**INSTALLATION / OPERATION
MANUAL**

**SERIES 9100
DIGITAL INTERCOM SYSTEM**

U.S. Patents Pending

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Cautions and Warnings

READ AND SAVE THESE INSTRUCTIONS. Follow the instructions in this installation manual. These instructions must be followed to avoid damage to this product and associated equipment. Product operation and reliability depends on proper installation.

DO NOT INSTALL ANY DAVID CLARK COMPANY PRODUCT THAT APPEARS DAMAGED. Upon unpacking your David Clark product, inspect the contents for shipping damage. If damage is apparent, immediately file a claim with the carrier and notify your David Clark product supplier.

ELECTRICAL HAZARD - Disconnect electrical power when making any internal adjustments or repairs. All repairs should be performed by a representative or authorized agent of the David Clark Company.

STATIC HAZARD - Static electricity can damage components. Therefore, be sure to ground yourself before handling components.

IMPORTANT - Refer to Component Maintenance Manual, P/N 19602P-99, for supplemental information pertaining to proper maintenance, use and care, and cleaning of Series 9100 System Components.

1. System Overview

The Series 9100 Digital Intercom System is a configurable, weather-resistant, IP-based communication system suitable for use in all environments. It allows for wired and wireless users to communicate with each other and external audio equipment such as two-way radios, smart phones, other intercoms, and any other analog audio device with virtually unlimited configurability. Each user has a PTT button and 4 modes to select from called selections. Via web-based programming, each user can have unique settings configured in "talk groups".

| Component	Part and Model Numbers
Master Station	**Master Station** - Model U9100 (p/n 44000G-01); Includes 1 each U9101 Switch Card (pre-installed)
Add-In Cards	**Switch Card** – Model U9101 (p/n 44003G-01); Connection for up to 4 network cable assemblies **Radio/Aux Card** – Model U9102 (p/n 44003G-02); Connection for up to 2 radios, 1 auxiliary input and 1 auxiliary output **Quad Radio Card** – Model U9104 (p/n 44003G-03); Connection for up to 4 radios
Endpoint – Wired	**Headset Station** – Model U9110 (p/n 44001G-01); Connection for 1 headset **Headset Station** – Model U9111 (p/n 44001G-02); Connection for 1 headset + remote PTT
Endpoint - Wireless	**Wireless Gateway** – Model U9120-W4 (p/n 44002G-01); Wireless connection for up to 4 users (DECT 6.0 frequencies, US/CAN) **Wireless Gateway** – Model U9120-W4(EU) (p/n 44002G-02); Wireless connection for up to 4 users (DECT frequencies, EU)
Wireless Belt Station	**Wireless Belt Station** – Model U9110-BSW (p/n 40992G-19); Connection for 1 headset (DECT 6.0 frequencies) **Wireless Belt Station** – Model U9110-BSW(EU) (p/n 40992G-20); Connection for 1 headset (DECT frequencies, EU)

Headsets	**Over-the-Head Style**
	    Model H9130 (p/n 40864G-04); Dual-ear
	    Model H9190 (p/n 40864G-05); Single-ear
	Behind-the-Head Style
	    Model H9140 (p/n 40897G-09); Dual-ear
	    Model H9141 (p/n 40897G-11); Single-ear, slotted dome
	    Model H9140-HT (p/n 40897G-10); Dual-ear, Hear Through
	Helmet-Compatible Models
	    Model H9185 (p/n 41096G-03); Gecko open or full-face helmet models
	    Model H9180 (p/n 41032G-07); Under helmet, ballistic (e.g., ACH-type)

Cable Assemblies	**Radio Interface Cable** – Model C91-20RD (p/n 40892G-19); Universal analog interface (loose leads) **Power Cable** – Model C91-20PW (p/n 40892G-20); Connection to 11-30VDC **Auxiliary In/Out Cable** – Model C91-20AX (p/n 40892G-21); Terminates in 3.5mm TRRS connector (3.5mm to dual-RCA adapter also included)

Network/Endpoint Connectivity	**Cat 5e Cable**
	    (p/n 09271P-57); Standard-grade Cat5e cable, raw (sold per foot), .200" O.D.
	    (p/n 09271P-58); Industrial-grade Cat5e cable, raw (sold per foot), .265" O.D.
	RJ-45 Connectors
	    (p/n 13108P-09);RJ-45 standard, 10/pk (for use with 09271P-57 cable)
	    (p/n 13199P-66);RJ-45 Field Termination Kit (IP-68 rated), 1 each (for use with 09271P-58 cable)

Table 1.1: System Components
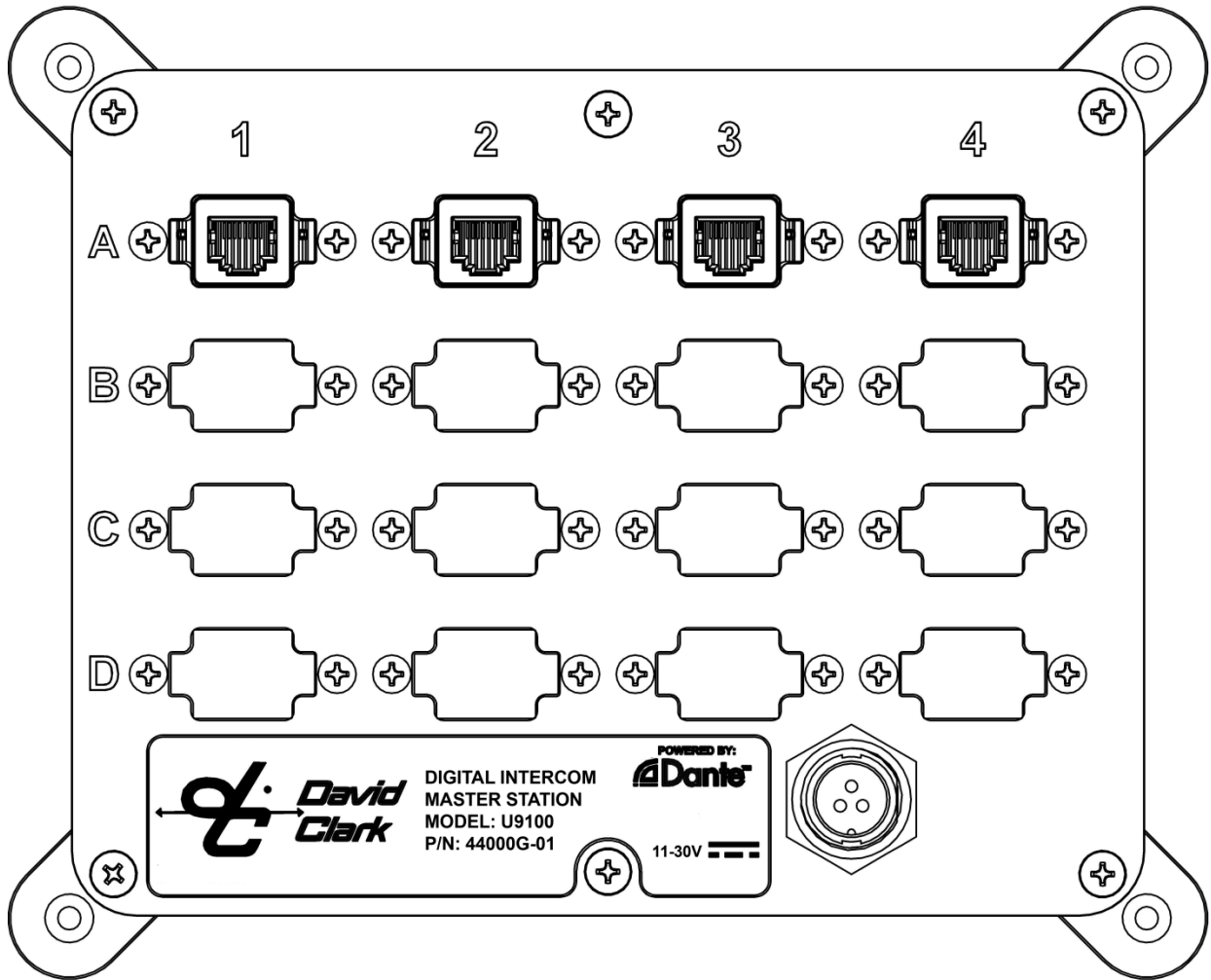
**Figure 1.1 U9100 Digital Intercom Master Station – Populated with U9101 Switch Card in slot "A".
Slots "B", "C", and "D" have blank panels installed.**

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2. Mounting the Master Station

Parts/Tools Required

- ❑ U9100 Series Digital Intercom System Master Station (44000G-01)
- ❑ M9100RM Rack-Mount Kit (44004G-01, optional)
- ❑ Pencil/Pen
- ❑ Drill
- ❑ 13/32-inch Drill Bit
- ❑ #8 Mounting Screws, Stainless Steel (customer supplied)
- ❑ Nuts, Stainless Steel (customer supplied)
- ❑ Lock-washers, Stainless Steel (customer supplied)

Procedure

Location Considerations

Select a location on a flat surface that is out-of-the-way, and provides adequate room to attach all cables. The Master Station is immersion-proof (IP67). However the mounting location should be chosen to minimize direct exposure to the elements.

Alternately, the Master Station may be rack-mounted as a 4U in an EIA-310 standard 19-in. rack with the optional rack-mount kit (M9100RM, 44004G-01).

Mounting

- ❑ Position the Master Station on the surface to be mounted and mark the (4) hole locations.
- ❑ Drill the (4) holes with 13/32-inch drill bit.
- ❑ Mount the endpoint with #8 mounting screws and nuts/lock-washers (customer supplied).

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3. Mounting Endpoints

Parts/Tools Required

- ❑ U9100-series endpoint(s) (Headset Stations/Wireless Gateways)
- ❑ M9110FM Flush-Mount Kit (44004G-02, optional)
- ❑ Pencil/Pen
- ❑ Drill
- ❑ 13/32-inch Drill Bit
- ❑ #8 Mounting Screws, Stainless Steel (customer supplied)
- ❑ Nuts, Stainless Steel (customer supplied)
- ❑ Lock-washers, Stainless Steel (customer supplied)

Procedure

Location Considerations

Select a location on a flat surface that is out-of-the-way, and provides adequate room to attach all cables. The U9100-series endpoints are immersion-proof (IP67). However where possible the mounting location should be chosen to minimize direct exposure to the elements.

Alternately, the endpoints may be flush-mounted with the optional flush-mount kits:
- M9110FM, 44004G-02 (with plate)
- 44004G-03 (without plate)

Mounting

- ❑ Position the endpoint on the surface to be mounted and mark the (2) hole locations.
- ❑ Drill the (2) holes with 13/32-inch drill bit.
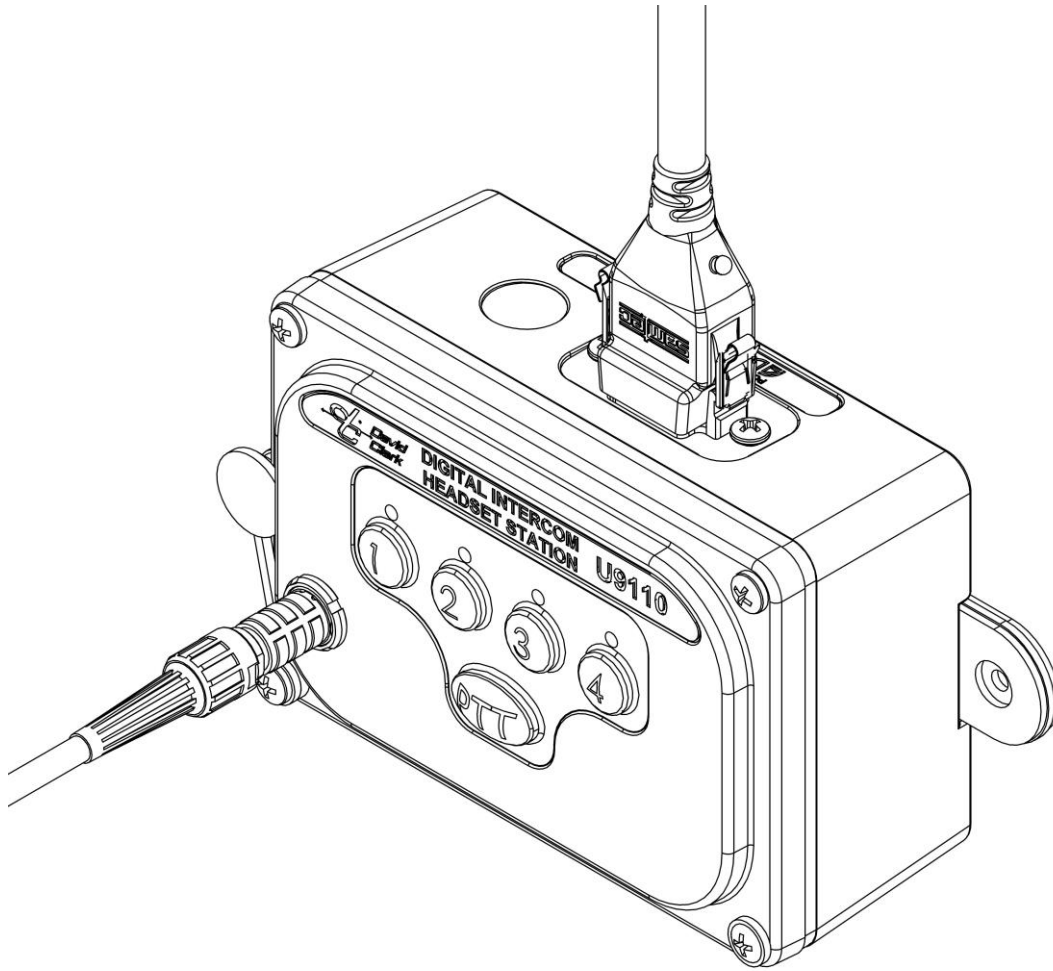- ❑ Mount the endpoint with #8 mounting screws and nuts/lock-washers (customer supplied).

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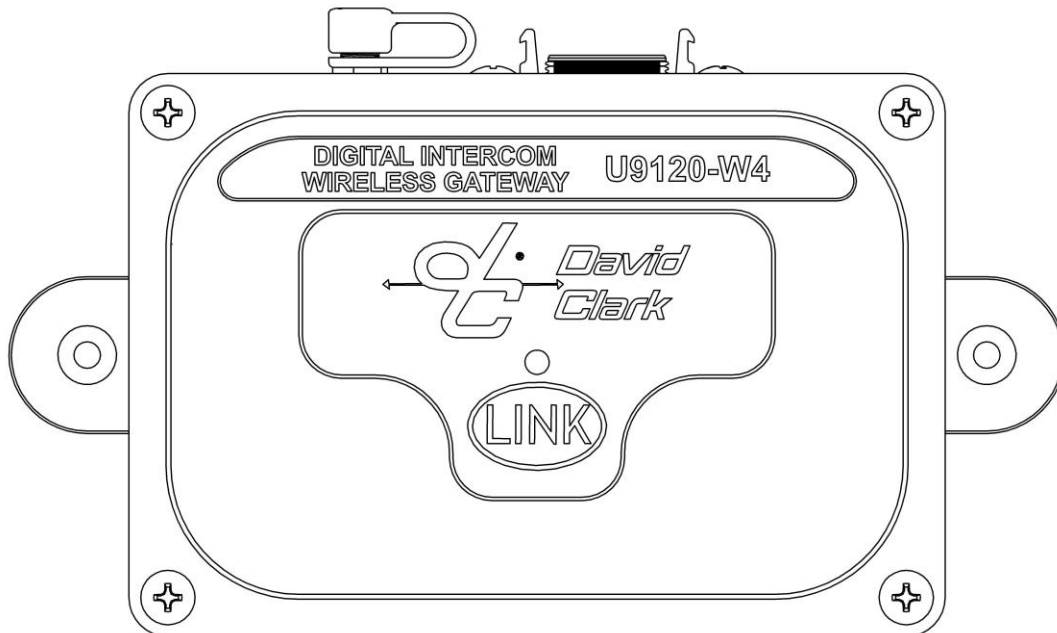**Figure 3.1 U9110 Headset Station, shown with waterproof RJ-45 and headset connected**

Figure 3.2 U9120-W4 Wireless Gateway

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4. System Cabling

System Cabling is used to interface David Clark Series 9100 Endpoints to the 9100 Digital Master Station. This cabling must be Ethernet Category 5e or higher. David Clark offers two types of cabling as well as two RJ-45 connector options depending on the application and location.

Note: The maximum length for any copper Cat 5/6 Ethernet cable run is 328ft (100m). Third party Ethernet to fiber optic adapters can support distances of 25mi (40km) or further.

Parts/Tools Required

- ❑ Ethernet Cabling (sold by the foot)
    - ❑ 09271P-57HA000 for indoor use
        - ▪ Use standard RJ-45 connectors (13104P-09/10pk)
    - ❑ 09271P-58HA000 for outdoor/wet locations
        - ▪ Use waterproof RJ-45 connectors (13199P-66)
- ❑ RJ-45 crimper
- ❑ Wire ties
- ❑ Silicone spray (for waterproof connectors only)
- ❑ Ethernet pinout (below)
- ❑ Cable tester (Fluke Networks CableIQ or similar; optional)

Procedure

- ❑ Determine the lengths of cable required for each run and route the unterminated cables.

