PLIANT
TECHNOLOGIES

CREWCOM

# BREAK AWAY FROM THE PACK

COPYRIGHT 2019 PLIANT TECHNOLOGIES, LLC. ALL RIGHTS RESERVED.

PLIANT TECHNOLOGIES

CREWCOM

# New and Revolutionary

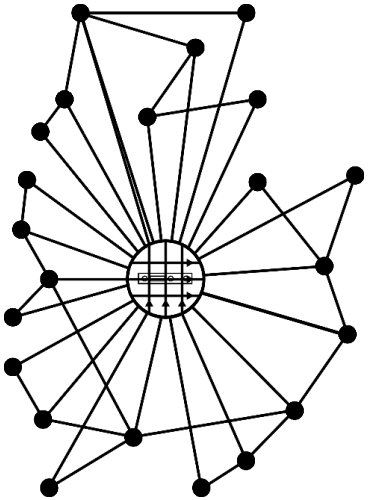
- A Different Approach to Intercom
- Much More than Just Wireless Intercom
  - A complete communication solution
    - Flexible intercom system with unparalleled wireless capabilities

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom Overview

## The Basics:

- CrewNet Uses a Distributed Network Architecture
  - Unlike a traditional Matrix-based architecture.
  - Wherever the network is you have the entire CrewCom system.
- Add CrewCom Devices Anywhere
  - Resources on the entire network are available to anyone, anywhere.
    - Place any CrewCom device exactly where needed.
- The Network is Unaware of Frequency
  - Only Transceivers and Belt Packs are radio devices.
  - In the future additional frequency bands can easily be added.
    - No change to the existing users.
    - Prevents the entire system from becoming obsolete.



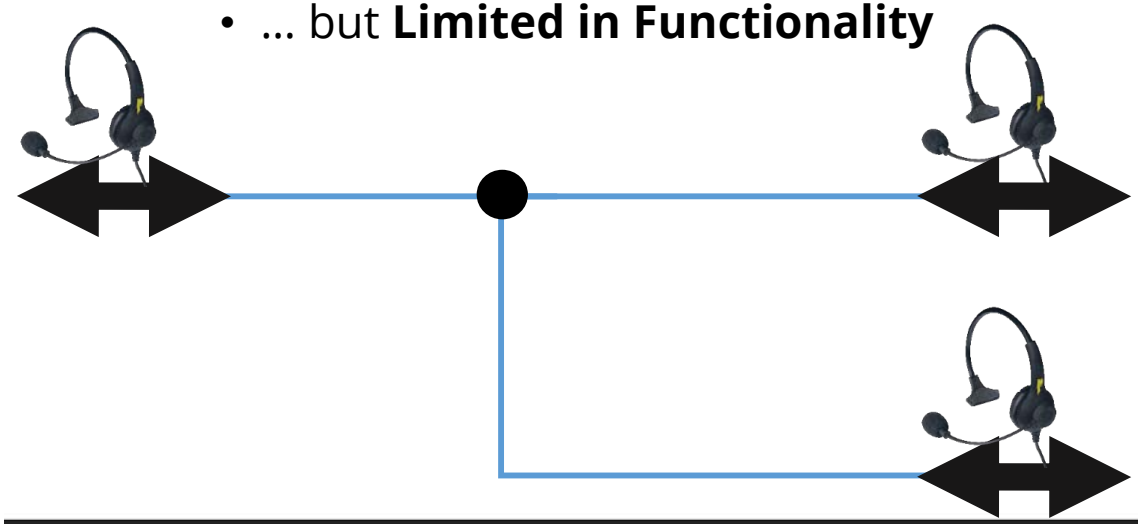
Matrix-Based CrewCom

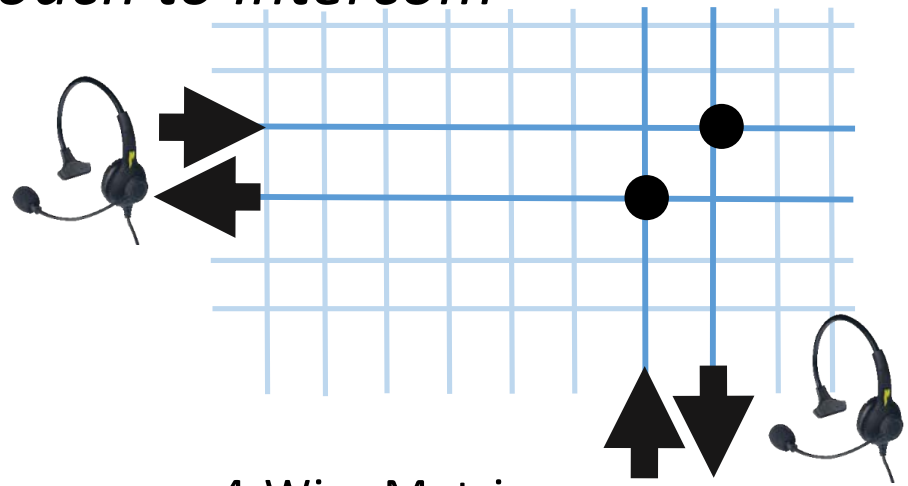
Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom Overview

## *Traditional Approach to Intercom*

- 2-Wire Party Line
  - Efficient
  - Reliable
  - Easy
  - … but **Limited in Functionality**





- 4-Wire Matrix
  - Configurable
  - Flexible
  - …but **Complicated**
  - **Expensive**
  - **Limited Depletable Resources**
  - **Requires an Expert Operator**

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT® TECHNOLOGIES

# Radio Management

## Managing Radios for Real World Applications

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Radio Management

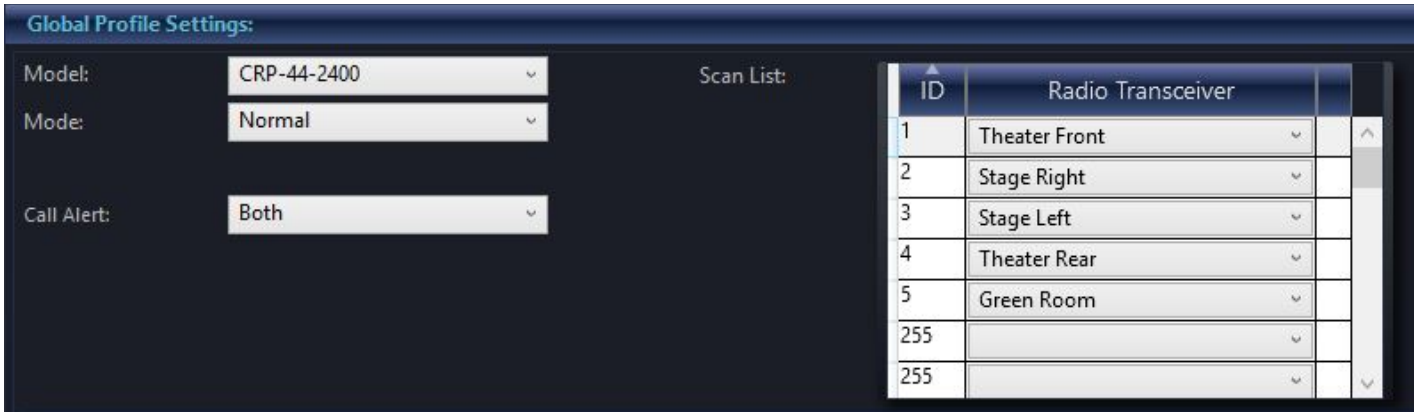
- Radio Transceiver Flexibility
  - CrewNet Supports:
    - Up to 16 RTs in 2.4GHz or
    - Up to 14 RTs in 900MHz*
- Used for:
  - Extending Coverage
  - Increasing User Density
  - Adding More Frequency Bands
  - …or All of the Above, Simultaneously!

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

** Max 14 900MHz RTs on any single system (out of 16 total RTs).*
** 900MHz Available Only in North America, Australia and New Zealand. Due to limited bandwidth max totals for Oceania are half that of North America.*

# Radio Management

- Managed Roaming
  - RP Profile Scan List
    - Determines the RT location(s) a Radio Pack can log into
    - Allows the System Administrator to customize roaming areas
      - Keeps critical users from being inadvertently “locked out” due to overcrowding in specific areas




*CrewWare RP Profile Management Screen*

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

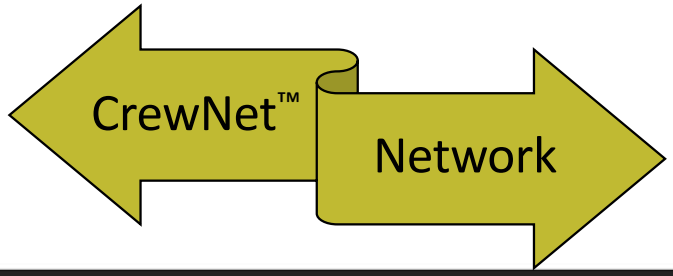
# Radio Management

## Managing User Coverage Areas (Video)

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewNet™

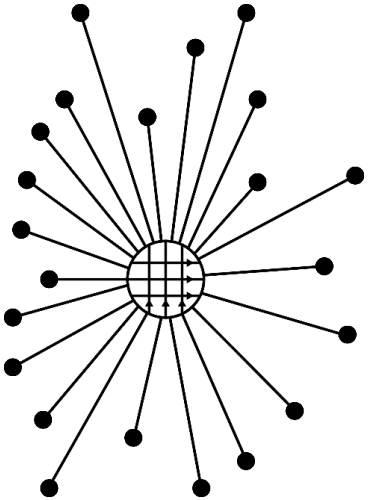
- CrewNet Network Backbone
  - Proprietary transport for data, timing, and digital audio
  - Features and control beyond other intercom systems
- Unlike Other Systems
  - More than an RF data link to a transceiver




Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewNet™

- Decentralized Network Architecture
  - Unlike Traditional Matrix-based Architectures

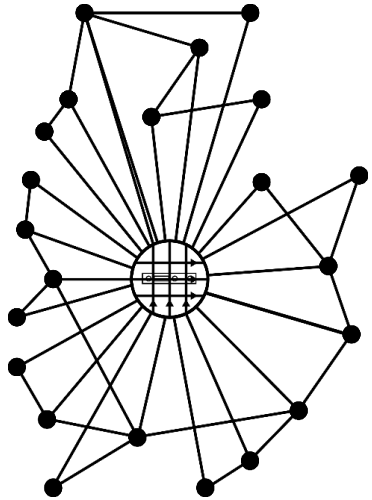


Matrix-Based

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewNet™

- Decentralized Network Architecture
  - Unlike Traditional Matrix-based Architectures
- Distributed Resources
  - CrewCom Transceivers and Other Devices Exactly Where Needed
- Frequency Agnostic
  - Only Transceivers and Belt Packs are RF Devices
  - Future Frequency Bands Easily Added



Matrix-Based CrewNet

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Truly Distributed Architecture

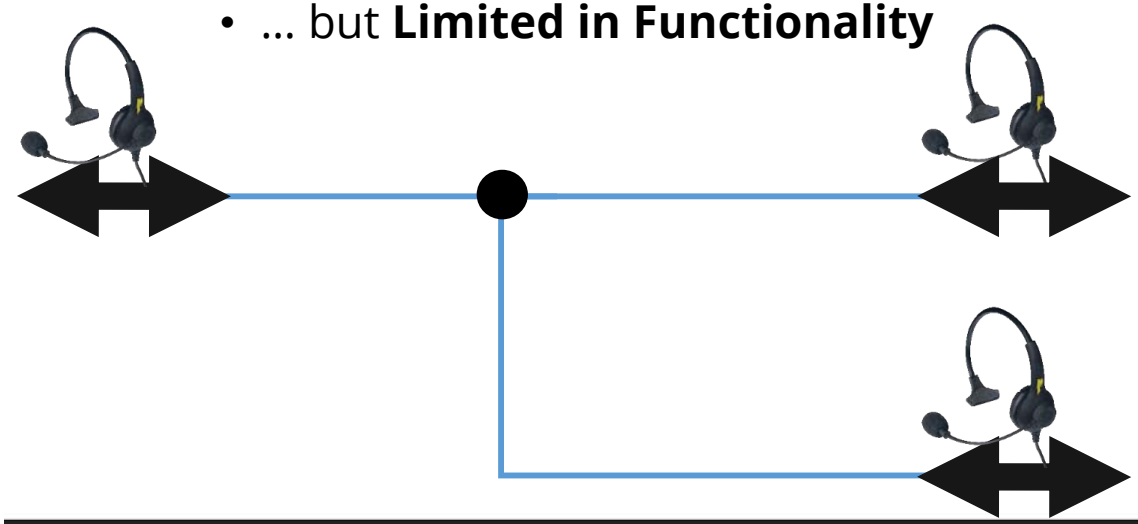
- All devices have access to all resources
  - It doesn’t matter where an RP is paired
  - It doesn’t matter where an RP is being used (which RT)
  - It doesn’t matter to which CU an intercom channel is physically connected
  - All RPs have access to all conferences and resources
- RPs are set up by profiles which control which resources an RP has access to
- Fully configurable and reconfigurable architecture
- Truly distributed architecture

