Cont)**

<b>M30TXS9PW1_N</b>				
<b>Option</b>				<b>Description</b>
			G133AJ	INT: SAFETY DATA SHEET APEX
			G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX
			G146AE	INT: SAFETY LEAFLET WEEE APEX
			G657AD	INT: USER/INSTALL MANUAL CD APEX
			W947AT	ADD: RS232 PACKET DATA INTERFACE APX
<b>Item No.</b>				<b>Description</b>
X				6881095C99 CGISS MOB RADIO SAFETY BKLT
	X			6866537D37 SAFETY INFO MOBILE ANALOG EMEA
		X		6866537D90 WEEE SAFETY SUPPLEMENT
			X	PMLN5336_ APX 7500 CDROM O5 & O3 CH UG'S
			X	NVN5424_ SOFTWARE,ASSEMBLY,INF FILE CD

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N									
Option							Description		
G892AB							ENH: HAND MIC,GCAI WTR RESISTANT APX		
W20CA							ADD: KEYPAD MIC GCAI APEX		
W22BB							ADD: HAND MIC (MTRCYCLE WP MIC) APX		
W22BA							ADD: STD PALM MICROPHONE APEX		
W872AB							ADD: MIC VISOR STD APEX		
W874AB							ADD: HANDSET/HANGUP MIC ARMOR CBL APX		
GA00221AC							ADD: MODEL III GCAI KEYPAD HANDSET		
GA00304AA							ADD: PUSHBUTTON PTT APX		
							Item No.		Description
X							HMN1089_	HAND MIC,GCAI (WATER RESISTANT)	
	X						HMN4079_	KEYPAD MICROPHONE	
		X					HMN1079_	MODIFIED MOTORCYCLE WP MIC w/ DB9	
			X				HMN1090_	STD PALM MICROPHONE (GCAI)	
				X			RMN5054_	VISOR MIC	
					X		HKN1018_	HSET/HANGUP NORMAL ARMOURD CABLE	
						X	HMN4097_	MODEL III GCAI KEYPAD HANDSET	
						X	RLN5926_	PUSH BUTTON PTT	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 7500 UHF Range 1 100 W & VHF 100 W Model Chart (Cont)

M30TXS9PW1_N				
Option			Description	
		B18CR	ADD: AUXILIARY SPKR 7.5 W APEX	
		G832AD	ADD: SPKR 7.5W WTR RST	
		W432AG	ENH: SPKR INCREASED AUDIO POWER APX	
		G831AD	ADD: SPKR 13W WATER RESISTANT	
			Item No.	Description
	X		HSN4031_	EXT SPKR 7.5W
		X	HSN4038_	EXT SPKR 7.5W
		X	HSN4032_	EXT SPKR 13W
		X	HSN4040_	EXT SPKR 13W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart

M24KSS9PW1_N									
Option								Description	
G296AF								ADD: 1/4 WAVE WHIP ROOF TOP 136-144	
G297AF								ADD: 1/4 WAVE ROOF TOP 144-150.8	
G299AF								ADD: 1/4 WAVE ROOF TOP 150.8-162	
G300AF								ADD: 1/4 WAVE ROOF TOP ANT VHF	
W652AP								ALT: 1/4 WV BDBD ANT 136-162 MHZ	
G629AC								ADD: 1/4 WAVE BROADBAND ANT 146-174	
G792AC								ADD: VHF ANT WIDEBAND 136-174 MHZ	
G301AD								ADD:3BD ANT 136-174MHZ	
GA00226AA								ADD: GPS ANTENNA	
GA00270AA								ADD: GPS ANTENNA GLASS MT	
GA00268AA								ADD: RFID LABEL APEX	
								Item No.	Description
X								HAD4006_	ASSEMBLY,ANTENNA,ROOF TOP VHF
	X							HAD4007_	ANTENNA ROOF TOP VHF
		X						HAD4008_	ANTENNA, QUARTERWAVE, 152-162
			X					HAD4009_	ANTENNA ROOF TOP VHF
				X				HAD4016_	ANT ROOF MT WB VHF 136/162
					X			HAD4017_	ANT ROOF MT WB VHF 146/174
						X		HAD4021_	ASSEMBLY,ANTENNA,VHF ANT WIDEBAND 136-174 MHZ
							X	HAD4022_	ANTENNA, SPECTRUM, 136-174 MHZ
							X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
							X	PMAN4001_	GPS ANT GLASS MOUNT
							X	HLN7014_	RFID ASSEMBLY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N									
Option						Description			
G67CH						ADD: REMOTE MOUNT MOTORCYCLE O7 WWM			
G67CG						ADD: REMOTE MOUNT MOTORCYCLE O2 WWM			
G66AW						ADD: DASH MOUNT O2 WWM			
G66AX						ADD: DASH MOUNT O7 WWM			
G67CF						ADD: REMOTE MOUNT O2 WWM			
G67CE						ADD: REMOTE MOUNT O7 WWM			
W81AQ						ADD: KEY LOCK MOUNT APEX			
W15AJ						ADD: WETHR PROOF HSNG ENCLD BLK APEX			
W620AE						ADD: NO MTRCYCLE ENCL NEEDED APEX			
						Item No.		Description	
X	X			X	X	0364332H02	SCREW ASSY, SEALING		
X	X	X	X	X	X	3264059H03	SEAL, OVERMOLDED FRAME		
		X	X			HKN4191_	MOBILE POWER CBL LO/MED POWER		
				X	X	HKN4192_	MOBILE POWER CBL HI POWER 20'		
X	X			X	X	HKN6186_	TRUNNION, CH REMOTE MOUNT		
				X	X	HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER		
X	X			X	X	HKN6205_	REMOTE FLEX KIT		
					X	HLN6372_	KEYLOCK MT		
		X	X			HLN6863_	ACCESSORY CONNECTOR XTL5000		
X	X			X	X	HLN6980_	DUST CAPS KIT		
		X	X			HLN7025_	DUST CAP KIT		
X	X	X	X	X	X	HLN 6861_	TRUNNION HARDWARE KIT		
X	X			X	X	PMUN1038_	APX 7500 STANDARD TIB MP		
					X	HLN7022_	BLACK MOTORCYCLE ENCLOSURE		
					X	HLN6179_	MOTORCYCLE ADAPTER CONTROL HEAD SPEAKER		
					X	HLN6889_	XTL5000 MOTORCYCLE MOUNTING KIT		
		X	X			0104046J26	ASSEMBLY,FLEX CIRCUIT,O2/O7 DASH MOUNT FLEX ASSY		
		X	X	X		0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD		
X			X		X	03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL		
	X	X		X		03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED		
	X	X		X		03012063001	SCREW,SCREW ASSY, M4 X 0.7 X 27MM, WITH WASHER & SEAL		
X	X			X	X	5680002G03	PACKAGING,10X10 ANTI STATIC PE POUCH IN PINK		
X	X					3075217A02	CABLE ASSEMBLY,CABLE, MOTORCYCLE REMOTE (O5/M5)		
X	X			X	X	PMUN1057_	ASSEMBLY,KIT,CTRL HD END REM ASSEMBLY O2/O7		
X	X			X	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2/O7 CHIB FLEX ASSEMBLY		
X	X					HKN6032_	MOTORCYCLE POWER CABLE		
X	X					0715044C01	BRACKET,MOUNTING,STAINLESS STEEL,BRKT, MOTORCYCLE MOUNTING (O5/M5)		
X	X					HLN7026_	ASSEMBLY,KIT,CABLE,MCYCLE HEADSET CBL & LEAFLET		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N															
Option											Description				
												GA00804AA	ADD: APX O2 CONTROL HEAD (Grey)		
												GA00804AB	ADD: APX O2 CONTROL HEAD (Green)		
												G72AJ	ADD: APX O3 HANDHELD CH		
												GA00805AA	ADD: APX O7 CONTROL HEAD (Satandard Keypad)		
												GA00805AB	ADD: APX O7 CONTROL HEAD (Siren/Lights Keypad)		
												GA00805AC	ADD: APX O7 CONTROL HEAD (Hebrew)		
												GA00805AD	ADD: APX O7 CONTROL HEAD (Chinese)		
												GA00805AE	ADD: APX O7 CONTROL HEAD (Russian)		
												GA00092AF	ADD: APX DUAL-CONTROL HARDWARE (O7 Standard Keypad)		
												GA00092AG	ADD: APX DUAL-CONTROL HARDWARE (O7 Siren/Lights Keypad)		
												GA00092AH	ADD: APX DUAL-CONTROL HARDWARE (O7 Hebrew Keypad)		
												GA00092AJ	ADD: APX DUAL-CONTROL HARDWARE (O7 Chinese Keypad)		
												GA00092AK	ADD: APX DUAL-CONTROL HARDWARE (O7 Russian Keypad)		
												GA00092AL	ADD: APX DUAL-CONTROL HARDWARE (O2 Grey)		
													<b>Item No.</b>	<b>Description</b>	
X													X	PMHN4193_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREY)
	X													PMHN4195_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREEN)
						X	X	X	X	X	X			HKN6186_	TRUNION, CH REMOTE MOUNT
						X	X	X	X	X	X			HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER
		X												PMUN1034_	ASSEMBLY,KIT,CONTROL UNIT,O3 CONTROL HEAD
			X			X								PMHN4194_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH)
				X			X							PMHN4191_	ASSEMBLY,HOUSING,FRONT,O7 CH (SIREN & LIGHTS)
					X			X						PMHN4196_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_HEBREW)
					X					X				PMHN4192_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CHINESE)
						X						X		PMHN4197_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CYRILLIC)
						X	X	X	X	X				03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL
												X		03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
						X	X	X	X	X	X			0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSEMBLY
						X	X	X	X	X	X			3264059H03	SEAL,OVERMOLDED FRAME
						X	X	X	X	X	X			PMUN1057_	ASSEMBLY,KIT,CONTROL HEAD END REM ASSEMBLY O2/O7
						X	X	X	X	X	X			HLN6954_	ASSEMBLY,KIT,COVER,COVER, DUST, KIT
												X		0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
												X		03012063001	SCREW,SCREW ASSY,M4x0.7x27MM,WITH WASHER & SEAL

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N												
Option											Description	
GA00092AM											ADD: APX DUAL-CONTROL HARDWARE (O2 Green)	
GA00093AC											ADD: APX TRI-CONTROL HARDWARE (O7 Standard Keypad)	
GA00093AD											ADD: APX TRI-CONTROL HARDWARE (O7 Siren/Lights Keypad)	
GA00093AE											ADD: APX TRI-CONTROL HARDWARE (O7 Hebrew Keypad)	
GA00093AF											ADD: APX TRI-CONTROL HARDWARE (O7 Chinese Keypad)	
GA00093AG											ADD: APX TRI-CONTROL HARDWARE (O7 Russian Keypad)	
GA00093AH											ADD: APX TRI-CONTROL HARDWARE (O2 Grey)	
GA00093AJ											ADD: APX TRI-CONTROL HARDWARE (O2 Green)	
GA00094AC											ADD: APX QUAD-CONTROL HARDWARE (O7 Standard Keypad)	
GA00094AD											ADD: APX QUAD-CONTROL HARDWARE (O7 Siren/Lights Keypad)	
GA00094AE											ADD: APX QUAD-CONTROL HARDWARE (O7 Hebrew Keypad)	
GA00094AF											ADD: APX QUAD-CONTROL HARDWARE (O7 Chinese Keypad)	
GA00094AG											ADD: APX QUAD-CONTROL HARDWARE (O7 Russian Keypad)	
GA00094AH											ADD: APX QUAD-CONTROL HARDWARE (O2 Grey)	
GA00094AJ											ADD: APX QUAD-CONTROL HARDWARE (O2 Green)	
											Item No.	Description
										X	PMHN4193_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREY)
X										X	PMHN4195_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREEN)
X	X	X	X	X	X	X	X	X	X	X	HKN6186_	TRUNION, CH REMOTE MOUNT
X	X	X	X	X	X	X	X	X	X	X	HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER
		X									PMHN4194_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH)
			X								PMHN4191_	ASSEMBLY,HOUSING,FRONT,O7 CH (SIREN & LIGHTS)
				X							PMHN4196_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_HEBREW)
					X						PMHN4192_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CHINESE)
						X					PMHN4197_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CYRILLIC)
		X	X	X	X	X					03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL
X						X	X				03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
X	X	X	X	X	X	X	X	X	X	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSEMBLY
X	X	X	X	X	X	X	X	X	X	X	3264059H03	SEAL,OVERMOLDED FRAME
X	X	X	X	X	X	X	X	X	X	X	PMUN1057_	ASSEMBLY,KIT,CONTROL HEAD END REM ASSEMBLY O2/O7
X	X	X	X	X	X	X	X	X	X	X	HLN6954_	ASSEMBLY,KIT,COVER,COVER, DUST, KIT
X						X	X				0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
X						X	X				03012063001	SCREW,SCREW ASSY,M4x0.7x27MM,WITH WASHER & SEAL

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N				
Option			Description	
		G625AP		ENH: DES,DES-XL,DES-OFB ENCRYPTION
		W797BD		ENH: DVP-XL ENCRYPTION
		G843AH		ENH: AES ENCRYPTION
		G447AD		INT: NO ALGO PROVIDED
		X	NNTN8425_	AES ENCRYPTION
X			NNTN8426_	DES/DES-XL/DES-OFB ENCRYPTION
		X	NNTN8427_	ADP ENCRYPTION
	X		NNTN8428_	DVP-XL ENCRYPTION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N										
Option						Description				
									W374AJ	ADD: STATUS/MESSAGE 16 APEX
									W355AS	ADD: STATUS/MESSAGE 8 APEX
									W591AQ	ADD: AUXILIARY SWITCH PANEL APEX
									W599BF	ADD: 8 MODE DIRECT ENTRY APEX
									W614AT	ADD: 16 MODE DIRECT ENTRY APEX
									W615AW	ADD: 24 MODE DIRECT ENTRY APEX
									W271AR	ADD: SIREN/PUBLIC ADDRESS O7/O9 CONTROL HEAD APX
									GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER
									GA00814AA	ADD: DEK BOX FOR WHELEN SIREN
						Item No.		Description		
X	X							6880103W09	DIRECT ENTRY KEYBOARD INST MAN	
						X		6881094C81	INSTR MAN FOR HLN1439B SIREN PA	
						X	X	HKN4265_	FUSE CABLE	
						X		HKN4363_	CBL SPECTRA TO SIREN	
		X						HLN1196_	WILDCARD	
	X							HLN1228_	DEK STATUS/SYS 9000	
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000	
			X	X	X			HLN1362_	DEK 8 MODE SYS 9000	
				X	X			HLN1363_	DEK 16 MODE SYS 9000	
					X			HLN1364_	DEK 24 MODE SYS 9000	
						X		HLN1439_	ASSEMBLY,KIT,SIREN ASTRO MOBILE	
X	X		X	X	X		X	HKN6189_	KIT,CABLE,CABLE, CH DEK	
X	X		X	X	X		X	HLN6938_	ASSEMBLY,KIT,HDWR DEK MOUNTING	
							X	PMUN1046_	ASSEMBLY,KIT,HARDWARE,O9 RELAY CONTROL BOX	
							X	PMLN5436_	BRACKET,O9 HUB, STD TILTING MOUNT,FINISHED GOOD	
							X	40012006001	CIRCUIT BREAKER,CIRCUIT BREAKER,1,60A,30V-DC,CIRCUIT BREAKER, 60A	
							X	PMKN4109_	CABLE,WIRE, AWG 14,FINISHED GOOD	
							X	HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA	
							X	HLN5157_	DEK MOUNTING HARDWARE	
							X	HLN5331_	DEK 9000E SIREN/PA SPARE BUT	

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N				
Option				Description
			G235AC	ADD:PTT FOOTSWITCH APEX
			W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX
			W688AR	ADD: EXT EMERG PUSHBUTTON APEX
			GA00304AA	ADD:PUSHBUTTON PTT APX
Item No.				Description
	X			GLN7278_
		X		HLN5113_
			X	HLN5131_
			X	RLN5926_
				PTT FOOTSWITCH
				EMERGENCY FOOTSWITCH
				EMERGENCY PUSH BUTTON SWITCH
				PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N												
Option										Description		
										G303AB	ADD: RS232 DATA INTFC CBL DASH APEX	
										G304AC	ADD: RS232 DATA INTFC CBL TRK APEX	
										G308AD	ADD: USB DATA INTFC CABLE-DASH APEX	
										G309AC	ADD: USB DATA INTFC CABLE-TRK APEX	
										G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX	
										G879AC	ADD: REMOTE MOUNT CBL 115 FEET APEX	
										G607AC	ADD: CBL REMOTE MOUNT 75 FEET APEX	
										G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX	
										G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX	
										G628AC	ADD: REMOTE MOUNT CABLE 17 FT APEX	
										G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX	
										G618AC	ADD: CBL REMOTE MOUNT 10 FEET APEX	
										G927AB	INT: CONNECTOR RM MT APEX	
										GA00260AA	ADD: CABLE LIGHTBAR BOX TO TRANSCIEVER	
										GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT	
										Item No.	Description	
	X									HKN6160_	CABLE KIT 6' DASH MOUNT DATA	
		X								HKN6161_	CABLE KIT 20' RS232/J2 DATA	
			X							HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M	
				X						HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN	
					X					HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT	
						X				HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT	
							X			HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT	
								X		HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT	
									X	HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT	
							X	X		HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT	
									X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT	
										HLN6961_	ACCESSORY CONNECTOR RM (CHIB)	
										X	3064153H02	CABLE ASSEMBLY,SHIELD,4500MM L,ASSEMBLY,CABLE,SHIELDED
										X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N				
Option			Description	
		G133AJ	INT: SAFETY DATA SHEET APEX	
		G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
		G91AE	ADD: CONTROL STATION POWER SUPPLY APEX	
		W665BF	ADD: BASE STATION OP W/PS APEX	
			Item No.	Description
X			NNTN7851_	CGISS MOB RADIO SAFETY BKLT
	X		6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X	HPN4007_	PS 14V 15A UNI 117/240 VAC
		X	6880101W87	SPECTRA CTL STA INSTR MANUAL
		X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
		X	HLN6042_	DESK TRAY WITH SPEAKER
		X	HLN7024_	HDW INSTALLATION BASE TRAY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N									
Option								Description	
G892AB								ENH: HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD: MIC VISOR STD APEX	
W874AB								ADD: HANDSET/HANGUP MIC ARMR CBL APX	
W382AM								ADD: CONTROL STATION DESK GCAI MIC	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
G233AD								ADD: GOOSENECK PTT APEX	
G874AB								ADD: HANDSET/HANGUP (HANGUP CUP)	
G876AB								ADD: HANDSET/HANGUP COIL CBL APX	
								Item No.	Description
X								HMN1089_	HAND MIC, GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1090_	TRADITIONAL PALM MICROPHONE
			X					RMN5054_	VISOR MIC REMOTE MOUNT
				X				HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
					X			RMN5070_	DESKTOP MICROPHONE-NEW DESIGN
						X		HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	GLN7279_	GOOSENECK PTT
							X	HLN1457_	HANDSET/HANGUP MIC
							X	HKN1017_	HANDSET/HANGUP MIC COIL CBL

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N				
Option			Description	
		B18CR	ADD : AUXILIARY SPEAKER 7.5 W APEX	
		G832AD	ADD : SPEAKER 7.5 W WTR RST	
		W432AG	ENH : SPEAKER INCREASED AUDIO POWER APX	
		G831AD	ADD : SPEAKER 13 W WATER RESISTANT	
			Item No.	Description
	X		HSN4031_	EXT SPEAKER 7.5 W
		X	HSN4038_	EXT SPEAKER 7.5 W
		X	HSN4032_	EXT SPEAKER 13 W
		X	HSN4040_	EXT SPEAKER 13 W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 VHF 50 W Model Chart (Cont.)

M24KSS9PW1_N									
Option								Description	
GA00926AA								INT: USER / INSTALL MANUAL CD APX 4500/2500	
GA00926AB								INT: USER / INSTALL MANUAL CD APX 4500/2500 U	
GA01849AB								INT: LACR USER GUIDE	
GA01849AC								INT: LACR USER GUIDE U	
G213BN								INT: TRIPLE PACK KIT, MOBILE O2/O7	
G213BP								INT: DOUBLE PACK KIT, MOBILE O2/O7	
G213BR								INT: SINGLE PACK KIT, MOBILE O2/O7	
G213BS								INT: SINGLE PACK KIT, MOBILE DASH	
								Item No.	Description
X	X							PMLN5336_	APX 4500/2500 CDROM
		X	X					NNTN7930_	ASTRO USER GUIDE CD SP-PG-ENG
				X				HBN5104_	ASSEMBLY,PACKING,TRIPLE PACKING KIT
					X			HBN5103_	ASSEMBLY,PACKING,DOUBLE PACKING KIT
						X		HBN5102_	ASSEMBLY,PACKING,SINGLE PACKING KIT
							X	HBN5105_	ASSEMBLY,PACKING,SINGLE PACKING KIT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 2500 700–800 MHz 30–35 W Model Chart

M24URS9PW1_N						
Option						Description
					G174AF	ADD: ANT 3DB LOW-PROFILE 762-870
					G175AE	ADD: ANT 3DB ELEVATED FEED 762-870
					G335AY	ADD: ANT 1/4 WAVE 762-870MHZ
					W484AG	ALT: ANT 3DB GAIN 762-870MHZ
					GA00226AA	ADD: GPS ANTENNA
					GA00270AA	ADD: GPS ANTENNA GLASS MT
					GA00268AA	ADD: RFID LABEL APEX
Item No.						Description
	X					HAF4013A ANT 3DB LOW-PROFILE 762-870
		X				HAF4014A ANT 3DB ELEVATED FEED 762-870
			X			HAF4016A ANT 1/4 WAVE 762-870MHZ
				X		HAF4017A ADD: ANT 3DB COLLINEAR 762-870MHz
					X	HAG4000_ GPS ANT THROUGH HOLE MOUNT
					X	PMAN4001_ GPS ANT GLASS MOUNT
					X	HLN7014_ RFID ASSEMBLY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N									
Option						Description			
G67CH						ADD: REMOTE MOUNT MOTORCYCLE O7 WWM			
G67CG						ADD: REMOTE MOUNT MOTORCYCLE O2 WWM			
G66AW						ADD: DASH MOUNT O2 WWM			
G66AX						ADD: DASH MOUNT O7 WWM			
G67CE						ADD: REMOTE MOUNT O7 WWM			
G67CF						ADD: REMOTE MOUNT O2 WWM			
W81AQ						ADD: KEY LOCK MOUNT APEX			
W15AJ						ADD: WETHR PROOF HSNG ENCLD BLK APEX			
W620AE						ADD: NO MTRCYCLE ENCL NEEDED APEX			
						Item No.		Description	
X	X			X	X	0364332H02	SCREW ASSY, SEALING		
X	X	X	X	X	X	3264059H03	SEAL, OVERMOLDED FRAME		
		X	X			HKN4191_	MOBILE POWER CBL LO/MED POWER		
				X	X	HKN4192_	MOBILE POWER CBL HI POWER 20'		
X	X			X	X	HKN6186_	TRUNNION, CH REMOTE MOUNT		
				X	X	HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER		
X	X			X	X	HKN6205_	REMOTE FLEX KIT		
					X	HLN6372_	KEYLOCK MT		
		X	X			HLN6863_	ACCESSORY CONNECTOR XTL5000		
X	X			X	X	HLN6980_	DUST CAPS KIT		
		X	X			HLN7025_	DUST CAP KIT		
X	X	X	X	X	X	HLN 6861_	TRUNNION HARDWARE KIT		
X	X			X	X	PMUN1038_	APX 7500 STANDARD TIB MP		
					X	HLN7022_	BLACK MOTORCYCLE ENCLOSURE		
					X	HLN6179_	MOTORCYCLE ADAPTER CONTROL HEAD SPEAKER		
					X	HLN6889_	XTL5000 MOTORCYCLE MOUNTING KIT		
		X	X			0104046J26	ASSEMBLY,FLEX CIRCUIT,O2/O7 DASH MOUNT FLEX ASSY		
	X	X		X		0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD		
X		X	X			03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL		
	X	X		X		03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED		
	X	X		X		03012063001	SCREW,SCREW ASSY, M4 X 0.7 X 27MM, WITH WASHER & SEAL		
X	X			X	X	5680002G03	PACKAGING,10X10 ANTI STATIC PE POUCH IN PINK		
X	X					3075217A02	CABLE ASSEMBLY,CABLE, MOTORCYCLE REMOTE (O5/M5)		
X	X			X	X	PMUN1057_	ASSEMBLY,KIT,CTRL HD END REM ASSEMBLY O2/O7		
X	X			X	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2/O7 CHIB FLEX ASSEMBLY		
X	X					HKN6032_	MOTORCYCLE POWER CABLE		
X	X					0715044C01	BRACKET,MOUNTING,STAINLESS STEEL,BRKT, MOTORCYCLE MOUNTING (O5/M5)		
X	X					HLN7026_	ASSEMBLY,KIT,CABLE,MCYCLE HEADSET CBL & LEAFLET		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N															
Option											Description				
												GA00804AA	ADD: APX O2 CONTROL HEAD (Grey)		
												GA00804AB	ADD: APX O2 CONTROL HEAD (Green)		
												G72AJ	ADD: APX O3 HANDHELD CONTROL HEAD		
												GA00805AA	ADD: APX O7 CONTROL HEAD (Satandard Keypad)		
												GA00805AB	ADD: APX O7 CONTROL HEAD (Siren/Lights Keypad)		
												GA00805AC	ADD: APX O7 CONTROL HEAD (Hebrew)		
												GA00805AD	ADD: APX O7 CONTROL HEAD (Chinese)		
												GA00805AE	ADD: APX O7 CONTROL HEAD (Russian)		
												GA00092AF	ADD: APX DUAL-CONTROL HARDWARE (O7 Standard Keypad)		
												GA00092AG	ADD: APX DUAL-CONTROL HARDWARE (O7 Siren/Lights Keypad)		
												GA00092AH	ADD: APX DUAL-CONTROL HARDWARE (O7 Hebrew Keypad)		
												GA00092AJ	ADD: APX DUAL-CONTROL HARDWARE (O7 Chinese Keypad)		
												GA00092AK	ADD: APX DUAL-CONTROL HARDWARE (O7 Russian Keypad)		
												GA00092AL	ADD: APX DUAL-CONTROL HARDWARE (O2 Grey)		
													<b>Item No.</b>	<b>Description</b>	
X													X	PMHN4193_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREY)
	X													PMHN4195_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREEN)
						X	X	X	X	X	X			HKN6186_	TRUNION, CH REMOTE MOUNT
						X	X	X	X	X	X			HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER
		X												PMUN1034_	ASSEMBLY,KIT,CONTROL UNIT,O3 CONTROL HEAD
			X			X								PMHN4194_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH)
				X			X							PMHN4191_	ASSEMBLY,HOUSING,FRONT,O7 CH (SIREN & LIGHTS)
					X			X						PMHN4196_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_HEBREW)
						X				X				PMHN4192_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CHINESE)
							X					X		PMHN4197_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CYRILLIC)
							X	X	X	X	X			03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL
												X		03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
							X	X	X	X	X	X		0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSEMBLY
							X	X	X	X	X	X		3264059H03	SEAL,OVERMOLDED FRAME
							X	X	X	X	X	X		PMUN1057_	ASSEMBLY,KIT,CONTROL HEAD END REM ASSEMBLY O2/O7
							X	X	X	X	X	X		HLN6954_	ASSEMBLY,KIT,COVER,COVER, DUST, KIT
												X		0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
												X		03012063001	SCREW,SCREW ASSY,M4x0.7x27MM,WITH WASHER & SEAL

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N																
Option														Description		
GA00092AM														ADD: APX DUAL-CONTROL HARDWARE (O2 Green)		
GA00093AC														ADD: APX TRI-CONTROL HARDWARE (O7 Standard Keypad)		
GA00093AD														ADD: APX TRI-CONTROL HARDWARE (O7 Siren/Lights Keypad)		
GA00093AE														ADD: APX TRI-CONTROL HARDWARE (O7 Hebrew Keypad)		
GA00093AF														ADD: APX TRI-CONTROL HARDWARE (O7 Chinese Keypad)		
GA00093AG														ADD: APX TRI-CONTROL HARDWARE (O7 Russian Keypad)		
GA00093AH														ADD: APX TRI-CONTROL HARDWARE (O2 Grey)		
GA00093AJ														ADD: APX TRI-CONTROL HARDWARE (O2 Green)		
GA00094AC														ADD: APX QUAD-CONTROL HARDWARE (O7 Standard Keypad)		
GA00094AD														ADD: APX QUAD-CONTROL HARDWARE (O7 Siren/Lights Keypad)		
GA00094AE														ADD: APX QUAD-CONTROL HARDWARE (O7 Hebrew Keypad)		
GA00094AF														ADD: APX QUAD-CONTROL HARDWARE (O7 Chinese Keypad)		
GA00094AG														ADD: APX QUAD-CONTROL HARDWARE (O7 Russian Keypad)		
GA00094AH														ADD: APX QUAD-CONTROL HARDWARE (O2 Grey)		
GA00094AJ														ADD: APX QUAD-CONTROL HARDWARE (O2 Green)		
														<b>Item No.</b>	<b>Description</b>	
														X	PMHN4193_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREY)
X														X	PMHN4195_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREEN)
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HKN6186_	TRUNION, CH REMOTE MOUNT
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER
		X													PMHN4194_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH)
			X												PMHN4191_	ASSEMBLY,HOUSING,FRONT,O7 CH (SIREN & LIGHTS)
				X											PMHN4196_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_HEBREW)
					X										PMHN4192_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CHINESE)
						X									PMHN4197_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CYRILLIC)
		X	X	X	X	X			X	X	X	X	X		03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL
X						X	X							X	03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSEMBLY
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3264059H03	SEAL,OVERMOLDED FRAME
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMUN1057_	ASSEMBLY,KIT,CONTROL HEAD END REM ASSEMBLY O2/O7
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HLN6954_	ASSEMBLY,KIT,COVER,COVER, DUST, KIT
X						X	X							X	0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
X						X	X							X	03012063001	SCREW,SCREW ASSY,M4x0.7x27MM,WITH WASHER & SEAL

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N				
			Option	Description
			G625AP	ENH: DES,DES-XL,DES-OFB ENCRYPTION
			W797BD	ENH: DVP-XL ENCRYPTION
			G843AH	ENH: AES ENCRYPTION
			G447AD	INT: NO ALGO PROVIDED
		X	NNTN8425_	AES ENCRYPTION
X			NNTN8426_	DES/DES-XL/DES-OFB ENCRYPTION
		X	NNTN8427_	ADP ENCRYPTION
	X		NNTN8428_	DVP-XL ENCRYPTION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N										
Option						Description				
									W374AJ	ADD: STATUS/MESSAGE 16 APEX
									W355AS	ADD: STATUS/MESSAGE 8 APEX
									W591AQ	ADD: AUXILIARY SWITCH PANEL APEX
									W599BF	ADD: 8 MODE DIRECT ENTRY APEX
									W614AT	ADD: 16 MODE DIRECT ENTRY APEX
									W615AW	ADD: 24 MODE DIRECT ENTRY APEX
									W271AR	ADD: SIREN/PUBLIC ADDRESS O7/O9 CONTROL HEAD APX
									GA00259AA	ADD: UNIVERSAL RELAY CONTROLLER
									GA00814AA	ADD: DEK BOX FOR WHELEN SIREN
						Item No.		Description		
X	X							6880103W09	DIRECT ENTRY KEYBOARD INST MAN	
						X		6881094C81	INSTR MAN FOR HLN1439B SIREN PA	
						X	X	HKN4265_	FUSE CABLE	
						X		HKN4363_	CBL SPECTRA TO SIREN	
		X						HLN1196_	WILDCARD	
	X							HLN1228_	DEK STATUS/SYS 9000	
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000	
			X	X	X			HLN1362_	DEK 8 MODE SYS 9000	
				X	X			HLN1363_	DEK 16 MODE SYS 9000	
					X			HLN1364_	DEK 24 MODE SYS 9000	
						X		HLN1439_	ASSEMBLY,KIT,SIREN ASTRO MOBILE	
X	X		X	X	X		X	HKN6189_	KIT,CABLE,CABLE, CH DEK	
X	X		X	X	X		X	HLN6938_	ASSEMBLY,KIT,HDWR DEK MOUNTING	
							X	PMUN1046_	ASSEMBLY,KIT,HARDWARE,O9 RELAY CONTROL BOX	
							X	PMLN5436_	BRACKET,O9 HUB, STD TILTING MOUNT,FINISHED GOOD	
							X	40012006001	CIRCUIT BREAKER,CIRCUIT BREAKER,1,60A,30V-DC,CIRCUIT BREAKER, 60A	
							X	PMKN4109_	CABLE,WIRE, AWG 14,FINISHED GOOD	
							X	HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA	
							X	HLN5157_	DEK MOUNTING HARDWARE	
							X	HLN5331_	DEK 9000E SIREN/PA SPARE BUT	

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N				
Option			Description	
		G235AC	ADD:PTT FOOTSWITCH APEX	
		W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
		W688AR	ADD: EXT EMERG PUSHBUTTON APEX	
		GA00304AA	ADD:PUSHBUTTON PTT APX	
			Item No.	Description
	X		GLN7278_	PTT FOOTSWITCH
		X	HLN5113_	EMERGENCY FOOTSWITCH
		X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH
		X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N																
Option										Description						
										G303AB	ADD: RS232 DATA INTFC CBL DASH APEX					
										G304AC	ADD: RS232 DATA INTFC CBL TRK APEX					
										G308AD	ADD: USB DATA INTFC CABLE-DASH APEX					
										G309AC	ADD: USB DATA INTFC CABLE-TRK APEX					
										G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX					
										G879AC	ADD: REMOTE MOUNT CBL 115 FEET APEX					
										G607AC	ADD: CBL REMOTE MOUNT 75 FEET APEX					
										G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX					
										G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX					
										G628AC	ADD: REMOTE MOUNT CABLE 17 FT APEX					
										G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX					
										G618AC	ADD: CBL REMOTE MOUNT 10 FEET APEX					
										G927AB	INT: CONNECTOR RM MT APEX					
										GA00260AA	ADD: CABLE LIGHTBAR BOX TO TRANSCEIVER					
										GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT					
										Item No.	Description					
	X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA				
		X									HKN6161_	CABLE KIT 20' RS232/J2 DATA				
			X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M				
				X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN				
					X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT				
						X					HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT				
							X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT				
								X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT				
									X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT				
										X	X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT			
												X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT		
													X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)	
														X	3064153H02	CABLE ASSEMBLY,SHIELD,4500MM L,ASSEMBLY,CABLE,SHIELDED
														X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N				
			Option	Description
			G133AJ	INT: SAFETY DATA SHEET APEX
			G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX
			G91AE	ADD: CONTROL STATION POWER SUPPLY APEX
			W665BF	ADD: BASE STATION OP W/PS APEX
			Item No.	Description
X			NNTN7851_	CGISS MOB RADIO SAFETY BKLT
	X		6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X	HPN4007_	PS 14V 15A UNI 117/240 VAC
		X	6880101W87	SPECTRA CTL STA INSTR MANUAL
		X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
		X	HLN6042_	DESK TRAY WITH SPEAKER
		X	HLN7024_	HDW INSTALLATION BASE TRAY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N									
Option							Description		
G892AB							ENH: HAND MIC,GCAI WTR RESISTANT APX		
W20CA							ADD: KEYPAD MIC GCAI APEX		
W22BA							ADD: STD PALM MICROPHONE APEX		
W872AB							ADD: MIC VISOR STD APEX		
W874AB							ADD: HANDSET/HANGUP MIC ARMR CBL APX		
W382AM							ADD: CONTROL STATION DESK GCAI MIC		
GA00221AC							ADD: MODEL III GCAI KEYPAD HANDSET		
G233AD							ADD: GOOSENECK PTT APEX		
G874AB							ADD: HANDSET/HANGUP (HANGUP CUP)		
G876AB							ADD: HANDSET/HANGUP COIL CBL APX		
							Item No.		Description
X							HMN1089_	HAND MIC,GCAI (WATER RESISTANT)	
	X						HMN4079_	KEYPAD MICROPHONE	
		X					HMN1090_	TRADITIONAL PALM MICROPHONE	
			X				RMN5054_	VISOR MIC REMOTE MOUNT	
				X			HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE	
					X		RMN5070_	DESKTOP MICROPHONE-NEW DESIGN	
						X	HMN4097_	MODEL III GCAI KEYPAD HANDSET	
						X	GLN7279_	GOOSENECK PTT	
						X	HLN1457_	HANDSET/HANGUP MIC	
						X	HKN1017_	HANDSET/HANGUP MIC COIL CBL	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N					
Option			Description		
		B18CR	ADD : AUXILIARY SPEAKER 7.5 W APEX		
		G832AD	ADD : SPEAKER 7.5 W WTR RST		
		W432AG	ENH : SPEAKER INCREASED AUDIO POWER APX		
		G831AD	ADD : SPEAKER 13 W WATER RESISTANT		
			Item No.	Description	
	X		HSN4031_	EXT SPEAKER 7.5 W	
		X	HSN4038_	EXT SPEAKER 7.5 W	
			X	HSN4032_	EXT SPEAKER 13 W
			X	HSN4040_	EXT SPEAKER 13 W

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

### ASTRO APX 2500 700–800 MHz 30–35 W Model Chart (Cont.)

M24URS9PW1_N									
Option						Description			
						GA00926AA	INT: USER / INSTALL MANUAL CD APX 4500/2500		
						GA00926AB	INT: USER / INSTALL MANUAL CD APX 4500/2500 U		
						GA01849AB	INT: LACR USER GUIDE		
						GA01849AC	INT: LACR USER GUIDE U		
						G213BN	INT: TRIPLE PACK KIT, MOBILE O2/O7		
						G213BP	INT: DOUBLE PACK KIT, MOBILE O2/O7		
						G213BR	INT: SINGLE PACK KIT, MOBILE O2/O7		
						G213BS	INT: SINGLE PACK KIT, MOBILE DASH		
						Item No.		Description	
	X	X				PMLN5336_	APX 4500/2500 CDROM		
			X	X		NNTN7930_	ASTRO USER GUIDE CD SP-PG-ENG		
				X		HBN5104_	ASSEMBLY,PACKING,TRIPLE PACKING KIT		
					X	HBN5103_	ASSEMBLY,PACKING,DOUBLE PACKING KIT		
					X	HBN5102_	ASSEMBLY,PACKING,SINGLE PACKING KIT		
					X	HBN5105_	ASSEMBLY,PACKING,SINGLE PACKING KIT		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 1 40 W Model Chart

M24QSS9PW1_N									
Option								Description	
G427AB								ADD: ANT 3.5DB 380-433 MHZ MAXRAD	
G429AB								ADD: ANT 5.0DB 380-433 MHZ MAXRAD	
G430AC								ADD: ANT 5.0DB 445-470 MHZ	
G425AC								ADD: ANT 1/4 WAVE WHIP 380-433 MHZ	
G426AD								ADD: ANT 1/4 WAVE WHIP 450-470 MHZ	
G428AD								ADD: ANT 3.5DB 450-470 MHZ	
G431AC								ADD: ANT WIDEBAND 380-470 MHZ MAXRA	
GA00505AA								ADD: ANT 2DB WIDEBAND 380-520 MHZ	
GA00226AA								ADD: GPS ANTENNA	
GA00270AA								ADD: GPS ANTENNA GLASS MT	
GA00268AA								ADD: RFID LABEL APEX	
								Item No.	Description
X								HAE6010_	ANT 3.5DB 380-433 MHZ MAXRAD
	X							HAE6011_	ANT 5.0DB 380-433 MHZ MAXRAD
		X						RAE4014AR_	ANT 5.0DB 445-470 MHZ
			X					HAE6012_	ANT 1/4 WAVE WHIP 380-433 MHZ
				X				HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ
					X			HAE4011_	ANT 3.5DB 450-470 MHZ
						X		HAE6013_	ANT WIDEBAND 380-470 MHZ MAXRA
							X	HAE6031_	ADD: ANT 2DB WIDEBAND 380-520 MHZ
							X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
							X	PMAN4001_	GPS ANT GLASS MOUNT
							X	HLN7014_	RFID ASSEMBLY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N									
Option						Description			
G67CH						ADD: REMOTE MOUNT MOTORCYCLE O7 WWM			
G67CG						ADD: REMOTE MOUNT MOTORCYCLE O2 WWM			
G66AW						ADD: DASH MOUNT O2 WWM			
G66AX						ADD: DASH MOUNT O7 WWM			
G67CF						ADD: REMOTE MOUNT O2 WWM			
G67CE						ADD: REMOTE MOUNT O7 WWM			
W81AQ						ADD: KEY LOCK MOUNT APEX			
W15AJ						ADD: WETHR PROOF HSNG ENCLD BLK APEX			
W620AE						ADD: NO MTRCYCLE ENCL NEEDED APEX			
						Item No.		Description	
X	X			X	X	0364332H02	SCREW ASSY, SEALING		
X	X	X	X	X	X	3264059H03	SEAL, OVERMOLDED FRAME		
		X	X			HKN4191_	MOBILE POWER CBL LO/MED POWER		
				X	X	HKN4192_	MOBILE POWER CBL HI POWER 20'		
X	X			X	X	HKN6186_	TRUNNION, CH REMOTE MOUNT		
				X	X	HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER		
X	X			X	X	HKN6205_	REMOTE FLEX KIT		
					X	HLN6372_	KEYLOCK MT		
		X	X			HLN6863_	ACCESSORY CONNECTOR XTL5000		
X	X			X	X	HLN6980_	DUST CAPS KIT		
		X	X			HLN7025_	DUST CAP KIT		
X	X	X	X	X	X	HLN 6861_	TRUNNION HARDWARE KIT		
X	X			X	X	PMUN1038_	APX 7500 STANDARD TIB MP		
					X	HLN7022_	BLACK MOTORCYCLE ENCLOSURE		
					X	HLN6179_	MOTORCYCLE ADAPTER CONTROL HEAD SPEAKER		
					X	HLN6889_	XTL5000 MOTORCYCLE MOUNTING KIT		
		X	X			0104046J26	ASSEMBLY,FLEX CIRCUIT,O2/O7 DASH MOUNT FLEX ASSY		
		X	X	X		0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD		
X			X		X	03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL		
	X	X		X		03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED		
	X	X		X		03012063001	SCREW,SCREW ASSY, M4 X 0.7 X 27MM, WITH WASHER & SEAL		
X	X			X	X	5680002G03	PACKAGING,10X10 ANTI STATIC PE POUCH IN PINK		
X	X					3075217A02	CABLE ASSEMBLY,CABLE, MOTORCYCLE REMOTE (O5/M5)		
X	X			X	X	PMUN1057_	ASSEMBLY,KIT,CTRL HD END REM ASSEMBLY O2/O7		
X	X			X	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2/O7 CHIB FLEX ASSEMBLY		
X	X					HKN6032_	MOTORCYCLE POWER CABLE		
X	X					0715044C01	BRACKET,MOUNTING,STAINLESS STEEL,BRKT, MOTORCYCLE MOUNTING (O5/M5)		
X	X					HLN7026_	ASSEMBLY,KIT,CABLE,MCYCLE HEADSET CBL & LEAFLET		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N															
Option											Description				
												GA00804AA	ADD: APX O2 CONTROL HEAD (Grey)		
												GA00804AB	ADD: APX O2 CONTROL HEAD (Green)		
												G72AJ	ADD: APX O3 HANDHELD CH		
												GA00805AA	ADD: APX O7 CONTROL HEAD (Satandard Keypad)		
												GA00805AB	ADD: APX O7 CONTROL HEAD (Siren/Lights Keypad)		
												GA00805AC	ADD: APX O7 CONTROL HEAD (Hebrew)		
												GA00805AD	ADD: APX O7 CONTROL HEAD (Chinese)		
												GA00805AE	ADD: APX O7 CONTROL HEAD (Russian)		
												GA00092AF	ADD: APX DUAL-CONTROL HARDWARE (O7 Standard Keypad)		
												GA00092AG	ADD: APX DUAL-CONTROL HARDWARE (O7 Siren/Lights Keypad)		
												GA00092AH	ADD: APX DUAL-CONTROL HARDWARE (O7 Hebrew Keypad)		
												GA00092AJ	ADD: APX DUAL-CONTROL HARDWARE (O7 Chinese Keypad)		
												GA00092AK	ADD: APX DUAL-CONTROL HARDWARE (O7 Russian Keypad)		
												GA00092AL	ADD: APX DUAL-CONTROL HARDWARE (O2 Grey)		
													<b>Item No.</b>	<b>Description</b>	
	X												X	PMHN4193_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREY)
		X												PMHN4195_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREEN)
							X	X	X	X	X	X		HKN6186_	TRUNION, CH REMOTE MOUNT
							X	X	X	X	X	X		HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER
			X											PMUN1034_	ASSEMBLY,KIT,CONTROL UNIT,O3 CONTROL HEAD
			X				X							PMHN4194_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH)
				X				X						PMHN4191_	ASSEMBLY,HOUSING,FRONT,O7 CH (SIREN & LIGHTS)
				X					X					PMHN4196_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_HEBREW)
					X					X				PMHN4192_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CHINESE)
						X						X		PMHN4197_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CYRILLIC)
							X	X	X	X	X			03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL
												X		03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
							X	X	X	X	X	X		0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSEMBLY
							X	X	X	X	X	X		3264059H03	SEAL,OVERMOLDED FRAME
							X	X	X	X	X	X		PMUN1057_	ASSEMBLY,KIT,CONTROL HEAD END REM ASSEMBLY O2/O7
							X	X	X	X	X	X		HLN6954_	ASSEMBLY,KIT,COVER,COVER, DUST, KIT
													X	0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
													X	03012063001	SCREW,SCREW ASSY,M4x0.7x27MM,WITH WASHER & SEAL

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N																	
Option										Description							
GA00092AM										ADD: APX DUAL-CONTROL HARDWARE (O2 Green)							
GA00093AC										ADD: APX TRI-CONTROL HARDWARE (O7 Standard Keypad)							
GA00093AD										ADD: APX TRI-CONTROL HARDWARE (O7 Siren/Lights Keypad)							
GA00093AE										ADD: APX TRI-CONTROL HARDWARE (O7 Hebrew Keypad)							
GA00093AF										ADD: APX TRI-CONTROL HARDWARE (O7 Chinese Keypad)							
GA00093AG										ADD: APX TRI-CONTROL HARDWARE (O7 Russian Keypad)							
GA00093AH										ADD: APX TRI-CONTROL HARDWARE (O2 Grey)							
GA00093AJ										ADD: APX TRI-CONTROL HARDWARE (O2 Green)							
GA00094AC										ADD: APX QUAD-CONTROL HARDWARE (O7 Standard Keypad)							
GA00094AD										ADD: APX QUAD-CONTROL HARDWARE (O7 Siren/Lights Keypad)							
GA00094AE										ADD: APX QUAD-CONTROL HARDWARE (O7 Hebrew Keypad)							
GA00094AF										ADD: APX QUAD-CONTROL HARDWARE (O7 Chinese Keypad)							
GA00094AG										ADD: APX QUAD-CONTROL HARDWARE (O7 Russian Keypad)							
GA00094AH										ADD: APX QUAD-CONTROL HARDWARE (O2 Grey)							
GA00094AJ										ADD: APX QUAD-CONTROL HARDWARE (O2 Green)							
										Item No.		Description					
									X					X	PMHN4193_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREY)	
X									X					X	PMHN4195_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREEN)	
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HKN6186_	TRUNION, CH REMOTE MOUNT
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER
		X														PMHN4194_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH)
			X													PMHN4191_	ASSEMBLY,HOUSING,FRONT,O7 CH (SIREN & LIGHTS)
				X												PMHN4196_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_HEBREW)
					X											PMHN4192_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CHINESE)
						X										PMHN4197_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CYRILLIC)
		X	X	X	X	X					X	X	X	X	X	03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL
X							X	X							X	03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSEMBLY
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3264059H03	SEAL,OVERMOLDED FRAME
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMUN1057_	ASSEMBLY,KIT,CONTROL HEAD END REM ASSEMBLY O2/O7
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HLN6954_	ASSEMBLY,KIT,COVER,COVER, DUST, KIT
X							X	X							X	0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
X							X	X							X	03012063001	SCREW,SCREW ASSY,M4x0.7x27MM,WITH WASHER & SEAL

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N				
			Option	Description
			G625AP	ENH: DES,DES-XL,DES-OFB ENCRYPTION
			W797BD	ENH: DVP-XL ENCRYPTION
			G843AH	ENH: AES ENCRYPTION
			G447AD	INT: NO ALGO PROVIDED
		X	NNTN8425_	AES ENCRYPTION
X			NNTN8426_	DES/DES-XL/DES-OFB ENCRYPTION
		X	NNTN8427_	ADP ENCRYPTION
	X		NNTN8428_	DVP-XL ENCRYPTION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N									
Option						Description			
W374AJ						ADD: STATUS/MESSAGE 16 APEX			
W355AS						ADD: STATUS/MESSAGE 8 APEX			
W591AQ						ADD: AUXILIARY SWITCH PANEL APEX			
W599BF						ADD: 8 MODE DIRECT ENTRY APEX			
W614AT						ADD: 16 MODE DIRECT ENTRY APEX			
W615AW						ADD: 24 MODE DIRECT ENTRY APEX			
W271AR						ADD: SIREN/PUBLIC ADDRESS O7/O9 CONTROL HEAD APX			
GA00259AA						ADD: UNIVERSAL RELAY CONTROLLER			
GA00814AA						ADD: DEK BOX FOR WHELEN SIREN			
						Item No.		Description	
X	X						6880103W09	DIRECT ENTRY KEYBOARD INST MAN	
					X		6881094C81	INSTR MAN FOR HLN1439B SIREN PA	
					X	X	HKN4265_	FUSE CABLE	
					X		HKN4363_	CBL SPECTRA TO SIREN	
		X					HLN1196_	WILDCARD	
	X						HLN1228_	DEK STATUS/SYS 9000	
X							HLN1229_	DEK STATUS/MESSAGE SYS 9000	
			X	X	X		HLN1362_	DEK 8 MODE SYS 9000	
				X	X		HLN1363_	DEK 16 MODE SYS 9000	
					X		HLN1364_	DEK 24 MODE SYS 9000	
						X	HLN1439_	ASSEMBLY,KIT,SIREN ASTRO MOBILE	
X	X		X	X	X		X HKN6189_	KIT,CABLE,CABLE, CH DEK	
X	X		X	X	X		X HLN6938_	ASSEMBLY,KIT,HDWR DEK MOUNTING	
						X	PMUN1046_	ASSEMBLY,KIT,HARDWARE,O9 RELAY CONTROL BOX	
						X	PMLN5436_	BRACKET,O9 HUB, STD TILTING MOUNT,FINISHED GOOD	
						X	40012006001	CIRCUIT BREAKER,CIRCUIT BREAKER,1,60A,30V-DC,CIRCUIT BREAKER, 60A	
						X	PMKN4109_	CABLE,WIRE, AWG 14,FINISHED GOOD	
						X	HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA	
						X	HLN5157_	DEK MOUNTING HARDWARE	
						X	HLN5331_	DEK 9000E SIREN/PA SPARE BUT	

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N				
Option			Description	
		G235AC	ADD:PTT FOOTSWITCH APEX	
		W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
		W688AR	ADD: EXT EMERG PUSHBUTTON APEX	
		GA00304AA	ADD:PUSHBUTTON PTT APX	
			Item No.	Description
	X		GLN7278_	PTT FOOTSWITCH
		X	HLN5113_	EMERGENCY FOOTSWITCH
		X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH
		X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N											
Option											
Description											
										G303AB	ADD: RS232 DATA INTFC CBL DASH APEX
										G304AC	ADD: RS232 DATA INTFC CBL TRK APEX
										G308AD	ADD: USB DATA INTFC CABLE-DASH APEX
										G309AC	ADD: USB DATA INTFC CABLE-TRK APEX
										G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX
										G879AC	ADD: REMOTE MOUNT CBL 115 FEET APEX
										G607AC	ADD: CBL REMOTE MOUNT 75 FEET APEX
										G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX
										G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX
										G628AC	ADD: REMOTE MOUNT CABLE 17 FT APEX
										G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX
										G618AC	ADD: CBL REMOTE MOUNT 10 FEET APEX
										G927AB	INT: CONNECTOR RM MT APEX
										GA00260AA	ADD: CABLE LIGHTBAR BOX TO TRANSCIEVER
										GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT
										Item No.	Description
	X									HKN6160_	CABLE KIT 6' DASH MOUNT DATA
		X								HKN6161_	CABLE KIT 20' RS232/J2 DATA
			X							HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
				X						HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
					X					HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
						X				HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
							X			HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
								X		HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
									X	HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
								X	X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
									X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
									X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
									X	3064153H02	CABLE ASSEMBLY,SHIELD,4500MM L,ASSEMBLY,CABLE,SHIELDED
									X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N					
Option				Description	
			G133AJ	INT: SAFETY DATA SHEET APEX	
			G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
			G91AE	ADD: CONTROL STATION POWER SUPPLY APEX	
			W665BF	ADD: BASE STATION OP W/PS APEX	
			G799AC	ADD: PRINTED TEST RESULTS APEX	
				Item No.	Description
	X			NNTN7851_	CGISS MOB RADIO SAFETY BKLT
		X		6866537D37	SAFETY INFO MOBILE ANALOG EMEA
			X	HPN4007_	PS 14V 15A UNI 117/240 VAC
			X	6880101W87	SPECTRA CTL STA INSTR MANUAL
			X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
			X	HLN6042_	DESK TRAY WITH SPEAKER
			X	HLN7024_	HDW INSTALLATION BASE TRAY
			X	1205043A59	TEST DATA SHEET OPTION H799

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N									
Option								Description	
G892AB								ENH: HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD: MIC VISOR STD APEX	
W874AB								ADD: HANDSET/HANGUP MIC ARMR CBL APX	
W382AM								ADD: CONTROL STATION DESK GCAI MIC	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
G233AD								ADD: GOOSENECK PTT APEX	
G874AB								ADD: HANDSET/HANGUP (HANGUP CUP)	
G876AB								ADD: HANDSET/HANGUP COIL CBL APX	
								Item No.	Description
X								HMN1089_	HAND MIC, GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1090_	TRADITIONAL PALM MICROPHONE
			X					RMN5054_	VISOR MIC REMOTE MOUNT
				X				HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
					X			RMN5070_	DESKTOP MICROPHONE-NEW DESIGN
						X		HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	GLN7279_	GOOSENECK PTT
							X	HLN1457_	HANDSET/HANGUP MIC
							X	HKN1017_	HANDSET/HANGUP MIC COIL CBL

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N				
Option			Description	
		B18CR	ADD : AUXILIARY SPEAKER 7.5 W APEX	
		G832AD	ADD : SPEAKER 7.5 W WTR RST	
		W432AG	ENH : SPEAKER INCREASED AUDIO POWER APX	
		G831AD	ADD : SPEAKER 13 W WATER RESISTANT	
			Item No.	Description
	X		HSN4031_	EXT SPEAKER 7.5 W
		X	HSN4038_	EXT SPEAKER 7.5 W
		X	HSN4032_	EXT SPEAKER 13 W
		X	HSN4040_	EXT SPEAKER 13 W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 1 40 W Model Chart (Cont.)

M24QSS9PW1_N									
Option								Description	
GA00926AA		INT: USER / INSTALL MANUAL CD APX 4500/2500							
GA00926AB			INT: USER / INSTALL MANUAL CD APX 4500/2500 U						
GA01849AB				INT: LACR USER GUIDE					
GA01849AC					INT: LACR USER GUIDE U				
G213BN						INT: TRIPLE PACK KIT, MOBILE O2/O7			
G213BP							INT: DOUBLE PACK KIT, MOBILE O2/O7		
G213BR								INT: SINGLE PACK KIT, MOBILE O2/O7	
G213BS									INT: SINGLE PACK KIT, MOBILE DASH
								Item No.	Description
X	X							PMLN5336_	APX 4500/2500 CDROM
		X	X					NNTN7930_	ASTRO USER GUIDE CD SP-PG-ENG
				X				HBN5104_	ASSEMBLY,PACKING,TRIPLE PACKING KIT
					X			HBN5103_	ASSEMBLY,PACKING,DOUBLE PACKING KIT
						X		HBN5102_	ASSEMBLY,PACKING,SINGLE PACKING KIT
							X	HBN5105_	ASSEMBLY,PACKING,SINGLE PACKING KIT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 2500 UHF Range 2 45 W Model Chart

M24SSS9PW1_N															
Option									Description						
G486AC									ADD: 5DB GAIN ANT 494-512 MHZ						
G490AD									ADD: ANT 1/4 WAVE 470-512 MHZ						
G493AD									ADD: ANT 3 DB ROOF TOP 470-495 MHZ						
G494AD									ADD: ANT 3 DB ROOF TOP 494-512 MHZ						
G510AB									ADD:ANT LOW PROFILE 450-512 MHZ						
G430AC									ADD: ANT 5.0DB 445-470 MHZ						
G511AB									ADD:2DB ANT WIDEBAND 450-520 MHZ						
G426AD									ADD: ANT 1/4 WAVE WHIP 450-470 MHZ						
G428AD									ADD: ANT 3.5DB 450-470 MHZ						
GA00505AA									ADD: ANT 2DB WIDEBAND 380-520 MHZ						
GA00652AA									ADD: ANT ROOF TOP 5 DB 470-494 MHZ						
GA00226AA									ADD: GPS ANTENNA						
GA00270AA									ADD: GPS ANTENNA GLASS MT						
GA00268AA									ADD: RFID LABEL APEX						
Item No. Description															
X										RAE4016AR_	ANT ROOF TOP 5 DB, 494-512 MHZ				
	X									HAE4004_	ANT 1/4 WAVE 470-512 MHZ				
		X								HAE4012_	ANT ROOF TOP 3.5 DB 470-495 MHZ				
			X							HAE4013_	ANT ROOF TOP 3.5 DB 494-512 MHZ				
				X						HAE6016_	ANT LOW PROFILE 450-512 MHZ				
					X					RAE4014AR_	ANT 5.0DB 445-470 MHZ				
						X				HAE6015_	ANT 2DB WIDEBAND 450-520 MHZ				
							X			HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ				
								X		HAE4011_	ANT 3.5DB 450-470 MHZ				
									X	HAE6031_	ANT 2DB WIDEBAND 380-520 MHZ				
										X	RAE4015AR_	ANT ROOF TOP 5 DB 470-494 MHZ			
											X	HAG4000_	GPS ANT THROUGH HOLE MOUNT		
												X	PMAN4001_	GPS ANT GLASS MOUNT	
													X	HLN7014_	RFID ASSEMBLY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N									
Option						Description			
G67CH						ADD: REMOTE MOUNT MOTORCYCLE O7 WWM			
G67CG						ADD: REMOTE MOUNT MOTORCYCLE O2 WWM			
G66AW						ADD: DASH MOUNT O2 WWM			
G66AX						ADD: DASH MOUNT O7 WWM			
G67CF						ADD: REMOTE MOUNT O2 WWM			
G67CE						ADD: REMOTE MOUNT O7 WWM			
W81AQ						ADD: KEY LOCK MOUNT APEX			
W15AJ						ADD: WETHR PROOF HSNG ENCLD BLK APEX			
W620AE						ADD: NO MTRCYCLE ENCL NEEDED APEX			
						Item No.		Description	
X	X			X	X	0364332H02	SCREW ASSY, SEALING		
X	X	X	X	X	X	3264059H03	SEAL, OVERMOLDED FRAME		
		X	X			HKN4191_	MOBILE POWER CBL LO/MED POWER		
				X	X	HKN4192_	MOBILE POWER CBL HI POWER 20'		
X	X			X	X	HKN6186_	TRUNNION, CH REMOTE MOUNT		
				X	X	HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER		
X	X			X	X	HKN6205_	REMOTE FLEX KIT		
					X	HLN6372_	KEYLOCK MT		
		X	X			HLN6863_	ACCESSORY CONNECTOR XTL5000		
X	X			X	X	HLN6980_	DUST CAPS KIT		
		X	X			HLN7025_	DUST CAP KIT		
X	X	X	X	X	X	HLN 6861_	TRUNNION HARDWARE KIT		
X	X			X	X	PMUN1038_	APX 7500 STANDARD TIB MP		
					X	HLN7022_	BLACK MOTORCYCLE ENCLOSURE		
					X	HLN6179_	MOTORCYCLE ADAPTER CONTROL HEAD SPEAKER		
					X	HLN6889_	XTL5000 MOTORCYCLE MOUNTING KIT		
		X	X			0104046J26	ASSEMBLY,FLEX CIRCUIT,O2/O7 DASH MOUNT FLEX ASSY		
		X	X	X		0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD		
X			X		X	03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL		
	X	X		X		03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED		
	X	X		X		03012063001	SCREW,SCREW ASSY, M4 X 0.7 X 27MM, WITH WASHER & SEAL		
X	X			X	X	5680002G03	PACKAGING,10X10 ANTI STATIC PE POUCH IN PINK		
X	X					3075217A02	CABLE ASSEMBLY,CABLE, MOTORCYCLE REMOTE (O5/M5)		
X	X			X	X	PMUN1057_	ASSEMBLY,KIT,CTRL HD END REM ASSEMBLY O2/O7		
X	X			X	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2/O7 CHIB FLEX ASSEMBLY		
X	X					HKN6032_	MOTORCYCLE POWER CABLE		
X	X					0715044C01	BRACKET,MOUNTING,STAINLESS STEEL,BRKT, MOTORCYCLE MOUNTING (O5/M5)		
X	X					HLN7026_	ASSEMBLY,KIT,CABLE,MCYCLE HEADSET CBL & LEAFLET		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N													
Option											Description		
GA00804AA											ADD: APX O2 CONTROL HEAD (Grey)		
GA00804AB											ADD: APX O2 CONTROL HEAD (Green)		
G72AJ											ADD: APX O3 HANDHELD CH		
GA00805AA											ADD: APX O7 CONTROL HEAD (Satandard Keypad)		
GA00805AB											ADD: APX O7 CONTROL HEAD (Siren/Lights Keypad)		
GA00805AC											ADD: APX O7 CONTROL HEAD (Hebrew)		
GA00805AD											ADD: APX O7 CONTROL HEAD (Chinese)		
GA00805AE											ADD: APX O7 CONTROL HEAD (Russian)		
GA00092AF											ADD: APX DUAL-CONTROL HARDWARE (O7 Standard Keypad)		
GA00092AG											ADD: APX DUAL-CONTROL HARDWARE (O7 Siren/Lights Keypad)		
GA00092AH											ADD: APX DUAL-CONTROL HARDWARE (O7 Hebrew Keypad)		
GA00092AJ											ADD: APX DUAL-CONTROL HARDWARE (O7 Chinese Keypad)		
GA00092AK											ADD: APX DUAL-CONTROL HARDWARE (O7 Russian Keypad)		
GA00092AL											ADD: APX DUAL-CONTROL HARDWARE (O2 Grey)		
											Item No.		Description
X											X	PMHN4193_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREY)
	X											PMHN4195_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREEN)
						X	X	X	X	X	X	HKN6186_	TRUNION, CH REMOTE MOUNT
						X	X	X	X	X	X	HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER
		X										PMUN1034_	ASSEMBLY,KIT,CONTROL UNIT,O3 CONTROL HEAD
			X			X						PMHN4194_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH)
				X			X					PMHN4191_	ASSEMBLY,HOUSING,FRONT,O7 CH (SIREN & LIGHTS)
					X			X				PMHN4196_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_HEBREW)
						X				X		PMHN4192_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CHINESE)
							X				X	PMHN4197_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CYRILLIC)
						X	X	X	X	X		03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL
											X	03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
						X	X	X	X	X	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSEMBLY
						X	X	X	X	X	X	3264059H03	SEAL_OVERMOLDED FRAME
						X	X	X	X	X	X	PMUN1057_	ASSEMBLY,KIT,CONTROL HEAD END REM ASSEMBLY O2/O7
						X	X	X	X	X	X	HLN6954_	ASSEMBLY,KIT,COVER,COVER, DUST, KIT
											X	0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
											X	03012063001	SCREW,SCREW ASSY,M4x0.7x27MM,WITH WASHER & SEAL

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N																
Option														Description		
GA00092AM														ADD: APX DUAL-CONTROL HARDWARE (O2 Green)		
GA00093AC														ADD: APX TRI-CONTROL HARDWARE (O7 Standard Keypad)		
GA00093AD														ADD: APX TRI-CONTROL HARDWARE (O7 Siren/Lights Keypad)		
GA00093AE														ADD: APX TRI-CONTROL HARDWARE (O7 Hebrew Keypad)		
GA00093AF														ADD: APX TRI-CONTROL HARDWARE (O7 Chinese Keypad)		
GA00093AG														ADD: APX TRI-CONTROL HARDWARE (O7 Russian Keypad)		
GA00093AH														ADD: APX TRI-CONTROL HARDWARE (O2 Grey)		
GA00093AJ														ADD: APX TRI-CONTROL HARDWARE (O2 Green)		
GA00094AC														ADD: APX QUAD-CONTROL HARDWARE (O7 Standard Keypad)		
GA00094AD														ADD: APX QUAD-CONTROL HARDWARE (O7 Siren/Lights Keypad)		
GA00094AE														ADD: APX QUAD-CONTROL HARDWARE (O7 Hebrew Keypad)		
GA00094AF														ADD: APX QUAD-CONTROL HARDWARE (O7 Chinese Keypad)		
GA00094AG														ADD: APX QUAD-CONTROL HARDWARE (O7 Russian Keypad)		
GA00094AH														ADD: APX QUAD-CONTROL HARDWARE (O2 Grey)		
GA00094AJ														ADD: APX QUAD-CONTROL HARDWARE (O2 Green)		
														Item No.	Description	
														X	PMHN4193_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREY)
X														X	PMHN4195_	ASSEMBLY,HOUSING,FRONT,KIT,FRONT HOUSING, O2 CONTROL HEAD (GREEN)
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HKN6186_	TRUNION, CH REMOTE MOUNT
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HKN6188_	CABLE, CONTROL HEAD POWER AND SPEAKER
		X													PMHN4194_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH)
			X												PMHN4191_	ASSEMBLY,HOUSING,FRONT,O7 CH (SIREN & LIGHTS)
				X											PMHN4196_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_HEBREW)
					X										PMHN4192_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CHINESE)
						X									PMHN4197_	ASSEMBLY,HOUSING,FRONT,O7 CH (ENGLISH_CYRILLIC)
		X	X	X	X	X									03012062001	SCREW,SCREW ASSY, M3 X 0.5 X 39MM, WITH WASHER & SEAL
X							X	X						X	03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSEMBLY
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3264059H03	SEAL,OVERMOLDED FRAME
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PMUN1057_	ASSEMBLY,KIT,CONTROL HEAD END REM ASSEMBLY O2/O7
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HLN6954_	ASSEMBLY,KIT,COVER,COVER, DUST, KIT
X							X	X						X	0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
X							X	X						X	03012063001	SCREW,SCREW ASSY,M4x0.7x27MM,WITH WASHER & SEAL

X = Item Included  
 \_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N				
			Option	Description
			G625AP	ENH: DES,DES-XL,DES-OFB ENCRYPTION
			W797BD	ENH: DVP-XL ENCRYPTION
			G843AH	ENH: AES ENCRYPTION
			G447AD	INT: NO ALGO PROVIDED
		X	NNTN8425_	AES ENCRYPTION
X			NNTN8426_	DES/DES-XL/DES-OFB ENCRYPTION
		X	NNTN8427_	ADP ENCRYPTION
	X		NNTN8428_	DVP-XL ENCRYPTION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N									
Option						Description			
									ADD: STATUS/MESSAGE 16 APEX
									ADD: STATUS/MESSAGE 8 APEX
									ADD: AUXILIARY SWITCH PANEL APEX
									ADD: 8 MODE DIRECT ENTRY APEX
									ADD: 16 MODE DIRECT ENTRY APEX
									ADD: 24 MODE DIRECT ENTRY APEX
									ADD: SIREN/PUBLIC ADDRESS O7/O9 CONTROL HEAD APX
									ADD: UNIVERSAL RELAY CONTROLLER
									ADD: DEK BOX FOR WHELEN SIREN
						Item No.		Description	
X	X							6880103W09	DIRECT ENTRY KEYBOARD INST MAN
						X		6881094C81	INSTR MAN FOR HLN1439B SIREN PA
						X	X	HKN4265_	FUSE CABLE
						X		HKN4363_	CBL SPECTRA TO SIREN
		X						HLN1196_	WILDCARD
	X							HLN1228_	DEK STATUS/SYS 9000
X								HLN1229_	DEK STATUS/MESSAGE SYS 9000
			X	X	X			HLN1362_	DEK 8 MODE SYS 9000
				X	X			HLN1363_	DEK 16 MODE SYS 9000
					X			HLN1364_	DEK 24 MODE SYS 9000
						X		HLN1439_	ASSEMBLY,KIT,SIREN ASTRO MOBILE
X	X		X	X	X		X	HKN6189_	KIT,CABLE,CABLE, CH DEK
X	X		X	X	X		X	HLN6938_	ASSEMBLY,KIT,HDWR DEK MOUNTING
							X	PMUN1046_	ASSEMBLY,KIT,HARDWARE,O9 RELAY CONTROL BOX
							X	PMLN5436_	BRACKET,O9 HUB, STD TILTING MOUNT,FINISHED GOOD
							X	40012006001	CIRCUIT BREAKER,CIRCUIT BREAKER,1,60A,30V-DC,CIRCUIT BREAKER, 60A
							X	PMKN4109_	CABLE,WIRE, AWG 14,FINISHED GOOD
							X	HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA
							X	HLN5157_	DEK MOUNTING HARDWARE
							X	HLN5331_	DEK 9000E SIREN/PA SPARE BUT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N				
Option			Description	
		G235AC	ADD:PTT FOOTSWITCH APEX	
		W470AT	ADD: EMERG ID EXT. FOOTSWITCH APEX	
		W688AR	ADD: EXT EMERG PUSHBUTTON APEX	
		GA00304AA	ADD:PUSHBUTTON PTT APX	
			Item No.	Description
	X		GLN7278_	PTT FOOTSWITCH
		X	HLN5113_	EMERGENCY FOOTSWITCH
		X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH
		X	RLN5926_	PUSH BUTTON PTT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N															
Option											Description				
											G303AB	ADD: RS232 DATA INTFC CBL DASH APEX			
											G304AC	ADD: RS232 DATA INTFC CBL TRK APEX			
											G308AD	ADD: USB DATA INTFC CABLE-DASH APEX			
											G309AC	ADD: USB DATA INTFC CABLE-TRK APEX			
											G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX			
											G879AC	ADD: REMOTE MOUNT CBL 115 FEET APEX			
											G607AC	ADD: CBL REMOTE MOUNT 75 FEET APEX			
											G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX			
											G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX			
											G628AC	ADD: REMOTE MOUNT CABLE 17 FT APEX			
											G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX			
											G618AC	ADD: CBL REMOTE MOUNT 10 FEET APEX			
											G927AB	INT: CONNECTOR RM MT APEX			
											GA00260AA	ADD: CABLE LIGHTBAR BOX TO TRANSCEIVER			
											GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT			
											Item No.	Description			
	X											HKN6160_	CABLE KIT 6' DASH MOUNT DATA		
		X										HKN6161_	CABLE KIT 20' RS232/J2 DATA		
			X									HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M		
				X								HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN		
					X							HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT		
						X						HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT		
							X					HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT		
								X				HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT		
									X			HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT		
										X	X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT		
											X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT		
												X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)	
													X	3064153H02	CABLE ASSEMBLY,SHIELD,4500MM L,ASSEMBLY,CABLE,SHIELDED
													X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N					
Option				Description	
			G133AJ	INT: SAFETY DATA SHEET APEX	
			G146AF	INT: SAFETY LEAFLET EMEA/MCIL APEX	
			G91AE	ADD: CONTROL STATION POWER SUPPLY APEX	
			W665BF	ADD: BASE STATION OP W/PS APEX	
			G799AC	ADD: PRINTED TEST RESULTS APEX	
				Item No.	Description
X				NNTN7851_	CGISS MOB RADIO SAFETY BKLT
	X			6866537D37	SAFETY INFO MOBILE ANALOG EMEA
		X		HPN4007_	PS 14V 15A UNI 117/240 VAC
			X	6880101W87	SPECTRA CTL STA INSTR MANUAL
			X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
			X	HLN6042_	DESK TRAY WITH SPEAKER
			X	HLN7024_	HDW INSTALLATION BASE TRAY
			X	1205043A59	TEST DATA SHEET OPTION H799

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N									
Option								Description	
G892AB								ENH: HAND MIC,GCAI WTR RESISTANT APX	
W20CA								ADD: KEYPAD MIC GCAI APEX	
W22BA								ADD: STD PALM MICROPHONE APEX	
W872AB								ADD: MIC VISOR STD APEX	
W874AB								ADD: HANDSET/HANGUP MIC ARMR CBL APX	
W382AM								ADD: CONTROL STATION DESK GCAI MIC	
GA00221AC								ADD: MODEL III GCAI KEYPAD HANDSET	
G233AD								ADD: GOOSENECK PTT APEX	
G874AB								ADD: HANDSET/HANGUP (HANGUP CUP)	
G876AB								ADD: HANDSET/HANGUP COIL CBL APX	
								Item No.	Description
X								HMN1089_	HAND MIC, GCAI (WATER RESISTANT)
	X							HMN4079_	KEYPAD MICROPHONE
		X						HMN1090_	TRADITIONAL PALM MICROPHONE
			X					RMN5054_	VISOR MIC REMOTE MOUNT
				X				HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
					X			RMN5070_	DESKTOP MICROPHONE-NEW DESIGN
						X		HMN4097_	MODEL III GCAI KEYPAD HANDSET
							X	GLN7279_	GOOSENECK PTT
							X	HLN1457_	HANDSET/HANGUP MIC
							X	HKN1017_	HANDSET/HANGUP MIC COIL CBL

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N				
Option			Description	
	X	B18CR	ADD : AUXILIARY SPEAKER 7.5 W APEX	
		G832AD	ADD : SPEAKER 7.5 W WTR RST	
		W432AG	ENH : SPEAKER INCREASED AUDIO POWER APX	
		G831AD	ADD : SPEAKER 13 W WATER RESISTANT	
			Item No.	Description
	X		HSN4031_	EXT SPEAKER 7.5 W
		X	HSN4038_	EXT SPEAKER 7.5 W
		X	HSN4032_	EXT SPEAKER 13 W
		X	HSN4040_	EXT SPEAKER 13 W

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 2500 UHF Range 2 45 W Model Chart (Cont.)

M24SSS9PW1_N									
Option								Description	
GA00926AA		INT: USER / INSTALL MANUAL CD APX 4500/2500							
GA00926AB			INT: USER / INSTALL MANUAL CD APX 4500/2500 U						
GA01849AB				INT: LACR USER GUIDE					
GA01849AC					INT: LACR USER GUIDE U				
G213BN						INT: TRIPLE PACK KIT, MOBILE O2/O7			
G213BP							INT: DOUBLE PACK KIT, MOBILE O2/O7		
G213BR								INT: SINGLE PACK KIT, MOBILE O2/O7	
G213BS									INT: SINGLE PACK KIT, MOBILE DASH
								Item No.	Description
X	X							PMLN5336_	APX 4500/2500 CDROM
		X	X					NNTN7930_	ASTRO USER GUIDE CD SP-PG-ENG
				X				HBN5104_	ASSEMBLY,PACKING,TRIPLE PACKING KIT
					X			HBN5103_	ASSEMBLY,PACKING,DOUBLE PACKING KIT
						X		HBN5102_	ASSEMBLY,PACKING,SINGLE PACKING KIT
							X	HBN5105_	ASSEMBLY,PACKING,SINGLE PACKING KIT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart

M22KSS9PW1_N									
Option								Description	
G296AF								ADD: 1/4 WAVE WHIP ROOF TOP 136-144	
G297AF								ADD: 1/4 WAVE ROOF TOP 144-150.8	
G299AF								ADD: 1/4 WAVE ROOF TOP 150.8-162	
G300AF								ADD: 1/4 WAVE ROOF TOP ANT VHF	
W652AP								ALT: 1/4 WV BDBD ANT 136-162 MHZ	
G629AC								ADD: 1/4 WAVE BROADBAND ANT 146-174	
G792AC								ADD: VHF ANT WIDEBAND 136-174 MHZ	
G301AD								ADD:3BD ANT 136-174MHZ	
GA00226AA								ADD: GPS ANTENNA	
GA00270AA								ADD: GPS ANTENNA GLASS MT	
GA00268AA								ADD: RFID LABEL APEX	
								Item No.	Description
X								HAD4006_	ASSEMBLY,ANTENNA,ROOF TOP VHF
	X							HAD4007_	ANTENNA ROOF TOP VHF
		X						HAD4008_	ANTENNA, QUARTERWAVE, 152-162
			X					HAD4009_	ANTENNA ROOF TOP VHF
				X				HAD4016_	ANT ROOF MT WB VHF 136/162
					X			HAD4017_	ANT ROOF MT WB VHF 146/174
						X		HAD4021_	ASSEMBLY,ANTENNA,VHF ANT WIDEBAND 136-174 MHZ
							X	HAD4022_	ANTENNA, SPECTRUM, 136-174 MHZ
							X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
							X	PMAN4001_	GPS ANT GLASS MOUNT
							X	HLN7014_	RFID ASSEMBLY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart (Cont.)

M22KSS9PW1_N			
		Option	Description
		G66AW	ADD: DASH MOUNT O2 WWM
		G67CF	ADD: REMOTE MOUNT O2 WWM
		W81AQ	ADD: KEY LOCK MOUNT APEX
		Item No.	Description
	X	0364332H02	SCREW ASSY, SEALING
X	X	3264059H03	SEAL, OVERMOLDED FRAME
X		HKN4191_	MOBILE PWR CBL LO/MED PWR
	X	HKN4192_	MOBILE PWR CBL HIPWR 20'
	X	HKN6186_	TRUNNION, CH REMOTE MOUNT
	X	HKN6188_	CABLE, CH POWER AND SPEAKER
	X	HKN6205_	REMOTE FLEX KIT
		X HLN6372_	KEYLOCK MT
X		HLN6863_	ACCESSORY CONNECTOR XTL5000
	X	HLN6980_	DUST CAPS KIT
X		HLN7025_	DUST CAP KIT
X	X	HLN6861_	TRUNNION HARDWARE KIT
	X	PMUN1038_	APX7500 STANDARD TIB MP
X		0104046J26	ASSEMBLY,FLEX CIRCUIT,O2O7 DASH MOUNT FLEX ASSEMBLY
	X	X 0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
X	X	03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
X	X	03012063001	SCREW,SCREW ASSY, M4 X 0.7 X 27MM, WITH WASHER & SEAL
	X	5680002G03	PACKAGING,10X10 ANTI STATIC PE POUCH IN PINK
	X	PMUN1057_	ASSEMBLY,KIT,CTRL HD END REM ASSY O2O7
	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22KSS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		GA00804AA	ADD: APX O2 CONTROL HEAD (Grey)
		G843AH	ENH: AES ENCRYPTION
		G447AD	INT: NO ALGO PROVIDED
		<b>Item No.</b>	<b>Description</b>
	X	PMHN4193_	KIT,FRONT HOUSING, O2 CH (GREY)
		X NNTN8425_	AES ENCRYPTION
		X NNTN8427_	ADP ENCRYPTION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart (Cont.)

M22KSS9PW1_N									
Option						Description			
W374AJ						ADD: STATUS/MESSAGE 16 APEX			
W355AS						ADD: STATUS/MESSAGE 8 APEX			
W591AQ						ADD: AUXILIARY SWITCH PANEL APEX			
W599BF						ADD: 8 MODE DIRECT ENTRY APEX			
W614AT						ADD: 16 MODE DIRECT ENTRY APEX			
W615AW						ADD: 24 MODE DIRECT ENTRY APEX			
GA00814AA						ADD: DEK BOX FOR WHELEN SIREN			
						Item No.		Description	
X	X					6880103W09	DIRECT ENTRY KEYBOARD INST MAN		
						X HKN4265_	FUSE CABLE		
		X				HLN1196_	WILDCARD		
	X					HLN1228_	DEK STATUS SYS 9000		
X						HLN1229_	DEK STATUS/MESSAGE SYS 9000		
			X	X	X	HLN1362_	DEK 8 MODE SYS 9000		
				X	X	HLN1363_	DEK 16 MODE SYS 9000		
					X	HLN1364_	DEK 24 MODE SYS 9000		
X	X		X	X	X	X HKN6189_	KIT,CABLE,CABLE, CH DEK		
X	X		X	X	X	X HLN6938_	ASSEMBLY,KIT,HDWR DEK MOUNTING		
						X HLN1241_	DEK HSNB ASEM SYS9000 SIREN/PA		
						X HLN5157_	DEK MOUNTING HARDWARE		
						X HLN5331_	DEK 9000E SIREN/PA SPARE BUT		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



**ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22KSS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		W470AT	ADD: EMERGENCY ID EXT. FOOTSWITCH APEX
		W688AR	ADD: EXT EMERGENCY PUSHBUTTON APEX
		<b>Item No.</b>	<b>Description</b>
X		HLN5113_	EMERGENCY FOOTSWITCH
	X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

### ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart (Cont.)

M22KSS9PW1_N									
Option								Description	
								G303AB	ADD: RS232 DATA INTFC CBL DASH APEX
								G304AC	ADD: RS232 DATA INTFC CBL TRK APEX
								G308AD	ADD: USB DATA INTFC CABLE-DASH APEX
								G309AC	ADD: USB DATA INTFC CABLE-TRK APEX
								G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX
								G879AC	ADD: REMOTE MOUNT CBL 115 FEET APEX
								G607AC	ADD: CBL REMOTE MOUNT 75 FEET APEX
								G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX
								G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX
								G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX
								G618AC	ADD: CBL REMOTE MOUNT 10 FEET APEX
								G927AB	INT: CONNECTOR RM MT APEX
								GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT
								Item No.	Description
X								HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X							HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X						HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X					HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X				HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X			HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X		HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X	HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
							X	HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
							X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
							X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
							X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
							X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart (Cont.)

<b>M22KSS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		G133AJ	INT: SAFETY DATA SHEET APEX
		G91AE	ADD: CNTRL STATION PWR SUPPLY APEX
		W665BF	ADD: BASE STATION OP W/PS APEX
		<b>Item No.</b>	<b>Description</b>
	X	NNTN7851_	CGISS MOB RADIO SAFETY BKLT
		X HPN4007_	PS 14V 15A UNI 117/240 VAC
		X 6880101W87	SPECTRA CTL STA INSTR MANUAL
		X 6880102W93	SPECTRA MXTRC CTRL BASE MAN
		X HLN6042_	DESK TRAY WITH SPEAKER
		X HLN7024_	HDW INSTALLATION BASE TRAY

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

### ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart (Cont.)

M22KSS9PW1_N									
Option								Description	
								W20CA	ADD: KEYPAD MIC GCAI APEX
								W22BA	ADD: STD PALM MICROPHONE APEX
								W872AB	ADD:MIC VISOR STD APEX
								W874AB	ADD: HANDSET/HANGUP MIC ARMR CBL APX
								W382AM	ADD: CONTROL STATION DESK GCAI MIC
								GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET
								G233AD	ADD:GOOSENECK PTT APEX
								G874AB	ADD: HANDSET/HANGUP (HANGUP CUP)
								G876AB	ADD: HANDSET/HANGUP COIL CBL APX
								Item No.	Description
X								HMN4079	KEYPAD MICROPHONE
	X							HMN1090_	TRADITIONAL PALM MICROPHONE
		X						RMN5054_	VISOR MIC REMOTE MOUNT
			X					HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
				X				RMN5070_	DESKTOP MICROPHONE-NEW DESIGN
					X			HMN4097_	MODEL III GCAI KEYPAD HANDSET
						X		GLN7279_	GOOSENECK PTT
							X	HLN1457_	HANDSET/HANGUP MIC
							X	HKN1017_	HANDSET/HANGUP MIC COIL CB

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart (Cont.)

M22KSS9PW1_N					
Option			Description		
		B18CR	ADD: AUXILIARY SPKR 7.5 WATT APEX		
		G832AD	ADD: SPKR 7.5W WTR RST APEX		
		W432AG	ADD: AUXILARY SPKR 13W (3.2ohm)		
		G831AD	ADD: SPKR 13W WATER RESISTANT		
			Item No.	Description	
	X		HSN4031_	7.5 W SPEAKER NON WATER RESISTANT	
		X	HSN4038_	7.5 W SPEAKER WATER RESISTANT	
			X	HSN4032_	13 W SPEAKER MINI SIZE WATER RESISTANT
			X	HSN4040_	13 W SPEAKER WATER RESISTANT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 VHF 50 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22KSS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		GA00926AA	INT: USER / INSTALL MANUAL CD APX 4500/2500
		GA00926AB	INT: USER / INSTALL MANUAL CD APX 4500/2500 U
		G213BS	INT: SINGLE PACK KIT, MOBILE DASH
		<b>Item No.</b>	<b>Description</b>
	X	X	PMLN5336_ APX 4500/2500 CDROM
		X	HBN5105_ ASSEMBLY,PACKING,SINGLE PACKING KIT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart

M22URS9PW1_N						
Option						Description
					G174AF	ADD: ANT 3DB LOW-PROFILE 762-870
					G175AE	ADD: ANT 3DB ELEVATED FEED 762-870
					G335AY	ADD: ANT 1/4 WAVE 762-870MHZ
					W484AG	ALT: ANT 3DB GAIN 762-870MHZ
					GA00226AA	ADD: GPS ANTENNA
					GA00270AA	ADD: GPS ANTENNA GLASS MT
					GA00268AA	ADD: RFID LABEL APEX
Item No.						Description
	X					HAF4013A ANT 3DB LOW-PROFILE 762-870
		X				HAF4014A ANT 3DB ELEVATED FEED 762-870
			X			HAF4016A ANT 1/4 WAVE 762-870MHZ
				X		HAF4017A ADD: ANT 3DB COLLINEAR 762-870MHz
					X	HAG4000_ GPS ANT THROUGH HOLE MOUNT
					X	PMAN4001_ GPS ANT GLASS MOUNT
					X	HLN7014_ RFID ASSEMBLY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart (Cont.)

M22URS9PW1_N			
Option		Description	
	G66AW	ADD: DASH MOUNT O2 WWM	
	G67CF	ADD: REMOTE MOUNT O2 WWM	
	W81AQ	ADD: KEY LOCK MOUNT APEX	
		Item No.	Description
	X	0364332H02	SCREW ASSY, SEALING
X	X	3264059H03	SEAL, OVERMOLDED FRAME
X		HKN4191_	MOBILE PWR CBL LO/MED PWR
	X	HKN4192_	MOBILE PWR CBL HIPWR 20'
	X	HKN6186_	TRUNNION, CH REMOTE MOUNT
	X	HKN6188_	CABLE, CH POWER AND SPEAKER
	X	HKN6205_	REMOTE FLEX KIT
		X HLN6372_	KEYLOCK MT
X		HLN6863_	ACCESSORY CONNECTOR XTL5000
	X	HLN6980_	DUST CAPS KIT
X		HLN7025_	DUST CAP KIT
X	X	HLN6861_	TRUNNION HARDWARE KIT
	X	PMUN1038_	APX7500 STANDARD TIB MP
X		0104046J26	ASSEMBLY,FLEX CIRCUIT,O2O7 DASH MOUNT FLEX ASSEMBLY
	X X	0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
X	X	03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
X	X	03012063001	SCREW,SCREW ASSY, M4 X 0.7 X 27MM, WITH WASHER & SEAL
	X	5680002G03	PACKAGING,10X10 ANTI STATIC PE POUCH IN PINK
	X	PMUN1057_	ASSEMBLY,KIT,CTRL HD END REM ASSY O2O7
	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart (Cont.)

<b>M22URS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		GA00804AA	ADD: APX O2 CONTROL HEAD (Grey)
		G843AH	ENH: AES ENCRYPTION
		G447AD	INT: NO ALGO PROVIDED
		<b>Item No.</b>	<b>Description</b>
X		PMHN4193_	KIT,FRONT HOUSING, O2 CH (GREY)
	X	NNTN8425_	AES ENCRYPTION
	X	NNTN8427_	ADP ENCRYPTION

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

## ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart (Cont.)

M22URS9PW1_N									
Option						Description			
						W374AJ	ADD: STATUS/MESSAGE 16 APEX		
						W355AS	ADD: STATUS/MESSAGE 8 APEX		
						W591AQ	ADD: AUXILIARY SWITCH PANEL APEX		
						W599BF	ADD: 8 MODE DIRECT ENTRY APEX		
						W614AT	ADD: 16 MODE DIRECT ENTRY APEX		
						W615AW	ADD: 24 MODE DIRECT ENTRY APEX		
						GA00814AA	ADD: DEK BOX FOR WHELEN SIREN		
							<b>Item No.</b>	<b>Description</b>	
X	X						6880103W09	DIRECT ENTRY KEYBOARD INST MAN	
							X HKN4265_	FUSE CABLE	
		X					HLN1196_	WILDCARD	
	X						HLN1228_	DEK STATUS SYS 9000	
X							HLN1229_	DEK STATUS/MESSAGE SYS 9000	
			X	X	X		HLN1362_	DEK 8 MODE SYS 9000	
				X	X		HLN1363_	DEK 16 MODE SYS 9000	
					X		HLN1364_	DEK 24 MODE SYS 9000	
X	X		X	X	X	X	HKN6189_	KIT,CABLE,CABLE, CH DEK	
X	X		X	X	X	X	HLN6938_	ASSEMBLY,KIT,HDWR DEK MOUNTING	
						X	HLN1241_	DEK HSNG ASEM SYS9000 SIREN/PA	
						X	HLN5157_	DEK MOUNTING HARDWARE	
						X	HLN5331_	DEK 9000E SIREN/PA SPARE BUT	

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart (Cont.)

<b>M22URS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		W470AT	ADD: EMERGENCY ID EXT. FOOTSWITCH APEX
		W688AR	ADD: EXT EMERGENCY PUSHBUTTON APEX
		<b>Item No.</b>	<b>Description</b>
	X	HLN5113_	EMERGENCY FOOTSWITCH
	X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

# ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart (Cont.)

M22URS9PW1_N											
Option									Description		
									G303AB	ADD: RS232 DATA INTFC CBL DASH APEX	
									G304AC	ADD: RS232 DATA INTFC CBL TRK APEX	
									G308AD	ADD: USB DATA INTFC CABLE-DASH APEX	
									G309AC	ADD: USB DATA INTFC CABLE-TRK APEX	
									G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX	
									G879AC	ADD: REMOTE MOUNT CBL 115 FEET APEX	
									G607AC	ADD: CBL REMOTE MOUNT 75 FEET APEX	
									G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX	
									G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX	
									G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX	
									G618AC	ADD: CBL REMOTE MOUNT 10 FEET APEX	
									G927AB	INT: CONNECTOR RM MT APEX	
									GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT	
										<b>Item No.</b>	<b>Description</b>
X										HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X									HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X								HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X							HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X						HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X					HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X				HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X			HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
								X		HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
									X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
									X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
								X		HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
								X		PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart (Cont.)

<b>M22URS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		G133AJ	INT: SAFETY DATA SHEET APEX
		G91AE	ADD: CNTRL STATION PWR SUPPLY APEX
		W665BF	ADD: BASE STATION OP W/PS APEX
		<b>Item No.</b>	<b>Description</b>
X		NNTN7851_	CGISS MOB RADIO SAFETY BKLT
	X	HPN4007_	PS 14V 15A UNI 117/240 VAC
	X	6880101W87	SPECTRA CTL STA INSTR MANUAL
	X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
	X	HLN6042_	DESK TRAY WITH SPEAKER
	X	HLN7024_	HDW INSTALLATION BASE TRAY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

# ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart (Cont.)

M22URS9PW1_N									
Option								Description	
								W20CA	ADD: KEYPAD MIC GCAI APEX
								W22BA	ADD: STD PALM MICROPHONE APEX
								W872AB	ADD:MIC VISOR STD APEX
								W874AB	ADD: HANDSET/HANGUP MIC ARMOR CBL APX
								W382AM	ADD: CONTROL STATION DESK GCAI MIC
								GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET
								G233AD	ADD:GOOSENECK PTT APEX
								G874AB	ADD: HANDSET/HANGUP (HANGUP CUP)
								G876AB	ADD: HANDSET/HANGUP COIL CBL APX
								Item No.	Description
X								HMN4079	KEYPAD MICROPHONE
	X							HMN1090_	TRADITIONAL PALM MICROPHONE
		X						RMN5054_	VISOR MIC REMOTE MOUNT
			X					HKN1018_	HSET/HANGUP NORMAL ARMOURD CABLE
				X				RMN5070_	DESKTOP MICROPHONE-NEW DESIGN
					X			HMN4097_	MODEL III GCAI KEYPAD HANDSET
						X		GLN7279_	GOOSENECK PTT
							X	HLN1457_	HANDSET/HANGUP MIC
							X	HKN1017_	HANDSET/HANGUP MIC COIL CB

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart (Cont.)

M22URS9PW1_N				
Option			Description	
	B18CR			ADD: AUXILIARY SPKR 7.5 WATT APEX
		G832AD		ADD: SPKR 7.5W WTR RST APEX
			W432AG	ADD: AUXILARY SPKR 13W (3.2ohm)
			G831AD	ADD: SPKR 13W WATER RESISTANT
			Item No.	Description
X			HSN4031_	7.5 W SPEAKER NON WATER RESISTANT
	X		HSN4038_	7.5 W SPEAKER WATER RESISTANT
		X	HSN4032_	13 W SPEAKER MINI SIZE WATER RESISTANT
			X HSN4040_	13 W SPEAKER WATER RESISTANT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 700–800 MHz 30–35 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22URS9PW1_N</b>				
		<b>Option</b>	<b>Description</b>	
		GA00926AA	INT: USER / INSTALL MANUAL CD APX 4500/2500	
		GA00926AB	INT: USER / INSTALL MANUAL CD APX 4500/2500 U	
		G213BS	INT: SINGLE PACK KIT, MOBILE DASH	
		<b>Item No.</b>	<b>Description</b>	
X	X	PMLN5336_	APX 4500/2500 CDROM	
		X	HBN5105_	ASSEMBLY,PACKING,SINGLE PACKING KIT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



## ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart

M22QSS9PW1_N									
Option								Description	
G427AB								ADD: ANT 3.5DB 380-433 MHZ MAXRAD	
G429AB								ADD: ANT 5.0DB 380-433 MHZ MAXRAD	
G430AC								ADD: ANT 5.0DB 445-470 MHZ	
G425AC								ADD: ANT 1/4 WAVE WHIP 380-433 MHZ	
G426AD								ADD: ANT 1/4 WAVE WHIP 450-470 MHZ	
G428AD								ADD: ANT 3.5DB 450-470 MHZ	
G431AC								ADD: ANT WIDEBAND 380-470 MHZ MAXRA	
GA00505AA								ADD: ANT 2DB WIDEBAND 380-520 MHZ	
GA00226AA								ADD: GPS ANTENNA	
GA00270AA								ADD: GPS ANTENNA GLASS MT	
GA00268AA								ADD: RFID LABEL APEX	
								Item No.	Description
X								HAE6010_	ANT 3.5DB 380-433 MHZ MAXRAD
	X							HAE6011_	ANT 5.0DB 380-433 MHZ MAXRAD
		X						RAE4014AR_	ANT 5.0DB 445-470 MHZ
			X					HAE6012_	ANT 1/4 WAVE WHIP 380-433 MHZ
				X				HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ
					X			HAE4011_	ANT 3.5DB 450-470 MHZ
						X		HAE6013_	ANT WIDEBAND 380-470 MHZ MAXRA
							X	HAE6031_	ADD: ANT 2DB WIDEBAND 380-520 MHZ
							X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
							X	PMAN4001_	GPS ANT GLASS MOUNT
							X	HLN7014_	RFID ASSEMBLY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart (Cont.)

M22QSS9PW1_N			
		Option	Description
		G66AW	ADD: DASH MOUNT O2 WWM
		G67CF	ADD: REMOTE MOUNT O2 WWM
		W81AQ	ADD: KEY LOCK MOUNT APEX
		Item No.	Description
	X	0364332H02	SCREW ASSY, SEALING
X	X	3264059H03	SEAL, OVERMOLDED FRAME
X		HKN4191_	MOBILE PWR CBL LO/MED PWR
	X	HKN4192_	MOBILE PWR CBL HIPWR 20'
	X	HKN6186_	TRUNNION, CH REMOTE MOUNT
	X	HKN6188_	CABLE, CH POWER AND SPEAKER
	X	HKN6205_	REMOTE FLEX KIT
		X HLN6372_	KEYLOCK MT
X		HLN6863_	ACCESSORY CONNECTOR XTL5000
	X	HLN6980_	DUST CAPS KIT
X		HLN7025_	DUST CAP KIT
X	X	HLN6861_	TRUNNION HARDWARE KIT
	X	PMUN1038_	APX7500 STANDARD TIB MP
X		0104046J26	ASSEMBLY,FLEX CIRCUIT,O2O7 DASH MOUNT FLEX ASSEMBLY
	X	X 0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
X	X	03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
X	X	03012063001	SCREW,SCREW ASSY, M4 X 0.7 X 27MM, WITH WASHER & SEAL
	X	5680002G03	PACKAGING,10X10 ANTI STATIC PE POUCH IN PINK
	X	PMUN1057_	ASSEMBLY,KIT,CTRL HD END REM ASSY O2O7
	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22QSS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		GA00804AA	ADD: APX O2 CONTROL HEAD (Grey)
		G843AH	ENH: AES ENCRYPTION
		G447AD	INT: NO ALGO PROVIDED
		<b>Item No.</b>	<b>Description</b>
X		PMHN4193_	KIT,FRONT HOUSING, O2 CH (GREY)
	X	NNTN8425_	AES ENCRYPTION
	X	NNTN8427_	ADP ENCRYPTION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart (Cont.)

M22QSS9PW1_N									
Option						Description			
W374AJ						ADD: STATUS/MESSAGE 16 APEX			
W355AS						ADD: STATUS/MESSAGE 8 APEX			
W591AQ						ADD: AUXILIARY SWITCH PANEL APEX			
W599BF						ADD: 8 MODE DIRECT ENTRY APEX			
W614AT						ADD: 16 MODE DIRECT ENTRY APEX			
W615AW						ADD: 24 MODE DIRECT ENTRY APEX			
GA00814AA						ADD: DEK BOX FOR WHELEN SIREN			
						Item No.		Description	
X	X					6880103W09	DIRECT ENTRY KEYBOARD INST MAN		
						X HKN4265_	FUSE CABLE		
		X				HLN1196_	WILDCARD		
	X					HLN1228_	DEK STATUS SYS 9000		
X						HLN1229_	DEK STATUS/MESSAGE SYS 9000		
			X	X	X	HLN1362_	DEK 8 MODE SYS 9000		
				X	X	HLN1363_	DEK 16 MODE SYS 9000		
					X	HLN1364_	DEK 24 MODE SYS 9000		
X	X		X	X	X	X HKN6189_	KIT,CABLE,CABLE, CH DEK		
X	X		X	X	X	X HLN6938_	ASSEMBLY,KIT,HDWR DEK MOUNTING		
						X HLN1241_	DEK HSNB ASEM SYS9000 SIREN/PA		
						X HLN5157_	DEK MOUNTING HARDWARE		
						X HLN5331_	DEK 9000E SIREN/PA SPARE BUT		

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22QSS9PW1_N</b>		
<b>Option</b>		<b>Description</b>
	W470AT	ADD: EMERGENCY ID EXT. FOOTSWITCH APEX
	W688AR	ADD: EXT EMERGENCY PUSHBUTTON APEX
		<b>Item No.</b>
		<b>Description</b>
X	HLN5113_	EMERGENCY FOOTSWITCH
	X HLN5131_	EMERGENCY PUSH BUTTON SWITCH

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

**ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart (Cont.)**

M22QSS9PW1_N									
Option								Description	
								G303AB	ADD: RS232 DATA INTFC CBL DASH APEX
								G304AC	ADD: RS232 DATA INTFC CBL TRK APEX
								G308AD	ADD: USB DATA INTFC CABLE-DASH APEX
								G309AC	ADD: USB DATA INTFC CABLE-TRK APEX
								G582AC	ADD: REMOTE MOUNT CABLE 131 FT APEX
								G879AC	ADD: REMOTE MOUNT CBL 115 FEET APEX
								G607AC	ADD: CBL REMOTE MOUNT 75 FEET APEX
								G609AC	ADD: REMOTE MOUNT CBL 50 FEET APEX
								G610AC	ADD: REMOTE MOUNT CBL 30 FEET APEX
								G628AD	INT: REMOTE MOUNT CABLE 17 FT APEX
								G618AC	ADD: CBL REMOTE MOUNT 10 FEET APEX
								G927AB	INT: CONNECTOR RM MT APEX
								GA00589AA	ADD: GCAI EXTENSION CABLE 2 FT
								Item No.	Description
X								HKN6160_	CABLE KIT 6' DASH MOUNT DATA
	X							HKN6161_	CABLE KIT 20' RS232/J2 DATA
		X						HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M
			X					HKN6172_	CBL, DATA, USB, 4.5M, 26 PIN ACCY CONN
				X				HKN6164_	CAN CABLE, REMOTE MOUNT,131 FT
					X			HKN6165_	CAN CABLE, REMOTE MOUNT,115 FT
						X		HKN6166_	CAN CABLE, REMOTE MOUNT, 75 FT
							X	HKN6167_	CAN CABLE, REMOTE MOUNT, 50 FT
							X	HKN6168_	CAN CABLE, REMOTE MOUNT, 30 FT
							X	HKN6169_	CAN CABLE, REMOTE MOUNT, 17 FT
							X	HKN6170_	CAN CABLE, REMOTE MOUNT, 10 FT
							X	HLN6961_	ACCESSORY CONNECTOR RM (CHIB)
							X	PMKN4093_	GCAI EXTENSION CABLE

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart (Cont.)**

M22QSS9PW1_N				
			Option	Description
			G133AJ	INT: SAFETY DATA SHEET APEX
			G91AE	ADD: CNTRL STATION PWR SUPPLY APEX
			W665BF	ADD: BASE STATION OP W/PS APEX
			G799AC	ADD: PRINTED TEST RESULTS APEX
			Item No.	Description
	X		NNTN7851_	CGISS MOB RADIO SAFETY BKLT
		X	HPN4007_	PS 14V 15A UNI 117/240 VAC
		X	6880101W87	SPECTRA CTL STA INSTR MANUAL
		X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
		X	HLN6042_	DESK TRAY WITH SPEAKER
		X	HLN7024_	HDW INSTALLATION BASE TRAY
		X	1205043A59	TEST DATA SHEET OPTION H799

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart (Cont.)

M22QSS9PW1_N									
Option								Description	
								W20CA	ADD: KEYPAD MIC GCAI APEX
								W22BA	ADD: STD PALM MICROPHONE APEX
								W872AB	ADD:MIC VISOR STD APEX
								W874AB	ADD: HANDSET/HANGUP MIC ARMR CBL APX
								W382AM	ADD: CONTROL STATION DESK GCAI MIC
								GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET
								G233AD	ADD:GOOSENECK PTT APEX
								G874AB	ADD: HANDSET/HANGUP (HANGUP CUP)
								G876AB	ADD: HANDSET/HANGUP COIL CBL APX
								Item No.	Description
X								HMN4079	KEYPAD MICROPHONE
	X							HMN1090_	TRADITIONAL PALM MICROPHONE
		X						RMN5054_	VISOR MIC REMOTE MOUNT
			X					HKN1018_	HSET/HANGUP NORMAL ARMoured CABLE
				X				RMN5070_	DESKTOP MICROPHONE-NEW DESIGN
					X			HMN4097_	MODEL III GCAI KEYPAD HANDSET
						X		GLN7279_	GOOSENECK PTT
							X	HLN1457_	HANDSET/HANGUP MIC
							X	HKN1017_	HANDSET/HANGUP MIC COIL CB

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



**ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart (Cont.)**

M22QSS9PW1_N				
Option			Description	
		B18CR	ADD: AUXILIARY SPKR 7.5 WATT APEX	
		G832AD	ADD: SPKR 7.5W WTR RST APEX	
		W432AG	ADD: AUXILARY SPKR 13W (3.2ohm)	
		G831AD	ADD: SPKR 13W WATER RESISTANT	
			Item No.	Description
	X		HSN4031_	7.5 W SPEAKER NON WATER RESISTANT
		X	HSN4038_	7.5 W SPEAKER WATER RESISTANT
		X	HSN4032_	13 W SPEAKER MINI SIZE WATER RESISTANT
		X	HSN4040_	13 W SPEAKER WATER RESISTANT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 UHF Range 1 40 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22QSS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		GA00926AA	INT: USER / INSTALL MANUAL CD APX 4500/2500
		GA00926AB	INT: USER / INSTALL MANUAL CD APX 4500/2500 U
		G213BS	INT: SINGLE PACK KIT, MOBILE DASH
		<b>Item No.</b>	<b>Description</b>
	X	X	PMLN5336_ APX 4500/2500 CDROM
		X	HBN5105_ ASSEMBLY,PACKING,SINGLE PACKING KIT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## ASTRO APX 4500 UHF Range 2 45 W & 4500Li 25 W Model Chart

M22SSS9PW1_N												
Option									Description			
									G486AC	ADD: 5DB GAIN ANT 494-512 MHZ		
									G490AD	ADD: ANT 1/4 WAVE 470-512 MHZ		
									G493AD	ADD: ANT 3 DB ROOF TOP 470-495 MHZ		
									G494AD	ADD: ANT 3 DB ROOF TOP 494-512 MHZ		
									G510AB	ADD:ANT LOW PROFILE 450-512 MHZ		
									G430AC	ADD: ANT 5.0DB 445-470 MHZ		
									G511AB	ADD:2DB ANT WIDEBAND 450-520 MHZ		
									G426AD	ADD: ANT 1/4 WAVE WHIP 450-470 MHZ		
									G428AD	ADD: ANT 3.5DB 450-470 MHZ		
									GA00505AA	ADD: ANT 2DB WIDEBAND 380-520 MHZ		
									GA00652AA	ADD: ANT ROOF TOP 5 DB 470-494 MHZ		
									GA00226AA	ADD: GPS ANTENNA		
									GA00270AA	ADD: GPS ANTENNA GLASS MT		
									GA00268AA	ADD: RFID LABEL APEX		
										<b>Item No.</b>	<b>Description</b>	
	X									RAE4016AR_	ANT ROOF TOP 5 DB, 494-512 MHZ	
		X								HAE4004_	ANT 1/4 WAVE 470-512 MHZ	
			X							HAE4012_	ANT ROOF TOP 3.5 DB 470-495 MHZ	
				X						HAE4013_	ANT ROOF TOP 3.5 DB 494-512 MHZ	
					X					HAE6016_	ANT LOW PROFILE 450-512 MHZ	
						X				RAE4014AR_	ANT 5.0DB 445-470 MHZ	
							X			HAE6015_	ANT 2DB WIDEBAND 450-520 MHZ	
								X		HAE4003_	ANT 1/4 WAVE WHIP 450-470 MHZ	
									X	HAE4011_	ANT 3.5DB 450-470 MHZ	
										X	HAE6031_	ANT 2DB WIDEBAND 380-520 MHZ
										X	RAE4015AR_	ANT ROOF TOP 5 DB 470-494 MHZ
										X	HAG4000_	GPS ANT THROUGH HOLE MOUNT
										X	PMAN4001_	GPS ANT GLASS MOUNT
										X	HLN7014_	RFID ASSEMBLY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

### ASTRO APX 4500 UHF Range 2 45 W & 4500Li 25 W Model Chart (Cont.)

M22SSS9PW1_N			
		Option	Description
		G66AW	ADD: DASH MOUNT O2 WWM
		G67CF	ADD: REMOTE MOUNT O2 WWM
		W81AQ	ADD: KEY LOCK MOUNT APEX
		Item No.	Description
	X	0364332H02	SCREW ASSY, SEALING
X	X	3264059H03	SEAL, OVERMOLDED FRAME
X		HKN4191_	MOBILE PWR CBL LO/MED PWR
	X	HKN4192_	MOBILE PWR CBL HIPWR 20'
	X	HKN6186_	TRUNNION, CH REMOTE MOUNT
	X	HKN6188_	CABLE, CH POWER AND SPEAKER
	X	HKN6205_	REMOTE FLEX KIT
		X HLN6372_	KEYLOCK MT
X		HLN6863_	ACCESSORY CONNECTOR XTL5000
	X	HLN6980_	DUST CAPS KIT
X		HLN7025_	DUST CAP KIT
X	X	HLN6861_	TRUNNION HARDWARE KIT
	X	PMUN1038_	APX7500 STANDARD TIB MP
X		0104046J26	ASSEMBLY,FLEX CIRCUIT,O2O7 DASH MOUNT FLEX ASSEMBLY
	X	X 0104046J72	ASSEMBLY,HOUSING,BACK,BACK HOUSING SUB-ASSEMBLY, O2 CONTROL HEAD
X	X	03012052001	SCREW,MACHINE SCREW, M3, STAINLESS STEEL 401 HARDENED
X	X	03012063001	SCREW,SCREW ASSY, M4 X 0.7 X 27MM, WITH WASHER & SEAL
	X	5680002G03	PACKAGING,10X10 ANTI STATIC PE POUCH IN PINK
	X	PMUN1057_	ASSEMBLY,KIT,CTRL HD END REM ASSY O2O7
	X	0104046J13	ASSEMBLY,FLEX CIRCUIT,O2O7 CHIB FLEX ASSY

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 UHF Range 2 45 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22SSS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		GA00804AA	ADD: APX O2 CONTROL HEAD (Grey)
		G843AH	ENH: AES ENCRYPTION
		G447AD	INT: NO ALGO PROVIDED
		<b>Item No.</b>	<b>Description</b>
X		PMHN4193_	KIT,FRONT HOUSING, O2 CH (GREY)
	X	NNTN8425_	AES ENCRYPTION
	X	NNTN8427_	ADP ENCRYPTION

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 UHF Range 2 45 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22SSS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		W470AT	ADD: EMERGENCY ID EXT. FOOTSWITCH APEX
		W688AR	ADD: EXT EMERGENCY PUSHBUTTON APEX
		<b>Item No.</b>	<b>Description</b>
	X	HLN5113_	EMERGENCY FOOTSWITCH
	X	HLN5131_	EMERGENCY PUSH BUTTON SWITCH

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

**ASTRO APX 4500 UHF Range 2 45 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22SSS9PW1_N</b>		
<b>Option</b>		<b>Description</b>
	G303AB	ADD: RS232 DATA INTFC CBL DASH APEX
	G308AD	ADD: USB DATA INTFC CABLE-DASH APEX
		<b>Description</b>
<b>Item No.</b>		
X	HKN6160_	CABLE KIT 6" DASH MOUNT DATA
	X HKN6163_	ASSEMBLY,CABLE,DATA,USB, 1.5M

*X = Item Included*

*\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.*

## ASTRO APX 4500 UHF Range 2 45 W & 4500Li 25 W Model Chart (Cont.)

M22SSS9PW1_N			
Option		Description	
	G133AJ	INT: SAFETY DATA SHEET APEX	
	G91AE	ADD: CNTRL STATION PWR SUPPLY APEX	
	W665BF	ADD: BASE STATION OP W/PS APEX	
	G799AC	ADD: PRINTED TEST RESULTS APEX	
		Item No.	Description
X		NNTN7851_	CGISS MOB RADIO SAFETY BKLT
	X	HPN4007_	PS 14V 15A UNI 117/240 VAC
	X	6880101W87	SPECTRA CTL STA INSTR MANUAL
	X	6880102W93	SPECTRA MXTRC CTRL BASE MAN
	X	HLN6042_	DESK TRAY WITH SPEAKER
	X	HLN7024_	HDW INSTALLATION BASE TRAY
	X	1205043A59	TEST DATA SHEET OPTION H799

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.



### ASTRO APX 4500 UHF Range 2 45 W & 4500Li 25 W Model Chart (Cont.)

M22SSS9PW1_N						
Option					Description	
				W20CA	ADD: KEYPAD MIC GCAI APEX	
				W22BA	ADD: STD PALM MICROPHONE APEX	
				W874AB	ADD: HANDSET/HANGUP MIC ARMR CBL APX	
				W382AM	ADD: CONTROL STATION DESK GCAI MIC	
				GA00221AC	ADD: MODEL III GCAI KEYPAD HANDSET	
				G874AB	ADD: HANDSET/HANGUP (HANGUP CUP)	
				G876AB	ADD: HANDSET/HANGUP COIL CBL APX	
					Item No.	Description
	X				HMN4079	KEYPAD MICROPHONE
		X			HMN1090_	TRADITIONAL PALM MICROPHONE
			X		HKN1018_	HSET/HANGUP NORMAL ARMOURED CABLE
				X	RMN5070_	DESKTOP MICROPHONE-NEW DESIGN
				X	HMN4097_	MODEL III GCAI KEYPAD HANDSET
				X	HLN1457_	HANDSET/HANGUP MIC
				X	HKN1017_	HANDSET/HANGUP MIC COIL CB

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 UHF Range 2 45 W & 4500Li 25 W Model Chart (Cont.)**

M22SSS9PW1_N					
Option			Description		
	B18CR		ADD: AUXILIARY SPKR 7.5 WATT APEX		
		G832AD	ADD: SPKR 7.5W WTR RST APEX		
			W432AG	ADD: AUXILARY SPKR 13W (3.2ohm)	
				G831AD	ADD: SPKR 13W WATER RESISTANT
			Item No.	Description	
X			HSN4031_	7.5 W SPEAKER NON WATER RESISTANT	
	X		HSN4038_	7.5 W SPEAKER WATER RESISTANT	
		X	HSN4032_	13 W SPEAKER MINI SIZE WATER RESISTANT	
			X	HSN4040_	13 W SPEAKER WATER RESISTANT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

**ASTRO APX 4500 UHF Range 2 45 W & 4500Li 25 W Model Chart (Cont.)**

<b>M22SSS9PW1_N</b>			
		<b>Option</b>	<b>Description</b>
		GA00926AA	INT: USER / INSTALL MANUAL CD APX 4500/2500
		GA00926AB	INT: USER / INSTALL MANUAL CD APX 4500/2500 U
		G213BS	INT: SINGLE PACK KIT, MOBILE DASH
		<b>Item No.</b>	<b>Description</b>
	X	X	PMLN5336_ APX 4500/2500 CDROM
		X	HBN5105_ ASSEMBLY,PACKING,SINGLE PACKING KIT

X = Item Included

\_ = the latest version kit. When ordering a kit, refer to your specific kit for the suffix number.

## VHF Radio Specifications

GENERAL		RECEIVER	TRANSMITTER
<b>FCC Designations:</b>	AZ492FT7047 AZ492FT3821 AZ492FT4898 AZ492FT4895 AZ492FT7037 AZ492FT7035 AZ492FT3824 AZ492FT3826	<b>Frequency Range:</b> 136–174 MHz	<b>Frequency Range:</b> 136–174 MHz
<b>Temperature Range:</b>		<b>Channel Spacing:</b> 12.5 kHz/25 kHz/30 kHz	<b>Rated Output Power:</b>
Operating:	-30°C to +60°C	<b>Input Impedance:</b> 50 Ohm	Motorcycle Radio: 15 W
Storage:	-55°C to +85°C	<b>Frequency Separation:</b> Full Bandsplit	Low-Power Radio: 25 W
<b>Power Supply:</b>	12 Vdc Negative Ground Only	<b>Sensitivity*:</b>	Mid-Power Radio: 50 W
<b>Battery Drain:</b> (Maximum)		<b>With pre-amplifier</b>	High-Power Radio: 100 W
<b>50 W:</b>		<b>20 dB Quieting:</b> (25 kHz Channel Spacing):	<b>Channel Spacing:</b> 12.5 kHz, 25 kHz or 30 kHz
Standby @ 13.8 V:	0.85 A	0.25 µV	<b>Output Impedance:</b> 50 Ohm
Receive at Rated Audio @ 13.8 V:	3.2 A	<b>12 dB SINAD:</b> (25 kHz Channel Spacing):	<b>Frequency Separation:</b> Full Bandsplit
Transmit @ Rated Power:		0.20 µV	<b>Frequency Stability:</b>
15 W	8.0 A	<b>Without pre-amplifier</b>	(-30° to +60°C; 25°C Ref.): ±2 ppm
50 W	13.0 A	<b>20 dB Quieting:</b> (25 kHz Channel Spacing):	<b>Modulation Limiting:</b>
		0.4 µV	25 kHz Channel Spacing: ±5.0 kHz
<b>100 W:</b>		<b>12 dB SINAD:</b> (25 kHz Channel Spacing):	12.5 kHz Channel Spacing: ±2.5 kHz
Standby @ 13.8 V:	0.85 A	0.3 µV	<b>Frequency Deviation for (C4FM):</b>
Receive at Rated Audio @ 13.8 V:	3.2 A	<b>Intermodulation*:</b>	12.5 kHz Digital Channel: ±2.8 kHz
Transmit @ Rated Power:		<b>With pre-amplifier</b>	<b>FM Hum and Noise:</b>
100 W	20.0 A	(Measured in the Analog Mode): 80 dB	25 kHz Channel Spacing: 50 dB
<b>Dimensions (H x W x D)*:</b>		<b>Without pre-amplifier</b>	12.5 kHz Channel Spacing: 40 dB
APX 5500/6500/7500 Mid Power Radio		(Measured in the Analog Mode): 85 dB	<b>Emission (Conduct/Radiated):</b> -85 dBc/-20dBm
Transceiver:	50.8 mm x 177.8 mm x 218.4 mm (2" x 7" x 8.6")	<b>Digital Sensitivity**:</b>	<b>Audio Sensitivity:</b>
O5 Control Head:	50.8 mm x 180.3 mm x 63.5 mm (2" x 7" x 2.5")	<b>With pre-amplifier</b>	(For 60% Max. Deviation at 1 kHz): 0.08V ±3 dB
O2 Control Head:	68.4 mm x 206 mm x 52.83 mm (2.7" x 8" x 2.1")	1% BER (12.5 kHz channel): 0.25 µV	<b>Audio Response:</b>
O7 Control Head:	50.8 mm x 178 mm x 40 mm (2" x 7" x 1.5")	5% BER (12.5 kHz channel): 0.20 µV	(Measured in the Analog Mode)
APX 5500/6500/7500 Mid Power Radio		<b>Without pre-amplifier</b>	(6 dB/Octave Pre-Emphasis 300 to 3000Hz):
Transceiver and O5 Control Head – Dash Mount:	50.8 mm x 180.3 mm x 243.8 mm (2" x 7" x 9.6")	1% BER (12.5 kHz channel): 0.4 µV	<b>Audio Distortion:</b>
APX 5500/6500/7500 Mid Power Radio		5% BER (12.5 kHz channel): 0.3 µV	(For 60% Max. Deviation at 1 kHz): 2% per EIA
Transceiver and O2 Control Head – Dash Mount:	68.4 mm x 206 mm x 268 mm (2.7" x 8" x 10.5")	<b>Selectivity*:</b>	<b>Emissions Designators:</b>
APX 5500/6500/7500 Mid Power Radio		30 kHz Channel Spacing: 90 dB	8K10F1D, 8K10F1E, 8K10F1W, 11K0F3E,
Transceiver and O7 Control Head – Dash Mount:	50.8 mm x 178 mm x 262 mm (2" x 7" x 10.3")	12.5 kHz Channel Spacing: 70 dB	16K0F3E, 20K0F1E
APX 5500/6500/7500 Mid Power Radio		<b>Spurious Rejection*:</b> 90 dB	
Transceiver and Remote Mount:	50.8 mm x 180.3 mm x 243.8 mm (2" x 7" x 9.6")	<b>Frequency Stability:</b>	
		(-30° to +60°C; 25°C Reference.): ±2 ppm	
		<b>Audio Output*:</b>	
		Measured in the Analog Mode at less than 3% distortion. Maximum output level of Speaker lines are 33 W with 3.2 ohm speaker. Acceptable speaker loads are between 3 to 10 ohms total. Attenuate headphones as needed for impedance and power rating.	
		7.5 W (8 ohm Speaker)	
		15 W (3.2 ohm Speaker)	

GENERAL	RECEIVER	TRANSMITTER
<p>APX 5500/6500/7500 High Power Radio Transceiver: 74 (87 locally at handle) mm x 293 mm x 223 mm (2.9" (3.4" locally at handle) x 11.5" x 8.8")</p> <p>APX 2500/4500/4500Li Mid Power Radio Transceiver: 50.8 mm x 178 mm x 163mm (2" x 7" x 6.4")</p> <p>O2 Control Head: 68.4 mm x 206 mm x 52.83 mm (2.7" x 8" x 2.1")</p> <p>O7 Control Head: 50.8 mm x 178 mm x 40 mm (2" x 7" x 1.5")</p> <p>APX 2500/4500/4500Li Mid Power Radio Transceiver and O2 Control Head – Dash Mount: 68.4 mm x 206 mm x 223 mm (2.7" x 8" x 8.8")</p> <p>APX 2500 Mid Power Radio Transceiver and O7 Control Head – Dash Mount: 50.8 mm x 178 mm x 208 mm (2" x 7" x 8.2")</p> <p>APX 2500 Mid Power Radio Transceiver and Remote Mount: 50.8 mm x 180.3 mm x 194mm (2" x 7 "x 7.6")</p> <p><b>Weight:</b></p> <p>APX 5500/6500/7500 Mid Power Radio Transceiver and Control Head: 3.17 kg (7 lbs)</p> <p>APX 5500/6500/7500 High Power Radio Transceiver: 6.4 kg (14.2 lbs with trunnion) 5.4 kg (12 lbs without trunnion)</p> <p>APX 2500/4500/4500Li Mid Power Radio Transceiver and O2 Control Head: 2.45 kg (5.28 lbs)</p> <p>APX 2500 Mid Power Radio Transceiver and O7 Control Head: 2.24 kg (4.83 lbs)</p> <p>APX 2500 Mid Power Radio Transceiver and Remote Mount: 2.18 kg (4.70 lbs)</p> <p>*All dimensions and weights are shown excluding any mounting hardware or cables.</p>		

*Specifications subject to change without notice.*

*\* Measured in analog mode per TIA/EIA 603 under nominal conditions.*

*\*\* Measured in digital mode per TIA/EIA IS 102.CAAB.*

**NOTE:** All O5 Control Head dimensions and High Power Radio Transceiver specification are not applicable for APX 2500/4500/4500Li radios.

# UHF R1 Radio Specifications

GENERAL		RECEIVER	TRANSMITTER
<b>FCC Designations:</b>	AZ492FT4894 AZ492FT4897 AZ492FT4898 AZ492FT4895 AZ492FT7043 AZ492FT7048 AZ492FT4904 AZ492FT4915	<b>Frequency Range:</b> 380–470 MHz	<b>Frequency Range:</b> 380–470 MHz
<b>Temperature Range:</b>		<b>Channel Spacing:</b> 12.5 kHz/25 kHz	<b>Rated Output Power:</b>
Operating:	-30°C to +60°C		Motorcycle Radio: 15 W
Storage:	-55°C to +85°C	<b>Input Impedance:</b> 50 Ohm	Low-Power Radio: 25 W
<b>Power Supply:</b> 12 Vdc Negative Ground Only		<b>Frequency Separation:</b> Full Bandsplit	Mid-Power Radio: 40 W
<b>Battery Drain:</b> (Maximum)		<b>Sensitivity*:</b>	High-Power Radio: 100 W
<b>40 W:</b>		<b>With pre-amplifier</b>	<b>Channel Spacing:</b> 12.5 kHz or 25 kHz
Standby @ 13.8 V:	0.85 A	<b>20 dB Quieting:</b> (25 kHz Channel Spacing): 0.25 µV	<b>Output Impedance:</b> 50 Ohm
Receive at Rated Audio @ 13.8 V:	3.2 A	<b>12 dB SINAD:</b> (25 kHz Channel Spacing): 0.20 µV	<b>Frequency Separation:</b> Full Bandsplit
Transmit @ Rated Power:		<b>Without pre-amplifier</b>	<b>Frequency Stability:</b>
15 W:	8.0 A	<b>20 dB Quieting:</b> (25 kHz Channel Spacing): 0.4 µV	(-30° to +60°C; 25°C Ref.): ±2 ppm
40 W:	11.0 A	<b>12 dB SINAD:</b> (25 kHz Channel Spacing): 0.3 µV	<b>Modulation Limiting:</b>
<b>100 W:</b>		<b>Intermodulation*:</b>	25 kHz Channel Spacing: ±5.0 kHz
Standby @ 13.8 V:	0.85 A	<b>With pre-amplifier</b>	12.5 kHz Channel Spacing: ±2.5 kHz
Receive at Rated Audio @ 13.8 V:	3.2 A	(Measured in the Analog Mode): 80 dB	<b>Frequency Deviation for (C4FM):</b>
Transmit @ Rated Power:		<b>Without pre-amplifier</b>	12.5 kHz Digital Channel: ±2.8 kHz
100 W:	24.0 A	(Measured in the Analog Mode): 85 dB	<b>FM Hum and Noise:</b>
<b>Dimensions (H x W x D)*:</b>		<b>Digital Sensitivity**:</b>	25 kHz Channel Spacing: 45 dB
APX 5500/6500/7500 Mid Power Radio Transceiver:	50.8 mm x 177.8 mm x 218.4 mm (2" x 7" x 8.6")	<b>With pre-amplifier</b>	12.5 kHz Channel Spacing: 40 dB
O5 Control Head:	50.8 mm x 180.3 mm x 63.5 mm (2" x 7" x 2.5")	1% BER (12.5 kHz channel): 0.25 µV	<b>Emission (Conduct/Radiated):</b> -85 dBc/-20dBm
O2 Control Head:	68.4 mm x 206 mm x 52.83 mm (2.7" x 8" x 2.1")	5% BER (12.5 kHz channel): 0.20 µV	<b>Audio Sensitivity:</b>
O7 Control Head:	50.8 mm x 178 mm x 40 mm (2" x 7" x 1.5")	<b>Without pre-amplifier</b>	(For 60% Max. Deviation at 1 kHz): 0.08V ±3 dB
APX 5500/6500/7500 Mid Power Radio Transceiver and O5 Control Head – Dash Mount:	50.8 mm x 180.3 mm x 243.8 mm (2" x 7" x 9.6")	1% BER (12.5 kHz channel): 0.4 µV	<b>Audio Response:</b>
APX 5500/6500/7500 Mid Power Radio Transceiver and O2 Control Head – Dash Mount:	68.4 mm x 206 mm x 268 mm (2.7" x 8" x 10.5")	5% BER (12.5 kHz channel): 0.3 µV	(Measured in the Analog Mode)
APX 5500/6500/7500 Mid Power Radio Transceiver and O7 Control Head – Dash Mount:	50.8 mm x 178 mm x 262 mm (2" x 7" x 10.3")	<b>Selectivity*:</b>	(6 dB/Octave Pre-Emphasis 300 to 3000Hz):
APX 5500/6500/7500 Mid Power Radio Transceiver and Remote Mount:	50.8 mm x 180.3 mm x 243.8 mm (2" x 7" x 9.6")	25 kHz Channel Spacing: 82 dB	+1, -3 dB
APX 5500/6500/7500 High Power Radio Transceiver:	74 (87 locally at handle) mm x 293 mm x 223 mm (2.9" (3.4" locally at handle) x 11.5" x 8.8")	12.5 kHz Channel Spacing: 70 dB	<b>Audio Distortion:</b>
		<b>Spurious Rejection*:</b> 90 dB	(For 60% Max. Deviation at 1 kHz): 2% per EIA
		<b>Frequency Stability:</b>	<b>Emissions Designators:</b>
		(-30° to +60°C; 25°C Reference.): ±2 ppm	8K10F1D, 8K10F1E, 8K10F1W, 11K0F3E,
		<b>Audio Output*:</b>	16K0F3E, 20K0F1E
		Measured in the Analog Mode at less than 3% distortion. Maximum output level of Speaker lines are 33 W with 3.2 ohm speaker. Acceptable speaker loads are between 3 to 10 ohms total. Attenuate headphones as needed for impedance and power rating.	
		7.5 W (8 ohm Speaker)	
		15 W (3.2 ohm Speaker)	

GENERAL	RECEIVER	TRANSMITTER
<p>APX 2500/4500/4500Li Mid Power Radio Transceiver: 50.8 mm x 178 mm x 163mm (2" x 7" x 6.4")</p> <p>O2 Control Head: 68.4 mm x 206 mm x 52.83 mm (2.7" x 8" x 2.1")</p> <p>O7 Control Head: 50.8 mm x 178 mm x 40 mm (2" x 7" x 1.5")</p> <p>APX 2500/4500/4500Li Mid Power Radio Transceiver and O2 Control Head – Dash Mount: 68.4 mm x 206 mm x 223 mm (2.7" x 8" x 8.8")</p> <p>APX 2500 Mid Power Radio Transceiver and O7 Control Head – Dash Mount: 50.8 mm x 178 mm x 208 mm (2" x 7" x 8.2")</p> <p>APX 2500 Mid Power Radio Transceiver and Remote Mount: 50.8 mm x 180.3 mm x 194 mm (2" x 7 "x 7.6")</p> <p><b>Weight:</b> APX 5500/6500/7500 Mid Power Radio Transceiver and Control Head: 3.17 kg (7 lbs)</p> <p>APX 5500/6500/7500 High Power Radio Transceiver: 6.4 kg (14.2 lbs with trunnion) 5.4 kg (12 lbs without trunnion)</p> <p>APX 2500/4500/4500Li Mid Power Radio Transceiver and O2 Control Head: 2.45 kg (5.28 lbs)</p> <p>APX 2500 Mid Power Radio Transceiver and O7 Control Head: 2.24 kg (4.83 lbs)</p> <p>APX 2500 Mid Power Radio Transceiver and Remote Mount: 2.18 kg (4.70 lbs)</p> <p>*All dimensions and weights are shown excluding any mounting hardware or cables.</p>		

*Specifications subject to change without notice.*

*\* Measured in analog mode per TIA/EIA 603 under nominal conditions.*

*\*\* Measured in digital mode per TIA/EIA IS 102.CAAB.*

**NOTE:** All O5 Control Head dimensions and High Power Radio Transceiver specification are not applicable for APX 2500/4500/4500Li radios.