- ❑ The cables should be routed using conduits and be as far as possible from radio antenna coax cables and anywhere water may collect.

- ❑ Once run and properly secured, terminate the cables with the appropriate RJ-45 connector assembly. See **Figure 4.1** for RJ-45 pinout.

- ❑ It is highly recommended to verify cabling with a cable tester such as Fluke Networks CableIQ.

Pin	Color	Signal
8	BRN	DATA 2 COM
7	WHT/BRN	DATA 1 COM
6	GRN	DATA 2 -
5	WHT/BLU	N/C
4	BLU	N/C
3	WHT/GRN	DATA 2 +
2	ORG	DATA 1 -
1	WHT/ORG	DATA 1 +
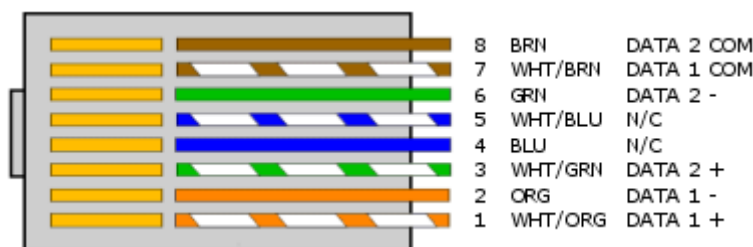
Figure 4.1 RJ45 pinout

Note: When using shielded cable, shield termination is unnecessary for this application.

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- ❑ See **Figures 4.2 and 4.3** for assembly.
- ❑ SCN-17-02, NCC-17-01, SG-17-XX, and RCEF-B-01 must be slid onto cable prior to terminating the RJ45 connector
- ❑ Use silicone spray on cable jacket to allow SG-17-XX to more easily slide on cable. Failure to use silicone spray may result in improper assembly.
- ❑ Crimp the RJ45.
- ❑ Slide RCEF-B-02 over the RJ45 as shown.
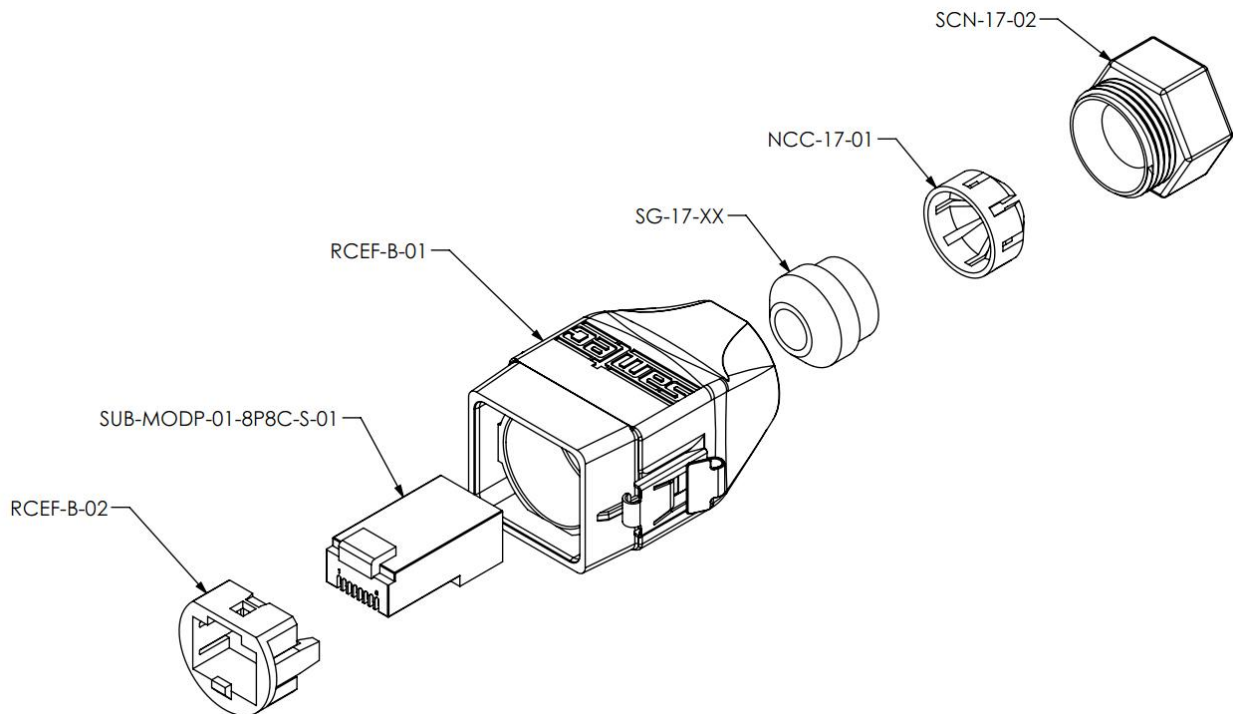- ❑ Slide all pieces together and hand-tighten SCN-17-02.

Figure 4.2 Waterproof connector assembly
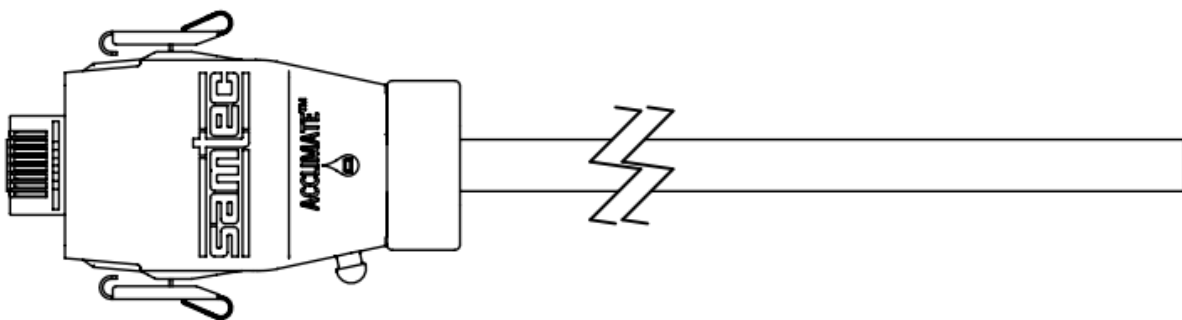
Figure 4.3 Waterproof connector fully assembled

To connect to an IP-protected RJ-45 jack, align the conductor end of the RJ-45 connector with the proper side of its mate and push the connector/shell assembly straight in, until the side locking tabs lock into place.

To disconnect, first **push the connector in towards the module**, slightly but assertively, then squeeze both tabs in towards the connector shell to clear their locking mates on the jack. Then, while squeezing the tabs, pull the connector straight out of its mate.

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5. Radio Cables

The C91-20RD Radio Cables are used to interface a marine or mobile radio to the 9100 Digital Intercom System. One end of the cable connects to a U9104 or U9102 installed in the Master Station and the other end connects to the radio. Since the interface is different for each type of radio, the C91-20RD is left un-prepared at the radio end so that the installer may choose the correct interface connector. Alternatively, the C91-20RD cable can be used as a remote PTT cable with a U9111 Headset Station. In this case, the un-prepared end is connected to up to two remote PTT switches.

Parts/Tools Required

- ❑ C91-20RD Radio Cable (One for each radio to be interfaced)
- ❑ A U9104 or U9102 radio card installed in the Master Station
- ❑ Mating connector and pin information for radio interface (installer provided)
    - o Wire Crimping/Cutting/Soldering/etc. tools (depends on radio interface)
- ❑ Wire ties

Procedure

- ❑ Determine the path of the cable between each radio and the Master Station. The radios should already be installed and tested.

- ❑ Route the cable. The cable should be routed using conduits and be as far as possible from radio antenna coax cables and anywhere water may collect. The connector end connects to the appropriate radio card as installed in the Master Station. Leave enough excess cable at the radio end for preparation of radio interface connector.

- ❑ Connect the cable to one of the radio card inputs on the Master Station. Align red keyways and push. Pull back gently on the connector (behind the quick-release collar) to ensure it is locked.

- ❑ Prepare the radio interface in accordance with manufacturer's instructions. See **Table 5.1** for C91-20RD Radio Cable wire color functions. The end of this cable is stripped and tinned at the factory. Due to the difficulty in soldering to these conductors, it is recommended that any extra cable be coiled up rather than cut.

- ❑ If using as a remote PTT cable, connect the unprepared end to one or two switches to be used for Remote PTT. See Table Below for wire color functions.
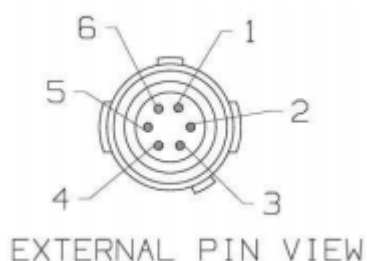
Pin	Color	Function
Radio Functions		
1	Red	Mic Hi (+)
2	White	Mic Lo (-)
3	Green	Ear Hi (+)
4	Black	Ear Lo (-)
5	Yellow	PTT Hi (+)
6	Blue	PTT Lo (-)
	Shield	Shield (To PTT Lo or Mic Lo)
Remote PTT Functions		
2	White	PTT Lo #1
4	Black	PTT Lo #2
5	Yellow	PTT Hi #1
6	Blue	PTT Hi #2

Figure 5.1 Radio Cable Wire Color Functions

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6. Power Cable

The C91-20PW is a 20-foot cable used to provide power to the 9100 Digital Intercom System. It has a connector on one end and the other end requires the installer to prepare. It is important to choose a power "pick-off" point which can provide 10 amperes of current at a voltage between 11-30VDC. Direct connection to a 10-Amp fuse/circuit-breaker is preferred.

Parts/Tools Required

- ❑ C91-20PW Power Cable (40892G-02)
    - o Includes David Clark 10-Amp Fuse kit (41090G-22)
- ❑ Power pick-off point (circuit breaker/Fuse box, 11-30VDC)
- ❑ Soldering iron/Solder
- ❑ Wire terminals
- ❑ Wire cutters/ Wire strippers
- ❑ Tape Measure
- ❑ Wire ties

Procedure

- ❑ Determine the location of a 10-Amp circuit breaker to be used and how to connect to it (solder, screw terminals, lugs, etc.).

- ❑ If only a higher-amperage circuit breaker is available, it may be used, but the David Clark 10-Amp Fuse Kit must also be used.

- ❑ Determine the location of the 11-30VDC and Ground pick-off points.

- ❑ Determine the path of the cable between the power source and the Master Station. The cable should be routed using under-deck conduits and be as far as possible from radio antenna coax cables and anywhere water may collect.

- ❑ Measure the length of cable necessary, adding 3 ft as a service loop.

- ❑ If necessary trim the length of the cable to the length determined in the previous step, making sure to trim the UN-PREPARED end of the cable.

- ❑ Route the cable. Use wire ties where necessary.

- ❑ Connect the cable to the power jack on the Master Station. To connect the cable to the Master Station, align keyways and push. Then firmly turn collar clockwise until it locks into place. Pull back gently on the cable to ensure connector is properly locked.

Before continuing, ensure that power is shut off to the point where you are going to connect the power cable!

- ❑ Using the wire cutters and wire strippers, prepare the end of the cable as necessary for your installation.

- ❑ If using the David Clark 10-Amp Fuse Kit, please see **10. Fuse Kit** for assembly instructions.

- ❑ Connect the cable to the power source

    - o Connect the RED to the positive (+) terminal.
    - o Connect the BLACK **and** SHIELD to the negative (-) terminal.

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7. Auxiliary Audio

The Auxiliary Audio connection is intended for use with line-level devices only. Typical connections include a portable CD/MP3 player's headphone jack or the "Preamp Output" RCA jacks on a car/marine stereo. This cable can also be used to route audio from the Digital Intercom System to another device (such as a camera or recorder). Additionally, this cable can be used to interface to a smart phone.

⚠️ **IMPORTANT: To connect to the External Speaker terminals of a communications or weather radio that has balanced audio DO NOT use an aux connection. Instead use a radio connection.**

Failure to observe this warning may result in damage to the radio and/or the 9100 Digital Intercom.

Parts/Tools Required

- ❑ A U9102 Radio/Aux card installed in the Master Station
- ❑ C91-20AX Auxiliary Audio Cable (40892G-21)
  - o Includes 3.5mm Female to Left/Right RCA Plugs Adapter
- ❑ Wire cutters/Wire strippers
- ❑ Soldering iron/Solder
- ❑ Heat-shrink tubing
- ❑ Wire ties

Procedure

- ❑ Route the C91-20AX Cable between the source and the Master Station. The cable should be routed using under-deck conduits and be as far as possible from radio antenna coax cables and anywhere water may collect. Use wire ties where necessary.

- ❑ Connect the cable to Port 3 (Aux Out) or Port 4 (Aux In or smartphone) on the U9102 card in the Master Station. Align red keyways and push. Pull back gently on the connector (behind the quick-release collar) to ensure it is properly locked.

- **For Portable CD/MP3/Smartphone installation:**

  - ❑ Plug 3.5mm male into the device's 3.5mm jack labeled "Line Out" or "Headphones".

  - ❑ Adjust device's volume to 75% to start. Make further adjustments if necessary.

- **For Car/Marine Stereo installation:**

  - ❑ Locate the "Preamp Output" RCA jacks on the stereo. Some models require an additional adapter from the manufacturer to access these jacks.

  - ❑ Connect the supplied 3.5mm to RCA adapter cable to the stereo's output RCA jacks.

  - ❑ Connect the C91-20AX cable to the adapter cable's 3.5mm jack.

  - ❑ Use a waterproof, outdoor cable/coax sealant to ensure that no moisture can enter the contacts of the RCA plugs and the 3.5mm connections.

8. Operation and Programming

The Series 9100 Digital Intercom System has a variety of programming options and can satisfy virtually every configuration application. See the information and examples below for details.

Headset Stations

The U9110-series headset stations provide a fixed-position, wired interface into the U9100 Digital Intercom System. The headset station has the following interfaces:

- Headset Connector
    - o Accepts a H9100-series headset
- Selection Buttons (1-4)
    - o Used to change selection
    - o Correspond to "S1-S4" settings in the user interface
- Selection LED Indicators
    - o Visual indication of current selection status
- PTT Button
    - o Traditionally used to transmit over a radio but is configurable in the user interface
- Ethernet Jack (RJ45)
    - o Provides communications and power to the headset station
- Remote PTT Connector (U9111 only); Accepts C91-20RD cable for use as remote PTT interface
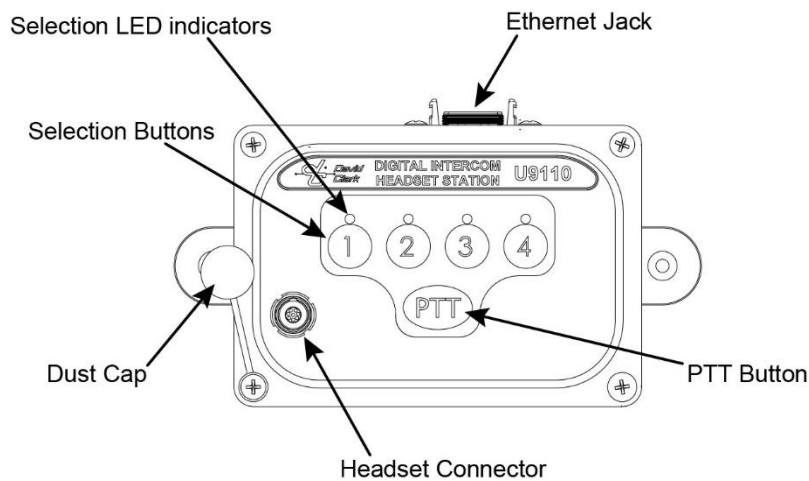   - o See doc. #19601P-40 for details.

