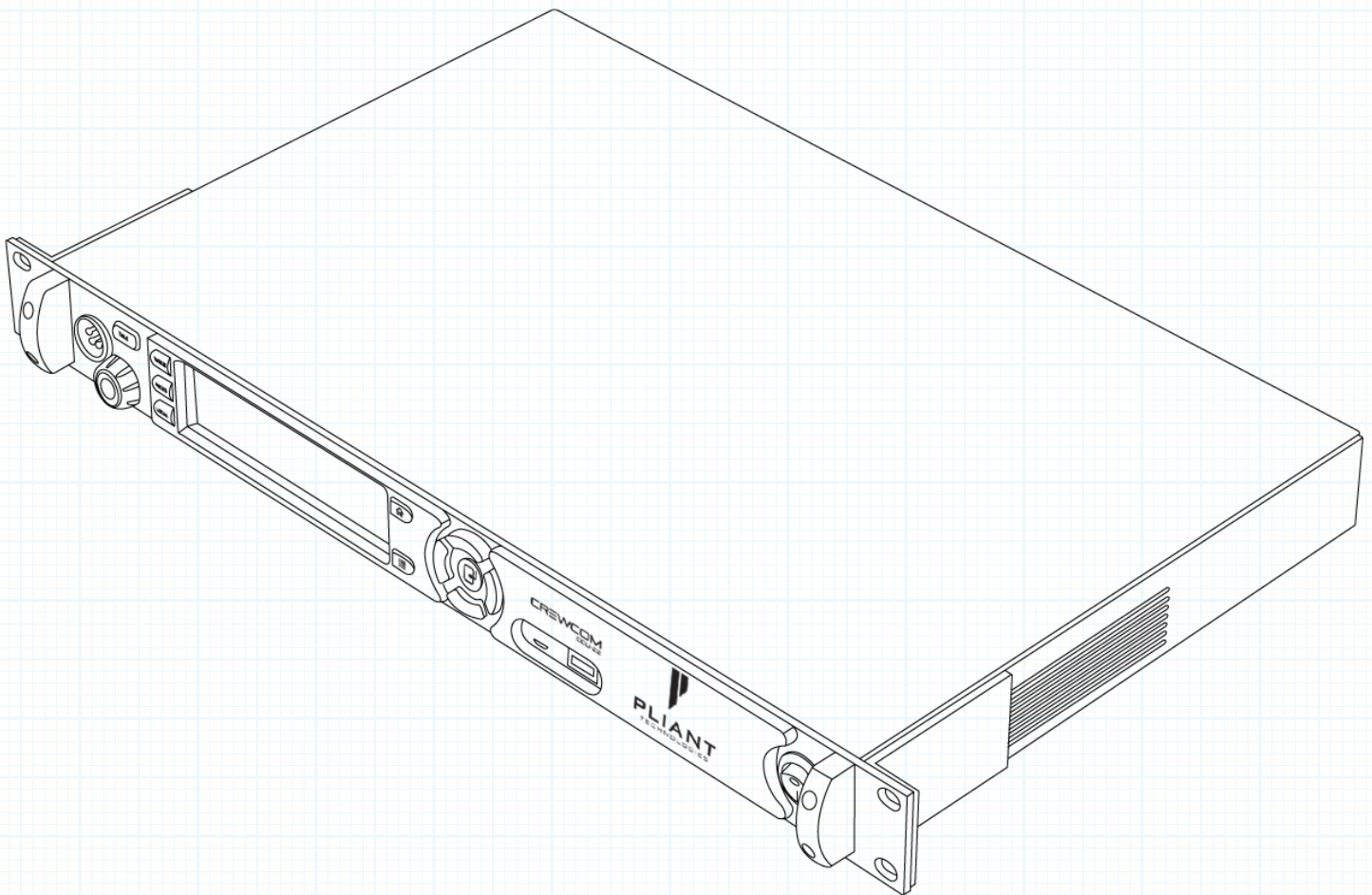


Control Unit

CREWCOM
BY PLIANT

O P E R A T I N G M A N U A L



Thank You

We at Pliant® Technologies want to thank you for purchasing CrewCom®. Pliant brings our experience, expertise, and commitment to quality technology with the new CrewCom System. In order to get the most out of your new CrewCom product, please take a few moments to read this manual completely so that you better understand the operation of this product. For questions not addressed in this manual, feel free to review the additional support documentation provided on our website or to contact Pliant's Customer Support Department:

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Model Information

This document applies to models CCU-22 and CCU-44.
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Safety Information

The following section details important safety information related to the ownership and operation of the CrewCom Control Unit.

**WARNING:**

Indicates a situation, which, when not avoided, has the potential to result in death or severe injury.

**CAUTION:**

Indicates a situation, which, when not avoided, results or has the potential to result in minor injury or product failure or damage.

1. Read these instructions.
2. Follow all instructions.
3. Heed all warnings.

Safe Operation Recommendations

- Install and operate in accordance with manufacturer's instructions.
- Do not submerge the Control Unit in water.
- Do not set food, water, or other beverage containers on or near the unit.
- Do not place unit in areas where it will be exposed to weather.
- Plug the Control Unit directly into an AC power inlet. Avoid using extension cords to power unit.
- Ensure the power cord remains free from areas of foot traffic. Do not allow power cord to become crimped, twisted, or frayed.
- Clean by using a dry cloth only. Do not spray household cleaners or water onto the cloth. Never spray household cleaners or water onto any part of the unit.
- Use only attachments/accessories that are specifically made for or certified by Pliant Technologies with the Control Unit. Any attempt to modify ports in order to use cables or wires that are not manufactured specifically for or certified for use on this system will void the product warranty.
- Unplug the Control Unit during periods of inclement weather and after use.
- **Refer all Control Unit service to qualified Pliant Technologies service personnel.** There are no user-serviceable parts inside the CrewCom Control Unit. Opening the product may expose dangerous electrical components, which will result in product failure. Any attempt to self-service or self-repair the unit will void the product warranty.



CAUTION: To Service Person: Double Pole/Neutral Fusing hazards exist within the CU's internal power supply.

- Service is required if the Control Unit receives any type of damage to any of its parts or if it does not operate normally. For example, if water or any other type of liquid has been spilled on the Control Unit or if it has been exposed to rain or moisture, then service is necessary. Service is also required if debris or other objects have fallen into the unit or if it has been dropped.

Safe Installation Recommendations

- **Elevated Operating Ambient Temperature** - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified on page xx [cross ref to specs page].

- **Reduced Air Flow** - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical Loading** - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit Overloading** - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- **Reliable Earthing** - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips)."

Power Information



WARNING – DANGER! Users should exercise extreme care when working with electricity. Additional care should be used when working with electricity outdoors during inclement weather. When working outdoors or near water, always connect the system into a ground-fault interrupting circuit.

AC Power Connection Safety

- Always connect the power cord to the CrewCom Control Unit before connecting to the outlet.
- CrewCom Control Units are powered by an internal power supply. The cord to connect the internal power supply to the mains supply must conform to the following specifications:
 - » The mains power cord shall have an IEC C13 connector at one end and a mains power plug at the opposite end.
 - » An IEC C13 plug has three pins. The center pin carries the earth/ground. The remaining two pins carry neutral and live circuits.
 - » The conductors of the mains cords shall have adequate cross-sectional area for rated current consumption of the equipment.
 - » The mains plug that connects to the mains supply must be approved for use in the country in which the equipment will be used.
 - » The mains power cord must be an IEC mains 3-Wire grounding power cord complying with standard IEC60320; IEC320/C13.
 - » Mains power cords used in the U.S. must also comply with standard UL817.

Firmware Version 1.2 Release Notes

The following document is a list of features implemented with the latest CrewCom® firmware release.

Firmware Details:

Version	1.2.0.0
Release Date	September 28, 2018
Affected Models	CRP-22-900, CRP-44-900, CRP-22-2400, CRP-22-2400CE, CRP-44-2400, CRP-44-2400CE
	CRT-900, CRT-2400, CRT-2400CE
	CCU-22, CCU-44
	CHB-8C

Compatibility Note: To work together as a system, all connected devices must have firmware that matches the version installed on the Master Control Unit.

Device Parameters:

CrewNet supports the following:

- Up to 4 Control Units (CUs)
- Up to 72 Radio Packs (RPs): 4 CUs × 18 RPs per CU
- Up to 16 Radio Transceivers (RTs): any combination of 2.4 and 900*
- Up to 4 layers of Hubs (See Operational Notes for more information on Hub layers.)
- Up to 32 wired intercom/audio channel inputs (maximum of 16 2-wire and 16 4-wire across 4 CUs)
- Up to 64 Profiles
- Up to 64 Conferences
- This firmware version is not yet compatible with the following device models: CRP-22-900AN, CRP-44-900AN, and CRT-900AN.

**Maximum of 14 900MHz RTs on any single system (out of 16 total RTs). Systems may contain an even or odd number of RTs.*

Feature Notes:

- The Master CU is the control host for the CrewWare application via the LAN port.
- Available RP Function button options include Stage Announce and Call.
- Call on Talk is now supported.
- Stage Announce Relay is now supported.
- Auxiliary Audio Input (program audio) and Output are now supported. Audio supplied to Aux In can be assigned to any combination of up to 10 possible conferences. Audio supplied from Aux Out can be assigned from any single conference.
- Up to 4 Hub layers can be configured. The number of Hub layers is defined by how many Hubs are between the device and the Master CU.
- The following functions are not yet supported: GPIO Relays, Ping, High Density mode, User Access Rights management, hardwire Mic Kill, and CrewWare multi-client access to one system.

- The following CU menu options are not operational: Sync Priority, Device Settings (CU menu), RT Hopping Patterns, and RT Radio Band; however, these settings can be managed via CrewWare while offline (requires save/upload of new CrewCom Configuration File (.ccf)).
 - » By default, the first Control Unit added to the CCF is automatically assigned the Master sync priority. Every CCF must contain one Master Control Unit. Secondary and Tertiary sync priority assignments are not currently operational.
- Out-of-the-box dynamic configuration of hardware is not yet supported. CrewWare is required to build a configuration files (.ccf).

Enhancements:

- Updated CrewWare user interface to remove/disable non-operational features that were previously visible.
- Added ability to upload CCF to your system from CrewWare via network LAN connection.

Operational Notes:

Firmware Updates

- The user will need to disable the Windows firewall in order to install CrewWare.
- When updating firmware from previous versions via USB, devices may require additional rescan. See the “How to Update Firmware via USB” tutorial and/or the CrewWare Manual for further detailed instructions on this process.
- Following system firmware updates, a complete power down and restart of system is recommended. Upon restart, Radio Transceivers will finish updating the radio. This will be evident by the alternating flashing of the RX and TX lights. Once this sequence ends per RT, the device is ready. See the “How to Update Firmware” document and/or the CrewWare Manual for further detailed instructions on this process.

Configuration and Startup

- If updating from firmware version 1.1 or older, you must save your CCF in the new version to match existing settings to added features. Do so with the following steps:
 - » After updating device firmware, connect CrewWare to your CU via LAN connection, and go “live.”
 - » In CrewWare, click **File** then **Save File As...**; then select a file location, name your file (8 characters or less), and save it. This CCF is now updated.
 - » In CrewWare, click **File** then **Upload File...**, then navigate to your saved file (.ccf) and choose it. Follow the CrewWare and CU prompts to upload the file and restart your system.
- Moving device port or connection locations will cause configuration errors at startup. Pliant recommends avoiding connecting devices to a port different than that in the CCF.
 - » Once the system is powered on, you can tell that a configuration error has occurred with the system if the TX LED on one or more connected RTs is not lit and if the associated RPs do not log in. The configuration error may be present in the RT or other device upstream. If you are connected to CrewWare, it will alert you of any firmware or configuration errors needing resolution.
- CCF uploads from USB and from CrewWare are now supported.
 - » Uploading the CCF via USB is done by saving the .ccf from CrewWare to a USB drive, manually uploading the saved file to the Master CU, and rebooting the system once more. Deleting the old CCF is no longer a required step of this process.
 - » Uploading the CCF via CrewWare is done by selecting the **Upload File...** option from CrewWare's file menu. While uploading, CrewWare will notify you of any configuration exceptions. Follow the CrewWare prompts for the upload and reboot your system when prompted by the CU LCD.

- Adding and removing devices (such as an RT) in live mode (often referred to as “hot-plugging” or “hot-swapping”) may cause system errors to occur. Pliant recommends only performing this type of action when the system is powered off.
- Upon startup, non-Master CU(s) (if applicable) may require up to 60 seconds to complete the CCF load. The LCD screen will display load progress messages during this time.
- Any change to RF parameters such as hopping pattern or radio band will require RPs to be repaired.
- To avoid an RP going inactive, Pliant recommends ensuring your CUs and RTs are powered on and ready prior to powering on the RPs. An RP will enter inactive mode if it cannot establish communication with an RT. If an RT becomes available, an inactive RP can be prompted to attempt to re-establish communication by pressing the RP Menu button.
- Changes to CU port names made in live mode do not save in the CCF. To save changes, save the .ccf from CrewWare, reload the file to the system from CrewWare, then reboot the system.
- Pliant recommends that Hubs be externally powered with local power supply (provided).

LAN Settings

- When changing LAN settings from the CU front panel, a reboot is required before operation. Pliant recommends waiting about 60 seconds after making the change before powering off the CU.
- Disconnecting the LAN connection while in live mode will require a system restart to reconnect CrewWare to the Control Unit; therefore, Pliant recommends only performing this type of action when the system is powered off.

CrewWare Interface

- CrewWare’s “Device Management” tab (individual device detail view) does not currently populate with the accurate Radio Version or Powered By data (for RTs). It also does not populate with the accurate Operational Status indicator (for CUs and RTs). This does not affect operation.

Introduction

What's in the box?

- Control Unit
- AC Power Cord
- USB A to Micro B Cable
- Cat 5e cable, 15 ft. (4.6 m)
- Quick Start Guide
- USB Flash Drive that includes product documentation
- Warranty Extension Registration Card

Note: A one-year product warranty is standard with CrewCom products. Follow the product registration instructions on the Warranty Extension Registration Card and visit www.plianttechnologies.com/customer/account/login to extend your product warranty to two years at no charge. See page 42 for more information about Pliant warranties.

Additional Items Required

In addition to your Control Unit, at least one of each of the devices listed below is required to complete your CrewCom System (sold separately with included components):

- Radio Transceiver
- Radio Pack
- Headset

CrewCom Overview

CrewCom is a versatile yet straightforward communications solution built on an intelligent wireless and wired network-based distributed system architecture. Innovative technologies have been specifically developed to facilitate intercom system growth and effortless adaptation, along with unparalleled digital wireless reliability for consistent operation, even in the most demanding production environments.

