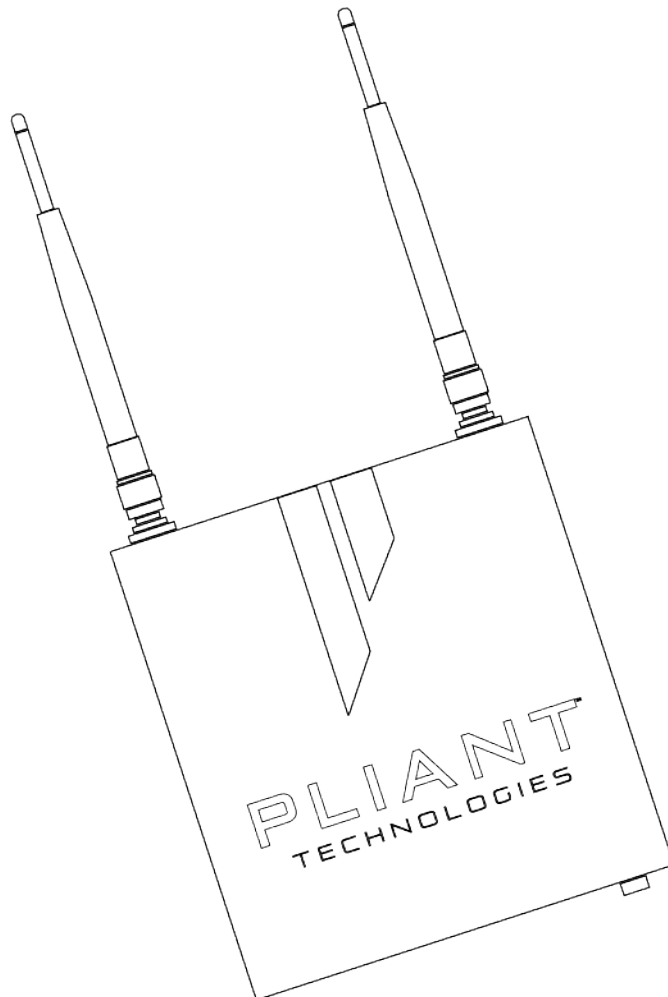


# Radio Transceiver

## OPERATING MANUAL

Version 1.14





# 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 ([www.plianttechnologies.com](http://www.plianttechnologies.com)) or contact Pliant's Customer Support Department. See "Product Support" on page 43.

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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.

## ***Model Information***

This document applies to Version 1.14.

This document applies to CrewCom models Models CRT-900, CRT-900AN, CRT-2400, CRT-2400CE, CRT-900-IPR\*, CRT-900AN-IPR\*\*, CRT-2400-IPR, and CRT-2400CE-IPR\*\*\*. (Note: Images reflect non-IPR models.)

\*CRT-900 and CRT-900-IPR models are only available in North America and operates within the 902–928 MHz frequency range.

\*\*CRT-900AN and CRT-900AN-IPR (Oceania) models are approved for use in Australia and New Zealand and operates within the 915–928 MHz frequency range.

\*\*\*CRT-2400CE and CRT-2400CE-IPR models meet the same specifications as the CRT-2400-IPR model, and they complies with ETSI standards (300.328 v1.8.1). Non-CE models are non-compliant with some ETSI standards.

Document Reference: D0000216\_H

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# CHAPTER 1

## SAFETY INFORMATION

This chapter consists of the following sections:

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# Radio Transceiver Safety Information

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



**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, 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 Radio Transceiver 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 Radio Transceiver 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 Radio Transceiver. 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 Radio Transceiver during periods of inclement weather and after use.

- Refer all Radio Transceiver service to qualified Pliant Technologies service personnel. There are no user-serviceable parts inside the CrewCom Radio Transceiver. 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.
- Service is required if the Radio Transceiver 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 Radio Transceiver 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.

## ***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

- When using local power to power the Radio Transceiver, always connect the power cord to the CrewCom Radio Transceiver's external power supply before connecting to the outlet.
- CrewCom Radio Transceivers may be powered by an external power supply. The cord to connect the external 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.

# CHAPTER 2

## INTRODUCTION

This chapter consists of the following sections:

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# What's in the Box?

- Radio Transceiver
- USB A to Micro B cable
- Cat 5e cable, 15 ft. (4.6 m)
- Product Overview Guide
- RT Flat Mounting Bracket
- Single RT Adapter Mounting Bracket
- Bracket Mounting Hardware
- Omni-Directional Antenna (x2)
- Microphone Stand Adapter
- Warranty 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 Pliant's [Product Registration Page](#) to extend your product warranty to two years at no charge. See "Warranty Information" on page 52.

## Additional Items Required

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

- Control Unit
- Radio Pack
- Headset

# Firmware Release Notes

Find the latest [CrewCom firmware release notes](#) on the Pliant Technologies website. Download the latest firmware release from the Pliant Technologies [downloads page](#).

# 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 the specific device's overview pages linked below.

- [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”, “CCU-44”, and “CCU-08” models, which simultaneously support up to (2) 2-Wire and (2) 4-Wire, (4) 2-Wire and (4) 4-Wire, or (8) 4-Wire intercom connections, respectively.
- [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, and General Purpose Output (GPO) control. 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 one, two, and four volume/talk button configurations.
- [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).
- [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.

## **CrewWare**

CrewCom includes CrewWare, a companion desktop software, to simplify the process of optimizing your CrewCom wireless system. CrewWare is used for monitoring and managing CrewCom wireless intercom systems. The software enables the user to create a CrewCom Configuration File offline and then load the settings to your system from a portable USB drive or from a connected computer. CrewWare provides an intuitive method of accessing all connected CrewCom devices and their associated peripherals. CrewWare allows a user to adjust critical settings from the computer, and only requires connection to your existing computer or computer network.

See the [CrewWare Manual](#) for a summary of CrewWare's functions.

# CrewCom Configuration File (CCF)

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. See ["Conferences" on page 13](#) and ["Profiles" on page 13](#) for more information.

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 on building a system diagram and creating a Configuration File, see the [How to Create a System Diagram Video Tutorial](#). For more information on using the Configuration File, see the [Control Unit](#) and [CrewWare](#) Manuals.

## ***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.

If your system is not preconfigured, you may elect to use the Auto Configuration function. This function allows the user to configure a basic system (up to 3 RTs with no hubs) very quickly and without using the CrewWare software application. If more customization is required or a larger system needs to be deployed, the CrewWare application can be used to create a tailored system configuration specific to your application. For more information on how to Auto Configure, see the [Control Unit Manual](#).

## ***Determining Which CCF is Active***

The CCF that is currently active for the CrewCom system is named in the top banner of the Primary CU's main menu. The Primary CU will also have (Primary) next to the CCF name. If the system was configured using Auto Configuration, the CCF name will show as "AutoCfg." If the unit is a non-primary CU in a system, the CCF name will show as the Primary CU's name with (Non-Primary) at the end. For more information on adding a non-primary CU, see ["Add More CrewCom Devices" on page 36](#).