## UHF R2 Radio Specifications

GENERAL		RECEIVER	TRANSMITTER
<b>FCC Designations:</b>	AZ492FT4896 AZ492FT7044 AZ492FT7047 AZ492FT4904 AZ492FT4916	<b>Frequency Range:</b> 450–520 MHz	<b>Frequency Range:</b> 450–520 MHz
<b>Temperature Range:</b>		<b>Channel Spacing:</b> 12.5 kHz/25 kHz	<b>Rated Output Power:</b>
Operating:	-30°C to +60°C	<b>Input Impedance:</b> 50 Ohm	Motorcycle Radio: 15 W
Storage:	-55°C to +85°C	<b>Frequency Separation:</b> Full Bandsplit	Low-Power Radio: 25 W
<b>Power Supply:</b>	12 Vdc Negative Ground Only	<b>Sensitivity*:</b>	Mid-Power Radio: 45 W
<b>Battery Drain:</b> (Maximum)		<b>With pre-amplifier</b>	<b>Channel Spacing:</b> 12.5 kHz or 25 kHz
<b>45 W:</b>		<b>20 dB Quieting:</b> (25 kHz Channel Spacing):	<b>Output Impedance:</b> 50 Ohm
Standby @ 13.8 V:	0.85 A	0.25 µV	<b>Frequency Separation:</b> Full Bandsplit
Receive at Rated Audio @ 13.8 V:	3.2 A	<b>12 dB SINAD:</b> (25 kHz Channel Spacing):	<b>Frequency Stability:</b>
Transmit @ Rated Power:		0.20 µV	(-30° to +60°C; 25°C Ref.): ±2 ppm
15 W:	8.0 A	<b>Without pre-amplifier</b>	<b>Modulation Limiting:</b>
45 W:	11.0 A	<b>20 dB Quieting:</b> (25 kHz Channel Spacing):	25 kHz Channel Spacing: ±5.0 kHz
<b>Dimensions (H x W x D)*</b>		0.4 µV	12.5 kHz Channel Spacing: ±2.5 kHz
APX 5500/6500/7500 Mid Power Radio Transceiver:		<b>12 dB SINAD:</b> (25 kHz Channel Spacing):	
	50.8 mm x 177.8 mm x 218.4 mm (2" x 7" x 8.6")	0.3 µV	
<b>O5 Control Head:</b>		<b>Intermodulation*:</b>	<b>Frequency Deviation for (C4FM):</b>
	50.8 mm x 180.3 mm x 63.5 mm (2" x 7" x 2.5")	<b>With pre-amplifier</b>	12.5 kHz Digital Channel: ±2.8 kHz
<b>O2 Control Head:</b>		(Measured in the Analog Mode): 80 dB	<b>FM Hum and Noise:</b>
	68.4 mm x 206 mm x 52.83 mm (2.7" x 8" x 2.1")	<b>Without pre-amplifier</b>	25 kHz Channel Spacing: 45 dB
<b>O7 Control Head:</b>		(Measured in the Analog Mode): 85 dB	12.5 kHz Channel Spacing: 40 dB
	50.8 mm x 178 mm x 40 mm (2" x 7" x 1.5")	<b>Digital Sensitivity**:</b>	<b>Emission (Conduct/Radiated):</b> -85 dBc/-20dBm
APX 5500/6500/7500 Mid Power Radio Transceiver and O5 Control Head – Dash Mount:		<b>With pre-amplifier</b>	<b>Audio Sensitivity:</b>
	50.8 mm x 180.3 mm x 243.8 mm (2" x 7" x 9.6")	1% BER (12.5 kHz channel): 0.25 µV	(For 60% Max. Deviation at 1 kHz): 0.08V ±3 dB
APX 5500/6500/7500 Mid Power Radio Transceiver and O2 Control Head – Dash Mount:		5% BER (12.5 kHz channel): 0.20 µV	<b>Audio Response:</b>
	68.4 mm x 206 mm x 268 mm (2.7" x 8" x 10.5")	<b>Without pre-amplifier</b>	(Measured in the Analog Mode)
APX 5500/6500/7500 Mid Power Radio Transceiver and O7 Control Head – Dash Mount:		1% BER (12.5 kHz channel): 0.4 µV	(6 dB/Octave Pre-Emphasis 300 to 3000Hz):
	50.8 mm x 178 mm x 262 mm (2" x 7" x 10.3")	5% BER (12.5 kHz channel): 0.3 µV	+1, -3 dB
<b>APX 2500/4500/4500Li Mid Power Radio Transceiver:</b>		<b>Selectivity*:</b>	<b>Audio Distortion:</b>
	50.8 mm x 178 mm x 163mm (2" x 7" x 6.4")	25 kHz Channel Spacing: 82 dB	(For 60% Max. Deviation at 1 kHz): 2% per EIA
		12.5 kHz Channel Spacing: 70 dB	<b>Emissions Designators:</b>
		<b>Spurious Rejection*:</b> 90 dB	8K10F1D, 8K10F1E, 8K10F1W, 11K0F3E, 16K0F3E, 20K0F1E
		<b>Frequency Stability:</b>	
		(-30° to +60°C; 25°C Reference.): ±2 ppm	
		<b>Audio Output*:</b>	
		Measured in the Analog Mode at less than 3% distortion. Maximum output level of Speaker lines are 33 W with 3.2 ohm speaker. Acceptable speaker loads are between 3 to 10 ohms total. Attenuate headphones as needed for impedance and power rating.	
		7.5 W (8 ohm Speaker)	
		15 W (3.2 ohm Speaker)	



GENERAL	RECEIVER	TRANSMITTER
<p>O2 Control Head: 68.4 mm x 206 mm x 52.83 mm (2.7" x 8" x 2.1")</p> <p>O7 Control Head: 50.8 mm x 178 mm x 40 mm (2" x 7" x 1.5")</p> <p>APX 2500/4500/4500Li Mid Power Radio Transceiver and O2 Control Head – Dash Mount: 68.4 mm x 206 mm x 223 mm (2.7" x 8" x 8.8")</p> <p>APX 2500 Mid Power Radio Transceiver and O7 Control Head – Dash Mount: 50.8 mm x 178 mm x 208 mm (2" x 7" x 8.2")</p> <p>APX 2500 Mid Power Radio Transceiver and Remote Mount: 50.8 mm x 180.3 mm x 194mm (2" x 7 "x 7.6")</p> <p><b>Weight:</b></p> <p>APX 5500/6500/7500 Mid Power Radio Transceiver and Control Head: 3.17 kg (7 lbs)</p> <p>APX 2500/4500/4500Li Mid Power Radio Transceiver and O2 Control Head: 2.45 kg (5.28 lbs)</p> <p>APX 2500 Mid Power Radio Transceiver and O7 Control Head: 2.24 kg (4.83 lbs)</p> <p>APX 2500 Mid Power Radio Transceiver and Remote Mount: 2.18 kg (4.70 lbs)</p> <p>*All dimensions and weights are shown excluding any mounting hardware or cables.</p>		

*Specifications subject to change without notice.*

*\*Does not support 25 KHz channel spacing (16K0F3E, 20K0F1E) in North America.*

## 700–800 MHz Radio Specifications

GENERAL		RECEIVER	TRANSMITTER
<b>FCC Designations:</b>	<b>AZ492FT5858</b> <b>AZ492FT7037</b> <b>AZ492FT7035</b> <b>AZ492FT7043</b> <b>†AZ492FT7044</b> <b>AZ492FT7048</b> <b>AZ492FT7055</b>	<b>Frequency Range:</b> 700 MHz Band: 764–776 MHz 800 MHz Band: 851–870 MHz	<b>Frequency Range:</b> <b>700 MHz Band:</b> Repeater Mode: 794–806 MHz Talkaround Mode: 764–776 MHz <b>800 MHz Band:</b> Repeater Mode: 806–824 MHz Talkaround Mode: 851–870 MHz
<b>Temperature Range:</b> Operating: -30° C to +60° C Storage: -40° C to +85° C		<b>Channel Spacing:</b> 12.5 kHz/20 kHz/25 kHz	<b>Rated Output Power:</b> Motorcycle Radio(700/800 MHz Band 2***/15 W
<b>Power Supply:</b> 12 Vdc Negative Ground Only		<b>Input Impedance:</b> 50 ohm	<b>Vehicle Mount Radio:</b> 700 MHz Band: 2***/30 W 800 MHz Band: 35 W
<b>Battery Drain:</b> (Maximum)		<b>Frequency Separation:</b> Full Bandsplit	<b>Channel Spacing:</b> 12.5 kHz/20 kHz/25 kHz
<b>35 W:</b> Standby @ 13.8 V: 0.85 A Receive at Rated Audio @ 13.8 V: 3.2 A Transmit @ Rated Power: 15 W 8.0 A 35 W 12.0 A		<b>Sensitivity:</b> <b>20 dB Quieting:</b> 25 kHz Channel Spacing: 0.30 µV <b>12 dB SINAD:</b> 25 kHz Channel Spacing: 0.25 µV	<b>Output Impedance:</b> 50 ohm
<b>Dimensions (H x W x D)*</b> APX 5500/6500/7500 Mid Power Radio Transceiver: 50.8 mm x 177.8 mm x 218.4 mm (2" x 7"x 8.6") O5 Control Head: 50.8 mm x 180.3 mm x 63.5 mm (2" x 7"x 2.5") O2 Control Head: 68.4 mm x 206 mm x 52.83 mm (2.7" x 8" x 2.1") O7 Control Head: 50.8 mm x 178 mm x 40 mm (2" x 7" x 1.5") APX 5500/6500/7500 Mid Power Radio Transceiver and O5 Control Head – Dash Mount: 50.8 mm x 180.3 mm x 243.8 mm (2" x 7"x 9.6") APX 5500/6500/7500 Mid Power Radio Transceiver and O2 Control Head – Dash Mount: 68.4 mm x 206 mm x 268 mm (2.7" x 8" x 10.5") APX 5500/6500/7500 Mid Power Radio Transceiver and O7 Control Head – Dash Mount: 50.8 mm x 178 mm x 262 mm (2" x 7" x 10.3") APX 5500/6500/7500 Mid Power Radio Transceiver and Remote Mount: 50.8 mm x 180.3 mm x 243.8 mm (2" x 7"x 9.6") APX 5500/6500/7500 High Power Radio Transceiver: 74 (87 locally at handle) mm x 293 mm x 223 mm (2.9" (3.4" locally at handle) x 11.5"x 8.8")		<b>Digital Sensitivity**:</b> 1% BER (12.5 kHz channel): 0.30 µV 5% BER (12.5 kHz channel): 0.25 µV	<b>Frequency Separation:</b> Full Bandsplit
		<b>Adjacent Channel Selectivity*:</b> 25 kHz Channel: 80 dB 12.5 kHz Channel: 65 dB	<b>Frequency Stability:</b> (-30° to +60°C; 25° C Ref.): ±1.5 ppm
		<b>Intermodulation*:</b> 80 dB	<b>Modulation Limiting*:</b> 25 kHz Channel Spacing: ±5.0 kHz 12.5 kHz Channel Spacing: ±2.5 kHz
		<b>Spurious Rejection*:</b> 90 dB	<b>Frequency Deviation for (C4FM)**:</b> 12.5 kHz Digital Channel: ±2.8 kHz
		<b>Frequency Stability:</b> (-30° to +60° C; 25° C Ref.): ±1.5 ppm	<b>FM Hum and Noise*:</b> 20/25 kHz Channel: 40 dB 12.5 kHz Channel: 34 dB
		<b>Audio Output at 3% Distortion*:</b> Measured in the Analog Mode at less than 3% distortion. Maximum output level of Speaker lines are 33 W with 3.2 ohm speaker. Acceptable speaker loads are between 3 to 10 ohms tota Attenuate headphones as needed for impedance and power rating.	<b>Emission (Conducted/Radiated):</b> -70 dBc/-20dBm and -85 dBc/-40dBm (GNSS)
		7.5 W (8 ohm Speaker) 15 W (3.2 ohm Speaker)	<b>Audio Sensitivity*:</b> (For 60% Max. Deviation at 1 kHz): 0.08 V ±3 dB
			<b>Audio Response*:</b> (6 dB/Octave Pre-Emphasis 300 to 3000 Hz): +1,-3 dB
			<b>Audio Distortion*:</b> 2%
			<b>Emissions Designators:</b> 8K10F1D, 8K10F1E, 8K10F1W, 11K0F3E, 16K0F3E, 20K0F1E

GENERAL	RECEIVER	TRANSMITTER
<p>APX 2500/4500/4500Li Mid Power Radio Transceiver: 50.8 mm x 178 mm x 163mm (2" x 7" x 6.4")</p> <p>O2 Control Head: 68.4 mm x 206 mm x 52.83 mm (2.7" x 8" x 2.1")</p> <p>O7 Control Head: 50.8 mm x 178 mm x 40 mm (2" x 7" x 1.5")</p> <p>APX 2500/4500/4500Li Mid Power Radio Transceiver and O2 Control Head – Dash Mount: 68.4 mm x 206 mm x 223 mm (2.7" x 8" x 8.8")</p> <p>APX 2500 Mid Power Radio Transceiver and O7 Control Head – Dash Mount: 50.8 mm x 178 mm x 208 mm (2" x 7" x 8.2")</p> <p>APX 2500 Mid Power Radio Transceiver and Remote Mount: 50.8 mm x 180.3 mm x 194mm (2" x 7 "x 7.6")</p> <p><b>Weight:</b></p> <p>APX 5500/6500/7500 Mid Power Radio Transceiver and Control Head: 3.17 kg (7 lbs)</p> <p>APX 5500/6500/7500 High Power Radio Transceiver: 6.4 kg (14.2 lbs with trunnion) 5.4 kg (12 lbs without trunnion)</p> <p>APX 2500/4500/4500Li Mid Power Radio Transceiver and O2 Control Head: 2.45 kg (5.28 lbs)</p> <p>APX 2500 Mid Power Radio Transceiver and O7 Control Head: 2.24 kg (4.83 lbs)</p> <p>APX 2500 Mid Power Radio Transceiver and Remote Mount: 2.18 kg (4.70 lbs)</p> <p>*All dimensions and weights are shown excluding any mounting hardware or cables.</p>		

*Specifications subject to change without notice.*

*\* Measured in analog mode per TIA/EIA 603 under nominal conditions.*

*\*\* Measured in digital mode per TIA/EIA IS 102.CAAB.*

*\*\*\* 2 W. itinerant frequencies.*

*† Does not support 25 KHz spacing (16K0F3E, 20K0F1E) in North America.*

**NOTE:** All O5 Control Head dimensions and High Power Radio Transceiver specifications are not applicable for APX 2500/4500/4500Li radios.

## Notes

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# Chapter 1 Introduction

## 1.1 Manual Notations

Throughout the manual, you will notice the use of note, caution, warning, and danger notations. These notations are used to emphasize that safety hazards exist, and due care must be taken and observed.

**NOTE:** An operational procedure, practice, or condition that is essential to emphasize.



Caution

CAUTION indicates a potentially hazardous situation which, if not avoided, might result in equipment damage.



WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or injury.



DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or injury.

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## 1.2 Radio Description

The ASTRO APX mobile radios are Motorola's newest two-way mobile radio designed for your organization's most demanding needs. These radios are available in the following frequencies and power levels.

*Table 1-1. APX Mobile Radios Frequency Ranges and Power Level*

Frequency Band	Bandwidth	Power Level		
		APX 7500 / 6500 / 6500Li / 5500	APX 4500 / 2500	APX 4500 Li
VHF	136 – 174 MHz	10-50 W variable	1-50 W variable	1-25W variable
VHF 100W	136 – 174 MHz	25-100 W variable	N/A	N/A
UHF Range 1	380 – 470 MHz	10-40 W variable	10-40 W variable	10-25W variable
UHF Range 1 100W	380 – 470 MHz	25-100 W variable	N/A	N/A
UHF Range 2	450 – 520 MHz	10-45 W variable	10-45 W variable	10-25W variable
700-800 MHz	764 – 870 MHz	10-35 W variable (2 W itinerant)	10-35 W variable (2 W itinerant)	10-25W variable (2 W itinerant)

**NOTE:** APX 4500Li follows the minimum power variable of APX 4500.

The APX mobile radios are among the most sophisticated two-way radios available. They have a new robust design for radio users who need high performance, quality, and reliability in their daily communications. This new architecture supports a multitude of legacy and advanced features resulting in a more cost-effective two-way radio communications solution.

[Table 1-2](#), [Table 1-3](#), [Table 1-4](#), [Table 1-5](#) and [Table 1-6](#) provides a description of basic features for the APX mobile radios control head.

*Table 1-2. O2 Control Head Basic Features*

Feature	APX 5500 / 6500 / 7500 / 6500Li / 2500 / 4500 / 4500Li
Display	1 indicator line and 4 text lines ( inclusive of menu ) / 14 characters of text, 320 x 144 RGB resolutions TFT Liquid-Crystal Display (LCD)
Control Type	Multifunction knob for Volume and Channel, Push Button On/ Off, Home Keypad button, Data keypad button, Dimming button, Navigation Key
Numeric Keypad	Available with Keypad Microphone
Channel Capability	Maximum channel for APX 7500 / 5500 / 6500 / 6500Li is 250 Maximum channel for APX 2500 is 1000 Maximum channel for APX 4500/4500Li is 512
Remote Mount	Not available
Dash Mount	Available
Dual Control Head	Available
Motorcycle Configuration	Future feature, but APX 4500/4500Li does not support motorcycle configuration

Table 1-3. O3 Control Head Basic Features

Feature	APX 5500 / 6500 / 7500 / 6500Li / 2500
Display	4 lines being for Primary, Secondary, Tertiary and Menu line. Max primary text area character size (WxH):12 x 18 pixels. Max secondary and tertiary text are character size (WxH):10 x 15 pixels. Color LCD with 3 dimming levels; High, Low and Off
Control Type	Push Button On/Off, Keypad Up/Down for Mode and Volume, Home Keypad Button, WAP keypad Button, 3 Menu Keypad Buttons and 4 way navigation pad.
Numeric Keypad	12 Keypad consisting of 1–9, 0, * and #
Channel Capability	Maximum channel for all radios is 1250, except for APX 2500 is 1000
Remote Mount	Available
Dash Mount	Available
Dual Control Head	Future feature
Motorcycle Configuration	Not available, but APX 2500 supports this feature

**NOTE:** APX 4500/4500Li do not support O3 control head.

Table 1-4. O5 Control Head Basic Features

Feature	APX 5500 / 6500 / 7500 / 6500Li
Display	2 lines/14 character of text, 1 menu line, bit map Liquid-Crystal Display (LCD)
Control Type	Rotary Mode and Volume Control, Push Button On/Off
Numeric Keypad	Available with Keypad Microphone
Channel Capability	1250
Remote Mount	Available
Dash Mount	Available
Dual Control Head	Future feature
Motorcycle Configuration	Available

**NOTE:** APX 2500/4500/4500Li do not support O5 control head.

Table 1-5. O7 Control Head Basic Features

Feature	APX 5500 / 6500 / 7500 / 6500Li / 2500
Display	1 indicator line and 4 text lines (inclusive of menu) / 14 characters of text, 320 x 144 RGD resolutions TFT Liquid-Crystal Display (LCD)
Control Type	Multifunction knob for Volume and Channel, Push Button On/Off, Home Keypad button, Data keypad button, Dimming button, Navigation Key
Numeric Keypad	Alpha numerical keypad consisting of 1–9, 0, * and #
Channel Capability	Maximum channel for all radios is 1250, except for APX 2500 is 1000
Remote Mount	Available
Dash Mount	Available
Dual Control Head	Available
Motorcycle Configuration	Available

**NOTE:** APX 4500/4500Li do not support O7 control head.

Table 1-6. O9 Control Head Basic Features

Feature	APX 7500
Display	4 lines/14 character of text, 480 X 272 RGB resolution TFT Liquid-Crystal Display (LCD)
Control Type	Rotary Mode and Volume Control, Push Button On/Off, Illumination rocker
Numeric Keypad	Alpha numerical keypad consisting of 1–9, 0, * and #
Channel Capability	512
Remote Mount	Available
Dash Mount	Not Available
Dual Control Head	Future Feature
Motorcycle Configuration	Not Available

**NOTE:** Only APX 7500 supports O9 control head.

### 1.3 FLASHport®

All APX mobile radios are part of the FLASHport program and ship standard with a FLASH IC, which allows for feature and system upgrades. FLASHport Aftermarket Software is used to upgrade to the latest version of your System Enhancement Software Package, to upgrade to a different System Enhancement Software Package, or to order enhancements for existing APX mobile radios in the field.



## 1.4 O2/O3/O5/O7/O9 Control Head Descriptions

The control head used with APX mobile radios has microprocessor circuitry that operates the standard and optional features built into the system.

The following illustrations show a typical APX mobile radio control head.

### 1.4.1 O2 Control Head

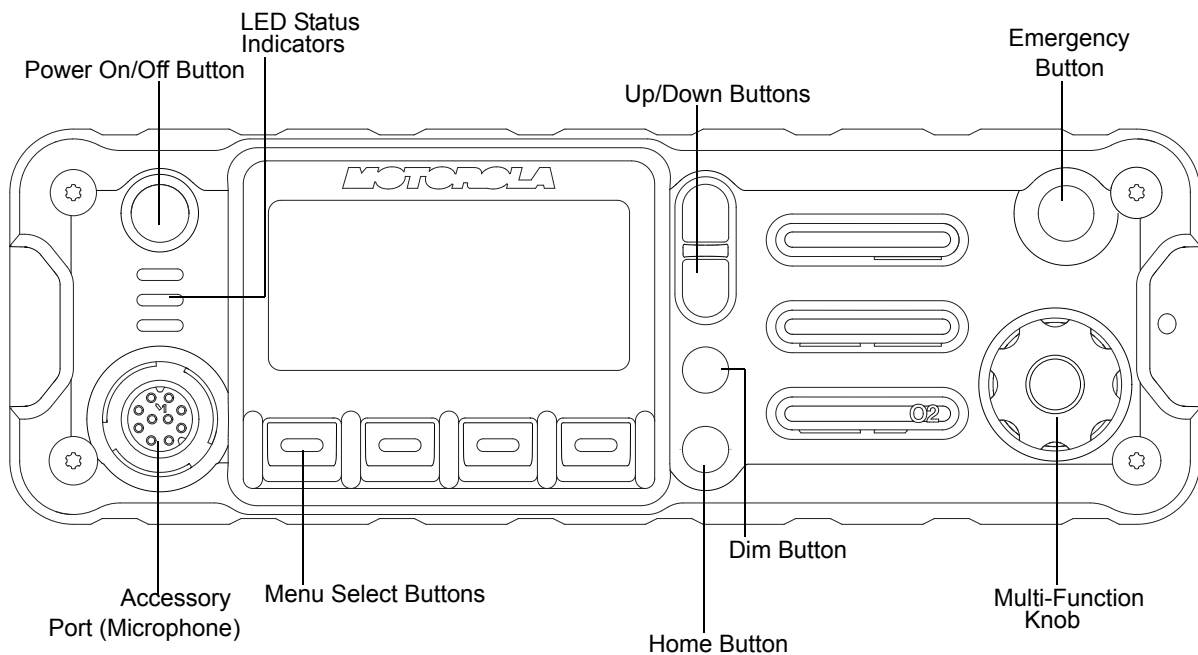


Figure 1-1. O2 Control Head

### 1.4.2 O2 Controls

- **MULTI-FUNCTION KNOB** – Used to change audio volume and channels.
- **HOME BUTTON** – Used to exit all menu functions. The long press behavior of the HOME button is programmable.
- **POWER ON/OFF BUTTON** – Turns the radio on and off.
- **LED STATUS INDICATORS** – Red, Yellow, and Green LED's that indicate transmits, busy and private call respectively.
- **EMERGENCY BUTTON** – Button that can be custom programmed by system manager and usually used for emergency feature.
- **UP/DOWN BUTTONS** – Used to scroll through menu items and selections.
- **MENU SELECT BUTTONS** – Field-programmable buttons.
- **DIM BUTTON** – Use this button to adjust the brightness of the display. Long press to toggle between day and night mode.

### 1.4.3 O3 Control Head

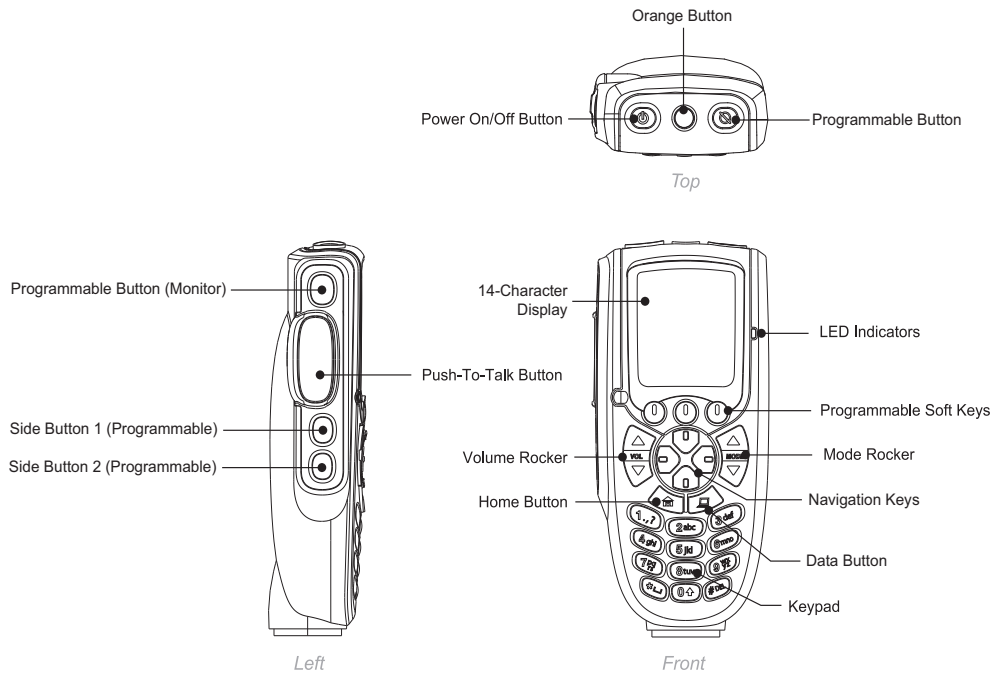


Figure 1-2. O3 Control Head

#### 1.4.4 O3 Controls

- **POWER ON/OFF BUTTON** – Turns the radio on and off.
- **ORANGE BUTTON** – Programmed at the factory to activate the Emergency feature.
- **TOP PROGRAMMABLE BUTTON** – Buttons that can be custom programmed by system manager.
- **PROGRAMMABLE SOFTKEYS** – Field-programmable buttons.
- **NAVIGATION KEYS** – Used to scroll through menu items and selections.
- **VOLUME ROCKER** – Adjust the volume level up or down.
- **MODE ROCKER** – Scroll up or down through the list of available modes.
- **HOME BUTTON** – Used to exit all menu functions.
- **WAP BUTTON** – Programmable.
- **NUMERIC KEYPAD** – Features 12 keys and used to enter menus, scroll through a list of displayed options, and enter data.
- **PUSH TO TALK BUTTON** – Pressed to transmit on the displayed mode and released to receive.
- **LED INDICATOR** – Green/red light-emitting diode that indicates radio status as you operate various features.
- **SIDE PROGRAMMABLE BUTTONS** – Buttons that can be custom programmed by system manager.

## 1.4.5 O5 Control Head

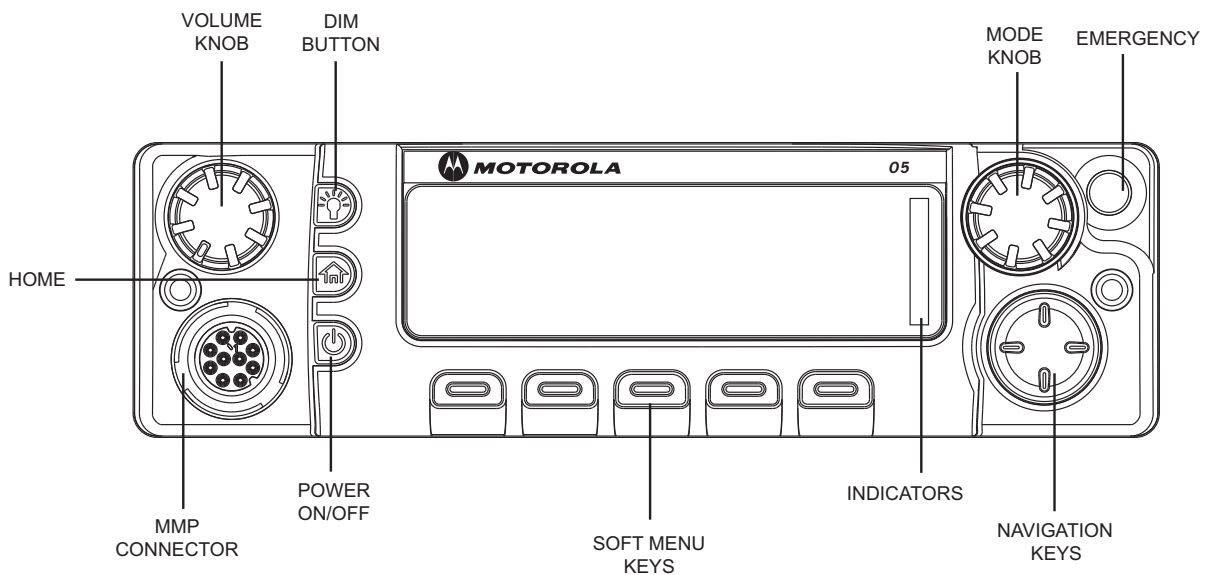


Figure 1-3. O5 Control Head

## 1.4.6 O5 Controls

- **VOLUME KNOB** – Changes the audio volume.
- **MMP CONNECTOR** – Used to connect accessories, such as the microphone, to the control head.
- **DIM BUTTON** – Dims the backlight through three levels of brightness including backlight off.
- **HOME** – Used to exit all menu functions. The long press behavior of the HOME button is programmable.
- **POWER ON/OFF** – Turns the radio on and off.
- **SOFT MENU KEYS** – Field-programmable buttons.
- **INDICATORS** – Red, Yellow and Green LED's that indicate transmit, busy and private call respectively.
- **MODE KNOB** – Used to change channels.
- **NAVIGATION KEY** – Used to scroll through menu items and selections.
- **EMERGENCY** – Field-programmable button via CPS, typically programmed for the emergency feature but other functions are possible.

### 1.4.7 O7 Control Head

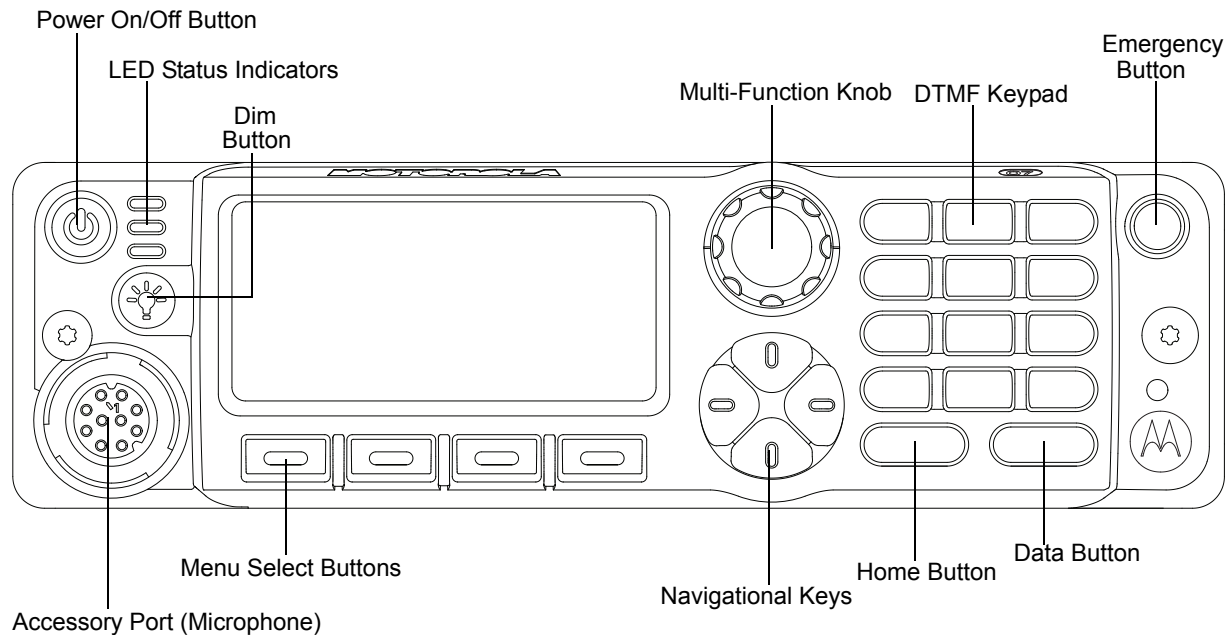


Figure 1-4. O7 Control Head

### 1.4.8 O7 Controls

- **MULTI-FUNCTION KNOB** – Used to change audio volume and channels.
- **HOME BUTTON** – Used to exit all menu functions. The long press behavior of the HOME button is programmable.
- **DATA BUTTON** – Used to access data-related features, such as the Text Messaging Service (TMS) feature screen.
- **DTMF BUTTON** – Dual Tone Multi-Frequency Signaling Button is used to perform Siren and Light functions.
- **POWER ON/OFF BUTTON** – Turns the radio on and off.
- **LED STATUS INDICATORS** – Red, Yellow, and Green LED's that indicates transmit, busy and private call respectively.
- **EMERGENCY BUTTON** – Button that can be custom programmed by system manager and usually used for emergency feature.
- **4-WAY NAVIGATION BUTTON** – Used to scroll through menu items and selections.
- **MENU SELECT BUTTONS** – Field-programmable buttons.
- **DIM BUTTON** – Use this button to adjust the brightness of the display. Long press to toggle between day and night mode.

## 1.4.9 O9 Control Head

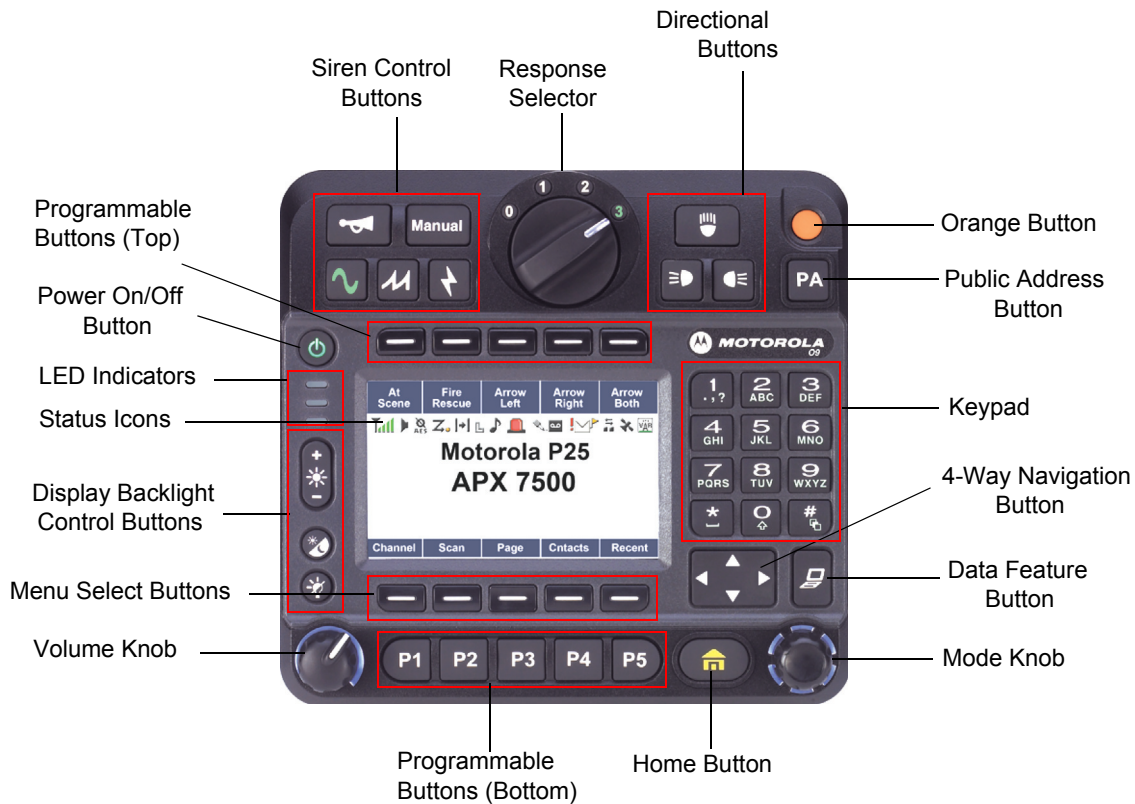


Figure 1-5. O9 Control Head

### 1.4.10 O9 Controls

- **VOLUME KNOB** – Changes the audio volume.
- **MODE KNOB** – Used to change channels.
- **HOME BUTTON** – Used to exit all menu functions. The long press behavior of the HOME button is programmable.
- **POWER ON/OFF BUTTON** – Turns the radio on and off.
- **LED INDICATORS** – Red, Yellow, and Green LED's that indicate transmit, busy and private call respectively.
- **ORANGE BUTTON**– Field-programmable button usually used for the emergency feature
- **4-WAY NAVIGATION BUTTON** – Used to scroll through menu items and selections.
- **MENU SELECT BUTTONS** – Field-programmable buttons.
- **PROGRAMMABLE BUTTON** – Buttons that can be custom programmed by system manager.

## **1.5 P25 Digital Vehicular Repeater System (DVRS)**

Motorola Solutions offers an MSI Certified APX compatible, 3rd Party, P25 Digital Vehicular Repeater System (DVRS) that provides low cost portable radio coverage in areas, where only mobile radio coverage is available, and portable radio coverage is either intermittent or non-existent.

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# Chapter 2 Basic Maintenance

## 2.1 Introduction

This section of the manual describes preventive maintenance, handling precautions, and some basic repair procedures and techniques. Each of these topics provides information vital to the successful operation and maintenance of your radio.

**NOTE:** For board- and component-level repair of the radio, refer to the *APX Mobile Radios And O3, O5 & O9 Detailed Service Manual* (see Related Publications).

## 2.2 Preventive Maintenance

Radios are shipped from the factory with a worst-case frequency error of:

- $\pm 250$  Hz for VHF
- $\pm 250$  Hz for UHF
- $\pm 600$  Hz for 700–800 MHz

These specifications are tighter than the more stringent FCC requirements of:

- $\pm 2.0$  ppm for the 136–174 MHz band
- $\pm 2.0$  ppm for the 380–470 MHz band Range 1 / 450–520 MHz band Range 2
- $\pm 1.5$  ppm for the 700–800 MHz bands

For radios that have been in storage for over six months from the factory ship date, the reference oscillator should be checked when the radio is initially deployed to the field. It is strongly recommended that the reference oscillator be checked every time the radio is serviced or at least once a year, whichever comes first. The crystal contained in the reference oscillator naturally drifts over time due to its aging characteristic. Periodic (annual) adjustment of the reference oscillator is important for proper radio operation. Improper adjustment can result in both poor performance and interference with other users operating on adjacent channels. Refer to [section 6.4.4](#) for reference oscillator alignment procedures.

### 2.2.1 Inspection

Check that the external surfaces of the radio are clean, and that all external controls and switches are functional. A detailed inspection of the interior electronic circuitry is not needed.

**NOTE:** Verify that all dust covers are in place.

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## 2.2.2 Cleaning Procedures

The following procedures describe the recommended cleaning agents and the methods to be used when cleaning the external and internal surfaces of the radio. External surfaces include the control head and radio chassis. These surfaces should be cleaned whenever a periodic visual inspection reveals the presence of smudges, grease, and/or grime. Internal surfaces should be cleaned only when the radio is disassembled for servicing or repair.

**Caution**

Use all chemicals as prescribed by the manufacturer. Be sure to follow all safety precautions as defined on the label or material safety data sheet.

The effects of certain chemicals and their vapors can have harmful results on certain plastics. Aerosol sprays, tuner cleaners, circuit board cleaners, alcohols, and other chemicals should not make contact with plastic or metal radio housings. Extreme etching to disintegration of the plastic can result.

The only recommended agent for cleaning the external radio surfaces is a 0.5% solution of a mild dishwashing detergent in water. The only factory recommended liquid for cleaning the printed circuit boards and their components is isopropyl alcohol (100% by volume).

### 2.2.2.1 Cleaning External Plastic Surfaces

Apply the 0.5% detergent-water solution sparingly with a stiff, non-metallic, short-bristled brush to work all loose dirt away from the radio. A soft, absorbent, lint-free cloth or tissue should be used to remove the solution and dry the radio. Make sure that no water remains entrapped near the connectors, cracks, or crevices.

### 2.2.2.2 Cleaning Internal Circuit Boards and Components

Isopropyl alcohol (100%) may be applied with a stiff, non-metallic, short-bristled brush to dislodge embedded or caked materials located in hard-to-reach areas. The brush stroke should direct the dislodged material out and away from the inside of the radio. Be careful not to break off electrical components.

Alcohol is a high-wetting liquid and can carry contamination into unwanted places if an excessive quantity is used. Make sure that controls or tunable components are not soaked with the liquid. Do not use high-pressure air to hasten the drying process, since this could cause the liquid to puddle and collect in unwanted places.

Upon completion of the cleaning process, use a soft, absorbent, lint-free cloth to dry the area. Do not brush or apply any isopropyl alcohol to any plastic parts.

**NOTE:** Always use a fresh supply of alcohol and a clean container to prevent contamination by dissolved material (from previous usage).

## 2.2.3 General Radio Care and Handling Precautions

- Avoid physical abuse: do not pound, drop, or throw the radio. Exposed parts, such as controls and connectors, might be damaged.
- Operating the radio without an antenna cable attached may lead to radio failure and may void the warranty.



## 2.2.4 RF Power Amplifier (RF PA) Heatsinking

You should never transmit unless the printed-circuit board (PCB) DC and RF connector clips and internal screws are installed in the chassis. Doing so can result in immediate failure of RF PA devices or greatly reduced RF PA device life. You also can transmit for short periods with the chassis eliminator ( as mentioned in [Table 4-5](#) ) if it is used properly.

## 2.3 Safe Handling of CMOS and LDMOS Devices

Complementary metal-oxide semiconductor (CMOS), and Laterally Diffused Metal-Oxide Semiconductor (LDMOS) devices, are used in this family of radios, and are susceptible to damage by electrostatic or high voltage charges. Damage can be latent, resulting in failures occurring weeks or months later. Therefore, special precautions must be taken to prevent device damage during disassembly, troubleshooting, and repair. Handling precautions are mandatory for CMOS/LDMOS circuits and are especially important in low humidity conditions.

DO NOT attempt to disassemble the radio without first referring to the following CAUTION statement.



### Caution

This radio contains static-sensitive devices. Do not open the radio unless you are properly grounded. Take the following precautions when working on this unit:

- Store and transport all CMOS/LDMOS devices in conductive material so that all exposed leads are shorted together. Do not insert CMOS/LDMOS devices into conventional plastic “snow” trays used for storage and transportation of other semiconductor devices.
- Ground the working surface of the service bench to protect the CMOS/LDMOS device. We recommend using a wrist strap, two ground cords, a table mat, a floor mat, ESD shoes, and an ESD chair.
- Wear a conductive wrist strap in series with a 100k resistor to ground. (Replacement wrist straps that connect to the bench top covering are Motorola part number 4280385A59).
- Do not wear nylon clothing while handling CMOS/LDMOS devices.
- Do not insert or remove CMOS/LDMOS devices with power applied. Check all power supplies used for testing CMOS/LDMOS devices to be certain that there are no voltage transients present.
- When straightening CMOS/LDMOS pins, provide ground straps for the apparatus used.
- When soldering, use a grounded soldering iron.
- If at all possible, handle CMOS/LDMOS devices by the package and not by the leads. Prior to touching the unit, touch an electrical ground to remove any static charge that you may have accumulated. The package and substrate may be electrically common. If so, the reaction of a discharge to the case would cause the same damage as touching the leads.

## **Notes**

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## Chapter 3 Basic Theory of Operation

### 3.1 Introduction

The ASTRO APX mobile radios are a two-board assembly that consists of an RF board and a controller board. It is important to correctly identify the malfunctioning region before replacing expensive modules. To assist with radio repair, descriptions of the sections are listed below.

### 3.2 General Overview

The APX mobile radios are wideband, synthesized, fixed-tuned, single band and dual band radios, and are available with the following frequency bands:

- VHF (136–174 MHz) (25 W, 50 W and 100 W models available)
- UHF Range 1 (380–470 MHz) (25 W, 40 W and 100 W models available)
- UHF Range 2 (450–520 MHz) (25 W, 45 W model available)
- 700–800 MHz (25 W, 30 W for 700 MHz Band, and 25 W, 35 W for 800 MHz Band)

However, APX 2500 and APX 4500 do not support high power radios, hence all its band do not support 100 W, and currently only available on mid power model. Meanwhile, APX 4500Li has rated power of 25 W for all its bands.

All APX mobile radios are capable of both analog operation (12.5 kHz, 20 kHz, and 25 kHz bandwidths) and ASTRO mode operation (12.5 kHz bandwidth).

The APX mobile radios contain the following assemblies and sections:

- O2 Control Head Assembly – The control head assembly contains the LCD display, User Interface, and OMAP 1710 microprocessor. For the dash mount configuration, the control head assembly is attached directly to the controller via a flex, and utilizes SSI to communicate. For remote mount configuration, the control head assembly is attached to the Control Head Interface Board (CHIB) via a flex and a CAN cable is used to interface the Remote Control Head to the Transceiver Interface Board (TIB). A flex connects the TIB to the Controller and RF board.
  - O3 Control Head Assembly – The control head assembly contains the LCD display, User Interface, OMAP™ microprocessor, and a Synchronous Serial Interface (SSI) to Controller Area Network (CAN) protocol, and down this remote cable to the Transceiver Interface Board (TIB), and eventually into the Controller and RF board. The only difference between Dash mount and Remote Mount is the additional 17' Straight cable.
  - O5 Control Head Assembly – The control head assembly contains the LCD display, User Interface, OMAP microprocessor. For the dash mount configuration, the control head assembly is attached directly to the controller via a flex, and utilizes SSI to communicate. For remote mount configuration, the control head assembly is attached to the Control Head Interface Board (CHIB) via a flex and a CAN cable is used to interface the Remote Control Head to the Transceiver Interface Board (TIB). A flex connects the TIB to the Controller and RF board.
  - O7 Control Head Assembly – The control head assembly contains the LCD display, User Interface and OMAP 1710 microprocessor. For the dash mount configuration, the control head assembly is attached directly to the controller via a flex, and utilizes SSI to communicate. For remote mount configuration, the control head assembly is attached to the Control Head Interface Board (CHIB) via a flex and a CAN cable is used to interface the Remote Control Head to the Transceiver Interface Board (TIB). A flex connects the TIB to the Controller and RF board.
-

- O9 Control Head Assembly – The control head assembly contains the LCD display, User Interface, OMAP microprocessor. For the dash mount configuration, the control head assembly is attached directly to the controller via a flex, and utilizes SSI to communicate. For remote mount configuration, the control head assembly is attached to the Control Head Interface Board (CHIB) via a flex and a CAN cable is used to interface the Remote Control Head to the Transceiver Interface Board (TIB). A flex connects the TIB to the Controller and RF board.
- Controller Board – Contains digital hardware (microcontroller, memory, logic, and supporting peripherals) governing radio operation, servicing all radio inputs and outputs, and processing all voice and data.
- The CHIB contains a SSI-CAN FPGA, a 16 bit CODEC for audio processing, a Class D Audio PA, and three Controller Area Network (CAN) transceivers. Each CAN transceiver is used to communicate with the RF transceiver, one for audio, one for data, and one for system power-on commands.
- Transceiver Interface Board – Contains CAN transceivers and audio and digital routing for accessories. The TIB is used with the O3 Control Head for Dash and Remote Mount configuration but is only used for Remote Mount configuration with the O5 Control Head.
- Radio Frequency Transceiver Board
  - Power Amplifier (PA) section – Contains the antenna switch, directional coupler/ detector, and amplifier(s).
  - Front-End Receiver section – Contains the preselector, low-noise amplifier (LNA), and mixer.
  - IF section – Contains the receiver intermediate-frequency (IF) amplifier/filter and the digital receiver back-end integrated circuit (IC).
  - Frequency Generation section – Contains the synthesizer, voltage-controlled oscillators (VCOs), reference oscillator, and receive and transmit buffers.

## 3.3 Controller Board

### 3.3.1 Introduction

The Controller board contains the following elements:

- Voltage regulators and data communication circuitry (RS232, USB, and SB9600)
- Microcontroller, FLASH IC, SDRAM IC, I/O expansion IC
- RF Board interface connector
- CODEC and Audio circuitry
- Power Management and Voltage Regulator IC
- Emergency circuitry
- Secure IC
- Edge connector interface for control head or Transceiver Interface Board (TIB)
- Rear connector for additional accessories (Mid Power Only)
- GPS circuitry
- Edge connector for option board

Block diagrams of controller are shown below:

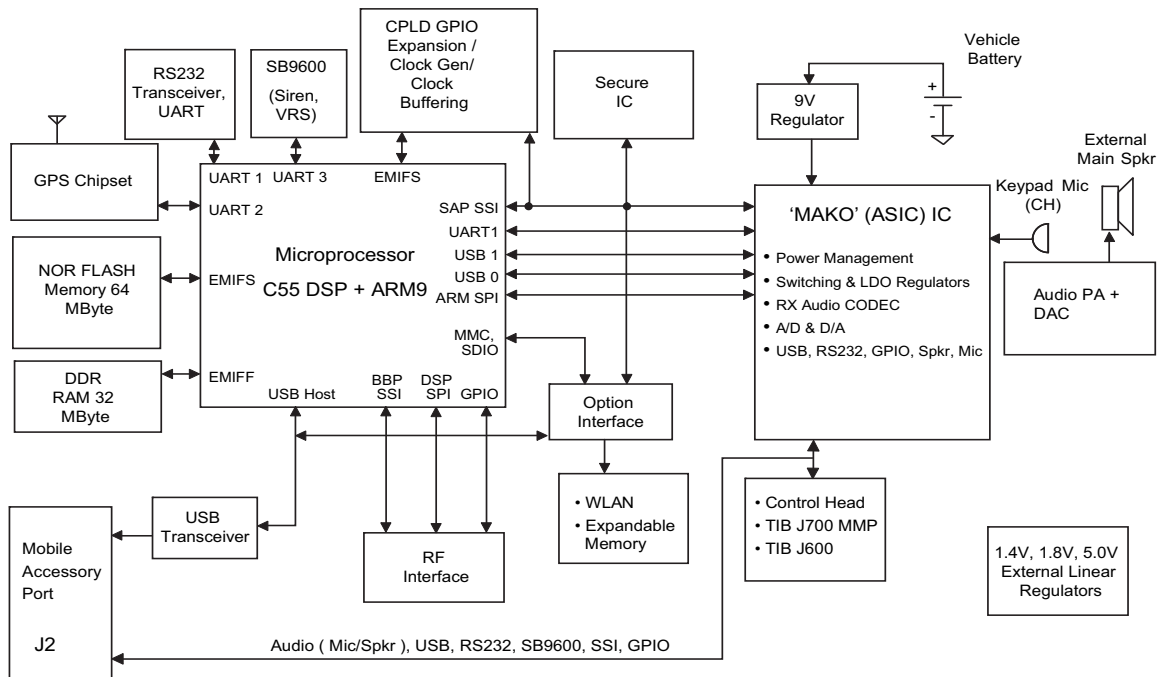


Figure 3-1. Mobile Controller Block Diagram for APX 5500 / 6500 / 7500 / 6500Li

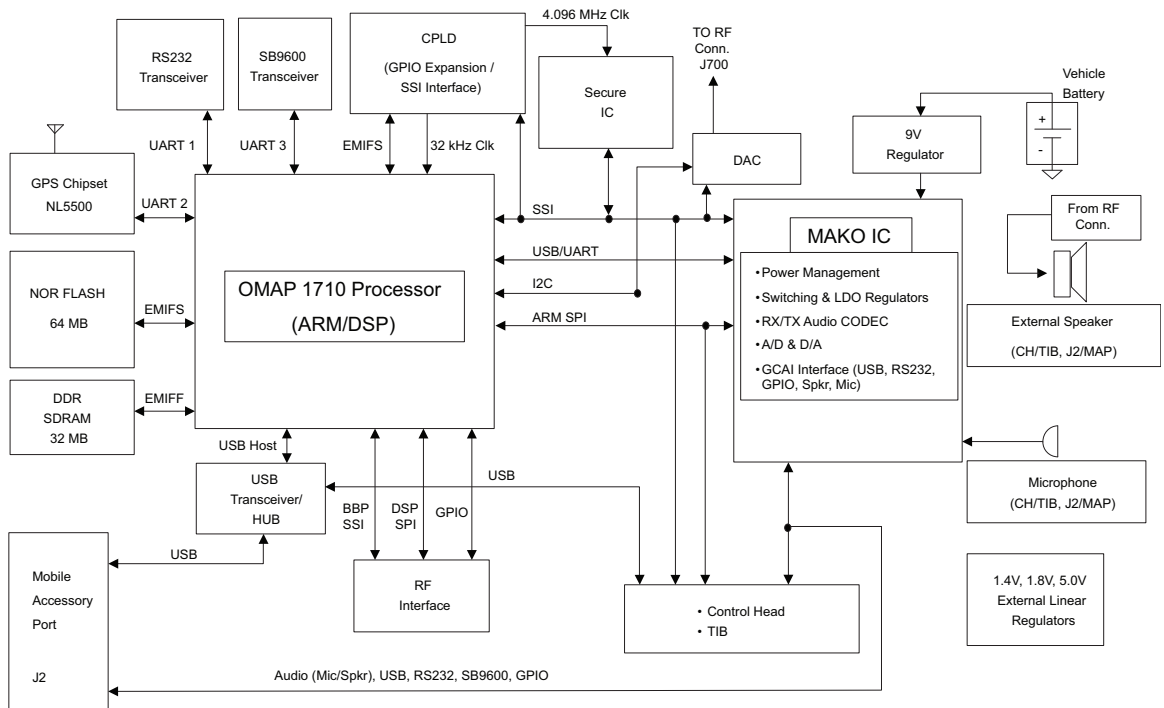


Figure 3-2. Mobile Controller Block Diagram for APX 2500 / 4500 / 4500Li

### 3.3.2 Location

The controller overlays are shown and described below.

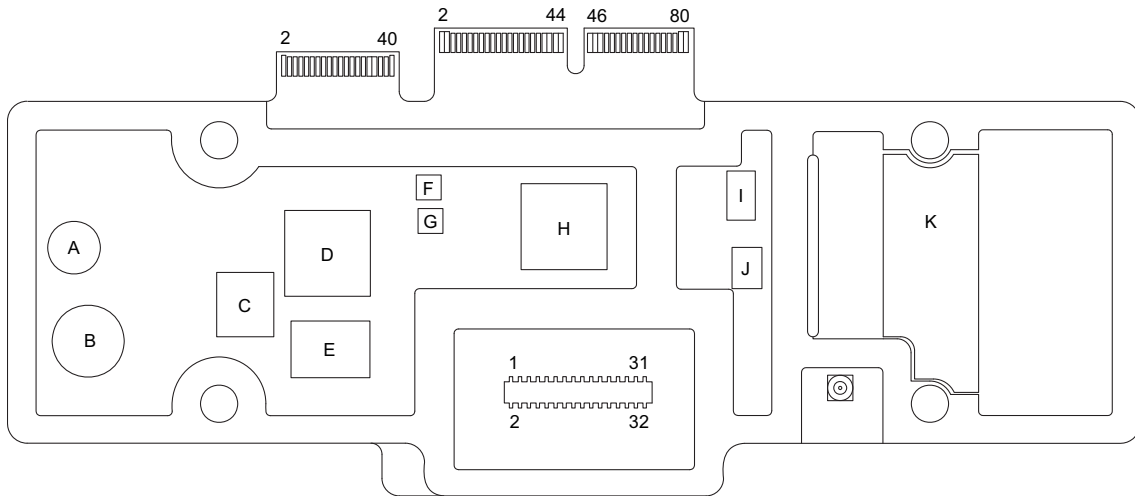


Figure 3-3. APX 5500 / 6500 / 6500Li / 7500 Controller Overlay (Side 1)

Component No.	Description
A	3.6V Switcher Regulator
B	5.45V Switcher Regulator
C	SDRAM
D	OMAP
E	Flash
F	1.4V Linear Regulator
G	1.8V Linear Regulator
H	MACE
I	GPS Regulators
J	GPS IC
K	Audio PA Heatsink

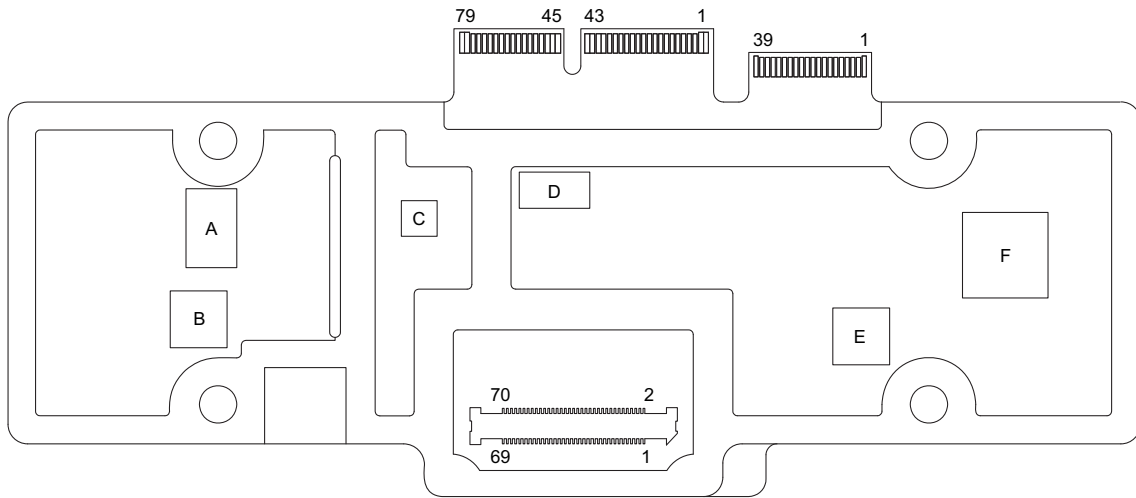


Figure 3-4. APX 5500 / 6500 / 6500Li / 7500 Controller Overlay (Side 2)

Component No.	Description
A	Audio PA
B	9.3V Linear Regulator
C	Audio DAC
D	RS-232 Transceiver
E	CPLD
F	Mako

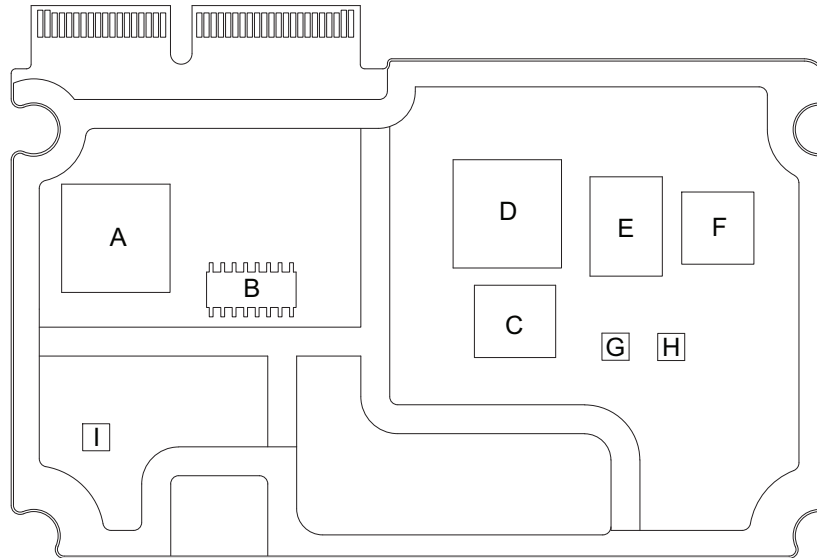


Figure 3-5. APX 2500 / 4500 / 4500Li Controller Overlay (Side 1)

**NOTE:** It is not necessary for all APX 2500 / 4500 / 4500Li radios to have MACE.

Component No.	Description
A	MACE
B	RS-232 Transceiver
C	SDRAM
D	OMAP
E	Flash
F	CPLD
G	1.4V Linear Regulator
H	1.8V Linear Regulator
I	GPS Regulators



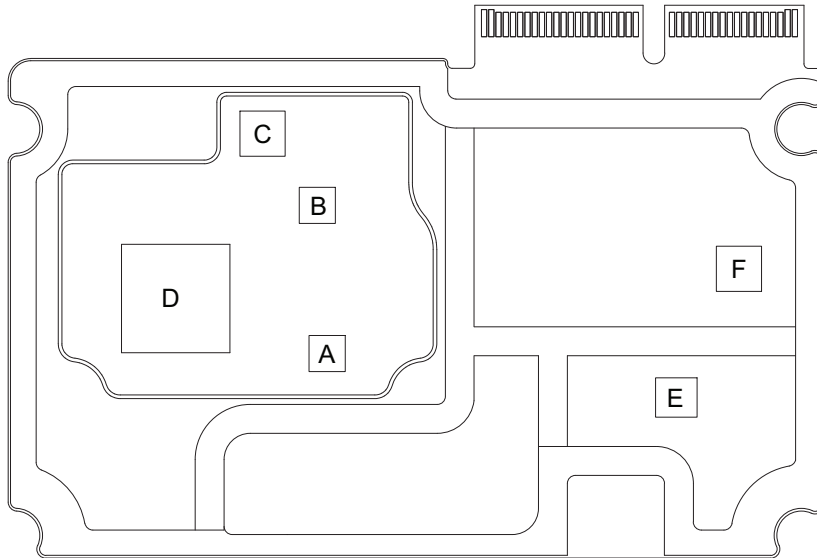


Figure 3-6. APX 2500 / 4500 / 4500Li Controller Overlay (Side 2)

Component No.	Description
A	3.6V Switcher Regulator
B	5.45V Switcher Regulator
C	Audio DAC
D	Mako
E	GPS IC
F	USB HUB

### 3.3.3 Microprocessor / Memory

The 'core' of the controller consists of three parts: microprocessor/DSP, NOR-FLASH IC, and DDR-SDRAM IC.

**NOTE:** The three parts are highly susceptible to ESD and moisture damage. Extreme care is advised.

#### 3.3.3.1 Microprocessor

The microprocessor consists of an ARM-based controller and a C55-based DSP that communicates with the memory ICs via a 16-bit data bus. It also communicates to peripheral ICs on the main board via an SSI, I2C and SPI bus. This microprocessor contains a fixed amount of one-time programmable ROM and a small section of RAM. However, the microprocessor does not contain the customer codeplug settings as programmed in the Customer Programming Software (CPS) or the firmware as installed at the factory. The purpose of this IC is for interpretation and processing of the content inside the FLASH IC (and executed out of the SDRAM IC). Therefore, this part may be replaced, as is, without the need to reflash the radio.

There are seven clocks supplied to the controller microprocessor: a 16.8 MHz reference/timing clock for RF modulation processing, a 32 kHz real-time clock (CKIL), a 12 MHz operating clock, a 20 kHz RX frame-sync clock, a 84 kHz TX frame-sync clock, a 1.2 MHz RX data clock, and a 4.2 MHz TX data clock. The microprocessor also generates the digital audio bus clocks: a 1.536 MHz data clock and an 8 kHz frame-sync clock.

#### 3.3.3.2 FLASH IC

The FLASH IC is the firmware and codeplug storage IC. Programming this IC is accomplished using one of the programming cables and input paths listed in [Table 4-8](#):



Caution

If during a flash upgrade, the radio power becomes interrupted and the radio fails to recover, the radio must be reflashed utilizing the force fail circuitry. An explanation of the circuitry can be found in [Section 3.4](#) and the service procedure can be found in [Chapter 4. Recommended Test Equipment](#).

#### 3.3.3.3 SDRAM IC

The SDRAM IC is used by the microprocessor to execute code downloaded from the FLASH IC, and to perform its memory operations and is not upgradeable to a larger density.

### 3.3.4 Voltage Distribution / Power On/Off

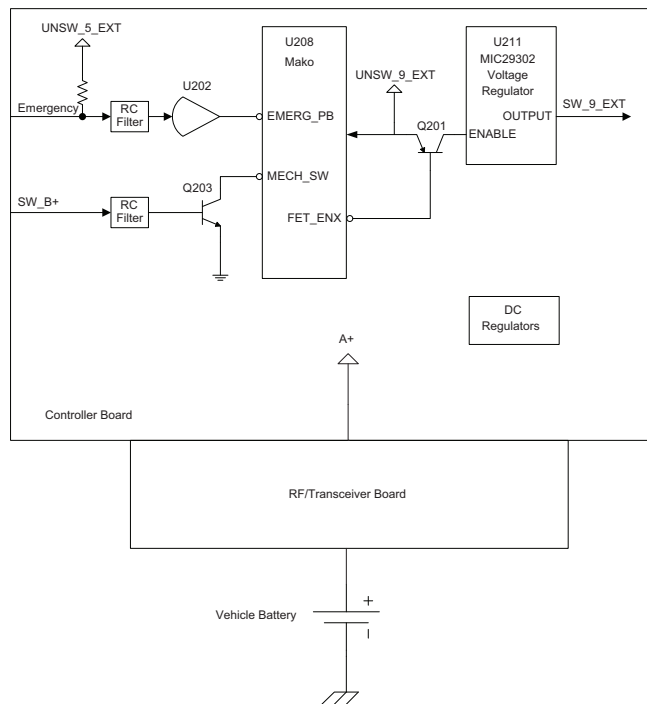


Figure 3-7. Voltage Distribution / Power On/Off Diagram for APX 5500 / 6500 / 7500 / 6500Li

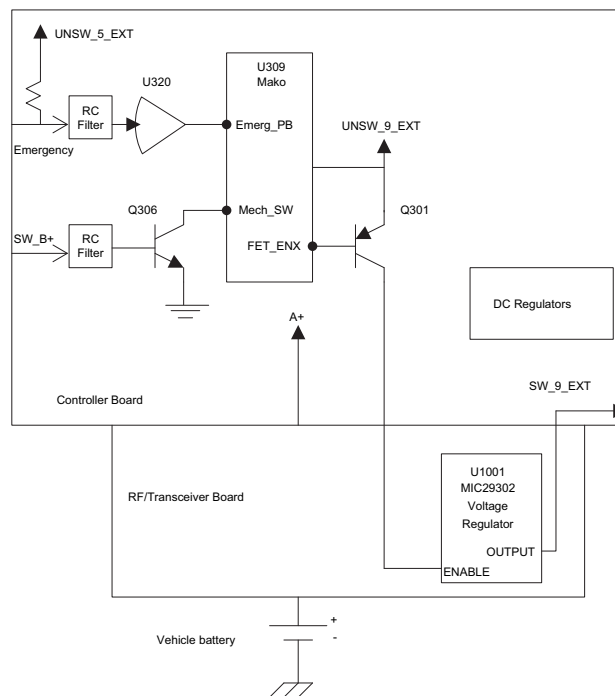


Figure 3-8. Voltage Distribution / Power On/Off Diagram for APX 2500 / 4500 / 4500Li

### 3.3.4.1 Voltage Distribution for Controller and RF Board

The APX mobile radios are powered by a 12V vehicle battery (negative ground), or a AC-to-DC desktop power adapter, and enters at the rear of the radio transceiver at a dedicated 2-pin DC connector. This raw voltage, referred to as "A+", is routed past a shunt clamping zener diode and into the RF board. The voltage then splits to some components on the RF board, as well as into a Load Dump "Over Voltage Protection" circuit. The output from this circuit clamps the voltage to a fixed maximum level, which is then supplied to both the remainder of the RF board circuit sub-sections as well as into the controller board's circuit sub-sections.

### 3.3.4.2 Power On/Off

There are four methods that can be used to turn the radio on and off; Power Button on the control head, power button on an accessory connected to the Mobile Microphone Port (MMP) of the control head, Ignition sense (ACC) line, and emergency.

**Power Button** – The power button will turn the radio on and off unless the codeplug is set to ignition required and the ignition signal is not present.

**Accessory with Power Button** – An accessory that has power-on functionality can be connected to the control head MMP port. The power button on the accessory will then function the same as the control head power button. Note that power-on functionality is not available at the Transceiver Interface Board (TIB) MMP.

**Ignition sense (ACC) line** – Ignition will turn the radio on in two cases. First, the codeplug is set to ignition required and the radio was in the "ON" state when ignition was removed from the radio. Second, the codeplug is set to "soft power off". "Soft Power Off" is an "OR" function between the power button and the ignition signal. If either the ignition signal is asserted or the power button is pressed, then the radio will turn on.

**Emergency** – The emergency footswitch connected to pin 15 of the Mobile Accessory Port (MAP) located on the rear of a mid-power transceiver and the rear of a remote mount control head will turn the radio on if "emergency power-on" is enabled in the codeplug.

The control head power button, MMP power button, Ignition sense (ACC) line connected to a remote control head, and emergency connected to a remote control head are all described in the control head manual. In the dash mount configuration, Ignition sense (ACC) and emergency are connected to the transceiver and handled by circuits on the controller board.

The transceiver regulators are controlled by the 'MAKO' (ASIC). This IC has a Power Management Controller (PMC) state machine that monitors two inputs to the 'MAKO' (ASIC), MECH\_SW and EMERG\_PB. The hardware for the state machine is powered by the UNSW\_9 regulator.

To turn the radio on, the control head, or TIB in the remote mount case, applies SW\_B+ to the controller board. This signal is connected to the 'MAKO' (ASIC) pin MECH\_SW through an inverting isolation transistor. When MECH\_SW is pulled low by this transistor, the state machine enters the "ON" state, turning on the transceiver regulators. When SW\_B+ is de-asserted, causing MECH\_SW to go high, a 125 ms timer is started. When the timer expires, the PMC state machine enters the "OFF" state. System software can extend this time by sending periodic commands to the 'MAKO' (ASIC) IC.

### 3.3.4.3 Emergency

The emergency feature allows the radio to power-up and send an alert over the system by pressing a footswitch. This feature must be enabled in the codeplug. In addition, emergency power-up is not available using the control head orange programmable emergency button.

The emergency footswitch is a normally closed switch that connects to J2 pin 15. The emergency signal is pulled to 5V on the controller board. When the emergency footswitch is pressed, the switch opens allowing the line to be pulled high. To reduce the chances of false triggering due to noise, a comparator with hysteresis is used. The comparator output is an open drain output and connects to the 'MAKO' (ASIC) EMERG\_PB signal.

When EMERG\_PB is pulled low by the comparator output, the PMC state machine enters the "ON" state. Software must turn the system off by sending a command to the 'MAKO' (ASIC). Specifically, an emergency flag must be cleared.

In the remote mount configuration, the emergency footswitch is normally connected to the MAP connector on the back of the control head assembly. The emergency footswitch can be connected to the J2 connector if the TIB is modified. A jumper is present on the TIB that grounds J2 pin 15. This jumper must be removed.

### 3.3.5 Audio Circuitry

#### 3.3.5.1 RX Audio Path

The receive audio path consists of the following main components:

- Texas Instruments OMAP 1710
- Texas Instruments Audio DAC TLV320DAC32
- Mako IC
- NXP Audio PA TDA8932

The Digital audio signal comes from the processor using SSI protocol. The Audio SSI bus is routed to Mako IC D/A converter (DAC) and the TI DAC. The Mako DAC converts the SSI digital data to analog; the analog data from the Mako has a fixed level output which is used for the receive filtered audio and universal speaker signals.

The TI DAC also converts SSI digital audio to analog audio which is then routed to the volume control section of the DAC. Analog audio is attenuated based on the volume setting. The TI DAC volume control uses I2C bus which is driven by the controller. The output of the TI DAC is routed to the Class D Audio PA TDA8932. The Audio PA converts the analog signal to a PWM output, it also adds 36 dB of gain. The output low pass filter (LC), filters out the Audio PA switching frequency before the audio is routed to the speaker output.

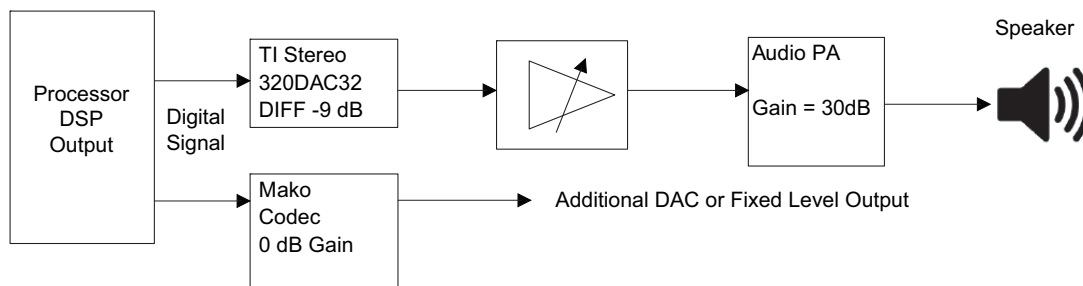


Figure 3-9. Audio Receive Path in APX mobile radio Transceiver

#### 3.3.5.2 TX Audio Path

Main Components:

- Texas Instruments OMAP 1710
- Mako ADC
- Atten/PreAmp.

Analog audio comes from the external Microphone attached to the radio via the control head mic port or the rear accessory connector J2 (Mic\_Hi or Aux\_Mic). Analog audio is attenuated by 6dB and is then routed to the Mako. Mako converts the analog audio to digital and sends it to the main processor using the Audio SSI bus. OMAP processes the audio which is then converted to Baseband audio which is routed to the RF board.

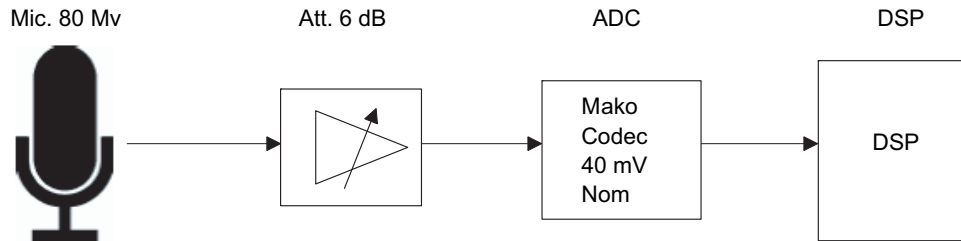


Figure 3-10. Audio Transmit Path in APX mobile radio Transceiver

### 3.3.6 Secure

The controller board is able to perform secure option functions through the MACE IC. Just like in digital mode, the CODEC supplies the DSP (part of OMAP) with audio. When a secure signal has been selected or detected, it is diverted to the MACE via the SSI lines. The conversion between non-encrypted (red) and encrypted (black) occurs within the MACE.

#### Power

- The MACE shares the same 1.8V supply as the OMAP. However the volatile memory within the MACE is supplied by a combination of one or two capacitors. These caps are charged through a blocking diode and regulators derived typically from a power source such as the vehicle battery.

#### Clock

- The 24.576 MHz clock originating at Mako is divided down to 4.096 MHz on the CPLD to supply clock and frame sync to the MACE. Also see [Section 3.3](#).

#### Keyloading

- See [Section 7.1](#). The KEYLOADER signal comes in on MMP pin 9 of the control head or TIB J700 connector. It connects directly to the MACE. There is an algorithm in the MACE which detects and stores the key as long as the radio is powered.

#### Tamper and key retention

- The MACE has the option of infinite key retention using the same electrically erasable memory as the operating code. The key can be disabled by several means to avoid compromise. A tamper switch will detect mechanical intrusion. A supply maintains the static memory when all power to the transceiver is removed. This volatile key retention option will hold the key for at least 30 seconds on the discharge of an on board capacitor. A three-day key retention option board (see [Section 3.4](#)), adds a much larger capacitor to increase the time for storage and/or shipping. In both cases, the loss of power will corrupt the static RAM.
- The 3-day key retention capacitor charge time (the duration when radio is plugged into a power supply / battery) versus key-retention duration is shown in [Figure 3-11](#).

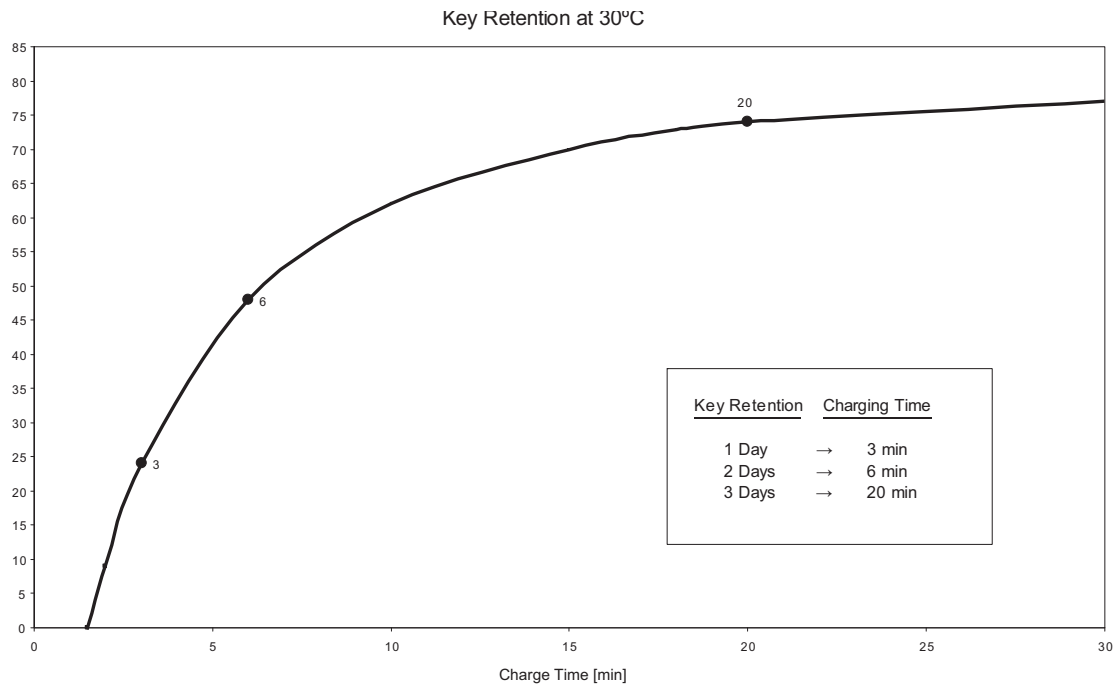


Figure 3-11. Key Retention Graph

### 3.3.7 GPS Overview

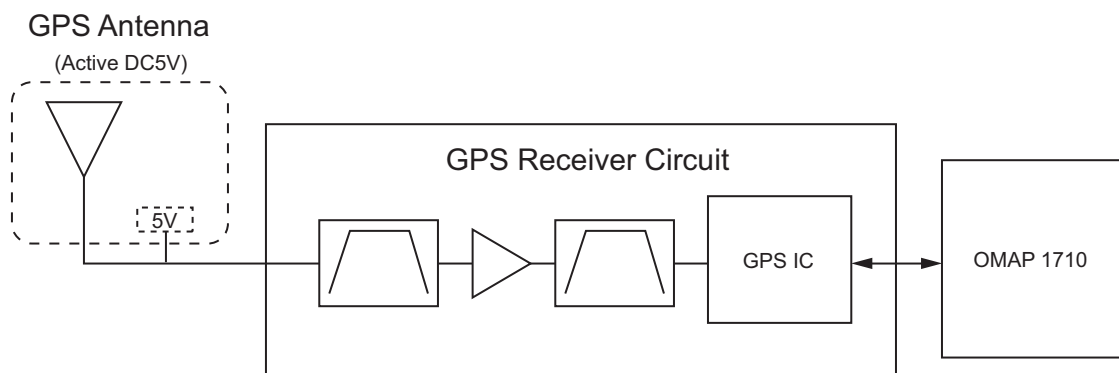


Figure 3-12. GPS Architecture


The GPS architecture employs a single chip GPS receiver which decodes GPS signals at 1575.42 MHz. It is capable of producing a final position solution including full tracking and data decode capability. The GPS receiver will operate in the autonomous mode only.

The GPS receiver is setup in an autonomous one track always (OTA) mode, also known as continuous navigation. This means the GPS will continuously track satellites for as long as the radio is powered to ensure the best possible accuracy. In the event the radio loses visibility of the satellites due to terrain or environmental factors such as driving through a tunnel or in a parking garage, the GPS will temporarily lose its position fix. The GPS will then begin to reacquire the signal and compute an updated position once the radio has moved back into an environment where GPS signals are present.

The user will be able to view the current latitude, longitude, and time/date stamp on the radio's display. The radio can also be configured to send its' location to the system at predetermined intervals (LRRP). Depending on system options, the user may be able to enable/disable the GPS receiver.

If the GPS receiver is unable to acquire a position try the following steps.

1. Make sure the unit is in an open sky environment to ensure the presence of GPS signals (min 5 satellites in view at nominal power levels of -130 dBm).
2. Reset the radio. If a position fix does not occur within 2 minutes go to step 3.
3. Disconnect the GPS antenna and make sure the center conductor on the antenna is not shorted to ground. If so, replace the GPS antenna.
4. Measure the voltage on the GPS SMA connector located on the radio and ensure 5V is present. If 5V is not present then send the radio in for repair.
5. If steps 1 to 4 have been followed and the GPS still does not obtain a position fix, then refer to the Detailed Service Manual for further instructions.



**Caution** These custom connectors are optimized to meet voltage and current requirements for existing accessories and for the compatible flexes that are used with the APX 7500 radio. Inserting non-Motorola parts or flexes into these connectors is not recommended. Failure to do so can result in equipment damage.

### 3.3.8 Serial Interfaces

#### Mobile - Dash Mount

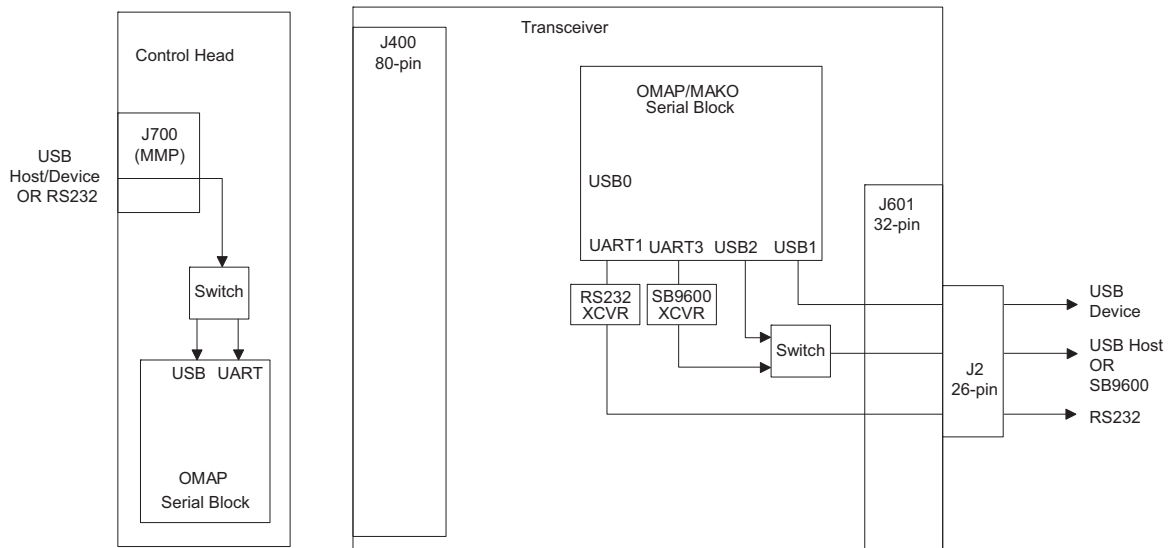


Figure 3-13. Dash-Mount Configuration



Mobile - Remote Mount

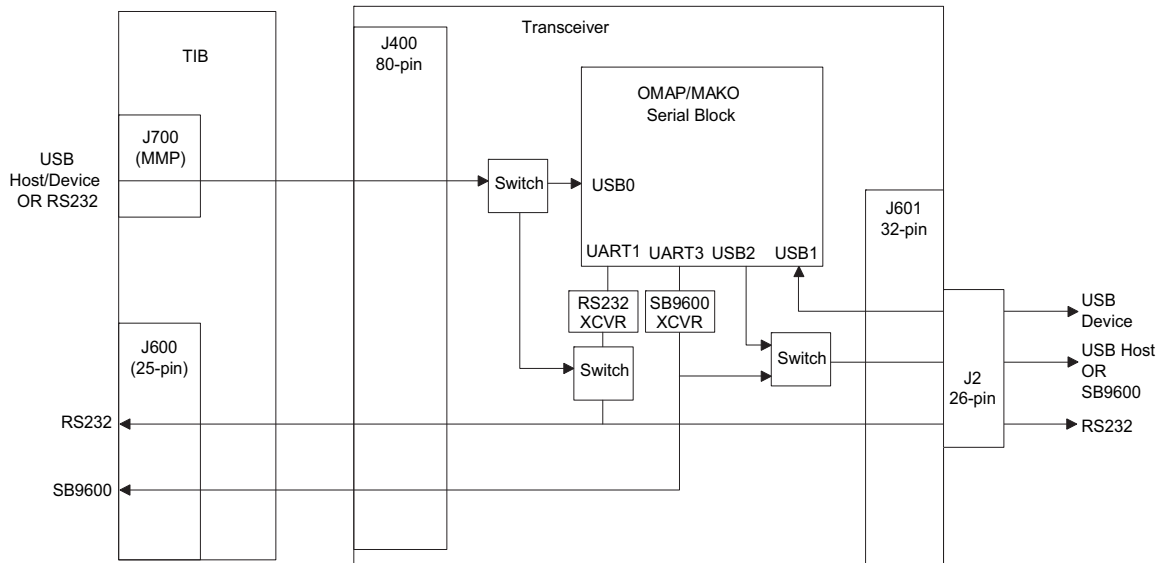


Figure 3-14. Remote-Mount Configuration for APX 5500 / 6500 / 7500 / 6500Li

Mobile - Remote Mount

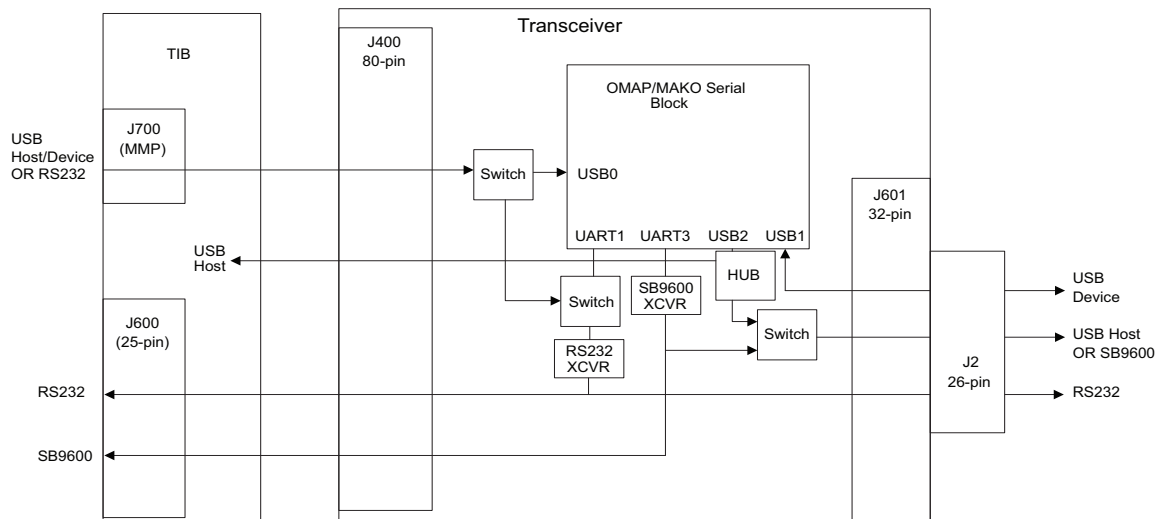


Figure 3-15. Remote-Mount Configuration for APX 2500 / 4500 / 4500Li

Several external serial interfaces are supported by the APX7500 / APX 6500 transceiver, and shown in the previous figures for both dash and remote mount operation. The mid-power radio has RS232, USB Device, USB Host, and SB9600 available at the rear 26-pin J2 connector. Both mid-power and high-power radios also have RS232, and USB Device/Host, available at the TIB external connectors J700 or J600. (Note in dash mount the serial interfaces at the J700 MMP connector do not go to the transceiver controller, but rather to circuitry on the control head). Many of the accessories that connect to the J700 and J2 connectors are identified through the 1-Wire<sup>®</sup> serial protocol. This information tells the controller which serial bus to configure for the accessory. The 1-Wire<sup>®</sup> IC is typically embedded in the cable/accessory for this purpose.

There are hardware design limitations that limit the number of serial interfaces that can be used simultaneously.

- **RS232** – This serial interface is available at either the J2 (rear) / J600 (TIB) connectors, or at the J700 (TIB) connector. The J2/J600 interface is compliant with industry-standard 12V RS232 logic and is the default selection when no 1-Wire<sup>®</sup> accessory is attached to the J700 connector. An RS232 device can be used at either J600 or J2 (but not simultaneously). If a 1-Wire<sup>®</sup> compliant RS232 accessory is attached to the J700 connector, then the bus is no longer supported at J2/J600. The J700 RS232 interface is at 5V logic, while the RS232 cable contains the voltage translation circuitry to make the bus 12V compliant.
- **SB9600** – This is a Motorola proprietary bus used to communicate with certain legacy accessories. The bus is available at both the J2 and J600 connectors by default. This bus can also be configured as a second UART/RS232 bus (at 5V logic level) at both connectors, as a future feature. This configuration would require a voltage-translation circuit in the cable, similar to that of the J700 RS232 1-Wire<sup>®</sup> accessory/cable. This would allow for use of both RS232 interfaces simultaneously, at either J2 or J600.
- **USB** – USB Host and Device functionality are available at the J700 MMP connector on TIB. The functionality is again determined by the type of accessory/cable identified by the 1-Wire<sup>®</sup> interface. USB Device is also a dedicated interface at the J2 connector by default. In addition, USB Host can be optionally configured at the J2 connector via the SB9600 interface (the buses share common pins). The SB9600 bus is configured by default, but USB Host will be configured when a 1-Wire<sup>®</sup> compliant USB Device accessory/cable is attached to the J2 connector. (Note that if a USB cable is attached to the TIB J700 connector, the RS232 link at the J2/J600 can still be used. The J2 USB Host and Device interface can also be used if the J700 USB interface is for Host only). USB Host is also available for TIB through the J400 CH/TIB edge connector, for APX 2500 /4500/4500Li.

In addition to the serial interfaces, there are several audio and digital inputs/outputs supported at J2, J700, and J600 connectors of the transceiver. Digital inputs/outputs include the following:

- **PTT** – Active low input signal that will cause the radio to transmit; available at J2 and J600.
- **IGNITION** – Active high input signal tied to vehicle ignition sense (ACC) for configurable system power-up; available at J2 and J600. Can also be used at the remote control head.
- **EMERGENCY** – Active high input signal activated by an optional foot-switch accessory, for configurable system power-up; available at J2 and J600.
- **MONITOR** – Active low input signal used as a microphone HUB detection, for override of PL signal during receive; available at J2.
- **CHAN\_ACT** – Active low output used to indicate presence of a qualified receive audio signal; available at J2.
- **VIP OUT 1 & 2** – Configurable control signals driven by a DEK or equivalent accessory box attached at the J600 connector, to control/enable various functions (e.g. Horn and lights) attached at the J2 connector.

The following audio signals exist on the radio, along with their locations:

- **AUX\_MIC** – Optional microphone audio input; available at J2 and J600.
- **MIC\_HI** – Primary dash-mount microphone audio input; available at J700.
- **AUX\_TX** – Optional microphone audio input; available at J600.
- **RX\_FILT\_AUDIO** – Line-level speaker output; available at J2 and J600.
- **MMP\_SPKR** – Line-level speaker output; available at J700.
- **SPKR+, SPKR-** – Primary amplified speaker outputs, available at J2 and J600.

### 3.3.9 Accessory Power

SW\_B+ is sourced from the control head in the dash mount configuration and the TIB in the remote mount configuration. SW\_B+ enters the transceiver through the front edge-connector J400. Applying SW\_B+ to the front connector turns the transceiver on. SW\_B+ is also routed to rear connector J2 to provide power for accessories. Two ground pins are available on rear connector J2 and four ground pins are available on the front-connector.

## 3.4 Option Board Assembly

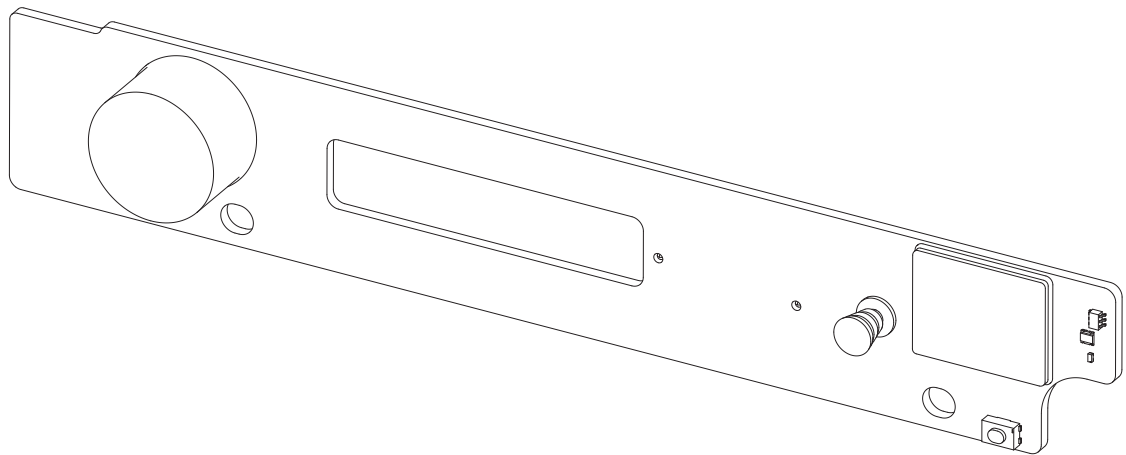


Figure 3-16. Option PCB with Memory and 3-Day Secure Key (MHLN6999\_)

There are 2 orderable option board assemblies available for both dash and remote mount configurations:

- GA00239AA containing the MHLN6999\_ Memory board with 3-day secure key retention
- GA00238AA containing the MHLN7000\_ Memory board

Both option boards contain a 1G managed NAND IC and Force fail circuitry. The MHLN6999 contains circuitry for 3-day key retention.

**NOTE:** These option boards are not in use for APX 2500 / 4500 / 4500Li.

### 3.4.1 Managed NAND

The managed NAND device is connected to the system processor using the Multimedia Card (MMC) interface. The bus runs at 25 MHz and is 4-bits wide.

### 3.4.2 Forced Fail Functionality

The transceiver ships with a boot application that either executes normal radio firmware, or downloads firmware to the radio via USB. The boot application will stop and wait for a download if the firmware is corrupted, from a previous download for example, or if the user forces the radio into boot mode. The mechanism to force the radio into boot mode is located on the standard option board. Pressing the button labeled “Force Fail” on the option board then turning on the radio will cause the boot application to not execute the radio firmware and instead wait to download new firmware. When boot application is in this mode, the LED on the option board labeled “TRAP” will light.

### 3.4.3 3-Day Secure Key Retention

A 0.47 F capacitor is used to maintain power to the secure IC when power is removed from the radio. This allows any programmed keys to be maintained for approximately three days. Without this capacitor, key retention time is roughly 30 seconds.

## 3.5 O2/O3/O5/O7/O9 Control Head Assembly

The APX mobile radio O2 control head assembly consists of the main board, bluetooth board, LCD display module, and mechanics that include the multifunction knob and user interface buttons. Circuits on the main board include the OMAP microprocessor, FLASH memory, DDR-SDRAM memory, and the control head voltage regulators. In dash mount the control head assembly is mounted directly to the transceiver unit. In remote mount, the control head communicates to the TIB on the transceiver unit using the Controller Area Network (CAN) protocol.

The APX mobile radio O3 control head assembly consists of the main board, Keypad Flex, Side Button Flex and LCD display module. Circuits on the main board include the OMAP microprocessor, FLASH memory, SDRAM memory, FPGA, CAN transceivers, AVR Power On/Off circuit and the control head voltage regulators. The control head is connected to the transceiver unit using a CAN cable and this applies to Dash mount and Remote mount. The control head communicates to the TIB on the transceiver unit using the Controller Area Network (CAN) protocol.

The APX mobile radio O5 control head assembly consists of the main board, keypad boards, LCD display module, and mechanics that include the volume knob, mode knob and user interface buttons. Circuits on the main board include the OMAP microprocessor, FLASH memory, SDRAM memory, and the control head voltage regulators. In dash mount the control head assembly is mounted directly to the transceiver unit. In remote mount, the control head assembly is mounted to the Control Head Interface Board (CHIB).

The APX mobile radio O7 control head assembly consists of the main board, bluetooth board, LCD display module, and mechanics that include the multifunction knob and user interface buttons. Circuits on the main board include the OMAP microprocessor, FLASH memory, DDR-SDRAM memory, and the control head voltage regulators. In dash mount the control head assembly is mounted directly to the transceiver unit. In remote mount, the control head communicates to the TIB on the transceiver unit using the Controller Area Network (CAN) protocol.

The APX mobile radio O9 control head assembly consists of the main board, LCD display module, and mechanics that include the volume knob, mode knob and user interface buttons. Circuits on the main board include the OMAP microprocessor, FLASH memory, DDR-SDRAM memory, and the control head voltage regulators. The control head communicates to the TIB on the transceiver unit using the Controller Area Network (CAN) protocol.

### 3.5.1 OMAP Microcontroller

The Texas Instruments OMAP microcontroller is used to perform control head operations. The user interface for O5, consisting of nine buttons, the volume knob, and 16 position mode knob and for O3 consisting of 32 buttons is read by OMAP and the input is passed to the transceiver unit via the Synchronous Serial Interface (SSI). In the dash mount configuration for the O5, the OMAP SSI bus is connected directly to the transceiver microprocessor's SSI bus. In remote mount for O5, the OMAP SSI bus is converted to the Controller Area Network (CAN) protocol by the CHIB. For the O3 Dash mount and remote mount configuration, the SSI is passed to the FPGA unit where it is converted to the CAN protocol and sent to the CAN Transceivers which transmits the CAN signal over the CAN cable. The CAN signal is received by the Transceiver Interface Board (TIB), which converts the signal back to SSI and routes the signal to the transceiver microprocessor. OMAP uses two clocks, a 32kHz clock supplied by an external oscillator and a 12MHz clock supplied by an internal oscillator.

The volume knob and 16 position frequency knob is read by OMAP. The user interface for O9, consisting of 16 buttons would be mapped to the OMAP keypad interface module via a column/row matrix as well. The rest of the 30 keys are mapped via an external keypad encoder. In the remote mount configuration for O9, the OMAP SSI bus is converted to the Controller Area Network (CAN) protocol by FPGA unit. The CAN signal is received by the Transceiver Interface Board (TIB), which converts the signal back to SSI and routes the signal to the transceiver microprocessor.

The user interface for O2 consisting of 9 keys would be mapped to the OMAP keypad interface module via a column/row matrix. In the dash mount configuration for the O2, the OMAP SSI bus is connected directly to the transceiver microprocessor's SSI bus. The user interface for O7 consisting of 24 keys would be mapped to the OMAP keypad interface module via a column/row matrix. In the dash mount configuration for the O7, the OMAP SSI bus is connected directly to the transceiver microprocessor's SSI bus. In remote mount for O7, the OMAP SSI bus is converted to the Controller Area Network (CAN) protocol by the CHIB.

### 3.5.2 Field-Programmable Gate Array (FPGA)

The FPGA implements an SSI to CAN-protocol translation, which is used to provide a remote link between the Control Head and radio transceiver, through the TIB, in a remote mount configuration. Each processor uses SPI to configure the FPGA at each startup (the OMAP programs the CHIB's FPGA, and the radio transceiver microprocessor programs the TIB's FPGA). Once the FPGA is programmed, each processor uses the SSI bus to send/receive data to/from the FPGA, clocked at 1.536Mhz and synchronized at 8kHz. The FPGA converts this SSI data into a CAN-protocol, which is input into 2 CAN transceivers (digital data stream and digital audio stream), and out special CAN cables to/from the O3 controlhead, the TIB, or the CHIB based on control head configuration. The third CAN Transceiver (power on/off/reset) is not controlled by the FPGA. For the O3, there is a 10 foot coiled CAN cable, and a 17 foot straight extension cable. For the O2, O7, O5 and O9, there are a variety of fixed-length CAN cables (3 meters to 40 meters).

### 3.5.3 Controller Area Network (CAN) Transceivers

There are a total of 3 CAN Transceivers located on the O3 Control Head, 3 on the TIB, and 3 on the CHIB. CAN1 is used for digital Audio, CAN2 is used for digital Data and CAN3 is for digital Power ON/OFF/RESET pulses. If an O5 control head is used, a TIB and CHIB must be present. If an O3 control head is used, only a TIB must be present, since the O3 control head has the CAN transceivers located on its PCB's. The CAN bus provides a 1MB/s data link. Only the list of approved Motorola CAN cables are to be used for any remote mount installations.

For the O2, O7 and O9 control head, the CAN provides the needed data and audio interface between the transceiver and control head for remote mount connectivity. FPGA unit is be the OMAP and CODEC interconnect for digital and audio data respectively. SPI is used to configure the FPGA unit, and GPIO is used for status and interrupt functionality. Three CAN transceivers are needed because the audio data uses its own transceiver, digital data uses another CAN transceiver and PWR on/off will use one more CAN transceiver. The data from the three CAN transceivers is sent over a network type cable containing 6 twisted pair sets of wire. There are two CAN interface connectors on the control head: one for the main network cable that is connected to the transceiver; and another for a parallel control head to interface on the CAN bus.

### 3.5.4 Power Management

The remote mount radio system uses a CAN protocol for turning-on, turning-off, and resetting the entire system. That means for normal operation, you will never have only part of the radio system operating. Either it is "all on" or "all off". Regarding specific regulator aspects of the radio, the Control Head assembly contains a 5V switching regulator that is supplied by A+. When enabled, the 5V regulator output is applied to a TI power management IC. For the O5 Control Head, A+ is also applied to a 2.8V regulator and a MOSFET that is used as a switch to provide "switched B+" to the radio transceiver in dash mount configuration. The ATMEL AVR, advanced RISC microcontroller is used on the O3, O5, and TIB to power-on, power-off, and reset the entire radio system. It has multiple inputs for determining the correct state of the radio as well as inputs to detect a request to change the state of the radio, either externally, or via processor GPIO's (refer to the detailed service manual for specifics). The TI power management IC provides three voltages that are used by the control head which are 3.3V, 1.8V, and 1.5V. The 3.3V supply is primarily used by the USB transceiver internally to OMAP and FPGA. The 3.3V supply and 2.8V supply are used the FPGA's general purpose inputs and outputs (GPIO's) in addition to most of the analog circuits on the main board. The 1.8V supply is used by the FLASH and SDRAM memory modules. The 1.5V supply is used by the OMAP core and FPGA core. The AVR also provides a watchdog function to the control head. The watchdog function is implemented for two conditions. First, if the AVR does not receive a response from OMAP within eight seconds after power-up, then the AVR will disable the 5V regulator. Second, when the user presses the power button, a 250ms counter is started. If OMAP does not reset the countdown or cancel the countdown before the 250ms has expired, then the AVR will disable the 5V regulator. Within the O3 Control Head main board, A+ is used by the LCD display module where the A+ is regulated by a 12V regulator and this is then supplied to the LCD backlight driver as the voltage input. If the vehicle's Ignition sense (ACC) is to be used as a means to sense power-on or power-off, then the CPS software tool can be used to enable ignition sensing and control a variety of customer power configurations.

The O9 control head is powered from vehicle's nominal 13.8V (A+) battery. The control head's power distribution consists of switching voltage regulators and linear regulators sourced from the A+. The regulators provide voltages consisting of 5V, 11V, 9.6V, 3.3V, 2.5V, 1.8V, 1.5V for operations of the circuitries on the board. An un-switched 3.3V regulator is used to support basic circuitry while the radio is in the "off" state. A power management IC TPS65012 regulates almost most of the digital circuit components on the board with its 3.3V switching regulator and OMAP's core voltage via the 1.5V switching regulator. Additional linear regulator from this IC for 2.5V and 1.8V will support some required voltages on the Keypad encoder and SDRAM/OMAP respectively. The TPS65012 will perform reset timing and voltage ramping as required by the OMAP processor as this function is built in the power management IC. Linear regulators of 11V and 9.6V are used for biasing circuit of audio amplifier circuit. The power is turned on by pressing the on/off button. The output ON\_OFF switches state from low to high. This will trigger the AVR to initiate power on, eventually pulling the 5V\_Enable pin low and enabling output from the 5V switched regulator. Supply from the 5V switched regulator will enable the TPS65012 power management IC and the power sequencing within the IC will start to turn on 1.5V as the first supply to OMAP core. Upon reaching the threshold, other voltage outputs would be turned on and finally release the Reset pin of OMAP.

CAN3 output controlled by AVR will send command through the CAN transceiver to turn on.

The O2 and O7 remote control head is powered from vehicle's nominal 13.8V (A+) battery. The control head's power distribution consists of switching voltage regulators and linear regulators sourced from the A+. The regulators provide voltages consisting of 5V, 3.3V, 2.8V, 1.8V and 1.4V for the operations of the circuitries on the board. An un-switched 3.3V regulator is used to support AVR circuit and CAN Transceivers. A switched 5.0V switching regulator is used to supply power to USB and power management IC. A power management IC LM26480 regulates most of the digital circuit components on the board with its 1.8V switching regulator and OMAP's core voltage via 1.4V switching regulator. Additional linear regulator from this IC for 2.8V and 1.8V will support some required voltages on the I/O voltage, GCAI, USB HUB, Bluetooth, OMAP 1710I/O voltage and User interface LCD. The LM26480 will perform reset timing and voltage ramping as required by the OMAP processor as this function is built in the power management IC. Linear regulators of 11V and 9.6V are used for biasing circuit of audio amplifier circuit. The power is turned on by pressing the on/off button. The output ON\_OFF switches state from low to high. This will trigger the AVR to initiate power on, eventually pulling the 5V\_En pin low and enabling output from the 5V switched regulator. Supply from the 5V switched regulator will enable the LM26480 power management IC and the power sequencing within the IC will start to turn on 1.4V as the first supply to OMAP core. Upon reaching the threshold, other voltage outputs would be turned on and finally release the Reset pin of OMAP.

### 3.5.5 SPI Controller

The SPI Controller has the responsibility for interfacing to the system SPI bus to provide a control and status register interface for the FPGA. The SPI is provided by the OMAP Microcontroller and this is done during system power up. Only then the FPGA behaves as a SSI-CAN-SSI Controller.

### 3.5.6 Flash IC

The FLASH memory is used to store the control head firmware. In addition, the codeplug setting for ignition is stored in the control head FLASH. The FLASH is updated after communications is established with the transceiver. Therefore, after the ignition setting has been changed in the codeplug using CPS, the radio should be turned on with the control head so that the control head FLASH will be updated. Otherwise, the FLASH will update in the field on the first successful power-up sequence.

### 3.5.7 SDRAM IC

SDRAM is volatile memory used by the processor to perform normal operations. SDRAM is not field upgradeable.

### 3.5.8 Color Liquid Crystal Display (LCD) module for O3

The LCD module contains a 130x130 dot matrix LCD display and backlight LED's. The LCD module uses two voltages, A+ and 2.8V. The display module is driven by an LCD controller internal to OMAP. The display interface consists of eight data lines, D0-D7, and three clock/synchronization lines. The control head firmware divides the display into four sections. Along the bottom, the software menu button labels are displayed. The next row up is the primary text area. The third row up is the secondary text area. And finally, along the top of the display is the icon area. The maximum primary text area character is 12x18 pixels and 10x15 pixels for secondary and tertiary text area.

### **3.5.9 Bi-Color Backlit BW Liquid Crystal Display (LCD) module for O5**

The LCD module contains a 320x83 dot matrix LCD display (whereby the contrast is internally temperature compensated and is not user adjustable), backlight LED's, and indicator LED's. The indicator LED's have shutters that cover the LED when not in use. This prevents external light from reflecting off the LED, giving the user the false impression that the LED is active. The LCD module uses two voltages, SW\_B+ and 2.8V. The display module is driven by an LCD controller internal to OMAP. The display interface consists of eight data lines, D0-D7, and three clock/synchronization lines.

The control head firmware divides the display into four sections. Along the bottom, the software menu button labels are displayed. The next row up is the primary text area. The third row up is the secondary text area. And finally, along the top of the display is the icon area. Both the primary and secondary text area's can display 14 characters.

### **3.5.10 TFT Liquid Crystal Display (LCD) module for O9**

The O9 supports a 4.3" TFT Liquid Crystal Display (LCD). It has a 480 x 272 RGB resolution and is capable of up to 16.7M colors display. It incorporates a trans-missive and micro-reflective lighting. It is also equipped with a LED driven backlight. The LCD uses a 24-bit RGB digital interface.

An external LCD controller is used to drive the LCD panel due to the frame buffer limitations on the OMAP's internal LCD controller. The EPSON S1D13742 LCD Controller is used as it has the capability to refresh the LCD panel independently, without overloading OMAP's data bus. It is capable of driving the LCD panel with resolutions of up to 800 x 480 pixels.

The S1D13742 is a color LCD graphics controller with an embedded 768K byte display buffer. This chip will interface with OMAP via Specially-Optimized Screen Interface (SoSSI).

### **3.5.11 TFT Liquid Crystal Display (LCD) module for O2 and O7**

The O2 and O7 supports a 2.6" TFT Liquid Crystal Display (LCD). It has a 320 x 144 RGB resolution display and is capable of displaying up to 262k colors. It is a transmissive LCD panel. The display module interface directly with OMAP via a Specially-Optimized Screen Interface (SOSSI).



### 3.5.12 O3 Remote Mount

The O3 control head can be remote mounted with both the APX mid-power and high-power transceivers.

In remote mount configuration, the 10 foot coiled CAN cable on the O3 CH will connect to a 17 foot CAN straight cable, which attaches to the TIB.

- Siren will be supported.
- DEK will be supported (only if Siren is installed).
- VIP In and Out's will be supported through the DEK (only if both Siren and DEK are installed).
- DVRS will be supported.

Digital vehicular repeater system (DVRS) connection is done via the J600 connector on the TIB using RS232 communication.

Programming capability will only be available on the trunk mounted transceiver via the MMP connector (J700).

Speaker, Emergency Footswitch, Ignition sense (ACC) and Audio Recording will be routed via the J600 connector at the front of both the mid-power and high power transceivers.

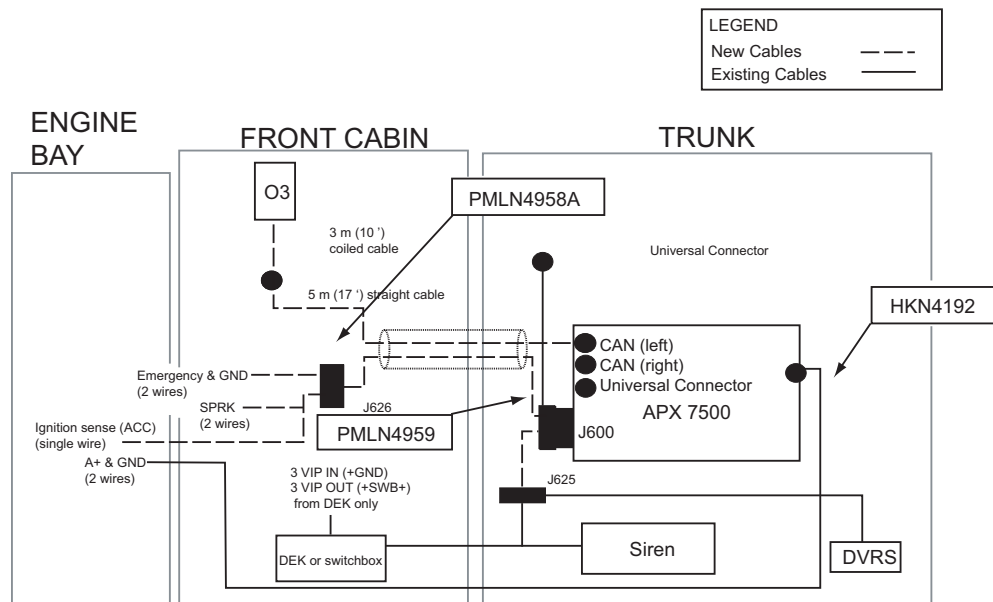


Figure 3-17. O3 Remote Mount Configuration

### 3.5.13 O2 and O7 Remote Mount

The O2 and O7 control head can be remote mounted with both the APX mid-power and high-power transceivers.

The O2 and O7 control head remote consists of a control head main board and CHIB. The control head is connected to the brick using a CAN cable.

A+ and ignition to the control head will be connected via the control head power cables, and A+ to the bricks will be connected via the bricks power cable.

Programming capability will only be available on the trunk mounted transceiver via the MMP connector (J700).

The speaker will be connected via the rear connector on control head.

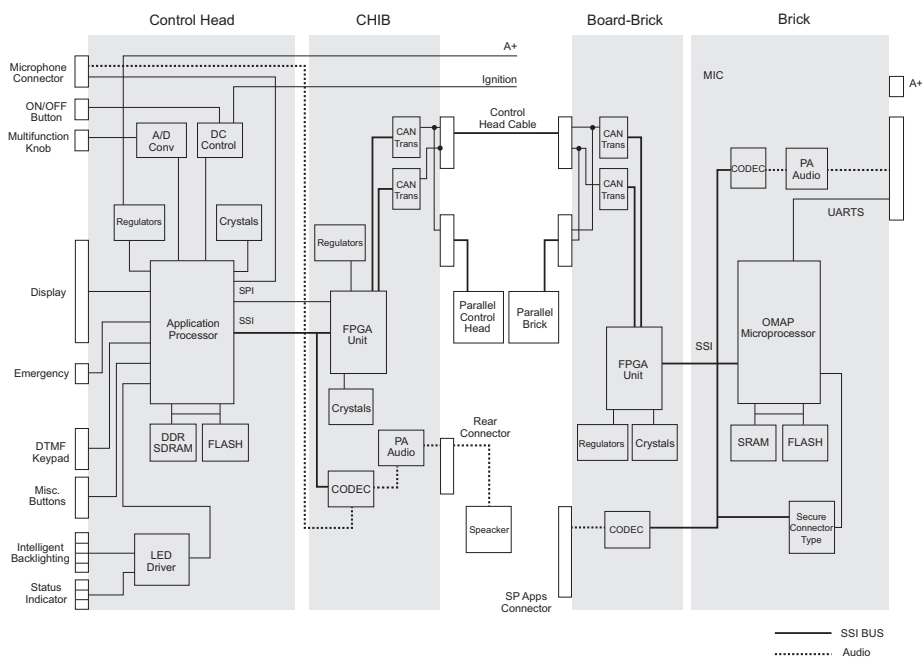


Figure 3-18. O2 and O7 Remote Mount Configuration

### 3.5.14 O9 and Transceiver Interface

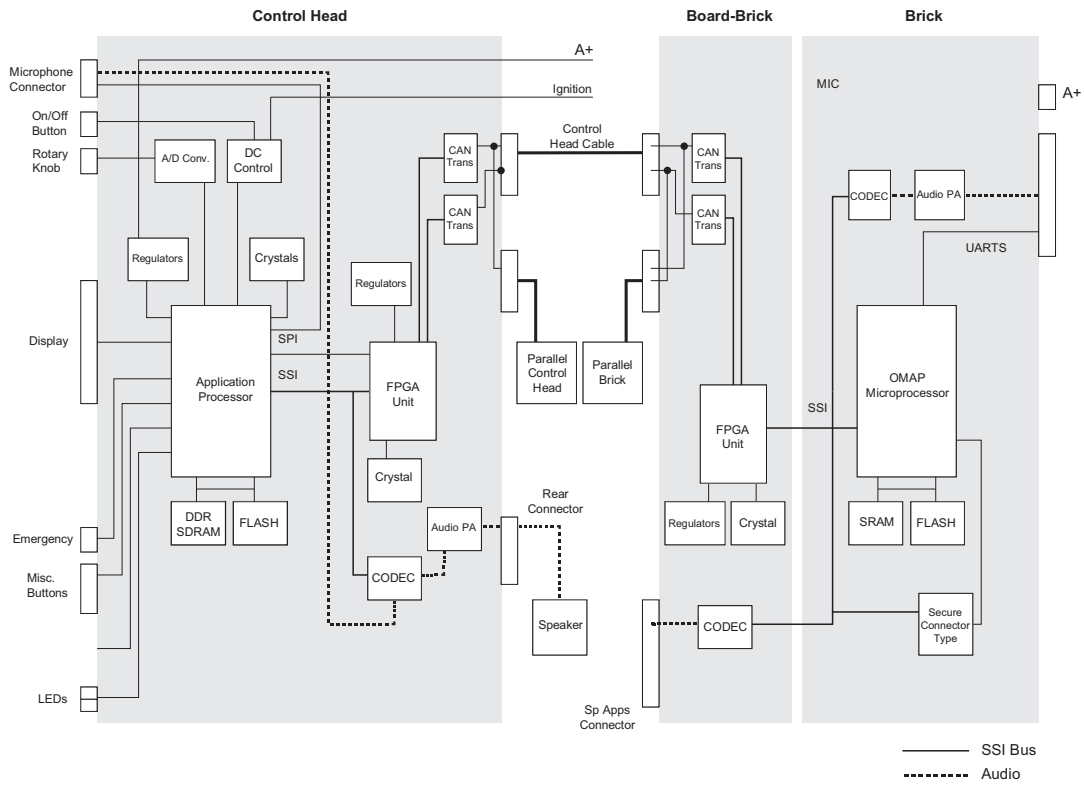


Figure 3-19. O9 and Transceiver Interface Block Diagram

### 3.5.15 Vehicle Interface Port (VIP)

#### 3.5.15.1 O2/O3/O5/O7/O9 Remote-Mount

The VIPs allow the control head to operate external circuits and to receive inputs from external circuits. There are three VIP outputs and three VIP inputs that are located on the back of the control head in connector J400 (only for O2, O5, O7, and O9) and on the transceiver interface board (TIB) in connector J600. The three VIP outputs in the J400 connector are implemented as open-drain MOSFETS capable of sinking 500 mA. Most applications use a relay connected between SW\_B+ and the VIP output. Typical applications for VIP outputs are: external horn/lights, alarm, and horn-ringing transfer. Specifically for O9, it is capable of controlling the shot gun locks. Shorting SW\_B+ directly to any of the VIP output lines without the use of a current limiting load will damage the MOSFETS. If the load is a relay, then a back-EMF protection diode is required. These are commonly known in the field as a snubber diode. Refer to the installation manual for a graphical description.

The three VIP inputs in the J400 connector are internally pulled high. An external accessory would pull the VIP input to ground to trigger a VIP input. Each VIP input transistor is connected to a dedicated input port and buffered for input protection. VIP functionality is field programmable using CPS. See installation manual HLN6923 for more information on VIP features, wiring, and operation. On the TIB there are two VIP outputs present at J600. One is a dedicated VIP output but the second must be configured as a VIP output by changing a jumper. There are also two VIP inputs present at J600, but these are also only available by changing a jumper on the TIB.

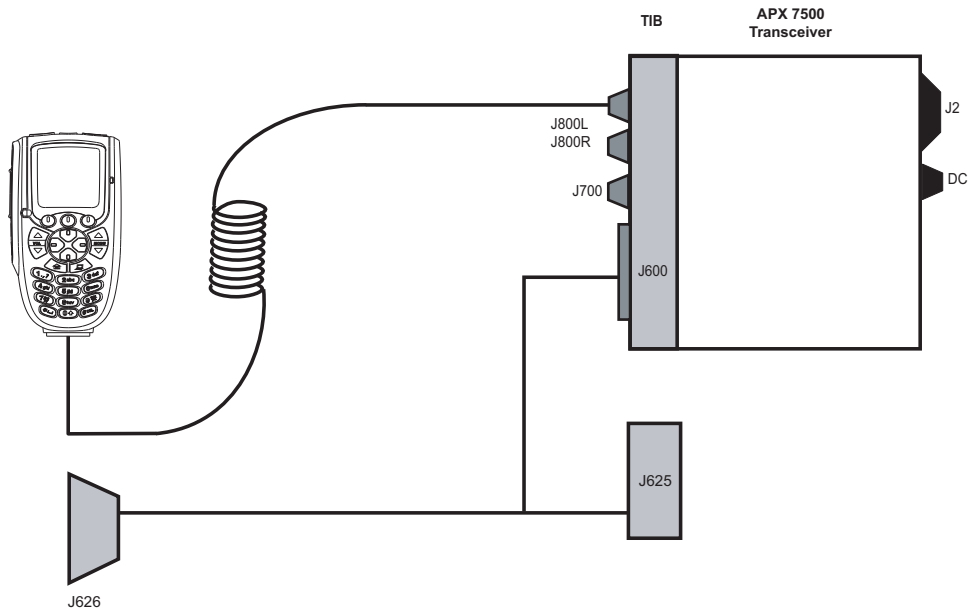


Figure 3-20. Single O3 Control Head + VIPS

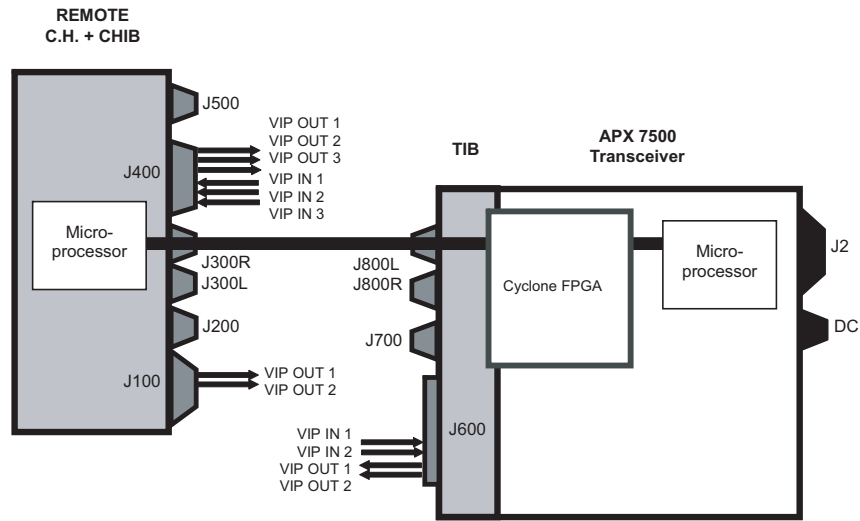


Figure 3-21. Single O2, O5, O7, and O9 Control Head + VIPS

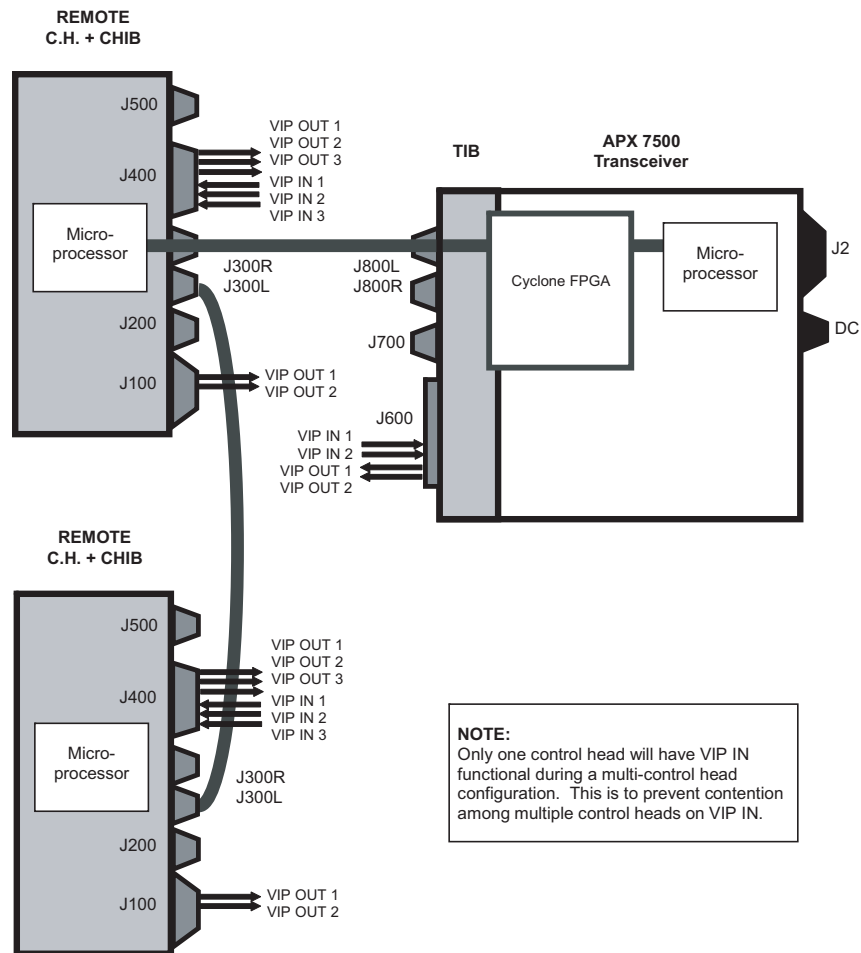


Figure 3-22. Multiple O5 Control Heads + VIPS

### 3.5.15.2 O5 Dash-Mount (Mid Power Only)

In the dash-mount configuration, two VIP outputs are available. These outputs are driven by open drain MOSFETS on the control head. These VIP outputs pass through the transceiver to rear connector J2. Primarily, these transistors control external relays. The relay is connected between the VIP output and switched B+. Refer to the Remote-Mount section for duplicate information on VIP drive strength and warnings.