Decentralized Network Architecture

The CrewCom system utilizes a proprietary network backbone, known as CrewNet™, to coordinate and transport all system timing, audio, signaling, and controls. This efficient, decentralized resource network delivers increased flexibility over that of traditional technologies, using a distributed network-to-device intelligence within a modular building block structure. System components can easily be placed where they are needed or scaled to facilitate system growth, reconfiguration, and effortless adaptation to changing environments. For increased infrastructure flexibility, the CrewNet network is capable of operating over standard Cat 5e (or greater) and/or Single Mode Fiber (SMF) connections.

Flexible RF Platform

CrewCom's RF platform is vast and flexible to meet the needs of virtually any wireless communication challenge facing production and entertainment professionals worldwide. Each CrewCom wireless product is available in the 2.4GHz and 900MHz (North America, Australia, and New Zealand only) ISM bands and any combination of these frequency ranges may be simultaneously used on the same CrewCom system. CrewCom makes it easy to operate in challenging RF environments by combining support for multiple simultaneous frequency bands, while also allowing for simple system setup without the need for an RF engineer.

In addition, a more robust RF link enhances RF range and reliability through a newly developed dual carrier double-send transmission scheme that minimizes the adverse effects of inter-symbol interference. This innovation allows increased useful RF range and improved performance, especially in large, reflective environments.

Intuitive User Experience

CrewCom's family of products is designed around a system architecture that offers a high density of users with a more manageable infrastructure and lower cost per user than typically found in large-scale wireless installations. The CrewCom system not only consists of a range of wired and wireless hardware products but also incorporates an intuitive software application, known as CrewWare, working together with the system hardware to enhance the experience of system administrators, designers, integrators, and users. Each device's user interface allows a quick learning curve with high functionality, and its ease of use is consistent across all frequency bands, types of users, and applications.

CrewCom Devices

The following is a list of available CrewCom devices. For more information on each of these products and their configuration capabilities, visit our website at: www.plianttechnologies.com

- **Control Unit (CU)** – the 1RU foundational element of the CrewCom system that establishes the CrewNet-based infrastructure while also providing external connections to common established intercom systems. Unlike traditional BaseStations, the CU contains no radio and is frequency agnostic, which sets the groundwork for a multi-frequency capable system. For maximum flexibility, any CU can access, control, and monitor any active device across CrewNet. The CU is available in a "CCU-22" or "CCU-44" model, which simultaneously support up to (2) 2-Wire and (2) 4-Wire or (4) 2-Wire and (4) 4-Wire intercom connections, respectively.
- **Radio Transceiver (RT)** – a CrewCom radio device that houses a transmitter and receiver (2.4GHz or 900MHz) and its corresponding antennas, enabling RF communications to CrewCom Radio Packs. Using the CrewNet network as the system's backbone, RTs can be positioned throughout a wide coverage area by being linked back to a Control Unit either directly or through a Hub(s). Connectivity is accomplished using either Cat 5e (or greater) or Single Mode Fiber (SMF).
- **Radio Pack (RP)** – the direct portable wireless communication device connecting individual CrewCom users to the CrewCom system. Each RP provides full duplex audio communications and, through customized function buttons, General Purpose Output (GPO) control and event logging. The RP requires a connected headset and access to a Radio Transceiver on the CrewCom system. Devices are available in 2.4GHz and 900MHz bands as well as two and four volume/talk button configurations.
- **Copper Hub** – a CrewNet-based device with eight ports to allow extended interconnection for a variety of CrewCom hardware. Ports one through seven are copper (RJ-45, Cat 5e, or greater); port eight can be either an additional copper port or a duplex LC Single Mode Fiber port, but only one may be used at a time. The Hub provides for extensive system expansion and flexibility.
- **Fiber Hub** – a CrewNet-based device with eight ports to allow extended interconnection for a variety of CrewCom hardware. Ports two through eight are duplex LC single-mode fiber ports; port one can be either an additional fiber port or a copper port (RJ-45, Cat 5e, or greater), but only one may be used at a time. The Hub provides for extensive system expansion and flexibility.

CrewCom Configuration File Overview

The CrewCom system operates using a CrewCom Configuration File (CCF) to coordinate the processes and data that make up the system's operation. A default CCF is available for your CrewCom system out-of-the-box to provide your initial settings. You can use CrewWare to customize your configuration to meet your specific needs beyond the default settings. The CCF stores the settings for your Conferences and Profiles, intercom settings, and connection information for your 2-Wire, 4-Wire, and CrewCom devices.

Conferences and Profiles work together to create channels of communication between CrewCom users. They are defined for each user, stored in the CCF, and available each time you set up. For more information about Conferences and Profiles, continue reading the following sections for their definition.

About Conferences

A CrewCom Conference is an administrator-defined grouping of audio entities (inputs such as Radio Packs, wired intercom ports, etc.). Conferences are then created dynamically by mixing one or more audio entities and routing them to Conference subscribers accordingly. This method of subscription-based audio using Conferences is very powerful. Point-to-point associations may also be easily constructed using this method. Each association requires a separate, unique Conference. Conferences in CrewCom are full duplex (i.e. bidirectional) and there can be a maximum of 1,024.

Default Conferences are included as part of a system's default configuration. New Conferences can be created using CrewWare.

About Profiles

Each CrewCom Radio Pack has a Profile that contains a variety of system settings that are defined as either global profile settings or user settings. A Radio Pack Profile assigns functionality to an RP's local controls, knobs, and buttons (including Conference assignments), and allows customization for user preferences and roaming.

- **Global Profile Settings** – These settings are part of the CrewCom Configuration File and are usually assigned by a system administrator through customization in CrewWare during setup. Find a full list of the global profile settings available for each Radio Pack in the CrewWare Operating Manual or the Radio Pack Operating Manual.
- **User Settings** – A user setting is one that is classified as being adjustable by the Radio Pack user and is limited to local device settings that do not alter the CrewCom Configuration File. The Profile can be used to determine these settings, but they can also be customized directly from a Radio Pack after a Profile is loaded.

CrewCom Configuration File Defaults

Your system may be preconfigured at the factory. Consult the documentation provided with your system for your specific configuration details. Be sure to follow the hardware connections in your configuration; failure to do so may result in system errors.

About Network Power

Power-over-CrewNet (PoC) is a proprietary network protocol that carries operating voltage and current to CrewNet-compatible devices connected to the Control Unit via RJ-45 connections (Cat-5e or greater.) Control Units must receive AC power via the supplied power cord in order to operate and provide necessary PoC to connected CrewNet-compatible devices. In addition, PoC can be supplied to devices downstream from a locally powered CrewCom Hub or RT.

For CrewNet-compatible devices using fiber connectivity, local power must be supplied to that device using a Pliant 48VDC power supply (sold separately).

Product Overview

The CrewCom Control Unit (CU) is a rack-mount device built to withstand the rigors of road use and rental applications. It is the foundation for CrewNet. The CCU-44 is an 8-intercom-port CU with the ability to support (4) 2-Wire and (4) 4-Wire ports simultaneously, providing eight intercom inputs/outputs. The CCU-22 is a 4-intercom-port CU with the ability to support (2) 2-Wire and (2) 4-Wire ports simultaneously, providing four intercom inputs/outputs. A separate Radio Transceiver (RT) is required for RF communications. The CU is capable of supporting all models of CrewCom RTs at the same time (2.4GHz or 900MHz).

CCU-44

Control Unit Front

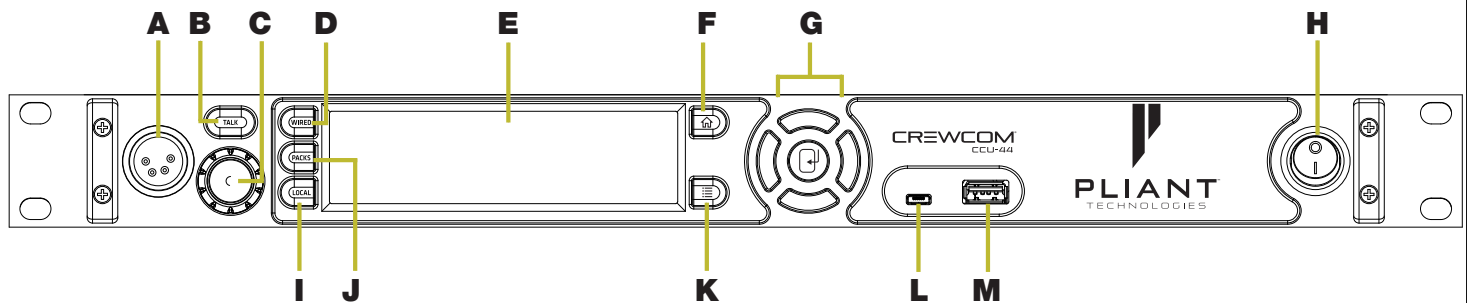


Figure 1: Control Unit Front View

(A) Local Headset Connection

The front panel headset connector is a 4-PIN XLR male. Use the "Local" button (letter I in Figure 1) to adjust local headset settings from the CU. A compatible headset must be provided by the user. See page 32 for connection pinout and headset wiring information.

(B) Talk Button for Local Headset

The Talk button works in conjunction with the Local Headset Connection. The Talk button enables or disables the microphone for the local headset. A white "TALK" LED will illuminate when the mic is enabled. This button has an intelligent latching function: one short press will latch the talk on; however, pressing and holding the talk button will cause the button to act as a momentary switch.

(C) Headset Volume Knob

Turning the Volume control adjusts the listening volume of the local headset.

(D) Wired Intercom Access Button

When pressed, the Control Unit LCD displays the Wired Settings screen.

(E) LCD Screen

Display for viewing real-time status of system, navigating menus, and making subsequent settings adjustments. The LCD screen is the focal point of the Control Unit's (CU) functionality. On the Home screen, the LCD displays the status of all Normal mode wireless Radio Packs that are currently paired to the CU. In the menu, the LCD shows the menu items or information.

(F) Home Button

If the user is currently viewing the Home operating screen, pressing this button toggles to the secondary operating screen. (See page 13 for more information.) If the user is currently viewing the CU menu, pressing this button returns them to the Home screen. This also serves as an escape button; no changes that may have been in process are saved if **Home** is pressed before saving.

(G) Navigational Controls

- Up – Moves the cursor or marker up on-screen; makes adjustments in edit mode.
- Down – Moves the cursor or marker down on screen; makes adjustments in edit mode.
- Left – Moves the cursor or level setting to the left on-screen.
- Right – Moves the cursor or level setting to the right on-screen.
- Enter (Center) – Selects the current cursor position or saves the current setting adjustment.

(H) On/Off Switch

Turns the power to the Control Unit on and off.

(I) Local Button

Opens the local headset settings on top of the current screen display, allowing for adjustments to the local headset settings. Press a second time to return to the previous menu.

(J) Radio Packs Button

Switches the Home screen to a selectable mode that allows selection of a (wireless) Radio Pack to edit its settings (via the navigational controls).

(K) Menu Button

Accesses the main menu system of the Control Unit. While in the main menu system, one press acts as an escape to return the user to the previous menu without saving any changes.

(L) USB Micro B

For connectivity to a computer when updating device firmware.

(M) USB A

For Radio Pack pairing, using a USB-to-Micro-USB cable, and for updating CrewCom Configuration Files (CCFs) via an external USB flash drive.

Note: The CrewCom CU is currently compatible with FAT and FAT32 formatted USB thumb drives (up to 16 TB drive size). Some operating systems (e.g., Windows 10) promote NTFS format, but only allow FAT32 formatting up to 32 GB. For help with formatting larger USB thumb drives, contact Pliant customer support at +334.321.1160 (option 3 for Service and Support).

Control Unit Rear

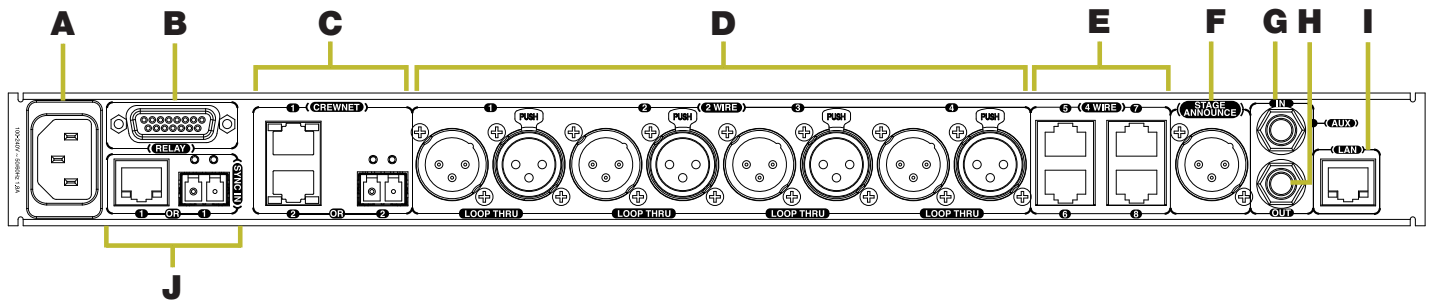


Figure 2: CCU-44 Back View

(A) AC Power Connection

100–240V, 50/60 Hz 0.8A (complies with standard IEC60320; IEC320/C13)

(B) RELAY Connection

CrewCom includes five General Purpose Output (GPO) contact closures for interfacing with other external devices (the Stage Announce (SA) Relay and four additional GPO relays). The user has access to both the normally open and the normally closed contacts for each relay. Rated load for all relay contacts: 0.3 Amp at 125VAC, 1 Amp at 30VDC. See page 36 for more information.

(C) CREWNET Ports (RJ-45 or Fiber)

The CrewNet ports allow the Control Unit (CU) to connect to other CrewCom devices, supporting a proprietary network design where all devices are part of a CrewCom Configuration File that shares data, timing synchronization, and audio. Up to two CrewNet connections are supported per CU using either two RJ-45 copper (Cat 5e or greater) ports or an RJ-45 copper and Single Mode Fiber (duplex LC connector) port. Any CrewCom device connected to CrewNet via a Cat 5e (or greater) cable will receive Power-over-CrewNet (PoC) from the CU via the CrewNet port. See the "Connecting to CrewCom Devices" section on page 14 of this manual for more details and exceptions.

Each CrewNet port's status LEDs indicate the status of the CrewNet link. See the "Operation" section on page 20 of this manual for more LED information.