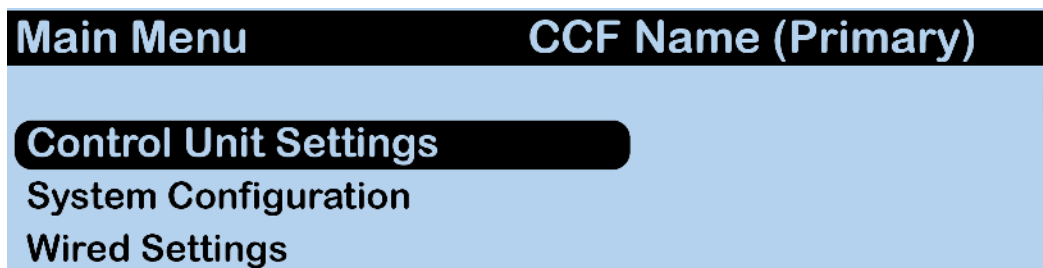


Figure 1 CCF Name in CU Main Menu

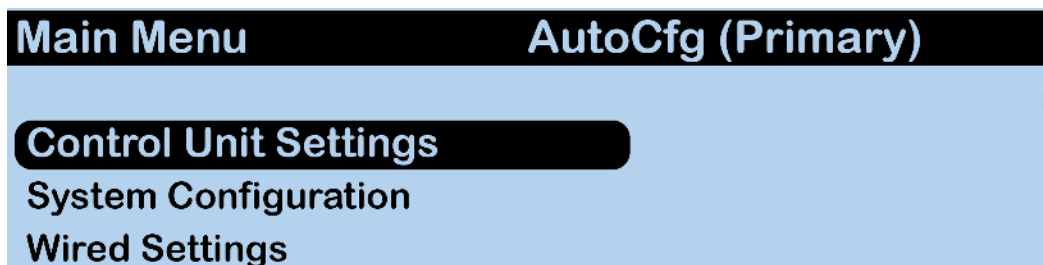


Figure 2 AutoCfg in CU Main Menu

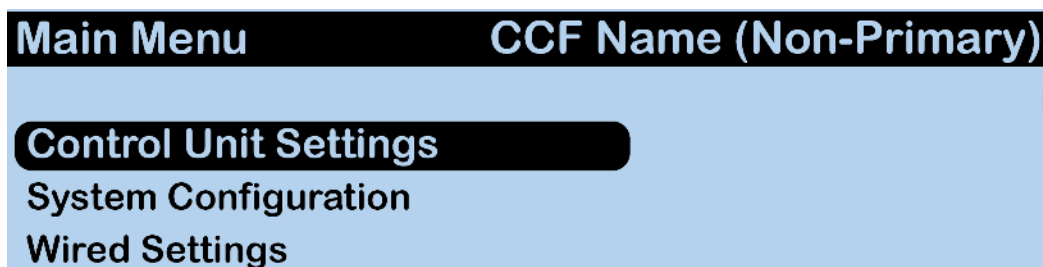


Figure 3 NoCfg in CU Main Menu

The active CCF is also named in CrewWare above the System Diagram left-hand panel.

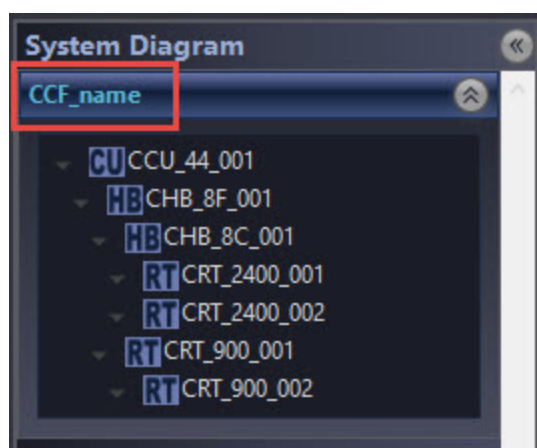


Figure 4 CCF Name in CrewWare

## 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 64.

Default Conferences are included as part of a system's "[CrewCom Configuration File Defaults](#)" on [page 11](#). New Conferences can be created using CrewWare. (See the [CrewWare Manual](#) for more information.)

## Profiles

Each CrewCom Radio Pack (RP) has a Profile that contains a variety of system settings that are defined as either global profile settings or user settings. An RP Profile determines the functionality of an RP's local controls, knobs, and buttons (including Conference assignments), and allows customization for user preferences, roaming, and operating mode. For more information on modes, see the [Control Unit Manual](#).

- **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. A global profile setting is one that assigns specific operational functions to an RP's Volume knobs, Talk buttons, and Function buttons, along with relay assignments and roaming options.
- **User Settings** – A user setting is one that is classified as being adjustable by the RP 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 an RP (after a Profile is loaded), the Control Unit's (CU's) menu, or CrewWare.

# Power Over CrewNet

## *What is Power-over-CrewNet?*

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.

- **RJ-45 Copper Ports** - 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 PoC from the CU 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 additional Pliant 48VDC power supplies must be used (PPS-48V-02 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 (PPS-48V-02 included with Hub; sold separately with all other devices).

## *Powering Downstream Devices*

In most cases, powering an RT and any daisy-chained RTs downstream via PoC is acceptable. However, depending on cable lengths and number of RTs in your CrewCom configuration, you may need to utilize the 48VDC power supply (PPS-48V, sold separately) to provide local power where needed. Under optimal conditions, seven connected RTs may be powered from a locally powered RT; however, this number can vary greatly depending on the line lengths and the number and configuration of those connected RTs.

To ensure best performance, especially with larger CrewCom configurations and longer cable lengths, Pliant recommends utilizing the supplied 48VDC power supply to locally power each Hub. However, powering a Hub and the devices connected to it via PoC may be advantageous in some smaller configurations.

## Power for Fiber Devices

Fiber connections will not transfer power to a CrewCom device. For CrewNet-compatible devices using fiber connectivity, local power must be supplied to that device using a Pliant 48VDC power supply (PPS-48V-02 included with Hubs, sold separately for all other devices). Once local power is supplied to the device, downstream devices may receive power via PoC (subject to limitations, depending on the line lengths and the number and configuration of those connected devices.)

# Operational Modes (Normal and High Density)

High Density Operational Mode is supported in Version 1.10 or higher. High Density Mode is a selectable mode of operation for existing hardware that will allow user densities to increase by more than fivefold. When selected, this new mode of operation will allow for up to 32 Radio Packs (RPs) to log into a single Radio Transceiver (RT). In addition, users will have the flexibility to mix “Normal” Mode engaged RPs and RTs along with separate High Density Mode engaged RPs and RTs on the same system to allow for application specific setup with ultimate adaptability.

For best system performance with no interaction between Radio Transceivers (RTs) in a mixed (Normal & High Density) system it is recommended that Normal-mode RTs and High Density-mode RTs be separated by at least at 80 feet (24 meters) or greater for 900MHz products and 60 feet (18 meters) for 2.4GHz products. It is possible to operate with less physical separation; however, overall range may be affected as the distance of separation is decreased.



**IMPORTANT:** Normal Mode is the default setting for devices in CrewWare. In order for proper use of Operational Modes, applicable devices and conferences need to be set using the same mode. Specifically, RP profiles and RT RF modes need to be set appropriately, and for High Density mode, up to four conferences need to be assigned as High Density conferences.

To choose High Density Mode for RTs in CrewWare, double-click on a Radio Transceiver in the Device Management list view to access its **device view** and view/edit its settings. For more information on RT settings, see the [CrewWare Manual](#). To choose High Density Mode for RP Profiles in CrewWare, double-click on a Profile in the Profile Management list view to access its **detail view** and view/edit its settings. For more information on RP Profiles, see the [CrewWare Manual](#).