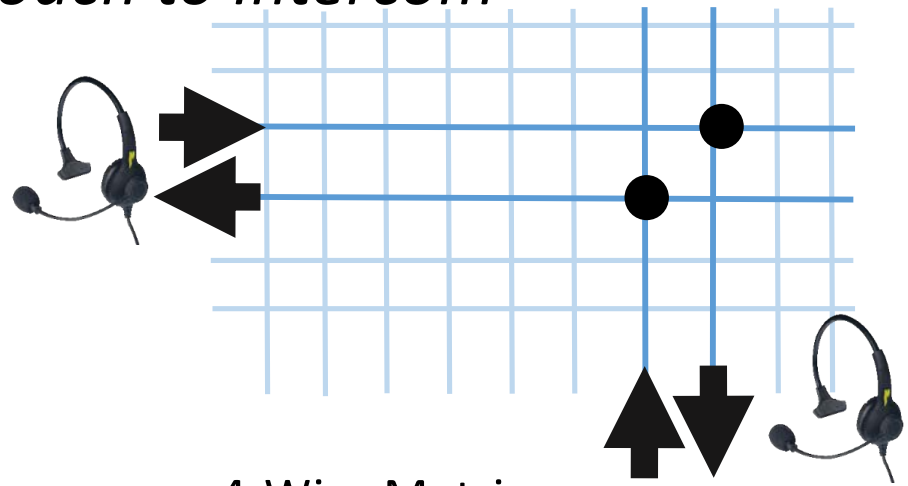
Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom Overview

## *Traditional Approach to Intercom*

- 2-Wire Party Line
  - Efficient
  - Reliable
  - Easy
  - … but **Limited in Functionality**



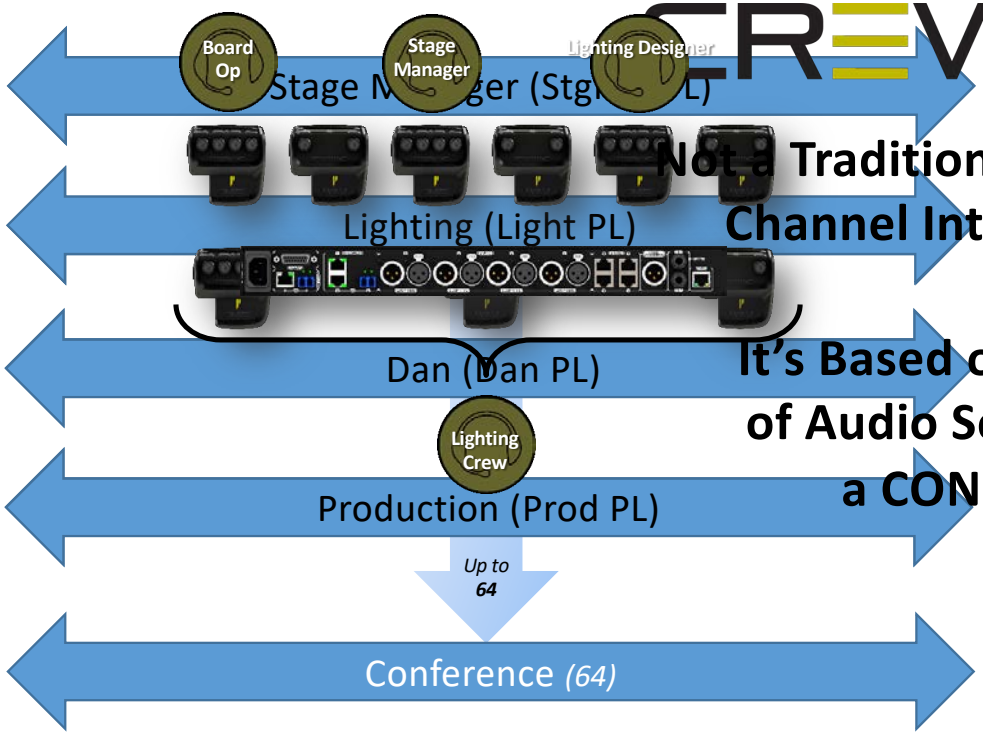


- 4-Wire Matrix
  - Configurable
  - Flexible
  - …but **Complicated**
  - **Expensive**
  - **Limited Depletable Resources**
  - **Requires an Expert Operator**

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Conferences

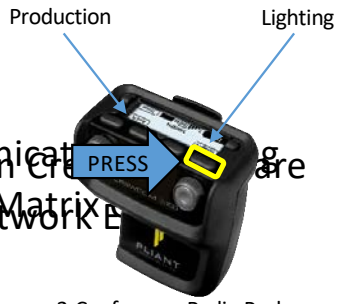
# CrewNet Conferences




**Not a Traditional 2 Channel or 4 Channel Intercom System**

**It's Based on a Grouping of Audio Sources Called a CONFERENCE**

System-wide Control of Communicat g
Conferences are Embedded Within Cre are
Without PL Restrictions or Matrix
Available Wherever the Network E




2-Conference Radio Pack

Connect Party Line, Matrix and Other I/O by
Similar to an Audio Summing Bus,
Multiple Conferences Can Easily be Created
Assigning Them to the Conference
Conference
Profile
...and Accessed with the Talk Button

4-Conference Radio Pack

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

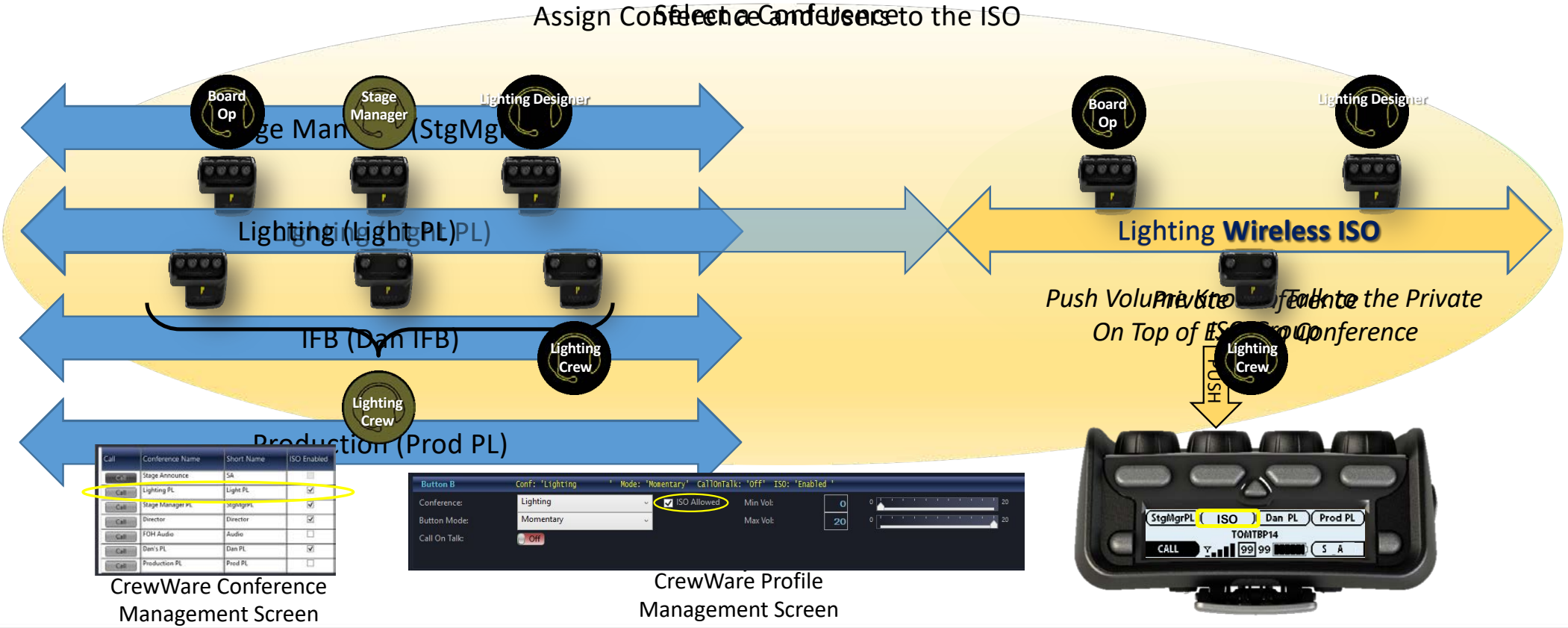
# Conferences

# CrewCom ISO (Selective Talk-around)

- Unique More Efficient ISO Workflow
  - Matrix-like functionality in Wireless ISO
  - Available on Every Conference
- Specialized Assignability Can Allow:
  - 2-Volume Packs up to 4 Conversations
  - 4-Volume Packs up to 8 Conversations
- Pushing Volume Initiates ISO

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# ISO Conferences







CrewWare Conference Management Screen




CrewWare Profile Management Screen

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT TECHNOLOGIES

# CrewCom Devices

Details & Features

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CREWCOM Family

FleXLR

Radio Packs

Radio Transceiver

Copper Hub

Fiber Hub

Headsets

Charger

Control Units

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Control Unit / CU

**CCU-22** 2+2 Rear Panel

**CCU-44** 4+4 Rear Panel

- Two Models to Choose From (CCU-22 & CCU-44)
- Establishes CrewNet-based Infrastructure
- Each CU Supports up to 18 RPs Across All RF Bands

- Simultaneous Connectivity
  - Two 2-Wire **plus** Two 4-Wire *(CCU-22)*
  - Four 2-Wire **plus** Four 4-Wire *(CCU-44)*

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

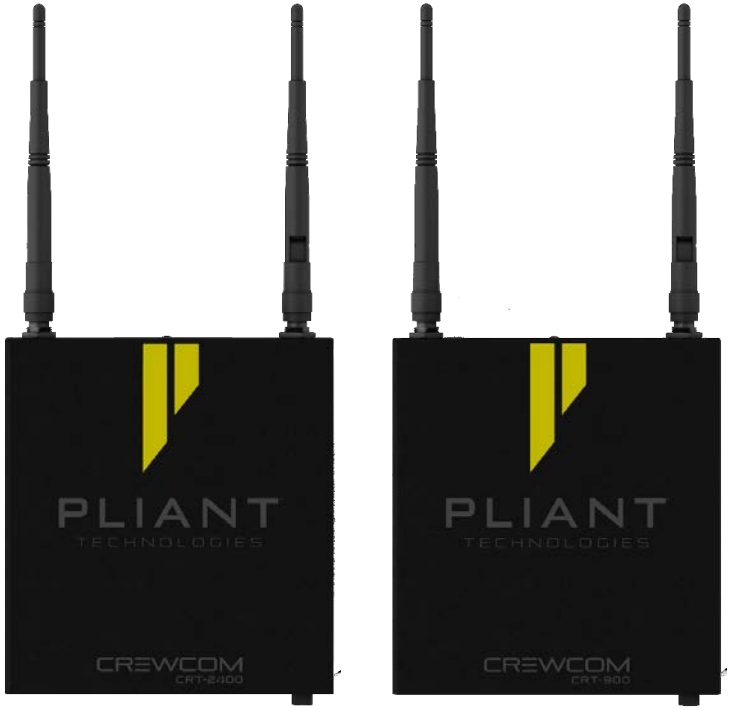
# Control Unit / CU

- **CCU-22 & CCU-44**
- **Simultaneous** Connectivity
  - Two 2-Wire **plus** Two 4-Wire *(CCU-22)*
    - *Auto Null*
    - *ECAN*
  - Four 2-Wire **plus** Four 4-Wire *(CCU-44)*
    - *Four Wire Act Like Ports*
- LAN Port for CrewWare Connectivity
- AUX In/Out
- Stage Announce
- CrewNet (Duplex LC/SMF & RJ-45/Copper)
- Sync In (Duplex LC & RJ-45)
  - RF Synchronization between CrewCom Systems
- GPO Relays
- Headset Monitor Position
- Navigation Keys w/Large Backlit LCD
- USB Connections
  - Pair/Firmware Update/Upload Configuration

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Radio Transceiver / RT

- Two Models / One for Each Band
  - *Separate models for 2.4GHz & 900MHz**




**CRT-2400**
Radio Transceiver

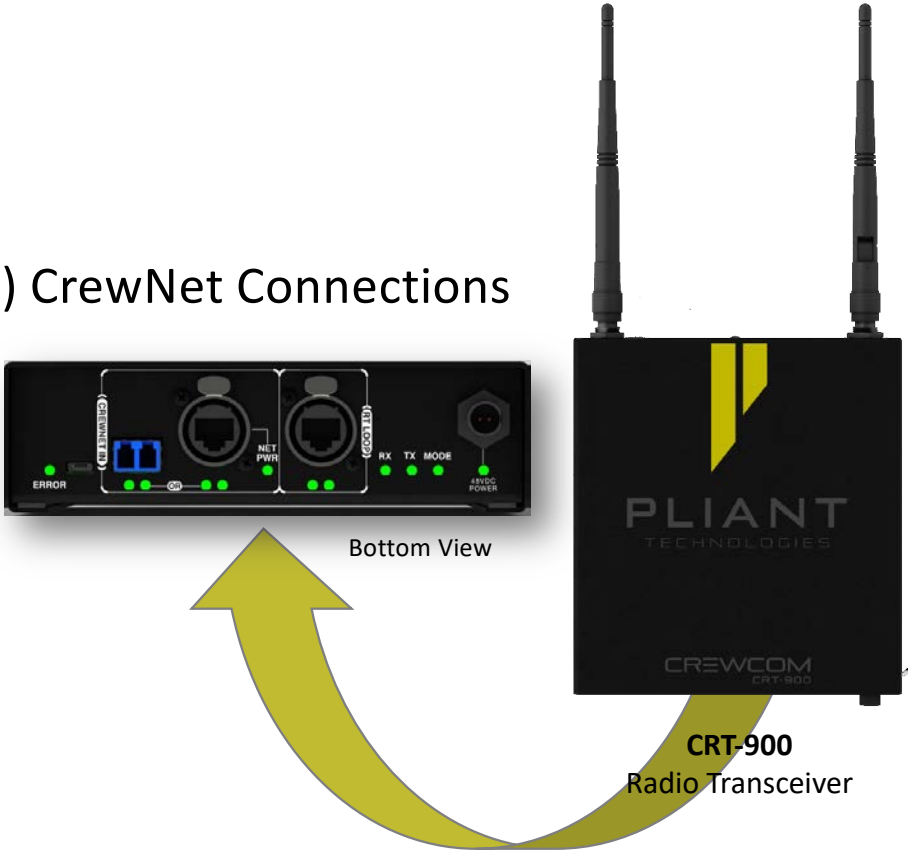
**CRT-900**
Radio Transceiver

**900MHz Available Only in North America and Oceania*

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Radio Transceiver / RT

- Two Models / One for Each Band
  - *Separate models for 2.4GHz & 900MHz**
- Supports up to 6 RadioPacks
- Duplex LC (Single Mode Fiber) & RJ-45 (Copper) CrewNet Connections
- CrewNet RT Loop Connection
  - 1+7 RT Loop Through
- Dual Powering
  - Power Supplied via CrewNet
    or External Power/48VDC *(Sold Separately)*
    - *Required for Fiber Connection*