Figure 8.1 Headset Station

Wireless

Wireless Gateway

The U9120-series Wireless Gateways provide an un-tethered interface into the U9100 Digital Intercom System. Each Wireless Gateway can be linked with up to four U91xxBSW belt stations. The Wireless Gateway has the following interfaces:

- Link button
  - Used to link Wireless Belt Stations
- Antenna connector (RP-SMA)
  - For optional externally mounted antenna
- Ethernet Jack (RJ45)
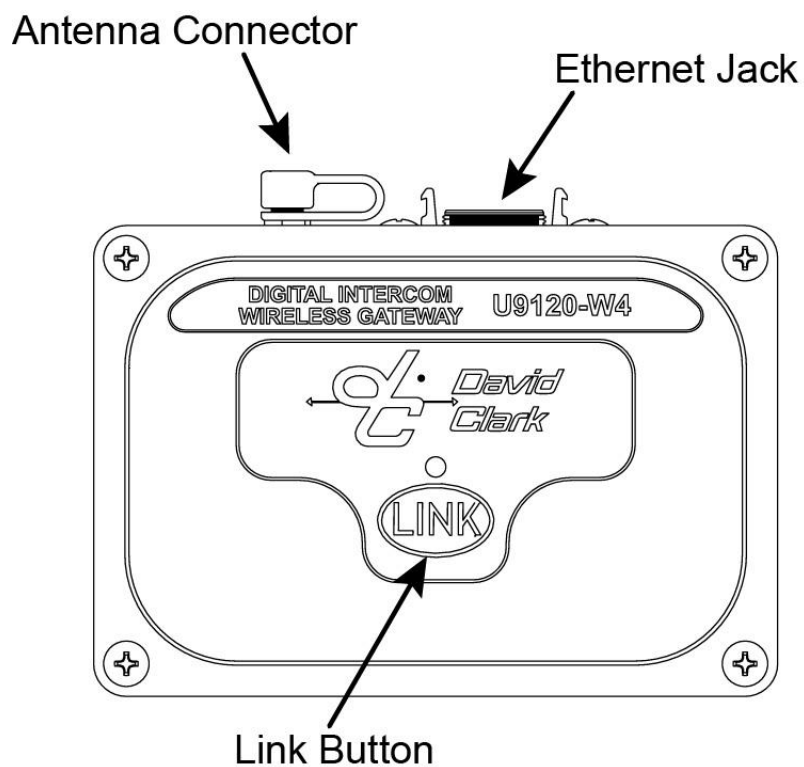 - Provides communications and power to the Wireless Gateway

Figure 8.2 Wireless Gateway

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Wireless Belt Stations

Pressing and holding the Power button for approximately 5 seconds will power on/off the Wireless Belt Station.

Linking

Linking is accomplished by momentarily pressing the LINK button on the Wireless Gateway and the PTT button on the Wireless Belt Station. The Wireless Gateway and the Wireless Belt Station must be within approximately 1 to 3ft (0.5 to 1m) of each other in order for linking to be successful. This "close-link" mechanism prevents other devices from being linked unintentionally.

Operation

Once linked, the Wireless Belt Station's Power button LED will flash green. Additionally, the Wireless Gateway's LED will flash green a number of times indicating how many Wireless Belt Stations are linked.

- PTT
    - Traditionally used to transmit over a radio but is configurable in the user interface
- Power Button/Status LED
    - Pressing and holding the Power button for approximately 5 seconds will power on/off the Wireless Belt Station.
    - Momentarily pressing and releasing the Power button will cycle the Wireless Belt Station through the four selections. A voice prompt will indicate the current selection.
- Battery Pack
    - The Li-Polymer battery pack is removable and is charged using the A99-14CRG charger.
- VOX
    - VOX is automatic and will adapt to background noise levels in real time.
    - VOX is also configurable in the user interface.

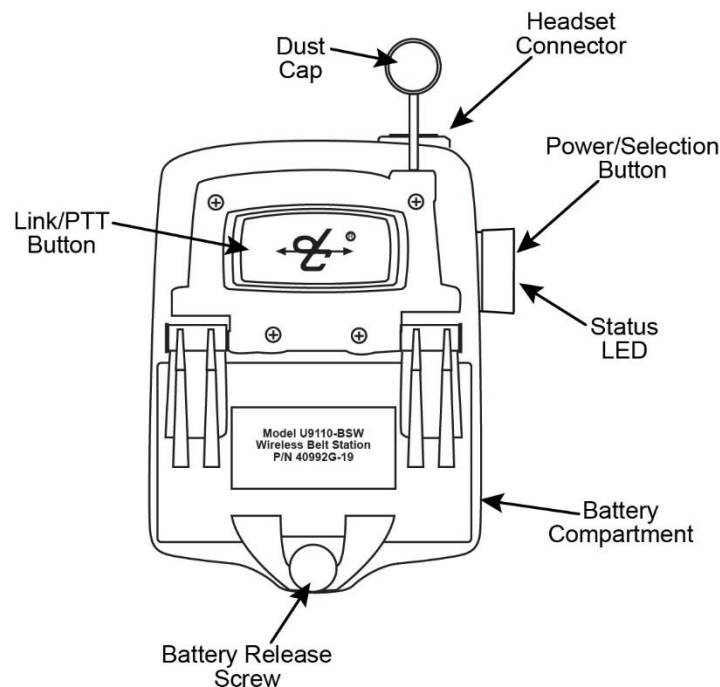Visit www.davidclark.com for more information on Wireless Gateways and Wireless Belt Stations.

Figure 8.3 Wireless Belt Station

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User Interface

1. Once power is turned on to the system in about 30 seconds the web interface will be available.
2. The factory default IP address is **192.168.2.1** and authentication is enabled.
3. Connect a computer via Ethernet cable to an open switch card port. If all switch card ports are used, a PoE splitter such as CyberData #011187 or a PoE capable Ethernet switch may be used.
4. Open a web browser and go to http://192.168.2.1
5. If prompted for a username and password, enter **user** for the username and **pass** for the password.
6. The user interface will begin loading. See **Figure 8.4.**
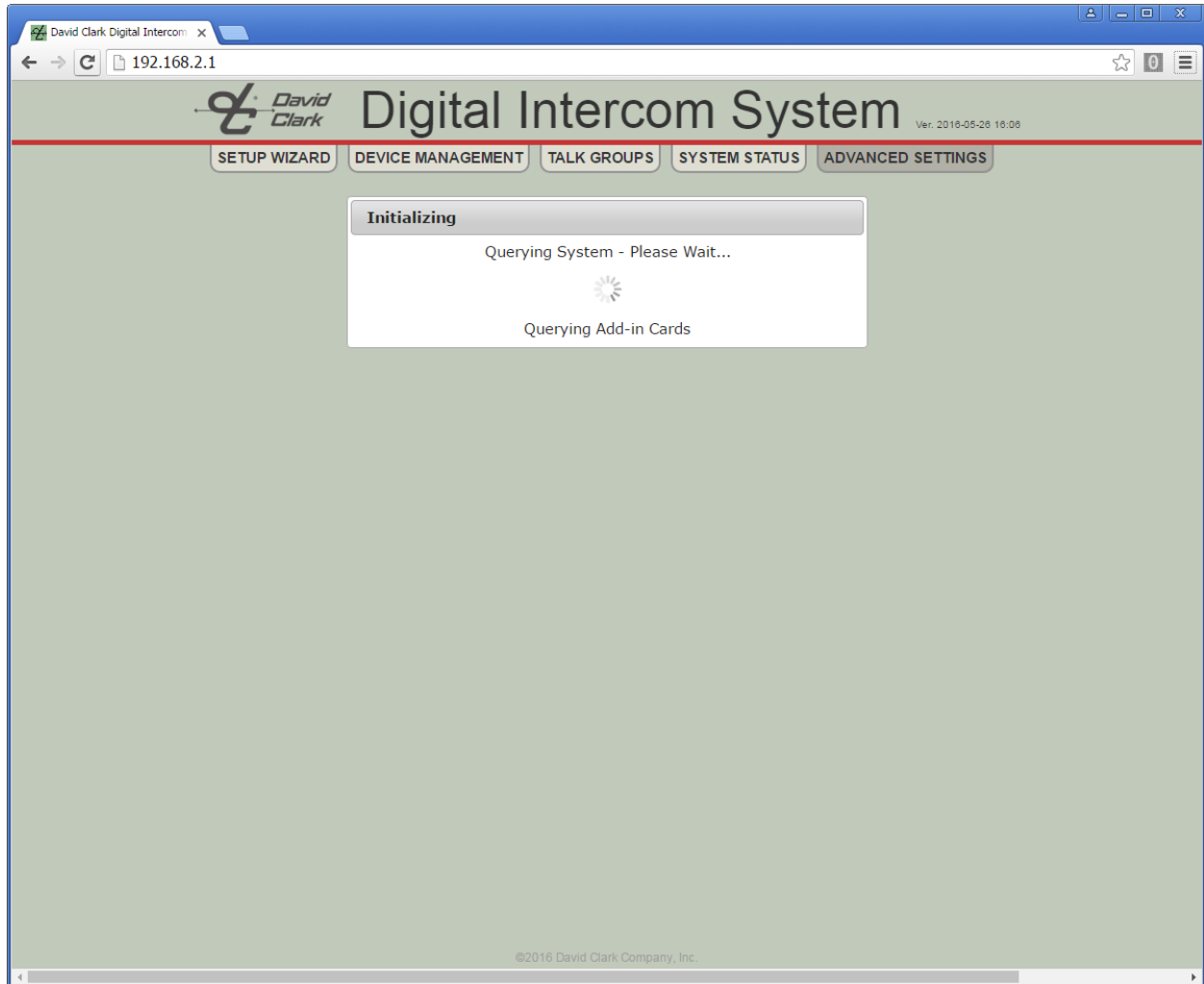
Figure 8.4

7. Once loaded, click SETUP WIZARD. See **Figure 8.5**

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Setup Wizard

Figure 8.5

1. Each device detected on the system is shown, as well as any add-in cards present in the Master Station.
2. Clicking on a device expands a pane with its properties and settings.
3. A Headset Station or Wireless Gateway Station has the following configurable options, as shown in **Figure 8.6**. See Device Management on page 21 for details.
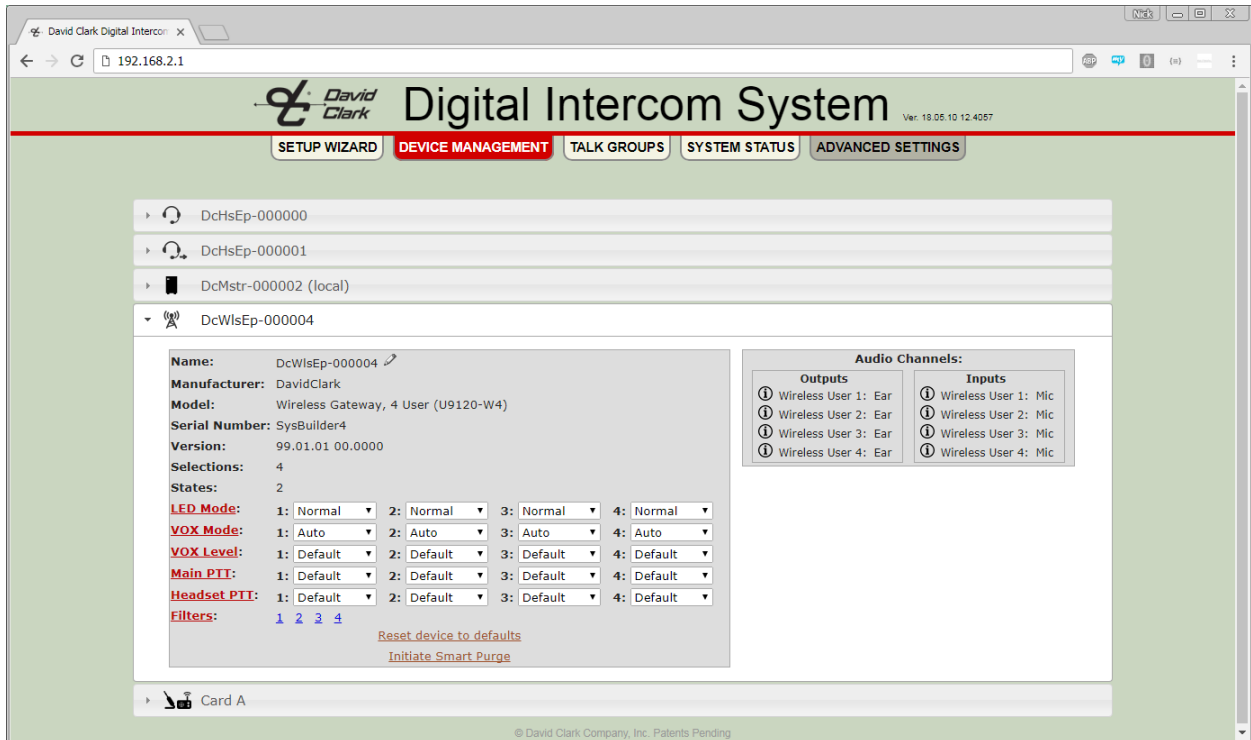
Figure 8.6.

4. A Radio Card or Radio/Aux Card can have its channels renamed and levels adjusted. Audio level adjustments should not be made now. Instead, make these adjustments after talk group setup is complete. See **Figure 8.7**
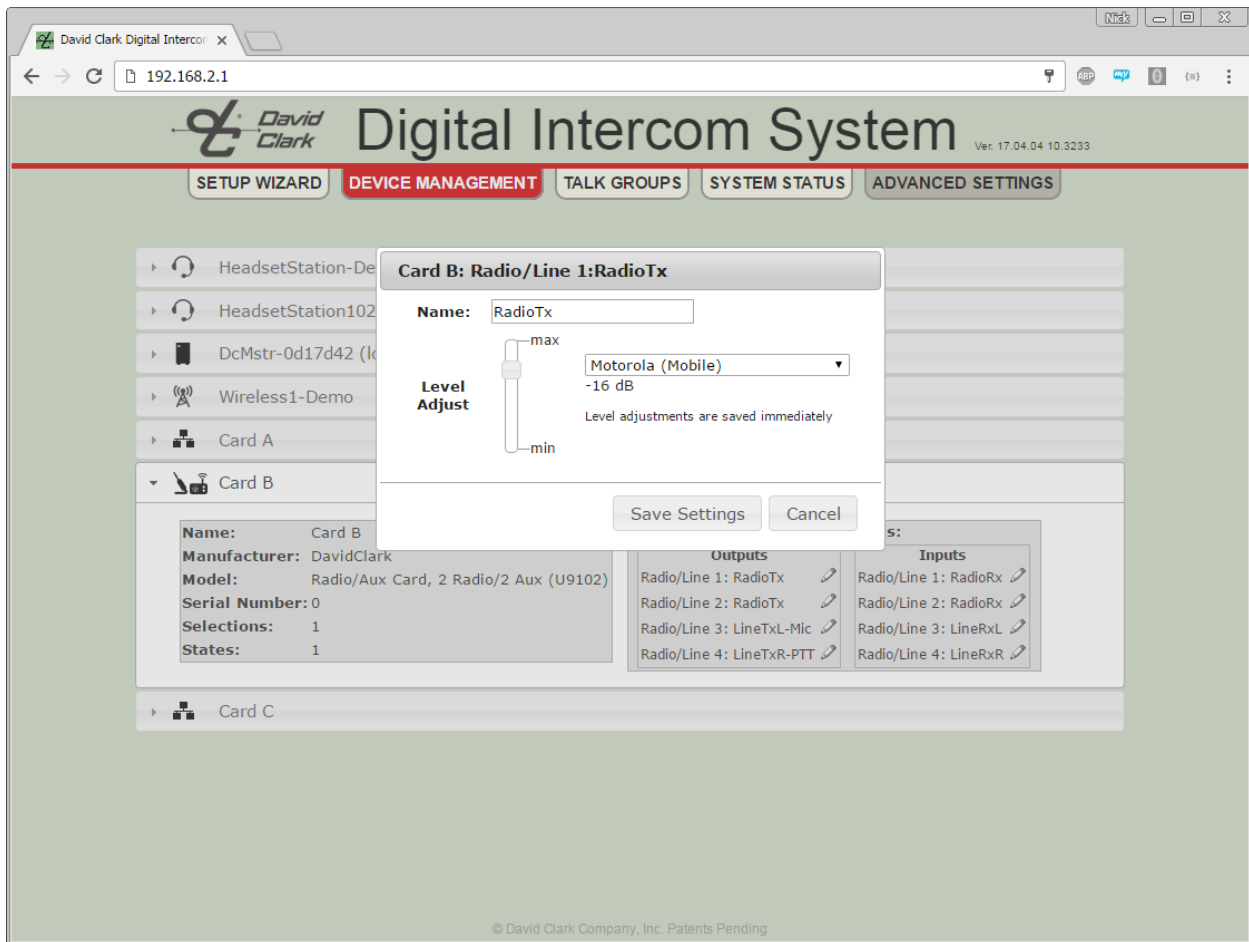
Figure 8.7