## NORMAL MODE

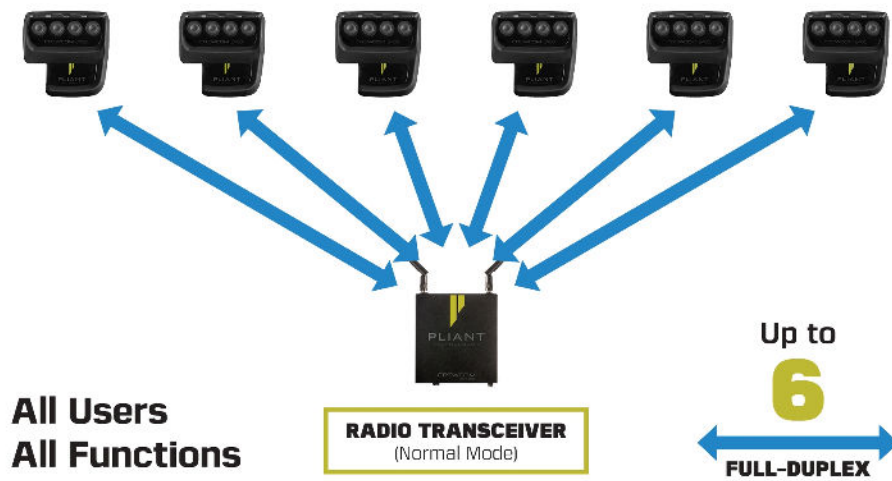


Figure 5 Normal Mode

## HIGH DENSITY MODE

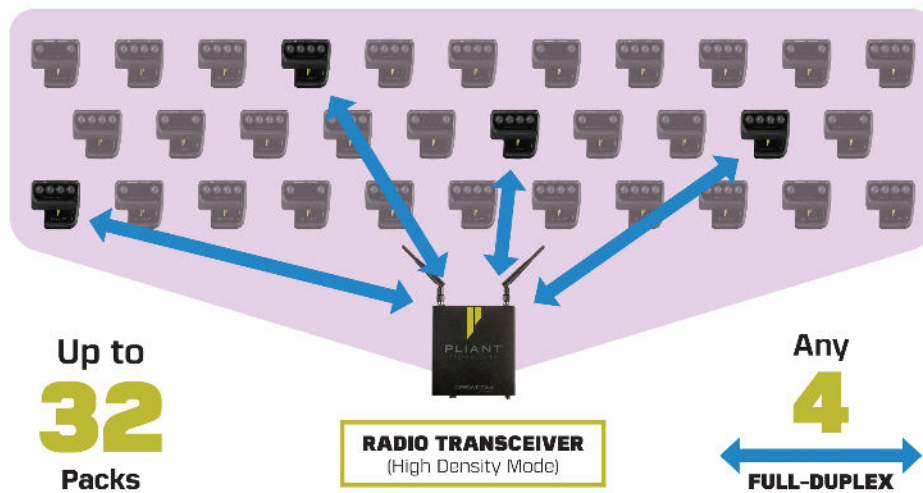


Figure 6 High Density Mode

# CHAPTER 3

## PRODUCT OVERVIEW

This chapter consists of the following sections:

- Radio Transceiver ..... 19**
  - RT Connections per Operational Mode ..... 19
  - RT Top ..... 20
  - RT Bottom ..... 21

# Radio Transceiver

The CrewCom Radio Transceiver (RT) serves as a point of contact for Radio Packs (RPs) on CrewNet. RTs are available in either 2.4GHz or 900MHz models, and they can be positioned throughout the coverage area to provide better, expanded coverage.

## ***RT Connections per Operational Mode***

### **Normal Operational Mode**

For a single CU to allow the maximum 18 Normal Mode enabled Radio Packs (RPs) to communicate wirelessly (6 per RT), a minimum of 3 RTs per single CU is needed. A system can utilize up to 16 RTs, in any combination of 2.4 GHz and 900 MHz. However, a maximum of 14 900 MHz RTs are allowed on any single system (out of 16 total RTs). The CRT-900AN and CRT-900AN-IPR (Oceania) model operates within the 915–928 MHz frequency range and supports a maximum of 7 900 MHz RTs on a single system.

### **High Density Operational Mode**

For a single CU to allow the maximum 64 High Density Mode enabled Radio Packs (RPs) to communicate wirelessly (32 per RT), a minimum of 2 RTs per single CU is needed. A system can utilize up to 16 RTs, in any combination of 2.4 GHz and 900 MHz. However, a maximum of 14 900 MHz RTs are allowed on any single system (out of 16 total RTs). The CRT-900AN and CRT-900AN-IPR (Oceania) model operates within the 915–928 MHz frequency range and supports a maximum of 7 900 MHz RTs on a single system.



**Note:** Connected RTs may require additional Pliant 48VDC power supplies (sold separately) if there are too many devices connected via CrewNet for the Power over CrewNet to adequately power all devices.

## RT Top

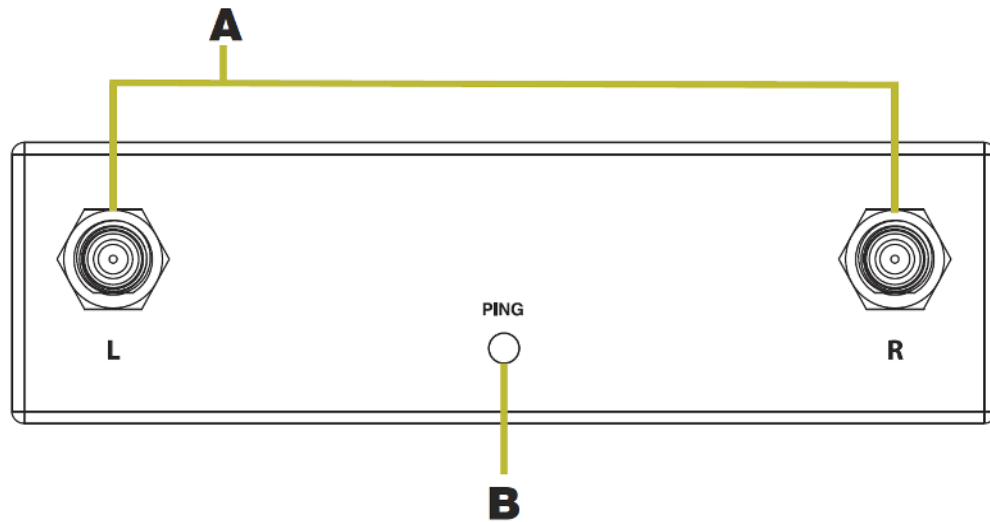


Figure 7 Radio Transceiver Top View

- A. **Antenna Connections:** RP-TNC (Connector). If alternative antenna setup is needed, see the RT Management section of the CrewWare Manual for more information about how to adjust antenna diversity settings within your CrewCom Configuration File.
- B. **PING LED:** White LED – FLASHING when user has initiated a PING to identify the device.