(D) 2-WIRE Intercom Port (x 4)

The Intercom Channel ports (1, 2, 3, and 4) allow the user to connect the Control Unit to 2-Wire external intercom systems. The XLR-3M/F 2-Wire intercom ports interface with Clear-Com, RTS, AudioCom (Balanced), and other compatible intercom systems. The pairs of XLR-3M and XLR-3F are electrically identical—including the grounds—but the grounds of the four channels are electrically isolated from each other. Each connector pair is transformer isolated. The 2-Wire Intercom settings can be adjusted under the **Wired Settings** menu or via CrewWare. See page 27 for more information about configuring a 2-Wire Intercom connection.

(E) 4-WIRE Intercom Port (x 4)

The RJ-45 4-Wire Intercom ports (5, 6, 7, and 8) interface with 4-Wire intercom systems and devices. This is an audio-only port and does not support data transfer. The connector is balanced and transformer isolated. Nominal line level is +5 dBu. The 4-Wire Intercom settings can be adjusted under the **Wired Settings** menu or via CrewWare. See page 28 for more information about configuring a 4-Wire Intercom connection.

(F) STAGE ANNOUNCE (SA)

Stage Announce (SA) is used to output system audio to a dedicated audio output. SA uses an XLR-3M connector. The connector is balanced and transformer isolated. Nominal line level is +5 dBu. The SA output level can be adjusted under the **Wired Settings** menu or via CrewWare. See page 31 for more information about using Stage Announce.

(G) Auxiliary Audio Input (Aux IN)

Aux IN is used to supply program or other audio sources to the Control Unit. The Aux IN connector is a 1/4 in. (6.35 mm) Tip/Ring/Sleeve jack. The Aux IN connector is balanced and transformer isolated. Nominal line level is +5 dBu.

(H) Auxiliary Audio Output (Aux OUT)

Aux OUT is used to supply intercom audio sources from the Control Unit (CU). The Aux OUT connector is a 1/4 in. (6.35 mm) Tip/Ring/Sleeve jack. The Aux OUT connector is balanced and transformer isolated. Nominal line level is +5 dBu.

(I) Local Area Network (LAN) Port

The LAN port allows the Control Unit to connect to a network for configuration, control, and monitoring purposes using CrewWare.

The LAN port's LEDs indicate the status of the LAN link. See the "Operation" section on page 20 of this manual for more LED information.

(J) SYNC IN Port (RJ-45 or Fiber)

SYNC IN allows the Control Unit to receive and use a sync source (available CrewNet connection) from another CrewCom system, but not to connect to or be included in that system's configuration. This particular connection can support either an RJ-45 copper (Cat 5e or greater) port or a Single Mode Fiber (duplex LC connector) port, but not both at the same time.

Important: No audio is shared between synced systems.

Each Sync In port's status LEDs indicate the status of the sync link. See the "Operation" section on page 20 of this manual for more LED information.

CCU-22

Control Unit Rear

The CCU-22 model has the same controls and functions as the CCU-44, with two exceptions: the 2-Wire and 4-Wire Intercom Connections, which are outlined below.

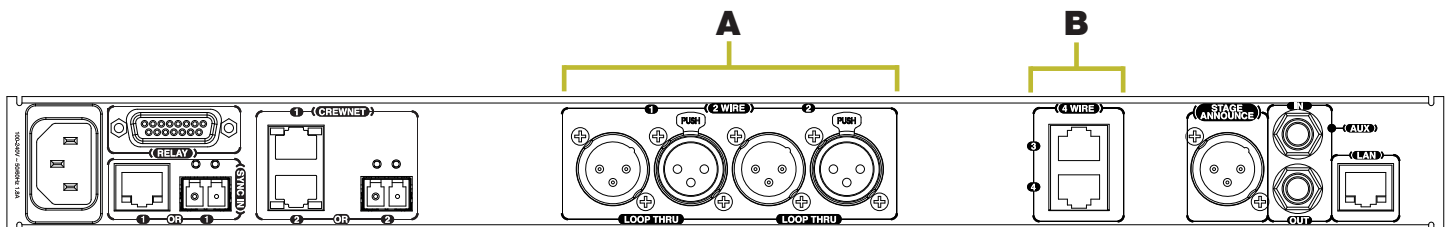


Figure 3: CCU-22 Back View

(A) 2-WIRE Intercom Port (x 2)

The Intercom Channel ports (1 and 2) allow the user to connect the Control Unit to 2-Wire external intercom systems. The XLR-3M/F 2-Wire intercom ports interface with Clear-Com, RTS, AudioCom (Balanced), and other compatible intercom systems. The pairs of XLR-3M and XLR-3F are electrically identical—including the grounds—but the grounds of the two channels are electrically isolated from each other. Each connector pair is transformer isolated. The 2-Wire Intercom settings can be adjusted under the **Wired Settings** menu or via CrewWare. See page 27 for more information about configuring a 2-Wire Intercom connection.

(B) 4-WIRE Intercom Port (x 2)

The RJ-45 4-Wire Intercom ports (3 and 4) interface with 4-Wire intercom systems and devices. These are audio-only ports and do not support data transfer. The connector is balanced and transformer isolated. Nominal line level is +5 dBu. The 4-Wire Intercom settings can be adjusted under the **Wired Settings** menu or via CrewWare. See page 28 for more information about configuring a 4-Wire Intercom connection.

Control Unit Display

Home Operating Screen

Serves as the primary operating screen and displays the status of the Control Unit's connected Radio Packs.

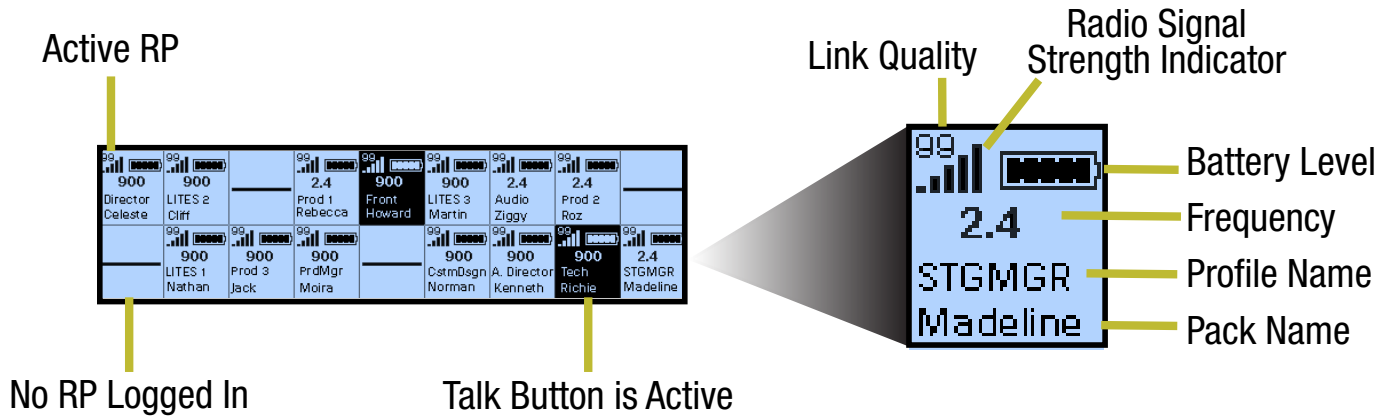


Figure 4: Control Unit Primary Operating Screen

Note: The Link Quality Indicator (LQ) provides a diagnostic measurement of actual packet transmission from Radio Pack to RT and vice versa. The LQ value on the Control Unit LCD represents the lowest LQ value of the two possibilities. To discover more about which value is displaying on your device, you would need to consult the individual Radio Pack or CrewWare. (See "Understanding Link Quality" on page 23 of this manual for more information.)

Secondary Operating Screen

Displays additional information about the status of the Control Unit's connected Radio Packs. Press the Home button once to toggle between the Primary and Secondary screens. After 60 seconds, the screen will timeout and revert back to the Home screen.

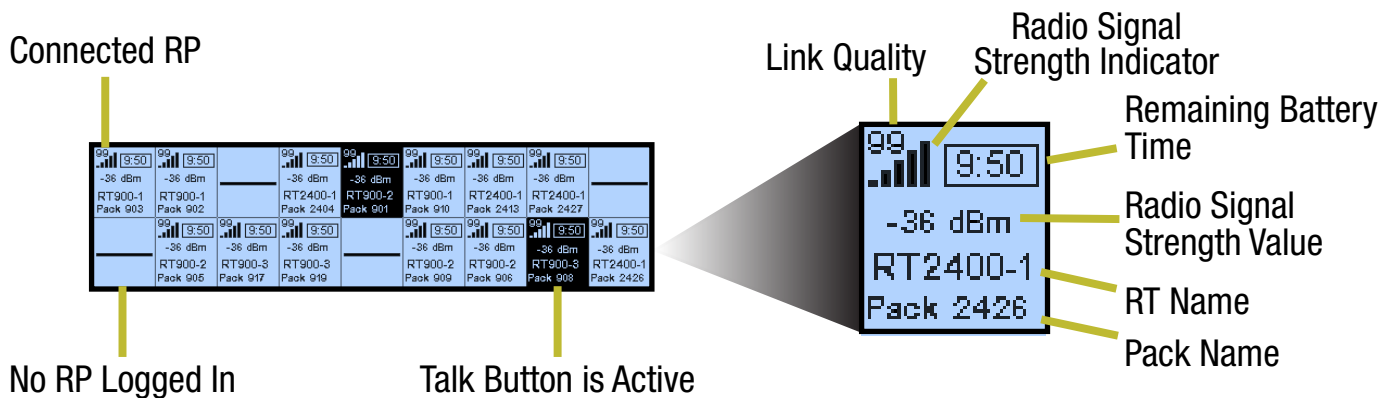


Figure 5: Control Unit Secondary Operating Screen

Note: Radio Signal Strength Value displays the actual value of the radio signal in dBm.

Setup and Installation

Determining the Device Location

Determine a location for your Control Unit. If rack-mounting, secure using its rack-mounting hardware (mounting hardware sold separately) or place the device on a clean, flat surface. Wherever it is placed, ensure that the air input and output sections for the Control Unit are not restricted.

Connecting to CrewCom Devices

After securely placing the Control Unit (CU), connect your additional CrewCom devices to it via an available CrewNet RJ-45 Copper or duplex LC Fiber port. Device port connections must match the CCF in order to operate. Pliant recommends making all cable connections from the CU to other CrewCom devices prior to powering on the system. Adding and removing devices in live mode (often referred to as “hot-plugging” or “hot-swapping”) may cause system errors to occur.

CrewNet Connectivity

- **RJ-45 Ports** – For an RJ-45 copper CrewNet port, use the supplied 15 ft. (4.6 m) Cat 5e cable, or your own Cat 5e (or greater) cable (up to 330 ft. (100 m) in length). Any CrewCom device connected to CrewNet via a Cat 5e (or greater) cable will receive Power-over-CrewNet (PoC) from the Control Unit via the CrewNet port. In some situations, there may be too many connected devices or the cable lengths may be too long for the PoC to adequately power all devices, and this will be indicated with the NET PWR LED lighting red. In this case, one or more supplemental Pliant 48VDC power supplies must be used (PPS-48V included with Hub; sold separately with all other devices).
- **Fiber (Optical) Ports** – For a fiber CrewNet port, a Single Mode Fiber cable (duplex LC connector) will be required (up to 32,800 ft. (10,000 m) in length). Any CrewCom device connected to CrewNet via fiber port must receive power via a Pliant 48VDC power supply (included with Hub; sold separately with all other devices).

Powering the Control Unit

After connecting your CrewCom devices to it, power on the Control Unit (CU).

1. First, plug one end of the AC power cord into the CU and the other end into the wall outlet.
2. Then, turn on the CU via its On/Off switch on the right side of the front panel.

Once the CU is powered on, you can tell that a configuration error has occurred with the system if the TX LED on one or more connected RTs is not lit and if the associated RPs do not log in. The configuration error may be present in the RT or other device upstream. If you are connected to CrewWare, it will alert you of any firmware or configuration errors needing resolution.

If a device does not have compatible firmware, follow the instructions provided in the *CrewWare Manual* to update to the correct version.

Note: See the CrewNet Connectivity section above for more information on how power is distributed for all connected CrewCom devices.

Applying CrewCom Configuration File (CCF)

Each CrewCom system uses a configuration file (.ccf file extension) to direct the operation of all processes and data. The CCF contains hardware device configuration, Conference and Profile settings, 2-wire port and 4-wire port intercom settings, and all other CrewNet information for all connected CrewCom devices.

Only one CCF may be active (live) on a given system. Some configuration updates may be made via the front LCD of the Control Unit; however, more advanced customization and control requires the CrewWare program. CCFs can be created or edited offline using CrewWare on your PC and then uploaded to the Master CU via CrewWare or via a portable USB drive at the front USB port of the CU.

Loading a CrewCom Configuration File via USB

Follow the procedure below to load a new CrewCom Configuration File (CCF) to your system.

Important! Be sure you have saved a backup copy of your current configuration file prior loading a new one, in case you need to revert back to it for any reason. See page 24 for more information on this procedure.

1. Make sure the Master Control Unit (CU) is powered on and has completed loading the current configuration file, then plug the USB thumb drive into the front of the Master CU. An External USB Drive menu screen will display on the CU LCD.

Important! Only load your CrewCom Configuration File to the Master CU, and make sure that any additional CUs on the system contain no CCF. Loading the file to a Secondary CU may cause system malfunction.

2. Navigate down the list of menu options until **Upload System Configuration** is highlighted.



Figure 6: CU LCD Upload Configuration File Prompt

3. Press the Master CU's enter button and scroll until you find the configuration file you wish to use, then press enter to select it.



Figure 7: CU LCD List of Available Configuration Files

4. The Master CU screen will display a progress message while the new configuration file loads.



Figure 8: CU LCD: Sample CCF Upload In Progress Screen

5. Once the configuration file has finished loading, the Master CU will display the following message: "Upload System Configuration. CCF Upload Complete." along with a configuration file summary. Wait until this message has appeared on all CUs' screens. (Secondary CUs will take about 30 seconds longer than the Master.) A prompt will instruct you to "Please cycle power to Control Unit and any connected devices.".

CCF Loaded				
Version: 3	Flags: 02	Length:	3,936	Number of Devices: 7
Device Connection: 6	Control Unit: 1	Expansion: 0	Hub: 0	
Radio Transceiver: 6	Radio Pack: 11	Radio Pack Profile: 2		
Conference: 8	Relay Assignment: 0	Aux Audio Assignment: 0		
User Info Record: 0	Access Rights: 0	UI Data: 0		

Figure 9: CU LCD Configuration File Summary Screen

6. Remove your USB drive and power cycle all CUs and connected devices. (Locally powered devices will need power removed locally.) Upon startup, the new configuration file will load and be in use.