5. The Master Station and Switch Cards do not have any configurable options but their properties can be viewed.

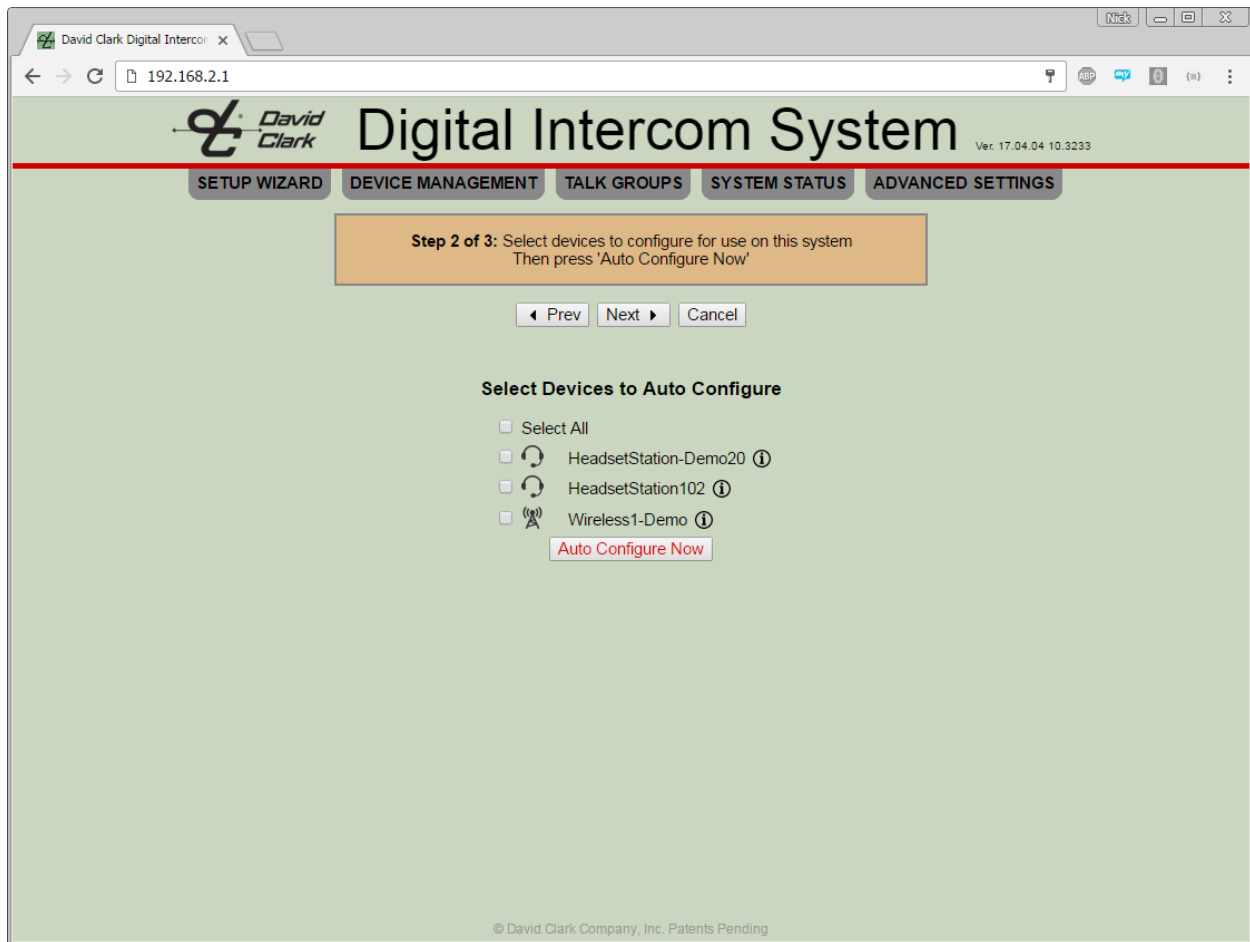6. Once all renaming and settings have been made, click NEXT. The Auto-Configure page will be displayed. See **Figure 8.8.**

Figure 8.8

7. On the Auto-Configure page, select all the devices to be used on this system. Note that if the system is connected to a LAN, there may be devices on the network that should not be configured. In most cases "Select All" should be checked.
8. Once the devices are selected, click "Auto Configure Now". A warning will appear indicating that settings will be cleared from the Master Station, the devices that have been selected and any devices previously configured by this Master Station. Click OK and the Auto-Configure operation begins. Depending on how many devices there are to configure, this could take several minutes.
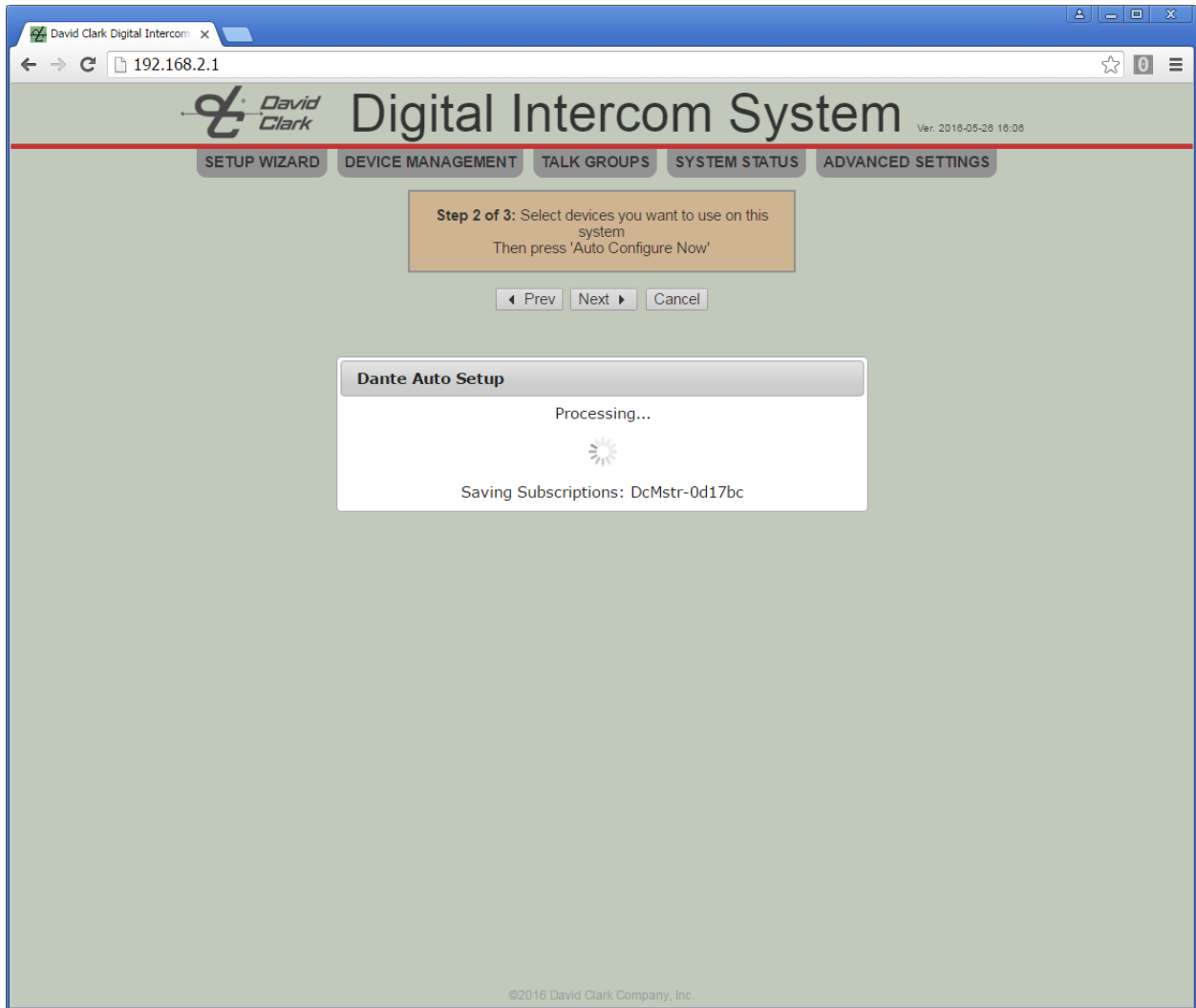9. See **Figure 8.9.**

Figure 8.9

10. Once Auto-Configure is complete, click NEXT. The system will reinitialize with the new settings. When complete, the Configure Talk Groups page will be displayed.
11. Click "Add New Talk Group" and click the talk group name to expand it. See **Figure 8.10.**

Figure 8.10

12. In the pane all of the devices selected during the Auto Configure step will be presented, plus any Radio Cards or Radio/Line cards installed in the Master Station.
13. The talk group may be renamed by clicking the ✎ icon.
14. For detailed talk group programming and examples, see <u>Talk Group Programming</u>.

Device Management

Clicking DEVICE MANAGEMENT will display a list of all devices detected on the network and all add-in cards installed in the Master Station. Expanding each device's pane will reveal different information and options depending on the type of device.

When changes are made, a "Save Changes" link will appear. Changes are not saved until this link is clicked.

- Device name (rename by clicking the ✎ icon)
- Identify device by clicking the ⓘ icon (all LEDs on the device will turn solid red for 10s)
- Manufacturer
- Model
- Version
- Selections (1-4 buttons, if applicable)
- States (PTT, if applicable)
- Audio Channels (if applicable)
- LED Mode -- See **Figure 8.6**.
    - Normal Mode
    - Dark Mode – all LEDs off (for covert operations)
    - For Wireless Gateway, the gateway's LED follows the "LED Mode 1" setting.
- VOX Mode – See **Figure 8.6**.
    - PTT – Mic active only when PTT button is pressed
    - Auto – VOX is automatic
    - Hot Mic – Mic always active
- VOX Level – See **Figure 8.6**.
    - Default – Appropriate for most cases
    - Levels 1-5 – Sets increasingly higher thresholds to break VOX. For extremely loud applications.
- PTT Overrides – See **Figure 8.6**.
    - Main PTT – Override selection when Main PTT is pressed. Default is current selection.
    - Headset PTT – Override selection when Headset PTT is pressed. Default is current selection.
    - Remote PTT 1/2 – Override selection when Remote PTT 1 or 2 is pressed. Default is current selection.
- Filters – See **Figure 8.6**.
    - In some circumstances, microphone audio filtering may be desired. Contact the factory for more information.
- Reset Device to Defaults
    - Resets all device settings to default.
- Initiate Smart Purge – Wireless Gateways only
    - Clears registrations of all Wireless Belt Stations which are not currently active.
- Audio Channel editing – Radio and Radio/Line cards only, click the ✎ icon.
    - Channel name
    - Audio levels - See **Figure 8.7.**
        - Presets for certain radios
        - Custom levels
        - Mute
        - Changes take effect immediately

System Status

Clicking SYSTEM STATUS will display the system status page. Code versions are displayed along with currently installed add-in cards in the Master Station. On the right-hand side the IP configuration and web credentials settings can be changed. See **Figure 8.11.**
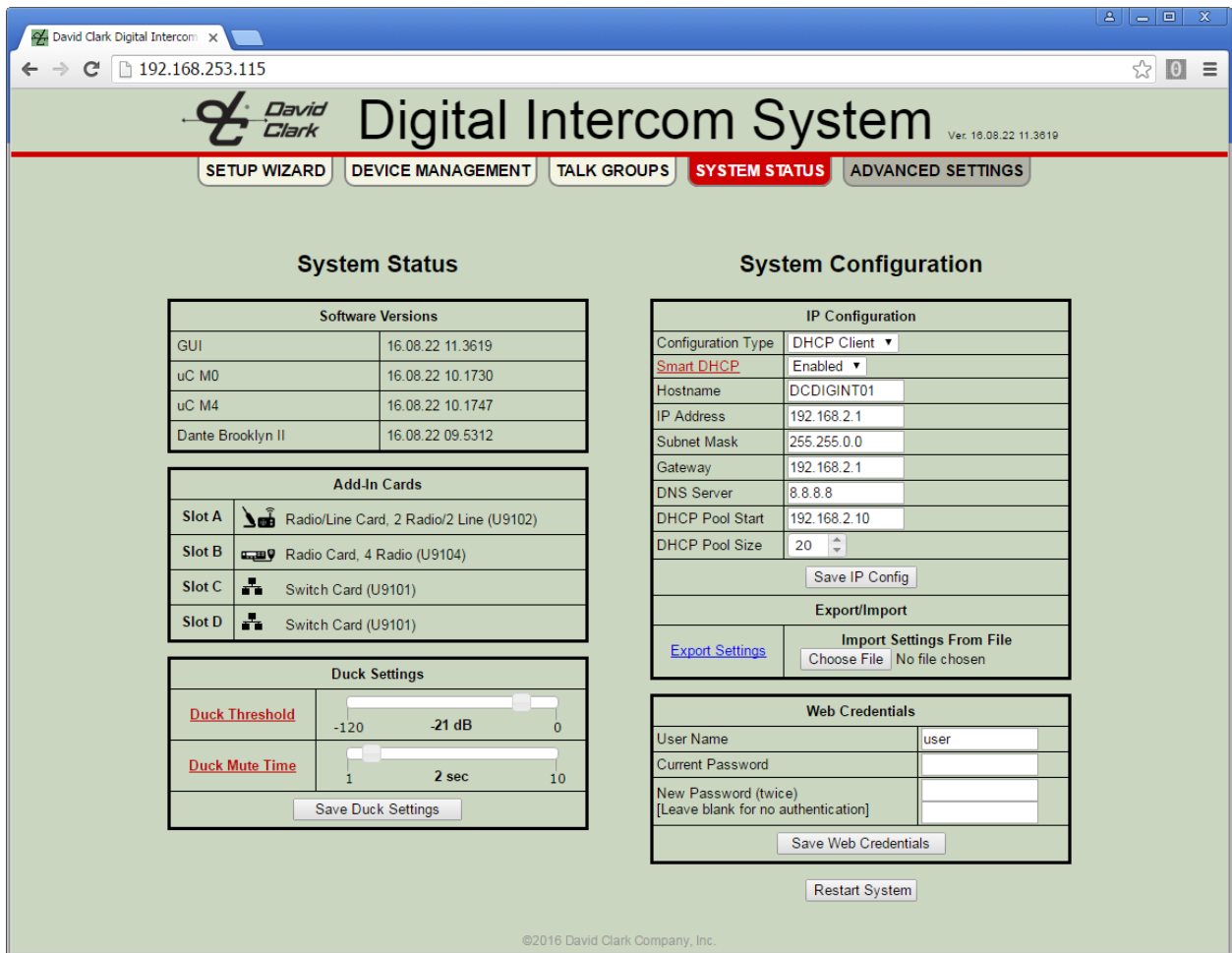
Figure 8.11: System Status

Configuration Type

There are three IP Configuration types available:
- DHCP Server
  - The Master Station will assign IP addresses to other network devices connected.
  - Use this option if the system will be operated in a stand-alone environment and not connected to an existing network.
- DHCP Client (default)
  - The Master Station will look for a DHCP server on the network and use an IP address provided by the DHCP server.
  - Use this option if this system will be connected to an existing network.
  - Smart DHCP (default enabled)
    - When enabled, the system will attempt to obtain an IP address from the network. If unsuccessful, DHCP Server mode will be enabled using the parameters indicated.
- Static IP
  - Use this option for advanced configurations only.

Additional Networking Options

- Hostname: A host name to identify this device on the network.
- DHCP Server, Smart DHCP, or Static IP the following options apply:
  - o IP Address
  - o Subnet Mask
  - o Gateway
  - o DNS Server
  - o DHCP Pool Start (not applicable for Static IP)
  - o DHCP Pool Size (not applicable for Static IP; Number of addresses to assign)
- Click Save IP Config to save changes. The system must be restarted for most settings to take effect.

Web Credentials

By default, credentials are required to log into the user interface. The default user name is **user** and the default password is **pass**. These credential may be changed. The current password must be specified to make this change. To disable, leave the new password field blank. Once "Save Web Credentials" is clicked the settings take effect immediately.

Duck Settings

Ducking is the ability for audio to mute when other audio is detected. The following settings can be used to tweak the duck settings:

- Duck Threshold
  - o This setting defines the detection level the system will use to initiate ducking, if configured in a talk group.
  - o A lower level would result in ducking occurring with quieter sounds where a higher level would require louder sounds to trigger the ducking.
  - o Default is -21dB
- Duck Mute Time
  - o This setting defines how long the ducked audio should mute before returning to normal level.
  - o Default is 2 seconds

See Talk Group Example 5 for details on configuring ducking.

Export and Import

Exporting can be used to backup a system configuration. An exported backup can be imported to restore a system or used as a template to clone multiple systems.

- Exporting
  - o Clicking the "Export Settings" will present an "export.dcc" file to be saved. This file should be renamed to something meaningful and saved somewhere safe.
- Importing
  - o Clicking the "Choose File" button will open a file-chooser dialog. A previously saved ".dcc" file should be selected. Clicking "Open" or "OK" will open the file.
  - o Once the file is processed and verified, the system will present the option of exploring the file or importing the file. See **Figure 8.12**.
  - o Exploring the file is for troubleshooting. In most cases click "Import File".
  - o A "Map Devices" page is displayed. See **Figure 8.13**.
    - ▪ If applying a backup to the same system it came from, no changes are required on this page. All devices should automatically be populated.
    - ▪ If using this backup to clone another system, each device from the file must be mapped to a device on the new system. The system will only allow mapping of

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devices if they are of the same type. The Master Station is mapped automatically.

- Optionally, the import process can rename the current device names to the names present in the file. This is most useful in cloning operations. The master station cannot be renamed.

o Click "Proceed With Import" once all mappings are complete. A confirmation dialog will appear. Click "Import" to begin the import process.

o The system will process all the settings from the file. This will take several minutes depending on the number of devices on the system.
Note: the password will <u>not</u> be changed.

o When complete, a dialog will ask to restart the system. The system should be restarted to complete all changes. See **Figure 8.14**.