## RT Bottom

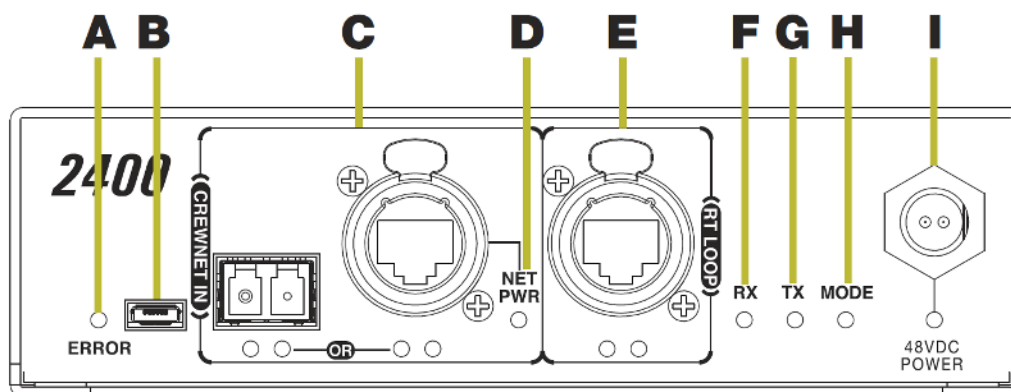


Figure 8 Radio Transceiver Bottom View

- A. **ERROR LED:** Indicates the device's error status. This LED function is currently not available. (See ["Radio Transceiver LEDs" on page 38](#) for more information.)
- B. **USB Connection:** For connectivity to a PC to update firmware. See the CrewWare Manual for more information about the firmware update process.
- C. **CREWNET IN Port (RJ-45 or Fiber) and Status LEDs:** The RT's CREWNET IN ports allow it to connect to any available CREWNET port on other devices or any RT LOOP port on other RTs, thus adding the RT to a proprietary network where all devices are part of a configuration that shares data, timing synchronization, and audio. Each RT has a CREWNET IN port (RJ-45 for copper or duplex LC for Single Mode Fiber) and an RT LOOP port (RJ-45, which allows RTs to be daisy-chained (looped through) together). Each port's status LEDs indicate the status of the CrewNet link. (See ["Radio Transceiver LEDs" on page 38](#) for more information.)
- D. **Network Power (NET PWR) LED:** Indicates the presence and condition of Power-over-CrewNet (PoC), which is being provided to the unit via the CREWNET IN port. This port must be connected via copper (Cat 5e or greater) cable for the RT to receive power over CrewNet. The NET PWR LED indicates the presence and strength of the PoC. If PoC is not used, the RT can be powered locally from an optional Pliant 48VDC power supply (sold separately). (See ["Radio Transceiver LEDs" on page 38](#) for more information.)
- E. **RT LOOP Port and Status LEDs:** The RT LOOP port is used to connect multiple RTs together. This port's status LEDs indicate the status of the CrewNet link. (See ["Radio Transceiver LEDs" on page 38](#) for more information.)
- F. **RX LED:** Green LED – Blinks when RT is receiving transmissions from Radio Packs.
- G. **TX LED:** Green LED – On when RT is transmitting properly.
- H. **OPERATIONAL MODE LED:** Multi-colored LED – Varies based on operational mode. FLASHING when user has initiated a PING to identify the device. See ["Radio Transceiver LEDs" on page 38](#).

- I. **48VDC POWER Connection and LED:** The locking DC Power Connector enables the RT to be powered locally with a Pliant 48VDC power supply (sold separately). External (local) power is required if using the CrewNet fiber port or if there isn't sufficient PoC present on the CrewNet In copper port. (See ["Radio Transceiver LEDs" on page 38](#) for more information.)

## CHAPTER 4

# SETUP AND INSTALLATION

This chapter consists of the following sections:

|                                                |           |
|------------------------------------------------|-----------|
| <b>Plan Coverage Area</b> .....                | <b>24</b> |
| Planning Tips .....                            | 24        |
| <b>Determine if you have a CCF.</b> .....      | <b>25</b> |
| <b>Position Devices</b> .....                  | <b>26</b> |
| How To Mount Radio Transceivers .....          | 26        |
| <b>Connect to CrewNet</b> .....                | <b>30</b> |
| RT Connections per Operational Mode .....      | 30        |
| How To Connect CrewNet to RTs .....            | 31        |
| <b>Power On the System</b> .....               | <b>33</b> |
| How to Power On and Configure the System ..... | 33        |
| <b>Name a Device</b> .....                     | <b>34</b> |

# Plan Coverage Area

Before installation begins, it is a good idea to plan your coverage area so that equipment is positioned in the best possible locations.

## *Planning Tips*

- Map out the site and identify the most critical areas where communication is needed.
- Consider cable length limitations during planning. Copper: 330ft. (100 m). Fiber: 32,800 ft. (10 km).
- Locate antennas in open spaces and avoid obstructions (especially metal).
- If using omni-directional antennas, position antennas in the center of the coverage area and as high as possible.

## Determine if you have a CCF.

Your Control Unit (CU) may have been pre-configured with a CrewCom Configuration File (CCF) at the factory or other source—consult the documentation provided with your system for your specific configuration details, then proceed to ["Position Devices" on the next page](#). (If you have no configuration documentation or printed system diagram, contact the person who provided your CrewCom system for assistance or contact Pliant Customer Support.)

If your CU has not been pre-configured with a CCF (and if you do not have a saved CCF on a USB drive to load to your CU), you will need to either Auto Configure your system or install CrewCom's software application, CrewWare, to create one. If you choose to Auto Configure, continue to ["Position Devices" on the next page](#). If you choose to create a CCF, you will create the CCF before continuing to ["Position Devices" on the next page](#). (For more information on building a system diagram and creating a Configuration File, see the [How to Create a System Diagram Video Tutorial](#).)



**Note:** Auto Configure is only available for systems upgraded to Version 1.10.

# Position Devices

After you plan your coverage area and determine if you have a CCF, you can begin positioning your Control Units (CUs), Radio Transceivers (RTs), and Hub(s) (if applicable).

## *How To Mount Radio Transceivers*

Attach the provided omni-directional antennas (2) to the RT, and mount the RT in the center of the desired coverage area as high as possible and away from any obstructions (especially metal).



**Note:** If using directional antennas (where legal), mount them on the edge of the coverage area and point antennas across coverage area. Find more antenna positioning recommendations and detailed mounting procedures below.

## Determining the Device Location

Follow these tips when determining a location for your RT and antennas:

- Every antenna has a certain pattern of coverage for which it is useful. The patterns of both CrewCom RT antennas need to be focused in the same general area of the desired coverage area to ensure best RF results.
  - When possible, centrally position omni-directional antennas in the middle of the desired coverage area.
  - Don't separate omni-directional antennas too far away from each other (not more than 3–4 m, 9–13 ft).
  - Don't aim directional antennas in two different directions.
- Both antennas are necessary and equally important. Redundant transmissions from both antennas must regularly reach the Radio Packs to have a robust, successful RF link.

- Higher is almost always better when placing antennas.
  - Maintaining a direct line of sight from the RT antennas to the Radio Pack is the best possible antenna scenario.
  - The minimum acceptable application of this is to get the RT antennas above head level. In many cases, the best execution is to place the RT well above the desired coverage area and aim antennas directly down at the coverage area.



**Note:** Always follow safety instructions. When the RT will be exposed to moisture, ensure proper measures are taken to prevent water ingress.