No VIP inputs are available in the dash-mount configuration.

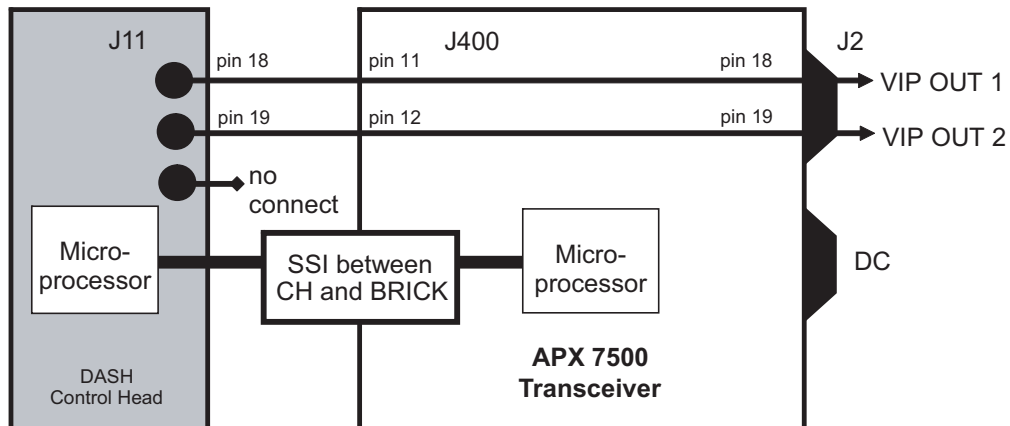


Figure 3-23. Single Control Head + VIPS

### 3.5.16 Data Entry Keyboard (DEK)

In the remote-mount configuration, the DEK box allows the programming of a single button to perform a function that was selected in the CPS, when the radio was configured. The DEK box is typically used for SIREN, to allow different modes or audio siren's from being selected by the push of a button.

Another use of the DEK box is the availability of 3 dedicated VIP-IN's and 3 dedicated VIP-OUT's. For a single DEK and controlhead configuration, Relays can be attached to the VIP pins in order to either allow your radio to toggle the relay via VIP-OUT, or to allow the radio to detect a change in mode, such as with the VIP-INs. Once you begin to add multiple controlheads and DEK boxes, please note that VIP-IN's are only allowed on the back of DEK on 1 CH. This control head must be the only "VIP In Selected" control head in the configuration. Control Heads ship "VIP In Selected." When dual control heads are connected, one must be **front-panel programmed in software** to de-select VIP-IN operation. If the software detects dual control heads with VIP IN selected, an error will be reported.

**NOTE:** the software cannot detect when VIP-INs are physically connected to a control head which has had its VIP-INs de-selected/disabled by front-panel programming. No warning will appear if VIP-INs are physically attached at both control heads.

**NOTE:** Dual control head will be available in the future.

There is no limitation as to where to tap-off for VIP-INs whether it is the backside of the DEKs found on the first CHIB, or the backside of the DEKs found at the second CHIB, etc. However, all 3 VIP-INs must only tap-off at whichever location is chosen. In other words, all must be at only one location at a single controlhead. VIP-OUTs may be present on any or all of the control heads in the system. The VIPs interface to the DEK, which interfaces with the Control Head.

The Control Head is programmed within CPS to know the function of VIP 1,2,3 at DEK A; VIP 1,2,3 at DEK B; and VIP 1,2,3 at DEK C. Please refer to the CPS help menu for complete descriptions of the features that are selectable for the DEK.

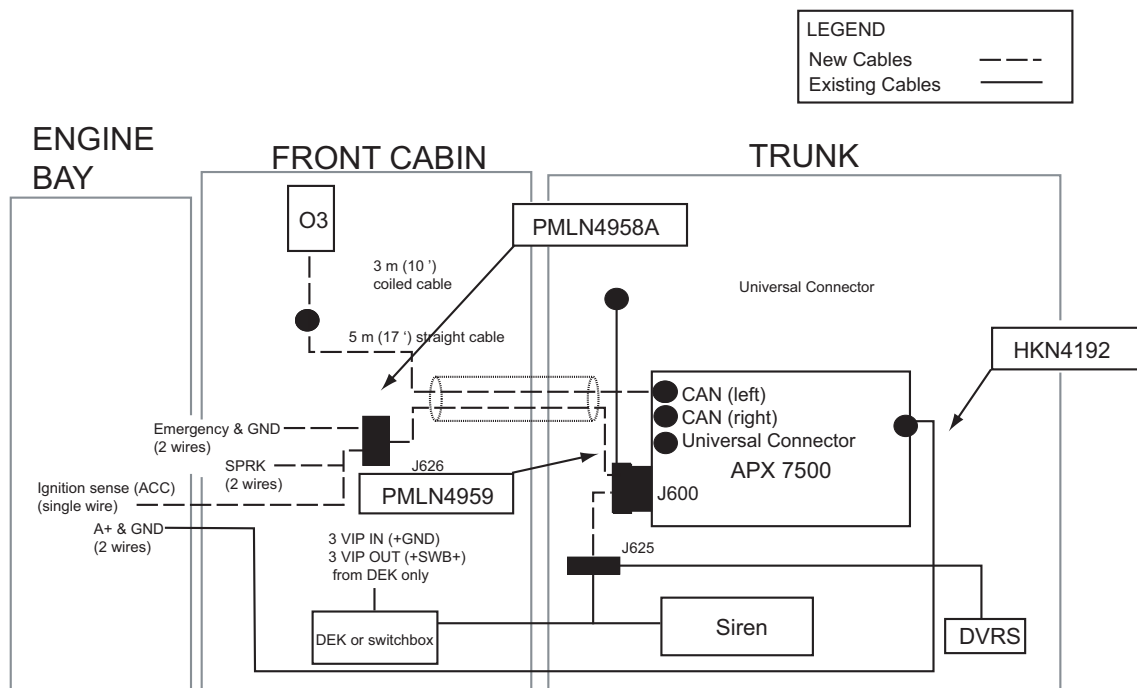


Figure 3-24. Single O3 Control Head + DEK + VIPS

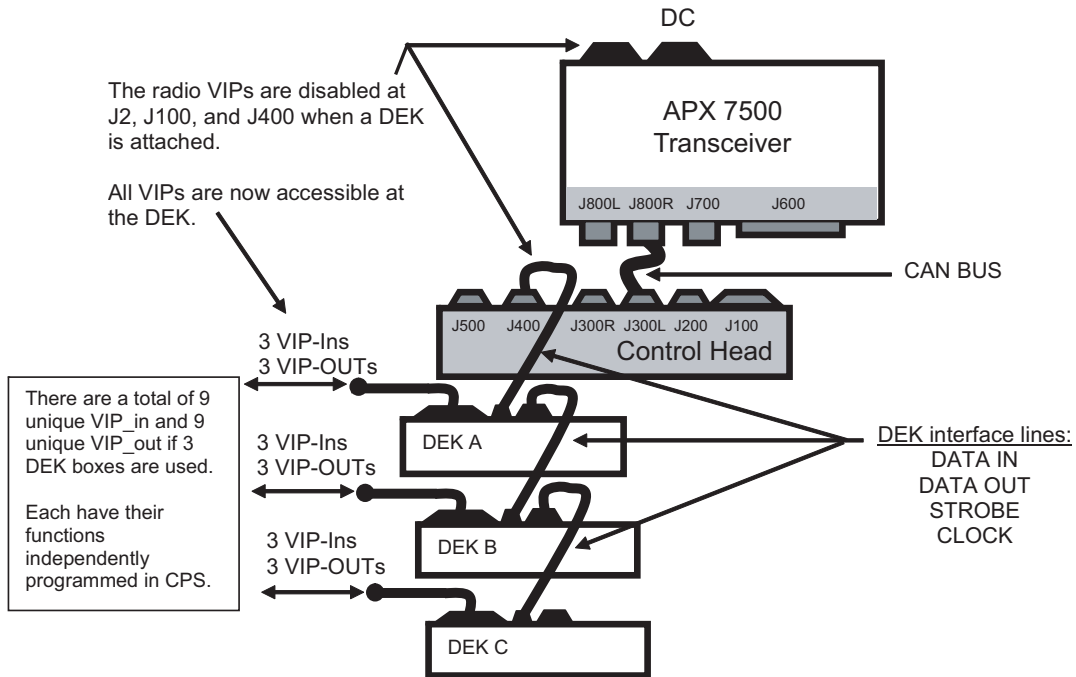


Figure 3-25. Single O5 Control Head + DEK + VIPs

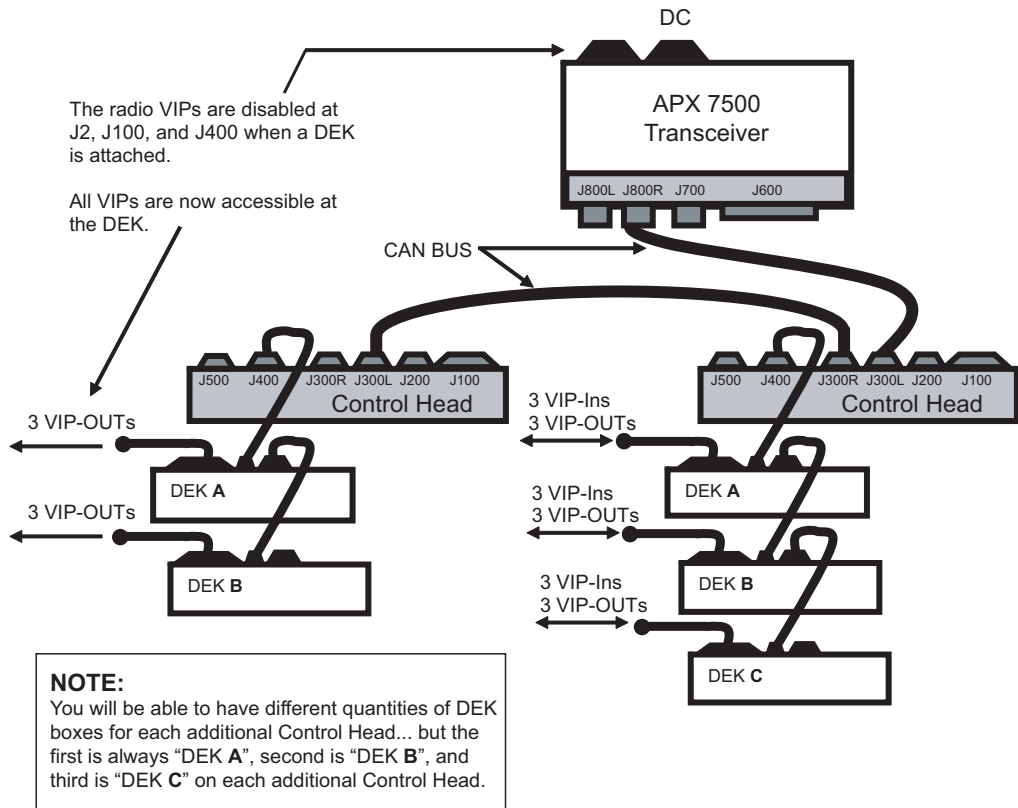


Figure 3-26. Multiple Control Heads + DEK + VIPs



### 3.5.17 CAN Termination Section

Three CAN transceivers SN65HVD230 in the Control Head & TIB side are differentially paired to minimize on interference to the CAN Bus Network. Each CAN transceiver is dedicated to transfer only one type of signal (Figure 3-28):

- CAN1 or CAN Audio – Transmit & receive audio signal from brick (Remote Mode).
- CAN2 or CAN Data – Interchange data & control between control head & brick in remote mode.
- CAN3 or CAN PWR – Send/Receive ON/OFF/RESET signal to/from the transceiver and control head.

The CAN architecture requires that a termination resistor be connected only at the two end-points of the CAN bus. The CAN cable contains a jumper that will ground a “detect pin” at the CAN connectors. Logic within the auto-termination circuit determines how many cables are attached and enables or disables the termination resistors, for each of the three twisted pairs. Figure 3-27 shows a system with terminations enabled on both the O5 control head and the radio transceiver. The O3 control head has the termination resistors enabled at all times, since it is always an end-node. The radio+TIB and O5+CHIB could be daisy-chained, so the termination had to be toggled when not an end node.

**NOTE:** The remote mount cables are able to be connected to either the left CAN connector or to the right CAN connector. That is why they have the same connector number, with the letter L and R next to the connector to indicate Left or Right CAN connector. It is not recommended to have CAN cables attached but dangling free at one end, during operation.

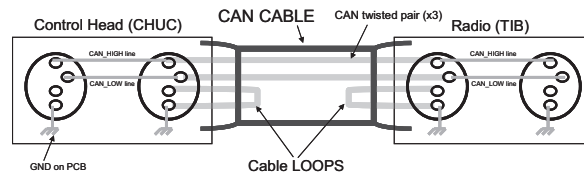


Figure 3-27. Two node system with CAN terminations enabled.

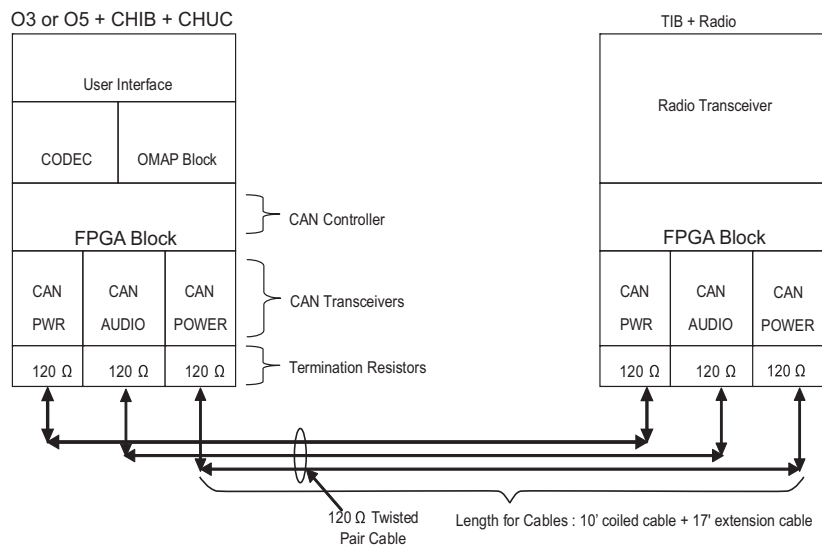


Figure 3-28. CAN Termination Section.

### 3.6 Control Head Interface Board (CHIB)

The Control Head Interface Board (CHIB) is used to provide functionality and connectivity between the CHUC, the transceiver, and the Control Head. In order for remote-mount operation to function, the Synchronous Serial Interface (SSI) used to communicate between the control head and the transceiver in a Dash-mount configuration is converted on the CHIB to a Controller Area Network (CAN) protocol. The CHIB accomplishes this conversion using an FPGA. This CAN data is then sent down the remote cable from the CHIB, through the CHUC, into the TIB, and finally into the transceiver. The CHIB also provides an audio power amplifier for driving a speaker, a USB host, two USB device transceivers, and an auto-termination circuit to terminate the CAN bus.

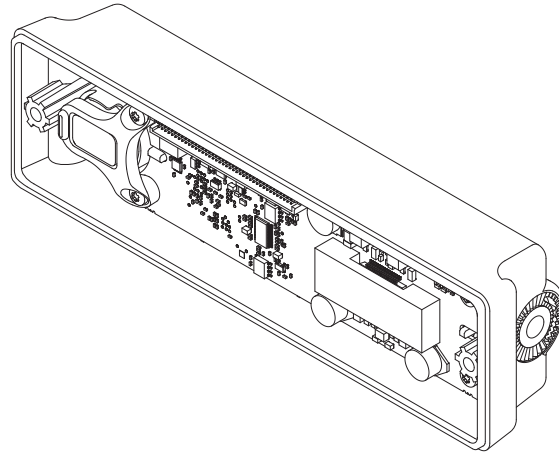


Figure 3-29. O5 Control Head Interface Board (CHIB)

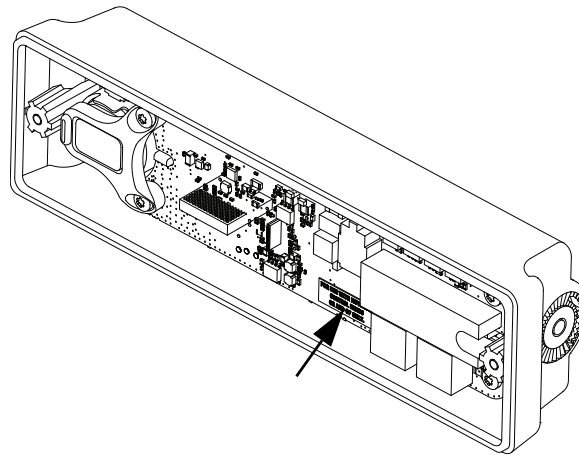


Figure 3-30. O2 and O7 Control Head Interface Board (CHIB)

**NOTE:** The O2 and O7 CHIB can be differentiated from O5 CHIB by the label “FOR USE WITH O2 and O7 MOTOROLA CONTROL HEADS ONLY.”

### 3.6.1 FPGA Section

Please refer to [Section 3.5.2](#).

### 3.6.2 Audio Section

The audio section is comprised of a class D audio amplifier with associated feedback circuitry and output filters, a code/decode (CODEC) IC, and a programmable attenuator. In receive mode, receive audio is sent to the FPGA via CAN. The FPGA converts the signal to SSI and routes the signal to the CODEC. The CODEC converts the signal to analog. Three analog CODEC outputs are used. Two are used for record out and ear jack out. These levels are fixed, meaning the volume control does not affect the output level. The third CODEC output is routed through a programmable attenuator, then into an A/D conversion stage and on to the class D audio amplifier. The differential output is short circuit protected and is capable of driving loads down to 3.2 ohms. Acceptable Speaker loads are between 3 to 10ohms total. Attenuate headphones as needed for impedance and power rating. In transmit mode, the analog signal from the microphone is routed through the control head to the CHIB. A microphone can also be connected to the AUX\_MIC input in the 26-pin accessory connector. These signals are feed into the CODEC, which selects the correct input, based on commands from the main board, and converts the signal to SSI. The SSI signal is sent to the FPGA, which performs the SSI to CAN conversion and sends the signal to the transceiver. The microphone bias circuit for both the MMP MIC\_HI line and the accessory connector AUX\_MIC input are located on the CHIB.

### 3.6.3 Power Section

A+ is routed through the Control Head Universal Connector (CHUC) and CHIB to the control head. An over-voltage transorb and fuse are located on the CHIB that protects the control head and CHIB from over-voltage transients and, to a limited extent, reverse-voltage wiring. A+ is routed to the control head 5V regulator input. The 5V output is then routed back to the CHIB and powers four voltage regulators. The four supply voltages are 1.5V, 1.8V, 2.85V, and 3.3V. The CHIB also has one un-switched 3.3V supply that is feed directly from A+. Finally, SW\_B+ from the control head is used to drive two additional regulators: an 11V regulator, which is used by the audio PA and a 9V regulator used to supply bias voltage to the MIC\_HI and AUX\_MIC inputs.

### 3.6.4 Connectivity Section

The CHIB contains two USB transceivers. One is used for USB host and the other is for USB device. The USB device connection is through J100, the 26-pin connector. The USB host connection is through J500, a 4-pin water-sealed connector. All other connectivity signals route from the control head, through the CHIB, and out through the connectors on the CHUC.

### 3.7 O2/O5/O7/O9 Control Head Universal Connector (CHUC)

The O2/O5/O7/O9 Control Head Universal Connector (CHUC) is a separate board which provides multiple functions to the control head and CHIB. Connectors J100, J200, J300, and J400 are all physically located on the CHUC, as well as the ESD protection for these pins. The signals from these connectors travel out through a 70-pin connector into the CHIB. The CHUC contains the switching circuitry that allows VIPS to exist at either J100 or J400, depending on cable detection. The voltage level shifting required for the duality of either DEK or VIP\_IN / VIP\_OUT at J400 is handled on the CHUC as well as a circuit to protect against reverse voltage wiring of the control head.

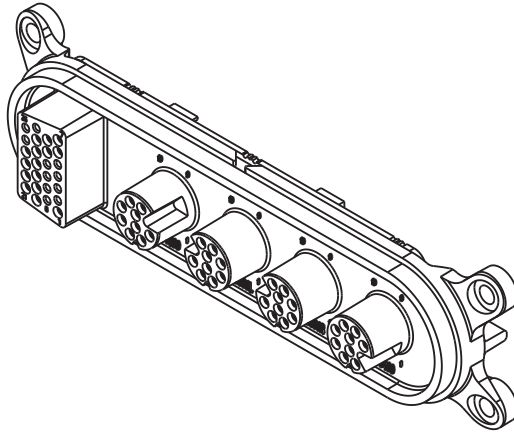


Figure 3-31. Control Head Universal Connector (CHUC)

## 3.8 O9 Universal Relay Controller Operation

### 3.8.1 Universal Relay Controller Architecture

This Universal Relay Controller (URC) is an extension of the O9 Control Head. The Universal Relay Controller is an orderable accessory for O9 Control Head. It is used to control high power switching peripherals, e.g light bar. URC works on all lightbars which can be controlled by power application. The URC design consists of a 32-bit microcontroller. The URC is connected to the transceiver's GCAI port. This URC uses 10 relays to control the switching device. A separate ground exists between the relay section and the MCU section, which is provided by the use of Analog Devices iCoupler. Each relay is connected to an output with 15A fuse with the mains capable of connecting to two 60A circuit breaker/fuses. One-wire EEPROM is employed to enable GCAI to recognize the Universal Relay Controller accessory ID. CPS can be used to program the relay patterns

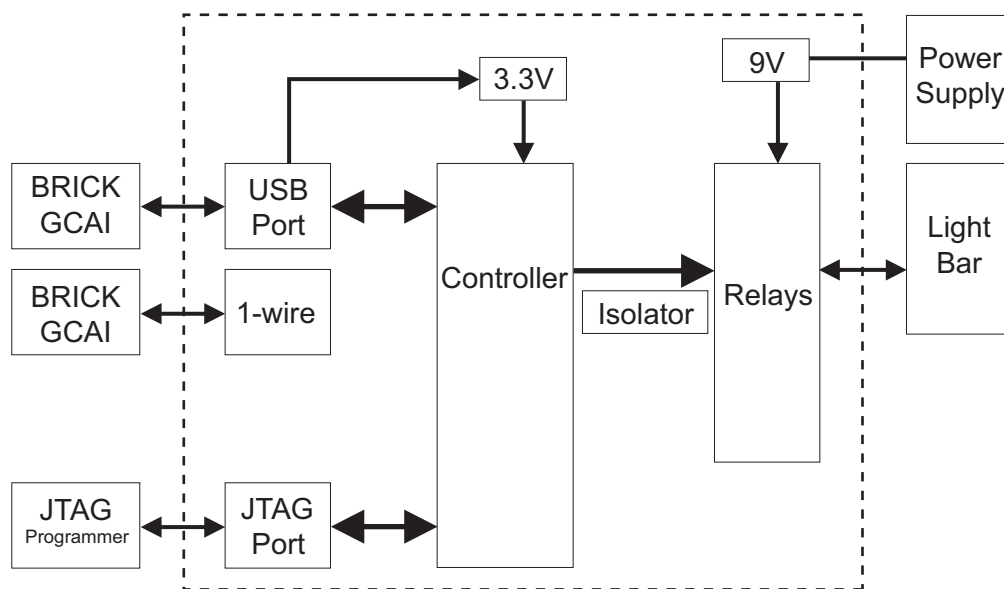


Figure 3-32. HUB-Box Block Diagram

### **3.8.2 Controller Section**

The controller used is from Atmel AT91 Thumb-based 32-bit ARM7DMI RISC Microcontroller series, the actual memory size and model to be specified when firmware is ready. The MCU features a USB Device Port v2.0 with full speed 12 Mbps compliant.

### **3.8.3 Power Management Section**

During normal operation, this Universal Relay Controller is connected to O9 via TIB GCAI USB port. The input power to this board is a direct supply from USB VBUS +5V. This is targeted to be less than 100mA of current draw, i.e. total power consumption less than 500mW.

The MCU core voltage is 1.8V+/-0.15V, with the USB and GPIO voltage at 3.3V+/-0.3V, provided through the use of step down regulators.

### **3.8.4 Power Relays Section**

10 relays from Tyco with ELV/RoHS/WEEE compliant is used for light bar control. Relays are capable for the rated fuse, 15Amp, at 85°C temperature. The relays supply the power and control signal to the light bar. The relays should be used to flash/blink the lights directly. Their coils are charged up by a regulated 9V supply to reduce heat generation from the relay coils.

## 3.9 Transceiver Interface Board (TIB)

The Transceiver Interface Board (TIB) provides connectivity between the remote CAN cable and either the mid-power or high-power transceiver. Opposite to that of the CHIB, the TIB must convert the CAN protocol back to Synchronous Serial Interface (SSI) via an FPGA, which is sent to the microprocessor. There also exists a legacy accessory interface J600, as well as the MMP J700 connection for data programming and secure key-loading of the transceiver. The TIB universal connector attaches directly to the board, so all ESD protection to the TIB circuitry and to the transceiver's front connector is located throughout the TIB. Power-ON, Power-OFF, and RESET of the transceiver is accomplished using an ATMEL AVR microcontroller to toggle SWB+ as determined by commands from the Transceiver or from a remote device, such as a control head, connected to the CAN bus.

The TIB contains an audio CODEC which interfaces to the FPGA to route audio to accessories attached to the TIB and a control line back to the transceiver. A charge pump boost circuit is designed to allow RS232 functionality at the MMP when A+ is below nominal value. During normal operation, the boost circuit is disabled. The TIB is capable of using either RS232 or USB at its MMP connector. The TIB contains an identical auto-termination circuit to that used on the CHIB. Finally, the TIB contains the circuitry to drive relays via VIP\_OUT paths and detect levels via VIP\_IN paths.

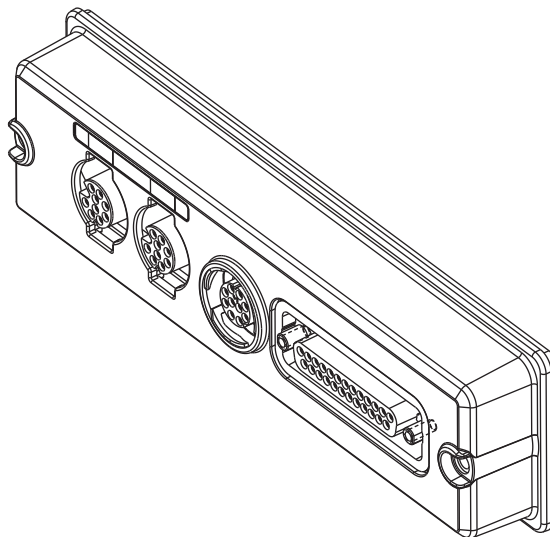


Figure 3-33. Transceiver Interface Board (TIB)

### 3.9.1 Quick Disconnect Circuit

The theory of the quick disconnect circuit, located in the TIB, is to provide immediate muting of all speaker audio by forcing the radio to reset when a control head's CAN cable is disconnected from the TIB or from an extension cable that is attached to the TIB. After the disconnection, if there are no other control heads attached via CAN to the TIB, the radio may be programmed to automatically turn itself off (approximately 20seconds after the radio reset). This programming is done via the CPS by check marking the "Control Head(s) Required for Power Up" field. Note that if this field is NOT checked, the radio will apply its normal power up rules (e.g., ignition) to determine whether to stay on or to power-off after the reset. The "Control Head(s) Required for Power Up" field is typically 'check marked' in a configuration that has a single O3 control (that is attached to an extension cable that is attached to the TIB) where it is desired that the radio immediately mute all speaker audio and ultimately power-off when the O3 control head is disconnected.

- If the field is 'check marked', then at least one controlhead must be present for the radio to remain powered-on after it resets. For example, if you only had 1 control head, and it is removed, the radio will be powered-off after reset. If you had 2 control heads, and only 1 is removed, then after reset, the radio will monitor the Ignition sense (ACC) line and compare to the ignition CPS setting to determine if it will remain powered-on, or power-off. If you had 2 control heads, and you remove both, the radio will be powered-off after reset.
- If the field is 'blank' (typical usage), then quick disconnect is not activated. For example, if you only had 1 control head, and it is removed, then after reset, the radio will monitor the Ignition sense (ACC) line and compare to the ignition CPS setting to determine if it will remain powered-on, or power-off. If you had 2 control heads, and only 1 is removed, the radio will be powered-on after reset. If you had 2 control heads, and you remove both, the radio will monitor the Ignition sense (ACC) line and compare to the ignition CPS setting to determine if it will remain powered-on, or power-off.

## 3.10 Analog Mode of Operation

### 3.10.1 Receive Operation

When the radio is receiving, the signal comes from the antenna through the RF PA output network located in the power amplifier section to the front-end receiver assembly. The signal is then filtered, amplified, and mixed with the first local oscillator signal generated by the receiver voltage controlled oscillator (VCO). The resulting intermediate-frequency (IF) signal is fed to the IF circuitry where it is again filtered and amplified. This amplified signal is passed to the back-end receiver IC where it is mixed with the second local oscillator to create the second IF at 2.25 MHz. The analog IF is processed by an analog-to-digital (A/D) converter located within the digital back-end IC, where it is converted to a digital bit stream and decimated down to an I/Q digital sample. This digital signal is then passed on to the DSP, where filtering and discrimination are performed in the software. For a voice signal, the DSP routes the digital voice data to the Codec for volume gain control and conversion to an analog signal. The signal passes to the audio power amplifier, which drives the speaker. For signaling information, the DSP decodes the message and passes it to the microprocessor.

### 3.10.2 Transmit Operation

When the radio is transmitting, microphone audio is passed to the gain control circuit, and then to the Codec, where the signal is digitized. The Codec passes digital data to the DSP, where pre-emphasis and low-pass (splatter) filtering is done. The DSP may also add signalling information. The DSP then sends the resulting digitized signal containing both voice and signalling data to the digital synthesizer IC as a modulation signal for the transmitter voltage controlled oscillator. A modulated carrier is provided to the RF power amplifier, which transmits the signal under dynamic power control.

## 3.11 ASTRO Mode of Operation

In the ASTRO mode (digital mode) of operation, the transmitted or received signal is limited to a discrete set of deviation levels, instead of continuously varying. The receiver handles an ASTRO-mode signal identically to an analog-mode signal up to the point where the DSP decodes the received data.

In the ASTRO receive mode, the DSP uses a specifically defined algorithm to recover information.

In the ASTRO transmit mode, microphone audio is processed the same as in the analog mode with the exception of the algorithm the DSP uses to encode the information. This algorithm will result in deviation levels that are limited to discrete levels.



## 3.12 Radio Frequency Transceiver Board (RF Board)

### 3.12.1 Radio-Frequency Power Amplifier (RF PA) & Output Network (ON)

The RF PA is a three-stage power amplifier consisting of discrete LDMOS transistors:

- Controlled stage
- Driver stage
- Final stage

The RF PA is followed by the ON section, consisting of discrete circuitry with the following functions:

- Antenna switch
- Harmonic filter
- Power detector

### 3.12.2 Gain Stages

The controlled stage consists of a two-stage, integrated amplifier with external matching, which amplifies the input signal from the VCO buffer and provides drive to the driver stage. Power is controlled via gate bias to both internal stages, and drain bias is supplied via K9.1V, through a band selector switch, but for APX 2500/4500/4500Li there is no band selector switch involved. The driver stage has a fixed gate bias. Drain bias is supplied by the A+ (battery) voltage in the VHF 100W, UHF 100W and 700/800 MHz radio, but for APX 2500/4500/4500Li the drain bias is supplied by the A+ (battery) voltage in the VHF 50W, UHF 40W and 700/800 MHz radio. The driver stage drives the final stage consisting of two transistors operating in parallel (one transistor for VHF 50 W model). Both devices have separate, fixed gate biases, and their drain biases are supplied by the A+ voltage. The output of the final stage feeds the antenna switch, which routes the RF PA to the harmonic filter/power detector/antenna and isolates the RX front-end in transmit mode. Antenna switch routes antenna/power detector/harmonic filter to RX and isolates TX in RX mode. Mode is determined via K9.1V. The harmonic filter is a low-pass filter that attenuates harmonics generated by the RF PA in transmit mode and provides additional receive selectivity in receive mode.

### 3.12.3 Power Control

The power control section regulates the RFPA output power by an automatic level control (ALC) circuit. The transmitter ALC consists of a digital attenuator, voltage variable attenuator, RF log amp, digital-to-analog converter (DAC) and buffer/amplifier. The APX 2500/4500/4500Li has the similar transmitter ALC, but with addition of analog-to-digital converter (ADC). The power detector senses the incident power transferred to the antenna via a directional coupler in which the RF signal is fed to the digital attenuator, voltage variable attenuator and the RF log amp. The RF log amp compares the input RF power from the directional coupler with the voltage set from the DAC to generate a DC voltage. The DC voltage is then gained by the buffer/amplifier and fed to the RFPA stage. The radio's carrier power level is set by adjusting the DAC voltage set while monitoring the output power, which is saved in the radio's memory.

### 3.12.4 Circuit Protection

The RFPA driver and final stage drain current, RFPA final stage temperature; RFPA control voltage and battery voltage are sensed by the power control circuitry. If a fault condition is detected, the control voltage is reduced, which cuts back the output power to a level that is safe for the particular operation conditions.

### 3.12.5 DC Interconnect

The DC connector at the edge of the board carries the A+ supply for the entire board. This supply is routed directly to the controller and transmitter circuitry for both direct supply and regulating additional supplies. The radio chassis is grounded through the PCB screws and also via direct contact to the board. The dash mount control head receives the A+ supply through the 50-pin flex connector.

## 3.13 VHF Receiver Overview

The primary duties of the receiver circuits are to detect, filter, amplify, and demodulate RF signals in the presence of strong interfering noise and unintended signals. The receiver contains the following blocks:

- Front-end (preselectors and LNAs)
- Mixer
- IF
- Back-end

### 3.13.1 Receiver Front-End

The VHF receiver operates in the frequency range of 136 to 174 MHz. The primary function of the receiver front-end is to optimize the rejection of the image frequency and other out-of-band frequencies while providing low-noise amplification of the received signal. The front-end uses discrete fixed-tuned filters and discrete bipolar LNAs. The front-end has two possible configurations: standard mode, which provides the best intermodulation performance, and the optional pre-amp mode, which provides improved sensitivity at the cost of slightly reduced intermodulation performance. The front-end line-up for standard mode is: a switched 15 dB attenuator for AGC purposes, a 4-pole Chebyshev bandpass filter, a low-noise amplifier, and a 6-pole elliptic bandpass filter. In pre-amp mode, a 2-pole highpass filter and an additional LNA is added between the attenuator and the first bandpass filter by means of discrete PIN diode switches.

### 3.13.2 Mixer

The receiver front-end signal is fed to the monolithic Mixer IC where it is down converted to an IF of 109.65 MHz. The mixer is designed to provide low conversion loss and high intermodulation performance. The mixer is driven by the receiver injection buffer, a two-stage discrete IC design used with the receiver VCO to efficiently drive the mixer over a wide temperature range with minimum power variation. The injection buffer provides 17 dBm to the mixer. The VCO provides high-side injection for the VHF band. The design maintains temperature stability, low insertion loss, and high out-of-band rejection.

### 3.13.3 IF Circuitry

The crystal filters provide IF selectivity and out-of-band signal protection to the back-end IC. The use of two 2-pole crystal filters centered at 109.65 MHz, which are isolated from one another by a discrete IF amplifier, enable the receiver to meet specifications for gain, close-in intermodulation rejection, adjacent channel selectivity, and second-image rejection.

### 3.13.4 Receiver Back-End

The output of the IF circuit is fed directly to the back-end receiver IC. This uses a variable-bandwidth bandpass sigma-delta architecture. It is capable of down-converting analog, as well as digital, RF protocols into a baseband signal, which is then transmitted over the Synchronous Serial Interface (SSI) bus. It also converts the 109.65 MHz signal from the IF section down to 2.25 MHz using a second LO frequency, which is produced by the second LO VCO. This VCO runs at 107.4 (low-side injection) or 111.9 MHz (high-side injection). The choice of frequency depends on known spurious interference related to the programmed received frequency.

## 3.14 UHF R1 & R2 Receiver Overview

The primary duties of the receiver circuits are to detect, filter, amplify, and demodulate RF signals in the presence of strong interfering noise and unintended signals. The receiver contains the following blocks:

- Front-end (preselectors and LNAs)
- Mixer
- IF
- Back-end

### 3.14.1 Receiver Front-End

The UHF R1 receiver operates in the frequency range of 380 to 470 MHz and UHF R2 receiver operates in the frequency range of 450 to 520 MHz. The primary function of the receiver front-end is to optimize the rejection of the image frequency and other out-of-band frequencies while providing low-noise amplification of the received signal. The front-end uses varactor-tuned filters and discrete E-PHEMT LNAs. The front-end has two possible configurations:

- Standard mode, which provides the best intermodulation performance; and
- Pre-amp mode (optional), which provides improved sensitivity at the cost of slightly reduced intermodulation performance.

The front-end line-up for standard mode is: a switched 15 dB attenuator for AGC purposes, 2 pole highpass filter, varactor-tuned image filter, low-noise amplifier, and finally a second varactor tuned image filter. In pre-amp mode, an additional E-PHEMT LNA is added between the attenuator and the first bandpass filter by means of discrete PIN diode switches.

### 3.14.2 Mixer

The receiver front-end signal is fed to the monolithic Mixer IC where it is down converted to an IF of 109.65 MHz. The mixer is designed to provide low conversion loss and high intermodulation performance. The mixer is driven by the receiver injection buffer, a two-stage discrete IC design used with the receiver VCO to efficiently drive the mixer over a wide temperature range with minimum power variation. The injection buffer provides +17dBm to the mixer. The VCO provides high-side injection for both VHF and UHF bands. The design maintains temperature stability, low insertion loss, and high out-of-band rejection.

### 3.14.3 IF Circuitry

The crystal filters provide IF selectivity and out-of-band signal protection to the back-end IC. The use of two 2-pole crystal filters centered at 109.65 MHz, which are isolated from one another by a discrete IF amplifier, enable the receiver to meet specifications for gain, close-in intermodulation rejection, adjacent channel selectivity, and second-image rejection.

### 3.14.4 Receiver Back-End

The output of the IF circuit is fed directly to the back-end receiver IC. This uses a variable-bandwidth bandpass sigma-delta architecture. It is capable of down-converting analog, as well as digital, RF protocols into a baseband signal, which is then transmitted over the Synchronous Serial Interface (SSI) bus. It also converts the 109.65 MHz signal from the IF section down to 2.25 MHz using a second LO frequency, which is produced by the second LO VCO. This VCO runs at 107.4 (low-side injection) or 111.9 MHz (high-side injection). The choice of frequency depends on known spurious interference related to the programmed received frequency.

## 3.15 700–800 MHz Receiver Overview

The receiver circuits primary duties are to detect, filter, amplify, and demodulate RF signals in the presence of strong interfering noise and unintended signals. The receiver is broken down into the following blocks:

- Front-end (preselector and LNA)
- Mixer
- IF
- Back-end

### 3.15.1 Receiver Front-End

The 700–800 MHz receiver front-end operates in two bands. The primary function of the receiver front-end is to optimize image rejection and selectivity while providing the first conversion. The front-end uses ceramic-filter technology and includes a wideband, monolithic amplifier. The first filter is a dual-switched filter that reduces the image frequency response and limits some of the out-of-band interference. The second filter following the monolithic Low Noise Amplifier (LNA) provides additional image rejection.

### 3.15.2 Mixer

The receiver front-end signal is fed to the monolithic Mixer IC where it is down converted to an IF of 109.65 MHz. The mixer is designed to provide low conversion loss and high intermodulation performance. The mixer is driven by the receiver injection buffer, a two-stage discrete IC design used with the receiver VCO to efficiently drive the mixer over a wide temperature range with minimum power variation. The injection buffer provides 17 dBm to the mixer. The VCO provides low-side injection to the 7/800 MHz bands. The design maintains temperature stability, low insertion loss, and high out-of-band rejection.

### 3.15.3 IF Circuitry

The crystal filters provide IF selectivity and out-of-band signal protection to the back-end IC. Two 2-pole crystal filters centered at 109.65 MHz that are isolated from one another by a stable, moderate-gain amplifier are used to meet the receiver specifications for gain, close-in intermodulation rejection, adjacent-channel selectivity, and second-image rejection.

### 3.15.4 Receiver Back-End

The output of the IF circuit is fed directly to the back-end receiver IC. This uses a variable-bandwidth bandpass sigma-delta architecture. It is capable of down-converting analog, as well as digital, RF protocols into a baseband signal, which is then transmitted over the Synchronous Serial Interface (SSI) bus. It also converts the 109.65 MHz signal from the IF section down to 2.25 MHz using a second LO frequency, which is produced by the second LO VCO. This VCO runs at 107.4 (low-side injection) or 111.9 MHz (high-side injection). The choice of frequency depends on known spurious interference related to the programmed received frequency.

### 3.16 Frequency Generation Unit

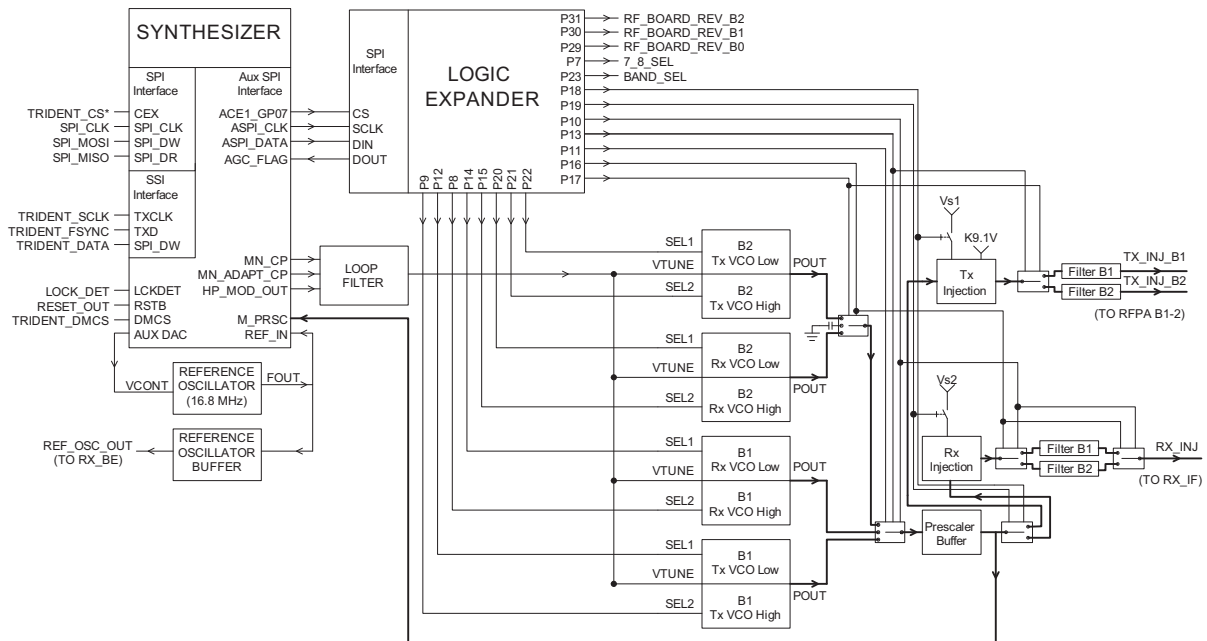


Figure 3-34. Configuration of the Dual Band Frequency Generation Unit for APX 5500 / 6500 / 7500 / 6500Li

The Dual Band Frequency Generation Unit (FGU) in Figure 3-34 consists of the following:

- Daughter card pc board module containing the synthesizer IC and the 16.8 MHz reference oscillator.
- Voltage Controlled Oscillator (VCO) modules (two per frequency band).
- Logic expander.
- VCO buffer, amplifiers and filter circuits.
- Associated circuits.

The Reference oscillator provides a frequency standard for the fractional-N synthesizer IC, the back-end receiver IC, and the controller section. The synthesizer programs the logic expander IC to select one of the VCO (determined by mode and frequency of operation), and tunes it to the receiver (RX), local oscillator injection (LO), or the transmitter (TX) carrier frequency.

The VCOs' are non serviceable modules, each containing two oscillator circuits to cover the frequency bands of interest. For a dual band radio there are two transmitters and two receiver VCO modules that cover the frequency bands designated as Band 1 and Band 2. The output of each module is connected to a RF switch, then to a prescaler buffer amplifier. The prescaler buffer feeds back to synthesizer IC, and switches to either TX and RX injection amplifiers.

In TX mode, the prescaler buffer amplifier output is switched to a two stage buffer. Before being injected into the power amplifier, the signal is switched to a band dependant filter to reduce the spurious levels of the signals. The output of the filters are directly connected to the band specific power amplifier. In RX mode, the prescaler is switched to another two stage buffer, and also band selectively filtered before being switched to the receiver mixer.

Modulation is accomplished by direct digital programming of the Fractional-N synthesizer by the SSI (Serial Synchronous Interface) to the controller.

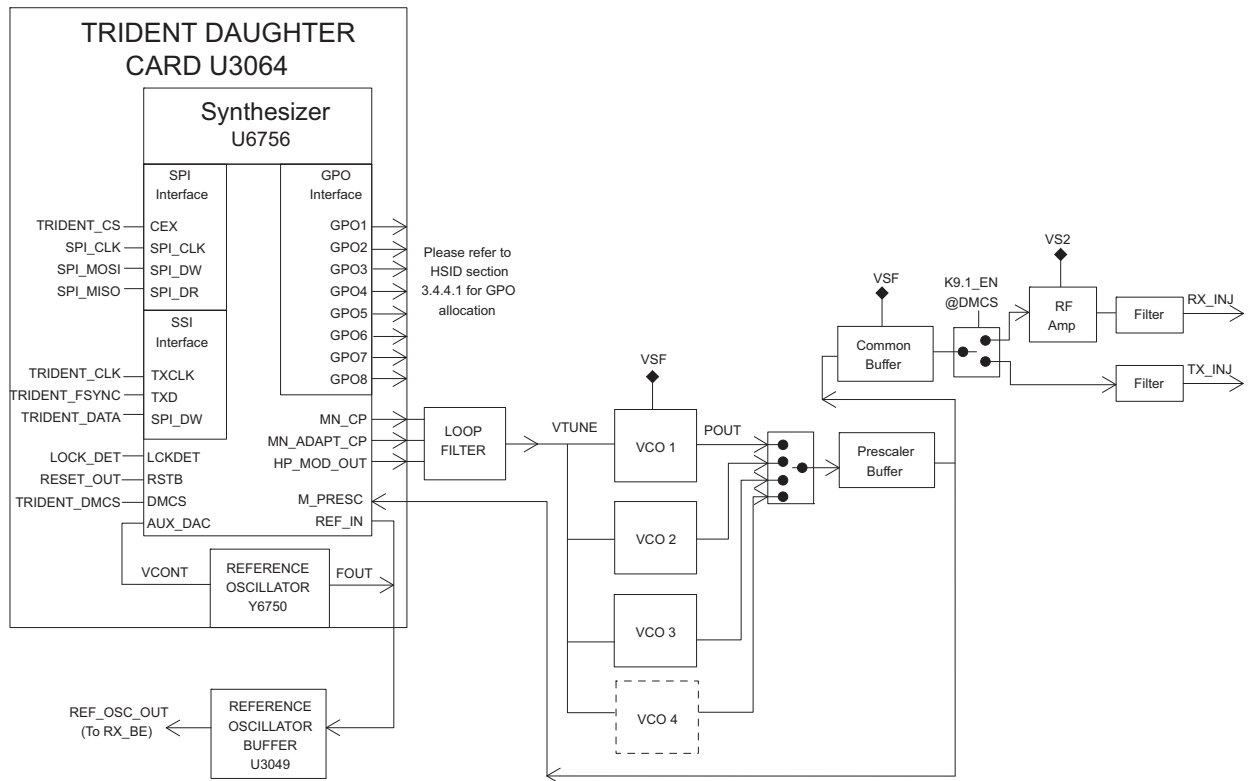


Figure 3-35. Configuration of APX 2500 / 4500 / 4500Li Frequency Generation Unit

The Frequency Generation Unit (FGU) in Figure 3-35 consists of the following:

- Daughter card pc board module containing the synthesizer IC and the 16.8 MHz reference oscillator.
- Voltage Controlled Oscillator (VCO).
- VCO buffer, amplifiers and filter circuits.
- Associated circuits.

The Reference oscillator provides a frequency standard for the fractional-N synthesizer IC, the back-end receiver IC, and the controller section. The synthesizer programs its internal GPO to select one of the VCO (determined by mode and frequency of operation), and tunes it to the receiver (RX), local oscillator injection (LO), or the transmitter (TX) carrier frequency.

The output of each VCO is connected to a RF switch, then to a prescaler buffer amplifier. The prescaler buffer feeds back to the synthesizer IC, then supplies to common buffer amplifiers, and to a RF switch for Tx or Rx injection selection.

In TX mode the common buffer amplifier output is switched to a band dependant filter to reduce the spurious levels of the signals. The output of the filters are directly connected to the band specific power amplifier. In RX mode, the common buffer amplifier output is switched to another stage buffer and, also band selectively filtered before being switched to the receiver mixer.

Modulation is accomplished by direct digital programming of the Fractional-N synthesizer by the SSI (Serial Synchronous Interface) to the controller.

# Chapter 4 Test Equipment, Service Aids, and Tools

## 4.1 Recommended Test Equipment

The list of equipments contained in [Table 4-1](#) includes most of the standard test equipment required for servicing Motorola APX mobile radios, as well as several unique items designed specifically for servicing this family of radios. The *Characteristics* column is included so that equivalent equipment can be substituted. However, when no information is provided in this column, the specific Motorola model listed is either a unique item or no substitution is recommended.

*Table 4-1. Recommended Motorola Test Equipment*

Motorola Model Number	Description	Characteristics	Application
R-1439 or  R-1440 (See <a href="#">Table 4-2</a> for plug-in elements)	BIRD Wattmeter  BIRD Wattmeter	Power range: 100 mW to 100W, 2 MHz to 1GHz, UHF-F connector Power range: 100 mW to 100W, 2 MHz to 1GHz, N-female connector	Transmitter power measurements
R-1611	Dual-Channel 100 MHz Oscilloscope (Agilent)	Two-channel, 100MHz bandwidth, 200 Msample rate/sec., 2MB memory/channel	Waveform measurements
R-2670 (with options, as applicable)	System Analyzer	This item will substitute for items with an asterisk (*) in <a href="#">Table 4-3</a>	Frequency/deviation meter and signal generator for wide-range troubleshooting and alignment

[Table 4-2](#) contains a listing of the plug-in elements that are available for the BIRD wattmeters listed in [Table 4-1](#).

*Table 4-2. Wattmeter Plug-In Elements*

Power	25–60 MHz	50–125 MHz	100–250 MHz	200–500 MHz	400–1000 MHz
5W	–	–	0180305F29	0180305F38	0180305F46
10W	–	0180305F22	0180305F30	–	0180305F47
25W	0180305F15	0180305F23	0180305F31	0180305F40	0180305F48
50W	0180305F16	0180305F24	0180305F32	0180305F41	0180305F49
100W	0180305F17	0180305F25	0180305F33	0180305F42	0180305F50
250W	0180305F18	0180305F26	0180305F34	0180305F43	0180305F51
500W	0180305F19	0180305F27	0180305F35	0180305F44	0180305F52
1000W	0180305F20	0180305F28	0180305F36	0180305F45	0180305F53

Table 4-3 contains a listing of non-Motorola test equipment recommended for servicing mobile radios.

Table 4-3. Recommended Non-Motorola Test Equipment

Model Number	Description	Application
	1:1 Audio Transformer	Audio measurement (audio PA must NOT be grounded)
Agilent 6552	Power Supply (0–20 V, 0–25 A)	Mobile radio power supply and current measurements
Agilent 8901	Modulation Analyzer	Reference frequency measurements
*Aeroflex 3920 with options (P25, X2, AEX, etc.)	Digital Radio Test Set	Frequency, reference oscillator deviation digital tests and compensation measurements
Agilent U8903A and Rohde & Schwarz UPV	Audio Analyzer	Audio signal-level, SINAD, and distortion measurements
Keithly 2015-D	Audio Analyzing DMM	AC/DC voltage and distortion measurements
Fluke 187 or 189	Handheld Digital Multimeter (True RMS, AC, AC+DC, dB)	AC/DC voltage and current measurements
Fluke 190 Series	Handheld Oscilloscope (60–200 MHz Bandwidth, 2.5 GS/sec, Built-in 500-Count True RMS Multimeter)	Waveform measurements
Weinschel 49 30 43	30 dB RF Attenuator	For tests that require a modulation analyzer or wattmeter



## 4.2 Service Aids and Recommended Tools

Refer to below tables in this section for listing and description of the service aids and tools designed specifically for servicing this APX mobile radios, and the common tools required to disassemble and maintain the radio well. These kits and/or parts are available from the Motorola parts division offices listed in Appendix A, B, C, and D accordingly.

Table 4-4. Service Aids for APX Mobile Radios

Motorola Part Number	Description	Application
0105953U15	Force Fail Board (Not applicable for APX 2500 / 4500 / 4500Li)	Radio set in bootstrap mode for radio flashing/ programming.
84009287001	APX 5500 / 6500 / 7500 / 6500Li Service Flex	Connects controller board to RF board for analysis of either board while the other remains in the radio chassis.
0104054J56	APX 2500 / 4500 Service Flex	
DVN4236_	APX FLASHport Firmware CD	Kit with firmware to upgrade the radio, APX FLASHport CD.
DVN4237_	APX 7500 FLASHport Kit	Kit with firmware to upgrade the radio, APX FLASH port kit.
DVN4299_	APX 2500 / 4500 FLASHport Kit	
RVN5224_	APX Customer Programming Software (CPS) and Tuner Software	Programming and radio alignment software.
HKN6122_	4-wire RS232 data cable	Cable for data applications through the TIB J600 connector, remote mount only.
HKN6160_	1.8m (6') 4-wire RS232 data cable	1.8m (6') cable used for RS232 data applications through the 26 pin rear accessory connector. Also provides an Ignition sense (ACC) wire.
HKN6161_	6.1m (20') 4-wire RS232 data cable	6.1m (20') cable used for RS232 data applications through the 26 pin rear accessory connector (J2).
HKN6163_	1.8m (6') USB data cable	1.8m (6') cable used for USB programming and data applications through the 26 pin rear accessory connector (J2) or the J100 remote control head connector. Also provides Ignition sense (ACC) and speaker wires. An emergency jumper wire must be installed between pins 15 (emergency) and 1 (gnd) when used in dash mount applications.
HKN6172_	4.5m (15') USB data cable	4.5m (15') cable used for USB programming and data applications through the 26 pin rear accessory connector (J2) or the J100 remote control head connector. An emergency jumper wire must be installed between pins 15 (emergency) and 1 (gnd) when used in dash mount applications.
HKN6182_	MMP Cable Adapter for Keyloader	Use with TIB MMP or dash-mount control head MMP. Must be combined with KVL cable TKN8531_
HKN6183_	2-wire MMP RS232 Data Cable	Cable for RS232 data applications through the control head or TIB MMP.

Table 4-4. Service Aids for APX Mobile Radios

Motorola Part Number	Description	Application
HKN6184_	MMP USB Programming Cable	Use with APX 7500 USB programming through the MMP on its control head or TIB. Can also be used for data terminal applications.

Table 4-5. Recommended Motorola Tools for Board-Level Troubleshooting

Motorola Part Number	Tools and Supplies
0180320B16	Magnetic screwdriver set with bits
0180706J23	Chassis eliminator (Mid Power)
0180706J24	Chassis eliminator (High Power)
0104057J53	APX 2500/4500/4500Li Chassis Eliminator Enclosures (Mid Power)
Refer to <a href="#">Table 4-6</a>	APX 2500/4500/4500Li Chassis Eliminator Internal Assemblies
3085651A01	Mini-UHF to N-type adapter cable
6686119B01	Plastic scraping tool
6680163F01	Removal and insertion tool
RSX4043	Roto-Torq adjustable torque driver

Table 4-6. APX 2500/4500/4500Li Chassis Eliminator Internal Assemblies

Part Number	Descriptions	Quantity
0104054J54	Assembly, Screw, Sealing	12
0310909A33	Screw, Heat Spreader	3
4285702E01	Clip, RF & DC Connectors	2
3015953H02	Cable, GPS	1
0371838H01	Screw, D-Sub for accessory connector	2
0104052J27	Flex Assembly, Accessory Connector	1
1110022D23	Thermal grease	1
75012190001	Pad, Thermal	2
0104054J56	APX 2500/4500/4500Li Extended Flex Assembly	1

Table 4-7. Recommended Non-Motorola Tools for APX Mobile Radios

Part Number	Tools and Supplies
MA-800G	Solder aid, (black stick), Hexacon Electric Co.
	Flat-blade screwdriver
	Small, flat-blade screwdriver
	Torx® T10 and T20 bits
	Anti-static grounding kit

### 4.3 APX Mobile Radios Field Programming and Equipment

The APX mobile radios can be aligned and programmed in the field. This requires specific equipment and special instructions. Refer to the online help in Customer Programming Software (CPS) and Tuner Software (RVN5224\_).

The radios use a flash-memory device to store information about frequencies, squelch codes, signaling codes, time-out timer durations, and other parameters and can be programmed in the field any number of times without removing the flash memory from the radio.

The APX mobile radios can only be programmed using USB. To program the radio, connect USB cable HKN6184\_ to the control head's Mobile Microphone Port (MMP) connector. This is the 10-pin connector to which the microphone is commonly attached. The MMP connector is below the volume knob and to the left of the LCD display. HKN6163\_ and HKN6172\_ USB cables can also be used for radio programming, and can be connected at the remote control head J100 or radio rear J2 connectors. Refer to the *CPS Programming Installation Guide* (Motorola part number 6881095C44) for installation and setup procedures for the software.

Once the computer is connected to the radio, the prompts provided by the programming software can be followed. The following items, available through the Radio Products Services Division (except the computer), are required when programming APX mobile radios.

Table 4-8. APX Mobile Radios Field-Programming Items

Type or Part Number	Description
Customer Programming Software (CPS) and Tuner Software (RVN5224_)	This software enables you to program the radio's features and align its parameters.
Personal Computer (PC)	<p>Operating System</p> <ul style="list-style-type: none"> <li>• Microsoft® Windows® Vista Home Premium Edition</li> <li>• Microsoft® Windows® Vista Business Edition</li> <li>• Microsoft® Windows® XP Home/Professional Edition</li> <li>• Microsoft® Windows® 2000 Professional with Service Pack 2, or above</li> </ul> <p>Hardware – Minimum Requirements</p> <ul style="list-style-type: none"> <li>• USB (Universal Serial Bus) Port</li> <li>• CD-ROM drive</li> <li>• 350 MB of hard disk space for the CPS</li> <li>• 100 MB of hard disk space for the Tuner Software</li> </ul>
USB Programming Cable	Used to connect radio directly to the computer, refer to <a href="#">Table 4-4</a> .

**Notes**

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# Chapter 5 Performance Checks

## 5.1 Introduction

This section covers performance checks used to verify that the radio meets published specifications. The recommended test equipment listed in [Chapter 4](#) approaches the accuracy of the manufacturing equipment, with a few exceptions. Accuracy of the equipment must be maintained in compliance with the manufacturer's recommended calibration schedule.

## 5.2 Test Setup

The equipment required for APX mobile radio performance checks is connected as shown in the following diagram.

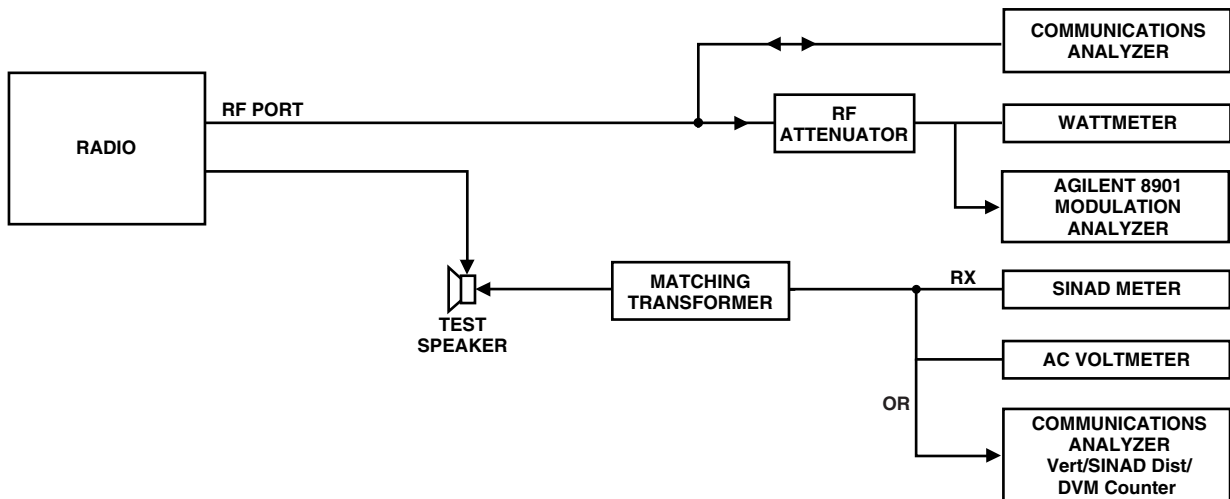



Figure 5-1. Performance Checks Test Setup

## 5.3 Test Mode

 Caution	Be sure to transmit into a series load when keying a radio under test (e.g. 30dB RF pad). Failure to do so can result in test equipment damage.
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### 5.3.1 Entering Test Mode

1. To enter test mode, turn the radio on.
  2. Within 10 seconds after Self Test is complete, press the **Home Button** five times in succession for O2/O5/O7/O9 Control Head (see [Figure 5-2](#) for O2, [Figure 5-4](#) for O5, [Figure 5-5](#) for O7 and [Figure 5-6](#) for O9 Control Head), or press the **Side Button 2** five times in succession for O3 Control Head (see [Figure 5-3](#)).
  3. The radio shows a series of displays that will give information regarding various version numbers and subscriber-specific information. The displays are described in [Table 5-1](#).
-

Table 5-1. Test-Mode Displays

Display Name	Description	Appears
SERVICE	Indicates radio has entered test mode	Always
HOST VERSION	Version of transceiver firmware	Always
DSP VERSION	Version of transceiver DSP firmware	Always
Secure Version	Firmware version for encryption	When radio is secure- equipped
Encryption Mode	Type of encryption being used	When radio is secure- equipped
CH VERSION	Version of Control Head firmware	Always
MCHB Version	Version of Control Head Board	Always
CHIB Version	Version of Control Head Interface Board	When auxiliary control head is present / radio is remote mount
Auxiliary Control Head	Firmware version for auxiliary control head	When auxiliary control head is present
Siren Version	Firmware version for siren	When siren is present
URS Version Number	Firmware version for VRS	When VRS is present
MODEL NUMBER	Radio's model number, as programmed in codeplug	Always
SERIAL NUMBER	Radio's serial number, as programmed in codeplug	Always
ESN	Electronic Serial Number	Always
ROM Size	Memory capacity of flash part	Always
FLASHCODE	FLASHcodes, programmed as a part of radio's codeplug	Always
RF BAND	Frequency band of transceiver	Always
TUNING VER	Version of Codeplug tuning	Always
PROCESSOR VER	Version of transceiver microprocessor	Always

**Note:** All displays are temporary and expire without any user intervention. If the information is longer than the physical length of the control head display, it wraps around to the next display. After the last display, RF TEST is displayed.

Special attention: while information is scrolling while in test mode, if the "UP" Navigation button is pressed, the scrolling information will pause until the "DOWN" Navigation button is pressed again. Repeat with "Up" button to pause any other information. This makes recording radio version information easier.

4. Turn the **Mode** Rotary Knob for O5 Control Head. The test mode menu, CH TEST, is displayed.
5. Pressing the **Home** button enters the RF test mode. The display shows 1 CSQ, indicating test frequency 1, Carrier SQuelch mode.
6. For the O3 Control Head, pressing the programmed **Monitor** button enables toggling between RF TEST and CH TEST.
7. To select, press the **Orange (EMERG)** button. If the RF TEST is selected, display Shows 1 CSQ, indicating test frequency 1, Carrier SQuelch mode.
8. Go to the **RF Test Mode** section.

### 5.3.2 RF Test Mode

A special routine called **RF TEST MODE** or *air test* has been incorporated into the radio.

1. For the O2/O5/O7/O9 Control Head, enter the RF test mode by pressing the **Home** button when the test mode menu RF TEST is displayed. If RF TEST is not displayed, use the **Mode** knob to scroll through the test mode menu until RF TEST is displayed.
2. For the O3 Control Head, enter the RF test mode by pressing the **Orange (EMERG)** button when the test mode menu RF TEST is displayed. If RF TEST is not displayed, use the **Monitor** button to toggle between RF TEST and CH TEST.
3. For the O2/O5/O7/O9 Control Head, press the **Home** button to move the cursor back and forth between the frequency and signaling type (See [Table 5-2](#) on this page and [Table 5-3](#), [Table 5-4](#)). Use the **Mode** knob to scroll through the available selections.
4. For the O3 Control Head, press the **Monitor** button to select Channel Spacing (12.5KHz or 25kHz), press the **Side Button 1** to change signaling type and press **Side Button 2** to change frequency.

Table 5-2. Rx Test Frequencies

Rx Freq #	VHF 50W/100W	UHF R1 40W/100W	UHF R2 45 W	700–800 MHz 35W
F1	136.0625	380.0625	450.0625	762.0625
F2	140.8125	389.0625	455.0625	769.0625
F3	145.5625	405.0625	465.0625	775.9375
F4	150.3125	415.0625	470.0625	851.0625
F5	154.9375	424.9375	484.9375	860.0625
F6	155.0625	425.0625	485.0625	860.0625
F7	159.8125	440.0625	498.0625	869.9375
F8	164.5625	455.0625	511.9375	851.0625
F9	169.3125	465.0625	512.0625	860.0625
F10	173.9375	469.9375	519.9375	869.9375

Table 5-3. Tx Test Frequencies

<b>Tx Freq #</b>	<b>VHF 50W/100W</b>	<b>UHF R1 40W/100W</b>	<b>UHF R2 45 W</b>	<b>700–800 MHz 35W</b>
F1	136.0125	380.0125	450.0125	762.0125
F2	140.7625	389.0125	455.0125	768.9875
F3	145.5125	405.0125	465.0125	776.0125
F4	150.2625	415.0125	470.0125	793.9875
F5	154.9875	424.9875	484.9875	805.9125
F6	155.0125	425.0125	485.0125	806.0125
F7	159.7625	440.0125	498.0125	823.9875
F8	164.5125	455.0125	511.9875	851.0125
F9	169.2625	465.0125	512.0125	860.0125
F10	173.9875	469.9875	519.9875	869.8875

Table 5-4. Signaling Types

<b>Display</b>	<b>Modulation</b>	<b>Demodulation</b>	<b>Type</b>
CSQ	None	None	Carrier Squelch
TPL	192 Hz	192 Hz	Private-Line
AST	1200 Hz	N/A	ASTRO (digital)
USQ	None	None	Open Squelch

When in the transmit test mode, DTMF modulation produces a sidetone in the speaker. All signaling types will continually modulate the transmitted signal for detection/measurement by external instruments.



### 5.3.3 O2 Control Head Test Mode

The control head test mode is part of the diagnostics built into the radio and is entered through the front-panel programming sequence. This test mode allows you to perform button and display tests to verify proper operation.

1. Power up the control head by pressing the Power Button. Press the Menu Select Buttons 1 and 4 simultaneously to enter control head STANDALONE TEST. CH firmware, CH Nautilus, CH Flashzap version and CH Board version will be displayed before the unit enters the Control Head Test mode.
2. Press Home to enter sequential test.
3. In Factory Test menu, pressing any buttons will activate the following tests:
  - LED test (green, red and yellow)
  - Backlight test (Off, Medium and On)
  - LCD test (4 borders test)
  - Keypad LED test (green, amber, red and common white LED test)
4. Hit any button after this to activate the keypad test. All the 10 buttons notations will be displayed on the LCD and once the corresponding button is pressed, the notation will disappear from the LCD.
5. After all 10 buttons are pressed, hit any key to enter Multifunction Knob test.
6. Turn the radio off and back on to exit test mode and return to normal radio operation.

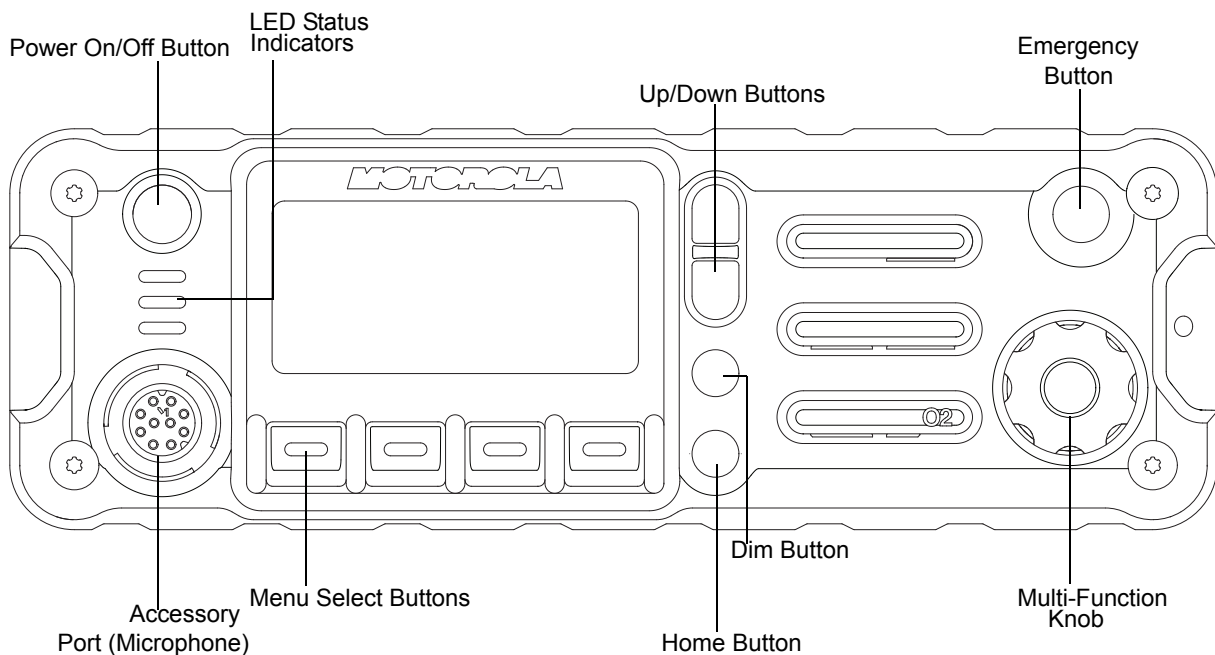


Figure 5-2. O2 Control Head

### 5.3.4 O3 Control Head Test Mode

The control head test mode is part of the diagnostics built into the radio and is entered through the front-panel programming sequence. This test mode allows you to perform button and display tests to verify proper operation.

1. Enter the control head test mode by pressing the **POWER ON/OFF Button** while holding down the 1 and 3 button of the keypad. Wait till Standalone Mode is displayed and release the 1 and 3 Button of the keypad. CH Firmware version, CH FPGA version, CH Flashzap version and CH Board version will be displayed before being able to be in Factory Test.
2. Once in Factory Test menu, pressing any buttons will activate the following tests:
  - LED test (green, red and yellow)
  - Backlight test (Off, Medium and On)
  - LCD test (4 borders test)

For the Hook Up test that follows right after the LCD test has been completed, place the Hook Up and remove the Hook Up until Hook Off is shown. Hit any button after this to activate the 32 buttons test that will test the Keypad Buttons, Side Buttons and Top Buttons. All the 32 Buttons notations will be displayed on the LCD and once the corresponding button is pressed, the notation will disappear from the LCD. After all 32 Buttons are pressed, Test Completed will be displayed and to turn the CH off, press the ON/OFF button once.

3. Turn the radio off and back on to exit test mode and return to normal radio operation.

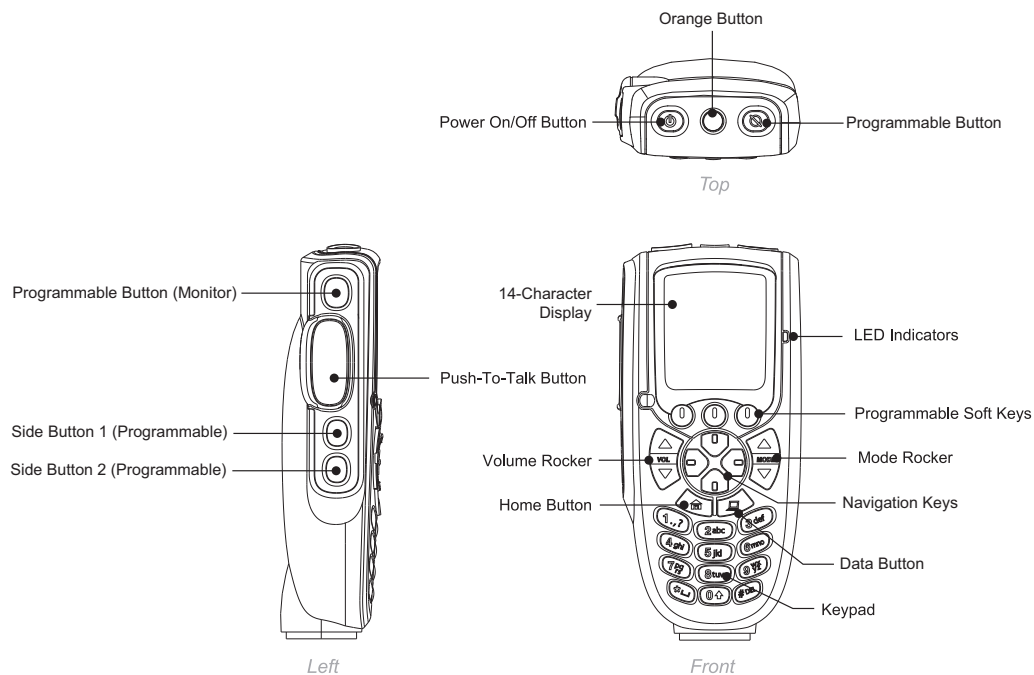


Figure 5-3. O3 Control Head

### 5.3.5 O5 Control Head Test Mode

The control head test mode is part of the diagnostics built into the radio and is entered through the front-panel programming sequence. This test mode allows you to perform button and display tests to verify proper operation.

1. After power up, press the **HOME** button five times to enter the Test Mode menu.

**NOTE:** Once **CH TEST** has been selected by pressing **Home**, turning the **Mode** knob will not change the control head test mode back to the RF test mode. You must turn the radio off and reenter the RF test mode as described earlier.

2. When the control head test mode has been selected, all the icons across the top of the LCD are displayed briefly and the indicator LED's on the right side will light briefly. At this point, pressing any of the control head buttons or turning the knobs will display the button or knob ID and the value of the button or knob. The value of a button is 1 for a press and 0 for a release. The power button functions normally and will turn the control head off.
3. Turn the radio off and back on to exit test mode and return to normal radio operation.

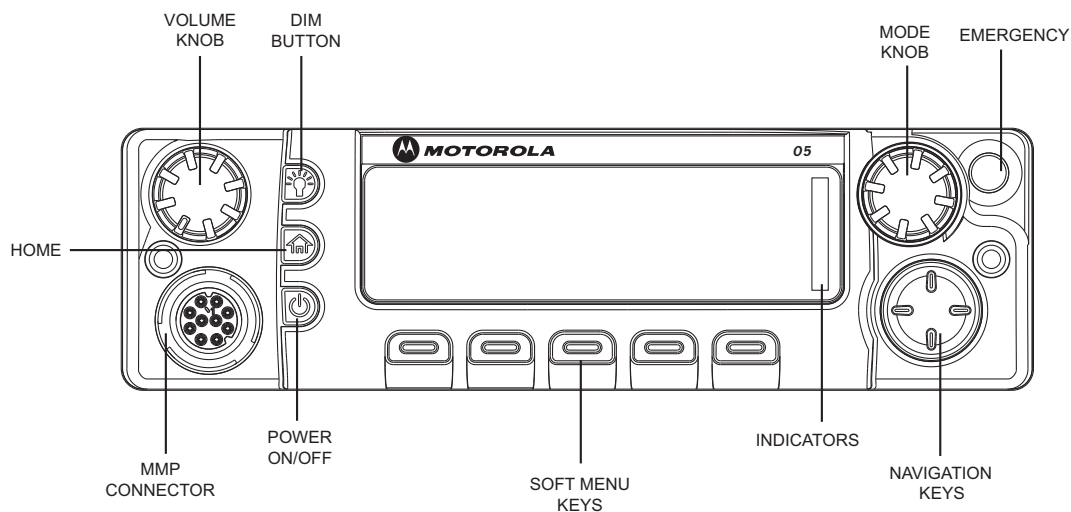


Figure 5-4. O5 Control Head

### 5.3.6 O7 Control Head Test Mode

The control head test mode is part of the diagnostics built into the radio and is entered through the front-panel programming sequence. This test mode allows you to perform button and display tests to verify proper operation.

1. Power up the control head by pressing the Power Button. Press the Menu Select Buttons 1 and 4 simultaneously to enter control head STANDALONE TEST. CH firmware, CH Nautilus, CH Flashzap version and CH Board version will be displayed before the unit enters the Control Head Test mode.
2. Press Home to enter sequential test.
3. In Factory Test menu, pressing any buttons will activate the following tests:
  - LED test (green, red and yellow)
  - Backlight test (Off, Medium and On)
  - LCD test (4 borders test)
  - Keypad LED test (green, amber, red and common white LED test)
4. Hit any button after this to activate the keypad test. All the 24 buttons notations will be displayed on the LCD and once the corresponding button is pressed, the notation will disappear from the LCD.
5. After all 24 buttons are pressed, hit any key to enter Multifunction Knob test.
6. Turn the radio off and back on to exit test mode and return to normal radio operation.

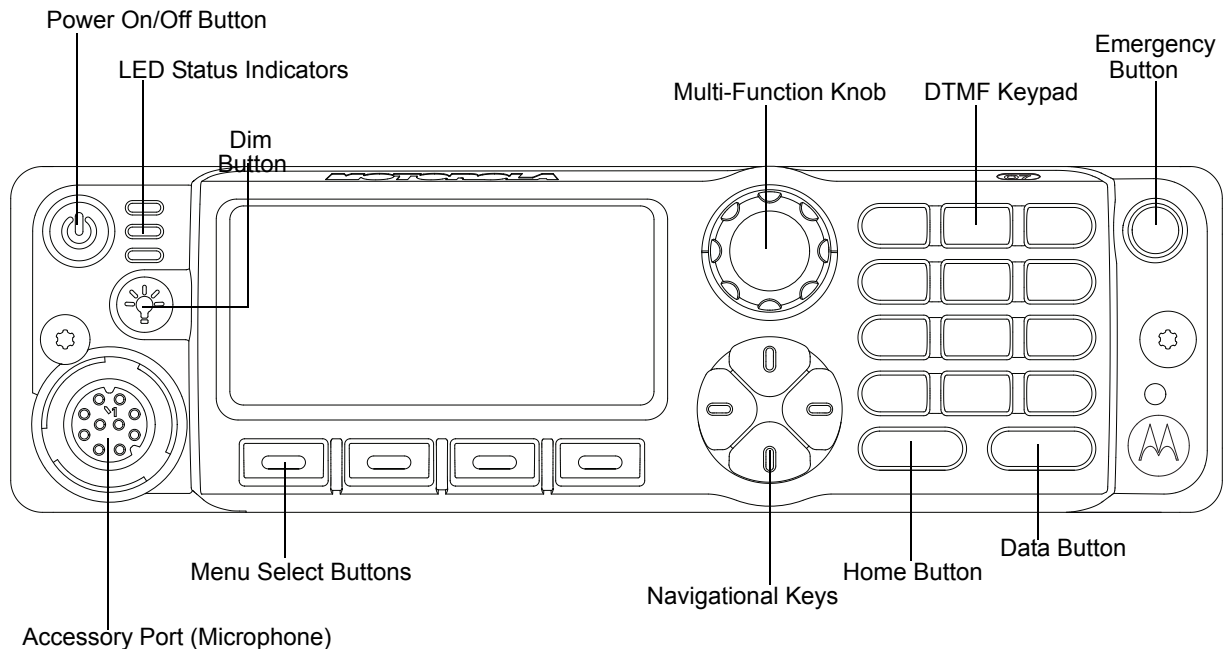


Figure 5-5. O7 Control Head

### 5.3.7 O9 Control Head Test Mode

The control head test mode is part of the diagnostics built into the radio and is entered through the front-panel programming sequence. This test mode allows you to perform button and display tests to verify proper operation.

1. Power up the control head by pressing the Power Button. Press the Soft Menu Keypad Buttons 2 and 5 simultaneously to enter control head STANDALONE TEST. CH firmware, CH FPGA version, CH Flashzap version and CH Board version will be displayed before being able to be in Factory Test.
2. Press Home to enter sequential test.
3. In Factory Test menu, pressing any buttons will activate the following tests:
  - LED test (green, red and yellow)
  - Backlight test (Off, Medium and On)
  - LCD test (4 borders test)
  - Keypad LED test (green, amber, red and common white LED test)
4. Hit any button after this to activate the keypad test. All the 48 buttons notations will be displayed on the LCD and once the corresponding button is pressed, the notation will disappear from the LCD.
5. After all 48 buttons are pressed, hit any key to enter Rotary test. Response selector, Volume rotary and Channel rotary functionality is tested by turning the knob.
6. Turn the radio off and back on to exit test mode and return to normal radio operation.

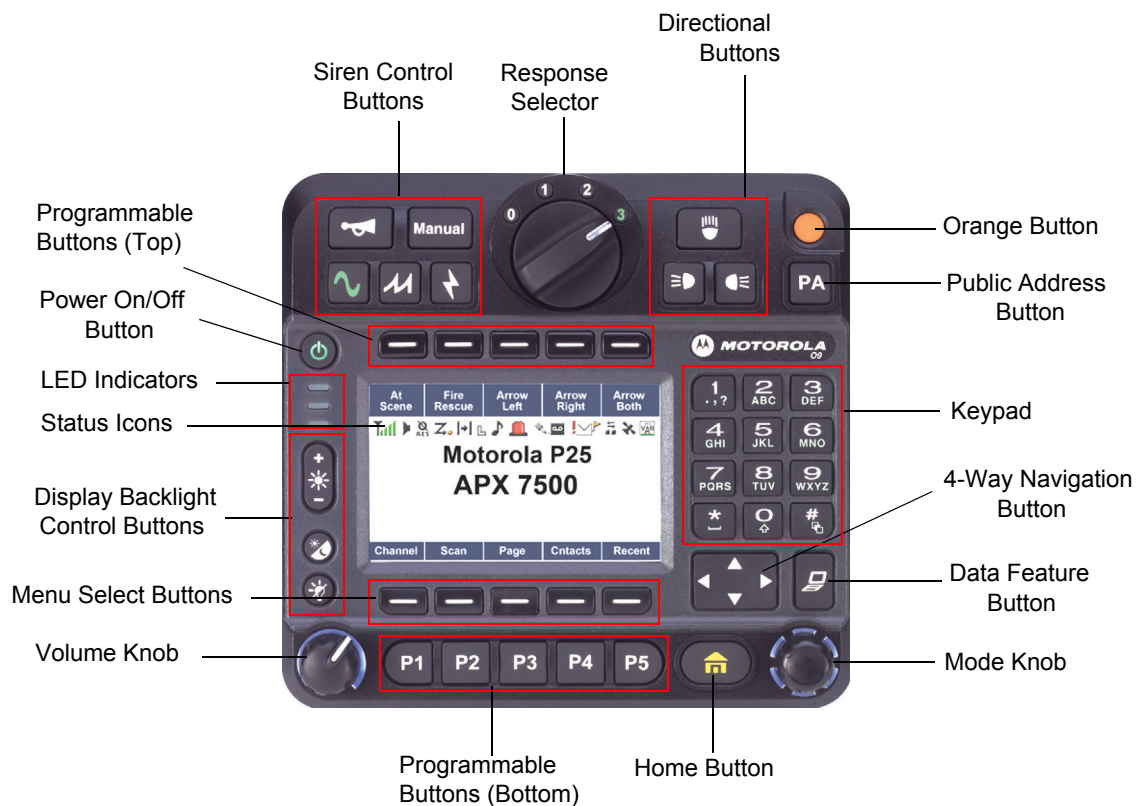


Figure 5-6. O9 Control Head

## 5.4 Receiver Performance Checks

Table 5-5. Receiver Performance Checks

Test Name	System Analyzer	Radio	Test Condition	Comments
Reference Frequency	Mode: PWR MON 1st channel test frequency* Monitor: Frequency error Input at RF In/Out	TEST MODE, 1 CSQ output at antenna	Press and hold PTT switch.	Maximum Frequency error is $\pm 2.0$ PPM for VHF & UHF $\pm 1.5$ PPM for 700/800
Rated Audio	Mode: GEN Output level: 1.0 mV RF 1st channel test frequency* Mod: 1 kHz tone at 3 kHz deviation Monitor: DVM: AC Volts	TEST MODE, 1 CSQ	Release PTT switch.	Set volume control to 6.45 Vrms across the 3.2 ohm speaker or 7.75 Vrms across the 8 ohm speaker
Distortion	As above, except to distortion	TEST MODE, 1 CSQ	Release PTT switch.	Distortion $\leq 3.0\%$
Sensitivity (SINAD)	As above, except SINAD, lower the RF level for 12 dB SINAD	TEST MODE, 1 CSQ	Release PTT switch.	RF input to be $< 0.25 \mu\text{V}$
Noise Squelch Threshold (only radios with conventional system need to be tested)	RF level set to 1 mV RF	TEST MODE, 1 CSQ	Release PTT switch.	Set volume control to 3.16 Vrms across the speaker.
	As above, except change frequency to a conventional system. Raise RF level from zero until radio unsquelches.	Out of TEST MODE; select a conventional system	Release PTT switch.	Unsquelch to occur at $< 0.25 \mu\text{V}$
* Test frequencies are listed in <a href="#">Table 5-2</a> .				

## 5.5 Transmitter Performance Checks

Table 5-6. Transmitter Performance Checks

Test Name	System Analyzer	Radio	Test Condition	Comments
Reference Frequency	Mode: PWR MON 1st channel test frequency** Monitor: Frequency error Input at RF In/Out	TEST MODE, 1 CSQ	Press and hold PTT switch.	Maximum Frequency error is $\pm 2.0$ PPM for VHF & UHF $\pm 1.5$ PPM for 700/800
Power RF	As above	TEST MODE, 1 CSQ	Press and hold PTT switch.	Refer to the Radio Specifications in the front of the manual.
Voice Modulation	Mode: PWR MON 1st channel test frequency** attenuation to $-70$ , input to RF In/Out, Monitor: DVM, AC Volts Set 1 kHz Mod Out level for 25 mVrms at test set, 80 mVrms at dummy microphone or load box input	TEST MODE, 1 CSQ	Press and hold PTT switch.	Deviation: VHF, 700-800 MHz: $\geq 2.5$ kHz but $\leq 3.5$ kHz See the Detailed Service Manual for test equipment descriptions.
Voice Modulation External Microphone	Mode: PWR MON 1st channel test frequency** attenuation to $-70$ , input to RF In/ Out	TEST MODE, 1 CSQ, output at antenna	Connect external microphone. Press and hold PTT.	Press PTT switch on microphone and say "four" loudly into the radio mic. Measure deviation: VHF, UHF, 700-800 MHz: $\geq 2.5$ kHz but $\leq 3.5$ kHz See the Detailed Service Manual for test equipment descriptions.
PL Modulation (radios with conventional, clear mode, coded squelch operation only)	Change frequency to 1st channel test frequency**; B/W to narrow	TEST MODE, 1 TPL	Remove modulation input from dummy microphone or load box. Press and hold PTT switch.	Deviation: VHF, UHF, 700-800 MHz: $\geq 500$ Hz but $\leq 1000$ Hz See the Detailed Service Manual for test equipment descriptions.

Table 5-6. Transmitter Performance Checks (Continued)

Test Name	System Analyzer	Radio	Test Condition	Comments
Talkaround Modulation (radios with conventional, clear mode, talkaround operation only)	Change frequency to conventional talkaround frequency. Mode: PWR MON deviation, attenuation to -70, input to RF In/Out Monitor: DVM, AC Volts Set 1 kHz Mod Out level for 80 mVrms at dummy microphone or load box.	Conventional talkaround personality (clear mode operation) 1 CSQ	Press and hold PTT switch.	Deviation: VHF, UHF, 700-800 MHz: >= 2.5 kHz but <= 3.5 kHz See the Detailed Service Manual for test equipment descriptions.
Talkaround Modulation (radios with conventional, secure mode, talkaround operation only) *	Change frequency to conventional talkaround frequency. Mode: PWR MON deviation, attenuation to -70, input to RF In/Out Monitor: DVM, AC Volts Mod: 1 kHz out level for 80 mVrms at dummy microphone or load box.	Conventional talkaround personality (secure mode operation). Load key into radio 1 sec.	Press and hold PTT switch.	Deviation: VHF, UHF, 700-800 MHz: >= 3.6 kHz but <= 4.4 kHz See the Detailed Service Manual for test equipment descriptions.
<p>* The secure mode, talkaround modulation test is only required for radios that do not have clear mode talkaround capability.</p> <p>** Test frequencies are listed in <a href="#">Table 5-3</a>.</p>				



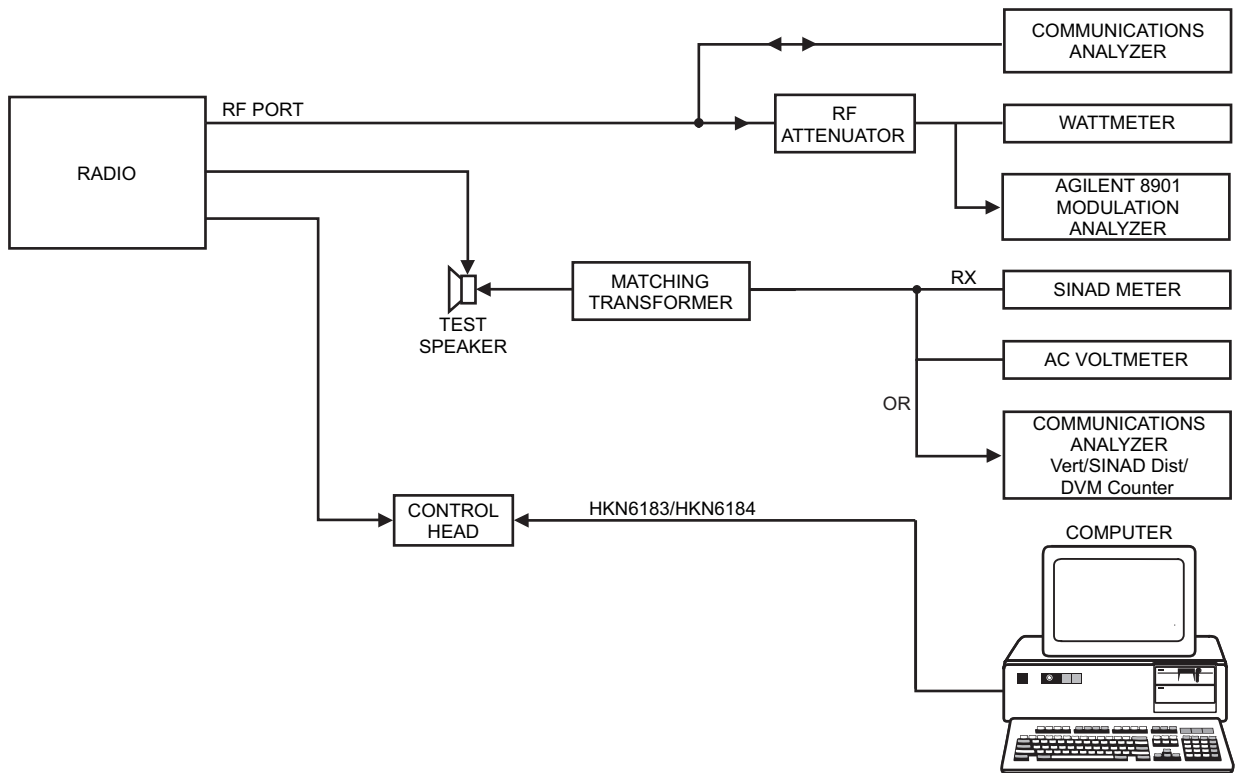
# Chapter 6 Radio Alignment Procedures

## 6.1 Introduction

This section describes both receiver and transmitter radio alignment procedures.

## 6.2 ASTRO APX Mobile Radio Tuner Software

A personal computer (PC) and Tuner Software are required to align the radio. Refer to the *CPS Programming Installation Guide* (Motorola part number RVN5224\_) for installation and setup procedures for the software. To perform the alignment procedures, the radio must be connected to the computer and to a universal test set, as shown in the following figure.



MAEPF-27657-O

Figure 6-1. Radio Alignment Test Setup for APX Mobile Radio



**Caution**

These procedures should be attempted only by qualified service personnel who are operating as an FCC licensed technician, or are overseen by an FCC licensed technician. Failure to perform alignment procedures properly may result in seriously degraded radio or system performance.

Select **Tuner** from the **Start** menu. To read the radio, click on the “read device” icon. [Figure 6-2](#) illustrates how the alignment screens are organized. To access a screen, click on the desired screen name in the **Tuner** menu.

[Figure 6-2](#) shows the tuner main menu screen for VHF and 700–800 MHz radios.

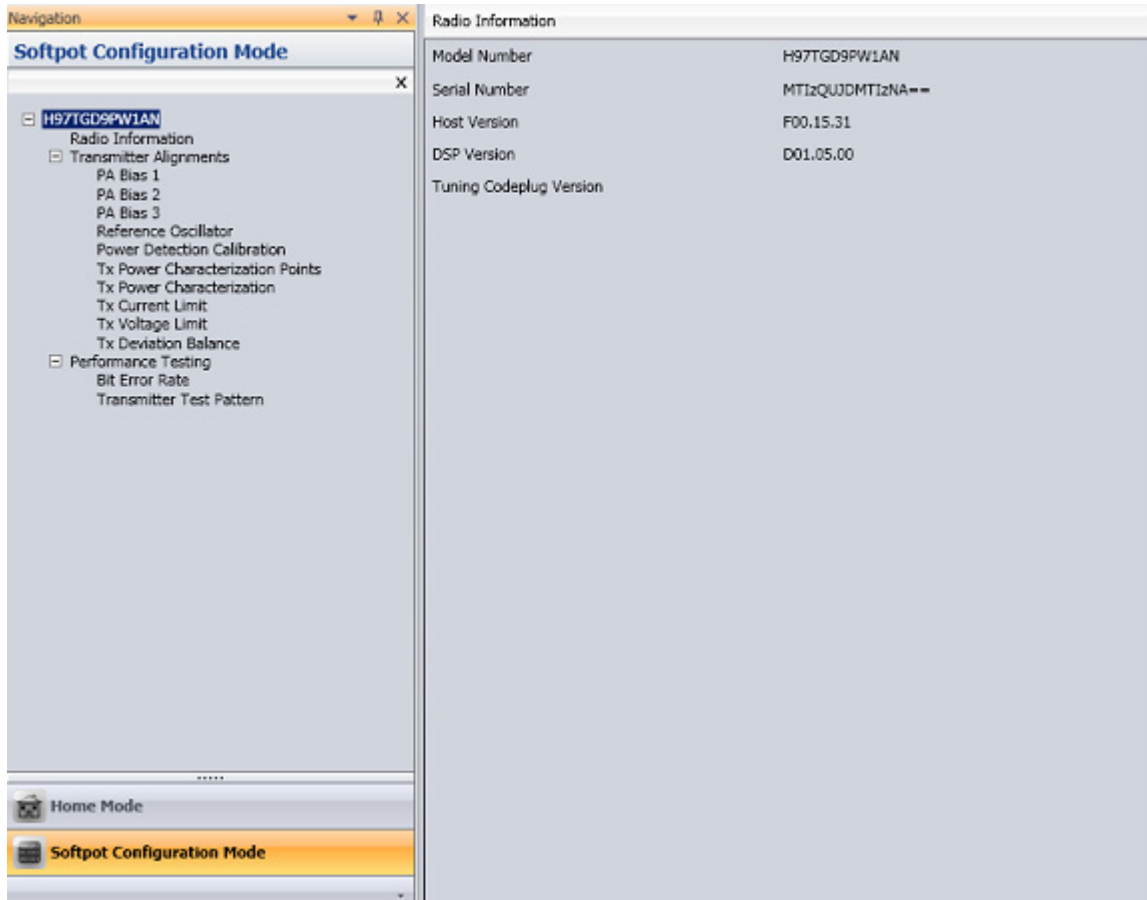



Figure 6-2. VHF/700-800 MHz Tuner Main Menu



**Caution**

Do NOT switch radios in the middle of any alignment procedure. Left-click Close button [X] located in the top right corner of the alignment window to close the screen and return to the Tuner Main Menu. Improper exits from the Alignment screens might leave the radio in an improperly configured state and result in seriously degraded radio or system performance.

The alignment screens utilize the “softpot,” an analog **SOFT**ware-controlled **POT**entiometer used for adjusting all transceiver alignment controls.

Each alignment screen provides the ability to increase or decrease the softpot value by using the **slider** or the **spin buttons** ( ▲ and ▼ ), or by entering the new value from the keyboard. A graphical scale on the display indicates the minimum, maximum, and proposed value of the softpot.

## 6.3 Radio Information

**NOTE:** APX 2500/4500 /4500Li VHF band do not support 100 W.

Figure 6-3 shows a typical Radio Information screen. All of the data appearing here is informational and cannot be changed.

Radio Information	
Model Number	M24URS9PW1AN
Serial Number	123ABC1234
Host Version	S08.86.01A
DSP Version	S08.86.01A
Tuning Codeplug Version	R01.10.05

Figure 6-3. Radio Information Screen

## 6.4 Transmitter Alignments

**NOTE:** Screen captures are representative. Actual screen may change with software version.

### 6.4.1 PA Bias 1 Alignment

**NOTE:** This alignment is required after replacing (or servicing) the transceiver board.

The PA Bias 1 alignment procedure adjusts the drain bias current in one of the RF power amplifier devices.

Table 6-1. PA Bias 1 Alignment RF Power Amplifier Devices

Band/Power Level	Device
VHF 50 W/25 W	Final
VHF 100 W	Final 1
UHF R1 40 W/25 W	Final 1
UHF R1 100 W	Final 1
UHF R2 45 W/25 W	Final 1
700–800 MHz 35 W	Final 1

**NOTE:** The appropriate antenna port should be terminated with a 50-ohm load while tuning.

1. Set the power supply voltage as indicated in Table 6-2. Set power supply current limit to 3 A.

Table 6-2. Power Supply Voltage Settings

Band/Power Level	Supply Voltage (V)	Supply Current Limit (A)
VHF 50 W/25 W	13.6	3
VHF 100 W	13.4	3

Table 6-2. Power Supply Voltage Settings (Continued)

Band/Power Level	Supply Voltage (V)	Supply Current Limit (A)
UHF R1 40 W/25 W	13.6	3
UHF R1 100 W	13.4	3
UHF R2 45 W/25 W	13.6	3
700–800 MHz 35 W	13.6	3

2. Select **PA Bias 1** from the Tuner Main Menu. When the screen is displayed, the radio enters a special bias tune mode, and radio current increases by approximately 70 mA.

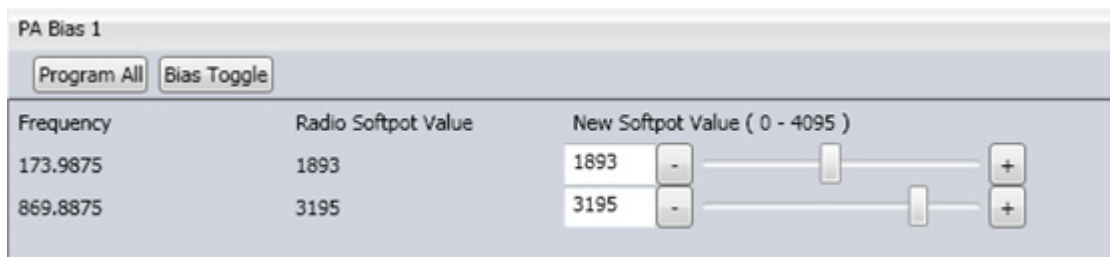


Figure 6-4. PA Bias 1 Alignment Screen

3. Read baseline current from current meter on power supply.
4. Add baseline current to device bias current to calculate target current.

Table 6-3. PA Bias 1 Alignment Device Bias Current

Band/Power Level	Device Bias Current (mA)
VHF 50 W/25 W	400
VHF 100 W	75
UHF R1 40 W/25 W	30
UHF R1 100 W	500
UHF R2 45 W/25 W	200
700–800 MHz 35 W	250

5. Left-click the **Bias Toggle** button to apply bias to gate of device.
6. Adjust softpot value until target current is achieved within  $\pm 10\%$
7. Left-click the **Bias Toggle** button to remove bias from gate of device.
8. Left-click the **Program All** button to save tuned value.
9. Left-click **Close button [X]** located in the top right corner of the alignment window to close the screen and return to the Tuner Main Menu.

## 6.4.2 PA Bias 2 Alignment

**NOTE:** This alignment is required after replacing (or servicing) the transceiver board.

The PA Bias 2 alignment procedure adjusts the drain bias current in one of the RF power amplifier devices.

Table 6-4. PA Bias 2 Alignment Amplifier Devices

Band/Power Level	Device
VHF 50 W/25 W	Driver
VHF 100 W	Final 2
UHF R1 40 W/25 W	Final 2
UHF R1 100 W	Final 2
UHF R2 45 W/25 W	Final 2
700–800 MHz 35 W	Final 2

**NOTE:** The appropriate antenna port should be terminated with a 50-ohm load while tuning.

1. Set the power supply voltage as indicated in Table 6-5. Set power supply current limit to 3 A.

Table 6-5. Power Supply Voltage Settings

Band/Power Level	Supply Voltage (V)	Supply Current Limit (A)
VHF 50 W/25 W	13.6	3
VHF 100 W	13.4	3
UHF R1 40 W/25 W	13.6	3
UHF R1 100 W	13.4	3
UHF R2 45 W/25 W	13.6	3
700–800 MHz 35 W	13.6	3

2. Select **PA Bias 2** from the Tuner Main Menu. When the screen is displayed, the radio enters a special bias tune mode, and radio current increases by approximately 70 mA.

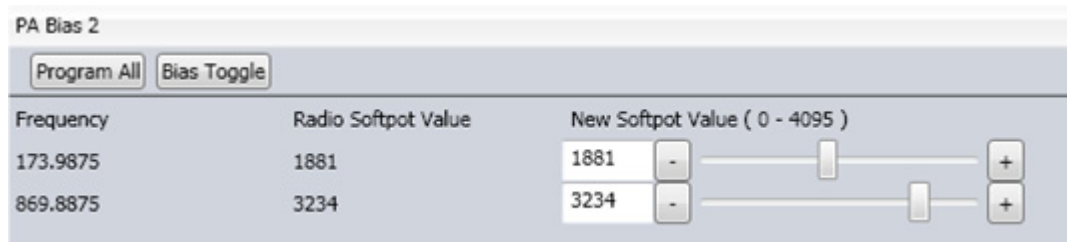


Figure 6-5. PA Bias 2 Alignment Screen

3. Read baseline current from current meter on power supply.
4. Add baseline current to device bias current to calculate target current.

*Table 6-6. PA Bias 2 Alignment Device Bias Current*

<b>Band/Power Level</b>	<b>Device Bias Current (mA)</b>
VHF 50 W/25 W	150
VHF 100 W	75
UHF R1 40 W/25 W	30
UHF R1 100 W	500
UHF R2 45 W/25 W	200
700–800 MHz 35W	250

5. Left-click the **Bias Toggle** button to apply bias to gate of device.
6. Adjust softpot value until target current is achieved within  $\pm 10\%$
7. Left-click the **Bias Toggle** button to remove bias from gate of device.
8. Left-click the **Program All** button to save tuned value.
9. Left-click **Close button [X]** located in the top right corner of the alignment window to close the screen and return to the Tuner Main Menu.

### 6.4.3 PA Bias 3 Alignment

**NOTE:** This alignment is required after replacing (or servicing) the transceiver board.

The PA Bias 3 alignment procedure adjusts the drain bias current in one of the RF power amplifier devices.

Table 6-7. PA Bias 3 Alignment Amplifier Devices

Band/Power Level	Device
VHF 50 W/25 W	NA
VHF 100 W	Driver
UHF R1 40 W/25 W	Driver
UHF R1 100 W	Driver
UHF R2 45 W/25 W	Driver
700–800 MHz 35 W	Driver

**NOTE:** The appropriate antenna port should be terminated with a 50-ohm load while tuning.

1. Set the power supply voltage as indicated in Table 6-8. Set power supply current limit to 3 A.

Table 6-8. Power Supply Voltage Settings

Band/Power Level	Supply Voltage (V)	Supply Current Limit (A)
VHF 50 W/25 W	NA	NA
VHF 100 W	13.4	3
UHF R1 40 W/25 W	13.6	3
UHF R1 100 W	13.4	3
UHF R2 45 W/25 W	13.6	3
700–800 MHz 35 W	13.6	3

2. Select **PA Bias 3** from the Tuner Main Menu. When the screen is displayed, the radio enters a special bias tune mode and radio current increases by approximately 70 mA.

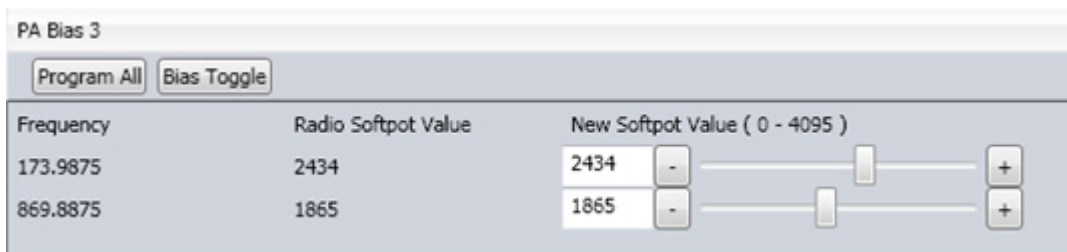


Figure 6-6. PA Bias 3 Alignment Screen

3. Read baseline current from current meter on power supply.

4. Add baseline current to device bias current to calculate target current.

Table 6-9. PA Bias 3 Alignment Device Bias Current

Band/Power Level	Device Bias Current (mA)
VHF 50 W/25 W	NA
VHF 100 W	150
UHF R1 40 W/25 W	150
UHF R1 100 W	150
UHF R2 45 W/25 W	100
700–800 MHz 35 W	100

5. Left-click the **Bias Toggle** button to apply bias to gate of device.
6. Adjust softpot value until target current is achieved within  $\pm 10\%$
7. Left-click the **Bias Toggle** button to remove bias from gate of device.
8. Left-click the **Program All** button to save tuned value.
9. Left-click **Close button [X]** located in the top right corner of the alignment window to close the screen and return to the Tuner Main Menu.

#### 6.4.4 Reference Oscillator Alignment

Radios are shipped from the factory with a worst-case frequency error of  $\pm 250$  Hz for the VHF frequency band, and  $\pm 600$  Hz for the 700–800 MHz bands. These specifications are tighter than the more stringent FCC requirements of  $\pm 2.0$  ppm for VHF and UHF, and  $\pm 1.5$  ppm for the 700–800 MHz bands.

For radios that have been in storage for over six months from the factory ship date, the reference oscillator should be checked when the radio is initially deployed to the field. It is strongly recommended that the reference oscillator be checked every time the radio is serviced or at least once a year, whichever comes first.

The crystal contained in the reference oscillator naturally drifts over time due to its aging characteristic. Periodic (annual) adjustment of the reference oscillator is important for proper radio operation.

Improper adjustment can result in both poor performance and interference with other users operating on adjacent channels.

This test can be done with either the R-2670 Communication Analyzer or the Agilent 8901 Modulation Analyzer.

- Initial setup using the R-2670 Communication Analyzer:
  - RF Control: MONITOR
  - B/W: WB
  - Freq: RSS frequency under test
  - Attenuation: 20 dB
  - Mon RF in: RF I/O
  - Meter: RF Display
  - Mode: STD



- Input Level: uV or W
  - Display: Bar Graphs
  - Squelch: Mid-range or adjust as necessary
  - Initial setup using the Agilent 8901 Modulation Analyzer:
    - Press the green Automatic Operation button on the analyzer.
    - Press the **FREQ** key.
    - Type **7.1**, followed by the **SPCL** button, to set the 8901 Modulation Analyzer for maximum accuracy.
1. Select **Reference Oscillator** from the Tuner Main Menu (Figure 6-7).



Figure 6-7. Reference Oscillator Window

2. If you are using the R-2670 analyzer, enter the frequency displayed on the Tuner screen in the "RF control" section of the R-2670. Under the "Meter" section of the display, choose RF DISPLAY.
3. For dual band radios, select the appropriate antenna port based on the frequency displayed in the tuner screen and connect it to the test equipment (See Figure 6-1). Left-click the **PTT Toggle** button on the screen to make the radio transmit. The screen indicates whether the radio is transmitting.
4. Wait five seconds until the analyzer reading stabilizes, and then record the transmitter frequency.
5. Adjust the reference oscillator's softpot value until the measured value is as close as possible to the frequency shown on the screen. Allow approximately five seconds for the analyzer frequency reading to stabilize after each change. See Table 6-10.

Table 6-10. Reference Oscillator Alignment

Band	Target
VHF	±150 Hz
UHF	±150 Hz
800 MHz	±100 Hz

6. Left-click the **Program All** button on the screen to dekey the radio and save the tuned values.
7. Left-click **Close button [X]** located in the top right corner of the alignment window to close the screen and return to the Tuner Main Menu.

### 6.4.5 Power Detector Calibration

**NOTE:** This alignment is required after replacing (or servicing) the transceiver board.

The power detector calibration alignment procedure adjusts the buffer gain for the forward power detector to minimize radio power variation from radio to radio.

**NOTE:** The appropriate antenna port should be terminated with calibrated power meter through a 30 db RF pad.

1. Set the power supply voltage and current limit as indicated in [Table 6-11](#).

Table 6-11. Power Supply Voltage Settings

Band/Power Level	Supply Voltage (V)	Supply Current Limit (A)
VHF 50 W/25 W	13.6	15
VHF 100 W	13.4	25
UHF R1 40 W/25 W	13.6	15
UHF R1 100 W	13.4	30
UHF R2 45 W/25 W	13.6	15
700–800 MHz 35 W	13.6	15

2. Select **Power Detection Calibration** from the Tuner Main Menu.

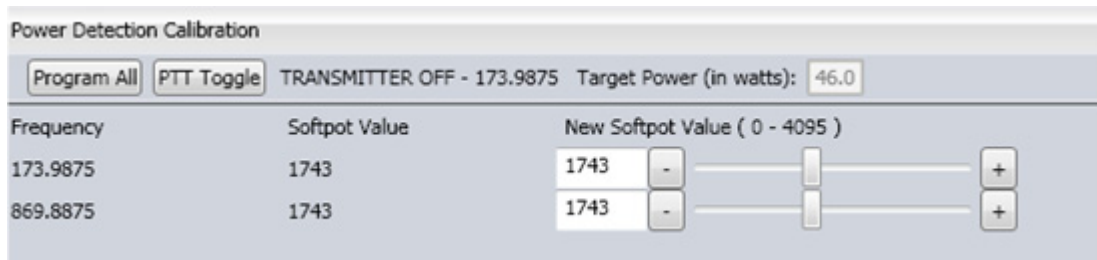


Figure 6-8. Power Detection Calibration Alignment Screen

3. Left-click the **PTT Toggle** button to transmit at indicated frequency.
4. Adjust softpot value until target power is achieved.
5. Left-click the **PTT Toggle** button to disable transmit mode.
6. Left-click the **Program All** button to save tuned value.
7. For dual band radio, switch antenna port and repeat the alignment procedure for the second frequency displayed in the tuning screen.

### 6.4.6 Tx Power Characterization

**NOTE:** This alignment is required after replacing (or servicing) the transceiver board.

The Tx Power Characterization alignment procedure characterizes power tuning so that Tx power can be adjusted with CPS software. You will transmit at two power levels for each test frequency and record the measured power level with 0.1 W resolution.

**NOTE:** The appropriate antenna port should be terminated with a calibrated power meter through a 30 db RF pad.

1. Set the power supply voltage and current limit as indicated in [Table 6-12](#).

*Table 6-12. Power Supply Voltage Settings*

Band/Power Level	Supply Voltage (V)	Supply Current Limit (A)
VHF 50 W/25 W	13.6	15
VHF 100 W	13.4	25
UHF R1 40 W/25 W	13.6	15
UHF R1 100 W	13.4	30
UHF R2 45 W/25 W	13.6	15
700–800 MHz 35 W	13.6	15

2. Select **Tx Power Characterization** from the Tuner Main Menu.

Tx Power Characterization

Program All PTT Toggle TRANSMITTER OFF - 136.0125

Frequency (MHz)	Measured Power 1	Measured Power 2
136.0125	27.83	105.54
140.7625	27.79	104.86
145.5125	27.65	103.85
150.2625	27.59	103.52
154.9875	27.65	103.52
155.0125	27.61	103.19
159.7625	27.56	102.86
164.5125	27.61	103.19
169.2625	27.84	103.50
173.9875	27.92	103.82
762.0125	3.09	32.71
768.9875	3.05	32.06
776.0125	3.19	31.51
793.9875	3.05	30.23
805.9125	2.95	31.36
806.0125	2.97	35.68
823.9875	3.01	33.86
851.0125	2.99	36.77
860.0125	2.93	35.62
869.8875	2.86	36.56

Figure 6-9. Tx Power Characterization Alignment Screen

3. Left-click in the first box of the Measured Power 1 column. The perimeter of the box will turn green indicating active characterization point.
4. Left-click the **PTT Toggle** button to transmit at indicated frequency and record power measurement with 0.1 W resolution. The perimeter of the box will turn red, indicating that the radio is transmitting.
5. Left-click the **PTT Toggle** button to disable transmit mode.
6. Enter the power measurement with 0.1 W resolution, overwriting any value that may reside in the box from previous tuning.
7. Left-click in the first box of the Measured Power 2 column. The perimeter of the box will turn green, indicating it has become the active characterization point.
8. Repeat steps 4-6.
9. Repeat steps 3-8 for the remaining frequencies.
10. Left-click the **Program All** button to save tuned value.
11. Left-click **Close button [X]** located in the top right corner of the alignment window to close the screen and return to the Tuner Main Menu.

## 6.4.7 Tx Current Limit

**NOTE:** This alignment is required after replacing (or servicing) the transceiver board. The Tx Current Limit alignment procedure tunes the Tx current-limiting protection.

**NOTE:** The appropriate antenna port should be terminated with a calibrated power meter through a 30 dB RFpad.

1. Set the power supply voltage and current limit as per [Table 6-13](#).

Table 6-13. Power Supply Voltage Settings

Band/Power Level	Supply Voltage (V)	Supply Current Limit (A)
VHF 50 W/25 W	13.6	15
VHF 100 W	13.4	25
UHF R1 40 W/25 W	13.6	15
UHF R1 100 W	13.4	30
UHF R2 45 W/25 W	13.6	15
700–800 MHz 35 W	13.6	15

2. Select **Tx Current Limit** from the Tuner Main Menu.

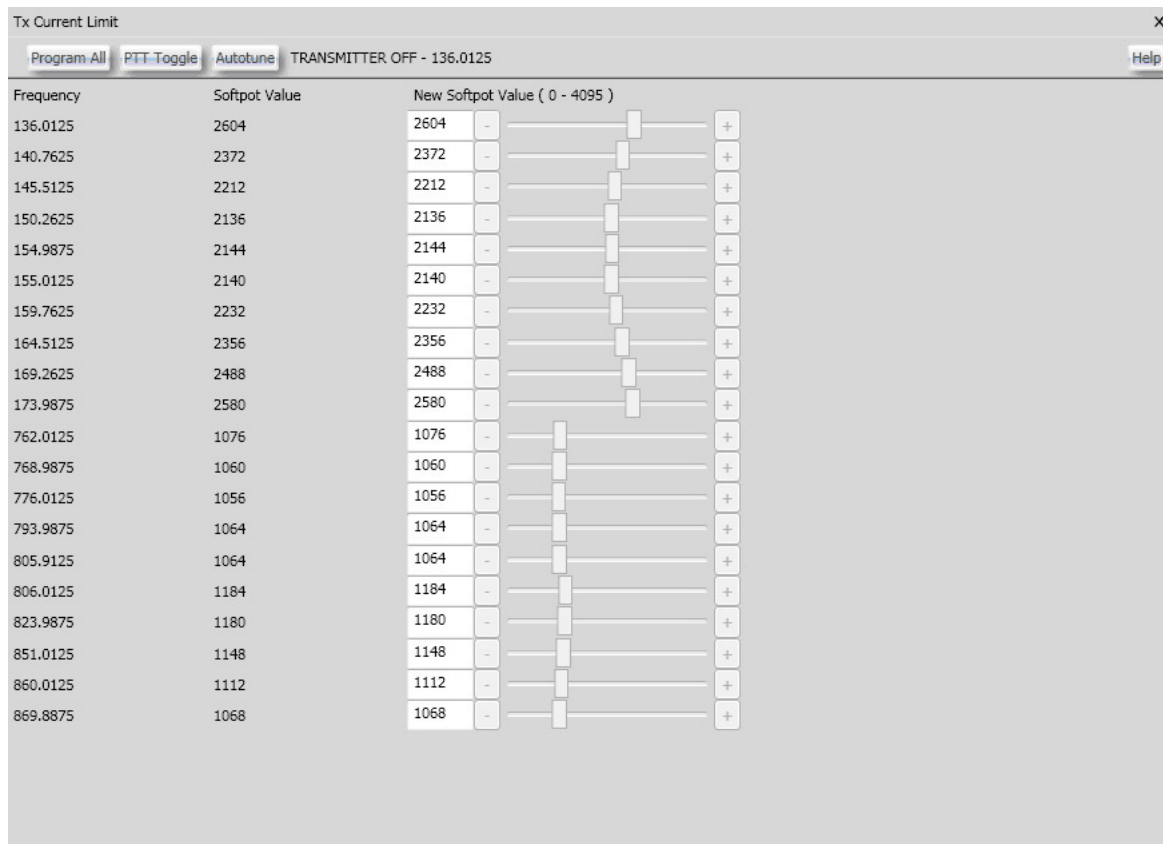


Figure 6-10. Tx Current Limit Alignment Screen

3. Select the first test frequency to tune.
4. Left-click the **PTT Toggle** button to transmit on the indicated frequency in the TX current limit alignment screen.
5. Left-click the auto tune.
6. Repeat steps 3 through 5 for all test frequencies in the TX current limit alignment screen.
7. Left-click the **Program All** button to save tuned values.
8. Left click the **Close** button to close screen and return to the Tuner Main Menu.

Table 6-14. Transmit Current Limit Devices

Band/Power Level	Devices		
VHF 50 W/25 W	Final		
VHF 100 W	Final1	Final2	Driver
UHF R1 40 W/25 W	Final 1	Final 2	Driver
UHF R1 100 W	Final1	Final2	Driver
UHF R2 45 W/25 W	Final 1	Final 2	Driver
700–800 MHz 35 W	Final1	Final2	Driver

#### 6.4.7.1 Tx Voltage Limit

**NOTE:** This alignment is required after replacing (or servicing) the transceiver board.

The Tx Voltage limit alignment procedure tunes the TX control voltage limiting protection.

**NOTE:** The antenna port should be terminated with a calibrated power meter through a 30 dB RF pad.

1. Set the power supply voltage and current limit as per [Table 6-13](#).

2. Select TX Voltage limit from the Tuner Main Menu.

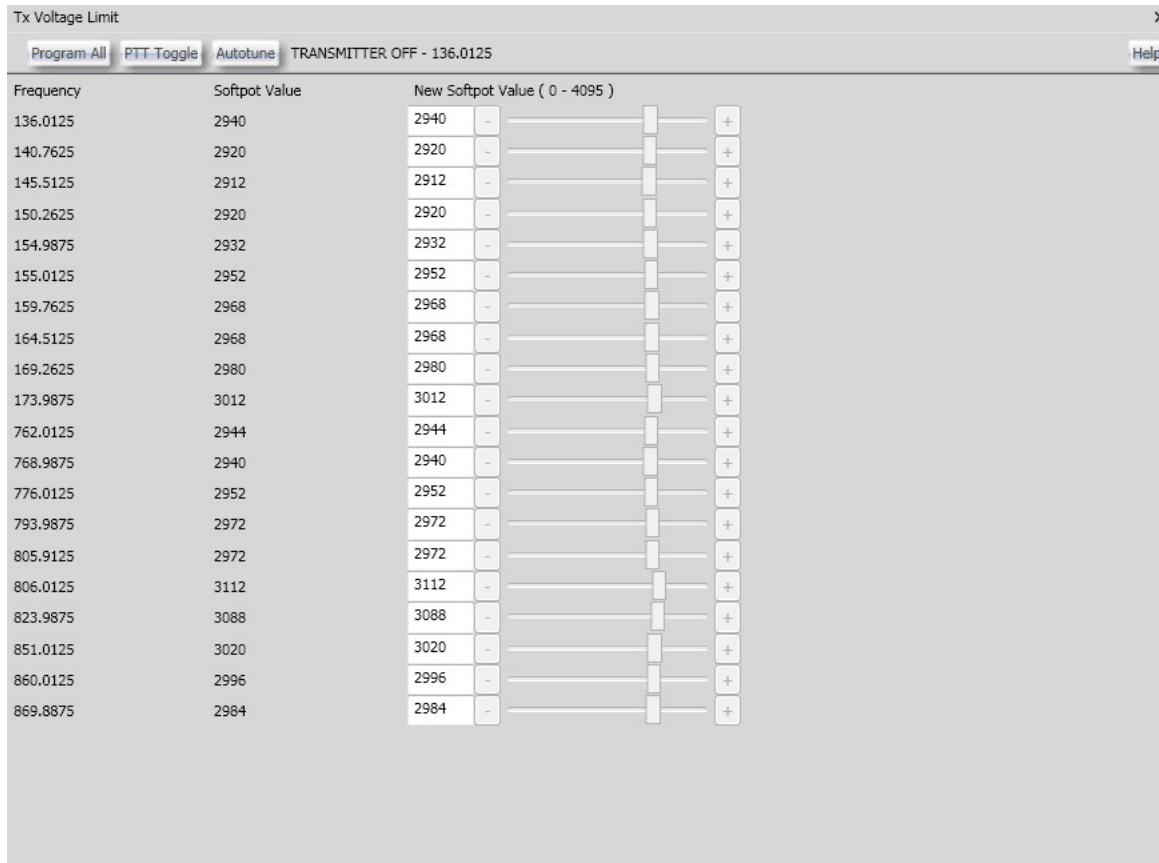


Figure 6-11. Tx Voltage Limit Alignment Screen

3. Select the first test frequency to tune.
4. Left-click the **PTT Toggle** button to transmit on the indicated frequency in the TX Voltage limit alignment screen.
5. Left-click the auto tune.
6. Repeat steps 3 through 5 for all test frequencies in the TX Voltage limit alignment screen.
7. Left-click the **Program All** button to save tuned values.
8. Left click the **Close** button to close screen and return to the Tuner Main Menu.

### 6.4.8 Tx Deviation Balance (Compensation)

**NOTE:** This alignment is required after replacing (or servicing) components on the transceiver board.

The Tx Deviation Balance (Compensation) alignment procedure balances the modulation contributions of the low- and high-frequency portions of a baseband signal. Proper alignment is critical to the operation of signaling schemes that have very low frequency components (for example, DPL) and could result in distorted waveforms if improperly adjusted. This procedure needs to be performed at multiple frequencies to allow for proper alignment across the entire RF band. The RF band is divided into frequency zones with a calibration point (value) in each zone. When performing this tuning procedure, the **PTT Tone Low** generates a 300 Hz modulation frequency. The deviation level of this 300 Hz tone is used as the reference level for adjusting the deviation level of the **PTT Tone High**, which is a 3 kHz modulation frequency.

This test can be done with either the R-2670 Communication Analyzer or the Agilent 8901 Modulation Analyzer. The method of choice is the R-2670 Analyzer.

- Initial setup using the R-2670 Communication Analyzer:
  - Connect a BNC cable between the "DEMODO OUT" port and the "VERT/SINAD DIST/DMM COUNTER IN" port on the R-2670.
  - Press the SPF key on the R-2670 to display the "SPECIAL FUNCTIONS MENU." Move the cursor to "High Pass," and select 5 Hz on the soft key menu. Select 20 kHz for the "Low Pass" setting.
  - In the "RF Control" section of the R-2670, enter the frequency displayed on the Tuner screen. Move the cursor to the "B/W" setting and select "WIDE  $\pm 100$  kHz" on the soft key menu.
  - Place the R-2670 cursor in the "Display" zone. Select "AC VOLTS" on the soft key menu. Move the cursor to the "Range" setting and select "AUTO."
- Initial setup using the 8901 Modulation Analyzer:
  - Press the FM MEASUREMENT button. (The "Error 03-input level too low" indication is normal until an input signal is applied.)
  - Simultaneously press the Peak - and Peak + buttons. Both LEDs on the buttons should light.
  - Press the 15 kHz LP filter key.



1. Select **TX Deviation Balance (Compensation)** from the Tuner Main Menu. The screen will indicate the transmit frequencies to be used. For dual band radios, select appropriate antenna port based on the frequencies displayed on the tuner screen and connect it to the test equipment (see [Figure 6-1](#)).