Figure 8.12: Import File
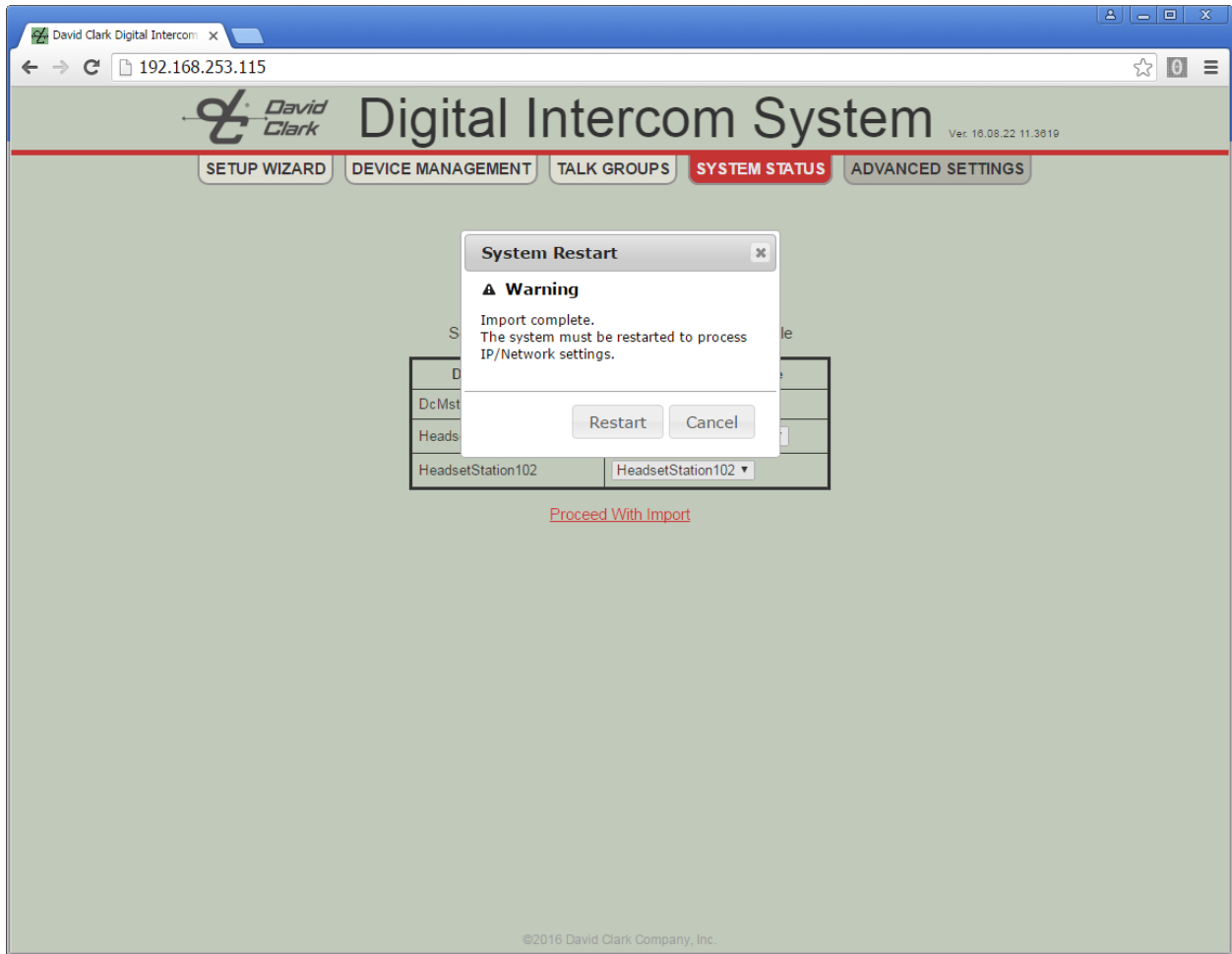
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Figure 8.13: Map Devices

Figure 8.14: Restart After Import

Advanced Settings

Most users should not have to make changes in the Advanced Settings menu. Changes made here may disrupt settings made in the Basic Settings menu.
The Advanced Settings menu provides for manual manipulation of Dante subscriptions and DSP settings. Additionally, the system may be restarted from Advanced Settings.

Contact David Clark Customer Service at (**800) 900-3434** for guidance if you feel your application requires settings not available in the Basic Settings menu.

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Talk Group Programming

Talk groups are where most of the settings for the system will be made. Talk groups are a method of presenting the powerful options of the system to the user in a straight-forward and intuitive way. Each Headset Station or Wireless Belt Station is capable of (4) Selections as well as a PTT button. Talk groups are configured such that different combinations of selection and PTT pressed/not pressed can have different settings.

Headset Stations have four buttons labeled 1-4 to choose the selection and a PTT button to assert PTT. Wireless Belt Stations cycle through selections in numerical order by momentarily pressing the power button. A voice prompt will indicate "one", "two", "three", or "four". PTT is asserted by the large button on the front of the Wireless Belt Station or by the PTT button on the mic boom.

Talk Group Global Settings

- Rename
    - Click the ✎ icon to rename the talk group.
- Isolate Users
    - When selected, this option will prevent wired and wireless users configured in the talk group from hearing each other.
    - This is useful when configuring multiple users with radio access while preventing intercom between them.
    - Default: Unselected
- Isolate Radios
    - When selected, this option will prevent audio from radios being heard by other radios.
    - This should be enabled except when radio-to-radio audio communication is required.
    - Default: Selected
- Delete Talk Group
    - Deletes the talk group
- Clone Talk Group
    - Makes a new talk group which is a copy of the current talk group.

Device Specific Settings

- **Outputs**
    - Outputs are channels that the user of the device can hear
        - **All Rx** – All output channels (when more than one channel is available)
        - **EarL/EarR** – The left or right output channel.
        - **Ear** – The output channel when the device has only one output channel.
        - **Off** – No channel is selected.
    - Output state modifiers
        - **-PTT:On** – Applies only when PTT is pressed.
        - **-PTT:Off** – Applies only when PTT is not pressed.
        - No modifier – Applies whether PTT is pressed or not.

- **Inputs**
    - Inputs are channels that the user of the device can talk on
        - **All Tx** – All input channels (when more than one channel is available)
        - **Mic** – The input channel when the device has only one input channel.
        - **Off** – No channel is selected.
    - Input state modifiers
        - **-PTT:On** – Applies only when PTT is pressed.
        - **-PTT:Off** – Applies only when PTT is not pressed.
        - No modifier – Applies whether PTT is pressed or not.

Tip: A device shown with red text and a green outline is a device that has one or more channels configured as part of the current talk group.

Following are some examples of common scenarios and how to program the system for each of them.

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Talk Group Example 1: Multiple users on intercom, hot mic

- Multiple users talking and listening to each other
- Users can be on any selection (1-4) and do not have to press PTT to be heard

Steps

1. Click **Add New Talk Group**.
2. Rename talk group if desired by clicking ✎.
3. Click to expand each Headset Station or Wireless Gateway to add to this group.
4. To identify a device, click the ⓘ and all LEDs on the device will turn red for 10 seconds.
5. Under **Outputs**, select **All Rx** which enables this user to hear in both L+R ears. Since wireless is mono, select **Ear** for wireless users.
6. Under Inputs, select **Mic** which enables this user's mic to be heard by other users of the group.
7. When finished, click **SAVE REQUIRED** on the top menu.
8. Once the operation completes, the users are now able to talk freely to each other.
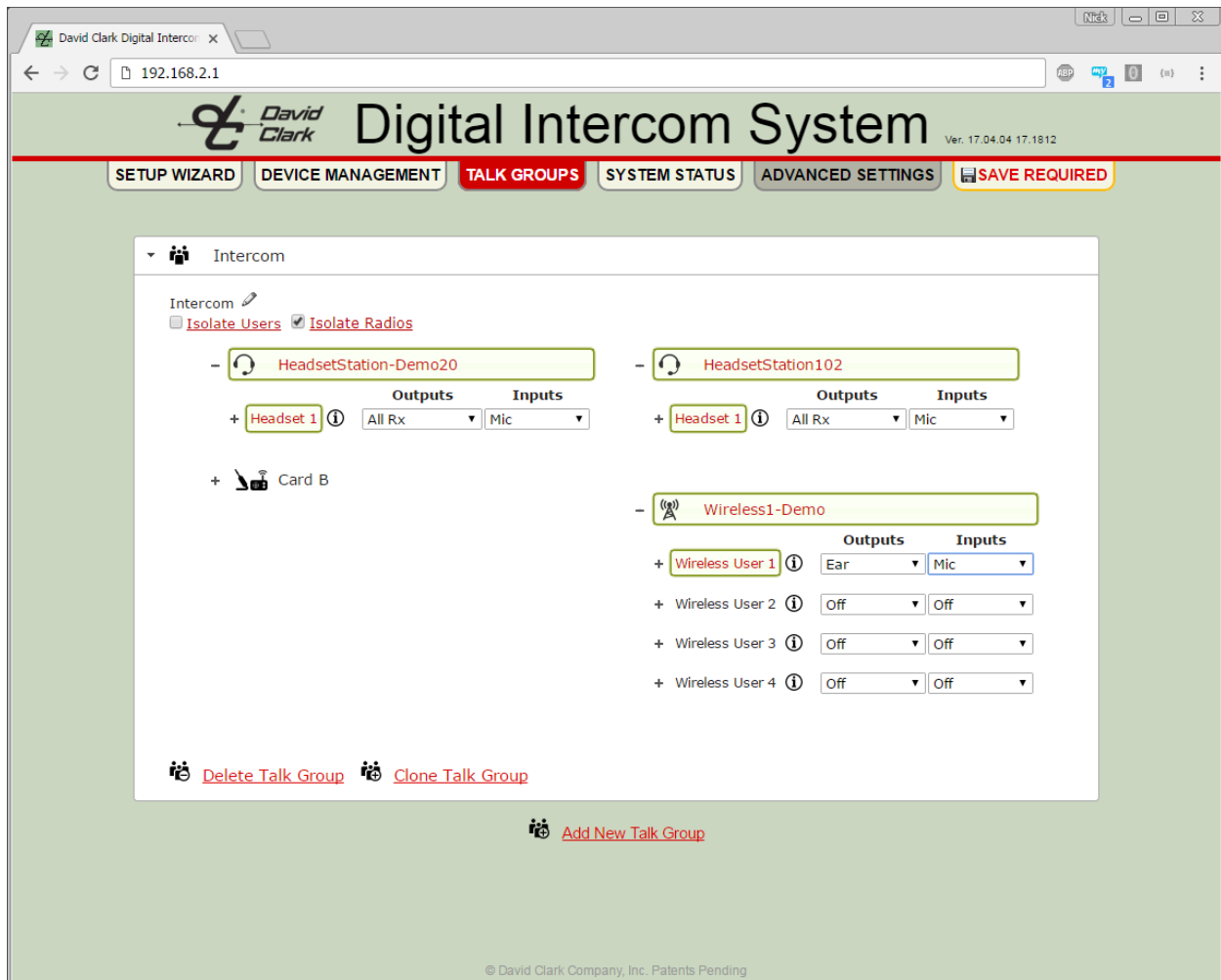9. See **Figure 8.12.**

Figure 8.12: Talk Group Example 1

For the next examples it will be assumed that the user knows how to add a new talk group, rename it, and identify devices.

Talk Group Example 2: Multiple users on intercom, press PTT to talk

- Multiple users talking and listening to each other.
- Users can be on any selection (1-4) but must press PTT in order to be heard by others.

Steps

1. Create a new talk group.
2. Click to expand each Headset or Wireless user to add to this group.
3. Under **Outputs** select **All Rx.** For wireless, select **Ear.**
4. Under **Inputs** select **Mic-PTT:On** which specifies that the PTT button must be pressed in order for the mic to be heard by the other users of this group.
5. Click **SAVE REQUIRED.**
6. When the operation is complete, users of this group are now able to talk to each other by pressing the PTT button on the Headset Station, Wireless Belt Station, or the Headset mic boom.
7. See **Figure 8.13.**
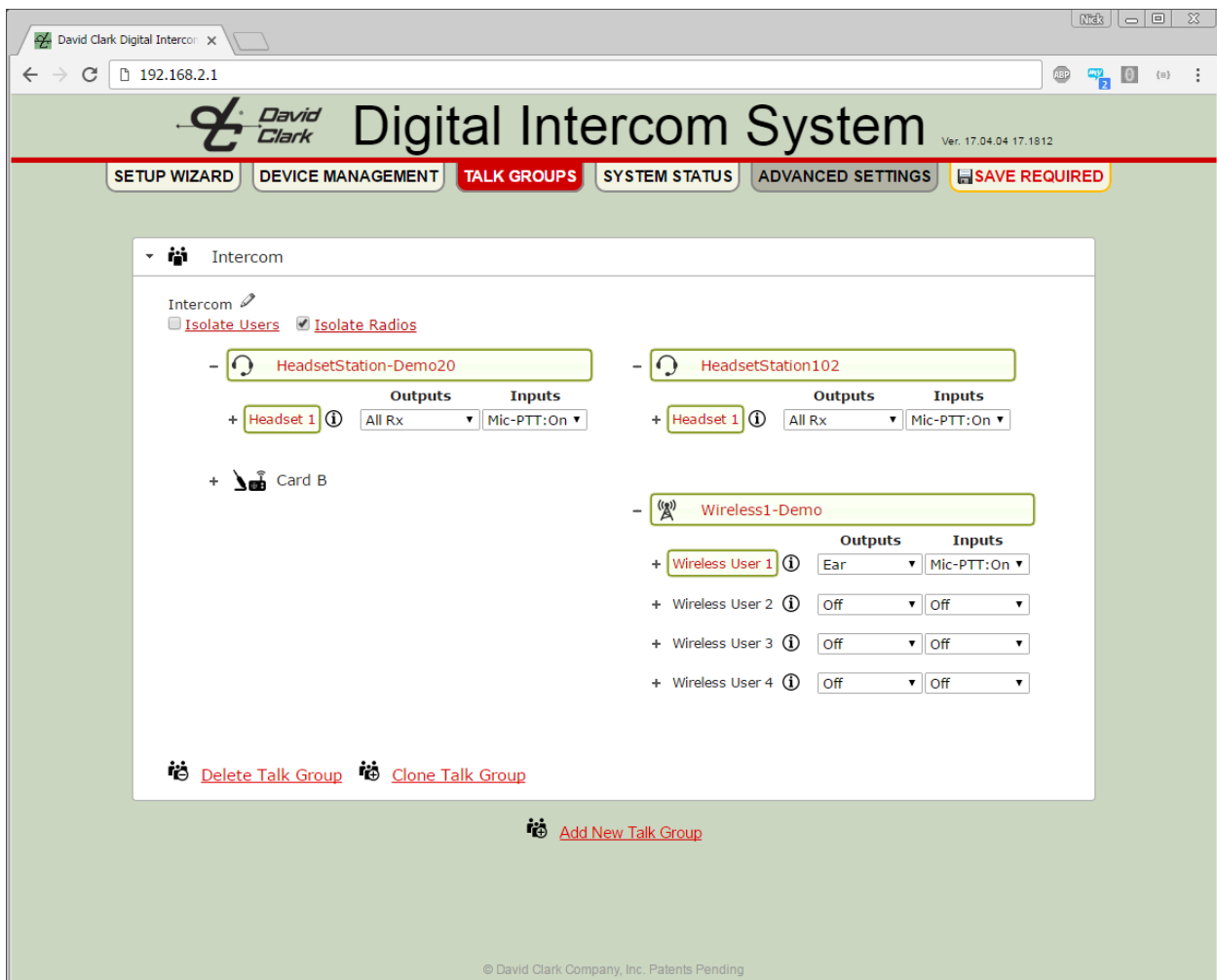
Figure 8.13 Talk Group Example 2

Talk Group Example 3: Multiple users on hot-mic intercom, press PTT to talk over radio

- Multiple users talking to each other freely (no PTT)
- Press PTT to talk over radio
- Selection may be anything (1-4)

Steps

1. Create a new talk group and rename it "Intercom"
2. Click to expand each Headset or Wireless user to add to this group.
3. Under **Outputs** select **All Rx.** For wireless, select **Ear.**
4. Under **Inputs** select **Mic**.
5. Create another new talk group and rename it "Radio"
6. Click to expand each Headset or Wireless user configured in the "Intercom" talk group.
7. Under **Outputs** select **All Rx.** For wireless, select **Ear.**
8. Under **Inputs** select **Mic-PTT:On**.
9. Click to expand the Radio card or Radio/Aux card
10. Under Radio 1 **Outputs** select **Radio Tx**.
11. Under Radio 1 Inputs select **Radio Rx**.
12. Click **SAVE REQUIRED.**
13. When the operation is complete, users of this group are now able to talk to each other freely, and pressing the PTT button on the Headset Station, Wireless Belt Station, or the headset mic boom will cause that user to transmit over the radio.
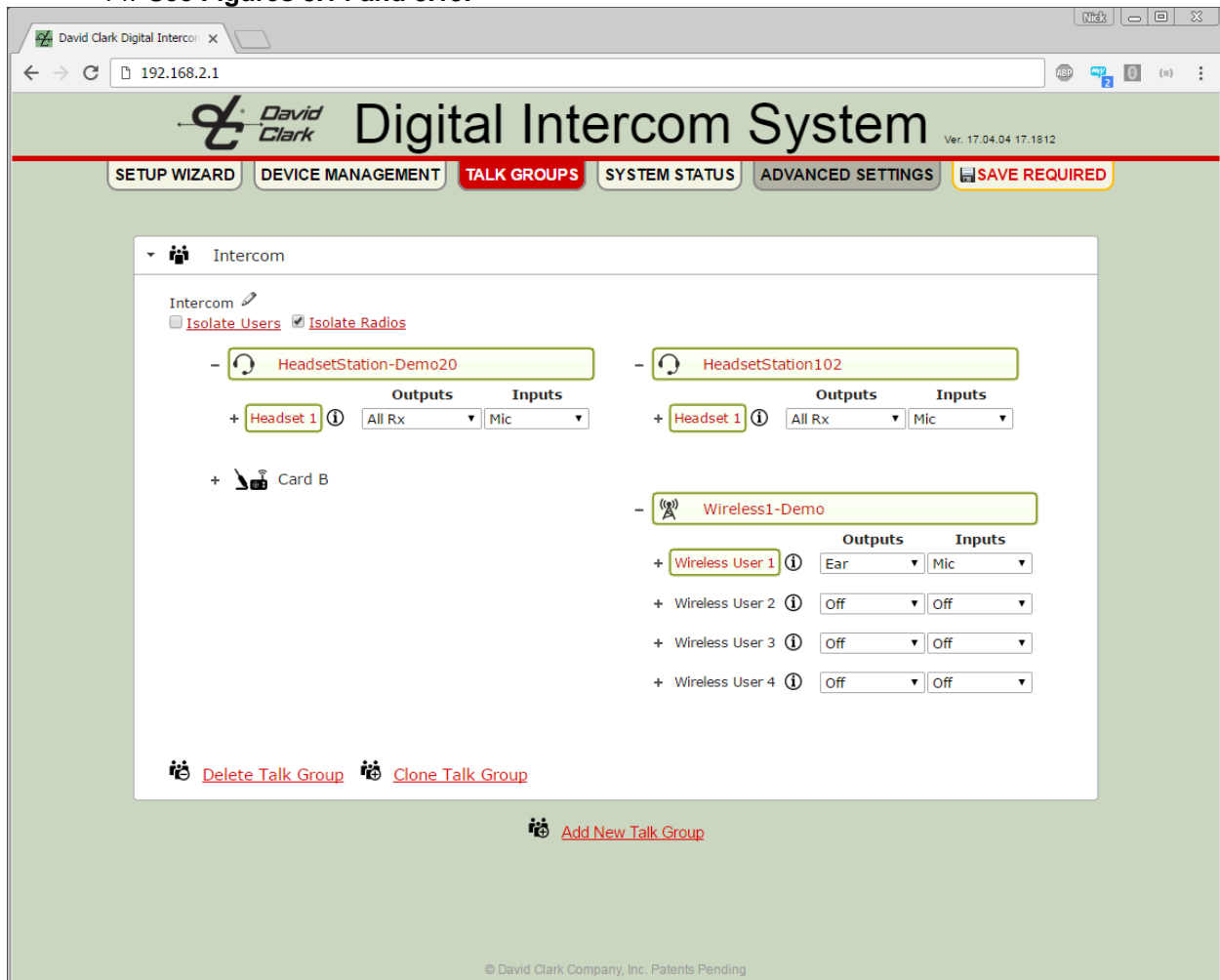14. See **Figures 8.14 and 8.15.**
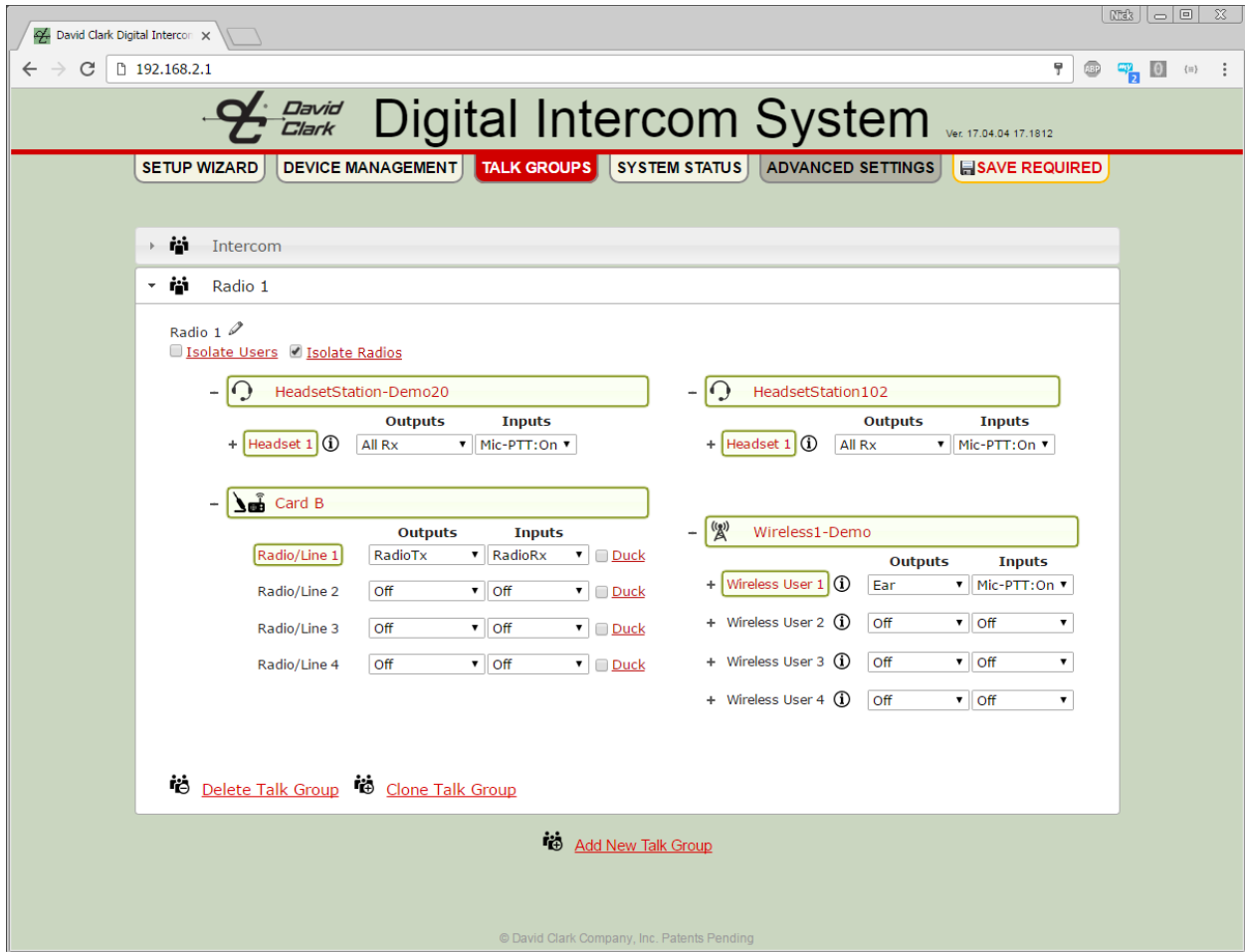

Figure 8.14 Talk Group Example 3 - Intercom

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Figure 8.15 Talk Group Example 3 - Radio

Talk Group Example 4: Intercom, multiple radios

- Users can talk freely on intercom when on selection 1 or 2
- Users hear and talk over Radio 1 when on selection 1
- Users hear and talk over Radio 2 when on selection 2

Steps

1. Create a new talk group and name it "Intercom".
2. Expand the Headset or Wireless users to be part of this group.
3. For each Headset/Wireless user, expand Headset/Wireless User to reveal the selections.
4. For each user, set S1 and S2 **Outputs** to **All Rx** (**Ear** for wireless) and **Inputs** to **Mic.**
5. Create a new talk group and name it "Radio 1"
6. Expand the Headsets and Wireless users which were configured in the "Intercom" group.
7. For each Headset/Wireless user, expand Headset/Wireless User to reveal the selections.
8. For each user, set S1 **Outputs** to **All Rx** and **Inputs** to **Mic-PTT:On.**
9. Expand the Radio card or Radio/Aux card.
10. Under Radio 1 **Outputs** select **Radio Tx**.
11. Under Radio 1 Inputs select **Radio Rx**.
12. Create a new talk group and name it "Radio 2"
13. Expand the Headsets and Wireless users which were configured in the "Intercom" group.
14. For each Headset/Wireless user, expand Headset/Wireless User to reveal the selections.
15. For each user, set S2 **Outputs** to **All Rx** and **Inputs** to **Mic-PTT:On.**
16. Expand the Radio card or Radio/Aux card.
17. Under Radio 2 **Outputs** select **Radio Tx**.
18. Under Radio 2 Inputs select **Radio Rx**.
19. Click **SAVE REQUIRED.**
20. When the operation is complete, users of this group are now able to talk to each other freely when on S1 or S2. Pressing the PTT button on the Headset Station, Wireless Belt Station, or the headset mic boom will cause that user to transmit over Radio 1 when on S1 and Radio 2 when on S2.
21. See **Figures 8.16, 8.17, and 8.18.**

Figure 8.16 Talk Group Example 4 - Intercom

Figure 8.17 Talk Group Example 4 – Radio 1

Figure 8.18 Talk Group Example 4 – Radio 2

Talk Group Example 5: Aux-in + Smart phone with ducking

- Users can hear auxiliary audio from a music device or optionally, a smart phone.
- Users can press PTT to play/pause/answer/hang-up phone (if supported by phone).
- Users can talk over the phone.
- If a user speaks, the phone audio mutes in favor of the speaking user's audio*.*

Steps

1. Follow Talk Group Example 1 to create a talk group named "Intercom".
2. Create a new talk group named "Left".
3. Expand the Headset or Wireless users to be part of this group.
4. Optionally expand further to reveal selections (see previous examples).
5. Under **Outputs** for each device, select **EarL** (or just **Ear** for Wireless).
6. Expand the Radio/Aux card.
7. Under Radio/Line 3 **Inputs**, select **LineRxL** and check the box next to **Duck.**
8. Create a new talk group named "Right"
9. Under **Outputs** for each device, select **EarR** (or just **Ear** for Wireless).
10. Under Radio/Line 4 **Inputs**, select **LineRxR** and check the box next to **Duck.**
11. Create a new talk group named "Mic"
12. Under Inputs for each device, select **Mic.**
13. Under Radio/Line 3 Outputs, select **LineTxL-Mic.**
14. Create a new talk group named "PTT"
15. Under Inputs for each device, select **Mic-PTT:On.**
16. Under Radio/Line 4 Outputs, select **LineTxR-PTT.**
17. Click **SAVE REQUIRED.**
18. When the operation is complete, users of this group are now able to hear audio/music from the phone, press PTT to pause/play/answer/hang-up the phone, and talk over the phone. If a user speaks, the phone audio will be muted in favor of the speaking user's audio. When the user stops talking, the phone audio will resume.
19. This procedure could be combined with other examples to enable selections, two-way radios, etc.
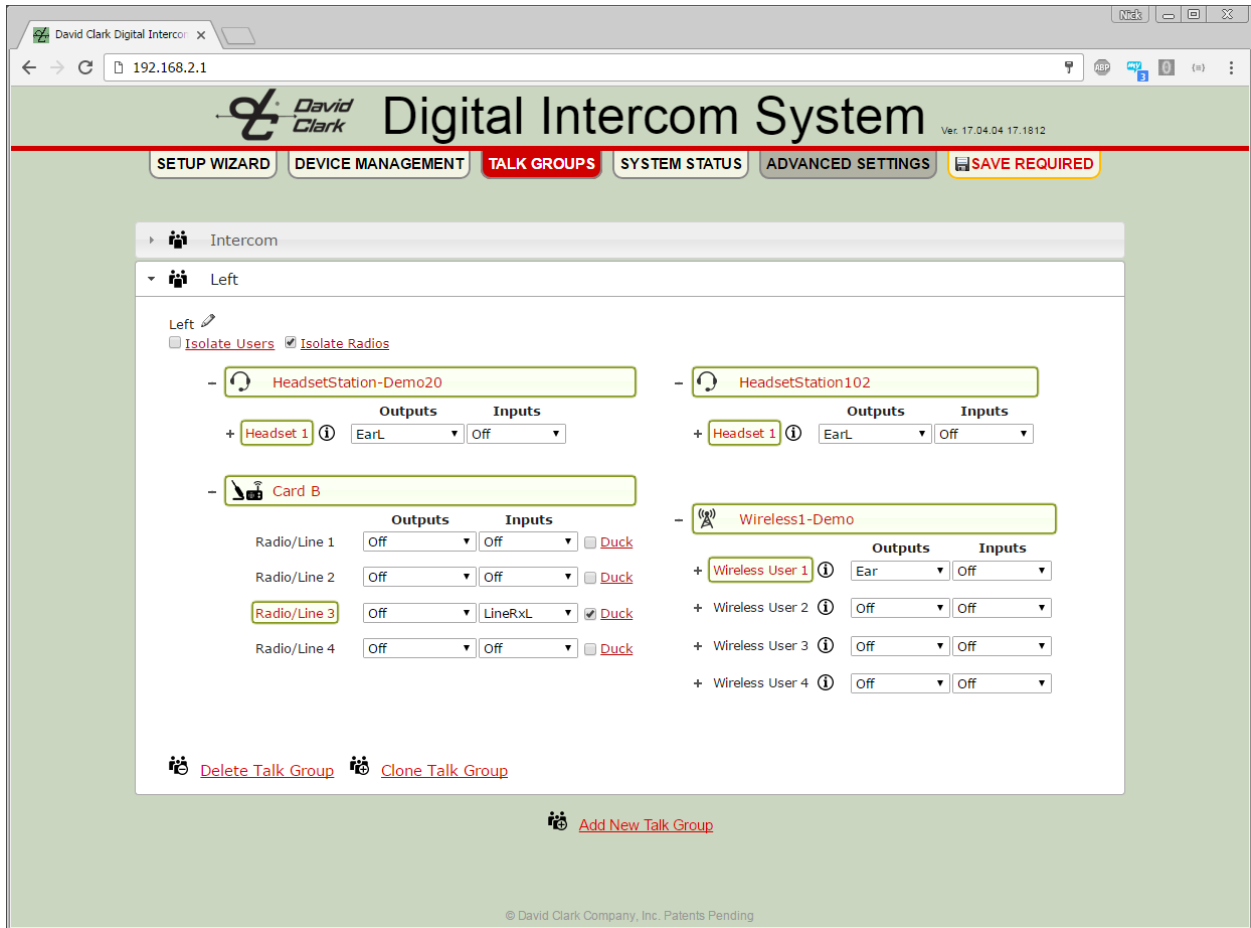20. See **Figures 8.19, 8.20, 8.21, and 8.22.**
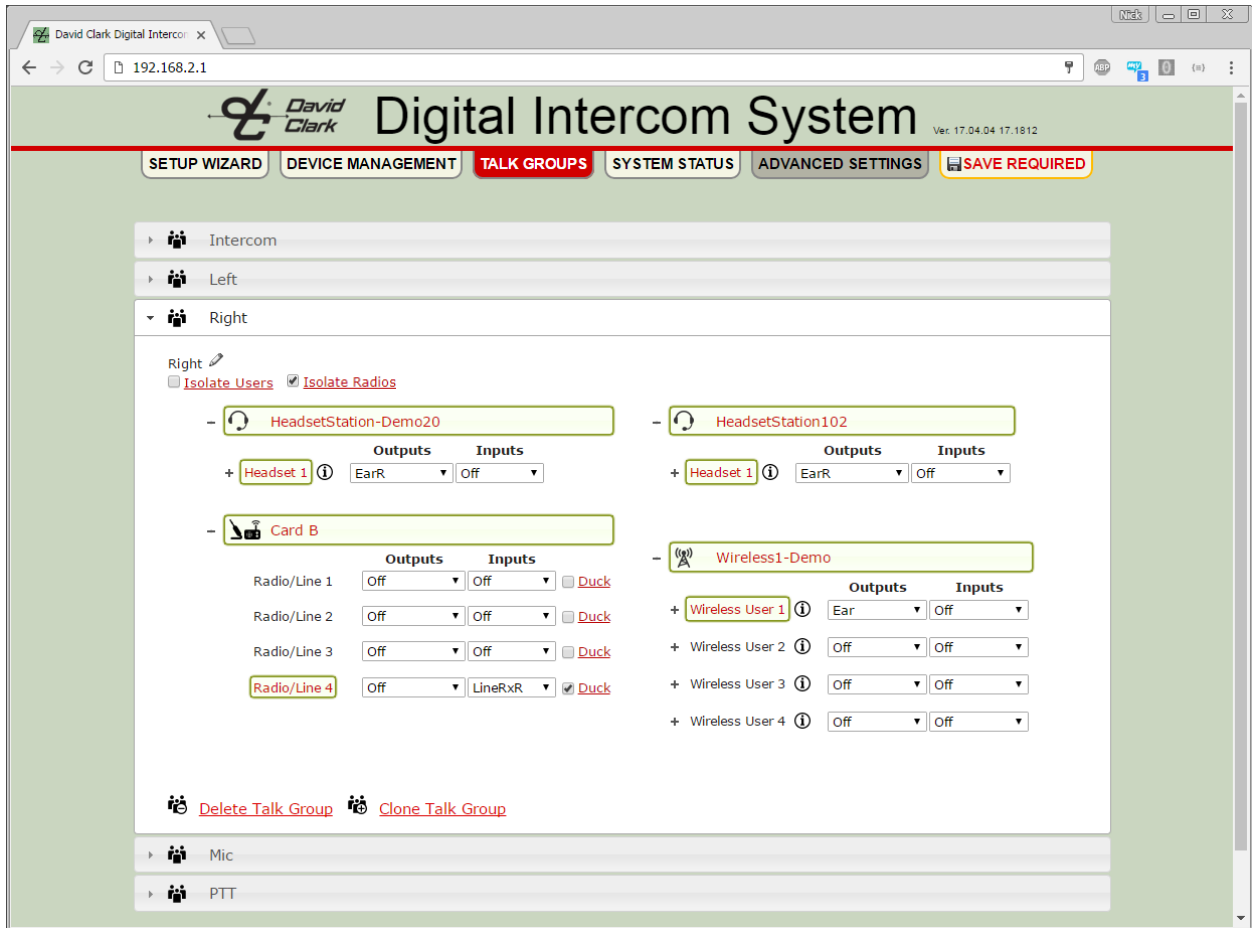
Figure 8.19 Talk Group Example 5 – Left

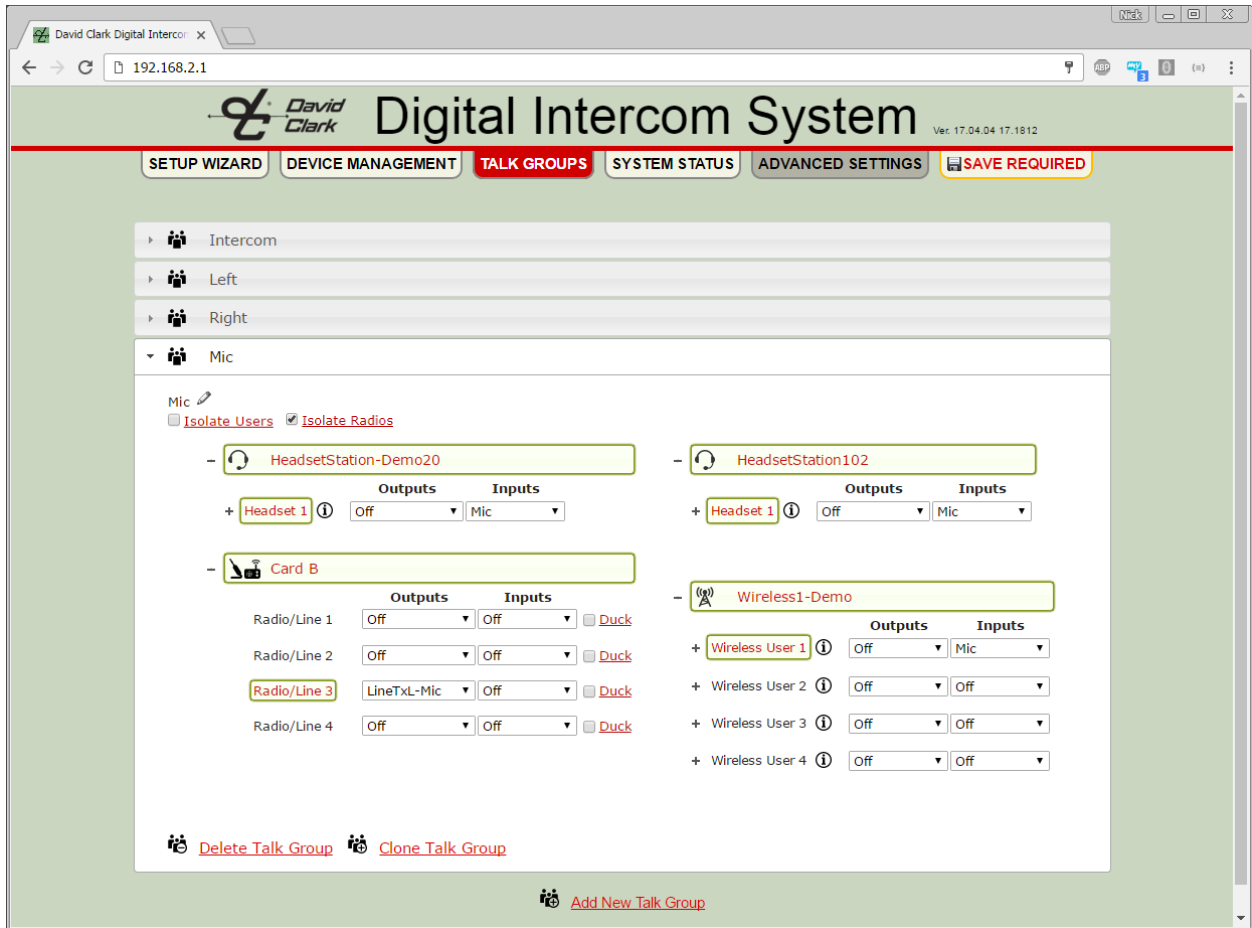**Figure 8.20 Talk Group Example 5 - Right**

Figure 8.21 Talk Group Example 5 – Mic

Figure 8.22 Talk Group Example 5 – PTT

Talk Group Example 6: Connecting to another intercom with sidetone

- Sidetone is the ability to hear your own voice.
- This example outlines the steps to connect an external intercom with sidetone to Radio port 1.
- This example will configure talking to the external intercom only when PTT is pressed.
- This example will configure listening to the external intercom only when PTT is not pressed.
- Because the intercom has sidetone, an echo can be heard when a user speaks over it.
- This example will eliminate this echo.

<u>Steps</u>

1. If desired, follow previous examples to create a talk group named "Intercom".
2. Create a new talk group named "External Intercom".
3. Expand the Headset or Wireless users to be part of this group.
4. Optionally expand further to reveal selections (see previous examples).
5. Under **Outputs** for each device, select **All Rx-PTT:Off** (or just **Ear-PTT:Off** for Wireless).
6. Under **Inputs** for each device, select **Mic-PTT:On.**
7. Expand the Radio/Aux card.
8. Under Radio 1 **Outputs**, select **Radio Tx**.
9. Under Radio 1 **Inputs**, select **Radio Rx**.
10. Click **SAVE REQUIRED.**
11. When the operation is complete, users of this group are now able to hear the external intercom when not pressing the PTT, and talk over the external intercom while pressing PTT. When PTT is pressed, the users will not hear the external intercom.
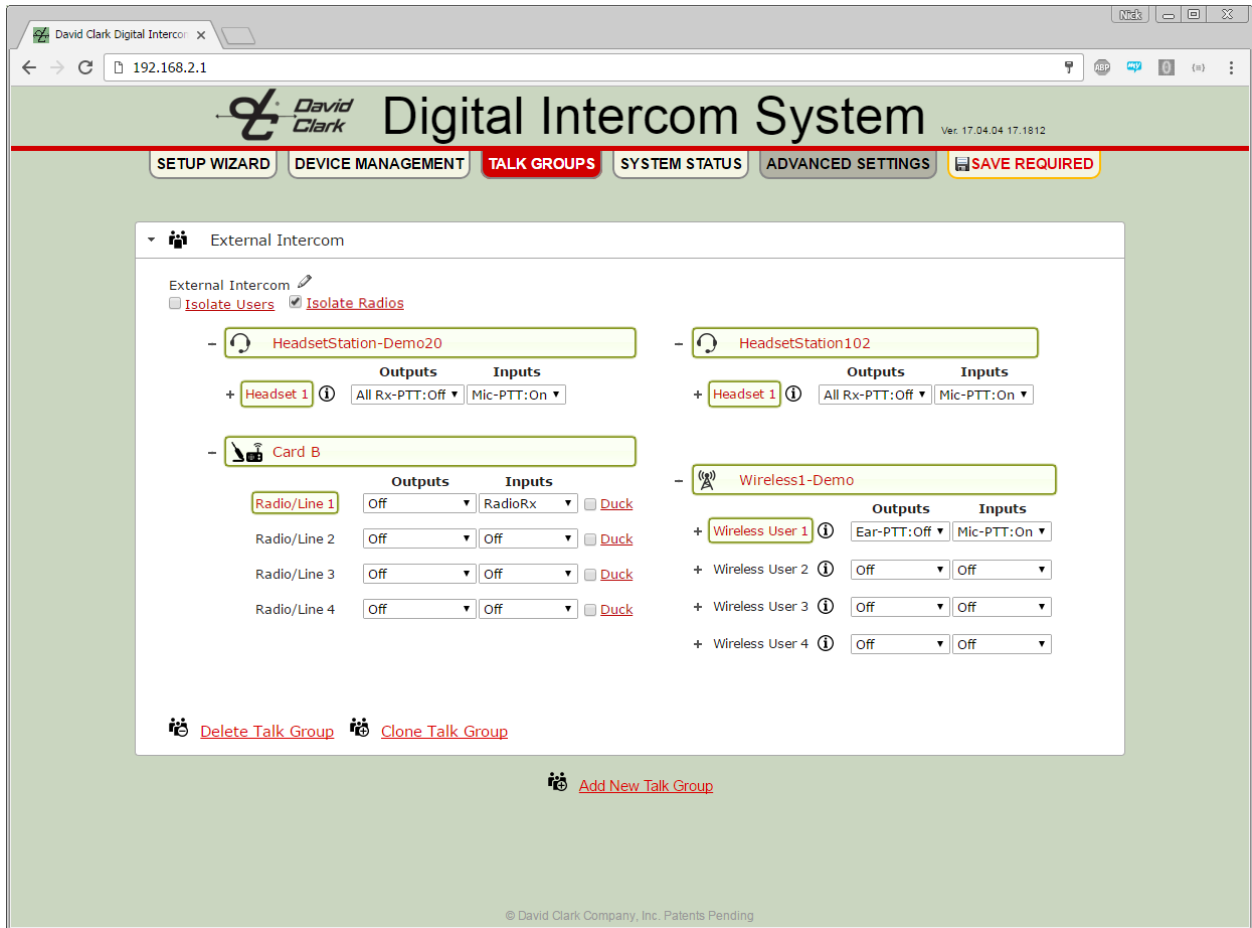12. See **Figure 8.23.**

Figure 8.23 Talk Group Example 6 – External Intercom

Headsets

Donning/Positioning

Each Headset should be worn so that the ear seals fit snugly against the head, and the ears are fully enclosed within the inside of the ear seals. Adjust the microphone boom so that the microphone is positioned no more than ¼" from the lips. Using the Headset in this manner ensures optimal performance, especially in high-noise environments. For more detail on proper fit, maintenance and cleaning instructions, please refer to individual Headset documentation packaged with Headset or download at www.davidclark.com.

To connect Headset to Headset Station or Wireless Belt Station, align red keyways and push. Pull back gently on the connector (behind the quick-release collar) to ensure it is properly locked. To disconnect, pull back on the quick-release collar.

Volume Controls

The Series H9100-series Headsets have individual volume controls for the right and left ears (dual-ear models). This provides the wearer maximum flexibility to adjust volume and balance.

PTT Switches

The H9100-series Headsets have PTT switches conveniently located on the mic boom, just behind the microphone. These can be used to transmit over a talk group or a two-way radio. Additionally, each PTT may have a separate function defined.

See **8. Operation and Programming** for more information.

Multi-Master Systems

A single Master Station is capable of managing up to 32 channels of audio from endpoints. Headset Stations use two channels because they have stereo audio. Wireless Belt Stations use one channel. Therefore 16 wired endpoints or 32 wireless belt stations can be managed by a single Master Station. When a larger amount of endpoints are required, multiple master stations can be used together to extend the system.

Calculating the Quantity of Master Stations Required

The number of master stations required for a system can be calculated as follows (round up to the nearest whole number):

$$\frac{(\text{Headset Endpoints x 2}) + (\text{Wireless Endpoints x 4}) + \text{Number of talk groups required between Master Stations}}{32}$$

Note: Number of Master Stations x Number of talk groups must not exceed 32.

Connecting the Master Stations

Ethernet cables must be used to connect all Master Stations to each other. Endpoints may then be connected to any Master Station. Note that PoE switches (non-DCCI) might be necessary to provide connectivity to all endpoints. Alternatively, additional Master Stations can be used to provide connectivity. Each Master Station must be connected to its own DC power supply.

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One Master Station should be designated as the "Primary Master". Other masters are considered "Secondary Masters". It is on the Primary Master that the majority of the configuration will take place and it is configured first.

Important: Secondary Masters must be configured as *DHCP Client.* Additionally, *Smart DHCP* must be disabled. It is recommended to change the HOSTNAME of each Secondary Master and use the HOSTNAME in the browser location field to access the user interface. See Networking Settings.

Auto Configure

When additional Master Stations are detected on the network, the Auto Configure page will list them with the rest of the devices as shown in **Figure 8.24.**
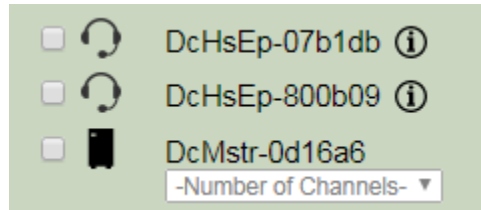
Figure 8.24 Multi-Master Auto Configure

The number of channels to connect to each Master Station must be specified by the user. The number of channels is defined as the "Number of Groups Between Master Stations" which is the same number used in the calculation above. Valid options are 1-31.

Next, each device must be associated with a Master Station. This process allows the user to indicate which devices are local to each Master Station. Local systems can operate independently of one another and have the option of being connected together into one large system. Device association is performed by a drag-and-drop mechanism as shown in **Figure 8.25**.
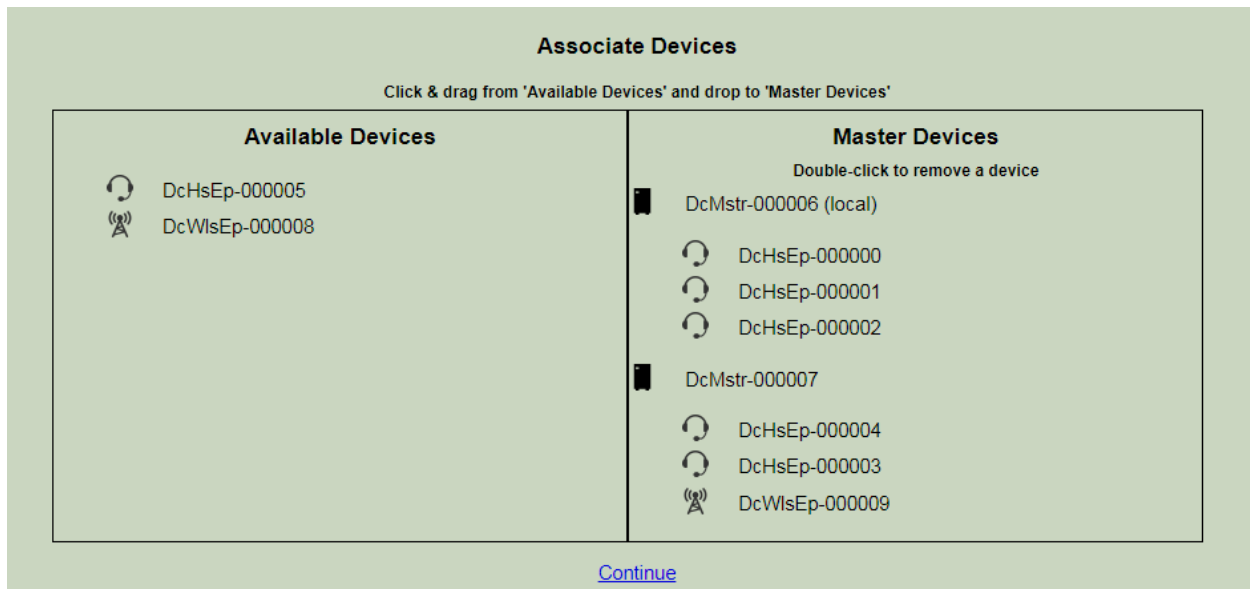
Figure 8.25 Associate Devices

Important: Auto Configure is to be run <u>only</u> on the Primary Master. Do NOT run Auto Configure on the Secondary Master Stations.

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Configuring Talk Groups

Talk groups must be configured on each master station in the system. It is recommended to start with the Primary Master. When configuring talk groups, inter-master channels must be added to each talk group in order for the talk group to be linked to talk groups on other master stations. The inter-master channels will be shown in the talk groups as shown in **Figure 8.26.**
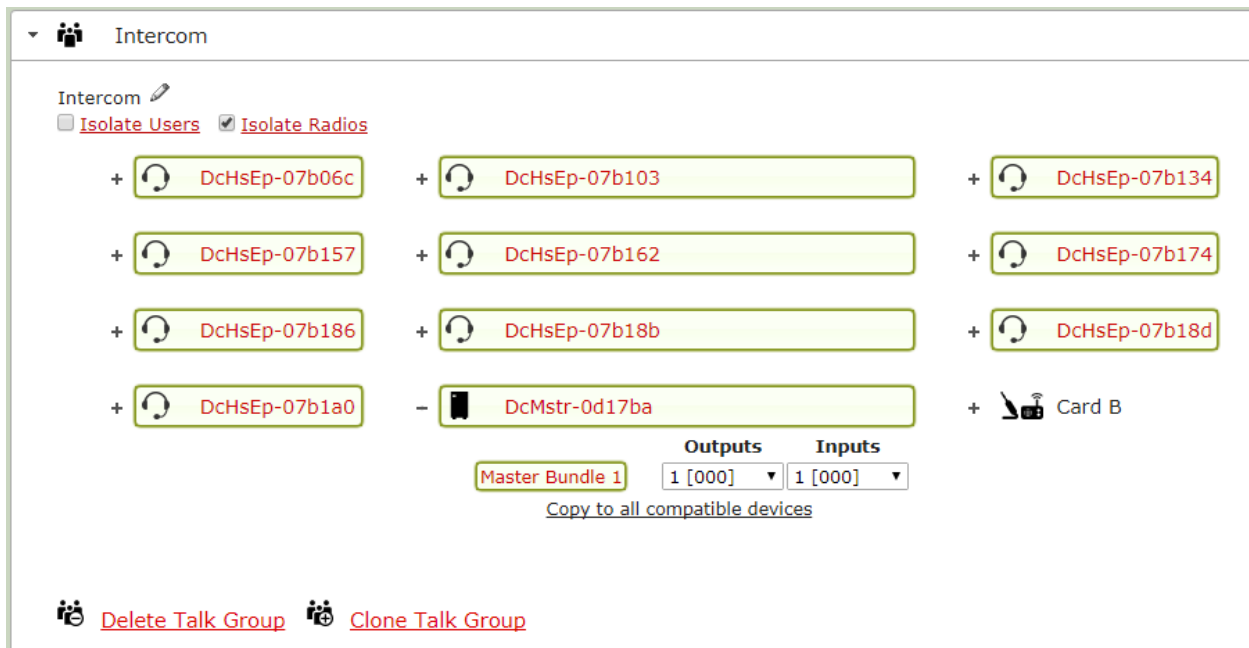
Figure 8.26 Multi-Master Talk Group

Each talk group must have a pair of channels selected from the Secondary Master. Make note of the channel number. In the example above, channel 1 is selected for both Input and Output.

Important: Use a new pair of inter-master channels for each talk group.

When finished with talk groups on the Primary Master, connect to the User Interface on each Secondary Master. Once connected, go to Talk Groups, and create talk groups mirroring those on the Primary Master. Select the same channels for the inter-master connection as the corresponding group on the Primary Master. This links the talk group on the Primary Master to the talk group on the Secondary Master and allows two-way audio to pass between them as if they were a single group.

Radios

Radio audio works normally in a multi-master system but radio PTT is not possible across inter-master channels. If radio PTT is necessary the PTT lines from the radio must be brought into a radio card on each Master Station via a separate radio interface cable for each. Only the PTT Hi/Lo connections are necessary. The **RadioTx** channel must be selected in the appropriate talk groups on *each* Master Station to facilitate PTT.

Importing/Exporting

Importing and exporting works normally in a multi-master system however each master station must be imported/exported separately and stored as separate files.

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9. Testing & Troubleshooting

Parts/Tools Required

- ❑ Completion of the previous installation sections in their entirety
- ❑ An assistant (recommended)

Test Procedure

- ❑ Double-check all connections and wiring from the previous sections.

- ❑ Complete connections of power cables to power source.

- ❑ Turn on power at the pick-off point/source.

- ❑ Connect a computer/laptop via Ethernet cable to one of the switch card ports on the Master Station.

  - o If all switch card ports are used, a PoE splitter such as CyberData #011187 or a PoE capable Ethernet switch may be used.

- ❑ After approximately 30 seconds, open a web browser and go to **http://192.168.2.1**

- ❑ Once the system initializes, click DEVICE MANAGEMENT

- ❑ Verify that all installed devices are present on this list, including add-in cards.

- ❑ To test audio and radio/aux connections, see **8. Operation and Programming**.

Troubleshooting

If the system does not function properly, it can be reset by powering off the Series 9100 Digital Intercom System and then powering it back on.

Most problems are a result of improper setup. The first step in troubleshooting should always be to perform the SETUP WIZARD again.

Symptom	Possible Cause(s)
Cannot access web user interface	1. Is power applied to Master Station? Allow 30s for complete boot up. 2. Is computer connected to a Switch Card via Ethernet? 3. Did you previously change the IP settings in the user interface? 4. If all else fails, perform a Factory Reset
Device(s) missing on DEVICE MANAGEMENT	1. Check/replace Ethernet cabling to missing device(s). 2. Try a different port on the Switch Card. 3. Replace device.
Not able to communicate to other users/radios as expected	1. Verify configuration (see the Talk Group examples). 2. Repeat SETUP WIZARD.
Radio audio problem (low/high/distorted/etc.)	1. Verify configuration (see the Talk Group examples). 2. Radio turned on? 3. Adjust radio audio levels in DEVICE MANAGEMENT 4. Check radio settings/wiring. 5. Repeat SETUP WIZARD.
Muffled audio/high background noise	1. Keep mic as close to the mouth as possible when speaking.

Table 9.1 Troubleshooting

Factory Reset

A factory reset will clear all user and network settings. The system will have to be reconfigured.

❑ Disconnect the power cable.

❑ Remove the six main screws on the Master Station enclosure (see Fig. 11.1)

❑ Lift the top assembly out of the bottom enclosure.

❑ Reconnect the power cable.

❑ Find the button labeled FACTORY RESET on the bottom of the main PC board.

❑ Press and hold FACTORY RESET for at least 30 seconds.

❑ The Master Station will restart with factory settings and the web user interface will be available on http://192.168.2.1 using default credentials.

❑ Replace the six main cover screws and tighten to **6 lb.- in. (68N-cm).**

10. Fuse Kit

<u>P/N 41090G-22 Waterproof Fuse Kit</u>
<u>Installation Instructions</u>

<u>Parts/Tools Required</u>

❑ 1/8-inch diameter heat shrink tubing
❑ Wire strippers
❑ Crimp tool (Thomas & Betts WT-11-M or equivalent)
❑ Crimp terminals
❑ 10-Amp fuse kit

<u>Procedure</u>

❑ Using a heat gun, install 1/8" diameter heat shrink tubing* over one end of the 4" red wire (supplied). Install the second piece of 1/8" diameter heat shrink tubing over the red wire on the C91-20PW Power Cable.

❑ Thread red wire of power cord with heat shrink tubing* into one end of fuse holder.

❑ Thread the heat shrink end of the 4-inch red wire into other end of fuse holder.

❑ Strip insulation on both wires 1/4 inch.

❑ Crimp fuse clips to both wires.

❑ Insert 10 amp fuse.

❑ Snap two halves of housing together.

* Note: The heat shrink tubing is necessary in order to provide weather tightness.
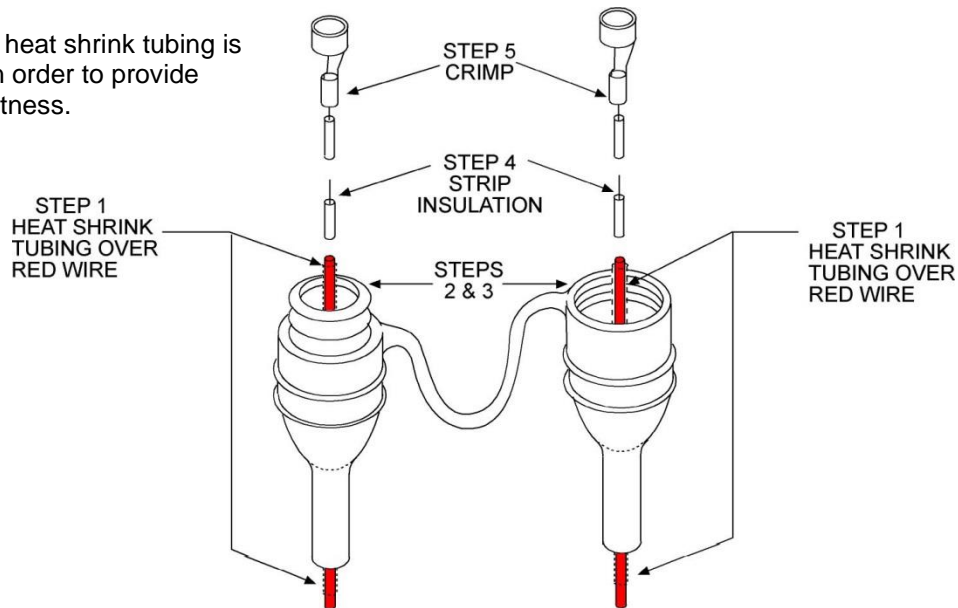

Figure 10.1 Proper assembly of Fuse Holder Kit (41090G-22)

11. Add-In Cards

Adding/Removing Master Station Add-in Cards

To add or remove an add-in card the Master Station must be opened. The procedure below must be followed correctly to maintain IP67 integrity and to prevent damage to the Master Station and Add-in Cards.

Parts/Tools Required

❑ #1 and #2 Philips bits
❑ Torque wrench capable of measuring 2 - 6 lbf-in (20 - 70 N-cm) of torque

Procedure

> *STATIC HAZARD – Static electricity can damage components.*
> *Therefore, be sure to ground yourself before handling components.*

> *IMPORTANT: Failure to observe torque specifications will result in*
> *a compromise of IP67 integrity.*

Disassembly

1. Disconnect all radio and Ethernet cables from the Master Station. Mark them if necessary for reconnection later.
2. Remove the six main cover screws (**Figure 11.1**).
3. Remove the enclosure bottom.
4. Disconnect the power cable assy from the main PCB assy (**Figure 11.2**).
5. Remove the four screws which attach the main PCB assy to the standoffs (**Figure 11.3**).
6. Gently remove the main PCB assy from the cover assy and set aside.

Adding card(s)

1. Remove the eight screws from the blank plate and remove the plate (**Figure 11.4**).
2. Ensure there are gaskets on each of the four ports of the card and that no leftover gaskets are stuck to the backside of the front panel.
3. Insert the new card into the plastic cover and tighten the eight screws to **3 lb-in (34 N-cm)**.

Removing card(s)

1. Remove the eight screws from the card and remove the card (**Figure 11.4**).
2. Ensure there are gaskets on each of the four ports of the blank plate and that no leftover gaskets are stuck to the backside of the front panel.
3. Insert a blank plate into the plastic cover and tighten the eight screws to **3 lb-in (34 N-cm)**.

Reassembly

1. Gently attach the main PCB assy to the cover assy, ensuring the "fingers" on the add-in cards line up with and insert fully into the connectors on the main PCB assy (**Figure 11.3**).
2. Tighten the four screws which attach the main PCB assy to the standoffs to **2 lb-in (23 N-cm)**.
3. Reconnect the power cable assy to the main PCB assy (**Figure 11.2**).
4. Place entire assembly back into enclosure bottom (**Figure 11.1**).
5. Replace the six main cover screws and tighten to **6 lb-in (68 N-cm)**.
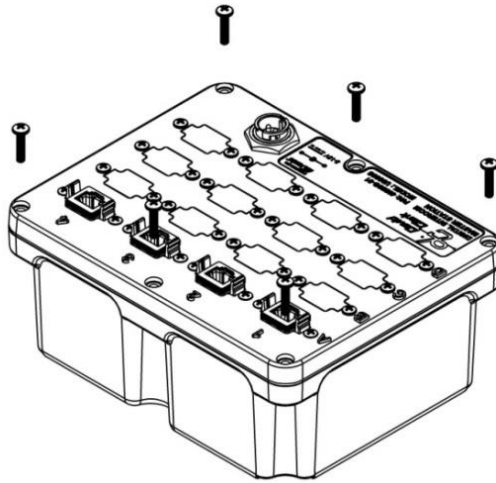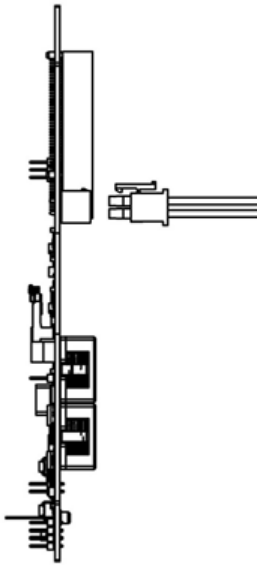
Figure 11.1 Main Cover Assembly
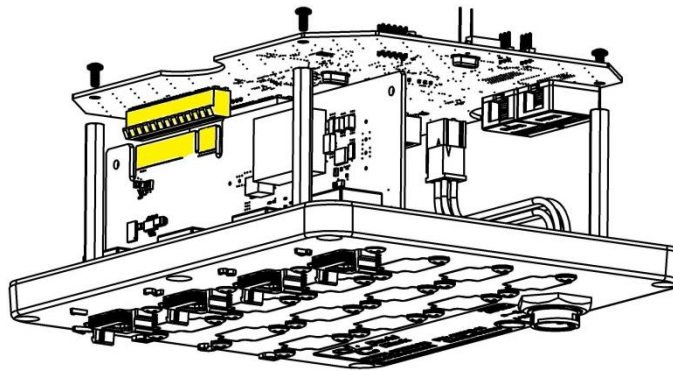

Figure 11.2 Power Connection

Figure 11.3 Main PCB and Add-In Card Assemblies
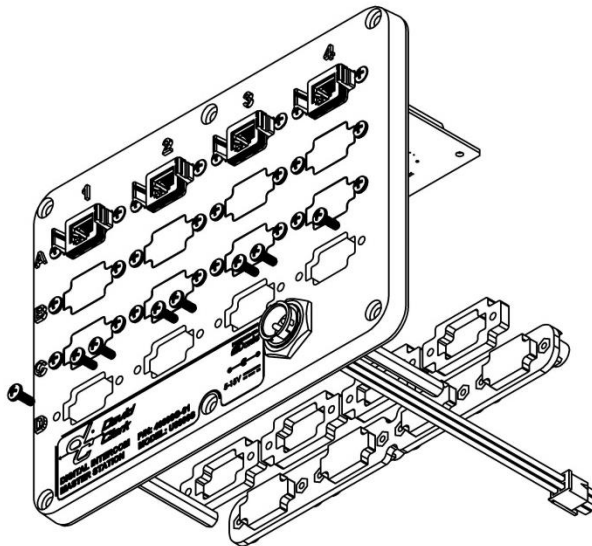
Figure 11.4 Adding/Removing Add-In Cards

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12. Technical Specifications

ELECTRICAL	
Power Requirements	11-30VDC (10A max., depending on system configuration)
Power Distribution	Power-over-Ethernet (802.3af)
Radio Connectivity	See U9102 or U9104
Auxiliary Connectivity	See U9102
System Cable Type	CAT5e (stock) or CAT6
Intercom Connection Scheme	RJ-45 type

MECHANICAL	
Mounting Method (where applicable)	Surface (included) or Flush/Rack Mount Kits (optional)
Enclosure Material (where applicable)	Polyethylene

COMPLIANCE	
	MECHANICAL
Ingress Protection	IP67, per IEC 60529, with proper installation
Operating Temperature*	-40° to +185°F (-40° to +85°C), per MIL-STD-810G
Storage Temperature*	-40° to +158°F (-40° to +70°C), per MIL-STD-810G
Aggravated Humidity	Per MIL-STD-810G
Functional Shock	Per MIL-STD-810G
Operational Vibration	Per MIL-STD-810G
Salt Fog	Per MIL-STD-810G
	ELECTRICAL (WIRED)
Immunity to DC Power Line Transients	Per EN 301 489-1 (ISO 7637-2)
Radiated and Conducted Emissions	Per EN 301 489-1, FCC Part 15
Electrostatic Discharge	Per EN 301 489-1
Radiated Immunity	Per EN 301 489-1
Electrical Fast Transient Burst	Per EN 301 489-1
Conducted Immunity	Per EN 301 489-1
	ELECTRICAL (WIRELESS)
Specific Absorption Rate (SAR) Compliance	Per IEEE 1528-2003, OET Bulletin 65, RSS-102 & Safety Code 6
DECT Harmonized EN	Per EN 301 406
EMC & ERM, Short Range Devices	Per EN 300 330-1, EN 300 330-2
Electrostatic Discharge	Per EN 61000-4-2
Radiated Immunity	Per EN 61000-4-3
EMC & ERM for Radio Equipment and Services, Part 1	Per EN 301 489-1
EMC & ERM for Radio Equipment and Services, Part 6	Per EN 301 489-6
CB Scheme	Per IEC 60950

* Not applicable to Wireless Belt Stations or Battery Charger
See individual product Data Sheets for more information

Table 12.1 Technical Specifications

FCC Part 15 Statement

RADIO AND TELEVISION INTERFERENCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You may also find helpful the following booklet, prepared by the FCC: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402.

In order to maintain compliance with FCC regulations shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio & television reception.

Industry Canada Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Unauthorized Changes

Changes or modifications not expressly approved by David Clark Company, Inc. could void the users' authority to operate the equipment.

Usage Restrictions

Due to the UPCS frequencies used, this product is licensed for operation only in the United States of America and Canada, and those countries that have approved the DECT 6.0 Standard.

FCC Radiation Exposure Statement

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of your body.