- Always keep antennas away from the following:
  - Large metal objects. Stay at least two feet away from these.
  - Large containers of liquid. Most liquids are intense RF absorbers.
  - Confined spaces. Don't set up antennas in rooms or areas with RF obstacles. Wide open spaces are good. Stay two to four feet away from walls or ceilings.

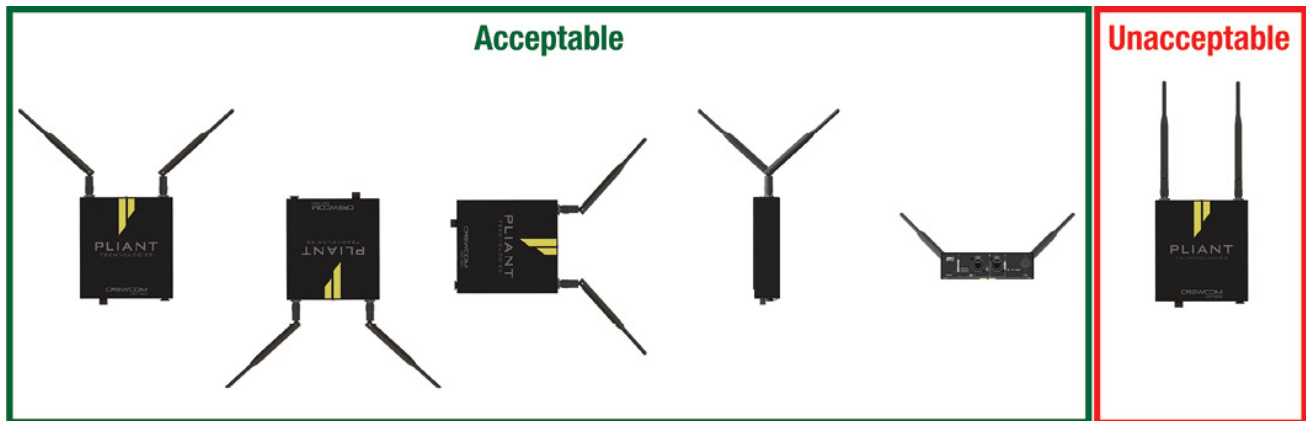


Figure 9 RT and Antenna Orientation

## Attaching RT Bracket Mount

1. Place the transceiver down on a flat surface (logo side down) and place two rubber washers over each of the two holes on the rear of the device.
2. Choose one of the two available mounting brackets—the single RT adapter bracket (for use with mic stand adapter or other mounting hardware [e.g., ball mount]) or the flat bracket.
3. Place the bracket flush over the washers and align the two holes.
4. Insert each knob/screw into the back side of the bracket and hand tighten until the transceiver is secure.



**Note:** If using the flat bracket to mount the RT(s) flush with a wall, use the provided screws rather than knobs to attach the RT to the bracket.

5. If using the adapter bracket, and the mic stand adapter is needed, attach the mic stand adapter to the bracket by screwing it into the hole on the bottom.
6. Attach the provided 2dBi omni-directional antennas onto the RT's antenna connections.



**Note:** Additional antenna options are available where legal. For more information, please contact an applications specialist.

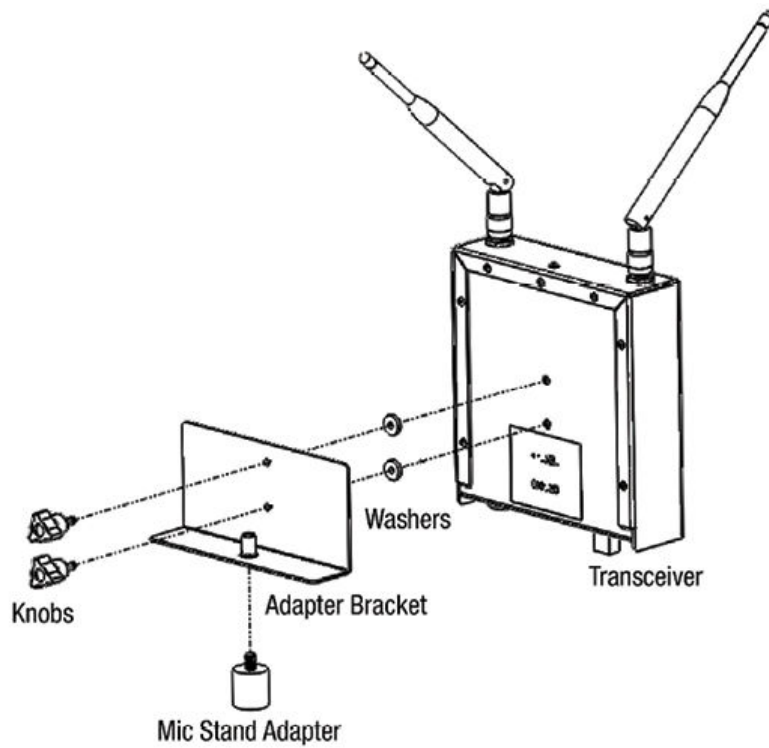


Figure 10 Diagram of Single RT Adapter Mounting Bracket

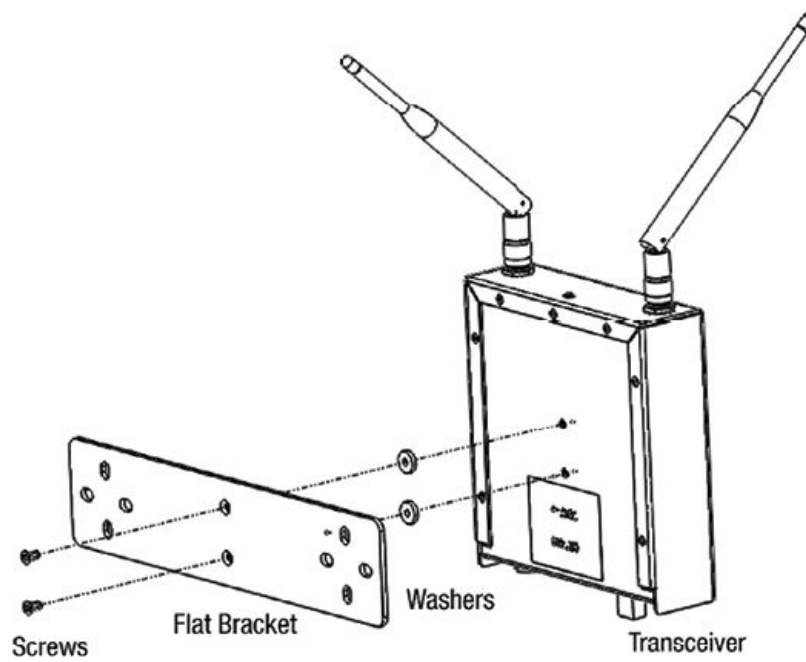


Figure 11 Diagram of RT Flat Mounting Bracket

# Connect to CrewNet

Connect your CrewCom system's devices via their available CrewNet RJ-45 Copper or duplex LC Fiber ports.



**Note:** If you choose to Auto Configure your system, the CU will prompt you to plug in devices after you have powered on the CU. Hubs cannot be Auto Configured.



**Important!** Device port connections must match your CCF's system diagram in order to operate. Pliant recommends making all cable connections from the CU to other CrewCom devices prior to powering on the system. However, CrewCom devices (such as RTs) that are already present in the CCF may be connected or replaced while the system is operating. When hot-swapping devices, Pliant recommends waiting at least 10 seconds between disconnecting and reconnecting the device.