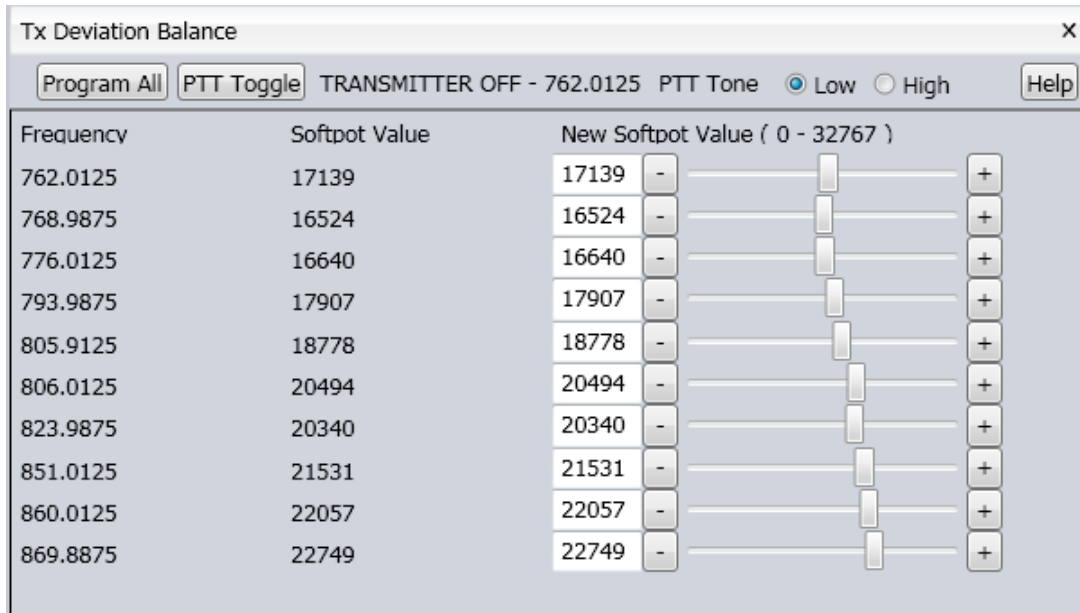


Figure 6-12. Tx Deviation Balance (Compensation) Alignment Screen

2. Left-click the highest frequency field first.
3. Left-click the **PTT Tone Low** button.
4. Left-click the **PTT Toggle** button on the screen to enable transmission. The screen indicates whether the radio is transmitting. Wait approximately 5 seconds until the voltage shown on R-2670, or the deviation shown on the 8901 Analyzer, stabilizes.
5. Measure and record the AC voltage value from the R-2670 Analyzer or the deviation value from the 8901 Analyzer.
6. Left-click the **PTT Tone High** button.
7. Adjust the softpot value until the measured deviation/voltage, when using the high tone, is within  $\pm 1\%$  of the value observed when using the low tone.
8. Repeat steps 3-7 for the remaining frequencies.
9. Left-click the **Program All** button on the screen to dekey the radio and save the tuned values.

## 6.5 Performance Testing

### 6.5.1 Bit Error Rate (BER) Test

This procedure tests the Bit Error Rate (BER) of the radio's receiver at a desired frequency and contains the fields described in [Table 6-15](#).

Figure 6-13. Bit Error Rate Screen

Table 6-15. Bit Error Rate Test Fields

Field	Description
Rx Frequency	Selects the Receive Frequency in MHz.
Test Pattern	Selects the Digital test pattern - TIA.
Modulation Type	Selects the digital modulation type of the incoming signal on which BER is to be calculated.
Continuous Operation	<p>Allows the user to adjust the number of test repetitions. A selection of <b>Yes</b> will cause the radio to calculate BER on a continuous basis indefinitely and update the results on this screen after each integration time. A selection of <b>No</b> will cause the BER test to execute only one sample and then update the display.</p> <p><b>NOTE:</b> When Continuous Operation = Yes, all fields will be dimmed while the test is in progress. They will be enabled when the test is complete, or if the STOP button is pressed.</p> <p>When Continuous Operation = No, a wait cursor will be displayed while the test is in progress and return to normal when the test is done.</p>
Audio	<p>Allows the user to select the audio output during a test. Selecting <b>External</b> will route the same signal to the radio's accessory connector audio output. Selecting <b>Internal</b> is not supported. Selecting <b>Mute</b> will disable the audio output.</p>

Table 6-15. Bit Error Rate Test Fields (Continued)

Field	Description
BER Integration Time	<p>Represents the amount of time during which the Bit Error Rate is to be calculated. Remember that integration over a longer time period results in a more precise measurement, at the expense of more time per measurement.</p> <p><b>NOTE:</b> This is especially useful in fading measurements.</p> <p>The range is from 0.360 to 91.8 seconds in increments of 0.360 seconds.</p>

## 6.5.2 Transmitter Test Pattern

This procedure allows you to generate test patterns at selectable frequencies and channel spacing to check the transmitter. The procedure contains the fields described in [Table 6-16](#).

Table 6-16. Transmitter Test Pattern Fields

Field	Description
Tx Frequency	This field selects the Transmit Frequency directly in MHz.
Channel Spacing	This field allows the user to select the desired transmit deviation in kHz.
Test Pattern Type	This field represents the type of test pattern which will be transmitted by the radio when the PTT Toggle button is pressed.

**NOTE:** Test Pattern Type field will be dimmed while the radio is transmitting.

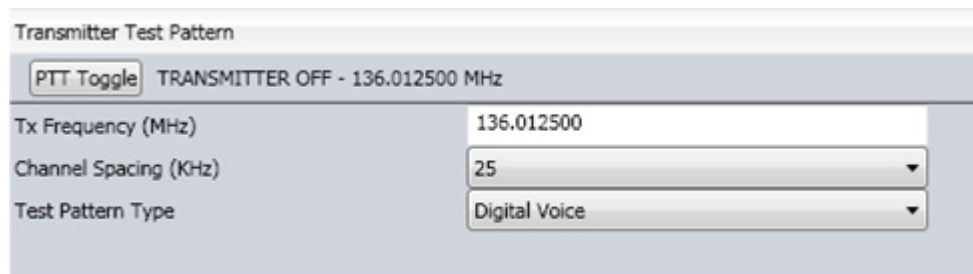


Figure 6-14. Transmitter Test Pattern Screen

## Notes

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# Chapter 7 Encryption

## 7.1 Motorola Advanced Crypto Engine Secure Options

**NOTE:** This information applies to both conventional and trunked systems.

The controller board contains the MACE (Motorola Advanced Crypto Engine) which can only be activated for secure-equipped APX mobile radios. These options can be found in the electronic catalog, ECAT. MACE uses a custom encryption IC and an encryption key variable to perform its encode/decode functions. The encryption key variable is loaded into the MACE using a key variable loader (KVL). The encryption IC corresponds to the particular encryption algorithm purchased.

### 7.1.1 Secure Key Retention

The APX 5500 / 6500 / 7500 / 6500Li comes standard with 30 second or infinite key retention (CPS setting). APX 2500 and APX 4500 do not support 3-days secure key retention, as there is no interface hardware. If a 3 day key retention is required, the following option board kit is available:

*Table 7-1. Secure Board Kit*

Kit Number	Description
MHLN6999_	Memory board with 3 day secure key retention

*Table 7-2. Controller Boards with Programmed Secure Algorithms for APX 5500 / 6500 / 7500 / 6500Li*

Kit Number	Description
NNTN7918_	Controller board, AES/DVP-XL encryption
NNTN7919_	Controller board, DVP-XL encryption
NNTN7920_	Controller board, AES/DES/DES-XL/DES-OFB encryption
NNTN7921_	Controller board, AES encryption
NNTN7922_	Controller board, DES/DES-XL/DES-OFB encryption
NNTN7923_	Controller board, ADP encryption

*Table 7-3. Controller Boards with Programmed Secure Algorithms for APX 2500*

Kit Number	Description
NNTN8425_	Controller board, AES encryption
NNTN8426_	Controller board, DES / DES-XL / DES-OFB encryption
NNTN8427_	Controller board, ADP encryption
NNTN8428_	Controller board, DVP-XL encryption

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Table 7-4. Controller Boards with Programmed Secure Algorithms for APX 4500

Kit Number	Description
NNTN8425_	Controller board, AES encryption
NNTN8427_	Controller board, ADP encryption

### 7.1.2 Secure Dispatch Operation

For personalities or talkgroups that are programmed to be secure-selectable, press and release the *Secure* button to toggle between Secure and Clear.

- An illuminated secure status annunciator indicates that the transmitted signal will be encrypted when the **PTT** button is pressed.
- The absence of the secure status annunciator indicates that the transmitted signal will not be encrypted.

Whether the current personality is strapped for secure or clear, the secure status annunciator correctly displays the transmit operation as being either secure (encrypted) or clear (non-encrypted).

**NOTE:** You cannot change from secure to clear while the **PTT** button is pressed. The radio will generate an illegal tone and the transmission will be terminated.

Secure-equipped radios automatically determine whether a secure or clear voice message is being received. This allows you to receive either type of message without having to reset the programmable secure button.

### 7.1.3 Secure Emergency Operation

Clear or Secure emergency-call operation is determined by the programming of the selected mode (or talkgroup) or the default emergency mode, if set up. Otherwise, transmit operation is controlled by the setting of the secure, programmable button. You will not be able to change from Secure to Clear, or from Clear to Secure, operation during an emergency call.

## 7.2 Load an Encryption Key

To load an encryption key into an APX mobile radio:

1. Ensure that an encryption module is installed in the radio.
2. Ensure the secure shield is installed and screwed into chassis prior to radio power-up. This is necessary for proper radio operation.
3. Load an encryption key into the radio's memory from a key-variable loader (KVL) using the correct loader for the radio's encryption type.

Attach the keyloader cable to the control head MMP connector in the dash mount configuration and to the TIB MMP connector in the remote mount configuration.

4. KEYLOADING is displayed on the radio display while the key transfer is in progress.

For single-key radios, a short tone sounds when a key is successfully loaded.

For multi-key radios, an alternating tone sounds for a few seconds after keys are successfully loaded.

**NOTE:** An invalid encryption key aborts a secure transmission. KEYFAIL is displayed and a keyfail tone (consecutive medium-pitched beeps) sounds until you release the PTT button.

5. If a mode is not programmed for either secure or clear-only operation, use the secure programmable button to select secure or clear transmission.

**NOTE:** You cannot change from secure to clear, or from clear to secure, while pressing the PTT button.

## 7.3 Advanced Secure Operation

**NOTE:** The Advanced Secure feature is available only on radios that have been equipped by the factory to support it. The radio must also be equipped with an encryption module.

Advanced Secure incorporates the Multikey feature and a dual-encryption feature into the existing secure system. Multikey allows a radio to be equipped with multiple encryption keys. A default key is included and is associated with the current mode. The keys are strapped to a given mode or are operator-selectable and can be indexed into groups of keys called keysets. The keys are loaded using a manual keyloader.

In addition, your radio can support up to eight different encryption algorithms simultaneously.

### 7.3.1 Multikey Operation

The multikey feature can be used in both conventional and trunked applications.

- **Conventional Multikey** - The encryption keys can be selectively strapped, one per each channel. In addition, the programmable radio features include operator-selectable keys, operator-selectable indices, and operator-selectable key erasure. Encryption keys are loaded into the radio through a KVL.
- **Trunked Multikey** - If the radio is used for both conventional and trunked applications, the encryption keys have to be strapped for trunking on a talkgroup, or announcement group, basis. In addition, a different encryption key can be strapped to other features, such as Private Call, Dynamic Regrouping, Failsoft, Interconnect, System Wide, or Emergency Talkgroup.

## 7.4 Erase a Single Key

1. Press the menu button labeled ERAS. Alternatively, press and hold the menu button labeled SEC until a tone sounds. Then press ERAS on the second menu that is displayed. If ERAS or SEC is not on the current menu, use the NAV key to scroll through the available menus.

The last selected key is displayed.

2. Use the NAV key to scroll through the encryption keys until the key to be erased is displayed. Alternatively, if a keypad microphone is used, press the numeric keys to jump to the desired encryption key.

ERASED alternates with the key name if the displayed key is blank.

3. Press the menu button labeled SNGL to erase the selected key.

ERASE SNGL KEY followed by the key name is displayed.

4. Press the menu button labeled YES.

The selected key is set to zero.

ERASED is alternately displayed with the key name confirming the erasure.

5. To exit the menu without erasing a key, press the menu button labeled **ABRT**, the **PTT** button, or the home button.

## 7.5 Erase All Keys

1. Press the menu button labeled **ERAS**. Alternatively, press and hold the menu button labeled **SEC** until a tone sounds. Then press **ERAS** on the second menu that is displayed. If **ERAS** or **SEC** is not on the current menu, use the **NAV** key to scroll through the available menus.

The last selected key is displayed.

2. Press the menu button labeled **ALL**.

**ERASE ALL KEYS** is displayed.

3. Press the menu button labeled **YES**. All keys are erased.

**ERASED** is alternately displayed with the displayed key name confirming the erasure.

4. To exit the menu without erasing the keys, press the menu button labeled **ABRT**, the **PTT** button, or the home button.

## 7.6 Over-the-Air Rekeying

The over-the-air rekeying (OTAR) feature allows the dispatcher to reprogram the encryption keys in the radio remotely. The following steps describe how to use this feature.

1. Press the menu button labeled **REKY**. Alternatively, press and hold the menu button labeled **SEC** until a tone sounds. Then press **REKY** on the second menu that is displayed. If **REKY** or **SEC** is not on the current menu, use the **NAV** key to scroll through the available menus.

**REQUEST REKEY** is displayed.

2. Press the **PTT** button to send the rekey request.

**PLEASE WAIT** is displayed.

One of the following occurs:

The radio sounds five tones when the dispatcher has received the request.

**NOTE:** Any subsequent press of the **PTT** button will exit the OTAR feature and allow you to transmit in the normal manner. Pressing the **HOME** or emergency button also exits the feature.

If the display momentarily shows **REKEY FAIL** and the bad-key tone sounds, then the rekey operation failed because the radio does not contain the Unique Shadow Key (USK) or Unique Key Encryption Key (UKEK). You have to load the USK into the radio using the **KVL** before the radio can be reprogrammed over the air.

**NOTE:** If you exit at this point, but stay on the current channel in the dispatch mode, the radio momentarily shows **REKEYED** or **DENIED** and sounds a tone indicating the status of the rekey request.

If the display shows **NO ACK** and the bad-key tone sounds, then the dispatcher has not acknowledged your request after the radio has tried five times to send it. The radio then returns to the display message in step 1, allowing you to retry the request.

If the request is accepted and the radio is successfully rekeyed, the display momentarily shows **REKEYED**.



If the display momentarily shows `DENIED` and the bad-key tone sounds, the request has been denied by the dispatcher, and the radio returns to the home display.

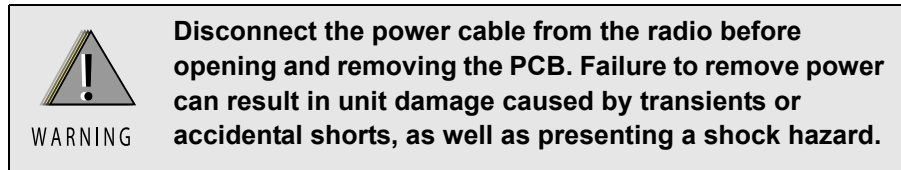
## Notes

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# Chapter 8 Disassembly/Reassembly Procedures

## 8.1 Introduction

This section details the procedures necessary to remove and replace the printed circuit boards in APX mobile radios. After troubleshooting and determining what needs to be replaced, disconnect the test equipment, the antenna cable, and the power cable.



Locate the exploded view of the radio in [Chapter 11. Exploded Views and Parts Lists](#). Keep it handy for reference as you disassemble and reassemble the radio.

When installing a new circuit board, all mounting screws should be started before any are torqued. This will help ensure proper alignment.

After installing a new board, perform a complete alignment procedure as outlined in [Chapter 6. Radio Alignment Procedures](#).

## 8.2 Replacement Procedures

After performing alignment procedures, always exit the SERVICE menu entirely (to the MAIN MENU) to properly save all changes. Failure to do so can result in an alignment or other failure.

### 8.2.1 Required Tools and Supplies

*Table 8-1. Required Tools and Supplies*

Tools and Supplies	Motorola Part Number	Supplier Part Number
8mm, 10mm, 15mm, 25mm and 28mm Hex Nut bits	–	–
Anti-static grounding kit	0180386A82	–
Chassis eliminator (Mid Power)	0180706J23	–
Chassis eliminator (High Power)	0180706J24	–
APX 2500/4500/4500Li Chassis Eliminator (Mid Power)	0104057J53	–
Flat-blade screwdriver	–	–
Long Nose Plier	–	–
Magnetic screwdriver set with bits	0180320B16	–
Mini-UHF to N-type adapter cable	3085651A01	–
Net Runner M8	–	–
Philips PH2 screw bit	–	–
Plastic scraping tool	6686119B01	–
Removal and insertion tool	6680163F01	–
Roto-Torq adjustable driver	–	RSX4043

Table 8-1. Required Tools and Supplies (Continued)

Tools and Supplies	Motorola Part Number	Supplier Part Number
Small, flat-blade screwdriver	–	–
Solder aid (black stick), HEXACON	–	MA-800G
Tohnichi 6RTD-A Analog Torque Driver (1-6 in-lbs)	–	–
Torx T10 and T20 bits	–	–
Tweezers	–	–
Wire Stripper	–	–
Chassis Opener	6685666D01	–
O2/O7 Knob Removal Tool	66012035001	–
Electromagnetic Interference (EMI) metallic shielding tape, or equivalent	–	–

## 8.2.2 O2 Control Head Disassembly

**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-1](#).

1. Lay the control head face down on a clean, flat surface being careful not to scratch or mar the display.
2. Carefully disconnect the Bluetooth flex [17].
3. Using a Torx T10 screwdriver, remove the eight PCB screws [16] as shown in [Figure 8-1](#).

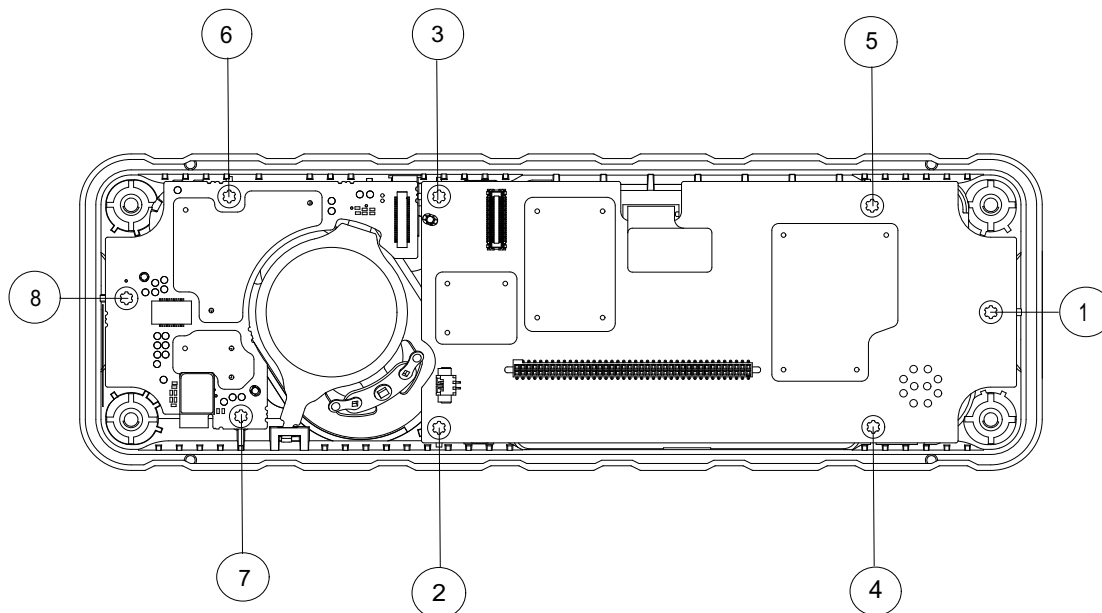


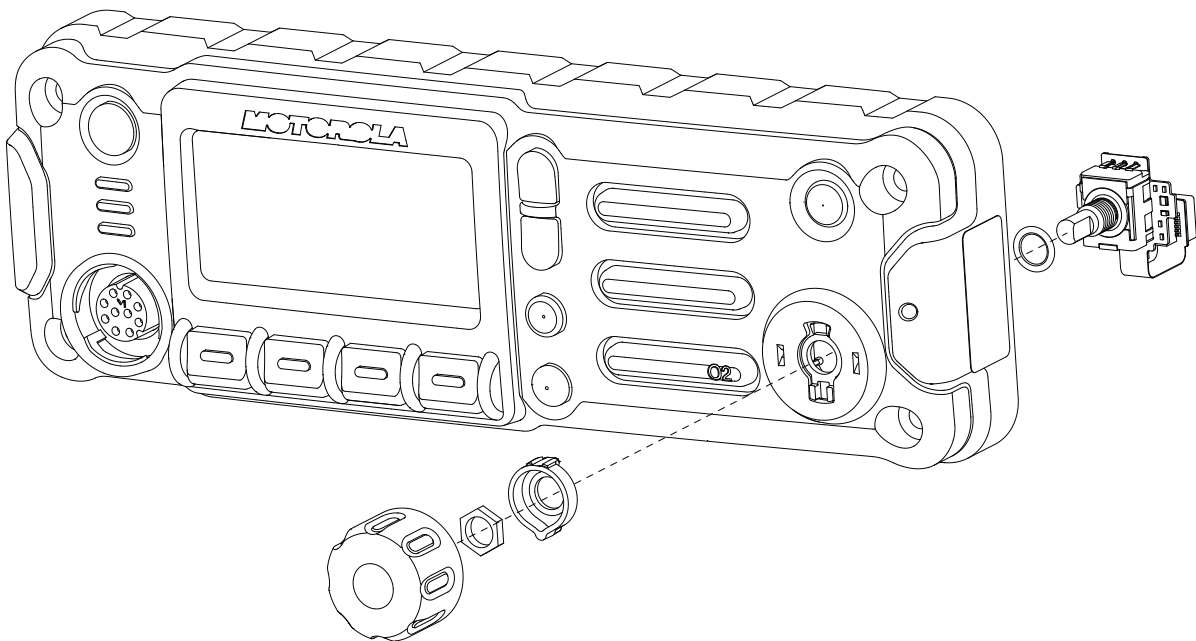
Figure 8-1. PCB Screw Sequence

4. Carefully disconnect the speaker [21] connector assembly and the LCD display module [13] and encoder [23] flex assemblies.

5. After all the connectors have been unplugged, gently lift the Bluetooth PCB [18] and the main PCB [15] up from the front housing assembly.

**NOTE:** Be careful not to damage the speaker connector or the LCD display module and encoder flex connectors when lifting up the main PCB and Bluetooth PCB.

6. Using the O2/O7 knob removal tool, remove the encoder knob [1] from the front housing assembly.
7. Using a hex nut driver, remove the encoder hex nut [2], followed by the detent spring [3], the encoder assembly [23], and o-ring [24] as shown in [Figure 8-2](#). Do not reuse the encoder hex nut.



*Figure 8-2. Removing The Encoder Assembly*

8. Using a Torx T10 screwdriver, remove the speaker retention screw [19], followed by the speaker retainer [20] and speaker [21] as shown in [Figure 8-3](#).

**NOTE:** The speaker is affixed to front housing using an adhesive [22]. Once the speaker is removed, both the speaker and speaker adhesive must be replaced.

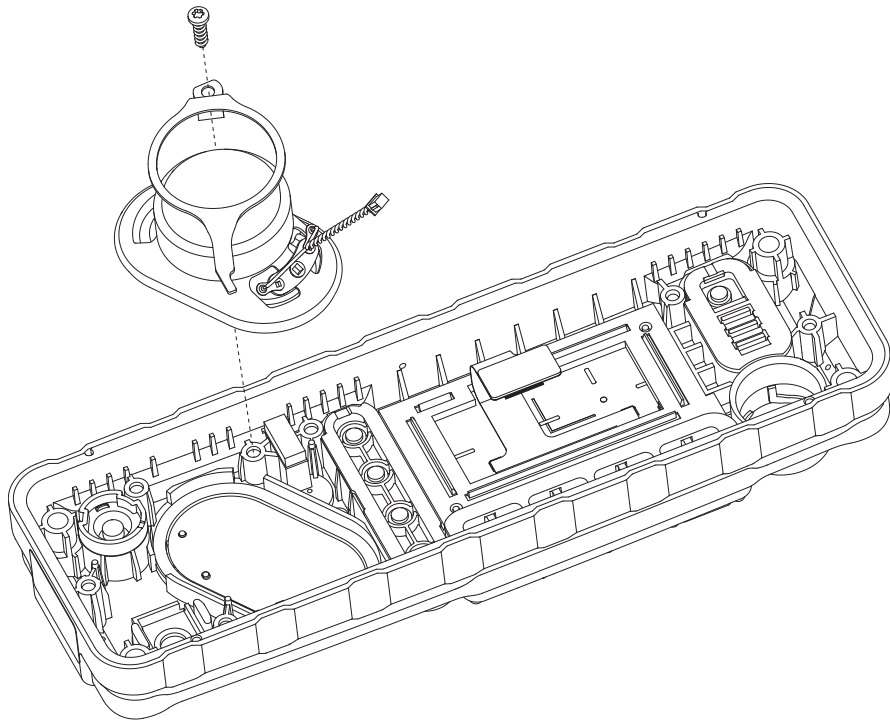


Figure 8-3. Speaker Retainer Alignment

### 8.2.3 O2 Control Head Reassembly

**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-1](#).

1. Apply a new speaker adhesive to the speaker recess on front housing.

**NOTE:** Ensure all traces of previous speaker adhesive are removed, by thoroughly cleaning the speaker recess with IPA.

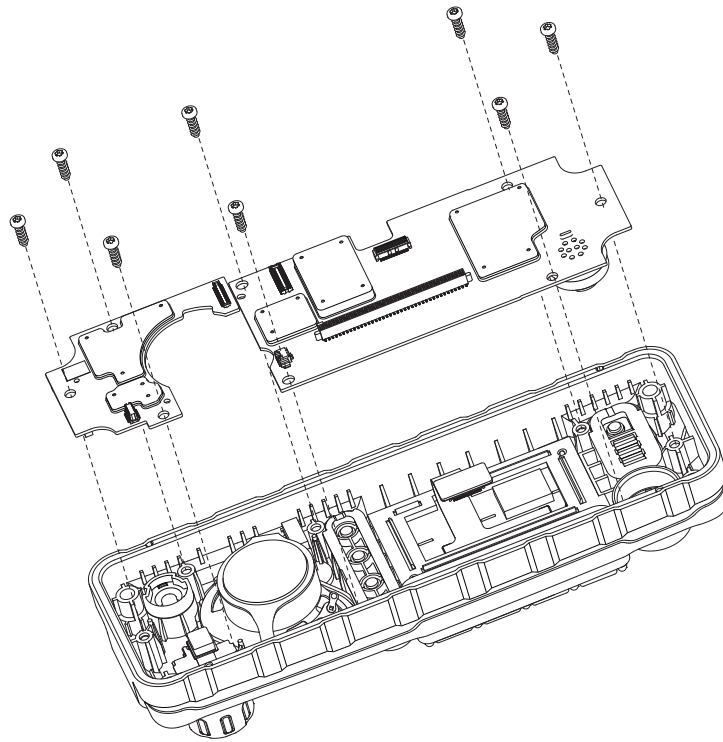
2. Based on the speaker wire orientation in [Figure 8-3](#), place a new speaker onto the adhesive.
3. Slot the speaker retainer into place and fasten the speaker retainer screw using a Torx T10 screwdriver (torque to 6 in.lbs.).
4. Insert the encoder assembly, o-ring, and detent spring into place and using a hex nut driver, fasten the new encoder hex nut (torque to 4.5 in.lbs.). See [Figure 8-2](#).
5. Press the knob firmly onto the shaft of the encoder assembly.

**NOTE:** After the initial click of the encoder actuation, continue applying pressure to slide the knob smoothly into place.

6. To reassemble the rest of the control head, ensure all the keypads are fully seated into front housing, and the LCD display module and encoder flex assemblies are not covered by either the main or Bluetooth PCB. Ensure that the GCAI seal [7] is properly placed on the GCAI connector.
7. Plug the speaker connector into the main PCB.

- Place the main PCB into front housing, seating the PCB surface on the screw bosses. Ensure that the screw bosses align with the corresponding holes in the PCB. See [Figure 8-4](#).

**NOTE:** Be careful not to pinch the speaker connector wires or the LCD display module flex assembly when pushing the board in place.



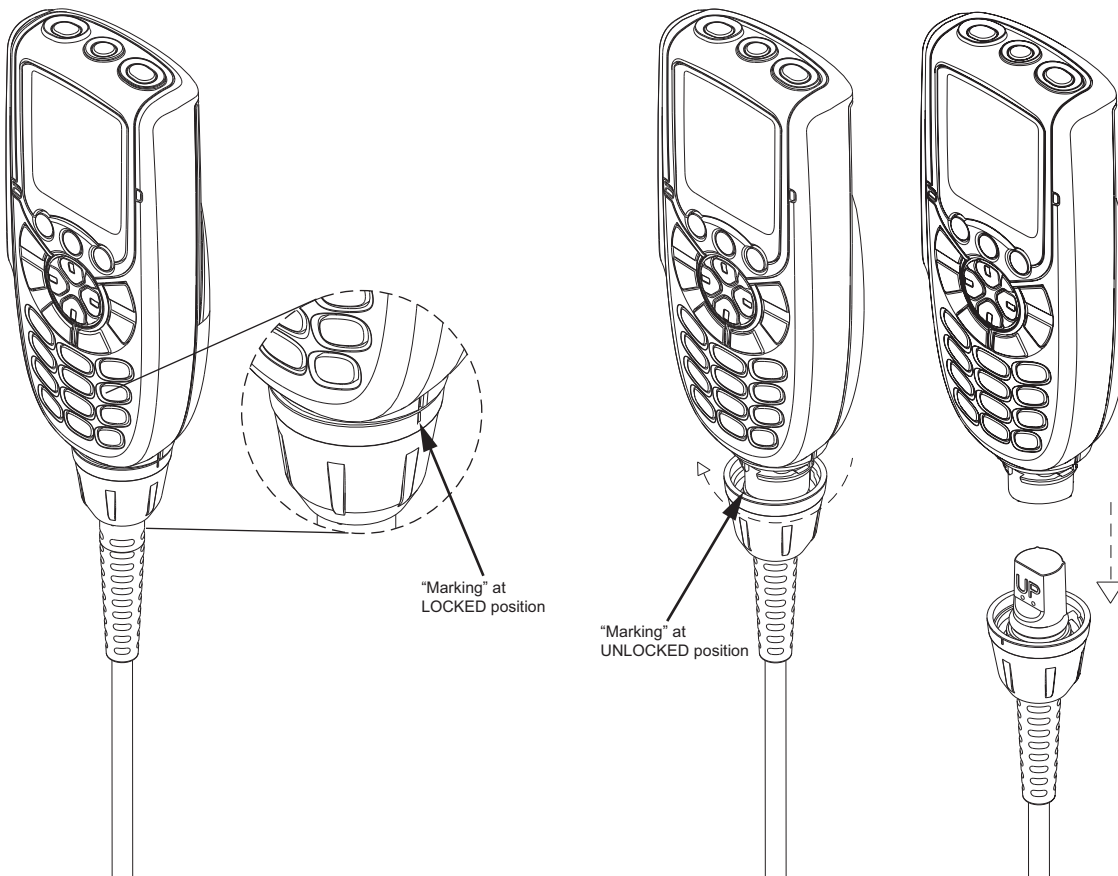
*Figure 8-4. PCB Screw Alignment*

- Using a Torx T10 screwdriver, fasten the first five PCB screws [16] following the sequence as shown in [Figure 8-1](#) (torque to 6 in. lbs.).
  - Plug in the LCD display module flex.
  - Plug the Bluetooth flex into the Bluetooth PCB, and insert the Bluetooth PCB into the front housing assembly. Ensure that the screw bosses align with the corresponding holes in the PCB.
- NOTE:** Be careful not to pinch the encoder flex assembly when pushing the board into place, and to align the board with the guide pin on the front housing assembly.
- Plug the Bluetooth flex and encoder flex assembly into the main PCB.
  - Using a Torx T10 screwdriver, fasten the remaining three PCB screws following the sequence as shown in [Figure 8-1](#) (torque to 6 in. lbs.).

## 8.2.4 O3 Control Head Disassembly

**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-2](#).

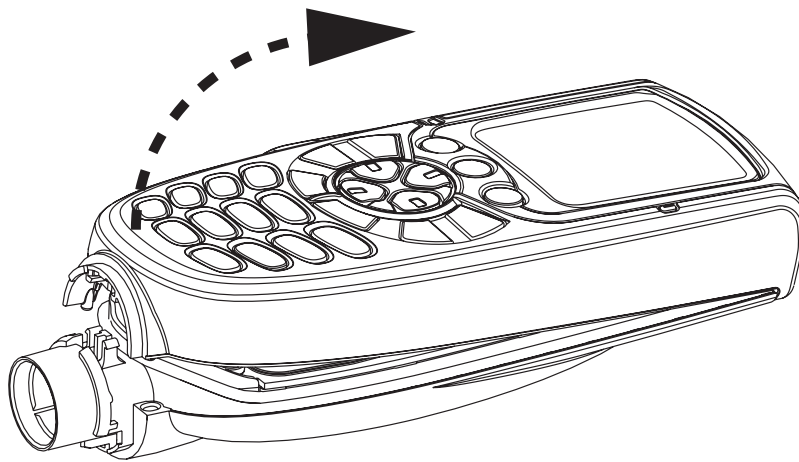
1. Hold the control head straight up, and twist the cable lock as shown in the figure.



*Figure 8-5. Cable Lock Detachment*

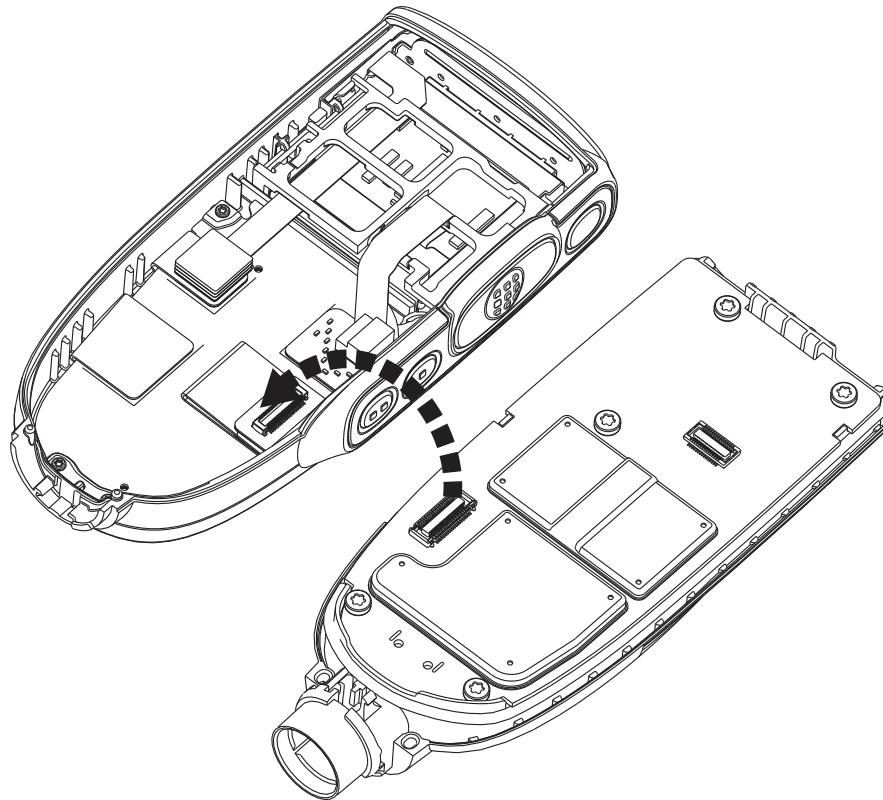
2. While holding the front housing, slowly pull the back housing from the cable insertion hole on the bottom until the 2 housings detached.





*Figure 8-6. Front Housing and Back Housing Detachment*

3. Disconnect the 40-pin connector and separate the front housing.



*Figure 8-7. Separate Front Housing and Back Housing*

- Using a Torx T-8 screwdriver, remove the 5 printed circuit board (PCB) screws.

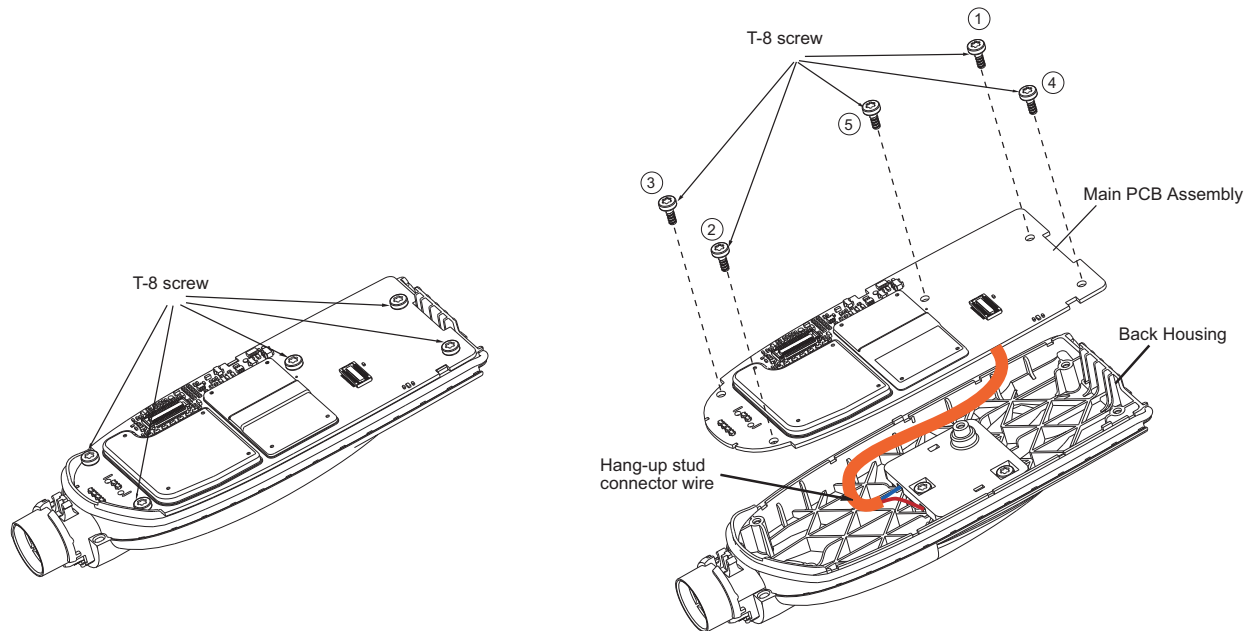


Figure 8-8. PCB Detachment

- Gently pull out the 2-pin connector which connect the back housing to the PCB.

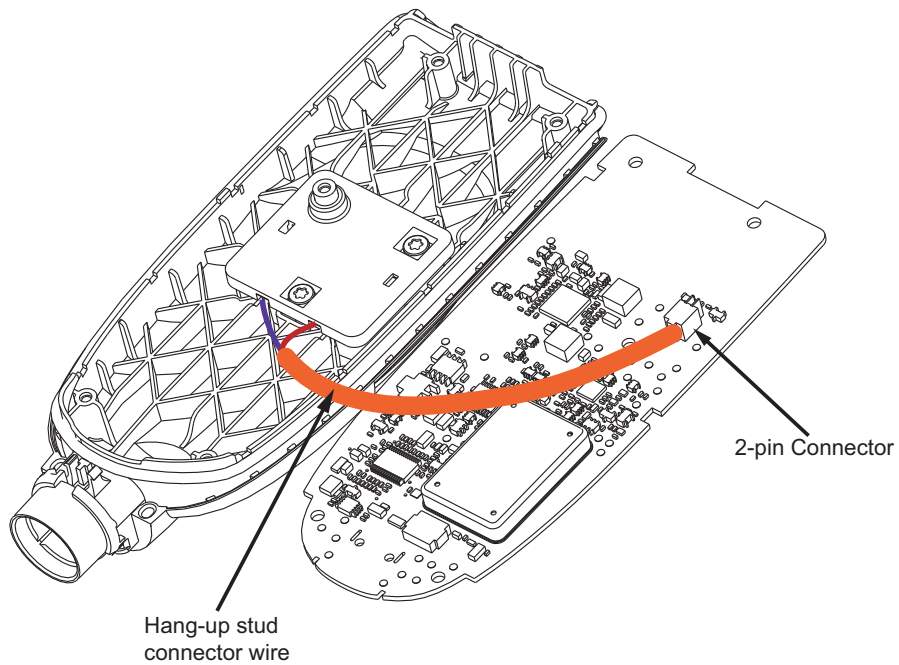


Figure 8-9. Disconnecting the 2-pin Connector

## 8.2.5 O3 Control Head Reassembly

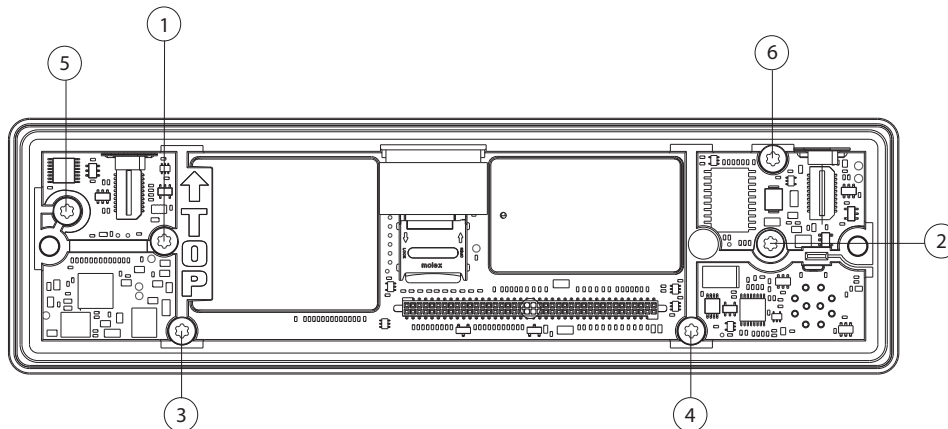
**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-2](#).

1. To reassemble, ensure that the wire from the back housing is connected to the PCB and the o-ring seal is installed properly.
2. Place the PCB on the back housing as shown in the picture.
3. Using a Torx T-8 screwdriver, fasten the 5 PCB screws following the sequence as shown in [Figure 8-4](#) (torqued to 4 in. lbs).
4. Plug in the 40-pin connector from Front Housing to the PCB. Make sure the connector is intact.
5. Put the Back Housing and Front Housing together.
6. Insert the coiled cable. Twist the cable lock to tighten the control head.

## 8.2.6 O5 Control Head Disassembly

**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-3](#).

1. Lay the control head face down on a clean, flat surface being careful not to scratch or mar the display.
2. Using a Torx T10 screwdriver, remove the 6 control head screws [15] as shown in [Figure 8-10](#).



*Figure 8-10. Control Head Screw Sequence*

3. Carefully separate the sealframe [14] from the front housing assembly [7].
4. Carefully disconnect the LCD module [11], volume flex assembly [8], and mode switch flex [18].
5. After all the connectors have been unplugged, gently lift up the control head board [13] from the front housing assembly [7].

**NOTE:** Be careful not to damage the LCD module, volume, and mode switch flex connector while lifting the control head board.

## 8.2.7 O5 Control Head Reassembly

**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-3](#).

1. To reassemble, ensure that all the keypads are fully seated into the front housing, and that all the flexes (LCD Display module, volume and mode) will not be covered by the PCB. Ensure that the MMP seal is properly placed on the MMP connector.
2. Place the PCB in the housing seating the PCB surface to the screw bosses. Ensure that the aligning boss protrudes through the PCB. See [Figure 8-38](#).

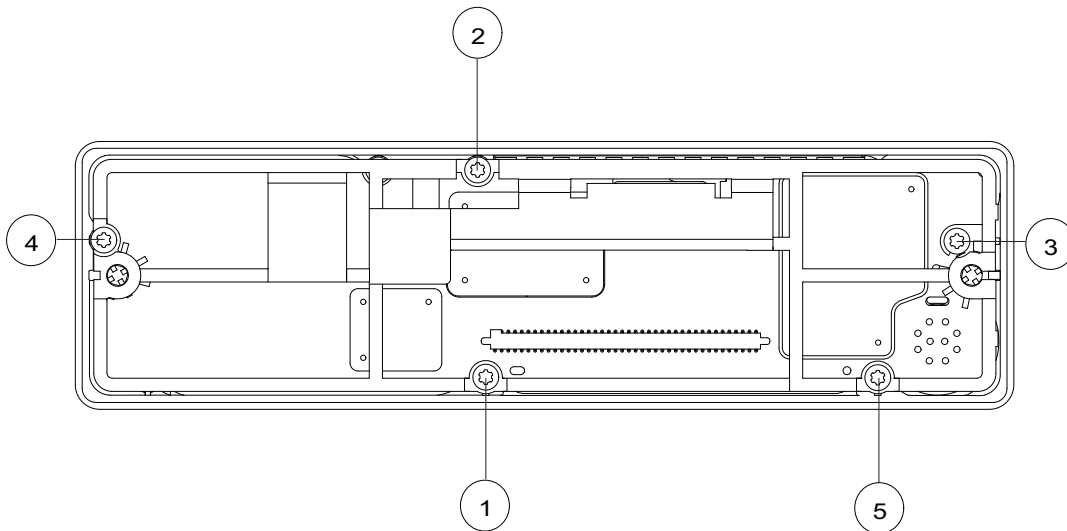
**NOTE:** Be careful not to pinch the flex for the LCD module and the volume switch flex assembly while pushing the board in place.

3. Plug in the three flexes.
4. Place the sealframe onto the PCB locating the "Top" is oriented correctly.
5. Using a Torx T10 screwdriver, fasten the 6 control head screws [15] following the sequence as shown in [Figure 8-10](#) (torque to 8 in. lbs).

## 8.2.8 O7 Control Head Disassembly

**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-4](#).

1. Lay the control head face down on a clean, flat surface being careful not to scratch or mar the display.
2. Using a Torx T10 screwdriver, remove the five main PCB retention screws [15] as shown in [Figure 8-11](#).



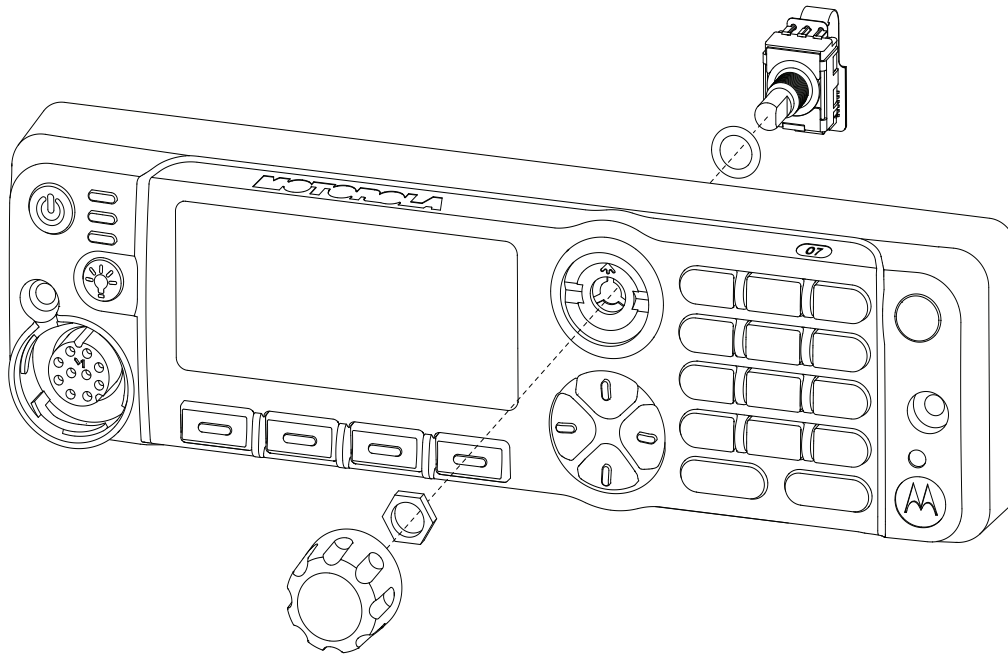
*Figure 8-11. Main PCB Retention Screw Sequence*

3. Carefully separate the main PCB retainer [14] from the front housing assembly.
4. Carefully disconnect the Bluetooth [16], encoder [7] and LCD display module [11] flex assemblies. Disassemble the encoder [7] flex connector, by pulling in a normal direction to the PCB, in avoiding damage to the flex and connector.
5. After all the connectors have been unplugged, gently lift the main PCB [13] up from the front housing assembly.

**NOTE:** Be careful not to damage the Bluetooth, encoder or LCD display module flex connectors when lifting up the main PCB.

6. Carefully disconnect the Bluetooth flex from the Bluetooth PCB [19].

7. Using the O2/O7 knob removal tool, remove the encoder knob [1] from the front housing assembly.
8. Using a hex nut driver, remove the encoder hex nut [2], followed by the encoder assembly [7], and o-ring [6] as shown in [Figure 8-12](#). Do not reuse the encoder hex nut.



*Figure 8-12. Removing the Encoder Assembly*

9. Using a Torx T10 screwdriver, remove the four Bluetooth PCB retention screws [17] as shown in [Figure 8-13](#).

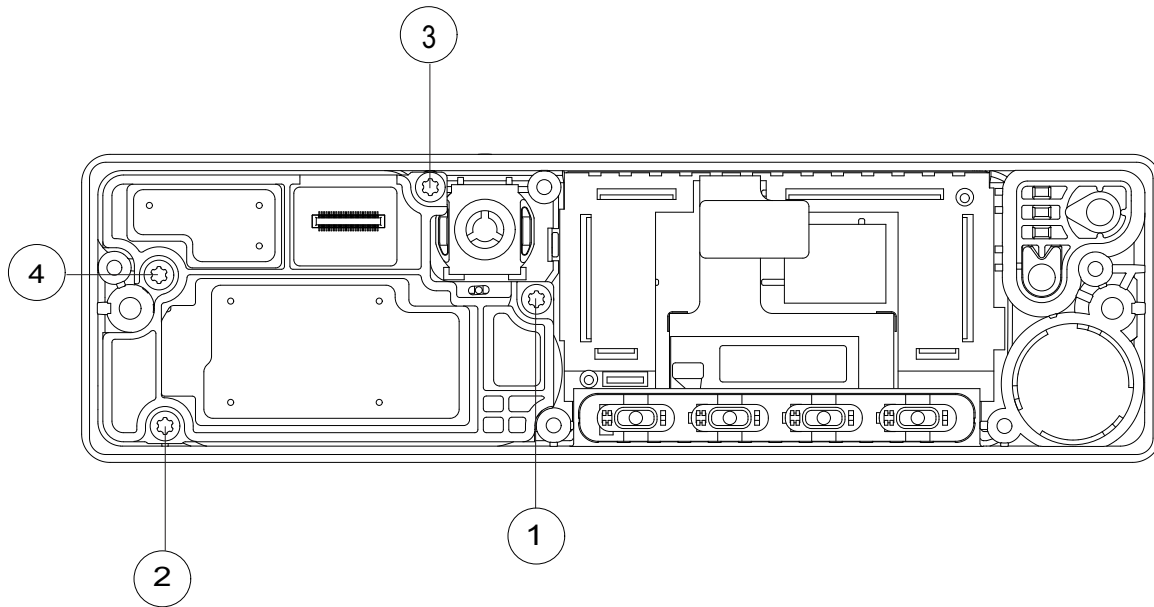


Figure 8-13. Bluetooth PCB Retention Screw Sequence

10. Carefully separate the Bluetooth PCB retainer [18] from the front housing assembly.
11. Gently lift the Bluetooth PCB up from the front housing assembly.

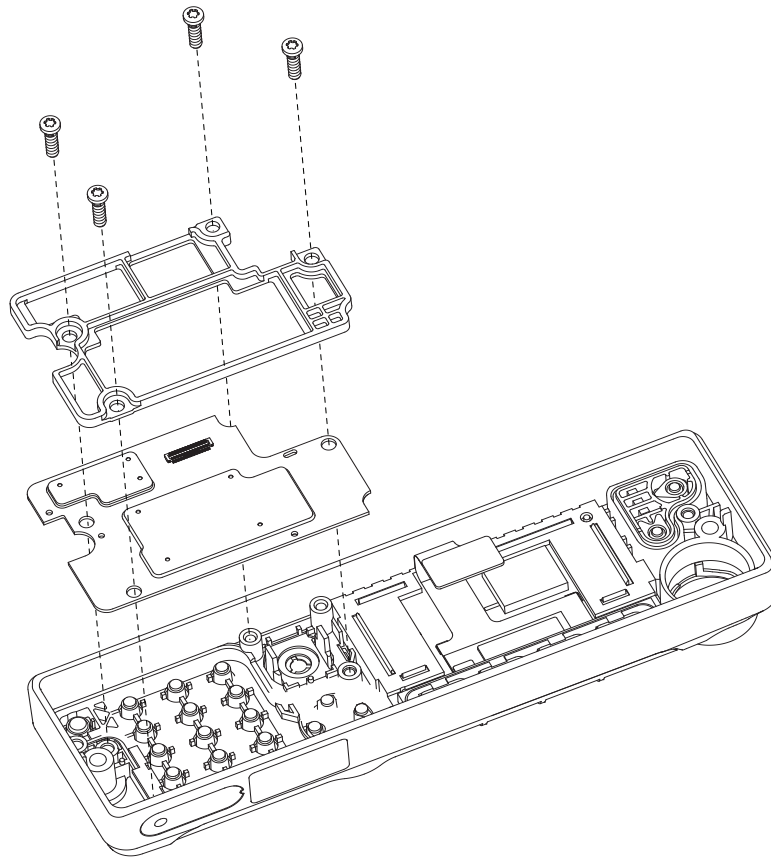
**NOTE:** Be careful not to damage the encoder flex connector when lifting up the Bluetooth PCB.

### 8.2.9 O7 Control Head Reassembly

**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-4](#).

1. To reassemble, ensure that all the keypads are fully seated into the front housing, and that the LCD display module and encoder flex assemblies will not be covered by either the main or Bluetooth PCB. Ensure that the GCAI seal [5] is properly placed on the GCAI connector.
2. Place the Bluetooth PCB and Bluetooth PCB retainer in the front housing, seating the PCB surface on the screw bosses. Ensure that the screw bosses align with the corresponding holes in the PCB and retainer. See [Figure 8-14](#).

**NOTE:** Be careful not to pinch the flex for the encoder flex assembly when pushing the board and retainer in place.



*Figure 8-14. Bluetooth PCB Retention Screw Alignment*

3. Using a Torx T10 screwdriver, fasten the four Bluetooth PCB retention screws following the sequence as shown in [Figure 8-13](#) (torque to 6 in. lbs.).
4. Plug in the Bluetooth flex.
5. Insert the encoder assembly and o-ring into place and using a hex nut driver, fasten the new encoder hex nut (torque to 4.5 in. lbs.). See [Figure 8-12](#).
6. Press the knob firmly onto the shaft of the encoder assembly.

**NOTE:** After the initial click of the encoder actuation, continue applying pressure to slide the knob smoothly into place.

7. Place the main PCB in the front housing, seating the PCB surface on the screw bosses.
8. Plug in the Bluetooth, encoder, and LCD display module flexes.
9. Place the main PCB retainer in the front housing, and it all the way to the left to ensure the screw bosses align with the corresponding holes in PCB and retainer. See [Figure 8-15](#).

**NOTE:** Be careful not to pinch the flexes for the Bluetooth, encoder or LCD display module flex assemblies when pushing the board and retainer in place.

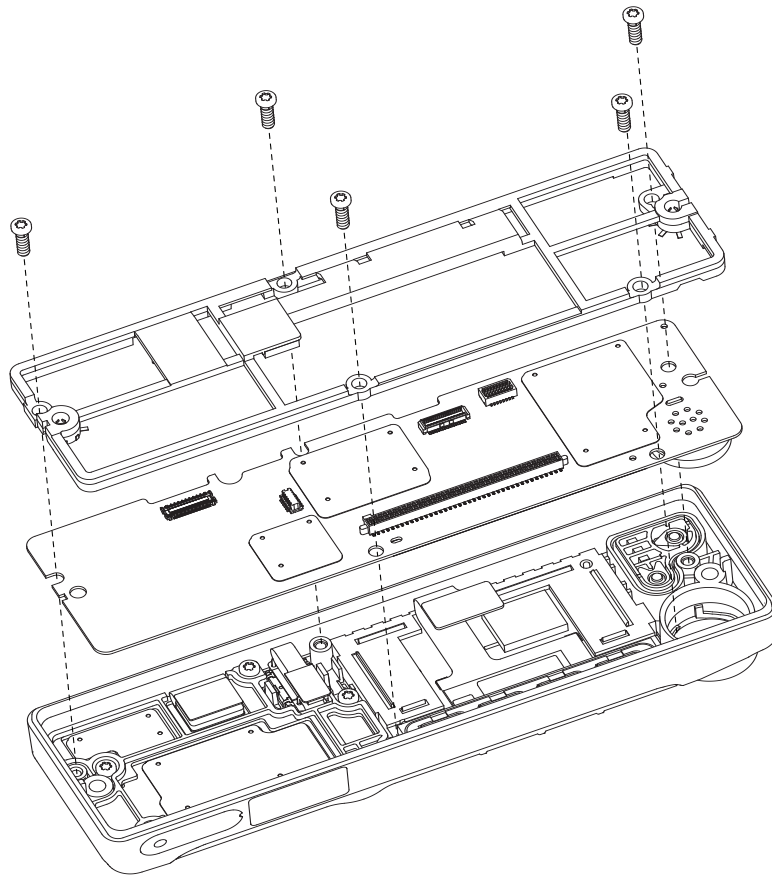


Figure 8-15. Main PCB Retention Screw Alignment

10. Using a Torx T10 screwdriver, fasten the five PCB screws following the sequence as shown in [Figure 8-11](#) (torque to 6 in. lbs.).

### 8.2.10 O9 Control Head Disassembly

**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-5](#).

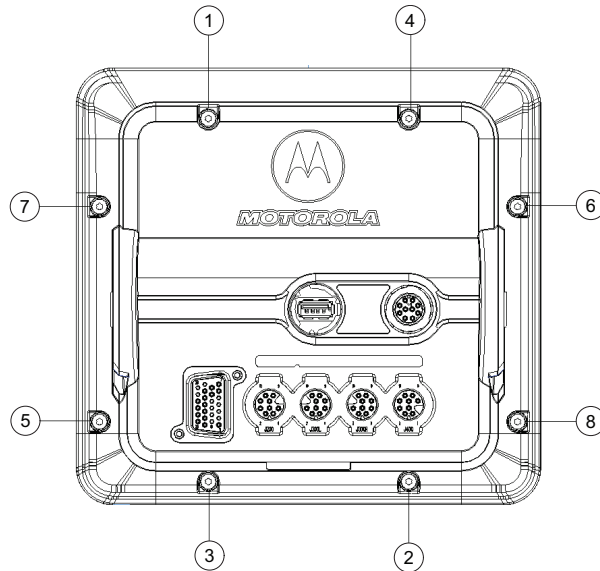
1. Lay the control head faces up on a clean and flat surface, pull out the top pursuit knob [1] using long nose plier with cloth at the clamp area to avoid damaging the pursuit knob. The volume knob [6] and frequency knob [8] should be removed using a small, flat-blade screwdriver or chassis opener. Ensure the three knobs are still with the D-clips inserts inside. Ensure the torque enhancers [7] for volume and frequency knobs are in the knobs.

**NOTE:** Only disassemble the top pursuit knob if plan to replace top pursuit switch flex, top pursuit knob, top pursuit light bar keypad, top pursuit siren keypad or top keypad PCB kit. Only disassemble the volume knob and frequency knob if plan to replace volume flex, frequency flex, volume knob and frequency knob.

2. Remove all the three nuts [2] with 8mm Hex nut bits and then remove the washers [3] as well.
3. Then, remove the pursuit spring [4] from the top pursuit knob area.

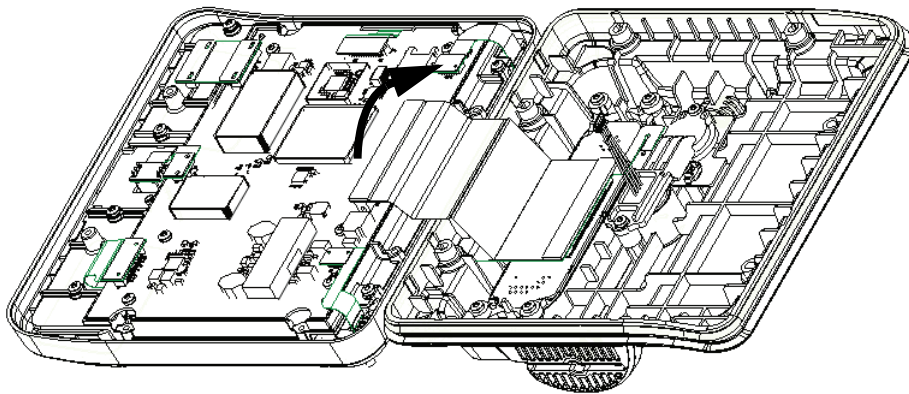


- Using a Torx T10 screwdriver, remove the 8 screw assemblies [44] as shown in [Figure 8-16](#).



*Figure 8-16. Control Head Screw Sequence*

- Carefully separate the back housing assembly from the front housing assembly.
- Carefully disconnect the main flex assembly [32] from the front housing assembly.



*Figure 8-17. Separated Front and Back Housing Assemblies*

7. Carefully disconnect the remaining seven flex connectors on the front housing assembly. Remove top pursuit switch flex [12] from front housing [9].

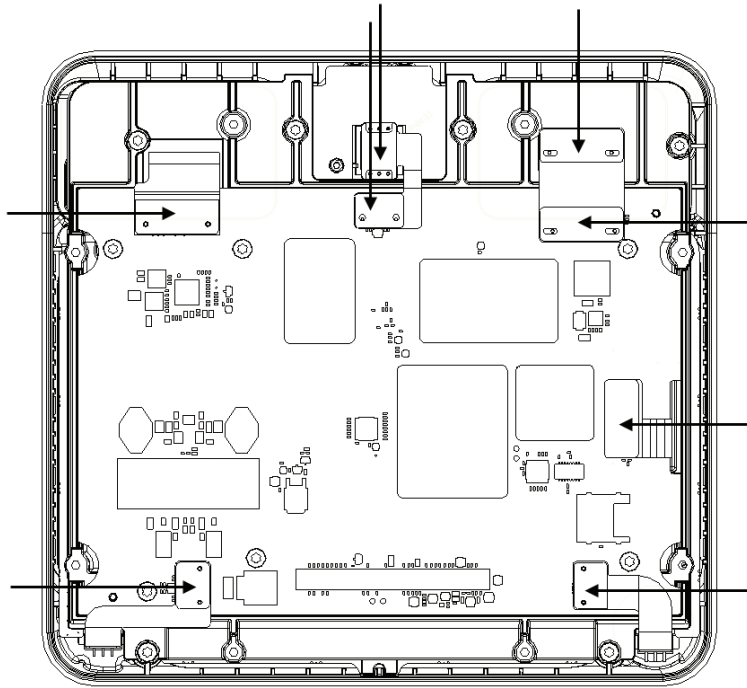
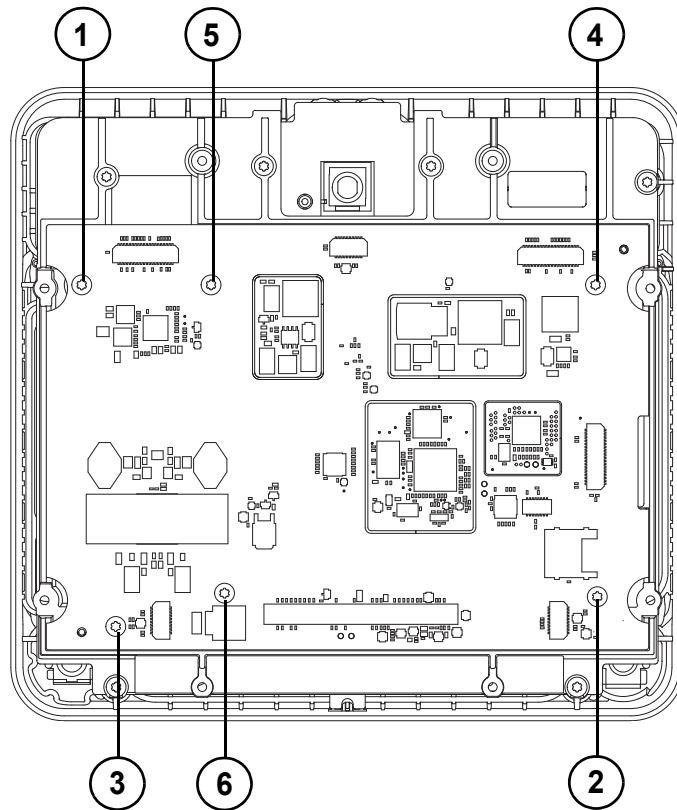


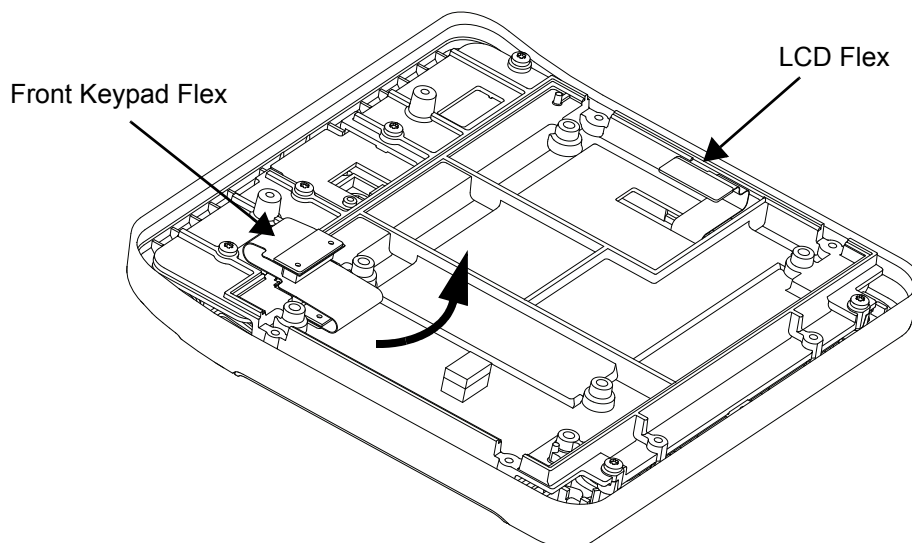
Figure 8-18. Location of Flex Connectors

- After all flex connectors have been disconnected, remove the 6 self tapping screws [14] as shown in [Figure 8-19](#) using a Torx T10 screwdriver, and then gently lift up the main PCB [31] from the front housing assembly.



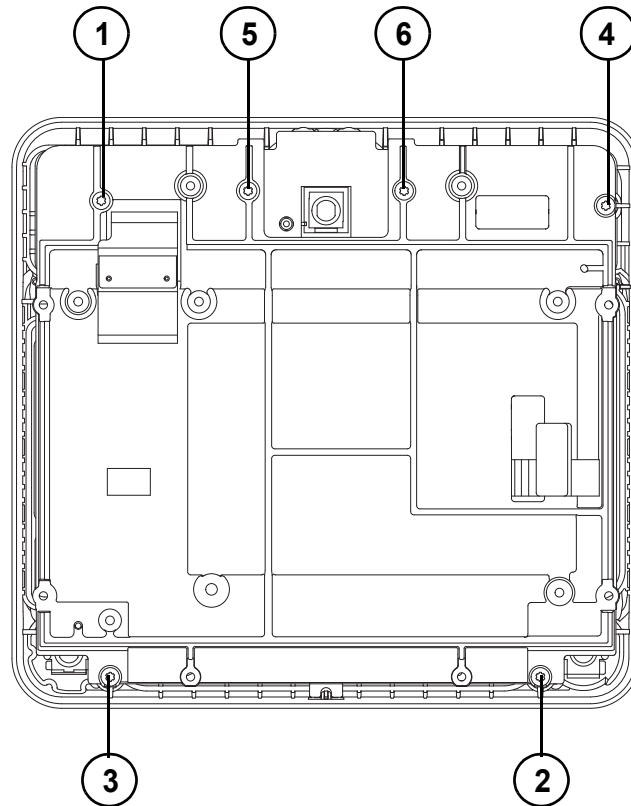
*Figure 8-19. Self Tapping Screws Sequence*

- Carefully disconnect the front keypad flex connector [28] which connected to front keypad PCB [26] as shown in [Figure 8-20](#). Peel off the flex from the chassis [29] and scrap the front keypad flex [28].



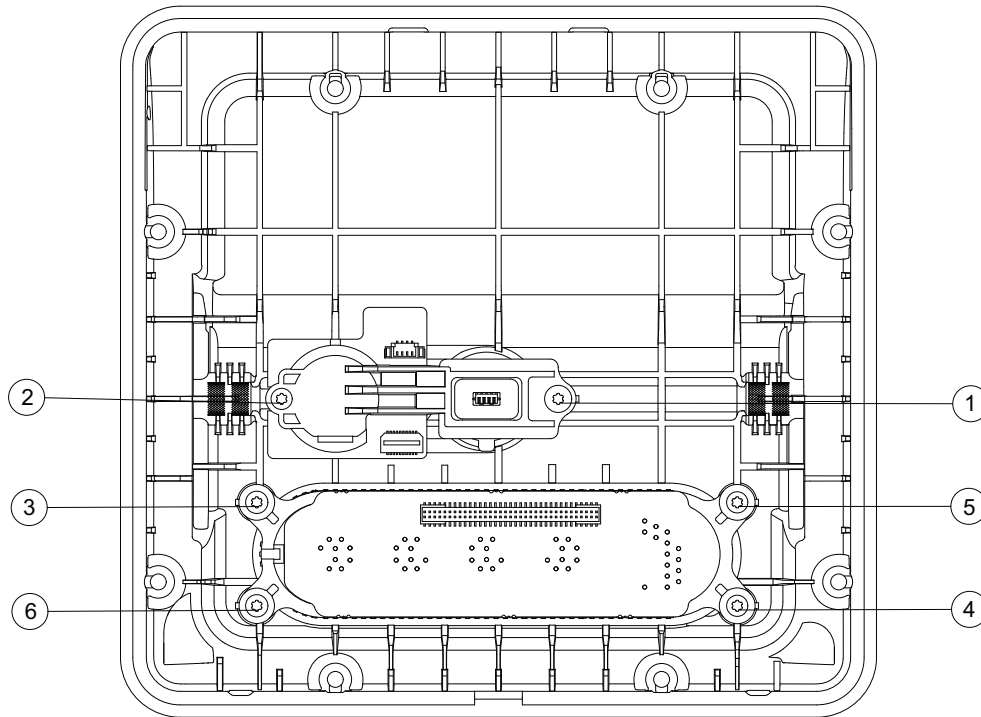
*Figure 8-20. Disconnect Frequency Flex*

10. Remove the 6 self tapping screws [14] as shown in [Figure 8-12](#) using a Torx T10 screwdriver.



*Figure 8-21. Self Tapping Screws Sequence*

11. Remove the chassis [29] from the front housing assembly. Carefully ensure the LCD flex which go thru the chassis is not damaged when disassembly.
12. Carefully remove top keypad PCB [27] and LCD display [15] from front housing [9]. Avoid leaving any finger marks or foreign material on the LCD display and lens on the front housing. Next, remove front keypad PCB [26].
13. Remove the pursuit light bar keypad [17] and top pursuit siren keypad [18] with the retainers [20,21]. Then, remove all the four keypads at front housing [22, 23, 24, 25] carefully to avoid tearing the web due to high engagement force of the mushroom seal.
14. Place the back housing assembly on a clean, flat surface. Disassemble the main O-ring [33] around the back housing [40] from the bottom to top.
15. Carefully disconnect the main flex assembly [32] from the back housing assembly.
16. Disassemble the USB wire connector of the USB overmold [37] from the GCAI PCB [35].
17. Remove the 6 self tapping screws [14] as shown in [Figure 8-13](#) using a Torx T10 screwdriver, and then gently lift up the CHUC PCB kit [38] from the back housing assembly. Take note that there is a CHUC seal [39] on the kit.



*Figure 8-22. Self Tapping Screws Sequence*

18. Then, remove USB/GCAI retainer [34], follow by GCAI PCB kit [35] with GCAI seal [36] and USB overmold [37].

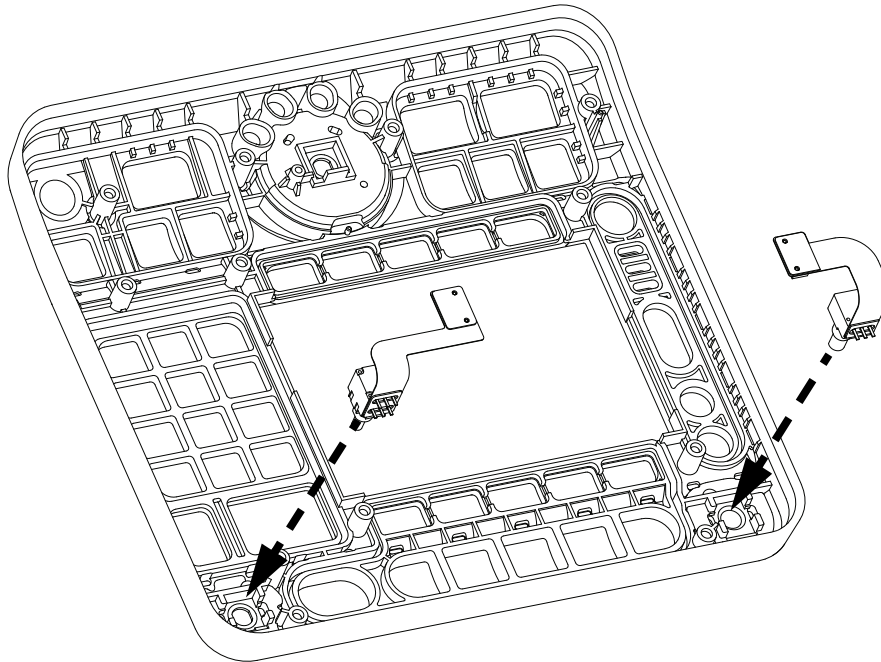
**NOTE:**

- Be careful not to leave any foreign material/finger marks/others cosmetic defects on the lens and LCD module.
- All flexes must be handled with care to avoid tearing/connectivity issue upon reuse (except the front keypad flex which needs to be replaced after each disassembly).
- Upon removal, inspect keypad on web areas. Any keypad web torn must be scraped and replaced.

## 8.2.11 O9 Control Head Reassembly

**NOTE:** Bracketed numbers are identical to item numbers shown in [Figure 11-5](#).

1. To reassemble, insert the black color frequency flex's indicator [10] on the left side and white color volume flex's indicators on the right side [11] by pressing into the cavity on the front housing [9] as shown in [Figure 8-23](#).



*Figure 8-23. Assemble Flexes Into Front Housing*

2. Flip the front housing [9] with flexes, place washers [3] and nuts [2] on the flexes' indicator. Tighten the nuts with 8mm hex nut bit at 8 in. lbs.
3. Flip back the housing and assemble all the four keypads, which included menu, brightness control keypad, DEK silicone keypad, programmable control keypad and alpha numeric silicone keypad at front housing [22, 23, 24, 25] by pressing all the mushroom ribs until it is flush to all the guided walls as shown in [Figure 8-15](#). Else, keypad sealing & tactility might be affected.
4. Pre-assemble top pursuit light bar keypad [17] and top pursuit siren keypad [18] to the retainers [20, 21]. Ensure the keypads are properly assembled to the retainers. Next, assemble the pre assembled keypads and retainers into the front housing by pushing the parts until the retainers flushed to the housing wall. Also, assemble the indicator light guide [19] as shown in [Figure 8-24](#).

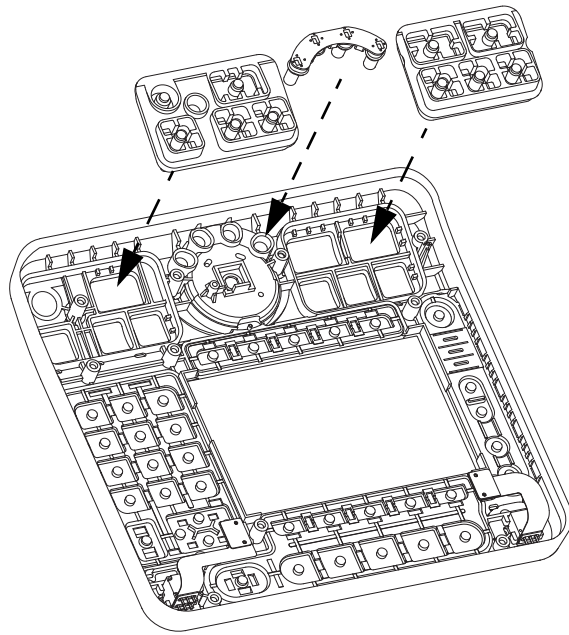


Figure 8-24. Assemble Keypads and Indicator Light Guide

5. Place the front keypad PCB [26] by aligning to the alignment pins circled, as shown in [Figure 8-26](#).
6. After that, insert LCD display [15] into the rubber boot [13] and carefully place them into the lens areas as showed in [Figure 8-25](#). Make sure the conductive pad [16] at the back of LCD display [15] is aligned to legends. There are orientation proof features at the housing wall for LCD display as boxed in [Figure 8-26](#) (Ensure no finger marks and no foreign material such as fibre on the lens and LCD display area).

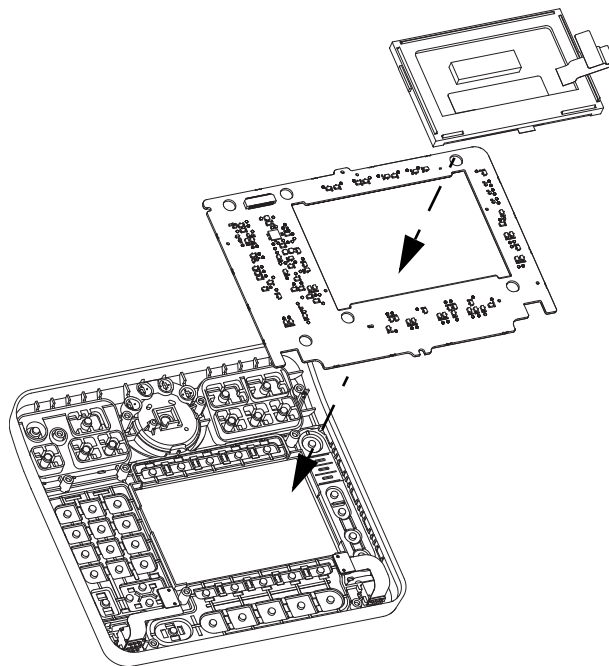


Figure 8-25. Assemble Front Keypad PCB and LCD Display

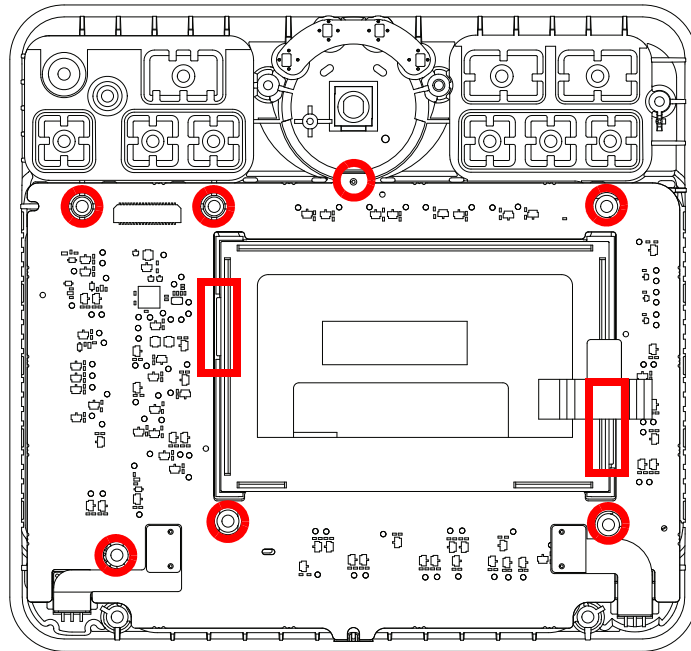


Figure 8-26. Orientation Proof Features at the Housing

7. Place the Top keypad PCB [27] by aligning to the alignment pins circled, as shown in Figure 8-27.

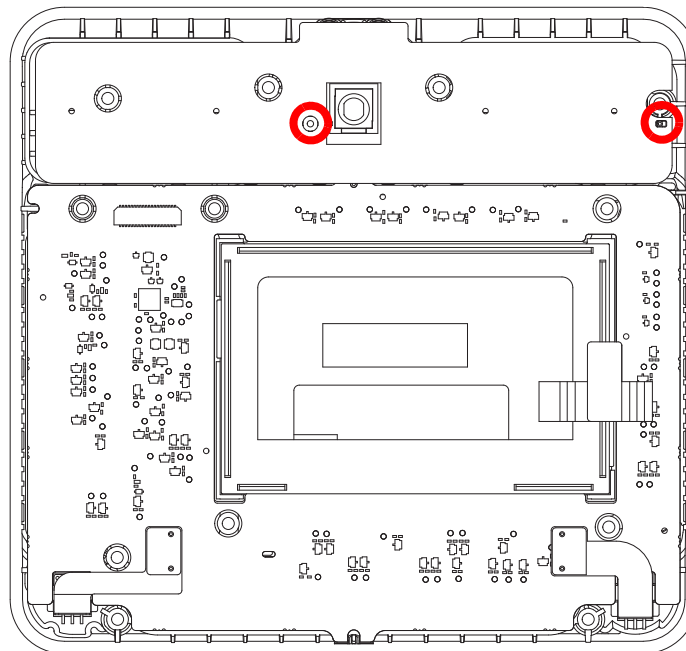

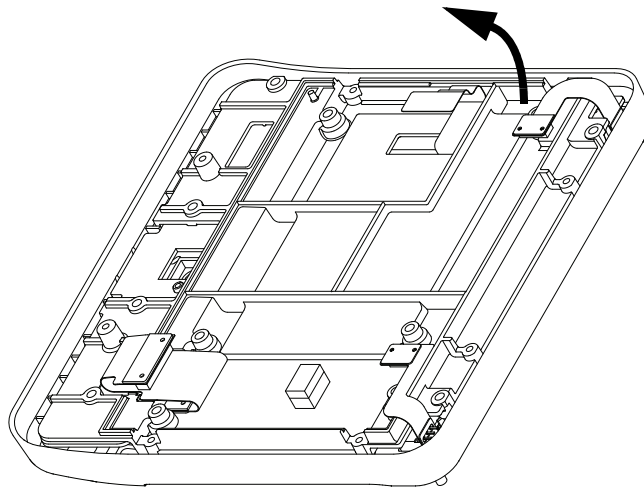


Figure 8-27. Location of Alignment Pins




- Place the chassis [29] on top of boards. Make sure that the frequency flex [10] and volume flex [11] are visible and not crushed by the chassis [29]. Fish through the LCD display's flex through the chassis as shown in [Figure 8-28](#). Assemble six T10 self tapping screws through the screw boss and torque down 8 in. lbs by following the sequence as shown in [Figure 8-21](#).

	New self tapping screws [14] must be used. Make sure screw boss on front housing [9] and chassis [29] in good condition. Front housing [9] or chassis [29] must be replaced if it is reworked for more than 10 times.
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*Figure 8-28. Align LCD Flex and Front Keypad Flex*

- After that, connect the front keypad flex [28] to front keypad PCB [26]. Take note of the printings on the flex that indicates which end of the connector is assembled to. Remove the liner of the front keypad flex, then fold and align the flex to chassis aligning feature before pressing the flex to the chassis as shown in [Figure 8-28](#).
- Assemble the main PCB [31] to the front housing assembly. Take note of the two guiding pins circled in RED as shown in [Figure 8-29](#). Make sure all the flexes are visible and not under the main PCB before placing the main PCB. Fasten the 6 self tapping screws [14] as shown in [Figure 8-19](#) using a Torx T10 screwdriver with 8 in. lbs.

	New self tapping screws [14] must be used. Make sure screw boss on front housing [9] and chassis [29] in good condition. Front housing [9] or chassis [29] must be replaced if it is reworked for more than 10 times.
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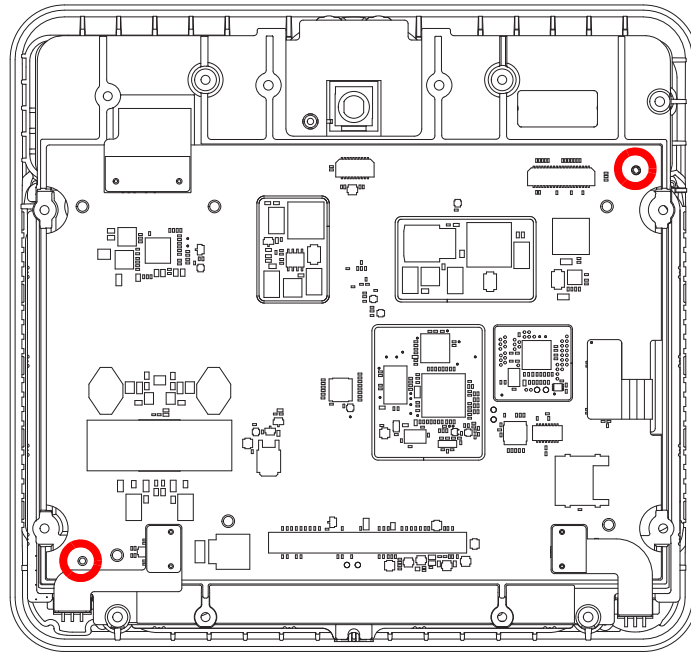


Figure 8-29. Location of Guiding Pins

11. Place the top pursuit switch flex [12] into front housing [9]. After that, lay the front housing assembly faces up on a clean and flat surface. Make sure the gore port seal [5] on the front housing [9] is present. Place the pursuit spring [4], washer [3] and follow by nut. Fasten the nut with 8mm hex nut bit at 8 in. lbs and then assemble the top pursuit knob [1].
12. Connect top keypad flex assembly [30] to top keypad PCB kit [27] and main PCB kit [31]. Take note of the printings on the flex that indicates which end of the connector is assembled to. After that, connect all the remaining flexes' connector to main PCB [31] as shown in [Figure 8-18](#).
13. Place the back housing [40] on a clean, flat surface. Make sure the GCAI seal [36] is assembled on the GCAI PCB kit [35] and then assemble the PCB to the back housing [40] by aligning to the housing's two guiding bosses. Flip the back housing [40] and inspect for pinched GCAI seal [36].
14. Before assemble the USB overmold [37] to back housing [40], ensure the o-ring on it is present. Take note of the recess on the housing. The protrusion of the USB overmold [37] should align to the recess and pressed down. Follow by assemble USB/GCAI retainer [34] and after that assemble the USB wire connector of the USB overmold [37] to the GCAI PCB kit [35].
15. Place the CHUC seal [39] around the CHUC PCB kit [38], then assemble the PCB into back housing [40]. Fasten 6 self tapping screws [14] following sequence shown in [Figure 8-22](#) using a Torx T10 screwdriver with 8 in. lbs.



Caution

New self tapping screws [14] must be used. Make sure screw boss on back housing [40] in good condition. Back housing [40] must be replaced if it is reworked for more than 10 times.

16. Assemble the main O-ring [33] around the back housing [40] from the bottom to top. Ensure the main O-ring is well seated in the housing's groove.
17. Carefully connect the main flex assembly [32] to the GCAI PCB kit [35] and CHUC PCB kit [38]. To avoid damaging the connectors, take out the back housing [40] and hold vertically to align the main flex connector to the CHUC Connector.
18. After that, carefully assemble the other end of the main flex connector to the main PCB [31]. Bend the main flex assembly [32] and close the back housing assembly and front housing assembly together.
19. Prepare 8 new screw assemblies [44] and ensure that the washer and green o-ring is in place. Using a Torx T10 screwdriver, fasten the 8 screws [44] with 10 in. lbs as shown in [Figure 8-16](#).
20. Assemble the torque enhancer [7] for the volume knob [6] and frequency knob [8]. Then, ensure all the knobs are with D-clips inserts. Finally, assemble all the knobs to the front housing.

**Caution**

New screw assemblies [44] must be used. Make sure screw boss on back housing [40] in good condition. Back housing [40] must be replaced if it is reworked for more than 10 times. Wrong assembly could damage water sealing.

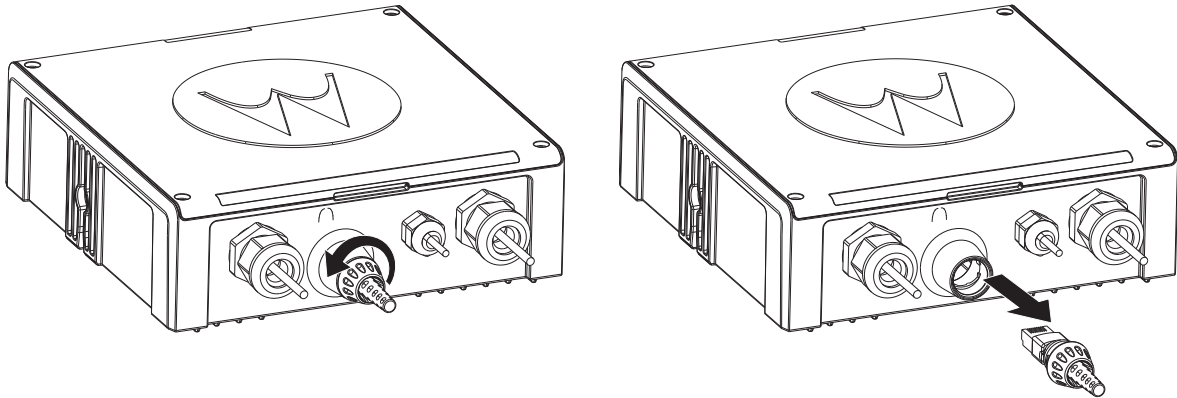
**NOTE:**

- Be careful not to leave any foreign material/finger marks/others cosmetic defects on the lens and LCD module.
- All flexes must be handled with care to avoid tearing/connectivity issue upon reuse (except the front keypad flex which needs to be replaced after each disassembly).
- Any keypad web torn must be scraped and replaced.

### 8.2.12 O9 Universal Relay Controller Disassembly

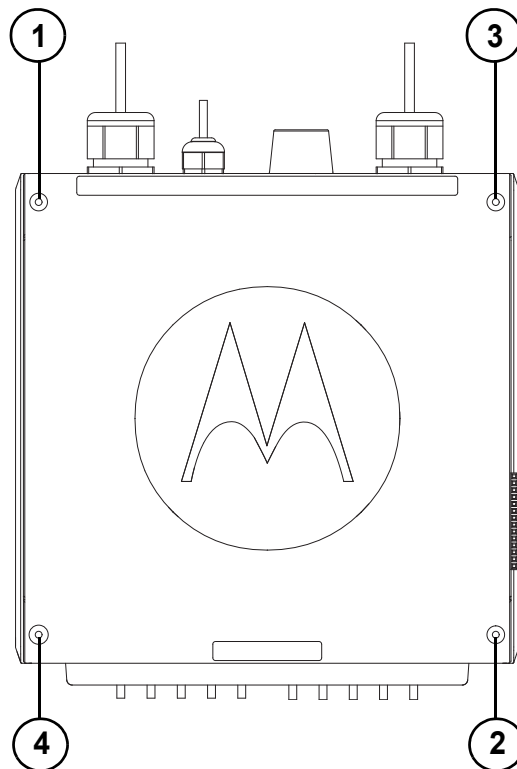
**NOTE:** The Universal Relay Controller (URC) is an accessory that can be ordered for O9 Control Head. Bracketed numbers are identical to item numbers shown in [Figure 11-18](#).

1. Remove O9 to URC cable (P/N: 3064153H02) by twisting the cable lock counter-clockwise (quarter turn) as shown in the [Figure 8-30](#).



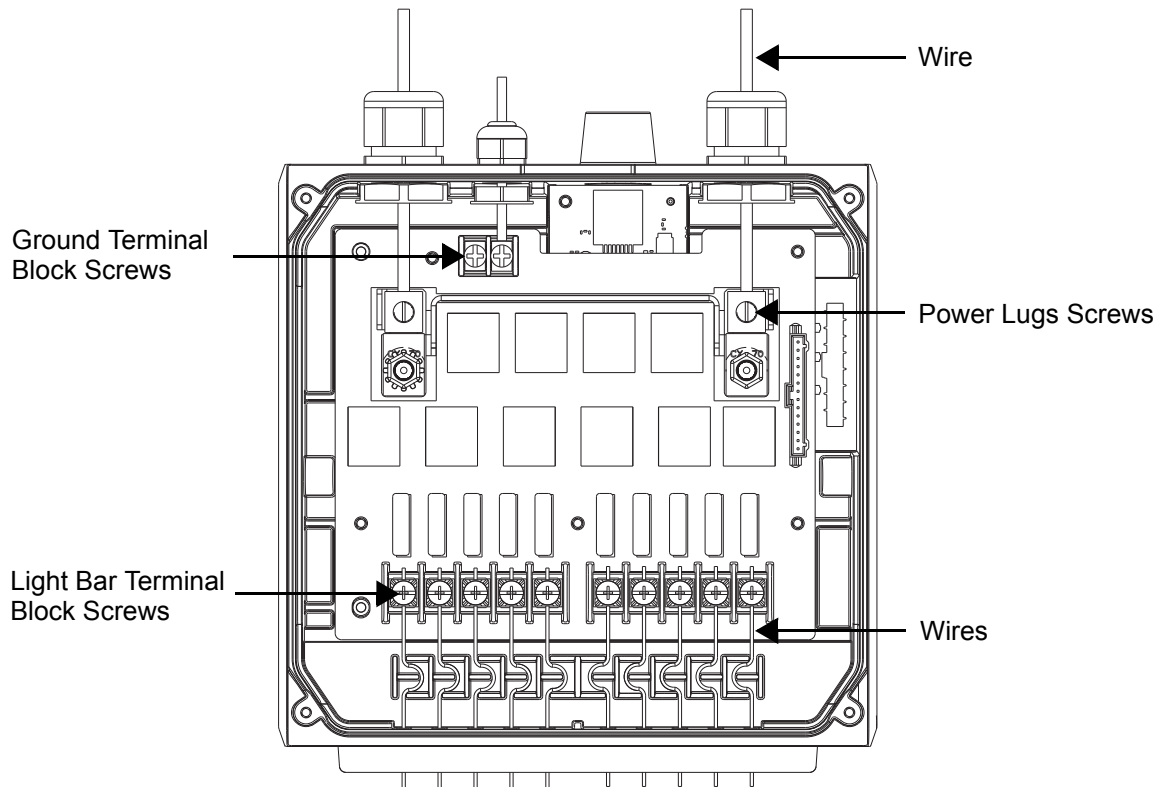
*Figure 8-30. Cable Lock Detachment*

2. Using a Philip screw bit size PH2 screwdriver, remove the four Universal Relay Controller screws [1] as shown in [Figure 8-31](#).



*Figure 8-31. Universal Relay Controller Screw Sequence*

3. Carefully separate the top housing [2] from the chassis [20].
4. Unscrew all the light bar terminal block screws, ground terminal block screws and power lugs screws to remove the wires.



*Figure 8-32. Universal Relay Controller Wire Connections*

5. Remove the wires which are attached to the light bar terminal block.
6. Remove the two screws on the retainer to remove the light bar gasket retainer [22] and light bar gasket [21] with a screwdriver with Philips PH2 screw bit.
7. Open the cap nut of the power and ground cable glands [12, 16] to remove the wires.
8. Carefully disconnect the wire harness from the controller board with the other end of the wire harness still connected to the relay board. Remove all the five machined torx screws [4] on the relay board and gently lift up the relay board from the Universal Relay Controller chassis [20].
9. Lay the relay board [9] on a clean and flat surface and disconnect the wire harness.
10. Using a Torx T10 screw driver, remove the two machined torx screws [4] on the controller board and gently lift up the controller board from the chassis [20].
11. Use a 25mm and 15mm hex nut bits to disassemble the power and ground cable glands [12, 16].
12. Remove the port seal [19] at the chassis [20] with a tweezer.

### 8.2.13 O9 Universal Relay Controller Reassembly

1. Place the two light bar gasket into the chassis [20] recess and then place the light bar gasket retainer [22] onto the chassis [20] on top of the two light bar gaskets [21].
2. Using a Philips PH2 screwdriver, fasten the 2 philips screws [1] through screw boss on gasket retainer [22] (torqued to 5 in. lbs).
3. Assemble the port seal [19] to the chassis [20] recess using a plastic tweezer. Press it to ensure the port seal is sealed properly on the housing.
4. Insert gasket into cable gland body. Pre-tighten the cable gland counter nut and cable gland body on the chassis [20]. Repeat this action for both the power and ground cable glands [12, 16]. Fasten the power cable gland to 38 in. lbs with a 25mm hex nut bit. Meanwhile, torque the ground cable gland at 13 in. lbs with a 15mm hex nut bit. Place the cap nuts and turn a few turns. Make sure the neoprene seal in cable gland is present. Refer to [Figure 8-33](#) for cable gland assembly with gasket.

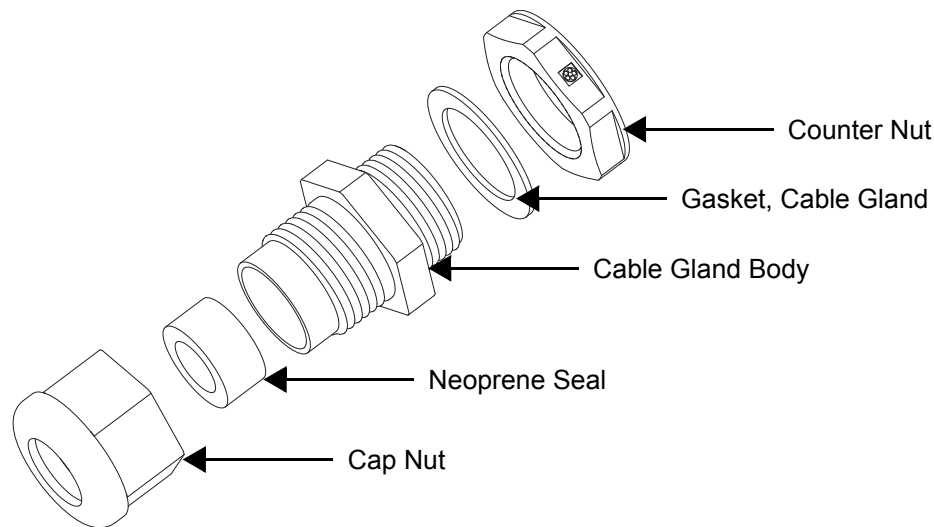


Figure 8-33. Cable Gland Assembly with Gasket

5. Place the controller board [10] into the chassis [20] by following the recess. Ensure the board is aligned to the two guiding pins. Fasten the screws [4] to 8 in. lbs with a T10 screw bit.
6. Assemble the wire harness [6] to the controller board [10]. Ensure that the protrusions of the wire harness are aligned correspondingly to the connector's recess.
7. Place the relay board [9] into the chassis [20]. Ensure the board is aligned to the two guiding pins. Fasten the screws [4] to 8 in. lbs with a T10 screw bit. After that, assemble the other end of the wire harness to the relay board. Ensure that the protrusions of the wire harness are aligned correspondingly to the connector's recess.
8. Assemble the O-ring [3] to the top housing [2]. Place the top housing on top of the chassis [20] and press the top housing down. Ensure the O-ring is not pinched.
9. Fasten the screws [1] to 5 in. lbs by using a Philip screw bit size PH2. Follow the screw sequence in [Figure 8-31](#).

## 8.2.14 O9 Universal Relay Controller Cable Assembly

### 8.2.14.1 Power Cable

1. Remove the cap nut of power cable gland assembly [12], insert the power cable through the cap nut and then the neoprene seal in cable gland body. Use only power cable with either AWG 6 or AWG 8 (recommended OD range of cable is 5.5mm to 9mm) that are able to withstand 80A and 50A respectively to ensure water sealing of the control box. User can decide to install one or two power cables based on the requirements. The power cables (A+) will not be supplied.
2. The loose end of the power cable with cable strip length 7.94mm (5/16") is then placed on the power lug and secured down by a set screw. The cap nut is then assembled back with tightening torque 18 in. lbs.
3. The other end of the power cable should be connected to one end of the circuit breaker (P/N: 40012006001) labelled "AUX". Then, connect the power supply to the other end of the circuit breaker labelled "BAT". Do not connect the power cable directly to the power supply.
4. Repeat steps 1 to 3 to install the second power cable if it is required.
5. If only install one power cable, the other side of power cable gland is recommended to cover with power cable gland seal [11] with tightening torque 18 in. lbs.

### 8.2.14.2 Ground Cable

1. Remove the cap nut of ground cable gland assembly [16], insert the ground cable through the cap nut and then assemble back the cap nut. Use only ground cable with AWG 14 (recommended OD range of cable is 2mm to 4mm) that are able to withstand 5A. The ground cables (A+) will not be supplied.  
**NOTE:** The ground is used to simply switch the relays and not act as a ground to the actual device being controlled.
2. The loose end of the ground cable with cable strip length 7.94mm (5/16") is then connected to a two pin terminal block, both pins on the terminal block are inter-connected and either pin can be used. The cap nut is then assembled back with tightening torque 7lb-in.

### 8.2.14.3 Wires

1. Assemble the wires into the light bar gasket retainer [22] and light bar gasket [21]. The Universal Relay Controller can support light bars through control wires with outer diameter ranging from 1.52 to 3.77mm (0.06" to 0.148") which wire gages ranging from AWG12-20.
2. Each individual loose wire (prior to stripping off the wire jacket) will need to be inserted one at a time through the chassis [20]. Ensure the lightbar wire is straight prior insert the wire into the chassis[20]. Each wire will be sealed individually by the radial gasket seal. When thick wire (i.e. AWG 14 wire or wire OD >2.90mm) is inserted through the chassis, there is potentially rubber gasket torn. Remove the rubber gasket residual and continue to the next step.
3. Thin wires 2.5mm and below should be dressed into the retention feature using a black stick (see [Figure 8-35](#)); thick wires above 2.5mm should be routed above the retention feature. Strip off the wire until 7.94mm (5/16") after the wire is inserted into Universal Relay Controller and installs the wire into respective light bar terminal block.

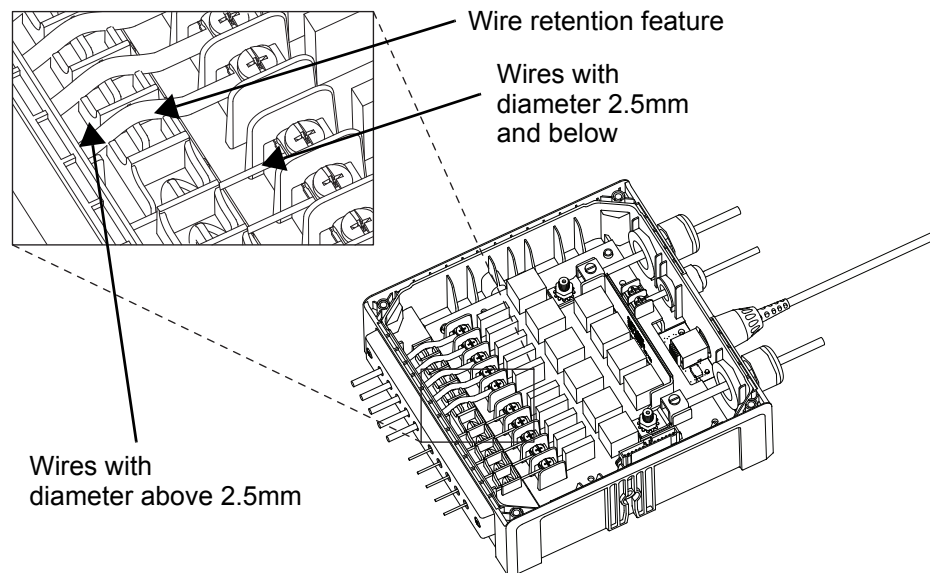


Figure 8-34. Wires Installation

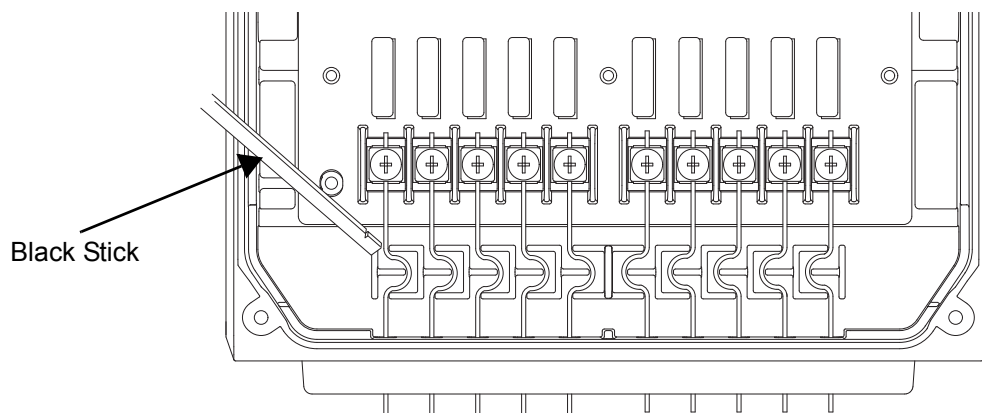


Figure 8-35. Wire Installation with Black Stick



4. The light bar gasket [21] should be replaced at each reassembly of the lightbar control wire.
5. Cover the light bar gasket retainer's hole [22] with seal, gasket and ground cable gland [14] if no wire is inserted.

**NOTE:** Use of other cable gages except as recommended in this manual may result in water intrusion. Any reassembly of wire needs a new lightbar gasket replaced. If the current loading for one wire is higher than 12 A, the wires should be split before being assembled to the Universal Relay Controller system. Wires Kit (PMKN4109A) is provided to ease installation of the URC. Incorrect use of this wires kit e.g. improper connection at external loose end wires may impact the robustness of the URC.

6. Remove the wires and gasket residual inside the URC after the wire installation, before closing the top housing of the URC.

#### 8.2.14.4 O9 to URC Cable

1. The O9 to URC cable (P/N: 3064153H02) can be assembled either before or after assemble back the top housing. Assemble the RJ45 port of the cable into the RJ45 connector on the Universal Relay Controller and turn the locking collar instead of cable 90 degree to the right to make sure it is lock properly. After this, test whether the cable is lock properly or not by trying to pull out the cable.

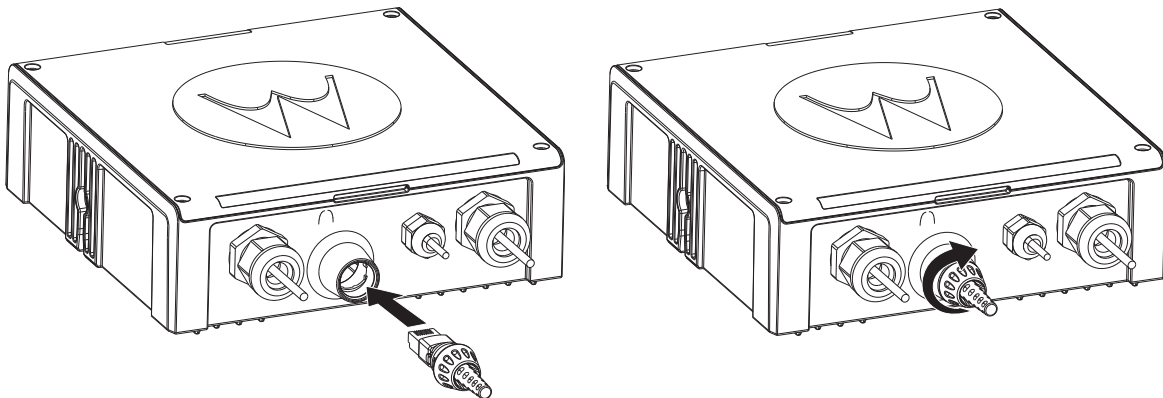


Figure 8-36. O9 to URC Cable Installation



Caution

Make sure cables and wires are assembled correctly. Wrong assembly could damage water sealing.

## 8.2.15 Transceiver Interface Board Disassembly/Reassembly

### 8.2.15.1 Mid Power Model Disassembly

1. To remove the front panel from the front of the radio, follow the disassembly procedure outlined in [section 8.2.16.1](#), steps 1 to 5.
2. Place the front panel face down on a flat surface and remove the six interconnect board retaining screws with a T10 Torx driver.
3. Remove the TUC seal from the connector on the front side of the board.

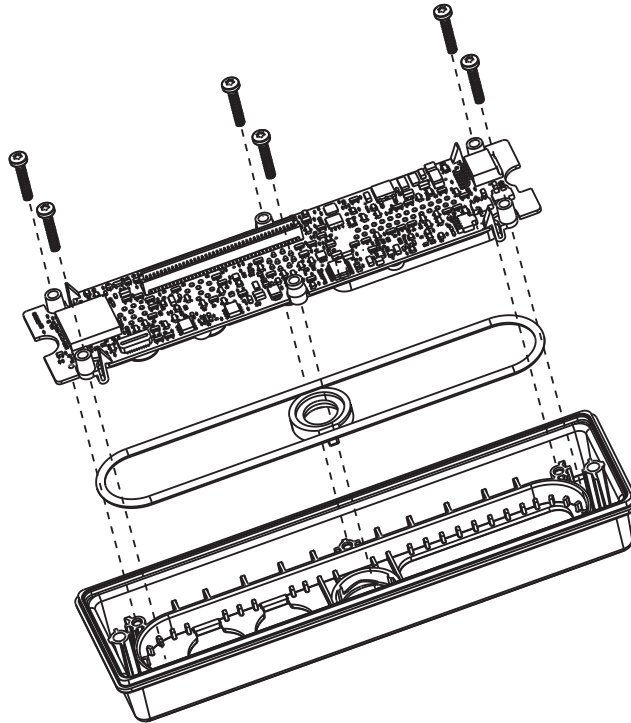


Figure 8-37. Front Panel Disassembly for Mid Power Model

### 8.2.15.2 High Power Model Disassembly

1. To remove the front panel from the front of the radio, follow the disassembly procedure outlined in [section 8.2.16.2](#), steps 1 to 3.
2. Place the front panel face down on a flat surface and remove the six interconnect board retaining screws with a T10 Torx driver.

3. Remove the TUC seal from the connector on the front side of the board.

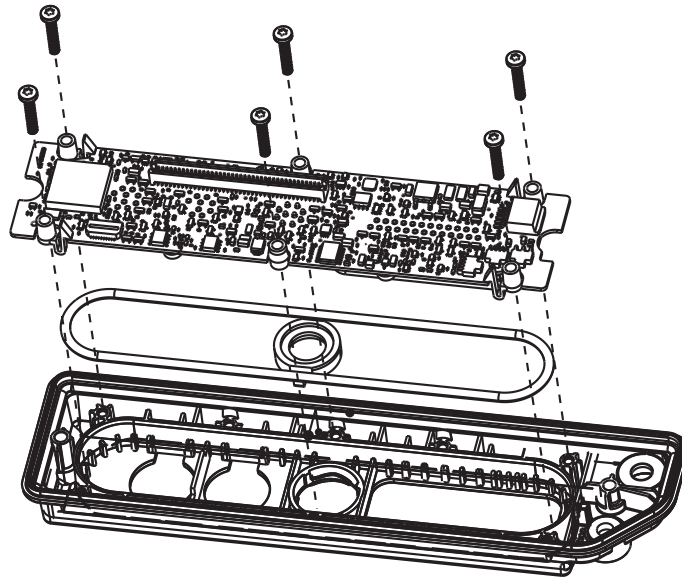


Figure 8-38. Front Panel Disassembly for High Power Model

### 8.2.15.3 TIB Model Reassembly

1. Install the TUC seal ensuring it is seated properly to the TUC connector, then install the remote interconnect board onto the front panel, and replace the screws. Torque the screws to (6-8 in.-lbs).
2. Ensure that the front seal is properly seated to the radio.

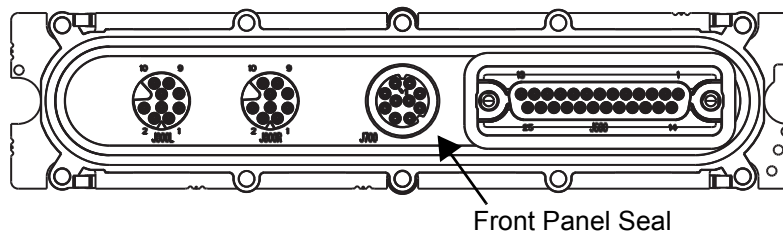


Figure 8-39. TUC Seal Placement



Never attach or remove a flex with power supplied to the radio. Also, take care to avoid misalignment of Flex connector pins upon re-attachment. Failure to remove power or align properly can result in electrical shorting of the circuit board and possible component damage.

3. Reconnect the interconnect flex to the TUC PCB then connect the flex to the radio, noting proper alignment of the mating connections.
4. Place the Frame Seal (MP part number: 3264059H03; HP part number: 3271902H01) onto the TIB housing.

5. Reassemble the front panel TIB assembly into the radio, with Frame Seal attached and replace the screws.
6. Torque the screws to (6-8 inch-lbs). Over-torque of the screws can result in warping of the circuit board and possible board damage.

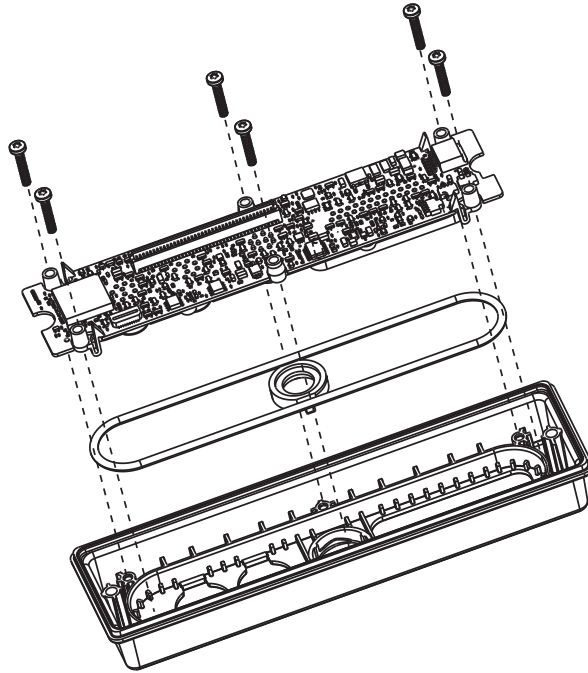


Figure 8-40. Front Panel Reassembly for Mid Power Model

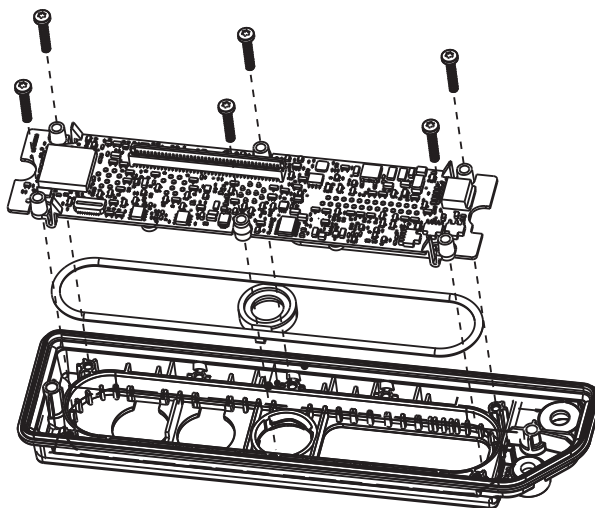


Figure 8-41. Front Panel Reassembly for High Power Model

## 8.2.16 Radio Disassembly

### 8.2.16.1 APX 5500/APX 6500/APX 7500/APX 6500Li Mid Power Models



Caution

Steps 1 through 6 MUST be performed, prior to removal of the Controller and RF Board from the chassis. Otherwise damage to the transceiver Controller Board could occur.

Use the following procedures to disassemble your radio:

1. Ensure all accessory connections, power, antenna, and microphone are unplugged.

If radio is in remote mount configuration, disconnect the remote-mount control cable (CAN cable) from the transceiver.

2. Remove the two (2) front control head/TIB screws using a T-10 torx bit, do not discard screws.

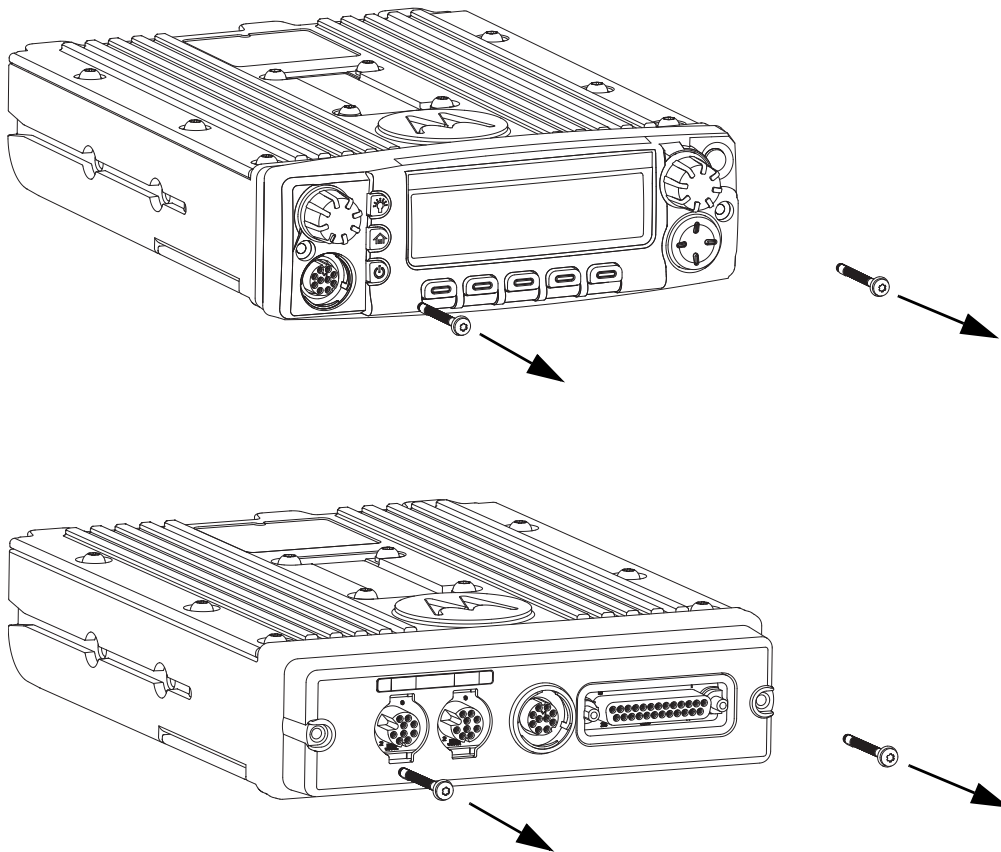


Figure 8-42. Removing the Control Head Screws

3. Firmly grasp the control head/transceiver interface board (TIB) front housing and frame seal, and carefully remove from the radio. Be careful not to pull on the attached flex or damage option board during control head/TIB removal.

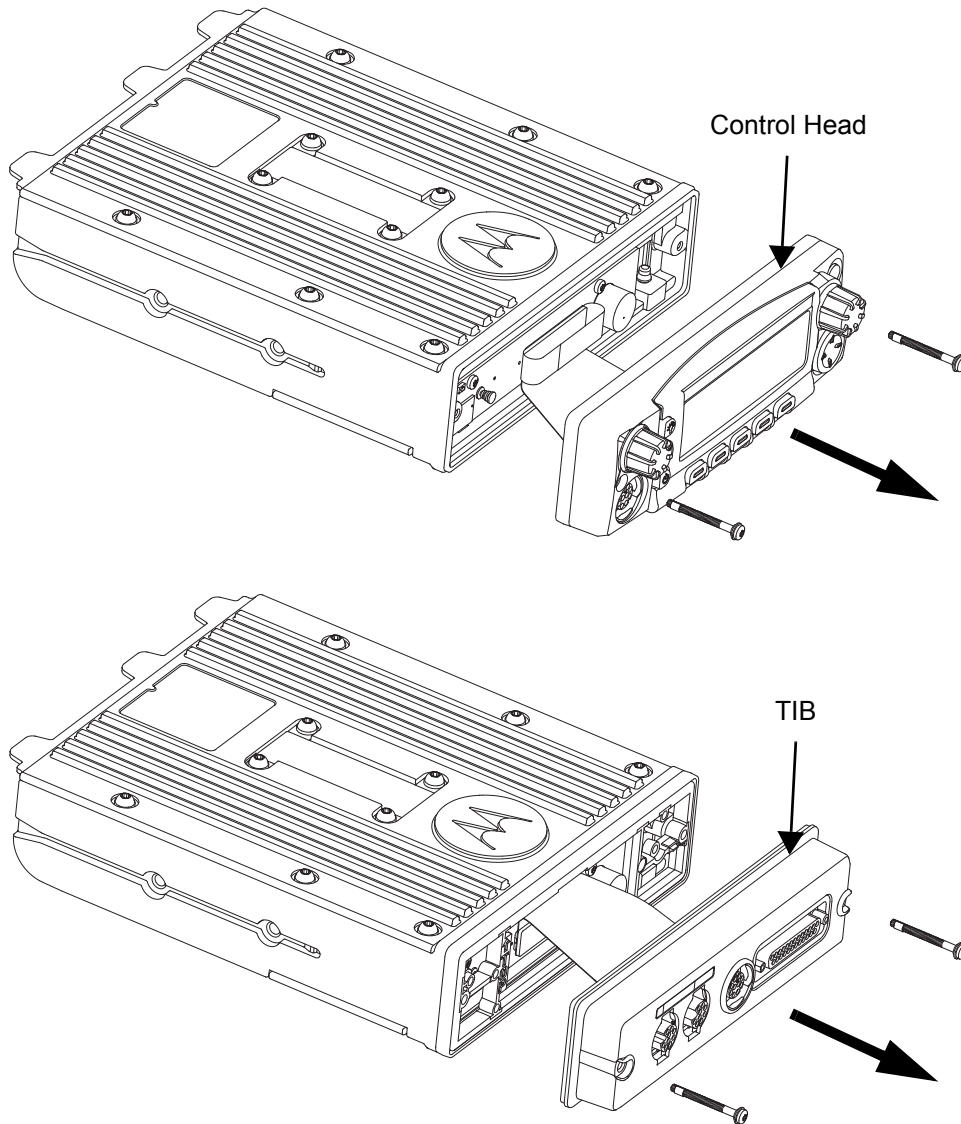
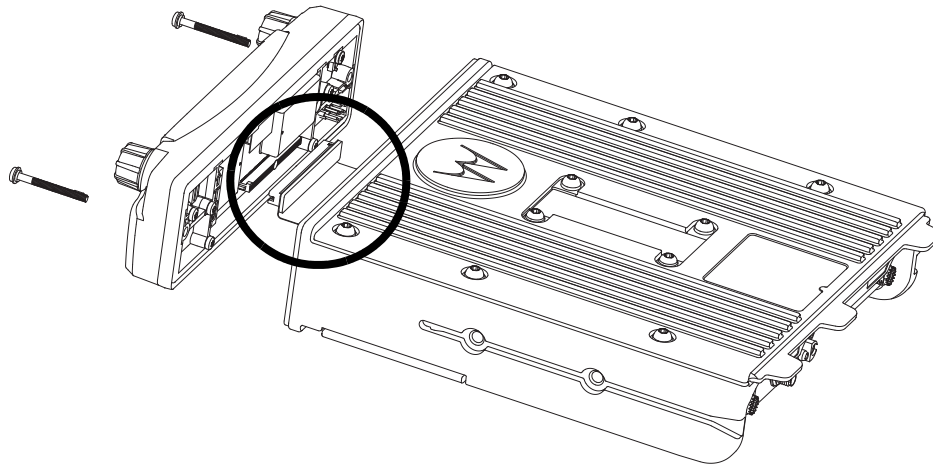


Figure 8-43. Removing the Control Head/TIB

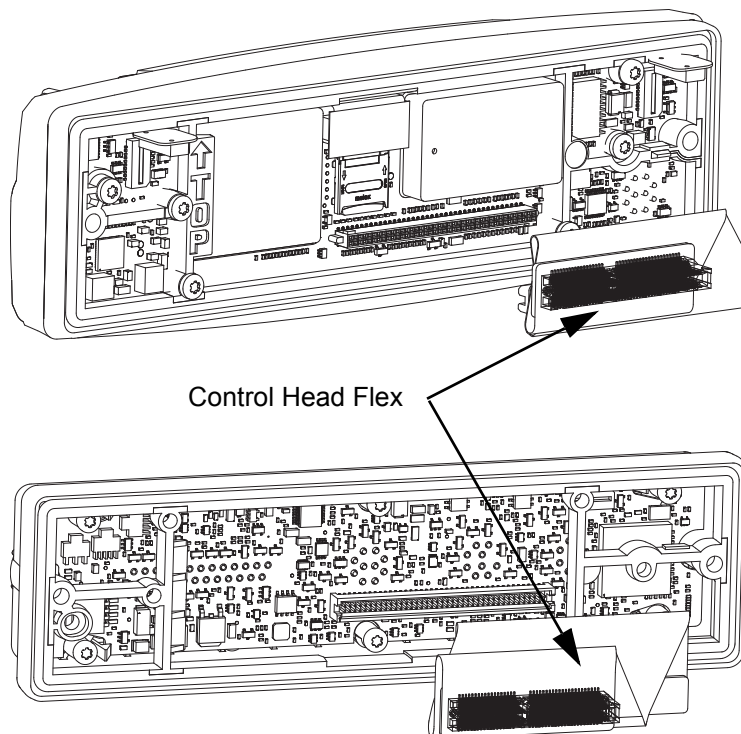
4. Lay the control head or TIB face down on a clean, flat surface, being careful not to scratch or mar the face of the display.

5. Carefully disconnect control head/TIB flex from transceiver's edge card.


**NOTE:** "Carefully" means that the control head flex shall be disconnected from its mating control head connector by applying equal amounts of pressure on both ends of the mated pair until they fully disconnect. While disconnecting, make sure both mated pairs are pulled apart in a straight-forward [or "in-line"] direction parallel to the longitudinal axis of the connector pins.



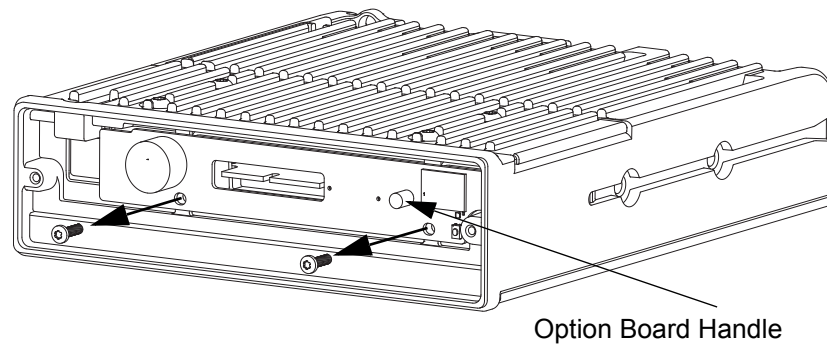
**AREA ENLARGED**



*Figure 8-44. Removing the Control Head Flex*


 <b>Caution</b>	<p>The following steps <b>MUST</b> be performed for option board equipped radios, prior to removal of the Controller or RF board from chassis. Otherwise damage to Controller or RF boards could occur.</p>
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- If Option Board is not present, skip to step 7. Remove the two option board screws using a T-10 torx bit. Do not discard screws.