Note: The CrewCom CU is currently compatible with FAT and FAT32 formatted USB drives (up to 16 GB drive size). Some operating systems (e.g., Windows 10) promote NTFS format, but only allow FAT32 formatting up to 32 GB. For help with formatting larger USB drives, contact Pliant customer support at +334.321.1160 (option 3 for Service and Support).

Loading a CrewCom Configuration File via CrewWare

See the CrewWare Manual for more information about this process.

Adding CrewCom Devices

If you need to add additional CrewCom devices (e.g., a Hub, RT, or additional Control Units) after you've applied your CrewCom Configuration File, you'll need to power down your system and add the devices while powered down and offline.

Connect the additional CrewCom device(s) via an available CrewNet RJ-45 Copper or duplex LC Fiber port. Add the device(s) to your CrewNet system diagram in CrewWare, then save the Configuration File change and apply the new Configuration File to your system. For more information on adding devices to your configuration see the CrewWare Manual.

Connecting Multiple Control Units

Additional Control Units can be connected to the network via an available CrewNet port on another Control Unit or a CrewCom Hub. No Control Unit additions can be made via an RT. CrewNet supports up to 4 Control Units.

Connecting Wired Intercom to the Control Unit

External Audio Sources

Both 2-Wire and 4-Wire ports can be used simultaneously. You may configure these connected sources using the CU's display or CrewWare. For more information on this process, see "Wired Settings" on page 25 of this manual.

2-Wire

Connect a 2-Wire intercom system to the Control Unit's (CU) 2-Wire intercom ports (labeled 1–2 on CCU-22 and labeled 1–4 on CCU-44).

Configure the 2-Wire connection from the CU's **Wired Settings** menu or CrewWare's Device Management tab. See "Steps to Configure a 2-Wire Intercom Connection" on page 27 for more information about updating these settings from the CU.

4-Wire

Connect a matrix intercom system to the CU's 4-Wire intercom ports (labeled 3–4 on CCU-22 and labeled 5–8 on CCU-44).

Configure the 4-Wire connection from the CU's **Wired Settings** menu or CrewWare's Device Management tab. See "Steps to Configure a 4-Wire Intercom Connection" on page 28 for more information about updating these settings from the CU.

Relay

To connect and enable relays to external General Purpose Output (GPO), connect any (or all) of the relays via the DA-15 Relay connection on the back of the Control Unit (CU). Configure the triggers for each relay via the CU's **Wired Settings** menu or CrewWare. For more information on configuring Relay settings, see "Relay Connection" on page 36 of this manual for more information.

Stage Announce

To connect Stage Announce (SA), connect an audio destination to the SA output via the XLR-3M on the back of the Control Unit (CU). Configure and set the SA audio level via the CU's **Wired Settings** menu or CrewWare. For more information on configuring SA settings, see the "Using Stage Announce" section on page 31 of this manual.

Auxiliary In

To connect and configure Aux IN, connect an audio source to Aux IN via the 1/4 in. (6.35 mm) TRS jack. Choose the destination(s) for Aux IN via CrewWare; then, set the audio level(s). Audio supplied to Aux IN can be assigned to any combination of up to 10 possible Aux Conferences under the **Wired Settings** menu. For more information on configuring Aux IN settings, see page 30 of this manual.

Auxiliary Out

To connect and configure Aux OUT, connect an external device to Aux OUT via the 1/4 in. (6.35 mm) TRS jack. Choose the Conference to be routed to Aux OUT via CrewWare; then, set each relative level(s). Audio supplied from Aux OUT can be assigned from single Conference under the **Wired Settings** menu. For more information on configuring Aux OUT settings, see page 30 of this manual.

Audio from Aux OUT comes from any available system Conference other than Stage Announce, but no audio sourced from the hard-wired intercom ports is routed to Aux OUT.

Setting Up Radio Packs

Radio Pack Power and Battery

Radio Packs (RP) are powered with one Lithium-Polymer rechargeable battery for more than 10 hours (2.4GHz) or 9 hours (900MHz), or they may be powered with three AA Alkaline batteries for approximately 5 hours (2.4GHz) or 4.5 hours (900MHz).

1. Before powering on an RP, install its battery by doing the following:
 - a. Hold the RP at about a 45 degree angle, pointing the bottom end down. Then, depress the RP's belt clip and hold it.
 - b. Press the battery-release button on the bottom of the RP and pry open the battery door. Remove the door.
 - c. While still holding the RP at an angle and depressing the belt clip, install a fully charged Lithium-Polymer rechargeable battery or three AA batteries in the RP.
 - d. Place the battery door back on the RP, making sure to align its tab and secure the door by pressing until it clicks.
2. Turn on the RP by pressing and holding the Power button on the back of the RP for three seconds.

Note: The RP will not operate unless it has been paired to a Control Unit; if it has not been paired it will indicate "No Pairing Information Available" on its display.

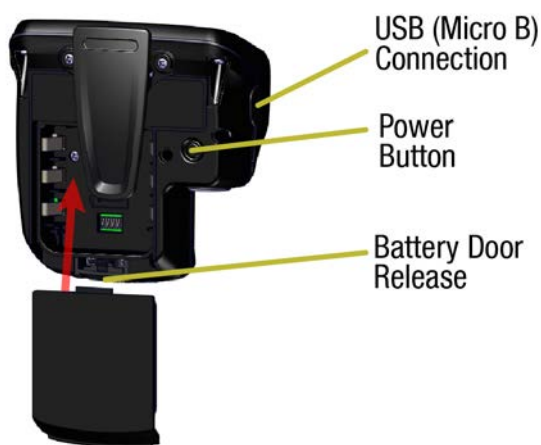


Figure 10: RP Battery Compartment Door



Figure 11: RP Battery Removal/Insertion

Pairing a Radio Pack (to a Control Unit)

CrewCom Radio Packs (RP) must be paired to a Control Unit (CU) before they can operate on any CrewCom system. Once RPs are paired to a CU, this process does not need to be done again unless the RP is being paired to a new or different CU (for example, after a replacement is made for repairs). A maximum of 255 RPs can be paired to a single CU; however only 18 of those RPs can be active at one time. If having more active RPs is applicable, you will need another CU. The limit for active communicating RPs is 72 on four CUs.

A Radio Pack (RP) may be paired without installing a battery, if necessary. The CU will provide power to the RP during the setup process. If no battery is installed, the RP will shut off as soon as it is disconnected from the CU.

- **Compatibility Note:** To work together as a system, all connected devices must have firmware that matches the version installed on the Master CU. See the "Updating Device Firmware" section of this manual for more information on this process. Call Pliant Customer Support if you require assistance with updating your system firmware.

During the pairing process, do not disconnect the RP until you are instructed to do so. To pair your RP, use the following steps:

1. Connect an RT to the selected CU. Power on the CU.
 2. Wait about two minutes for the configuration file to load on the system. All CUs will display a "CCF Loaded" message and a configuration file summary during the load process--wait until this message has cleared from all screens before taking further action. Once the message times out, the home screen will display on the front of the CU.
 3. Ensure the RP to be paired is powered OFF.
 4. Connect a USB-to-Micro-USB cable from the desired CU to the device (micro end goes into the RP's USB port beneath its rubber port cover). The RP will power on by itself. Pairing begins automatically and should take about 30 seconds.
 5. When prompted, use the RP volume knob and function buttons to choose a profile from those available in the list on the RP's LCD. Only compatible profiles will display as available options.
 6. Wait for the Profile to load. The RP LCD will display a "Pairing Complete" message when the profile is finished loading.
 7. Disconnect the USB cable from the device. The RP will power off automatically when disconnected.
 8. Power on the RP and wait for it to log in to the system. The initial login may take up to 90 seconds. When an RP is logged in, its RSSI indicator will display on its primary screen.
 9. Verify that the RP paired correctly and is displayed on the CU LCD and CrewWare (if connected).
10. The RP is ready for use. Repeat steps 3–10 until every RP is paired.

Note: When in Live mode, you should see the RPs appear in CrewWare's real-time pack display as they are paired. Offline mode will not display newly paired RPs until the system is "Live."

Note: Remember that only 18 RPs can be actively used per CU. Additional RPs can be paired to a CU, but only 18 may be active at a time.

For more information on RP operation see the CrewCom Radio Pack Operating Manual.

Operation

Understanding the Control Unit's LEDs

Each LED on the rear of the Control Unit (CU) indicates a particular condition or status for the device. See Table 1 for details about each meaning.

Table 1: Control Unit's LEDs

Port/LED	Description	
CrewNet LEDs	Left	Green – CrewNet connection is good.
		Off – No CrewNet connection detected.
	Right	On (Green) – 1000 Mbps link is detected.
		Blinking (Green) – Activity is detected.
		Off – No CrewNet connection detected.
LAN LEDs	Left	Blinking (Green) – LAN link is connected.
		Green – No LAN connection detected.
	Right	Off – LAN activity is detected.
		Amber – No LAN activity detected.
Sync LEDs	Left	Green – Sync connection is good.
		Red – Sync connection has a problem (e.g., when a CrewNet connection is made to the sync port of a secondary or tertiary CU).
		Off – No Sync connection detected.
	Right	On (Green) – 1000 Mbps link is detected.
		Off – No Sync connection detected.

Locking the Front Panel

The Front Panel Lock function is intended to minimize the probability of unintentional adjustments to the system. The buttons and knobs on the front of the Control Unit (CU) will not function until unlocked, except for the power switch, which will power the unit off, and the Volume knob and Talk button, which will allow communication with a connected local headset. When the CU is first powered ON, it is always unlocked. Lock and unlock the CU front panel by holding the **Home** button, then pressing the **Enter** button once for five seconds.

Control Unit Settings

The Control Unit (CU) can be configured depending on user preferences. The following settings and processes can be found in the CU's menu under **Control Unit Settings**. These settings can also be managed using CrewWare; refer to the *CrewWare Operating Manual* for more information.

Naming a Control Unit

Control Units (CUs) can be given a 16-character long name and an 8-character short name for display in the various CrewWare menus and diagrams. The default setting for CU Name is the device's electronic serial number. Use these steps to change the CU name:

1. Scroll through the CU Settings options and select **Control Unit Name** to enter "edit" mode.
2. Use the CU's up/down navigation buttons to scroll to each desired letter. Then, use the right/left navigation buttons to move to each letter of the name.
3. Press **Enter** to save your changes.

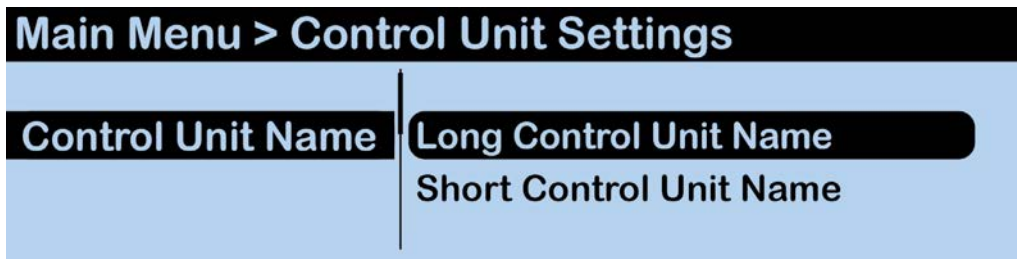


Figure 12: Edit Control Unit Name

Adjusting LCD Display Settings

The LCD display has a few adjustable settings such as Contrast, Brightness, and Backlight Time Out.

LCD Contrast

Allows adjustment to the LCD's contrast; use the navigational controls to increase or decrease the level of contrast and press **Enter** to save your changes. The default setting for LCD contrast is **3**.

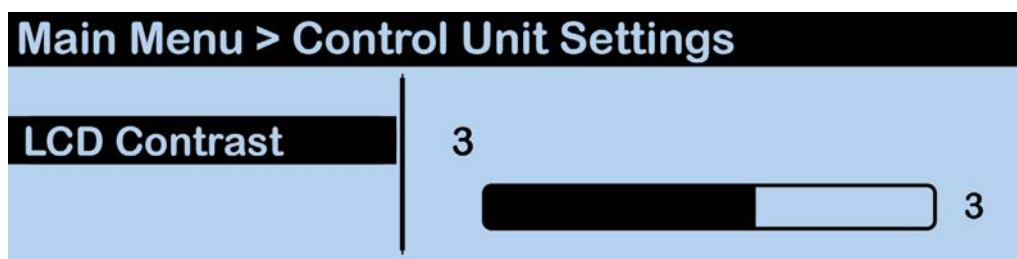


Figure 13: Edit Control Unit LCD Contrast

LCD Backlight Brightness

Allows adjustment to the LCD's brightness; select either **High**, **Med**, or **Low** for brightness level. The default setting for LCD backlight brightness is **High**.

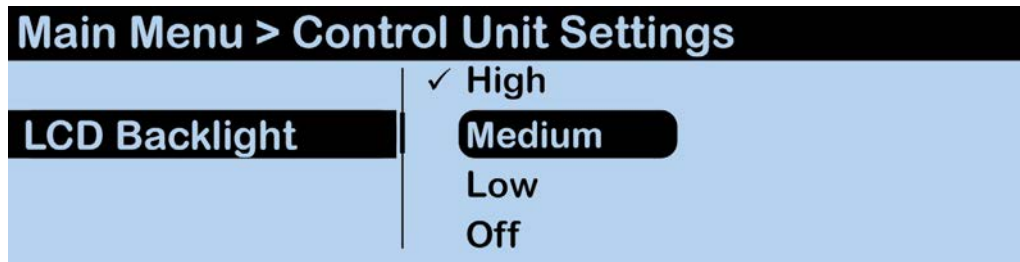


Figure 14: Edit Control Unit LCD Backlight Brightness

LCD Backlight Time Out

Enables users to set the amount of time the LCD's backlight will stay lit after engaging the Control Unit's interface. Select either **60**, **30**, or **10** seconds or disable the backlight timer entirely by selecting **Never**. The default setting for LCD backlight time out is **Never**.

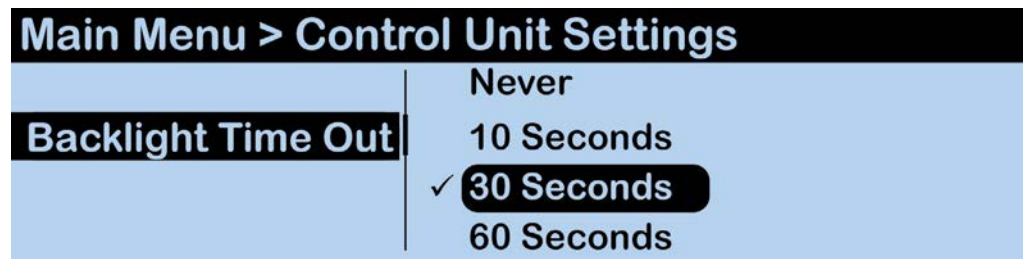


Figure 15: Edit Control Unit LCD Backlight Time Out

LED Brightness

Enables users to adjust the brightness of the Control Unit LED indicators. Select either **High**, **Medium**, **Low**, or **Off**. The default setting for LED brightness is **High**.

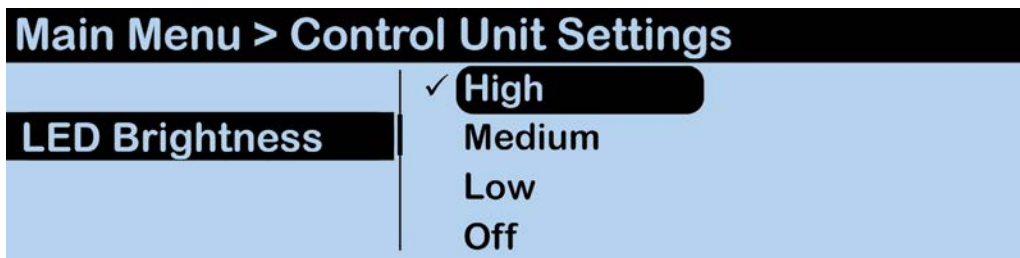


Figure 16: Edit Control Unit LED Brightness

Understanding Link Quality

The Link Quality (LQ) is a numeric value that provides a real-time metric on the quality of communication between the Radio Transceiver and the Radio Pack. The LQ serves as a diagnostic tool for proper system operation and troubleshooting Radio Packs.

- The LQ value represents the number of successful audio packets of the last 100 transmissions—99 being the most, 0 being the least
- With CrewCom, the receiving LQ signal is reported for both the Radio Transceiver and Radio Pack. The Radio Pack's on-screen LQ indicator with the box around it is the Transceiver's LQ from the RP. If this LQ is lower than normal, then it is an indication that you may have an issue related to interference, the transceiver, or a cable connection. If only the RP's LQ is low, it could be an indication that you may have an issue related to interference or the Radio Pack.
- What should the LQ value be during operation? — The LQ will not remain at an exact value during system operation. Depending on what degree of outside interference or attenuation (blocking) is present, the LQ will fluctuate during normal operation. Fluctuations in LQ can and will span a wide range of values. The lower the LQ, the poorer the audio quality will be during operation. During start-up, within adequate range and no outside influences present, the LQ should display "99" which is the highest LQ value a Radio Pack or Radio Transceiver can have.
- What if the LQ on a single Radio Pack is below "99" at start-up? — This depends on where the Radio Pack is located at start-up, but if the other Radio Packs on the same Radio Transceiver are at "99" this is a good indication that an isolated radio issue exists within that Radio Pack. If the LQ value has dropped considerably lower or if that unit is experiencing poor audio quality, it may require service.

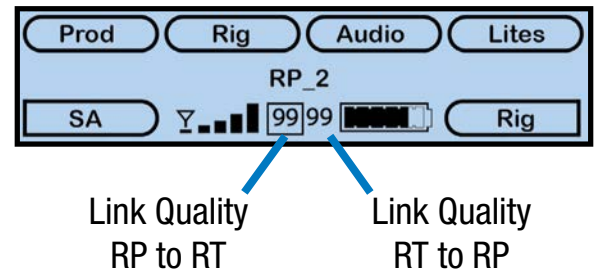


Figure 17: RP Primary Screen LQ Indicator

System Configuration

The following settings and processes can be found in the Control Unit's menu under **System Configuration**.

Setting Sync Priority

By default, the first Control Unit added to the CCF is automatically assigned the Master sync priority. Every CCF must contain one master Control Unit, which is set either through the CU menu or CrewWare. Secondary and Tertiary sync priority assignments are not currently operational.

Viewing Conference Information

Users can view details about each Conference on the system from the Control Unit LCD. Because a system supports up to 1,024 Conferences, you can sort Conferences (alphanumerically) by Name or by Type. CrewWare is required to create or edit Conferences, but the CU menu does allow you to assign a selected conference to a hardware port or Aux In/Out from this menu.

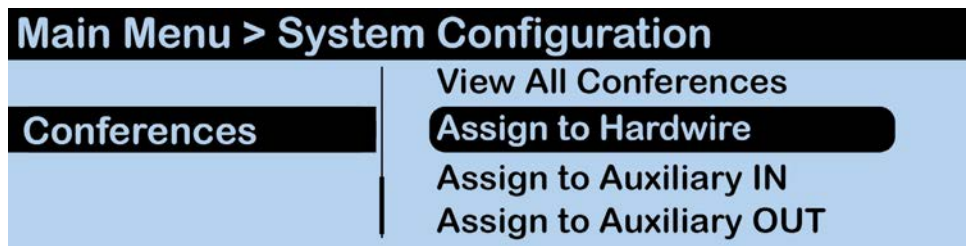


Figure 18: Conferences Menu Screen

Viewing Profile Information

Users can view details about each Radio Pack Profile on the system from the Control Unit LCD. Because a system supports up to 1,024 Profiles, you can sort Profiles (alphanumerically) by Name or by Type. CrewWare is required to create or edit Profiles.

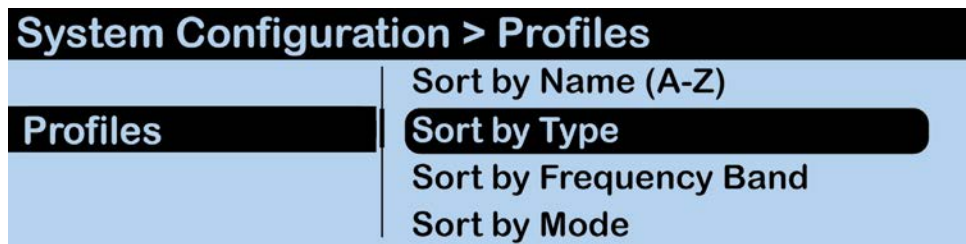


Figure 19: Profiles Menu Screen

Saving CrewCom Configuration File

Changes to the configuration during operation will be saved in real-time. However, if you wish to save a copy of the configuration file for later use, follow these procedures using CrewWare.

1. Make sure your Control Unit(s) are powered on.
2. Launch CrewWare and connect to your Control Unit(s).
3. Go to **File** and click **Save System Configuration As...** and save your file to your desired file location.

Note: The file name must be 8 characters or less. If saving to a USB drive, make sure it has enough available space to save the file (at least 50 KB).

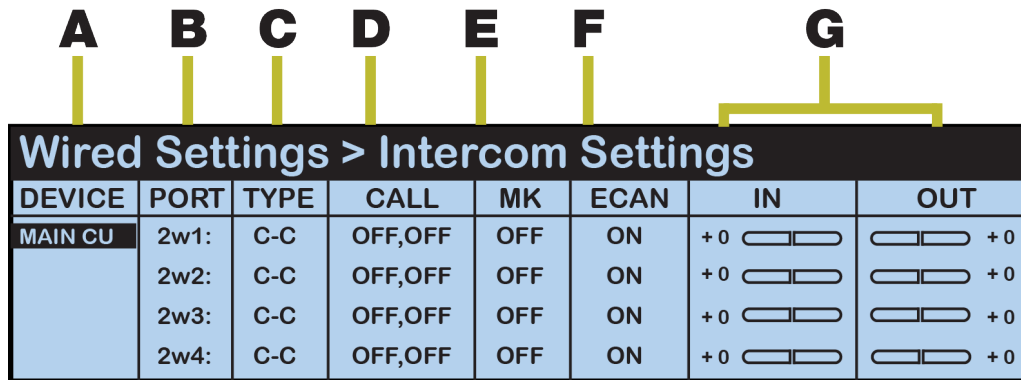
4. See "Applying CrewCom Configuration File (CCF)" on page 15 for more information about how to load the saved file onto a system.

Wired Settings

The following settings and processes can be found in the Control Unit's menu under **Wired Settings**. You can access this are of the menu by pressing the Wired button on the front of the Control Unit.

Editing Intercom Settings

This menu option displays all the 2-Wire and 4-Wire settings on the LCD. Intercom settings can be edited from the Control Unit (CU) or via CrewWare. Due to LCD size constraints, only four ports are viewable at a given time. Use the Navigational Controls on the front of the CU to scroll through devices and ports and move from setting to setting. Use the **Enter** button to select a setting for editing.



Wired Settings > Intercom Settings							
DEVICE	PORT	TYPE	CALL	MK	ECAN	IN	OUT
MAIN CU	2w1:	C-C	OFF,OFF	OFF	ON	+ 0 ☐	☐ + 0
	2w2:	C-C	OFF,OFF	OFF	ON	+ 0 ☐	☐ + 0
	2w3:	C-C	OFF,OFF	OFF	ON	+ 0 ☐	☐ + 0
	2w4:	C-C	OFF,OFF	OFF	ON	+ 0 ☐	☐ + 0

Figure 20: Intercom Settings LCD Display

A. Device

Displays the selected device's name.

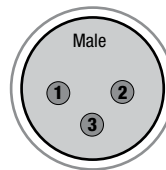
B. Port

Displays the individual device ports for which intercom settings can be adjusted.

C. Intercom Type

Allows selection from the four possible intercom types: Off, RTS, AudioCom (Balanced), and ClearCom.

Table 2: 3-Pin Wiring Scheme			
Pin #	Clear-Com	AudioCom	RTS
1	Common	Common	Common
2	Power	Audio (-) & Power	Audio 1 & Power
3	Audio	Audio (+) & Power	Audio 2



TYPE	
C-C	OFF
C-C	RTS Ch1
C-C	RTS Ch2
C-C	AudioCom
C-C	▶ ClearCom

Figure 21: 2-Wire Intercom Type Options

The above types of intercom only affect 2-Wire operation and do not control 4-Wire operation. When connecting to a 4-Wire intercom system, you must enable the port (On/Off) before using. The default setting for Intercom Type is OFF.

D. Call

Each wired intercom port (2-Wire only) can be individually set to send and receive a CrewCom-generated call signal to/from a connected wired intercom system. To do so, turn that port's Call function **ON**. Turning the Call function **OFF** only prevents the signal from entering or leaving CrewCom via the respective port. Call signals can still be generated and transmitted by entities across CrewNet. The default setting for Call is **OFF**.

CALL	MK	ECAN
OFF,OFF	IN:OFF OUT:OFF	
OFF,OFF	IN:OFF OUT:ON	
OFF,OFF	IN:ON OUT:OFF	
OFF,OFF	IN:ON OUT:ON	

Figure 22: Intercom Type Options

E. Mic Kill

Each wired intercom port (2-Wire only) is capable of receiving a mic kill signal from a connected wired intercom system. Each port is capable of sending a mic kill signal to connected RTS and AudioCom systems. The mic kill signal is passed through to any Conference associated with the intercom port where the signal came through. Turning the Mic Kill signal **OFF** only prevents external mic kill signals from entering or leaving CrewCom via the respective port. Mic Kill signals can still be generated and transmitted by entities across CrewNet. The default setting for Mic Kill is OFF.

Note: CrewCom does not send Mic Kill signals to Clear-Com 2-Wire systems.

F. Echo Cancellation (ECAN)

Echo Cancellation (ECAN) assists in reducing echo from 2-Wire and 4-Wire intercom connections.

For 2-Wire ports, hardware connections need to be optimized with the null procedure to minimize echo in the physical link so that the software can reduce any residual echo. ECAN is on by default in 2-Wire (it is off by default in 4-Wire).

If a port is never utilized in a system, ECAN can be turned off to ensure that it cannot create undesirable effects. This should not be necessary, though, and it is highly recommended that you keep ECAN on at all times for 2-Wire connections. It is better to leave ECAN off for 4-Wire connections unless it is necessary on a given port.

ECAN is disabled while the Control Unit's Auto Null menu screen is active to ensure that the hardware is optimized for echo reduction.

G. Intercom Audio In/Out

The IN level control adjusts the incoming level (from the connected wired intercom) of the currently selected wired intercom channel. If an intercom port is disabled, the IN Level control is inactive. The default setting for Intercom In is "0."

The OUT level control adjusts the outgoing level (from CrewCom) of the currently selected wired intercom channel. If an intercom port is disabled, the OUT Level control is inactive. The default setting for Intercom Out is "0."

IN	OUT
+3	+0
+0	+0
+0	+0
+0	+0

Figure 23: Intercom Type Options

Steps to Configure a 2-Wire Intercom Connection

Always confirm that the non-Pliant 2-Wire intercom system and the CrewCom wireless system are functioning properly separately before connecting them together.

Under the **Wired Settings** menu, select **Intercom Settings**:

1. Use the Navigational controls to navigate to the desired setting for a 2-Wire port (CCU-22 ports 1 and 2; CCU-44 ports 1 through 4).
 - a. For intercom "Type," press **Enter** to view the available list of compatible types: **RTS Ch 1**, **RTS Ch 2**, **AudioCom (Balanced)**, or **Clear-Com**. You can also select **Off**. Use the navigation buttons to scroll through the list, and press **Enter** when the desired setting is highlighted.
 - b. Determine if you would like to send and receive Call signals from CrewCom to the connected 2-Wire intercom system. Press **Enter** to view and select **ON** or **OFF**. See the "Call" section of this manual on page 26 for more information.
 - c. If desired, set Mic Kill to send and receive signals from a connected 2-Wire intercom system. Press **Enter** to view and select **ON** or **OFF**. See the "Mic Kill" section of this manual on page 26 for more information.

Note: CrewCom does not send Mic Kill settings to Clear-Com 2-Wire systems.

 - d. The Echo Cancellation (ECAN) setting for the 2-Wire ports is on by default. Pliant highly recommends that ECAN remain on even if a 2-Wire system is not in use. If you wish to change this setting, press **Enter** to view and select **ON** or **OFF**. See the "ECAN" section of this manual on page 26 for more information.
2. Now that your settings are established, connect the 2-Wire intercom system to the appropriate ports via 3-pin XLR cables/connectors.
3. After connecting the 2-Wire intercom system, initiate Auto Null for the appropriate ports or all ports of this particular CU. See page 29 for the Auto Null process.
4. Adjust IN/OUT audio levels between the CrewCom System and the 2-Wire intercom system as needed.
 - a. With appropriate mic gain settings and expected nominal levels from the interfaced system, the 2-Wire settings you can expect to see for RTS, Clear-Com, and AudioCom are provided in Table 3.

Table 3: 2-Wire Intercom Settings			
	RTS	Clear-Com	AudioCom
2W OUT	0	0	+3
2W IN	0	0	-3

5. If you need conferences for 2-Wire other than the default Conferences detailed on page 24 of this manual, you will need to create new conferences in CrewWare and assign the new conferences to the wired ports. See the *CrewWare Manual* for more information about this process.