## *RT Connections per Operational Mode*

### Normal Operational Mode

For a single CU to allow the maximum 18 Normal Mode enabled Radio Packs (RPs) to communicate wirelessly (6 per RT), a minimum of 3 RTs per single CU is needed. A system can utilize up to 16 RTs, in any combination of 2.4 GHz and 900 MHz. However, a maximum of 14 900 MHz RTs are allowed on any single system (out of 16 total RTs). The CRT-900AN and CRT-900AN-IPR (Oceania) model operates within the 915–928 MHz frequency range and supports a maximum of 7 900 MHz RTs on a single system.

### High Density Operational Mode

For a single CU to allow the maximum 64 High Density Mode enabled Radio Packs (RPs) to communicate wirelessly (32 per RT), a minimum of 2 RTs per single CU is needed. A system can utilize up to 16 RTs, in any combination of 2.4 GHz and 900 MHz. However, a maximum of 14 900 MHz RTs are allowed on any single system (out of 16 total RTs). The CRT-900AN and CRT-900AN-IPR (Oceania) model operates within the 915–928 MHz frequency range and supports a maximum of 7 900 MHz RTs on a single system.

## How To Connect CrewNet to RTs

1. Connect at least one RT to the CU via an available CrewNet port.
2. If you have additional RTs, connect via an available CrewNet port on a CU (or Hub if applicable), or by daisy-chaining to an existing RT. (See ["Add More CrewCom Devices" on page 36](#) for more information about configuring multiple RTs.)

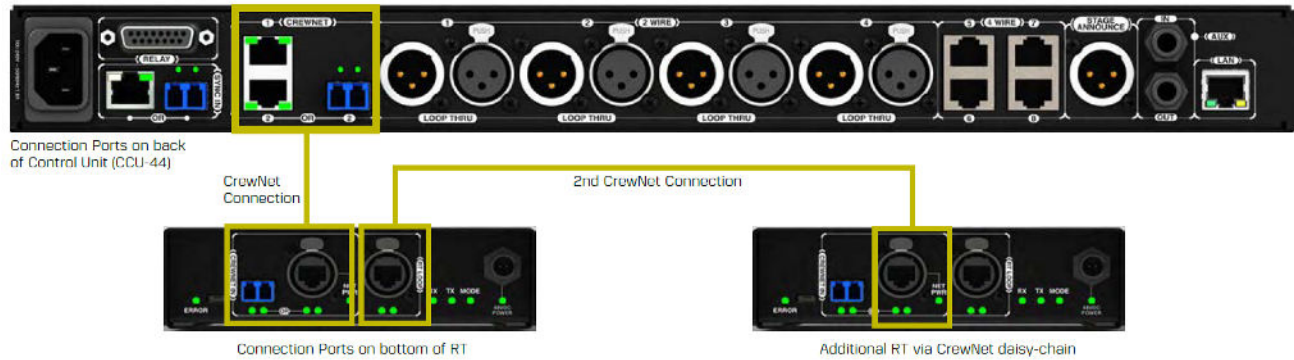


Figure 12 CU-to-RT CrewNet Connections

## CrewNet Connectivity

**RJ-45 Copper Ports** - 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 (PoC) via the CrewNet port. (See ["Power Over CrewNet" on page 14](#) for more information.) 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 additional Pliant 48VDC power supplies must be used (PPS-48V-02 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 (PPS-48V-02 included with Hub; sold separately with all other devices).

# Power On the System

## *How to Power On and Configure the System*

1. Turn ON the power switch on the front of the CU.
  - If your Control Unit (CU) was pre-configured with a CrewCom Configuration File (CCF) at the factory or other source, wait for the configuration file (CCF) to load on the system. The CU will display a progress bar during the load process. A “CCF Loaded” message and a configuration file summary will display when the load is complete. Once the message completes, the home screen will display on the front of the CU. Skip to Step 3.
2. If your Control Unit (CU) was not pre-configured, select the appropriate CCF option on the CU menu and follow the prompts on the screen.
  - Auto Configure: See the [Control Unit Manual](#) for a walk-through of the CU prompts.
  - Load Configuration: You can load a CCF via USB drive. See the [Control Unit](#) and [CrewWare](#) Manuals for more information about this process.
  - Use as Non-primary CU: The CU will prompt you to connect to a configured system.



**Note:** In a multi-CU system, only the primary CU requires a CCF to be loaded. (See the [Control Unit Manual](#) for more information about CU priority.)

3. Verify that your RTs and Hubs (if applicable) are receiving power by checking that their Power LEDs are green. Under optimal conditions, seven additional connected RTs can be powered from one locally powered RT; however, this number can vary greatly depending on the line lengths and the number and configuration of those connected devices.
4. See the [RP Manual](#) for instructions on setting up and using Radio Packs with your system.



**Configuration Troubleshooting:** Once the system is powered on, you can tell that a configuration error has occurred with an RT if its TX LED is not lit. The configuration error may be present in the RT or other device upstream. You may need to connect to CrewWare to identify the specific configuration errors needing resolution. In addition, if a device does not have compatible firmware, you will need to update its firmware using CrewWare. (See the [CrewWare Manual](#) for more information about the firmware update process.)

# Name a Device

CrewCom devices can be given a 16-character long name and an 8-character short name for display in the various CrewWare menus and diagrams.



**Note:** This is a different procedure than editing the RP Profile's name. (See the [CrewWare Manual](#) and/or the ["How to Edit a Profile" video tutorial](#).)

RT name customization can only be performed from CrewWare. Please refer to the [CrewWare Manual](#) for information about this process.

# CHAPTER 5

## OPERATION

This chapter consists of the following sections:

|                                       |           |
|---------------------------------------|-----------|
| <b>Add More CrewCom Devices</b> ..... | <b>36</b> |
| Adding a Radio Transceiver (RT) ..... | 36        |
| <b>Radio Transceiver LEDs</b> .....   | <b>38</b> |

# Add More CrewCom Devices

If you need to add additional CrewCom devices (e.g., a Hub, RT, or additional CUs) after you've applied your CrewCom Configuration File, you'll need to do the following:



**Note:** To add more CrewCom devices to a system that has been Auto Configured, restore factory defaults on the CU and Auto Configure again with all devices connected. Up to 3 RTs can be Auto Configured; Hubs cannot be Auto Configured. See the [Control Unit Manual](#) . To add a non-primary CU to a system that has been Auto Configured, see the [Control Unit Manual](#).

1. Add the device(s) to your system diagram in CrewWare, then save the Configuration File change and apply the new Configuration File to your system. (Remember, you cannot make System Diagram changes while CrewWare is "live.") (See the [CrewWare Manual](#) for information on building a system diagram and uploading the configuration file (CCF).)
2. Connect the additional CrewCom device(s) via an available CrewNet RJ-45 Copper or duplex LC Fiber port.

## ***Adding a Radio Transceiver (RT)***

When adding an RT, any advanced system configuration and customization of radio bands and hopping patterns must be done via the RT Management Tab in CrewWare. These settings are part of the CrewCom Configuration File, but they are not adjustable in "Live" mode.