Bottom View

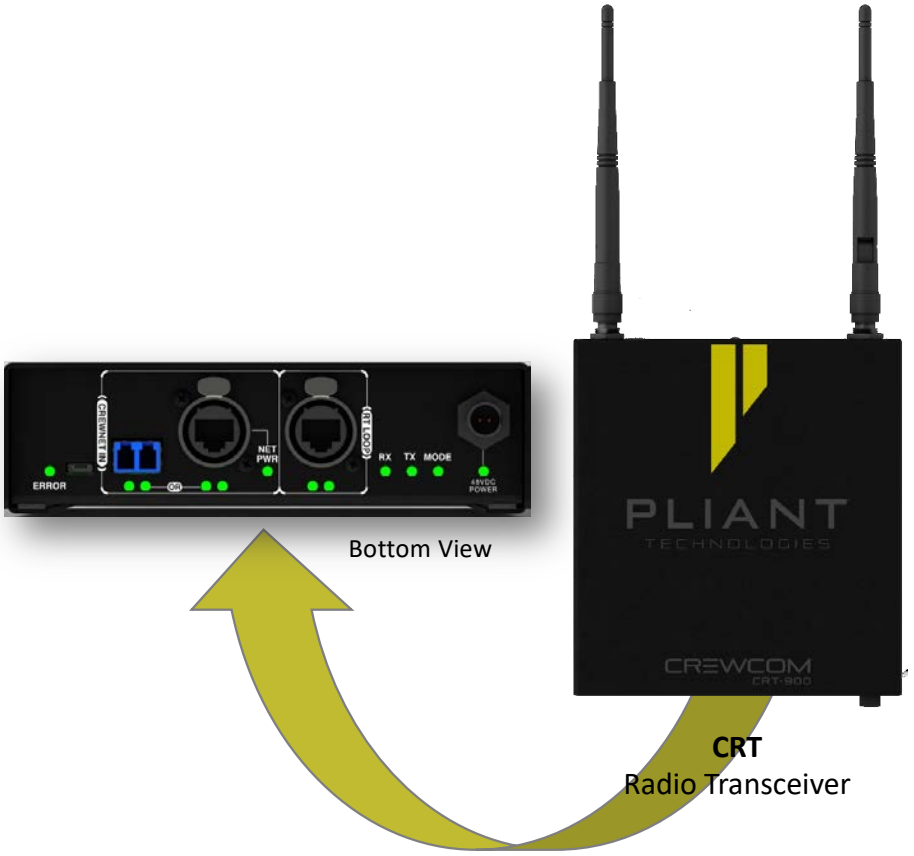
**CRT-900**
Radio Transceiver

*900MHz Available Only in North America and Oceania

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Radio Transceiver / RT

- Removable Antennas
  - For extension and other antenna options
- LED Status Indicators
- Multiple Mounting Options
  - *Included*
- USB for Firmware Updates




Bottom View

**CRT**
Radio Transceiver

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Radio Pack / RP

**2 Volume Top View**

**4 Volume Top View**

- Multiple Models
  - *2-Volume / 2-Conference*
  - *4-Volume / 4-Conference*
  - *Available in 2.4GHz & 900MHz*

**CRP-22**

2-Volume / 2-Conference Radio Pack

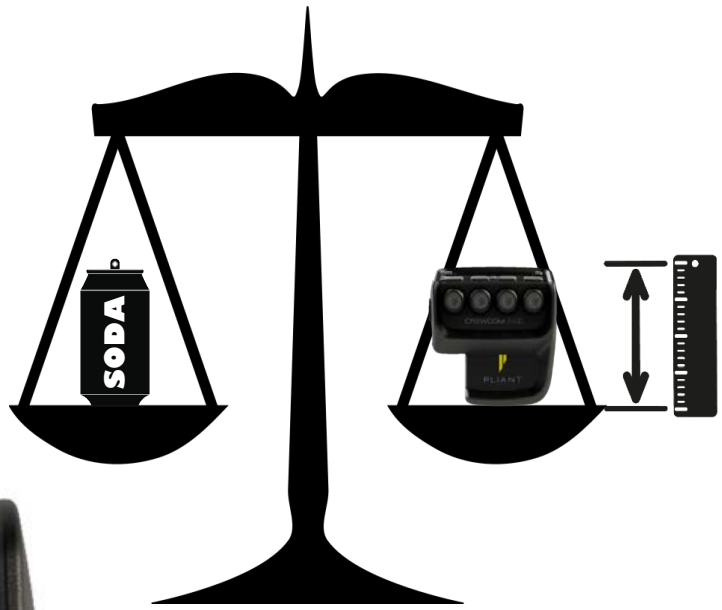
**CRP-44**

4-Volume / 4-Conference Radio Pack

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Radio Pack / RP

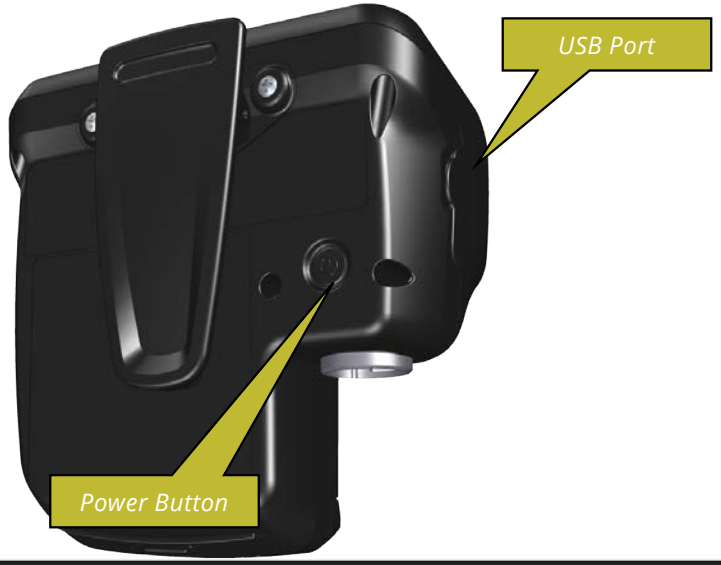
- Compact & Light Weight
- 7kHz Digital Audio Voice Quality
- Easy-to-Operate Familiar Interface
- Informative Top-Facing LCD

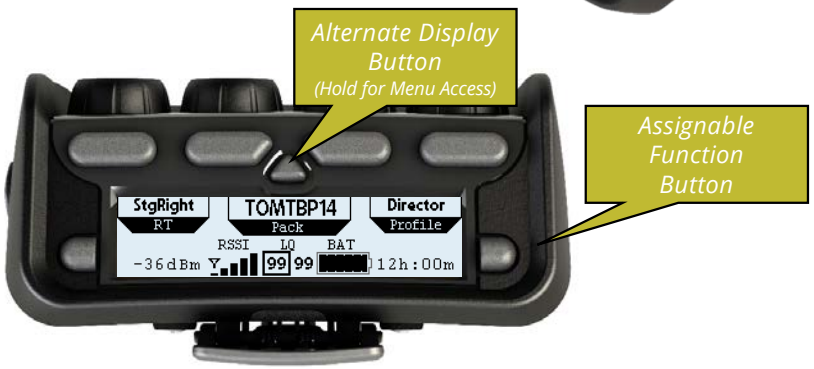


Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Radio Pack / RP

- Assignable Function Buttons (x2)
- Access Hundreds of Assignable Conferences
- Micro USB for Pairing, Firmware Updates & Charging
- Easy-to-Use & Secure Spring-Loaded Belt Clip






Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Radio Pack / RP

- Dual Battery (Li-Poly or AA) Operation
- IP65 Rated

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# 6+6 Drop-In Radio Pack & Battery Charger

- Charge up to six CrewCom Radio Packs and six batteries simultaneously
- Recharge batteries from empty in approximately 4 hours
- LED indicators provide real-time charge status

**PBT-RPC-66**

**Top View**

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# 6+6 Drop-In Radio Pack & Battery Charger

- Radio Pack charging bays compatible with FleXLR adapter
- Charger bottom designed for cable management
- Optional mounting bracket available (not included)
  - Angled Wall Mount
  - Shelf Mount
  - Table Top

**Angled Wall Mounting**

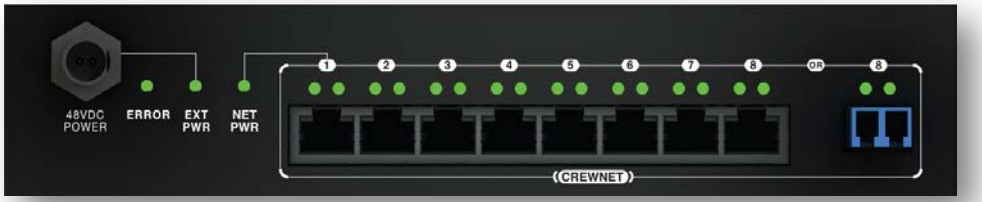
Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Copper Hub

- Eight CrewNet Ports
  - 8th Port, Duplex LC (SMF) or RJ-45 (Copper)
- Port 1 for Net Power Distribution
- Supplies Power Over CrewNet
  - Ports 2-8
    - Using Local or Network Power
- Front/Rear Panel Status LEDs
- Four Hub Layers Max
- Forward/Rear Facing 1RU Half Rack
  - Single & Dual Rack Kits Available

Front Panel

CHB-8C
Copper Hub

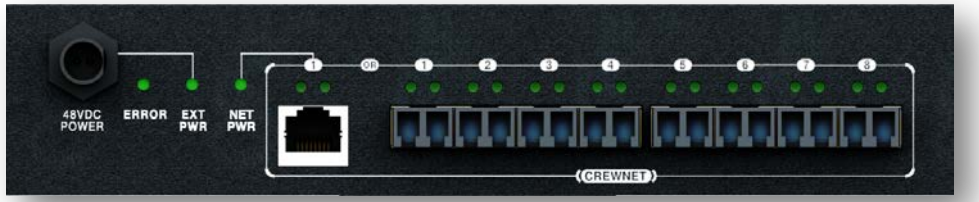



Rear Panel

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Fiber Hub

- Eight CrewNet Ports
  - 1st Port, RJ-45 (Copper) or Duplex LC (SMF)
- Port 1 for Net Power Operation




CHB-8F
Fiber Hub

Front Panel

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT TECHNOLOGIES

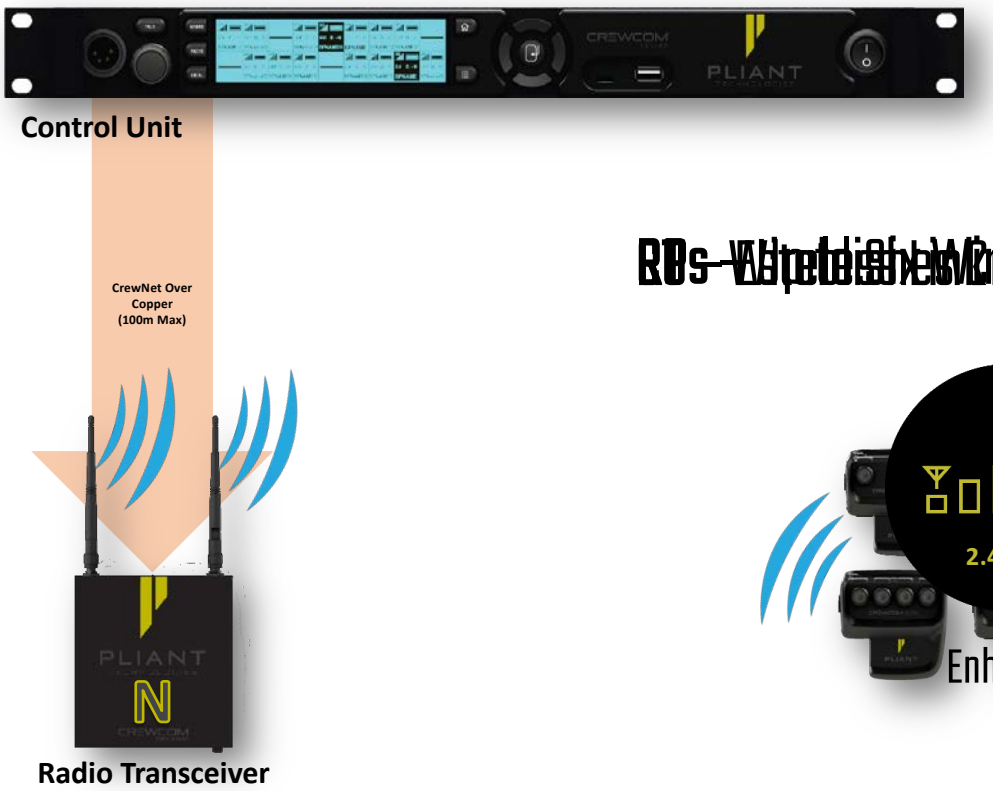
# System Deployment

## Building a CrewCom System

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# System Deployment

## Building a Basic System



Enhanced 2.4GHz and 900MHz*

Wireless Coverage

*900MHz products ONLY available in North America, Australia & New Zealand

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

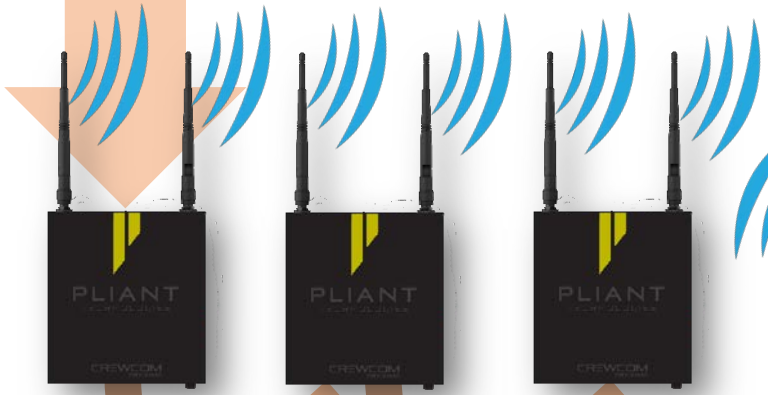
# System Deployment

## Adding More Wireless Users

Control Unit

CrewNet Over Copper (100m Max)

Connect to a 2nd RT or add up to 6 more RPs



Radio Transceivers

1 + up to 7 RT Loop Through

Radio Packs 1-6

Radio Packs 7-12

Radio Packs 13-18

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# System Deployment

## Extending Coverage

Master Control Unit

Fiber

Hub

CrewNet Over Copper (100m Max)

Stage

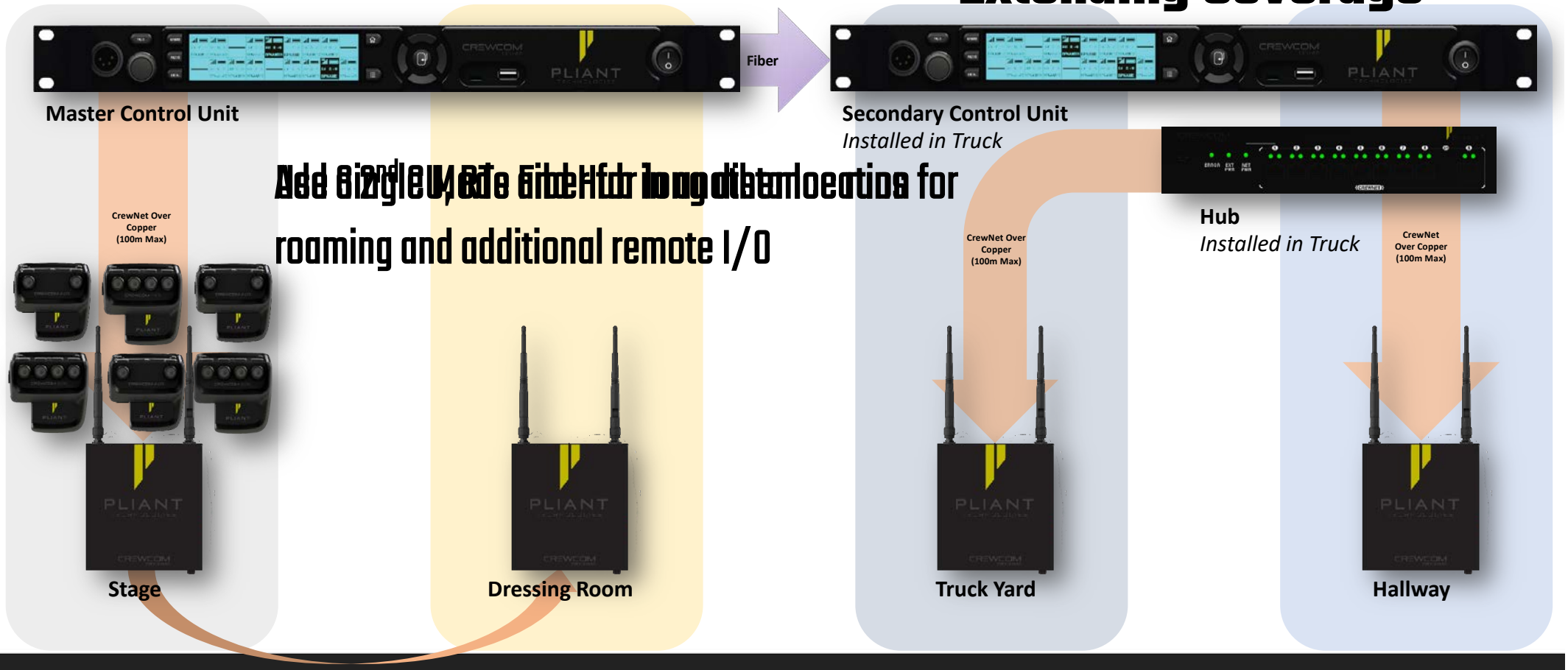
CrewNet Over Copper (100m Max)

Hallway

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# System Deployment

## Extending Coverage




**Add single UMR Fiber for long distance for roaming and additional remote I/O**

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT® TECHNOLOGIES

# CrewCom RF Scheme

The technology that makes CrewCom work in spectrums

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# 900MHz and 2.4GHz Bands

- 900MHz RF Band
  - 902 – 928 MHz
  - 26 MHz of useable spectrum
  - Up to 14 RTs in a single RF space
  - Up to 84 wireless users in a single RF space
  - Excellent range
  - Good interference rejection
- 2.4GHz RF Band
  - 2400 – 2483.5 MHz
  - 83.5 MHz of usable spectrum
  - Up to 38 RTs in a single RF space
  - Up to 228 wireless users in a single RF space
  - Good Range
  - Good interference rejection

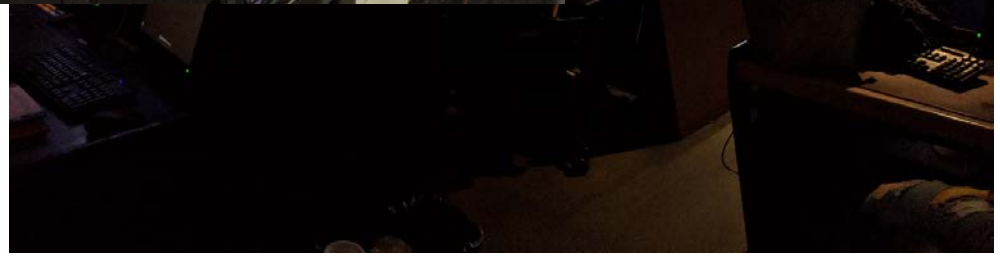
Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# 2.4GHz ISM Band

- Can a 2.4GHz system work in your environment?
- The 2.4GHz ISM band is crowded
  - Wi-Fi, Bluetooth, ZigBee, other proprietary
- Operation can be difficult
- Advanced technology is necessary to overcome challenges
- Successful operation can be accomplished with the right system!

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# NBC 30 Rock



Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Foundational RF Scheme

- Frequency Hopping Spread Spectrum
  - FHSS, continually changing frequency
- Time Domain Multiple Access
  - TDMA, many devices using the same frequency simultaneously
- Gaussian Frequency Shift Keying
  - GFSK, robust modulation

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Foundational RF Scheme

- Multiple Simultaneous Carrier Transmission
  - Limited, proprietary OFDM-like technique
- Lost Packet Concealment
  - LPC, intelligently covers missing data
- Redundant Data Transmission
  - 2xTX, sends all audio data twice
  - On different frequencies
  - On different antennas

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

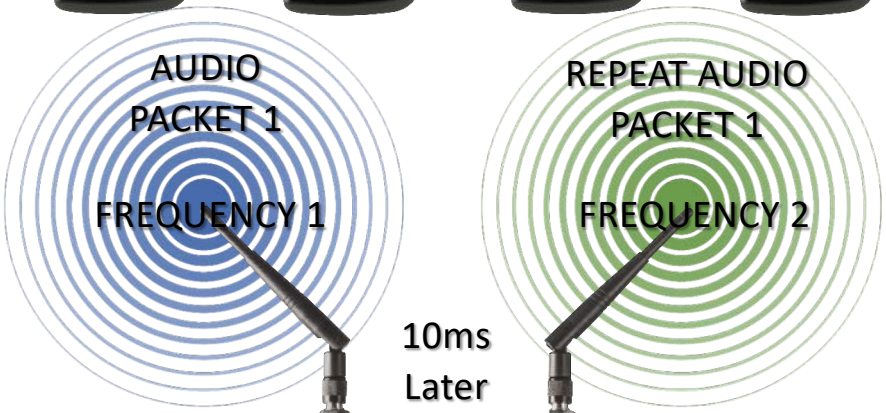
# Foundational RF Scheme

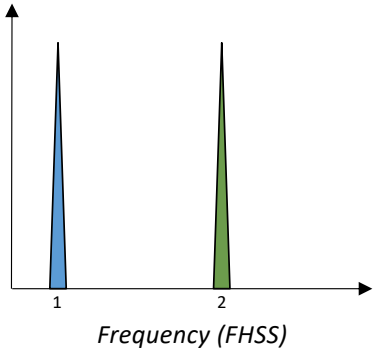
- Multi-Antenna operation (RT & RP)
- Multiple Diversity Techniques
  - Spatial diversity
  - Polarization diversity
  - Frequency Diversity
  - Time Diversity

- Extremely Robust Transmission Scheme

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Redundant Data Transmission

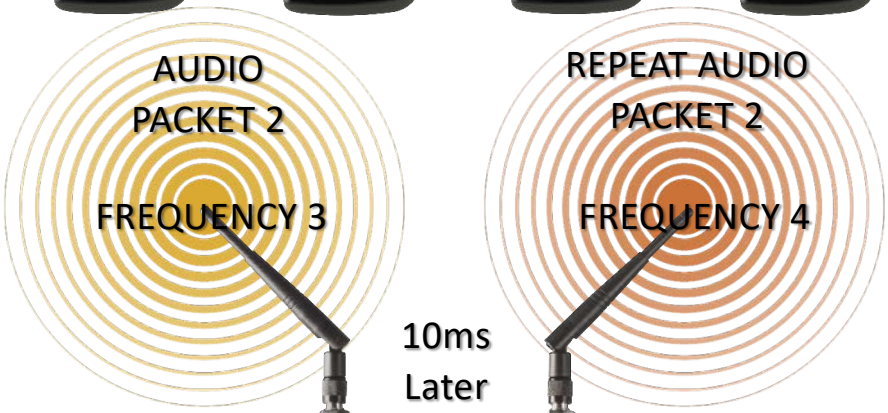


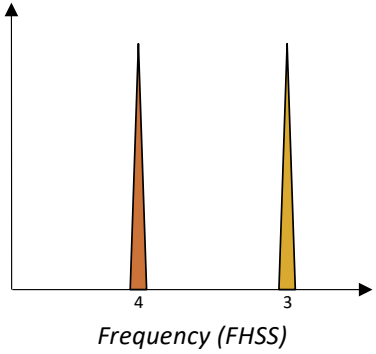




10ms
Later

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

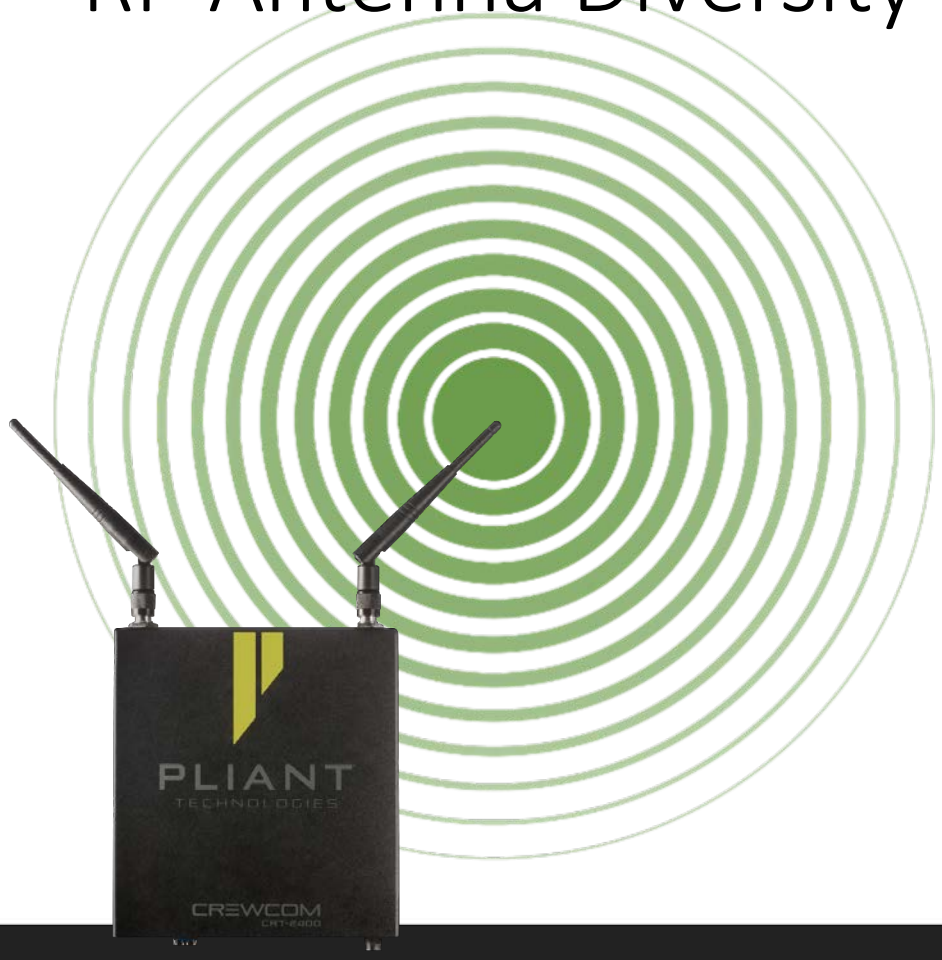
# Redundant Data Transmission



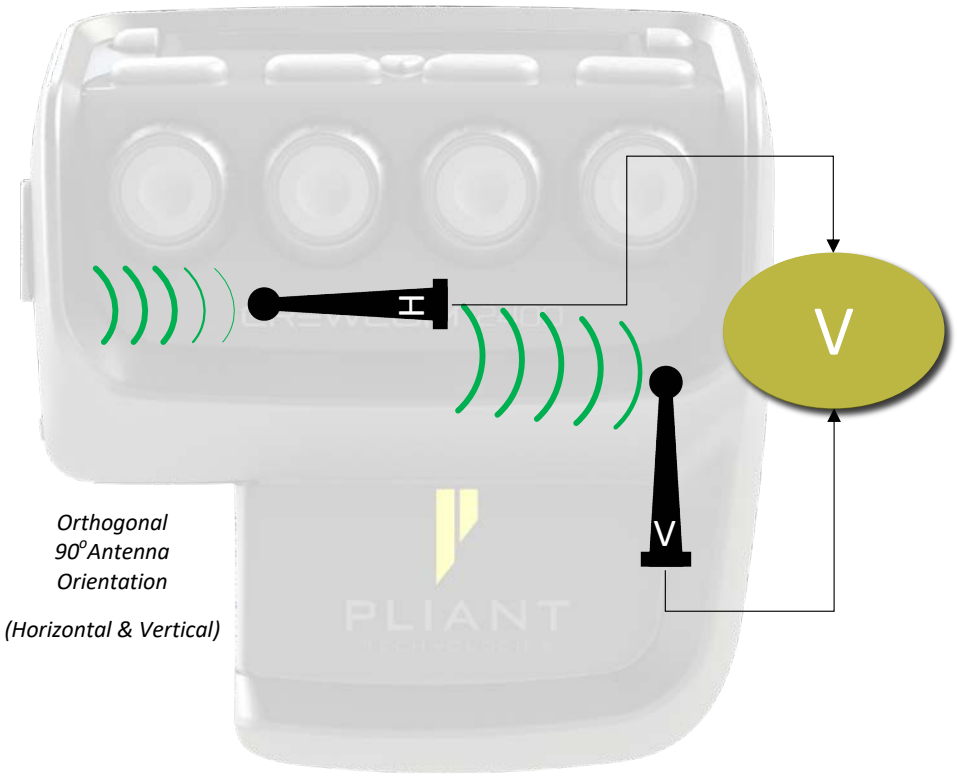



Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# RP Antenna Diversity




Both Antennas Sample Each Unit Between Two Antennas Only




*Orthogonal*
*90° Antenna*
*Orientation*

*(Horizontal & Vertical)*

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

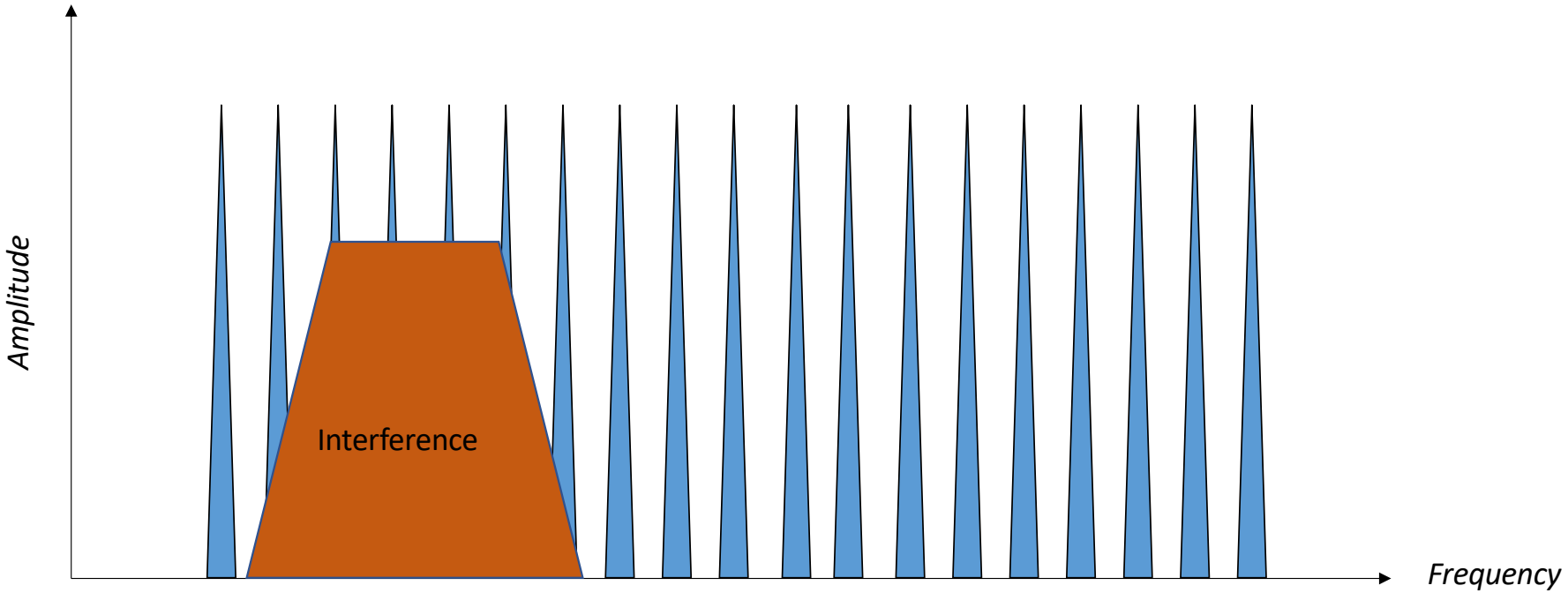
# Frequency Hopping Spread Spectrum

## Advantages of CrewCom's FHSS

- Allows multiple systems to operate using the same spectrum
- Entire system changes frequency 100 times per second
- Minimizes the effects of external interference including Wi-Fi and multipath drop-outs

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom FHSS & Interference



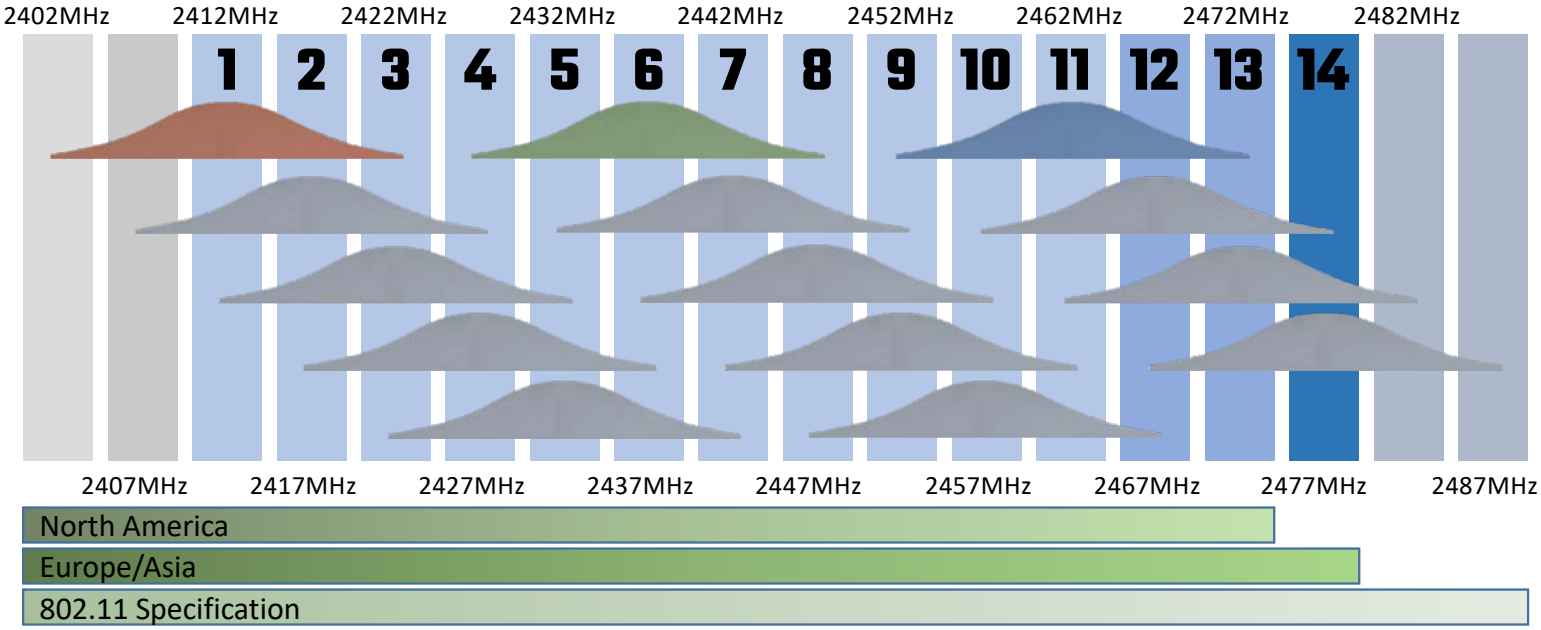

Interference only impacts a small percentage of the data because of FHSS

Double sending all of the data on different frequencies significantly reduces the problem

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Wi-Fi Channel Basics

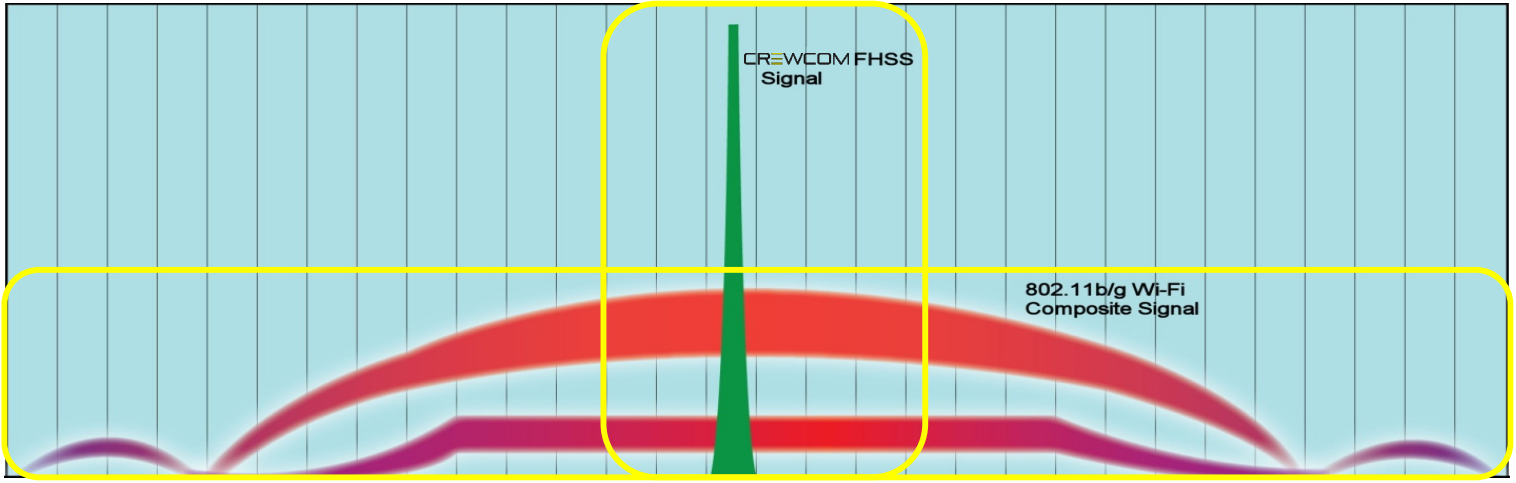
- Wi-Fi Channels overlap
- Only channels 1, 6, and 11 are non-overlapping
  - Channels 1, 6, 11 are used almost everywhere and unavoidable




Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

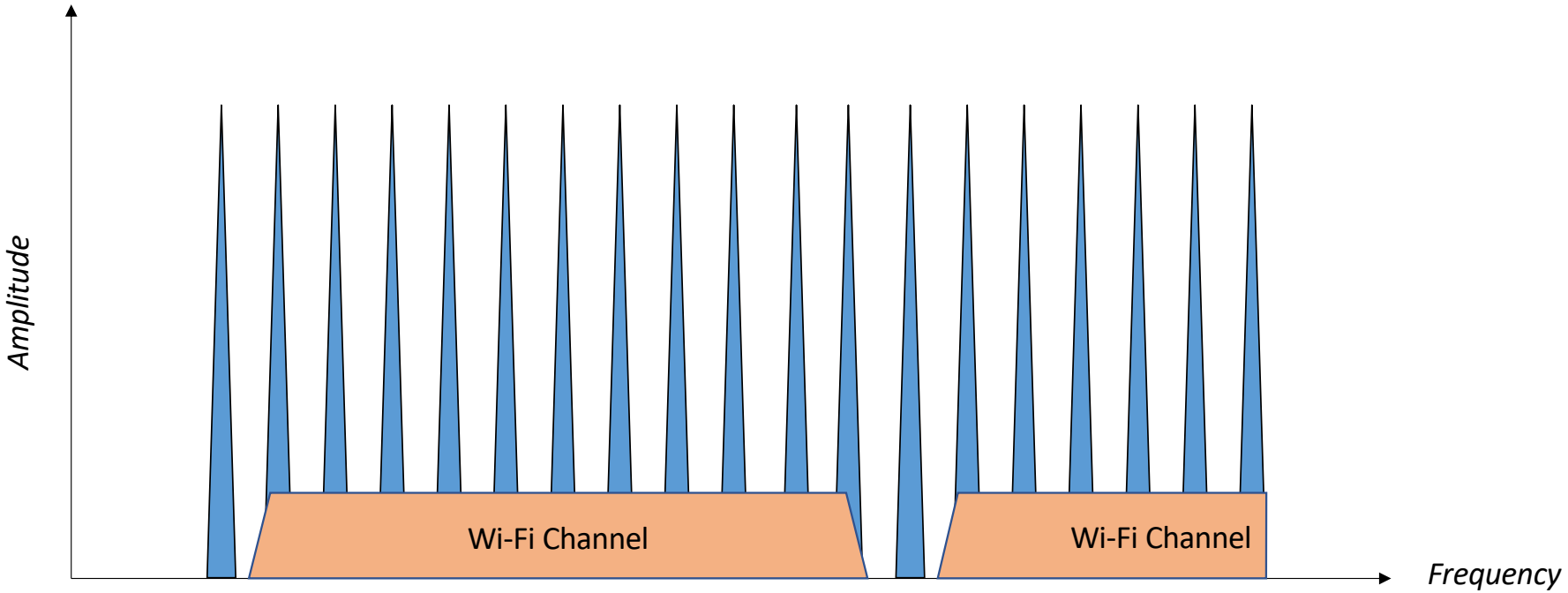
# Wi-Fi Channel Basics

- Wi-Fi is broadband RF
  - Signals span over 22MHz
- CrewCom's RF profile is narrowband
  - Signals span only 1.5MHz
  - Resulting in a much higher effective power




Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom FHSS & Interference




Wi-Fi appears as an elevated noise floor to the CrewCom FHSS system

Each FHSS carrier affects a very small part of the Wi-Fi signal. Data redundancies easily correct data loss.

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# FHSS and Multipath

- Multipath fades are highly
  - frequency dependent
  - location dependent
  - time dependent

$$R(t,k) = 2\sqrt{2}\left[\sum_{n=1}^{M}(\cos\beta_n + j\sin\beta_n)\cos(2\pi f_n t + \theta_{n,k}) + \frac{1}{\sqrt{2}}(\cos\alpha + j\sin\alpha)\cos 2\pi f_d t\right].$$

- Changing frequency repeatedly (FHSS) helps avoid multipath
- Changing frequencies quickly ensures maximum data throughput

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# FHSS Solutions

- FHSS helps solve

- External interference issues
- Wi-Fi cohabitation
- Multipath fades (dropouts)

- FHSS doesn’t fix everything though…

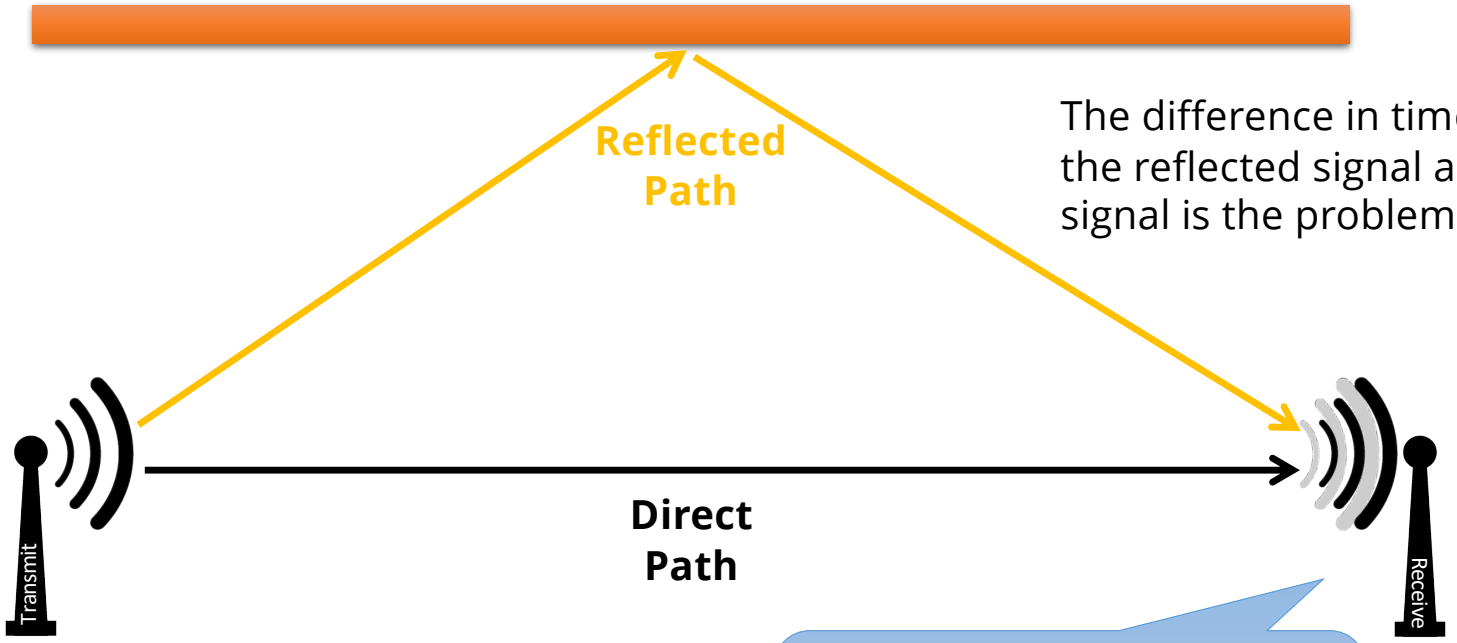
Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Intersymbol Interference

- Intersymbol interference is a BIG problem
  - This is why most digital systems doesn't work well in
    - Stadiums, airplane hangers, large open venues, any big open area
    - Outside, around a lot of building
  - Frequency band (i.e. 1.9 GHz, 2.4 GHz, 900 MHz) doesn't have a direct impact…
  - It's all about symbol width (inverse of over-the-air data rate)

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Multipath (Direct vs. Reflected Signals)



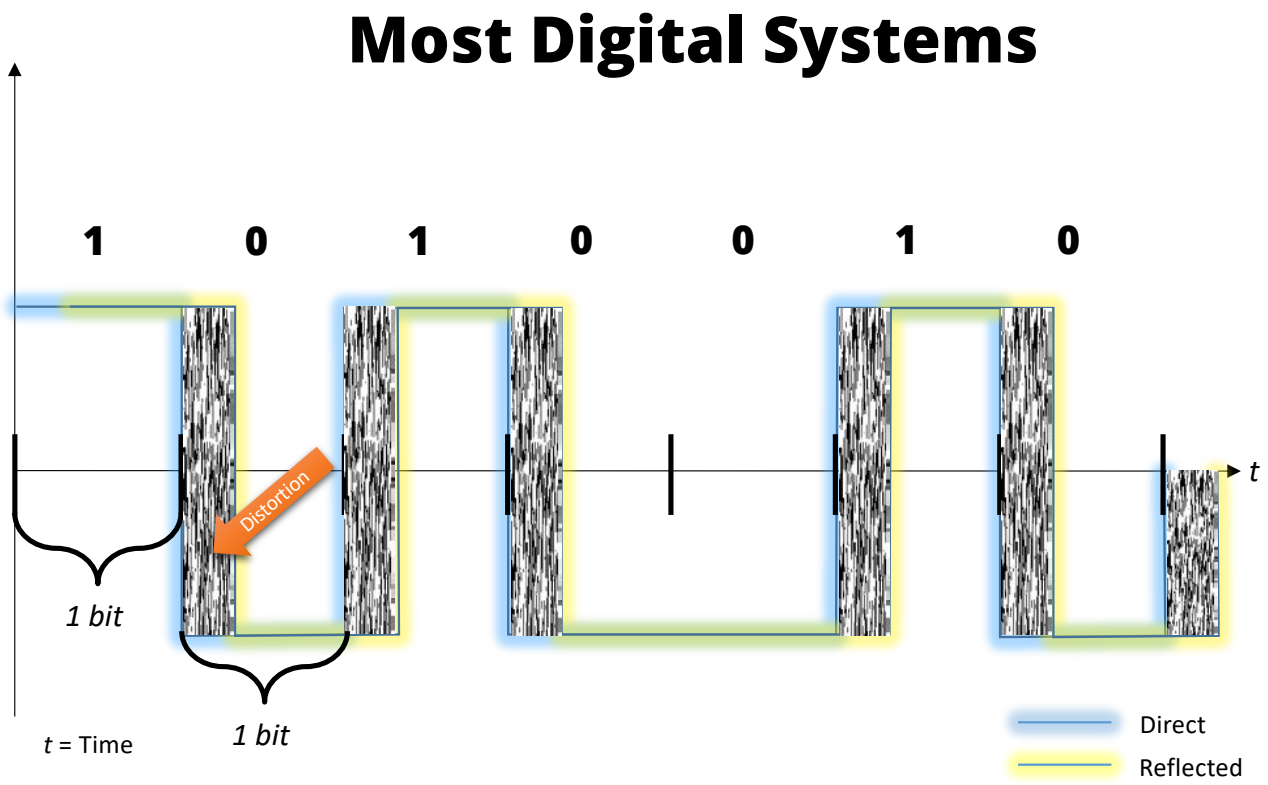

The difference in time between the reflected signal and the direct signal is the problem.

If the two signals are far enough apart in time the RX will not be able to tell whether a bit is a 1 or a 0.

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Intersymbol Interference

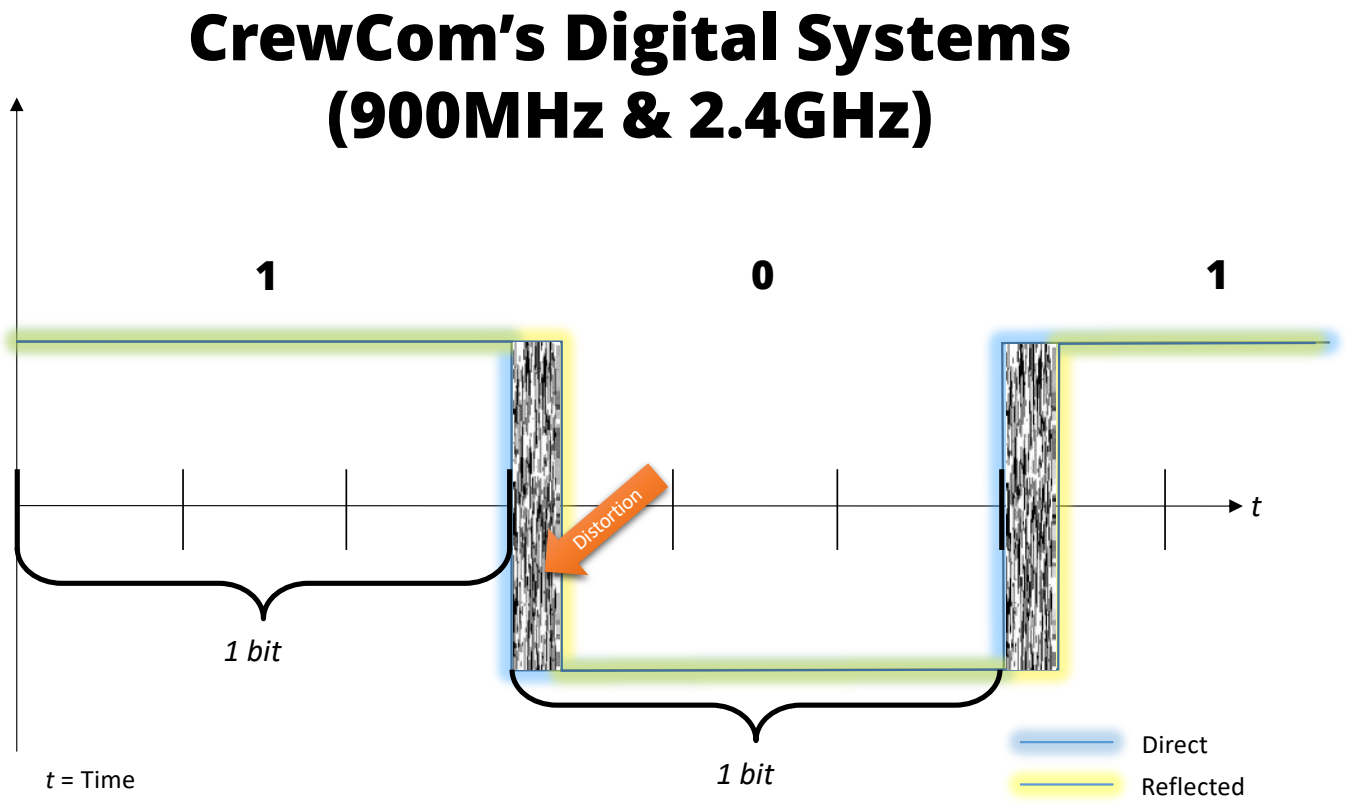
- Data is sent in digital bits.
- One bit takes a certain amount of time.
- When reflected, the signal is delayed from the direct signal.
- A large portion of the bit becomes distorted and unreadable by the receiver.
  - 15% Problematic (Becomes audible)
  - 20% Unusable




Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Intersymbol Interference

- CrewCom's bits are longer.
  - Wider symbols
- Signal is delayed the same amount at a given distance regardless of frequency or data rate.
- A much smaller percentage (5%–7%) of the bit is distorted so the RX can read it.

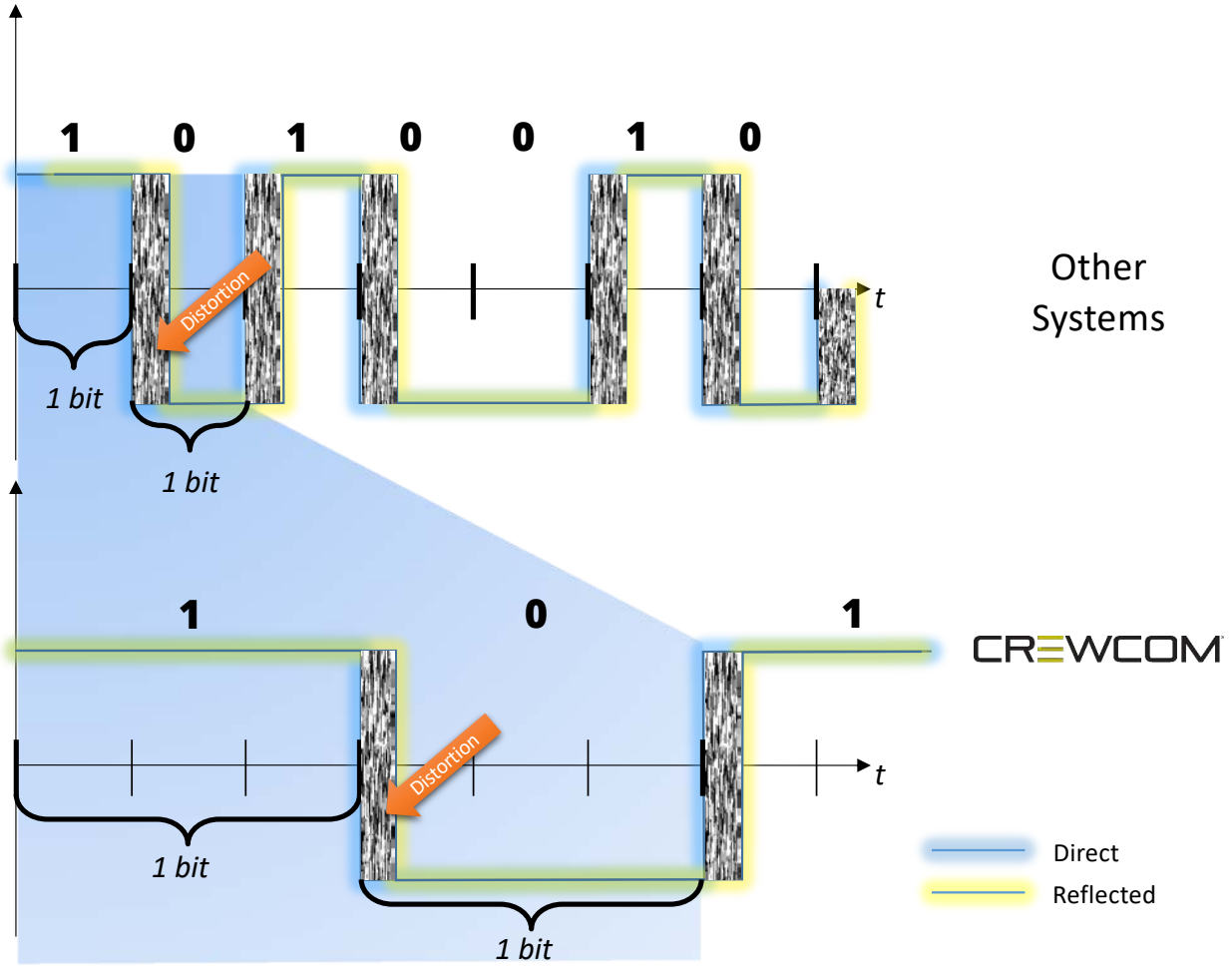



Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Intersymbol Interference

## Most Systems vs. CrewCom's Digital System

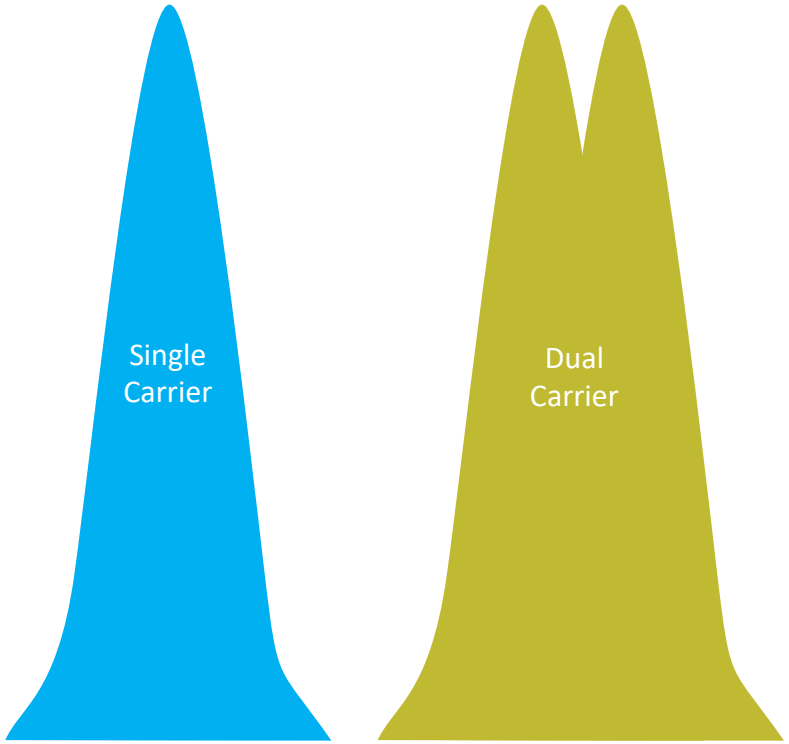
- CrewCom utilizes much wider symbol widths.
  - Almost 3x
- CrewCom is good in large venues and outside.
  - Other digital systems, not so much




Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Intersymbol Interference

- How do we get enough data throughput when using a wider symbol width?
- CrewCom splits the data across subcarriers.
  - Dual simultaneous carriers
  - Each one with a lower data rate (wider symbol width)
- Result: Greatly reduced intersymbol interference.
- This is one of the biggest technology advantages CrewCom has to offer.



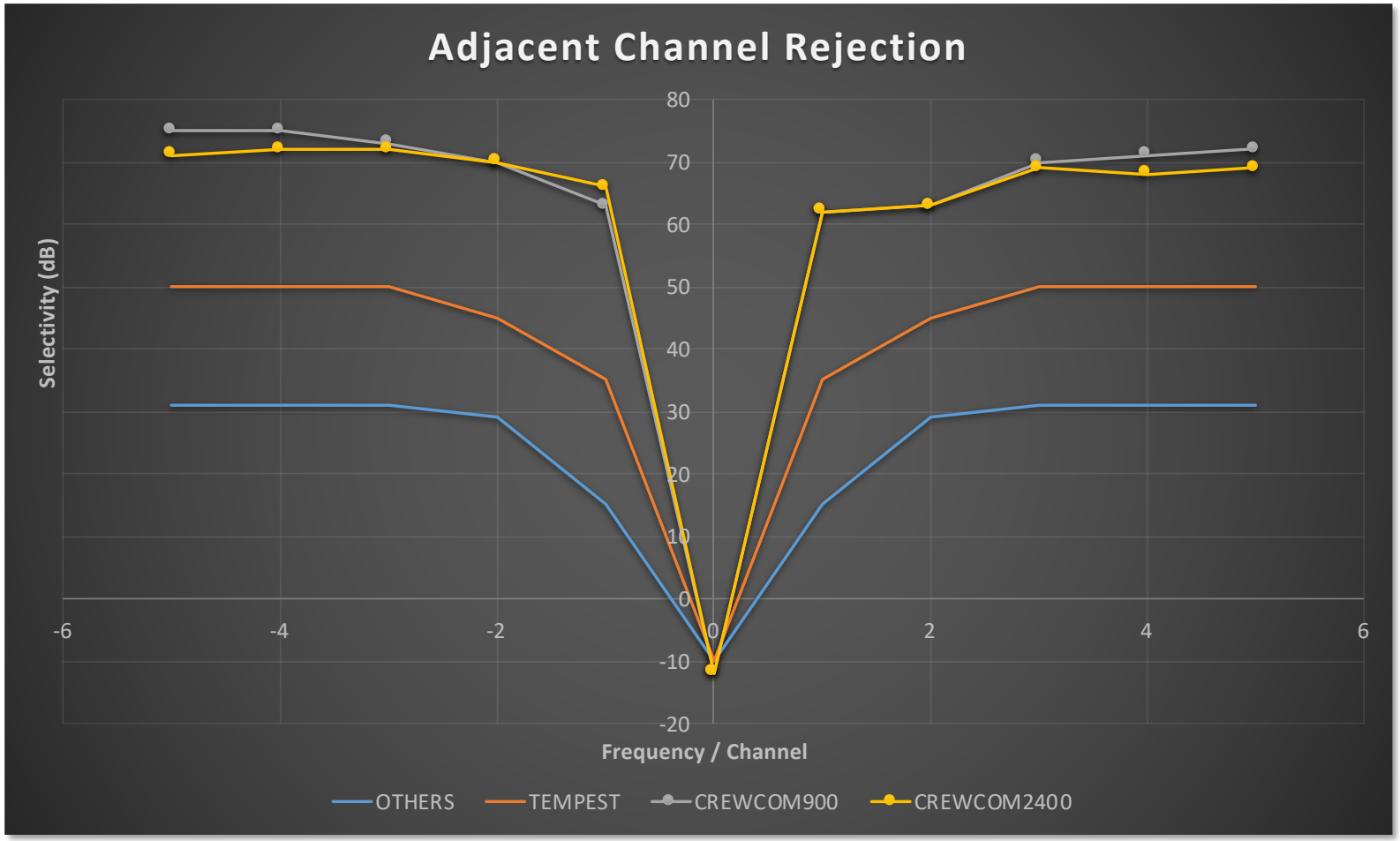

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Adjacent Channel Rejection

- Better front end filtering greatly improves Adjacent Channel Rejection (ACR)
  - Keeps off-frequency signals from interfering
  - Limits impact of intermodulation
  - Provides much better range and performance in high RF environments

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom Radio ACR




Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT® TECHNOLOGIES

# RF Takeaways

Why CrewCom works better than other wireless intercom options

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# RF Takeaways

- Advanced technology makes CrewCom work better
  - DECT based systems
  - Other digital systems
  - Analog UHF and/or VHF systems
- In large facilities or outdoor venues
  - Dual carrier transmission minimizes Intersymbol interference
  - FHSS Reduces the effects of multipath fades and dropouts
  - CrewNet backbone lets you put the RF where you need it
  - Roam from one location to another seamlessly
  - Allows for extremely large coverage areas

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# RF Takeaways

- Crowded RF environments (pretty much all of them!)
  - FHSS minimizes effects of external interference
  - 2xTX data redundancy improves performance dramatically
  - Improved ACR minimizes the effects of external interference and intermodulation
  - GFSK modulation is extremely robust in the face of external interference
  - Lost Packet Concealment covers over missing data
  - Antenna (RT & RP) increases system robustness

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# RF Takeaways

- Crowded RF environments (continued)
  - Multiple layers of diversity significantly improve robustness
    - Spatial, Polarization, Frequency, Time
    - DECT systems do not have this advantage!
  - All-digital transmission system eliminates noise and hiss related to interference (unlike UHF/VHF)
- No need to do complex/costly frequency coordination
  - Technology inherently shares the available spectrum
  - Reduces event pre-work and enforcement as compared to UHF
  - Opens up spectrum for wireless mics and IFB/IEM

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# RF Takeaways

- Coexistence with other RF systems
  - Every band has a lot of competition!
  - FHSS with 2xTX limits negative system interaction
  - Narrow band works and plays well with Wi-Fi and others
  - Extremely spectrally efficient… higher user counts
- DECT systems don’t hop… that’s a big deal

- The result is the best performing wireless intercom system in the world in highly varying environments.

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT® TECHNOLOGIES

# CrewWare

System Creation, Control, & Monitoring

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewWare

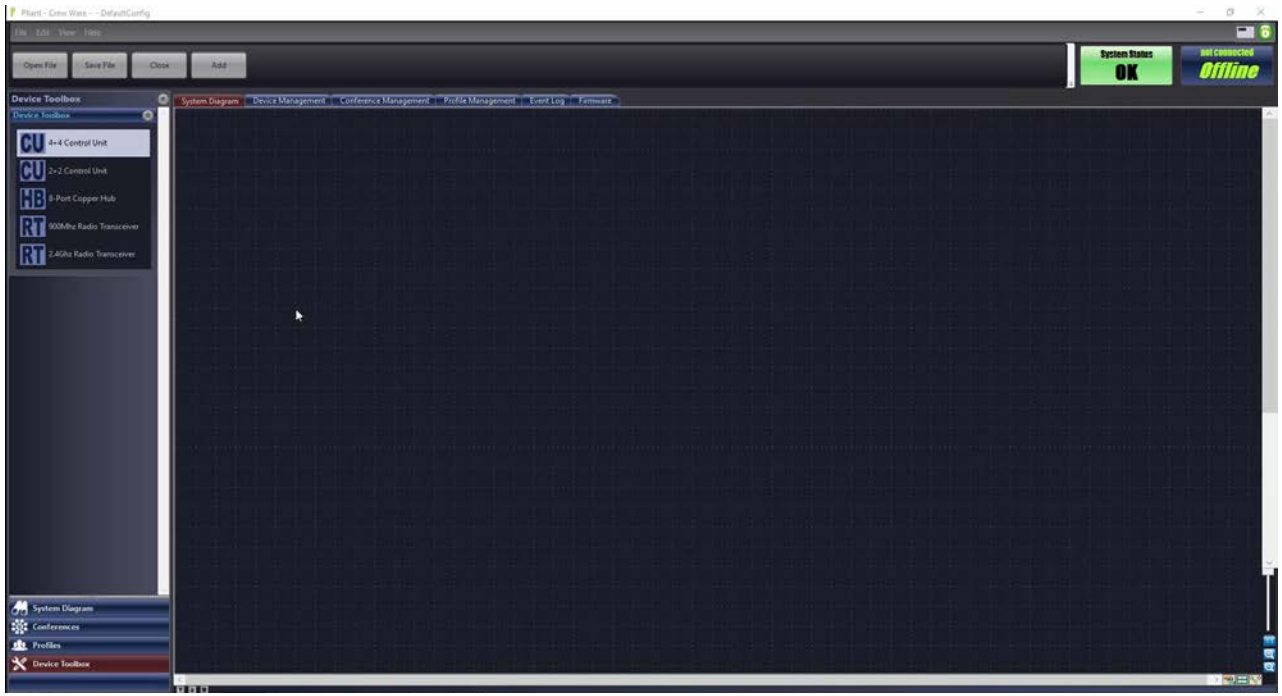
- **Included System Software Application**
  - Off-line System Configuration
  - On-line System Configuration
  - Real-time System Management
  - Real-time System Monitoring

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewWare

**System Development, Control and Monitoring Software**

- Offline Operation
  - Drag-and-Drop System Creation




Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST

# CrewWare

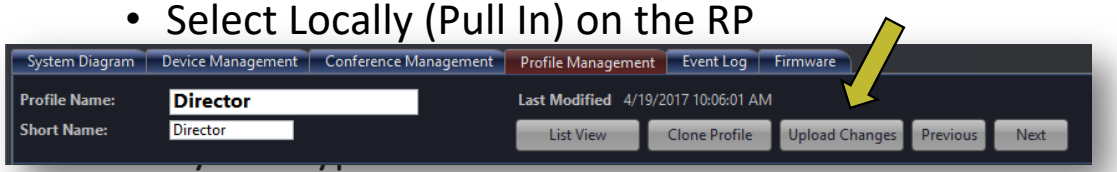
## System Development, Control and Monitoring Software

- Offline Operation
  - Drag-and-Drop System Creation
  - Create/Manage Conferences
  - Create/Manage & Clone Profiles
  - Configure I/O Port Assignments
  - Manage System Configurations
- Online Live Operation
  - Extensive System Monitoring
  - Individual Device Control & Management
  - System & Device Diagnostics

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom RP Profiles

- Facilitate Quick Radio Pack Setup
  - Push Over-the-Air to the RP
  - Select Locally (Pull In) on the RP



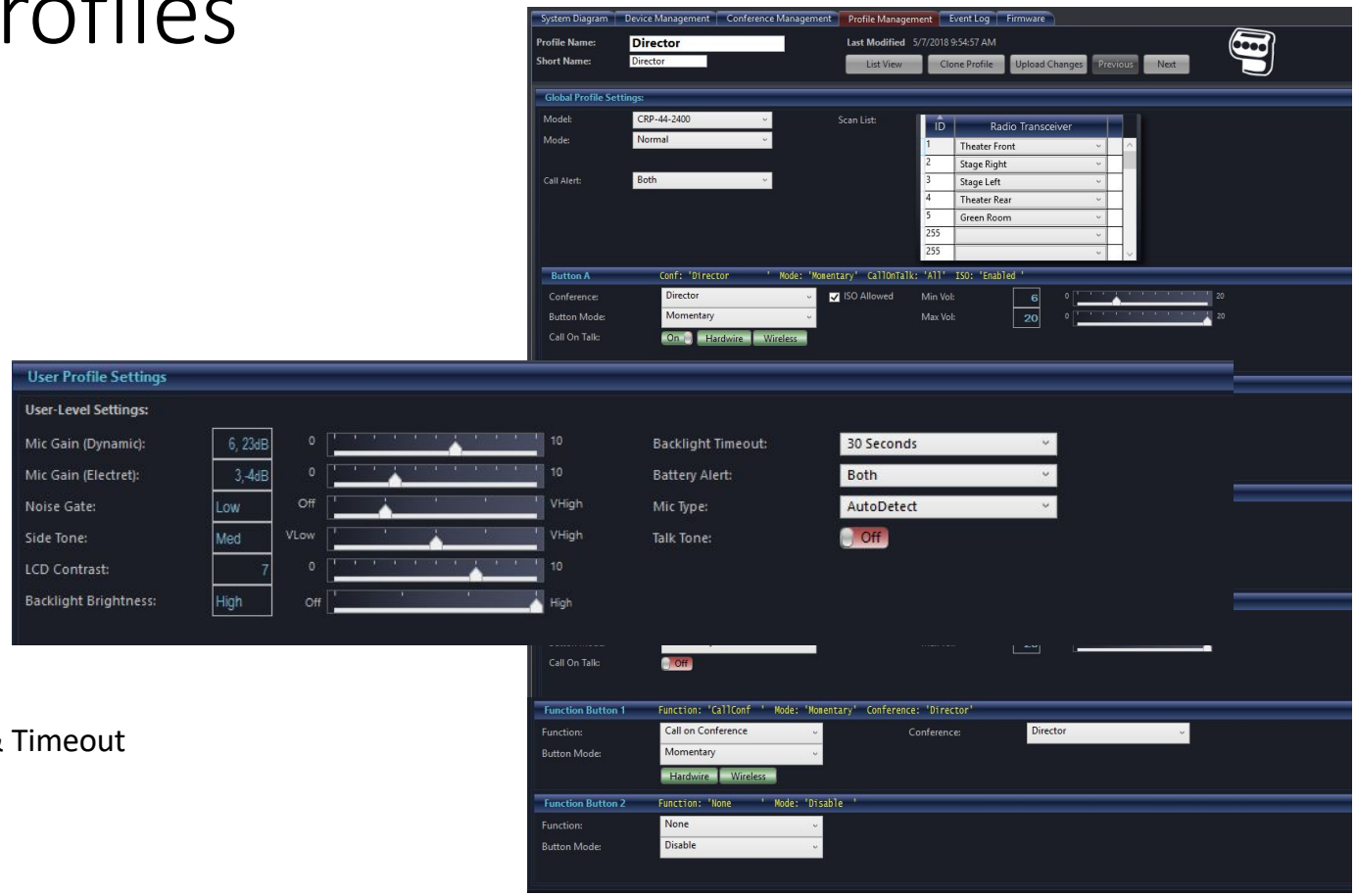

- Customize User Communications
  - Conference Assignments

Radio Pack Home Screen

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom RP Profiles

- Global Settings
  - Profile Name(s)
  - Model Selection
  - Allowed RT Assignments (Scan List)
  - Operation Mode
  - Conference Subscriptions
  - Talk Button Mode
  - Wireless ISO Configuration
  - Minimum/Maximum Volume
  - Call on Talk
  - Function Button Configuration
  - Relay Assignments
  - Group Selection
- User Settings
  - Microphone Gain
  - Noise Gate
  - Side Tone
  - LCD Contrast, Backlight Brightness, & Timeout
  - Battery Alert Type
  - Call Alert Type
  - Microphone Type
  - Talk Tones (Off/On)




Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom Configuration File (CCF)

- Streamline System Deployment Based on Application
  - Quickly change from event to event
  - Easily Create, Store and Recall System-wide Information
    - Manage Profiles
      - Setup Conversations Using Conferences
      - Administer Roaming Area Access

| ID | Radio Transceiver |
|---|---|
| 1 | Theater Front |
| 2 | Stage Right |
| 3 | Stage Left |
| 4 | Theater Rear |
| 5 | Green Room |
| 255 | |
| 255 | |

*RT Scan List Setup*

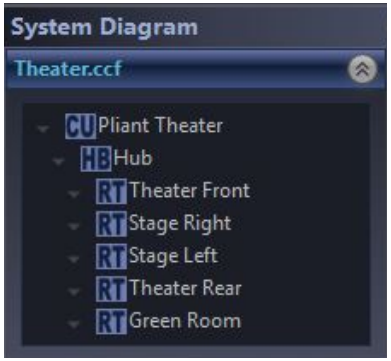
*CrewWare System Diagram Tab*

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# CrewCom Configuration File (CCF)

- CCF Contents
  - Conference Setup Information
  - Radio Pack Profiles
  - Network Topography
    - CrewNet Connections and Hardware Location
  - Paired RP List
  - CU I/O Port Assignments
    - 2-Wire
    - 4-Wire
    - Aux I/O
    - Stage Announce

*CrewWare System Diagram*
*Navigation Pane / Tree Display*



*CrewWare System Diagram*

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT®
TECHNOLOGIES

# CrewWare

Let’s Take a Look

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT
TECHNOLOGIES

MICROCOM™

# WIRELESS INTERCOM FOR EVERY BUDGET

COPYRIGHT 2019 PLIANT TECHNOLOGIES, LLC. ALL RIGHTS RESERVED.

# MicroCom Product Family

## M SERIES

**PMC-900M***

*Now Shipping*

## XR SERIES

NEW

**PMC-900XR** (Preliminary)*

*Available Spring 2020*

*Pictured with optional PHS-SB11LE-DM Headset

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# MicroCom 900M Features

- Economical Single Channel System
- Simple Pack-to-Pack Operation
- Up to 5 Full Duplex Users
- Unlimited Listen-Only Users
- Unlicensed 900MHz ISM Band
  - 902MHz – 928MHz*
- Encrypted FHSS Technology
- Latching Talk Button
  - Hands-free Operation
- High Dynamic Range
  - Clearer conversations in loud environments

*Where legal. Also available in 2.4GHz

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# MicroCom 900M Features

- Small and Lightweight
  - 3.9 in. (H) x 1.9 in. (W)
  - 3.1 Ounces
- Weather Resistant Construction
- Long 10 Hour Battery Life
- Operates While Charging
- 2 Year Warranty w/Registration
- Included Accessories
  - Holster with Belt Clip
  - Neck Strap
  - Micro USB Cable for Charging

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

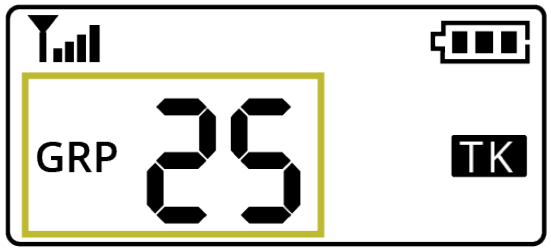
# Setting up the MicroCom M Intercom

- Indicators for
  - Log in
  - Battery status
- Menu Settings for
  - Side-Tone
  - Receiving Mode
    - Duplex/Listen-only
  - Mic Gain
  - Output Level

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Setting up the MicroCom M Intercom

- Plug In a Headset to the Belt Pack
- Power On
- Select a Group
  - All Belt Packs must be set to the same group in order to communicate.
  - Up to 4 separate groups can be operated in the same area




Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Setting up the MicroCom M Intercom

- Select an ID
  - One Belt Pack must be set to 00 (Master)
    - All Belt Packs Receive Sync from the Assigned Master
  - You can only have one pack each using 00-04
    - Packs set to 00-04 are full duplex
    - Packs set to 05 and above are listen-only

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# MicroCom 900XR *(Coming this Spring)*

PRELIMINARY SPECIFICATIONS

NEW

- Robust Dual Channel System
- Simple Pack-to-Pack Operation
- Up to 10 Full Duplex Users
- Unlimited Listen-Only Users
- Unlicensed 900MHz & 2.4GHz ISM Bands
  - 902MHz – 928MHz*
  - 2400MHz – 2480MHz
- Encrypted FHSS Technology
- IP67 Rated Housing
- OLED Display
- Field Replaceable Battery
- Extended 15 Hour Battery Life
- Available Drop In Charger

*Where legal. Also available in 2.4GHz

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# MicroCom Comparison

| Features | MicroCom M | MicroCom XR* |
|---|---|---|
| Number of Channels | One | Two |
| Full Duplex Users | Up to 5 | Up to 10 |
| Battery Life | 10 Hours | 15 Hours |
| Battery Type | Li-Poly Fixed | Li-Poly Field-Replaceable |
| Belt Clip Type | Included Holster | Built-in |
| Display | 7-Segment LCD | OLED |
| IP Rating | None | IP-67 |
| Charge Type | USB Micro | USB Micro |
| Optional Drop-in Charger | No | Yes |
| Size | 3.9 in. x 1.9 in. | 4.8 in. x 2.6 in. |
| Weight | 3.1 oz. | 6.4 oz. |

** Preliminary Specifications Subject to Change Without Notice*

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Full Range of Headset Options

## For Any Application

## Designed Specifically for MicroCom

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Full Range of Headset Options

## SmartBoom

**PHS-SB11LE-DMG**
**Single Lightweight**

**PHS-SB110E-DMG**
**Single Full-Size**

**PHS-SB210E-DMG**
**Dual Full Size**

** All pricing is List Price*

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

# Full Range of Headset Options

## Specialty Headsets

### In-Ear Headsets

**PHS-IEL-M**
**In-Ear Left**

**PHS-IELPTT-M**
**In-Ear Left w/PTT**

### Lav w/Earpiece Headsets

**PHS-LAV-DM**
**Eartube with Lav**

**PHS-LAVPTT-DM**
**Eartube with Lav & PTT**

** All pricing is List Price*

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT TECHNOLOGIES

NOW SHIPPING!

# FleXLR

## PAC-FLX-45

4-Pin XLR Female to 5-Pin XLR Female

## PAC-FLX-44

4-Pin XLR Female to 4-Pin XLR Female

Copyright © Pliant Technologies, LLC.
All rights reserved. 2020 PST
CrewWare v1.8

PLIANT
TECHNOLOGIES

CREWCOM

# THANK YOU!

*This content of this document is proprietary and confidential. No part of this document may be disclosed in any manner to a third party without the prior written consent of Pliant Technologies, LLC*