Steps to Configure a 4-Wire Intercom Connection

Always confirm that the non-Pliant 4-Wire intercom system and the CrewCom wireless system are functioning properly separately before connecting them together.

Under the **Wired Settings** menu, select **Intercom Settings**:

1. Use the Navigational controls to navigate to the desired setting for a 4-Wire port (CCU-22 ports 3 and 4; CCU-44 ports 5 through 8).
 - a. For intercom type, press **Enter** to turn the port on or off; use the navigation buttons to scroll through the list, and press **Enter** when the desired setting is highlighted.
 - b. If desired, enable Echo Cancellation (ECAN) for the 4-Wire ports. See the "ECAN" section of this manual on page 26 for more information.
2. Now that your settings are established, connect the 4-Wire intercom system to the appropriate ports via RJ-45 cables/connectors.
3. Adjust in/out audio levels between the CrewCom System and the 4-Wire intercom system as needed.
 - a. With appropriate mic gain settings and expected nominal levels from the interfaced system, the 4-wire settings you can expect to see for RTS, Clear-Com, and Riedel are provided in Table 4.

Table 4: 4-Wire Intercom Settings

	RTS	Clear-Com	Riedel
4W OUT	+2	-3	+1
4W IN	-2	+3	-1

4. If you need conferences for 4-Wire other than the default conferences detailed on page 24 of this manual, you will need to create new conferences in CrewWare and assign the new conferences to the wired ports. See the *CrewWare Manual* for more information about this process.

CrewCom 4-Wire / RJ-45 Connection

Wiring schemes vary, and it is important to ensure that the cable is wired correctly for proper system operation. CrewCom utilizes RJ-45 jacks for connection to a 4-Wire port. Only two pairs of wires are utilized—one to send audio and one to receive audio. Any twisted pair wiring can be used to connect between the 4-Wire and the CrewCom system. See the table below for a list of the 4-Wire RJ-45 pin connection list.

Note: Pins 1 and 8 are tied, and pins 2 and 7 are tied.

Table 5: 4-Wire RJ-45 Connections

RJ-45 Pin #	CrewCom 4-Wire Pin #
Pin 1	Pin 8
Pin 2	Pin 7
Pin 3	Audio Output (+)
Pin 4	Audio Input (+)
Pin 5	Audio Input (-)
Pin 6	Audio Output (-)
Pin 7	Pin 2
Pin 8	Pin 1

Initiating Auto Null

In order to minimize echo resulting from connection to an external 2-Wire system, it is necessary to optimize the hardware of the hybrid circuitry in the Control Unit (CU) to match line impedance. CrewCom provides a user-initiated Auto Null feature that automatically optimizes the 2-Wire interface. Nulling only impacts 2-Wire hard wired intercom connections. Auto Null sends a series of tones to each of the 2-Wire intercom channel connections. Activate Auto Null for new connections or whenever the 2-Wire system changes, such as when additional non-CrewCom wired Packs are added or removed, or when cable lengths are changed.

During the nulling process, the CU DSP monitors the echo and adjusts the line characteristics (Resistance, Inductance, and Capacitance) to optimize the interface to the external 2-Wire system. When Auto Null is initiated, all of the functions, including communication, of the intercom channel being nulled are interrupted. The nulling process takes approximately 10–15 seconds per channel. You may need to re-adjust the intercom levels to a proper level after the 2-Wire intercom lines have been nulled.

Auto Null Procedure

During the Auto Null process, the LCD will display each 2-Wire port's resistance (R), inductance (L), capacitance (C) and amplitude.

There are two options for auto nulling your CrewCom system – **Run All** and **Run by Port**. The following steps detail how to initiate the Auto Null process:

1. Turn off all Talk buttons on wired equipment. Since CrewCom monitors a self-generated tone to adjust the null characteristics, any sounds entering through the wired intercom system will interfere with the nulling process.
2. On the Control Unit, press **Menu** to open the main menu.
3. Scroll through the menu options to the **Wired Settings** and select **Auto Null**.
4. Select **Run All** to start the Auto Null process for all 2-Wire ports of the selected device. Normal functions will be interrupted for about 60 seconds during the Auto Null process (about 15 seconds per channel). An alert will display, asking you to confirm that you want to proceed.
 - a. Auto Null with CrewCom will send a mic kill signal to connected AudioCom and RTS wired systems, but not to Clear-Com wired systems. Auto Null operation will mute the audio from CrewCom Radio Packs as it connects to connected wired systems; however, those wireless Radio Packs will still communicate with one another while the null is in progress.

Wired Settings > Auto Null - All Ports					
DEVICE	PORT	R	L	C	Amplitude
CD000001	2w1	0487	0313	0101	-69dB
	2w2	0481	0299	0115	-69dB
	2w3	0480	0305	0133	-69dB
	2w4	0488	0307	0135	-69dB

Figure 24: Auto Null in Process

- b. After you confirm to proceed, progress of the null process can be observed on the LCD Display. The display will indicate "Auto Null Complete" once the Auto Null process is completed.
5. If nulling "by port," you will be prompted to select which ports after confirming your **Run by Port** selection.
6. Press the **Home** button to escape to the Home screen or press the **Menu** button to return to the previous screen.

Changing Aux IN and OUT Levels

Aux IN (Program Audio) Level

Aux IN (sometimes referred to as Program Audio) can be used to bring the program or other audio into the Control Unit (CU). Audio from the Aux IN connection is routed only to CrewCom devices and is not routed externally to other intercom systems. Audio supplied to Aux IN can be assigned to any combination of up to 10 possible Conferences under the **Wired Settings** menu. The default setting for Aux IN Level is "0." To adjust the Aux IN level, press **Menu** to open the main menu, scroll through the menu options to the **Wired Settings**, and select **Auxiliary Input**.

1. Use the navigation controls to scroll to the Aux IN setting and press **Enter** to select it.
2. Use the Up and Down navigation buttons to adjust the current value displayed on the LCD.
3. Press **Enter** to save; or **Menu/Home** to escape without saving changes.

Audio levels are expressed as a numerical value from -10 to +10.

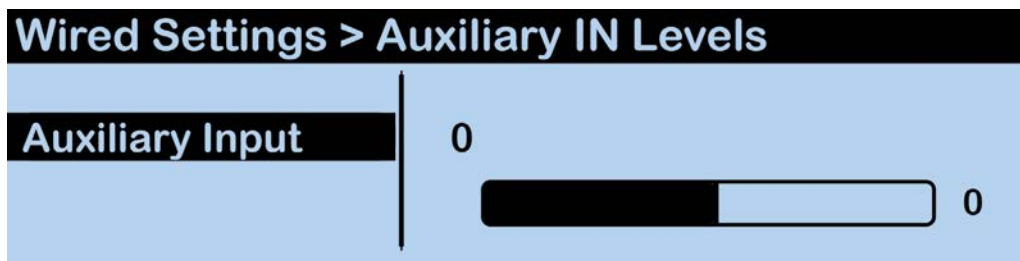


Figure 25: Aux IN Level

Aux OUT Level

Audio from the Aux OUT connection can be assigned from one Conference. Audio from the Aux OUT connection comes from any CrewCom audio entity such as Radio Packs and the local headset of a Control Unit (CU), but no audio from the hard wired intercom channels is routed to Auxiliary Out. Audio supplied from Aux OUT can be assigned from any single Conference under the **Wired Settings** menu. The default setting for Aux OUT Level is "Off."

To adjust the Aux OUT level, press **Menu** to open the main menu, scroll through the menu options to the **Wired Settings**, and select **Auxiliary Output**.

1. Use the navigation controls to scroll to the Aux OUT setting and press **Enter** to select it.
2. Use the Up and Down navigation buttons to adjust the current value displayed on the LCD; press down until the value is OFF to turn off Aux OUT and restrict audio from Conferences.
3. Press **Enter** to save; or **Menu/Home** to escape without saving changes.

Audio levels are expressed as a numerical value from -10 to +10.

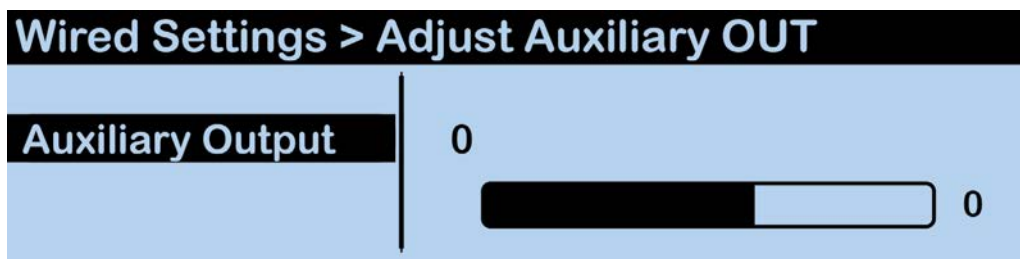


Figure 26: Aux OUT Level

Using Stage Announce

The Stage Announce (SA) function in the Control Unit (CU) is used to send a Radio Pack's (RP) microphone signal to a dedicated external audio output. When a user activates the SA function from an assigned button on an RP, their microphone is re-routed from any selected Conferences and is sent to each connected CU's SA audio output.

In addition, a relay closure contact is available via the Relay connector on the CU. Pressing the SA button enables the headset microphone, regardless of the status of the Talk buttons. If enabled, all RPs can access this feature. If more than one CU is present, SA audio will be routed out both (or all) of the CUs' SA ports simultaneously. The SA audio is identical on all CUs system-wide.

The SA output connector is an XLR-3M. The SA connector is balanced and transformer isolated and outputs nominal line level audio on a numerical scale from -10 to +10. The default setting for SA Relay is "Enabled." The default setting for SA Audio is "0." The SA connector output level can be adjusted at the **Stage Announce** menu screen, under **Wired Settings**. See the "Relay Connection" section on page 11 of this manual for more details.

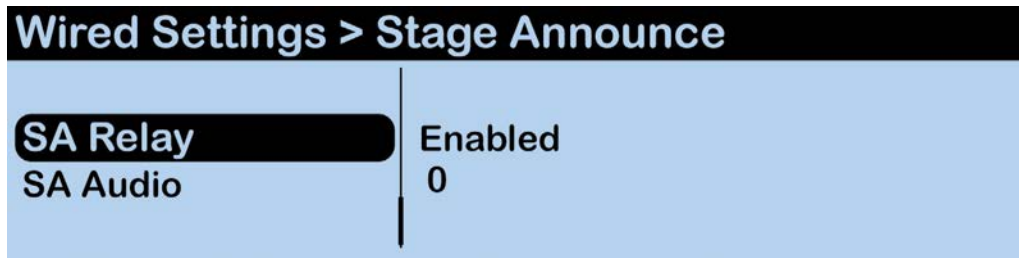


Figure 27: Stage Announce Settings

Radio Pack Settings

Pressing the **Packs** button on the front panel of the Control Unit or pressing **Menu** and navigating to **Radio Pack Settings** displays a list of all connected Radio Packs (RP), including detail of each RP's model, frequency band, and mode. For more information on setting up and using your RPs, see the *CrewCom Radio Pack Operating Manual*.

Changing Profile Assignments from the CU

1. Access the CU's **Radio Pack Settings** menu. (Do this quickly by pressing the **Packs** button on the front of the CU.)
2. Choose a method by which to sort the paired RPs (e.g., Sort by Name, Sort by Type, etc.)
3. Select the RP from the list to view its device settings options.
4. Select **Profile** to view a list of available profiles.
5. Scroll to the desired profile and press **Enter** to select it.

Note: To edit profile-level settings, you will need to access the Profile Management tab in CrewWare.

Device Settings

This Control Unit menu displays view-only settings for CrewCom devices connected to the system. To edit these settings, use the Device Management tab in CrewWare.

- **Radio Packs** - Select a profile or edit the RP long name, battery alert, and display options.
- **Radio Transceivers** – View a list of connected RTs and edit each one's information.
- **Hubs** – View a list of connected Hubs.

Local Headset Settings

The following settings can be accessed by pressing the LOCAL button on the front panel of the Control Unit or by pressing **Menu** and navigating to **Local Headset Settings**.

Selecting the Local Headset Conference

The Control Unit headset connector is a functional user communication point, designed primarily for setup and troubleshooting. The Front Panel Headset allows you to communicate on any one of the Conferences at a time. Select a Local Headset Conference from the list available in this menu option. The default Local Headset Conference setting is "Def Conf 1."

Changing the Local Headset Mic Gain

For dynamic microphones, select from within a range of +6 to +35 dB. For electret microphones, select from within a range of -12 to +17 dB. When the Mic Gain is set too high, it is possible to induce clipping, feedback, or echo. When set too low, words may sound too quiet to other listeners. Headsets by different manufacturers or different models of headsets will require widely varying Mic Gain settings.

The default setting for dynamic local mic gain is "6" (+23 dB). The default setting for electret local mic gain is "3" (−4 dB).

Selecting the Local Headset Mic Type

Select from **Auto-detect**, **Dynamic**, or **Electret** mic type. If you select a mic type that does not match the detected type of the connected mic, you will be prompted to accept the exception. It is highly recommended that the default **Auto-detect** is used.

Adjusting the Local Headset Sidetone

Sidetone value is expressed in dB. When adjusting sidetone, you will see a level indicator with a numeric value between 0 dB and -24 dB. The default setting for local headset sidetone is "Med" (-12 dB). Speak into the headset microphone at a typical speaking level and adjust the sound of your own voice in your headset. Press **Enter** to accept the changes.

Using the Local Headset

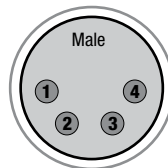
Talk and Volume Controls for the headset are located to the right of the connector.

A white "TALK" LED will illuminate when the mic is enabled. CrewCom uses an intelligent latching method for talk buttons. Quickly pressing and releasing TALK will cause the mic button to latch. The white "TALK" LED will stay lit and the microphone will remain enabled. Pressing and holding TALK will cause the button to act in a momentary fashion. The white "TALK" LED will remain lit and the microphone will remain enabled only as long as the button is pressed.

Local Headset Pinout and Wiring

Table 6: Local Headset Connection Wiring

XLR Pin #	Description
Pin 1	Mic −
Pin 2	Mic +
Pin 3	Speaker −
Pin 4	Speaker +



See the SmartBoom PRO and SmartBoom LITE data sheets for the pin wiring information for Pliant's SmartBoom headsets.

Local Area Network (LAN) Settings

The following settings and processes can be found in the Control Unit's menu under **LAN Settings**.