- **Radio Band** – All radios on a CrewCom system of the same frequency must be set to the same Radio Band. The default Radio Band is selected automatically by choosing the widest Radio Band setting for that frequency range. The Radio Band you use should follow the rules governing radio use in your country. You can change the system Radio Band selection from the Control Unit or CrewWare, choosing either **Full**, **High**, **Low**, or **Mixed**. The Mixed Band allows for the simultaneous use of both the Low and the High bands on the same CrewNet-based system. Using this mode allows Radio Packs to roam from Low Band to High Band and vice-versa. This is especially useful when coordinating hopping patterns and bands on more than one collocated and synced CrewCom or X-System/CrewCom system.

| Radio Band Options |                           |                                 |
|--------------------|---------------------------|---------------------------------|
|                    | 900MHz Radio Bands        | 2.4GHz Radio Bands              |
| <b>Full</b>        | 902–928 Mhz               | 2400–2483.5 Mhz                 |
| <b>High</b>        | 915–928 Mhz*              | 2445–2483.5 Mhz                 |
| <b>Low</b>         | 902–915 Mhz               | 2400–2444 Mhz                   |
| <b>Mixed</b>       | 902–915 Mhz / 915–928 Mhz | 2400–2444 Mhz / 2445–2483.5 Mhz |

\*The -900AN device models use only the High 900MHz radio band.



**Note:** Changes to the Radio Band setting will require all Radio Packs to be re-paired. See the [Radio Pack Manual](#) for more information about that process.

- **Hopping Pattern** – The RT's Hopping Pattern is selected automatically by CrewCom when comparing all the existing RTs and assigning the next compatible number (within the same frequency range) available on CrewNet. You can either leave the Hopping Pattern that the system selects or edit the Hopping Pattern to your preference. If you select a Hopping Pattern that is not compatible with the Control Unit's setting, a warning will display prompting you to confirm your preferred settings.

# Radio Transceiver LEDs

Each LED on the top and bottom of the RT indicates a particular condition or status for the device. See the table below for details about each meaning.

| RT LED Descriptions                       |                                                                                                                                  |                                            |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Connection/LED                            | Description                                                                                                                      |                                            |
| <b>ERROR LED</b>                          | This LED function is currently not available.                                                                                    |                                            |
| <b>48VDC POWER LED</b>                    | Green – External (local) power is present.                                                                                       |                                            |
|                                           | Off – No external (local) power is present.                                                                                      |                                            |
| <b>NET PWR LED</b>                        | Green – Power-over-CrewNet is adequate for operation with current connections.                                                   |                                            |
|                                           | Off – No Power-over-CrewNet is present.                                                                                          |                                            |
| <b>CREWNET IN and RT LOOP Status LEDs</b> | <b>Left</b>                                                                                                                      | Green – CrewNet connection is good.        |
|                                           |                                                                                                                                  | Off – No CrewNet connection detected.      |
|                                           | <b>Right</b>                                                                                                                     | On ( Green ) – 1000 Mbps link is detected. |
|                                           |                                                                                                                                  | Blinking ( Green ) – Activity is detected. |
|                                           |                                                                                                                                  | Off – No CrewNet connection detected.      |
|                                           |                                                                                                                                  |                                            |
| <b>RX LED</b>                             | Green LED – On, and blinks when RT is receiving transmissions from roaming Radio Packs (roaming to the RT and away from the RT). |                                            |
| <b>TX LED</b>                             | Green LED – On when RT is transmitting properly.                                                                                 |                                            |
| <b>PING LED</b>                           | White LED – FLASHING when user has initiated a PING to identify the device.                                                      |                                            |
| <b>OPERATIONAL MODE LED</b>               | Green LED - Normal Operational Mode                                                                                              |                                            |
|                                           | Blue LED - High Density Operational Mode                                                                                         |                                            |
|                                           | FLASHING when user has initiated a PING to identify the device.                                                                  |                                            |

This chapter consists of the following sections:

**CREWCOM**  
BY EMMI

# Radio Transceiver Specifications

| RT Specifications*                            |                                                                                                                            |                                                                          |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Specification                                 | CRT-900/CRT-900AN**/CRT-900-IPR/CRT-900AN-IPR**                                                                            | CRT-2400 / CRT-2400CE***/CRT-2400-IPR/CRT-2400CE-IPR***                  |
| RF Frequency (MHz)                            | 902–928 MHz<br>(915–928 MHz)**                                                                                             | 2400–2483 MHz                                                            |
| RF Scheme                                     | FHSS with TDMA                                                                                                             |                                                                          |
| Effective Radiated Power                      | 400 mW (+26dBm)                                                                                                            | 100 mW (+20dBm)                                                          |
| Receiver Sensitivity                          | -100 dBm at 10-5 BER                                                                                                       |                                                                          |
| Radio Certification                           | FCCID: 2AX9C-CCT900 and<br>IC: 30796-CCT900                                                                                | FCCID: 2AX9C-CCT24 and<br>IC: 30796-CCT24                                |
| Transmission Range                            | 650 ft. (200 m) under typical conditions; 1950 ft. (600 m) line of sight                                                   | 500 ft. (150 m) under typical conditions; 1500 ft. (450 m) line of sight |
|                                               | (Note: Functional range depends on many variables, including RF signal absorption, reflection, and external interference.) |                                                                          |
| No. of Radio Packs Supported                  | 6 (Normal Operational Mode)<br>32 (High Density Operational Mode)                                                          |                                                                          |
| Number of Antenna Connections per Transceiver | 2                                                                                                                          |                                                                          |
| RP-TNC Antenna Connector Type                 | RP-TNC Female                                                                                                              |                                                                          |
| Supplied Antenna                              | +2dBi Omni-directional (whip)                                                                                              |                                                                          |
| CREWNET IN Port (supports 1 connection)       | (1) Ethercon RJ-45 for copper; (1) duplex LC for Single Mode Fiber                                                         |                                                                          |
| RT LOOP Port                                  | (1) Ethercon RJ-45                                                                                                         |                                                                          |
| Maximum CrewNet Line Length                   | Copper 330 ft. (100 m); Fiber 32,800 ft. (10,000 m)                                                                        |                                                                          |
| Network Power (Power-over-CrewNet)            | CrewNet RJ-45 only                                                                                                         |                                                                          |
| External Power                                | 48VDC Power Supply, PPS-48V (Sold Separately)                                                                              |                                                                          |

| RT Specifications*                      |                                                                                                                                     |                                                         |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Specification                           | CRT-900/CRT-900AN**/CRT-900-IPR/CRT-900AN-IPR**                                                                                     | CRT-2400 / CRT-2400CE***/CRT-2400-IPR/CRT-2400CE-IPR*** |
| Dimensions without Antennas (L x W x H) | Non IPRTs: 6.30 in. × 7.74 in. × 1.81 in. (16 cm × 19.7 cm × 4.6 cm)<br>IPRTs: 6.56 in x 7.19 in x 1.97 in (16.7 cm x 18.3cm x 5cm) |                                                         |
| Weight                                  | 1.25 lbs (567 g)                                                                                                                    |                                                         |
| Operating Environment                   | -20° to 50° C (-4° to 122° F); 10% to 90% Humidity                                                                                  |                                                         |
| Maximum Altitude                        | 6,562 ft. (2,000 m)                                                                                                                 |                                                         |
| RoHS                                    | 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. 900MHz products only available in North America, Australia, and New Zealand.