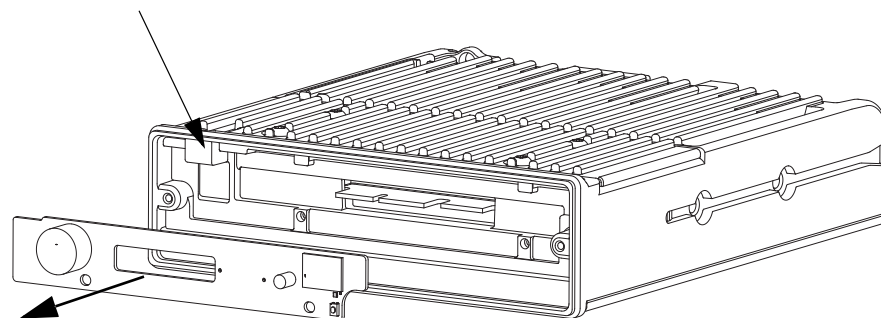


*Figure 8-45. Removing the Option Board Screws*

Carefully remove option board from transceiver's edge card using the option board handle.

 <b>Caution</b>	<p>Do not remove WLAN port plug.</p>
---	--------------------------------------

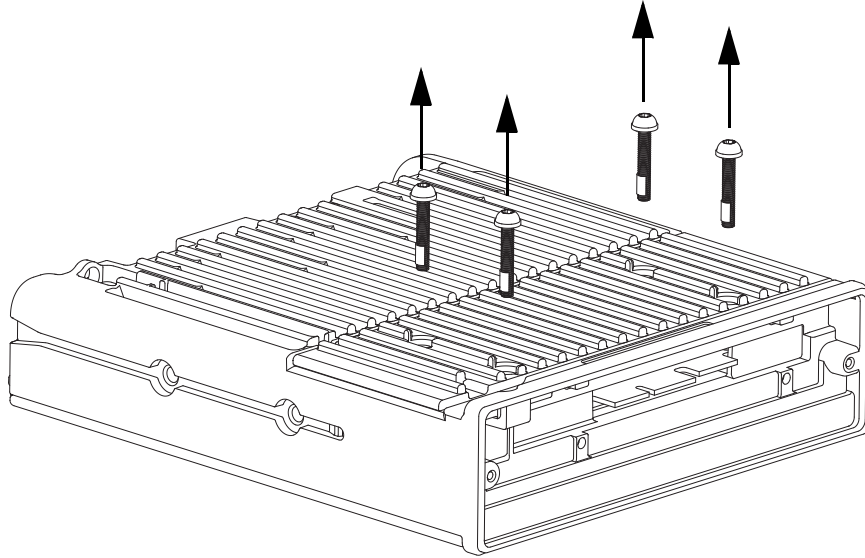
WLAN Port Plug (recessed at bottom of radio)



*Figure 8-46. Removing the Option Board*

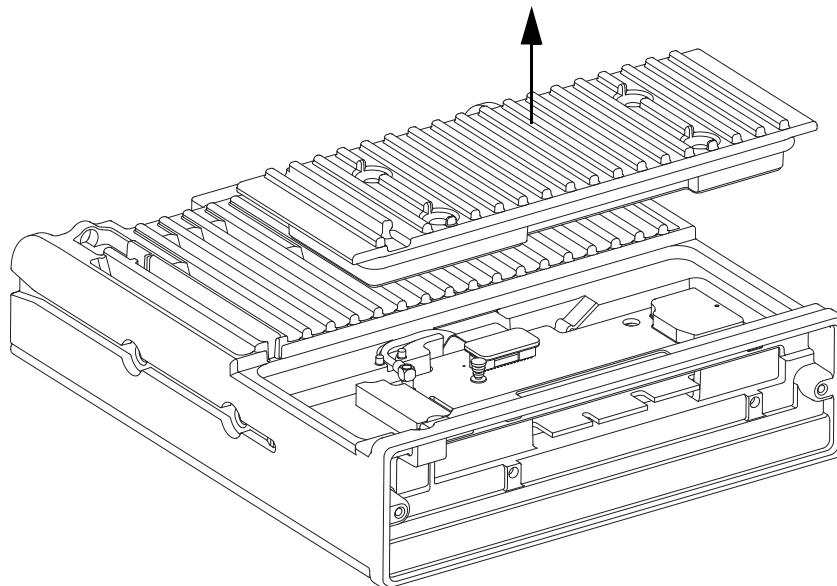


7. Radio must be oriented as shown below with the bottom of the radio facing up. Remove the four (4) controller cover screws using a T-20 torx bit. These screws have sealing washers that should be kept with the screw. Do not discard screws.



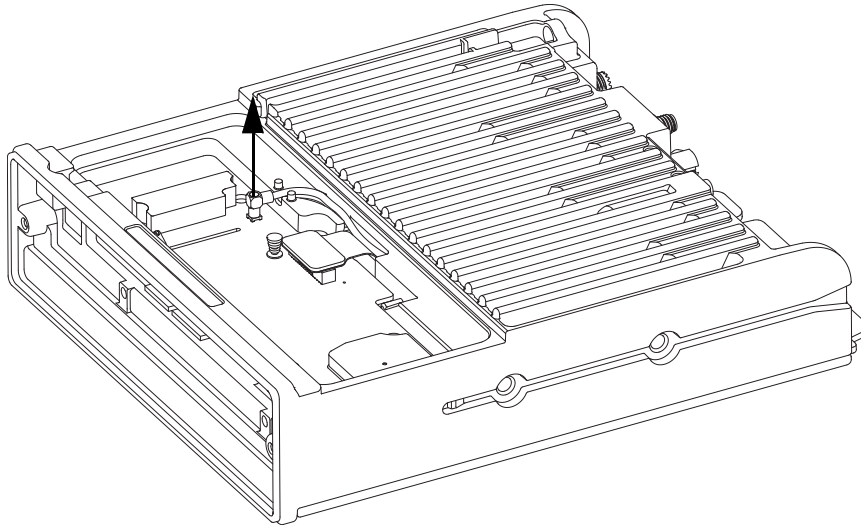
*Figure 8-47. Removing the Controller Cover Screws*

8. Remove the controller cover by lifting up simultaneously on both side edges. It may be necessary to gently pry the cover off using a plastic tool. Be sure to remove the controller cover seal. Do not discard seal.



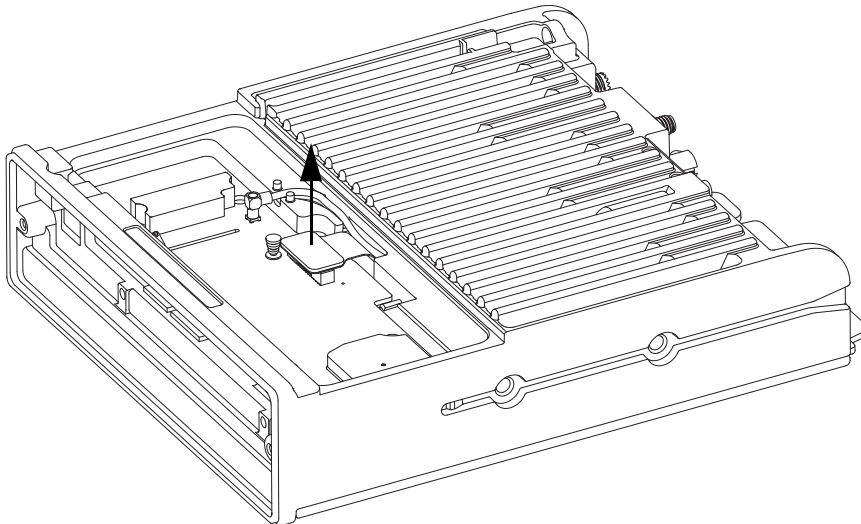
*Figure 8-48. Lifting the Controller Cover*

9. Disconnect the GPS cable from the controller board by gently holding the controller board in place and pulling up on the GPS cable's MMCX connector. Do not pull on the cable section of the GPS cable as damage may occur. Avoid contact with exposed thermal grease on controller board, thermal grease may be removed with a dry lint-free cloth.



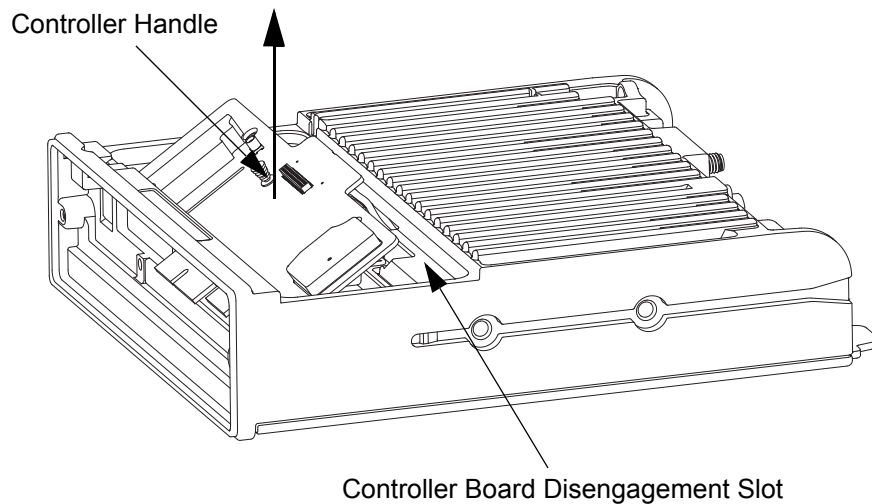
*Figure 8-49. Disconnecting the GPS Cable*

10. Disconnect the rear accessory flex from the controller board.



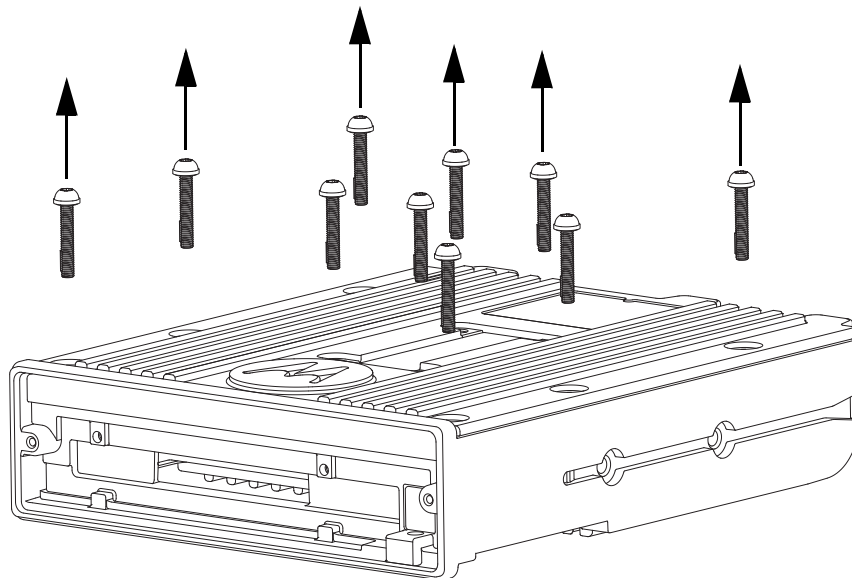
*Figure 8-50. Removing the J2 Rear Accessory Flex from the Controller Board*

11. Disconnect the controller board from the RF board by inserting a plastic tool into the controller board disengagement slot and gently prying controller board up.



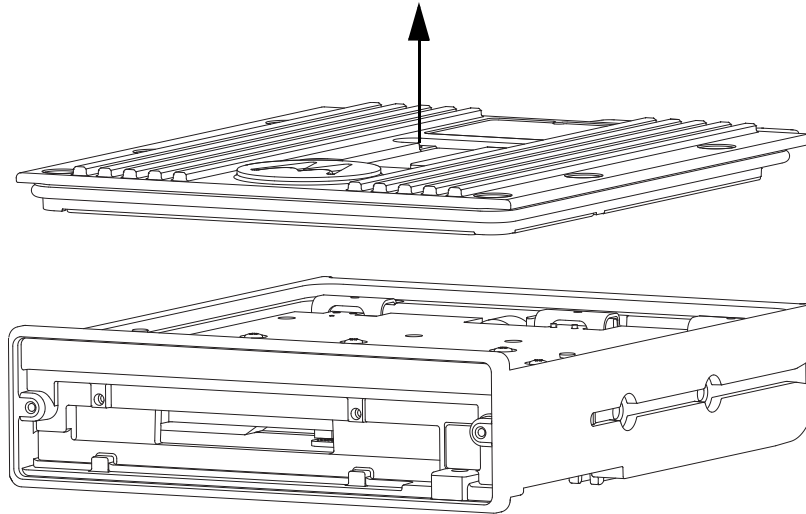
*Figure 8-51. Removing the Controller Board*

12. Remove the controller board from the chassis using the controller board handle. The controller board needs to be tilted forward and pulled back and out of the chassis to avoid damage to the controller board edge card. Hold the controller board by the handle or edges only, and store in an anti-static bag.
13. FLIP RADIO OVER: remove the ten (10) RF cover screws using a T-20 torx bit. These screws have sealing washers that should be kept with the screw. Do not discard screws.



*Figure 8-52. Removing the RF Cover Screws*

14. Remove the RF cover by lifting up simultaneously on both side edges. It may be necessary to gently pry the cover off using a plastic tool. Be sure to remove the RFcover seal. Do not discard seal.



*Figure 8-53. Lifting the RF Cover*



**Caution**

The PA screws must be removed BEFORE the RF/DC retention clips or damage will occur to the RF board.

15. Remove all PA screws (3 screws for single band radios, 6 screws for dual band radios) using a T-10 torx bit. Be careful while handling PA screws as there may be residual thermal grease on the threads.

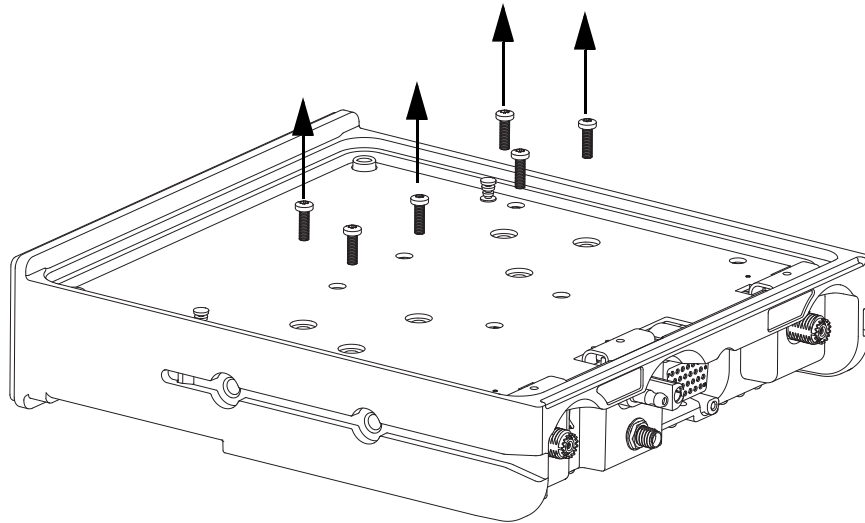


Figure 8-54. Removing the PA Screws

16. Remove the 3 RF/DC retention clips by gently prying them out with a flat-blade screwdriver. For leverage, use only the chassis, do not use the PCB or any of its components.

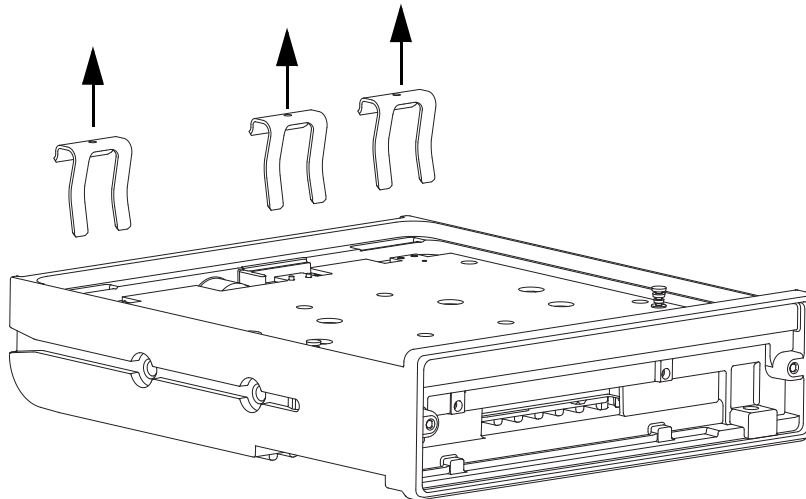


Figure 8-55. Removing the RF/DC Retention Clips

17. Remove the RF board by gently pulling up on the 2 RF board handles to disengage the RF board locating features and RF/DC seals. Then slide the RF board towards the front of the chassis and swing the board up and out. Handle the RF board by the 2 handles or edges only, and store in an anti-static bag. Avoid contact with exposed thermal grease on RF board, thermal grease may be removed with a dry lint-free cloth.

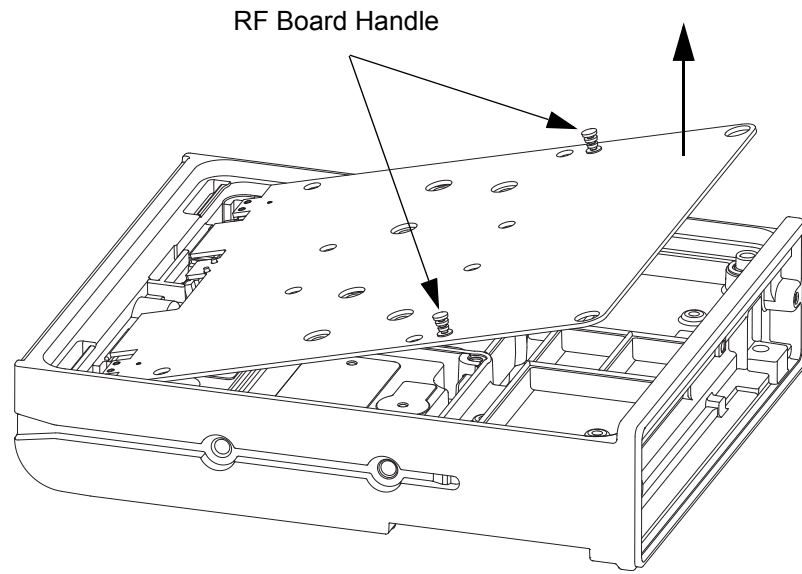


Figure 8-56. Removing the RF Board

18. Remove the accessory flex screw using a T-10 torx bit.

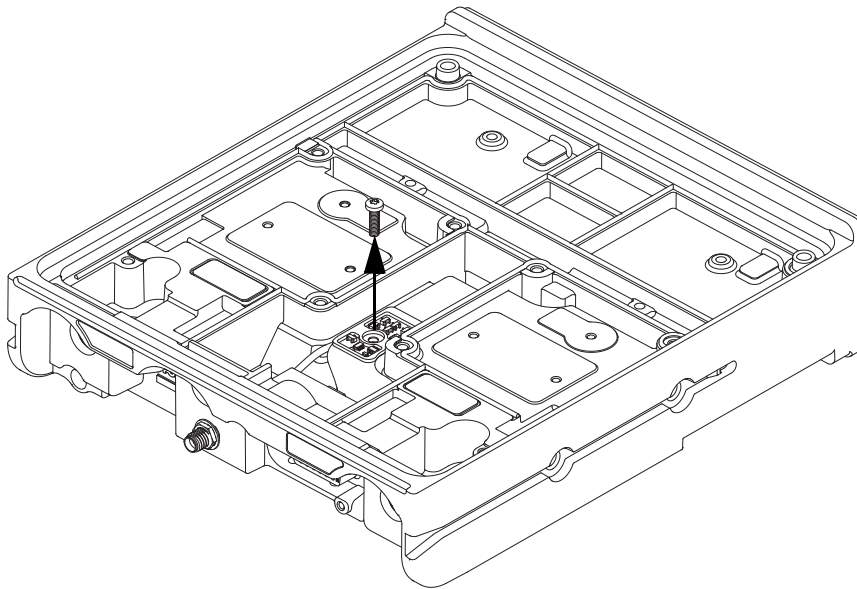


Figure 8-57. Removing the J2 Rear Accessory Connector Internal Screw

19. Remove the 2 rear accessory connector screws using a T-10 torx bit. The rear accessory screws have a washer and seal that need to remain assembled onto the screw. Do not discard screws.

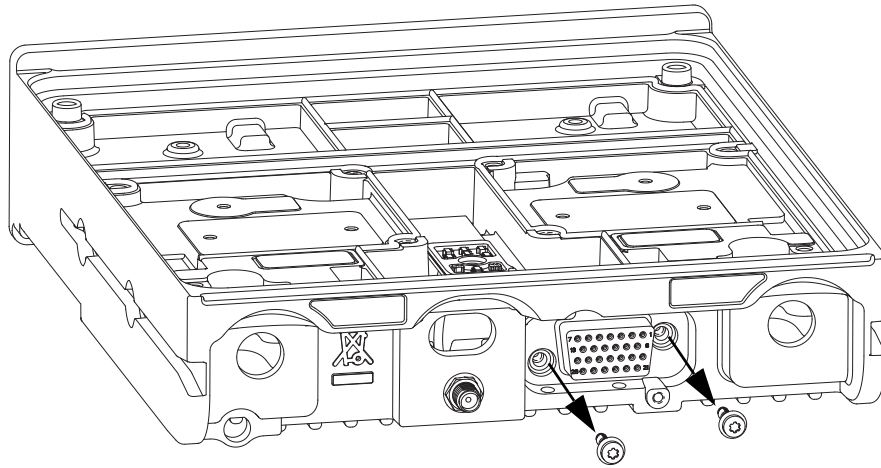


Figure 8-58. Removing the J2 Rear Accessory Connector External Screws

**NOTE:** Gently remove Rear Connector Flex from chassis through Rear Connector chassis opening.

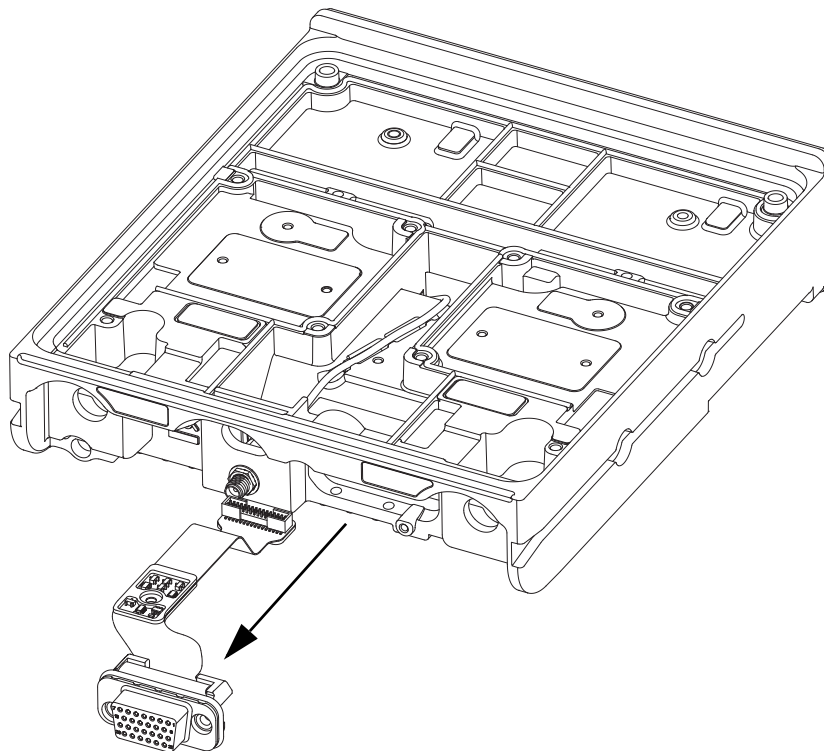
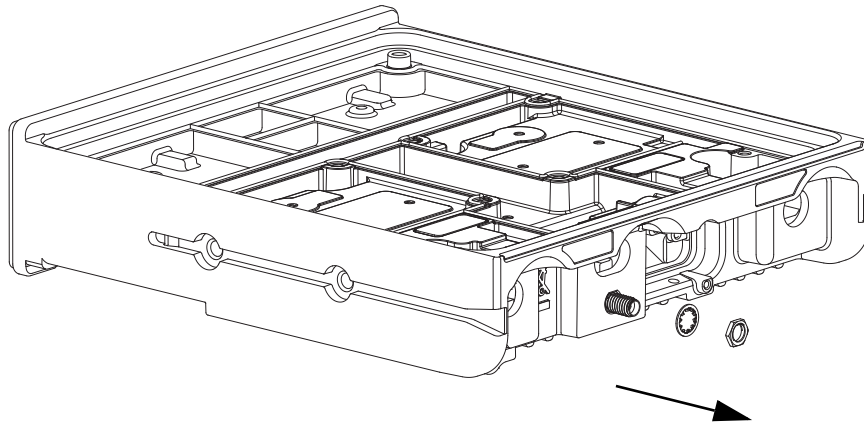


Figure 8-59. Removing the J2 Rear Accessory Connector

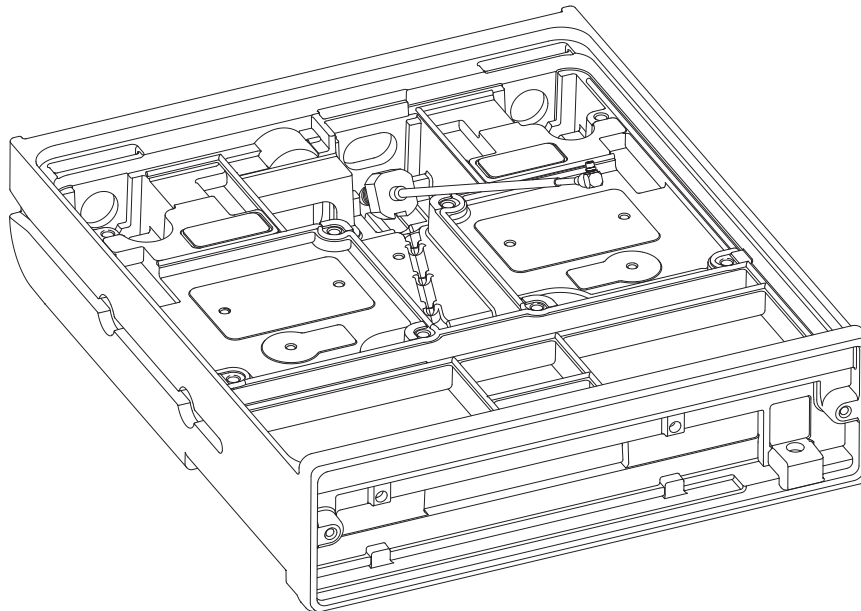
20. Remove GPS SMA connector nut using a deep 5/16" socket or deep nut driver. Remove the GPS SMA connector lock washer. Do not discard nut or lock washer.



*Figure 8-60. Removing the GPS Cable Nut*

21. Gently remove GPS cable from chassis retention channel (on opposite side of chassis) and pull cable through controller/RF chassis opening. Cable should now be entirely on top of the radio. Gently pull the GPS cable ferrule towards the front of the radio and lift cable out of the chassis.

**NOTE:** There is an o-ring on the internal portion of the threaded portion of the GPS ferrule. Reassemble the lock washer and nut onto the GPS to hold the o-ring in place.



*Figure 8-61. Removing the GPS Cable*



### 8.2.16.2 APX 2500/4500/4500Li Mid Power Models

Use the following procedures to disassemble your radio:

1. Ensure all accessories connections, power, antenna, and microphone are unplugged. If radio is in remote mount configuration, disconnect the remote-mount control cable (CAN cable) from the transceiver.
2. Remove the front control head or TIB screws using an appropriate bit by referring to the steps explained in 8.2.16.4 for O2 Control Head, 8.2.16.5 for O7 Control Head, and 8.2.16.6 for TIB. Do not discard screws.
3. After removing the control head or TIB, radio must be oriented as shown below with bottom of the radio facing up. Remove four (4) bottom cover screws using a T-20 torx bit. These screws have sealing washers, which should be kept with the screw. Do not discard screws.

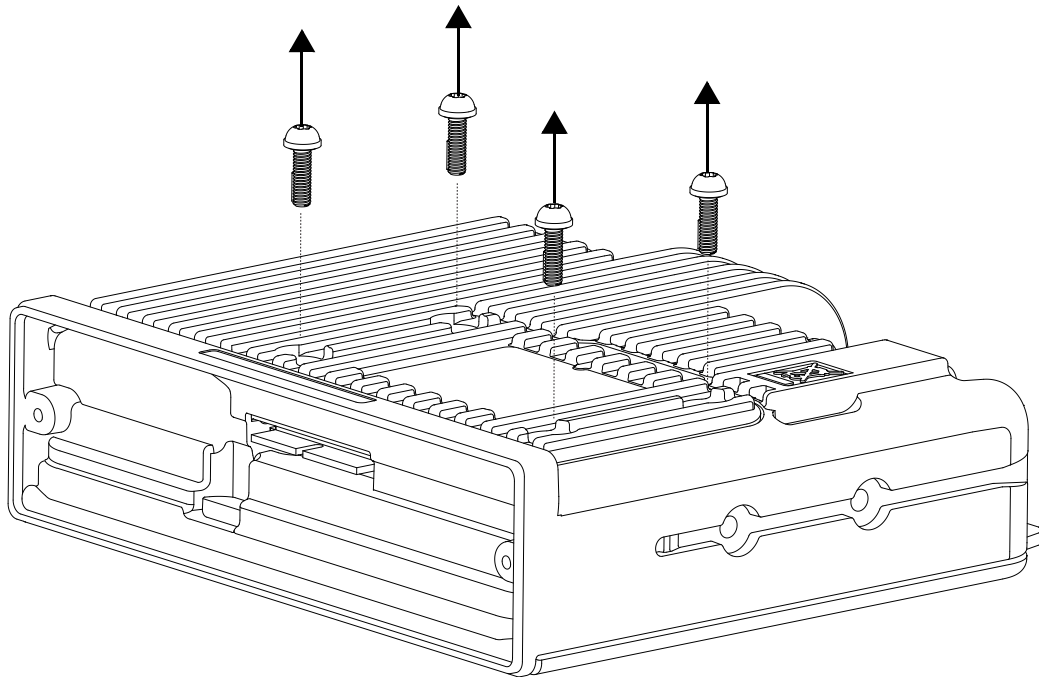
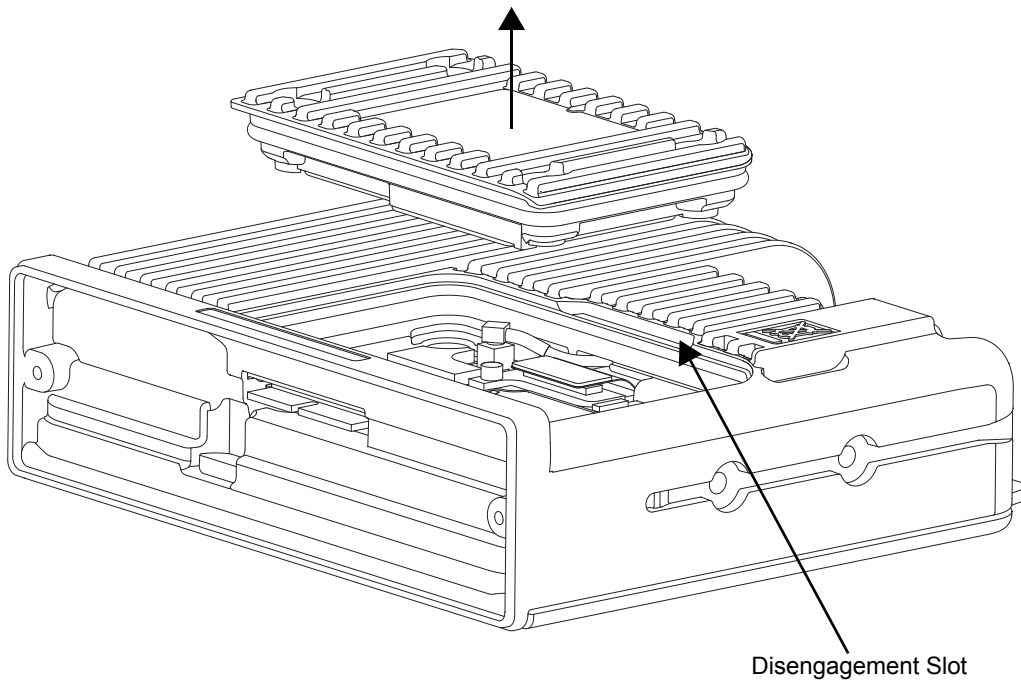


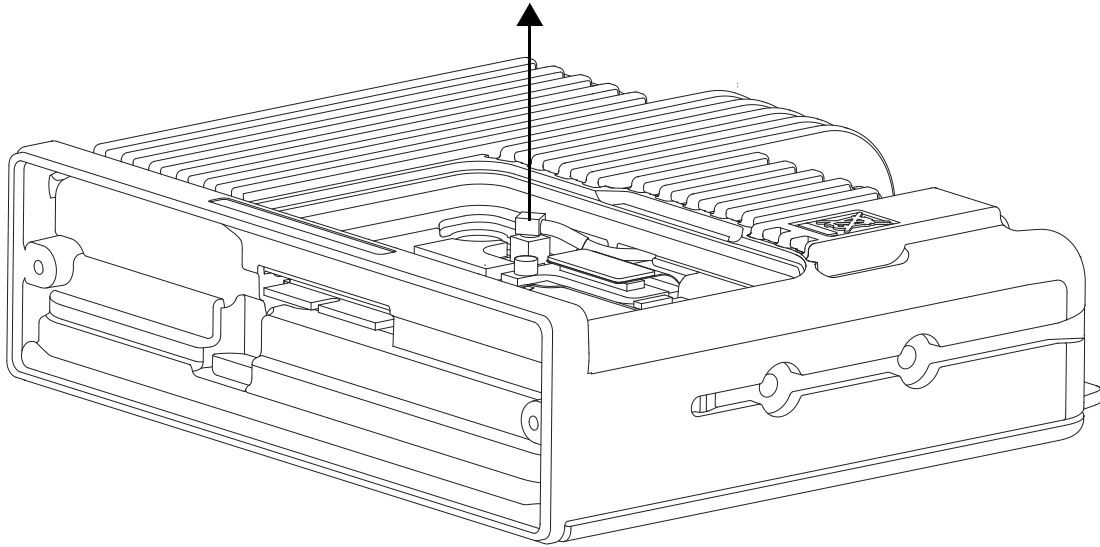
Figure 8-62. Removing the Bottom Cover Screws

4. Remove the bottom cover from the disengagement slot on main chassis. Hold both sides of the bottom cover, and lift it gently. It may be necessary to gently pry the cover off using a plastic tool. Be sure to remove the bottom cover seal. Do not discard seal.



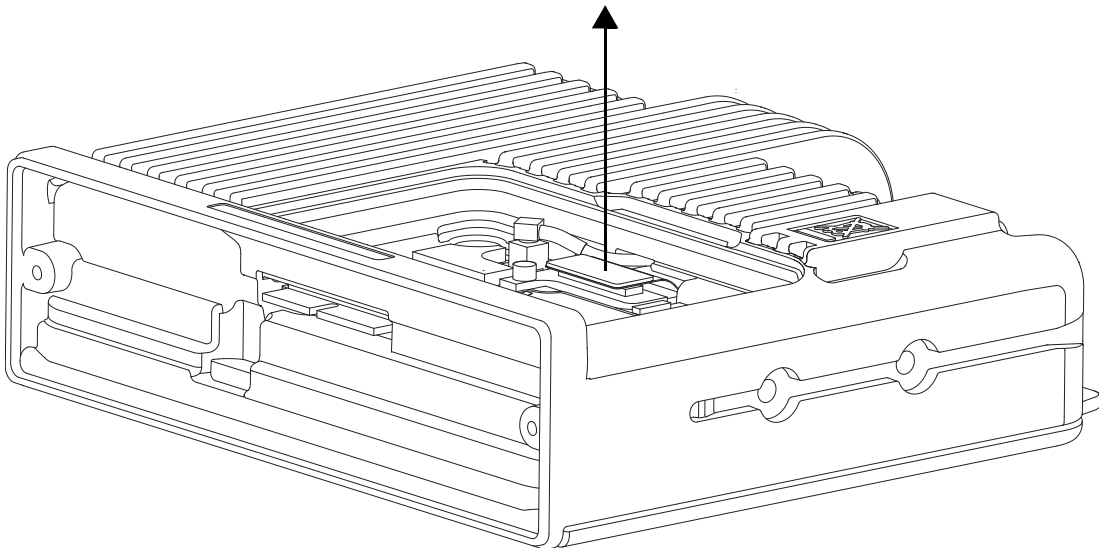
*Figure 8-63. Removing the Bottom Cover*

5. Disconnect the GPS cable from controller board by gently holding controller board in place and pulling up GPS cable's MMCX connector. Do not pull the GPS cable, as damage may occur.



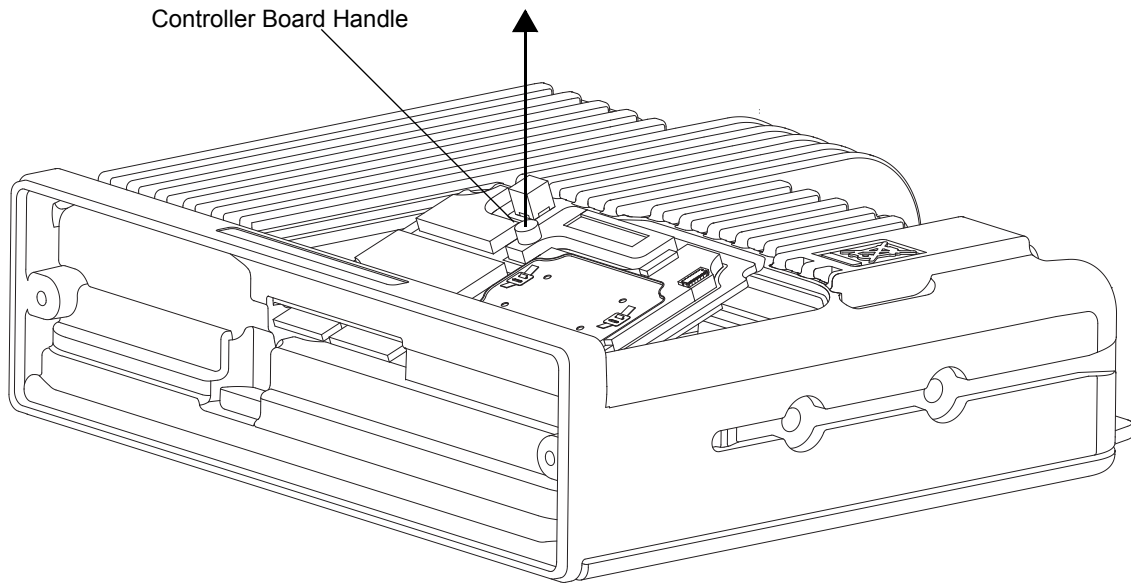
*Figure 8-64. Disconnecting the GPS Cable*

6. Disconnect the rear accessory flex from controller board.



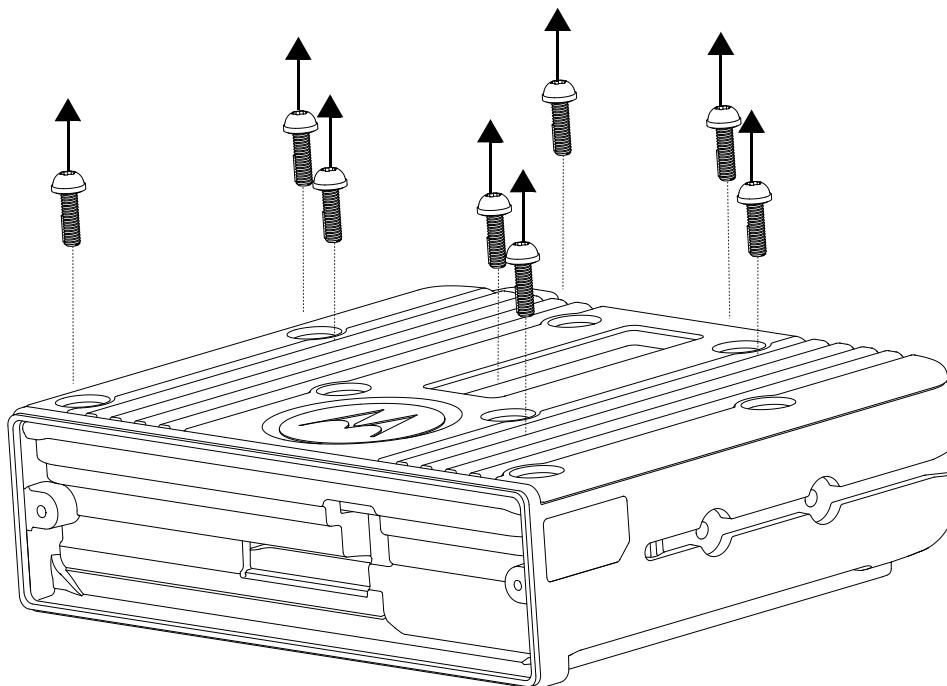
*Figure 8-65. Disconnecting the Rear Accessory Flex*

7. Disconnect controller board from RF board by tilting it upward from the core, out from the front chassis, and gently lift it with handle.
8. Use the controller board handle to remove controller board from chassis. The controller board needs to be tilted forward, pulled back and out from chassis, to avoid damage to controller board edge card. Hold controller board on the handle or edges only, and store it in an antistatic bag.



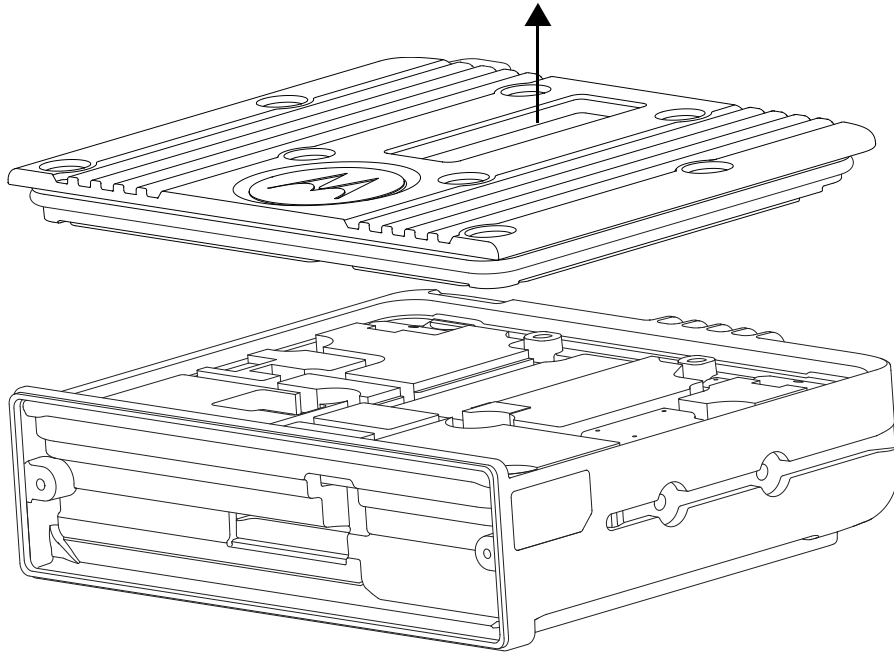
*Figure 8-66. Removing the Controller Board*

9. **FLIP RADIO OVER:** Remove eight (8) top cover screws using a T-20 torx bit. These screws have sealing washers that should be kept with the screws. Do not discard screws.



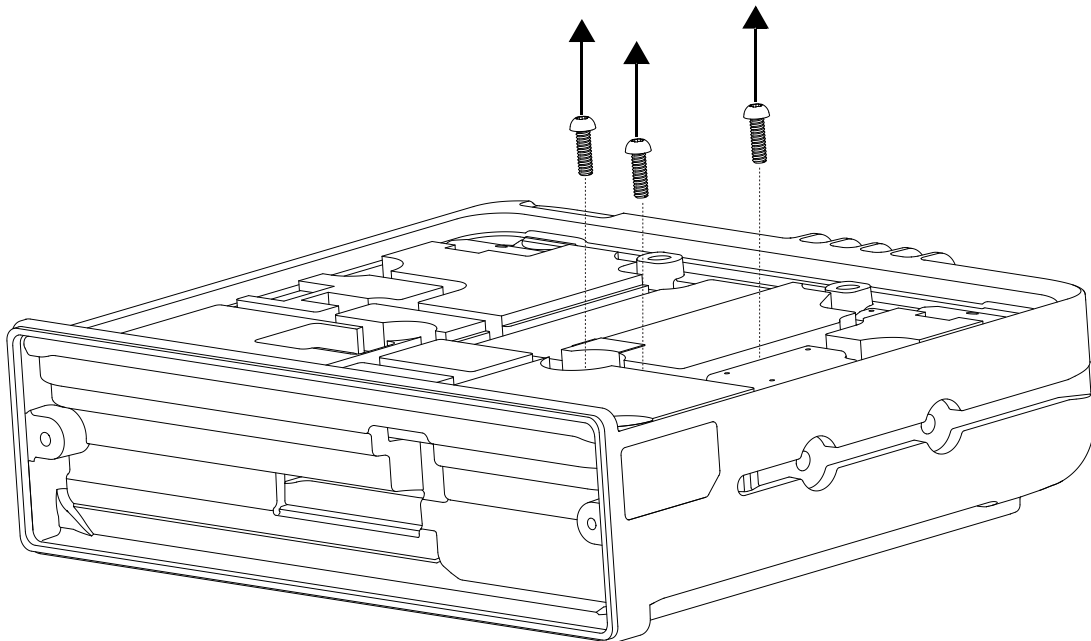
*Figure 8-67. Removing the Top Cover Screws*

10. Remove the top cover with assistance of a plastic tool (6686119B01), and lift up both side edges of the cover simultaneously. It may be necessary to gently pry off the cover using the plastic tool. Be sure to remove the top cover seal. Do not discard seal.



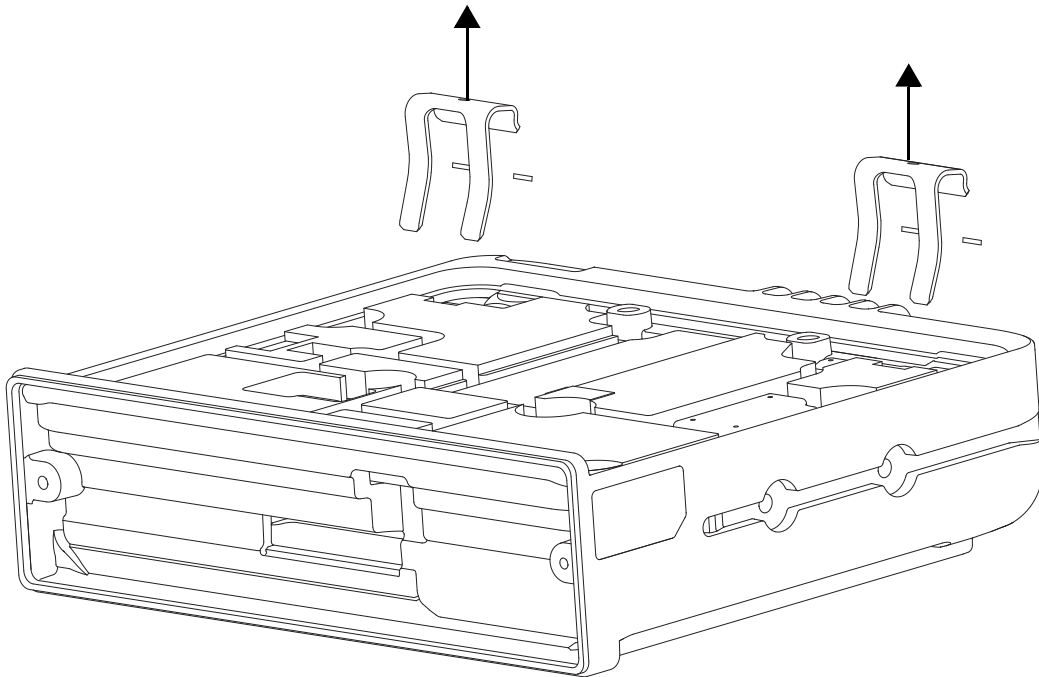
*Figure 8-68. Removing the RF Cover*

11. Remove three (3) PA screws using a T-10 torx bit. Be careful while handling PA screws as there may be residual thermal grease on threads.



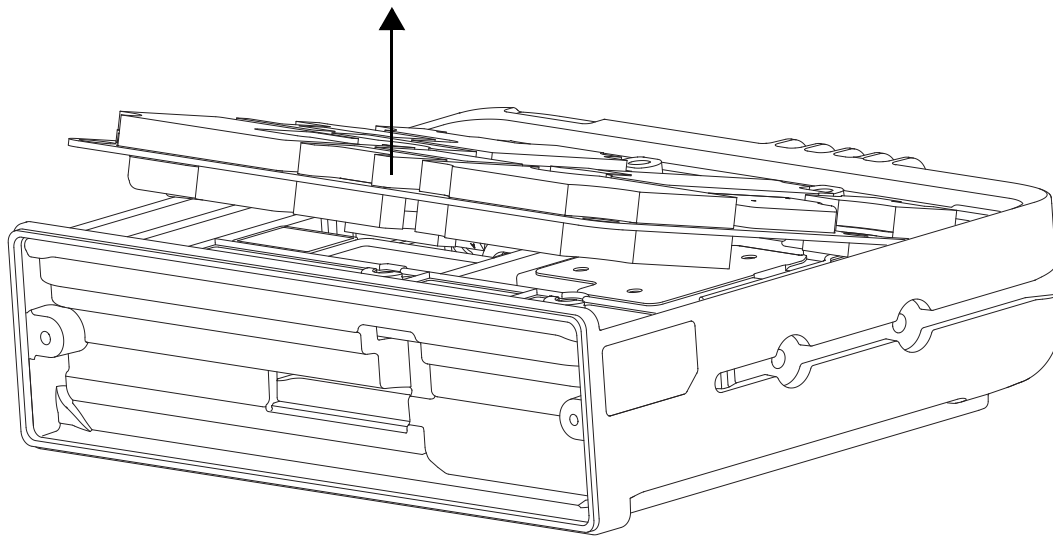
*Figure 8-69. Removing the PA Screws*

12. Remove the two (2) RF/DC retention clips by gently prying them out with a flat-blade screwdriver. For leverage, use only the chassis, do not use the PCB or any of its components.



*Figure 8-70. Removing the RF/DC Retention Clips*

13. Remove RF board by gently pushing it upwards, and moving out from front chassis. Then slide RF board towards front of chassis, and swing the board up and out. Hold RF board on the edges, and store in an antistatic bag. Avoid contact with exposed thermal grease on RF board, and it may be removed with a dry lint-free cloth.



*Figure 8-71. Removing the RF Board*

14. Remove two (2) rear accessory connector screws using a T-10 torx bit. The rear accessory screws have a washer and seal, that needs to be remained assemble on the screw. Do not discard screws.

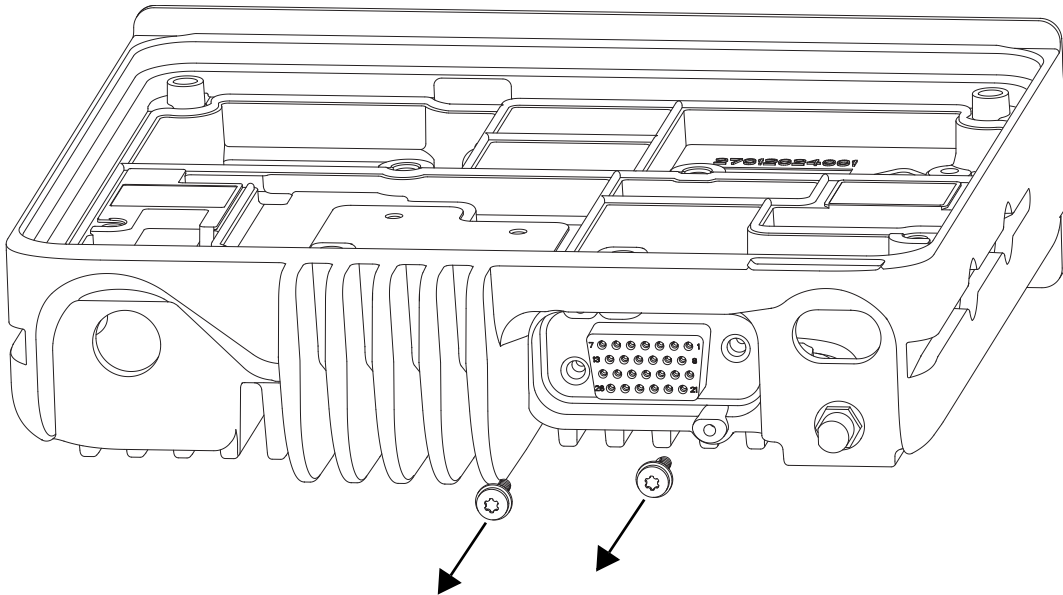


Figure 8-72. Removing the Rear Accessory Connector screws

**NOTE:** Gently remove rear connector flex from chassis, through rear connector chassis opening.

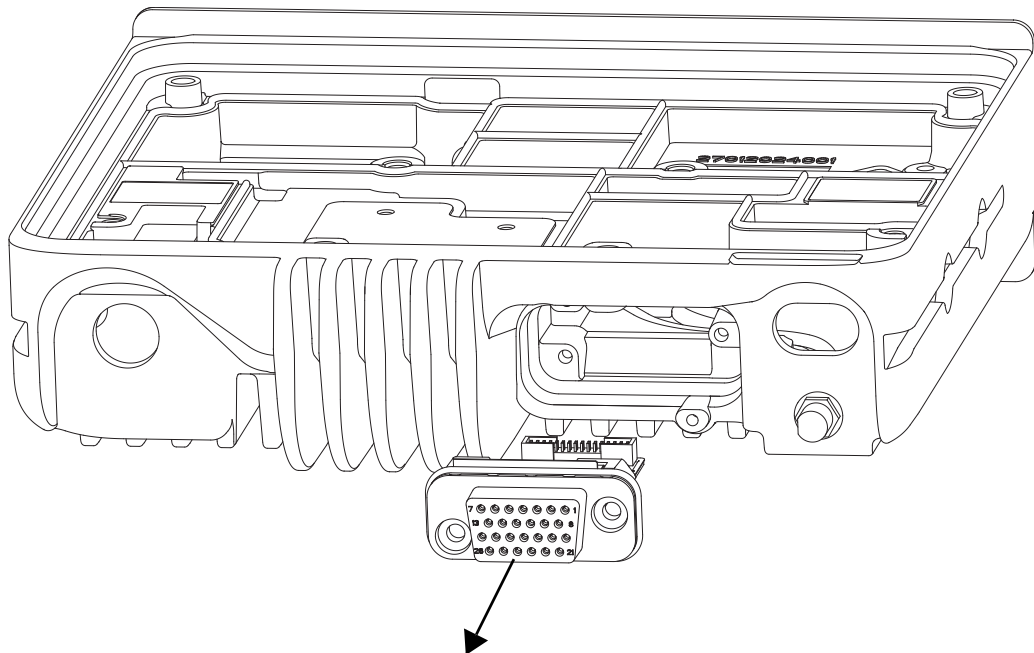


Figure 8-73. Removing the Rear Connector Flex

15. Remove GPS SMA connector nut using a deep 5/16" socket or deep nut driver. Remove the GPS SMA connector lock washer. Do not discard nut or lock washer.

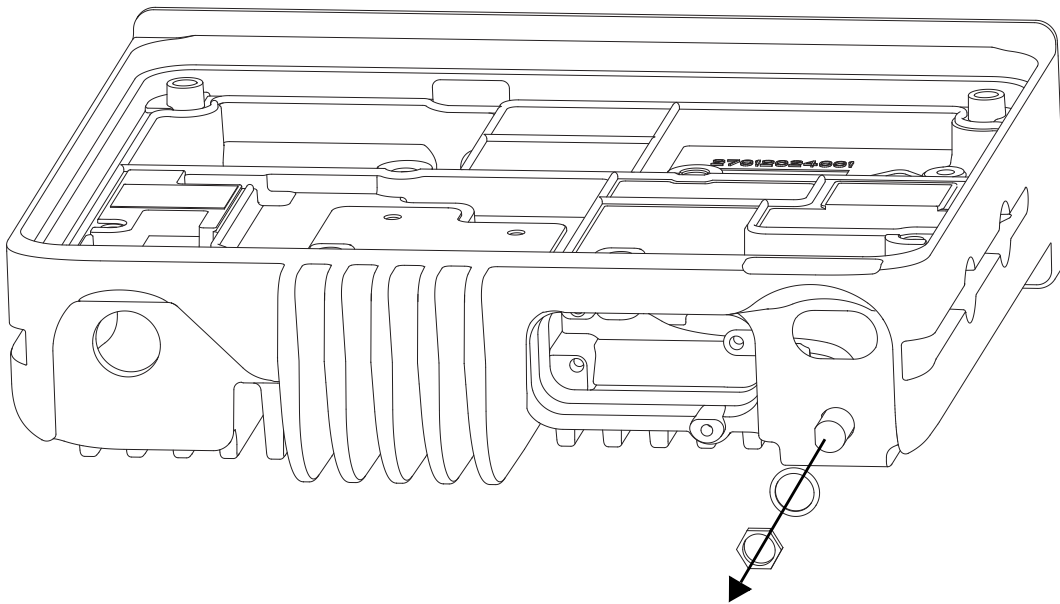


Figure 8-74. Removing the GPS SMA connector

16. Gently remove GPS cable from chassis retention channel, which is on the opposite side of chassis, and pull the cable through controller/RF chassis opening. Cable should now be entirely on top of radio. Pull GPS cable ferrule to front of radio, and lift cable out from chassis.

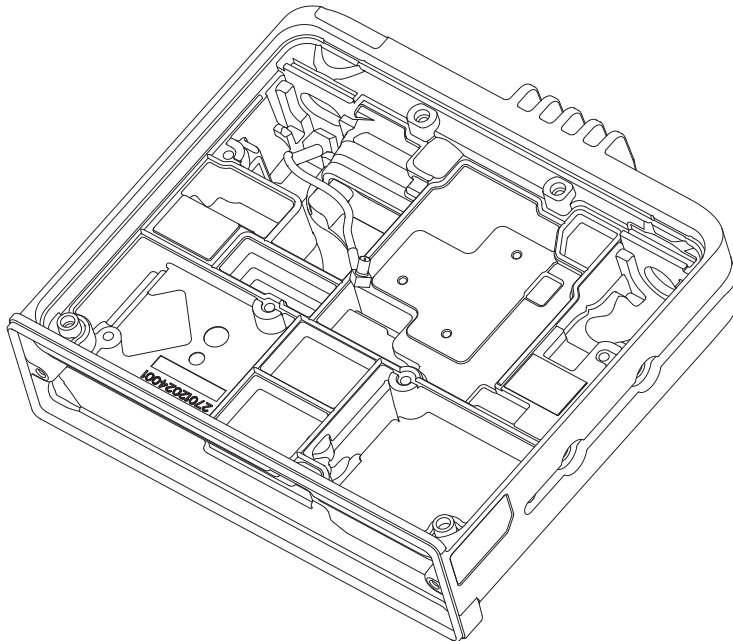
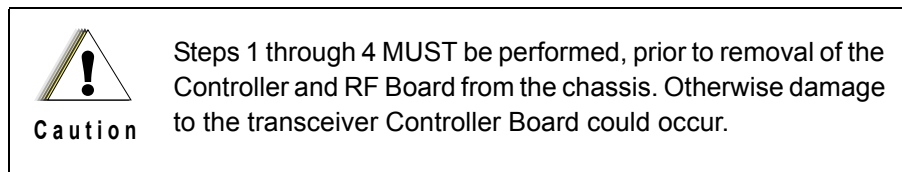


Figure 8-75. Removing the GPS Cable

**NOTE:** There is an o-ring on internal threaded portion of GPS ferrule. Reassemble lock washer and nut onto GPS to hold the o-ring in place.



## 8.2.16.3 High Power Models



Use the following procedures to disassemble your radio:

1. Ensure all accessory connections, power, antenna, and microphone are unplugged. Remove the two screws that secure the Transceiver Interface Board (TIB) housing using a T10 Torx bit. Also remove the GPS nut and washer using a "5/16" socket. Save for later use.

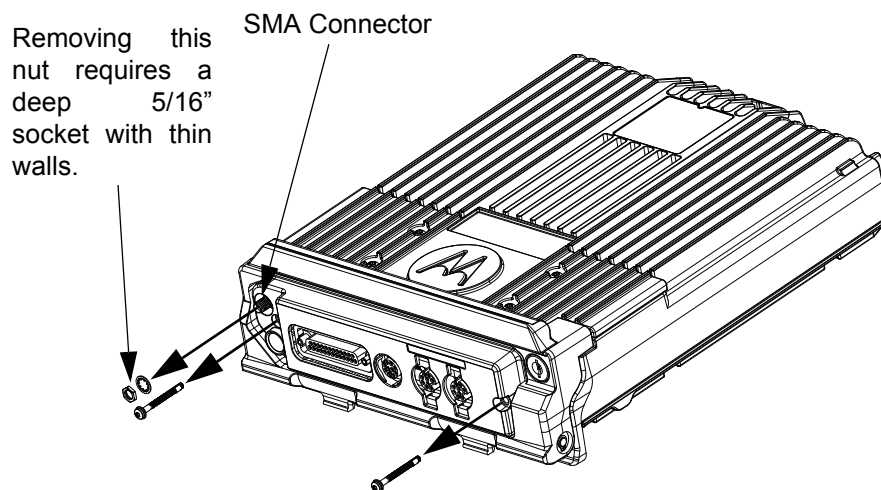


Figure 8-76. Removing the Transceiver Interface Board Screws

2. Remove the front panel by gently pulling the housing so that it disengages from the chassis. Be careful not to pull the attached flex as the housing is being removed.

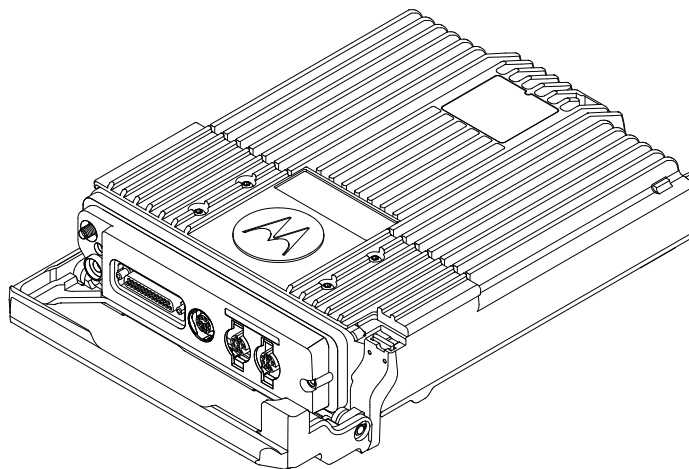


Figure 8-77. Removing the Transceiver Interface Board Assembly

3. Carefully disconnect the flex from the TIB and the transceiver, and set the panel aside on a clean, flat surface. The Seal Frame may still be attached to the chassis. Remove it and keep with the TIB.

**NOTE:** "Carefully" means that the control head flex shall be disconnected from its mating control head connector by applying equal amounts of pressure on both ends of the mated pair until they fully disconnect. While disconnecting, make sure both mated pairs are pulled apart in a straight-forward [or "in-line"] direction parallel to the longitudinal axis [or "in direction of arrow"] of the connector pins.

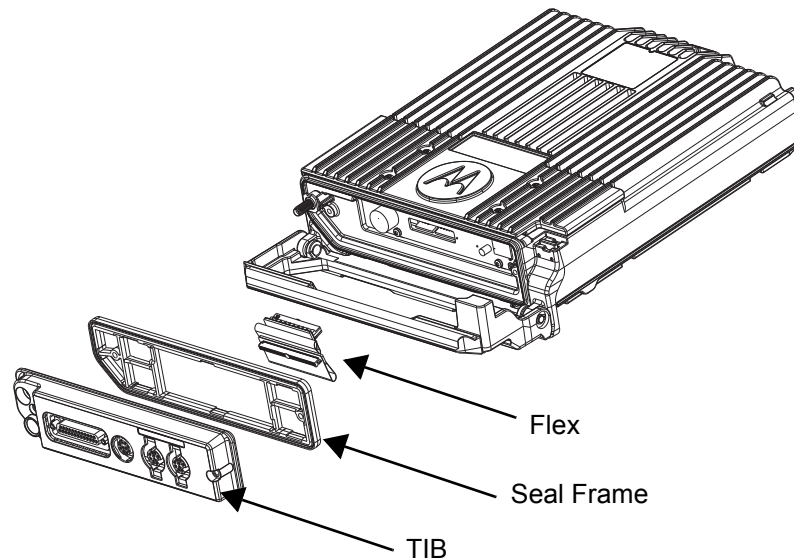


Figure 8-78. Removing the Flex (Transceiver Interface Board Connector)

4. For option-equipped radios, do the following prior to disassembly of the transceiver:
  - a. Remove the two screws holding the option board in place.
  - b. Grab the Small Handle on the option board, and gently pull the option board away from the chassis.

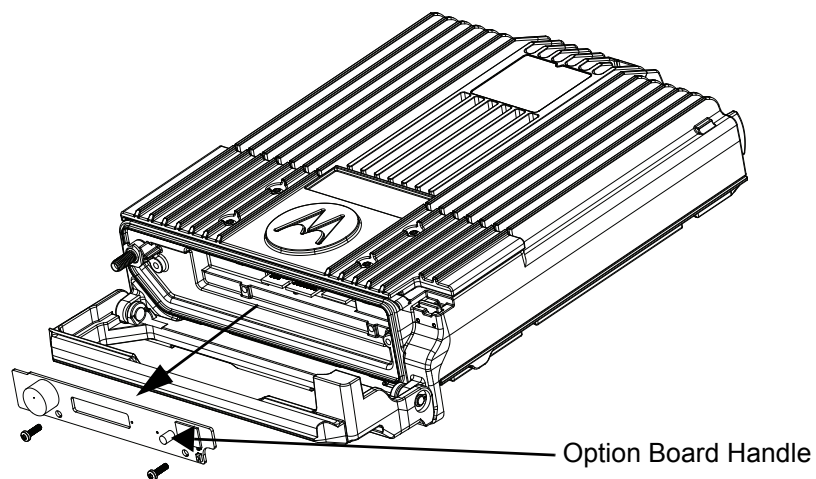


Figure 8-79. Removing the Option Board

5. Remove the four (4) controller cover screws using a T-20 torx bit. These screws have sealing washers that should be kept with the screw. Do not discard screws.

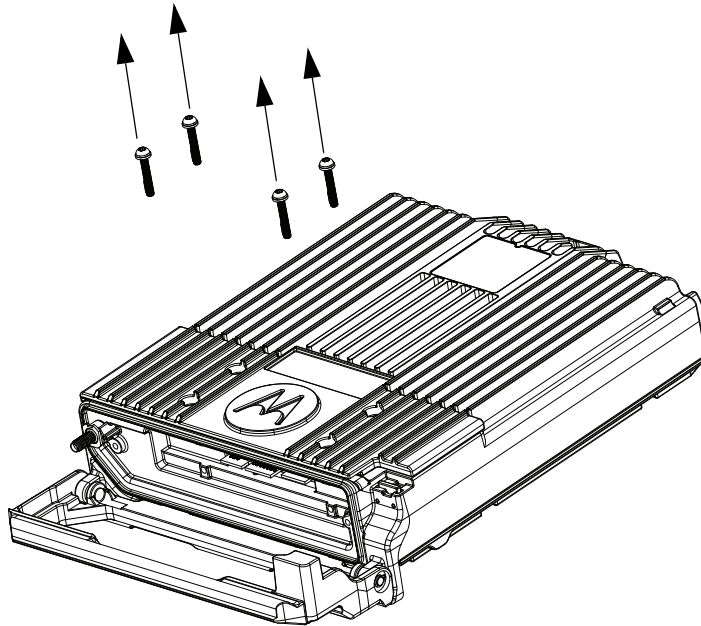


Figure 8-80. Removing the Controller Cover Screws

6. Remove the controller cover by lifting up simultaneously on both side edges. It may be necessary to gently pry the cover off using a plastic tool. Be sure to remove the controller cover seal. Do not discard seal.

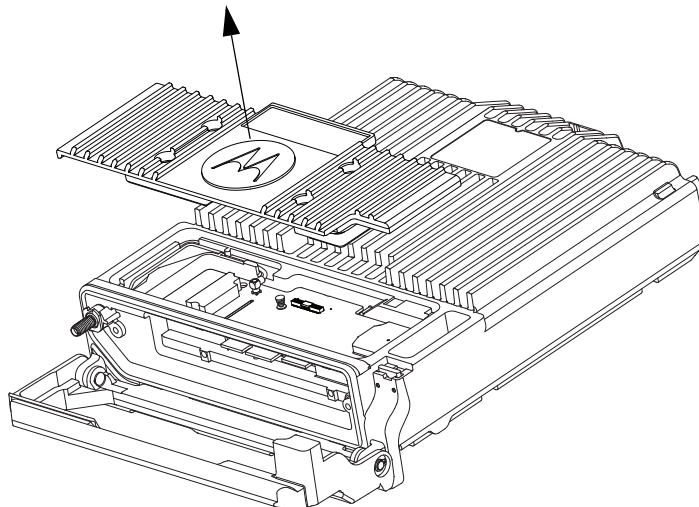


Figure 8-81. Lifting the Controller Cover

7. Disconnect the GPS cable from the controller board by gently holding the controller board in place and pulling up on the GPS cable's MMCX connector. Do not pull on the cable section of the GPS cable as damage may occur.

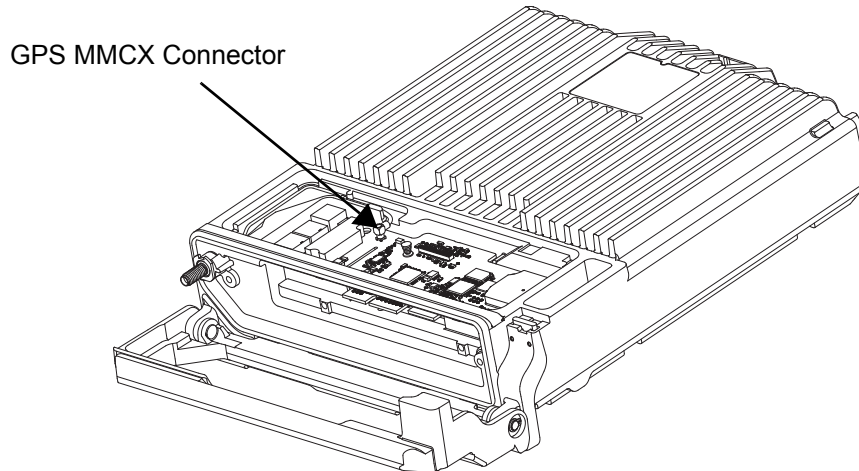


Figure 8-82. Controller Cover Removed

8. Disconnect the controller board from the RF board by inserting a plastic tool into the controller board disengagement slot and gently prying controller board up. Remove the controller board from the chassis using the controller board handle. The controller board needs to be tilted forward and pulled back and out of the chassis to avoid damage to the controller board edge card. Handle the controller board by the handle or edges only, and store in an anti-static bag. Remove the GPS cable from the pinch points and gently pull out of the front of the radio.

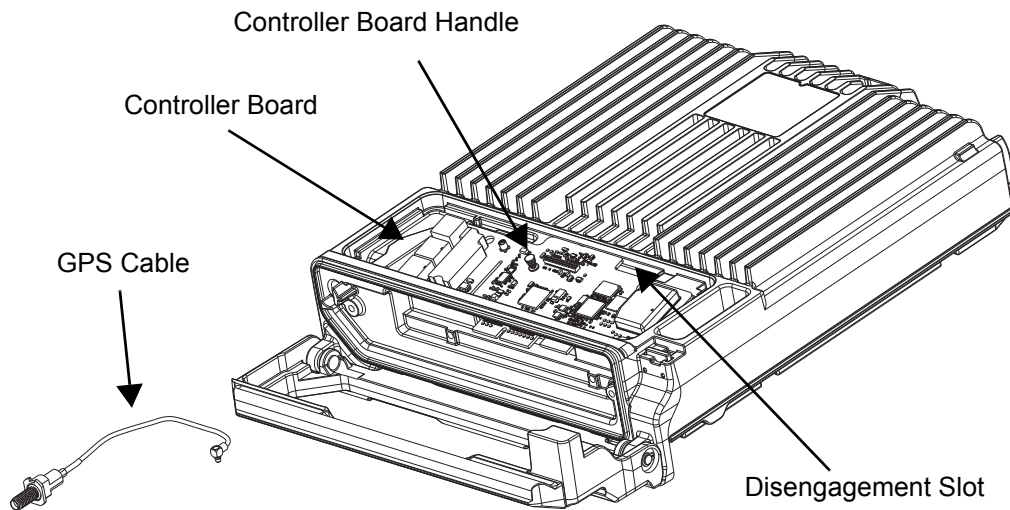
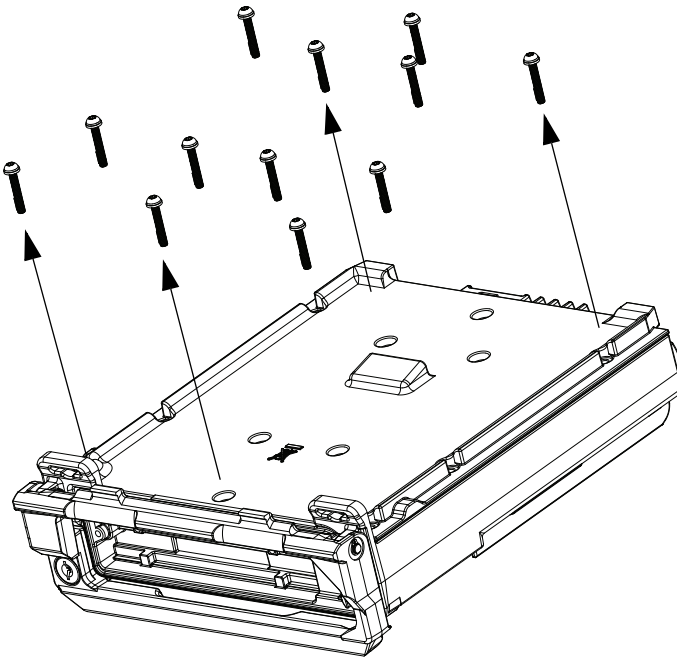


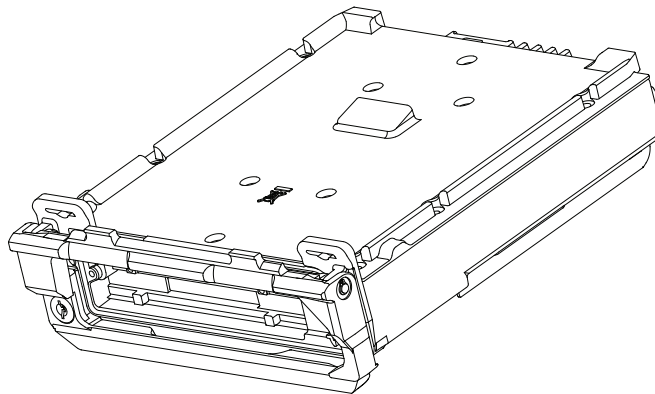
Figure 8-83. Removing the Controller Board

9. **FLIP THE RADIO OVER:** Remove the 12 RF cover screws using a Torx T20 bit. These screws have sealing washers that should be kept with the screw. Do not discard screws.



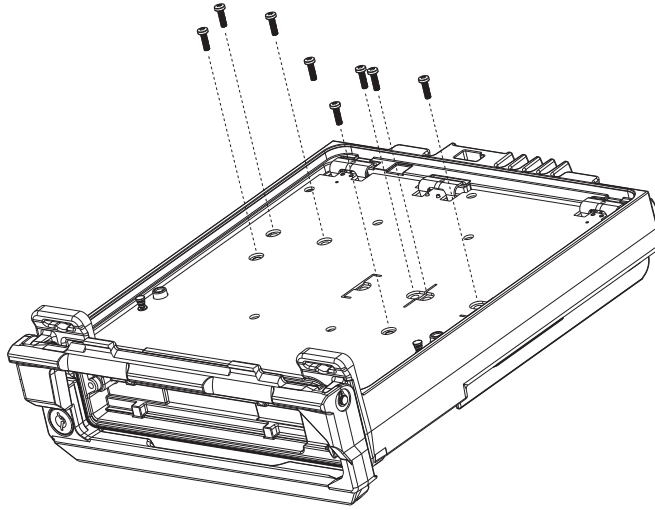
*Figure 8-84. Removing the RF Cover Screws*

10. Remove the RF cover by lifting up simultaneously on both side edges. It may be necessary to gently pry the cover off using a plastic tool.



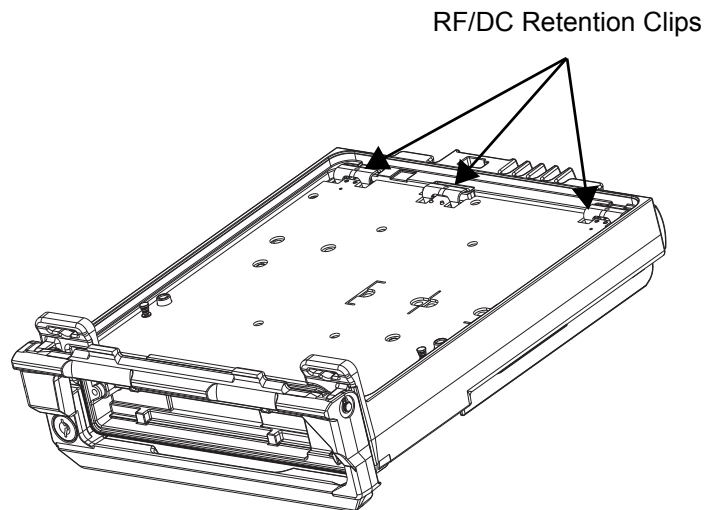
*Figure 8-85. Lifting the RF Cover*

11. Remove the PA screws shown using a Torx T10 bit (up to 10 screws).



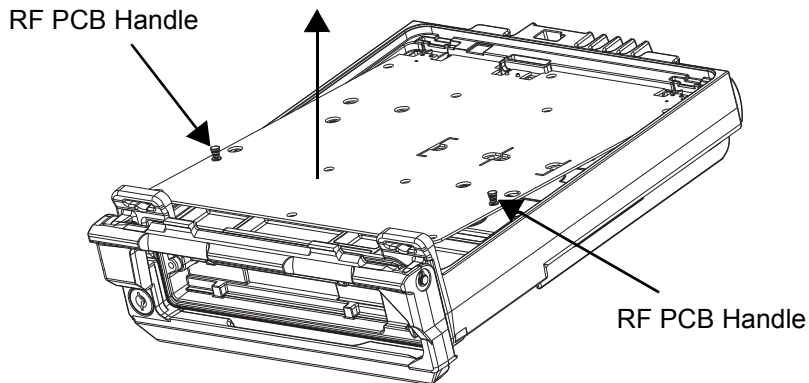
*Figure 8-86. Removing the PA Screws (MP/HP Configuration Shown)*

12. Remove the 3 RF/DC retention clips by gently prying them out with a flat-blade screwdriver. For leverage, use only the chassis, do not use the PCB or any of its components.



*Figure 8-87. Removing the RF/DC Retention Clips*

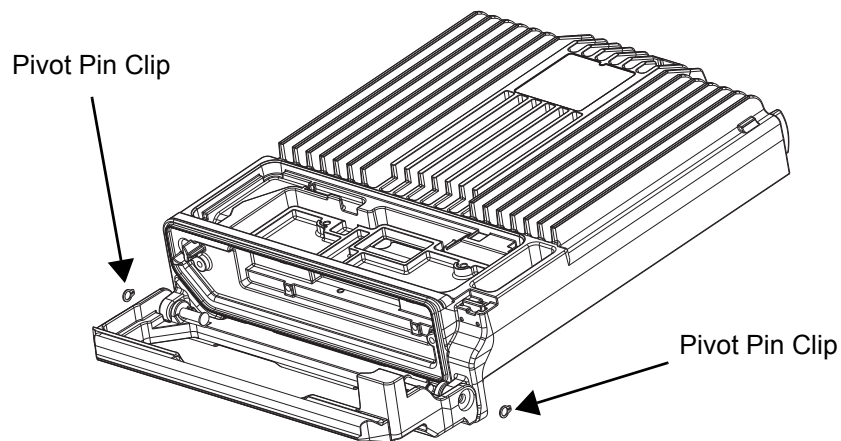
13. Remove the main board by pulling on the two handles on the side of the RF PCB.



*Figure 8-88. Pushing Up the Main Board*

14. Then, slide the main board towards the front of the chassis. Lift it out of the chassis. Handle the main board by the edges only, and store it in an antistatic bag.
15. If Handle Removal is needed; remove the pivot pin clip using a snap ring pliers on the outside of the handle and push the pivot pin towards the middle of the radio, repeat on other side of the handle.

**NOTE:** TIB housing must be removed to disassemble radio handle.

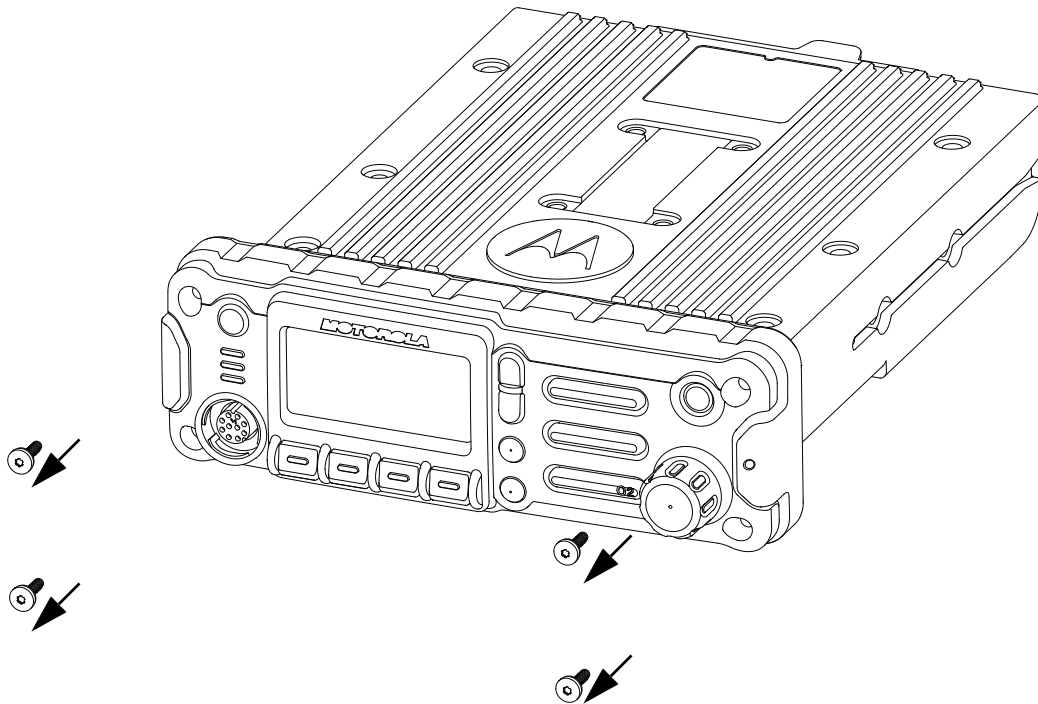


*Figure 8-89. Removing the Pivot Pin Clip*

### 8.2.16.4 O2 Radio Disassembly

Use the following procedures to disassemble your radio:

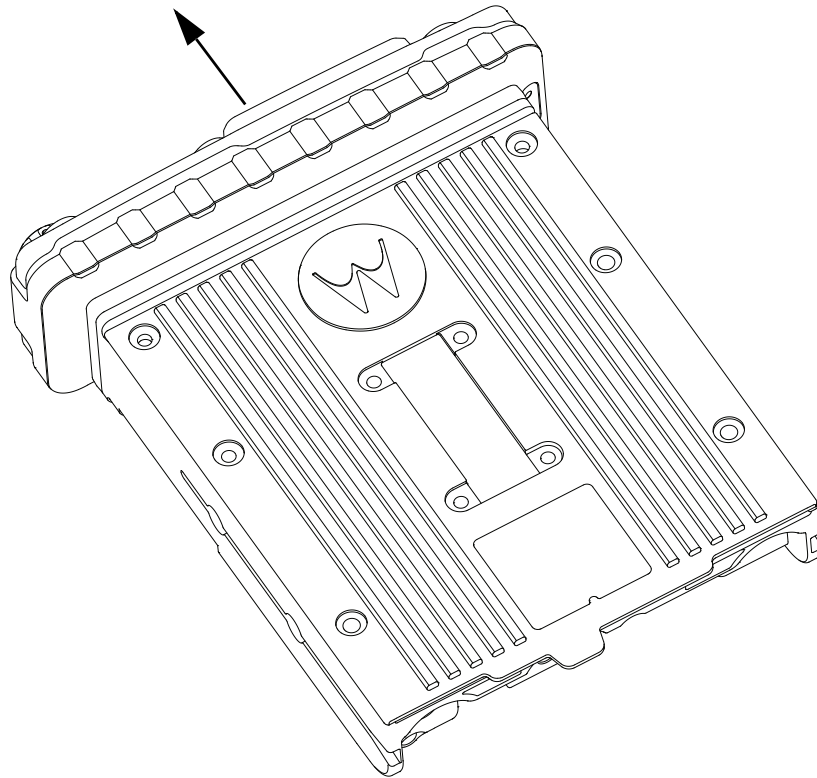
1. Ensure power, antenna, microphone and all accessory connections are unplugged. If the radio is a remote-mount radio, disconnect the remote-mount control cable from the front of the transceiver.
2. Remove the four front control head screws using a T20 and discard them.



*Figure 8-90. Removing the Control Head Screws*

3. Firmly grasp the front panel of the control head or the Transceiver Interface Board (TIB) for remote mount, and carefully remove the front housing assembly from the back housing assembly. Be careful not to pull on the attached flex.

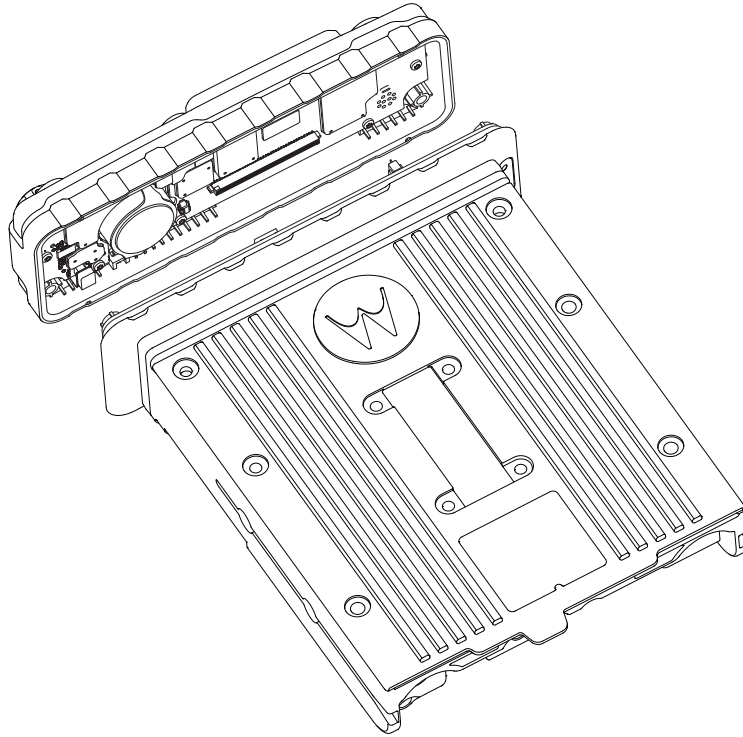




*Figure 8-91. Removing the Control Head*

4. Lay the control head or TIB face down on a clean, flat surface, being careful not to scratch or mar the surface of the display.
5. Carefully disconnect the transceiver flex from the front housing assembly or TIB and set the front housing assembly or TIB aside.

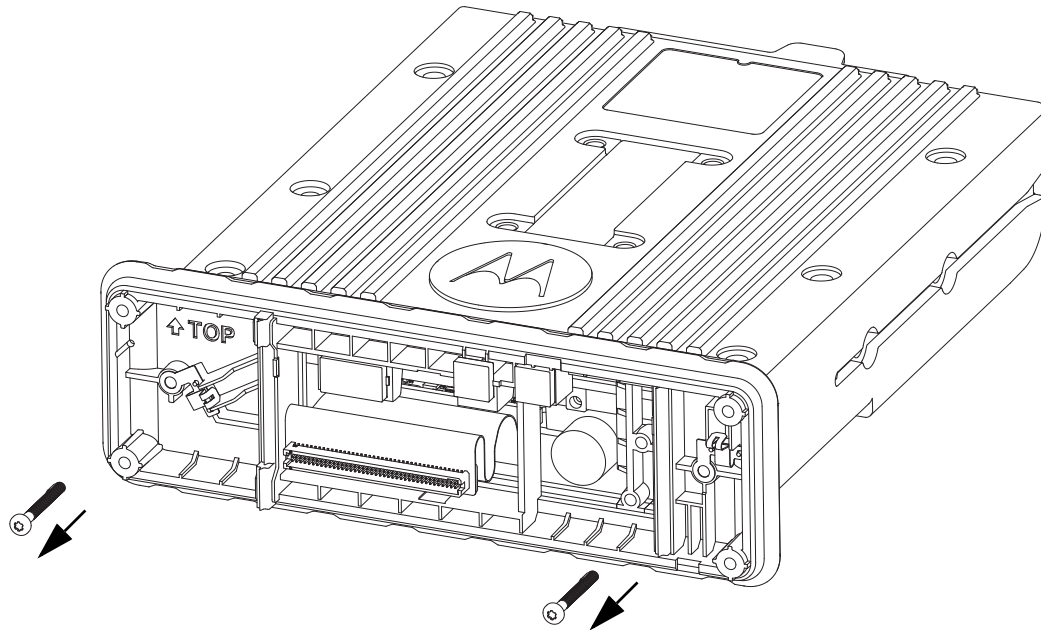
**NOTE:** The O2/O7 knob removal tool can be used as a lever to simplify the task of disconnecting the transceiver flex and reduce the risk of damaging the connectors.



*Figure 8-92. Disconnecting the Transceiver Flex from the Front Housing Assembly*

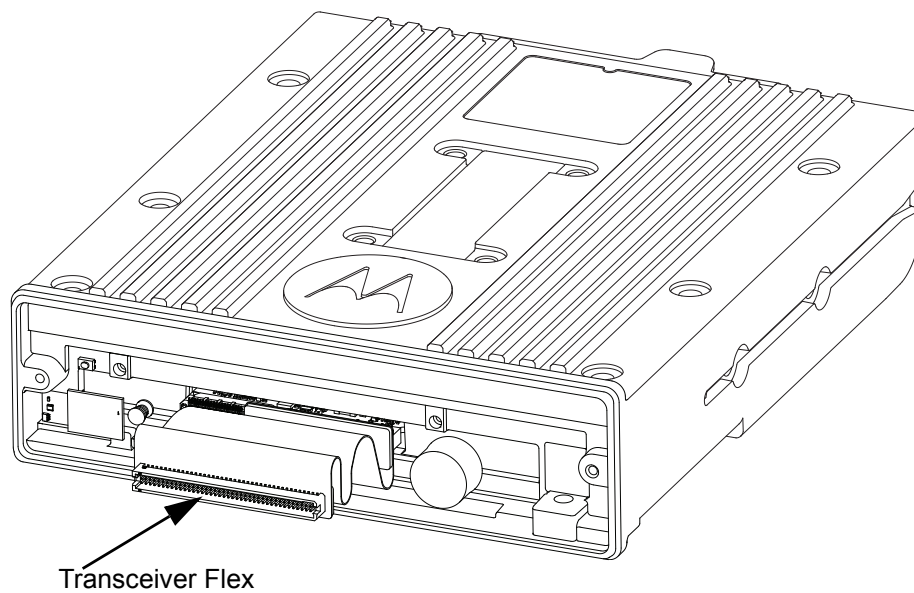
6. Remove the two transceiver screws using a T10 and pull the back housing assembly away from the transceiver. Do not reuse the transceiver screws.

**NOTE:** Be careful to avoid pulling on the flex.



*Figure 8-93. Removing the Back Housing Assembly*

7. Carefully remove the transceiver flex from the transceiver by grasping the provided handle and separating it from the connector.

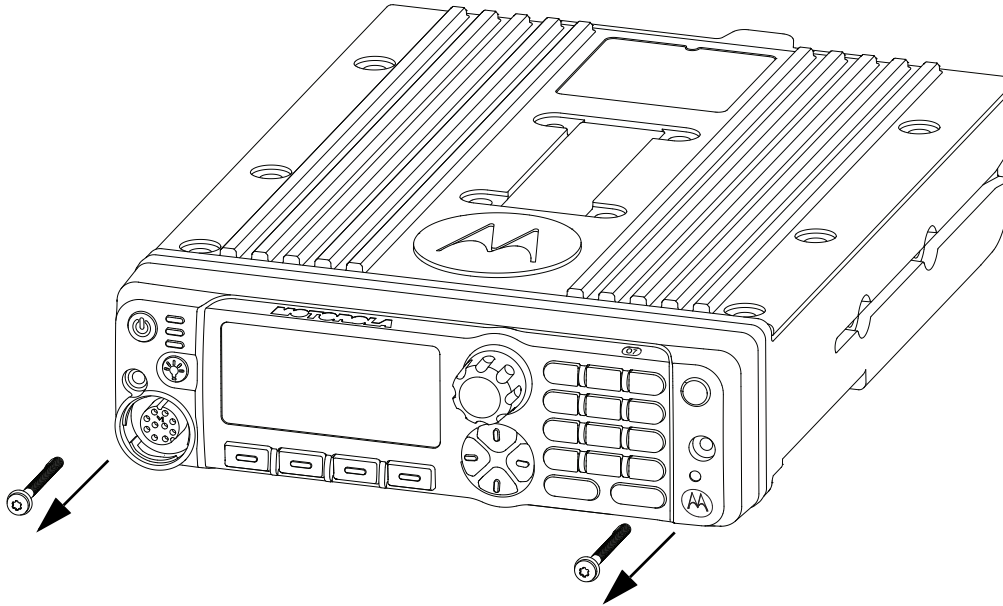


*Figure 8-94. Removing the Transceiver Flex*

### 8.2.16.5 O7 Radio Disassembly

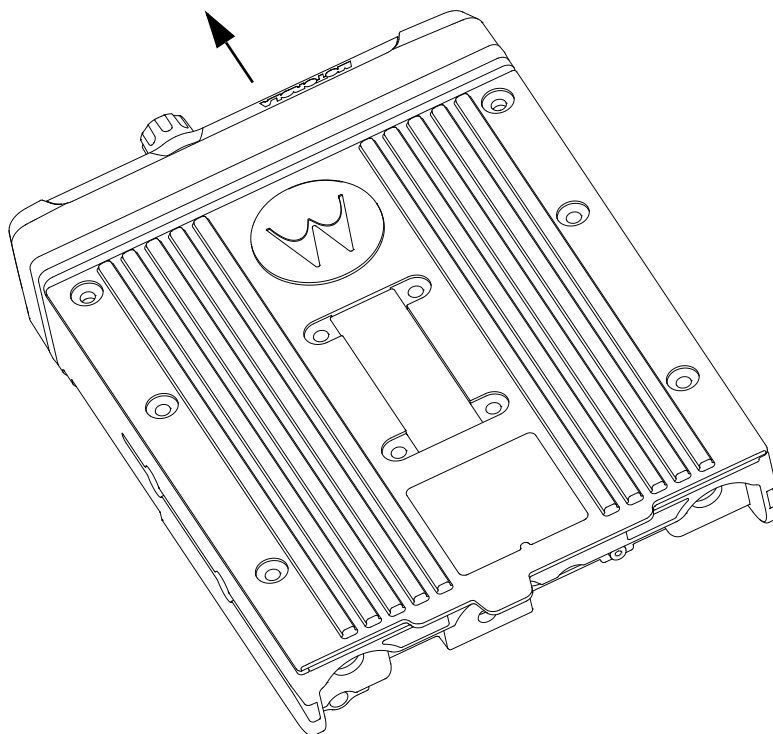
Use the following procedures to disassemble your radio:

1. Ensure power, antenna, microphone and all accessory connections are unplugged. If the radio is a remote-mount radio, disconnect the remote-mount control cable from the front of the transceiver.
2. Remove the two transceiver screws using a T10 and discard them.



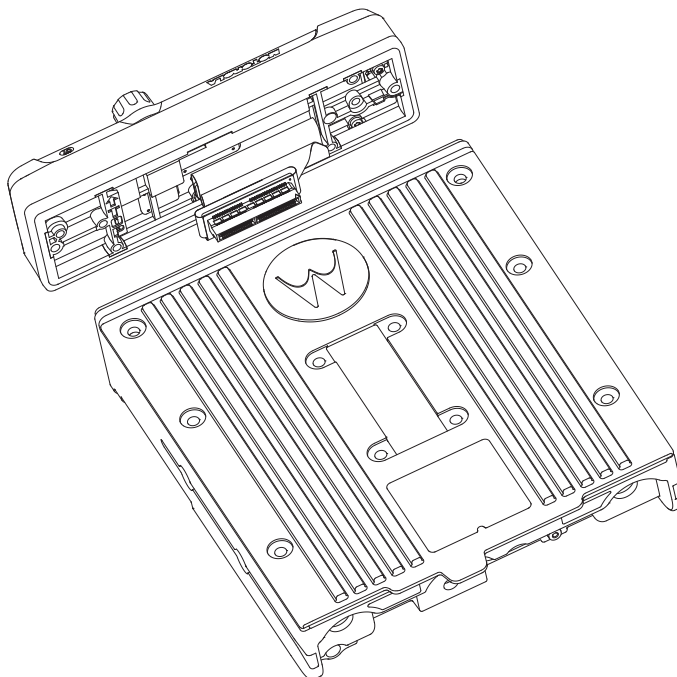
*Figure 8-95. Removing the Transceiver Screws*

3. Firmly grasp the control head or the Transceiver Interface Board (TIB) for remote mount, and carefully remove the control head from the transceiver. Be careful not to pull on the attached flex.



*Figure 8-96. Removing the Control Head*

4. Lay the control head or TIB face down on a clean flat surface, and be careful not to scratch or mar the surface of the display.
5. Carefully remove the transceiver flex from the transceiver by grasping the provided handle and separating it from the connector. Set the transceiver aside.



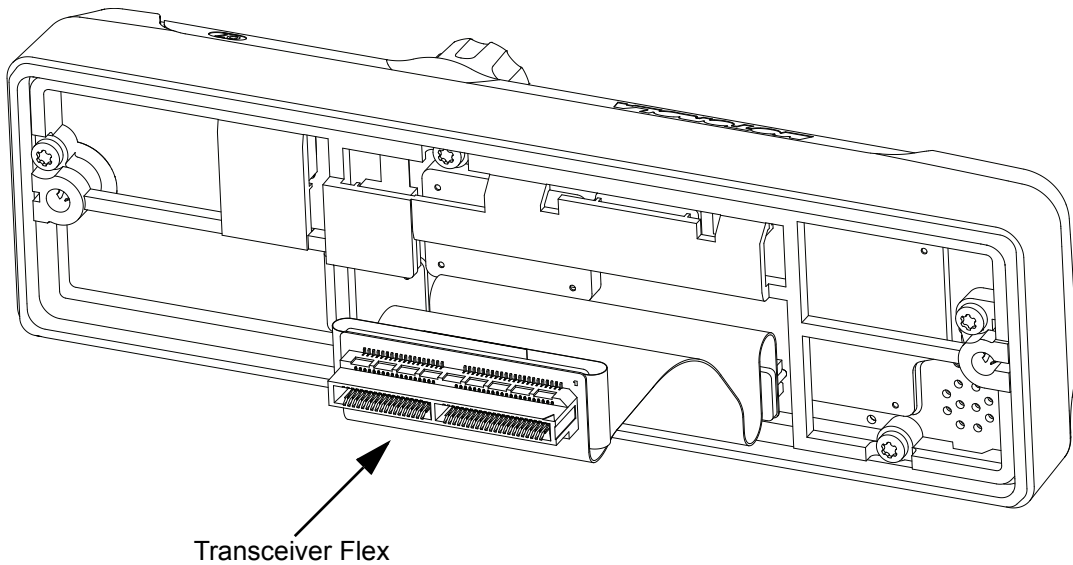
*Figure 8-97. Disconnecting the Transceiver Flex from the Transceiver*

- Carefully separate the I-seal from the control head or TIB.

**NOTE:** Be careful not to damage the transceiver flex when separating the I-seal from the control head or TIB.

- Carefully disconnect the transceiver flex from the control head or TIB.

**NOTE:** The O2/O7 knob removal tool can be used as a lever to simplify the task of disconnecting the transceiver flex and reduce the risk of damaging the connectors.

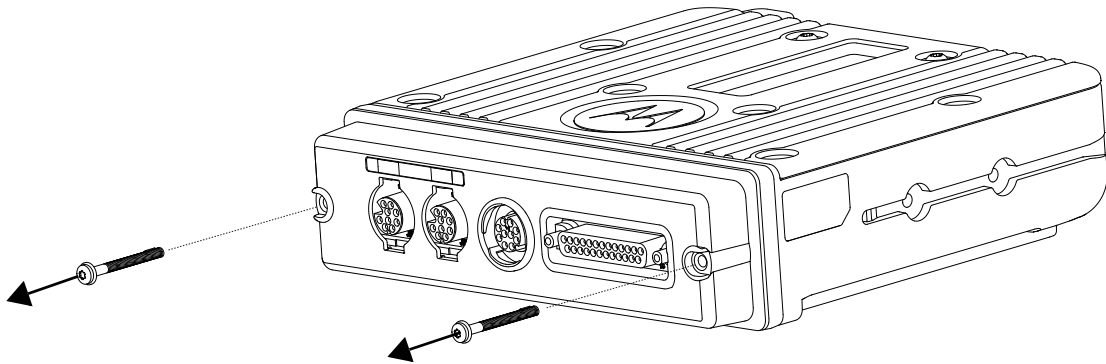


*Figure 8-98. Removing the Transceiver Flex*

### 8.2.16.6 TIB Disassembly

Use the following procedures to disassemble your radio:

1. Ensure all accessories connections, power, antenna, and microphone are unplugged. If radio is in remote mount configuration, disconnect the remote-mount control cable (CAN cable) from the transceiver.
2. Remove the two (2) transceiver interface board (TIB) screws using a T-10 torx bit, do not discard screws.



*Figure 8-99. Removing the TIB Screws*

3. Firmly grasp the TIB front housing and frame seal, and carefully remove from the radio. Be careful not to pull on the attached flex or damage the edge card during TIB removal.

4. Lay the TIB face down on a clean, flat surface, being careful not to scratch or mar the face of the display.

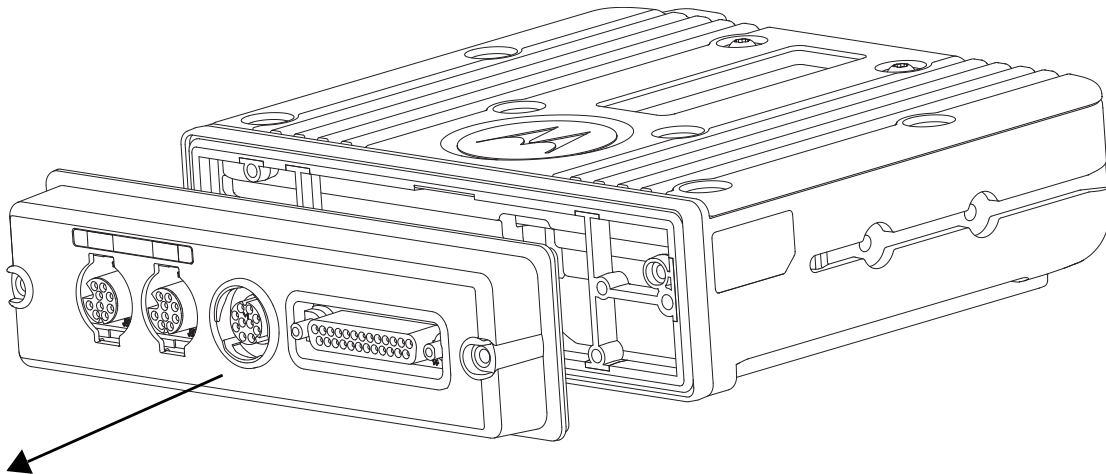


Figure 8-100. Laying down the TIB

5. Carefully disconnect TIB flex/ remote mount flex from transceiver's edge card.

**NOTE:** "Carefully" means that the control head flex shall be disconnected from its mating control head connector by applying equal amounts of pressure on both ends of the mated pair until they fully disconnect. While disconnecting, make sure both mated pairs are pulled apart in a straight-forward [or "in-line"] direction parallel to the longitudinal axis of the connector pins.

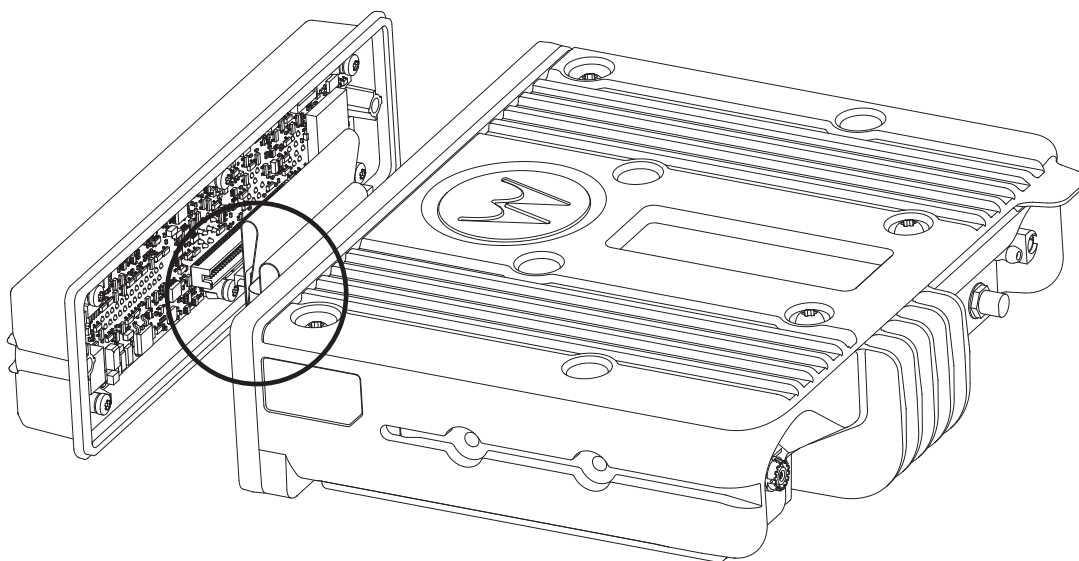


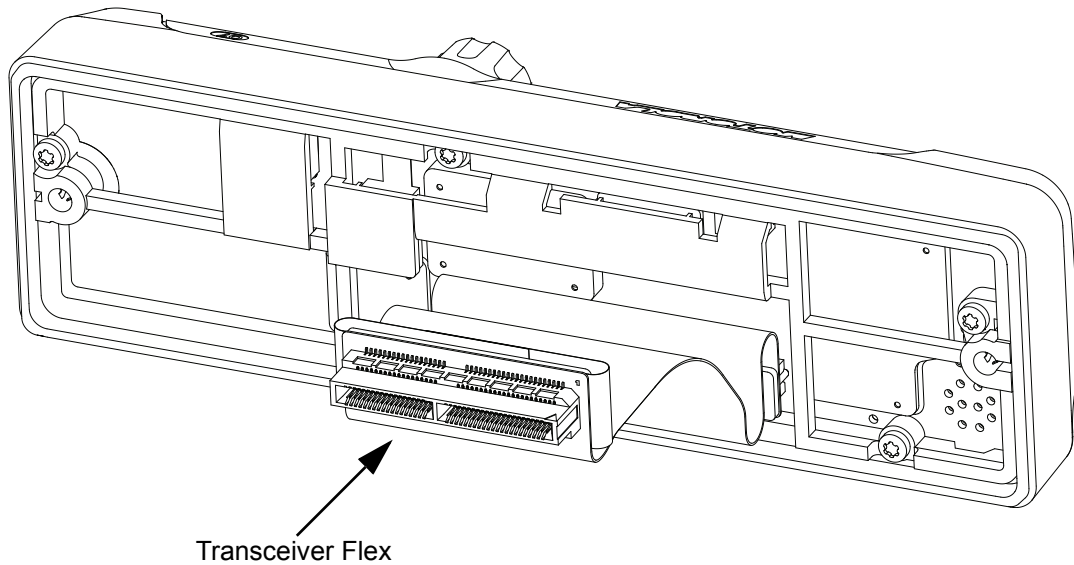
Figure 8-101. Disconnecting Remote Mount Flex from the Transceiver



6. Carefully separate the I-seal from the TIB.

**NOTE:** Be careful not to damage the remote mount flex when separating the I-seal from the TIB.

7. Carefully disconnect the transceiver flex from the TIB.



*Figure 8-102. Separating I-Seal from TIB*

## 8.2.17 Radio Reassembly

### 8.2.17.1 APX 5500/APX 6500/APX 7500/APX 6500Li Mid Power Models

**NOTE:** Prior to reassembling the radio, inspect all seals and sealing surfaces for damage (nicks, cuts, etc.) or dirt. Reseat all seals on their respective parts.

Use the following procedures to reassemble your radio.

1. Begin with the chassis. Thoroughly inspect the chassis shield gasketing for damage and verify all chassis thermal pads are in place and free of damage. See [Chapter 8. Chassis Thermal Pad Replacement Procedure](#) to replace damaged pads.

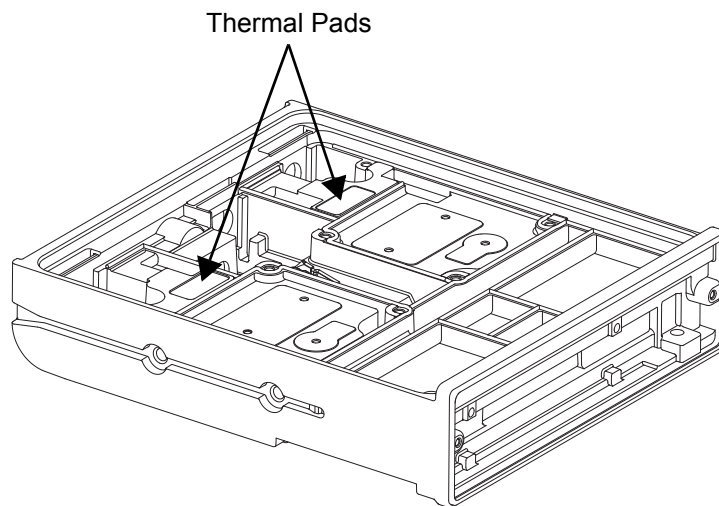


Figure 8-103. Inspecting the Chassis Shield Gasketing and Thermal Pads

2. After inspecting the GPS cable and seating the seal on the SMA connector ferrule, insert the GPS SMA connector through the GPS cable chassis opening, ensuring the notch on the GPS connector is down and aligned with the protrusion on the chassis. Install the lock washer. Install the GPS nut using a 5/16" nut driver and torque nut to 7-9 in-lbf.

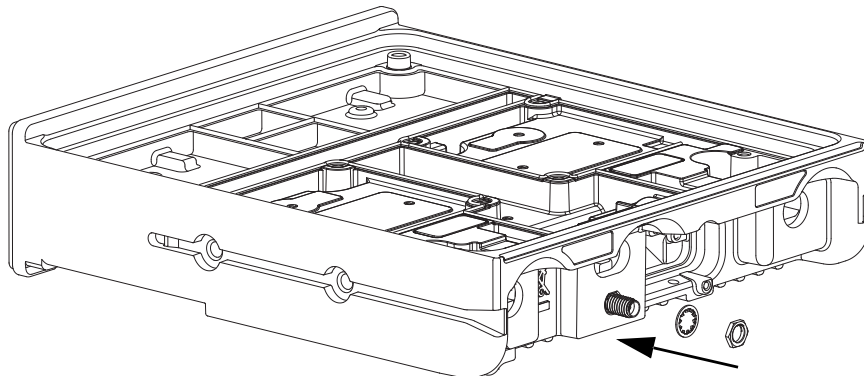


Figure 8-104. Installing the GPS Nut and Torque Nut

3. Insert free end of GPS cable through the RF/controller board chassis opening. Retain cable by pushing cable into chassis pinch points.
4. Insert rear accessory flex through rear chassis opening. Be sure flex is oriented with components facing up. Insert free end of accessory flex through the RF/controller board chassis opening.

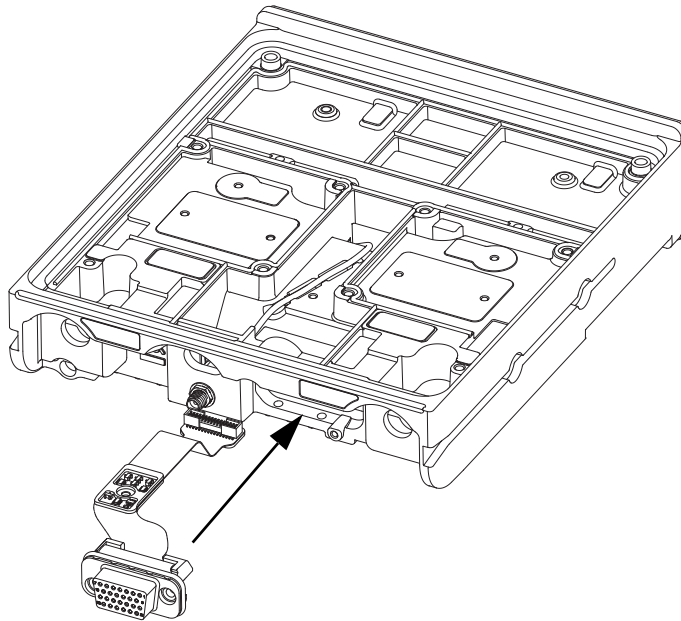


Figure 8-105. Inserting Rear Accessory Flex

5. Install the two (2) rear accessory connector screws using a T-10 torx bit. Be sure the rear accessory screws each have one (1) washer and one (1) seal. Torque rear accessory connector screws to 6-8 in-lbf.

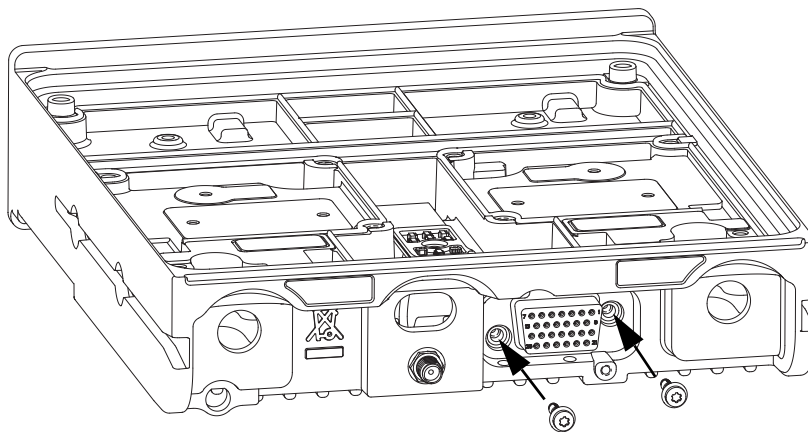
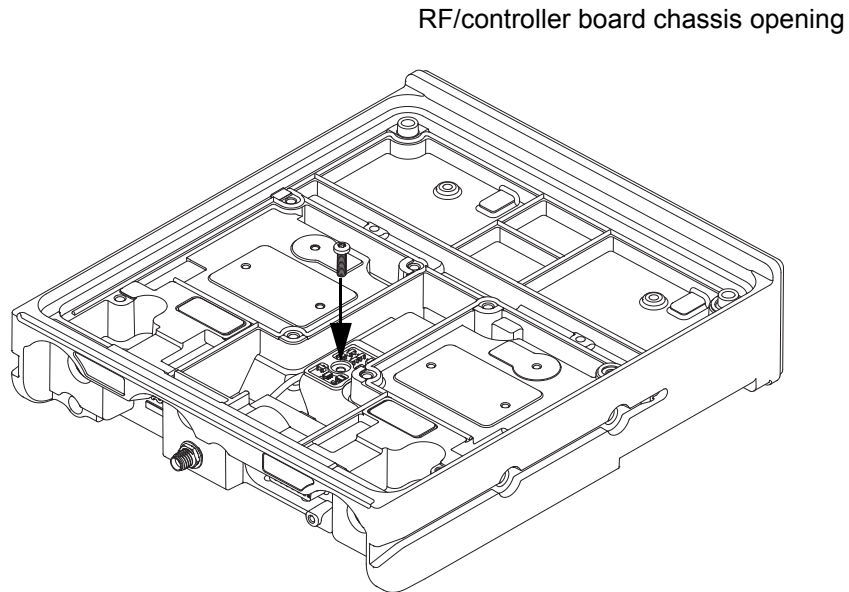


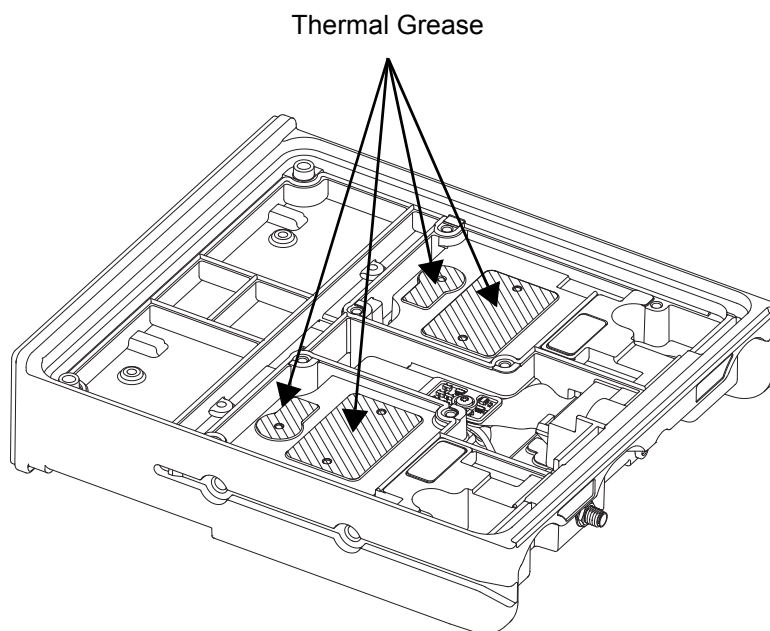
Figure 8-106. Installing Rear Accessory Connector Screws

6. Ensure flex is positioned as shown in [Figure 8-107](#) with small connector end of the flex passed through the RF/controller board chassis opening. Install accessory flex screw using a T10 torx bit. Torque accessory flex screw to 6-8 in-lbf.



*Figure 8-107. Installing Accessory Flex Screw*

7. Reapply thermal grease (p/n 1110022D23) to all RF board heat sinks. All heat sinks need to be covered with a smooth thin layer of thermal grease.



*Figure 8-108. Applying Thermal Grease to RF Board Heat Sinks*

8. Check that the DC connector seal on the RF board is properly seated.
9. Check that the RF connector seals on the RF board is properly seated.

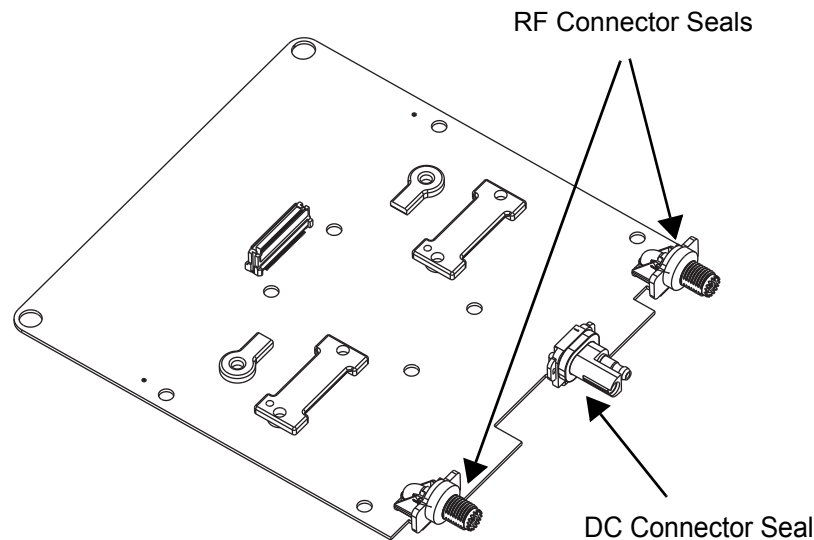


Figure 8-109. Ensuring RF and DC Connector Seals are properly seated

10. Install RF board by tilting and sliding into chassis using the two (2) RF board handles, taking care to line up the two (2) RF and one (1) DC connectors through the rear holes of the chassis. To fully seat RF board, push back and down on the board using the two (2) RF board handles to slightly compress RF/DC seals. Ensure that the RF board alignment holes are positioned over the chassis alignment bosses and that the RF board is fully seated in chassis.

**NOTE:** It is important that the RF Board get assembled prior to the placement of the Controller board and the assembly of the Controller Cover.

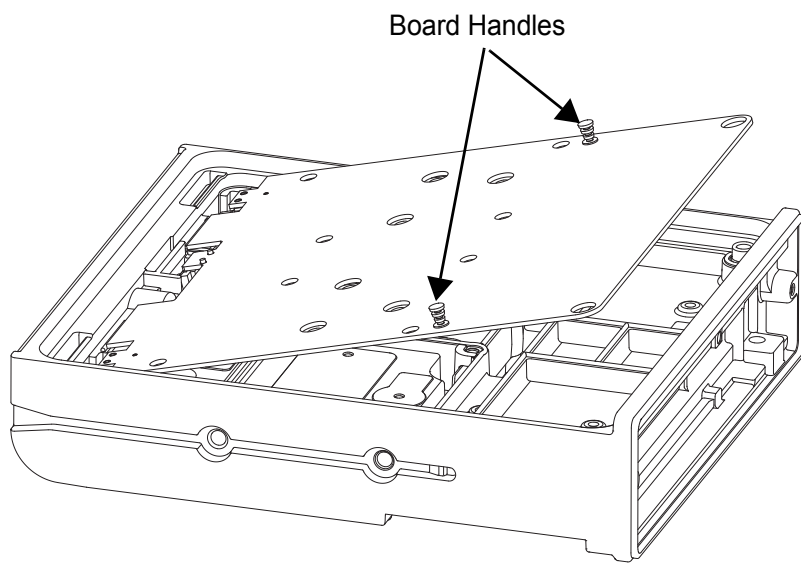


Figure 8-110. Inserting RF Board into Chassis

11. Insert the RF/DC retention clips and fully seat them. The DC clip should be placed first then the RF clips. All clips must be inserted prior to the board screws to properly locate RF board.

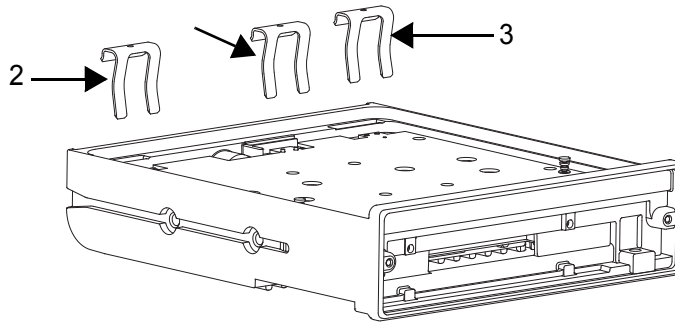


Figure 8-111. Inserting RF/DC Retention Clips

12. Install the PA screw using a T-10 torx bit. Three (3) PA screws are needed for single band radios, six (6) PA screws are needed for dual band radios. Torque down the PA screws to 12-14in-lbs.

Table 8-2. Number of PA Screws to Install

Radio Bands	PA Screws
Single Band	3
Dual Band	6

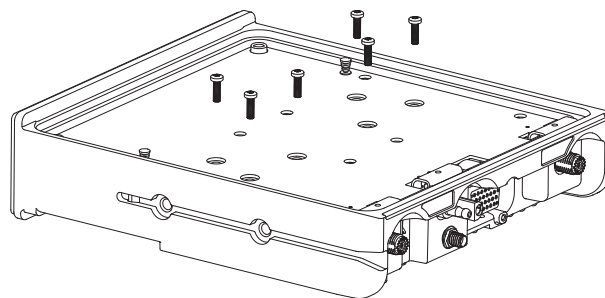


Figure 8-112. Installing PA Screws

13. Inspect RF cover for installation of the reverse polarity and voltage regulator thermal pads. Then inspect and properly seat the RF cover seal. Be careful to properly align the RF cover seal tab to the RF cover.

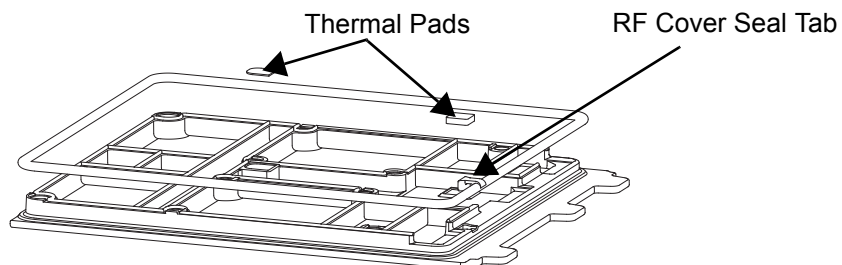


Figure 8-113. Inspecting Thermal Pad and Installing RF Cover Main Seal

14. Place the RF cover onto the chassis. Be sure RF cover is properly aligned to chassis. The RF cover and chassis can be compressed together to squeeze seal into place.

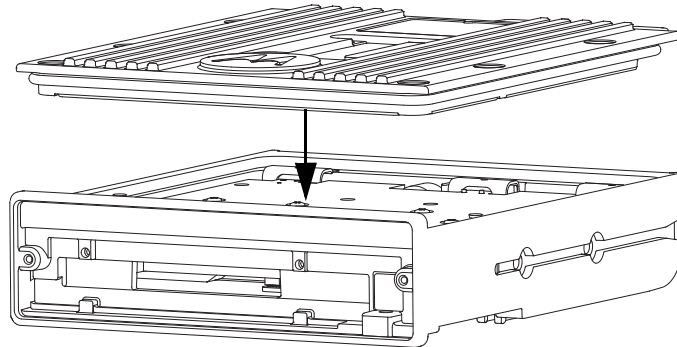


Figure 8-114. Securing RF Cover to Chassis

15. Inspect the sealing washers to the ten (10) RF cover screws, and then install the screws onto the RF cover/chassis. Torque the RF cover screws to (34-36 in-lbf), be sure to torque screws using the indicated order to ensure RF cover is properly seated. Repeat torque order sequence at least twice!

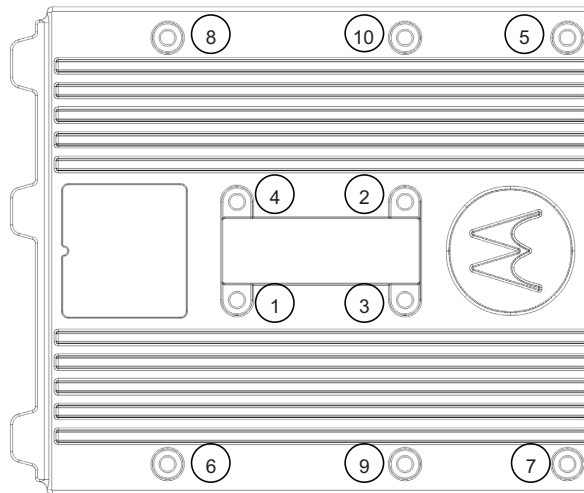


Figure 8-115. Securing the RF Cover to the Chassis

16. Once RF cover is fully installed, check the RF cover-chassis interface to ensure the RF cover seal is not pinched.

17. FLIP RADIO OVER: Install the controller board into the chassis by tilting controller board edge card through front opening using the controller board handle and then down into the chassis. Be sure to hold GPS cable and accessory flex out of controller chassis pocket. Once controller board is placed in chassis, use the controller board handle to align controller board-to-board (BTB) connector to the RF BTB connector. Once aligned press down on controller board, as shown in the circled area below, to connect the controller/ RF BTB connectors.

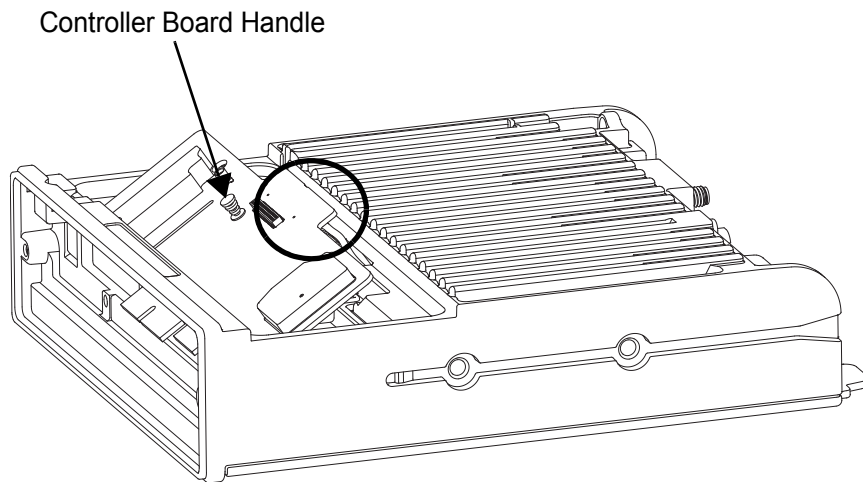


Figure 8-116. Installing the Controller Board into the Chassis

18. Install the accessory flex connector to the controller board connector. Press down on flex backer to ensure proper connection.

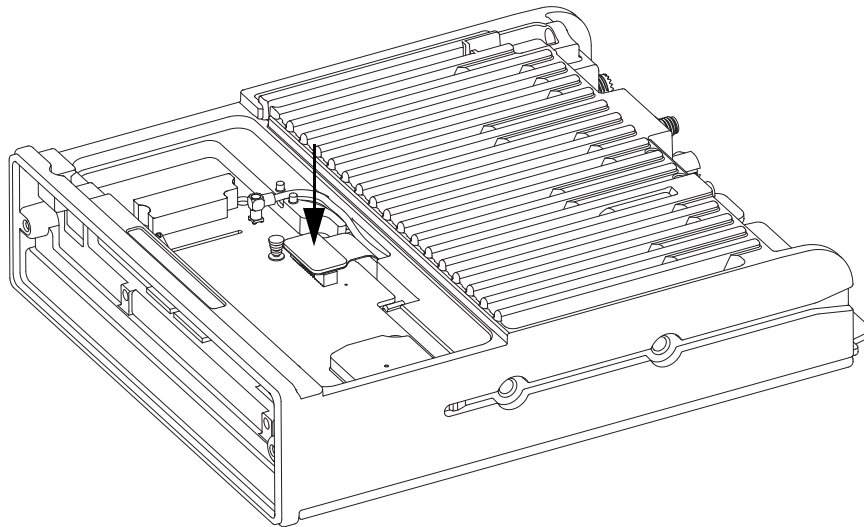
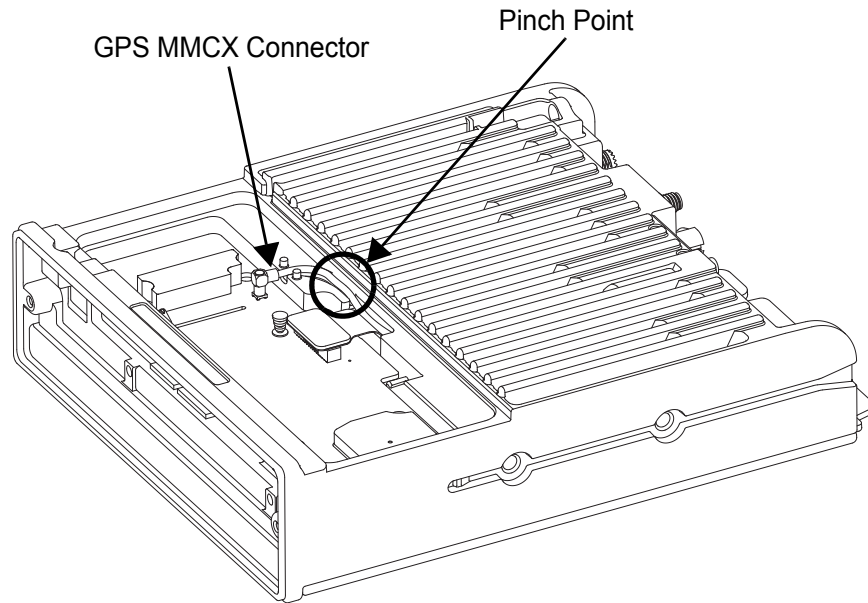


Figure 8-117. Install the Accessory Flex Connector to the Controller Board

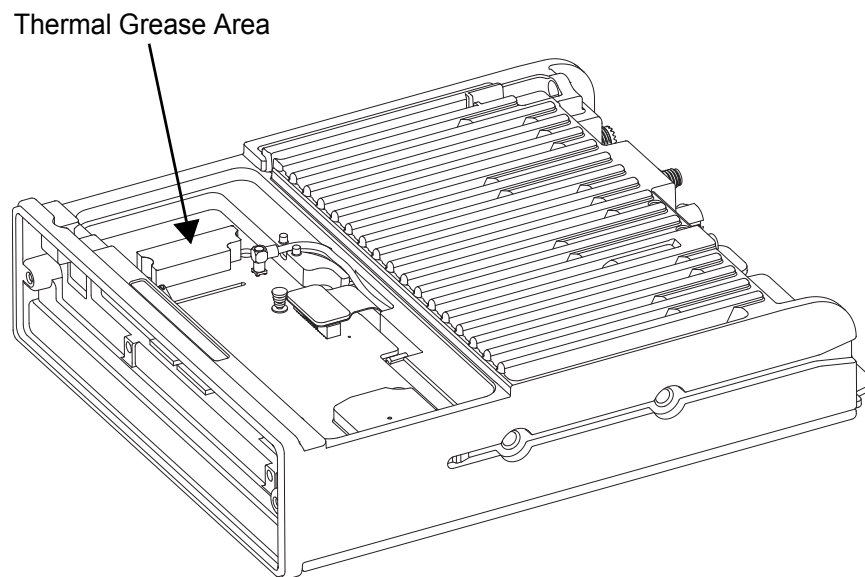


19. Install the GPS MMCX connector to the controller board. Be sure GPS cable is aligned in the GPS cable retention channel. Firmly press down on GPS MMCX connector to snap connector into place. Press cable down into chassis pinch point. Do not press or pull cable as damage may occur.



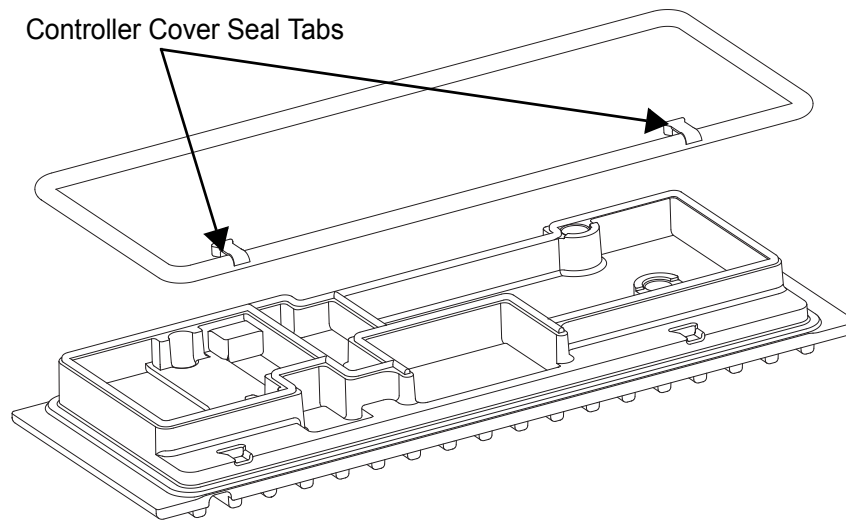
*Figure 8-118. Installing the GPS Connector to the Controller Board*

20. Reapply thermal grease (p/n 1110022D23) to the controller board heat sink. The heat sink needs to be covered with a smooth, thin layer of thermal grease.



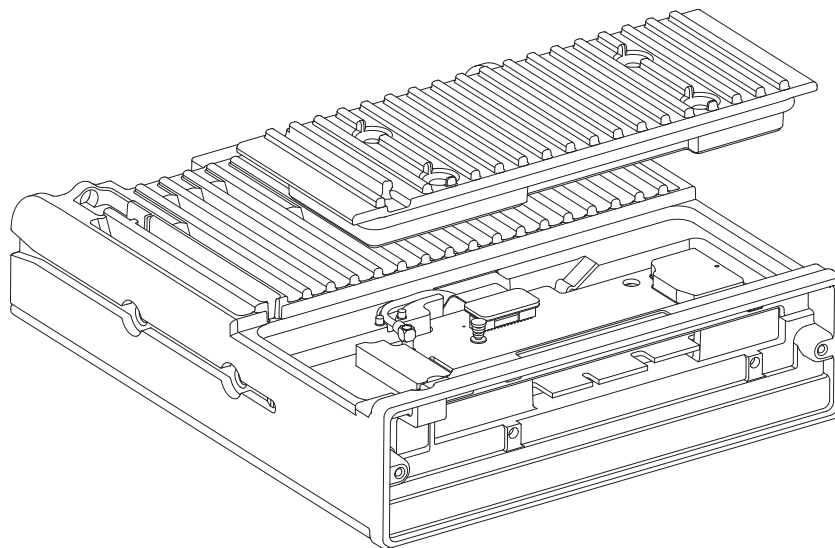
*Figure 8-119. Applying Thermal Grease to the Controller Cover*

21. Inspect and install controller cover seal onto the controller cover. Be sure to correctly align the two (2) controller cover seal tabs to the controller cover.



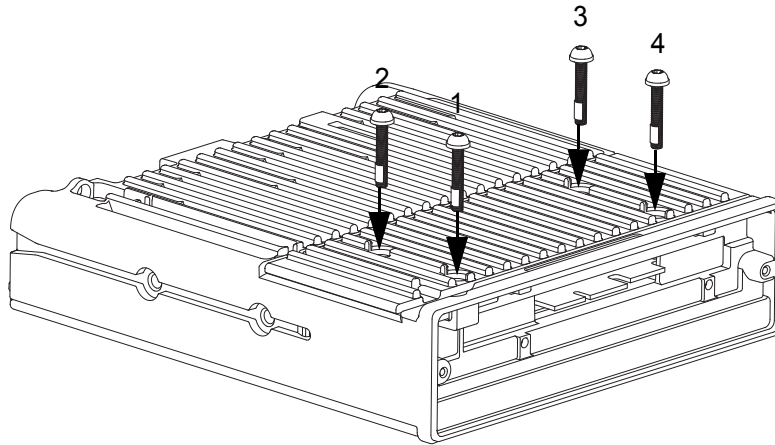
*Figure 8-120. Inspecting and installing Controller Cover Seal onto Controller Cover*

22. Place the controller cover onto the chassis. Be sure controller cover is properly aligned to chassis. The controller cover and chassis can be compressed together to squeeze seal into place.



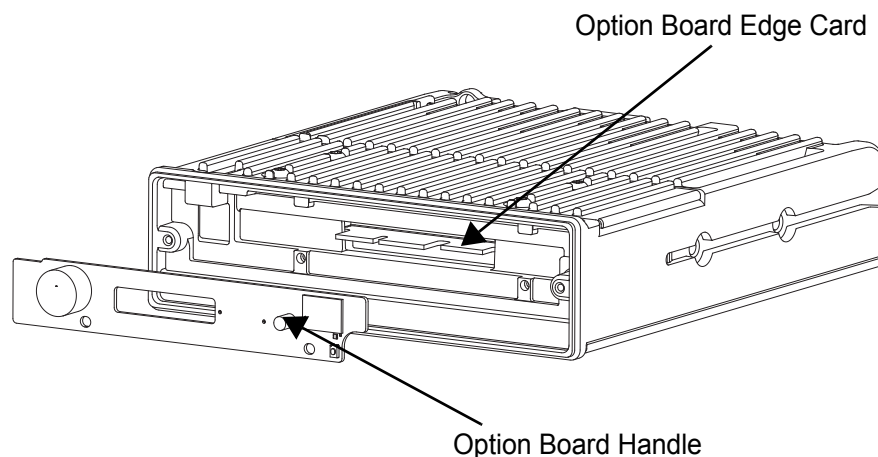
*Figure 8-121. Placing Controller Cover onto Chassis*

23. Inspect the sealing washers to the four (4) controller cover screws, and then install the screws onto the controller cover. Torque the controller cover screws to (34-36 in-lbf), be sure to torque screws starting with the bottom left screw and going around clockwise (see [Figure 8-122](#)) to ensure controller cover is properly seated. Repeat torque order sequence at least twice!



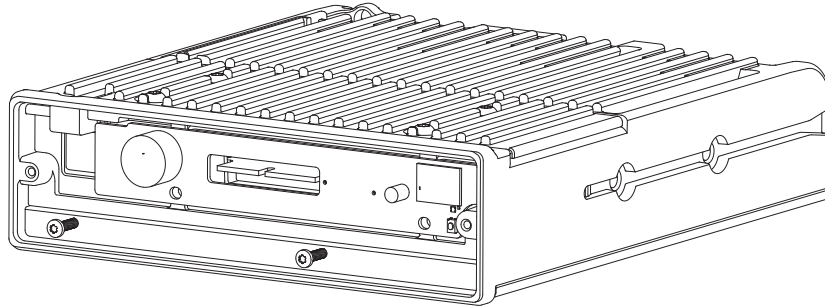
*Figure 8-122. Securing the Controller Cover Screws*

24. Once controller cover is fully installed check controller cover-chassis interface to ensure there is not a pinched controller cover seal. For Radios not equipped with an Option Board, skip to step 27.
25. Install the option board onto the front of the chassis by using the option board handle and plugging the option board edge card connector in to the shorter, single exposed edge card.



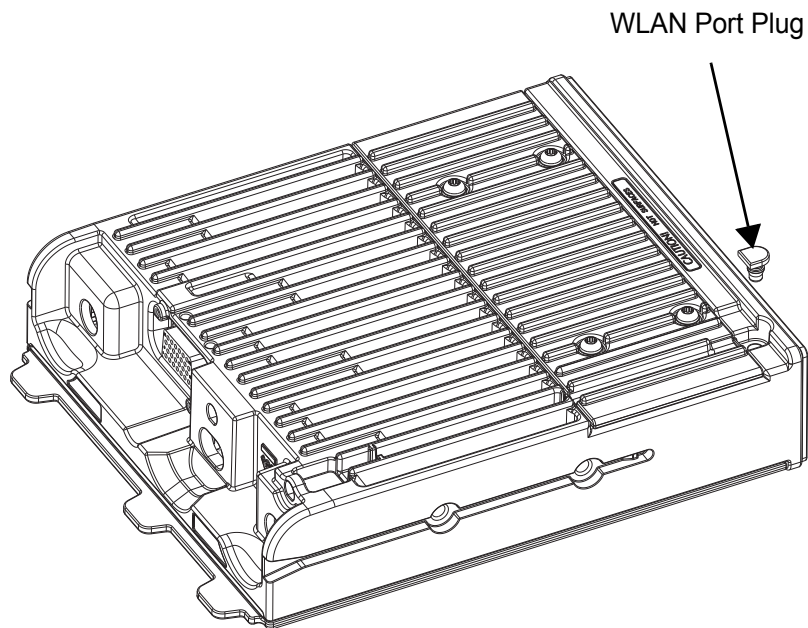
*Figure 8-123. Installing the Option Board*

26. Install the two (2) option board screws using a T-10 torx bit. Torque the option board screws to 6-8 in-lbf.



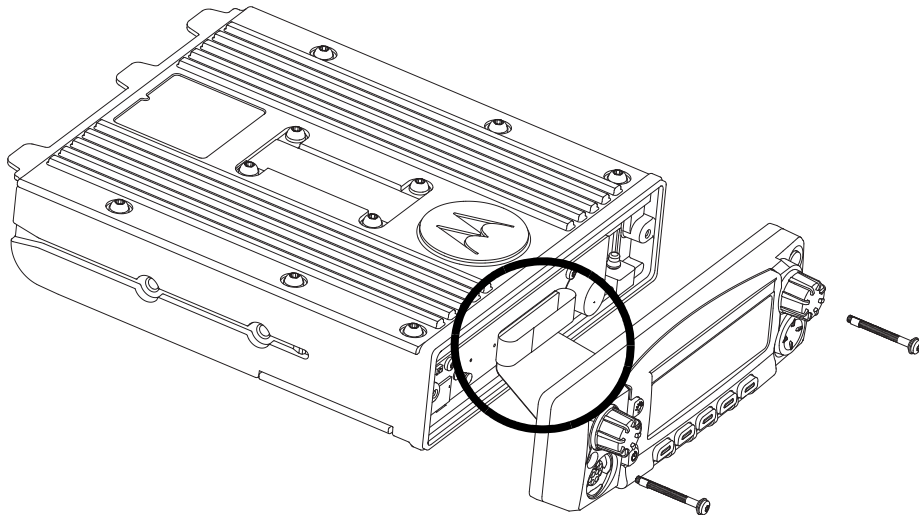
*Figure 8-124. Installing the Option Board Screws*

27. If WLAN Port Plug removed: To re-assemble, align plug to chassis opening and press down to seat. To aid in seating the plug it can be pulled from inside chassis with either tweezers or small needle nose pliers taking care not to damage the sealing surface.

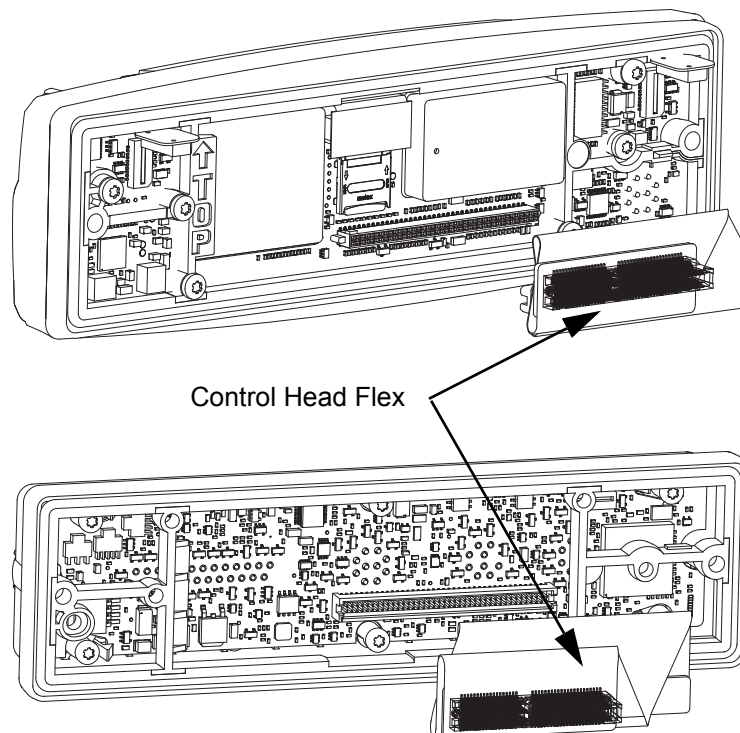


*Figure 8-125. Installing the WLAN Port Plug*

28. Attach the control head/TIB flex edge card connector to edge card. Be sure to properly align edge card connector to exposed edge card.



**AREA ENLARGED**



*Figure 8-126. Installing Flex into Controller PCB*

29. TIB: Align the frame seal to TIB. Compress TIB and frame seal together to be fully seated.

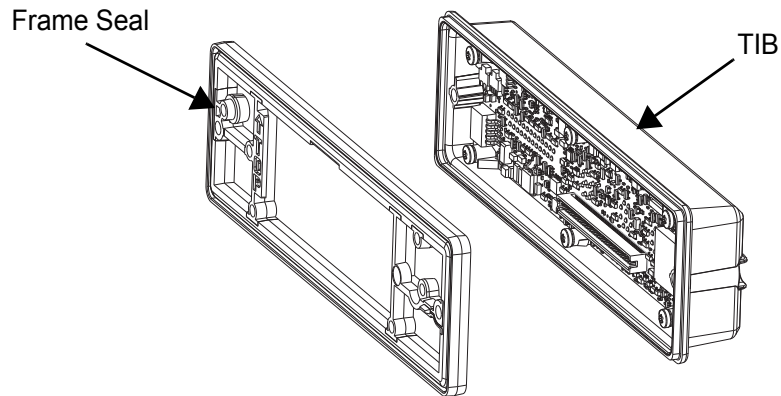


Figure 8-127. Aligning frame seal to TIB

30. Install control head/TIB flex to control head/TIB. Be sure to properly align connectors prior to connecting.

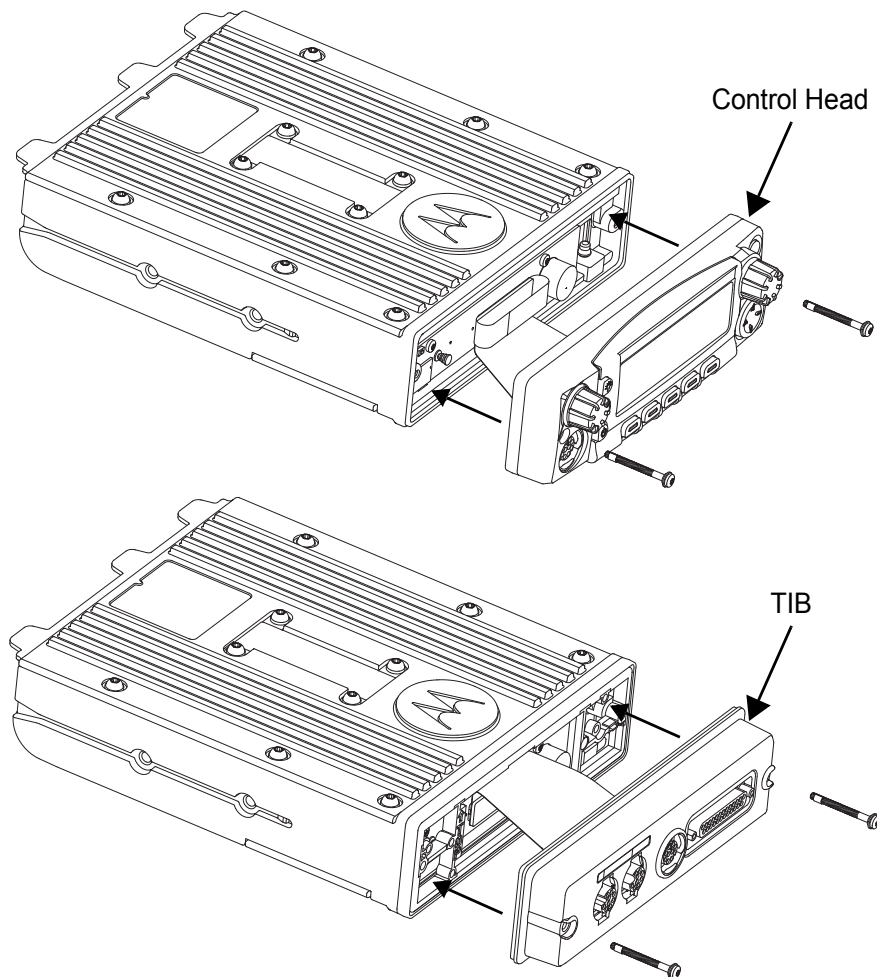
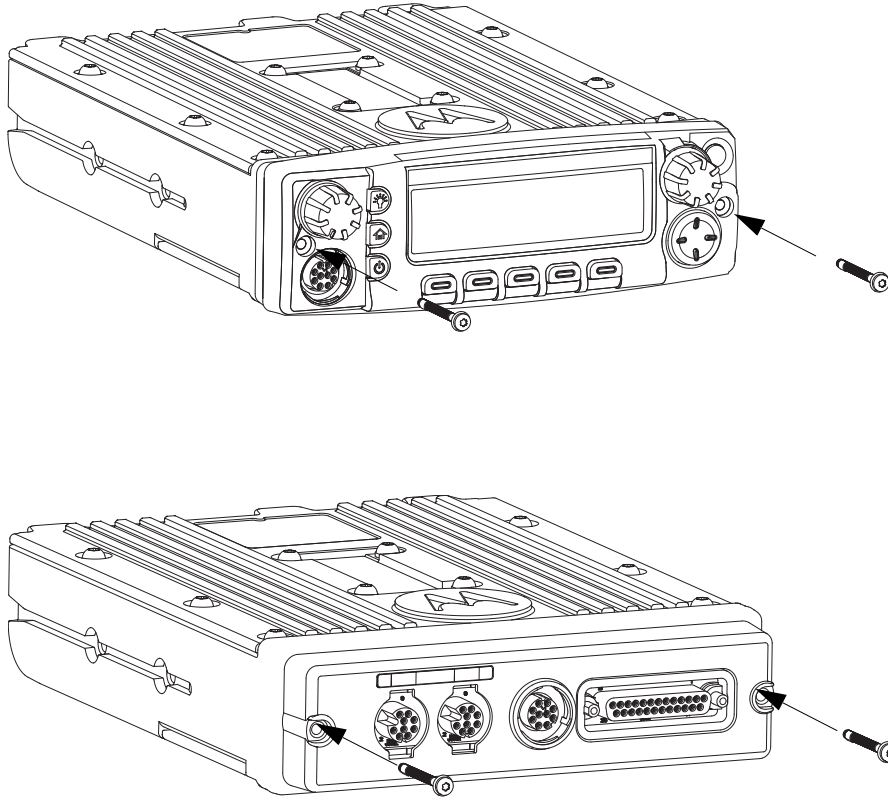


Figure 8-128. Installing Control Head/TIB Flex to Control Head/TIB

31. Align control head/TIB to front of chassis using the frame seal. Install two (2) control head/TIB screws. Be sure the control head/TIB screws each have one (1) washer and one (1) seal installed. Torque down control head/TIB screws to 8-10 in-lbf.



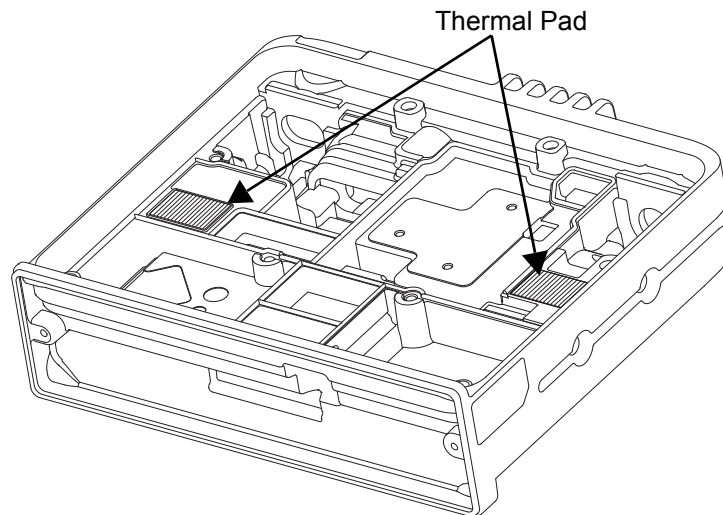
*Figure 8-129. Aligning Control Head/TIB front of chassis, and Installing the Control Head/TIB screws*

### 8.2.17.2 APX 2500/4500/4500Li Mid Power Models

**NOTE:** Prior to reassembling the radio, inspect all seals and sealing surfaces for damage (nicks, cuts, etc.) or dirt. Reseat all seals on their respective parts.

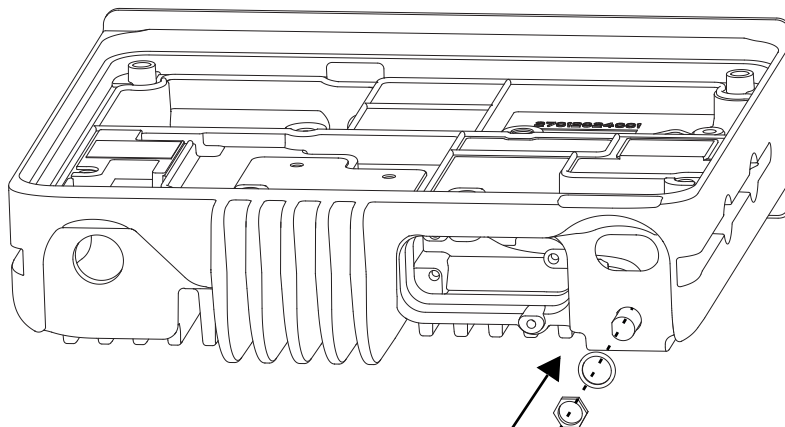
Use the following procedures to reassemble your radio.

1. Begin with the chassis. Thoroughly inspect chassis shield gasketing to ensure there is no damage, and verify all chassis thermal pads are in place and free of damage. See [Chapter 8. Chassis Thermal Pad Replacement Procedure](#) to replace damaged pads.



*Figure 8-130. Inspecting the Chassis Shield Gasketing and Thermal Pads*

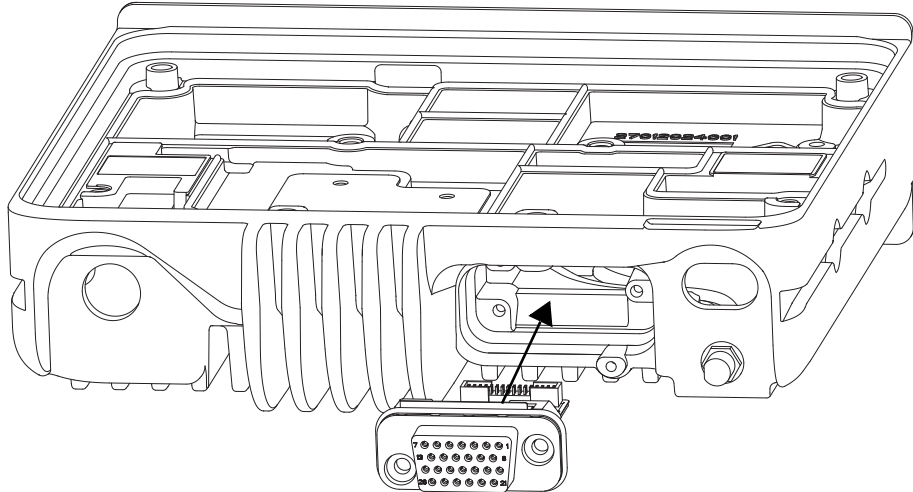
2. After inspecting GPS cable and placing seal on SMA connector ferrule, insert GPS SMA connector through GPS cable chassis opening, while ensuring the notch on GPS connector is down and aligned with the protrusion chassis. Install the lock washer. Install the GPS nut using a 5/16" nut driver and torque nut to 15 lbf-in.
3. Insert the free end of GPS cable through the RF/controller board chassis opening. Retain cable by pushing cable into chassis pinch points.



*Figure 8-131. Inserting GPS cable*

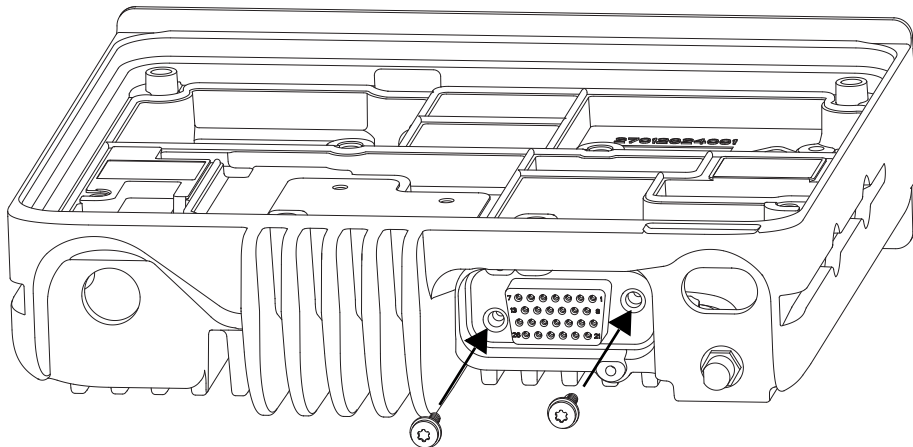


4. Insert rear accessory flex through rear chassis opening. Ensure flex is oriented with the facing up components. Insert the free end of accessory flex through the RF/controller board chassis opening.



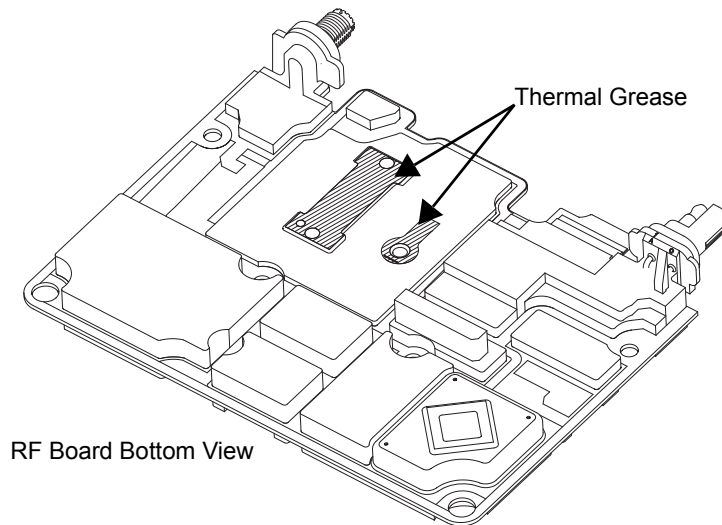
*Figure 8-132. Inserting Rear Accessory Flex*

5. Install two (2) rear accessory connector screws using a T-10 torx bit. Ensure each rear accessory screw has one (1) washer and one (1) seal. Torque the rear accessory connector screws to 6-8 lbf-in.



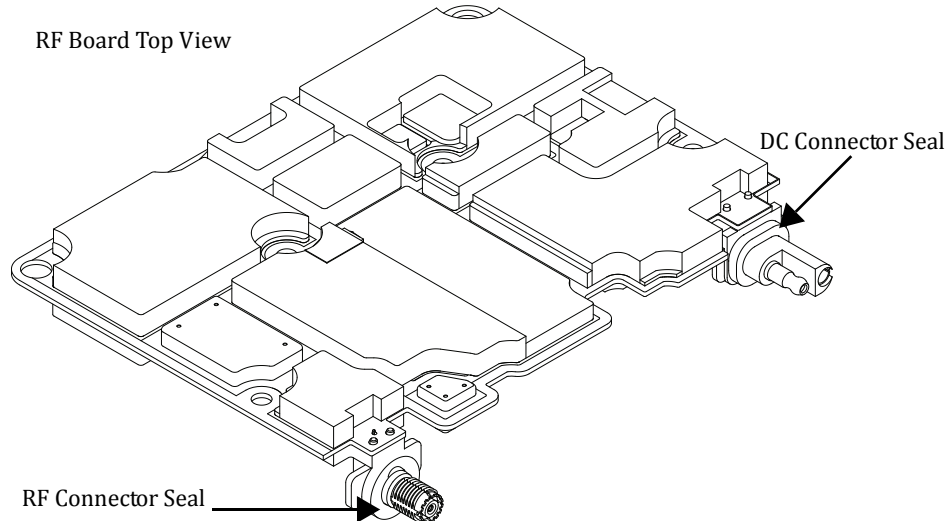
*Figure 8-133. Installing Rear Accessory Connector Screws*

6. Reapply thermal grease (p/n 1110022D23) to all RF board heat sinks. Cover all heat sinks with a smooth thin layer of thermal grease.



*Figure 8-134. Applying Thermal Grease to RF Board Heat Sinks*

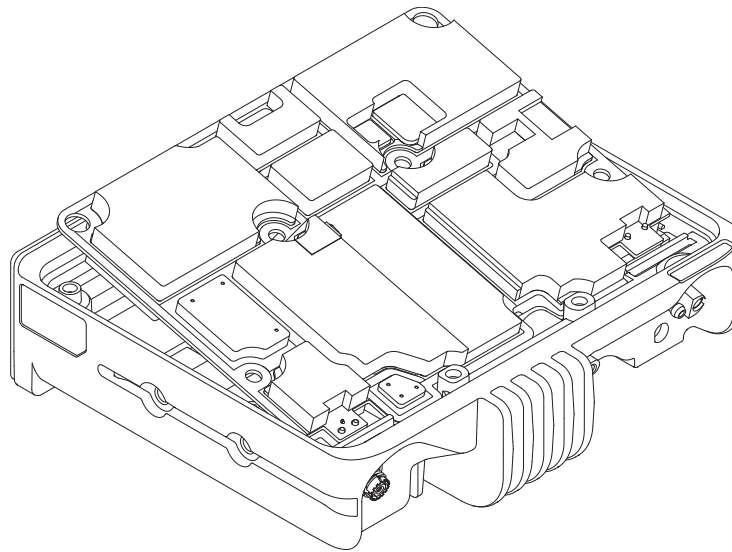
7. Check and ensure DC connector seal on RF board is properly seated.
8. Check and ensure RF connector seal on RF board is properly seated.



*Figure 8-135. Ensuring RF and DC Connector Seals are properly seated*

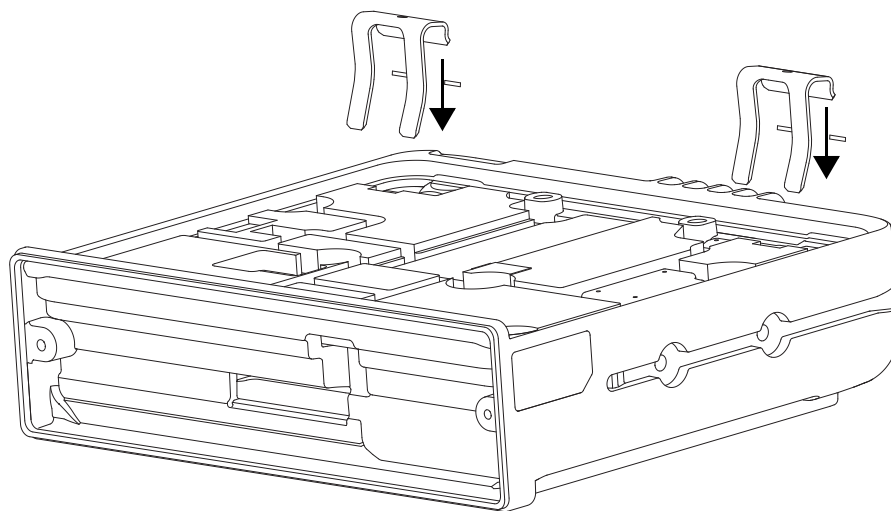
9. Install RF board by tilting and sliding into chassis, and secure RF and DC connectors through the rear holes of chassis. Push RF board back and down to compress RF/DC seals slightly, and ensure it is properly seated. Ensure RF board alignment holes are positioned over chassis alignment bosses, and RF board is fully seated in chassis.

**NOTE:** It is important to assemble RF Board, prior to placing the controller board and assembling the controller cover.



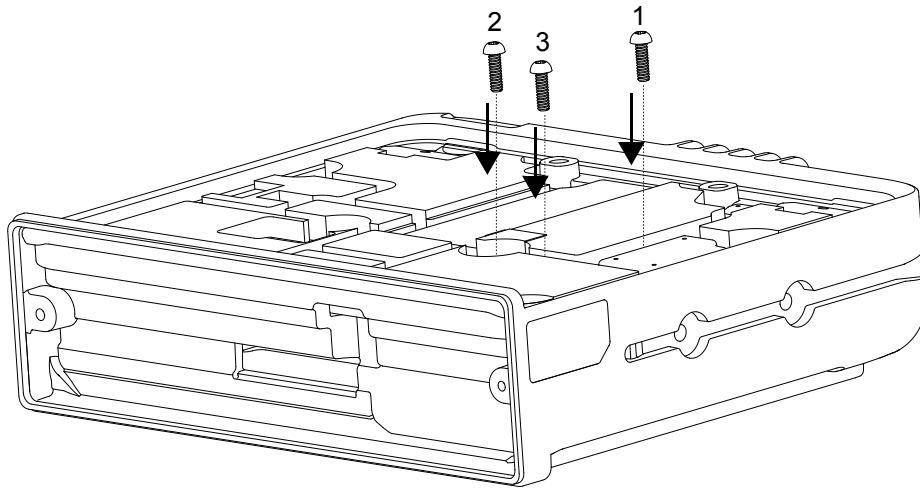
*Figure 8-136. Inserting RF Board into the Chassis*

10. Insert the RF/DC retention clips, and ensure they are fully seated. Insert all clips prior to board screws, to position RF board properly.



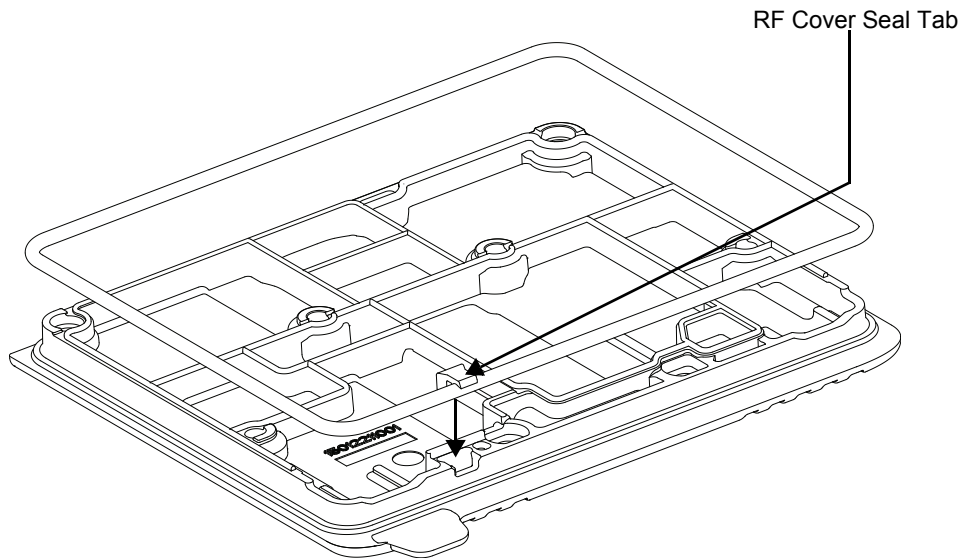
*Figure 8-137. Inserting RF/DC Retention Clips*

11. Install three (3) PA screws following the numbered sequence as shown below, using a T-10 torx bit. Torque down the PA screws to 6-8 lbf-in.



*Figure 8-138. Installing PA Screws*

12. Inspect and properly seat the top cover seal, and decently align its tab to the top cover.



*Figure 8-139. Inspecting and Installing the RF Cover Seal*

13. Place top cover onto chassis, and ensure top cover is properly aligned to chassis. The top cover and chassis can be compressed together to squeeze seal into place.

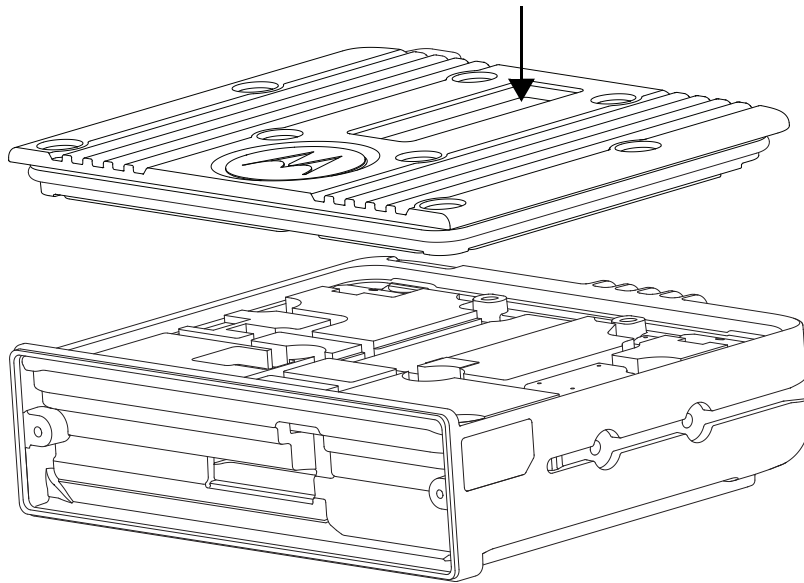


Figure 8-140. Placing the RF Cover onto Chassis

14. Inspect sealing washers on eight (8) top cover screws, and install the screws onto top cover/chassis. Torque the top cover screws to 30 lbf-in, following the numbered sequence shown in [Figure 8-141](#), to ensure top cover is seated properly. Repeat torque order sequence at least twice.

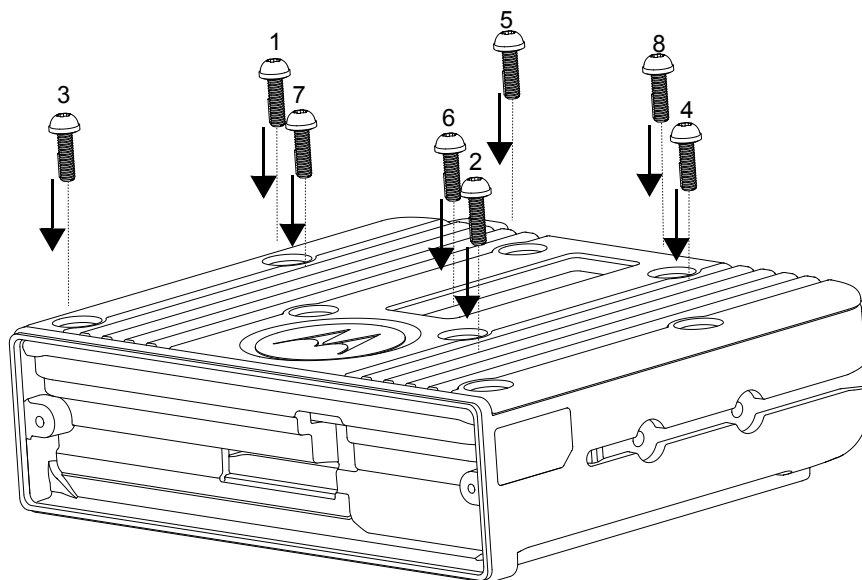


Figure 8-141. Installing screws onto RF cover/chassis

15. Once top cover is fully installed, check the interface between top cover and chassis to ensure top cover seal is not pinched.

16. FLIP RADIO OVER: Install controller board into chassis by tilting controller board edge card through the front opening using the controller board handle, and down into chassis. Ensure to hold GPS cable and accessory flex out from controller chassis pocket. Once controller board is placed in chassis, use controller board handle to align the controller board-to-board (BTB) connector to RF BTB connector. Once aligned press down the controller board as shown in below numbers, to connect the controller/ RF BTB connectors.

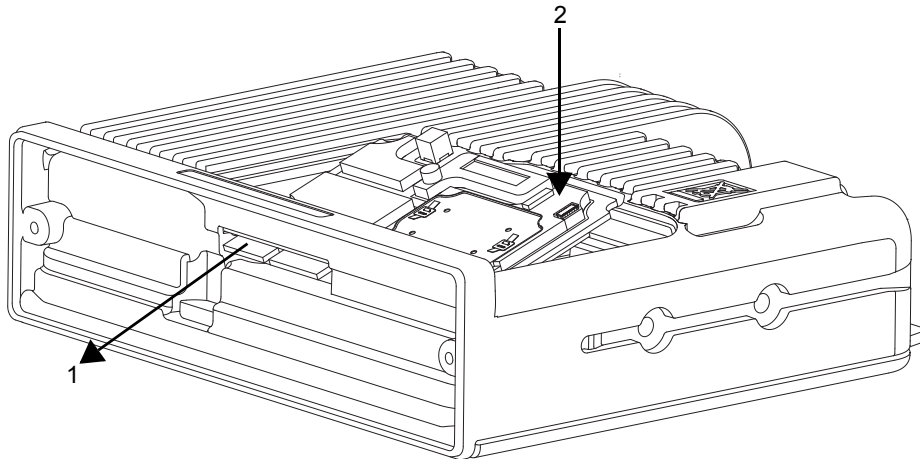


Figure 8-142. Installing Controller Board into Chassis

17. Install accessory flex connector onto controller board connector. Press down flex backer to ensure proper connection.

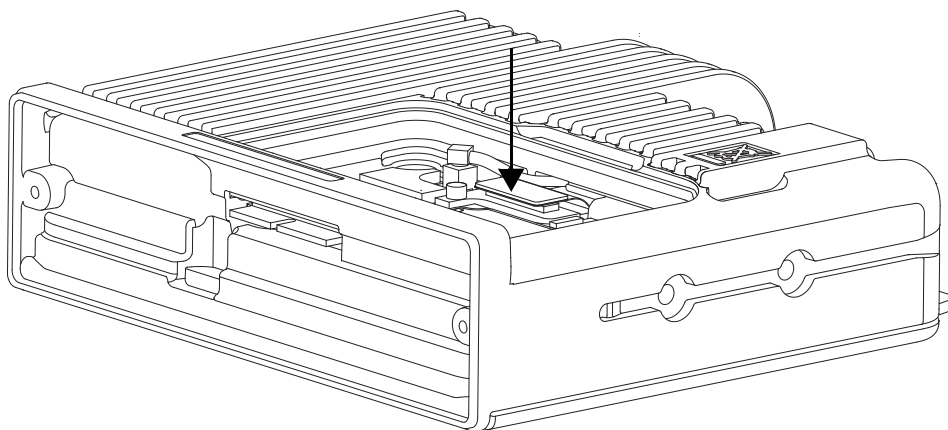
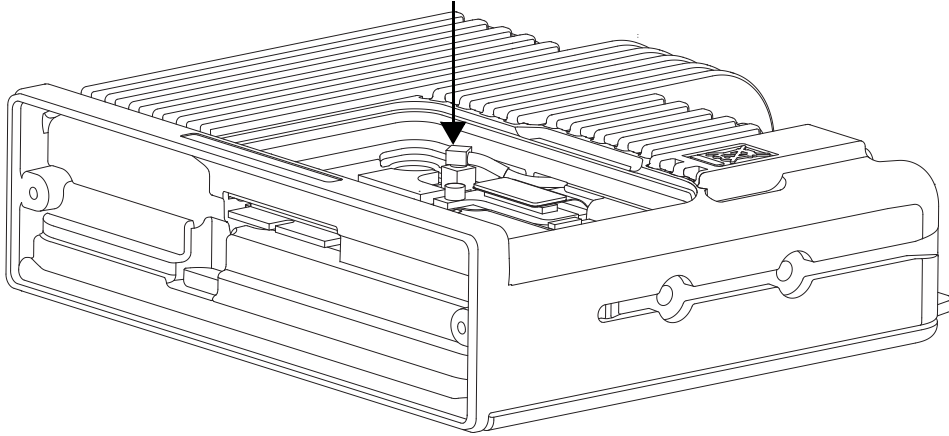


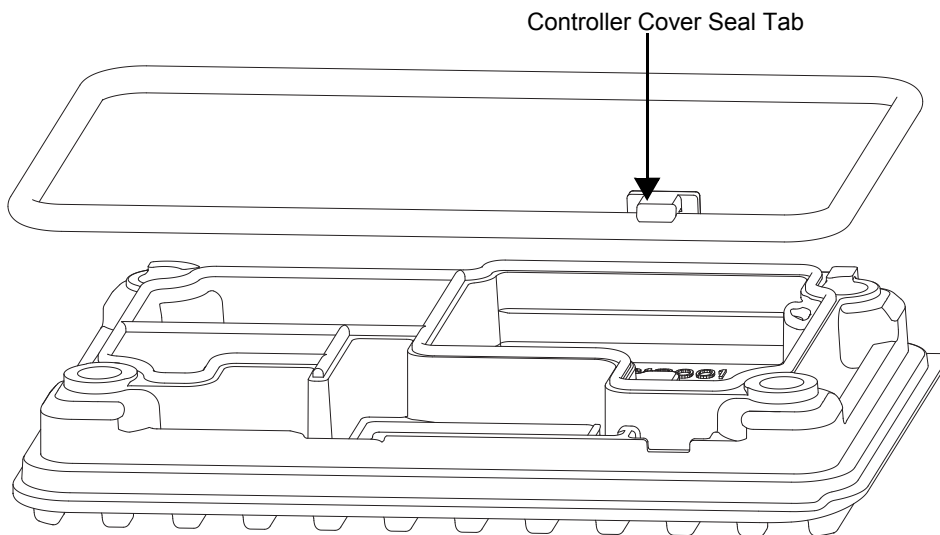
Figure 8-143. Installing Accessory Flex Connector to Controller Board

18. Install GPS MMCX connector to controller board. Ensure GPS cable is aligned in GPS cable retention channel. Firmly press down GPS MMCX connector to snap connector into place. Press cable down into chassis pinch point. Do not press or pull cable as damage may occur.



*Figure 8-144. Installing GPS Connector to Controller Board*

19. Inspect, and install bottom cover seal onto bottom cover. Ensure to correctly align the bottom cover seal tab to bottom cover.



*Figure 8-145. Inspecting and installing Controller Cover Seal onto Controller Cover*

20. Place bottom cover onto chassis. Ensure bottom cover is properly aligned with chassis. The bottom cover and chassis can be compressed together to squeeze seal into place.

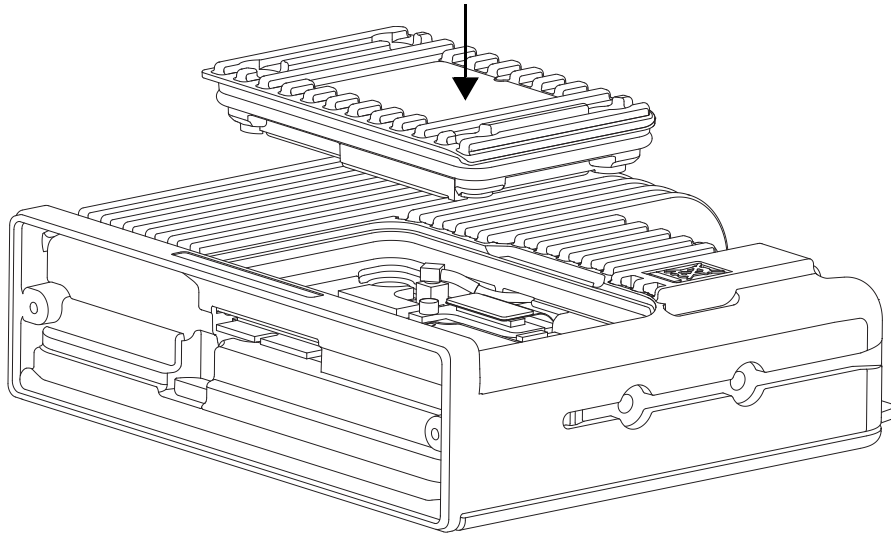


Figure 8-146. Placing the Controller Cover on Chassis

21. Inspect sealing washers on four (4) bottom cover screws, and install the screws onto bottom cover. Torque the bottom cover screws to 30 lbf-in, following the numbered sequence shown in Figure 8-147, to ensure bottom cover is seated properly. Repeat torque order sequence at least twice.

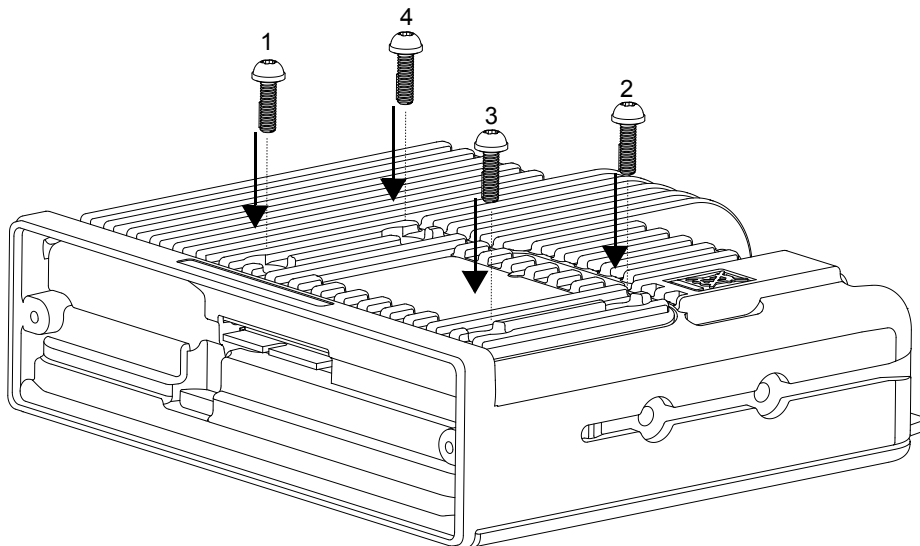


Figure 8-147. Placing the Controller Cover Screws

22. Once bottom cover is fully installed, check the interface between bottom cover and chassis to ensure bottom cover seal is not pinched.
23. Attach control head/TIB flex edge card connector to edge card as described in [Chapter 8. O2 Radio Reassembly](#) for O2 Control Head, [Chapter 8. O7 Radio Reassembly](#) for O7 Control Head, and 8.2.17.6 for TIB. Ensure to properly align edge card connector to the exposed edge card.



### 8.2.17.3 High Power Models

**NOTE:** Prior to reassembling the radio, inspect all seals and sealing surfaces for damage (nicks, cuts, etc.) or dirt. Reseat all seals on their respective parts.

Use the following procedures to reassemble your radio.

**NOTE:** If Handle is removed, place handle into place. Slide a pivot pin into the handle and chassis opening from the middle of the radio. Using a snap ring pliers place the snap ring onto the pivot pin. Ensure the snap ring is fully seated in the pivot pin groove. Repeat on other side.

1. Begin with the chassis. Thoroughly inspect the chassis shield gasketing for damage and verify all chassis thermal pads are in place and free of damage. See [Chapter 8. Chassis Thermal Pad Replacement Procedure](#) to replace damaged pads. Reapply thermal grease to all RF board heat sinks. All heat sinks need to be covered with a smooth thin layer of thermal grease.

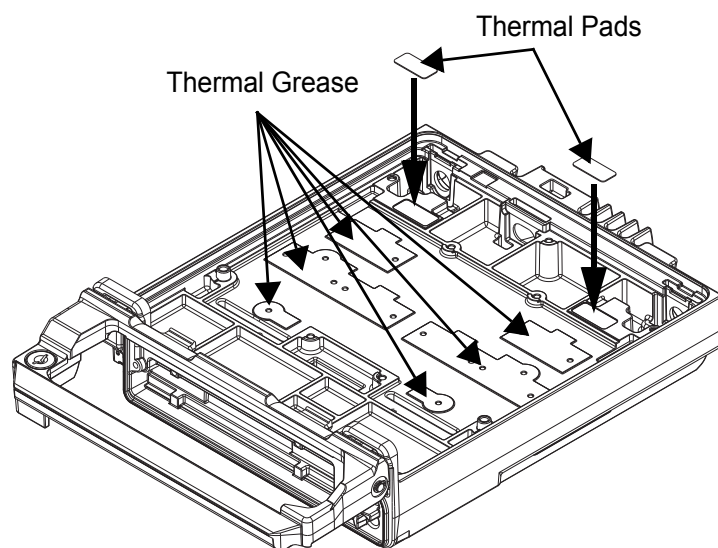


Figure 8-148. Inspecting the Chassis Shield Gasketing and Thermal Pads

2. Check that the 1 DC and 2 RF Connector seals on the RF Board are seated properly. Tilt the main board and slide it into place, taking care to line up the one (1) RF and two (2) DC connectors with the holes in the back of the chassis. Push back and down on the front of the main board to fully seat it. Ensure that the main board alignment holes are positioned over the chassis alignment bosses and that the main board is fully seated.

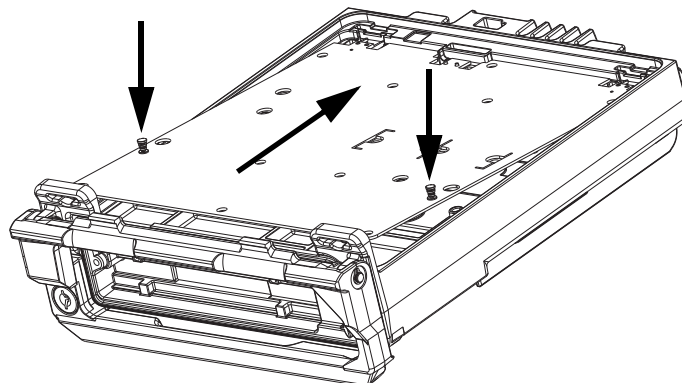


Figure 8-149. Inserting the RF Board into the Chassis

3. Insert the 3 RF/DC retention clips and fully seat them. The DC clip should be placed first, followed by the RF Clips. All Clips must be inserted prior to the board screws to properly locate the main board.

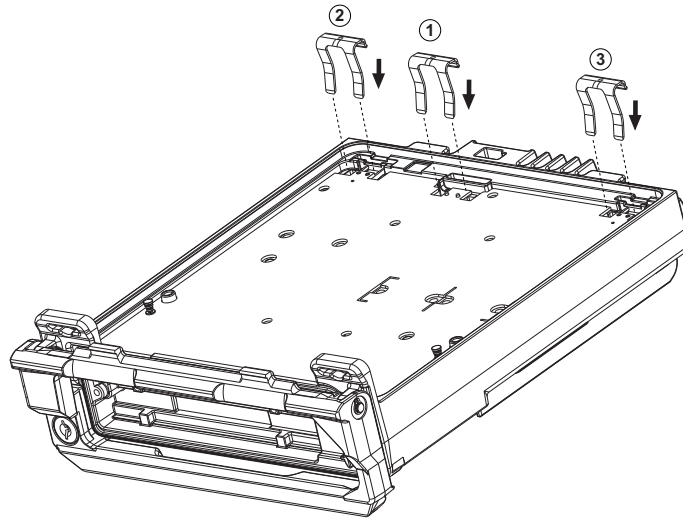


Figure 8-150. Inserting the RF/DC Retention Clips (Before)

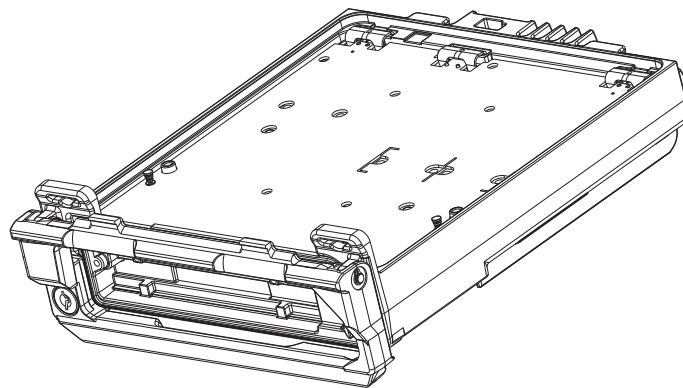


Figure 8-151. Inserting the RF/DC Retention Clips (After)

4. Insert and torque the PA screws to 12-14 in.-lbs. Start all screws prior to torquing them down (See [Table 8-3](#) for number of PA Screws).

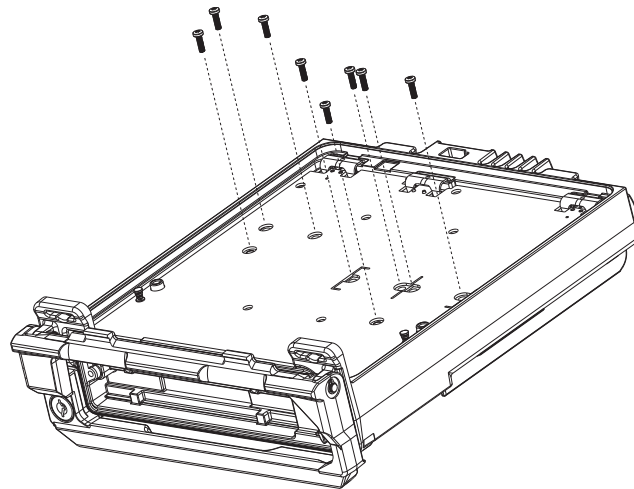


Figure 8-152. Installing the PA Screws (HP/MP radio shown)

Table 8-3. Number of PA Screws

Band Description	Number of Screws
Single Band	5
Dual Band (Mid and High)	8
Dual Band (High)	10

5. Inspect RF cover for installation of the reverse polarity and voltage regulator thermal pads. Then inspect and properly seat the RF cover seal. Be careful to properly align the RF cover seal tab to the RF cover.

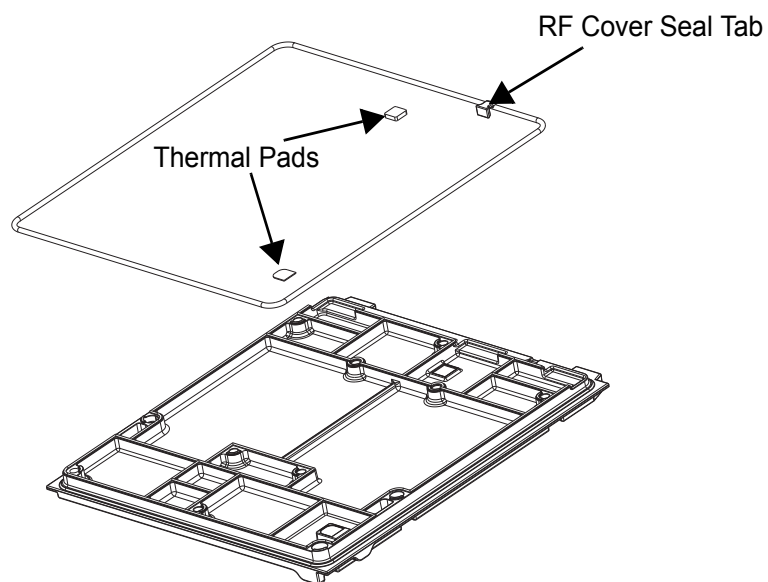


Figure 8-153. Inspecting the Thermal Pad and Installing the Cover Main Seal

6. Place the cover on the chassis and seat it properly. You can compress the cover and chassis together to squeeze the seal into place, seat the seal and make torquing the screws easier.
7. Inspect the sealing washers on the twelve (12) top cover screws, and then torque down screws in the indicated order (see [Figure 8-155](#)). Torque down the screws to 34-36 in.-lbs. To ensure a proper seating of the cover, repeat torque sequence at least twice!

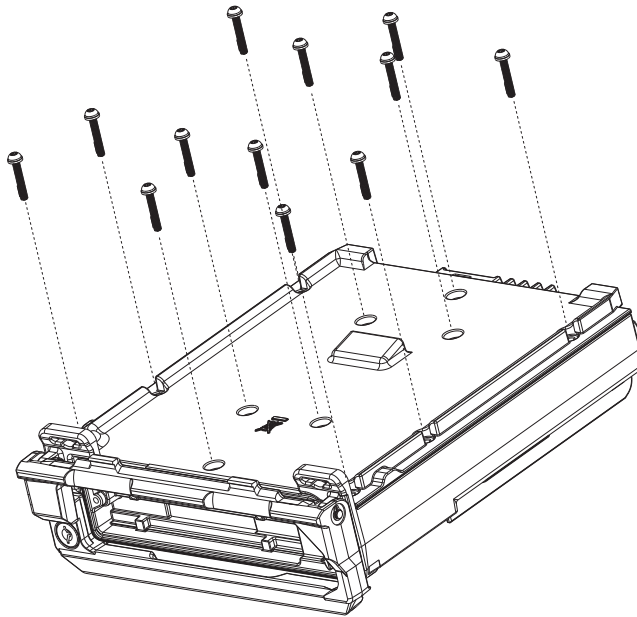


Figure 8-154. RF Screw Locations

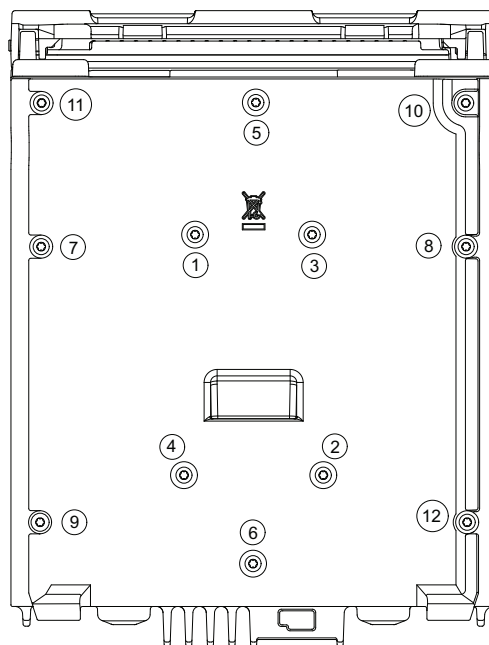
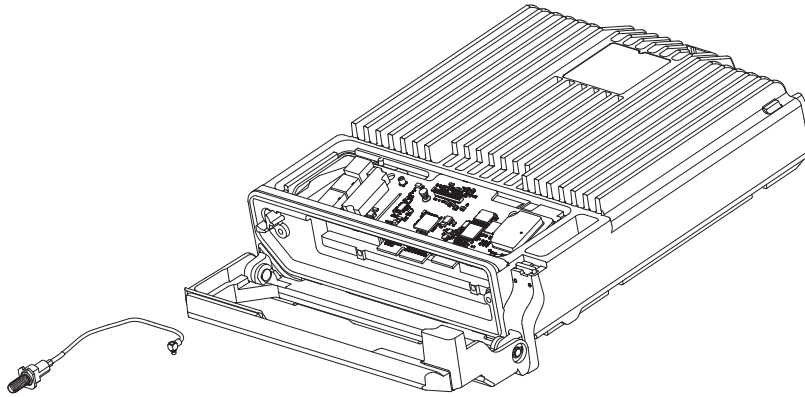


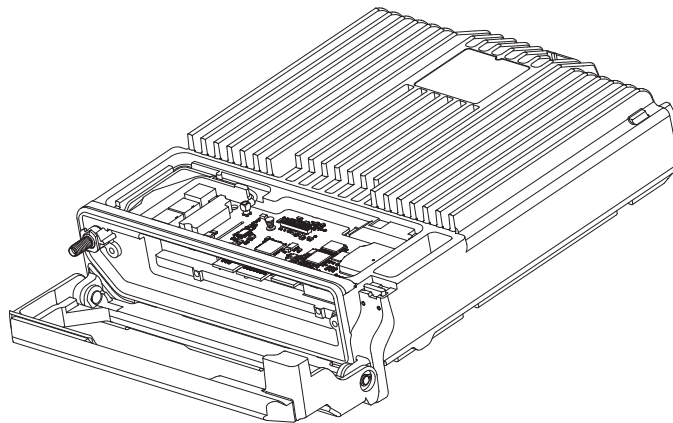
Figure 8-155. Torque Sequence

8. **FLIP RADIO OVER:** Install the controller board into the chassis by tilting controller board edge card through front opening using the controller board handle and then down into the chassis. Once controller board is placed in chassis, use the controller board handle to align controller board-to-board (BTB) connector to the RF BTB connector. Once aligned press down on controller board, in location shown, to connect the controller/ RF BTB connectors.



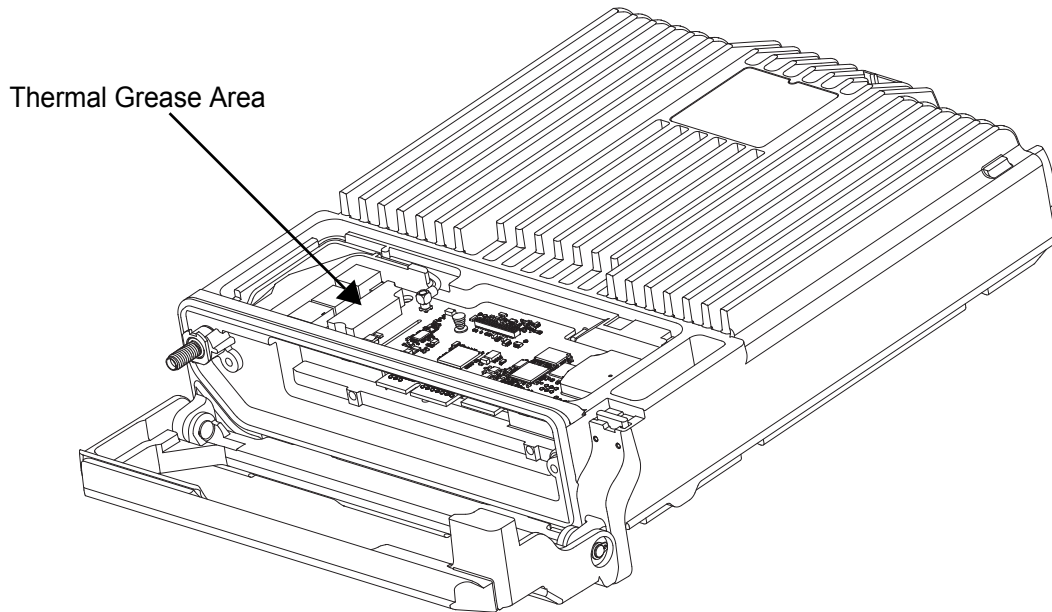
*Figure 8-156. Inserting the Controller Board in the Chassis*

9. Install the GPS MMCX connector to the controller board. Be sure GPS cable is aligned around GPS cable retention channel. Firmly press down on GPS MMCX connector to snap connector into place. After GPS connector is fully seated, press cable down into chassis pinch point. Do not pull directly on the cable as damage may occur.



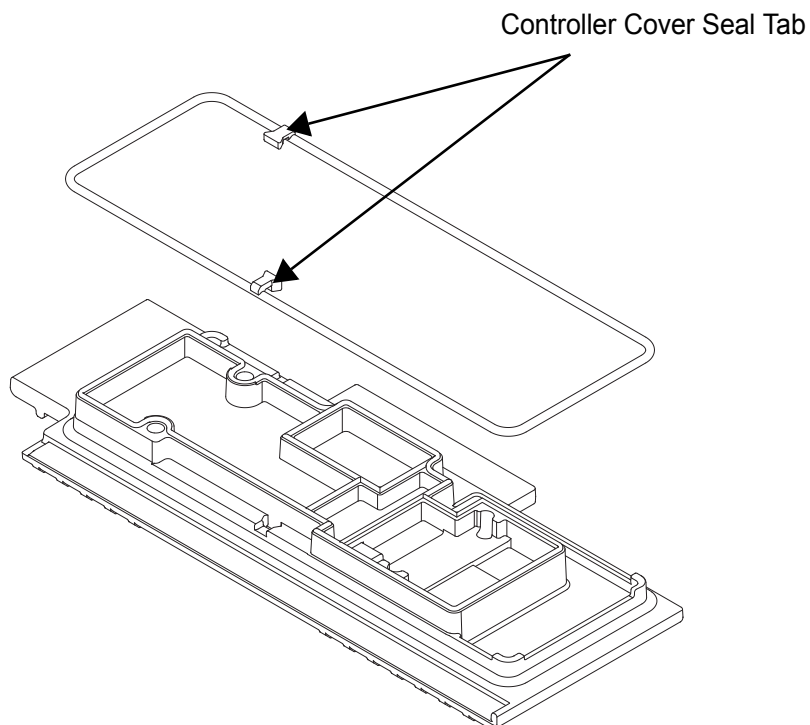
*Figure 8-157. Inserting the GPS Connector to the Controller Board*

10. Reapply thermal grease to the controller board heat sink. The heat sink needs to be covered with a smooth, thin layer of thermal grease.



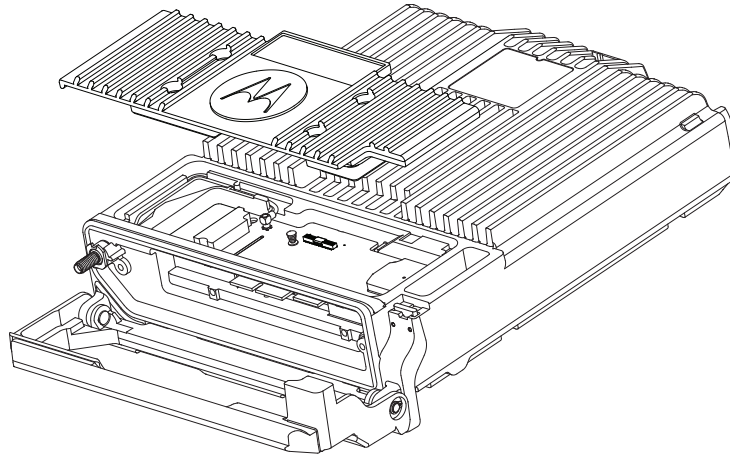
*Figure 8-158. Applying Thermal Grease to the Controller Board*

11. Inspect and install controller cover seal onto the controller cover. Be sure to correctly align the two (2) controller cover seal tabs to the controller cover.



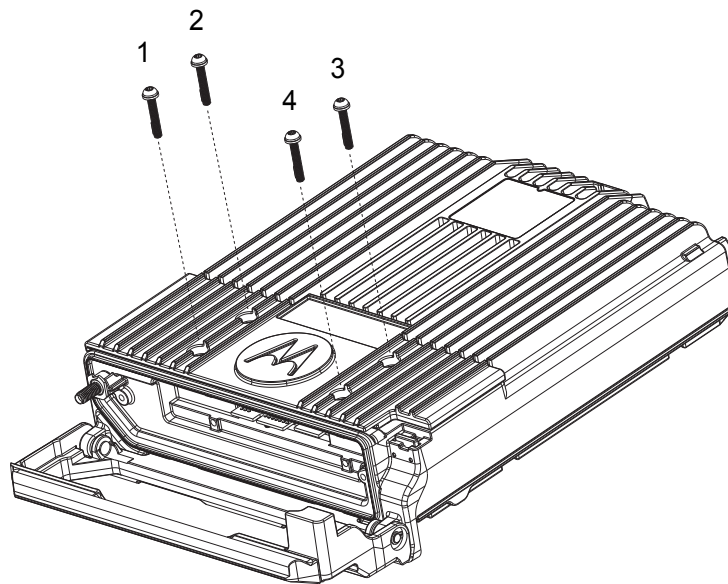
*Figure 8-159. Inspect and Install Controller Cover Seal onto the Controller Cover*

12. Place the controller cover onto the chassis. Be sure controller cover is properly aligned to chassis. The controller cover and chassis can be compressed together to squeeze seal into place.



*Figure 8-160. Place the Controller Cover onto the Chassis*

13. Inspect sealing washers on four (4) controller cover screws, and then install the screws onto controller cover. Torque the controller cover screws to 34-36 in-lbf, be sure to torque screws starting with the bottom left and going around clockwise (see [Figure 8-161](#)) to ensure controller cover is properly seated. Repeat torque order sequence at least twice.



*Figure 8-161. Securing the Controller Cover to Chassis*

14. Once controller cover is fully installed check controller cover-chassis interface to ensure the controller cover seal is not pinched. For Radios not equipped with an option board, skip to step 17.
15. Install the option board onto the front of the chassis by using the option board handle and plugging the option board edge card connector in to the shorter, single exposed edge card.

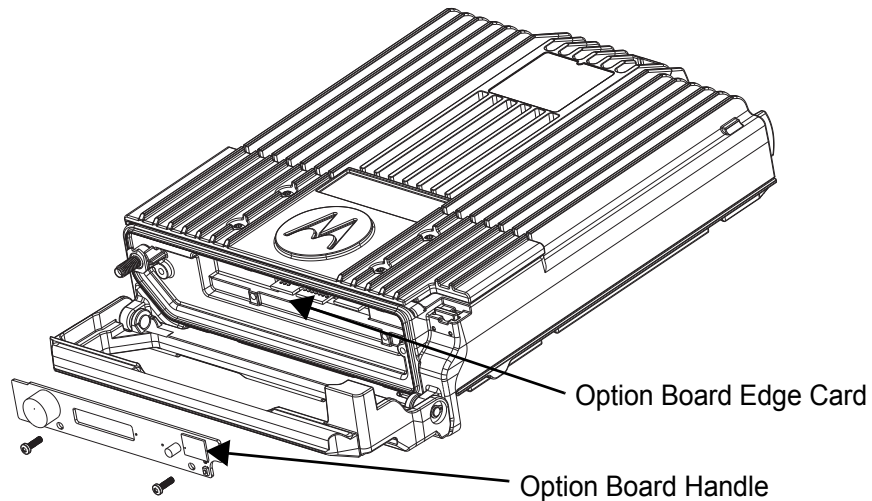


Figure 8-162. Installing the Option Board

16. Install the two (2) option board screws using a T-10 torx bit. Torque the option board screws to 6-8 in-lbf.
17. Install frame seal to TIB. Compress to TIB and frame seal together to fully seat.
18. Install flex to TIB. Be sure to properly align connectors prior to connecting.
19. Attach the flex edge card connector to edge card. Be sure to properly align edge card connector to exposed edge card.

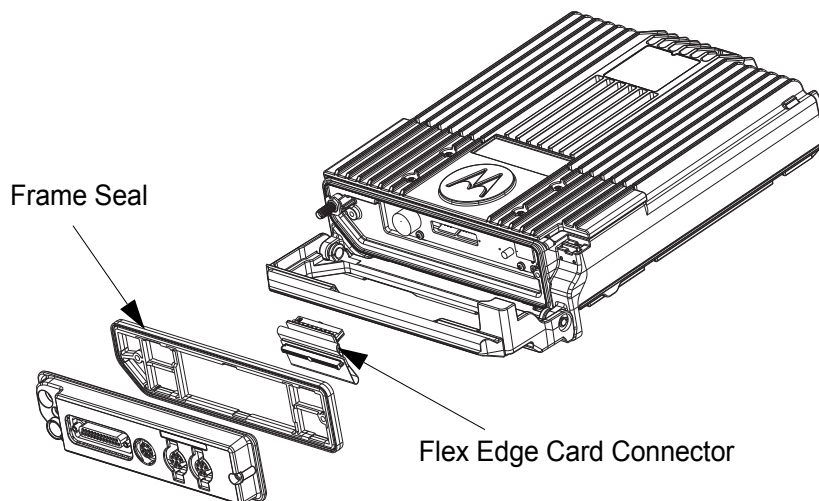
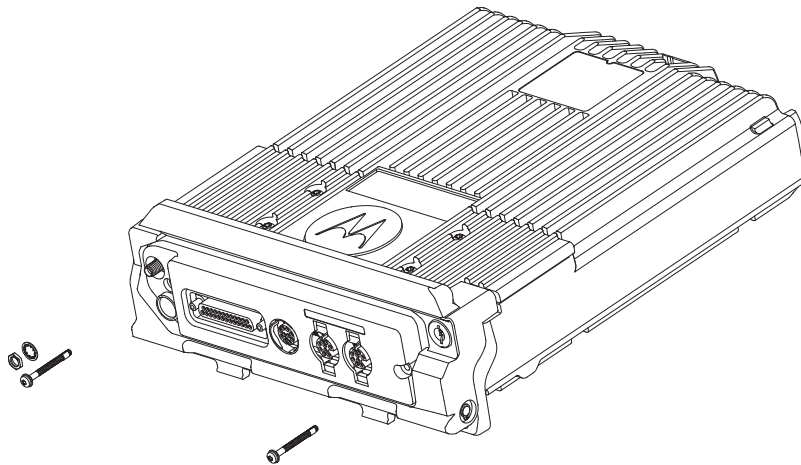


Figure 8-163. Attaching the Flex Edge Card Connector



20. Align TIB to front of chassis using the frame seal. Install two (2) TIB screws. Be sure the TIB screws each have one (1) washer and one (1) seal installed. Torque down TIB screws to 8-10 in-lbf. Secure the GPS SMA connector using the washer and nut. Seat the nut using a 5/16" nut driver and torquing it down to 7-9 in-lbf. Align plug to TIB opening and press down to seat.



*Figure 8-164. Installing the Control Head/TIB*

### 8.2.17.4 O2 Radio Reassembly

1. Grasp the handle on the transceiver end of the transceiver flex and plug the flex into the 50-pin connector on the side of the main board.

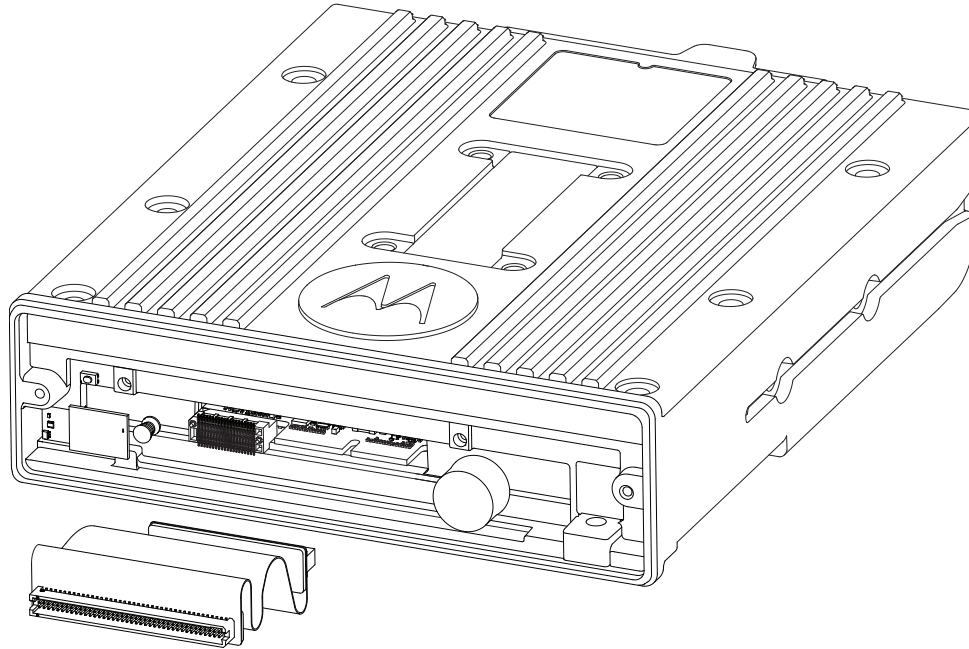


Figure 8-165. Installing the Transceiver Flex onto the Transceiver

2. Align the back housing assembly with the transceiver, thread the flex through the back housing assembly and push the back housing assembly into place.
3. Secure the back housing assembly to the transceiver with two new transceiver screws using the T10. Apply 13 in. lbs. of torque for each screw.

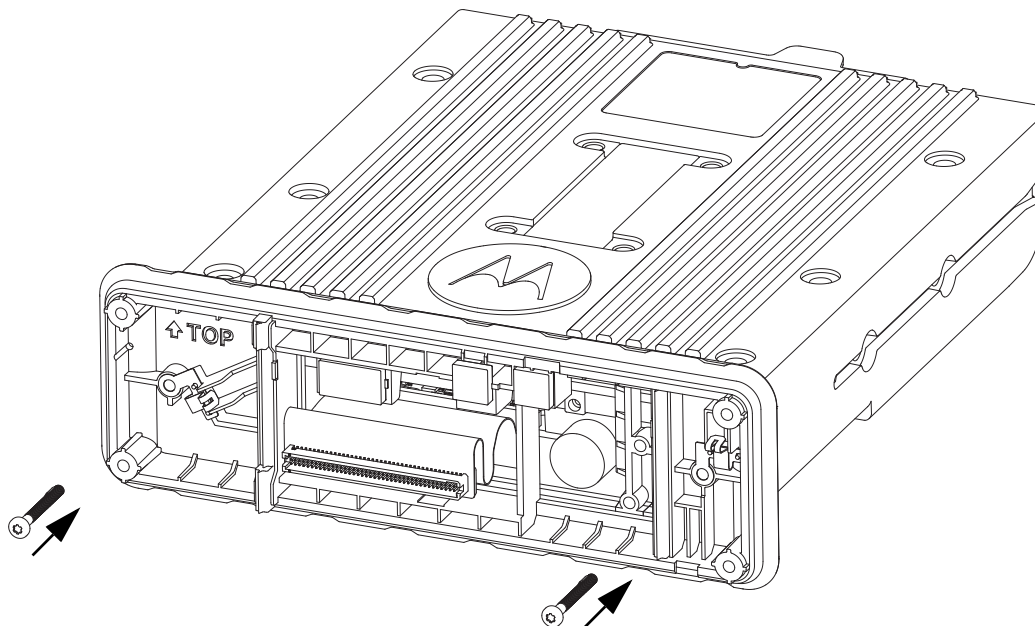


Figure 8-166. Installing the Back Housing Assembly onto the Transceiver

4. Reinstall the transceiver flex onto the front housing assembly or TIB flex onto the TIB connector.

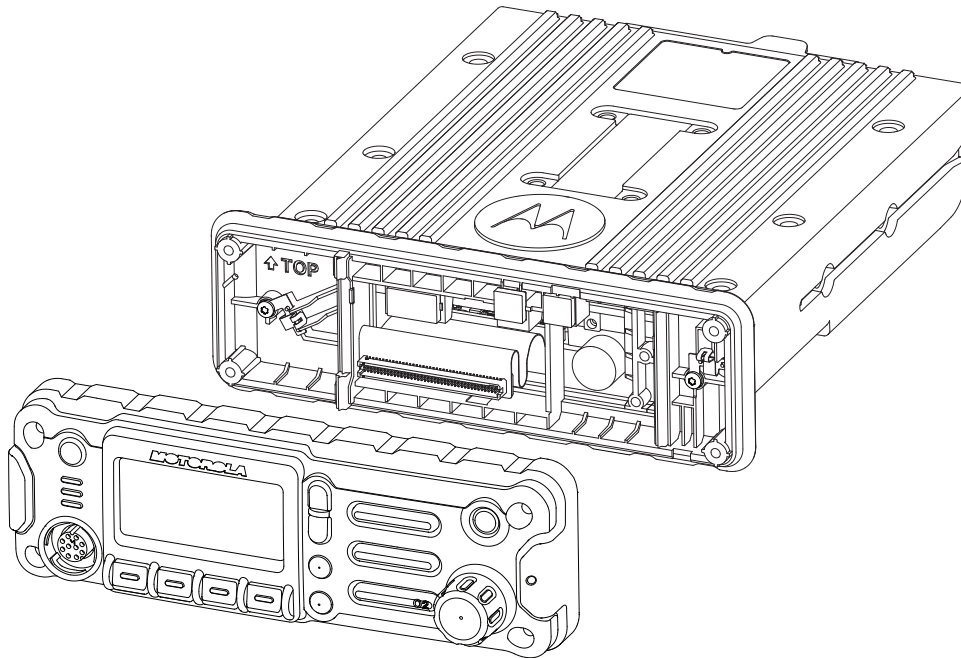


Figure 8-167. Installing the Transceiver Flex onto the Front Housing Assembly

5. Attach the front housing assembly to the back housing assembly.

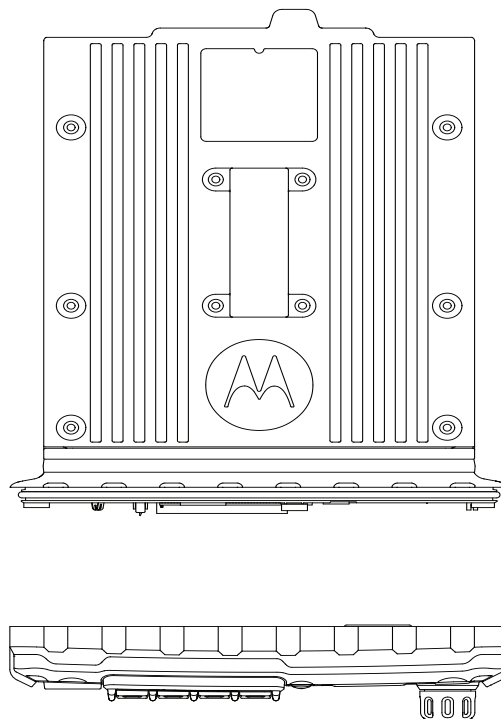


Figure 8-168. Attaching the Front Housing Assembly to the Back Housing Assembly

- Secure the front housing assembly to the back housing assembly with four new control head screws using the T20. Apply 9 in. lbs. torque for each screw.

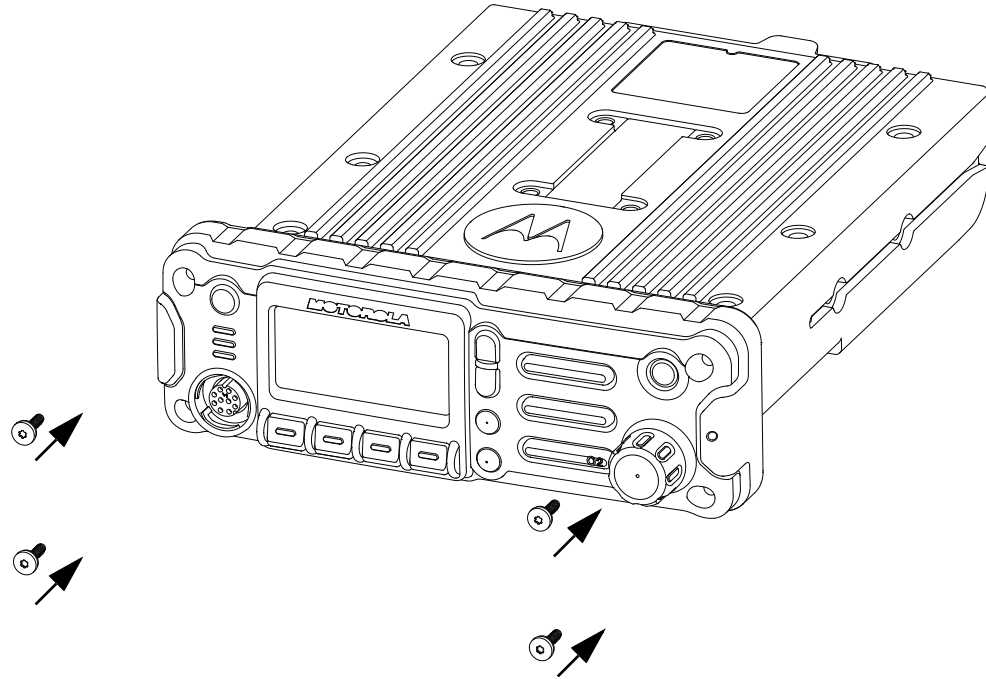
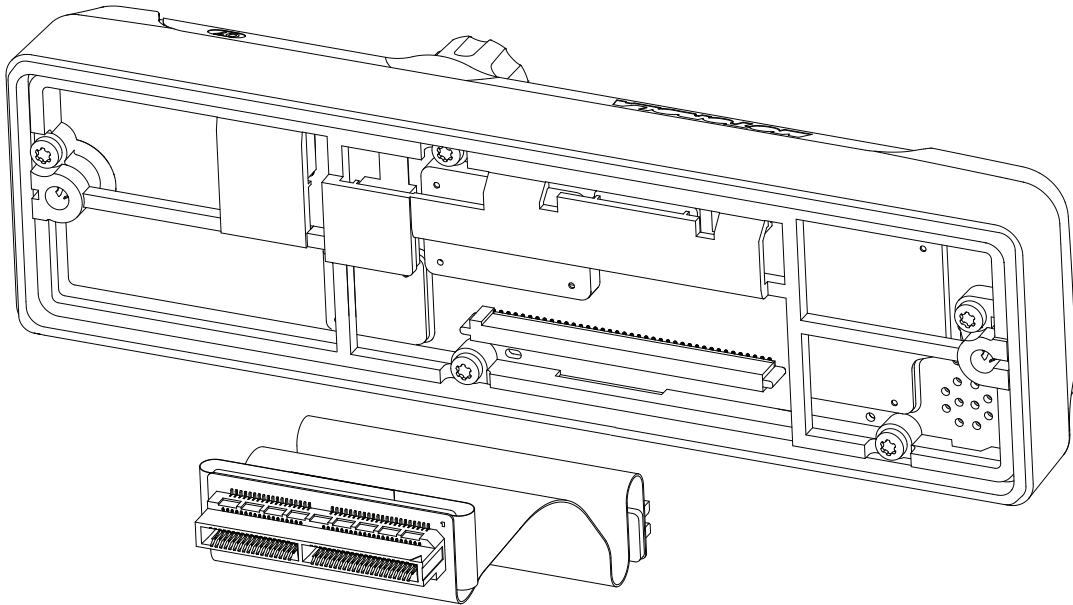


Figure 8-169. Attaching the Control Head Screws

### 8.2.17.5 O7 Radio Reassembly

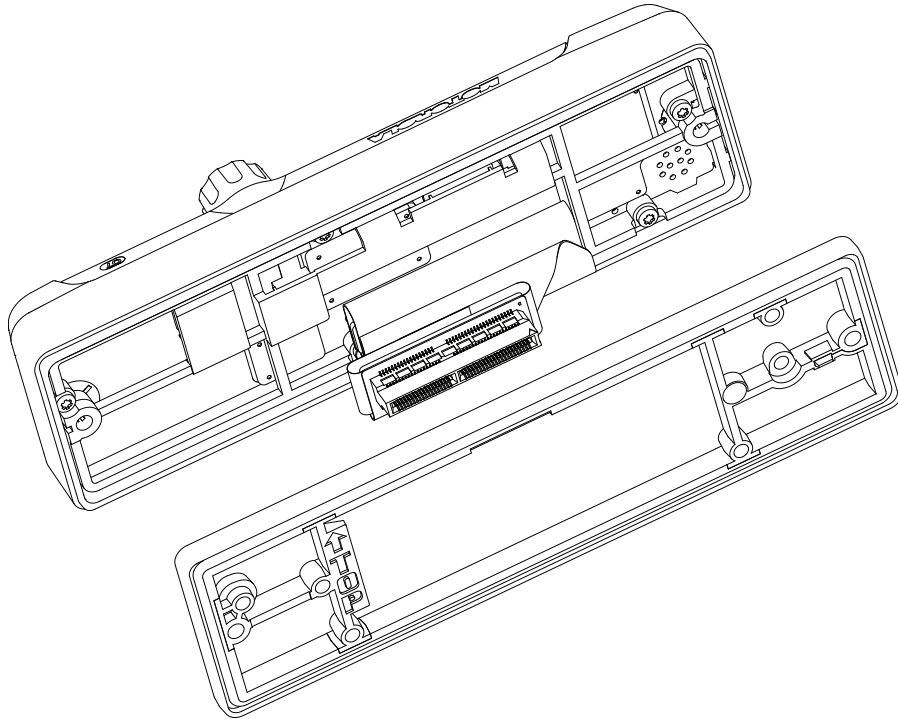
1. Reinstall the transceiver flex onto the control head or TIB flex onto the TIB connector.



*Figure 8-170. Installing the Transceiver Flex onto the Control Head*

2. Align the I-seal with the control head and push the I-seal into place.

**NOTE:** Be careful not to damage the transceiver flex when pushing the I-seal into place.



*Figure 8-171. Attaching the I-seal to the Control Head*

3. Grasp the handle at transceiver end of the transceiver flex and plug the flex into the 50-pin connector on main board side.
4. Align the control head with transceiver and push the control head into place on the transceiver.

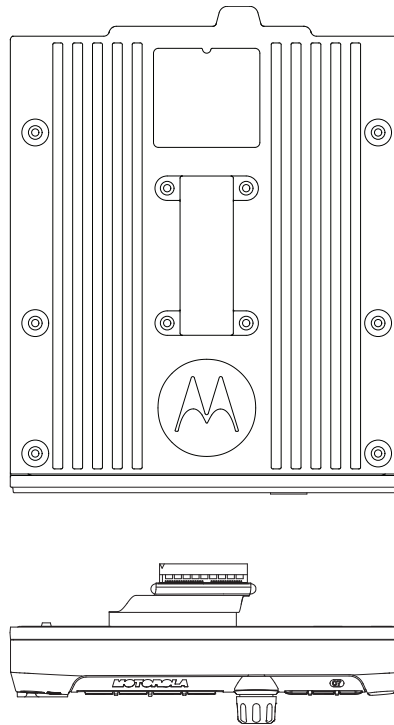


Figure 8-172. Attaching the Control Head to the Transceiver

5. Secure the control head to transceiver with two new transceiver screws using T10. Apply 9 in.lbs. torque for each screw.

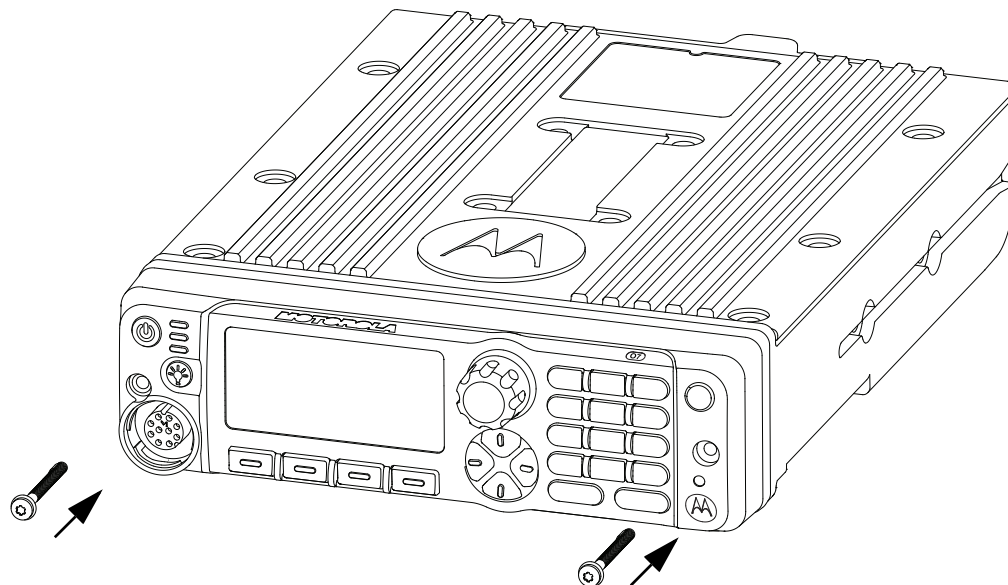
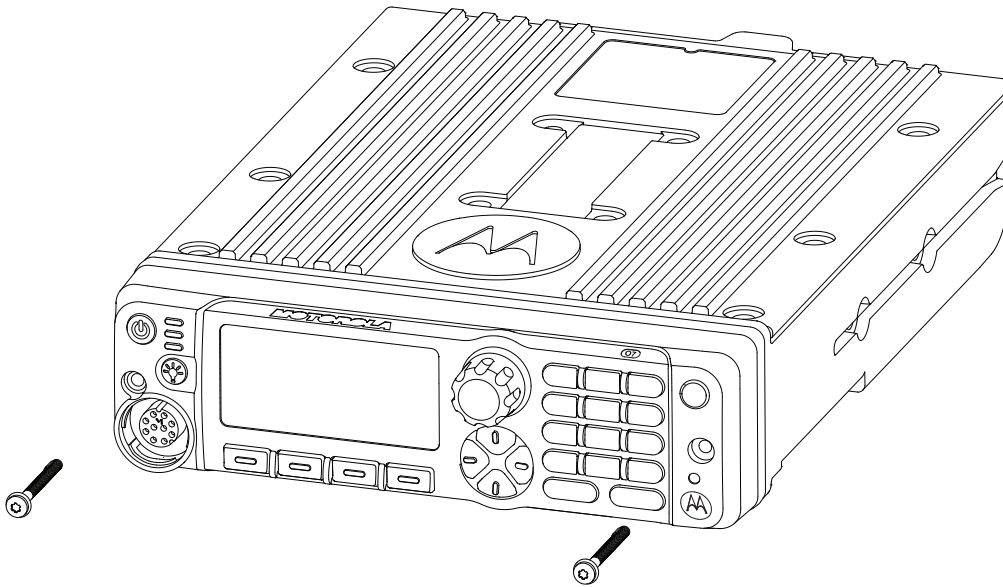


Figure 8-173. Attaching the Transceiver Screws

### 8.2.17.6 TIB Reassembly

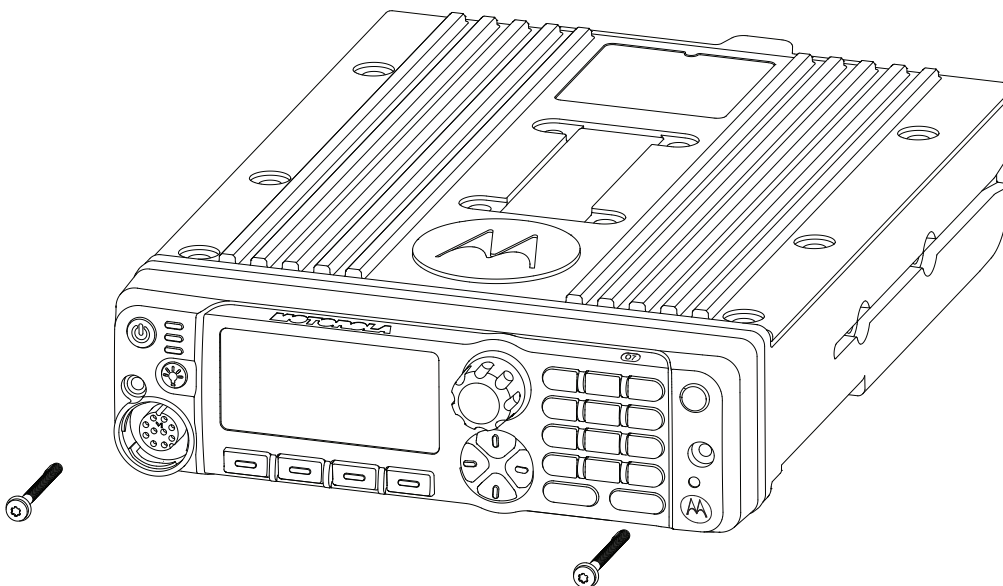
1. Reinstall the TIB flex/ remote mount flex onto the TIB connector.



*Figure 8-174. Reinstalling TIB Flex/Remote Mount Flex*

2. Align the I-seal with the TIB and push the I-seal into place.

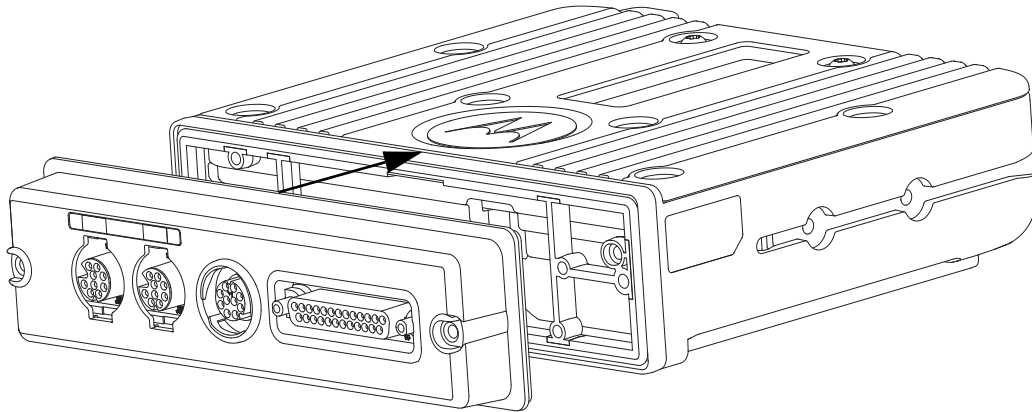
**NOTE:** Be careful not to damage the remote mount flex when pushing the I-seal into place.



*Figure 8-175. Aligning and placing the I-Seal*

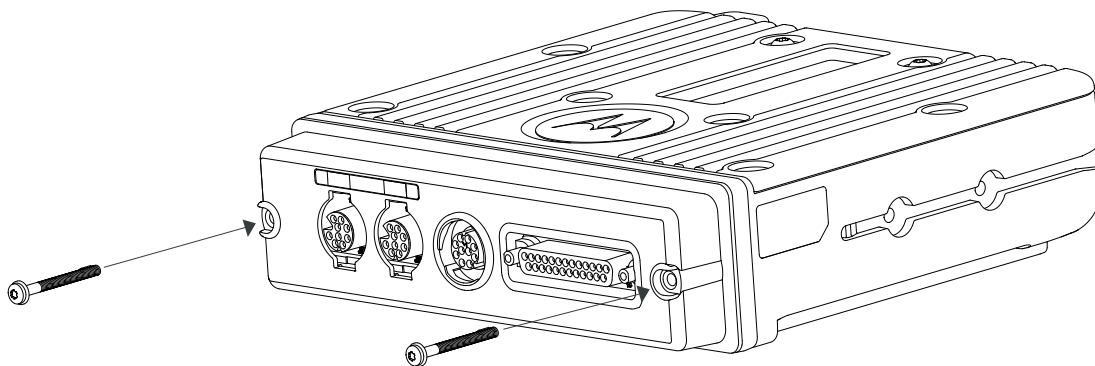


3. Grasp the handle at the transceiver end if the remote mount flex and plug the flex into the edge-card on main board side.
4. Align the TIB with transceiver and push the TIB into place on the transceiver.



*Figure 8-176. Aligning and Placing TIB on Transceiver*

5. Secure the TIB to the transceiver with two (2) new TIB screw using T-10 Torx bit. Apply 9 in.lbs torque for each screw.



*Figure 8-177. Installing the TIB screws*

### 8.3 Chassis Thermal Pad Replacement Procedure

#### 8.3.1 Mid Power Models

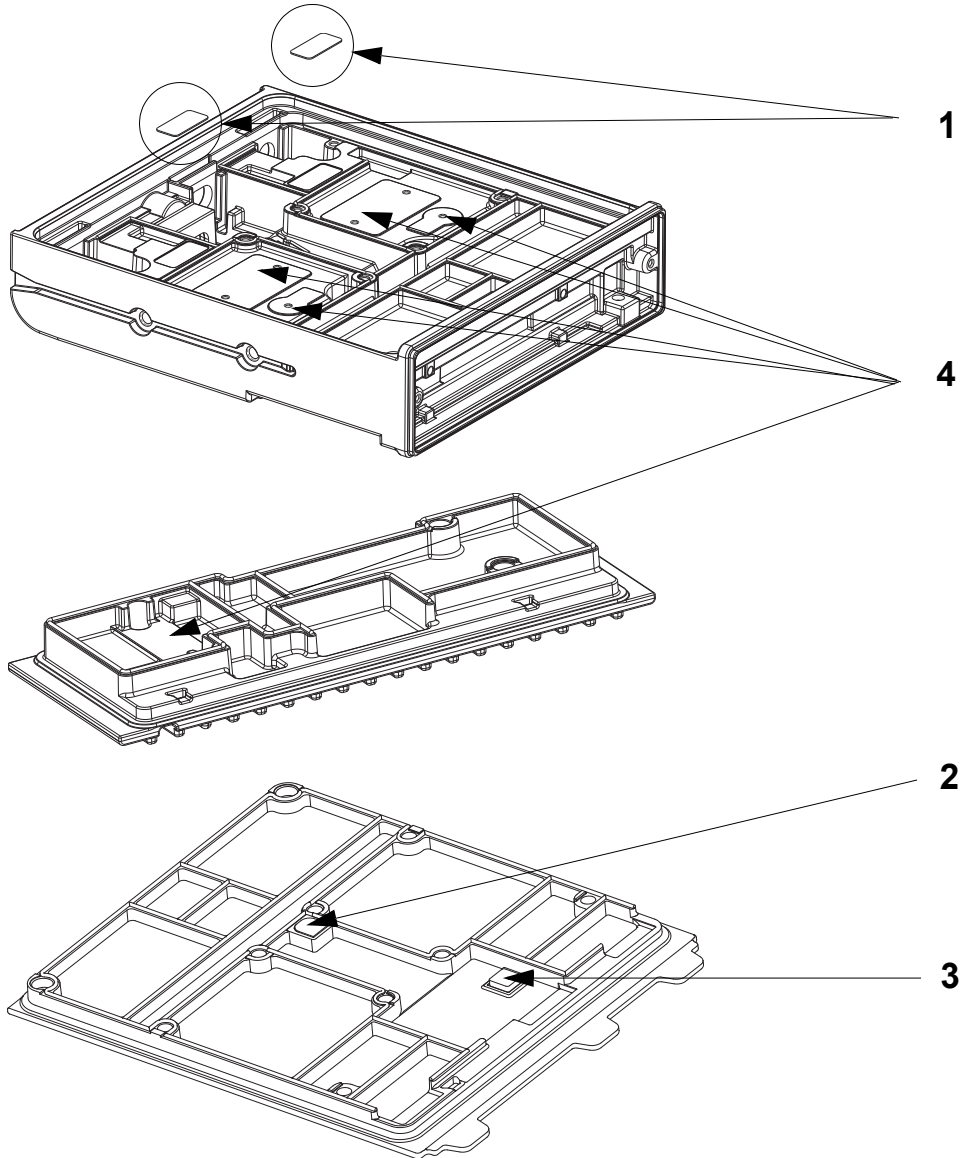


Figure 8-178. Chassis Thermal Pad and Grease Locations

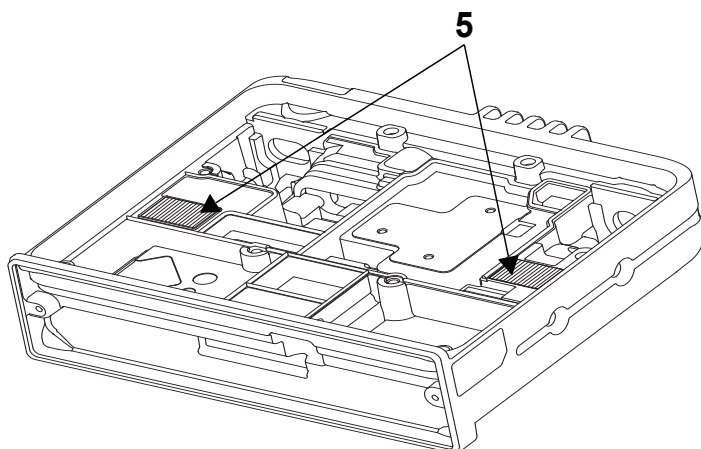


Table 8-4. Chassis Thermal Pad and Grease Part Numbers

Item No.	Part No.	Description
1	7575935B01	Pad, Thermal, Harmonic Filter
2	7575767B01	Pad, Thermal, Regulator
3	7585060F01	Pad, Thermal, Reverse Polarity
4	1110022D23	Thermal Grease
5	75012190001	APX 2500/4500/4500Li Thermal Pad

Use the following procedures for replacing the chassis thermal pads. To replace the thermal pads:

1. Use a plastic flat-edge tool (like a black-stick solder aid) to lift the pad from the chassis surface.
2. Discard the old pad. Use a soft cloth to remove any remaining residue. Alcohol can also be used, if necessary. Care should be taken to minimize any cleaning-agent contact with the surrounding shield gasket.
3. Once the surface is clean and dry, use tweezers to remove a new pad from the shipping liner, and place it yellow-side down on the chassis.
4. Apply pressure to the pad to activate the pressure-sensitive adhesive. If applicable, remove the blue liner with tweezers (Thermal pad P/N: 7585060F01 and P/N: 75012190001 do not have a blue liner).



**Caution**

Use of a metal tool will scratch the heat sink surface and reduce the thermal effectiveness of the thermal pad which is used to heat sink heat-sensitive components. Loss of thermal effectiveness of the thermal pads could result in the overheating of heat-sensitive radio components and result in their damage.

### 8.3.2 High Power Models

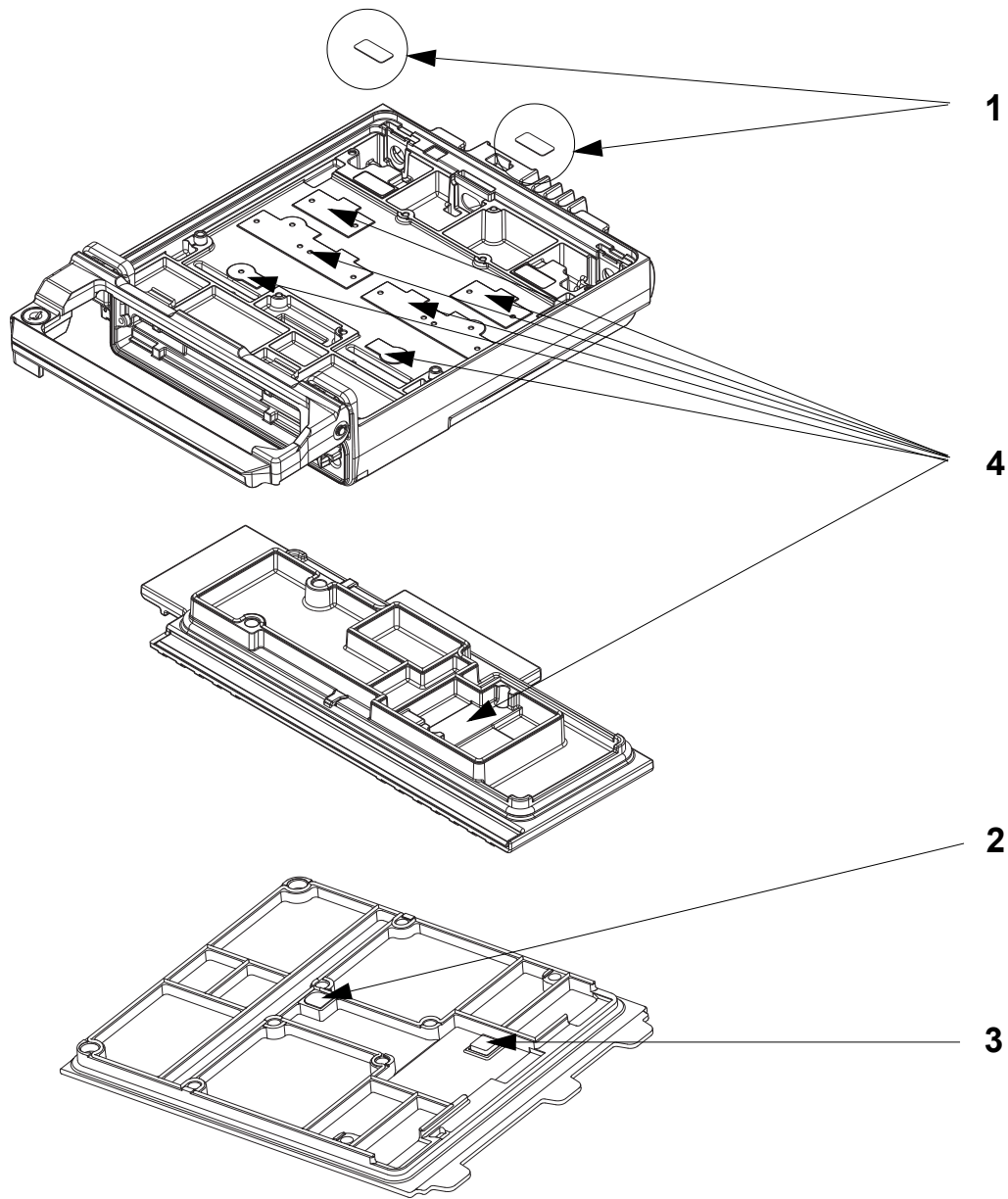


Figure 8-179. Chassis Thermal Pad and Grease Locations

Table 8-5. Chassis Thermal Pad and Grease Part Numbers

Item No.	Part No.	Description
1	7575935B01	Pad, Thermal, Harmonic Filter
2	7575767B01	Pad, Thermal, Regulator
3	7585060F01	Pad, Thermal, Reverse Polarity
4	1110022D23	Thermal Grease

Use the following procedures for replacing the chassis thermal pads. To replace the thermal pads:

1. Use a plastic flat-edge tool (like a black-stick solder aid) to lift the pad from the chassis surface.
2. Discard the old pad. Use a soft cloth to remove any remaining residue. Alcohol can also be used, if necessary. Care should be taken to minimize any cleaning-agent contact with the surrounding shield gasket.
3. Once the surface is clean and dry, use tweezers to remove a new pad from the shipping liner, and place it yellow-side down on the chassis.
4. Apply pressure to the pad to activate the pressure-sensitive adhesive. If applicable, remove the blue liner with tweezers (Thermal pad P/N: 7585060F01 does not have a blue liner).

## 8.4 Fastener Torque Chart

Table 8-6 lists the various fasteners by part number and description, followed by the torque values and the location where used. Torque all fasteners to the recommended value when assembling the radio.

Table 8-6. Fastener Torque Chart

Part Number	Description	Repair Torque (in.-lbs.)	Locations Used In A Radio
0310909A33	Screw, Torx M3x10	6–8	RF Board / *Option Board Slot / *Accessory Connector to Chassis
0385870E01	Screw, Torx M4.0xP0.7x25	34–36	*RF Covers and *Controller Covers
0364332H02	Screw, Torx M3.0xP0.5x32.5	8–10	TIB to Chassis / O5 Control Head
0371838H01	Screw, Torx M2.5xP0.45x12.0	6–8	Accessory Connector to External Chassis
0310909F21	Screw, Torx M3x16	6–8	TIB
0371859H01	Screw, Torx M6.0xP1.0x25.0	50–52	*Trunnion Mounting
02009258001	GPS Hex Nut	7–9	*GPS Connector
0104054J54	Screw, Torx M4.0xP0.7x15.0	29–31	APX 2500/4500/4500Li Top and Bottom Cover
03012052001	Screw, Torx M3.0xP0.5x26.0	8–10	O2 Rear Housing
03012063001	Screw, Torx M4.0xP0.7x18.0	12–14	O2 Front Housing
03012062001	Screw, Torx M3.0xP0.5x38.0	8–10	O7 Control Head
0310944A14	Screw, Torx M3.12xP1.27x16.0	8.8–9.2	Remote Rear Assembly Screws

**NOTE:** \* Is only applicable for APX 5500 / APX 6500 / APX 7500 / APX 6500Li

**Notes**

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# Chapter 9 System Level Diagnostics and Basic Radio Analysis

## 9.1 Introduction

This chapter contains pin-out information for the radio, error codes, and system level troubleshooting suggestions. This section can help you isolate a problem to the board level. Board-level troubleshooting does not attempt to isolate problems to the component level. Component-level service information can be found in the *APX Mobile Radios And O3, O5 & O9 Detailed Service Manual*. (See the "[Related Publications](#)" section of this manual for the specific manual number.)

**NOTE:** To access the various connector pins, use the housing eliminator/test fixture along with the diagrams found in this section of the manual. (See the section, "[Service Aids and Recommended Tools](#)", for the appropriate Motorola service aids and tools parts numbers.)



### Caution

With the exception of some inputs on service monitors, a suitable attenuator rated at 100 W or more should always be used with all test equipment connected to the RF connector. Failure to do so can result in test equipment damage.

When performing both transmit and receive tests, it is still possible that equipment might be damaged by the radio's transmitter. This could occur under the following conditions: trunking-mode affiliation, missing emergency jumper, a defective PTT button, unintentional PTT activations, or circuit board malfunction. Therefore, an attenuator is always recommended.

## 9.2 Accessory Connectors

### 9.2.1 J1 – Mobile Microphone Port (MMP)

The MMP connector is located on the O2,O7,O5 and O9 control heads and the transceiver interface board (TIB). [Table 9-1](#) describes the name and function of each pin.

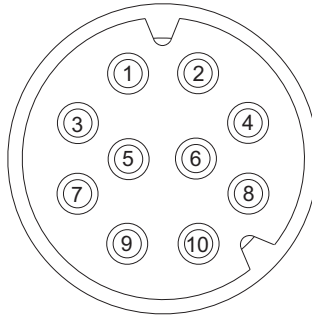


Figure 9-1. MMP Connector

Table 9-1. MMP Connector Signal Descriptions

Pin #	Pin Name		Pin Function
	Control Head (J1)	TIB (J700)	
1	1-Wire ®	1-Wire ®	Signal used to identify accessory.
2	PTT	PTT_GPIO3	Active low Push-To-Talk input. Asserting this input results in MIC_HI microphone input use. Distinguished from PTT at the TIB J600 or rear J2 connector, which uses the AUX_MIC microphone input.
3	SPK	SPK	Receive audio out designed to drive a 150Ω load.
4	USB_D- / RS232_RX_5v	USB_D- / RS232_RX_5v	Multiplexed USB D- and RS232 receive signal. The interface used is based on a 1-Wire ® read of the connected accessory. The RS232 signals are CMOS levels, 0-5 V.
5	GND	GND	Ground.
6	VBUS / OPT_5V	VBUS / OPT_5V	On both the control head and the TIB, when the MMP port is configured as a device, this is the VBUS input used for enumeration. When the MMP port is configured as a host, this is the VBUS output, capable of sourcing 500mA.
7	MIC_HI	MIC_HI	Microphone audio input (80 mV rms nominal) associated with the PTT* signal at pin 2. Distinguished from AUX_MIC at the TIB J600 or rear J2 connector.
8	USB_D+ / RS232_TX_5v	USB_D+ / RS232_TX_5v	Multiplexed USB D+ and RS232 transmit signal. The interface used is based on a 1-Wire ® read of the connected accessory. The RS232 signals are CMOS levels, 0-5 V.
9	HUB / KEYFAIL	KEYFAIL / GPIO_4	Multiplexed HUB and KEYFAIL lines on the control head. The TIB has KEYFAIL or GPIO_4 functionality.
10	GPIO_0	GPIO_0	General purpose I/O 0.



## 9.2.2 J2 Mid Power Transceiver – Data and Audio Rear Interface

J2 is located on the back of the transceiver. [Table 9-2](#) describes the function of each pin. The Male crimping pin can be ordered, according to the wire gauge for the accessory. Please select part number 3980034F03 for 22-28 gauge wire and 3980034F01 for 18 to 20 gauge wire.

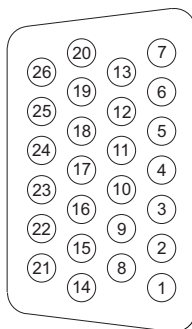


Figure 9-2. J2 Rear Accessory Connector

Table 9-2. J2 Rear Accessory Connector Signal and Voltage Descriptions

Pin #	Pin Name		Pin Function
1	GROUND	Ground	Preferred ground for any digital lines on J2.
2	BUS+ / USB2+ / RS232_TX_5V	SB9600 BUS+ / USB2+ / RS232 Transmit	Part of the Motorola SB9600 communications bus to connect external devices. Also used for USB host interface or 5v RS232_TX. Defaults to BUS+.
3	BUS- / USB2- / RS232_RX_5V	SB9600 BUS- / USB2- / RS232 Receive	Part of the Motorola SB9600 communications bus to connect external devices. Also used for USB host interface or 5v RS232_RX. Defaults to BUS-.
4	RS232_TX_9V	RS232 Transmit Data	Part of the 4-wire RS232 interface to external data accessories, programming cables, etc. An output normally -9V no load.
5	RS232_RX_9V	RS232 Receive Data	Part of the 4-wire RS232 interface to external data accessories, programming cables, etc.
6	USB-	USB - Data	Part of the 2-wire USB device differential data bus for connecting to items such as a PC (programming cable) or a modem.
7	USB+	USB + Data	Part of the 2-wire USB device differential data bus for connecting to items such as a PC (programming cable) or a modem.
8	RESET / USB2_VBUS_H / RS232_RTS_5V	SB9600 RESET / USB2_VBUS_HOST / RS232 Ready to Send	Part of the Motorola SB9600 communications bus to connect external devices. In USB Host mode, this signal is the 5V VBUS supply to a downstream device. Also configurable as 5V_RS232_RTS. Defaults to RESET.
9	BUSY / RS232_CTS_5V	SB9600 BUSY / RS232 Clear to Send	Part of the Motorola SB9600 communications bus to connect external devices or 5v RS232_CTS. Defaults to BUSY.
10	RS232_RTS_9V	RS232 Request-To-Send	Part of the 4-wire RS232 interface to external data accessories. An output normally +9V no load.

Table 9-2. J2 Rear Accessory Connector Signal and Voltage Descriptions (Continued)

Pin #	Pin Name		Pin Function
11	RS232_CTS_9V	RS232 Clear-To-Send	Part of the 4-wire RS232 interface to external data accessories. An input normally at +9V no load.
12	USB_VBUS_D	USB_VBUS_DEVICE	5V VBUS input for USB connectivity, supplied by the USB Host (i.e. a PC).
13	CHAN ACT	Channel Activity	Active low output used to indicate detection/unsquenching of a qualified received signal (idles at 5V).
14	GROUND	Ground	Preferred ground for any of the analog lines on J2.
15	EMERGENCY	Emergency	Input used to detect emergency activation. This pin must be connected to ground by a cable if emergency is disabled, even if disabled by CPS. If enabled, this line must be grounded via a switch, which is normally closed.
16	AUX PTT*	Push To Talk	Pulling this line to ground will activate PTT function normally selecting the AUX_MIC input.
17	ONE WIRE	1-Wire ® data	0-5V bidirectional data used for identification of smart accessories/cables. Caution, an external source of voltage could damage the microprocessor.
18	VIP OUT 1	Vehicular Interface Output	High voltage open drain output used for enabling relays used for accessories such as horn/lights.
19	VIP OUT 2	Vehicular Interface Output	High voltage open drain output used for enabling relays used for accessories such as horn/lights.
20	SPKR+	Speaker +	Used along with SPKR- to connect an external speaker. The audio PA is a bridge amplifier. Refer to Radio Specifications page for speaker impedances and loads.
21	RX FILT AUDIO	Receive Filtered Audio Out	Signal is a fixed level (independent of volume level) received audio signal, including alert tones. Flat or de-emphasis are programmed by CPS. Output voltage is approximately 100 mVrms per 1kHz of deviation. The DC offset is 1.4V.
22	MONITOR	Monitor overrides PL	Active low input used to detect when a rear microphone accessory is taken 'off-hook', to over-ride PL to alert the user to busy traffic prior to transmitting (idles at 5V).
23	AUX MIC	Rear microphone input	This microphone signal is independent of the microphone signal on the front microphone connector. The nominal input level is 80mVrms for 60% deviation when used for motorcycle, but can also support 300 mVrms for future APCO accessories. The DC impedance is 1560 ohms and the AC impedance is 560 ohms, 1Vrms max. 9V DC with no input load.
24	SW B+	Switched Battery Voltage	A+ battery voltage is available when the radio is switched on. Used as supply for certain J2 accessories.
25	IGN sense (ACC)	Vehicle Ignition sense (ACC)	Connecting to the ACC line controlled by the vehicle's ignition switch will allow CPS ignition features such as "ignition required for turn on" to be used. Connecting this line to the car battery will defeat CPS ignition features.
26	SPKR-	Speaker -	Used along with SPKR+ to connect an external speaker. The audio PA is a bridge amplifier. Refer to Radio Specifications page for speaker impedances and loads.

### 9.2.3 J100 CHUC – Mobile Accessory Port Interface for APX 7500 O2,O5,O7 and O9

J100 is located on the back of the O2,O5,O7 and O9 control head assemblies in the remote mount configuration. This connector provides pins located identical to connector J2 at the back of a mid power transceiver. Not all the pins are populated at J100 due to identical functionality on connectors J200, J400, J600, and J700. APCO audio pins can be located at J100. The VIP OUT 1 and VIP OUT 2 function at this connector when no cable is attached at J400. Figure 9-3 illustrates the J100 Mobile Accessory Port (MAP) connector while Table 9-3 describes the function of each pin.

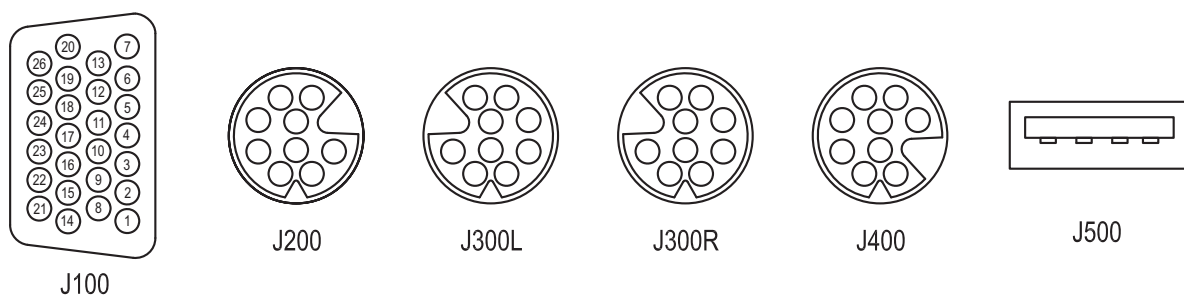


Figure 9-3. J100 Mobile Accessory Port (MAP) Connector

Table 9-3. J100 Remote Mount Control Head Mobile Accessory Port (MAP)

Pin #	Pin Name		Pin Function
1	GND	Ground	Preferred ground for digital signals.
2	N/C	No Connect	
3	N/C	No Connect	
4	N/C	No Connect	
5	N/C	No Connect	
6	USB-	USB- Data	Part of the USB differential data bus.
7	USB+	USB+ Data	Part of the USB differential data bus.
8	N/C	No Connect	
9	N/C	No Connect	
10	N/C	No Connect	
11	N/C	No Connect	
12	USB_VBUS	USB_VBUS_DEVICE	Used for USB enumeration. 5 V is applied to this pin by a USB HOST accessory.
13	CHAN ACT	Channel Activity [A(p)]	5 V active low output signal used to indicate that a qualified receive signal is present. One second after power-up, this line goes low for 1.8 seconds while the CHIB is configured. Therefore, this line should be ignored for at least 2.8 seconds after power-up. APCO required.
14	GND	Ground	Preferred ground for analog signals.
15	EMERGENCY	Emergency	Input used to detect emergency activation.
16	AUX PTT*	AUX PTT [PTT]	Pulling this line to ground will activate PTT function normally selecting the AUX_MIC input. APCO required.

Table 9-3. J100 Remote Mount Control Head Mobile Accessory Port (MAP) (Continued)

Pin #	Pin Name		Pin Function
17	ONE WIRE	1-Wire ® data	0-2.8V bidirectional data used for identification of smart accessories/cables.
18	VIP OUT 1	Vehicular Interface Output	High voltage open drain output used for enabling relays used for accessories such as horn/lights.
19	VIP OUT 2	Vehicular Interface Output	High voltage open drain output used for enabling relays used for accessories such as horn/lights.
20	N/C	No Connect	
21	RX FILT AUDIO	Receive Filtered Audio Out [A(rx)]	This is a fixed level (independent of volume control setting) received audio signal, including alert tones. Flat or de-emphasis is programmed by CPS. Output voltage is approximately 100 mVrms per 1kHz of deviation. The DC offset is 1.4V. APCO required.
22	MONITOR	Monitor overrides PL	Active low input used to detect when a rear microphone accessory is taken 'off-hook', to over-ride PL to alert the user to busy traffic prior to transmitting (idles at 5V).
23	AUX MIC	Rear microphone input [A(tx)]	This microphone signal is independent of the microphone signal on the front microphone connector. The nominal input level is 80mVrms for 60% deviation when used for motorcycle, but can also support 300 mVrms for future APCO accessories. The DC impedance is 1560 ohms and the AC impedance is 560 ohms, 1Vrms max. 9V DC with no input load. APCO required.
24	SW B+	Switched Battery Voltage	A+ battery voltage is available when the radio is switched on. Used as supply for certain J2 accessories.
25	N/C	No Connect	
26	N/C	No Connect	

## 9.2.4 J200 CHUC – Power and Audio Interface

J200 is located on the back of the O2,O5,O7 and O9 control head assemblies in the remote mount configuration. This connector provides the voltage into the transceiver, as well as Ignition sense (ACC) and speaker lines. An alternate power cable can be used at this connector to provide Earjack audio and TX/RX record out audio. Please refer to the installation manual for ordering part numbers. [Figure 9-4](#) illustrates the J200 connector while [Table 9-4](#) describes the function of each pin.

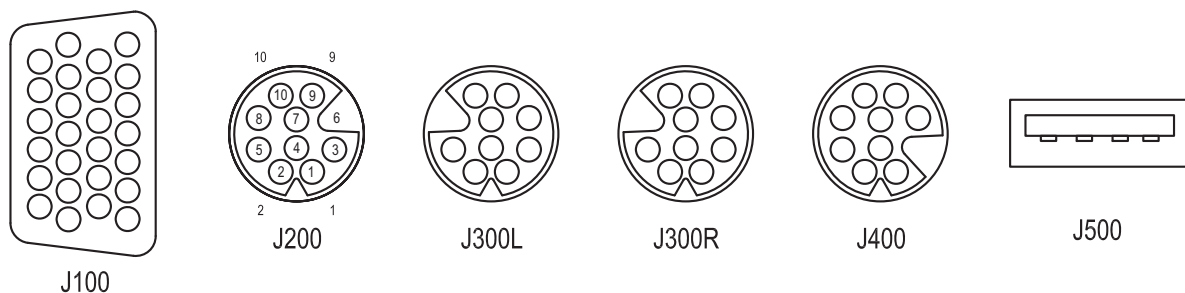


Figure 9-4. J200 Power and Audio Connector

Table 9-4. J200 Power and Audio Connector Pin Functions

Pin #	Pin Name	Pin Function
1	SPEAKER +	Primary output for external speaker. Refer to Radio Specifications page for speaker impedances and loads.
2	SPEAKER -	Primary output for external speaker. Refer to Radio Specifications page for speaker impedances and loads.
3	Record Out	Dedicated pin at a fixed level of 300mv
4	GND (analog)	Analog ground used for Record out.
5	Earjack	Dedicated audio path with a fixed level output higher than Record out. Mutes the Audio PA when connected to an earpiece (an external speaker attached at J200 will mute upon attachment of earpiece).
6	NO PIN	
7	C.H. SPEAKER MUTE	For Headset MUTING...by turning-off audio PA in C.H. This does not MUTE the radio's rear speaker.
8	GND for Pwr	Shared for POWER and audio grounds
9	IGN Sense (ACC)	Sense line to determine the state of the vehicle's IGNITION.
10	A+ (cable FUSED)	Control Head power supply.

## 9.2.5 J300 CHUC – Controller Area Network (CAN) Interface

J300L and J300R are located on the back of the O2,O5,O7 and O9 control head assemblies in the remote mount configuration. These two connectors are identical, in order to aid in future daisy-chaining of other CAN bus accessories. They provide the Data, digital audio, and power on/off/reset commands for the control head to transceiver communications. Please refer to the installation manual for ordering part numbers for various lengths of the CAN remote mount cables. [Figure 9-5](#) illustrates the J300 connector while [Table 9-5](#) describes the function of each pin.

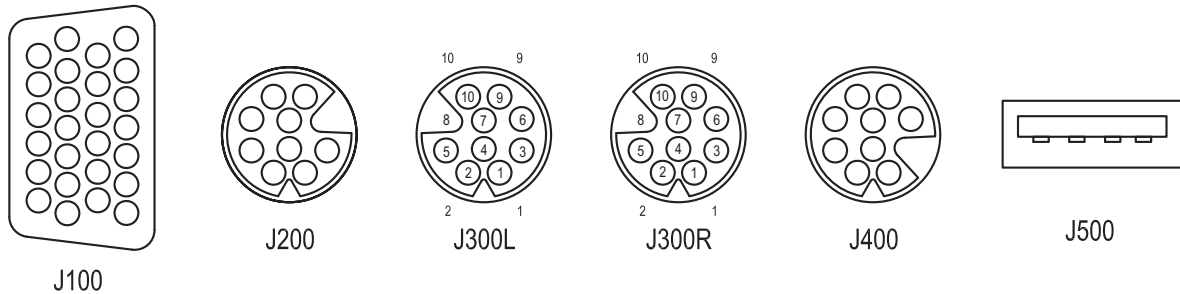


Figure 9-5. J300 Controller Area Network (CAN) Connector on CHIB

Table 9-5. J300 Controller Area Network Connector Pin Functions

Pin #	Pin Name	Pin Function
1	CAN_1_HIGH	TX+ (AUDIO)
2	CAN_1_LOW	TX- (AUDIO)
3	CAN_3_HIGH	TX+ (PWR) <i>Dedicated for System ON/OFF/RESET commands.</i>
4	CAN termination detect pin	Pin 4 shorted to GND inside each end of the CAN cable.
5	A+	Only routed on the "03" CAN cable
6	CAN_3_LOW	TX- (PWR) <i>Dedicated for System ON/OFF/RESET commands.</i>
7	GND	Drain wire wrapped around GND shield
8	NO PIN	
9	CAN_2_HIGH	TX+ (DATA)
10	CAN_2_LOW	TX- (DATA)

## 9.2.6 J400 CHUC – VIP and DEK Interface

J400 is located on the back of the O2,O5,O7 and O9 control head assemblies in the remote mount configuration. This connector provides the ability to utilize up to 3 VIP OUT, 3 VIP IN, the GND and SWB+ pins they require, or DEK signal lines. This connector has cable detection pins to allow the control head to determine which type of cable is being used, and therefore allow the control head to configure its pins appropriately for either VIP or DEK accessory interfacing. It is not recommend to fabricate this cable from scratch. The cable must be inserted prior to control head power-up. Please refer to the installation manual for ordering part numbers for either the VIP or DEK cable. [Figure 9-6](#) illustrates the J400 connector while [Table 9-6](#) describes the function of each pin.

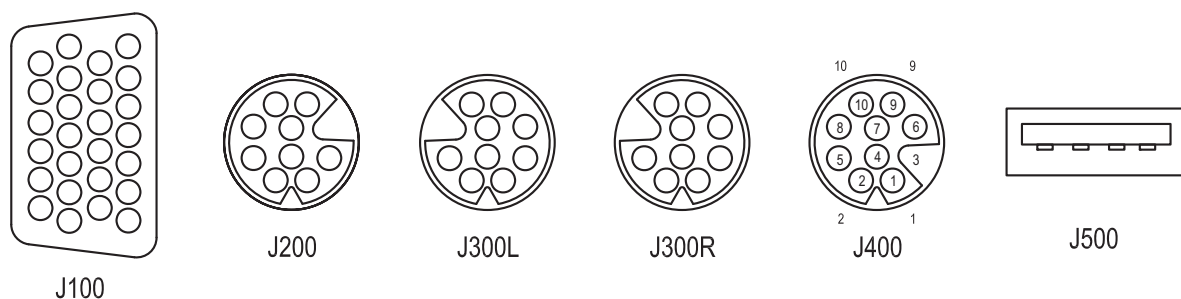


Figure 9-6. J400 VIP and DEK Connector

Table 9-6. J400 VIP and DEK Connector Functionality

Pin #	No cable	DEK cable	VIP cable	Future cable	Future cable
1	SWB+	SWB+	SWB+	SWB+	SWB+
2	GND	GND	GND	GND	GND
3	no pin	no pin	no pin	no pin	no pin
4	Detect Pin 1 (Short to GND)	Detect Pin 1 (Short to GND)	Detect Pin 1 (Short to SWB+)	Detect Pin 1 (Short to GND)	Detect Pin 1 (Short to GND)
5	no pin	STROBE	VIP_OUT_1	no pin	no pin
6	no pin	DATA-OUT	VIP_OUT_2	no pin	no pin
7	no pin	CLOCK	VIP_OUT_3	no pin	no pin
8	Detect Pin 2 (Short to GND)	Detect Pin 2 (Short to SWB+)	VIP_IN_1	Detect Pin 2 (Short to GND)	Detect Pin 2 (Short to SWB+)
9	Detect Pin 3 (Short to GND)	Detect Pin 3 (Short to GND)	VIP_IN_2	Detect Pin 3 (Short to SWB+)	Detect Pin 3 (Short to SWB+)
10	no pin	DATA-IN	VIP_IN_3	no pin	no pin

### 9.2.7 J500 CHIB – USB HOST Interface

The USB host series "A" Receptacle interface interacts with USB devices through the Host Controller. It is located at the back of the CHIB. This connector supports low and full speed devices that complies with USB 2.0 standard included in the Motorola approved list.

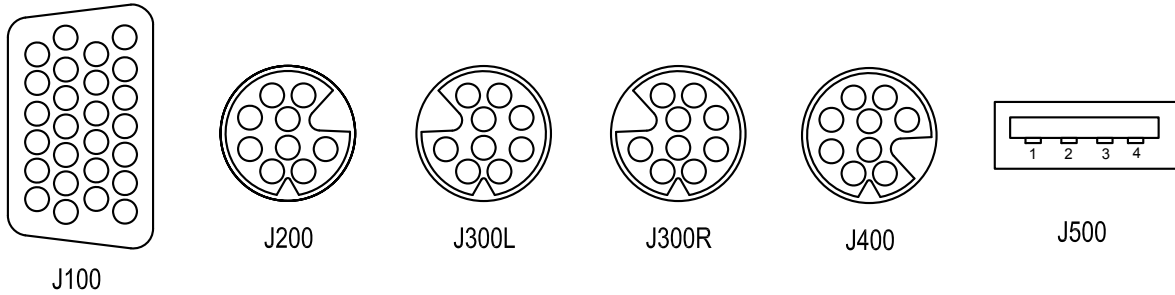


Figure 9-7. J500 USB Host Connector

Table 9-7. J500 USB Host Connector

Pin #	Pin Name	Pin Color	Pin Function
1	VBUS_Host	Black	Host supplied Power to accessory
2	Data (-)	Red	Data signal
3	Data (+)	Yellow	Data signal
4	GND	Green	Bus GND return



## 9.2.8 J600 TIB – Data and Audio Interface

J600 is located on the transceiver interface board (TIB). This connector is the legacy accessory interface, but contains some additional pin functionality. [Figure 9-8](#) illustrates the J600 connector while [Table 9-8](#) describes the function of each pin.

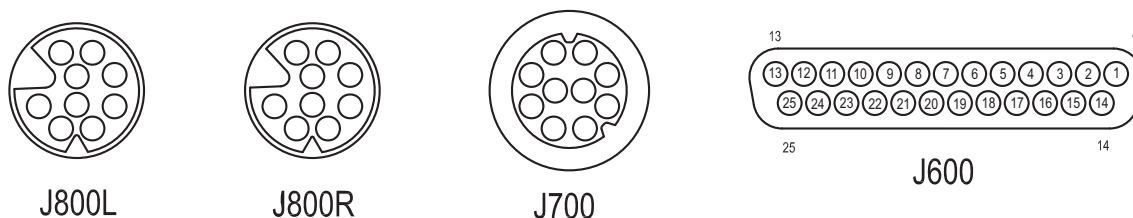


Figure 9-8. J600 Connector

Table 9-8. J600 Remote Mount Accessory Connector

Pin #	Pin Name		Pin Function
1	AUX_PTT	Auxiliary PTT input	Pulling this line to ground will activate PTT function normally selecting AUX_MIC input. Jumpers exist on the TIB to change this pin to Ignition sense (ACC) or VIP_IN 1 at 3.3 V levels.
2	RS232_TXD_9V	RS232 Transmit Data	Part of the 4-wire RS232 interface to external data accessories, programming cables, etc. An output normally -9V no load. A jumper exists on the TIB to change this pin to shield connection.
3	RS232_RXD_9V	RS232 Receive Data	Part of the 4-wire RS232 interface to external data accessories, programming cables, etc. A jumper exists on the TIB to change this pin to REMOTE IGNITION.
4	RS232_CTS_9V	RS232 Clear-To-Send	Part of the 4-wire RS232 interface to external data accessories, programming cables, etc. Jumpers exist on the TIB to change this pin to AUX_MIC, MIC_IN, or VIPOUT_1 (passthrough). MIC_IN routes to the transceiver MIC_HI input.
5	BUS+ / RS232_TXD_5V	SB9600 BUS+ / RS232 Transmit	Part of the Motorola SB9600 communications bus to connect external devices. RS232 is made available instead of SB9600 by means of a Motorola "RS232-activation" cable, without the need to remove any jumpers on the TIB.
6	RX_AUDIO	Receive Filtered Audio Out	This is a fixed level (independent of volume level) received audio signal, including alert tones. Flat or de-emphasis are programmed by CPS. Output voltage is approximately 100 mVrms per 1kHz of deviation. The DC offset is 1.4V. Formerly called RX_Filtered_Audio.
7	AUX_RX		Formerly called RX_Audio. This pin is an input to the radio. This input is routed through the volume control circuitry to the speaker. Nominal input level is 300mVrms. Jumper can allow for Record Out.

Table 9-8. J600 Remote Mount Accessory Connector

Pin #	Pin Name		Pin Function
8	AUX_TX		Formerly called TX_audio. This pin is an input to the radio. This input is routed to the transmitter through multiplexed lines that are controlled by the microprocessor. Nominal input level is 300mVrms.
9	RX_AUDIO		This pin is the same as pin 6. A jumper exists to change this pin to VIP_IN 2 at 3.3 V levels.
10	GND		
11	GND		
12	DAC_AUDIO_OUT & AUX_MIC		Audio spoken from the operator is OUTPUT from the radio transceiver. When SB9600 PTT command is detected by the radio transceiver, this pin switches into an audio INPUT line (for the duration of the PTT) and is routed into the AUX_MIC path of the radio transceiver. AUX_PTT does not turn this pin into an INPUT pin. Jumpers exist on the TIB to change this pin to AUX_MIC or MIC_IN (MIC_IN=MIC_HI inside radio).
13	EMERGENCY	Emergency	Input used to detect emergency activation. To use this input, a shorting jumper on the TIB, which grounds this input, must be removed. Once the jumper is removed, emergency operation is possible at either this connector or at the J2 connector.
14	BUS- / RS232_RXD_5V	SB9600 BUS- / RS232 Receive	Part of the Motorola SB9600 communications bus to connect external devices. RS232 is made available instead of SB9600 by means of a Motorola "RS232-activation" cable, without the need to remove any jumpers on the TIB.
15	AUX_MIC VIPOUT_1	Auxiliary microphone input Vehicle Interface Port 1	VIPOUT_1 as the default state of this pin. The nominal input level for AUX_MIC is 80 mVrms for 60% deviation when used for motorcycle, but can also support 300 mVrms for future APCO accessories. The DC impedance is 1560 ohms and the AC impedance is 560 ohms, 1 Vrms max 9V DC with no input load. Jumpers exist on the TIB to change this pin to AUX_MIC, MIC_IN, DAC_AUDIO_OUT, and VIPOUT_1 (passthrough). MIC_IN routes to the transceiver MIC_HI input.
16	REMOTE IGNITION	Front Ignition sense (ACC) which is independent of the Rear Ignition sense (ACC) at the J2 connector	Connecting to the ACC line controlled by the vehicle's ignition switch will allow CPS ignition features such as "ignition required for turn on" to be used. Connecting this line to the car battery will defeat CPS ignition features.
17	RS232_RTS_9V	RS232 Request to Send	Part of the 4-wire RS232 interface to external data accessories, programming cables, etc. An output normally +9V no load. A jumper exists on the TIB to change this pin to VIPOUT_2 (passthrough).
18	GND	Ground	

Table 9-8. J600 Remote Mount Accessory Connector

Pin #	Pin Name		Pin Function
19	RESET / RS232_RTS_5v	SB9600 RESET / RS232 Ready to Send	Part of the Motorola SB9600 communications bus to connect external devices. RS232 is made available instead of SB9600 by means of a Motorola "RS232-activation" cable, without the need to remove any jumpers on the TIB.
20	A+	Battery Voltage	
21	GND	Ground	
22	SWB+	Switched Battery Voltage	This voltage is available when the radio is switched on.
23	BUSY / RS232_CTS_5V	SB9600 BUSY / RS232 Clear to Send	Part of the Motorola SB9600 communications bus to connect external devices. RS232 is made available instead of SB9600 by means of a Motorola "RS232-activation" cable, without the need to remove any jumpers on the TIB.
24	SPKR-	Speaker-	Used along with SPKR+ to connect an external speaker. The audio PA is a bridge amplifier. Refer to Radio Specifications page for speaker impedances and loads.
25	SPKR+	Speaker+	Used along with SPKR- to connect an external speaker. The audio PA is a bridge amplifier. Refer to Radio Specifications page for speaker impedances and loads.

### 9.2.9 J700 TIB – Mobile Microphone Port (MMP)

J700 is located on the transceiver interface board (TIB) used in the remote mount configuration. This connector is the MMP connector.

**NOTE:** the same TIB is used for both mid power and high power transceivers. [Figure 9-9](#) illustrates the J700 connector while [Table 9-1](#) describes the function of each pin.

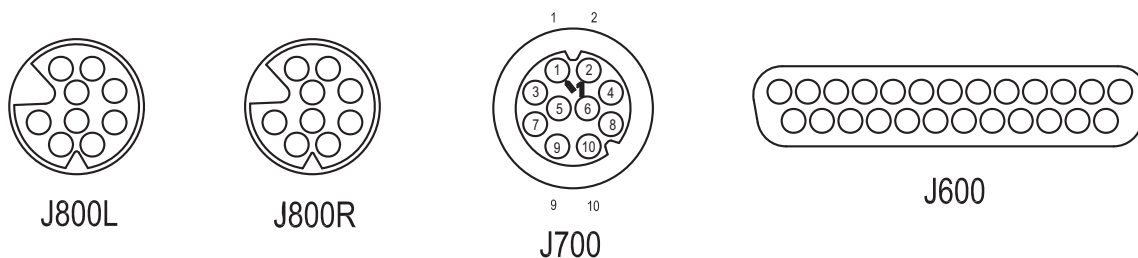


Figure 9-9. J700 MMP Programming Connector

### 9.2.10 J800 TIB – Controller Area Network (CAN) Interface

J800L and J800R are located on the transceiver interface board (TIB). These two connectors are identical, in order to aid in future daisy-chaining of other CAN bus accessories. They provide the Data, digital audio, and power on/off/reset commands for the control head to transceiver communications. Please refer to the installation manual for ordering part numbers for various lengths of the CAN remote mount cables. [Figure 9-10](#) illustrates the J800 connector while [Table 9-9](#) describes the function of each pin.

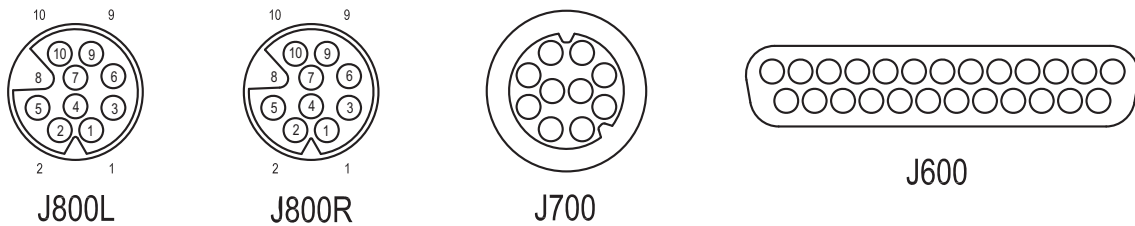


Figure 9-10. J800 Controller Area Network (CAN) Connector on TIB

Table 9-9. J800 Controller Area Network Connector Pin Functions

Pin #	Pin Name	Pin Function
1	CAN_1_HIGH	TX+ (AUDIO)
2	CAN_1_LOW	TX- (AUDIO)
3	CAN_3_HIGH	TX+ (PWR) <i>Dedicated for System ON/OFF/RESET commands.</i>
4	CAN termination detect pin	Pin 4 shorted to GND inside each end of the CAN cable.
5	A+	Only routed on the “03” CAN cable
6	CAN_3_LOW	TX- (PWR) <i>Dedicated for System ON/OFF/RESET commands.</i>
7	GND	Drain wire wrapped around GND shield
8	NO PIN	
9	CAN_2_HIGH	TX+ (DATA)
10	CAN_2_LOW	TX- (DATA)

### 9.2.11 I/O Disclaimer

Some of the signal lines on the J2 accessory connector are limited to between 0 and 5 V operation while other inputs are limited to between 0 and 20 V. The exception is four-wire RS232, which can tolerate up to ±15 V maximum. At no time should any two (or more) outputs be connected together. Exceeding the input voltages or output loads listed in the above tables could result in electronic component failure. In most cases Zener diodes have been added to protect against ESD.

### 9.3 Microphone Bias

A 9 V DC microphone bias is present on the MIC\_IN line. When this line is loaded by the microphone electronics, as when the PTT button is pressed, the bias voltage drops to between 3 and 6 V. The MIC\_IN line has an AC input impedance of 560 ohms. The MIC\_IN line should not be loaded such that the bias voltage drops below 1 V or rises above 10.5 V. If the bias voltage falls outside this range, the signal will be clipped by clamping diodes designed to protect the input. When testing with a signal generator or other audio source, use a DC blocking capacitor of 10 $\mu$ F on the MIC\_IN line. If the capacitor is polarized, then the plus lead goes to the radio MIC\_IN line. If the signal generator has the option of a DC offset, then applying a DC offset of 2.5 V may be used instead of the capacitor. MIC\_IN refers to both MIC\_HI and AUX\_MIC.

### 9.4 Audio PA Out Bias

The audio PA is a BTL (bridge-to-load) amplifier. When the radio is in receiver mode, the output of both speaker leads bias up to half of the supply voltage. Considering that both leads are at the same potential, the average DC voltage across the load is zero. At maximum volume the signal voltage to the load is double that of one amplifier peak-to-peak because the amplifiers work together 180 degrees out of phase. Caution must be taken not to short either lead to ground, which might cause component damage. Even though audio may still be heard from the speaker, the shorted side will go into current limiting and eventually into thermal shutdown, shutting off the amplifier. These protection devices are not intended to be tested.

### 9.5 Replacement Board Procedures

Once a problem has been isolated to a specific board, use one of the following recommended repair procedures:

- Install a good board from your inventory into the radio.
- Order a replacement board from Radio Products Services Division at 1-800-422-4210. Refer to ["Replacement Parts Ordering"](#) for further information.
- Troubleshoot the defective board using the *ASTRO APX Mobile Radios And O3, O5 & O9 Detailed Service Manual*. (Refer to the ["Related Publications"](#) section of this manual for the specific manual number.)

### 9.6 Power-Up Error Codes

When the radio is turned on (power-up), the radio performs cursory tests to determine if its basic electronics and software are in working order. Problems detected during these tests are presented as error codes on the radio's display. The presence of an error should prompt the user that a problem exists and that a service technician should be contacted.

Self-test errors are classified as either fatal or non-fatal. Fatal errors inhibit user operation; non-fatal errors do not. Use the following tables to aid in understanding particular power-up error code displays.

Table 9-10. Power-Up Error Codes

Error Code	Description	Corrective Action
01/02	FLASH ROM Codeplug Checksum Non-Fatal Error	Reprogram the codeplug
01/12	Security Partition Checksum Non-Fatal Error	Send radio to depot
01/81	Host ROM Checksum Fatal Error	Send radio to depot
01/82	FLASH ROM Codeplug Checksum Fatal Error	Reprogram the codeplug

Table 9-10. Power-Up Error Codes (Continued)

Error Code	Description	Corrective Action
01/84	External EEPROM blank (or SLIC failure) Fatal Error	Send radio to depot
01/88	External RAM Fatal Error <b>Note:</b> Not a checksum failure	Send radio to depot
01/90	General Hardware Failure Fatal Error	Turn the radio off, then on
01/92	Security Partition Checksum Fatal Error	Send radio to depot
01/93	FLASHport Authentication Code Failure	Send radio to depot
01/94	Internal EEPROM blank. Fatal Error	Send radio to depot
01/98	Internal RAM Fail Fatal Error	Send radio to depot
01/A2	Tuning Codeplug Checksum Fatal Error	Send radio to depot
02/81	DSP ROM Checksum Fatal Error	Send radio to depot
02/88	DSP RAM Fatal Error <b>Note:</b> Not a checksum failure	Turn the radio off, then on
02/90	General DSP Hardware Failure (DSP startup message not received correctly)	Turn the radio off, then on
09/10	Secure Hardware Error	When equipped with the 3 day key retention option, make sure the radio had battery voltage applied for at least 2 minutes, then turn the radio off, then on. With no options, turn the radio off, then on
09/90	Secure Hardware Fatal Error	Turn the radio off, then on
15/10	External Accessory Non-Fatal Error External Accessory is not present on power up or did not power up correctly, and external accessory feature is enabled in codeplug.	Verify external accessory is connected and powers up. Turn the radio off, then on.
15/90	External Accessory Fatal Error External Accessory is not present on power up or did not power up correctly, and external accessory feature is enabled in codeplug.	Verify external accessory is connected and powers up. Turn the radio off, then on.

## 9.7 Operational Error Codes

During radio operation, the radio performs dynamic tests to determine if the radio is working properly. Problems detected during these tests are presented as error codes on the radio's display. The presence of an error code should prompt a user that a problem exists and that a service technician should be contacted. Use [Table 9-11](#) to aid in understanding particular operational error codes.

Table 9-11. Operational Error Codes

Error Code	Description	Error Type	Corrective Action
FAIL 001	Synthesizer Out-of-Lock	NON-FATAL	1. Reprogram the codeplug. 2. Refer to Detailed Service Manual.
FAIL 002	Personality checksum or system block error	NON-FATAL	Reprogram the codeplug.

## 9.8 Transmitter Troubleshooting

Table 9-12 can help you troubleshoot problems that might occur in the transmitter section of your radio.

Table 9-12. Transmitter Troubleshooting Chart

Symptom	Possible Cause	Correction or Test (Measurements Taken at Room Temperature)
No RF Power Output	TX Power Level Programming	Check TX power level programming (from the appropriate Customer Programming Software).
	Radio Transceiver	Refer to the Detailed Service Manual.
Distorted Modulation	Bandwidth	Is the correct bandwidth selected (use the appropriate Customer programming software)? Is radio properly tuned? (See <a href="#">Chapter 6: Radio Alignment Procedures.</a> )
	Compensation Not Set/ Working (DPL Distorted)	Check the compensation setting. If compensation won't adjust, go to "Can't Set Compensation" below.
	Radio Transceiver	Refer to the Detailed Service Manual.
No Modulation, Bad Microphone Sensitivity	Check Deviation and Compensation	Retune, if necessary. (See <a href="#">Chapter 6: Radio Alignment Procedures.</a> )
	Microphone	Speak loudly into the microphone while monitoring the microphone line (pin 7 of control head MMP). If it is not greater than 80 mVrms, then check the microphone. In the dash configuration check the flex as well. If the microphone line is greater than 80mVrms refer to the Detailed Service Manual.
No/Low Signaling (PL, DPL, Trunking, MDC)	Check Programming	Reprogram the codeplug.
Can't Set Compensation	Deviation and Compensation	Vary deviation and compensation controls from maximum to minimum using softpots in the TX Deviation Balance screen and TX Deviation Limit screen (using the appropriate radio-programming software—see <a href="#">Chapter 6: Radio Alignment Procedures.</a> )
	Radio Transceiver	Refer to the Detailed Service Manual.

**NOTE:** "AC-coupled" is adding a 10  $\mu$ f capacitor externally to prevent biasing on the MIC-HI line from being grounded.

## 9.9 Receiver Troubleshooting

Table 9-13 can help you troubleshoot problems that might occur in the receiver section of your radio.

Table 9-13. Receiver Troubleshooting Chart

Symptom	Possible Cause	Correction or Test (Measurements Taken at Room Temperature)
Radio does not power-up	Blown power fuse	Check the fuse in the red cable.
	Blown ignition fuse	Check the fuse in the ignition cable, yellow cable from CHIB, red cable from transceiver J2 connection. Note that the IGNITION field in the codeplug would need to be set to REQUIRED for the ignition fuse to affect powerup. If IGNITION is set to anything besides REQUIRED, then ignore this step.
	Control Head	When the power button is pressed the control head should draw at least 100mA. If not, refer to the detailed service manual for control head troubleshooting. In addition, if the control head powers-up then powers-down roughly 8 seconds later, the control head has failed.
	Radio Transceiver	Measure SW_B+ on J2 pin 24. SW_B+ should go to battery voltage when the power button is pressed. If SW_B+ is low, check fuse F401 on the controller board. If SW_B+ is high, then refer to the detailed service manual for radio transceiver troubleshooting.
	Control head / TIB to transceiver FLEX	If SW_B+ is not present on J2 pin 24, then the flex is suspect. Replace the flex. If SW_B+ is still not present, refer to the detailed service manual for ON/OFF system troubleshooting.
	CAN Cable	Ensure that the CAN cable is connected in remote systems.
Radio will not power-down	Emergency Switch	Check the emergency signal at TIB J600-13 or rear accessory J2-15. A high voltage may indicate that the emergency switch line is not grounded by the rear accessory cable.
	Radio Transceiver	Measure SW_B+ on J2 pin 24. SW_B+ should drop to zero sometime after the power button is pressed. If SW_B+ is low, then refer to the detailed service manual for radio transceiver troubleshooting. If SW_B+ remains high, refer to the detailed service manual for ON/OFF system troubleshooting.
No Receiver Audio or Receive Does Not Unsquench	Code Plug	Check the codeplug to ensure correct frequency and signaling (PL, DPL) is enabled (use the appropriate radio-programming software).
	Speaker	Check for speaker leads shorted to ground or open speaker wires. Replace, if necessary.
	Radio Transceiver	Refer to the Detailed Service Manual.



Table 9-13. Receiver Troubleshooting Chart (Continued)

Symptom	Possible Cause	Correction or Test (Measurements Taken at Room Temperature)
Audio Distorted or Not Loud Enough	Codeplug	Ensure the codeplug is properly configured, including bandwidth and signaling.
	Synthesizer Not On Frequency/Working	See <a href="#">"Reference Oscillator Alignment"</a> .
	Radio Transceiver	Refer to the Detailed Service Manual.
RF Sensitivity Poor	Synthesizer Not On Frequency/Working	Check the local oscillator frequency. See <a href="#">"Reference Oscillator Alignment"</a> .
	Radio Transceiver	Refer to the Detailed Service Manual.
Radio Will Not Squelch	Codeplug	Check the offending channel for spurious activity by monitoring with a known-good radio or service monitor. If possible, remove the offending source (computer, etc.). If not, increase the squelch level using the appropriate radio-programming software.
Excessive Noise in Fading Conditions	Check Programming for Correct Bandwidth	Reprogram the codeplug with the correct bandwidth.

## 9.10 Controller Troubleshooting

[Table 9-14](#) can help you troubleshoot problems that might occur in the controller section of your radio.

Table 9-14. Controller Troubleshooting Chart

Symptom	Possible Cause	Correction or Test (Measurements Taken at Room Temperature)
Current too low when A+ applied to radio	Emergency mode may be activated.	In dash-mount, the rear accessory cable with a jumper grounding emergency or an emergency foot-petal must be present. In remote mount, the TIB has a jumper to GND that must be present, or, an emergency foot-petal must be attached to the transceiver or TIB. Attach the necessary cable, accessory, or resistor jumper to prevent accidental emergency mode activation. Verify the signal is low at TIB J600-13 or rear accessory J2-15.
	Controller board may be damaged.	Refer to Detailed Service Manual and verify output voltage on all regulators.
No audio	Incorrect speaker installation.	Refer to Installation Manual. Verify speaker not damaged via a continuity check.

Table 9-14. Controller Troubleshooting Chart (Continued)

Symptom	Possible Cause	Correction or Test (Measurements Taken at Room Temperature)
Control head display says Maintenance Mode and draws less than 200mA	Remote mount CAN cable attached may be disconnected.	Verify all cables securely attached, including power to the radio transceiver.
	Flexes inside radio or control head may be loose.	Open Control Head and check if flexes are not securely attached.
	Is 5amp surface-mount fuse blown inside transceiver?	Continuity test the fuse F401 after disassembling radio. If damaged, replace. Can be blown by accidentally shorting SWB+ to GND.
Radio resets when PTT	Vehicle battery voltage too low to allow radio to transmit.	Try radio on bench with power tuned down, and power supply rated to at least 20 A. Try new vehicle battery.
Radio does not retain secure key when A+ removed for more than 5 minutes	Radio is missing the 3-day secure option board MHLN6999_, option board is incorrectly installed, or key-retention capacitor is damaged.	Repair/replace/install option board inside radio.
No power on VBUS line to power USB accessory	Incorrect installation of USB accessory on the radio.	Connect USB accessory to "USB Host" pins, not "USB Device" pins. Refer to installation manual or Basic service chapter listing pin descriptions for each connector. Accessory may not be an approved USB accessory for this radio.
	USB accessory requires more current than the port can supply.	A USB accessory requiring 500mA can only be attached at the front of the control head's MMP port, or the TIB's MMP port. The rear accessory connector on the control head or rear of the midpower transceiver can only supply 100mA.
Radio won't turn on	Incorrect codeplug setting for vehicle Ignition sense (ACC).	Reprogram the radio via CPS and refer to Help section on possible Ignition settings and their functions. Verify that the Ignition sense (ACC) wire is attached at either the control head or the radio transceiver.
Radio seems too hot	Excessively long transmit times or radio has been constantly transmitting due to a PTT that is jammed.	Replace microphone or foot PTT switch.
	Radio transceiver Installation is located in a poorly ventilated location.	Refer to the installation manual.
	You may have foreign debris inside the radio. Open and inspect.	Clean radio. Look for damaged parts.
Radio not working	Installation could affect radio performance.	Refer to the Installation manual chapter containing recommendations and common radio system problems and solutions.

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## Chapter 10 Functional Block Diagrams and Connectors

This chapter contains the APX Mobile Radio functional block diagrams and connector locations.

*Table 10-1. Table of Functional Block Diagrams and Connectors*

Page	Figure Name
10-2	Figure 10-1. APX Mobile Radio Transceiver Functional Block Diagram
10-3	Figure 10-2. O3 Dash and Remote Control Head Functional Block Diagram
10-4	Figure 10-3. O2, O5, and O7 Dash and Remote Control Head Functional Block Diagram
10-5	Figure 10-4. O9 Remote Control Head Functional Block Diagram
10-6	Figure 10-5. O2 Control Head Functional Block Diagram
10-7	Figure 10-6. O3 Control Head Functional Block Diagram
10-8	Figure 10-7. O5 Control Head Functional Block Diagram
10-9	Figure 10-8. O7 Control Head Functional Block Diagram
10-10	Figure 10-9. O9 Control Head Functional Block Diagram
10-11	Figure 10-10. O5 Control Head Interface Board (CHIB) Functional Block Diagram
10-11	Figure 10-11. O2 and O7 Control Head Interface Board (CHIB) Functional Block Diagram
10-12	Figure 10-12. APX Mobile Radio Transceiver Interface Board (TIB) Functional Block Diagram
10-13	Figure 10-13. O3 Dash-Mount Radio Connector Locations (Mid Power Only)
10-13	Figure 10-14. O3 Remote-Mount Radio Connector Locations
10-13	Figure 10-15. O3 Remote-Mount Radio Connector Locations (High Power Only)
10-14	Figure 10-16. O5 Dash-Mount Radio Connector Locations (Mid Power Only)
10-14	Figure 10-17. O5 Remote-Mount Radio Connector Locations (Mid Power Only)
10-14	Figure 10-18. O5 Remote-Mount Radio Connector Locations (High Power Only)
10-15	Figure 10-19. Transceiver Interface Board (TIB), Universal Relay Controller & Control Head View.
10-15	Figure 10-20. Remote-Mount Configuration with 100W or Higher Power Radio

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### 10.1 APX Mobile Radio Transceiver Functional Block Diagram

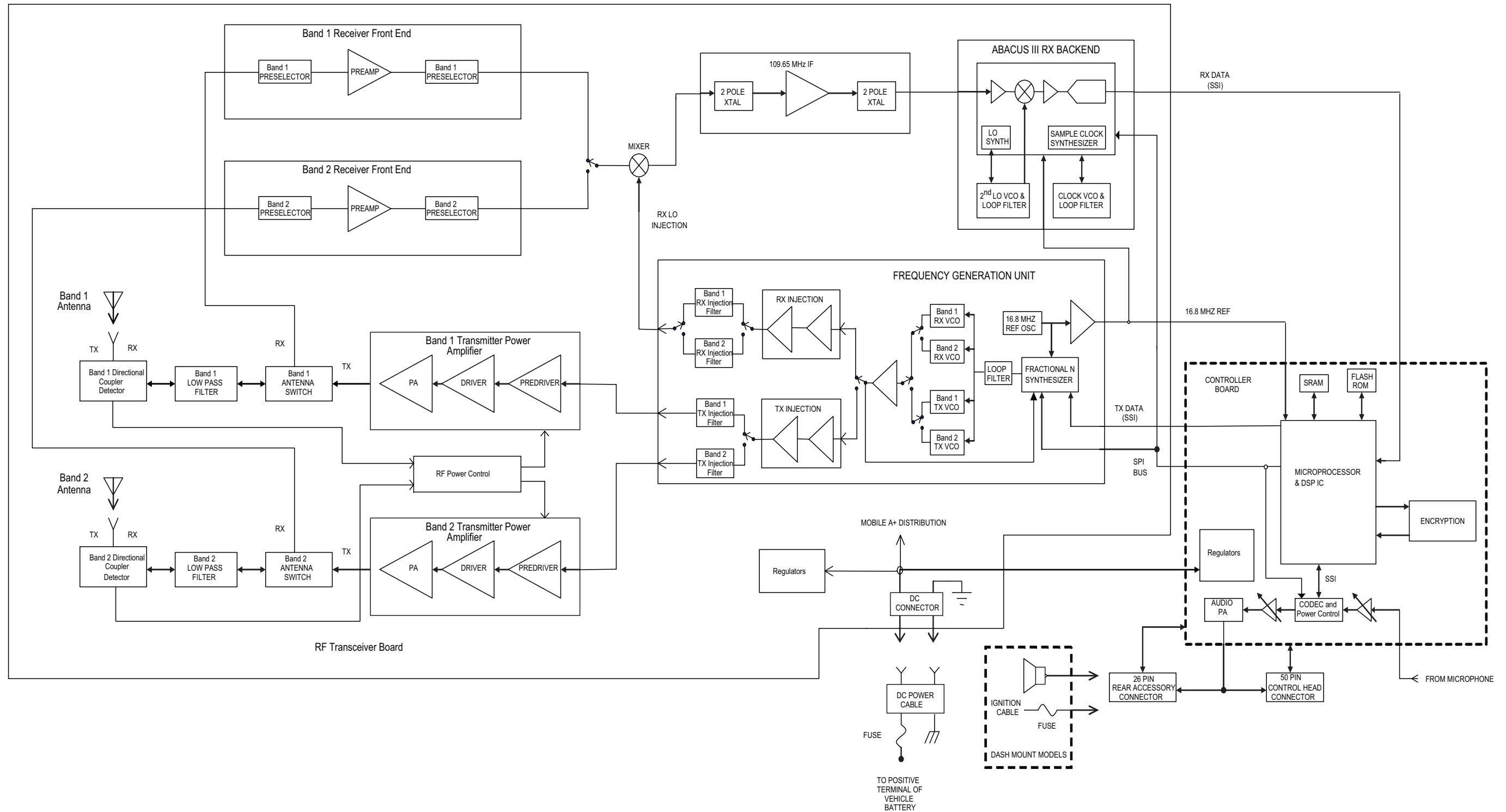


Figure 10-1. APX Mobile Radio Transceiver Functional Block Diagram

## 10.2 O3 Dash and Remote Control Head Functional Block Diagram

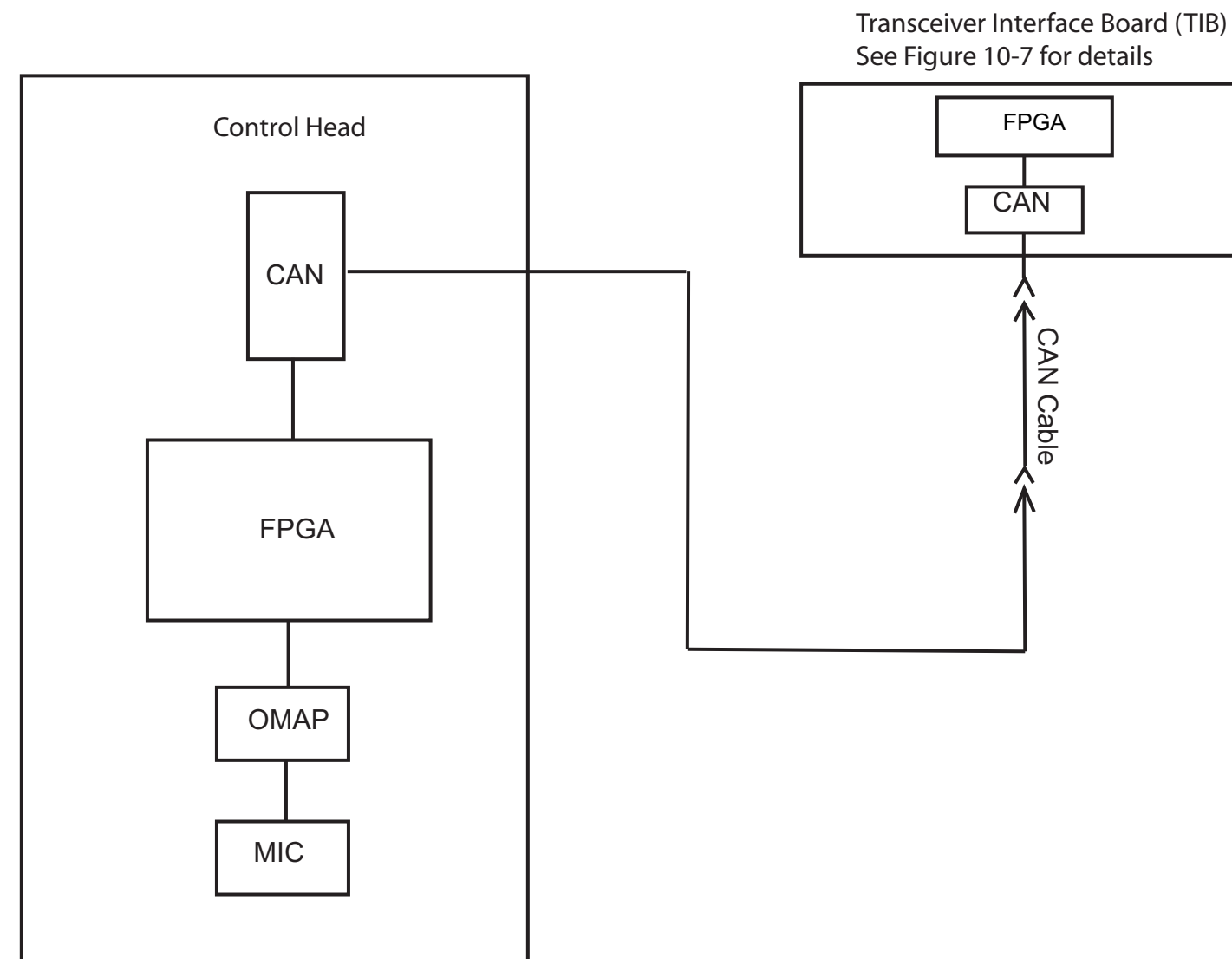


Figure 10-2. O3 Dash and Remote Control Head Functional Block Diagram

10.3 O2, O5, and O7 Dash and Remote Control Head Functional Block Diagram

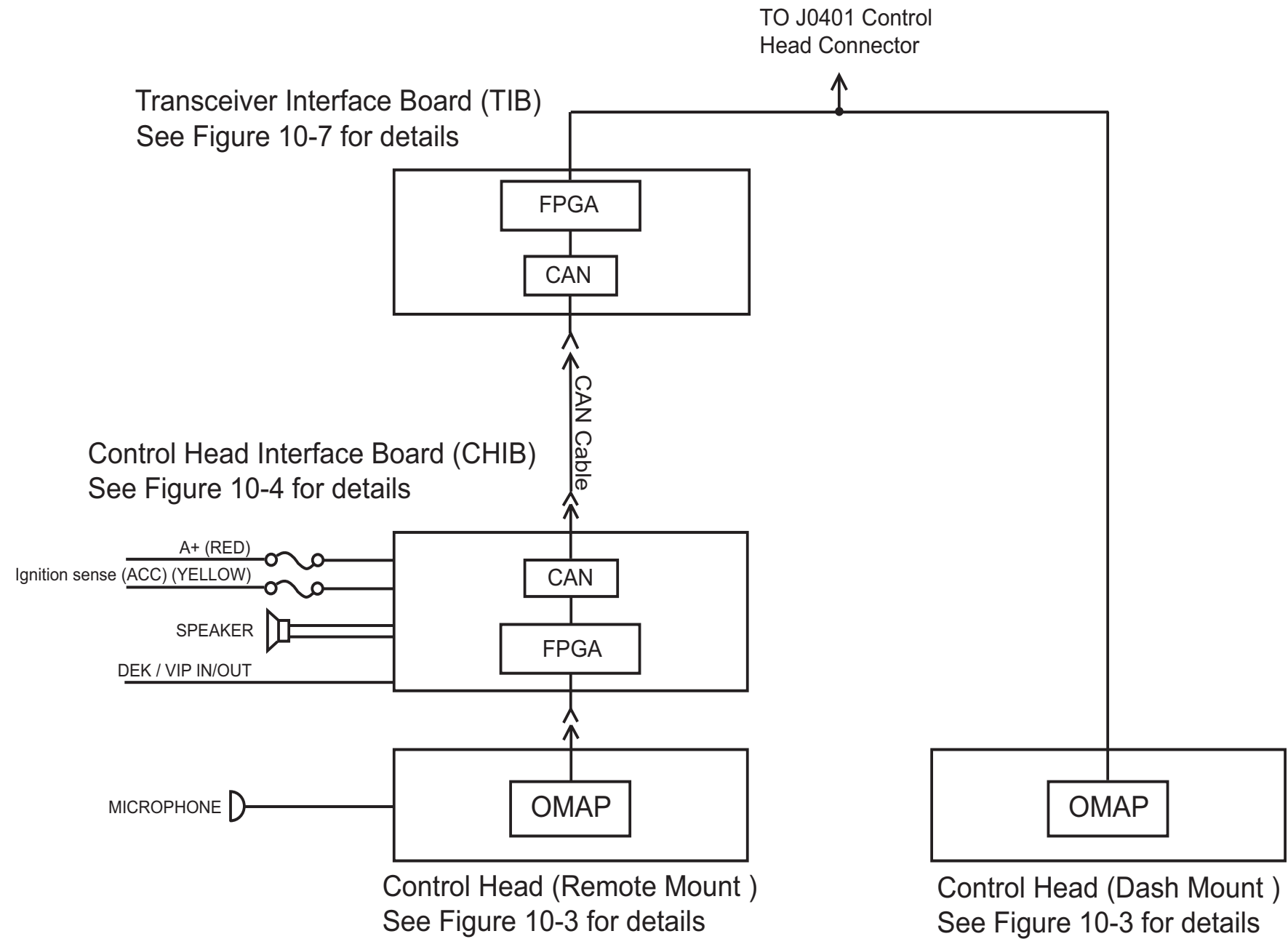


Figure 10-3. O2, O5, and O7 Dash and Remote Control Head Functional Block Diagram

### 10.4 O9 Remote Control Head Functional Block Diagram

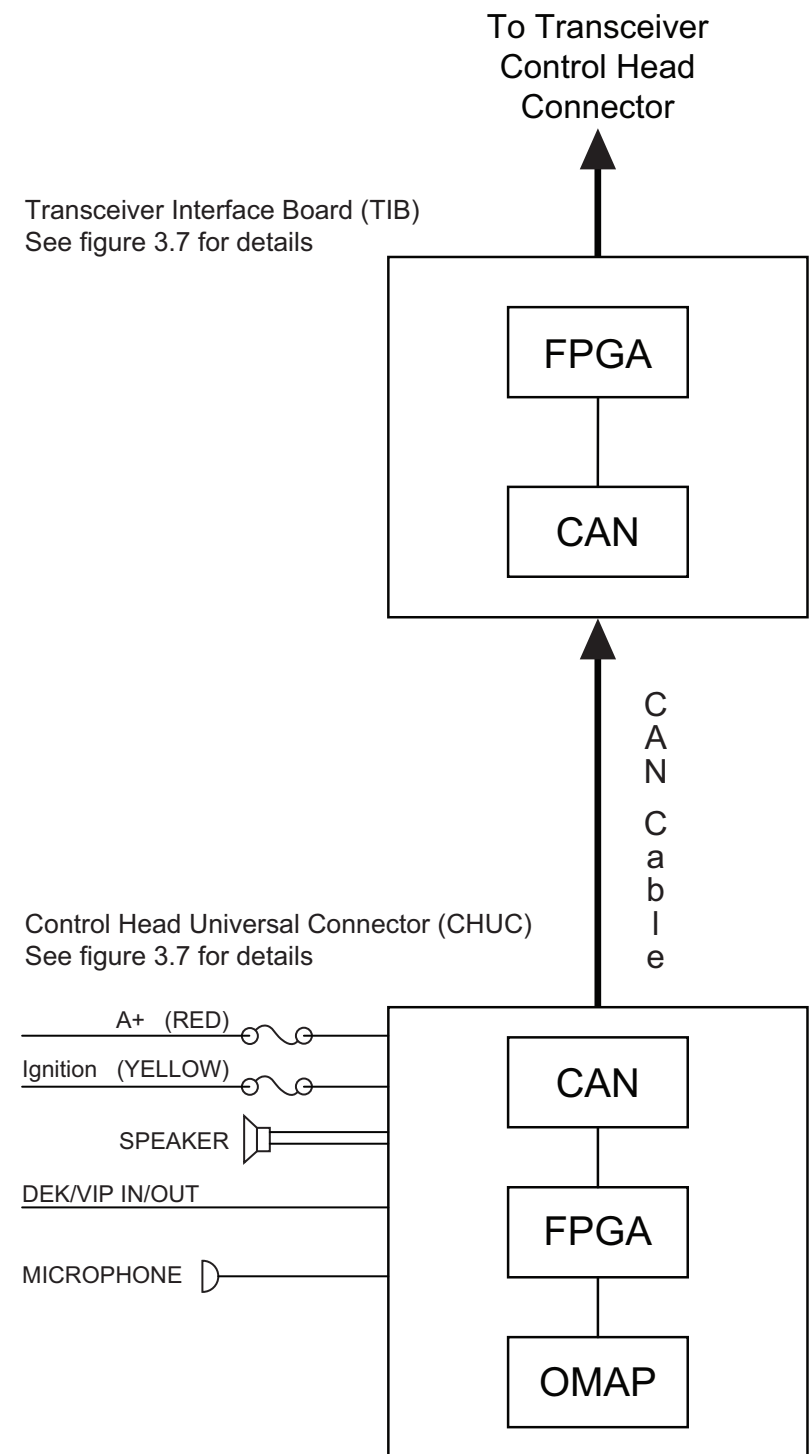


Figure 10-4. O9 Remote Control Head Functional Block Diagram

### 10.5 O2 Control Head Functional Block Diagram

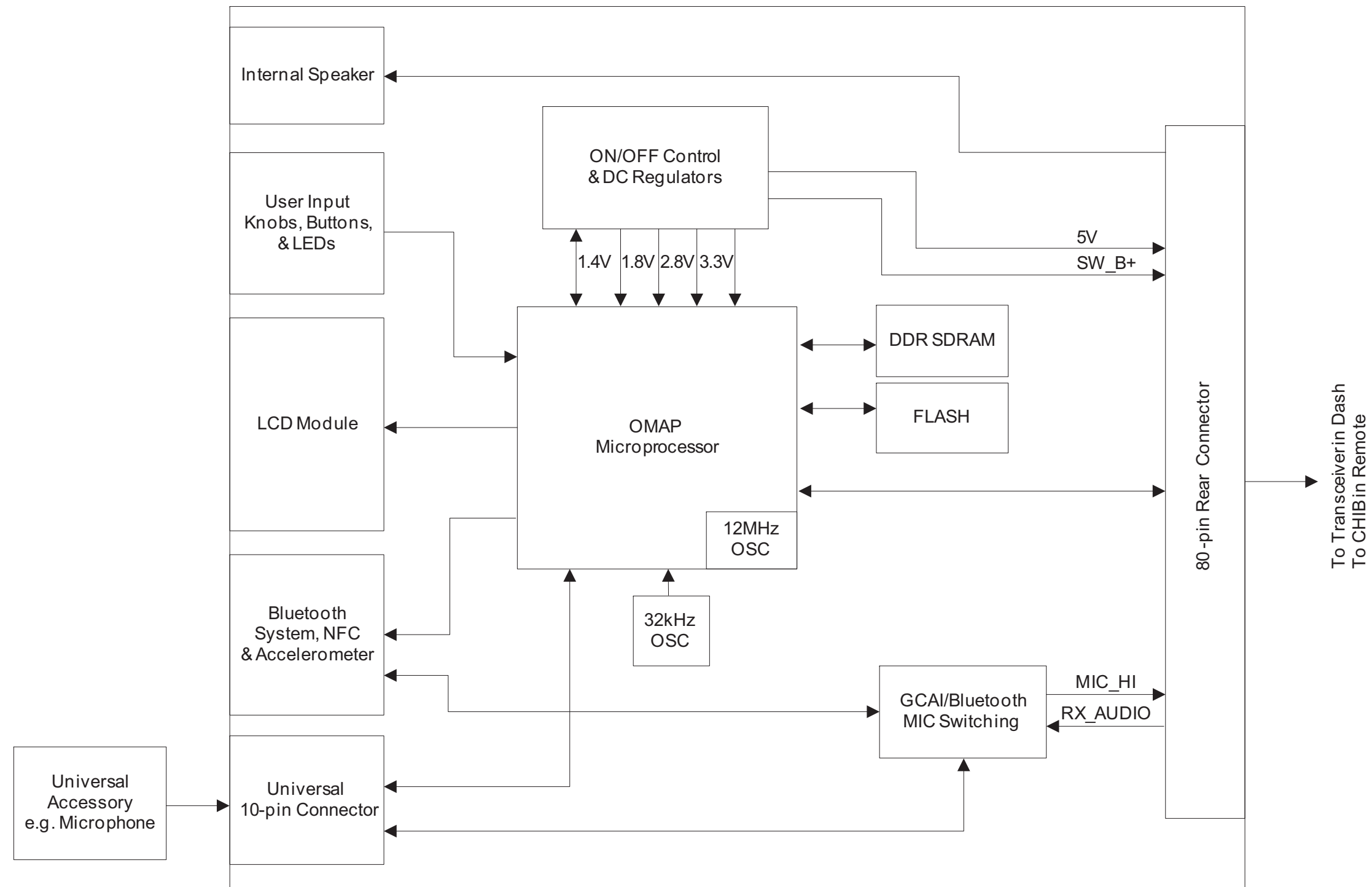


Figure 10-5. O2 Control Head Functional Block Diagram



### 10.6 O3 Control Head Functional Block Diagram

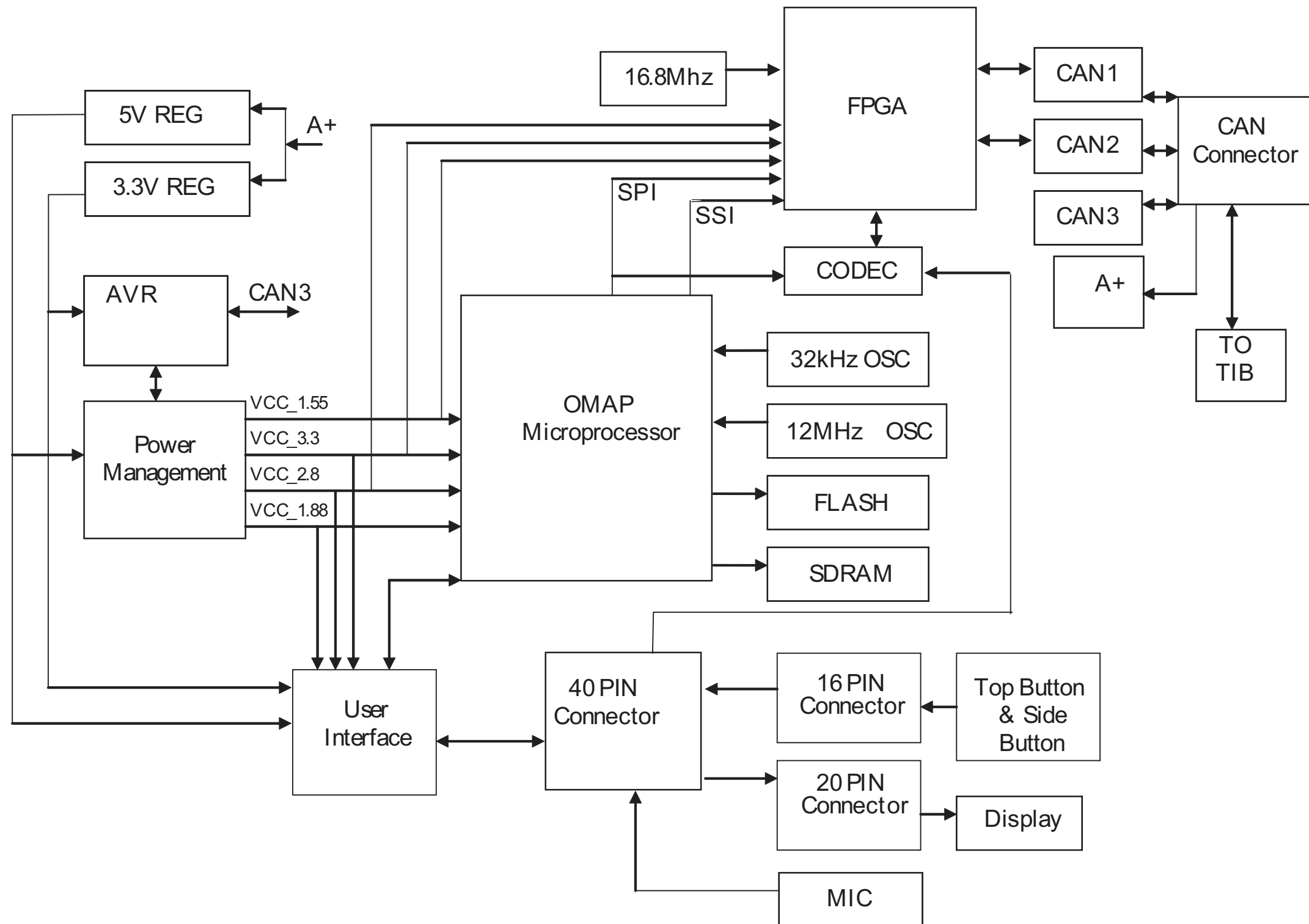


Figure 10-6. O3 Control Head Functional Block Diagram

10.7 O5 Control Head Functional Block Diagram

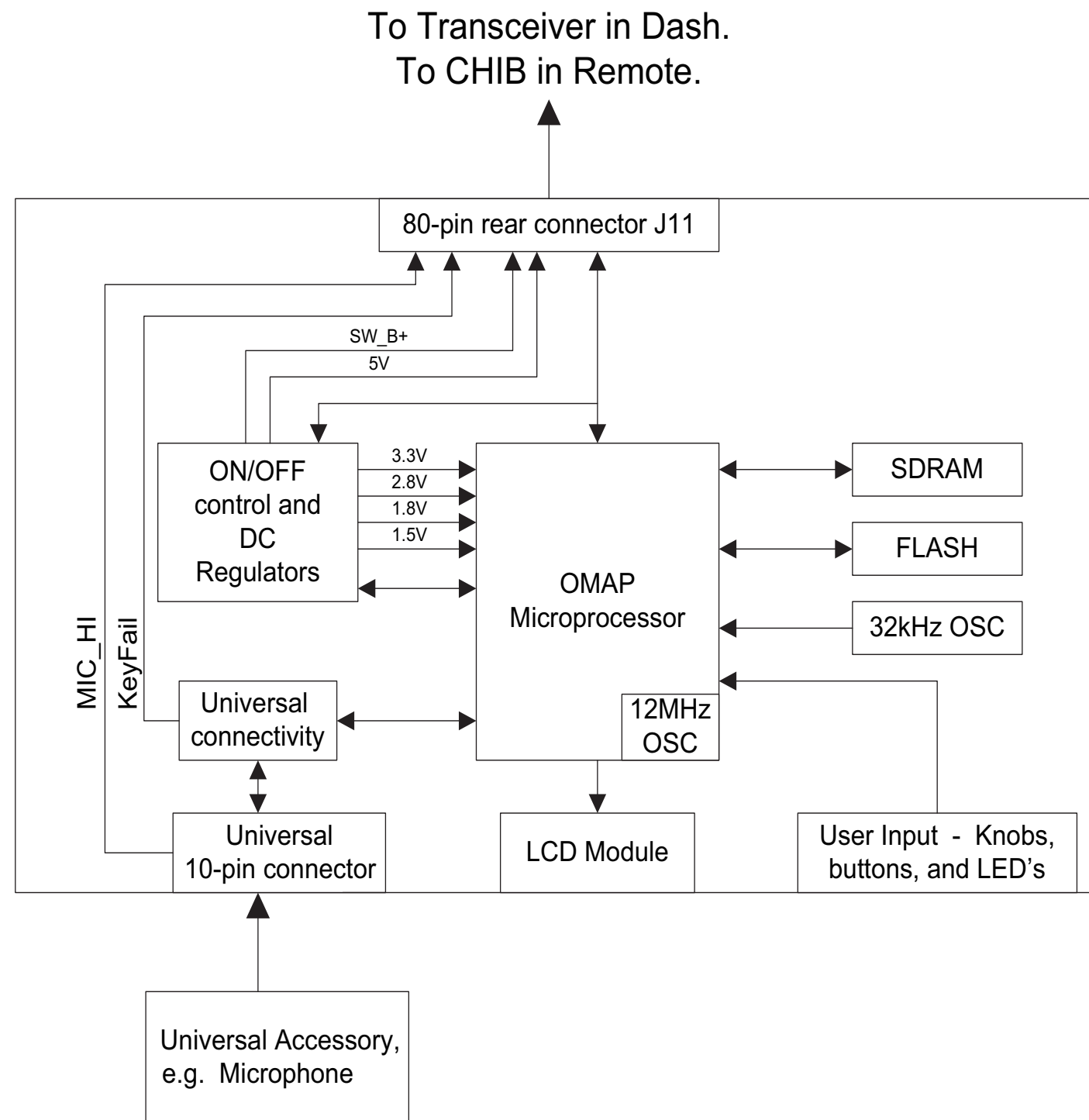


Figure 10-7. O5 Control Head Functional Block Diagram

### 10.8 O7 Control Head Functional Block Diagram

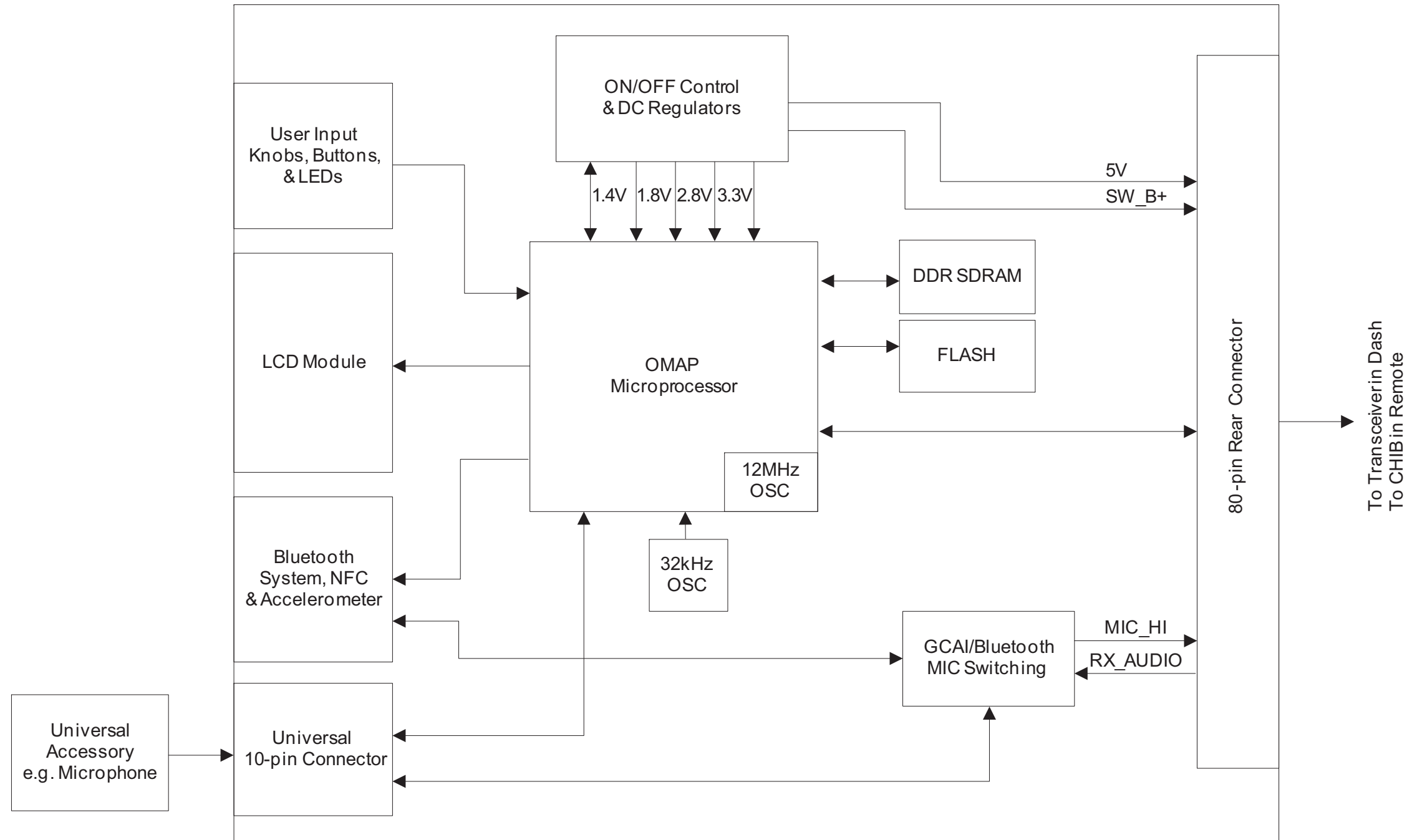


Figure 10-8. O7 Control Head Functional Block Diagram

### 10.9 O9 Control Head Functional Block Diagram

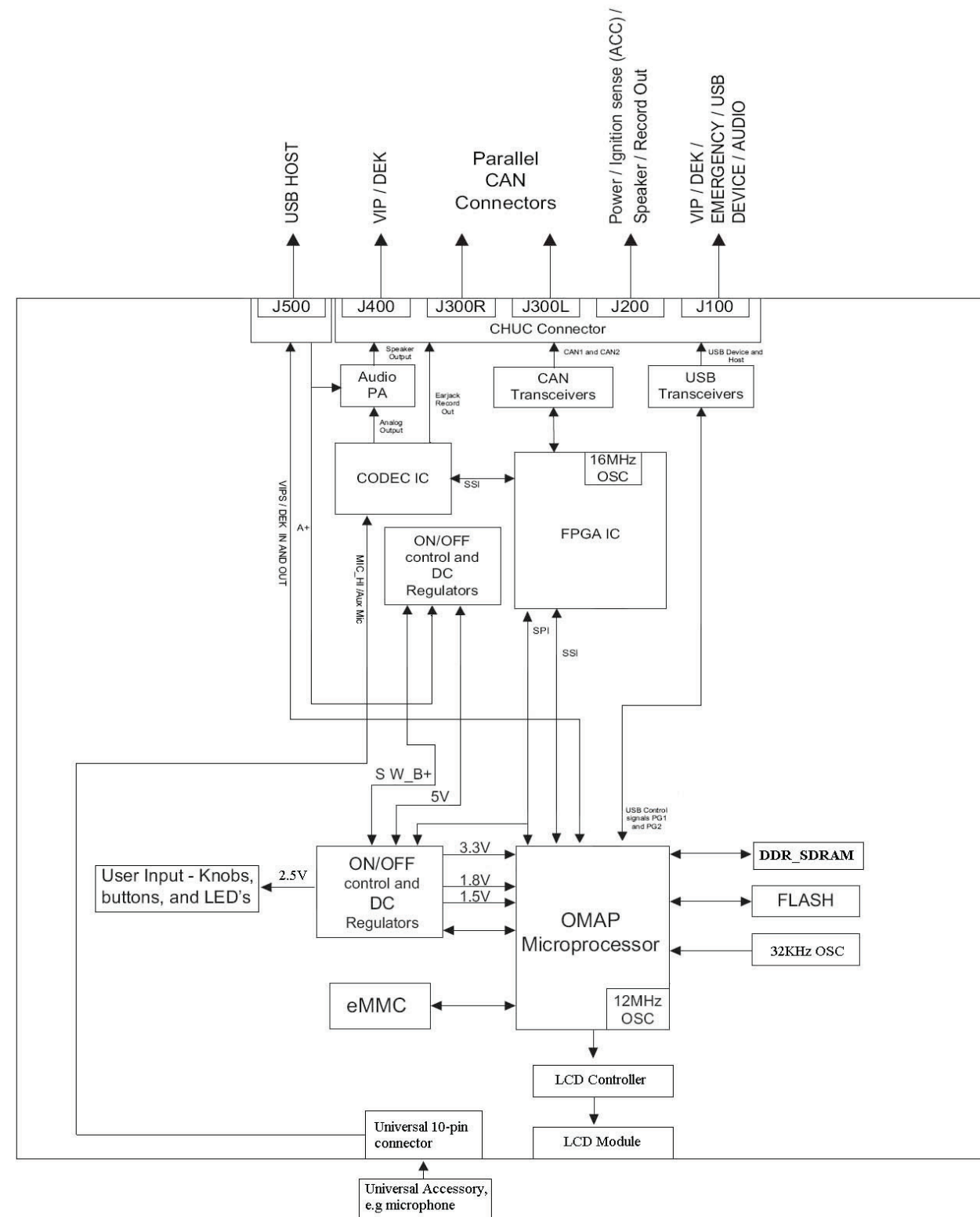


Figure 10-9. O9 Control Head Functional Block Diagram

10.10 O5 Control Head Interface Board (CHIB) Functional Block Diagram

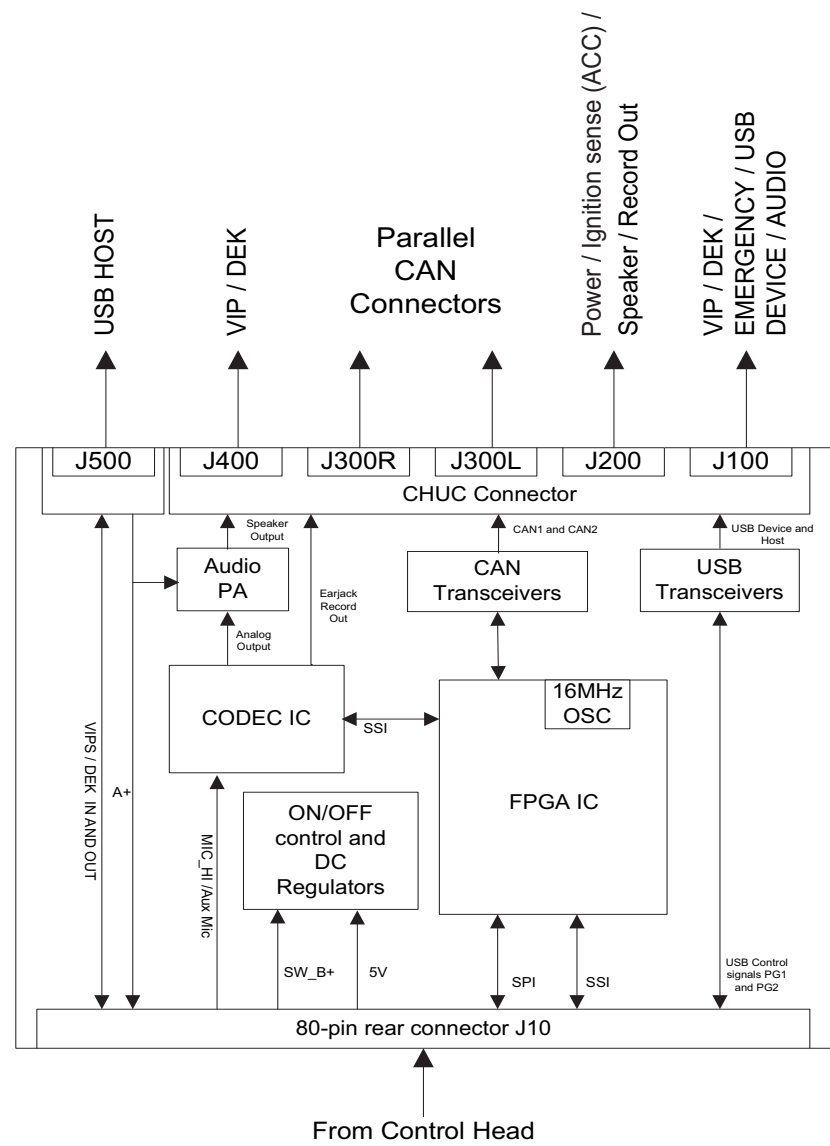


Figure 10-10. O5 Control Head Interface Board (CHIB) Functional Block Diagram

10.11 O2 and O7 Control Head Interface Board (CHIB) Functional Block Diagram

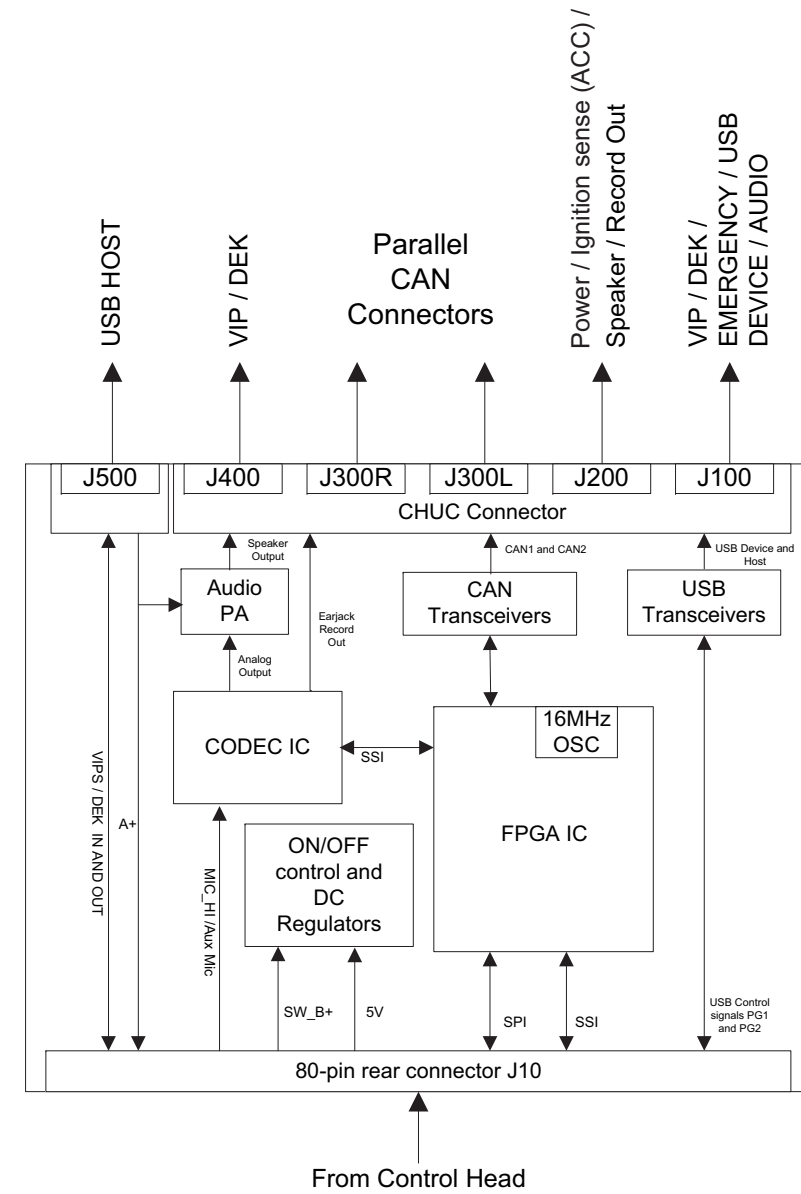


Figure 10-11. O2 and O7 Control Head Interface Board (CHIB) Functional Block Diagram

**NOTE:** O2 and O7 CHIB uses different components for Audio PA and CODEC IC compared to O5 CHIB, and it can be only used with O2 and O7 Control Head.

10.12 APX Mobile Radio Transceiver Interface Board (TIB) Functional Block Diagram

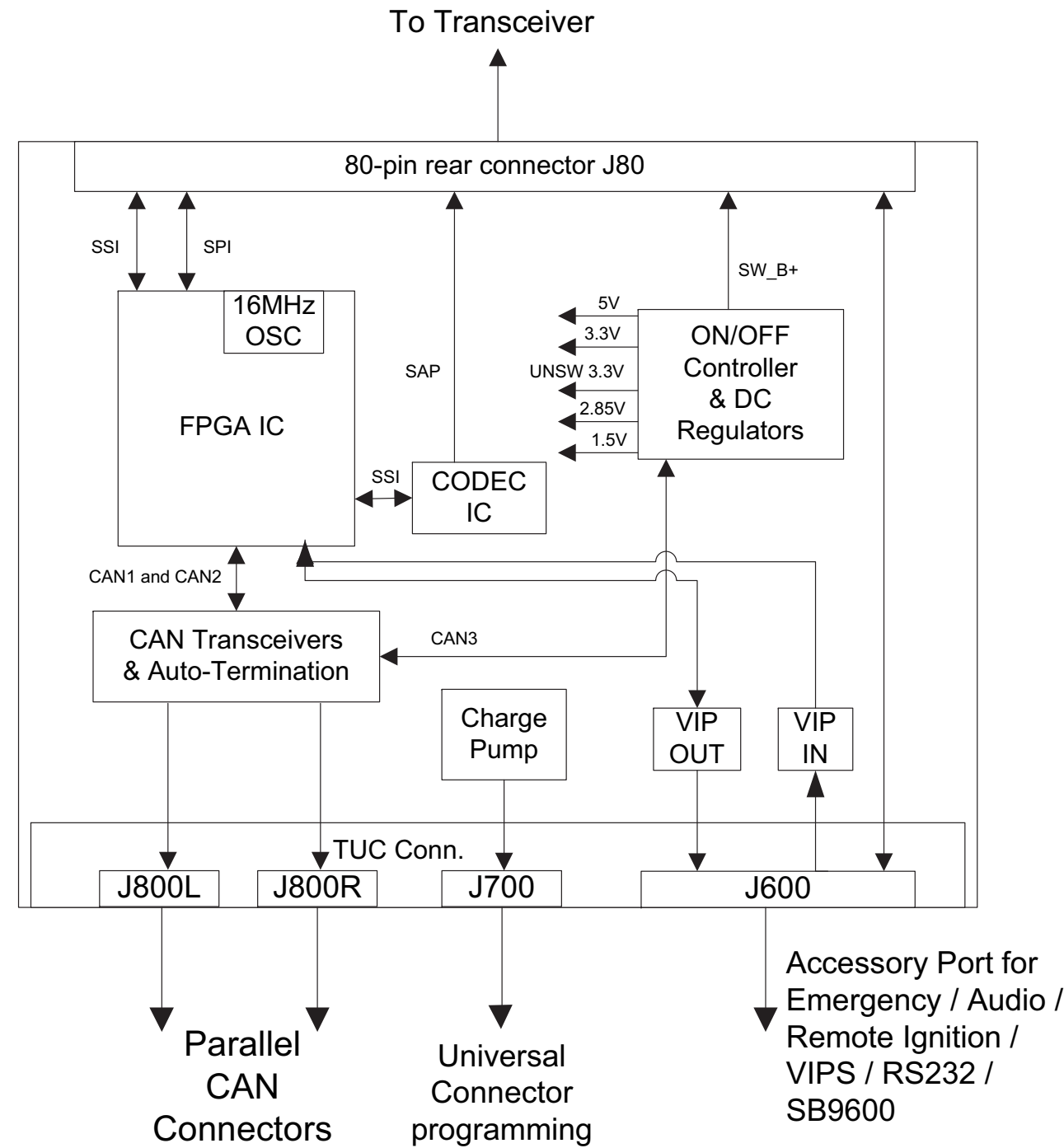


Figure 10-12. APX Mobile Radio Transceiver Interface Board (TIB) Functional Block Diagram

### 10.13 O3 Radio Connector Locations

#### 10.13.1 Mid Power Only

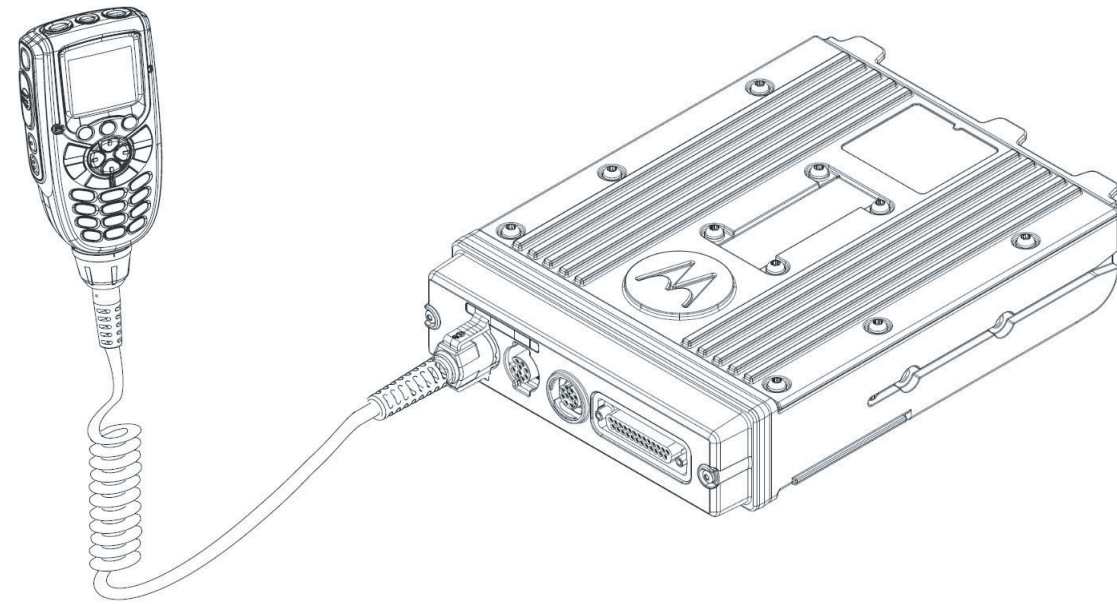


Figure 10-13. O3 Dash-Mount Radio Connector Locations (Mid Power Only)

#### 10.13.2 High Power Only

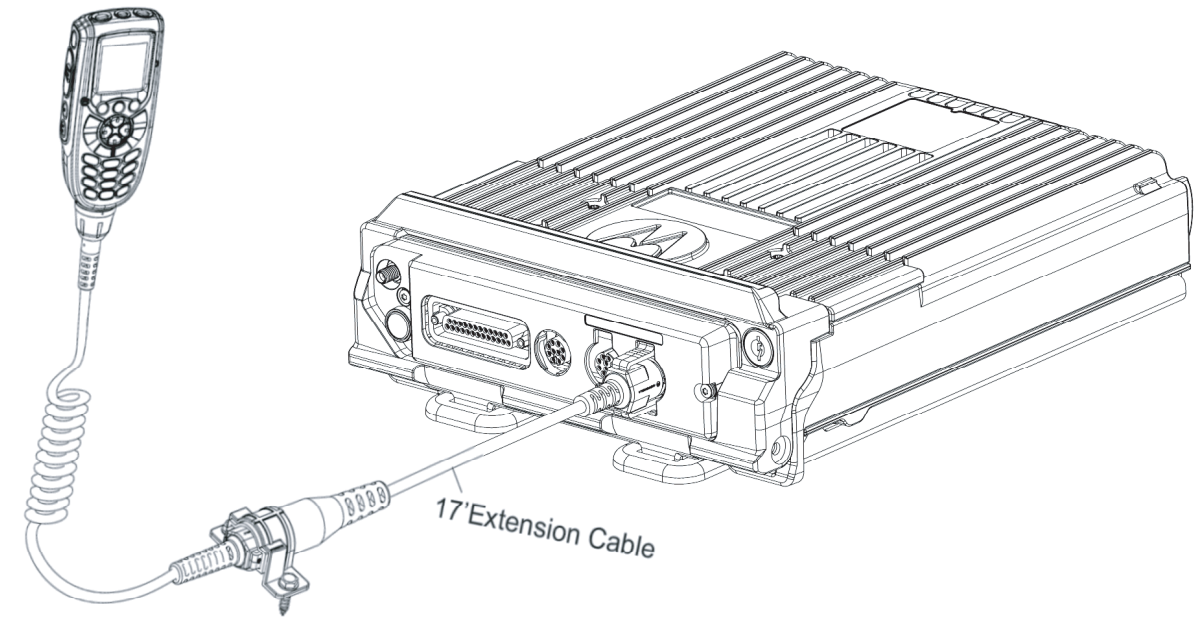


Figure 10-15. O3 Remote-Mount Radio Connector Locations (High Power Only)

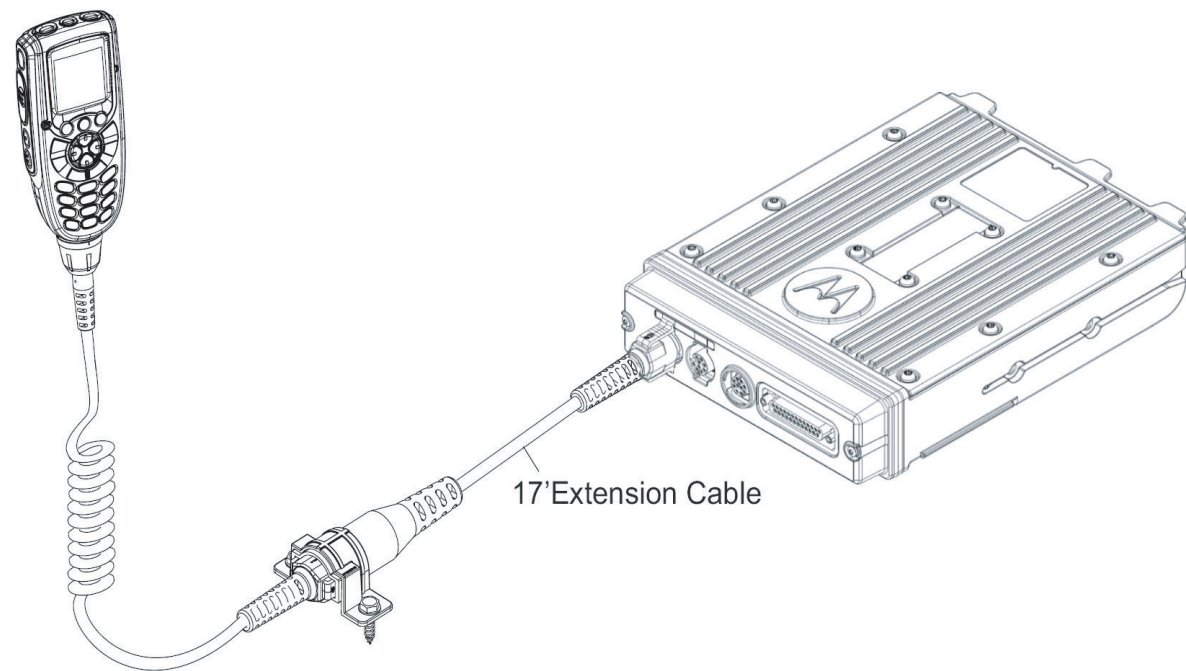


Figure 10-14. O3 Remote-Mount Radio Connector Locations

### 10.14 O5 Radio Connector Locations

#### 10.14.1 Mid Power Only

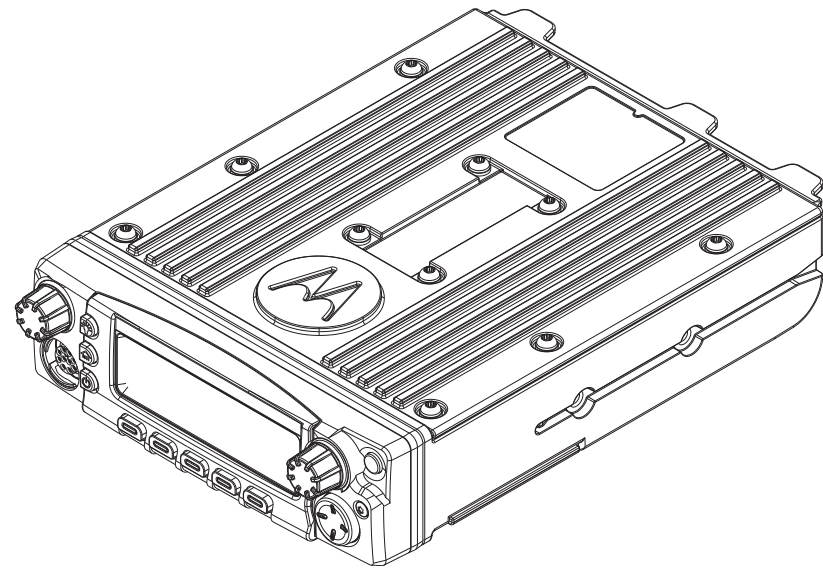


Figure 10-16. O5 Dash-Mount Radio Connector Locations (Mid Power Only)

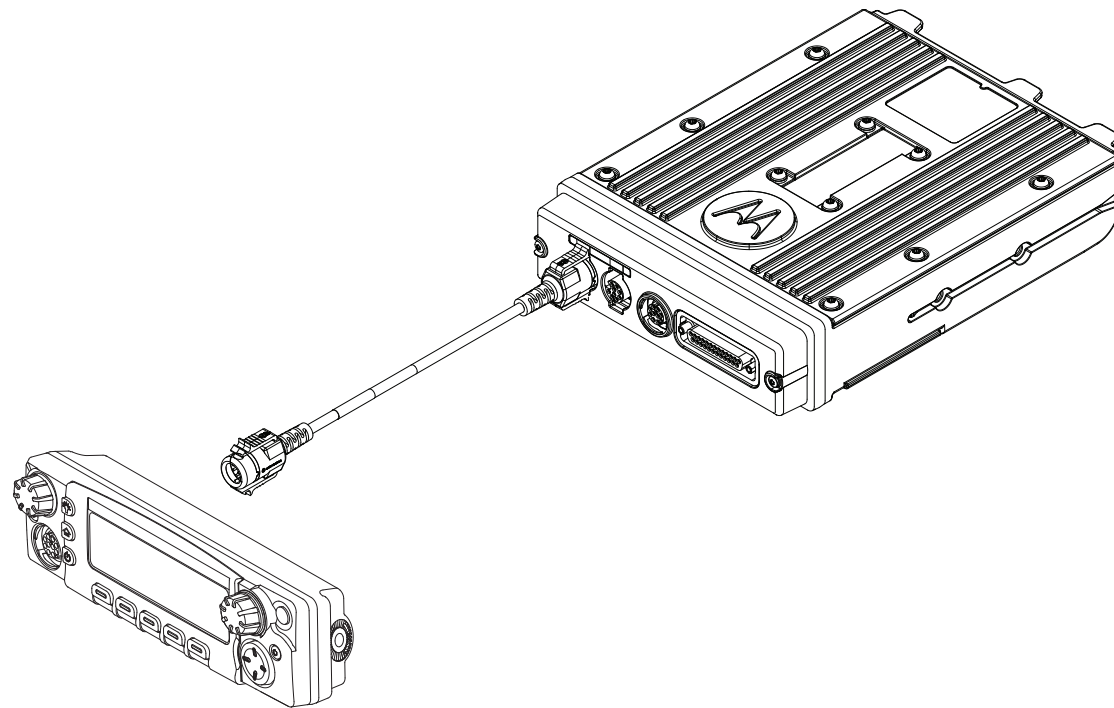


Figure 10-17. O5 Remote-Mount Radio Connector Locations (Mid Power Only)

#### 10.14.2 High Power Only

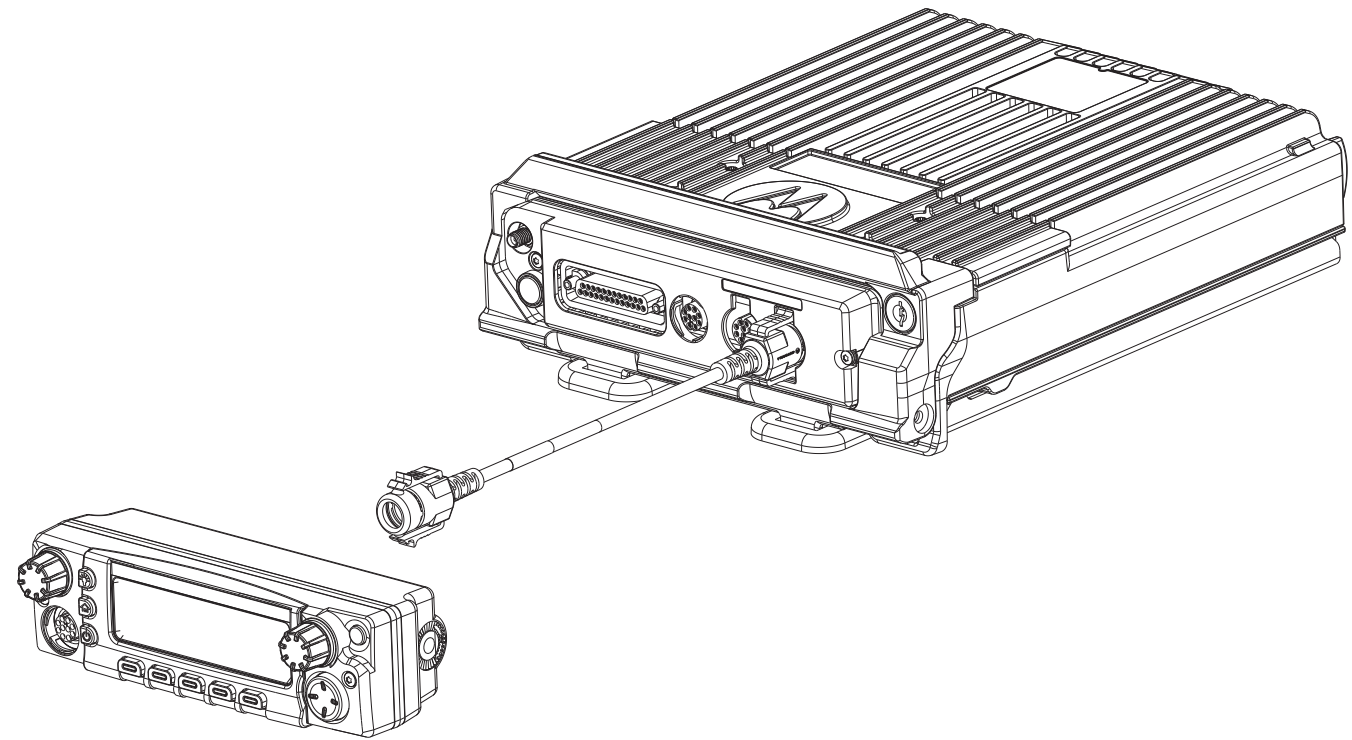


Figure 10-18. O5 Remote-Mount Radio Connector Locations (High Power Only)



### 10.15 O9 Transceiver Interface

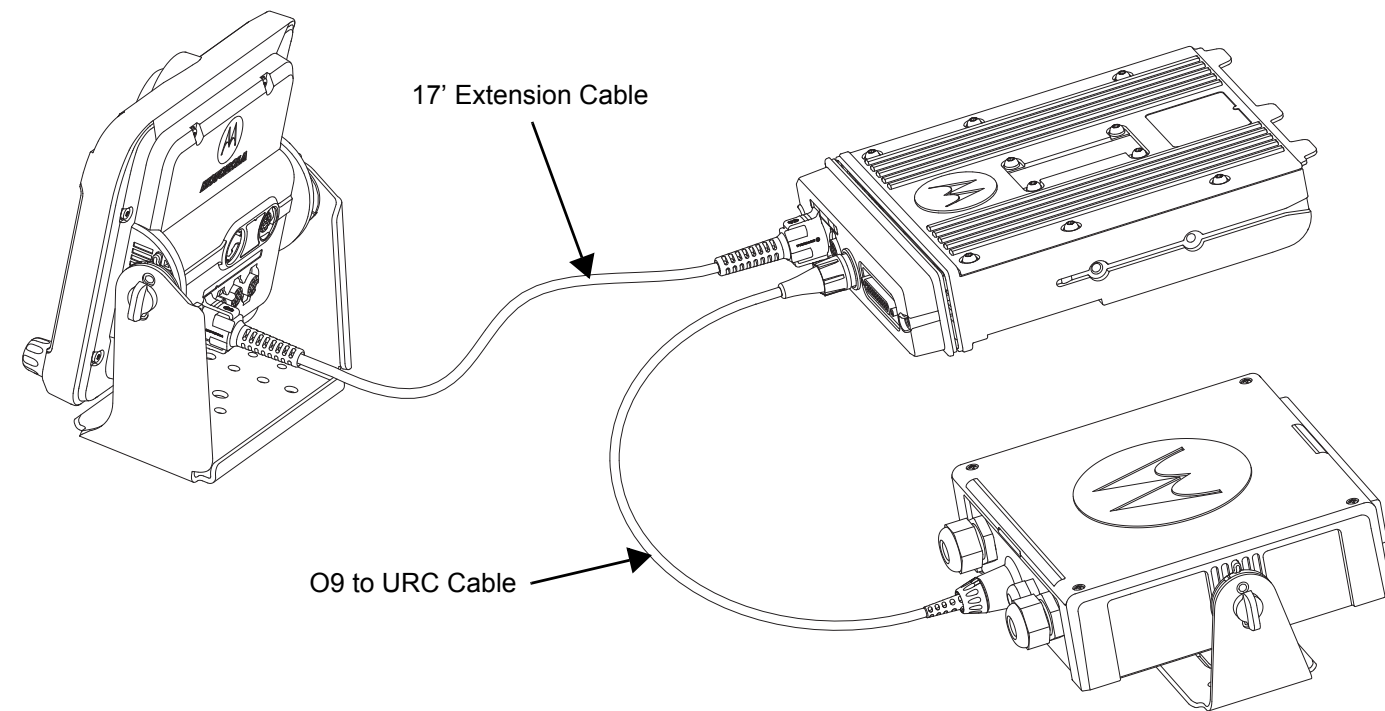


Figure 10-19. Transceiver Interface Board (TIB), Universal Relay Controller & Control Head View.  
(URC is an optional accessory).

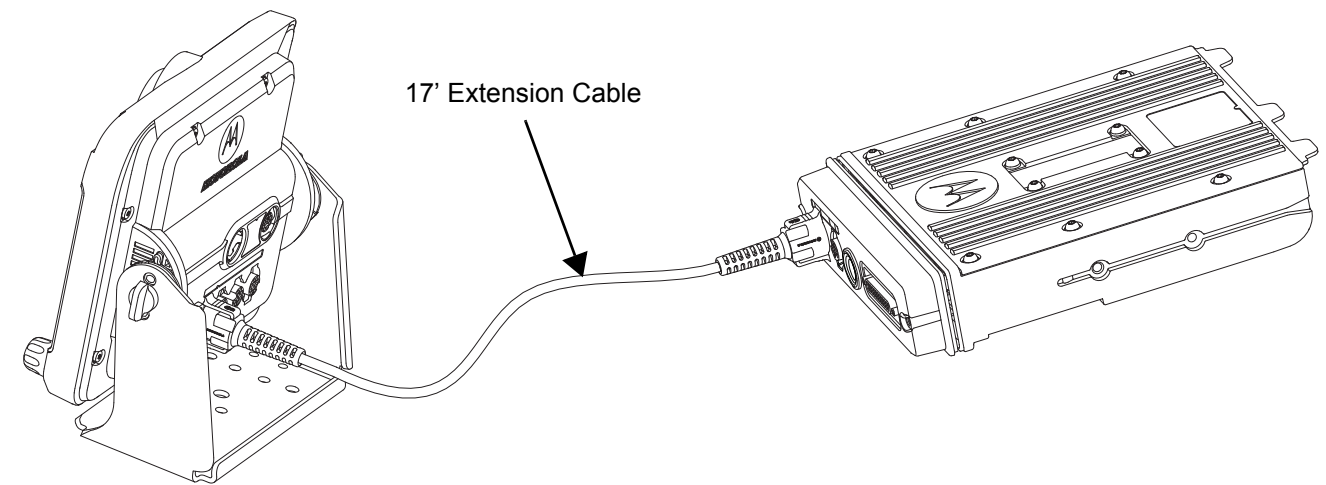


Figure 10-20. Remote-Mount Configuration with 100W or Higher Power Radio

**Notes**

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## Chapter 11 Exploded Views and Parts Lists

This chapter contains the exploded views and associated parts lists for the ASTRO APX Mobile radio and accessories. Tables containing pushbutton parts lists are also included at the end of this chapter.

*Table 11-1. Table of Exploded Views*

Page	Figure Name
11-2	Figure 11-1. O2 Control Head Exploded View
11-3	Figure 11-2. O3 Control Head Exploded View
11-4	Figure 11-3. O5 Control Head Exploded View
11-5	Figure 11-4. O7 Control Head Exploded View
11-6	Figure 11-5. O9 Control Head Exploded View
11-7	Figure 11-6. O2 CHIB and CHUC Exploded View
11-8	Figure 11-7. O5 CHIB and CHUC Exploded View
11-9	Figure 11-8. O7 CHIB and CHUC Exploded View
11-10	Figure 11-9. Transceiver Interface Board (TIB) Exploded View
11-11	Figure 11-10. APX 2500 / 4500 / 4500Li O2 Dash Mount Radio Exploded View
11-12	Figure 11-11. APX 2500 O3 Radio Exploded View
11-13	Figure 11-12. APX 2500 O7 Dash Mount Radio Exploded View
11-14	Figure 11-13. APX 5500 / 6500 / 7500 / 6500 Li O2 Dash Mount Radio Exploded View
11-15	Figure 11-14. APX 5500 / 6500 / 7500 / 6500 Li O3 Radio Exploded View
11-16	Figure 11-15. APX 5500 / 6500 / 7500 / 6500 Li O5 Dash Mount Radio Exploded View
11-17	Figure 11-16. APX 5500 / 6500 / 7500 / 6500 Li O7 Dash Mount Radio Exploded View
11-18	Figure 11-17. APX 5500 / 6500 / 7500 / 6500 Li 100 W Remote Mount Radio Exploded View
11-19	Figure 11-18. Universal Relay Controller Exploded View

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### 11.1 O2 Control Head Exploded View and Parts List

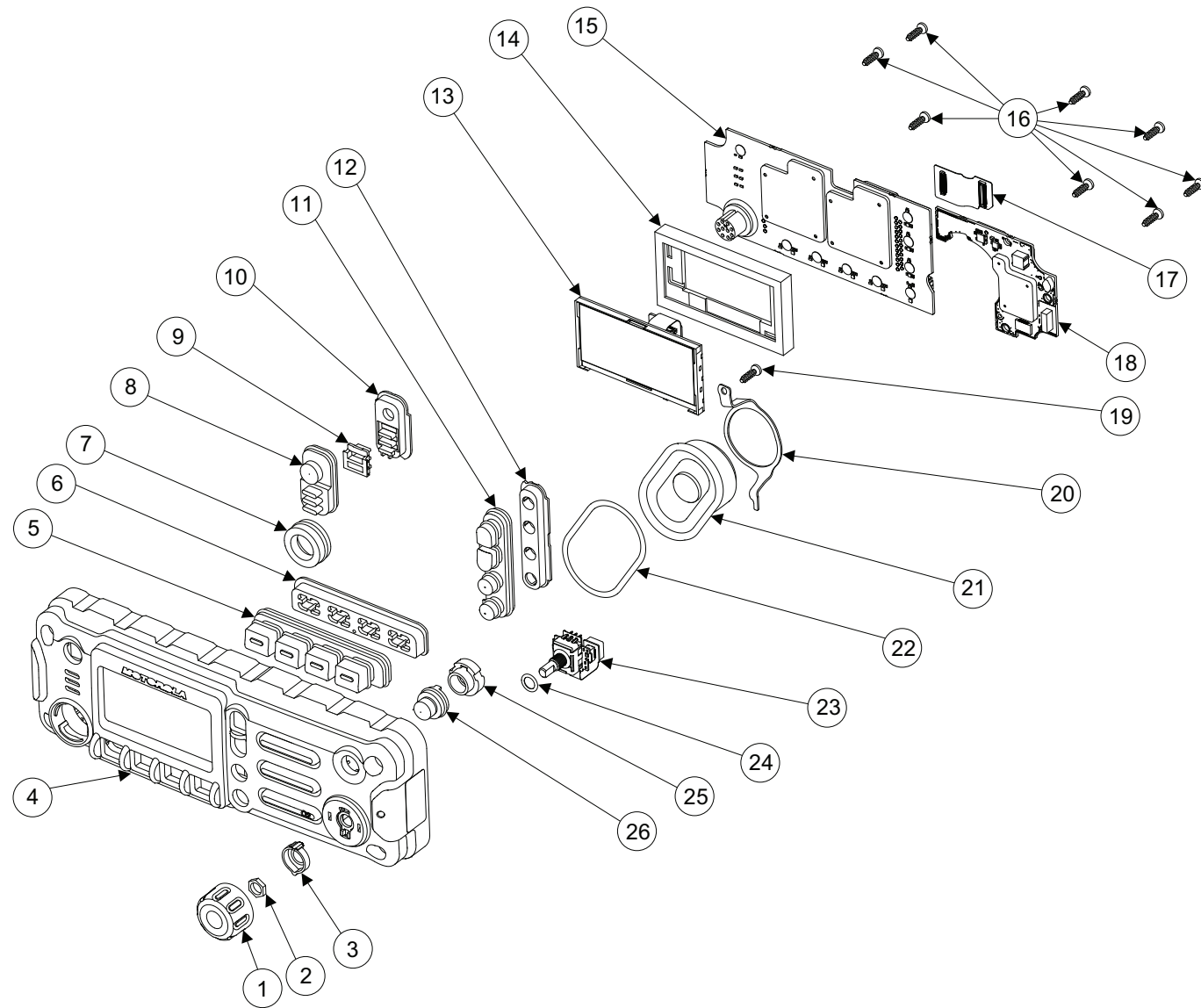


Figure 11-1. O2 Control Head Exploded View

Table 11-2. O2 Control Head Parts List

Item No.	Motorola Part No.	Description
1	36012023002	Knob, Encoder
2	02012021001	Nut, Hex
3	42012071001	Spring, Detent
4	0104058J01 (Grey) 0104058J02 (Green)	Housing, Front Assembly (Includes LIGHT GUIDE, Encoder, 61012062001 and LENS, Display, 61012060001)
5	75012155001	Keypad, Soft Key
6	42012066001	Retainer, Soft Key Keypad
7	3264133H01	Seal, GCAI
8	38012028001	Keypad, Power and Status Indicator
9	07012039001	Light Isolator, Status Indicator
10	07012040001	Retainer, Power and Status Indicator Keypad
11	38012029001	Keypad, Home, Dimmer, P1 and P2
12	07012038001	Retainer, Home, Dimmer, P1 and P2 Keypad
13	72012018001	Display Module, LCD
14	75012151001	Dampener, LCD Display Module
15	PMLN5901_	PCB, Control Head, Main
16	03012055001	Screw, PCB, Main and Bluetooth
17	0104046J24	Flex, Bluetooth
18	PMLN6054_	PCB, Bluetooth
19	03012055001	Screw, Speaker Retention
20	42012070001	Retainer, Speaker
21	5015134H01	Speaker
22	11012103001	Adhesive, Speaker
23	0104046J20	Potentiometer, Encoder Assembly
24	32012152001	Seal, O-ring, Encoder
25	07012041001	Retainer, Emergency Button Keypad
26	38012030001	Keypad, Emergency Button

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

## 11.2 O3 Control Head Exploded View and Parts List

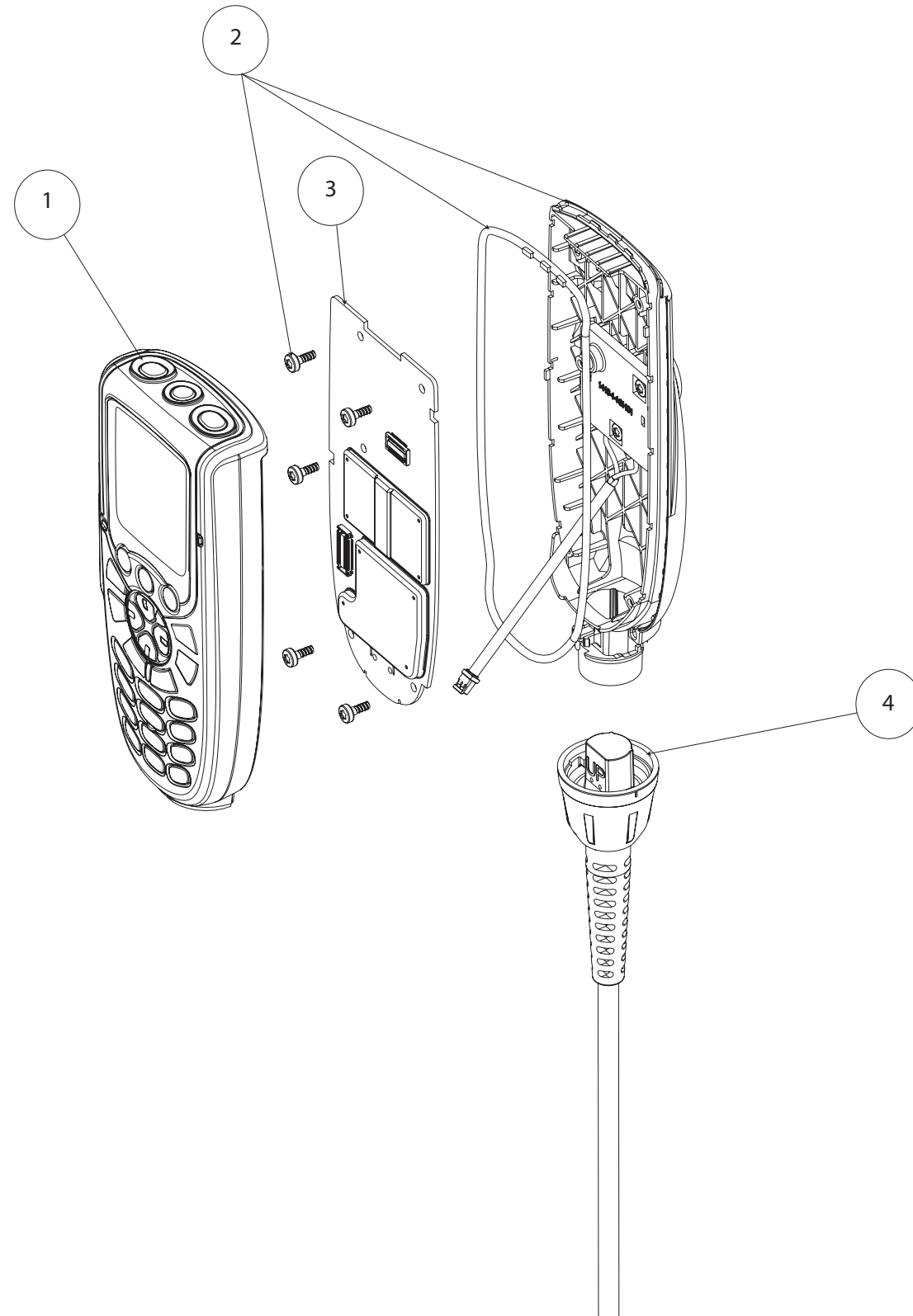


Figure 11-2. O3 Control Head Exploded View

Table 11-3. O3 Control Head Parts List

Item No.	Motorola Part No.	Description
1	PMHN4082_ PMHN4174_ PMHN4199_ PMHN4198_ PMHN4202_ PMHN4235_	Housing, Front, Service Kit for PMUN1034A & PMUN1034B Housing, Front, Service Kit for PMUN1034C or above Housing, Front, Service Kit for PMUN1052B or above Housing, Front, Service Kit for PMUN1053A or above Housing, Front, Service Kit for PMUN1054A or above Housing, Front, Service Kit for PMUN4227A or above
2	PMHN4083_	Housing, Back, Service Kit (Includes O-ring [Quantity 1] and screws, 0310944A02 [Quantity 5])
3	PMLN5035_	PCB Service Kit
4	PMLN4961_	Cable, Coiled, Kit

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

### 11.3 O5 Control Head Exploded View and Parts List

Table 11-4. O5 Control Head Parts List

Item No.	Motorola Part No.	Description
1	3664445H01	Knob, Mode
2	3664022H01	Knob, Volume
3	0415285H01	Washer, Torque
4	0215000C01	Nut, Hex, Special
5	0402838X01	Washer, 3 Wave
6	1564047H06	Housing, Front Assembly (Includes Light pipe, Vol/Select, 6164056H02, [Quantity 2])
7	1864069H01	Potentiometer, Volume Assembly
8	3264133H01	Seal, O-Ring, MMP
9	3864503H05	Buttons, Main Assembly
10	7264052H05	Display, LCD
11	2675960A01	Shield, LCD
12	HLN6911_	PCB, Control Head Main
13	3264059H02	Seal, Overmolded Frame
14	0310944A14	Screws, Mounting
15	3864502H02	Button, Emergency
16	3864499H04	Button, Navigation Assembly
17	4064073H01	Switch, Frequency Assembly

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

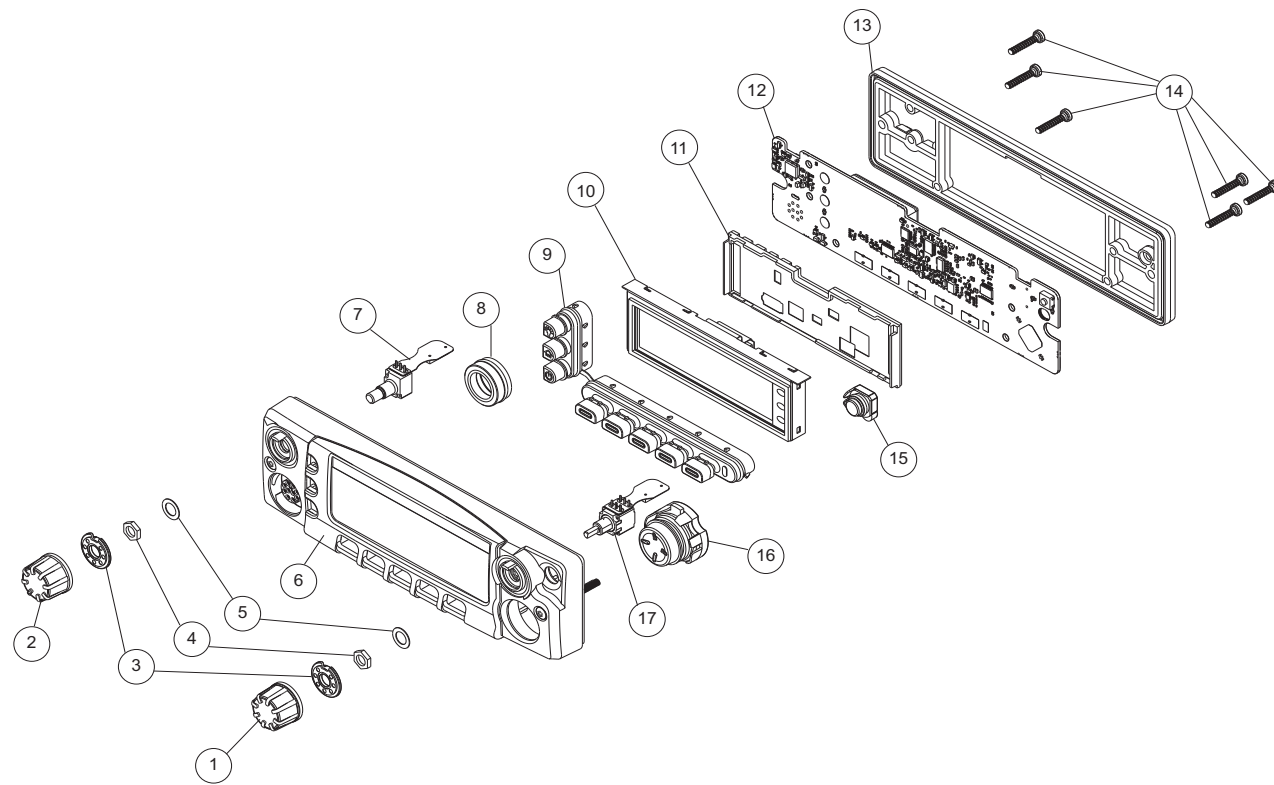


Figure 11-3. O5 Control Head Exploded View

### 11.4 O7 Control Head Exploded View and Parts List

Table 11-5. O7 Control Head Parts List

Item No.	Motorola Part No.	Description
1	36012022001	Knob, Encoder
2	02012021001	Nut, Hex
3	55012025001	Snap Plungers, Soft Key
4	0104047J41	Housing, Front Assembly (Includes LIGHT GUIDE, Encoder, 61012059001 and LENS, Display, 61012061001)
5	3264133H01	Seal, GCAI
6	32012152001	Seal, O-ring, Encoder
7	0104046J14	Potentiometer, Encoder Assembly
8	75012149001	Keypad, Power, Dimmer and Status Indicator
9	61012058001	Light Guide, Power, Dimmer and Status Indicator
10	42012065001	Retainer, Power, Dimmer and Status Indicator Keypad
11	72012018001	Display Module, LCD
12	75012152001	Dampener, LCD Display Module
13	PMLN5900_	PCB, Control Head, Main
14	42012067001	Retainer, PCB, Main
15	0371370L02	Screws, Retention, PCB, Main
16	0104046J27	Flex, Bluetooth
17	03012055001	Screws, Retention, PCB, Bluetooth
18	42012069001	Retainer, PCB, Bluetooth
19	PMLN5983_	PCB, Bluetooth
20	42012068001	Retainer, DTMF Keypad
21	75012157001 (English) 75012157002 (English_Chinese) 75012157003 (English_Cyrillic) 75012157004 (English_Hebrew) 75012157005 (Siren and Light))	Keypad, DTMF
22	75012153001	Keypad Rubber, Soft Key

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

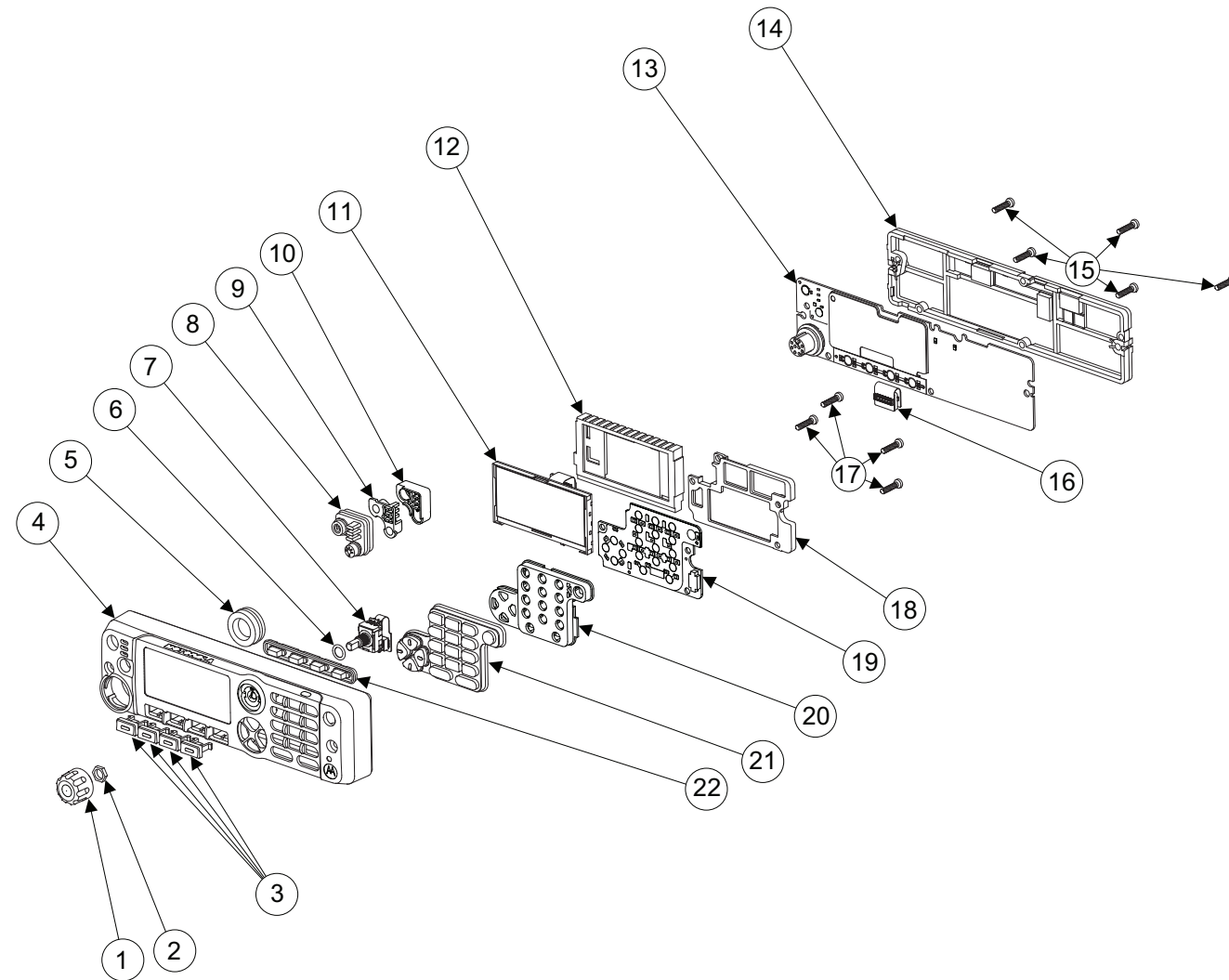


Figure 11-4. O7 Control Head Exploded View

### 11.5 O9 Control Head Exploded View and Parts List

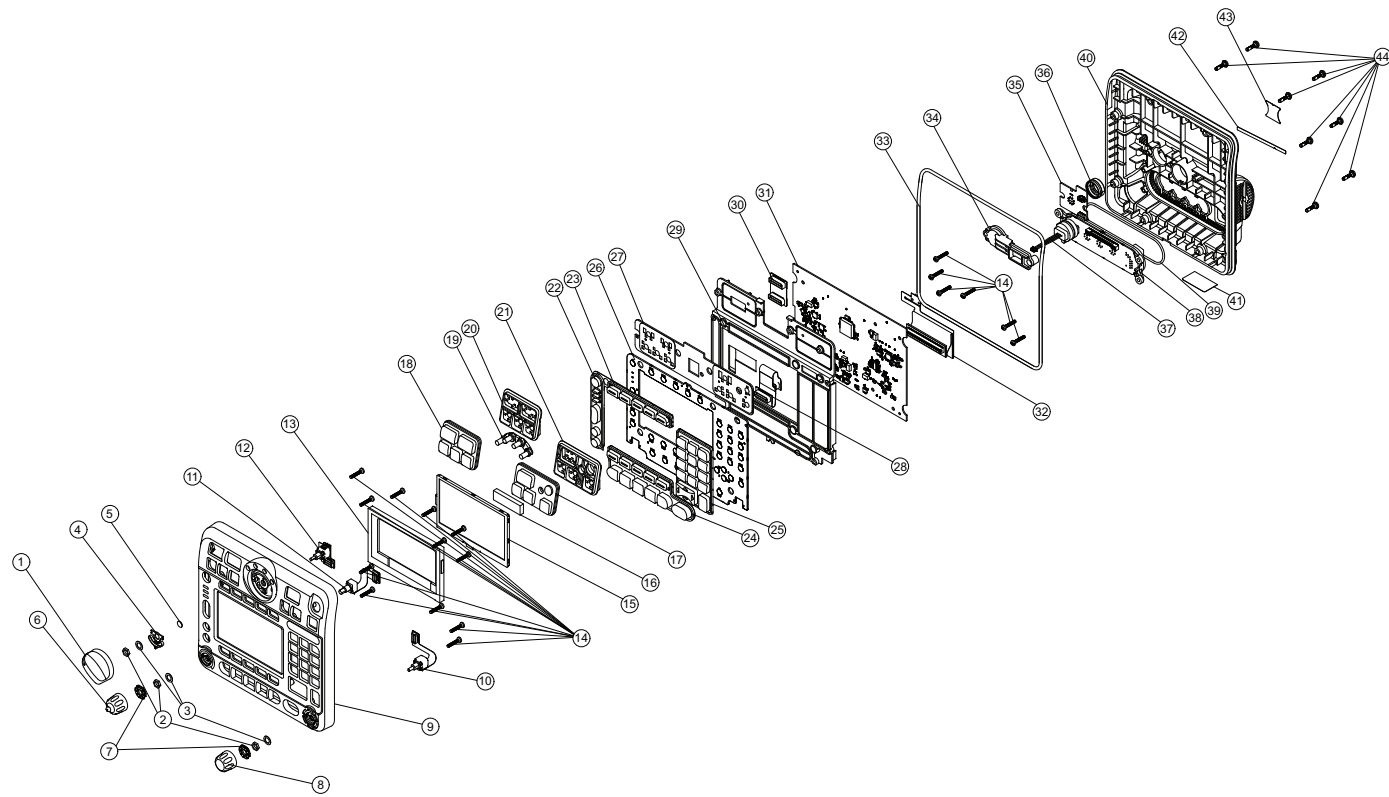


Figure 11-5. O9 Control Head Exploded View

Table 11-6. O9 Control Head Parts List

Item No.	Motorola Part No.	Description
1	3675872M01	Top Pursuit Knob
2	0215000C01	Nut
3	0402838X01	Washer
4	42012000001	Pursuit Spring
5	3205472M02	Gore Port Seal
6	3675893M01	Volume Knob
7	3275895M01	Torque Enhancer
8	3675898M01	Frequency Knob
9	PMHN4143_	Front Housing Assembly (with light guides)
10	0104031J86	Frequency Flex Assembly
11	0104031J85	Volume Flex Assembly
12	0104033J49	Top Pursuit Switch Flex Assembly
13	7575913M01	Rubber jacket/ Rubber Boot
14	0371370L02	Screw, Tapping, K30X1.34X16
15	7275224M01	LCD Module/Display
16	32012043001	Conductive Pad, LCD
17	7575866M01	Top Pursuit Light Bar Keypad
18	7575867M01	Top Pursuit Siren Keypad
19	6175865M01	Indicator Light Guide
20	4275869M01	Top Pursuit Siren Keypad Retainer
21	4275868M01	Top Pursuit Light Bar Keypad Retainer
22	7575911M02	Menu, Brightness Control Keypad
23	7575912M02	DEK Silicone Keypad
24	7575911M01	Programmable Control Keypad
25	7575912M01	Alpha Numeric Silicone Keypad
26	PMLN5601_	Front Keypad PCB Kit (with mylar)
27	PMLN5602_	Top keypad PCB Kit (with mylar)
28	0104033J13	Front Keypad Flex
29	2775878M02	Chassis with Thermal Pad
30	0104031J84	Top Keypad Flex Assembly
31	PMLN5637_	Main PCB Kit
32	0104033J12	Main Flex Assembly
33	3275880M01	Main O-ring
34	4278089A01	USB/GCAI Retainer
35	PMLN5638_	GCAI PCB Kit
36	3264133H01	GCAI Seal
37	0964098H01	USB Overmold
38	HLN6914_	CHUC PCB Kit
39	3264096H01	CHUC Seal
40	1575879M02	Back Housing with Screw Insert
41	54012001001	Label, Serial
42	3364425H01	Label Color Code
43	5475881M01	Label Connector
44	0378014A01	Screw Assembly (M3X0.5X14mm)

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.



### 11.6 O2 CHIB and CHUC Exploded View and Parts List

Table 11-7. O2 CHIB and CHUC Parts List

Item No.	Motorola Part No.	Description
1	PMHN4193_ PMHN4195_	O2 Control Head Grey O2 Control Head Green
2	03012052001	Transceiver Screws
3	0104046J72	O2 Back Housing Sub-assembly
4	3264059H03	I-Seal
5	0104046J13	Remote Mount Flex Assembly
6	0310944A14	Screw, Tapping (4)
7	0764091H01	Bracket, USB Connector
8	0964098H01	USB Connector
9	PMLN5927_	CHIB Board Assembly
10	HLN6914_	CHUC Board Assembly
11	3264096H01	Seal, Moisture, Silicone
12	1564090H01	Housing
13	03012063001	Housing Retention Screws
*	HLN6980_	Kit, Dust Cover

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter.  
When ordering, refer to your specific kit for this suffix letter.

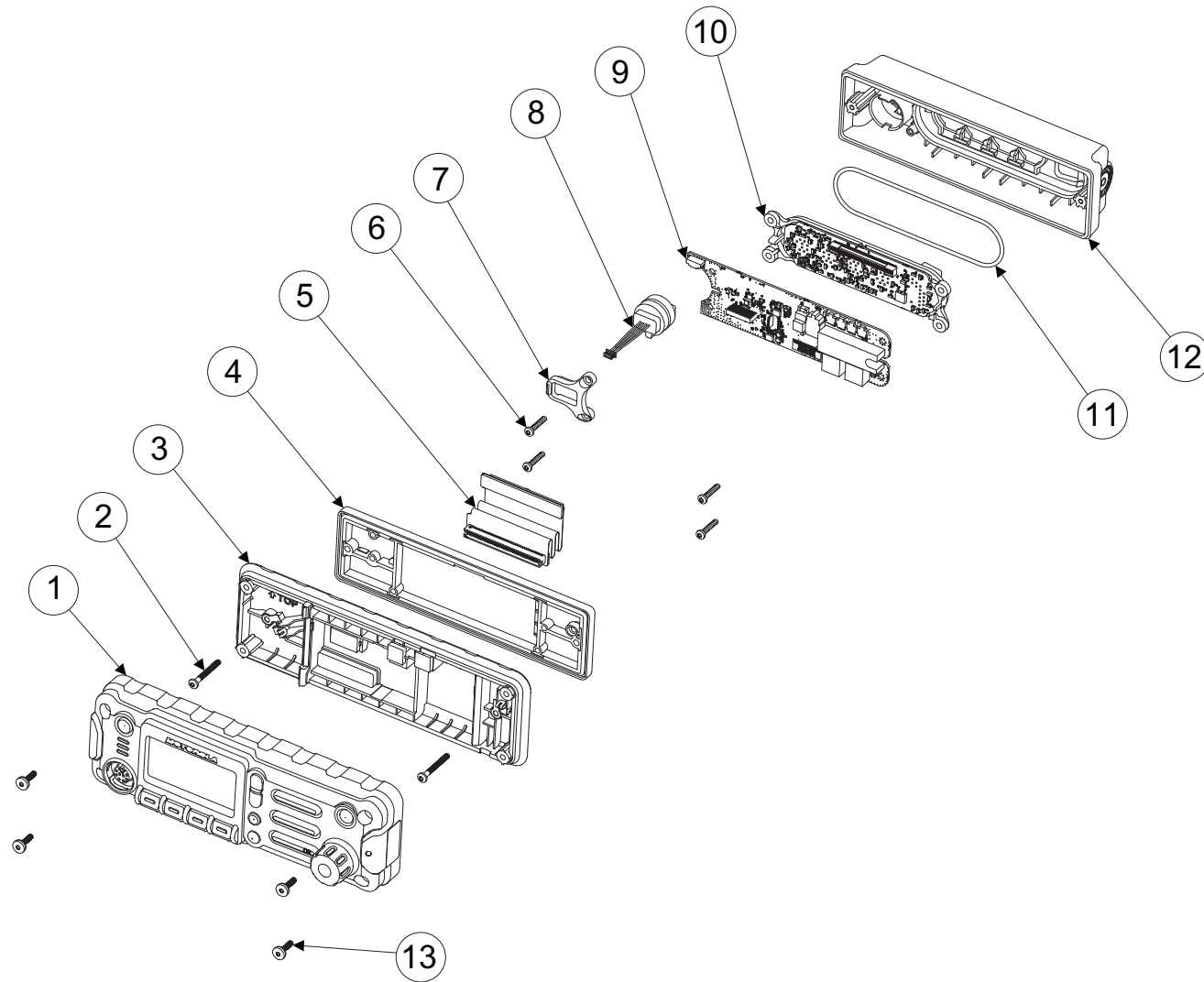


Figure 11-6. O2 CHIB and CHUC Exploded View

11.7 O5 CHIB and CHUC Exploded View and Parts List

Table 11-8. O5 CHIB and CHUC Parts List

Item No.	Motorola Part No.	Description
1	PHCN4000_	Control Head
2	HKN6191_	Flex Assembly
3	0310944A14	Screw
4	0764091H01	Retainer Bracket
5	0964098H01	USB Adapter
6	PHLN1000_ HLN7013_	CHIB
7	HLN6914_	CHUC
8	3264096H01	Moisture Seal
9	1564090H01	Rear Housing
10	0364332H02	Main Screws
*	HLN6980_	Kit, Dust Cover
*	NNTN7279_	Sun Shield

Note: The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

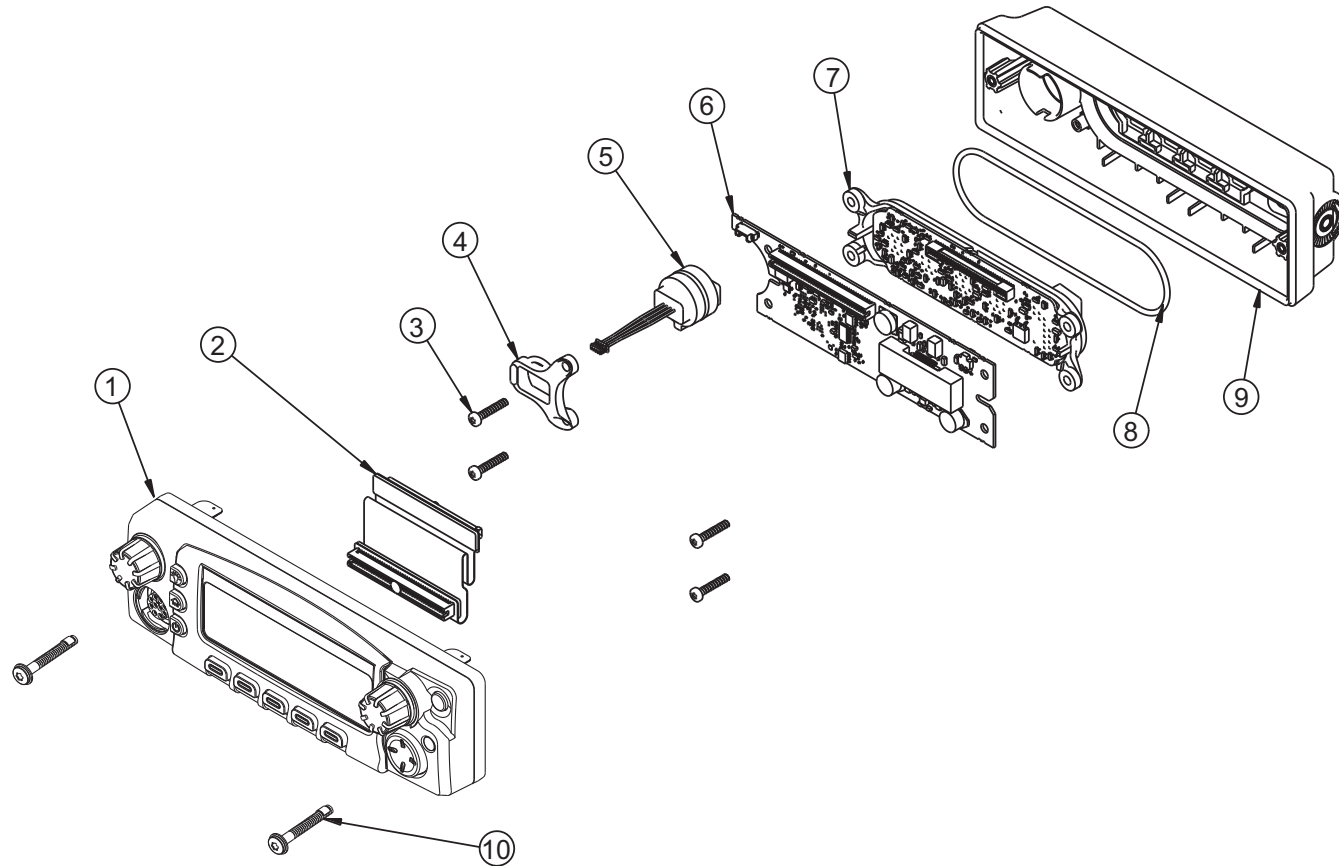


Figure 11-7. O5 CHIB and CHUC Exploded View

### 11.8 O7 CHIB and CHUC Exploded View and Parts List

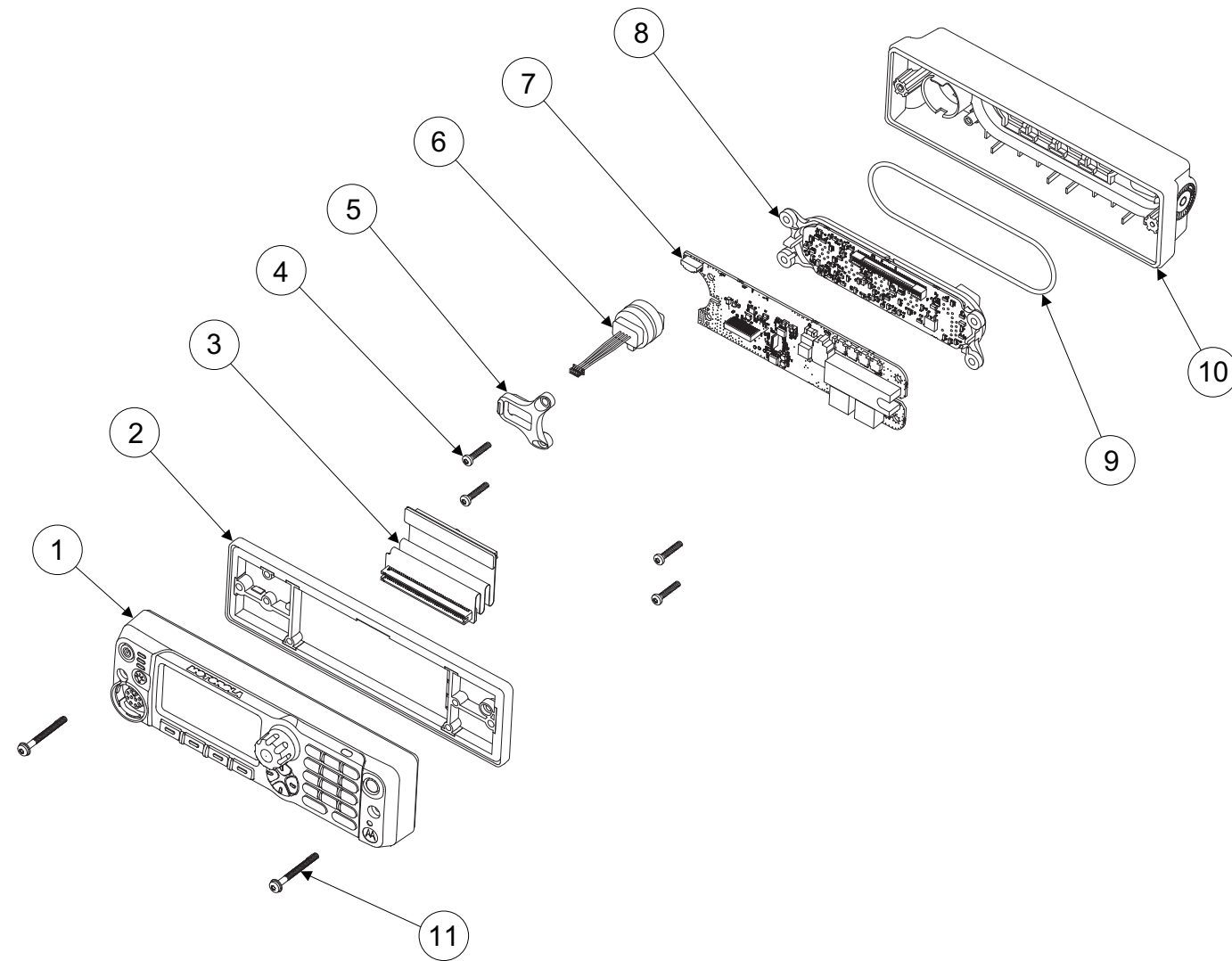


Figure 11-8. O7 CHIB and CHUC Exploded View

Table 11-9. O7 CHIB and CHUC Parts List

Item No.	Motorola Part No.	Description
1	PMHN4194_ PMHN4192_ PMHN4197_ PMHN4196_ PMHN4191_	O7 Control Head English O7 Control Head English_Chinese O7 Control Head English_Cyrillic O7 Control Head English_Hebrew O7 Control Head Siren and Light
2	3264059H03	I-Seal
3	0104046J13	Remote Mount Flex Assembly
4	0310944A14	Screw, Tapping (4)
5	0764091H01	Bracket, USB Connector
6	0964098H01	USB Connector
7	PMLN5927_	CHIB Board Assembly
8	HLN6914_	CHUC Board Assembly
9	3264096H01	Seal, Moisture, Silicone
10	1564090H01	Housing
11	03012062001	Transceiver Screws
*	HLN6980_	Kit, Dust Cover

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

### 11.9 Transceiver Interface Board (TIB) Exploded View and Parts List

This illustration (Figure 11-9) represents the interface board for all remote mount configurations, for both mid power and high power transceivers (only the flex changes depending on mid power or high power transceiver).

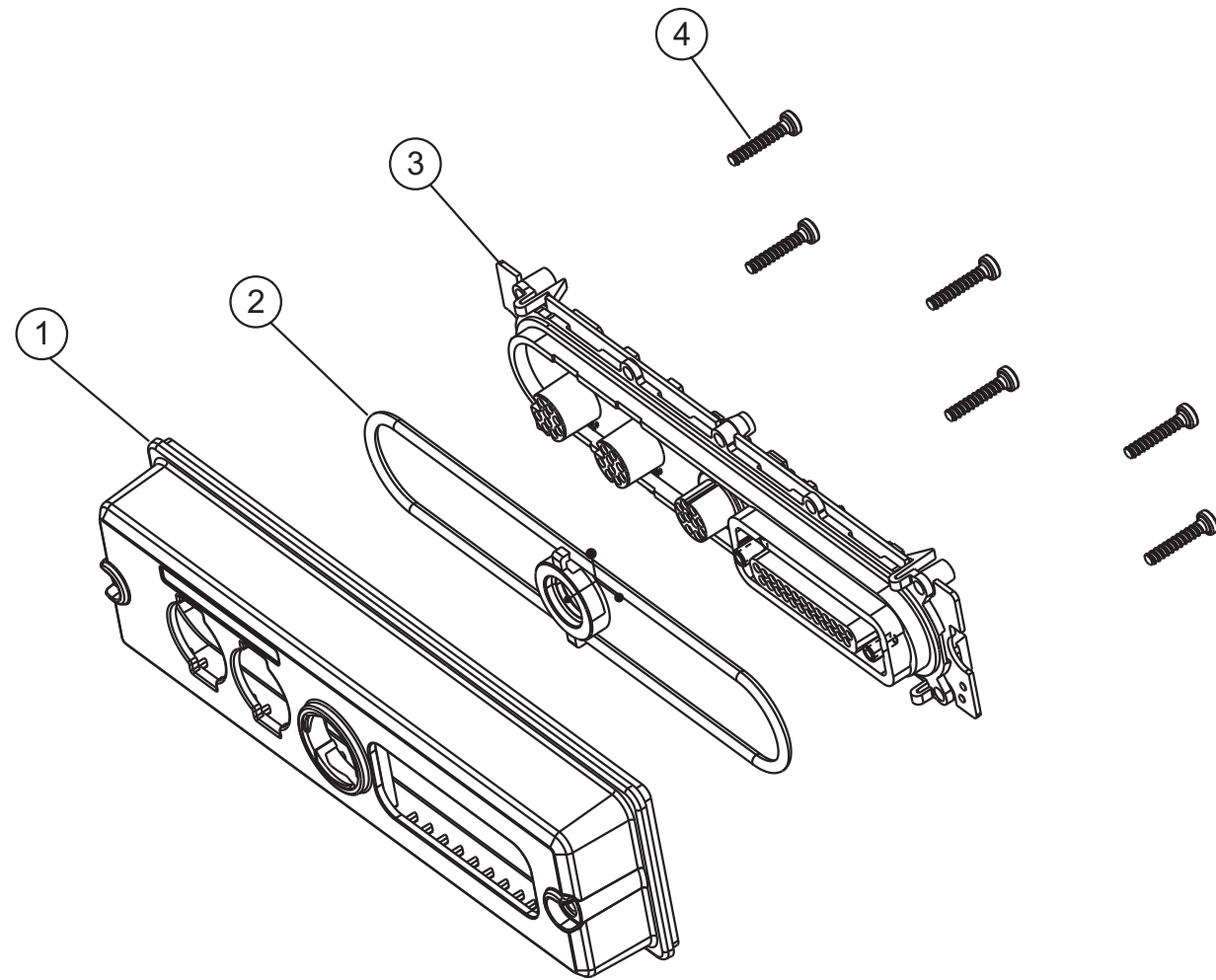


Figure 11-9. Transceiver Interface Board (TIB) Exploded View

Table 11-10. Transceiver Interface Board (TIB) Parts List

Item No.	Motorola Part No.	Description
1	1575769B01 or 1575715B01	Housing, Mid Power Remote Front or Housing, High Power Remote Front
2	3264121H01	Seal, Moisture, Silicone
3	PHLN4000_	TIB Board Assembly
4	0310909F21	Screw, Tapping (6)
*	3364474H01	Label, Housing (On Housing)
*	HLN6980_	Kit, Dust Cover (Not shown)

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

### 11.10 APX 2500 / 4500 / 4500Li O2 Dash Mount Radio Exploded View and Parts List

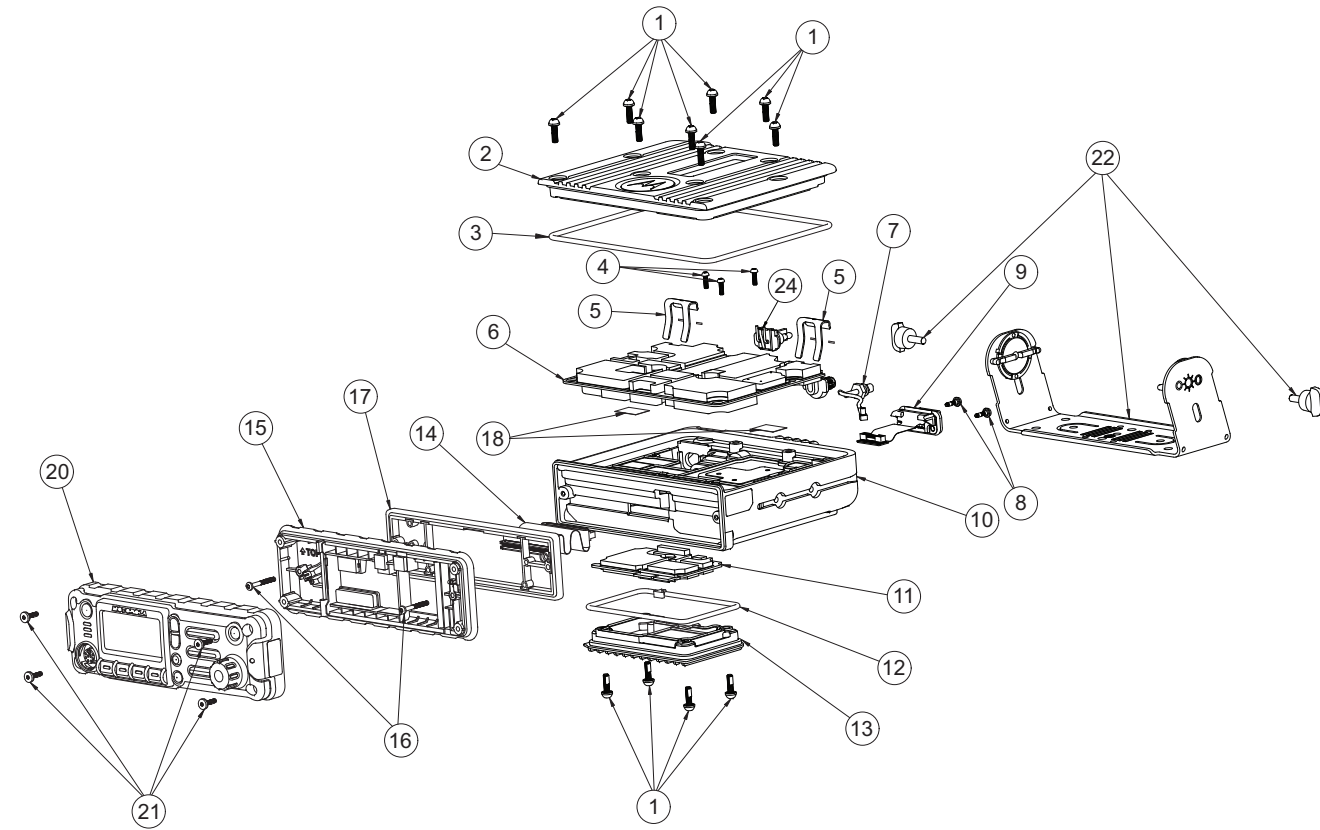


Table 11-11. APX 2500 / 4500 / 4500Li O2 Dash Mount Radio Parts List

Item No.	Motorola Part No.	Description
1	0104054J54	Assembly, Screw, Sealing
2	15012211001	Cover, Top
3	32012219001	Seal, Top Cover
4	0310909A33	Screw, Heat Spreader
5	4285702E01	Clip, RF and DC Connectors
6	See Table 11-20 for Kit Number	APX2500 / 4500 RF Board
7	3015953H02	Cable, GPS
8	0371838H01	Screw, D-Sub for accessory connector
9	0104052J27	Flex Assembly, Accessory Connector
10	27012024002	Chassis, Main
11	See Table for Kit Number	APX2500 / APX 4500 Controller Board
12	32012220001	Seal, Controller Cover
13	15012212001	Cover, Bottom
14	0104046J26	Dash Mount Flex Assembly
15	0104046J72	O2 Control Head Back Housing Assembly
16	03012052001	O2 Transceiver Screw
17	3264059H03	I-Seal
18	75012190001	Pad, Thermal
19	1110022D23	Compound, Thermal Joint
20	PMHN4193_ PMHN4195_	O2 Control Head (Grey) O2 Control Head (Green)
21	03012063001	O2 Housing Retention Screw (M4 ) with Washer & Screw
22	HLN6861_	Trunnion Installation Kit
23	-	FCC Label
24	09009344005	Connector DC Power

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

Figure 11-10. APX 2500 / 4500 / 4500Li O2 Dash Mount Radio Exploded View

### 11.11 APX 2500 O3 Radio Exploded View and Parts List

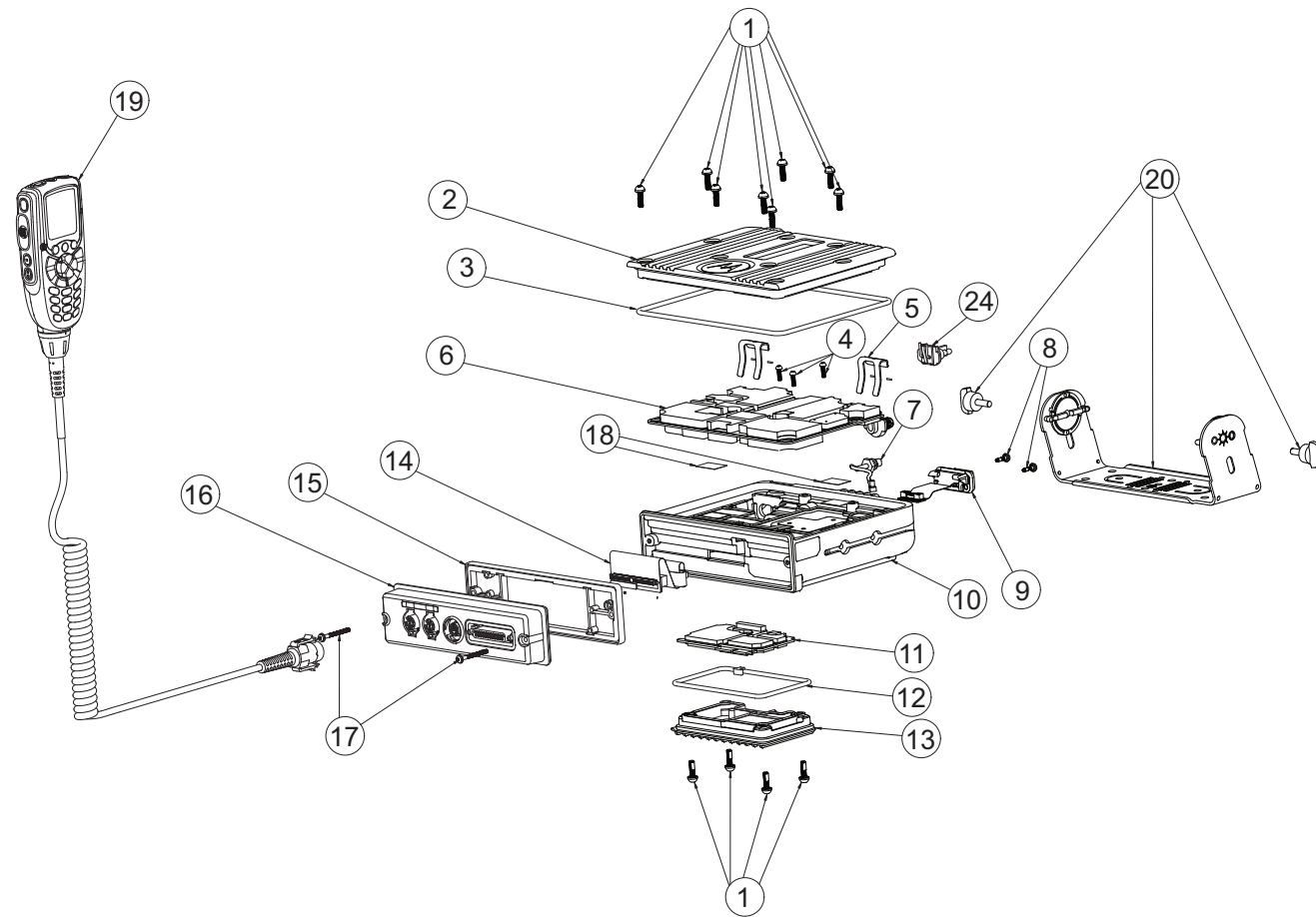


Figure 11-11. APX 2500 O3 Radio Exploded View

Table 11-12. APX 2500 O3 Radio Parts List

Item No.	Motorola Part No.	Description
1	0104054J54	Assembly, Screw, Sealing
2	15012211001	Cover, Top
3	32012219001	Seal, Top Cover
4	0310909A33	Screw, Heat Spreader
5	4285702E01	Clip, RF and DC Connectors
6	See Table 11-20 for Kit Number	APX 2500 RF Board
7	3015953H02	Cable, GPS
8	0371838H01	Screw, D-Sub for accessory connector
9	0104052J27	Flex Assembly, Accessory Connector
10	27012024002	Chassis, Main
11	See Table for Kit Number	APX 2500 Controller Board
12	32012220001	Seal, Controller Cover
13	15012212001	Cover, Bottom
14	HKN6205_	TIB Flex Assembly
15	3264059H03	I-Seal
16	PMUN1038_	TIB Housing
17	0364332H02	TIB Screw
18	75012190001	Pad, Thermal
19	PMUN 1034_	O3 Control Head
20	HLN6861_	Trunion Installation Kit
21	1110022D23	Compound, Thermal Joint
23	-	FCC Label
24	09009344005	Connector DC Power

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

### 11.12 APX 2500 O7 Dash Mount Radio Exploded View and Parts List

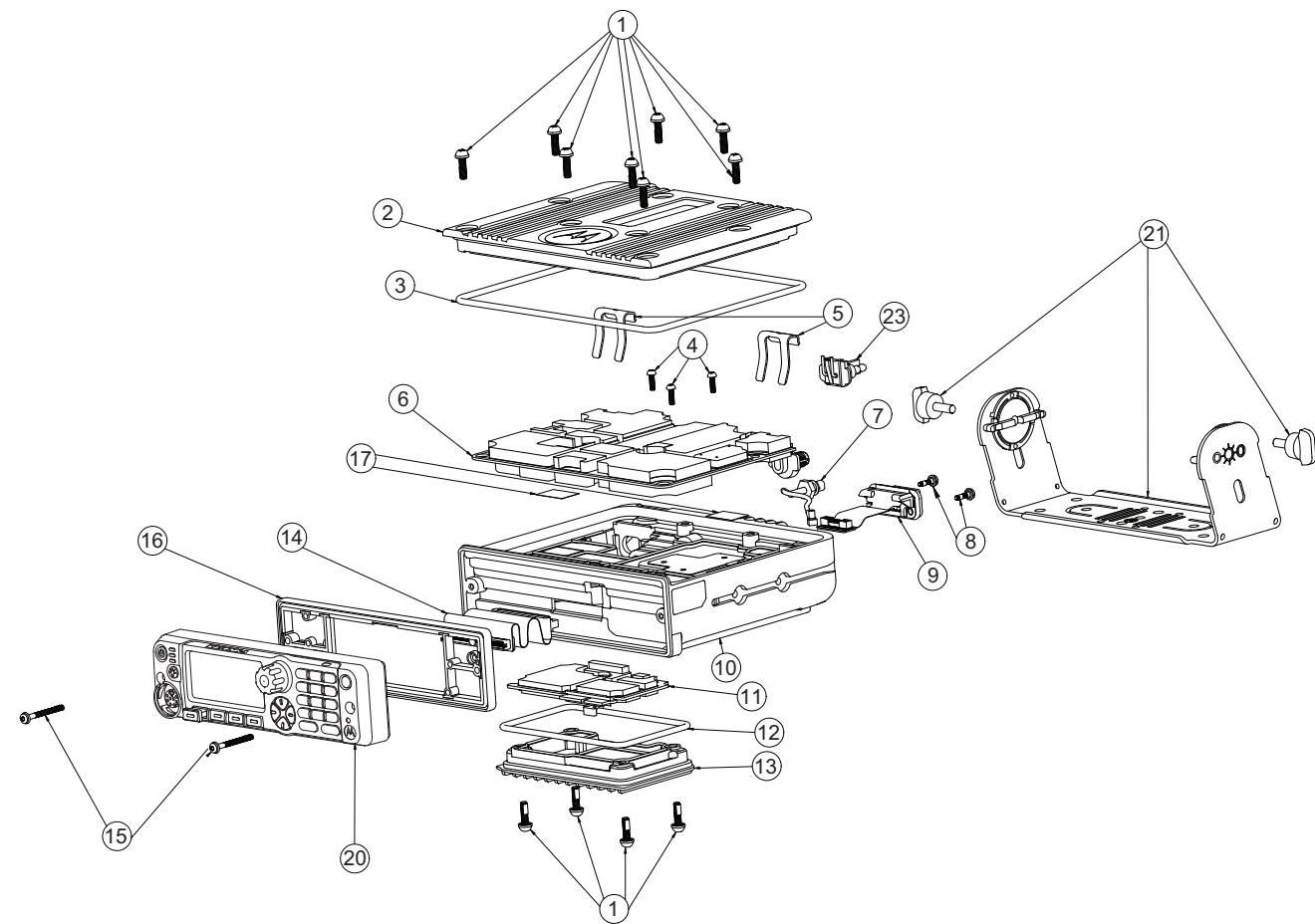


Figure 11-12. APX 2500 O7 Dash Mount Radio Exploded View

Table 11-13. APX 2500 O7 Dash Mount Radio Parts List

Item No.	Motorola Part No.	Description
1	0104054J54	Assembly, Screw, Sealing
2	15012211001	Cover, Top
3	32012219001	Seal, Top Cover
4	0310909A33	Screw, Heat Spreader
5	4285702E01	Clip, RF & DC Connectors
6	See Table 11-20 for Kit Number	APX 2500 RF Board
7	3015953H02	Cable, GPS
8	0371838H01	Screw, D-Sub for Accessory Connector
9	0104052J27	Flex Assembly, Accessory Connector
10	27012024002	Chassis, Main
11	See Table for Kit Number	APX 2500 Controller Board
12	32012220001	Seal, Controller Cover
13	15012212001	Cover, Bottom
14	0104046J26	Dash Mount Flex Assembly
15	03012062001	O7 Transceiver Screw with Washer & Seal
16	3264059H03	I-Seal
17	75012190001	Pad, Thermal
19	1110022D23	Compound, Thermal Joint
20	PMHN4194_ PMHN4192_ PMHN4197_ PMHN4196_ PMHN4191_	O7 Control Head (English) O7 Control Head (English_Chinese) O7 Control Head (English_Cyrillic) O7 Control Head (English_Hebrew) O7 Control Head (Alt Keypad Graphics)
21	HLN6861_	Trunnion Installation Kit
22	-	FCC Label
23	09009344005	Connector DC Power

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

**11.13 APX 5500 / APX 6500 / APX 7500 / APX 6500 Li O2 Dash Mount Radio Exploded View and Parts List**

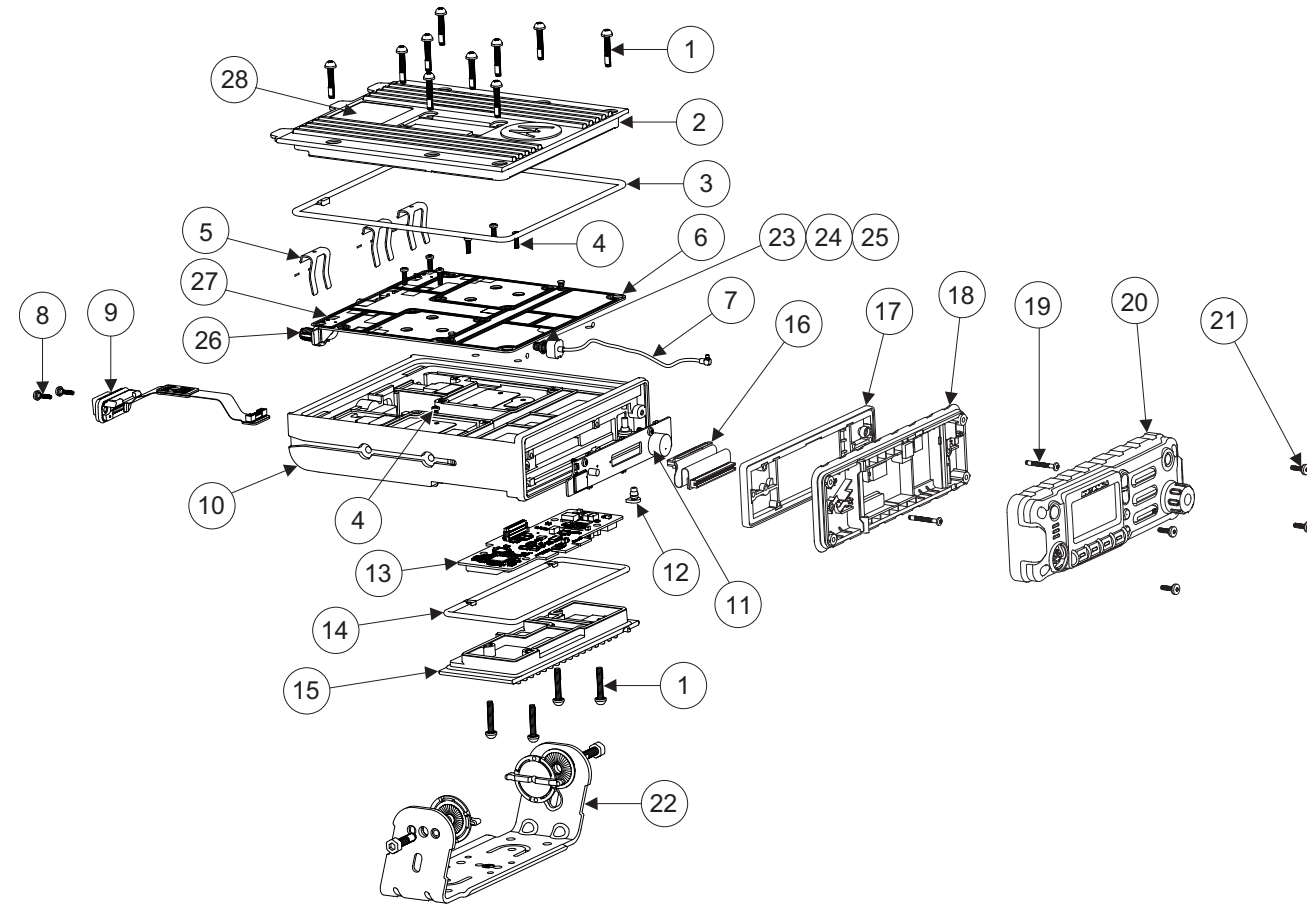


Table 11-14. APX 5500 / 6500 / 7500 / 6500 Li O2 Dash Mount Radio Parts List

Item No.	Motorola Part No.	Description
1	0385870E01	RF And Controller Cover Screws
2	1575713B02	Cover, Mid Power RF Main W/Choform
3	3275733B01	Seal, RF Cover (* Mid Power)
4	0310909A33	Screw
5	4285702E01	Clip, RF/DC Conn
6	See Table 11-20 for Kit Number	* Low/Mid Power RF Board
7	3075725B01	Cable, GPS Coax Assembly (* Mid Power)
8	0371838H01	Screw Assembly, Accessory Header
9	8475744B01	Flex Assembly, Accessory Connector
10	2775718B02	Chassis, Main (* Mid Power) W/Choform
11	MHLN6999_ MHLN7000_	Option Board W/ 3 Day Retention * Option Board For APX Mobiles
12	3275737B01	Seal, Wlan Port Plug
13	MHLN6979_	* Controller Board
14	3275732B01	Seal, Controller Cover (* Mid Power)
15	1575714B02	Cover, Mid Power Controller W/Choform
16	0104046J26	Dash Mount Flex Assembly
17	3264059H03	I-Seal
18	0104046J72	O2 Back Housing Assembly
19	03012052001	Transceiver Screws
20	PMHN4193_ PMHN4195_	O2 Control Head Grey O2 Control Head Green
21	03012063001	Housing Retention Screws
22	HLN7002_	Mid Power Installation Kit
23	04009258001	Washers, * GPS Internal Tooth
24	32009266001	Seal, * GPS
25	02009258001	Nut, * GPS
26	3275731B01	Seal, * RF Connector
27	3285744E01	Seal, DC Connector
28	-	FCC Label

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

\* Applies to APX 5500 / APX 6500 / APX 7500 / APX 6500 Li

Figure 11-13. APX 5500 / 6500 / 7500 / 6500 Li O2 Dash Mount Radio Exploded View



### 11.14 APX 5500 / APX 6500 / APX 7500 / APX 6500 Li O3 Radio Exploded View and Parts List

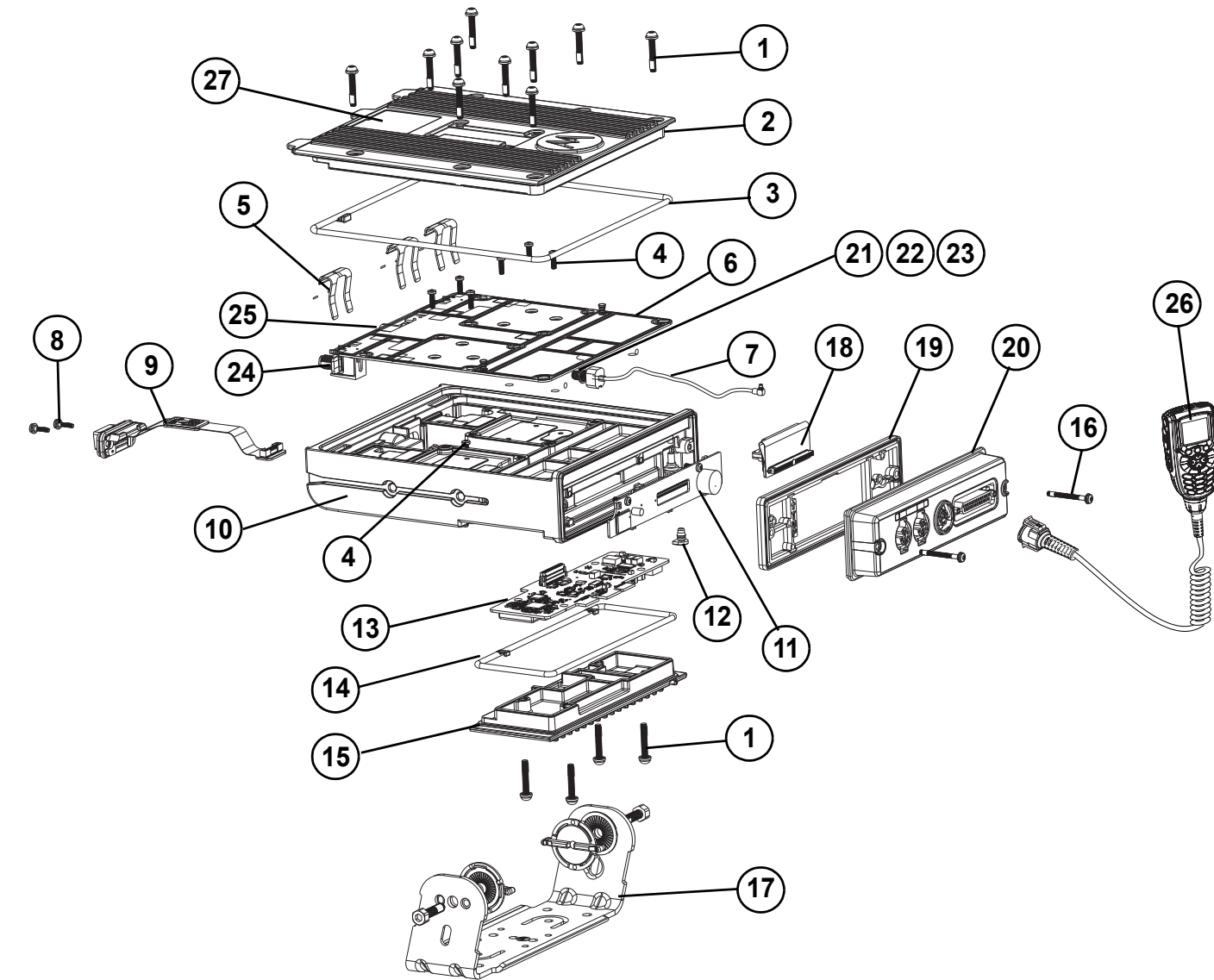


Figure 11-14. APX 5500 / 6500 / 7500 / 6500 Li O3 Radio Exploded View

Table 11-15. APX 5500 / 6500 / 7500 / 6500 Li O3 Radio Parts List

Item No.	Motorola Part No.	Description
1	0385870E01	RF And Controller Cover Screws
2	1575713B02	Cover, Mid Power RF Main W/Choform
3	3275733B01	Seal, RF Cover (* Mid Power)
4	0310909A33	Screw
5	4285702E01	Clip, RF/DC Conn
6	See Table 11-20 for Kit Number	* Low/Mid Power RF Board
7	3075725B01	Cable, GPS Coax Assembly (* Mid Power)
8	0371838H01	Screw Assembly, Accessory Header
9	8475744B01	Flex Assembly, Accessory Connector
10	2775718B02	Chassis, Main (* Mid Power) W/Choform
11	MHLN6999_ MHLN7000_	Option Board W/ 3 Day Retention * Option Board For APX Mobiles
12	3275737B01	Seal, Wlan Port Plug
13	MHLN6979_	* Controller Board
14	3275732B01	Seal, Controller Cover (* Mid Power)
15	1575714B02	Cover, Mid Power Controller W/Choform
16	0364332H02	TIB Screws (TIB Housing To Chassis) Assembly
17	HLN7002_	Mid Power Installation Kit
18	HKN6205_	Remote Flex Kit
19	3264059H03	Seal, Frame, Mid Power Remote
20	PMUN1038_	* Standard TIB Mp (* Mp Std TIB)
21	04009258001	Washers, * GPS Internal Tooth
22	32009266001	Seal, * GPS
23	02009258001	Nut, * GPS
24	3275731B01	Seal, * RF Connector
25	3285744E01	Seal, DC Connector
26	PMUN1034_	O3 Control Head
27	-	FCC Label

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.  
\* Applies to APX 5500 / APX 6500 / APX 7500 / APX 6500 Li

### 11.15 APX 5500 / APX 6500 / APX 7500 / APX 6500 Li O5 Dash Mount Radio Exploded View and Parts List

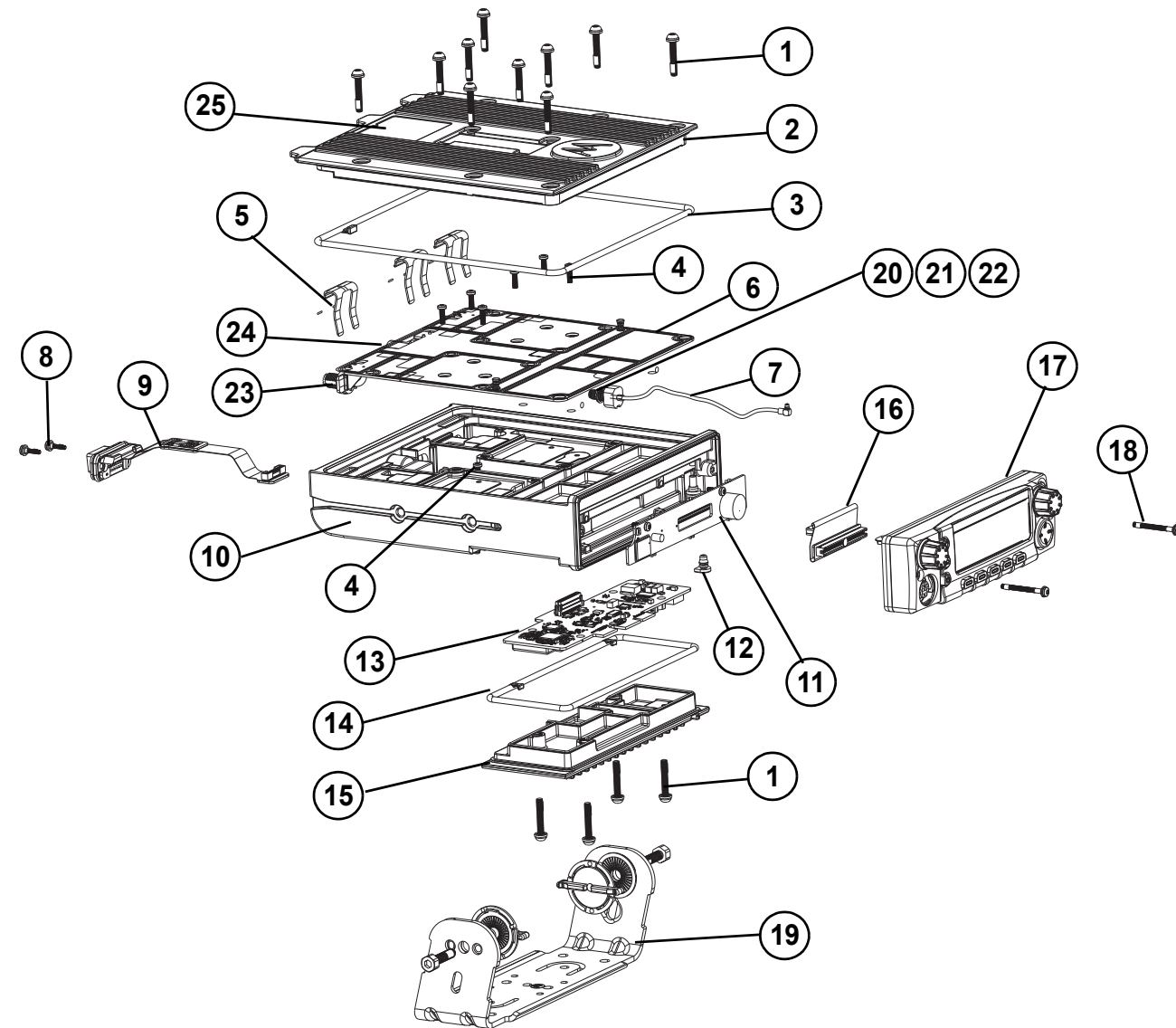


Table 11-16. APX 5500 / 6500 / 7500 / 6500 Li O5 Dash Mount Radio Parts List

Item No.	Motorola Part No.	Description
1	0385870E01	RF And Controller Cover Screws
2	1575713B02	Cover, Mid Power RF Main W/Choform
3	3275733B01	Seal, RF Cover (* Mid Power)
4	0310909A33	Screw
5	4285702E01	Clip, RF/DC Conn
6	See Table 11-20 for Kit Number	* Low/Mid Power RF Board
7	3075725B01	Cable, GPS Coax Assembly (* Mid Power)
8	0371838H01	Screw Assembly, Accessory Header
9	8475744B01	Flex Assembly, Accessory Connector
10	2775718B02	Chassis, Main (* Mid Power) W/Choform
11	MHLN6999_ MHLN7000_	Option Board W/ 3 Day Retention * Option Board For APX Mobiles
12	3275737B01	Seal, Wlan Port Plug
13	MHLN6979_	* Controller Board
14	3275732B01	Seal, Controller Cover (* Mid Power)
15	1575714B02	Cover, Mid Power Controller W/Choform
16	HKN6206_	Dash Flex Kit
17	PHCN4000_	O5 Control Head
18	0364332H02	TIB Screws (TIB Housing To Chassis) Assembly
19	HLN7002_	Mid Power Installation Kit
20	04009258001	Washers, * GPS Internal Tooth
21	32009266001	Seal, * GPS
22	02009258001	Nut, * GPS
23	3275731B01	Seal, * RF Connector
24	3285744E01	Seal, DC Connector
25	-	FCC Label

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

\* Applies to APX 5500 / APX 6500 / APX 7500 / APX 6500 Li

Figure 11-15. APX 5500 / 6500 / 7500 / 6500 Li O5 Dash Mount Radio Exploded View

### 11.16 APX 5500 / APX 6500 / APX 7500 / APX 6500 Li O7 Dash Mount Radio Exploded View and Parts List

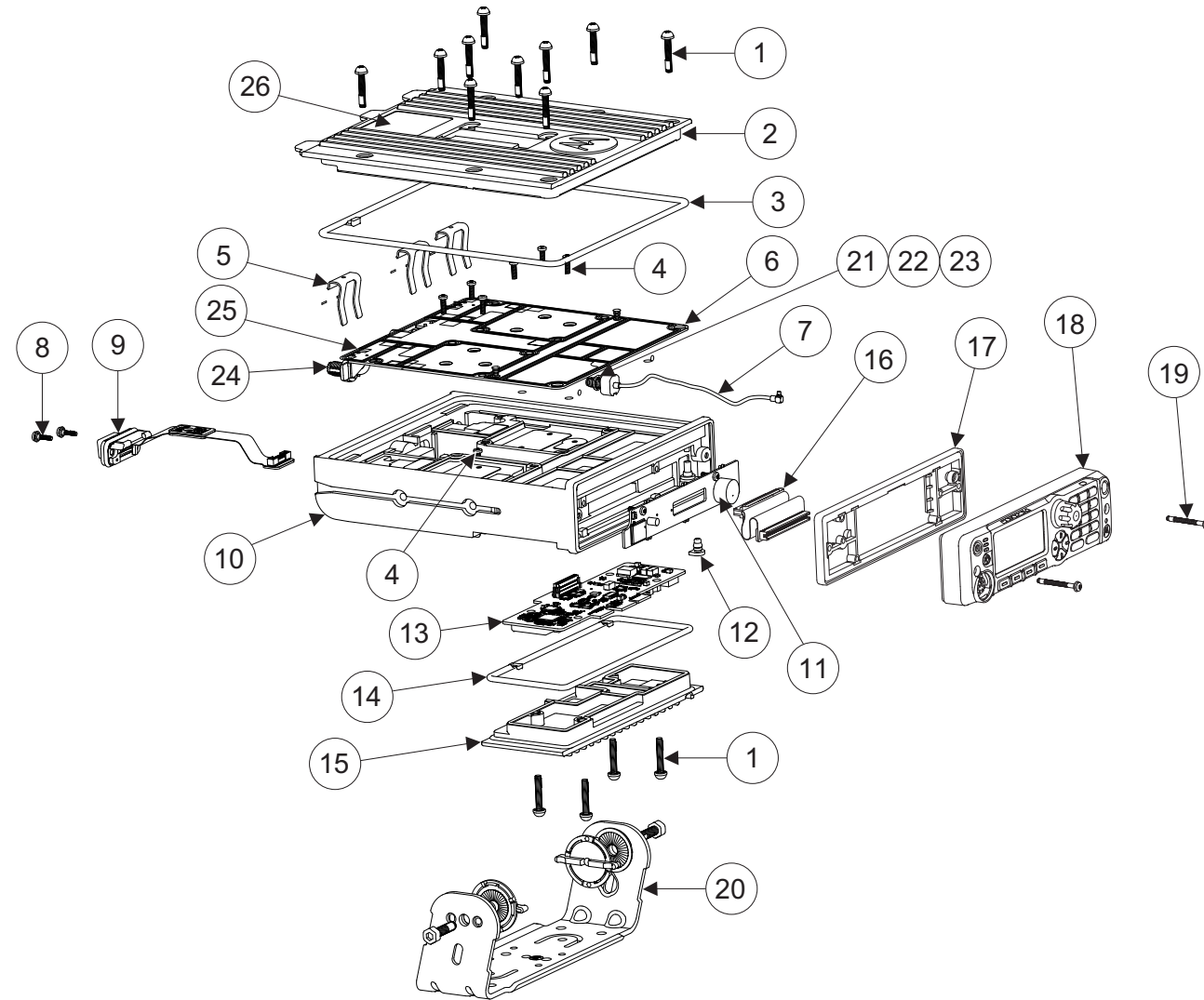


Figure 11-16. APX 5500 / 6500 / 7500 / 6500 Li O7 Dash Mount Radio Exploded View

Table 11-17. APX 5500 / 6500 / 7500 / 6500 Li O7 Dash Mount Radio Parts List

Item No.	Motorola Part No.	Description
1	0385870E01	RF And Controller Cover Screws
2	1575713B02	Cover, Mid Power RF Main W/Choform
3	3275733B01	Seal, RF Cover (* Mid Power)
4	0310909A33	Screw
5	4285702E01	Clip, RF/DC Conn
6	See Table 11-20 for Kit Number	* Low/Mid Power RF Board
7	3075725B01	Cable, GPS Coax Assembly (* Mid Power)
8	0371838H01	Screw Assembly, Accessory Header
9	8475744B01	Flex Assembly, Accessory Connector
10	2775718B02	Chassis, Main (* Mid Power) W/Choform
11	MHLN6999_ MHLN7000_	Option Board W/ 3 Day Retention * Option Board For APX Mobiles
12	3275737B01	Seal, Wlan Port Plug
13	MHLN6979_	* Controller Board
14	3275732B01	Seal, Controller Cover (* Mid Power)
15	1575714B02	Cover, Mid Power Controller W/Choform
16	0104046J26	Dash Mount Flex Assembly
17	3264059H03	I-seal
18	PMHN4194_ PMHN4192_ PMHN4197_ PMHN4196_ PMHN4191_	O7 Control Head English O7 Control Head English_Chinese O7 Control Head English_Cyrillic O7 Control Head English_Hebrew O7 Control Head Siren and Light
19	03012062001	Transceiver Screws
20	HLN7002_	Mid Power Installation Kit
21	04009258001	Washers, * GPS Internal Tooth
22	32009266001	Seal, * GPS
23	02009258001	Nut, * GPS
24	3275731B01	Seal, * RF Connector
25	3285744E01	Seal, DC Connector
26	-	FCC Label

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

\* Applies to APX 5500 / APX 6500 / APX 7500 / APX 6500 Li

**11.17 APX 5500 / APX 6500 / APX 7500 / APX 6500 Li 100 W Remote Mount Radio Exploded View and Parts List**

Table 11-18. APX 5500 / 6500 / 7500 / 6500 Li 100 W Remote Mount Radio Parts List

Item No.	Motorola Part No.	Description
1	0385870E01	RF And Controller Cover Screws
2	0310909A33	Screw
3	4285702E01	Clip, RF/DC Conn
4	1575712B02	Cover, High Power Controller W/Choform
5	3275734B01	Seal, Controller Cover (* HP)
6	-	FCC Label
7	HLN7017_	Sleeve, HP DC Connector
8	0180706K42	Chassis, Main (* HP) W/Choform Sub-Assembly
9	3075723B01	Cable, GPS Coax Assembly (* HP)
10	02009258001	Nut, * GPS
11	04009258001	Washers, * GPS Internal Tooth
12	32009266001	Seal, * GPS
13	3271902H01	High Power I-Seal
14	PMUN1040_	* Standard TIB HP
15	3875115H01	Seal, High Power WLAN Port Plug
16	See Table 11-21 for Kit Number	* 100 W Power RF Board
17	3275731B01	Seal, * RF Connector
18	3285744E01	Seal, DC Connector
19	3275735B01	Seal, RF Cover (* HP)
20	1575711B02	Cover, High Power RF Main W/Choform
21	4171865H01	Spring, Torque (For Lock)
22	5571649H01	Lock Assembly
23	4271651H01	Clip For Handle Pin
24	2271650H01	Pivot Pin, For Handle
25	MHLN6979_	* Controller Board
26	HLN6999_ HLN7000_	Option Board W/ 3 Day Retention * Option Board For APX Mobile
27	0364332H02	TIB Screws (TIB Housing To Chassis) Assembly
*	HLN7003_	Trunnion Mounting Kit

**Note:** The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.  
\* Applies to APX 5500 / APX 6500 / APX 7500 / APX 6500 Li

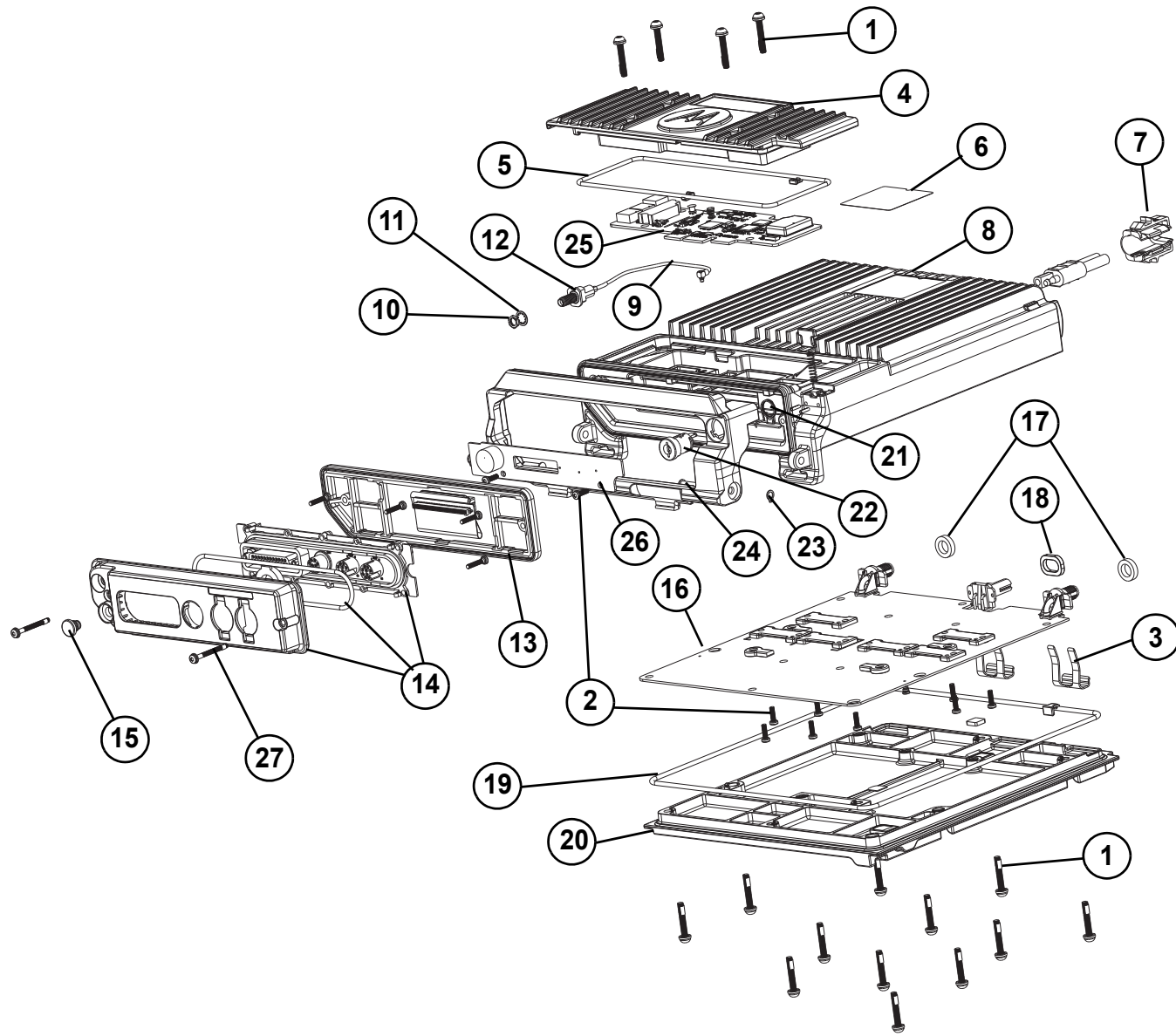


Figure 11-17. APX 5500 / 6500 / 7500 / 6500 Li 100 W Remote Mount Radio Exploded View

### 11.18 Universal Relay Controller Exploded View and Parts List

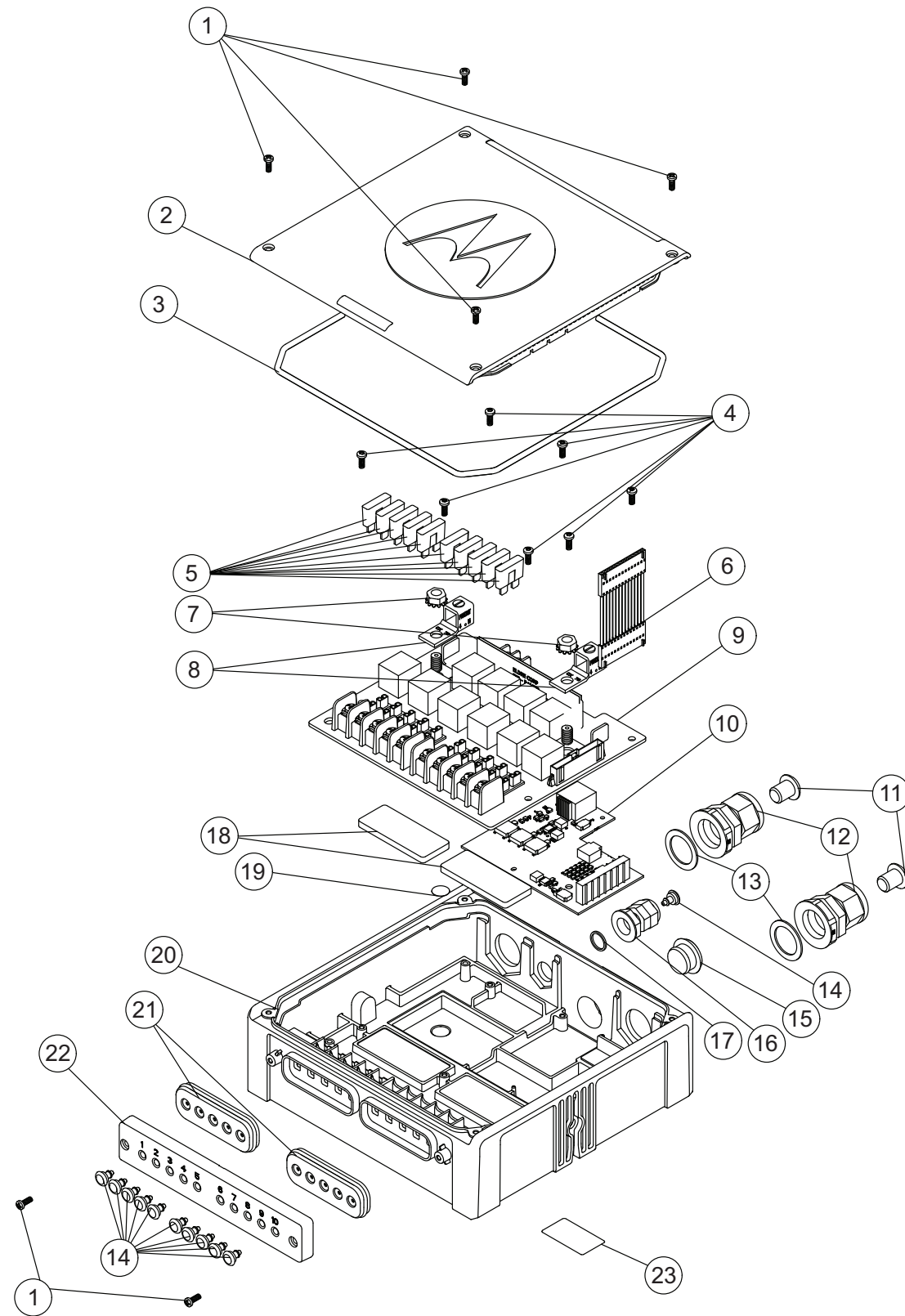


Figure 11-18. Universal Relay Controller Exploded View

Table 11-19. Universal Relay Controller Parts List

Item No.	Motorola Part No.	Description
1	0371889L03	M3X8MM, Machined Phillips Screw, EDBK
2	1578387A01	Top Housing
3	3275880M01	Main O-Ring
4	03012023001	M3X8MM, Machined TORX Screw
5	6500139768	Fuse
6	0975931M01	Connector Wire Harness
7	0275935M01	Nut, PCB Stud
8	3975932M01	Power Lug
9	PMLN5639_	URC Relay PCB Kit
10	PMLN5640_	URC Relay PCB Kit
11	32012001001	Seal, Power Cable Gland
12	42007054001	Power Cable Gland Assembly
13	32012036002	Gasket, Cable Gland (Power)
14	32012002001	Seal, Gasket and Ground Cable Gland
15	32012030001	Seal, RJ 45
16	42007054002	Ground Cable Gland Assembly
17	32012036001	Gasket, Cable Gland (Ground)
18	75012026001	Pad, Thermal, Hub Main Chassis
19	3278443A01	Seal, Port
20	27012007001	Chassis, Main, O9 Hub
21	3278310A01	Light Bar Gasket
22	4278307A01	Light Bar Gasket Retainer
23	54012001001	Label, Serial

Note: The underscore ( \_ ) used at the end of the kit number is replaced with the kit revision letter. When ordering, refer to your specific kit for this suffix letter.

Table 11-20. APX 5500 / 6500 / 7500 / 6500 Li / 2500 / 4500 Low/Mid Power RF Board

Motorola Part No.	Description
MHUF4022_	* 7/800 Mid Power RF Board
MHUD4026_	* VHF Mid Power RF Board
MHUR4001_	APX 7500 7/800 / VHF Mid Power RF Board
MHUT4001_	APX 7500 VHF / UHF Range 1 Mid Power RF Board
MHUE4044_	* UHF RANGE 1 Mid Power RF Board
MHUS4002_	APX 7500 UHF RANGE 1 7/800 Mid Power RF Board
MHUE4001_	* UHF RANGE 2 Mid Power RF Board
MHUS4001_	APX 7500 UHF RANGE 2 7/800 Mid Power RF Board
PMLF4092_	APX 2500 / APX 4500/4500Li 7/800 RF Board
PMLD4554_	APX 2500 / APX 4500/4500Li VHF RF Board
PMLE4806_	APX 2500 / APX 4500/4500Li UHF R1 RF Board
PMLE4924_	APX 2500 / APX 4500/4500Li UHF R2 RF Board

Note: \* Applies to APX 5500 / APX 6500 / APX 7500 / APX 6500 Li

Table 11-21. APX 5500 / 6500 / 7500 / 6500 Li 100 W Power RF Board

Motorola Part No.	Description
MHUD4027_	* VHF High Power RF Board
MHUE4045_	* UHF Range 1 High Power RF Board
MHUR4000_	APX 7500 VHF High/ 7/800 Mid Power RF Board
MHUT4000_	APX 7500 VHF High/UHF Range 1 High Power RF Board

**Note:** \* Applies to APX 5500 / APX 6500 / APX 7500 / APX 6500 Li

Table 11-22. APX 2500 / 4500 / 4500Li Low/Mid Power Controller Board

Motorola Part No.	Description
PMLN6299_	APX 2500 / APX 4500/4500Li Controller Service Kit without Secure
PMLN6176_	* APX 2500 / APX 4500 Controller Service Kit with Secure

**Note:** \* Refer to [Table 7-3](#) and [Table 7-4](#) for secure algorithm details

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## Appendix A Accessories

Motorola provides the following approved optional accessories to improve the productivity of the APX Mobile Radios.

For a complete list of Motorola-approved antennas, cables, and other accessories, visit the following web site: <http://www.motorolasolutions.com/APX>.

On the website, search for APX Mobile Radios and you will see the accessories information beside the specifications of the radio. You can also contact your dealer for more details.

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## Notes



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# Appendix B EMEA Warranty, Service and Technical Support

## B.1 Warranty and Service Support

MOTOROLA SOLUTIONS, INC. ("MOTOROLA") offers long term support for its products. This support includes full exchange and/or repair of the product during the warranty period, and service/repair or spare parts support out of warranty. Any "return for exchange" or "return for repair" by an authorized Motorola Dealer must be accompanied by a Warranty Claim Form. Warranty Claim Forms are obtained by contacting an Authorized Motorola Dealer.

### B.1.1 Warranty Period and Return Instructions

The terms and conditions of warranty are defined fully in the Motorola Dealer or Distributor or Reseller contract. These conditions may change from time to time and the following notes are for guidance purposes only.

In instances where the product is covered under a "return for replacement" or "return for repair" warranty, a check of the product should be performed prior to shipping the unit back to Motorola. This is to ensure that the product has been correctly programmed or has not been subjected to damage outside the terms of the warranty.

Prior to shipping any radio back to the appropriate Motorola warranty depot, please contact Customer Resources (See [page B-3](#)). All returns must be accompanied by a Warranty Claim Form, available from your Customer Services representative. Products should be shipped back in the original packaging, or correctly packaged to ensure no damage occurs in transit.

### B.1.2 After Warranty Period

After the Warranty period, Motorola continues to support its products in two ways.

1. Motorola's Managed Technical Services (MTS) offers a repair service to both end users and dealers at competitive prices.
  2. MTS supplies individual parts and modules that can be purchased by dealers who are technically capable of performing fault analysis and repair.
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## B.2 European Radio Support Centre (ERSC)

The ERSC Customer Information Desk is available through the following service numbers:

Austria:	08 00 29 75 41	Italy:	80 08 77 387
Belgium:	08 00 72 471	Luxemburg:	08 00 23 27
Denmark:	80 88 58 80	Netherlands:	08 00 22 45 13
Finland:	08 00 11 49 910	Norway:	80 01 11 15
France:	08 00 90 30 90	Portugal:	08 00 84 95 70
Germany:	08 00 18 75 240	Spain:	90 09 84 902
Greece:	00 80 04 91 29 020	Sweden:	02 07 94 307
UK :	08 00 96 90 95	Switzerland:	08 00 55 30 82
Ireland:	18 00 55 50 21	Iceland:	80 08 147

Or dial the European Repair and Service Centre:

Tel: +49 30 6686 1555

Fax: +49 30 6686 1579

Email: ERSC@motorolasolutions.com

Please use these numbers for repair enquiries only.

## B.3 Piece Parts

Some replacement parts, spare parts, and/or product information can be ordered directly. If a complete Motorola part number is assigned to the part, it is available from Motorola Radio Products and Solutions Organization (RPSO). Some parts may have become obsolete and no longer available in the market due to cancelations by the supplier. If no part number is assigned, the part is not normally available from Motorola. If the part number is appended with an asterisk, the part is serviceable by Motorola Depot only. If a parts list is not included, this generally means that no user-serviceable parts are available for that kit or assembly.

Orders for replacement parts, kits and assemblies should be placed directly on Motorola's local distribution/dealer organization or via Motorola Online at: <http://www.motorola.com/emeaonline>

\* The Radio Products and Solutions Organization (RPSO) was formerly known as the Radio Products Services Division (RPSD) and/or the Accessories and Aftermarket Division (AAD).

## B.4 Technical Support

Motorola Product Services is available to assist the dealer/distributors in resolving any malfunctions which may be encountered.

**North Europe** - Stephen Woodrow  
Telephone: +44 (0) 1256 488 082  
Fax: +44 01256 488 080  
Email: CSW066@motorolasolutions.com

**Central and East Europe** - Sigggy Punzenberger  
Telephone: +49 (0) 6128 70 2342  
Fax: +49 (0) 6128 95 1096  
Email: TFG003@motorolasolutions.com

**Russia and Belarus** - Andrey Nagornykh  
Telephone: +7 495 787 8910  
Fax: +7 495 785 0185  
Email: MWCB47@motorolasolutions.com

**Germany** - Customer Connect Team  
Telephone: +49 (0) 30 6686 1539  
Fax: +49 (0) 30 6686 1916  
Email: ESSC@motorolasolutions.com

**Middle East and Africa** - Wayne Holmes  
Telephone: +49 (0)6126 957 6237  
Fax: +49 (0)6126 957 6826  
Email: wayne.holmes@motorolasolutions.com

**Italy** - Ugo Gentile  
Telephone: +39 0 2822 0325  
Fax: +39 0 2822 0334  
Email: C13864@motorolasolutions.com

**France** - Armand Roy  
Telephone: +33 1 6935 7868  
Fax: +33 1 6935 7808  
Email: armand.roy@motorolasolutions.com

**France** - Laurent Irrmann  
Telephone: +33 1 6935 7866  
Fax: +33 1 6935 7808  
Email: laurent.irrmann@motorolasolutions.com

## B.5 Further Assistance From Motorola

You can also contact the Customer Help Desk through the following web address.  
[http://www.motorola.com/Business/US-EN/Pages/Contact\\_Us](http://www.motorola.com/Business/US-EN/Pages/Contact_Us)

## Notes

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# Appendix C LACR Replacement Parts Ordering and Motorola Service Centers

## C.1 Commercial Warranty

### Limited Warranty

#### MOTOROLA COMMUNICATION PRODUCTS

##### I. What This Warranty Covers And For How Long

MOTOROLA SOLUTIONS, INC. ("MOTOROLA") warrants the MOTOROLA manufactured Communication Products listed below ("Product") against material defects in material and workmanship under normal use and service for the period of time from the date of purchase as scheduled below:

ASTRO APX 5500 / APX 6500 / APX 7500 / APX 6500 Li / APX 2500 / APX 4500 / APX 4500Li Mobile Radios	One (1) Year
Product Accessories	One (1) Year

Motorola will at its option and at no charge either repair the defective Product (with new or reconditioned parts), replace it (with a new or reconditioned Product), or refund the purchase price of the defective Product during the warranty period provided it is returned before the expiration of the warranty period and in accordance with the terms of this warranty. Replaced Product, parts or boards are warranted for the balance of the original applicable warranty period. All replaced Product, parts or boards shall become the property of MOTOROLA.

This express limited warranty is extended by MOTOROLA to the original end user purchasing the Product for commercial, industrial or governmental use only and is not assignable or transferable to any other party. This is the complete warranty for the Product manufactured by MOTOROLA. MOTOROLA assumes no obligations or liability for additions or modifications to this warranty unless made in writing and signed by an officer of MOTOROLA. Unless made in a separate agreement between MOTOROLA and the original purchaser, MOTOROLA does not warrant the installation, maintenance or service of the Product.

MOTOROLA is not responsible in any way for any ancillary equipment not furnished by MOTOROLA which is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. Because each system which may use the Product is unique, MOTOROLA disclaims liability for range, coverage, or operation of the system in part or as a whole under this warranty.

## II. General Provisions

This warranty sets forth the full extent of MOTOROLA'S responsibilities regarding the Product. Repair, replacement or refund of the purchase price, at MOTOROLA'S option, is the exclusive remedy. THIS WARRANTY IS THE COMPLETE WARRANTY FOR THE PRODUCT AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES. MOTOROLA DISCLAIMS ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, FOR ANY COMMERCIAL LOSS; INCONVENIENCE; LOSS OF USE, TIME, DATA, GOOD WILL, REVENUES, PROFITS OR SAVINGS; OR OTHER SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THE SALE OR USE OF THE PRODUCT.

## III. How To Get Warranty Service

You must provide proof of purchase (bearing the date of purchase and Product item serial number) in order to receive warranty service and deliver or send the Product item, transportation and insurance prepaid, to an authorized warranty service location before the expiration of the warranty period. Warranty service will be provided by Motorola through one of its authorized warranty service locations. If you first contact the company which sold you the Product, it can facilitate your obtaining warranty service. You can also open a *Contact Us* case on Motorola Online (<http://www.motorola.com/businessonline>).

## IV. What This Warranty Does Not Cover

This warranty does not cover:

- A. Defects or damage resulting from use of the Product in other than its normal customary or authorized manner.
- B. Defects or damage from misuse, accident, liquid, lightning, neglect or act of God.
- C. Defects or damage from testing, maintenance, installation, alteration, modification, or adjustment not provided or authorized in writing by MOTOROLA.
- D. Breakage or damage to antennas unless caused directly by defects in material or workmanship.
- E. A Product subjected to unauthorized Product modifications, disassemblies or repairs (including, without limitation, the addition to the Product of non-Motorola supplied equipment) which adversely affect performance of the Product or interfere with Motorola's normal warranty inspection and testing of the Product to verify any warranty claim.
- F. Product which has had the serial number removed or made illegible.
- G. Freight costs to ship the Product to the repair depot.
- H. Batteries (because they carry their own separate limited warranty) or consumables.
- I. Customer's failure to comply with all applicable industry and OSHA standards.
- J. A Product which due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with MOTOROLA's published specifications or the FCC type acceptance labeling in effect for the Product at the time the Product was initially distributed from MOTOROLA.
- K. Scratches or other cosmetic damage to Product surfaces that does not affect the operation of the Product.
- L. Normal and customary wear and tear.

## V. Governing Law

This Warranty is governed by the laws of the State of Illinois, USA.

## C.2 Replacement Parts Ordering

### C.2.1 Basic Ordering Information

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, and sufficient description of the desired component to identify it.

### C.2.2 Motorola Online

Motorola Online users can access our online catalog at <http://www.motorola.com/businessonline>

To register for online access:

- Have your Motorola Customer number available.
- Please go to <http://www.motorola.com/businessonline> and click on "Sign Up Now."
- Complete form and submit it.
- Contact your BDM to complete set-up and it will be done within 24 to 48 hours.

## C.3 Motorola Service Centers

### C.3.1 Servicing Information

If a unit requires further complete testing, knowledge and/or details of component level troubleshooting or service than is customarily performed at the basic level, please send the radio to a Motorola Service Center as listed below.

### C.3.2 Motorola de México, S.A.

Bosques de Alisos 125  
Col. Bosques de las Lomas CP 05120  
México D.F.  
México  
Tel: (5) 257-6700

### C.3.3 Motorola de Colombia, Ltd.

Carrera 7 No. 71-52  
Bogota - Colombia  
Tel: (571) 376-6990

## Notes



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# Appendix D NAG Replacement Parts Ordering and Motorola Service Centers

## D.1 Commercial Warranty

### Limited Warranty

#### MOTOROLA COMMUNICATION PRODUCTS

##### I. What This Warranty Covers And For How Long

MOTOROLA SOLUTIONS, INC. ("MOTOROLA") warrants the MOTOROLA manufactured Communication Products listed below ("Product") against material defects in material and workmanship under normal use and service for the period of time from the date of purchase as scheduled below:

ASTRO APX 5500 / APX 6500 / APX 7500 / APX 6500 Li / APX 2500 / APX 4500 / APX 4500Li Mobile Radios	One (1) Year
Product Accessories	One (1) Year

Motorola will at its option and at no charge either repair the defective Product (with new or reconditioned parts), replace it (with a new or reconditioned Product), or refund the purchase price of the defective Product during the warranty period provided it is returned before the expiration of the warranty period and in accordance with the terms of this warranty. Replaced Product, parts or boards are warranted for the balance of the original applicable warranty period. All replaced Product, parts or boards shall become the property of MOTOROLA.

This express limited warranty is extended by MOTOROLA to the original end user purchasing the Product for commercial, industrial or governmental use only and is not assignable or transferable to any other party. This is the complete warranty for the Product manufactured by MOTOROLA. MOTOROLA assumes no obligations or liability for additions or modifications to this warranty unless made in writing and signed by an officer of MOTOROLA. Unless made in a separate agreement between MOTOROLA and the original purchaser, MOTOROLA does not warrant the installation, maintenance or service of the Product.

MOTOROLA is not responsible in any way for any ancillary equipment not furnished by MOTOROLA which is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. Because each system which may use the Product is unique, MOTOROLA disclaims liability for range, coverage, or operation of the system in part or as a whole under this warranty.

## II. General Provisions

This warranty sets forth the full extent of MOTOROLA'S responsibilities regarding the Product. Repair, replacement or refund of the purchase price, at MOTOROLA'S option, is the exclusive remedy. THIS WARRANTY IS THE COMPLETE WARRANTY FOR THE PRODUCT AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES. MOTOROLA DISCLAIMS ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, FOR ANY COMMERCIAL LOSS; INCONVENIENCE; LOSS OF USE, TIME, DATA, GOOD WILL, REVENUES, PROFITS OR SAVINGS; OR OTHER SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THE SALE OR USE OF THE PRODUCT.

## III. How To Get Warranty Service

You must provide proof of purchase (bearing the date of purchase and Product item serial number) in order to receive warranty service and deliver or send the Product item, transportation and insurance prepaid, to an authorized warranty service location before the expiration of the warranty period. Warranty service will be provided by Motorola through one of its authorized warranty service locations. If you first contact the company which sold you the Product, it can facilitate your obtaining warranty service. You can also open a *Contact Us* case on Motorola Online (<http://www.motorola.com/businessonline>).

## IV. What This Warranty Does Not Cover

This warranty does not cover:

- A. Defects or damage resulting from use of the Product in other than its normal customary or authorized manner.
- B. Defects or damage from misuse, accident, liquid, lightning, neglect or act of God.
- C. Defects or damage from testing, maintenance, installation, alteration, modification, or adjustment not provided or authorized in writing by MOTOROLA.
- D. Breakage or damage to antennas unless caused directly by defects in material or workmanship.
- E. A Product subjected to unauthorized Product modifications, disassemblies or repairs (including, without limitation, the addition to the Product of non-Motorola supplied equipment) which adversely affect performance of the Product or interfere with Motorola's normal warranty inspection and testing of the Product to verify any warranty claim.
- F. Product which has had the serial number removed or made illegible.
- G. Freight costs to ship the Product to the repair depot.
- H. Batteries (because they carry their own separate limited warranty) or consumables.
- I. Customer's failure to comply with all applicable industry and OSHA standards.
- J. A Product which due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with MOTOROLA's published specifications or the FCC type acceptance labeling in effect for the Product at the time the Product was initially distributed from MOTOROLA.
- K. Scratches or other cosmetic damage to Product surfaces that does not affect the operation of the Product.
- L. Normal and customary wear and tear.

## V. Governing Law

This Warranty is governed by the laws of the State of Illinois, USA.

## **D.2 Replacement Parts Ordering**

### **D.2.1 Basic Ordering Information**

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, and sufficient description of the desired component to identify it.

### **D.2.2 Motorola Online**

Motorola Online users can access our online catalog at

<http://motorolasolutions.com/businessonline>

To register for online access, please call 1-800-422-4210 (for U.S. and Canada Service Centers only). International customers can obtain assistance at <http://motorolasolutions.com/businessonline>

### **D.2.3 Mail Orders**

Mail orders are only accepted by the US Federal Government Markets Division (USFGMD).

Motorola  
7031 Columbia Gateway Drive  
3rd Floor - Order Processing  
Columbia, MD 21046  
U.S.A.

### **D.2.4 Telephone Orders**

Radio Products and Solutions Organization\*  
(United States and Canada)  
7:00 AM to 7:00 PM (Central Standard Time)  
Monday through Friday (Chicago, U.S.A.)  
1-800-422-4210  
1-847-538-8023 (United States and Canada)

U.S. Federal Government Markets Division (USFGMD)  
1-877-873-4668  
8:30 AM to 5:00 PM (Eastern Standard Time)

### **D.2.5 Fax Orders**

Radio Products and Solutions Organization\*  
(United States and Canada)  
1-800-622-6210  
1-847-576-3023 (United States and Canada)

USFGMD  
(Federal Government Orders)  
1-800-526-8641 (For Parts and Equipment Purchase Orders)

### **D.2.6 Parts Identification**

Radio Products and Solutions Organization\*  
(United States and Canada)  
1-800-422-4210

## **D.2.7 Product Customer Service**

Radio Products and Solutions Organization (United States and Canada)  
1-800-927-2744

\* The Radio Products and Solutions Organization (RPSO) was formerly known as the Radio Products Services Division (RPSD) and/or the Accessories and Aftermarket Division (AAD).

## **D.3 Motorola Service Centers**

### **D.3.1 Servicing Information**

If a unit requires further complete testing, knowledge and/or details of component level troubleshooting or service than is customarily performed at the basic level, please send the repeater to a Motorola Service Center as listed below.

### **D.3.2 Motorola Service Center**

Motorola Repair  
2214 Galvin Drive  
Elgin, IL 60123  
Tel: 1-800-221-7144

### **D.3.3 Motorola Federal Technical Center**

10105 Senate Drive  
Lanham, MD 20706  
Tel: 1-800-969-6680  
Fax: 1-800-784-4133

### **D.3.4 Motorola Canadian Technical Logistics Center**

Motorola Canada Ltd.  
8133 Warden Avenue  
Markham, Ontario, L6G 1B3  
Tel: 1-800-543-3222  
Fax: 1-888-331-9872 or 1-905-948-5970

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# Appendix E Asia-Pacific Warranty, Service and Technical Support

## E.1 Commercial Warranty

### Limited Warranty

#### MOTOROLA COMMUNICATION PRODUCTS

##### I. What This Warranty Covers And For How Long

MOTOROLA SOLUTIONS, INC. ("MOTOROLA") or its relevant subsidiary warrants the MOTOROLA manufactured Communication Products listed below ("Product") against material defects in material and workmanship under normal use and service for the period of time from the date of purchase as scheduled below:

ASTRO APX 5500 / APX 6500 / APX 7500 / APX 6500 Li / APX 2500 / APX 4500 / APX 4500Li Mobile Radios	One (1) Year
Product Accessories	One (1) Year

Motorola will at its option and at no charge either repair the defective Product (with new or reconditioned parts), replace it (with a new or reconditioned Product), or refund the purchase price of the defective Product during the warranty period provided it is returned before the expiration of the warranty period and in accordance with the terms of this warranty. Replaced Product, parts or boards are warranted for the balance of the original applicable warranty period. All replaced Product, parts or boards shall become the property of MOTOROLA.

This express limited warranty is extended by MOTOROLA to the original end user purchasing the Product for commercial, industrial or governmental use only and is not assignable or transferable to any other party. This is the complete warranty for the Product manufactured by MOTOROLA. MOTOROLA assumes no obligations or liability for additions or modifications to this warranty unless made in writing and signed by a duly authorized officer of MOTOROLA. Unless made in a separate agreement between MOTOROLA and the original purchaser, MOTOROLA does not warrant the installation, maintenance or service of the Product.

MOTOROLA is not responsible in any way for any ancillary equipment not furnished by MOTOROLA which is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. Because each system which may use the Product is unique, MOTOROLA disclaims liability for range, coverage, or operation of the system in part or as a whole under this warranty.

## II. General Provisions

This warranty sets forth the full extent of MOTOROLA'S responsibilities regarding the Product. Repair, replacement or refund of the purchase price, at MOTOROLA'S option, is the exclusive remedy. THIS WARRANTY IS THE COMPLETE WARRANTY FOR THE PRODUCT AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES AND REPRESENTATIONS. MOTOROLA DISCLAIMS, TO THE FULL EXTENT PERMISSIBLE BY LAW, ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, MOTOROLA SHALL NOT IN ANY EVENT BE LIABLE, FOR ANY COMMERCIAL LOSS, INCONVENIENCE, LOSS OF USE, TIME, DATA, GOOD WILL, REVENUES, PROFITS OR SAVINGS, INCREASED EXPENSE OF OPERATION, OR OTHER SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL LOSSES OR DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THE SALE, USE OR OPERATION OF THE PRODUCT.

## III. How To Get Warranty Service

You must provide proof of purchase (bearing the date of purchase and Product item serial number) in order to receive warranty service and deliver or send the Product item, transportation and insurance prepaid, to an authorized warranty service location before the expiration of the warranty period. Warranty service will be provided by Motorola through one of its authorized warranty service locations. If you first contact the company which sold you the Product, it can facilitate your obtaining warranty service. You can also open a *Contact Us* case on Motorola Online (<http://www.motorola.com/businessonline>).

Any dispute arising out of or in connection with this warranty which the parties cannot amicably resolve will be subject to the dispute resolution procedures set out in the agreement under which the Product was supplied. If no such procedure exists, then such dispute shall be referred to and finally resolved by the courts of the Republic of Singapore, to whose non exclusive jurisdiction the parties submit.

## IV. What This Warranty Does Not Cover

This warranty does not cover:

- A. Defects or damage resulting from use of the Product in other than its normal customary or authorized manner.
- B. Defects or damage from misuse, accident, liquid, lightning, neglect or act of God.
- C. Defects or damage from testing, maintenance, installation, alteration, modification, or adjustment not provided or authorized in writing by MOTOROLA.
- D. Breakage or damage to antennas unless caused directly by defects in material or workmanship.
- E. A Product subjected to unauthorized Product modifications, disassemblies or repairs (including, without limitation, the addition to the Product of non-Motorola supplied equipment) which adversely affect performance of the Product or interfere with Motorola's normal warranty inspection and testing of the Product to verify any warranty claim.
- F. Product which has had the serial number removed or made illegible.
- G. Freight costs to ship the Product to the repair depot.
- H. Batteries (because they carry their own separate limited warranty) or consumables.
- I. Customer's failure to comply with all applicable industry and OSHA standards.
- J. A Product which due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with MOTOROLA's published specifications or the FCC type acceptance labeling in effect for the Product at the time the Product was initially distributed from MOTOROLA.

- K. Scratches or other cosmetic damage to Product surfaces that does not affect the operation of the Product.
- L. Normal and customary wear and tear.

## V. After Warranty Period

After the Warranty Period, Motorola continues to support its Products in two ways.

1. MOTOROLA's Managed Technical Services (MTS) offers a repair service to both end users and dealers at competitive prices.
2. MTS supplies individual parts and modules that can be purchased by dealers who are technically capable of performing fault analysis and repair.

## E.2 Further Assistance From Motorola

If a unit requires further knowledge and service than its customarily performed practices at the basic level, please contact Motorola Service Centre as listed below.

Australia		+613-9847-7725
China	Service Centre	+86-10-84732106
	Northern Area	10-800-713-0885
	Southern Area	10-800-130-0867
	Local In-Country	+86 21 6108 6109
	Alternate Number	10-800-152-1206
Hong Kong		852-2966-4823
India		+91-9844218850
Indonesia		+62-21-3043-5239
Japan	Toll Free	00531-13-1127
	Local In-Country	(81) 335-708-643
Korea South		+822-3497-3649
Malaysia		+603-7809-0000
New Zealand	Toll Free	0800-448-472
	Local In-Country	9-913-1029
Phillipines		+632 858-7500
Singapore		+65-6352-6383
Taiwan		+886-2-8729 8000
Thailand		+662-653-220

## E.3 Asia-Pacific Customer Interaction Centre (APCIC)

You can also contact Motorola Solutions Asia-Pacific Customer Interaction Centre (APCIC) through the following web address: <http://www.motorola.com/Business/US-EN/Support/Support+Contacts/Phone+Support>.

## Notes



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## Appendix F Environmental Information

The ASTRO Digital APX mobile radios control head and transceiver was designed using Design for Environment (DfE) principles.

- Motorola has used halogen-reduced printed circuit board material in the production of this product.
- Motorola has used No-lead solder in the production of this product.
- There are no embedded batteries in this product.
- Motorola encourages reuse or recycling of the material used to manufacture this product. Please contact Motorola at 1-888-567-7347 or your local sales representative for rebate programs and for the latest disassembly and recycling strategies.
- Please do not dispose of this product into a landfill.

## Notes

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# Appendix G Maritime Radio Use in the VHF Frequency Range

## G.1 Special Channel Assignments

### G.1.1 Emergency Channel

If you are in imminent and grave danger at sea and require emergency assistance, use VHF Channel 16 to send a distress call to nearby vessels and the United States Coast Guard. Transmit the following information, in this order:

1. "MAYDAY, MAYDAY, MAYDAY."
2. "THIS IS \_\_\_\_\_, CALL SIGN \_\_\_\_\_."

*State the name of the vessel in distress 3 times, followed by the call sign or other identification of the vessel, stated 3 times.*

3. Repeat "MAYDAY" and the name of the vessel.
4. "WE ARE LOCATED AT \_\_\_\_\_."

*State the position of the vessel in distress, using any information that will help responders to locate you, e.g.:*

- *latitude and longitude*
- *bearing (state whether you are using true or magnetic north)*
- *distance to a well-known landmark*
- *vessel course, speed or destination*

5. State the nature of the distress.
6. Specify what kind of assistance you need.
7. State the number of persons on board and the number needing medical attention, if any.
8. Mention any other information that would be helpful to responders, such as type of vessel, vessel length and/or tonnage, hull color, etc.
9. "OVER."
10. Wait for a response.
11. If you do not receive an immediate response, remain by the radio and repeat the transmission at intervals until you receive a response. Be prepared to follow any instructions given to you.

### G.1.2 Non-Commercial Call Channel

For non-commercial transmissions, such as fishing reports, rendezvous arrangements, repair scheduling, or berthing information, use **VHF Channel 9**.

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## G.2 Operating Frequency Requirements

A radio designated for shipboard use must comply with Federal Communications Commission Rule Part 80 as follows:

- On ships subject to Part II of Title III of the Communications Act, the radio must be capable of operating on the 156.800 MHz frequency.
- On ships subject to the Safety Convention, the radio must be capable of operating in the:
  - Simplex mode on the ship station transmitting frequencies specified in the 156.025–157.425 MHz frequency band, and
  - Semiduplex mode on the two frequency channels specified in the table below.

**NOTE:** Simplex channels 3, 21, 23, 61, 64, 81, 82, and 83 **cannot be lawfully used** by the general public in US waters.

Additional information about operating requirements in the Maritime Services can be obtained from the full text of FCC Rule Part 80 and from the US Coast Guard.

Channel Number	Frequency (MHz)	
	Transmit (Tx)	Receive (Rx)
1	156.050	160.650
2	156.100	160.700
*	156.150	160.750
4	156.200	160.800
5	156.250	160.850
6	156.300	–
7	156.350	160.950
8	156.400	–
9	156.450	156.450
10	156.500	156.500
11	156.550	156.550
12	156.600	156.600
13**	156.650	156.650
14	156.700	156.700
15**	156.750	156.750
16	156.800	156.800
17**	156.850	156.850

Channel Number	Frequency (MHz)	
	Transmit (Tx)	Receive (Rx)
18	156.900	161.500
19	156.950	161.550
20	157.000	161.600
*	157.050	161.650
22	157.100	161.700
*	157.050	161.650
24	157.200	161.800
25	157.250	161.850
26	157.300	161.900
27	157.350	161.950
28	157.400	162.000
60	156.025	160.625
*	156.075	160.675
62	156.125	160.725
63	156.175	160.775
*	156.225	160.825
65	156.275	160.875
66	156.325	160.925
67**	156.375	156.375
68	156.425	156.425
69	156.475	156.475
71	156.575	156.575
72	156.625	—
73	156.675	156.675
74	156.725	156.725
75	***	***
76	***	***
77**	156.875	—

Channel Number	Frequency (MHz)	
	Transmit (Tx)	Receive (Rx)
78	156.925	161.525
79	156.975	161.575
80	157.025	161.625
*	157.075	161.675
*	157.125	161.725
*	157.175	161.775
84	157.225	161.825
85	157.275	161.875
86	157.325	161.925
87	157.375	161.975
88	157.425	162.025

\* Simplex channels 3, 21, 23, 61, 64, 81, 82, and 83 **cannot be lawfully used** by the general public in US waters.

\*\* Low power (1 W) only.

\*\*\* Guard band.

**NOTE:** A – in the Receive (Rx) column indicates that the channel is transmit (Tx) only.

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# Master Glossary

This glossary contains an alphabetical listing of terms and their definitions that are applicable to ASTRO portable and mobile subscriber radio products. All terms do not necessarily apply to all radios, and some terms are merely generic in nature.

The **Doc** column is for information only and identifies the type of publication in which the term might be appropriately listed. The **Doc** codes are listed at the end of the glossary. Do not include the **Doc** column information in any other publications.

Term	Definition
<b>A/D</b>	<i>See analog-to-digital conversion.</i>
<b>active channel</b>	A channel that has traffic on it.
<b>ACK</b>	Acknowledgment of communication.
<b>ADC</b>	<i>See analog-to-digital converter.</i>
<b>ALC</b>	<i>See automatic level control.</i>
<b>analog</b>	Refers to a continuously variable signal or a circuit or device designed to handle such signals. <i>See also digital.</i>
<b>analog-to-digital conversion</b>	Conversion of an instantaneous dc voltage level to a corresponding digital value. <i>See also D/A.</i>
<b>analog-to-digital converter</b>	A device that converts analog signals into digital data. <i>See also DAC.</i>
<b>ASTRO 25 trunking</b>	Motorola standard for wireless digital trunked communications.
<b>ASTRO conventional</b>	Motorola standard for wireless analog or digital conventional communications.
<b>APCO 25</b>	A standard of digital two-way radio communications, developed by the Association of Public-Safety Communications Officials, providing maximum radio spectrum efficiency; competition in system life cycle procurements; effective, efficient and reliable intra-agency and inter-agency communications; and “user friendly” equipment. <i>See also Association of Public-Safety Communications Officials.</i>
<b>Association of Public-Safety Communications Officials</b>	An association dedicated to an industry-wide effort (known as APCO 25 or Project 25) to set the recommended voluntary standards of uniform digital two-way radio technology for public safety organizations. This allows radio interoperability with multiple vendor products which are all APCO 25 compatible. <i>See also APCO 25.</i>
<b>automatic level control</b>	A circuit in the transmit RF path that controls RF power amplifier output, provides leveling over frequency and voltage, and protects against high VSWR.

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Term	Definition
<b>autoscan</b>	A feature that allows the radio to automatically scan the members of a scan list.
<b>band</b>	Frequencies allowed for a specific purpose.
<b>BBP</b>	<i>See baseband interface port.</i>
<b>baseband interface port</b>	Synchronous serial interface to the transceiver board used to transfer transmit and receive audio data.
<b>BGA</b>	<i>See ball grid array.</i>
<b>ball grid array</b>	A type of IC package characterized by solder balls arranged in a grid that are located on the underside of the package.
<b>Call Alert</b>	Privately paging an individual by sending an audible tone.
<b>carrier squelch</b>	Feature that responds to the presence of an RF carrier by opening or unmuting (turning on) a receiver's audio circuit. A squelch circuit silences the radio when no signal is being received so that the user does not have to listen to "noise."
<b>central controller</b>	A software-controlled, computer-driven device that receives and generates data for the trunked radios assigned to it. It monitors and directs the operations of the trunked repeaters.
<b>channel</b>	A group of characteristics, such as transmit/receive frequency pairs, radio parameters, and encryption encoding.
<b>CAN</b>	Controller Area Network protocol. The CAN cable is the remote communications cable which provides audio, data, and power signaling information between the Control head and the Transceiver.
<b>CHIB</b>	Control Head Interface Board. Used to provide functionality / connectivity between the CHUC and control head.
<b>CHUC</b>	Control Head Universal Connector. A separate board which provides connectivity to the CHIB and control head.
<b>CODEC</b>	<i>See coder/decoder.</i>
<b>coded squelch</b>	Used on conventional channels to ensure that the receiver hears only those communications intended for the receiver.
<b>coder/decoder</b>	A device that encodes or decodes a signal.
<b>control channel</b>	In a trunking system, one of the channels that is used to provide a continuous, two-way/data-communications path between the central controller and all radios on the system.
<b>conventional</b>	Typically refers to radio-to-radio communications, sometimes through a repeater. Frequencies are shared with other users without the aid of a central controller to assign communications channels. <i>See also trunking.</i>



Term	Definition
<b>conventional scan list</b>	A scan list that includes only conventional channels.
<b>CPS</b>	<i>See Customer Programming Software.</i>
<b>cursor</b>	A visual tracking marker (a blinking line) that indicates a location on a display.
<b>Customer Programming Software</b>	Software with a graphical user interface containing the feature set of an ASTRO radio.
<b>C4FM</b>	<i>See Constant Envelope 4-Level Frequency Modulation.</i>
<b>Constant Envelope 4-Level Frequency Modulation</b>	Also referred to as a 4-carrier modulation format where the carrier is shifted in frequency at a particular rate (time) to a particular location around a center frequency. This allows for each of the 4 "states" to represent a binary number. Each state is a "DiBit" or "Symbol" which contains two bits of information
<b>D/A</b>	<i>See digital-to-analog conversion.</i>
<b>DAC</b>	<i>See digital-to-analog converter.</i>
<b>deadlock</b>	Displayed by the radio after three failed attempts to unlock the radio. The radio must be powered off and on prior to another attempt.
<b>default</b>	A pre-defined set of parameters.
<b>DEK</b>	Direct Entry Keyboard.
<b>digital</b>	Refers to data that is stored or transmitted as a sequence of discrete symbols from a finite set; most commonly this means binary data represented using electronic or electromagnetic signals. <i>See also analog.</i>
<b>digital-to-analog conversion</b>	Conversion of a digital signal to a voltage that is proportional to the input value. <i>See also A/D.</i>
<b>digital-to-analog converter</b>	A device that converts digital data into analog signals. <i>See also ADC.</i>
<b>Digital Private-Line</b>	A type of digital communications that utilizes privacy call, as well as memory channel and busy channel lock out to enhance communication efficiency.
<b>digital signal processor</b>	A microcontroller specifically designed for performing the mathematics involved in manipulating analog information, such as sound, that has been converted into a digital form. DSP also implies the use of a data compression technique.

Term	Definition
<b>digital signal processor code</b>	Object code executed by the Digital Signal Processor in an ASTRO subscriber radio. The DSP is responsible for computation-intensive tasks, such as decoding ASTRO signaling.
<b>dispatcher</b>	An individual who has radio-system management duties and responsibilities.
<b>DPL</b>	<i>See Digital Private-Line. See also PL.</i>
<b>DSP</b>	<i>See digital signal processor.</i>
<b>DSP code</b>	<i>See digital signal processor code.</i>
<b>DTMF</b>	<i>See dual tone multi-frequency.</i>
<b>dual tone multi-frequency</b>	The system used by touch-tone telephones. DTMF assigns a specific frequency, or tone, to each key so that it can easily be identified by a microprocessor.
<b>dynamic regrouping</b>	A feature that allows the dispatcher to temporarily reassign selected radios to a single special channel so they can communicate with each other.
<b>EEPOT</b>	Electrically Programmable Digital Potentiometer.
<b>EEPROM</b>	<i>See Electrically Erasable Programmable Read-Only Memory.</i>
<b>Electrically Erasable Programmable Read-Only Memory</b>	A special type of PROM that can be erased by exposing it to an electrical charge. An EEPROM retains its contents even when the power is turned off.
<b>Failsoft</b>	A backup system that allows communication in a non-trunked, conventional mode if the trunked system fails.
<b>FCC</b>	Federal Communications Commission.
<b>firmware</b>	Code executed by an embedded processor such as the Host or DSP in a subscriber radio. This type of code is typically resident in non-volatile memory and as such is more difficult to change than code executed from RAM.
<b>FGU</b>	<i>See frequency generation unit.</i>
<b>flash</b>	A non-volatile memory device similar to an EEPROM. Flash memory can be erased and reprogrammed in blocks instead of one byte at a time.
<b>FLASHcode</b>	A 13-digit code which uniquely identifies the System Software Package and Software Revenue Options that are enabled in a particular subscriber radio. FLASHcodes are only applicable for radios which are upgradeable through the FLASHport process.

Term	Definition
<b>FLASHport</b>	A Motorola term that describes the ability of a radio to change memory. Every FLASHport radio contains a FLASHport EEPROM or FLASH memory chip that can be software written and rewritten to, again and again.
<b>frequency</b>	Number of times a complete electromagnetic-wave cycle occurs in a fixed unit of time (usually one second).
<b>frequency generation unit</b>	This unit generates ultra-stable, low phase noise master clock and other derived synchronization clocks that are distributed throughout the communication network.
<b>FPGA</b>	Field Programmable Gate Array.
<b>General-Purpose Input/Output</b>	Pins whose function is programmable.
<b>GPIO</b>	<i>See General-Purpose Input/Output.</i>
<b>GPS</b>	Global Positioning System.
<b>hang up</b>	Disconnect.
<b>home display</b>	The first information display shown after a radio completes its self test.
<b>host code</b>	Object code executed by the host processor in an ASTRO subscriber radio. The host is responsible for control-oriented tasks such as decoding and responding to user inputs.
<b>IC</b>	<i>See integrated circuit.</i>
<b>IF</b>	Intermediate Frequency.
<b>IMBE</b>	A sub-band, voice-encoding algorithm used in ASTRO digital voice.
<b>inbound signaling word</b>	Data transmitted on the control channel from a subscriber unit to the central control unit.
<b>integrated circuit</b>	An assembly of interconnected components on a small semiconductor chip, usually made of silicon. One chip can contain millions of microscopic components and perform many functions.
<b>ISW</b>	<i>See inbound signaling word.</i>
<b>key-variable loader</b>	A device used to load encryption keys into a radio.
<b>kHz</b>	<i>See kilohertz.</i>
<b>kilohertz</b>	One thousand cycles per second. Used especially as a radio-frequency unit.
<b>KVL</b>	<i>See key-variable loader.</i>
<b>LCD</b>	<i>See liquid-crystal display.</i>

Term	Definition
<b>LED</b>	<i>See light emitting diode.</i>
<b>light emitting diode</b>	An electronic device that lights up when electricity is passed through it.
<b>liquid-crystal display</b>	An LCD uses two sheets of polarizing material with a liquid-crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them.
<b>LO</b>	<i>See Local oscillator.</i>
<b>Local Oscillator</b>	Oscillator used in a super heterodyne receiver to down-convert a received signal to the intermediate frequency.
<b>low-speed handshake</b>	150-baud digital data sent to the radio during trunked operation while receiving audio.
<b>LSH</b>	<i>See low-speed handshake.</i>
<b>Mako</b>	A multi-functional IC, incorporating a power Management functions, A/D and D/A interfaces, various Audio processing capabilities, and some additional digital functions.
<b>Master In Slave Out</b>	SPI data line from a peripheral to the MCU.
<b>Master Out Slave In</b>	SPI data line from the MCU to a peripheral.
<b>MCU</b>	<i>See microcontroller unit.</i>
<b>MDC</b>	Motorola Digital Communications.
<b>MDI</b>	MCU/DSP Interface internal to the microprocessor IC.
<b>menu entry</b>	A software-activated feature shown at the bottom of the display. Selection of a feature is controlled by the programming of the buttons on the side of the radio.
<b>MHz</b>	<i>See Megahertz.</i>
<b>Megahertz</b>	One million cycles per second. Used especially as a radio-frequency unit.
<b>microcontroller unit</b>	Also written as $\mu\text{C}$ . A microprocessor that contains RAM and ROM components, as well as communications and programming components and peripherals.
<b>MISO</b>	<i>See Master In Slave Out.</i>
<b>MMP</b>	Mobile Microphone Port. Used to connect accessories and programming cables to the control head and the TIB.
<b>mode</b>	A programmed combination of operating parameters; for example, a channel or talkgroup.
<b>mode slaving</b>	A radio programmed to automatically provide the proper operation for a given selected mode.

Term	Definition
<b>monitoring</b>	Used in conventional operation where the programmed monitor button is pressed to listen to another user who is active on a channel. This prevents one user from interfering with another user's conversation.
<b>MOSI</b>	<i>See Master Out Slave In.</i>
<b>multiplexer</b>	An electronic device that combines several signals for transmission on some shared medium (e.g., a telephone wire).
<b>MUX</b>	<i>See multiplexer.</i>
<b>Network Access Code</b>	Network Access Code (NAC) operates on digital channels to reduce voice channel interference between adjacent systems and sites.
<b>non-tactical/revert</b>	The user will talk on a preprogrammed emergency channel. The emergency alarm is sent out on this same channel.
<b>O2</b>	Mobile Control Head for XTL 5000 and APX mobile radios.
<b>O3</b>	Hand Held Control head for XTL 5000 and APX 5500 / 6500 / 7500 / 6500Li / 2500 radios.
<b>O5</b>	Mobile Control Head for XTL 5000 and APX 5500 / 6500 / 7500 / 6500Li radios.
<b>O7</b>	Mobile Control Head for XTL 5000 and APX 5500 / 6500 / 7500 / 6500Li / 2500 radios.
<b>O9</b>	Mobile Control Head for XTL 5000 and APX 7500 radios.
<b>OMAP</b>	An ARM core microcontroller.
<b>open architecture</b>	A controller configuration that utilizes a microprocessor with extended ROM, RAM, and EEPROM.
<b>oscillator</b>	An electronic device that produces alternating electric current and commonly employs tuned circuits and amplifying components.
<b>OSW</b>	<i>See outbound signaling word.</i>
<b>OTAR</b>	<i>See over-the-air rekeying.</i>
<b>outbound signaling word</b>	Data transmitted on the control channel from the central controller to the subscriber unit.
<b>over-the-air rekeying</b>	Allows the dispatcher to remotely reprogram the encryption keys in the radio.
<b>PA</b>	Power amplifier.
<b>page</b>	A one-way alert with audio and/or display messages.
<b>paging</b>	One-way communication that alerts the receiver to retrieve a message.
<b>PC Board</b>	Printed Circuit Board. Also referred to as a PCB.

Term	Definition
<b>PCIC</b>	<i>See Power Control IC.</i>
<b>personality</b>	A set of unique features specific to a radio.
<b>phase-locked loop</b>	A circuit in which an oscillator is kept in phase with a reference, usually after passing through a frequency divider.
<b>PL</b>	<i>See private-line tone squelch.</i>
<b>PLL</b>	<i>See phase-locked loop.</i>
<b>Power Control IC</b>	The power control IC is intended for closed-loop bias control of power amplifiers. The device facilitates accurate control of the current delivered to the power amplifier (PA) via a control voltage.
<b>preprogrammed</b>	A software feature that has been activated by a qualified radio technician.
<b>Private (Conversations) Call</b>	A feature that lets you have a private conversation with another radio user in the group.
<b>PMR</b>	<i>See Publication Manual Revision</i>
<b>private-line tone squelch</b>	A continuous sub-audible tone that is transmitted along with the carrier. <i>See also DPL.</i>
<b>programmable</b>	A radio control that can have a radio feature assigned to it.
<b>Programmable Read-Only Memory</b>	A memory chip on which data can be written only once. Once data has been written onto a PROM, it remains there forever.
<b>programming cable</b>	A cable that allows the CPS to communicate directly with the radio using RS232 or USB.
<b>Project 25</b>	<i>See APCO 25.</i>
<b>PROM</b>	<i>See Programmable Read-Only Memory.</i>
<b>PTT</b>	<i>See Push-to-Talk.</i>
<b>Publication Manual Revision</b>	A publication that provides supplemental information for its parent publication before it is revised and reissued.
<b>Push-to-Talk</b>	The switch or button usually located on the left side of the radio which, when pressed, causes the radio to transmit. When the PTT is released, the unit returns to receive operation.
<b>radio frequency</b>	The portion of the electromagnetic spectrum between audio sound and infrared light (approximately 10 kHz to 10 GHz).
<b>radio frequency power amplifier</b>	Amplifier having one or more active devices to amplify radio signals.
<b>RAM</b>	<i>See random access memory.</i>

Term	Definition
<b>random access memory</b>	A type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed without touching the preceding bytes.
<b>read-only memory</b>	A type of computer memory on which data has been prerecorded. Once data has been written onto a ROM chip, it cannot be removed and can only be read.
<b>real-time clock</b>	A module that keeps track of elapsed time even when a computer is turned off.
<b>receiver</b>	Electronic device that amplifies RF signals. A receiver separates the audio signal from the RF carrier, amplifies it, and converts it back to the original sound waves.
<b>registers</b>	Short-term data-storage circuits within the microcontroller unit or programmable logic IC.
<b>repeater</b>	Remote transmit/receive facility that re-transmits received signals in order to improve communications range and coverage (conventional operation).
<b>repeater/talkaround</b>	A conventional radio feature that permits communication through a receive/transmit facility, which re-transmits received signals in order to improve communication range and coverage.
<b>RESET</b>	Reset line: an input to the microcontroller that restarts execution.
<b>RF</b>	<i>See radio frequency.</i>
<b>RF PA</b>	<i>See radio frequency power amplifier.</i>
<b>ROM</b>	<i>See read-only memory.</i>
<b>RPT/TA</b>	<i>See repeater/talkaround.</i>
<b>RS232</b>	A common interface standard for data communications equipment.
<b>RSSI</b>	Received Signal Strength Indicator.
<b>RTC</b>	<i>See real-time clock.</i>
<b>RX</b>	Receive.
<b>RX DATA</b>	Recovered digital data line.
<b>SAP</b>	<i>See Serial Audio Port.</i>
<b>selective call</b>	A feature that allows you to call a selected individual, intended to provide privacy and to eliminate the annoyance of having to listen to conversations of no interest to you.
<b>selective switch</b>	Any digital P25 traffic having the correct Network Access Code and the correct talkgroup.

Term	Definition
<b>Serial Audio Port</b>	SSI to and from the CODEC used to transfer transmit and receive audio data.
<b>Serial Peripheral Interface</b>	A serial interface comprised of two data lines and a clock line. This interface is typically used to communicate with other modules and ICs in the radio.
<b>signal</b>	An electrically transmitted electromagnetic wave.
<b>Signal Qualifier mode</b>	An operating mode in which the radio is muted, but still continues to analyze receive data to determine RX signal type.
<b>softpot</b>	<i>See software potentiometer.</i>
<b>software</b>	Computer programs, procedures, rules, documentation, and data pertaining to the operation of a system.
<b>software potentiometer</b>	A computer-adjustable electronic attenuator.
<b>spectrum</b>	Frequency range within which radiation has specific characteristics.
<b>SPI</b>	<i>See Serial Peripheral Interface.</i>
<b>squelch</b>	Muting of audio circuits when received signal levels fall below a pre-determined value. With carrier squelch, all channel activity that exceeds the radio's preset squelch level can be heard.
<b>SRAM</b>	<i>See static RAM.</i>
<b>SSI</b>	<i>See Synchronous Serial Interface.</i>
<b>Standby mode</b>	An operating mode in which the radio is muted but still continues to monitor data.
<b>static RAM</b>	A type of memory used for volatile, program/data memory that does not need to be refreshed.
<b>status calls</b>	Pre-defined text messages that allow the user to send a conditional message without talking.
<b>Synchronous Serial Interface</b>	DSP interface to peripherals that consists of a clock signal line, a frame synchronization signal line, and a data line.
<b>system central controllers</b>	Main control unit of the trunked dispatch system; handles ISW and OSW messages to and from subscriber units ( <i>See ISW and OSW</i> ).
<b>tactical/non-revert</b>	The user will talk on the channel that was selected before the radio entered the emergency state.
<b>TalkAround</b>	Bypassing a repeater and talking directly to another unit for local unit-to-unit communications.



Term	Definition
<b>talkgroup</b>	An organization or group of radio users who communicate with each other using the same communications path.
<b>talkgroup scan list</b>	A scan list that can include both talkgroups (trunked) and channels (conventional).
<b>thin small-outline package</b>	A type of dynamic random-access memory (DRAM) package that is commonly used in memory applications.
<b>TIB</b>	Transceiver Interface Board. Provides connectivity between transceiver and the CAN cable. Also, interface for accessories when TIB is used on a highpower transceiver.
<b>time-out timer</b>	A timer that limits the length of a transmission.
<b>tone</b>	A continuous, sub-audible tone transmitted with the carrier.
<b>TOT</b>	<i>See time-out timer.</i>
<b>transceiver</b>	Transmitter-receiver. A device that both transmits and receives analog or digital signals. Also abbreviated as XCVR.
<b>transmitter</b>	Electronic equipment that generates and amplifies an RF carrier signal, modulates the signal, and then radiates it into space.
<b>trunking</b>	The automatic sharing of communications paths between a large number of users. Allows users to share a smaller number of frequencies because a repeater or communications path is assigned to a talkgroup for the duration of a conversation. <i>See also conventional.</i>
<b>trunking priority monitor scan list</b>	A scan list that includes talkgroups that are all from the same trunking system.
<b>TSOP</b>	<i>See thin small-outline package.</i>
<b>TX</b>	Transmit.
<b>UART</b>	<i>See Universal Asynchronous Receiver Transmitter.</i>
<b>UHF</b>	Ultra-High Frequency.
<b>USK</b>	Unique shadow key.
<b>Universal Asynchronous Receiver Transmitter</b>	A microchip with programming that controls a computer's interface to its attached serial devices.
<b>UCM</b>	Universal Crypto Module
<b>Universal Serial Bus</b>	An external bus standard that supports data transfer rates of 12 Mbps.
<b>USB</b>	<i>See Universal Serial Bus.</i>
<b>VCO</b>	<i>See voltage-controlled oscillator.</i>

Term	Definition
<b>VCOB IC</b>	Voltage-Controlled Oscillator Buffer IC.
<b>VHF</b>	Very-High Frequency.
<b>VIP</b>	Vehicle Interface Port.
<b>VOCON</b>	<i>See vocoder/controller.</i>
<b>vocoder</b>	An electronic device for synthesizing speech by implementing a compression algorithm particular to voice. <i>See also voice encoder.</i>
<b>vocoder/controller</b>	A PC board that contains an ASTRO radio's microcontroller, DSP, memory, audio and power functions, and interface support circuitry.
<b>voice encoder</b>	The DSP-based system for digitally processing analog signals, and includes the capabilities of performing voice compression algorithms or voice encoding. <i>See also vocoder.</i>
<b>voltage-controlled oscillator</b>	An oscillator in which the frequency of oscillation can be varied by changing a control voltage.

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## Notes





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