Dynamic Host Configuration Protocol (DHCP) is a system that allows each component on a computer network to automatically obtain the network address information required for Network Interface Devices to communicate with one another. The CrewCom system can utilize DHCP if it is enabled on your Local Area Network (LAN). To use DHCP, the CrewCom Control Unit will need to be configured as a DHCP client. If DHCP is not enabled on your LAN, then the CrewCom system can be configured to use static IP Addresses. After the CrewCom system is fully booted-up, and the Control Unit is assigned an IP Address (either through DHCP or manually), CrewWare can connect to the Control Unit. Detailed procedures for LAN configuration are detailed in the *CrewWare Operating Manual*.

Changes made to the Control Unit LAN settings requires a restart of the Control Unit.

TCP/IP Mode

Select either **DHCP Client** or **Manual**.

- **DHCP Client:** Enables automatic LAN communication for the Control Unit. In this mode, when the CU is powered on, it automatically receives an IP Address from the DHCP server. Once booted, use this assigned IP address in CrewWare's Login window to connect CrewWare to your Control Unit.
- **Manual:** You'll be required to manually set the IP Address, Subnet Mask, and Default Gateway between your PC and CU to meet the needs of your LAN installation.

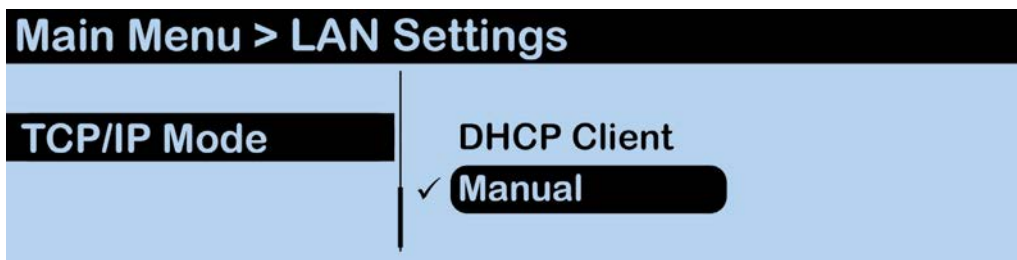


Figure 28: LAN Settings

TCP/IP Address

In DHCP mode: take note of the Control Unit's assigned IP address from this menu, and use it to connect to CrewWare. In Manual mode, input your desired TCP/IP Address on this screen using the CU's navigation buttons. Press the CU's enter button when done to save changes.

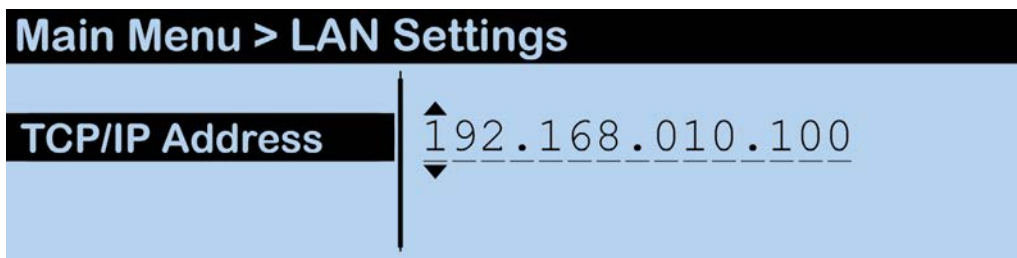
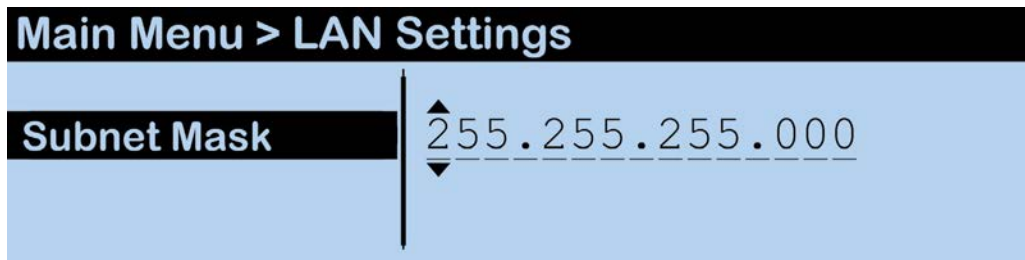


Figure 29: TCP/IP Address Input

Subnet Mask

Input the appropriate Subnet Mask address using the CU's navigation buttons.

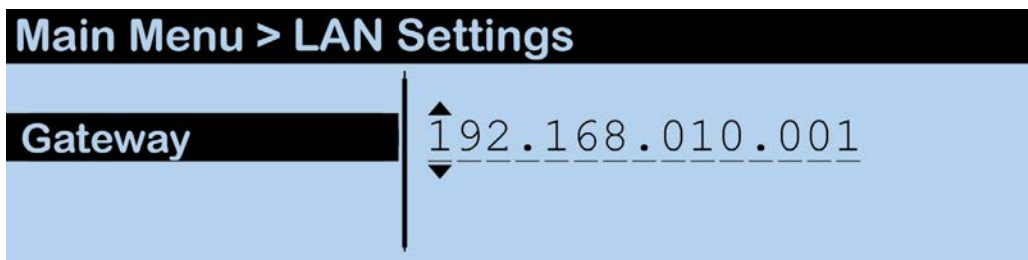


The screenshot shows a control unit interface with a black header bar containing the text "Main Menu > LAN Settings". Below the header, there is a light blue background. On the left side, there is a black button labeled "Subnet Mask". To the right of the button, there is a vertical line, and to the right of the line, the IP address "255.255.255.000" is displayed. Above the first dot and below the last dot of the IP address are small upward and downward arrows, indicating that the digits can be navigated and changed.

Figure 30: Subnet Mask Input

Default Gateway

Input the appropriate Default Gateway address using the CU's navigation buttons.

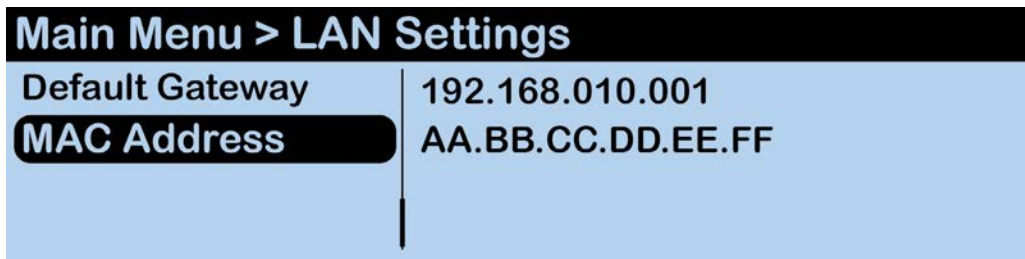


The screenshot shows a control unit interface with a black header bar containing the text "Main Menu > LAN Settings". Below the header, there is a light blue background. On the left side, there is a black button labeled "Gateway". To the right of the button, there is a vertical line, and to the right of the line, the IP address "192.168.010.001" is displayed. Above the first dot and below the last dot of the IP address are small upward and downward arrows, indicating that the digits can be navigated and changed.

Figure 31: Gateway Input

MAC Address

Reference the MAC Address screen if needed for setting up your LAN connection.



The screenshot shows a control unit interface with a black header bar containing the text "Main Menu > LAN Settings". Below the header, there is a light blue background. On the left side, there are two black buttons: "Default Gateway" and "MAC Address". The "MAC Address" button is highlighted with a white border. To the right of the buttons, there is a vertical line, and to the right of the line, the MAC address "AA.BB.CC.DD.EE.FF" is displayed. Above the first dot and below the last dot of the IP address are small upward and downward arrows, indicating that the digits can be navigated and changed.

Figure 32: MAC Address Read-Only Screen

Port Number

The default Port value to connect to a Control Unit is **2017**. You may change this default using CrewWare if your firewall settings require it.

Restoring Factory Defaults

Users can choose to restore factory defaults for the device or system. When restoring factory defaults, these settings are reset to their original factory settings:

Table 7: Original Factory Settings

Control Unit Setting	Control Unit Default	Reset by "Restore Defaults"
CU Name (Long)	ESN#	
CU Name (Short)	ESN#	
Contrast	3	X
Backlight Brightness	High	X
Talk LED Brightness	High	X
Sync Priority	Master	
Intercom Type	OFF	X
Intercom Call	OFF	X
Intercom Mic Kill	OFF	X
Intercom Echo Can	ON (2-Wire); OFF (4-Wire)	X
Intercom IN (2w/4w)	0	X
Intercom OUT (2w/4w)	0	X
Auxiliary IN	0	X
Auxiliary OUT	OFF	X
SA Relay	Enable	X
SA Audio	0	X
Local Conference	Def Conf 1	
Local Mic Type	Auto Detect	X
Local Mic Gain (Dynamic)	6 (+23 dB)	X
Local Mic Gain (Electret)	3 (–4 dB)	X
Local Sidetone	Med (–12 dB)	X
TCP/IP Mode	DHCP Client	
Access Rights	Admin	

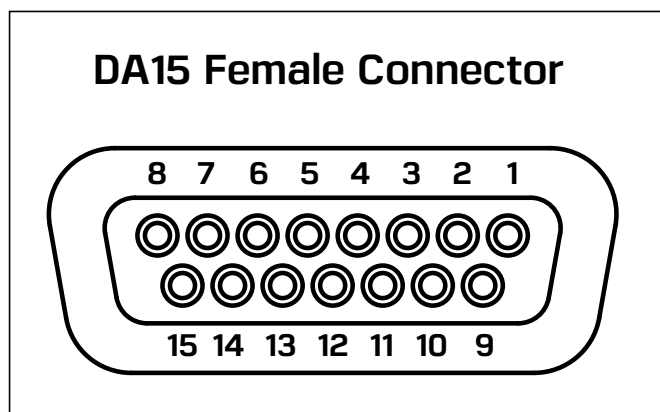
When clearing a device's memory, settings are reset to their original factory settings as detailed in the above Control Unit Defaults list, and the Profile pairing information is erased.

Note: Resetting factory defaults does not erase Profile pairing information.

Relay Connection

Rated load for all relay contacts: 0.3 Amp at 125VAC, 1 Amp at 30VDC. The following pinout is for the DA-15 connector on the rear of the Control Unit:

Pins	Connections
1	Relay 1 Normally Closed*
2	Relay 1 Normally Open*
3	Relay 2 Common
4	Relay 3 Normally Closed
5	Relay 3 Normally Open
6	Relay 4 Common
7	Relay 5 Normally Closed
8	Relay 5 Normally Open
9	Relay 1 Common*
10	Relay 2 Normally Closed
11	Relay 2 Normally Open
12	Relay 3 Common
13	Relay 4 Normally Closed
14	Relay 4 Normally Open
15	Relay 5 Common



*Relay 1 is Stage Announce Relay (Pins 1, 2, and 9)

Figure 33: Relay Pin Diagram

Auxiliary IN/OUT Audio Wiring

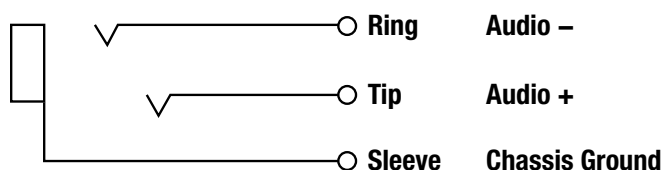


Figure 34: Auxiliary IN/OUT Audio Wiring Diagram

Stage Announce Audio Wiring

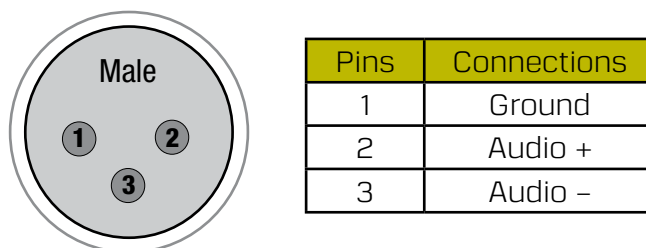


Figure 35: Stage Announce Audio Wiring Diagram

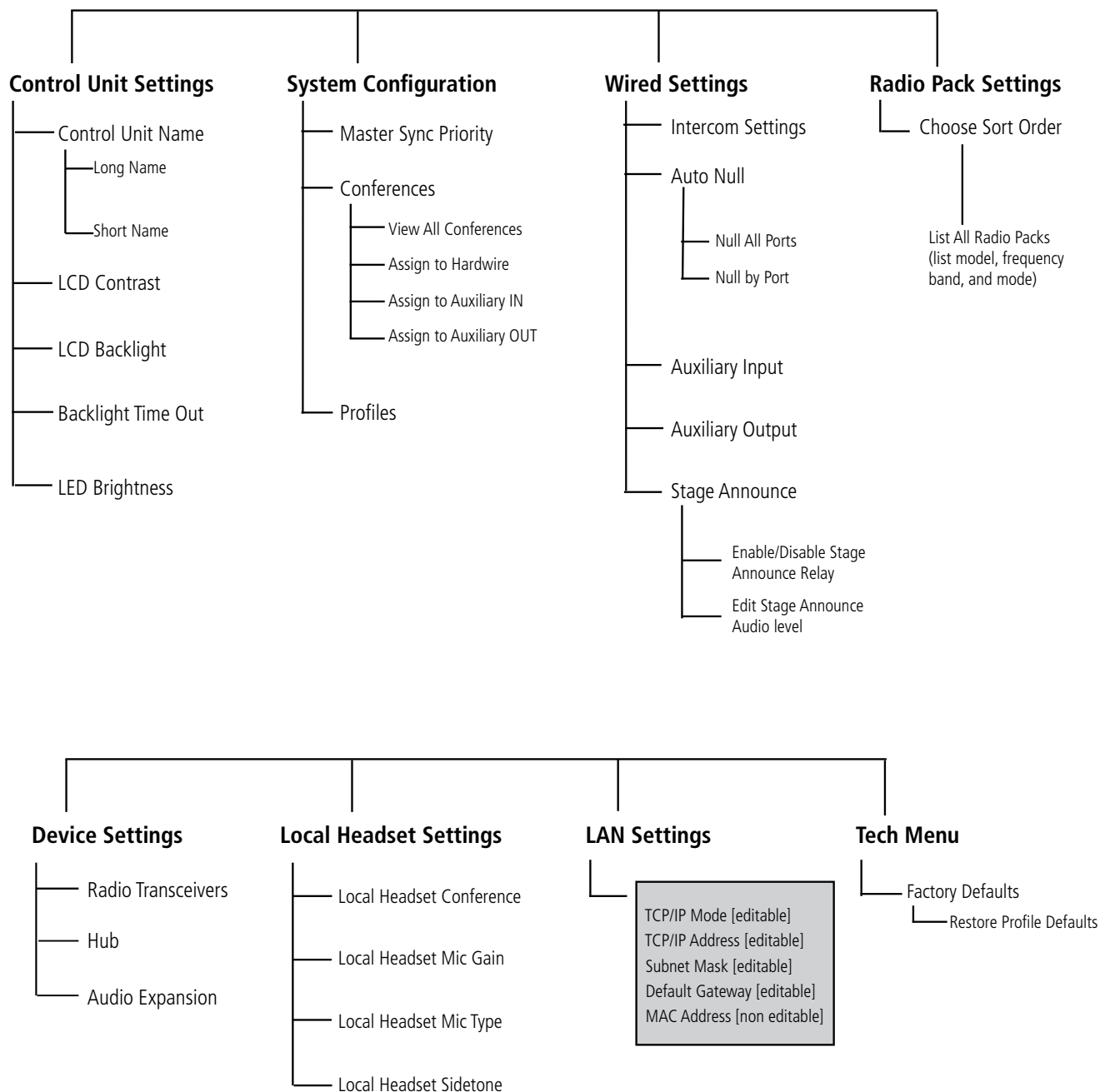
Product Specifications

Table 8: Product Specifications		
Specification*	CCU-22	CCU-44
Hardwired Intercom Audio Channels	4	8
Active Radio Packs (Normal Mode)	18 (18 active Normal mode Radio Packs requires use of 3 RTs.)	
No. of Paired Radio Packs Supported (per CU)	255	
USB Ports	(1) USB Type A; (1) Micro USB	
Front Panel LCD Display	512 × 128 resolution	
Stage Announce and GPO Closures	5 Relays via DA-15	
CrewNet Ports (supports two connections)	(2) RJ-45 for copper; (1) duplex LC for Single Mode Fiber	
Sync In Ports (supports one connection)	(1) RJ-45 for copper; (1) duplex LC for Single Mode Fiber	
2-Wire Intercom Connection	2 ports via XLR 3F with XLR 3M loop (2 ports)	4 ports via XLR 3F with XLR 3M loop (4 ports)
2-Wire Compatibility	Clear-Com, RTS, and AudioCom (Balanced)	
4-Wire Intercom Connection	2 ports via RJ-45	4 ports via RJ-45
Stage Announce Output	XLR 3M, balanced, transformer isolated	
Aux IN	6.35 mm (1/4 in.) 3 conductor jack, 17.5 dBu max in (nominal line level +5 dBu), balanced, transformer isolated	
Aux OUT	6.35 mm (1/4 in.) 3 conductor jack, 17.2 dBu into 600 ohms (nominal line level +5 dBu), balanced, transformer isolated	
LAN Port	(1) RJ-45 10/100 BASE-T 802.3 compliant	
Power Input/Connector	100–240V ~ 50–60 Hz, 0.8A	
Dimensions	1 RU, 48.26 cm × 4.39 cm × 29.67 cm (19.00 in. × 1.73 in. × 11.68 in.) metal enclosure	
Weight	2.7 kg (5.9 lbs)	2.9 kg (6.5 lbs)
Operating Environment	-20° to 50° C (-4° to 122° F); 10% to 90% Humidity.	
Maximum CrewNet Line Length	Copper 100 m (330 ft.); Fiber 10,000 m (32,800 ft.)	
Maximum Altitude	2,000 m (6,562 ft.)	
RoHS Compliant	Yes	

***Notice About Specifications:** While Pliant makes every attempt to maintain the accuracy of the information contained in this manual, this information is subject to change without notice, and published device/system functions and features are subject to firmware version. Please check our website for the latest system specifications and certifications.

Control Unit Menu

The following menu tree displays the Control Unit's primary menu options and settings:



Product Support

Pliant offers technical support via phone and email from 07:00 to 19:00 Central Time (UTC–06:00), seven days per week.

1.844.475.4268 or +1.334.321.1160
technical.support@plianttechnologies.com

Visit www.plianttechnologies.com for product support, documentation, and live chat for help. (Live chat available 08:00 to 17:00 Central Time (UTC–06:00), Monday–Friday.)

Returning Equipment for Repair or Maintenance

All questions and/or requests for a Return Authorization Number should be directed to the Customer Service department (customer.service@plianttechnologies.com). Do not return any equipment directly to the factory without first obtaining a Return Material Authorization (RMA) Number. Obtaining a Return Material Authorization Number will ensure that your equipment is handled promptly.

All shipments of Pliant products should be made via UPS, or the best available shipper, prepaid and insured. The equipment should be shipped in the original packing carton; if that is not available, use any suitable container that is rigid and of adequate size to surround the equipment with at least four inches of shock-absorbing material. All shipments should be sent to the following address and must include a Return Material Authorization Number:

Pliant Technologies Customer Service Department
Attn: Return Material Authorization #
205 Technology Parkway
Auburn, AL 36830-0500

Maintenance and Storage

Cleaning

Generally, the CrewCom hardware should be cleaned only with a dry cloth. A soft cloth with rubbing alcohol may be used to wipe the devices if needed, but you should avoid using rubbing alcohol on plastic components. Never spray solvents or chemicals onto the devices.

All electronic devices can be susceptible to particulate contamination. If yours are exposed to an extremely dusty environment, contact Pliant's Customer Service for internal cleaning.

Temperature and Humidity

CrewCom components are designed to be very durable and can tolerate a wide range of environmental conditions; however, you should take all necessary precautions to keep your system devices safe, dry, and out of extreme conditions.

The Radio Transceiver is weather-resistant, including gaskets intended to prevent moisture entry from the top and sides. The Cat 5e cable connection on the bottom is not water tight. If it is to be used in an outdoor environment, protect the RT with a protective enclosure that will not interfere with the radio signals.

The Radio Packs are designed to work wherever people work. While the Radio Pack design is weather-resistant, Radio Packs should not be submerged in liquids unnecessarily. Protect the battery compartment from water when changing batteries. The battery compartment offers a route to the electronic circuitry.

License Information

Warning: Changes or modifications to this device not expressly approved by Pliant could void the user's authority to operate the equipment.

1. FCC Notices

- 1.1. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2. Canada, Industry Canada (IC) Notices

- 2.1. This Class A digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations.

Cet appareillage numérique de la classe A répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement.

CrewCom Compliance Numbers

Model Numbers	Compliance Model No.
CCU-22	CU2510
CCU-44	CU2510

Warranty Information

Limited Warranty

CrewCom products are warranted to be free from defects in materials and workmanship for a period of two years from the date of sale to the end user, under the following conditions:

- First year of warranty included with purchase.
- Second year of warranty requires product registration on the Pliant website.

Tempest professional products will carry a two-year product warranty.

All accessories carry a one-year warranty.

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Glossary

Admin Level: Refers to System Security levels; the least restrictive level setting.

Amplitude: The magnitude of a sound wave or electrical signal, measured in decibels. Higher amplitude means louder sound and lower amplitude means softer sound.

Audio Entity: An audio input (source) on a CrewCom system.

Audio Output: Outputs are created by mixing one or more audio entities. This could be for use at any headset connection or for output to a wired connection.

Auto Detect: The CrewCom Radio Pack (RP) has the ability to automatically detect the type of microphone (dynamic or electret) that is plugged into its headset connector. The Auto Detect setting is an option in the RP menu along with the manual selection of dynamic or electret microphones.

Auto Null: A function used to minimize echo by monitoring the echo and adjusting the line characteristics (Resistance, Inductance, and Capacitance) to optimize the hybrid circuitry interface to an external 2-Wire system.

Auxiliary Audio Input (Aux IN): Typically referred to as Program Audio, Aux IN is an audio input to CrewCom that allows the user to bring in line level audio.

Auxiliary Audio Output (Aux OUT): An audio output that allows a line level audio signal to be sent to an external device.

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Call Functions: Call signals may be initiated by entities across CrewNet. Each 2-Wire intercom port may be individually set to send and receive a CrewCom-generated call signal to or from a connected wired intercom system by selecting ON to enable the Call function. Turning the Call function off prevents the signal from leaving CrewCom via the respective port.

- **Call:** An RP Function button option. When enabled for wireless devices, the user can elect to send a call signal to the RPs of each conference whose Talk button is currently active on that individual RP, or the user can elect to send a call signal to the RPs of a single assigned conference (regardless of the associated Talk button's status). When enabled for external hardwired intercom devices, a signal will be sent to any connected 2-wire devices associated with a conference whose Talk button is currently active on that individual RP (as long as outbound call is enabled for the CU port associated to the conference) or a signal will be sent to any connected 2-wire devices associated with that conference (as long as outbound call is enabled for the associated CU port). Call can be enabled for both wireless and hardwired devices or limited to only one type.
- **Call on Talk:** An RP Talk button function. When enabled, a call signal will remain active while the Talk button is active. This function is commonly used in applications where a two-way radio interface is connected.
- **Call Device:** A CrewWare function that allows the user to call a specific Radio Pack from the Device Management tab of CrewWare.

Capacitance: The indication of how much charge that a cable can store within itself. Capacitance is created within a cable and changes based on cable length, conductor diameter, insulation thickness and insulation type. Within CrewCom it is one of the three 2-Wire line characteristics used to Auto Null the CrewCom system.

Conference: A grouping of audio entities. Wireless Radio Packs (or other CrewCom I/O) may be subscribed to one or more of 1024 available Conferences.

Control Unit (CCU-22 and CCU-44): A CrewCom device that is used to establish a CrewNet system and provides initial system audio I/O. It is compatible with all levels of wireless Radio Packs.

CrewCom Configuration File (CCF): A file that stores all of the device setup and configuration parameters for a CrewCom system.

CrewNet: The digital proprietary network used to move audio and to control data, timing, and other functional signals used in CrewCom.

CrewWare: Software tool developed to incorporate all the necessary mechanisms for facilitating graphically based system construction and full system control, monitoring and diagnosis

Default Gateway: An access point that a networked computer uses to send information to a computer in another network or the internet.

Dynamic: A type of headset microphone used in professional headsets that do not require any type of external power for operation. In general, dynamic microphones have a lower output than Electret microphones.

Dynamic Host Configuration Protocol: A system that allows each component on a computer network to automatically obtain the network address information required for Network Interface Devices to communicate with one another. The CrewCom system can utilize DHCP if it is enabled on your Local Area Network (LAN).

Echo Cancellation (ECAN): Function to help reduce echo from both 2-Wire and 4-Wire intercom connections.

Electret: A type of headset microphone used in professional headsets that requires an external power source, such as from a CrewCom Radio Pack. In general, electret microphones have a higher output than dynamic microphones.

Firmware: (As it relates to CrewCom) all of the embedded code that exists in any CrewCom device. All of this embedded code, including radio code, is upgradeable easily by the end user. It is required that all CrewCom devices operate on the same version of the firmware.

Frequency Band: The area of the RF spectrum in which a device operates. For CrewCom, this is 2.4GHz (2400–2483 MHz) and 900MHz (900–928 MHz).

Front Panel Lock: A function that is intended to minimize the probability of unintentional adjustments to the system.

GPO Relay: General Purpose Output. Electromechanical switches, which create a simple contact closures, used to trigger an event or automation outside of the CrewCom system.

Hopping Pattern: A radio setting that determines the order in which the radio frequencies are used.

Hub: A device that provides routing and expansion capabilities to a CrewNet infrastructure allowing the connection of multiple CrewCom devices.

Inductance: The indication of the amount of energy stored in the magnetic field around the cable. Inductance is created within a cable and changes based on cable length and conductor diameter. Within CrewCom it is one of the three 2-Wire line characteristics used to Auto Null the CrewCom System.

Intercom Settings: Menu option that allows selection of Device, Port, Intercom Type, Call, Mic Kill, ECAN, and Intercom Audio In/Out.

ISM Bands: Industrial, Scientific, and Medical Bands. A part of the radio spectrum that can be used for any purpose without a license in most countries.

Link Quality: The percentage of successful audio packets sent/received (two different LQ numbers) between a wireless Radio Pack and the Radio Transceiver.

Mic Gain: Determines the headset microphone audio level being sent from the microphone pre amp. The user may experience feedback or echo on their headset if the Mic Gain is set too high. If set too low, the noise gate may clip words or other listeners may not hear the mic audio. Different models of headsets and different individual preferences require different Mic Gain settings.

Mic Kill: Each wired intercom port (2-Wire only) is capable of receiving a Mic Kill signal from a connected wired intercom system. Each port is capable of sending a mic kill signal to connected RTS and AudioCom systems. The Mic Kill signal is passed through to any Conference associated with the intercom port where the signal came through. Turning the Mic Kill signal off prevents external Mic Kill signals from entering or leaving CrewCom via the respective port; however, Mic Kill signals may continue to be generated and transmitted by entities across CrewNet. CrewCom does not send Mic Kill signals to Clear-Com 2-Wire systems.

Nominal Line Mode: The typical or normal signal level with which the product operates.

Null: Optimize 2-Wire port hardware connections by nulling them in order to minimize echo in the physical link and enable the software to remove any residual echo.

Pass Code: A pass code is used to access certain permissions granted by the system administrator and pre-defined by CrewCom Security and Access Rights.

Power-Over-CrewNet: A proprietary network protocol that provides operating voltage and current to devices that are connected to the CrewCom Control Unit.

Profile: A Radio Pack Profile assigns functionality to a Radio Pack's local controls, knobs, and buttons as well as what Conferences it subscribes to.

Program Audio: A more commonly used term for "Auxiliary Audio Input," which is an audio input to CrewCom that allows the user to bring in line level audio.

Radio Band: The frequency band that the radio transmits and receives within.

Radio Pack: The direct portable wireless communication device connecting individual CrewCom users to the CrewCom system. Sometimes commonly referred to as a BeltPack.

Radio Transceiver: A device used to remotely locate a radio and its corresponding antenna to provide an expanded coverage area.

Relay: Found on a Control Unit, a simple electrical switch closure that allows for automation of specific external devices (e.g., to trigger an amplifier for Stage Announce).

Resistance: A measure of the difficulty to pass an electric current through a cable. The longer the cable the higher the resistance. In auto nulling it is used in the calculation to reduce echo.

Sidetone: The effect of sound picked up by the headset microphone and instantly introduced at a low signal level into the earpiece of the headset.

Stage Announce: An audio output that allows a line level audio signal, typically a Radio Pack's (RP) microphone signal, to be sent to a dedicated external audio output for connection to an external device.

Subnet Mask: A 32-bit number that masks an IP address, and divides the IP address into network address and host address.

Sync Master: The Control Unit that is currently providing the master timing signal for the CrewNet network.

System Administrator: A CrewCom top-level user who has configuration knowledge and capabilities. Certain system changes should be performed by the administrator.

User Level: Refers to System Security levels; the most restrictive level setting.

Wired Intercom: Any hard wired duplex audio port for getting audio in or out of a system.

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