**\*\*CRT-900AN (Oceania) model is approved for use in Australia and New Zealand and operates within the 915–928 MHz frequency range.**



\*\*\*The CRT-2400CE model meets the same specifications and complies with ETSI standards (300.328 v1.8.1). Non-CE models are non-compliant with some ETSI standards.

The CrewCom 2.4GHz Radio Transceiver (CRT-2400) complies with EMC requirement KN 301 489 1/17 and the Korean Radio Law RF requirements. The Radio Pack is labeled with the KC mark and RRA (Radio Research Agency) registration number.

# CHAPTER 7

## PRODUCT SUPPORT

This chapter consists of the following sections:

|                                                     |           |
|-----------------------------------------------------|-----------|
| <b>Product Support</b> .....                        | <b>43</b> |
| Returning Equipment for Repair or Maintenance ..... | 43        |

# Product Support

Pliant Technologies, LLC support and service personnel are ready to help you with any issues you may have regarding products purchased from authorized dealers or authorized distributors. All requests and questions should be directed to our Customer Service department via phone, fax, or email. Support and service personnel may require that you provide proof of purchase from an authorized dealer or authorized distributor and the serial number, where applicable, for your product, and Pliant Technologies reserves the right to refuse to provide support or service without this information.

Pliant Technologies, LLC  
Customer Service Department  
Phone: +1.334.321.1160  
Toll-Free: 1.844.475.4268 or 1.844.4PLIANT  
Fax: +1.334.321.1162  
Email: [customer.service@plianttechnologies.com](mailto:customer.service@plianttechnologies.com)

Visit [www.plianttechnologies.com](http://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](mailto: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

# CHAPTER 8

## SYSTEM MAINTENANCE AND STORAGE

This chapter consists of the following sections:

|                                             |           |
|---------------------------------------------|-----------|
| <b>System Maintenance and Storage</b> ..... | <b>45</b> |
| Cleaning .....                              | 45        |
| Temperature and Humidity .....              | 45        |

# System 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.



# CHAPTER 9

## LICENSE AND COMPLIANCE INFORMATION

This chapter consists of the following sections:

**License Information .....47**

# 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

- A. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may cause undesired operation.
- B. 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

- A. This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

- B. Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

- C. This radio transmitter (FCCID: 2AX9C-CCT24 & 2AX9C-CCT900, IC: 30796-CCT24 & 30796-CCT900) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (FCCID: 2AX9C-CCT24 & 2AX9C-CCT900, IC: 30796-CCT24 & 30796-CCT900) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

- i. The following antenna types are approved for use with the Radio Transceiver, and their required impedance is 50 ohms:

- 2.4GHz Model :
  - 9dBi dipole
  - 14dBi corner reflector
  - 12dBi patch
  - 13.9dBi yagi
  - 4dBi pifa
  - 14dBi CP beam
- 900MHz Model:
  - 5 dBi dipole
  - 4dBi pifa
  - 9 dBi yagi
  - 12 dBi panel

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

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### 3. South Korea Notices

- A. The CrewCom Radio Transceiver (CRT-2400) complies with EMC requirement KN 301 489 1/17 and the Korean Radio Law RF requirements. The Radio Pack is labeled with the KC mark and RRA (Radio Research Agency) registration number.

## RF-Exposure Statement

The CrewCom Radio Transceiver has been designed for use as what the FCC calls a “mobile” device.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## CrewCom Compliance Numbers

| Model Numbers | Compliance Model No. |
|---------------|----------------------|
| CRT-2400      | RT2505               |
| CRT-2400CE    | RT2505               |
| CRT-900       | RT2505               |
| CRT-900AN     | RT2505               |

# CHAPTER 10

## WARRANTY INFORMATION

This chapter consists of the following sections:

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| Limited Warranty            | 52        |
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# Warranty Information

## ***Limited Warranty***

Subject to the conditions of this Limited Warranty, CrewCom and MicroCom 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 web site. Register your product here: <https://plianttechnologies.com/product-registration/>

Subject to the conditions of this Limited Warranty, Tempest® professional products carry a two-year product warranty.

Subject to the conditions of this Limited Warranty, all headsets and accessories (including Pliant-branded batteries) carry a one-year warranty.

Date of sale is determined by the invoice date from an authorized dealer or authorized distributor to the end user.

The sole obligation of Pliant Technologies, LLC during the warranty period is to provide, without charge, parts and labor necessary to remedy covered defects appearing in products returned prepaid to Pliant Technologies, LLC. This warranty does not cover any defect, malfunction, or failure caused by circumstances beyond the control of Pliant Technologies, LLC, including but not limited to negligent operation, abuse, accident, failure to follow instructions in the Operating Manual, defective or improper associated equipment, attempts at modification and/or repair not authorized by Pliant Technologies, LLC, and shipping damage.

Unless applicable state law provides otherwise, Pliant Technologies extends this limited warranty to only the end user who originally purchased this product from an authorized dealer or authorized distributor. Pliant Technologies does not extend this warranty to any subsequent owner or other transferee of the product. This warranty is valid only if the original proof of purchase issued to the original purchaser by an authorized dealer or authorized distributor, specifying the date of purchase, and the serial number, where applicable, is presented with the product to be repaired. Pliant Technologies reserves the right to refuse warranty service if this information is not provided or if a product's serial numbers have been removed or effaced.

This limited warranty is the sole and exclusive express warranty given with respect to Pliant Technologies, LLC products. It is the responsibility of the user to determine before purchase that this



## ***Parts Limited Warranty***

Replacement parts for Pliant Technologies, LLC products are warranted to be free from defects in materials and workmanship for 120 days from the date of sale to the end user.

This warranty does not cover any defect, malfunction, or failure caused by circumstances beyond the control of Pliant Technologies, LLC, including but not limited to negligent operation, abuse, accident, failure to follow instructions in the Operating Manual, defective or improper associated equipment, attempts at modification and/or repair not authorized by Pliant Technologies, LLC, and shipping damage. Any damage done to a replacement part during its installation voids the warranty of the replacement part.

This limited warranty is the sole and exclusive express warranty given with respect to Pliant Technologies, LLC products. It is the responsibility of the user to determine before purchase that this product is suitable for the user's intended purpose. ANY AND ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, ARE LIMITED TO THE DURATION OF THIS EXPRESS LIMITED WARRANTY. NEITHER PLIANT TECHNOLOGIES, LLC NOR ANY AUTHORIZED RESELLER WHO SELLS PLIANT PROFESSIONAL INTERCOM PRODUCTS IS LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND.

This warranty does not cover any defect, malfunction, or failure caused by circumstances beyond the control of Pliant Technologies, LLC, including but not limited to negligent operation, abuse, accident, failure to follow instructions in the Operating Manual, defective or improper associated equipment, attempts at modification and/or repair not authorized by Pliant Technologies, LLC, and shipping damage. Any damage done to a replacement part during its installation voids the warranty of the replacement part.

This limited warranty is the sole and exclusive express warranty given with respect to Pliant Technologies, LLC products. It is the responsibility of the user to determine before purchase that this product is suitable for the user's intended purpose. ANY AND ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, ARE LIMITED TO THE DURATION OF THIS EXPRESS LIMITED WARRANTY. NEITHER PLIANT TECHNOLOGIES, LLC NOR ANY AUTHORIZED RESELLER WHO SELLS PLIANT PROFESSIONAL INTERCOM PRODUCTS IS LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND.