User Guide

FreeSpeak II User Guide

Part Number: 399G169 Rev E

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Clear-Com
AN HME COMPANY

Document reference

FreeSpeak II Base User Guide

399G169 Rev E

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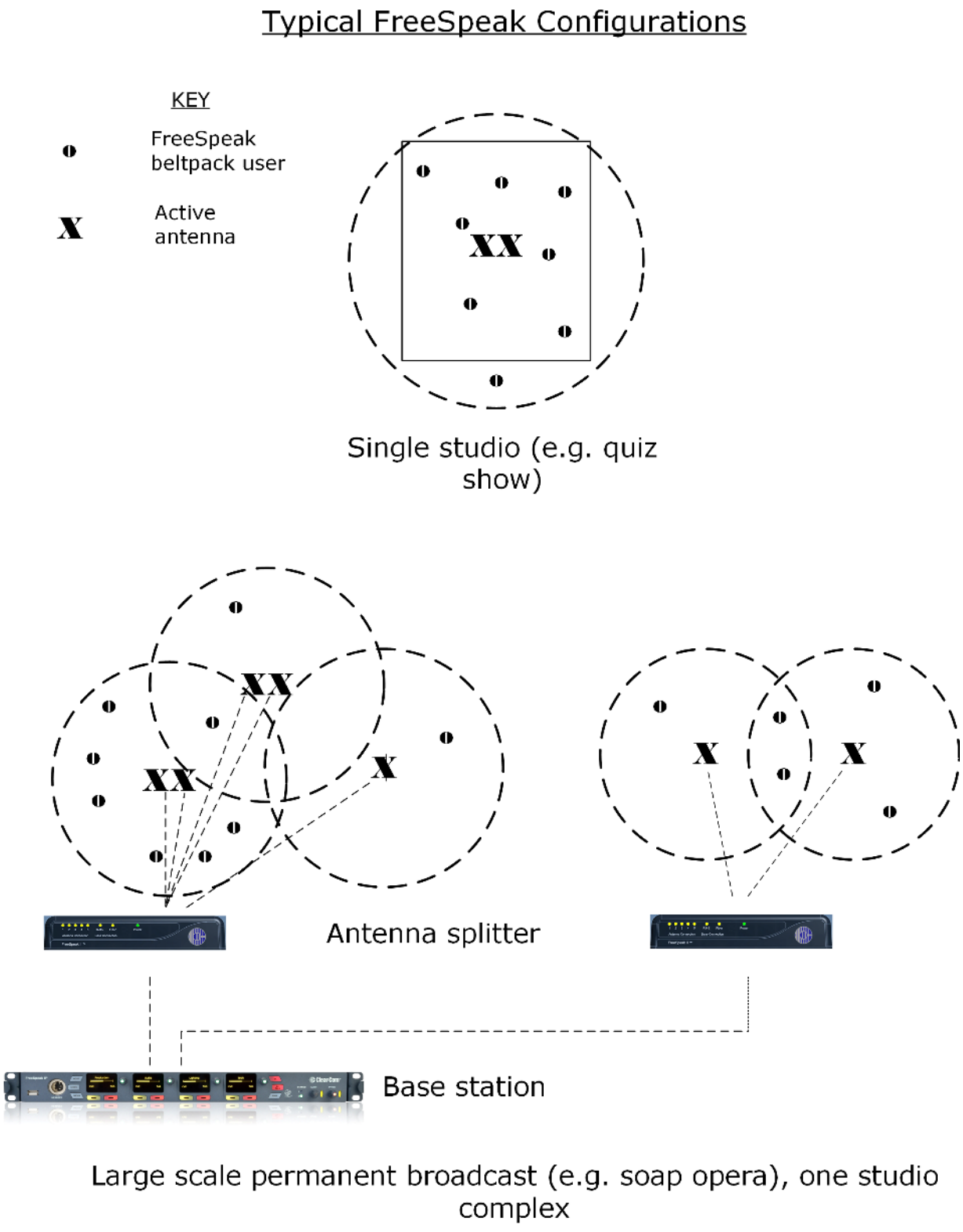
Important Safety Instructions

- Intended Audience: Professional, Technical and Qualified Personnel
- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way such as; power-cord supply or plug is damaged, liquid has been spilled, objects have fallen into the apparatus, the apparatus has been exposed to heavy rain, the apparatus does not operate normally.
- Caution: Shielded Cable Requirement
- Shielded Cable is required for ALL LQ SERIES GPIO Port connectivity. Shielded Cable must be used to assure compliance with domestic and international emissions standards. Customers, Installers and or qualified Personnel failing to use shielded cables may cause radio interference in which case the user may be required to take adequate measures.

1 What is FreeSpeak II?

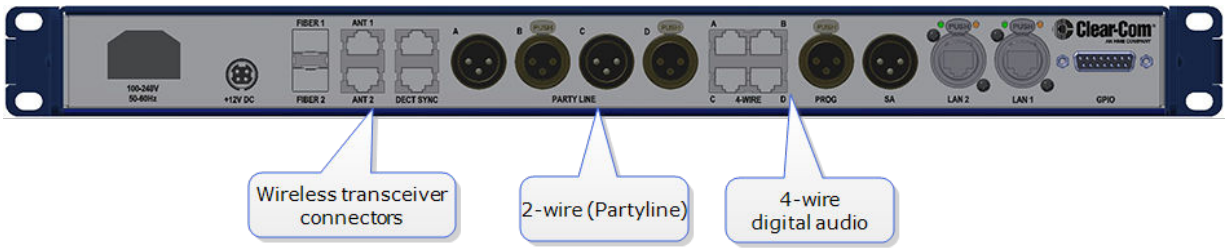
The FreeSpeak II wireless intercom system includes wired and wireless beltpacks that communicate using a cellular network of transceivers (1.9 and 2.4 GHz).

1.1 FreeSpeak II Base 1.9 GHz/2.4 GHz



1.2 2-wire, 4-wire and wireless intercom

These different devices communicate seamlessly.



1.3 Flexible configuration

Pre-configured beltpack Roles allow both rapid set-up and flexible configuration.

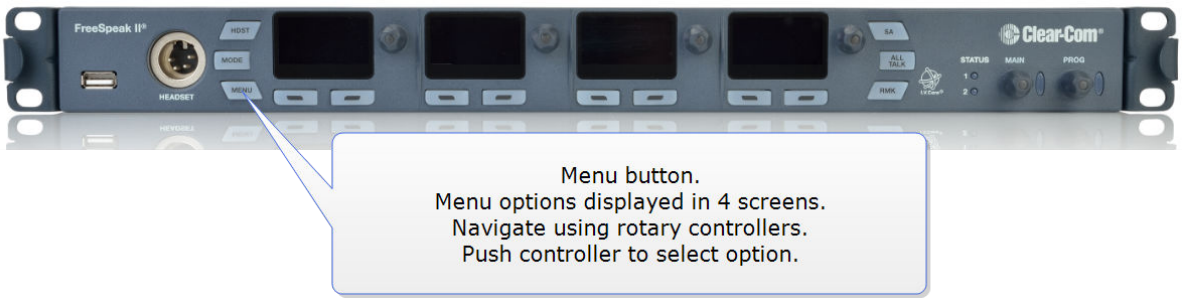
- Use simple default set-up; all beltpacks on Channel 1 and 2 assigned to A and B with call signal on C and D.
- or, customize the set-up to suit your needs.
- System has either 25 (FSII-BASE-II) or 5 (FSII-BASE-II-5) beltpack Roles. FSII-BASE-II-5 offers a license to upgrade to 25 beltpacks if required.

See **Using Roles on page 79**.

1.4 Live set-up and control

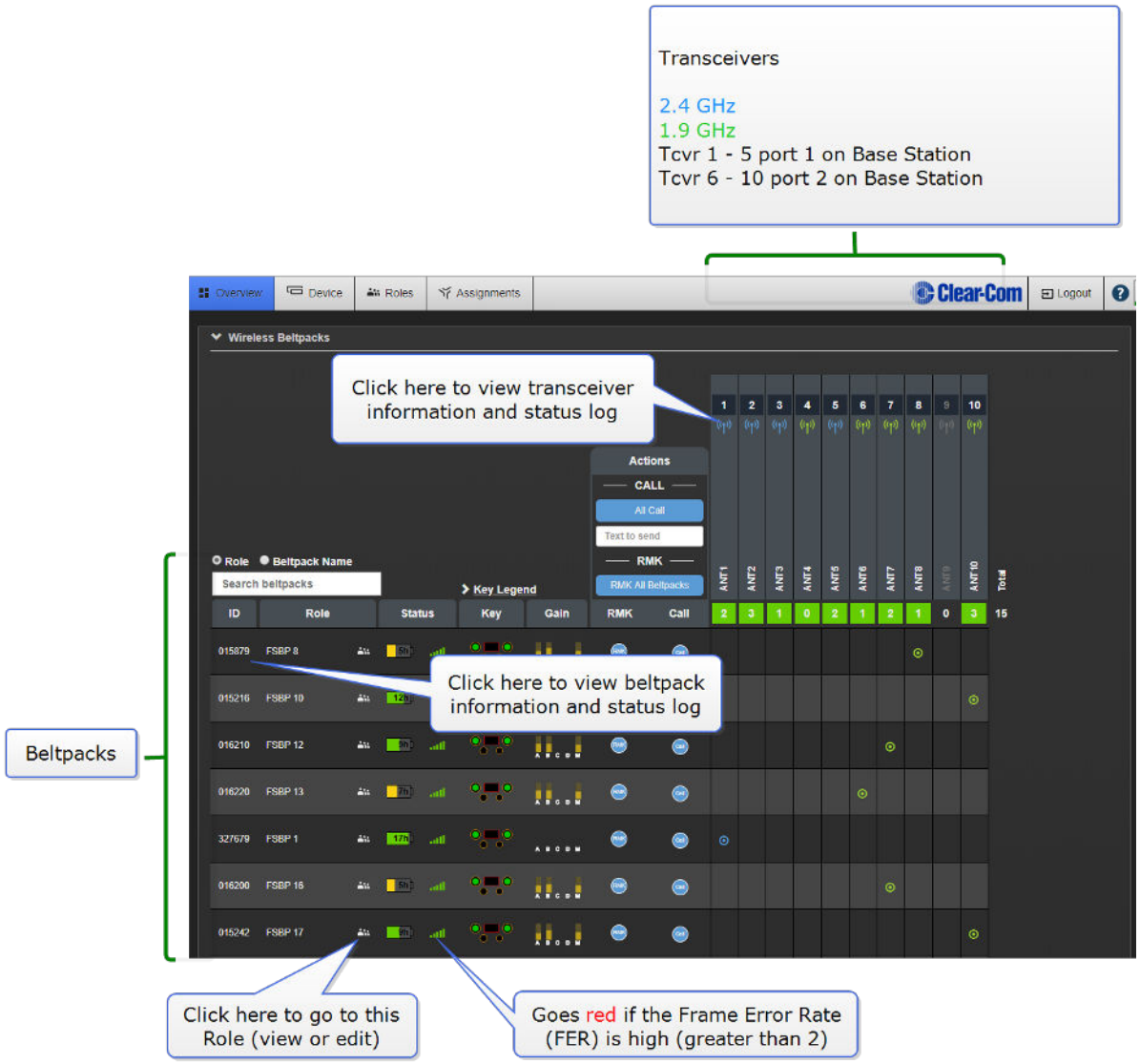
Use the front panels of the Base Station, or the browser-based Core Configuration Manager (CCM).

Press **Menu** button on the Base Station to access controls:



For more information, see **Using the Base Station on page 13**.

The browser-based **Core Configuration Manager** (CCM) is accessed via device IP address.



For more information, see **Accessing the Core Configuration Manager (CCM) on page 91**

1.5 System capacity

- Up to 25 wireless beltpacks,10 transceivers per base
- FSII-BASE-II: 25 beltpack capacity
- FSII-BASE-II-5: 5 beltpack capacity. To upgrade to 25 beltpacks you need to obtain a licence from your Clear-Com dealer.
- 12 Partyline Channels

- 12 Group set-ups
- Beltpack to beltpack connection (point-to-point)
- Completely scalable and configurable
- Up to four GPO and two GPI controls

2 Using the Base Station

2.1 About the Base Station

The FreeSpeak II Base Station routes communication to and from wireless beltpacks. It provides a control point for audio and allows the user to configure the system, either from the front panel menus or using the online configuration manager.

- Press **Menu** button to configure your audio set up from the Base.

See **Accessing the Core Configuration Manager (CCM) on page 91** for details about online configuration.

2.2 Base Station controls

Label	Connector function
A	USB port. Use when registering beltpacks to the Base Station. Also use when upgrading device or saving/restoring system settings. This port can also be used for obtaining detailed logs for diagnostic purposes. See **Registering beltpacks on page 56**, **Save system settings on page 28** or **Upgrading Base Station and devices on page 128**. See **The USB Logger on page 30**
B	Base headset connector (4-pin XLR female). There is also an optional 5-pin XLR male connector available.
C	**Menu** button. Push to enter menu mode and control system settings. Push again

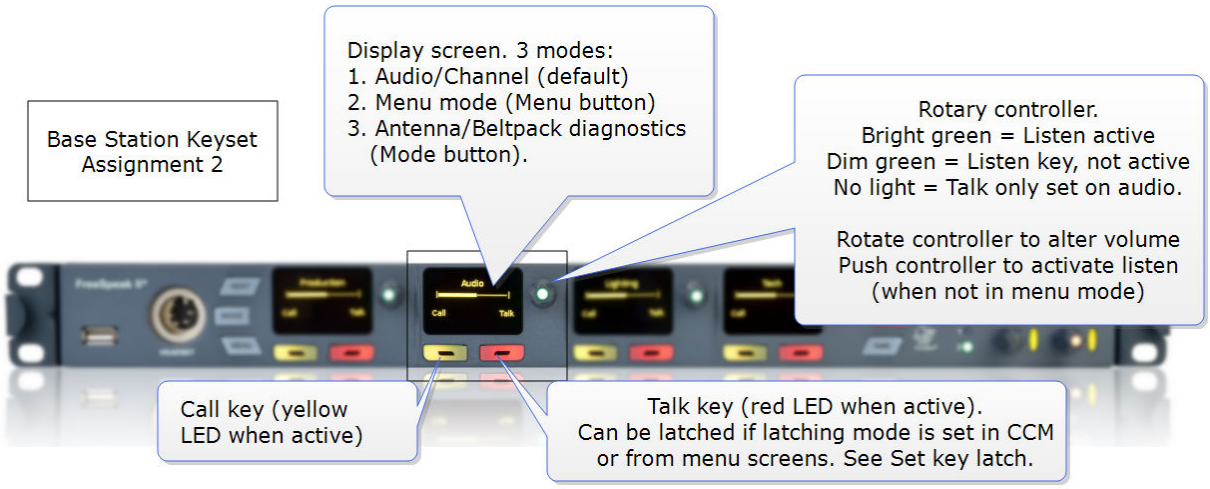
Label	Connector function
	to exit menu mode, or leave to time-out.
D	**Mode** button. Use to view transceiver performance in base menu screens. Toggle between diagnostic view and normal keyset view.
E	Push to toggle headset microphone on and off.
Keyset	A Keyset is a set of controls associated with an audio assignment. On the Base, a Keyset is made up of a viewing screen and three controls (a rotary and two push buttons). The viewing screen shows a Channel and any associated messages. The rotary controls volume to that Channel, and the push buttons control Call and Talk to the Channel. The viewing screens are also used to display menu and mode information.
F	Stage Announce. Allows the Base operator to talk on the Stage Announce output. Push and hold to talk.
G	All Talk. Allows the Base operator to talk to all wired and wireless beltpacks (2-Wire and 4-Wire). Push and hold to talk.
H	Remote Mic Kill (RMK). Allows Base operator to remotely unlatch all beltpack talk keys, wireless and wired.
I	Status LED 1 = Transceiver warning light. If green, all transceivers are online. Status LED 2 = Beltpack warning light. If green all BPs have sufficient battery power. If either light is amber (or red), you can press the **mode** button to check the issue in the diagnostics screens.
J	Controls overall volume to the Base headset. This includes Channels, program feed and any other available audio. Turn rotary to adjust volume, push to turn headset sound on and off.
K	Program feed to Base headset volume and control. Turn rotary to adjust volume, push to turn feed on and off. (Does not affect program feed in Channels).

2.3 What is a Keyset?

A Keyset is a set of controls associated with an audio assignment. The default configuration of the Base Station has three Partyline audio assignments, and a Reply assignment. Beltpacks have two Partyline audio assignments, two call assignments, and one reply assignment by default.

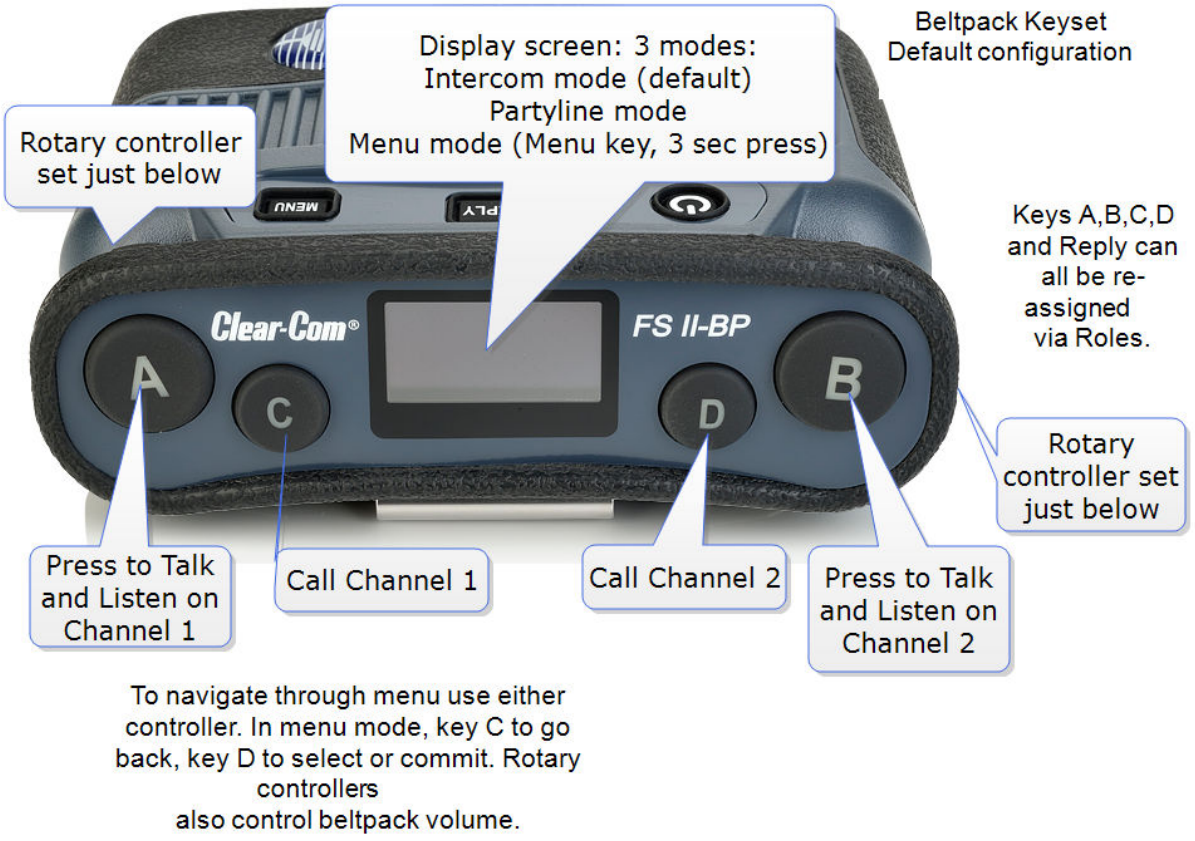
2.3.1 Main Station Keysets

The Keysets on a Base Station is made up of 4 viewing screens, each with an associated rotary controller, a Call key and a Talk key. These controls display and regulate the audio routes associated with the Base. As well as controlling audio assignments, the viewing screens display menu options and wireless diagnostics.



2.3.2 Beltpack Keysets

The Keyset on a beltpack has one screen and two sets of controls, to the left and right of the screen. The main assignments are on keys A & B and subsidiary assignments are on C & D. Additionally, the Reply key can be over-ridden with an audio assignment. The default set-up for a beltpack puts Channel 1 on keys A (Talk and Forced Listen) and C (Call signal on Channel 1), and Channel 2 on keys B (Talk and Forced Listen) and D (Call signal on Channel 2).



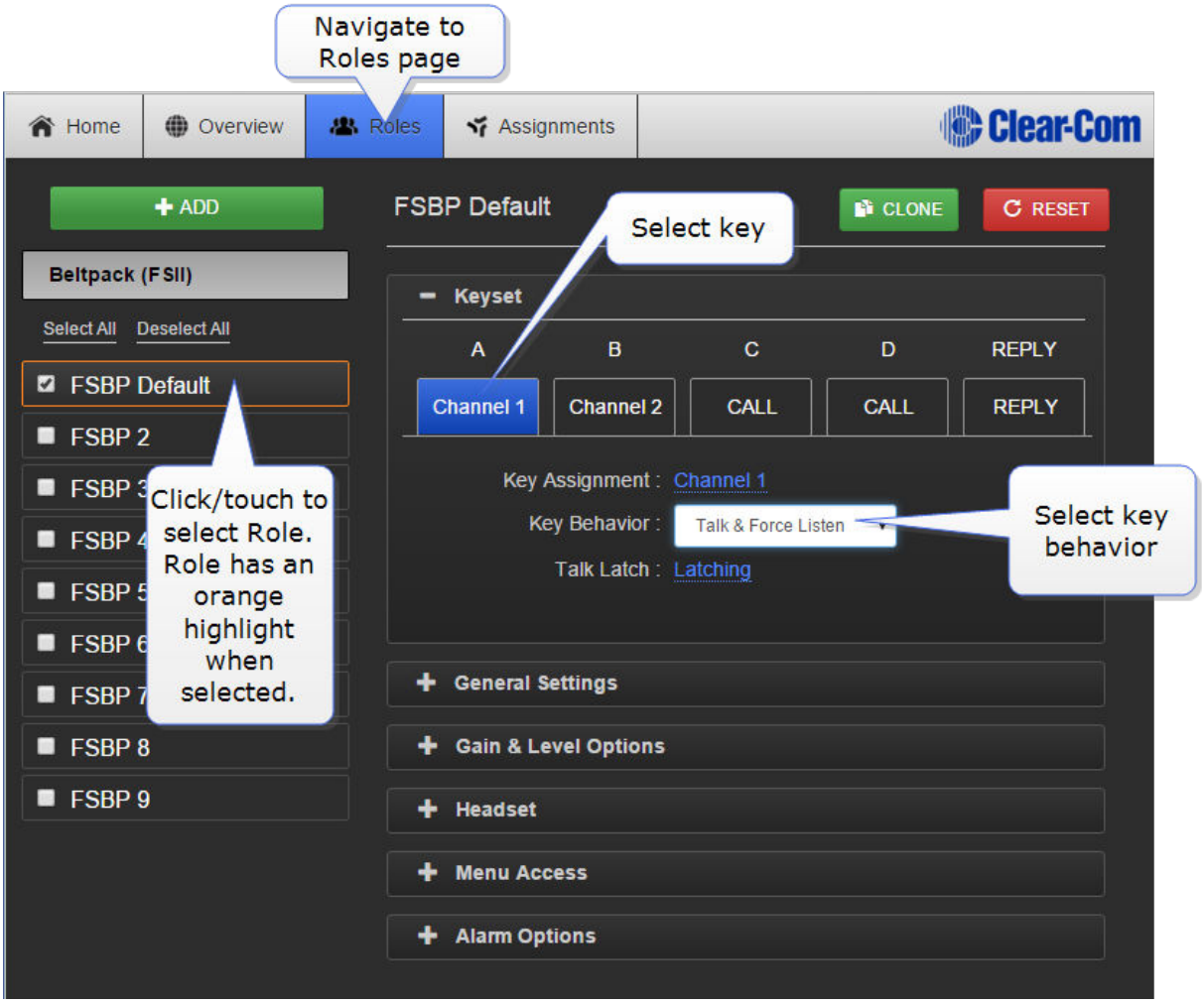
2.4 Key behavior

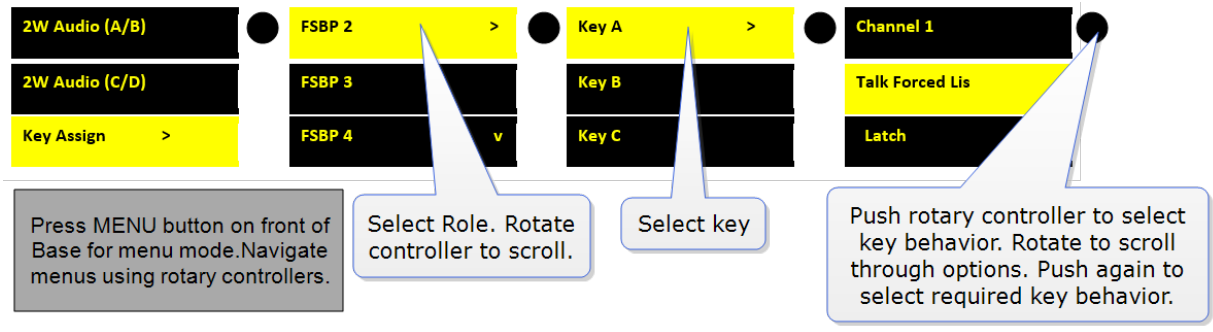
Keys can be set to different talk and listen states.

Key behavior options	Resulting audio behavior
Talk-only	Press key to talk. Key only controls talk.
Listen-only	Press key to listen. Key only controls listen.
Talk and Listen	Press key to talk and listen.
Dual Talk and Listen	Press key to talk and listen. Listen latches on or off according to preference (quick tap to latch). User controls listen state.
Force Listen	Permanent listen.
Talk and Force Listen	Permanent listen, push key to talk.
Force Talk and Force Listen	Permanent listen and talk.

2.4.1 Set key behavior

Key behavior can be set from the CCM or the Base Station.





Note: *Key behavior is modified by key latch state. When key is set to latch, latch is activated by a quick tap on the key.*

2.5 FreeSpeak II Base rear connectors

The Base Station rear connectors are listed below.

Label	Connnector function
A	Power connector. Mains power lead with internal current converter.
B	Power connector. DC wallwart power lead (Part # 453G032, 12V DC, 60W). Use connector A or connector B or both to guard against power failure.
C	Grounding screw. When connecting the base to other systems, you must connect the grounding screw to a good earth in order to prevent audio problems.
D	Fiber connector to FS II splitter (Part # FSII-SPL). Used with Fiber module (Part # HLI-SMFO or MMFO)
E	RJ45 connector to transceiver (FSII-TCVR-19, FSII-TCVR-24) or splitter.
F	Dect Sync. RJ45 connector to another Base Station. Can also be used to synchronize to other Clear-Com DECT devices or another DECT based system. In some cases you will need a cross-over cable instead of a standard cable. See Pinouts on page 19
G	XLR Partyline connectors (standard microphone cable). **Note**: If power is enabled on these ports the power operates across a pair of ports, A & B, C & D. See Powering your system on page 21. See Pinouts on page 19 Be sure to null the ports whenever cabling arrangements are changed.
H	RJ45 connectors for 4-wire intercom. These ports can change pin polarity according to whether they are connecting to a matrix or another device. See Port Function on page 114 .

Label	Connnector function
I	XLR connector (standard microphone cable) for Program Feed input, typically from a mixing console or audio player. Adjust levels in **Audio Settings/Program Input** in the Base Station menus.
J	XLR connector (standard microphone cable) for Stage Announce output.
K	2 x RJ45 ports. These can be used for network connection or for daisy-chaining devices. **Note**: The ports share an IP address, so only one network connection is possible (either port can be used).
L	GPIO connector. See Pinouts on page 19.

Note: *For connection between the Base and transceiver/splitter and digital audio feeds, Clear-Com recommends **shielded** Cat 5/6 cable of **no less than 24 AWG**. Use of other cable can result in shorter cable runs and other performance problems.*

2.6 Pinouts

2.6.1 DECT SYNC (connector E)

	Sync In	Sync Out
Pin 1	DECTSYNC +	DECTSYNC +
Pin 2	DECTSYNC -	DECTSYNC -
Pin 3	8 KHZ+	8 KHZ+
Pin 6	8 KHZ-	8 KHZ-

2.6.2 Partyline (connectors F)

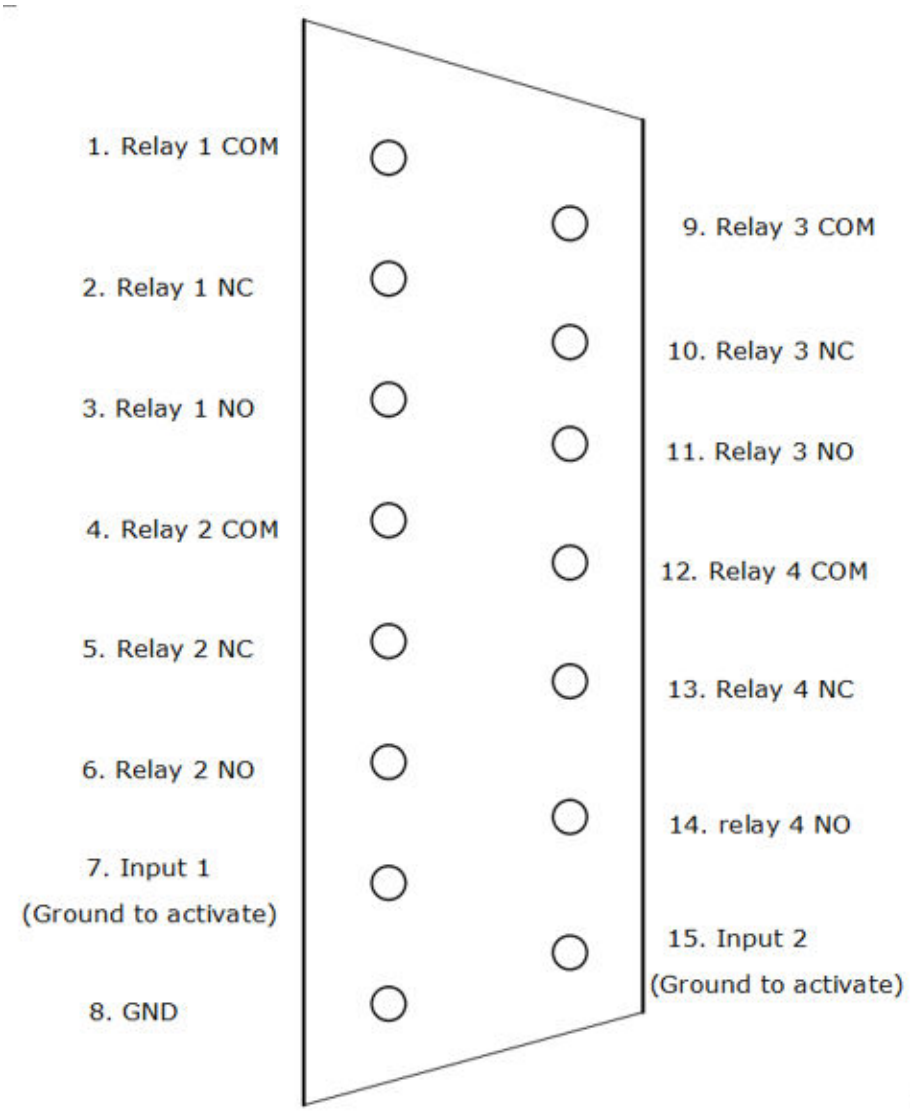
Pin	Description
Pin 1	Ground (shield)

Pin	Description
Pin 2	Power
Pin 3	Audio

2.6.3 4-wire intercom (connectors G)

See Port Function on page 114

2.6.4 GPIO/DB15 connector (K)



Pin	Description
Pin 1	Relay 1 COM
Pin 2	Relay 1 NC
Pin 3	Relay 1 NO
Pin 4	Relay 2 COM
Pin 5	Relay 2 NC
Pin 6	Relay 2 NO
Pin 7	Input 1 (Ground to activate)
Pin 8	GND
Pin 9	Relay 3 COM
Pin 10	Relay 3 NC
Pin 11	Relay 3 NO
Pin 12	Relay 4 COM
Pin 13	RELAY 4 NC
Pin 14	RELAY 4 NO
Pin 15	Input 2 (Ground to activate)

2.7 Powering your system

The powering requirements for your FreeSpeak II devices are detailed below.

2.7.1 Powering the FreeSpeak II Base

There are two power supplies, used according to preference:

- Mains power lead (internal power converter)
- DC connector. External AC/DC DIN4 power adapter.

Use one power connector or both to guard against one failing.

2.7.2 Powering wireless beltpacks

Beltpacks are usually powered by Li-Ion battery. A drop-in battery charger is available.

Battery power status is viewed from:

- Base Station menu screens
- Beltpack menu screens
- Core Configuration Manager (CCM).

For more information see: Battery Charger Quick Start Guide (PDF available from HME Clear-Com Ltd website).

Note: *You can also power beltpacks using standard AA batteries for convenience. In situations where Li-ion batteries are prohibited, you can also use nickel metal hydride batteries (NiMN) but will need to set battery type so battery life diagnostics are accurate. See* ***AA Battery Type: Alkaline /NiMh on page 76****.*

2.7.3 Power 2-wire beltpacks from the Partyline

2-wire Partyline beltpacks can take power from the Partyline:

- FreeSpeak base power : Supply = 800 mA to Partyline shared between A/B and C/D.
- Approximately 28 RS 701 beltpacks per pair of ports
- Approximately 20 RS 702 beltpacks per pair of ports
- Approximately 20 RS 703 beltpacks per pair of ports

To enable power to the Partyline go to Ports, 2-wire in the CCM or in Base front menu screens.

2.7.4 Powering the transceivers

- Directly (DC in power connector) **or**
- From the FreeSpeak II Base or splitter

Direct power to transceiver is recommended. Direct power will increase how far transceivers can be positioned from the Base

Transceiver powered locally:

- Shielded Cat 5/6 24 AWG cable up to **800 m (2,625 feet)** from base or splitter.
- Shielded Cat 5/6 26 AWG cable up to **400 m (1,312 feet)** from base or splitter.

Transceiver powered from Base Station:

- Shielded Cat 5/6 24 AWG cable, up to **100 m (328 feet)** from base or splitter.
- Shielded Cat 5/6 26 AWG cable, up to **50 m (164 feet)** from base or splitter.

Note: *Using heavier gauge cable will increase available distance. Clear-Com recommends using 24 AWG cable.*

For more information see:

- Using the transceivers on page 31
- Site survey on page 38

2.7.5 Powering the Transceiver Splitter

The splitter **MUST** be powered locally.

2.7.6 Recommended powering and cable lengths for a System

The Base Station can power 1 transceiver. More than one transceiver requires direct power supplied to the transceiver.

The figures in this table are based on the use of 24 AWG Cat5/6 cable	Capacity (distance and no. of devices)
Base to transceiver. No PSU at transceiver.	1 transceiver only. 100 meters (328 feet).
Base to transceiver. PSU at transceivers.	2 transceivers. 800 meters (2625 feet).
Base to splitter. Splitter **must** have PSU.	800 meters (2625 feet).
Splitter to transceiver. Transceivers powered by splitter, no PSU at transceiver.	5 transceivers per splitter. 100 meters (328 feet).
Splitter to transceiver. PSU supplied to transceivers.	5 transceivers per splitter. 800 meters (2625 feet).

The figures in this table are based on the use of 26 AWG Cat5/6 cable	Capacity (distance and no. of devices)
Base to transceiver. No PSU at transceiver.	1 transceiver only. 50 meters (164 feet).
Base to transceiver. PSU at transceivers.	2 transceivers. 400 meters (1312 feet).
Base to splitter. Splitter **must** have PSU.	400 meters (1312 feet).
Splitter to transceiver. Transceivers powered by splitter, no PSU at transceiver.	5 transceivers per splitter. 50 meters (164 feet).
Splitter to transceiver. PSU supplied to transceivers.	5 transceivers per splitter. 400

The figures in this table are based on the use of 26 AWG Cat5/6 cable	Capacity (distance and no. of devices)
	meters (1312 feet).

Note: *Distance between Base and transceivers can be increased by connecting via Fiber.*

2.8 Networking/IP Issues

Configure your IP network to work optimally with your FreeSpeak II devices.

2.8.1 Dynamic host configuration protocol (DHCP)

The FreeSpeak II Base is set to DHCP by default. For fast set-up, DHCP is the best option to use as the Base Station can be immediately connected to any network which provides DHCP. Most networks allocate IP addresses using DHCP. The addresses provided are dynamic and will change from time to time.

2.8.2 Static IP configuration

If your intercom installation becomes permanent, obtain a static IP address to avoid the Base IP address from changing periodically.

2.8.3 Netmask or subnet

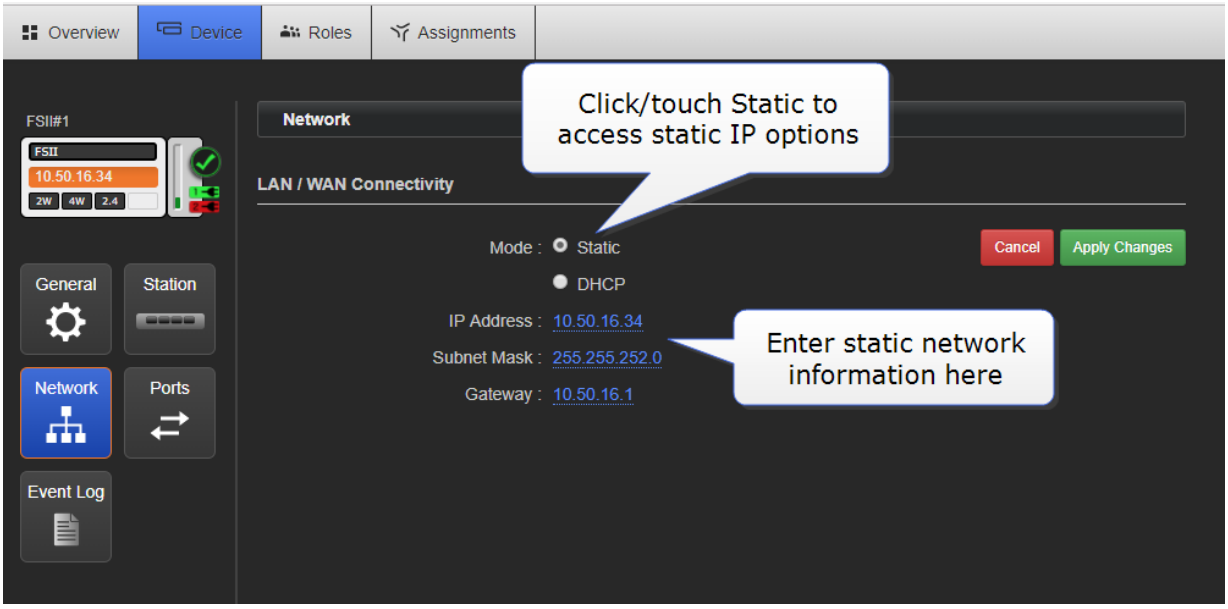
The netmask or subnet divides the network into sectors for more efficient routing and is required when allocating a static IP address to a Base Station. Your network administrator should provide details.

2.8.4 Gateway

This setting is optional. It is required if your system navigates across subnets (as might be the case when accessing the CCM across networks, or linking systems). If not explicitly stated, Gateway will revert to the device IP address.

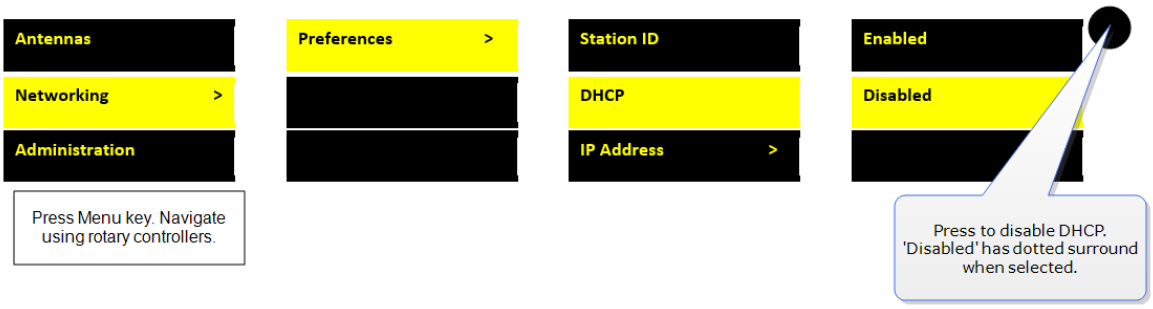
2.8.5 Set static IP details for Base Station

Set static IP address in the CCM.

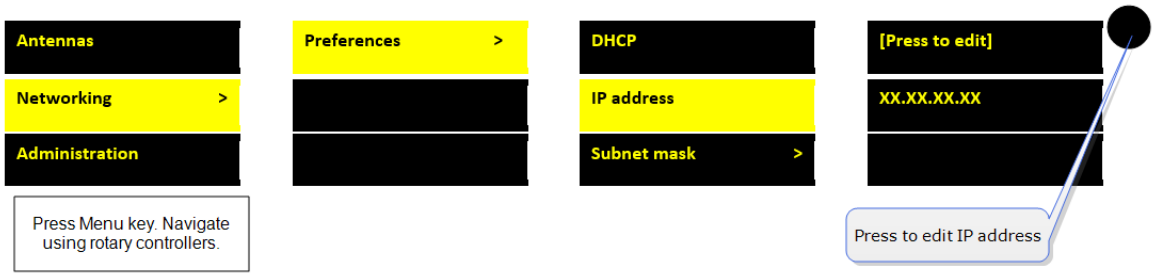


Set static IP address from the Base Station menu screens.

1. Disable DHCP

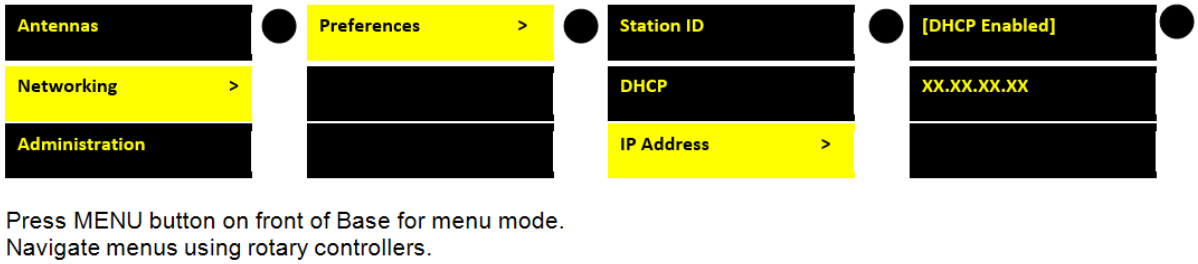


2. Enter static IP address



3. Edit subnet and gateway details as required.

Find the IP address in the front menu screens of your device.

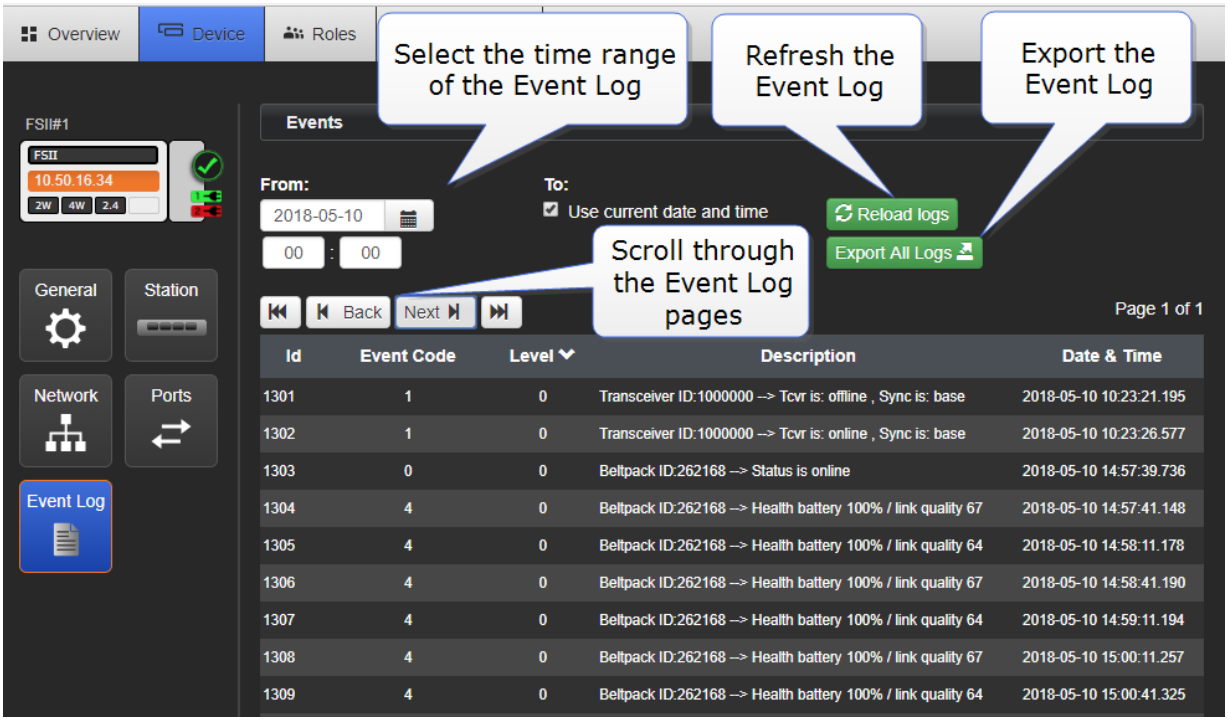


Note: *If you are having trouble connecting to the CCM for your Base Station, one possibility is an IP clash (two devices attempting to use the same IP address).*

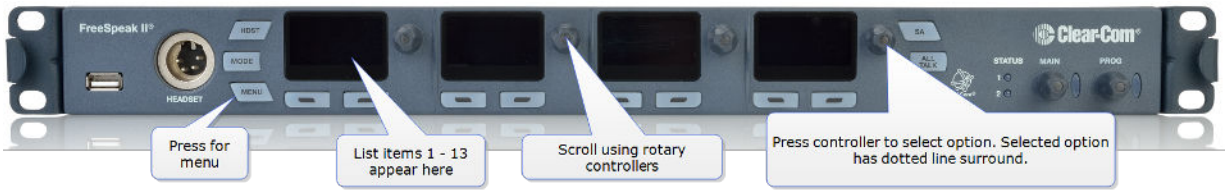
2.9 Using the Event Log

The Event Log enables you to examine a list of entries that the Base Station automatically creates. This checks the status of your system, and helps to diagnose and solve any issues.

To access the Event Log, go to **Device > Event Log**. The Event Log window displays:



2.10 FreeSpeak II Base Station menu guide



List item Description

2.10.1 Audio Settings:

- Headset
- Program input
- Stage announce output

2.10.2 Station settings:

- Program audio on Base station Keysets (1-4)
- Display settings
- Make Base headset a Group Member (listen to group announcements)
- TCVR Port

2.10.3 Channels

- Change Channel name (label)

2.10.4 Groups

- Change Group name (label)

2.10.5 4-wire audio

- Program audio for 4-wire (Ports 1-4)

2.10.6 2-wire audio, A&B, C&D.

- Program audio for 2-wire (Ports A&B, C&D)

2.10.7 Key Assign

- Select each beltpack (Role) and program/edit audio on keys (A,B,C,D)

2.10.8 Beltpacks

- Change beltpack Role
- Unregister beltpacks
- Check beltpack software version
- Fix beltpack Role

2.10.9 Roles

- Create, clone and delete Roles
- Edit Role settings, e.g. change channel, alter volume, set menu access etc.

2.10.10 Transceivers

- Change transceiver name (label)
- Set cable compensation if required

2.10.11 Networking

- Station id (name)
- DHCP or Static IP (see **Networking/IP Issues on page 24** for more information)
- Base station IP address

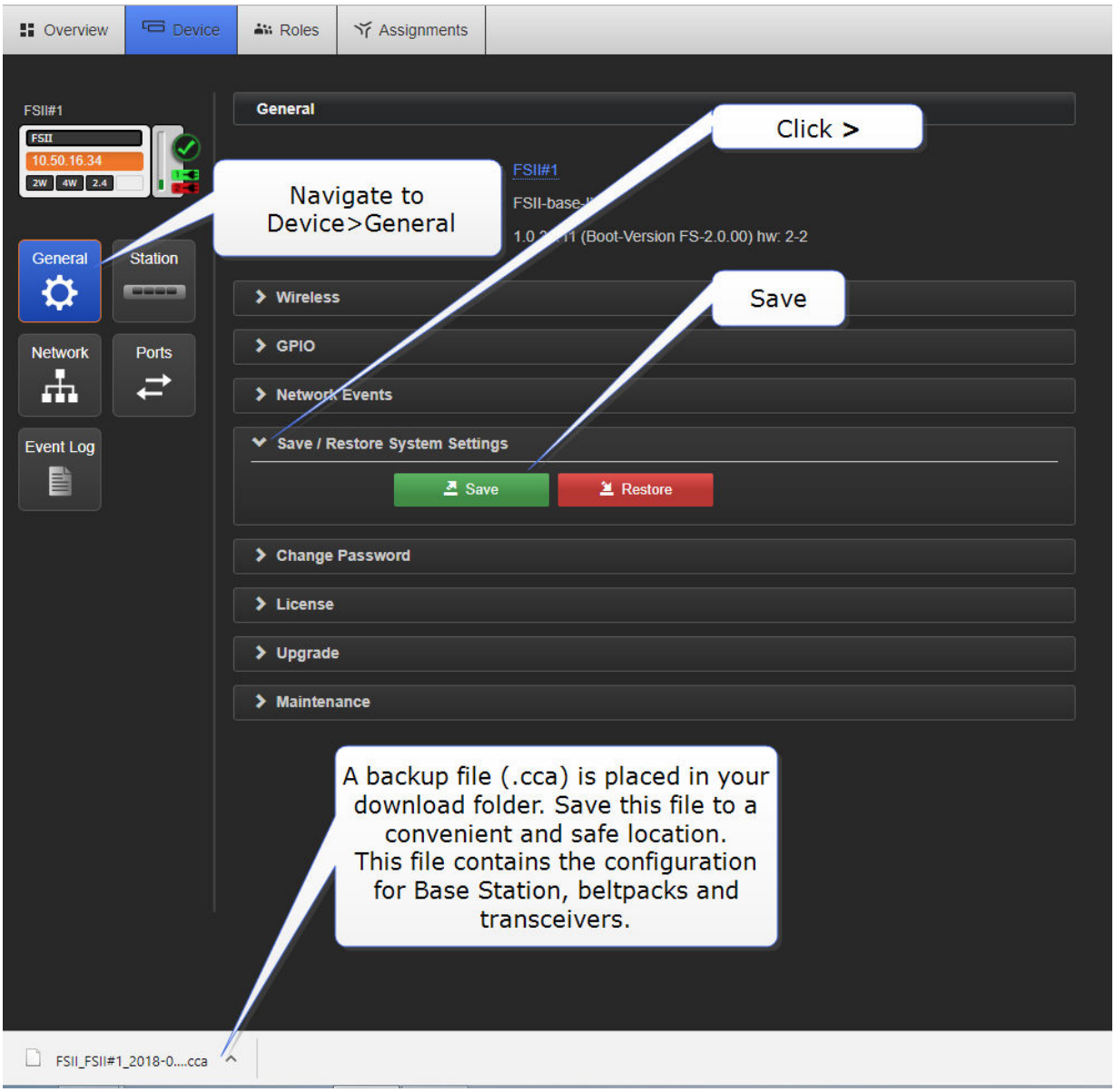
2.10.12 Administration

- Beltpacks: start over-the-air registration
- Software: View version and upgrade
- License: View license and upgrade
- Reset to factory settings and reboot
- Save and restore settings
- Change menu access pin code
- Set AA battery type

2.11 Save system settings

You can back up your system to a USB or directory. We advise that you backup your system configuration. Saving settings will save Role, Base Station and transceiver configuration.

How to save settings from the CCM :



How to save settings from the Base Station menus

2.12 The USB Logger

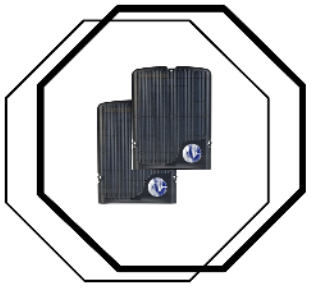
The USB logger can be used to capture comprehensive and detailed logs from your base station (FSII Base 1.5.2 and above). These logs can be used to troubleshoot and diagnose problems.

Contact Clear-Com General Support Services (GSS) for more information: https://www.clearcom.com/support/service-repair/

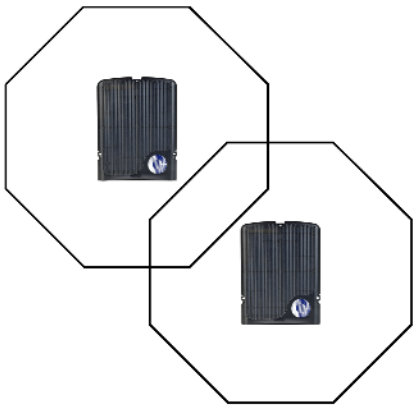
3 Using the transceivers

The transceivers provide a customizable network of coverage zones in which beltpacks can operate. Beltpacks can roam freely between zones.

- Each antenna covers a certain range or cell size.
- Maximum line of sight range: up to 500m (1640ft).
- Typical range: 50 - 150m (160 - 490ft).
- Each antenna covers 5 full duplex users (beltpacks).

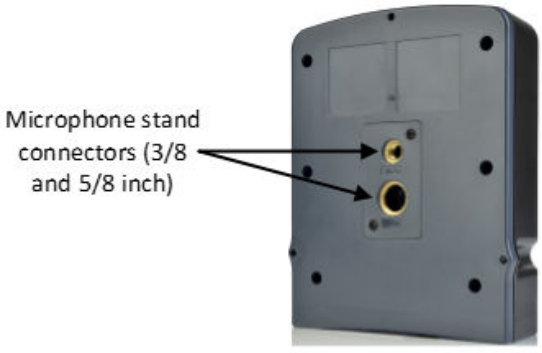


- If two or more antennas are placed in the same area the cell size is the same.
- However, cell density has increased to handle up to 10 users in the same area.



- If antennas are placed across the site then this increases radio coverage area.
- Beltpacks can roam from one antenna to another and stay in constant communication.

Transceivers can be mounted flat on a wall or using a microphone stand.



3.1 Transceiver capacity (how many beltpacks?)

Clear-com recommends a conservative approach to transceiver capacity, to ensure coverage and allow for system losses.

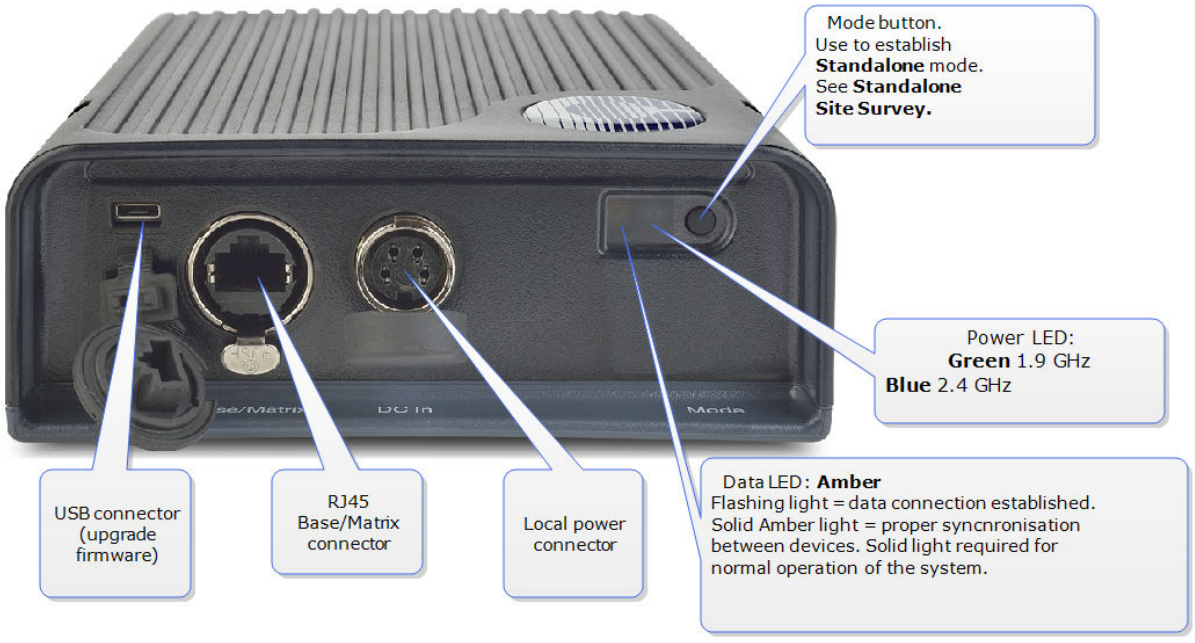
1.9 GHz : 3 - 4 beltpacks per transceiver

2.4 GHz: 2 - 3 beltpacks per transceiver.

3.2 IP rating (international protection marking)

The transceiver has an IP rating of 65 so it can be mouted outside and will be resistant to weather conditions.

3.3 Transceiver connectors



3.4 FreeSpeak II Base 1.9 GHz/2.4 GHz

The two sets of equipment can be used separately or together.

Which frequency you use affects how many beltpacks can be used in any one radio frequency (RF) cell (the range of one transceiver).

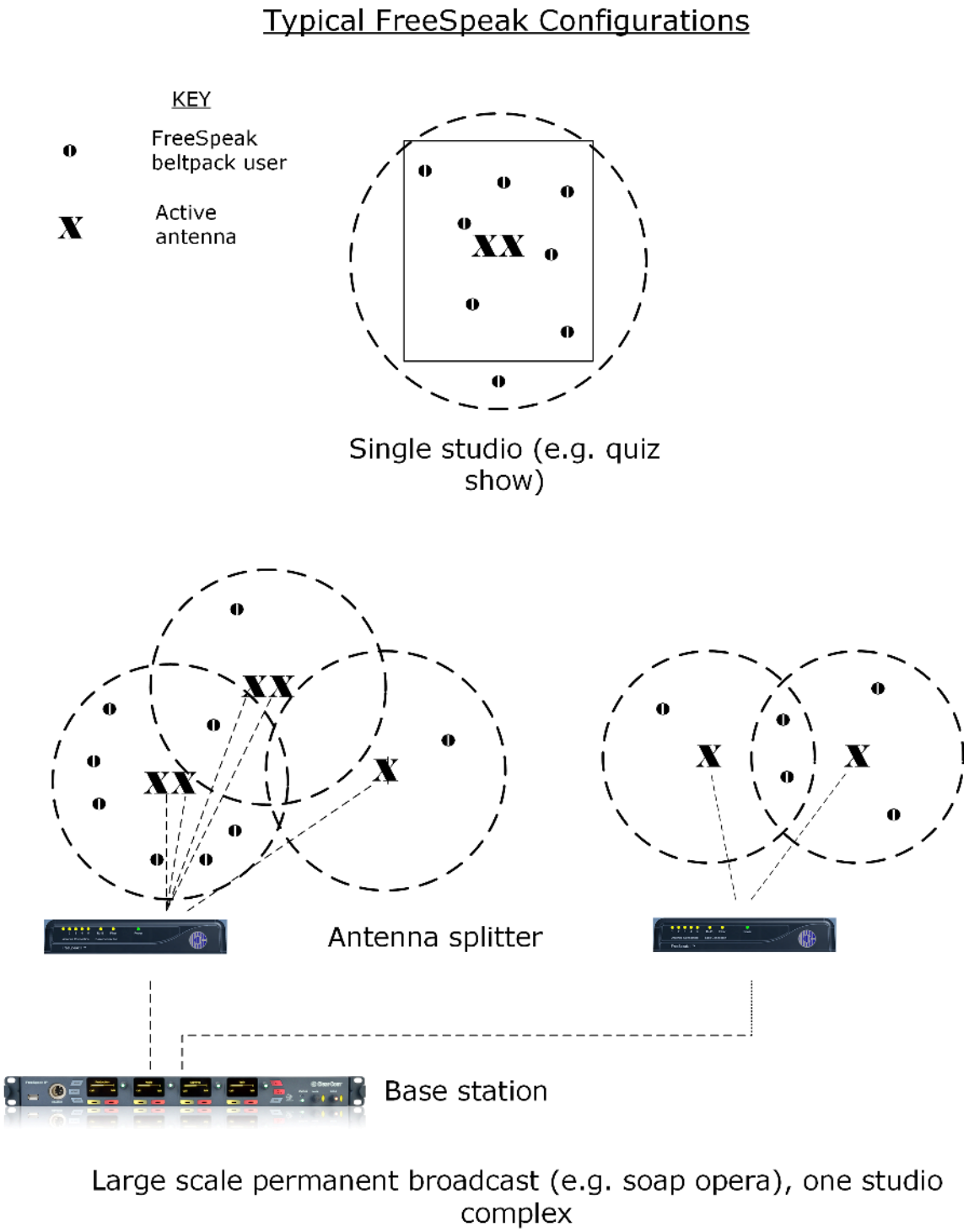
Each transceiver is designed to handle 5 beltpacks in the 1.9 GHz range and 4 beltpacks in the 2.4 GHz range, simultaneously and in good conditions. If interference or propagation problems occur in an area it may be practical to install one less beltpack for each transceiver.

For most working systems, Clear-Com uses a ratio of 3 - 4 (1.9 GHz) or 2-3 (2.4 GHz) users per transceiver. This is due to system losses.

3.5 Transceiver placement

Each FreeSpeak II Base has capacity for 25 beltpacks and up to 10 transceivers (using two splitters). You need to place transceivers to create a custom coverage zone to suit your requirements, taking into account the physical environment and beltpack user needs.

- Example set up.

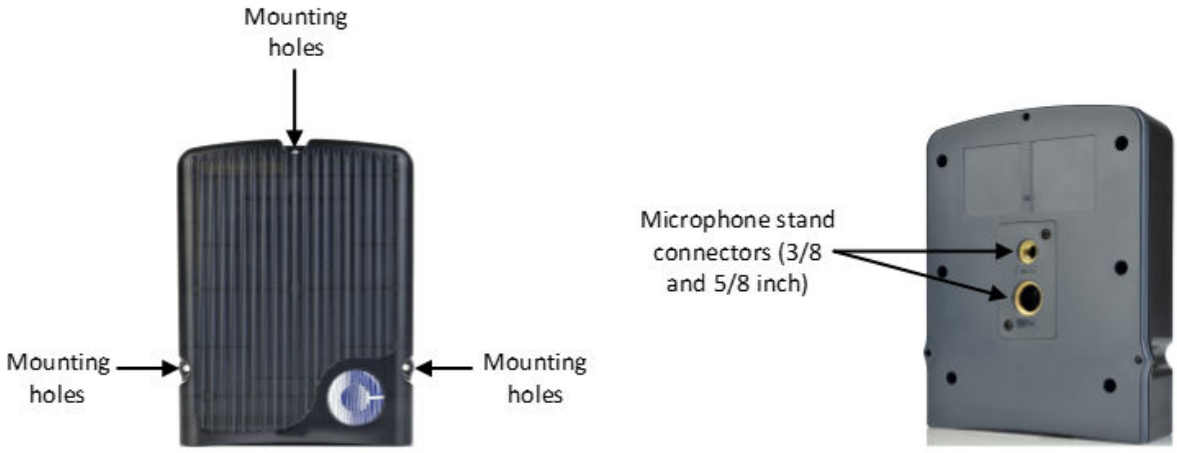


3.5.1 Things to take into account

- Consider both **capacity** and **coverage**. How many beltpack users are there and what are their movements? Ensure that you have enough capacity where users congregate, as

well as allowing for coverage area.

- What are the individual characteristics of your site? Radio waves can be reflected by metallic objects, and reduced by some objects, including the human body (for instance, a large audience can affect transmission).
- What conduit (cabling) is already available on site? Are there power points? Splitters must be powered locally, and Clear-Com recommends powering transceivers locally.
- As a general rule, transceivers should be placed 8 – 10 feet high (2.5 – 3 meters high).
- When co-locating transceivers for extra beltpack capacity in one area, do not put the devices too close to each other. They should be placed between 3 and 20 feet (1 - 7 meters) apart .
- FS II transceivers can be placed at any orientation in confined areas. However, in larger venues or outdoors, aim the transceiver to the front of the required coverage area.



3.5.2 Transceiver capacity (how many beltpacks?)

Clear-com recommends a conservative approach to transceiver capacity, to ensure coverage and allow for system losses.

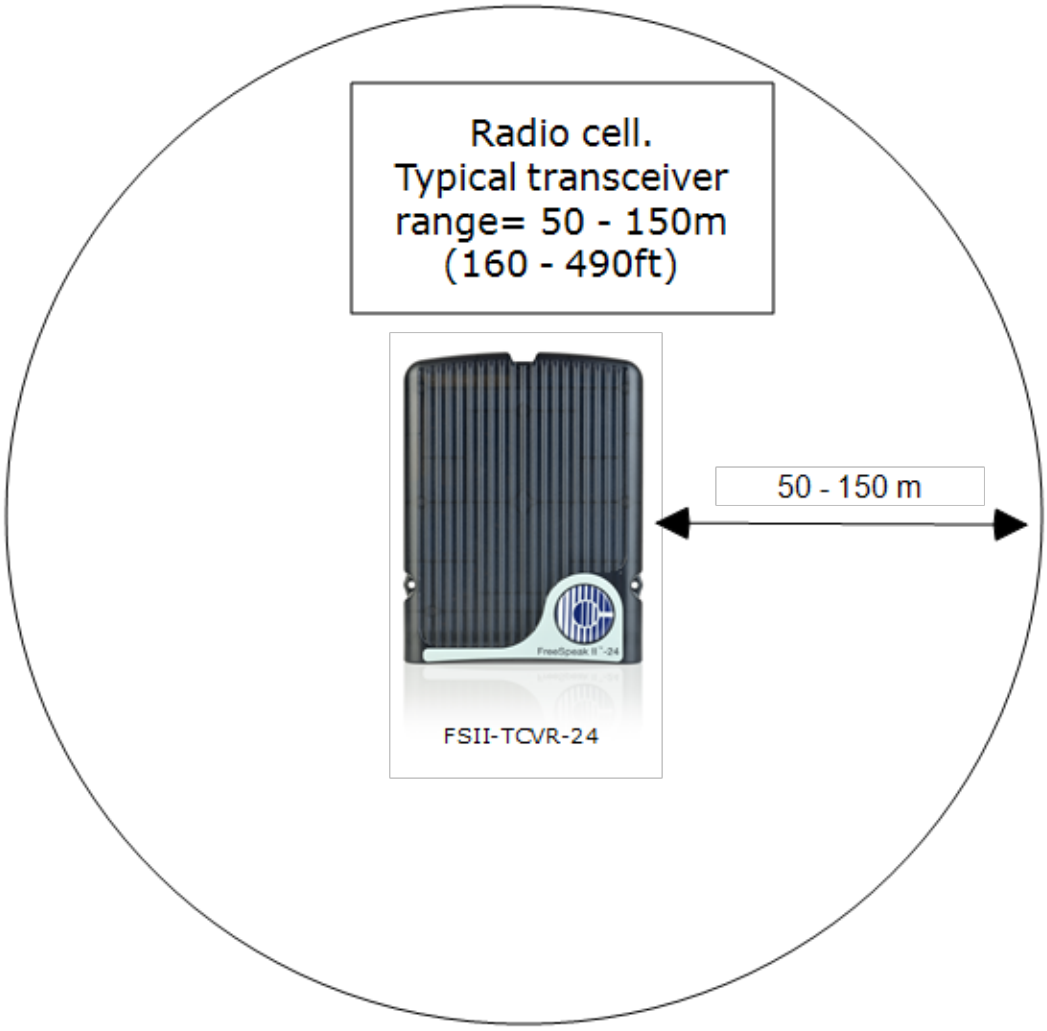
1.9 GHz : 3 - 4 beltpacks per transceiver

2.4 GHz: 2 - 3 beltpacks per transceiver.

3.5.3 Transceiver coverage (how far?)

Transceivers provide circular (omnidirectional) coverage.

In ideal conditions, a transceiver range can go up to 500 meters (1640 feet). However, an average range, taking into account objects and conditions that impede radio waves, is between 50 - 150 meters (164 - 490 feet).



3.5.4 Possible distance from Base Station to transceiver

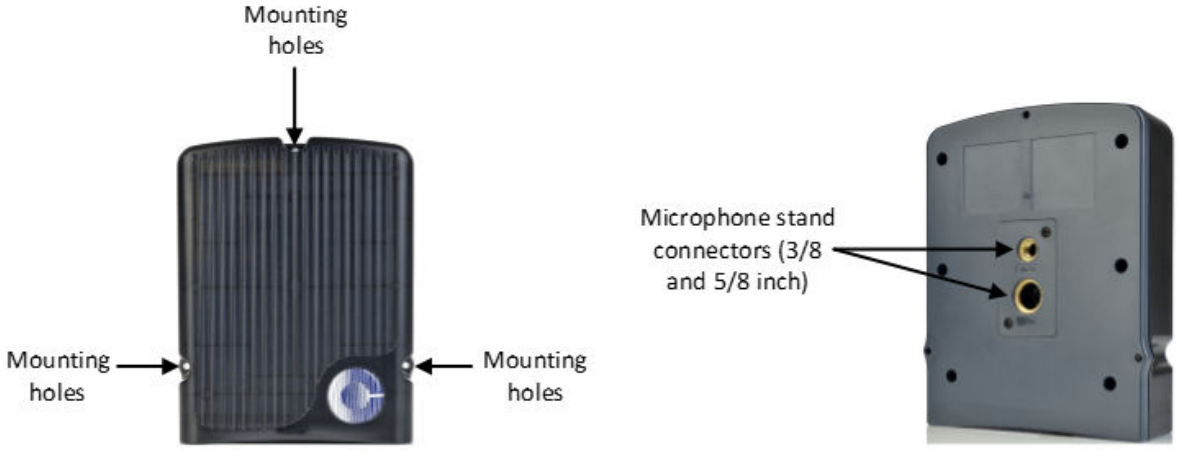
The Base Station can power 1 transceiver to a distance of 100 meters (328 feet). More than one transceiver and/or greater distances will need direct power supplied to the transceiver.

The figures in this table are based on the use of 24 AWG Cat5/6 cable	Capacity (distance and no. of devices)
Base to transceiver. No PSU at transceiver.	1 transceiver only. 100 meters (328 feet).
Base to transceiver. PSU at transceivers.	2 transceivers. 800 meters (2625 feet).
Base to splitter. Splitter **must** have PSU.	800 meters (2625 feet).
Splitter to transceiver. Transceivers powered by splitter, no PSU at transceiver.	5 transceivers per splitter. 100 meters (328 feet).

The figures in this table are based on the use of 24 AWG Cat5/6 cable	Capacity (distance and no. of devices)
Splitter to transceiver. PSU supplied to transceivers.	5 transceivers per splitter. 800 meters (2625 feet).

The figures in this table are based on the use of 26 AWG Cat5/6 cable	Capacity (distance and no. of devices)
Base to transceiver. No PSU at transceiver.	1 transceiver only. 50 meters (164 feet).
Base to transceiver. PSU at transceivers.	2 transceivers. 400 meters (1312 feet).
Base to splitter. Splitter **must** have PSU.	400 meters (1312 feet).
Splitter to transceiver. Transceivers powered by splitter, no PSU at transceiver.	5 transceivers per splitter. 50 meters (164 feet).
Splitter to transceiver. PSU supplied to transceivers.	5 transceivers per splitter. 400 meters (1312 feet).

Note: *Connecting devices over Fiber will increase potential distances from Base to transceiver. See **Install Fiber Module**.*



It is advisable to place transceivers temporarily until coverage has been tested. Once transceivers have been temporarily placed, test the coverage zone by putting a beltpack in **Site Survey** mode and walking through the area monitoring signal strength.

- Conduct a Site survey on page 38.

3.6 Install transceivers

When installing transceivers, please give careful thought to transceiver placement, taking into account the capacity (how many beltpacks) and coverage area that is needed. Also, take note of radio frequency issues covered in this guide. Refer to the section on transceiver placement in this guide for more information.

3.7 Site survey

A site survey involves temporary placement of transceivers while testing coverage (area covered by radio frequency) and capacity (how many beltpacks can be supported) by the system.

After placing the transceiver(s) in a temporary way, a beltpack user walks through all the areas where beltpack users will typically be moving, noting any areas of weak signal, dropout, or disconnection of the system.

For extensive or complicated systems it is helpful to draw a map of the area with transceiver placement and corresponding RF cells. For a smaller system, just testing one transceiver in **Standalone** mode may be sufficient.

To test coverage areas, put the beltpack into **Site Survey** mode. For more information, see:

- How to put a beltpack into Site Survey mode on page 40
- Interpreting the Site Survey screen on page 39
- Standalone site survey on page 40

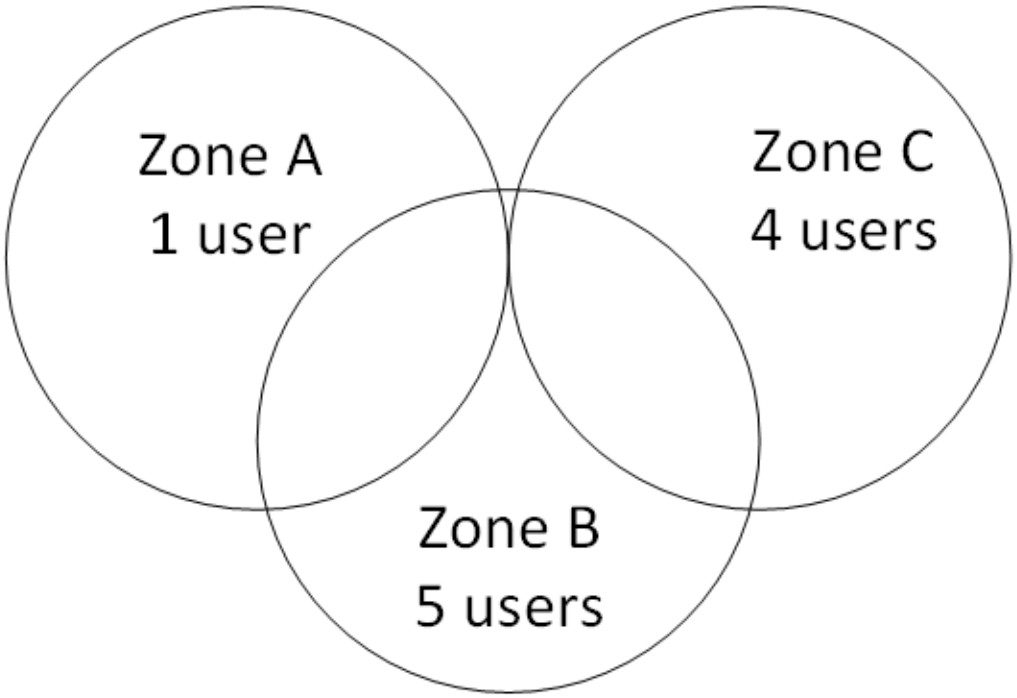
3.7.1 Transceiver coverage zone

Transceiver coverage zone = area where

- **RSSI => 30**
- **Link Quality => 3**

for all beltpacks.

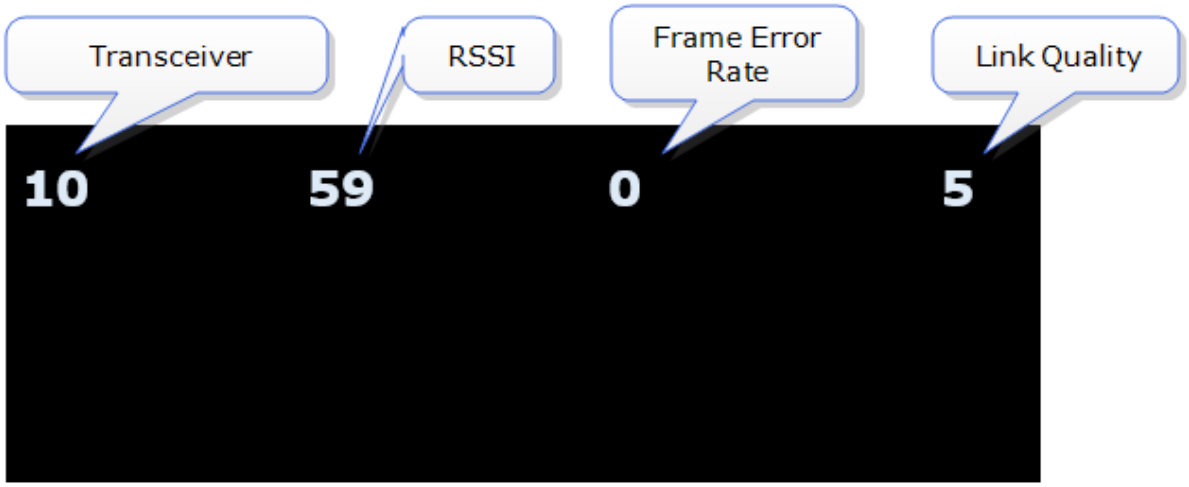
Adjust transceiver placement to get the best coverage. Coverage zones should be overlapped. Example coverage zones are shown below.



3.8 Interpreting the Site Survey screen

The four numbers on this screen represent, from left to right:

- Transceiver
- RSSI (Received Signal Strength Indication)
- FER (Frame Error Rate)
- Link Quality (this figure is a calculation based on RSSI and FER).



Note: *You can press the **Mode** button on the front of the Base Station to check transceiver performance at any time.*

3.9 How to put a beltpack into Site Survey mode

The beltpack must have advanced menu access (set menu access in **Roles/Beltpack Role/Menu Access** from Base Station menus or the CCM).

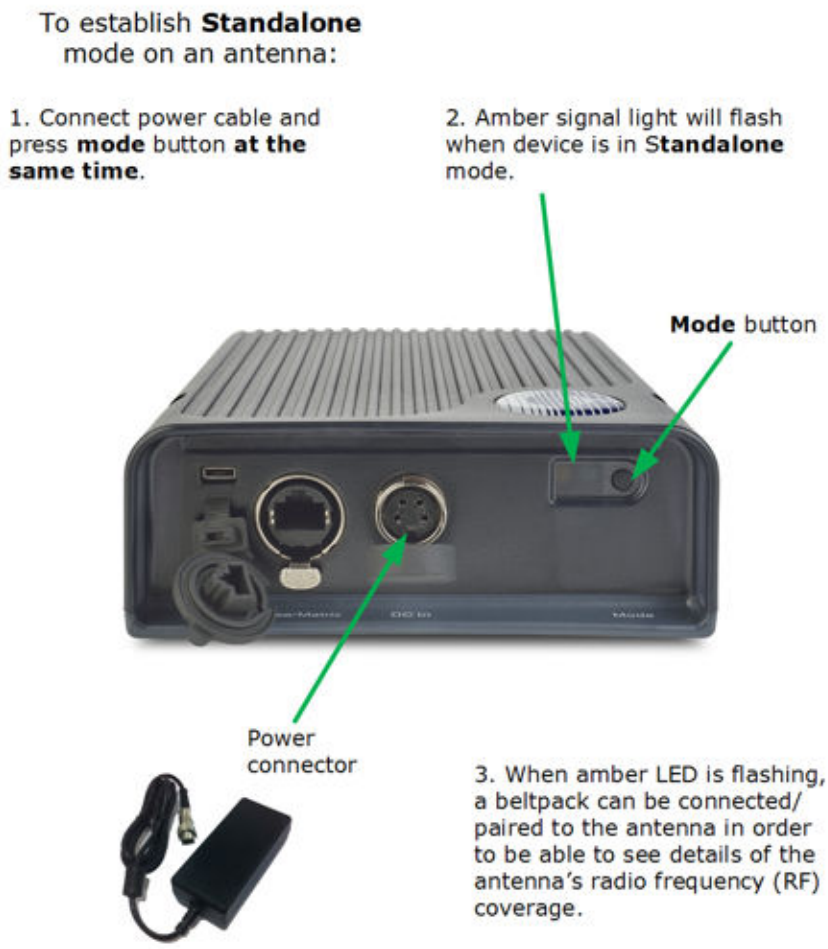
1. Press and hold the **menu** button on the beltpack for 2 seconds to enter menu mode.
2. Navigate to **Site Survey** in the Master menu using rotary controllers to scroll through menu options. Site survey is at the bottom of the Master menu.
3. Press **D** key to select Site Survey. Use **C** key to go back or cancel.

3.10 Standalone site survey

You might need to scope a site (check the range and performance of a transceiver) without connecting to a Base Station. To do this a beltpack and transceiver can be connected in **Standalone** mode.

Make sure you have to hand:

- A powered beltpack
- A transceiver
- A DC in male power connector for the transceiver
- Access to a power socket.



1. Connect power to the transceiver and **at the same time** press the black **Mode** button on the base of the transceiver. This puts the transceiver in standalone mode, and opens it for pairing to a beltpack.

   The amber LED flashes continously to show that the transceiver is open for pairing with a beltpack in standalone mode.

2. Holding the beltpack, press the **Menu** key (2 second press) and navigate to **System Connect** using the right hand rotary controller on the beltpack.
3. Press button **D** to see local systems available for connection.

In menu mode the **D** key on the beltpack operates as SELECT and the **C** key exits the menu level and cancels the selection.

4. Scroll through available systems using the right hand rotary controller.
5. When you have found the transceiver to pair to (it will be showing a '**P**' to indicate that it is open for pairing) press button **D** to select the transceiver and connect the beltpack to it.

6. When the beltpack is sucessfully connected to the transceiver, navigate to Site Survey in the beltpack menu and monitor the range and performance of the transceiver. See **Interpret the Site Survey Screen** below.

3.11 Radio frequency (RF) issues

Use system diagnostics and the site survey screen to interpret RSSI, FER and Link Quality.

As a general rule:

- Recieved Signal Strength Indicator (RSSI) => 30.
- Frame Error Rate (FER) should be as close to 0 as possible
- Link Quality should be => 3.

3.11.1 High frame error rate (FER)

You may have a situation where RSSI is high, but FER is also high, giving a low overall Link Quality. Potential causes of this kind of interference are:

- There is another RF device in the area. This can be tested using a band monitor or spectrum analyser.
- There are reflective surfaces in the area causing Long Delay Spread Multipath interference. This kind of interference is improved by careful transceiver placing, to avoid signal reflection. You may need advice from your Clear-Com representative in this situation.

3.11.2 National radio carrier frequencies

The carrier frequencies allocated for a radio space vary according to location. This affects the amount of beltpacks that can be supported in one RF cell.

Location	Number of carrier frequencies	Maximum beltpacks in one RF space
United States	5	25 beltpacks
European Union and elsewhere	10	50 beltpacks

See also:

Interpreting the Site Survey screen on page 39

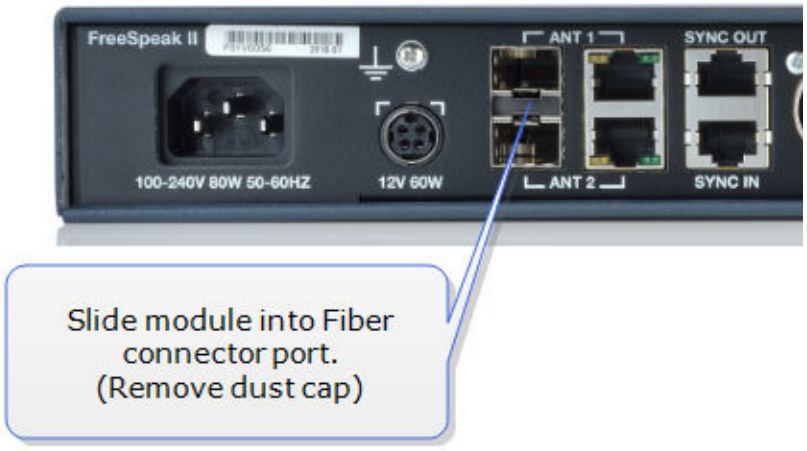
3.12 Using a transceiver with a fiber connection

You may wish to connect a FreeSpeak II Base to a splitter (FSII-SPL) using Fiber. In this case, you need to install Fiber modules to the Base and the splitter.

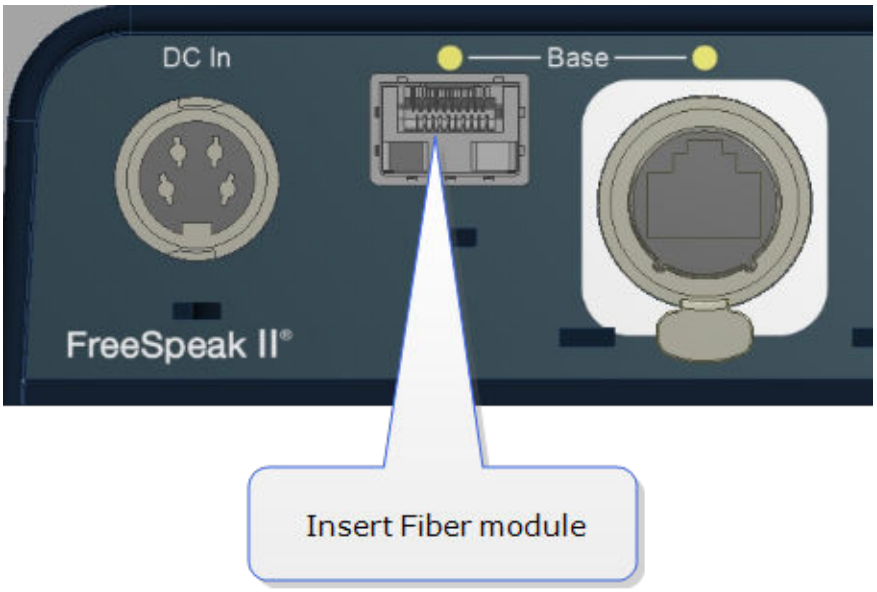
- Modules are available for single mode Fiber cable (HLI-SMFO) and multi-mode Fiber cable (HLI-MMFO)
- Modules are supplied as a pair, one for the Base Station and one for the splitter.
- Modules can be hot patched, no need to power off devices.

3.12.1 Install Fiber modules (parts # HLI-SMFO, HLI-MMFO)

Install Base Station Fiber module.

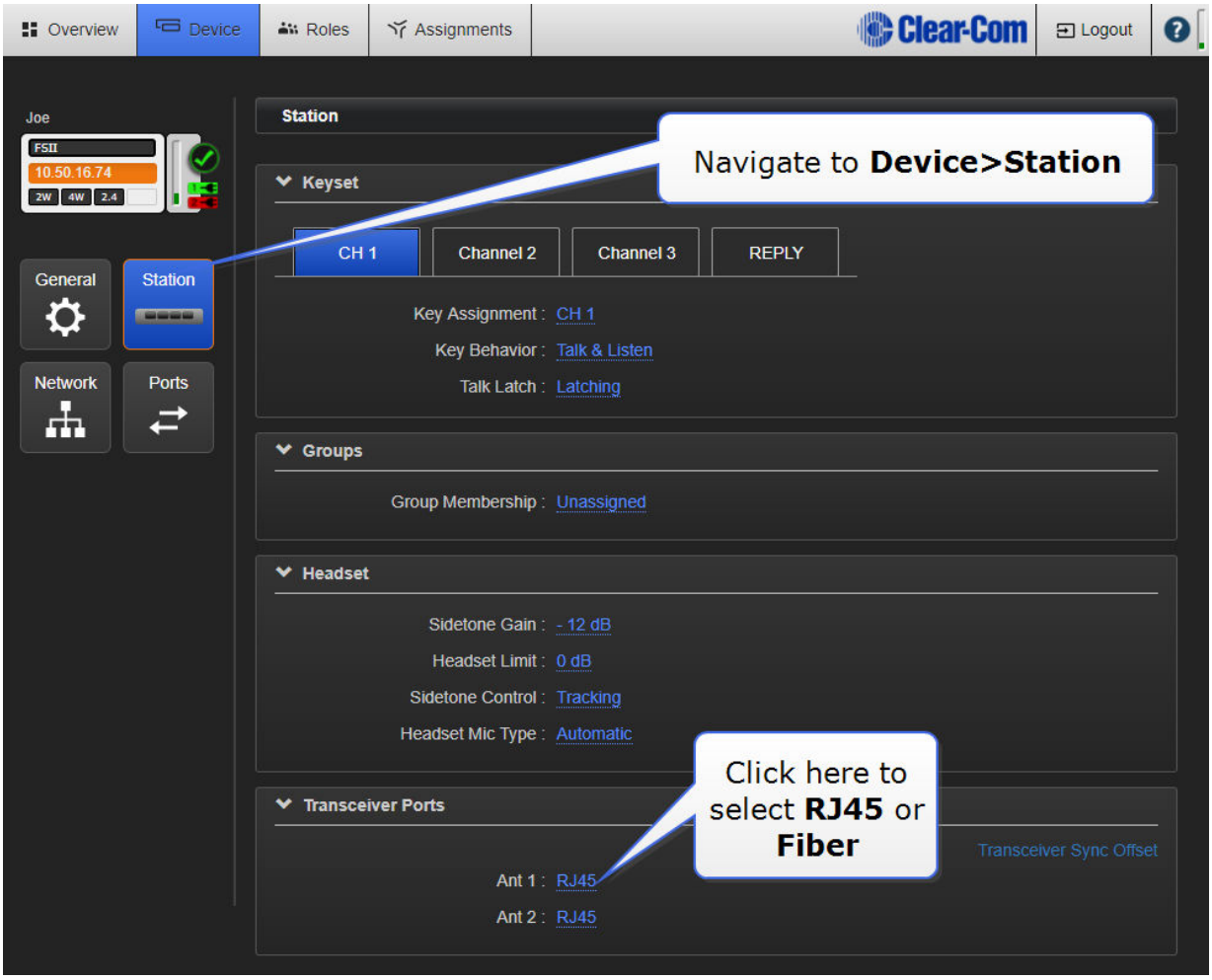


Install splitter Fiber module.



Once the modules are installed, the Base Station and the splitter can be cabled with the correct Fiber cable (single mode or multi-mode depending on existing cabling). You will see the **Base Connection** indicator on the front of the splitter change from **RJ45** to **Fiber**.

You must also set the transceiver port to Fiber in the Core Configuration Manager. Navigate to **Device>Station>Transceiver ports**.



3.13 Transceiver sync compensation (cable compensation)

You must set transceiver sync compensation if the total cable length between transceivers is greater than 500m / 1640 feet.

3.13.1 About transceiver sync compensation

Cable length needs to be calculated when the difference in total cable length between transceivers is greater than 500m/1640 feet. This is to prevent the DECT signals between transceivers from becoming out of synchronization. If the transceivers are not synchronized, beltpack handover will not happen effectively.

Setting transceiver sync compensation is particularly important if you have overlapping transceiver coverage zones (RF cells) or the beltpacks need to move between coverage zones.

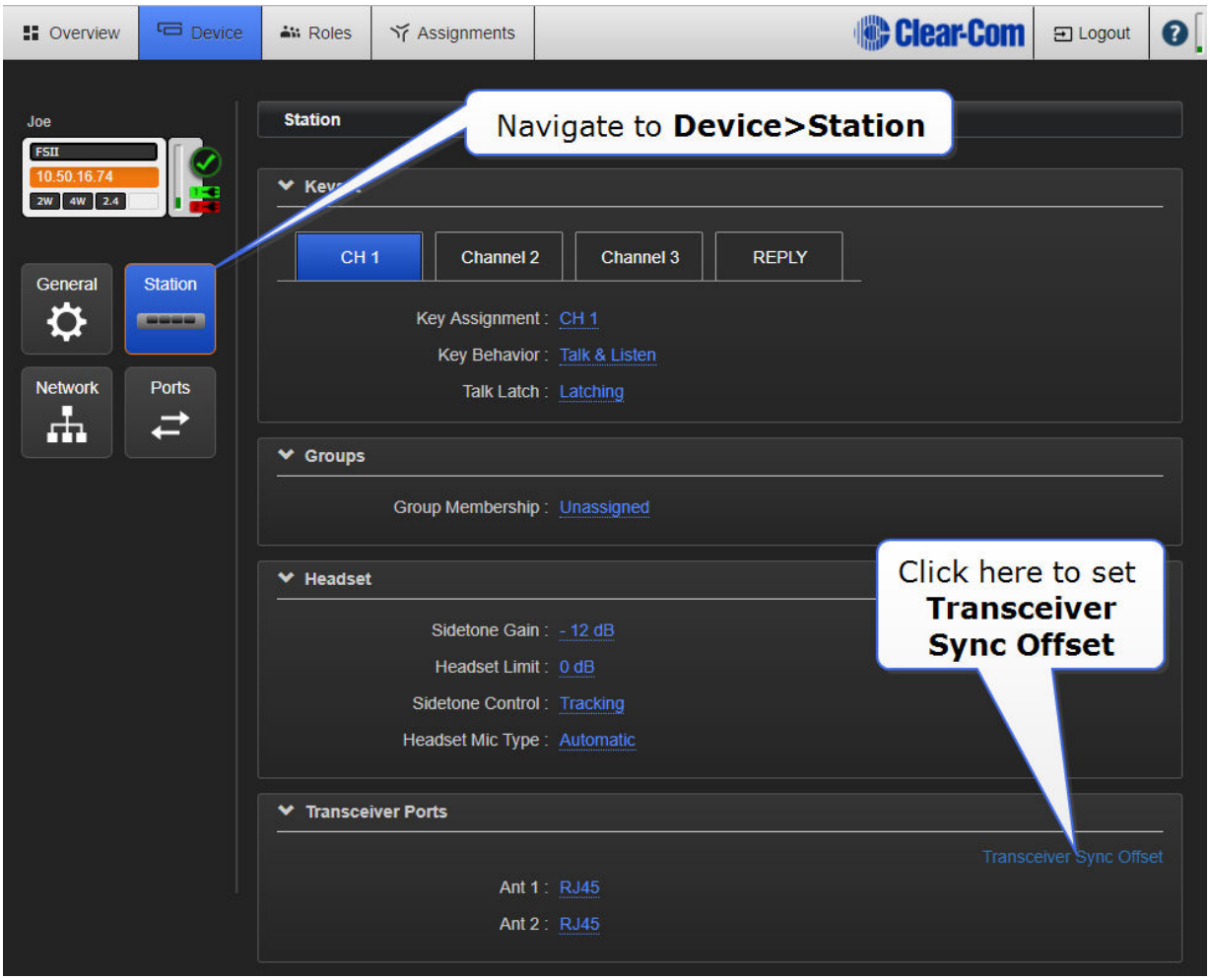
Example

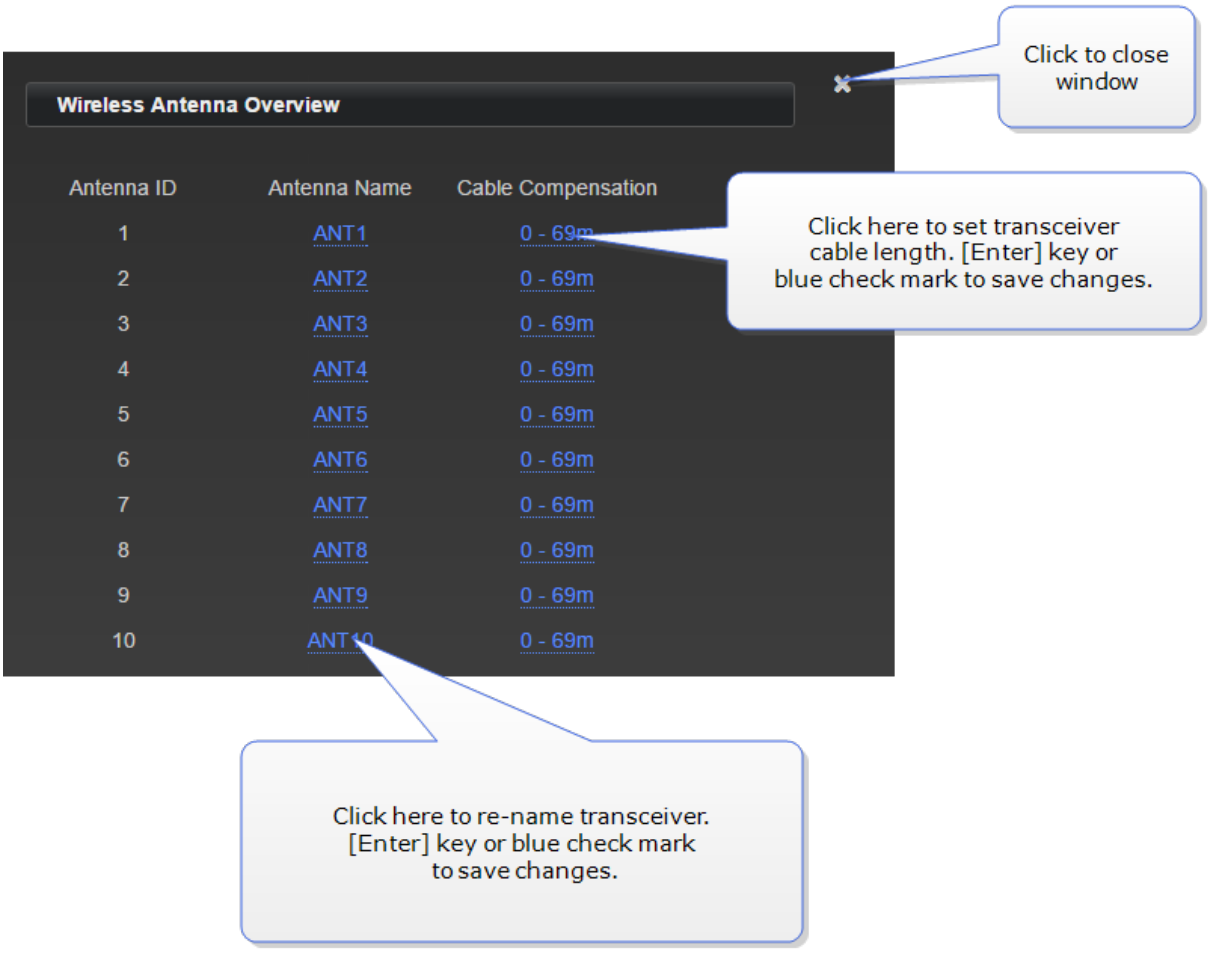
Transceiver 1: total cable length = 100m / 328 feet.

Transceiver 2: total cable length = 850m / 2788 feet.

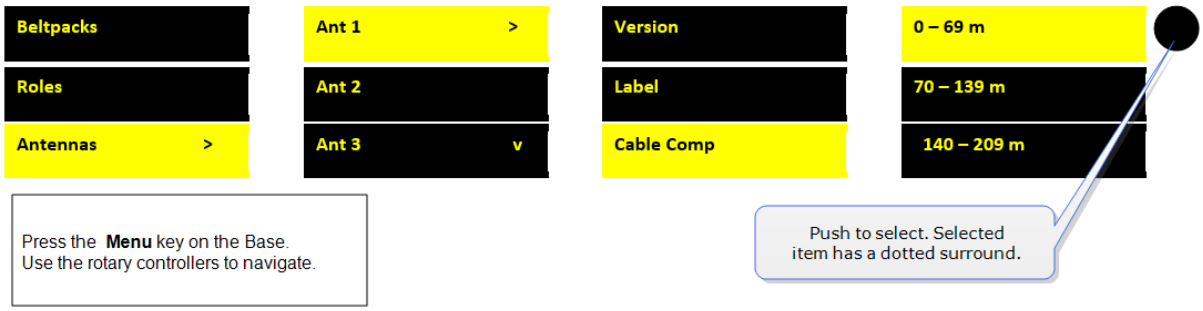
In this case, transceiver cable length should be set.

Set transceiver sync offset in the CCM:





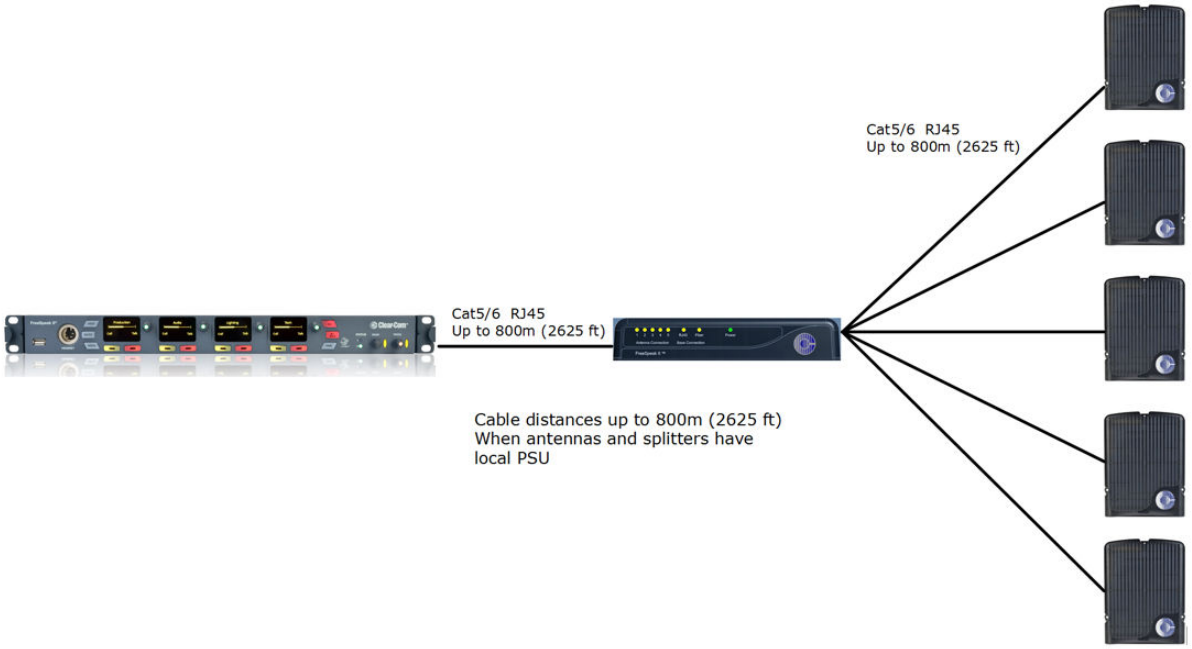
Set transceiver sync offset from the Base menus:



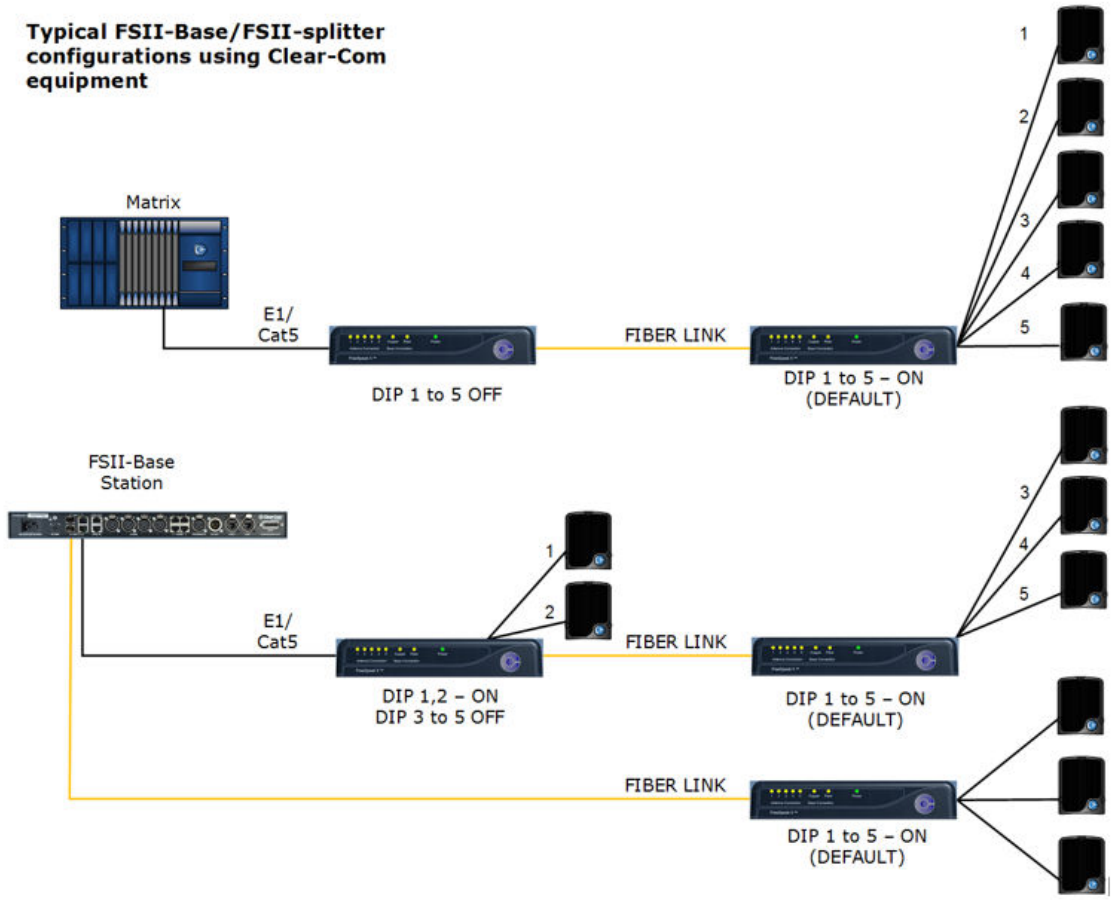
4 Using the FreeSpeak II Base splitter (FSII-SPL)

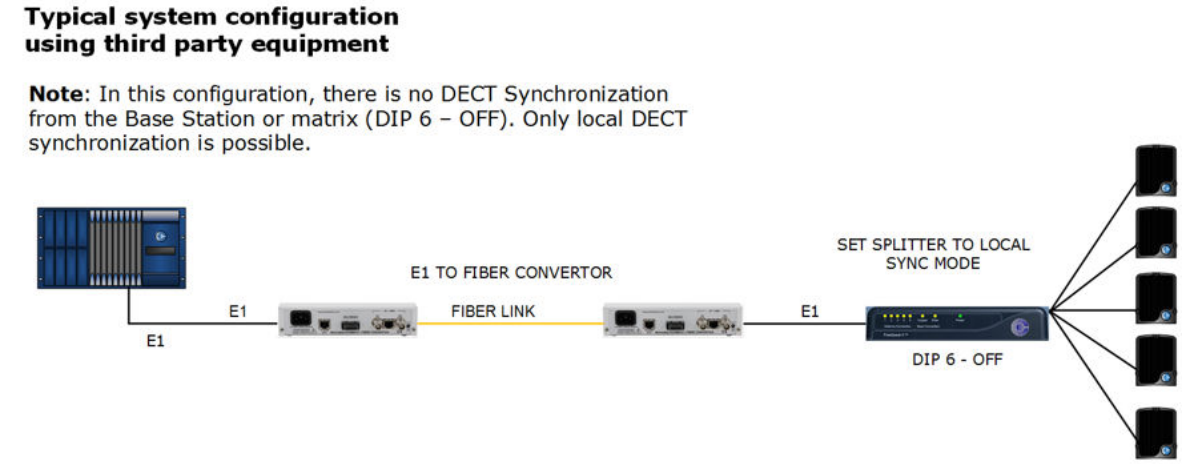
The FreeSpeak II Base transceiver splitter is a device that connects up to five transceivers to a FreeSpeak Base (both FreeSpeak I and FreeSpeak II, 1.9 and 2.4 systems) or an Eclipse matrix. Using the splitter, audio can be routed from the Base to transceivers either via Cat5/6 Ethernet cable (RJ45) or a Fiber connection.

4.1 Configuration using a splitter with Cat 5/6 RJ45 connection



4.2 Configuration using a splitter with fiber connection





The transceiver connections are switched between RJ45 and Fiber routing using dip switches set inside the splitter.

DIP switch settings (default in **BOLD**)	
1 to 5	Antenna ports 1 to 5 **ON** – Active OFF - Convert to Fiber
6	**ON** – Base Sync OFF – Local Sync
7	If 6 is switched to OFF **ON** – FreeSpeak II OFF – FreeSpeak I
8	ON – Update **OFF** – Normal operation

To access the DIP switches, remove the covering panel on the base of the splitter (two screws).

Note: When you change a DIP switch setting, you must re-power the unit for the change to have any effect.

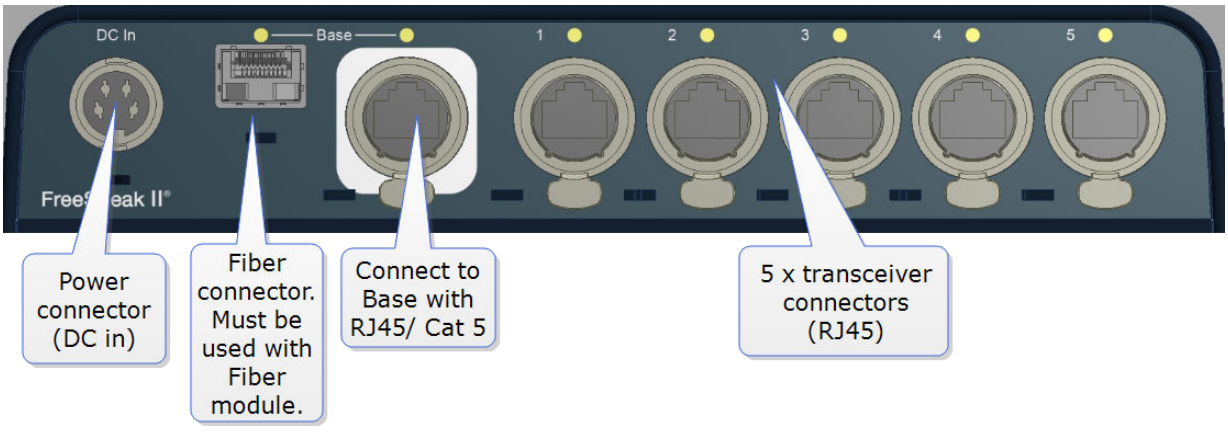
Note: *When using Fiber, you must install Fiber modules. See link below.*

Note: *When using the splitter with third party routing devices, transceiver synchronisation data is not passed. In this case, you need to set the splitter to 'local synch' mode. This is done by setting the splitter dip-switch no. 6 to OFF.*

For more information, see:

- Install Fiber modules (parts # HLI-SMFO, HLI-MMFO) on page 50
- Printable Splitter Quick Start Guide.pdf

4.3 Splitter (FSII-SPL) rear connectors

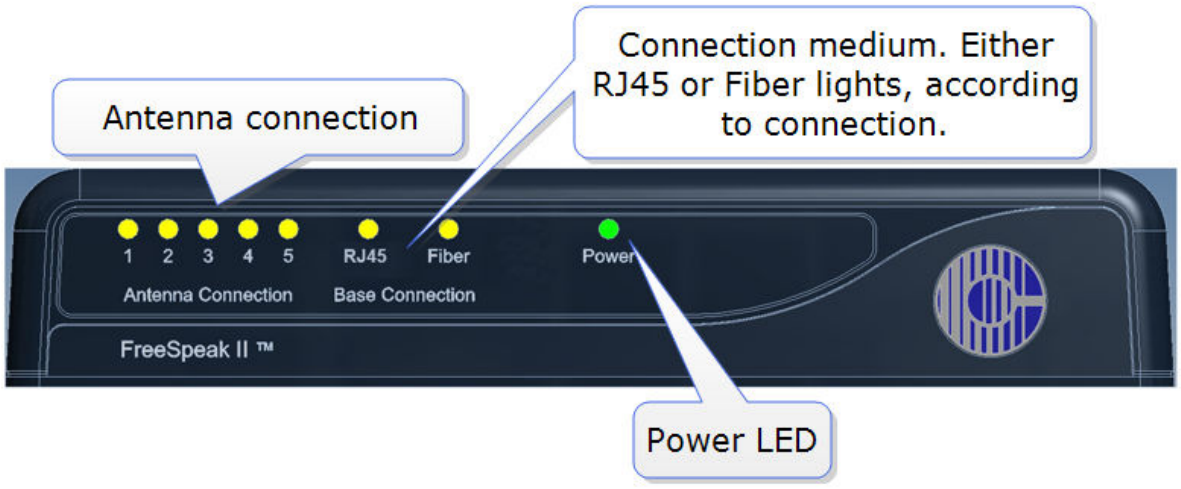


See also:

Splitter (FSII-SPL) front panel on page 50

Using the FreeSpeak II Base splitter (FSII-SPL) on page 47

4.4 Splitter (FSII-SPL) front panel



See also:

Splitter (FSII-SPL) rear connectors on page 49

Using the FreeSpeak II Base splitter (FSII-SPL) on page 47

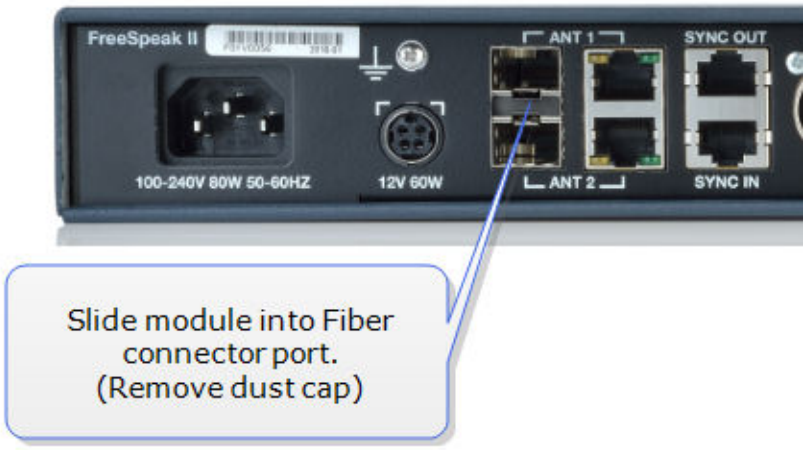
4.5 Using a transceiver with a fiber connection

You may wish to connect a FreeSpeak II Base to a splitter (FSII-SPL) using Fiber. In this case, you need to install Fiber modules to the Base and the splitter.

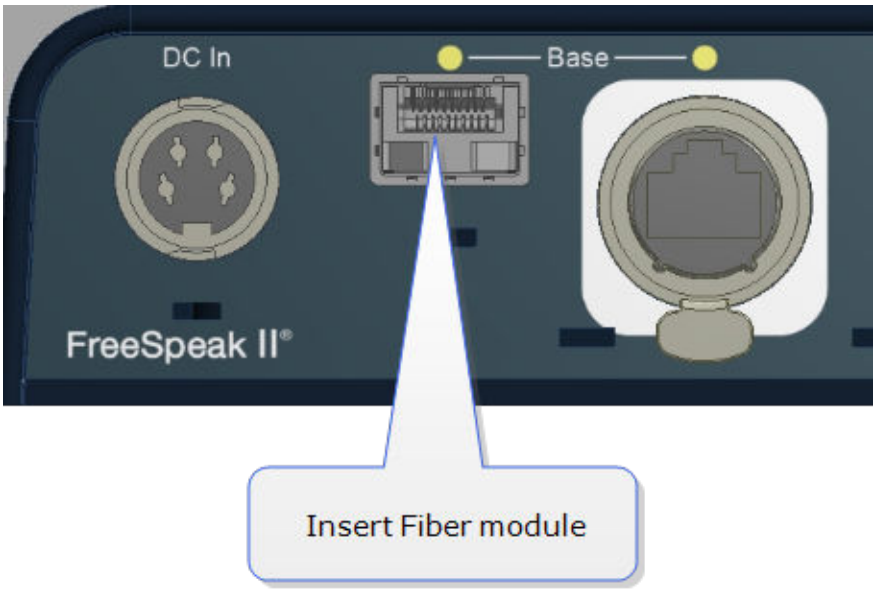
- Modules are available for single mode Fiber cable (HLI-SMFO) and multi-mode Fiber cable (HLI-MMFO)
- Modules are supplied as a pair, one for the Base Station and one for the splitter.
- Modules can be hot patched, no need to power off devices.

4.5.1 Install Fiber modules (parts # HLI-SMFO, HLI-MMFO)

Install Base Station Fiber module.

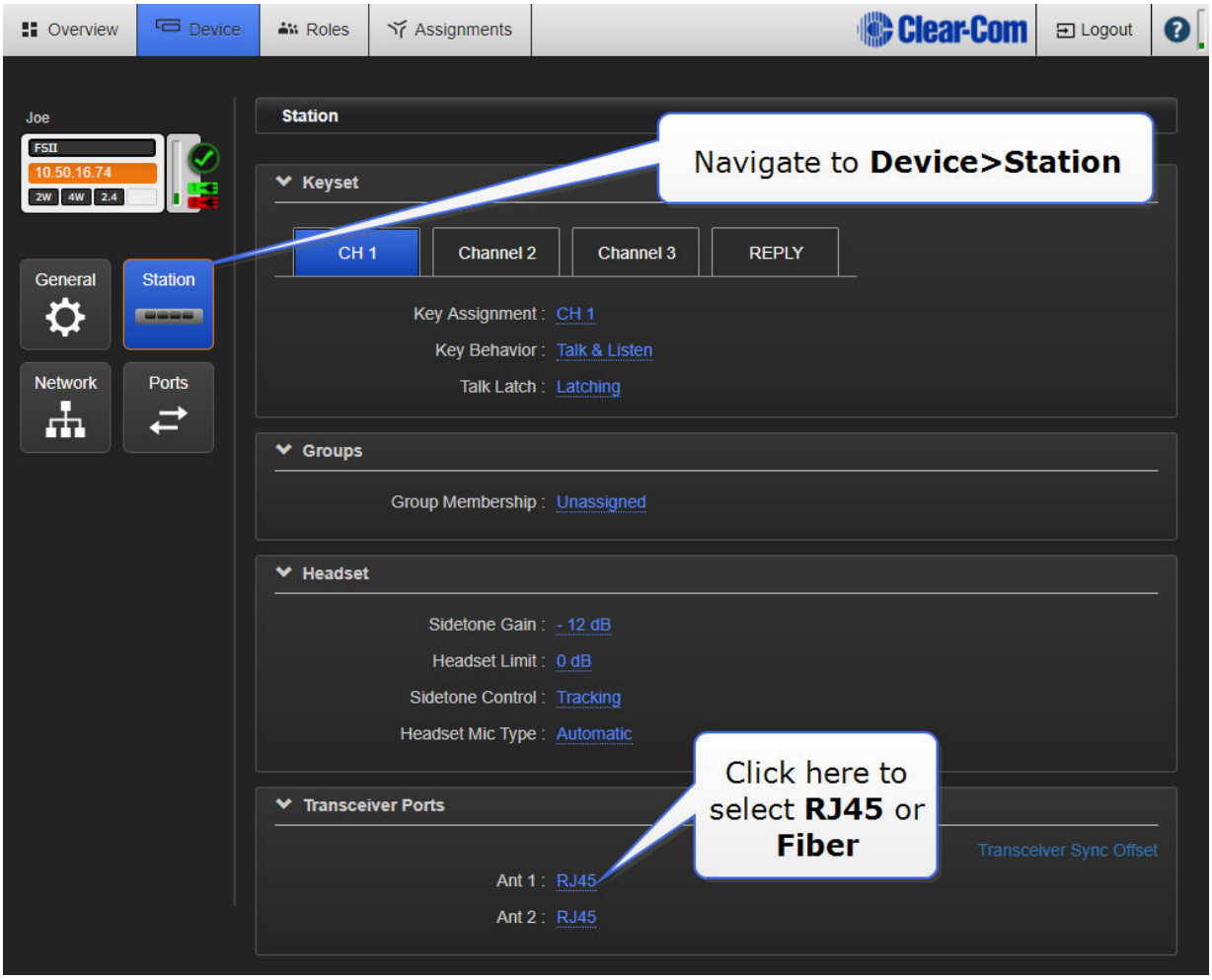


Install splitter Fiber module.



Once the modules are installed, the Base Station and the splitter can be cabled with the correct Fiber cable (single mode or multi-mode depending on existing cabling). You will see the **Base Connection** indicator on the front of the splitter change from **RJ45** to **Fiber**.

You must also set the transceiver port to Fiber in the Core Configuration Manager. Navigate to **Device>Station>Transceiver ports**.



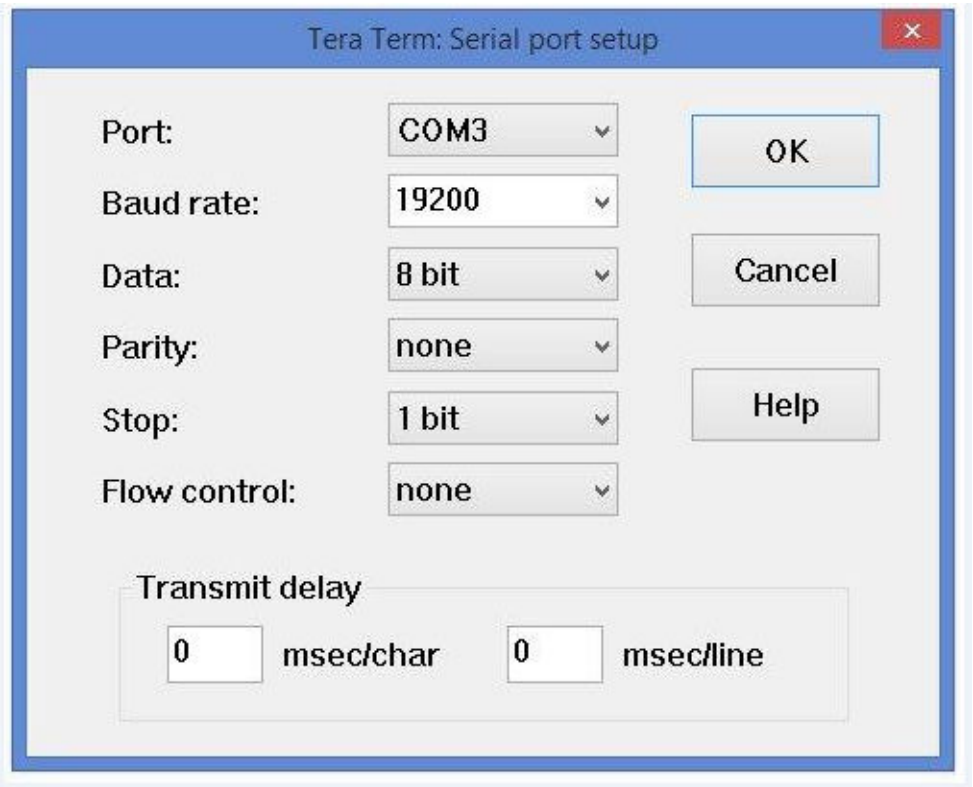
4.6 Splitter software version (FSII-SPL)

Splitter software is not usually user upgradable, but if necessary you can find out the splitter software version (usually for system diagnostic purposes) by connecting to the splitter with a PC and using a serial console emulator such as Tera Term.

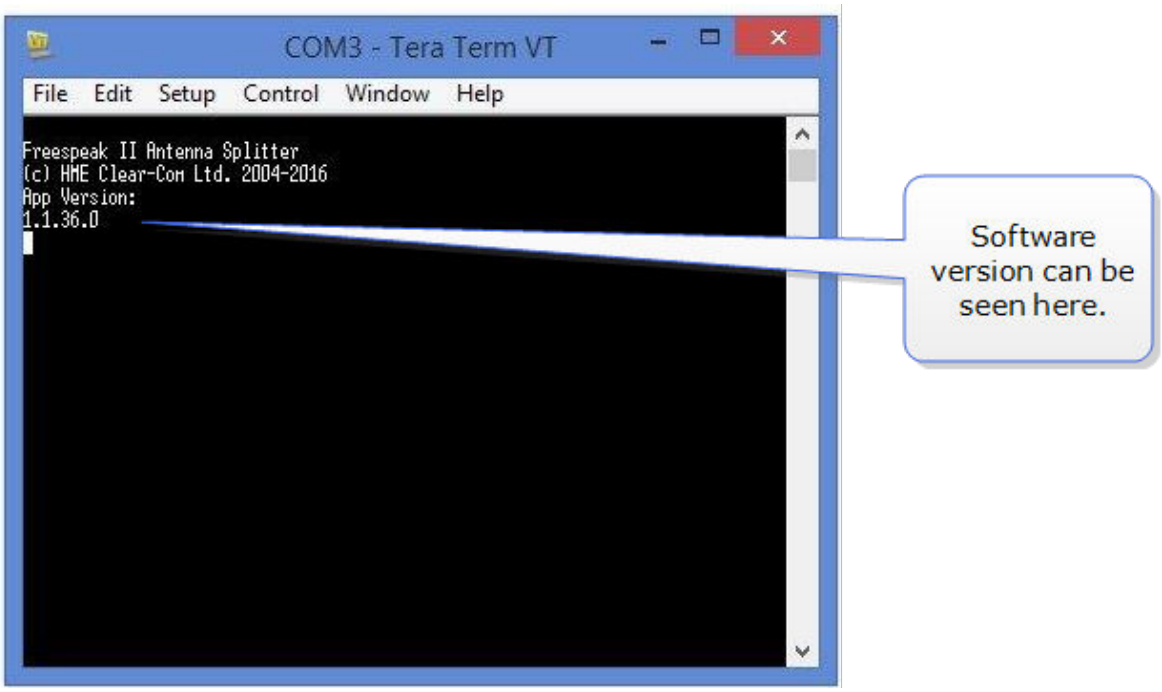
4.6.1 How to find out splitter software version

1. Remove the covering panel (two screws) on the base of the splitter to access a USB (micro) port next to the dip switch settings.
2. Connect the splitter to a PC using a USB A to micro B cable.
3. Allow windows to install a USB com port driver (this should be automatic).

4. Using a serial console emulator (such as Tera Term), input serial console settings.



5. Open the serial console. Press the space bar and the splitter will output its software version as shown.



5 Clear-Com cable recommendations

Use the following Category (Cat), American Wire Gauge (AWG) and shielded cable types:

5.1 Cable recommendations

Category (Cat)	• Higher Cat numbers will support a higher bandwidth. Therefore, by using a higher Cat number, you are future proofing your system to some extent. • Example: Cat 5; up to 1GB. Cat 6; up to 10GB. • Use Cat 5e or higher.
American Wire Gauge (AWG)	• The lower the AWG number, the less temperature rise there will be in the cable when using PoE. This is particularly important for bundles. Local building regulations may rule out the use of 26AWG or higher, depending on the installation. Check with your local building regulations. • Use AWG 24 or lower.
Shielded Twisted Pair (STP) or Foiled Twisted Pair (FTP)	Using shielded cable means less problems with interference from other sources. This means that your network will be more robust if you use shielded cables.
Overall Recommendation	Use Cat 6a 23 AWG STP cable.

6 Registering beltpacks

Wireless beltpacks must be registered to your Base Station before you can use them with the transceivers.

Roles must be available for beltpacks before you register them. Your system arrives with default Roles which can be used, or you can create your own.

There are two ways of registering beltpacks:

- Registering beltpacks using USB cable on page 56
- Register beltpacks over-the-air (OTA) on page 58.

Registering by USB cable is the quickest and easiest way.

6.1 Registering beltpacks

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There are two ways of registering beltpacks:

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- Register beltpacks over-the-air (OTA) on page 58.

Registering by USB cable is the quickest and easiest way.

6.2 Registering beltpacks using USB cable

You must have a USB A to micro USB B data cable and the beltpacks to hand before you start.

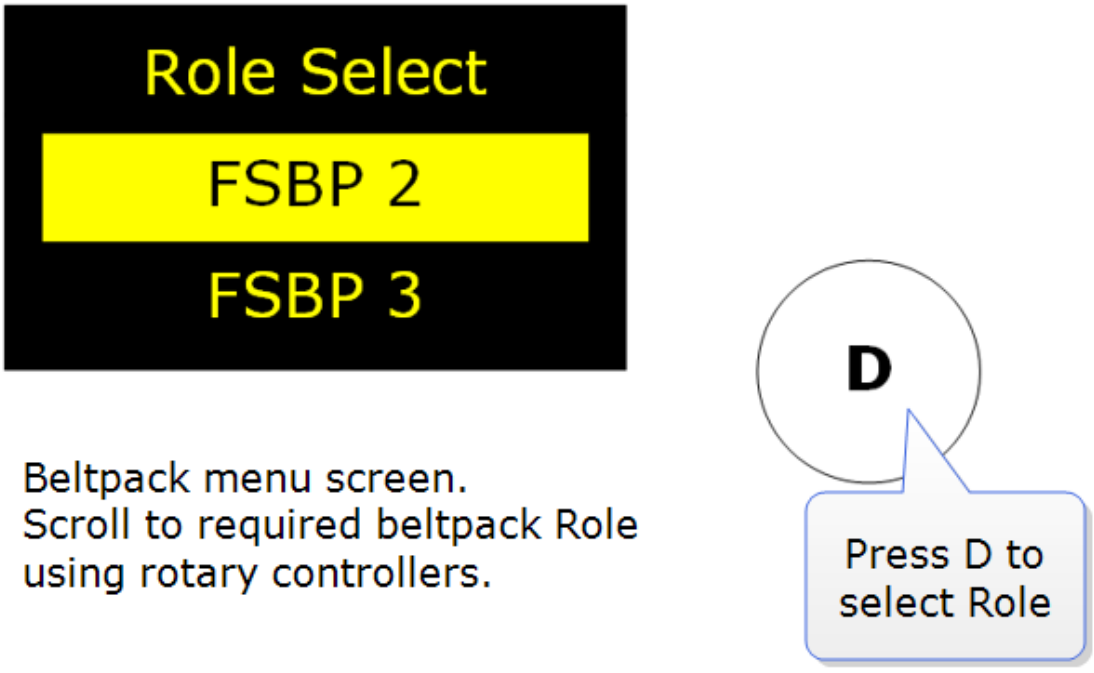
Note: *You cannot register beltpacks with a charging cable.*

1. Connect a beltpack to the Base Station using a USB A to micro USB B cable.

The beltpack can be powered on either before or after connection.

The Base Station will show 'Beltpack is now registered' in the front menu screens.

2. Select an available Role from the beltpack screen.



The beltpack is now registered and ready for use.

Note: *A Role can be fixed to a beltpack. If you fix a Role to a beltpack, the beltpack automatically selects the Role on powering.*

See also:

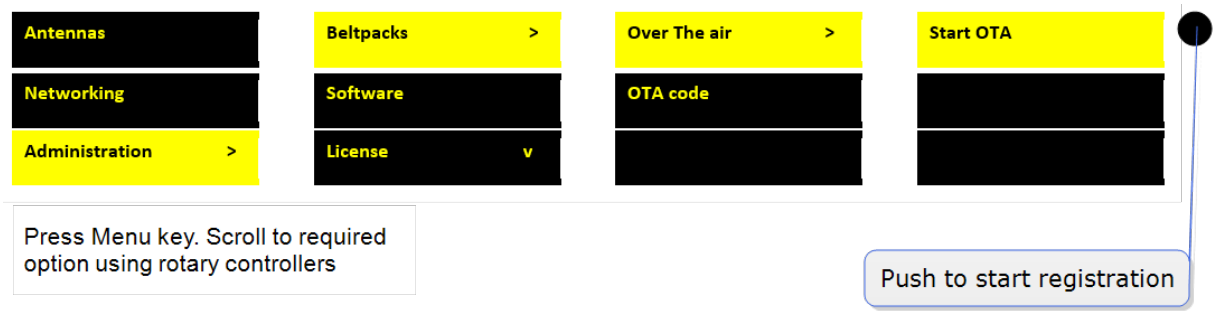
- Using Roles on page 79
- Unregister beltpacks on page 61

6.3 Register beltpacks over-the-air (OTA)

You can register beltpacks over-the-air from the CCM or the Base Station.

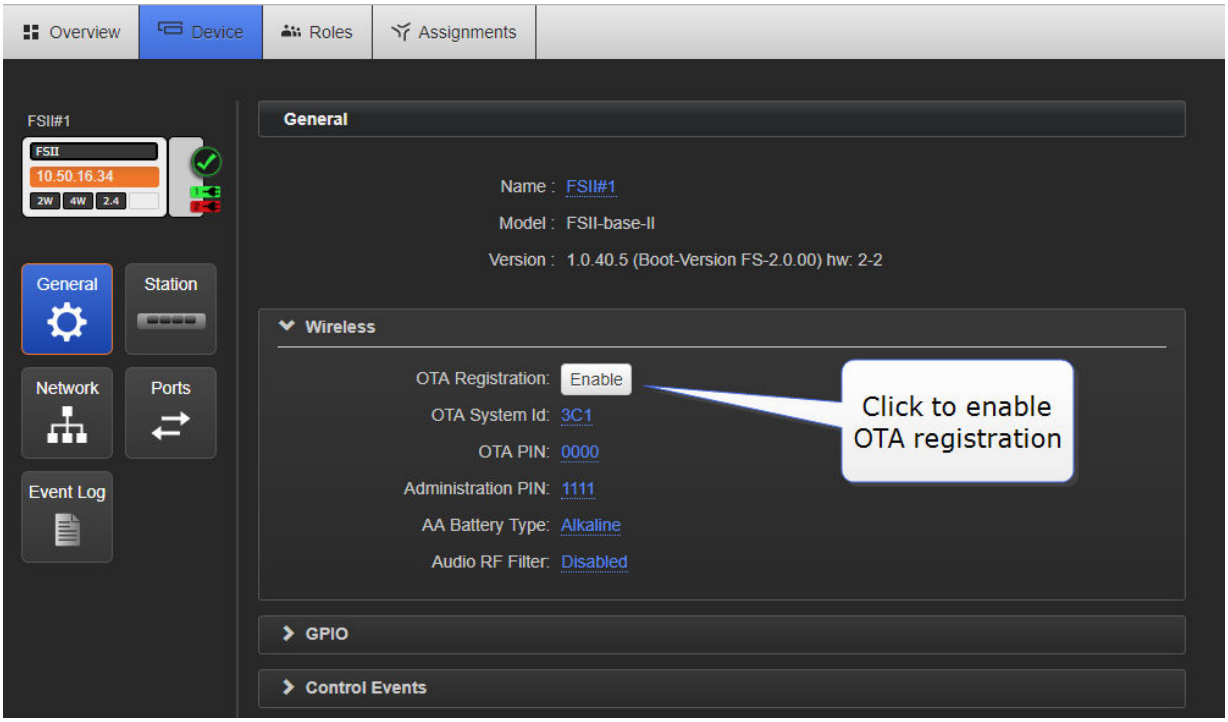
6.3.1 Start registration from the Base Station

Press the **MENU** button on the base and navigate to: **Administration>Beltpacks>Over The Air>Start OTA**. Press the rotary controller to start registration.



6.3.2 Start registration from the CCM

Connect to the CCM in a browser and navigate to **Device>General>Wireless**. Click the **OTA** button.



Note: *Registration mode has a two minute inactive time-out. This is so several beltpacks can be registered sequentially without the user having to re-enable registration mode.*

6.3.3 Connect to system

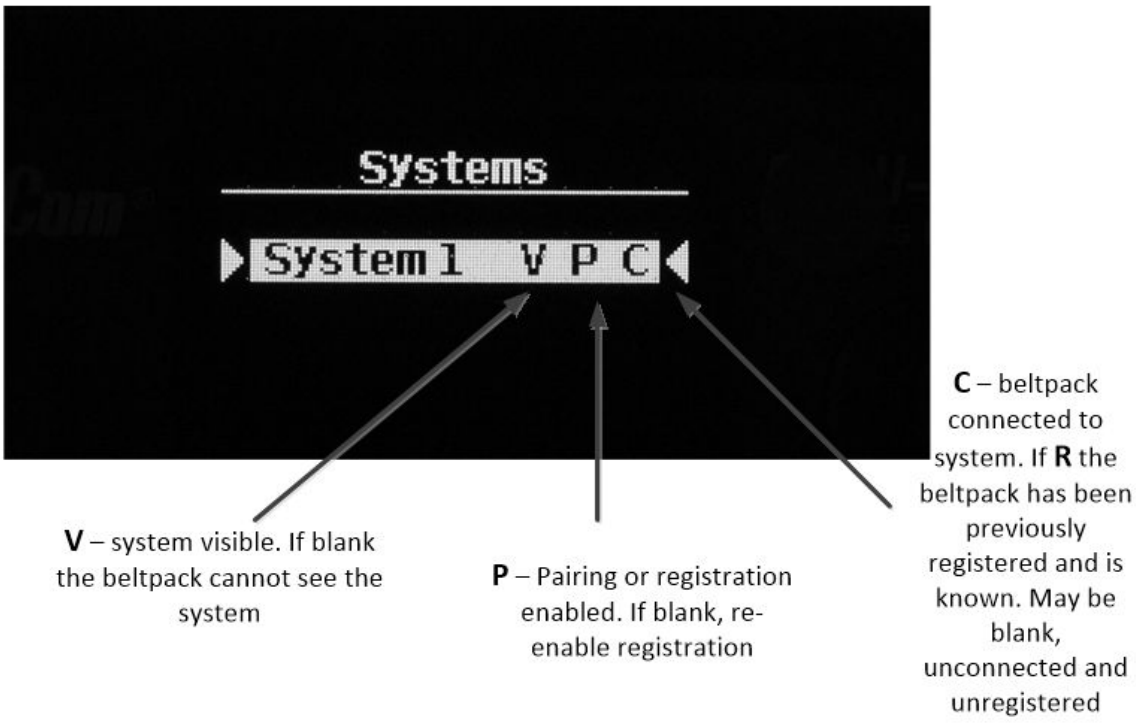
Note: *System = FreeSpeak II Base name.*

On the beltpack to be registered, hold the menu key for two seconds to enter **MENU** options. Scroll to **SYSTEM CONNECT** using the rotary controllers and select it using key **D**. In menu mode the **D** key on the beltpack operates as **SELECT** and the **C** key exits the menu level and cancels the selection.

Note: *On a new system there will be no previous connections at this point. However, if the beltpack is currently connected to an active system, a confirmation screen will appear. Select* ***Yes*** *to connect to a new system or* ***No*** *to remain connected to the current system.*

Available systems and previously registered systems will be visible on the beltpack menu screen.

To connect the beltpack to the system, the system must be visible (**V**) and in registration (pairing) mode. If the system is not in registration mode (**P** visible), registration should be re-started (Step 1).



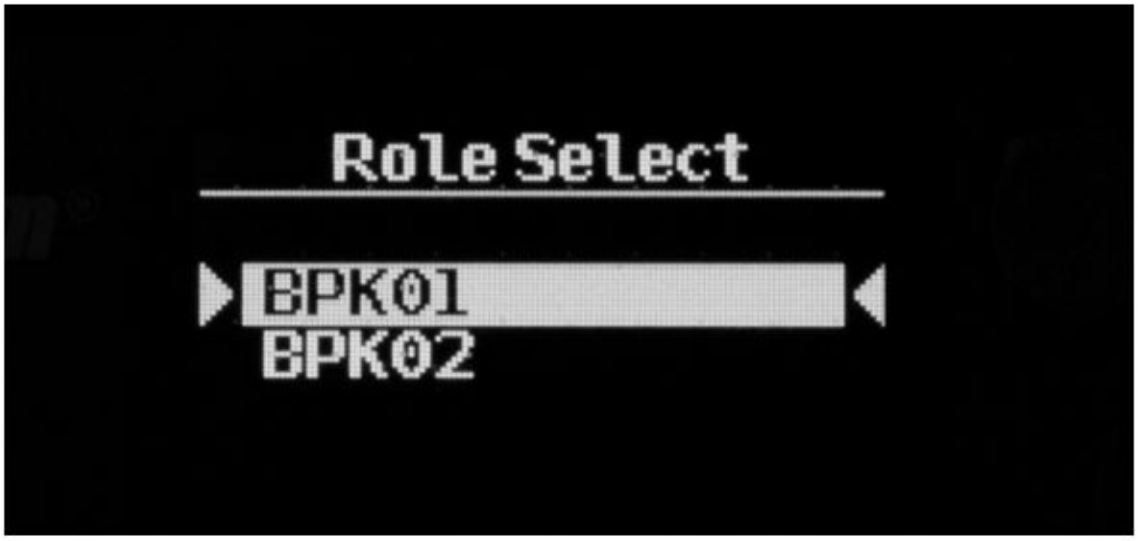
Connect the beltpack to the system using key **D**.

6.3.4 Enter pairing code

Enter the four digit pairing code for the system using both rotary controllers and the menu select key (**D**). The default code is 0000.

Note: *The O.T.A. pin code is available from the Base Station menus and the CCM. See* ***Administration/Beltpacks*** *on the Base Station,* ***Device/General/Wireless*** *in the CCM.*

Select an available Role from the list displayed on the beltpack



(Key **D** = SELECT)

The timer to enable registration is now re-started so another beltpack can be registered if required (step 2).

The beltpack is now registered and ready for use. If required another beltpack can be registered (step 2). A Role is associated with the beltpack until it is changed (from the CCM, Base Station menus or the beltpack itself). See **Roles**.

Note: *All system changes are live.*

See also:

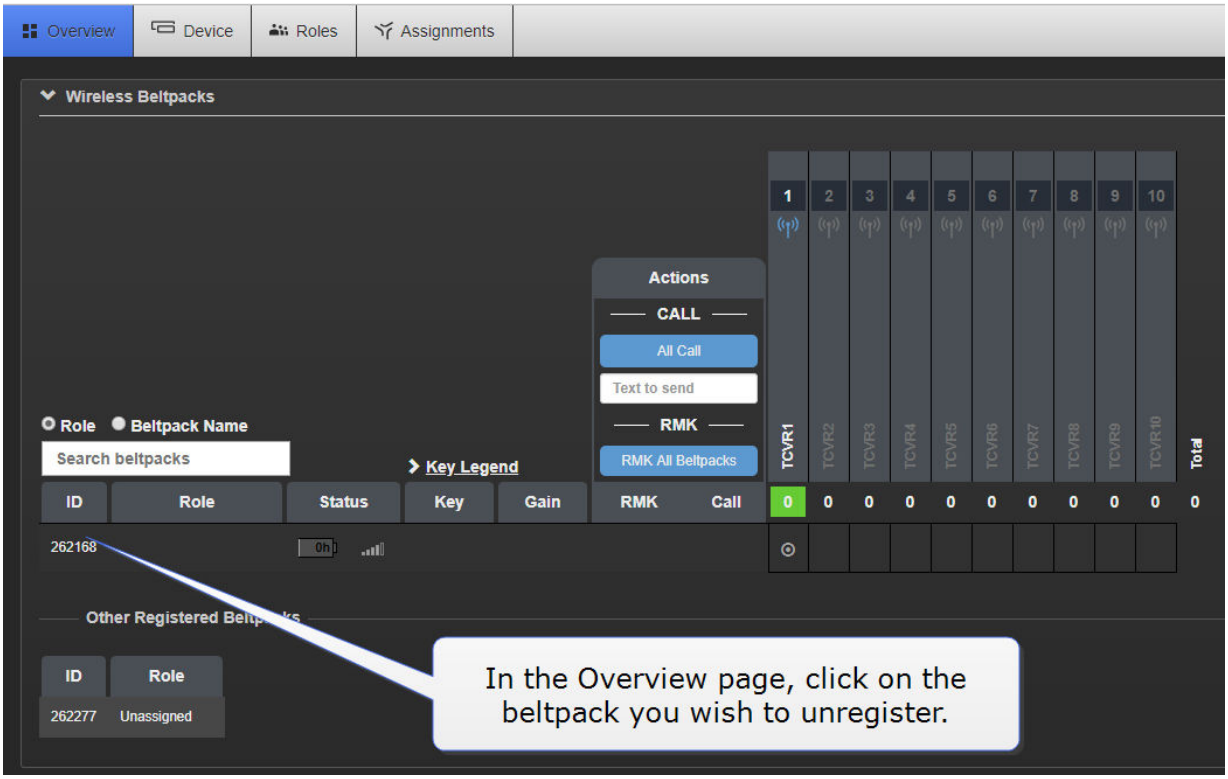
Unregister beltpacks on page 61

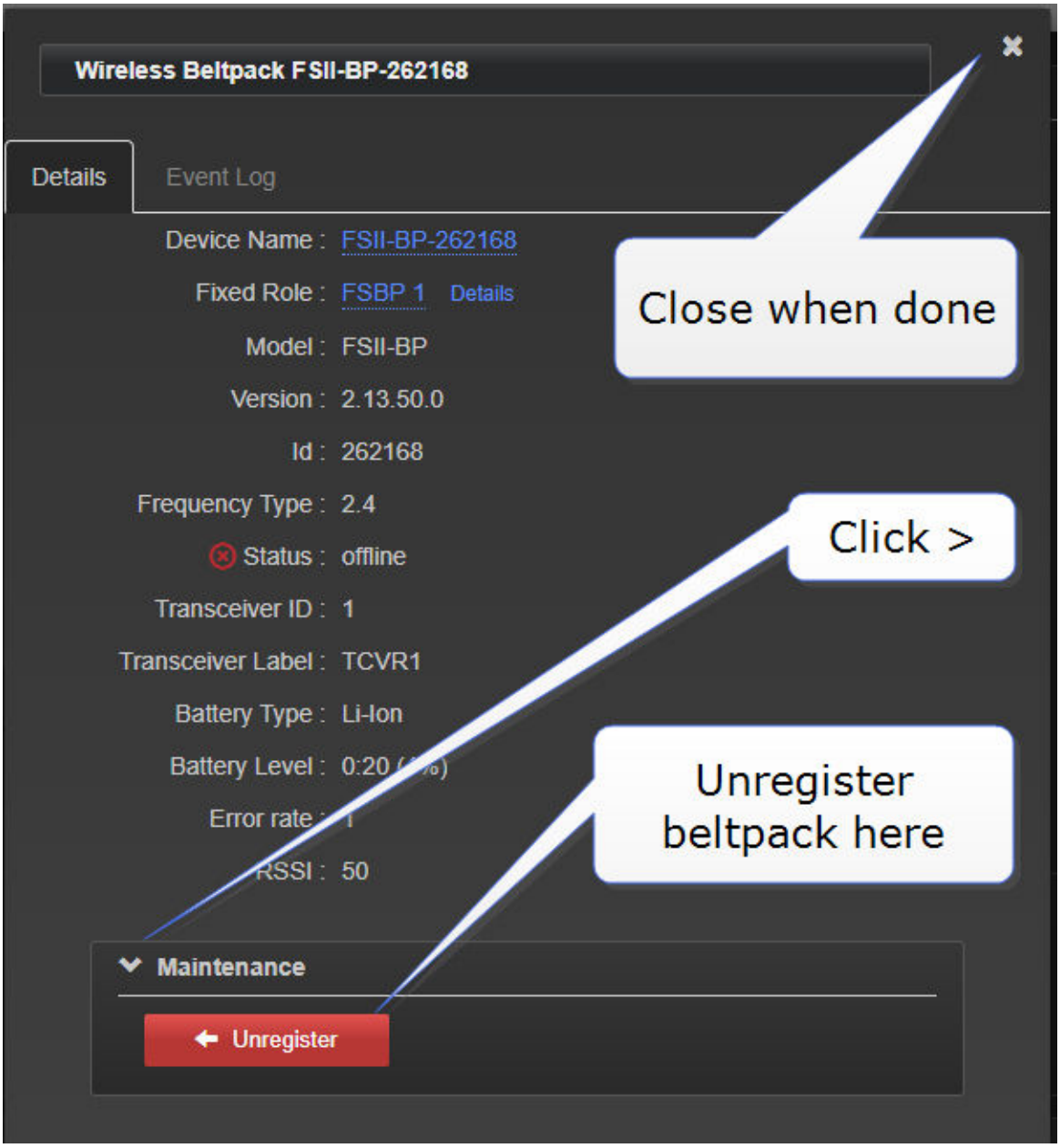
6.4 Unregister beltpacks

Sometimes, you might want to unregister beltpacks from the Base. This is generally for housekeeping and security reasons. For example, you work with two separate studios that both use wireless beltpacks and need to be confidential.

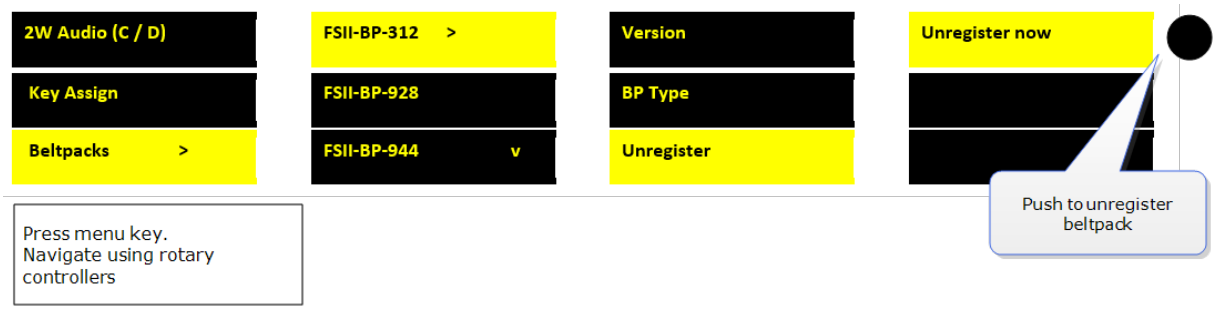
Beltpacks can be unregistered from the Base either in the CCM or from the Base front menu screens.

6.4.1 Unregister beltpacks in the CCM

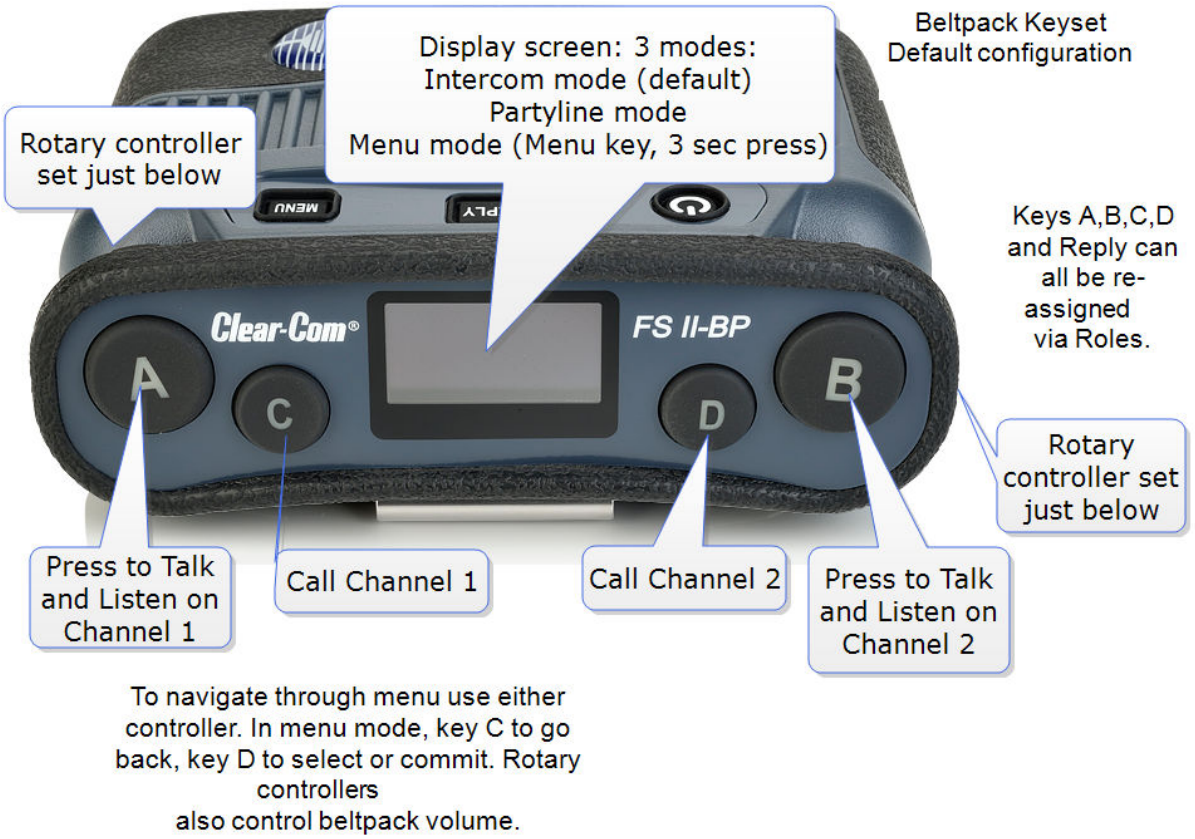




6.4.2 Unregister beltpacks from the Base menu screens



7 Using beltpacks



- Beltpacks are always configured using a Role. See **Using Roles on page 79**.
- Before they can be used, wireless beltpacks must be registered to the Base Station. This is done either via USB or over-the-air (OTA). See **Registering beltpacks on page 56**.
- See **Configuring audio routes in FreeSpeak II Base on page 98**
- See **Unregister beltpacks on page 61**
- See **Powering your system on page 21**
- See **Beltpack settings on page 65**

7.1 Beltpack settings

Note: *The default settings are shown in **bold**.*

7.1.1 Keyset (audio assignment)

This table shows what can be programmed to each FSII-Base beltpack key

	Key A	Key B	Key C	Key D	Reply
Key Assignment	**Channel 1** Channel 1 - 12 Groups 1 - 12 Role 1 - XX (where XX is the number of Roles available) Ports: PRGM, SA, Headset, 2W Partyline 1 - 4 , 4W digital partyline 1 - 4	**Channel 2** Channel 1 - 12 Groups 1 - 12 Role 1 - XX (where XX is the number of Roles available) Ports: PRGM, SA, Headset, 2W Partyline 1 - 4 , 4W digital partyline 1 - 4	**Call Channel 1** Channel 1 - 12 Groups 1 - 12 Role 1 - XX (where XX is the number of Roles available) Ports: PRGM, SA, Headset, 2W Partyline 1 - 4 , 4W digital partyline 1 - 4	**Call Channel 2** Channel 1 - 24 Groups 1 - 12 Role 1 - XX (where XX is the number of Roles available) Ports: PRGM, SA, Headset, 2W Partyline 1 - 4 , 4W digital partyline 1 - 4	**Reply** Channel 1 - 12 Groups 1 - 12 Role 1 - XX (where XX is the number of Roles available) Ports: PRGM, SA, Headset, 2W Partyline 1 - 4 , 4W digital partyline 1 - 4
Key Behavior	Talk only, Listen only,Talk and Listen, Dual Talk and Listen,Forced Listen,**Talk and Forced Listen**	Talk only, Listen only,Talk and Listen, Dual Talk and Listen,Forced Listen,**Talk and Forced Listen**	Varies, according to how key has been programmed	Varies, according to how key has been programmed	**Talk only** Listen only,Talk and Listen, Dual Talk and Listen,Forced Listen, Talk and Forced Listen
Talk Latch	**Latching**/Disabled	**Latching**/Disabled	**Latching**	**Latching**	Latching/**Disabled**

This table shows what can be programmed to each FSII-Base beltpack key					
			/Disabled	/Disabled	

7.1.2 General settings

Description	Enter description for Role (optional)
Display brightness	**Very low** - Very high
Dimmed tallies	**Enabled**/Disabled
Latch Disabled	Enabled/**Disabled**
Reply Auto-Clear	1 - 60 secs (**10 sec**)
Display Dim timeout	5 - 120 secs (**30 sec**)
Display Off timeout	5 - 120 secs (**30 sec**)
Listen Again timeout	Off, 1 -240 mins (**240 mins**)
Listen Again record	Off, 1 - 15 secs (**15 secs**)

7.1.3 Gain and level options

Type of Gain	Range
Input Gain	15 dB tto -70 dB (**0 dB**)
Output Gain	15 dB to -70 dB (**0 dB**)
Line-In Volume	6 dB to -15 dB (**0 dB**)
Master Volume	-o.4 dB to -69.9 dB (**0 dB**)

Type of Gain	Range
Min Master Volume	**Off**, -24.9 dB, -11.0 dB, - 6.0 dB

7.1.4 Headset

Headset setting	Range
Headset Limit	8 dB to -12 dB (**0 dB**)
Sidetone Level	0 dB to -24.9 dB (**0 dB**)
Mic Echo Cancellation	**Disabled**/Enabled

7.1.5 Menu access

Level/mode	Settings
Menu Access Level	Advanced/**Normal**/Basic/None
Display Mode	**Intercom Mode**/Partyline Mode
Master Volume Mode	**Talk Keys**/Master Volume

7.1.6 Alarm options

Alarm type	
Battery Alarm Mode	**Vibrate & Audible**/Vibrate Only/Audible Only/Off
Low Battery Threshold	0% to 100% (**10%**)
Call Alert Mode	Vibrate & Audible/Vibrate Only/Audible Only/**Off**
Out Of Range Alarm	**Audio Only**/Off

7.1.7 Logic input options

Logic input	Function
Logic input 1	**No function**
	Activate A, B, C or D key
	Activate Reply key
	Activate configured action
	Activate all pre-selected talk keys
Logic input 2	**No function**
	Activate A, B, C or D key
	Activate Reply key
	Activate configured action
	Activate all pre-selected talk keys

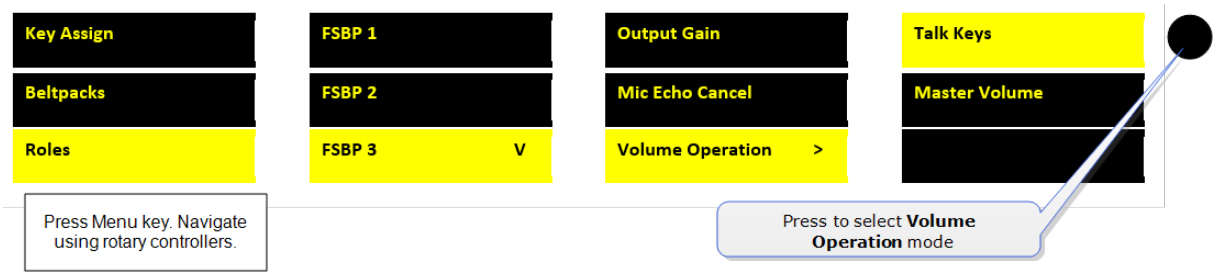
7.2 Volume Operation

Volume operation on beltpacks can be set according to user preference. Control volume operation via the beltpack's Role.

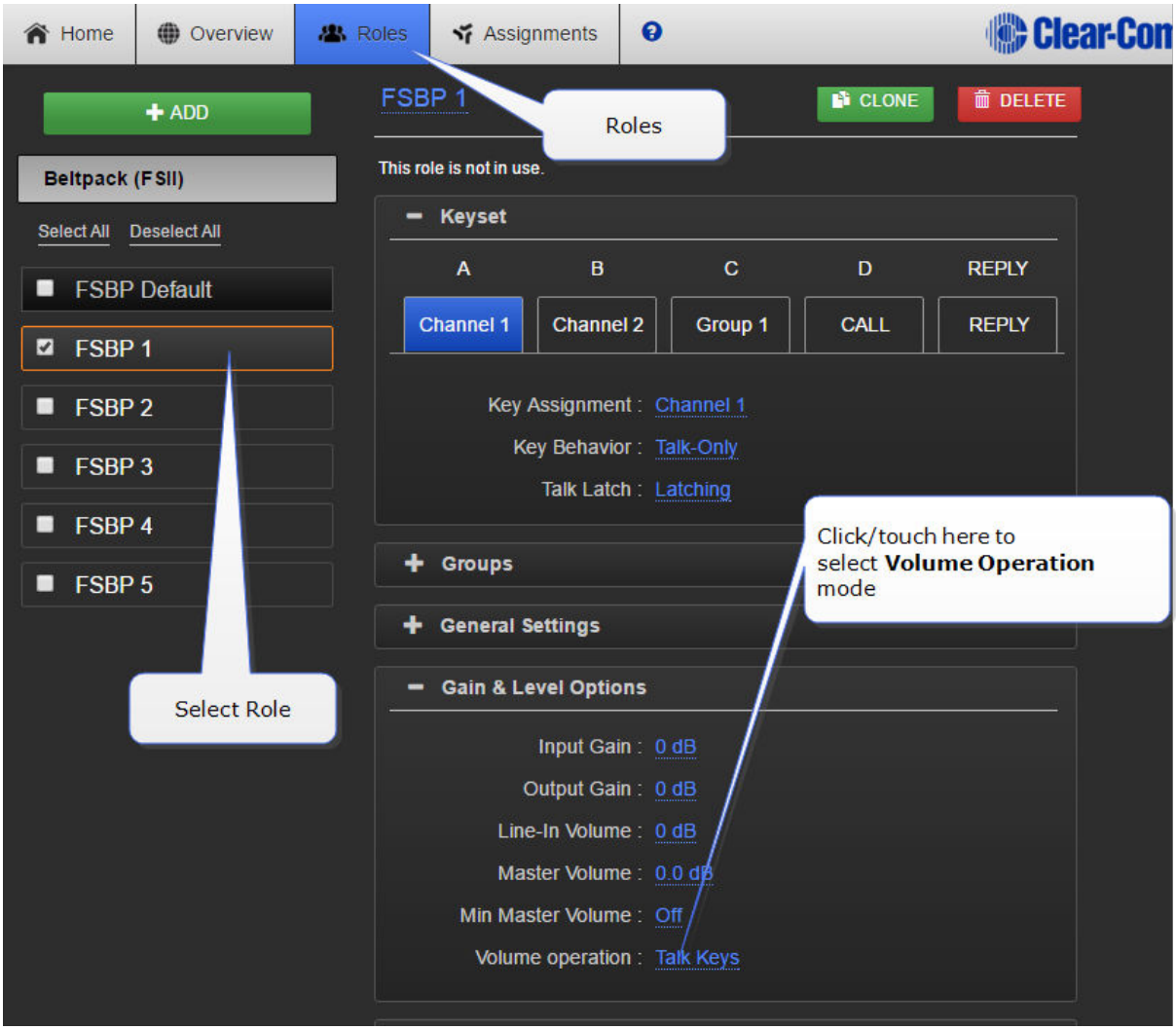
Volume Operation mode	
Master Volume	Rotary controllers adjust volume on all 5 beltpack keys
Talk Keys	Left rotary controller adjusts volume on A & B, right rotary controller adjusts volume on C & D.

7.2.1 How to control Volume Operation on beltpacks

Set Volume Operation from the Base station



Set Volume Operation in the CCM



Note: *Volume Operation can also be set from the beltpack menu. Press and hold the menu button on the beltpack to access menu options.*

7.2.2 Volume control on keys A & B, and D & C

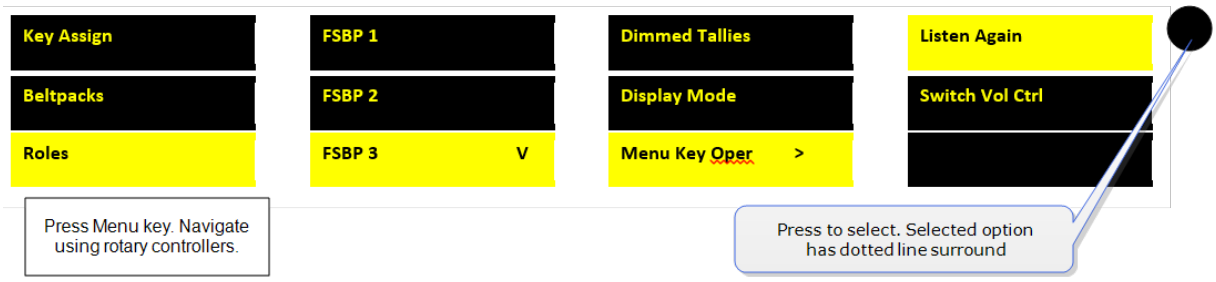
In addition to the **Volume Operation** control feature, you can set the beltpack menu button to adjust how the volume controls work.

A quick tap on the **menu** button can perform two different functions.

Menu Key Operation (quick tap)	
Menu Key Operation mode 1 (default)	trigger **Listen Again**
Menu Key Operation mode 2	Toggle rotary control volume adjust between **A** & **B**, and **C** & **D**. A beep will sound when controllers are switched. Toggle to C & D has a 10 second inactive timeout.

To use this function, navigate to **Menu Key Operation** in **Roles**.

Set Menu Key Operation from the Base station.



7.3 Menu Key Operation

The **menu** button on beltpacks has several functions.

- A two second press allows the user to enter menu mode.
- A quick tap on the button can be configured in two different ways by setting 'menu key operation' in **Roles**. This quick tap functionality is called '**Menu Key Operation**'.

Menu Key Operation has two settings:

- Trigger **Listen Again** (replays the last call to the beltpack).
- Switch volume control (A & B, C & D). **This is the default setting**.

Toggle beltpack rotary volume controls between A & B and C & D

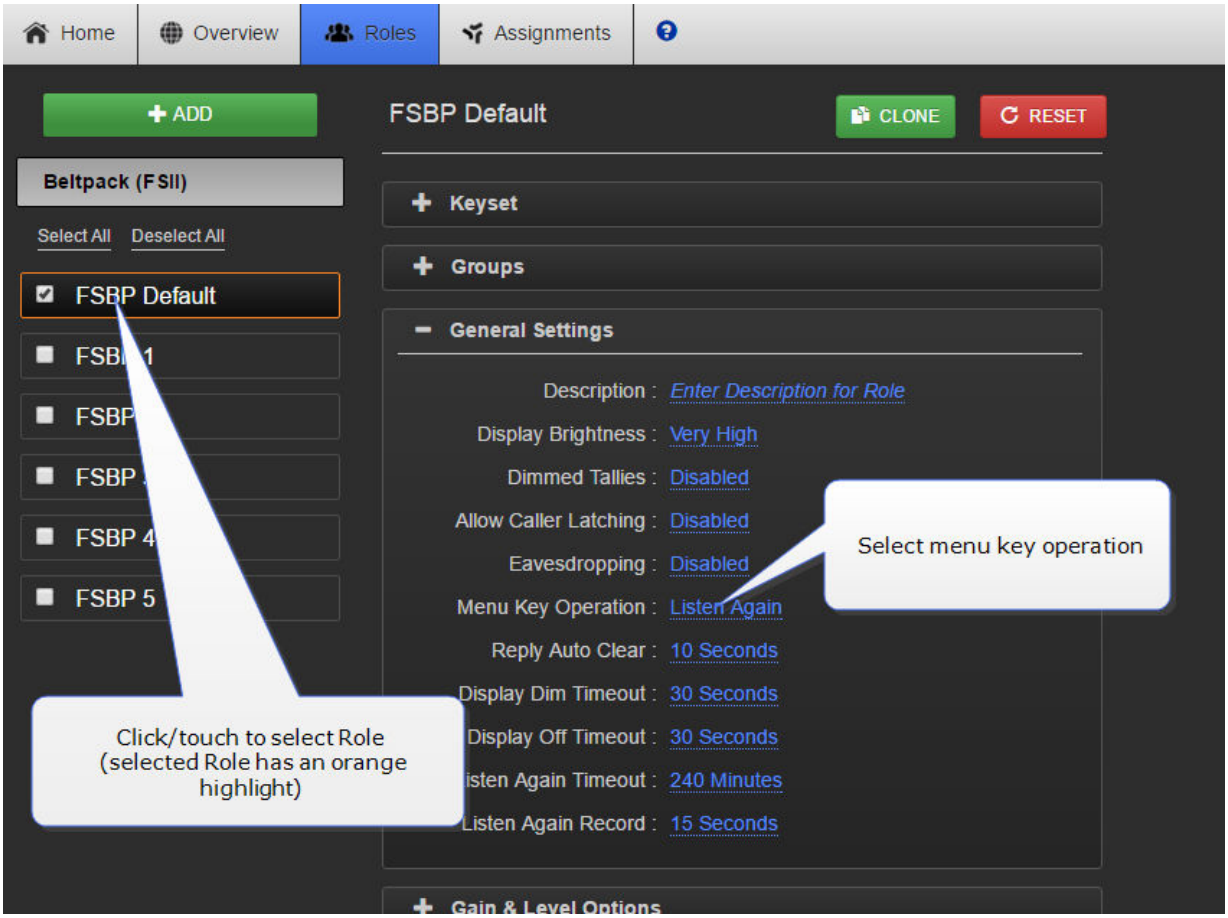
This feature allows the user to toggle rotary volume control between keys A & B, and C & D using a quick tap of the menu button. This is helpful if you have different audio sources assigned to each key.

This mode has a 5 second inactive time-out, after which time to rotary controllers will revert to controlling volume on keys A & B. To re-activate this mode in order to adjust C & D, use another quick tap of the menu key. To switch quickly between A & B and C & D, tap the menu key to toggle.

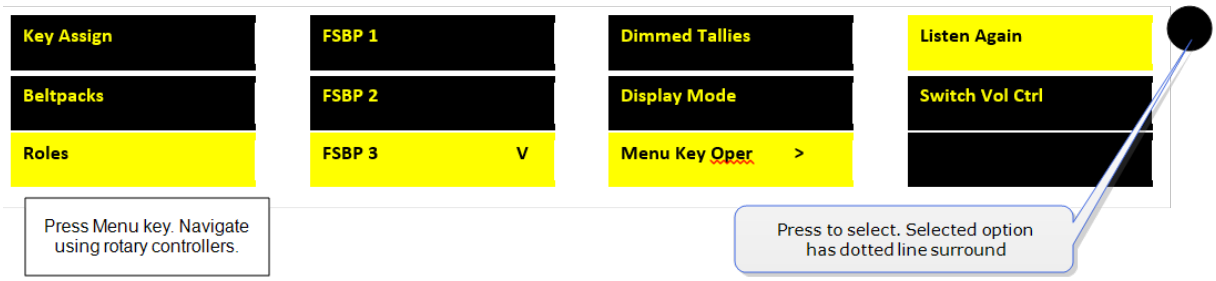
7.3.1 Set Menu Key Operation

This feature can be set under **Roles** in the CCM, from the Base Station front menus and from the beltpack itself (advanced menu options).

Set menu key operation in the CCM



Set menu key operation from the Base Station menus



- Set menu key operation from the beltpack: **Menu>Settings>Menu Key Oper**.The beltpack must have advanced menu options enabled (**Roles>Select Role>Menu access)**.

7.4 Master volume low level limiter (beltpacks)

This feature sets a low level limit in order to **prevent** beltpacks from being turned down so low they cannot be heard.

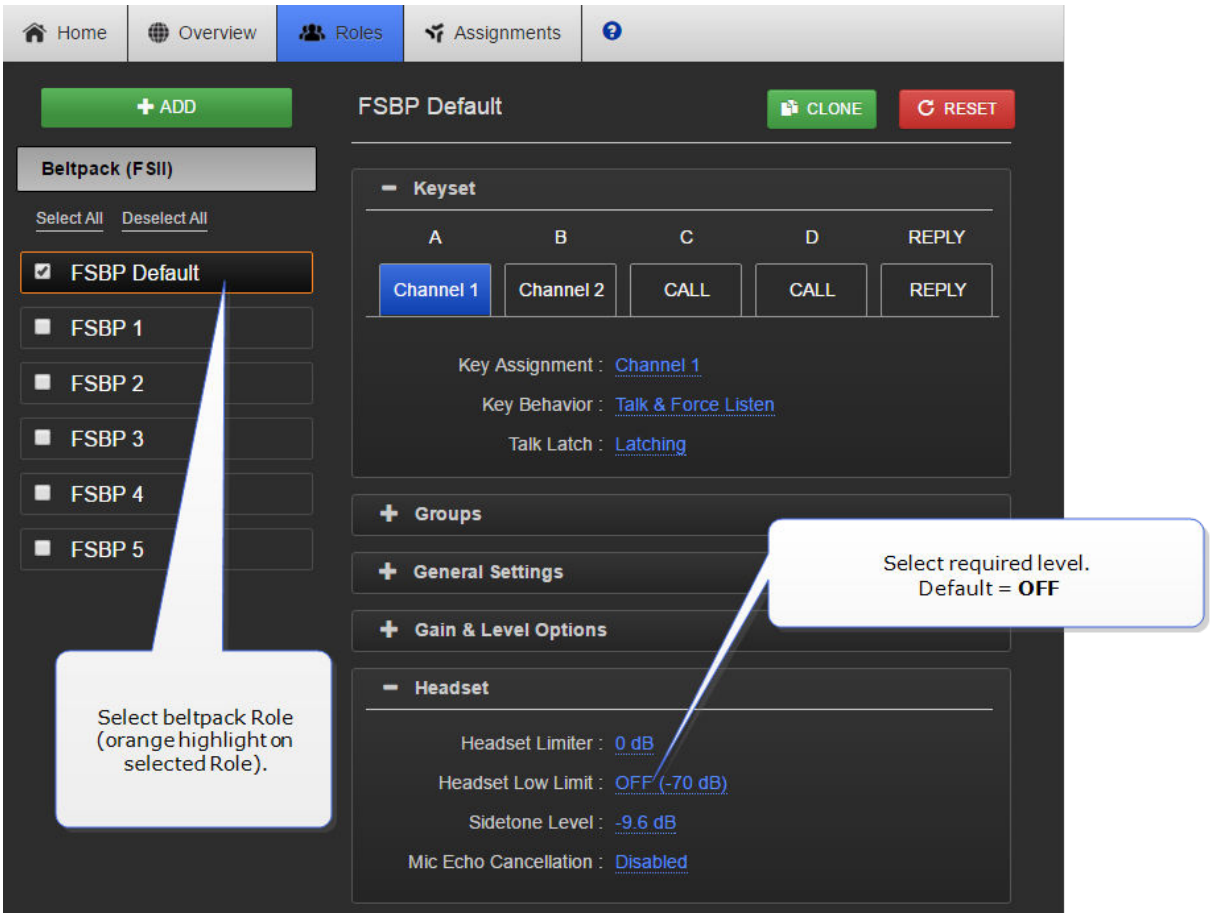
How this feature is used depends on your preferred working practice: it is possible to turn the volume on the beltpack down so low that all audio is inaudible. This can cause confusion among the unwary, although some users may want to turn the volume down completely on occasion.

Values: , -6, -12, -21, **-70 OFF**. Default value = **-70 OFF**. If OFF, audio can be turned down so low it cannot be heard at all.

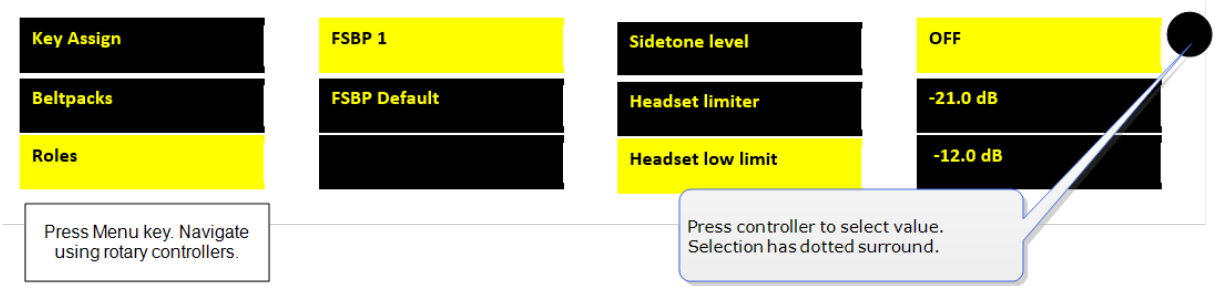
7.4.1 Set beltpack low level limit

The low level limiter feature is set in **Roles**, from the CCM, The Base Station menus or from the beltpack itself.

Set the low level limiter in the CCM



Set the low level limiter from the Base Station menus



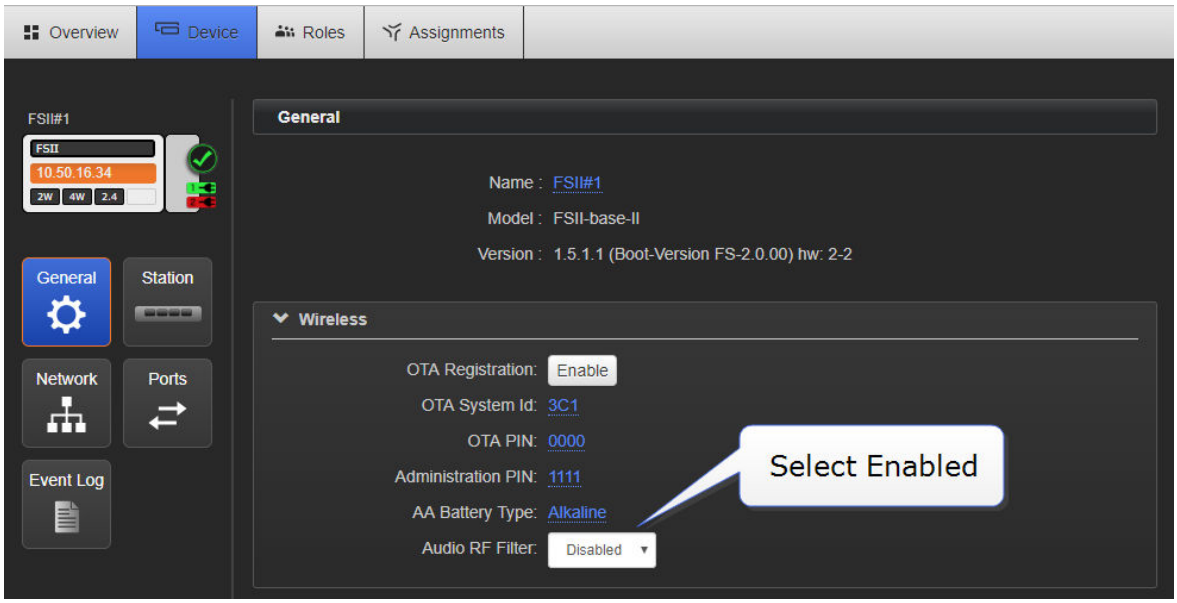
- Set low level limiter on a beltpack: (**Menu>Settings>Headset Options**). The beltpack must have advanced menu options enabled (**Roles>Select Role>Menu access**).

7.5 Set the audio RF filter

The audio RF filter provides audio packet filtering. This setting may help if you experience audio drop-outs in your system.

To enable or disable the audio RF filter:

1. Navigate to **Device > Wireless > Audio RF Filter**.



2. Select **Enabled** or **Disabled**.

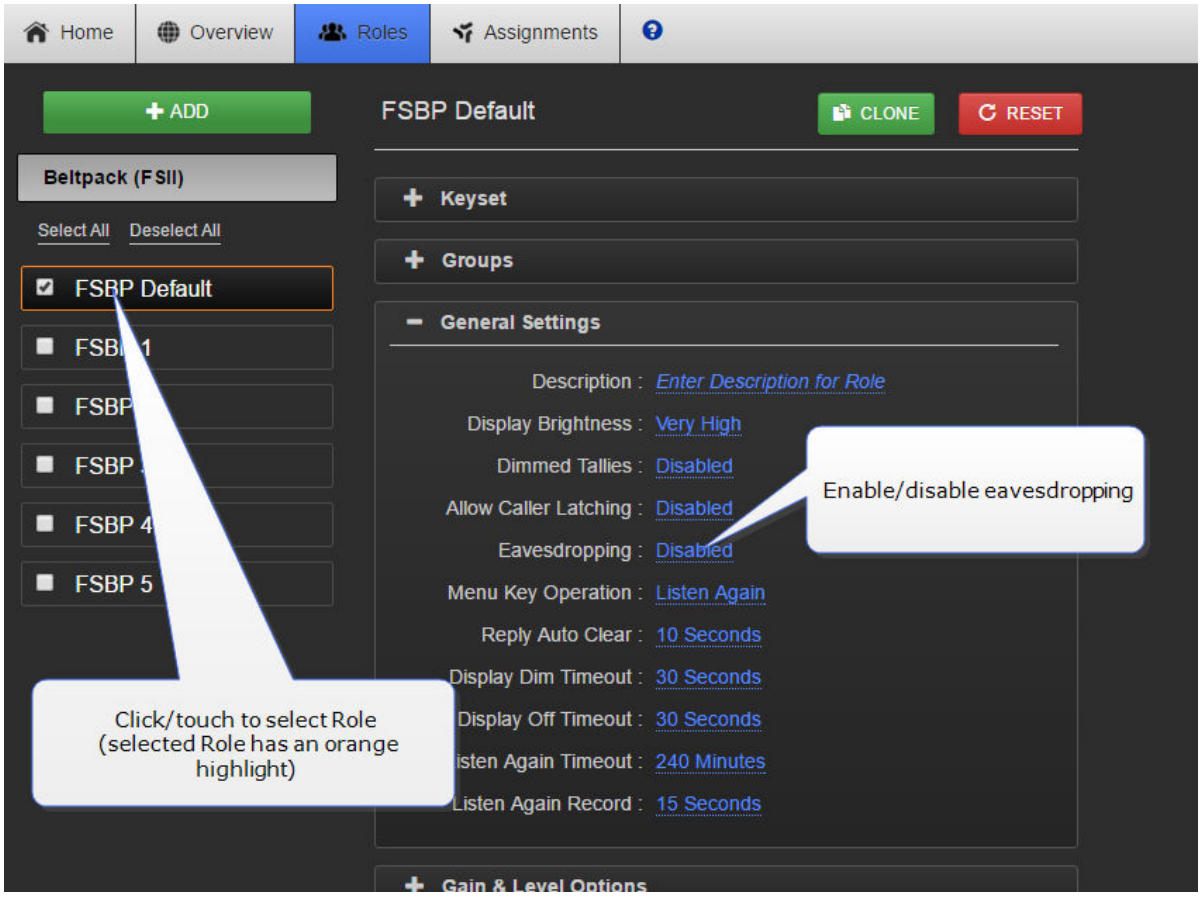
7.6 Configurable eavesdropping

Releases of FreeSpeak before FreeSpeak II Base left the beltpack mic permanently open, meaning that audio coming from the beltpack could be listeneed to even if the user had no active talk routes. This feature can now be configured as required for each beltpack/Role in your wireless system.

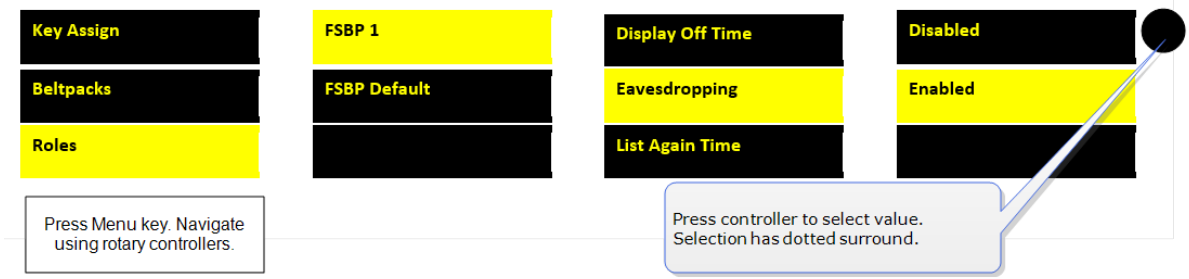
The default for FreeSpeak II Base and above is **Eavesdropping disabled**. However, earlier versions will revert to **Eavesdropping enabled**, the headset mic will remain open.

7.6.1 How to set Eavesdropping function on beltpacks

Set eavesdropping function in the CCM



Set eavesdropping function from the Base Station menus



7.7 AA Battery Type: **Alkaline** /NiMh

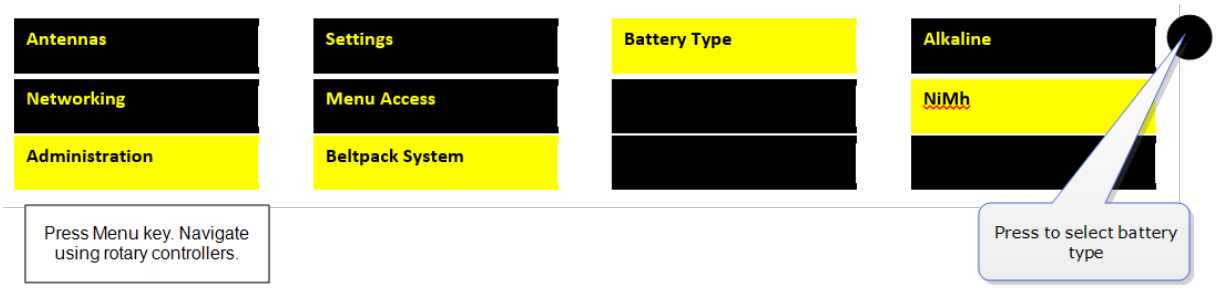
FreeSpeak II wireless beltpacks are supplied with Li-ion batteries and battery charger. However, in some cases you may wish to use AA batteries. Alkaline batteries can be used as a quick, easily available replacement. NiMH batteries can be used in environments (for instance, high atmospheric/hyperbaric) where Li-ion batteries are prohibited.

When using AA batteries of either kind, it is helpful to set battery type so that battery capacity can be monitored accurately. NiMH batteries and alkaline batteries have different discharge patterns and setting this option will allow for that.

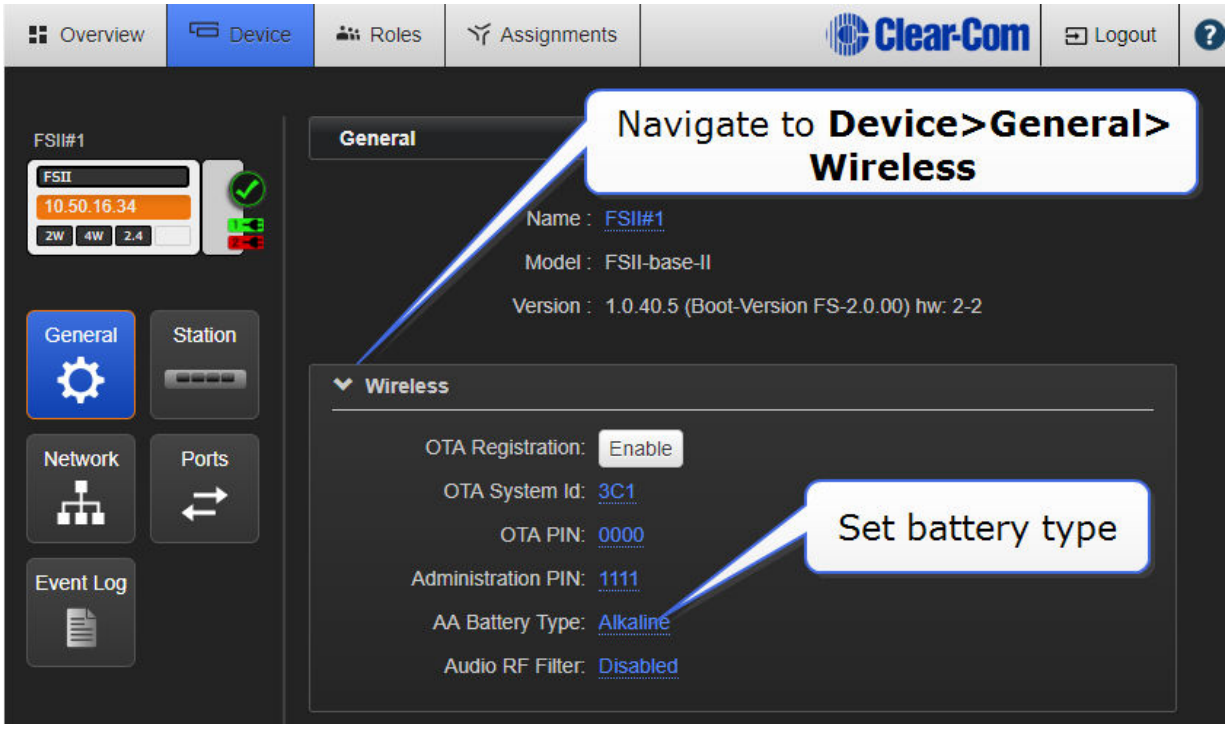
Default AA battery type = Alkaline.

7.7.1 How to set AA Battery Type

Set AA battery type from the Base station menus



Set AA battery type from the CCM



7.8 Accessing beltpack Admin menu

To access the beltpack Admin menu:

1. Press and hold the **Menu** button on the beltpack for two seconds.
2. Navigate to **Settings > Admin options**.

3. Enter the pin code: **1111**

The Admin menu appears.

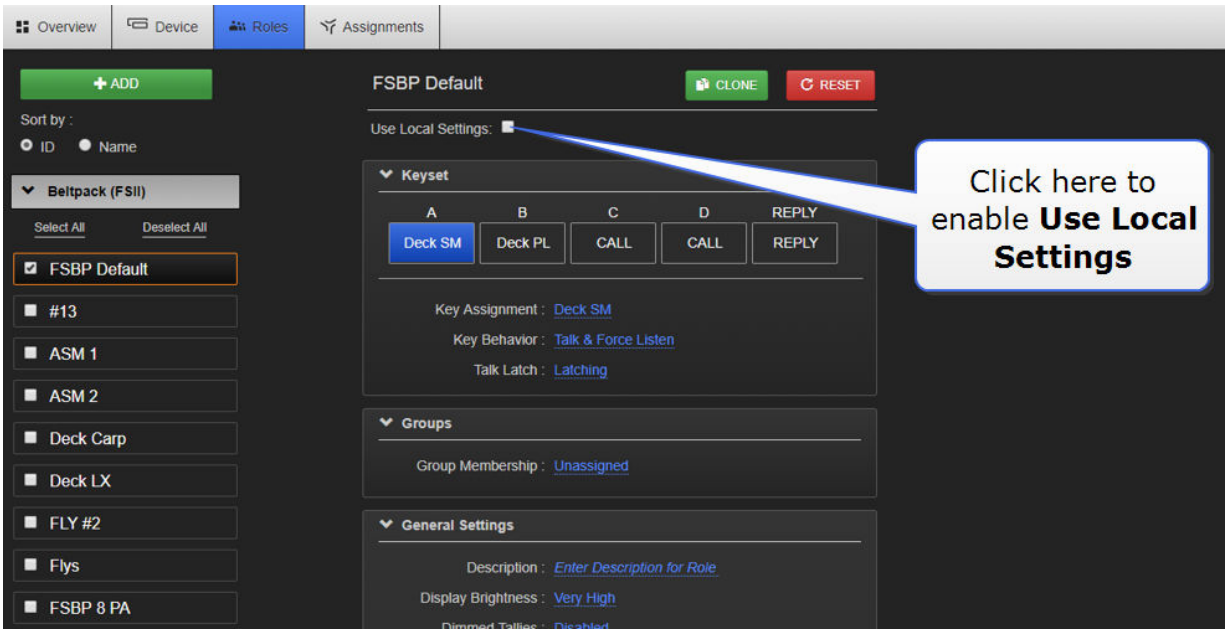
7.9 Use local settings (beltpacks)

By default, beltpack settings such as brightness and input gain are controlled by the configuration software (the CCM). FreeSpeak II Base II allows you to override the CCM and control beltpack preferences from the device itself. To do this, enable **Use Local Settings**. When **Use Local Settings** is enabled, the beltpack will keep it's user selected preferences between power cycles.

7.9.1 Enable **Use Local Settings**

In the CCM, navigate to the **Roles** page.

Click to check the **Use Local Settings** checkbox.



7.9.2 Return beltpack setting control to the configuration software

There are two methods of disabling the **Use Local Settings** feature.

1. From the CCM: navigate to the **Roles** page and uncheck the **Use Local Settings** checkbox.
1. From the beltpack: press and hold the menu key for 3 seconds. Go to **Settings>Role Default Set**. Press the **D** key to select and return the beltpack to the default control setup. When using the default setup, the beltpack will take it's settings from the CCM when it is power cycled.

8 Using Roles

8.1 About FreeSpeak II Base II Roles

Use Roles to program beltpack keys with audio and related settings.

A Role is a pre-configured setting, designed to enable rapid system set-up. You will always program audio and related settings for each beltpack via it's Role. Your FreeSpeak II Base arrives with default Roles for all your beltpacks (5 or 25 beltpacks according to product and licence).

In FreeSpeak II Base each beltpack has its own Role, and you must have enough Roles before you power beltpacks on. Use the pre-defined Roles, edit the pre-defined Roles, clone existing Roles or create new ones as required.

A Role cannot be used twice in FreeSpeak II Base II.

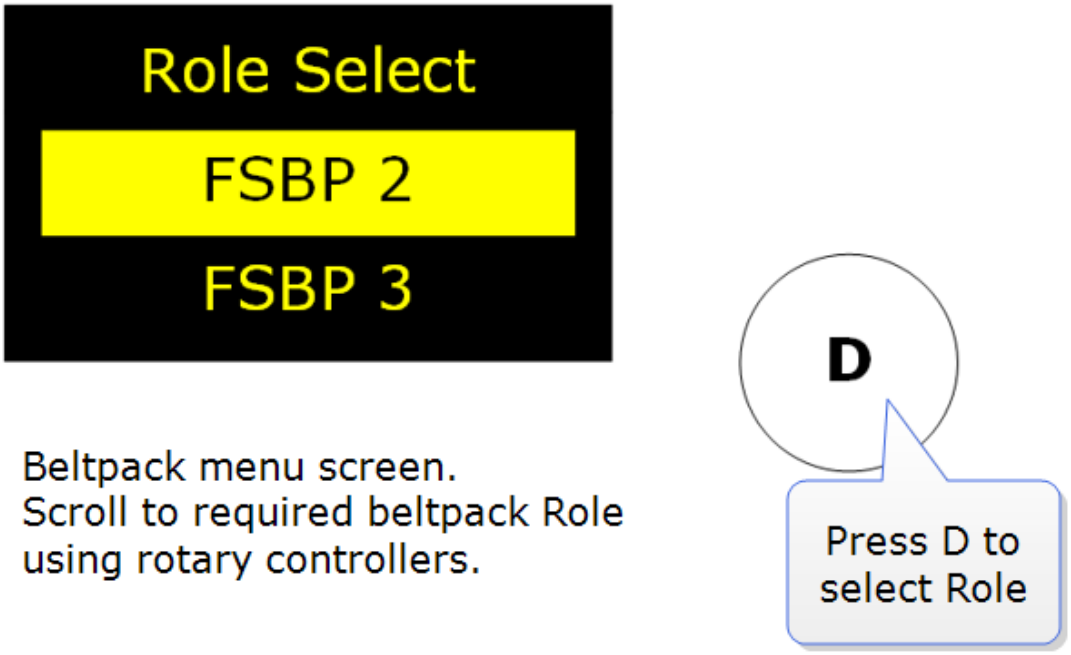
The default Role (which can be edited) uses Channel 1 and 2. Roles also contain settings such as volume, key latching, menu access, Talk and Listen behavior (key behavior) and alerts.

Note: *While the purpose of Roles is always to enable fast set-up, how Roles work is influenced by underlying system architecture. This means that they work slightly different across Clear-Com products. Refer to your system documentation for guidance.*

8.2 Default Role settings

Your FreeSpeak II Base system arrives with default Roles which can be used 'as is'. The default setting puts all beltpacks and the Base headset into Channel 1 and 2, where they talk and listen in a conference or Partyline set up. Simply register the beltpacks to the Base and select the next available Role when you power the beltpack on.

To use pre-defined Roles, simply select the next available Role for your beltpack when it powers up.



Note: *Beltpacks must be registered to the Base before a Role can be selected.*

Note: *The default Role can be changed to suit your requirements. It can also be reset to factory settings.*

See also:

Beltpack settings on page 65.

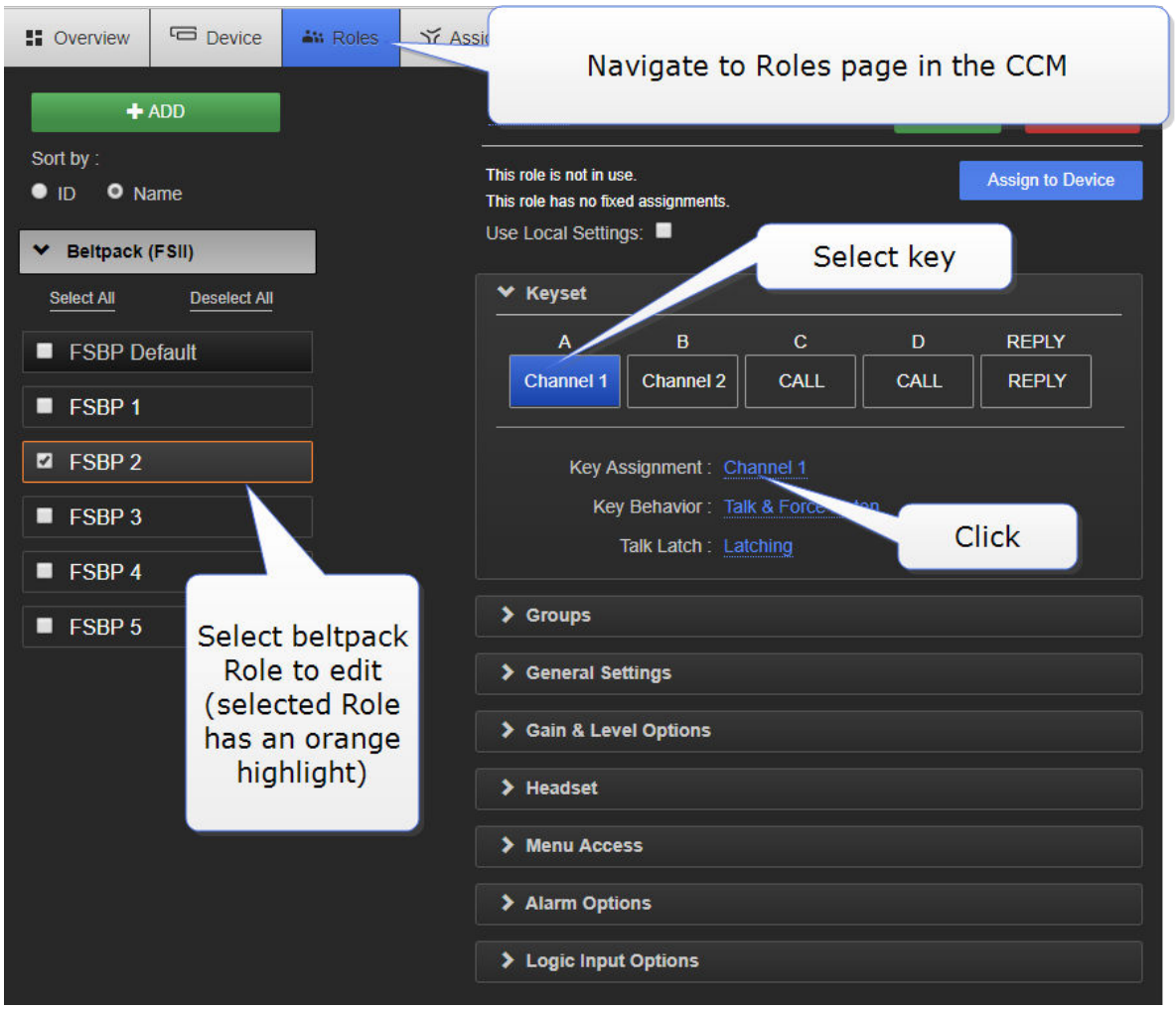
Registering beltpacks on page 56

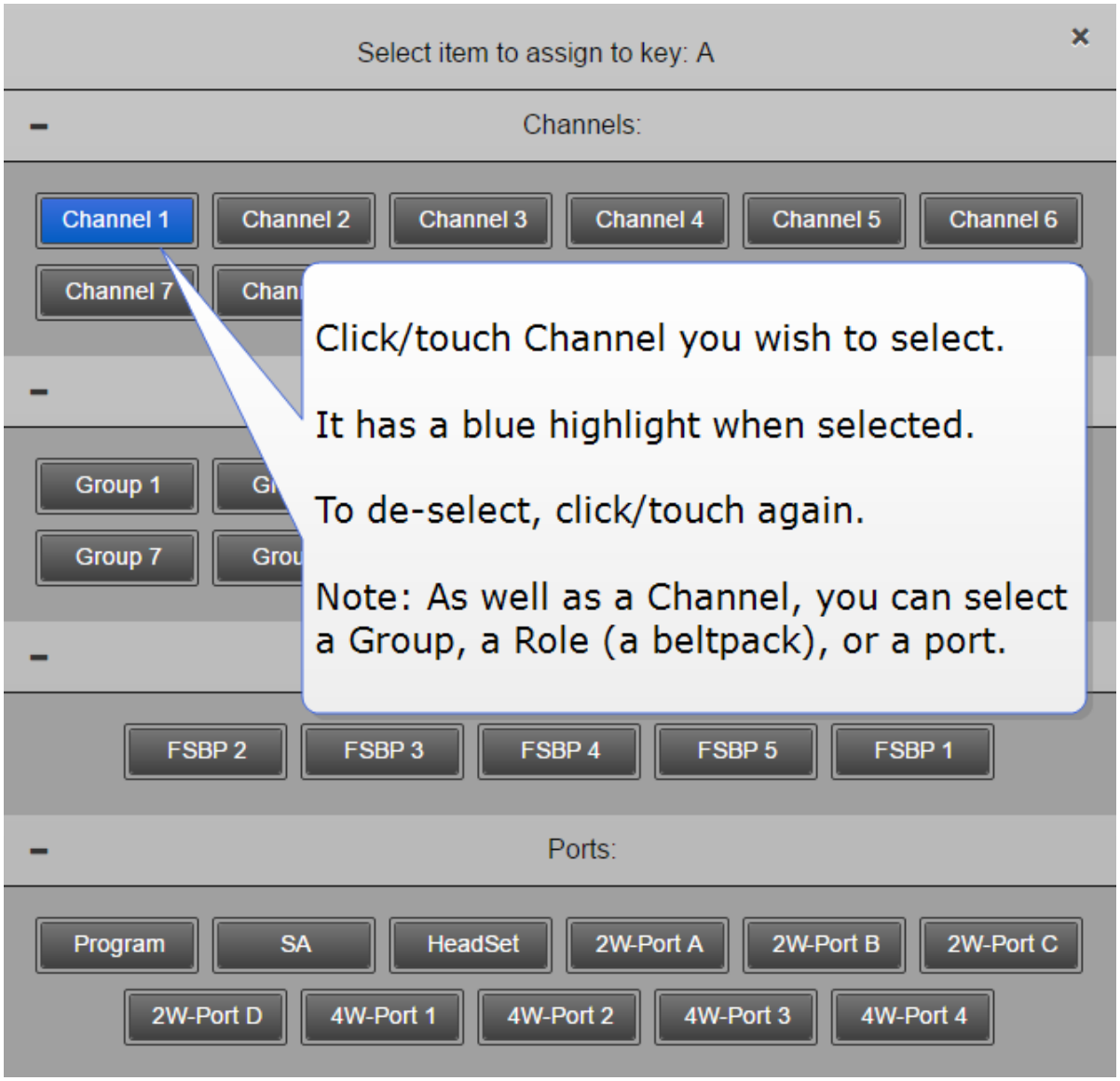
8.3 Changing Channels on beltpacks

To change the Channel on a beltpack, edit the Keyset of that beltpack. This is the same basic process from both the CCM and the Base Station. You must:

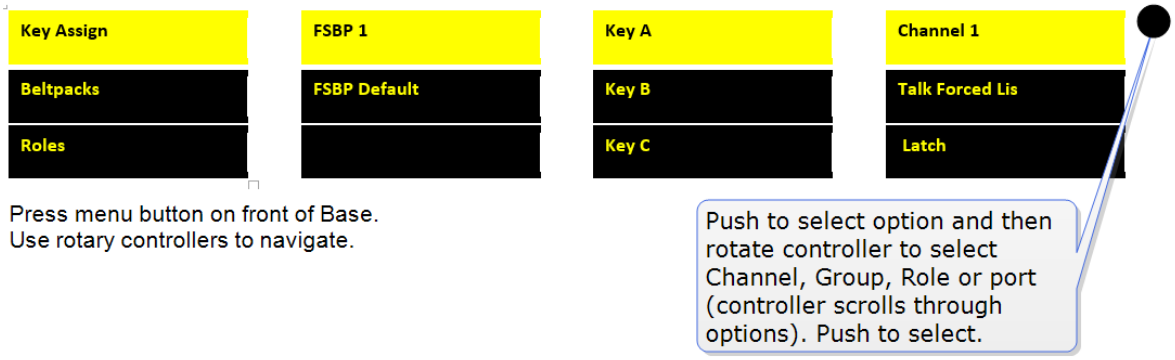
- Select the Role (the beltpack configuration map)
- Select the key to change
- Change the audio assignment on the key.

8.3.1 Change Channels on beltpacks in the CCM





8.3.2 Change Channels on beltpacks from the Base Station



Note: *In the CCM you can edit Roles individually or select multiple beltpack Roles for editing.*

8.4 Change beltpack settings

You can change of the available settings either in the online configuration manager (CCM) or from the Base menu screens (navigate to Roles in the first menu screen). To see what can be changed, see **Beltpack settings on page 65** or explore the **Roles** page in the CCM. Each page in the CCM has context sensitive help: press **?** in the navigation bar.

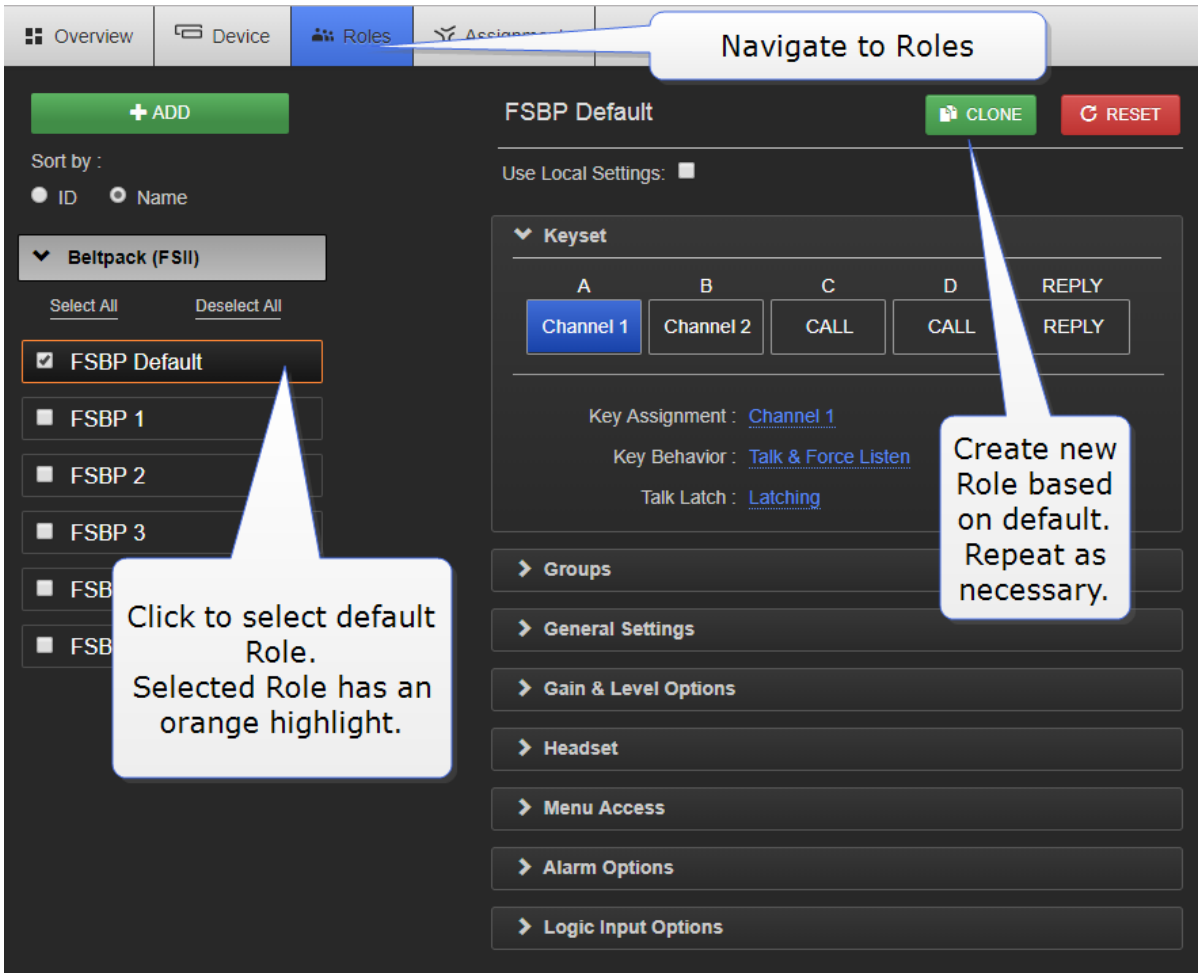
Note: *In the CCM you can edit Roles individually or select multiple beltpack Roles for editing.*

Changes you make from the CCM or the Base Station front menu screens are live.

8.5 How to create Roles for beltpacks

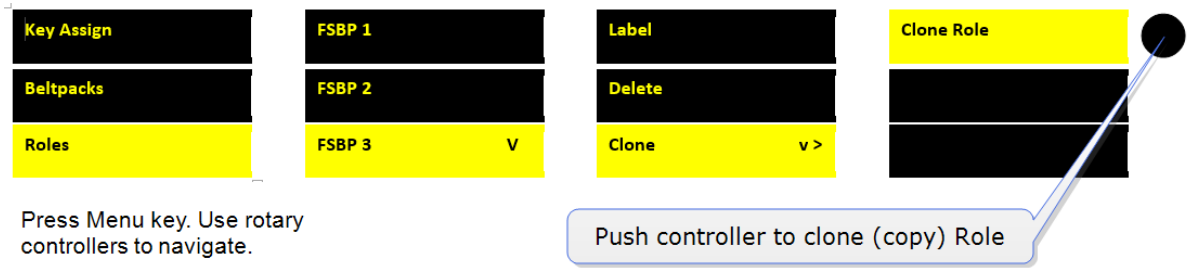
You can work with the default Roles, or create new ones. Roles can be deleted.

8.5.1 Create Roles in the CCM

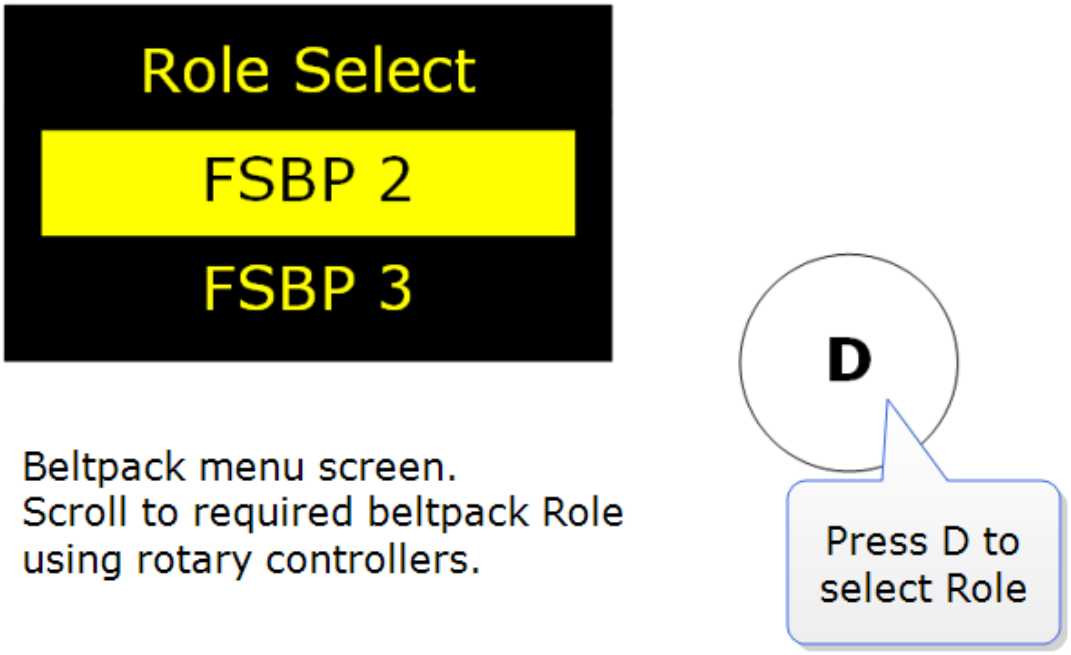


You can now use the drop-down menus to edit the settings for the new Role. For a list of configurable settings, see **Beltpack settings on page 65**.

8.5.2 Create Roles from the Base Station menus



To use the Roles you create, simply select the Role from your beltpack when it is powered up. You cannot select a Role twice.



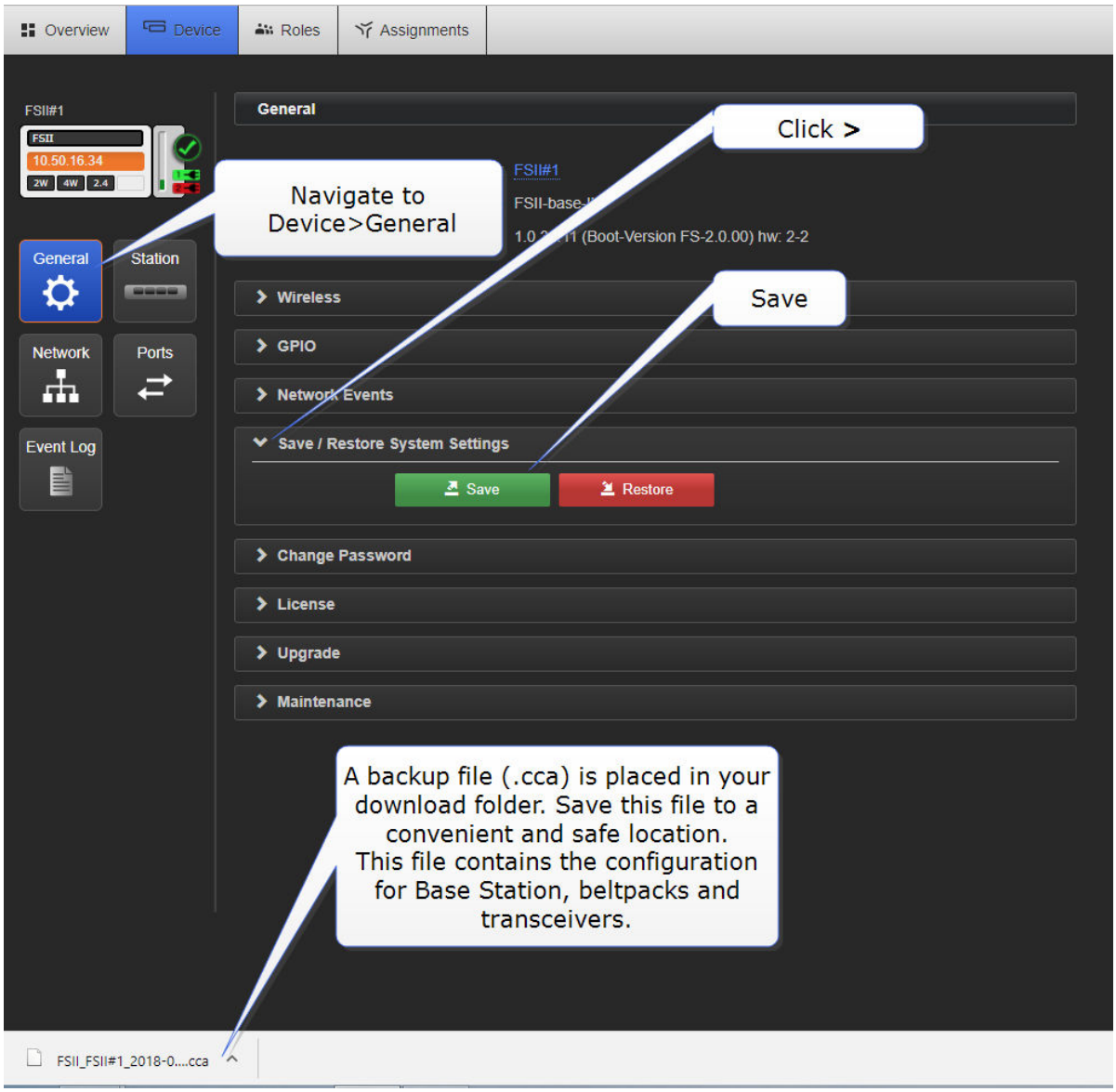
Note: *Beltpacks must be registered to the Base before a Role can be selected.*

You can now use the Base Station menus to edit the settings for the new Role. For a list of configurable settings, see **Using the Base Station on page 13**.

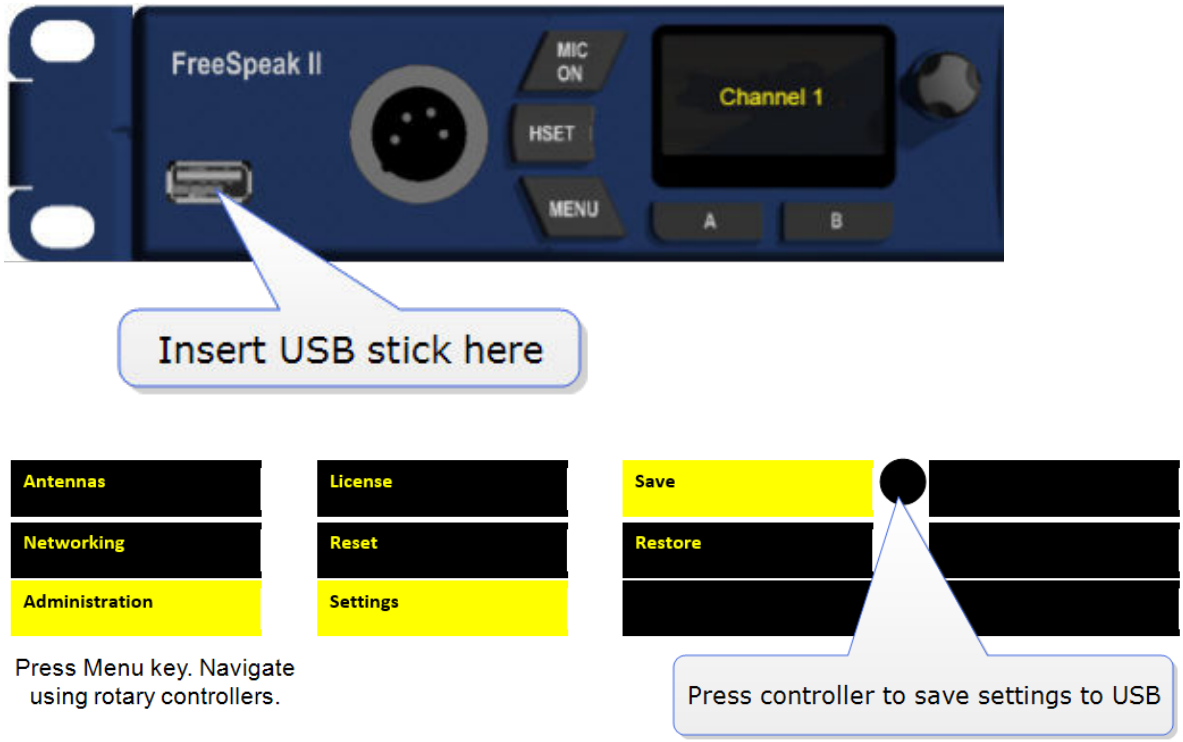
8.6 Save Settings

You can save your Role configuration to a USB or directory. We advise that you do this. Saving settings will save Role, Base Station and transceiver configuration.

8.6.1 How to save settings from the CCM



8.6.2 How to save settings from the Base Station menus



8.7 Fixed Roles

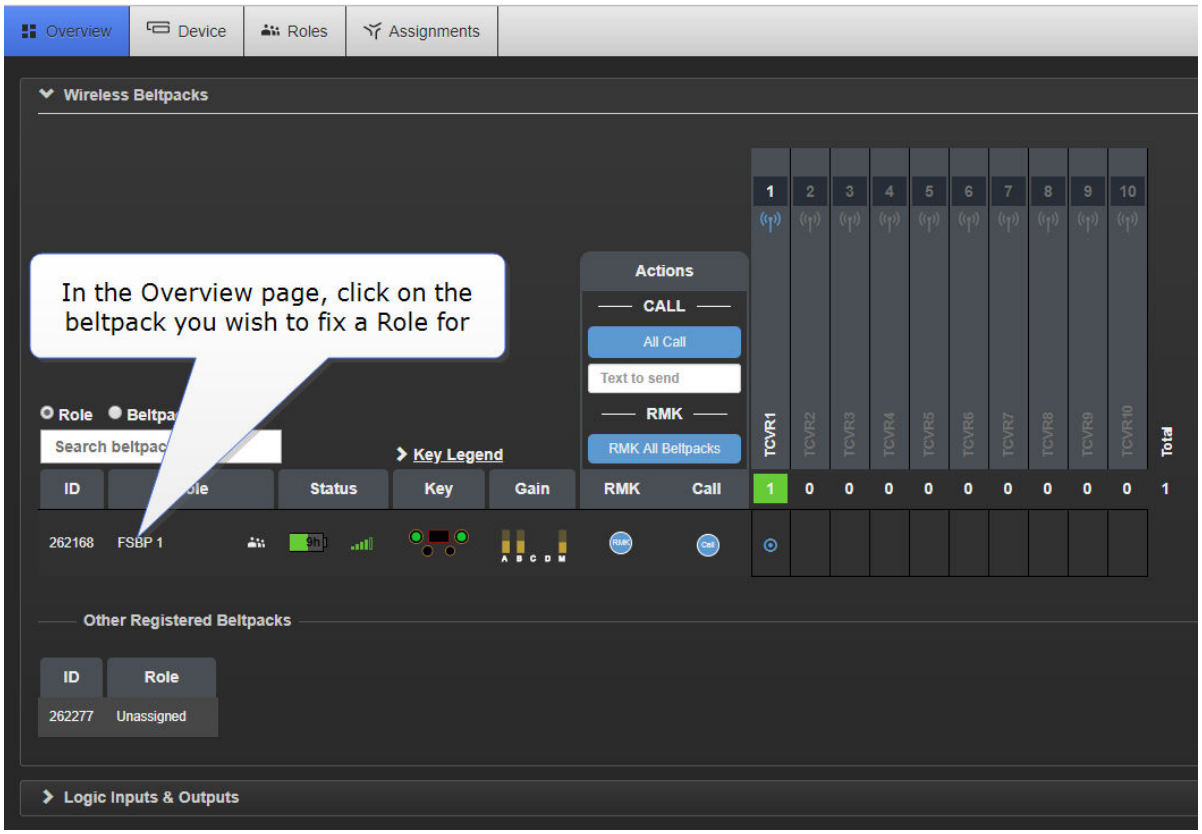
A fixed Role fixes a Role to a beltpack. This means that the beltpack user does not have to select a Role when they power up the device, as a Role is selected automatically.

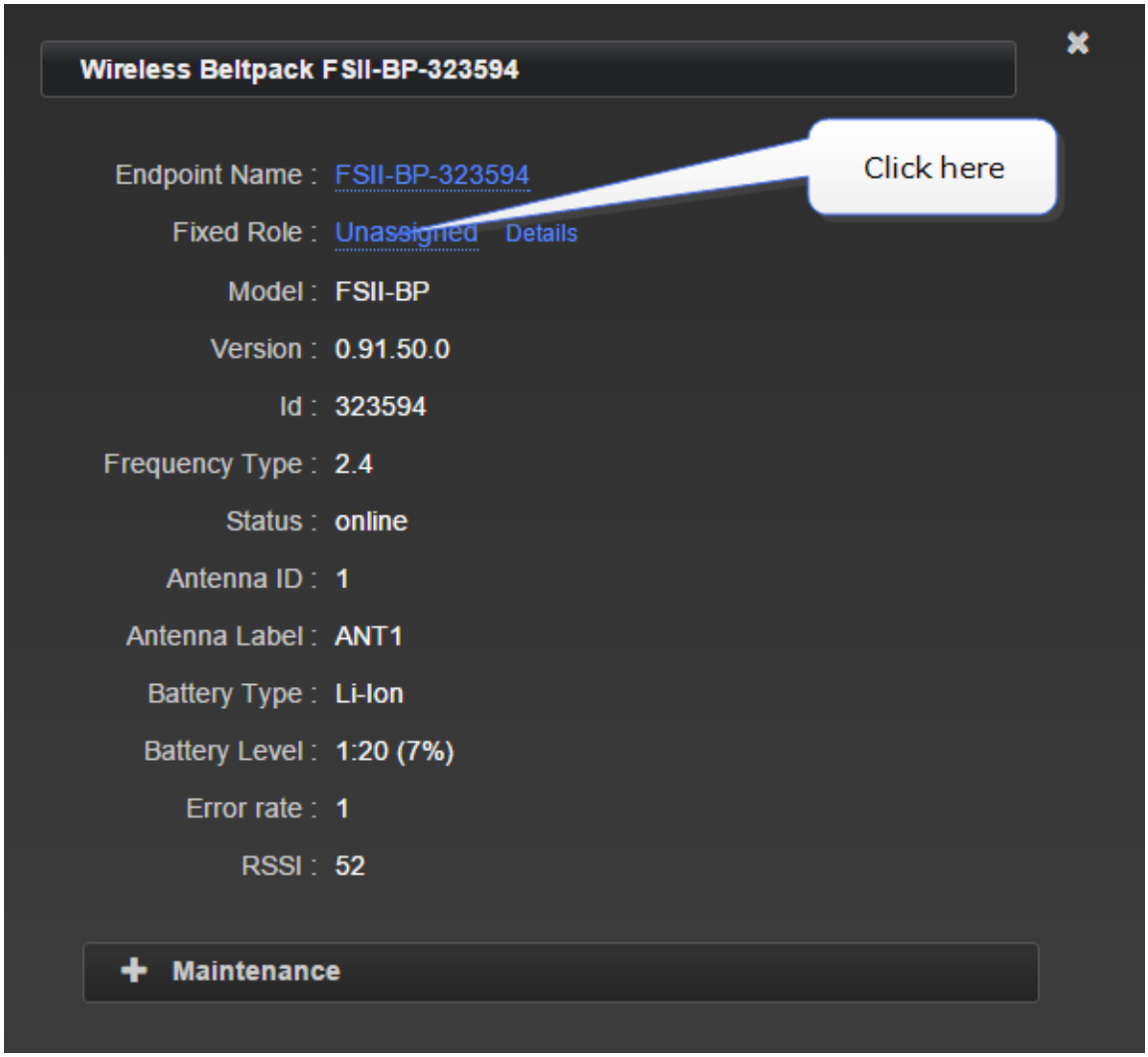
A Role can be:

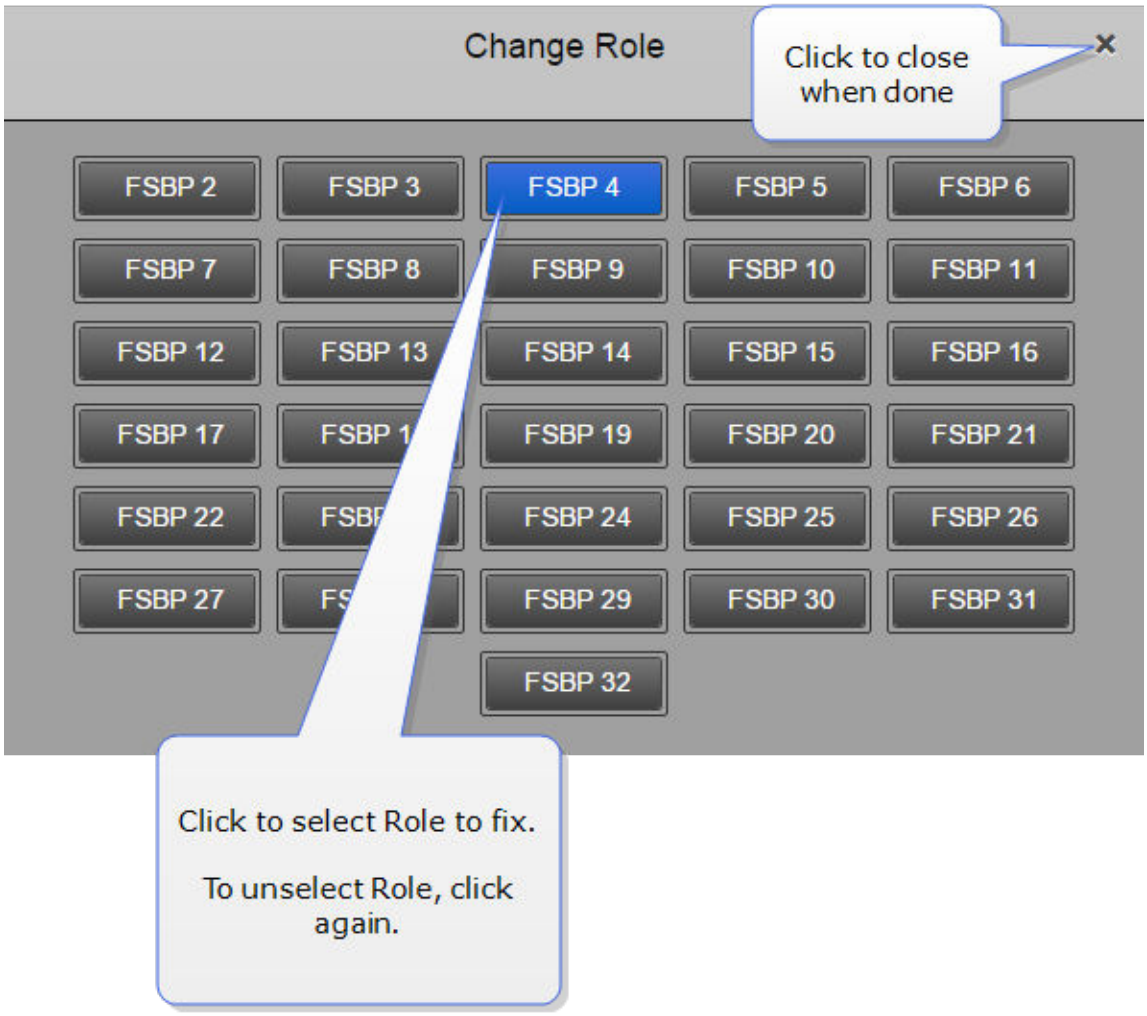
- Not associated with a beltpack. In this case, the user can select any available Role.
- Fixed to a beltpack. In this case, the user has no choice but to use the fixed Role.

For a beltpack to have a fixed Role, it must be already registered to the base. The Role is fixed to the beltpack, either from the CCM or the Base menu screens.

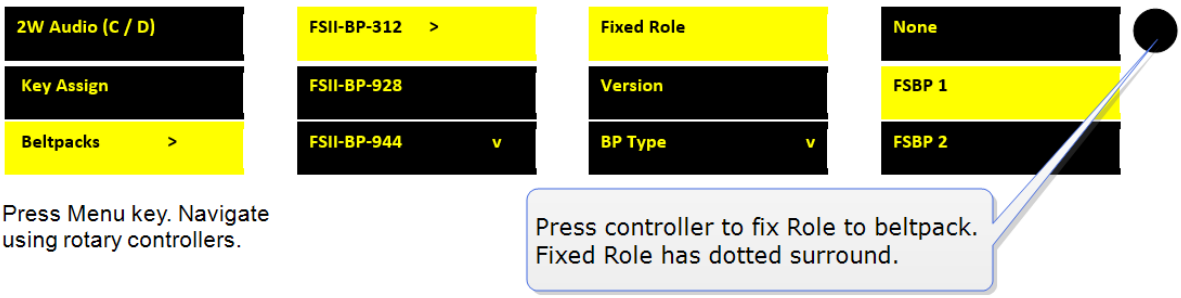
8.7.1 Fix a Role from the CCM




Wireless Beltpack FSII-BP-323594
Endpoint Name : FSII-BP-323594
Fixed Role : Unassigned Details
Model : FSII-BP
Version : 0.91.50.0
Id : 323594
Frequency Type : 2.4
Status : online
Antenna ID : 1
Antenna Label : ANT1
Battery Type : Li-Ion
Battery Level : 1:20 (7%)
Error rate : 1
RSSI : 52
Maintenance
Click here



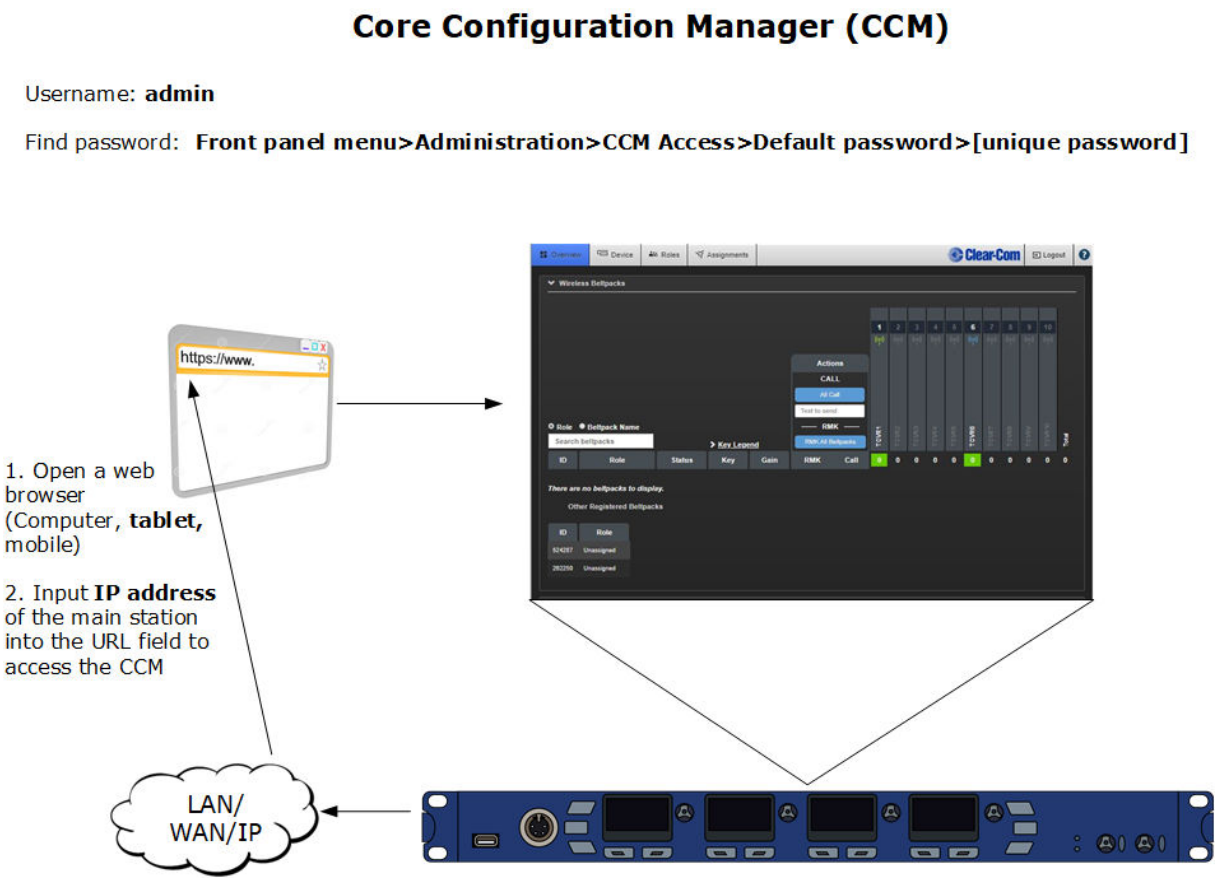
8.7.2 Fix a Role from the Base menu screens



Note: *A Role can be fixed to or associated with more than one beltpack. The Role cannot be used by more than one beltpack, so if it is fixed to more than one beltpack, the Role is given to the beltpack that is first powered on. In this case, the second beltpack must wait until the first beltpack is powered off before it can be used.*

Note: *A Role can also be fixed from the Roles screen in the CCM.*

9 Accessing the Core Configuration Manager (CCM)



9.1 The Core Configuration Manager (CCM) password

The username for the CCM is: **admin**.

The default unique password is based on the device serial number.

To find the default password navigate to: **Front panel menu>Administration>CCM Access>Default password>[unique password]**.

The default unique password is available in the front panel menu of the device UNTIL you change it in the CCM. If you change the password it is no longer available in the front panel menus. If you lose the password you need to reset it in order to gain access to the CCM.

9.1.1 Change the CCM password from the default setting

In the CCM, navigate to: **Device>General>Change password**.

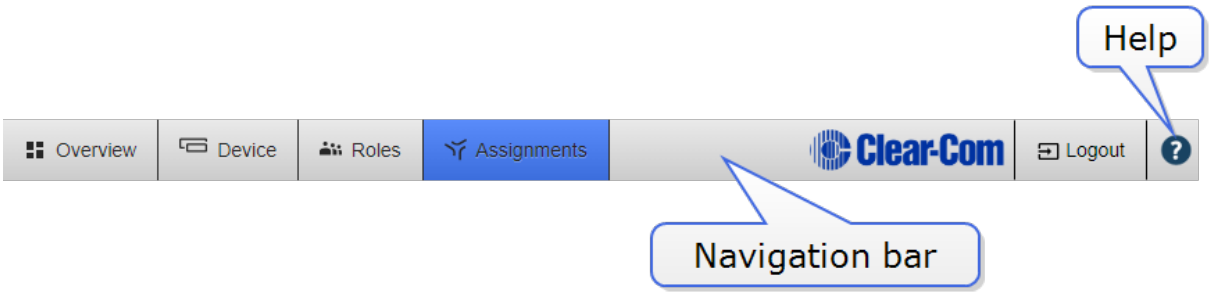
9.1.2 Reset the CCM password from the front panel menus

Press and hold the **Menu** button for 3 seconds.

Using the rotary controllers, navigate to **Front panel menu>Administration>Reset>Reset CCM password**.

Push the rotary controller to select an option or commit changes.

9.2 Core Configuration Manager (CCM) Walk-through



Click or touch the navigation bar to reach pages.

For context sensitive help, click/touch the help button (**?**).

9.2.1 Overview Page

This screen is the diagnostics screen for your FreeSpeak II Base system. It gives a live overview of transceivers and beltpacks in your system.

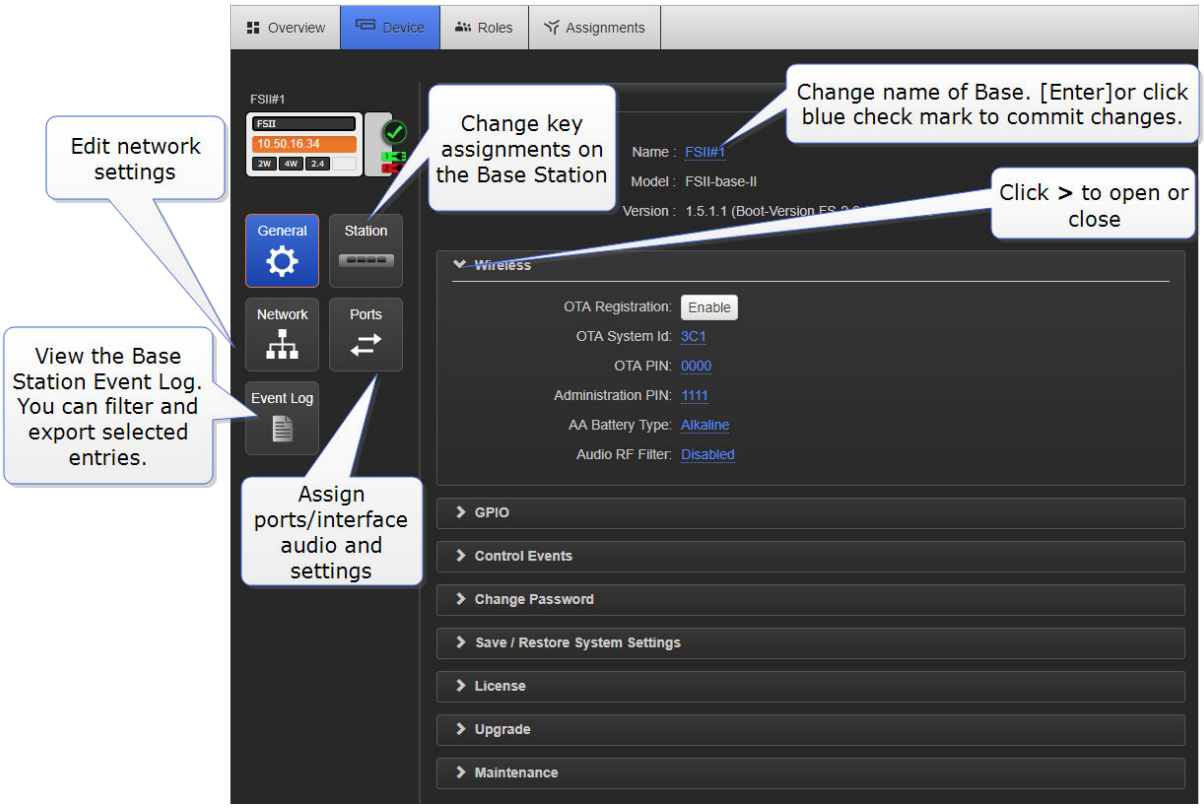
Click on any device in this page to access information and configuration options. Click on blue text fields to edit.

Note: *All system changes are live.*

- Transceivers 1 - 5: transceiver port 1 on Base Station
- Transceivers 6 - 10: transceiver port 2 on Base Station

9.2.2 Device page

The **Device** page is where you find configuration options specific to your Base Station.

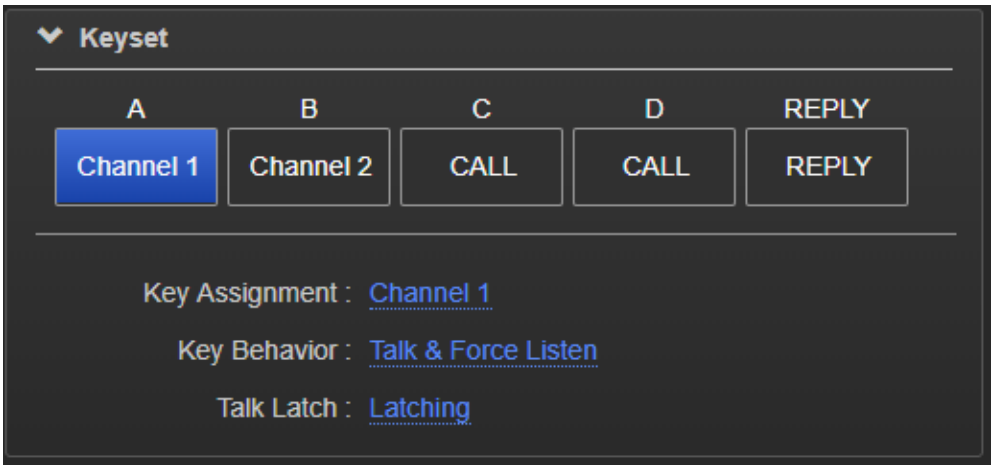


9.2.3 Roles Page

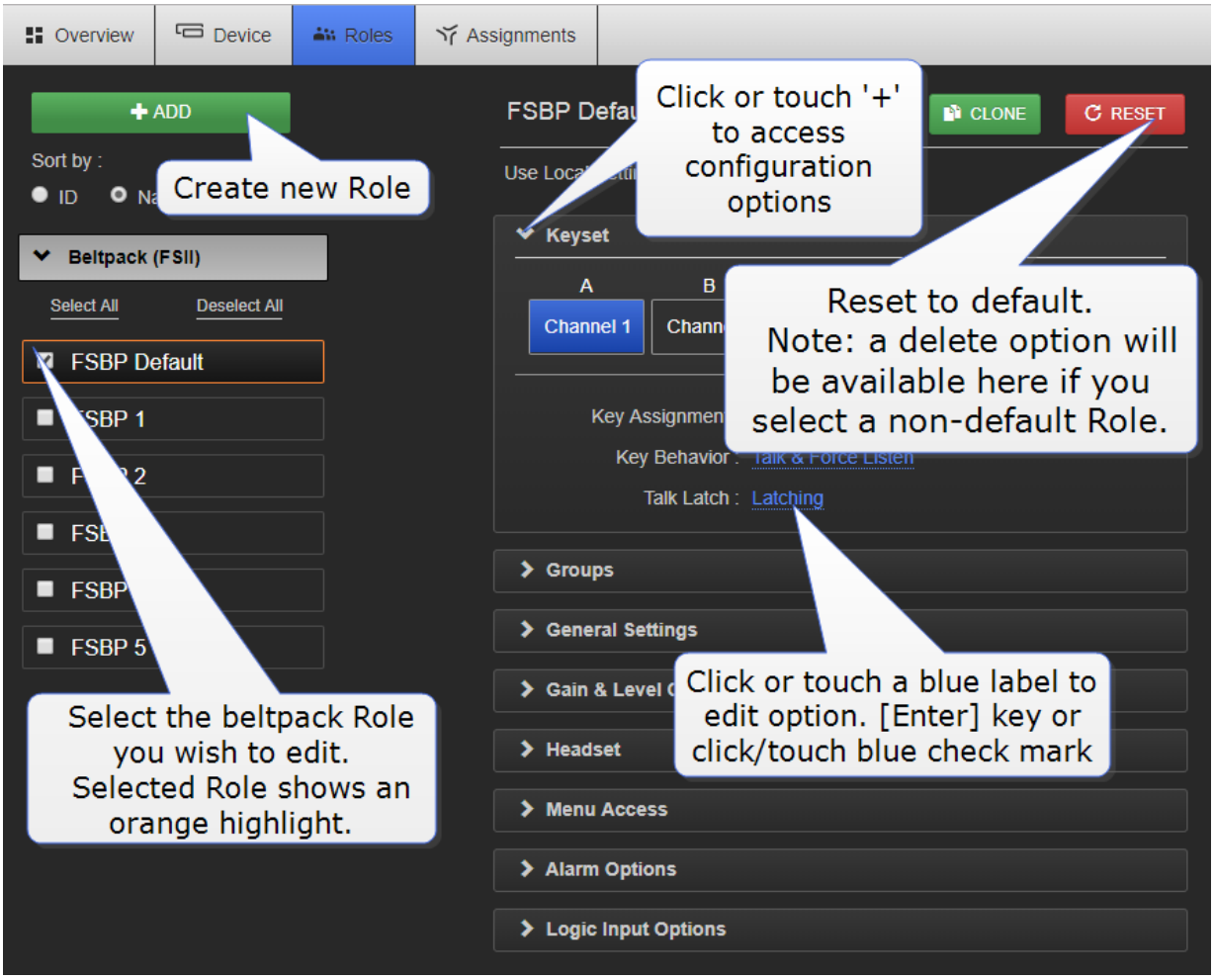
The **Roles** page is where you assign audio to beltpacks and configure a beltpack's settings.

Roles are pre-configurations: default audio routes and settings that are applied to your device when it is first powered up (a Role is selected by the beltpack user). The default Role can be edited and/or reset to default. Individual Roles can be edited, deleted, cloned and created.

In FreeSpeak II Base a Role is attached to a specific beltpack in a one-to-one relationship. The default Role puts Channel 1 and 2 on beltpack keys A and B, with C and D set as call keys. The Reply key can be re-assigned to a Channel as required.

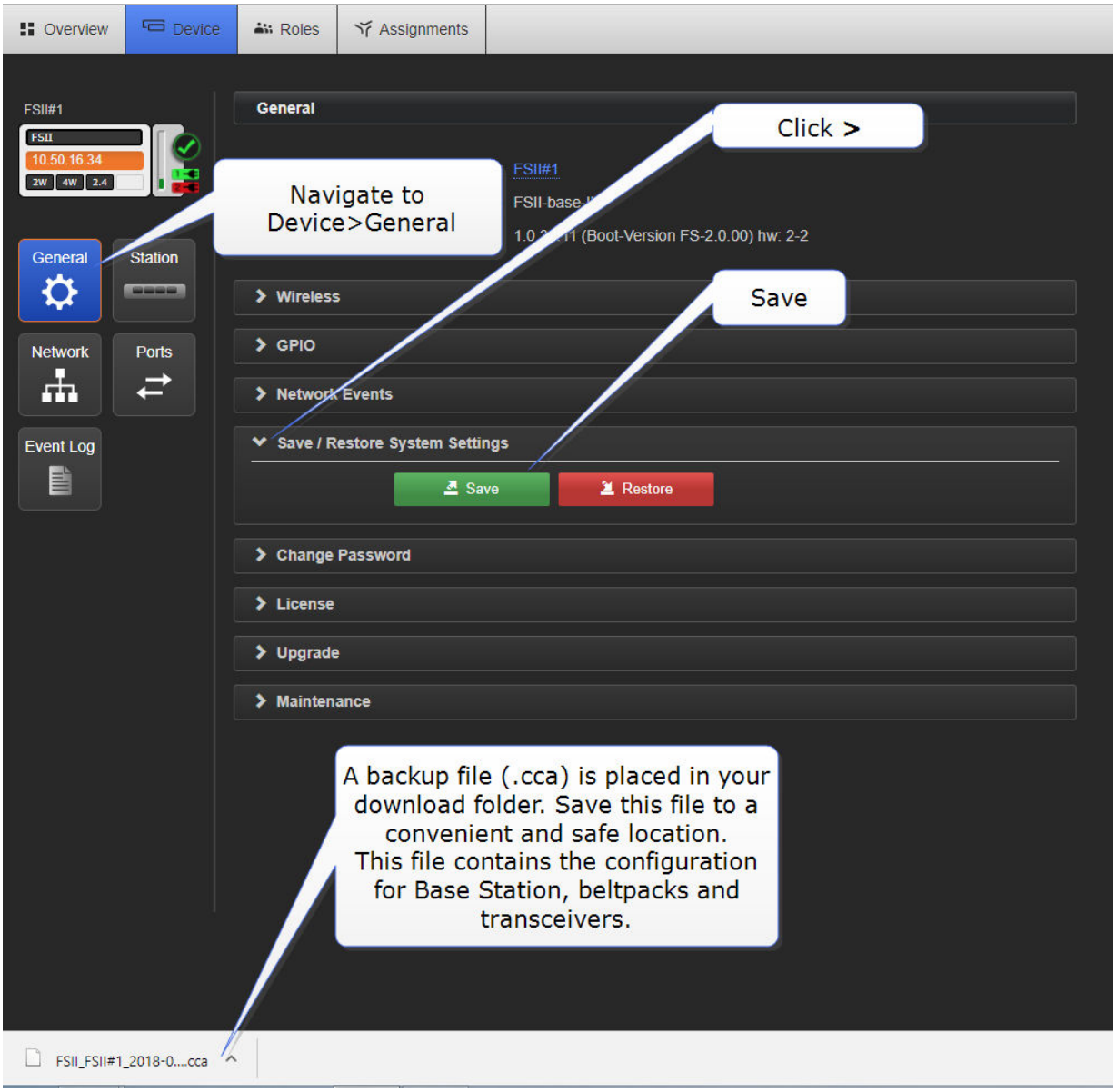


On the Roles page you can edit, create, clone and delete Roles.



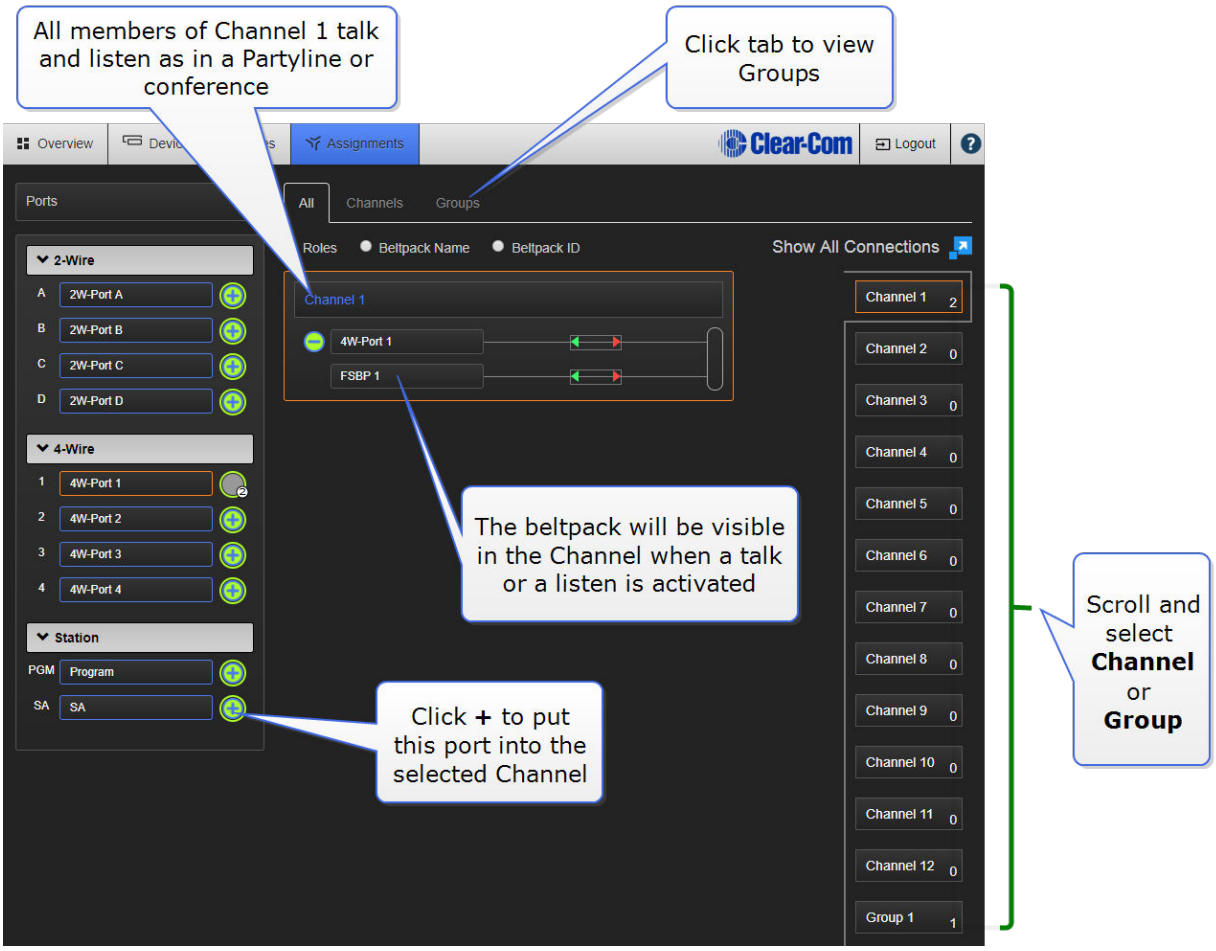
All Roles can be edited as required.

You can save your Roles to a USB stick or directory for convenience (advised).



9.2.4 Assignments Page

On this page you see audio assignment in Channels. This screen is a live representation of anyone talking or listening in up to 24 Channels. You can toggle between **Roles** view and **Hostname** view. Hostname view can be used to show individual beltpack hardware.



See also:

Accessing the Core Configuration Manager (CCM) on page 91

What is a Keyset? on page 14

Configuring audio routes in FreeSpeak II Base on page 98

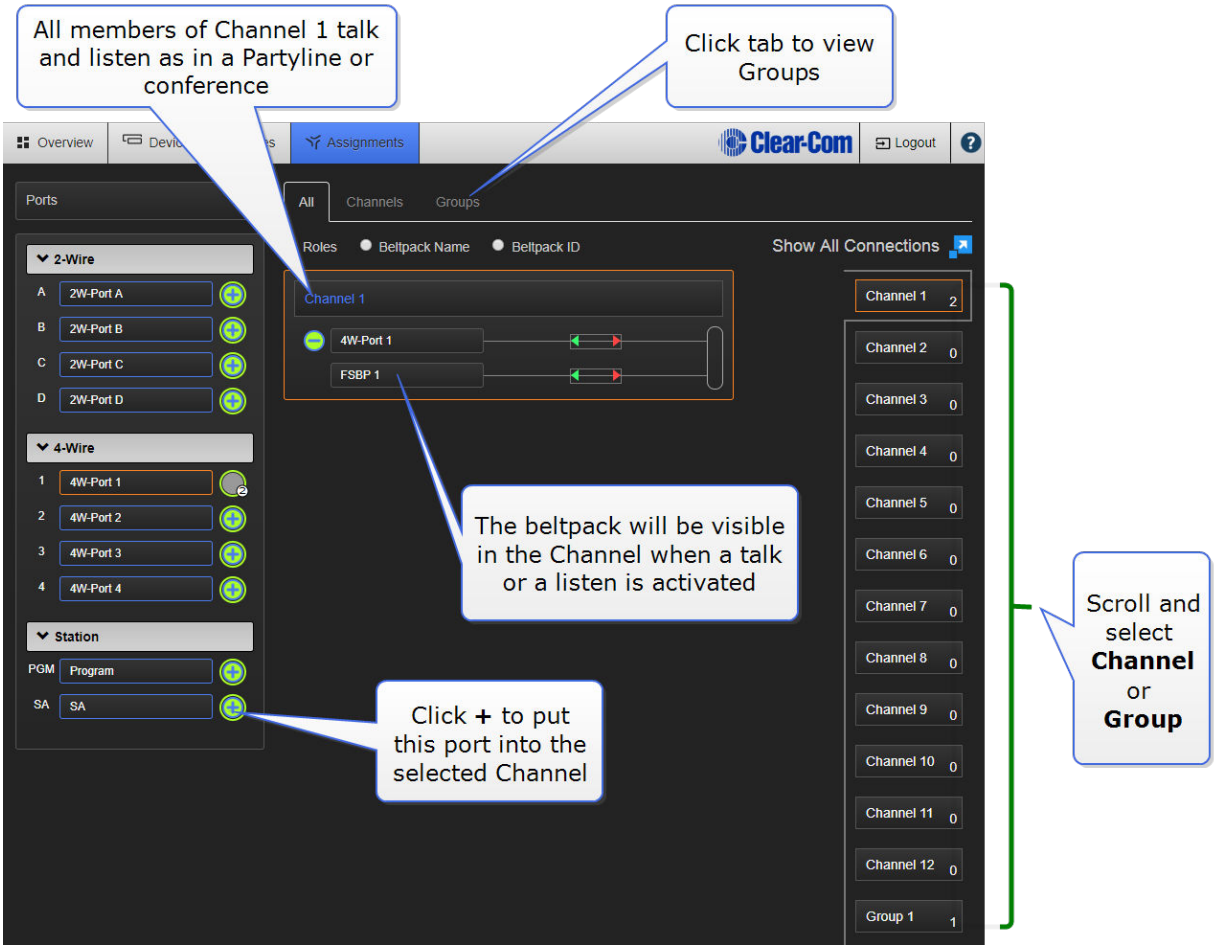
10 Configuring audio routes in FreeSpeak II Base

There are many ways to configure FreeSpeak II to route audio.

10.1 Channels

In FreeSpeak II Base, audio routes can be made between beltpacks and external interfaces by putting all members (audio feeds and beltpacks) in a Channel together. In this way, beltpacks, audio and the controller all communicate with each other. A Channel operates as a Partyline or conference.

You can see all active sources in a Channel or Group in the Assignments page.



Note: *Channels are set to 'Talk and Forced Listen' by default. See* ***Key behavior on page 16*** *for more information.*

10.2 Groups

Audio can also be configured into Groups. Groups are programed in a similar way to Channels; simply assign the audio sources to the Group (Group Members) and then program a key to talk

to the Group. Ports, the Base headset, and beltpacks can all become Group members. Once a Group member, users will be able to hear announcements to the Group, and reply using the **Reply** key.

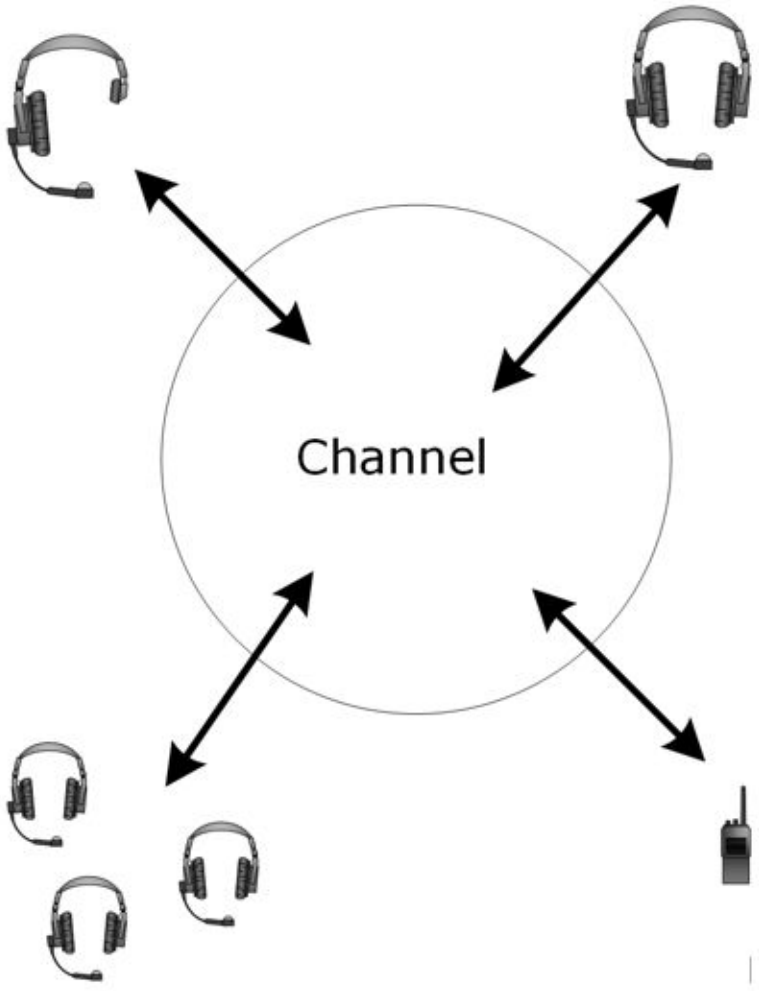
Note: *You can see all members of a Group at a glance in the Assignments page of the CCM. Navigate to **Assignments** and click the **Group** tab. Beltpacks will not be visible in the Group until they are online.*

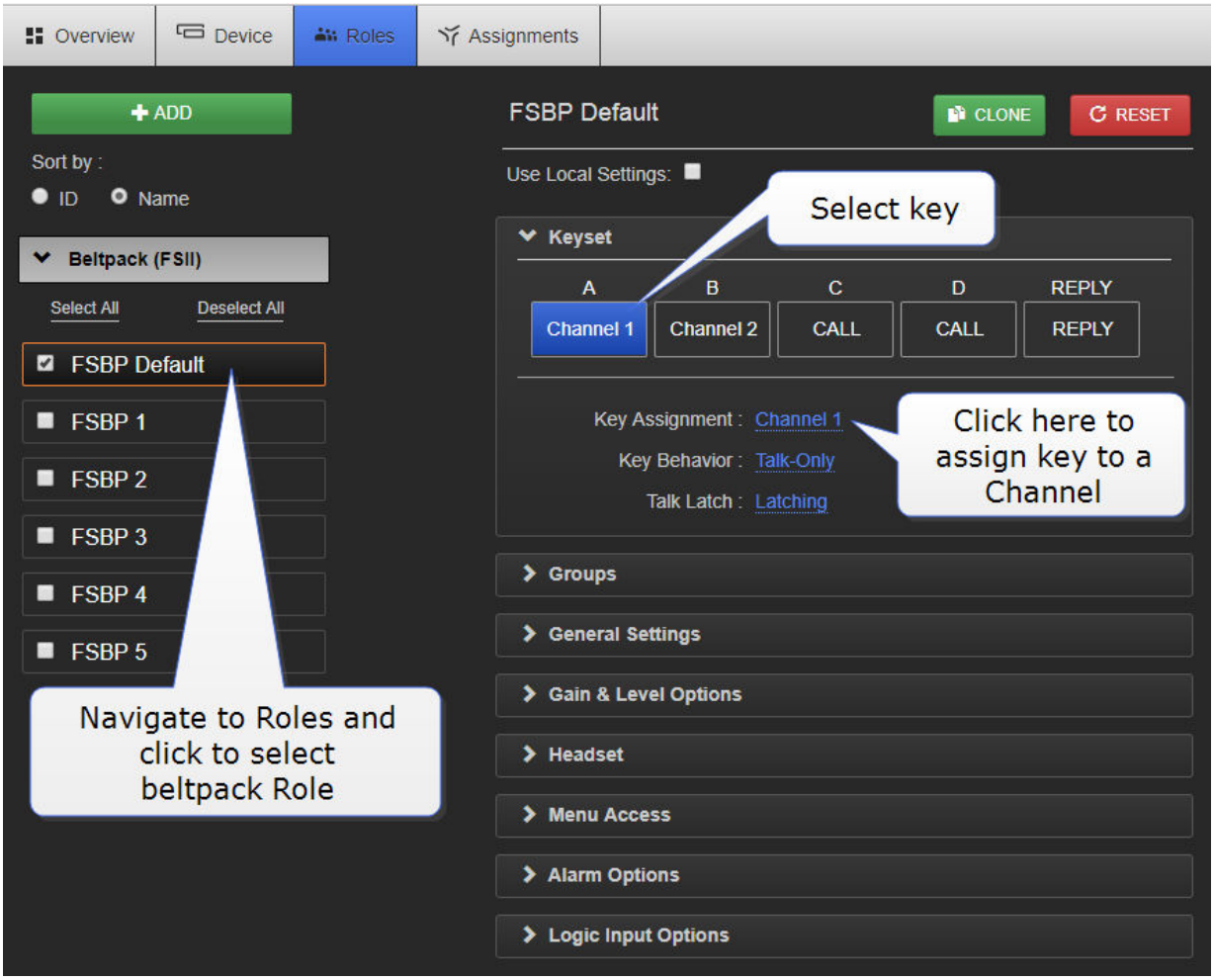
10.3 Channel or Group?

Both Channels and Groups are essentially digital containers for digital audio sources, allowing communication between members.

10.3.1 Channel

A Channel operates as an intercom Partyline or conference. All members can talk to and listen to all other members, as long as they have keys to do so.



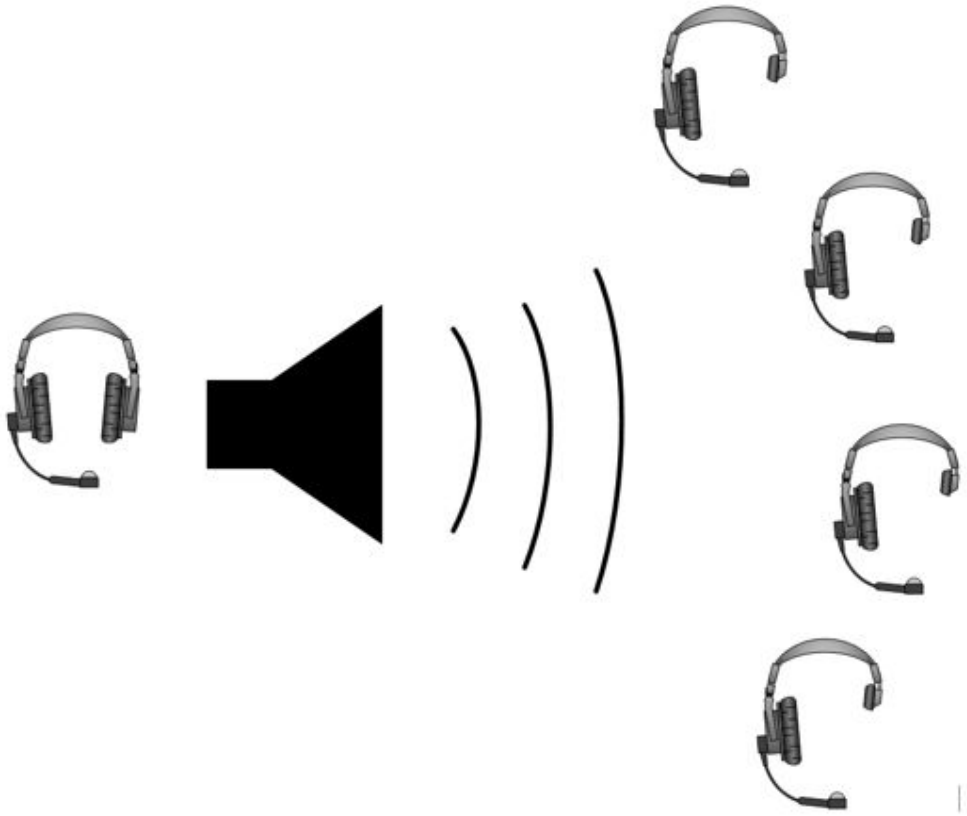


Note: *The default key behavior setting for a member of a Channel is Talk and Forced Listen. See* ***Key behavior on page 16*** *for more information.*

You can see Channel members in the Assignments page of the CCM. Navigate to **Assignments**.

10.4 Group

A Group configuration enables an announcement or broadcast to a number of members simultaneously.

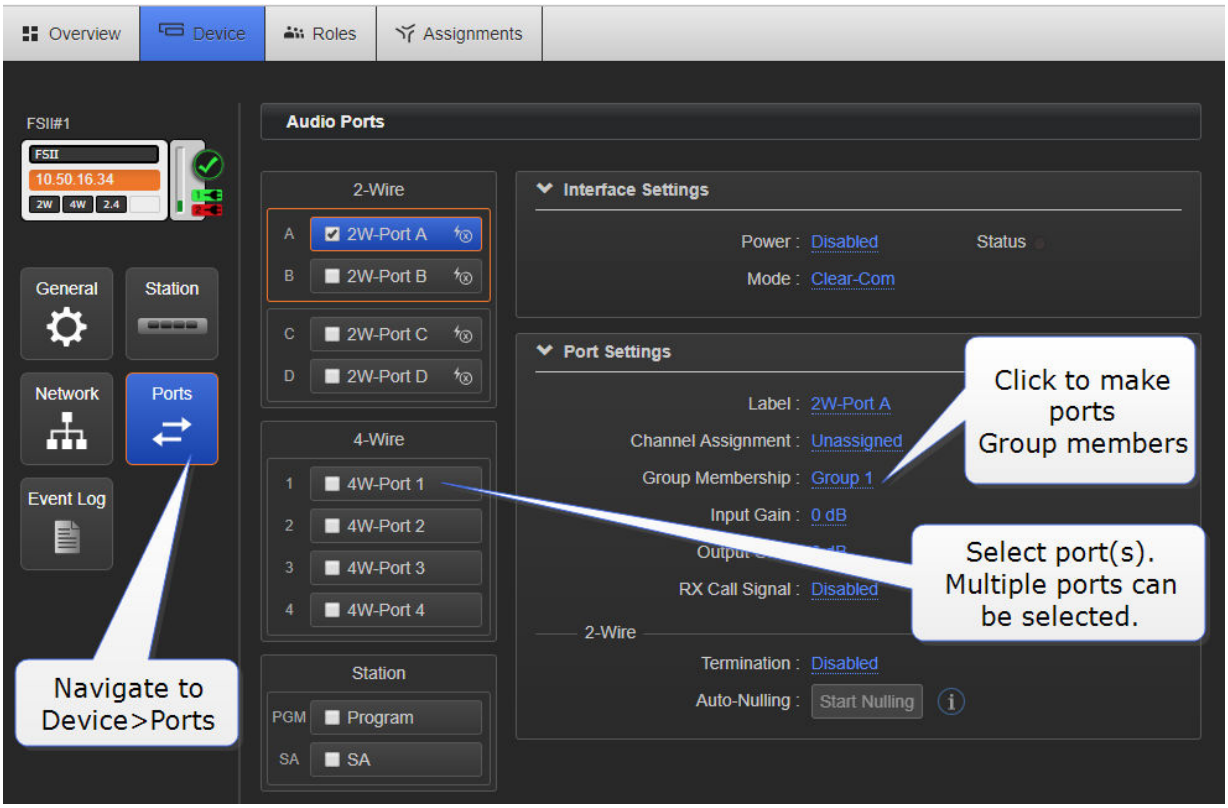


A group member can reply directly to the announcer using the **Reply** key. The other group members will not hear this.

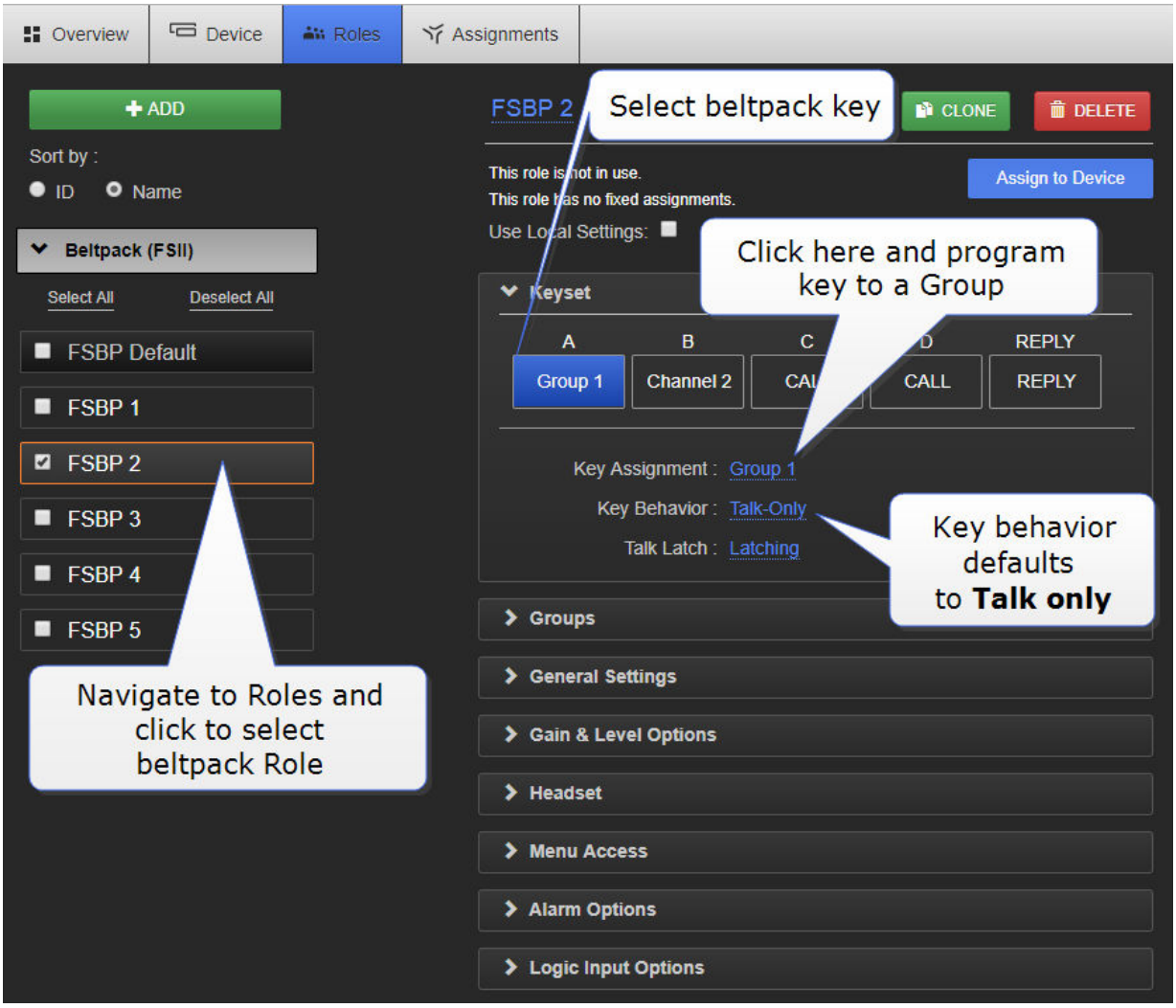
10.5 Example Group set-up

To set up a Group you must first put the members in the Group. Ports, Beltpacks and the Base headset can all become members of a Group. When the members of the Group are assigned, you must program a key to talk to the Group members.

10.5.1 How to make an audio source a Group member



10.5.2 How to program a Talk key to the Group



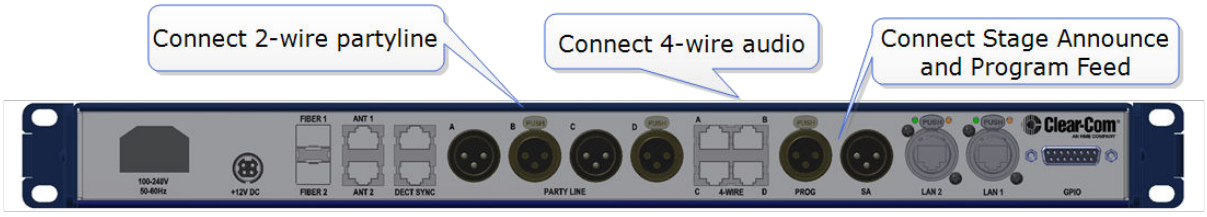
Note: *The default key behavior setting for a talk key to a Group is '**Talk Only**'. See Key behavior on page 16 for more information.*

You can see Group members in the Assignments page of the CCM. Navigate to **Assignments** and click/touch the **Groups** tab. Beltpacks will only be visible in the Group when they are online.

10.6 Example audio assignment

Follow steps 1. to 3. to connect audio from external devices to the Base Station, populate Channels and and set up communication with beltpacks.

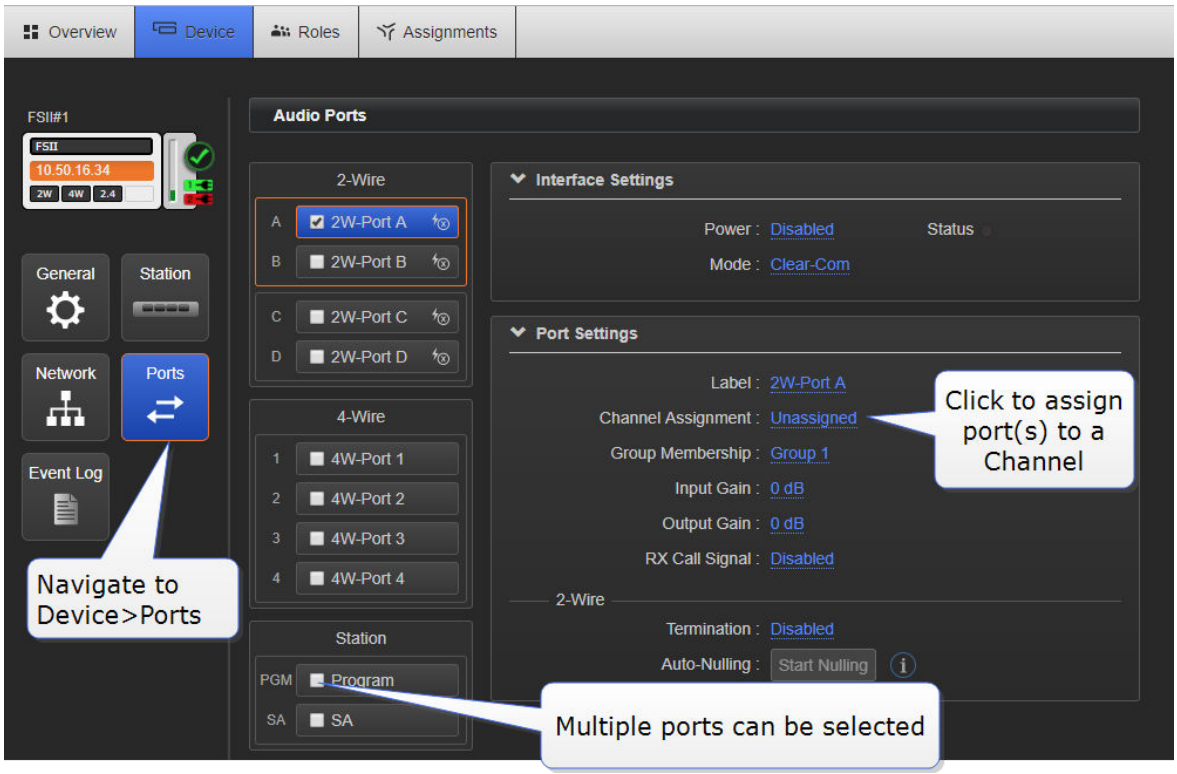
1. Connect 2-Wire or 4-Wire audio devices to interfaces/ports.

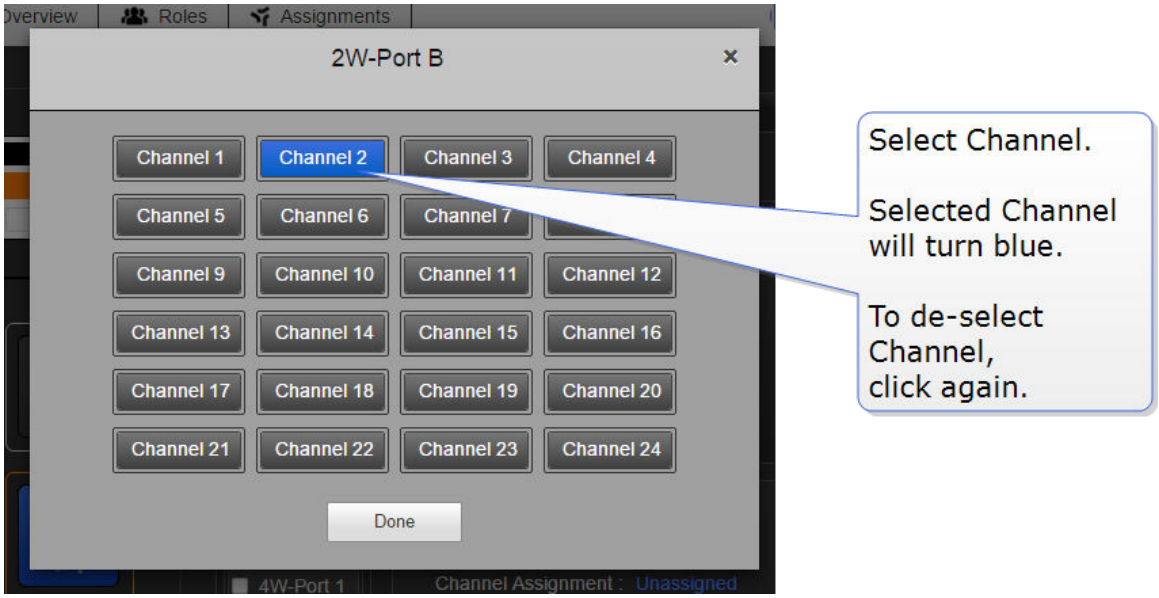


2. Assign interfaces/ports to Channels.

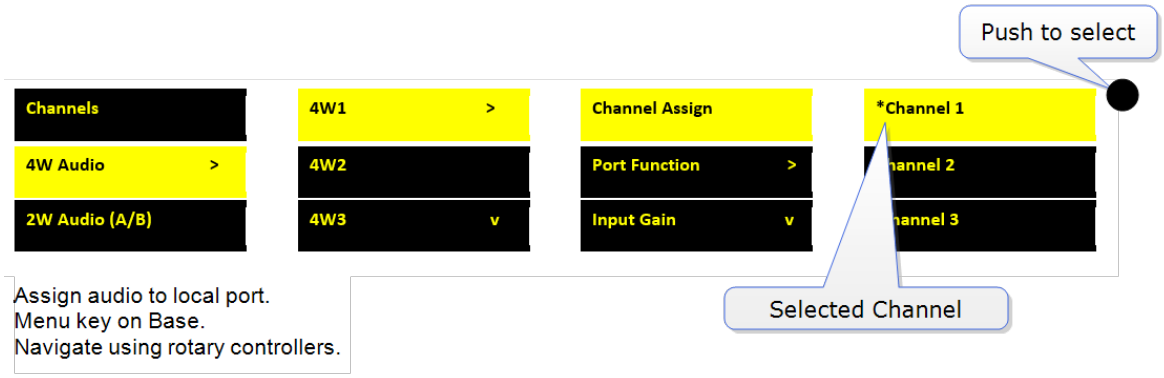
Setting audio on interfaces/ports can be done from the CCM or the Base Station:

a. Port assignment in the CCM.





b. Port assignment from the Base Station menu screens



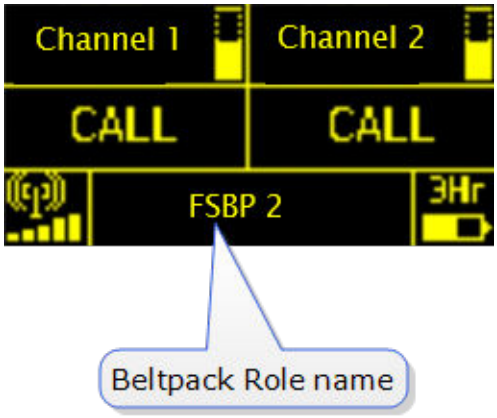
Note: *You can also assign a port to a Channel or Group in the Assignments page of the CCM.*

10.7 Assign Channels to beltpack keys (A, B, C, D, Reply)

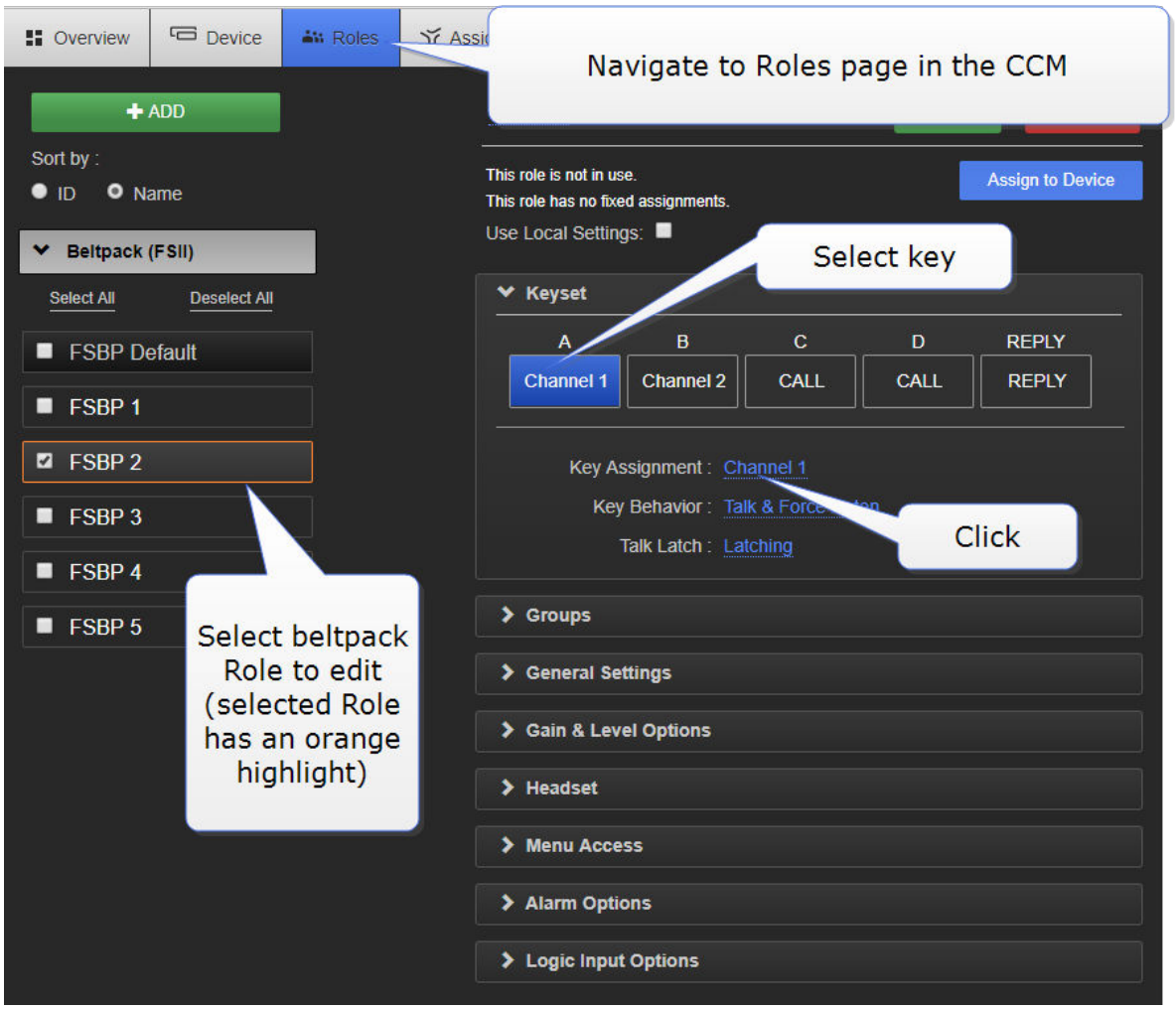
Audio assignment for beltpacks is always done with a Role. A Role is a pre-defined beltpack configuration map. You select a Role for a beltpack when it is first powered on. The Role a beltpack is using can be changed from the Base station, the CCM or the beltpack itself.

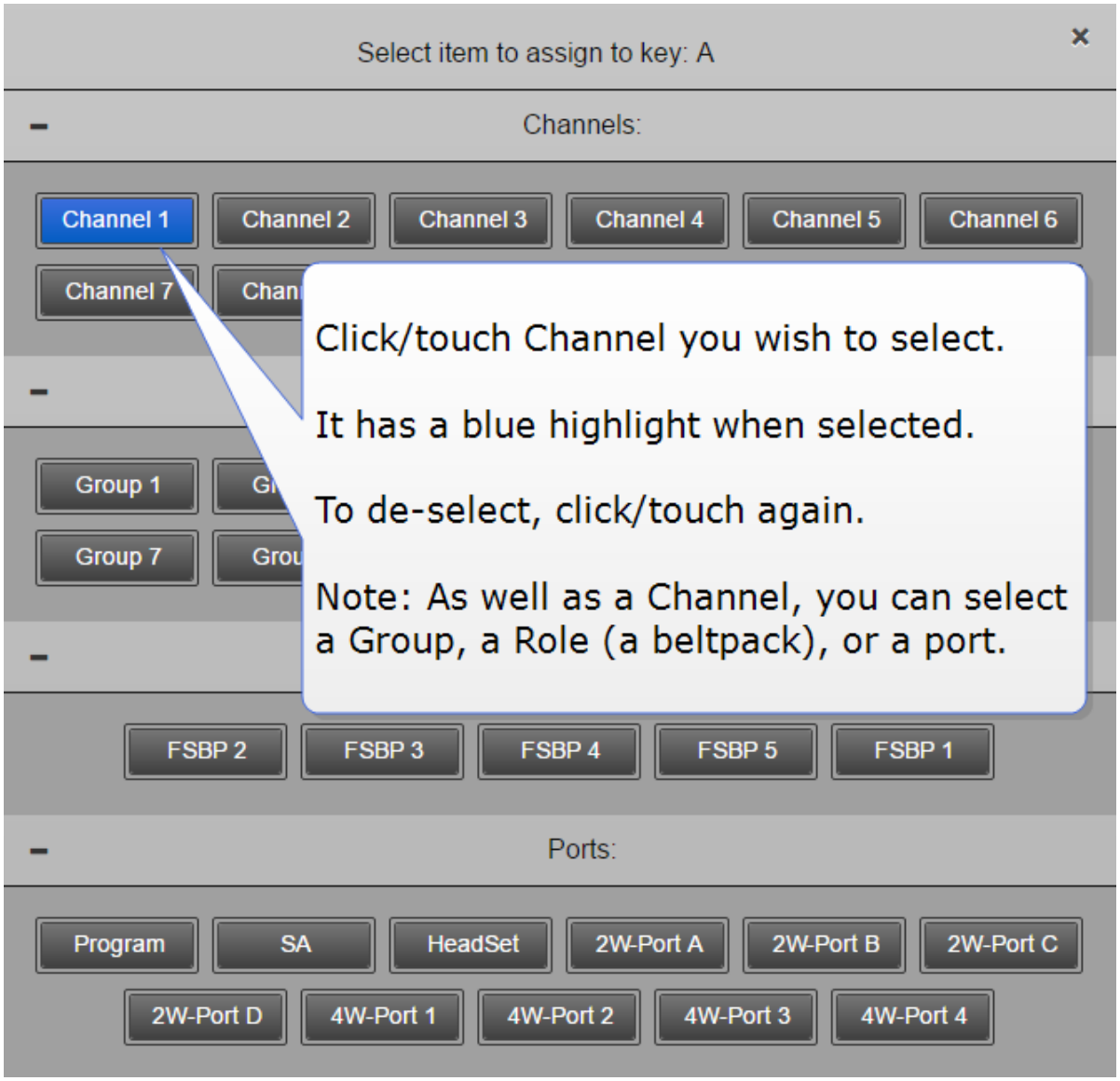
In the first case, it is easiest to use the default Role. This puts Channel 1 and Channel 2 on to the beltpack keys. See for how to do this.

To change the Channel on a beltpack you need to edit the Role that beltpack is using. Find the beltpack Role name at the bottom of the beltpack screen:

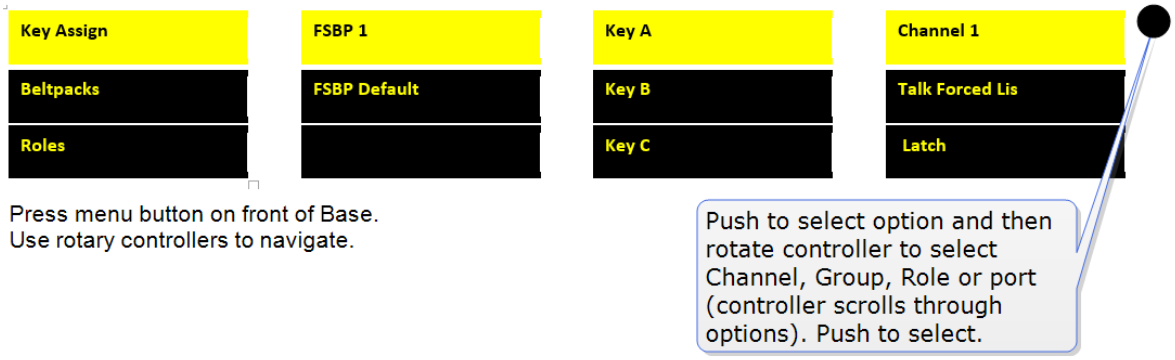


10.7.1 How to edit beltpack Role in the CCM





10.7.2 How to edit beltpack Role from the Base Station menu screens



Note: *You can assign audio to keys **C**, **D** and **Reply**. To return the status of these keys to **Call** and **Reply**, you must deselect or unassign the audio assignment. A selected assignment turns blue in the CCM.*

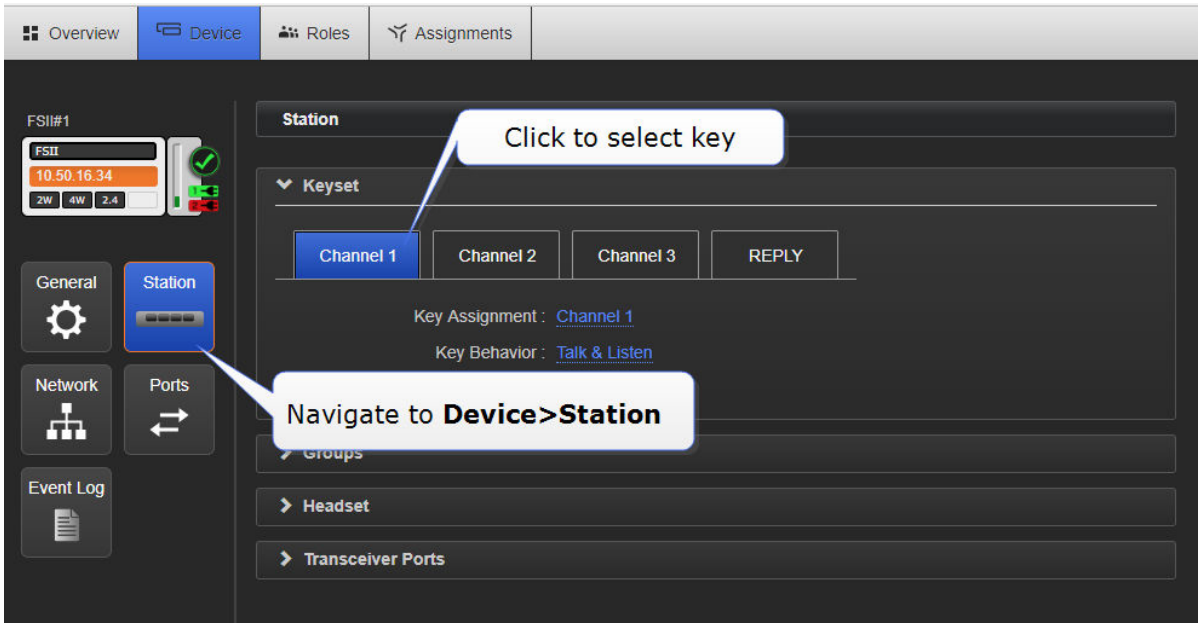
*Click on a blue assignment again to deselect it. From the Base Station menu screens go to **Key Assign/Role/Key/Unassigned**.*

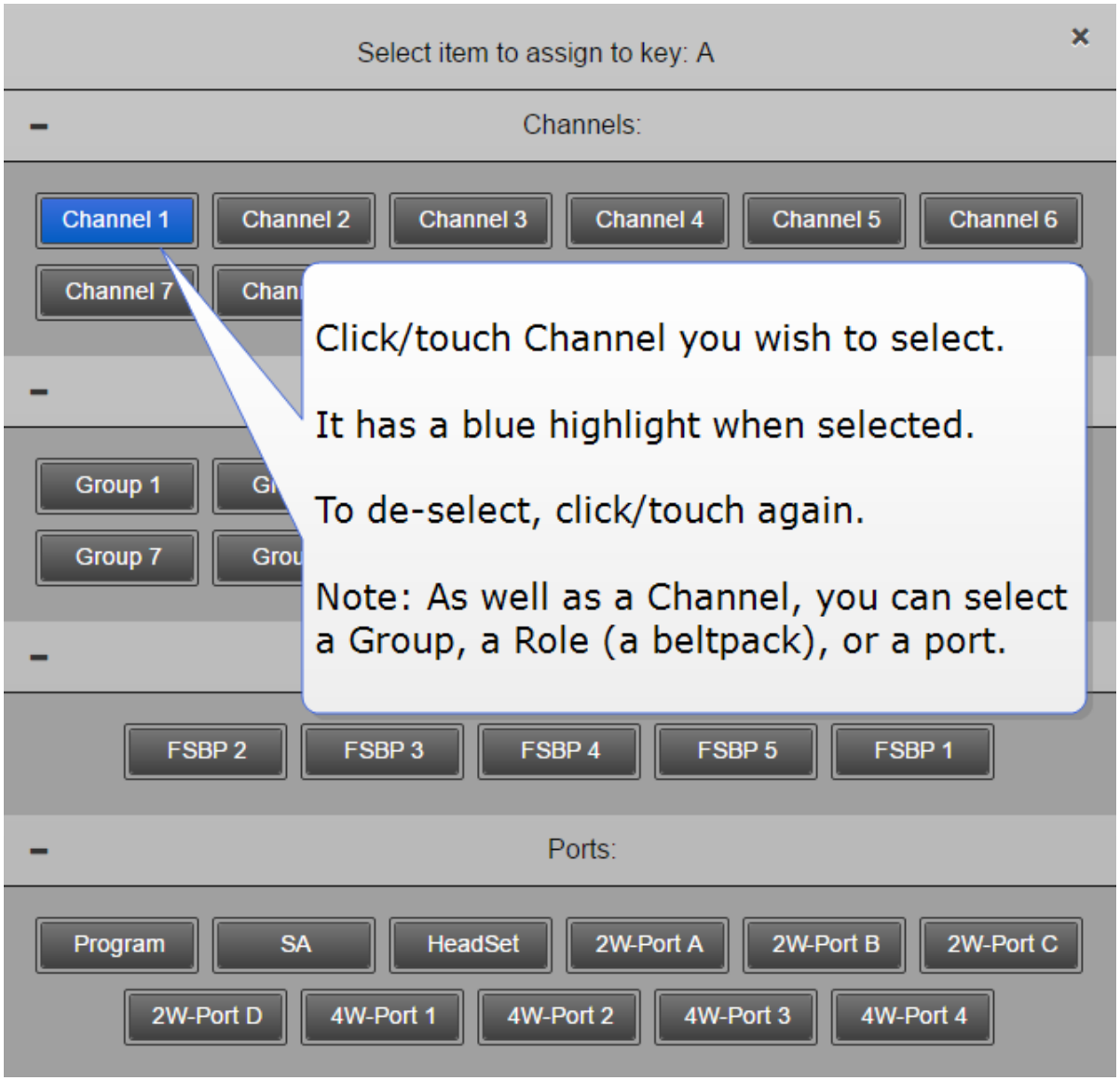
10.8 Change Channel Key Assignments on the Base Station

The Base Station default setting has Channels 1 - 3 on the first three Keysets. The 4th Keyset is a Reply key.

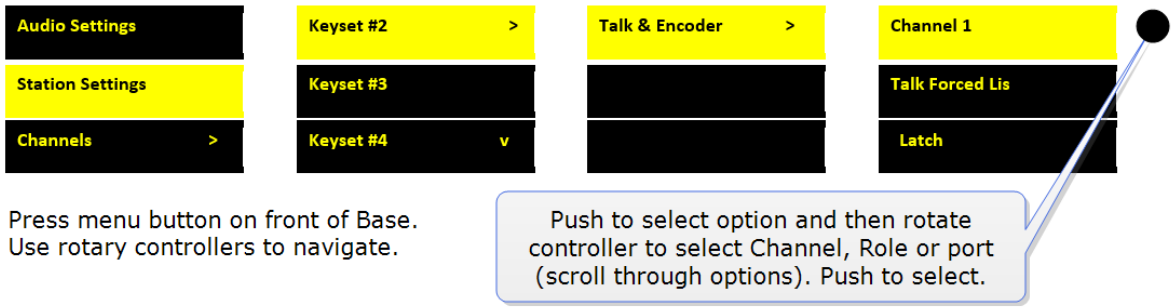
The Base Station default setting can be edited.

10.8.1 Change Base Station key assignment from the CCM





10.8.2 Change Base Station key assignment from the Base

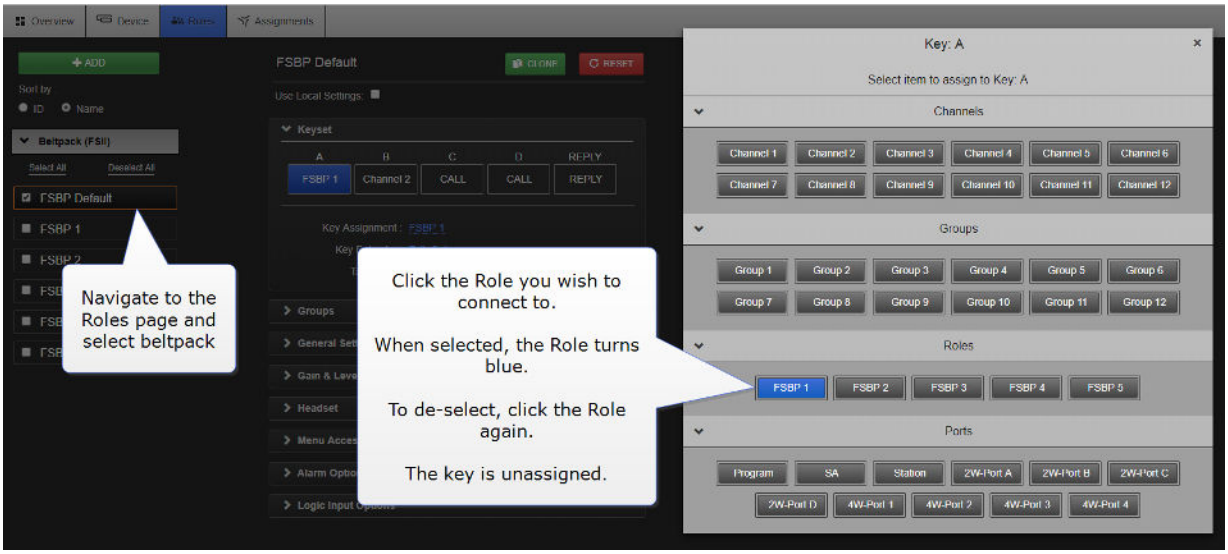


10.9 Configure a one-to-one connection

As well as into Channels, audio can be configured in a point-to-point relationship (for instance, one beltpack to another in a private communication).

10.10 Example point-to-point audio assignment

When selecting an audio source for any key, (in this example key C on a beltpack), instead of selecting a Channel, select a beltpack Role or port.



This creates a point-to-point connection. A similar effect could be achieved by putting two beltpacks into a Channel of their own.

11 Interconnecting intercom systems

You can connect FreeSpeak II Base to a range of intercom systems.

- Clear-Com Encore and RTS (2-wire cabled partyline systems)
- DX210 (2-wire/4-wire systems)
- Eclipse (digital matrix systems)
- HelixNet (digital partyline)
- Two-way radio systems
- FreeSpeak II Base can be connected to another FreeSpeak II Base station in order to share Channels between two Bases, increasing the range of your system.

Note: *When connecting the base to other systems, you must connect the grounding screw to a good earth in order to prevent audio problems.*

11.1 How do I connect to other intercom devices?

When connecting FreeSpeak II Base to other intercom devices, the general process is the same, though there are details that change according to device type. As a general guideline you need to:

1. Configure the relevant interface (port) settings (see below)
2. Connect the device with CAT5 or microphone cable
3. Adjust audio levels as required

11.2 Connecting 2-wire equipment

When connecting 2-wire equipment the following functions should be taken into consideration:

- Auto-null. Every time equipment is changed on a 2-wire interface (port) you should run auto-null.
- Enable/disable the partyline power. Do this in Ports/2-Wire. Default setting: Disabled.
- Enable/disable Line termination. The line should only be terminated once on interconnected devices, do not terminate on more than one piece of equipment. Default setting: Disabled.

These functions can be set either in the 2-wire port settings page of the Core Configuration Manager (CCM) or from the front panel screens on the Base Station.

11.3 Connecting to 4-wire equipment

When connecting to 4-wire equipment the following need to be taken into account:

- To minimise noise, use screened (shielded) cable when connecting 4-wire ports.
- Pin-out configuration (mode) can be set on all FreeSpeak II Base 4-wire interfaces. This is a software switch that switches the configuration of the pins on the RJ45 connectors, according to the device you are connecting to. Default setting: **To Matrix**. See Port Function.

11.4 Port Function

Clear-Com products are designed so matrices can connect directly to panels/Base Station/main station using a straight-through CAT 5/6 (Ethernet) cable. The pin assignments (inputs and outputs) on these devices are complementary. Previously, a crossover cable was necessary when connecting Bases to other Bases. It is no longer necessary to use a crossover cable as there is now a Port Function toggle which changes pinouts as required. This is function is found in port options and can be set from the CCM or the Base Station front panel menus.

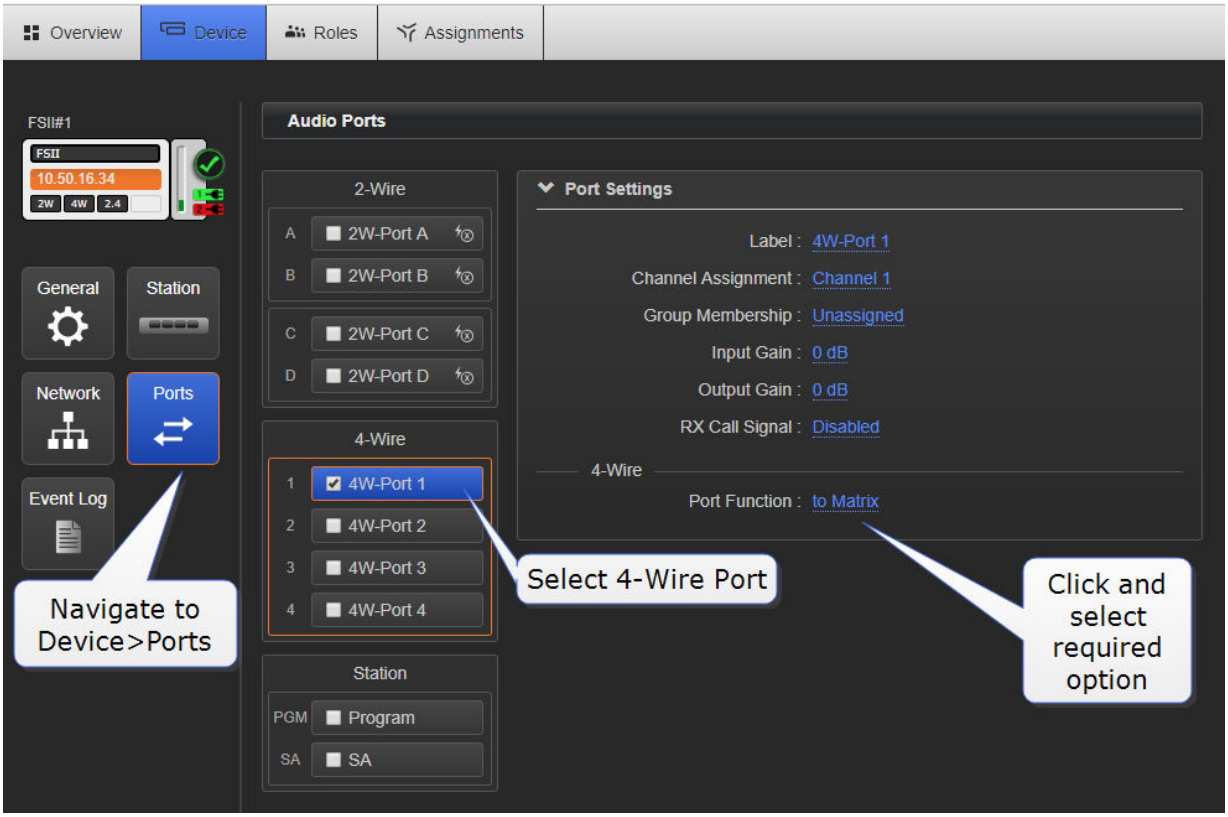
11.4.1 Pin Assignments

Port Function pin assignments		
Pin	**To Panel/Base Station**	**To Matrix**
1	Data in +	Data out +
2	Data in -	Data out -
3	Audio in +	Audio out +
4	Audio out +	Audio in +
5	Audio out -	Audio in -
6	Audio in -	Audio out -
7	Data out +	Data in +
8	Data out -	Data in -

When connecting one FreeSpeak II Base to another FreeSpeak II Base, one device must be set To Matrix and the other To Panel.

11.4.2 How do I set Port Function (pin polarity)?

Set Port Function in the CCM



12 Using General Purpose inputs and outputs (GPIOs)

FSII Base II software version 1.5.1 and above offers **six fully configurable GPIOs**, increasing the range and possible uses of controls and relays.

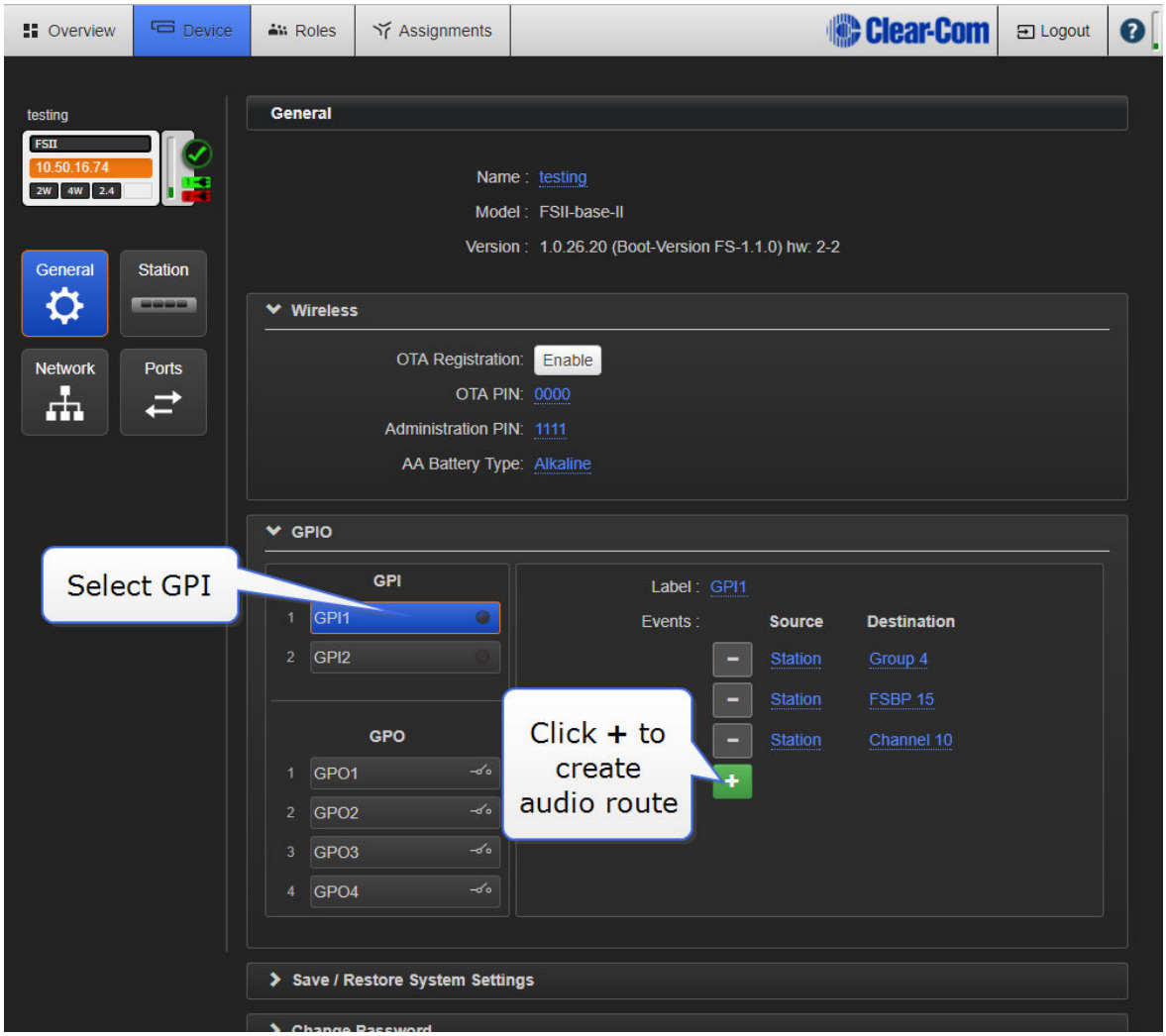
Earlier versions have limited GPIO functionality (an output fires on Stage Announce only).

- 2 x GPIs. These can be used, for example, to allow the station operator to open an audio route to a Channel using a foot switch, or to route a program feed to a Channel, Group or beltpack when an on-air light comes on. Each input control can be used to generate up to 10 different audio routes.
- 4 x GPOs. The most common uses for output relays are to turn on an on-air light, connect to a radio and send an input to an external audio console. Each GPO can be triggered by up to 10 different actions.

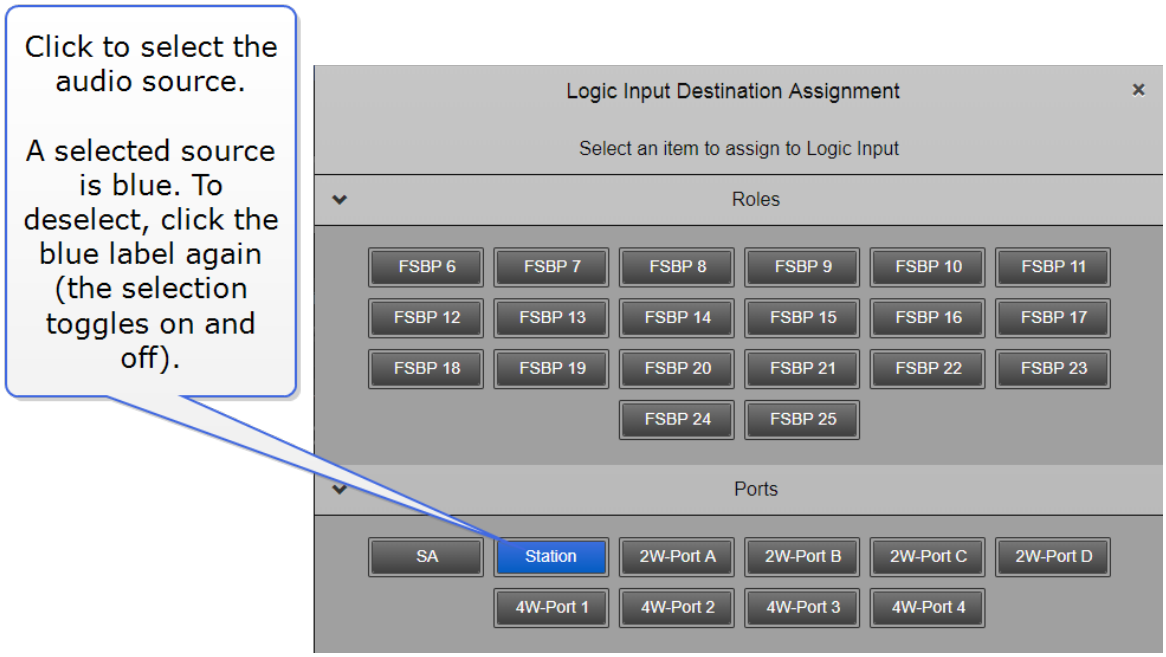
Relays and GPIOs are configured in the **General** page of the Core Configuration Manager (CCM).

12.1 How to configure a GPI when using FSII Base II

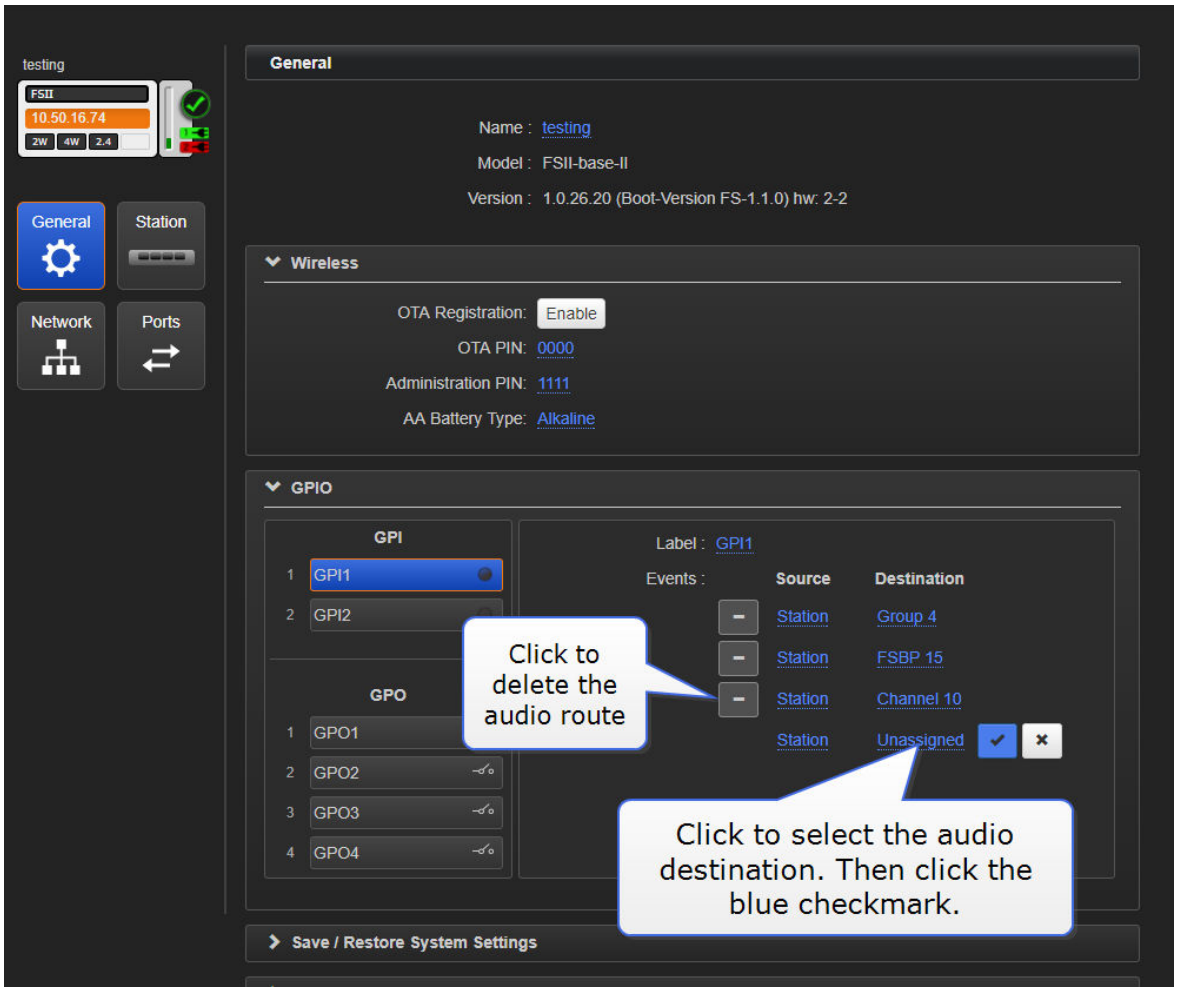
1. In the CCM, navigate to **Device>General**.


Overview
Device
Roles
Assignments
Clear-Com
Logout
testing
FSII
10.50.16.74
2W
4W
2.4
General
Station
Network
Ports
General
Name : testing
Model : FSII-base-II
Version : 1.0.26.20 (Boot-Version FS-1.1.0) hw: 2-2
Wireless
OTA Registration: Enable
OTA PIN: 0000
Administration PIN: 1111
AA Battery Type: Alkaline
GPIO
Select GPI
GPI
1 GPI1
2 GPI2
GPO
1 GPO1
2 GPO2
3 GPO3
4 GPO4
Label : GPI1
Events :
Source
Destination
Station
Group 4
Station
FSBP 15
Station
Channel 10
Click + to create audio route
Save / Restore System Settings

2. Select the audio source.



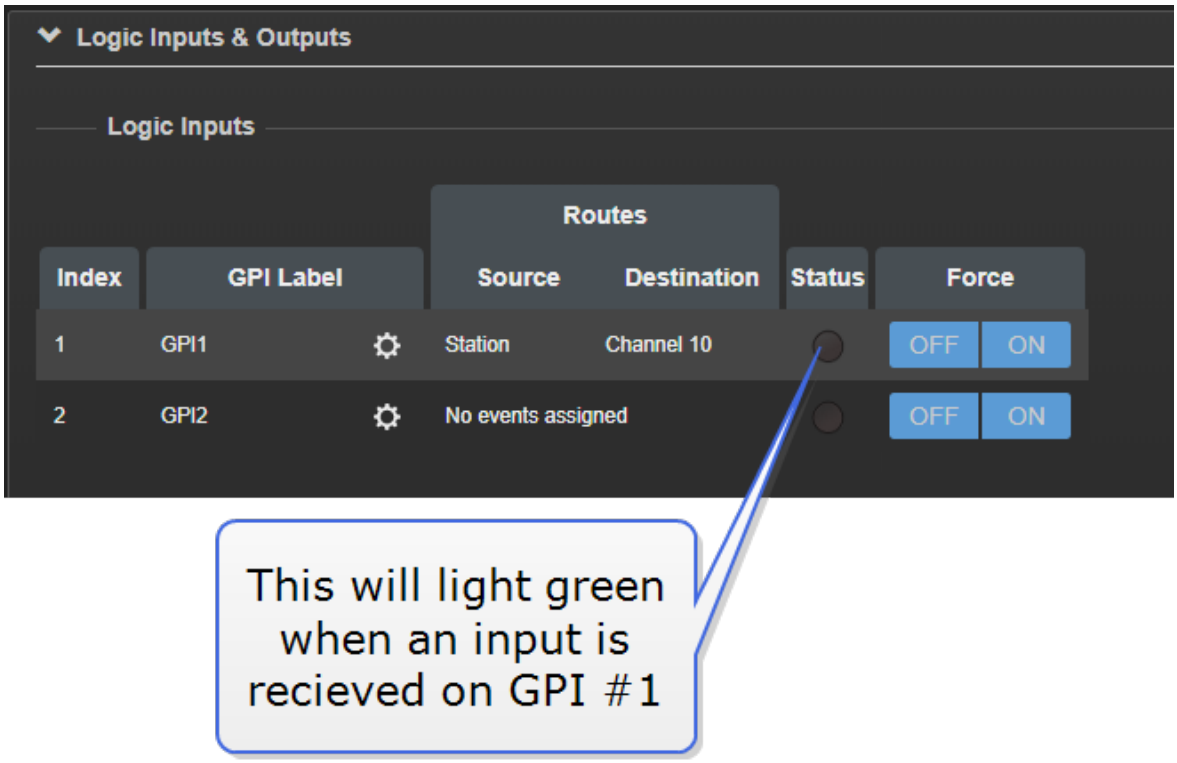
3. Select the audio destination



4. Name the GPI

In this example, an audio connection will be created between the Base Station headset and the destinations (Channel, beltpack, and port) whenever **Footswitch** generates an input.

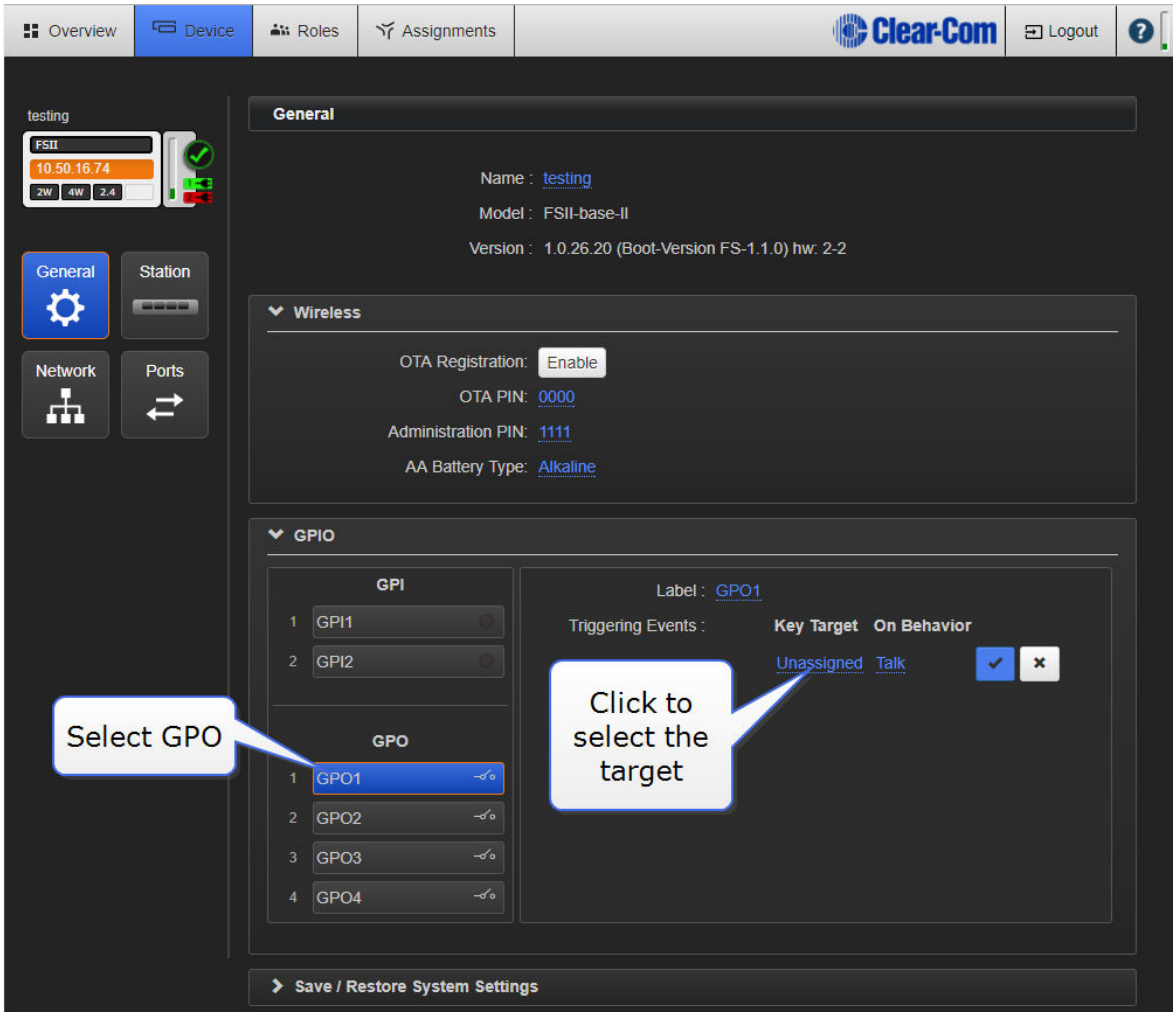
The GPI trigger can be seen in the **Overview** page of the CCM.



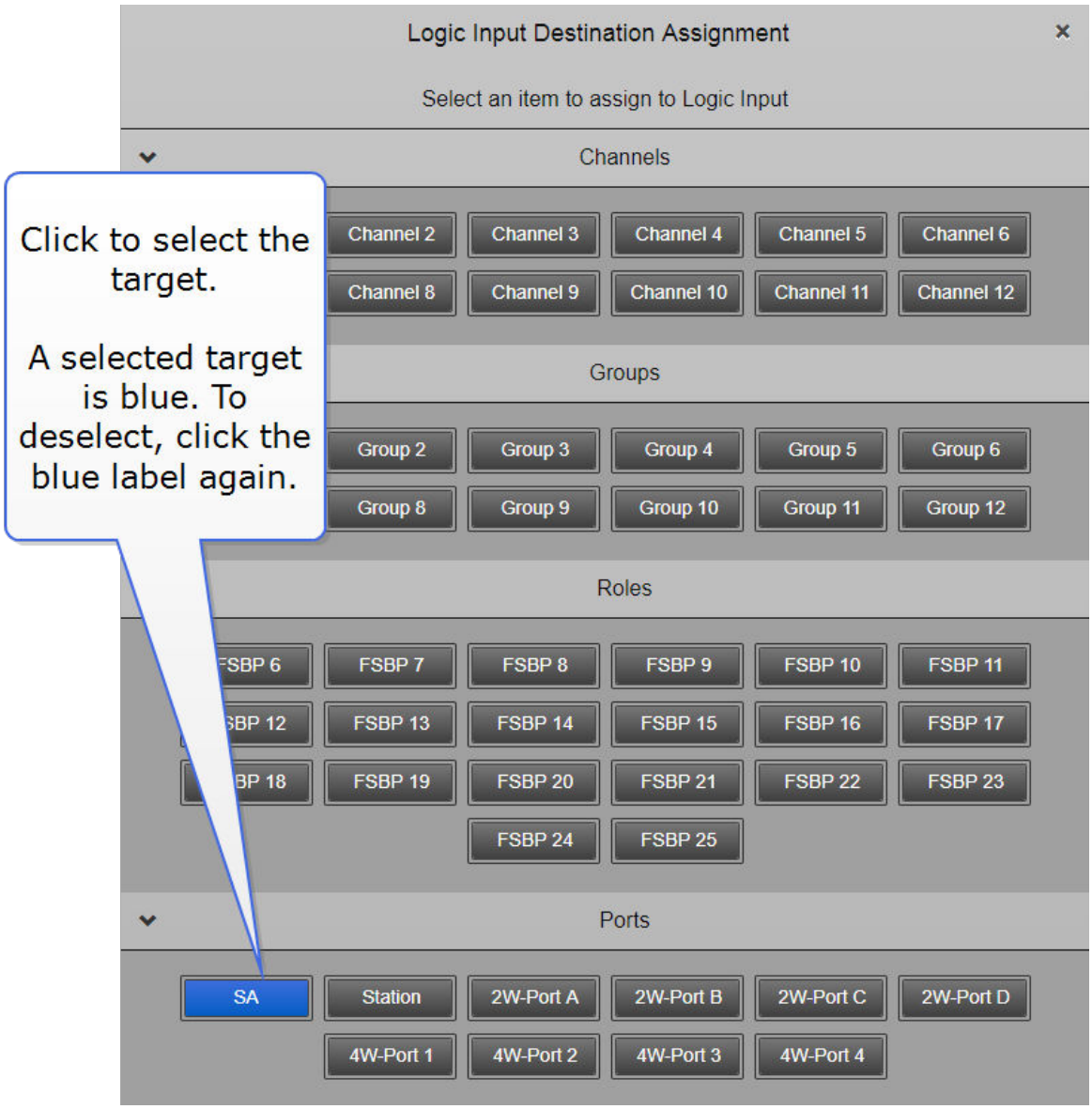
Note: *Each GPI can be used to generate up to 10 different audio routes.*

12.2 How to configure a GPO when using FSII Base II

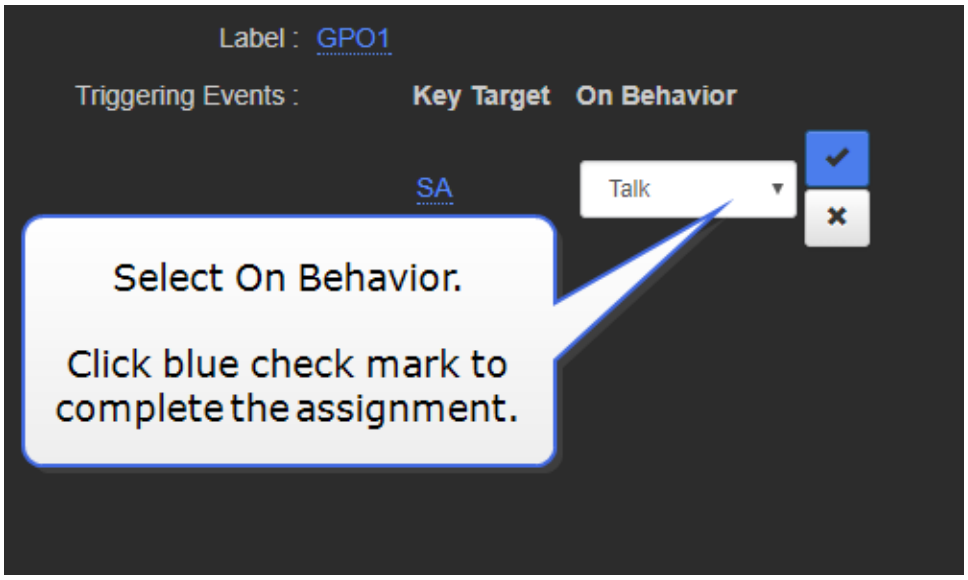
1. In the CCM navigate to **Device>General**.


Overview
Device
Roles
Assignments
Clear-Com
Logout
testing
FSII
10.50.16.74
2W
4W
2.4
General
Station
Network
Ports
General
Name : testing
Model : FSII-base-II
Version : 1.0.26.20 (Boot-Version FS-1.1.0) hw: 2-2
Wireless
OTA Registration: Enable
OTA PIN: 0000
Administration PIN: 1111
AA Battery Type: Alkaline
GPIO
GPI
1 GPI1
2 GPI2
GPO
1 GPO1
2 GPO2
3 GPO3
4 GPO4
Label : GPO1
Triggering Events :
Key Target
On Behavior
Unassigned
Talk
Select GPO
Click to select the target
Save / Restore System Settings

2. Select the target

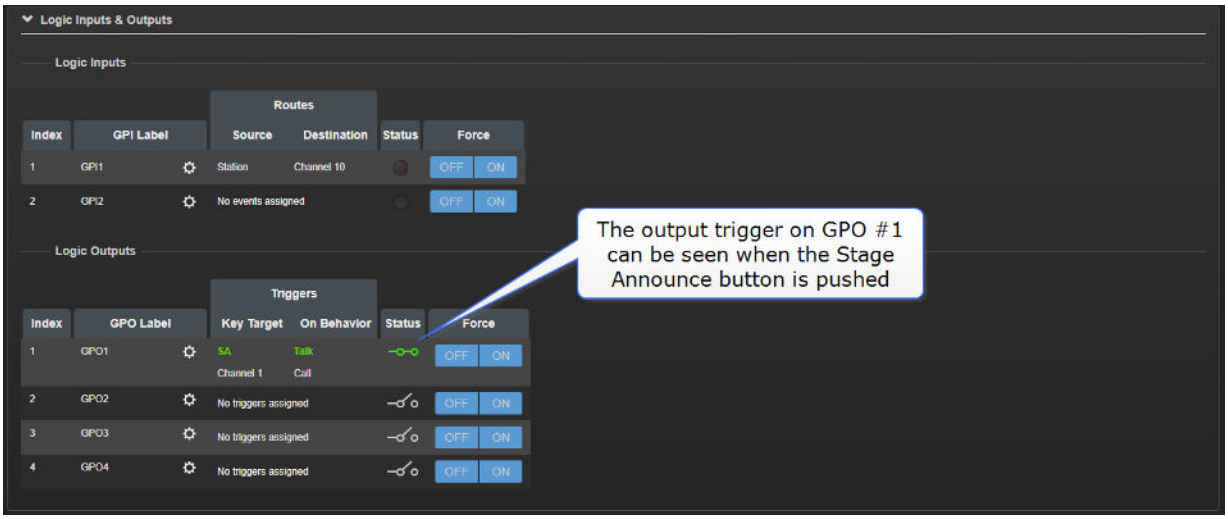


3. Select the behavior that triggers the GPO.



In this example, where the target is set to **Stage Announce**, and the behavior is set to **Talk** , an output trigger is sent whenever the Stage Announce button on the Base is pressed. This replicates existing functionality, but the GPOs can be set to any configuration you require. You can set up to 10 actions on each GPO.

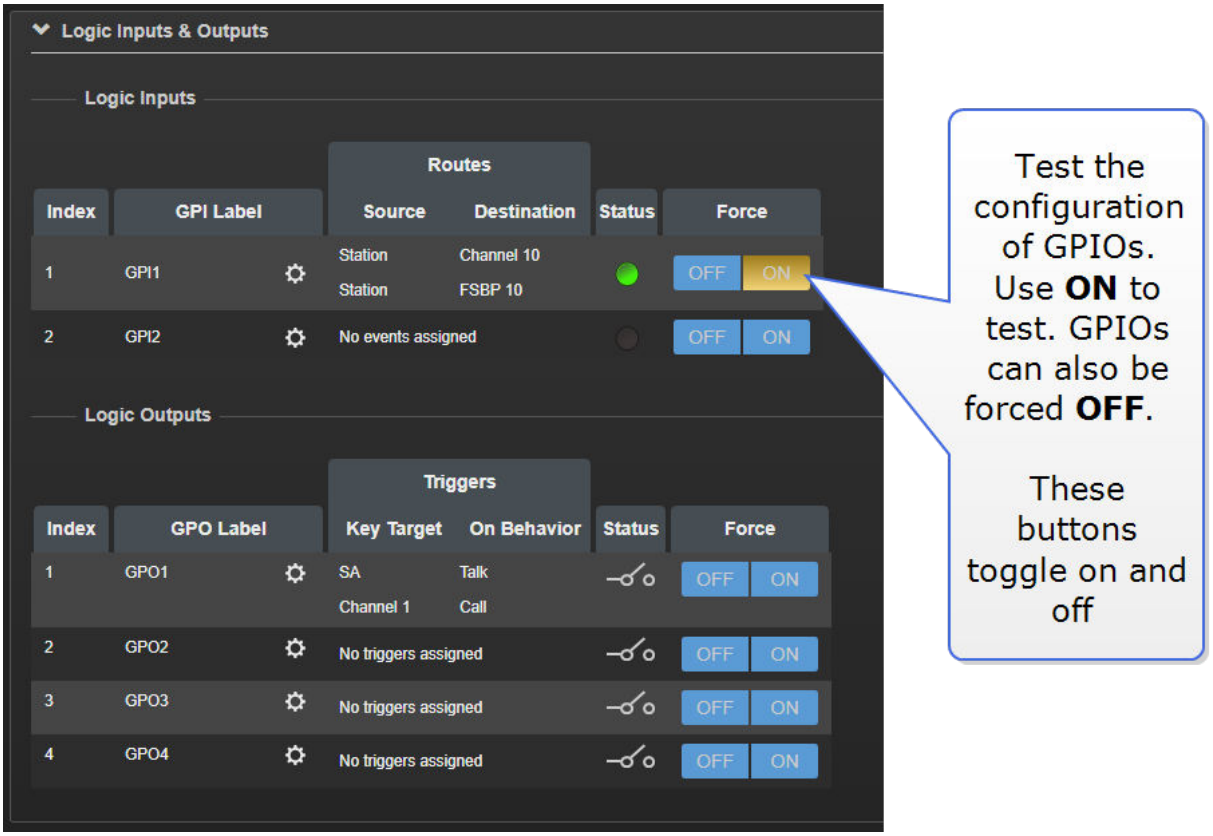
The GPO can be seen in the **Overview** page of the CCM.



Note: *You can set up to 10 actions on each GPO.*

12.3 Test GPIOs

The configuration of the GPIOs can be tested (without connecting an external device) in the **Overview page** of the CCM.



For more information, see:

GPIO/DB15 connector (K) on page 20

12.4 Control Events

When using FreeSpeak II, Control Events are used to trigger an event on an action (usually a crosspoint).

For example, the system can be configured to send a call signal to turn on an FOR22 radio when a beltpack talks in a channel.

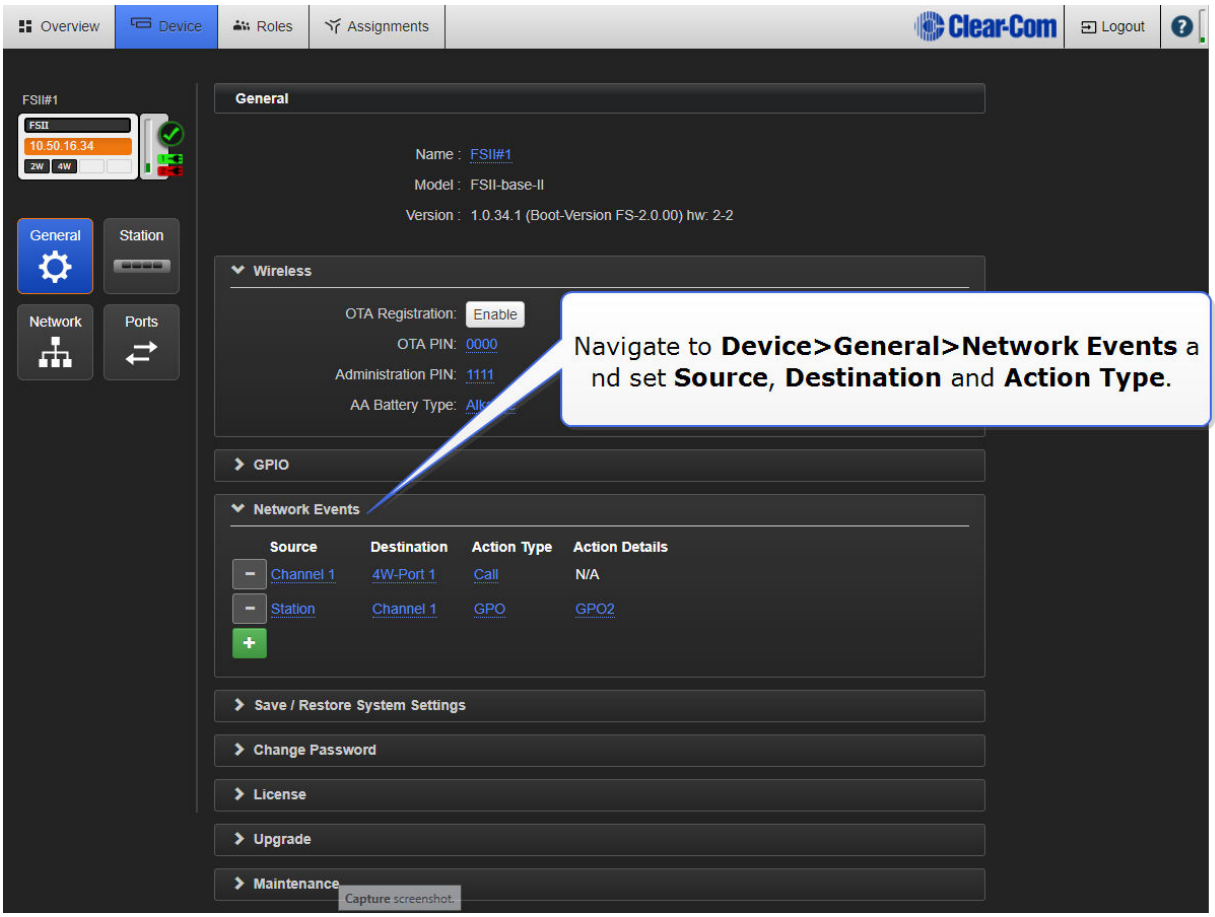
To use Control Events you must select a source and a destination and then set the type of action you want to happen when the source contacts the destination.

Possible source type	Possible destination type	Action type	Details
• Channel • Group • Beltpack • Port	• Channel • Group • Beltpack • Port	• **GPO**. There are 4 GPOs to chose from. • **Call**. A call signal is sent automatically from the destination.	• Chose from 1 – 4. • No further action required.

Possible source type	Possible destination type	Action type	Details
		• Xpt.	• Set new source and destination.

12.4.1 Control Events, example configurations

To set Control Events, in the CCM navigate to **Device>General>Control Events**. Set the source, destination and action type as required.



1. Configure trigger for an FOR22 radio (example)

Source	Destination	Action type	Action details
Channel 1	2-wire or 4-wire port	Call	No configuration necessary. A call signal is automatically sent from the port and this activates the FOR22.

2. Turn on an on-air light when the Base Station user talks to Channel 2 (example)

Source	Destination	Action type	Action details
Station	Channel 2	GPO	GPO2 fires when Station talks to Channel 2

13 Upgrading Base Station and devices

You can upgrade the whole FSII system, including Base Station, transceivers and beltpacks, as a system upgrade. You can also upgrade individual components of the FSII system.

13.1 System upgrade

To upgrade your base station and devices, you must import the upgrade files provided by Clear-Com into the Base Station. You can upgrade the Base Station firmware from the front panel or from the Core Configuration Manager (CCM). The procedure is the same for each device type.

Device type	File type (where xxxx = revision no.)
Base Station	FSII_xxxxx.gz
Beltpack	PP_xxxxx.FWW
Transceiver	RFP_xxxx.FWW

If upgrading the Base station, beltpack and transceiver software do in the following order:

1. Base Station. See **Upgrading the Base Station from the CCM on page 129** and **Upgrading the Base Station from the front panel on page 131**.
2. Transceivers. See **Upgrading the transceiver on page 131**.
3. Beltpacks. See **Upgrading the beltpacks on page 132**.

The following points apply:

- After a Base Station upgrade or a beltpack upgrade, you do not need to re-register beltpacks. They will automatically reconnect to the Base Station.
- For large systems, Clear-Com recommends that you upgrade beltpacks in batches of five to ten. See **Upgrading the beltpacks on page 132**.

13.1.1 Verifying the system upgrade

After a system upgrade, verify that the upgrade is successful as follows:

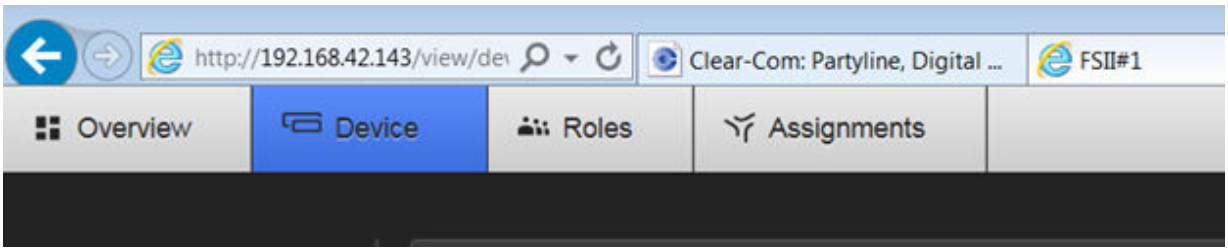
1. Ensure that all components of the FSII system are connected and working.
2. Do one of the following:
   a. From the Base Station front panel, press the **Mode** key. The Base Station is now in diagnostic mode. The first display shows a list of connected beltacks, and the third display shows a list of connected transceivers. Each display shows the firmware

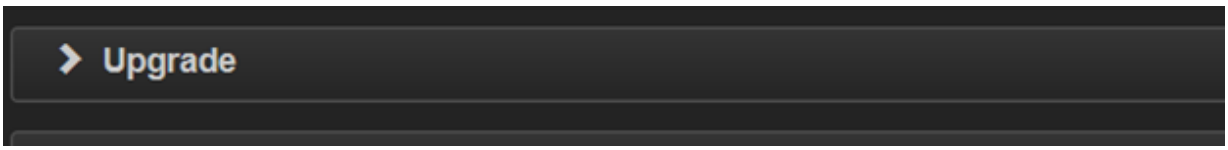
version that the corresponding beltpack or tranceiver is using. Use the encoders to scroll down the list of connected beltpacks and transceivers, and ensure that the correct firmware is installed for each beltpack and transceiver.

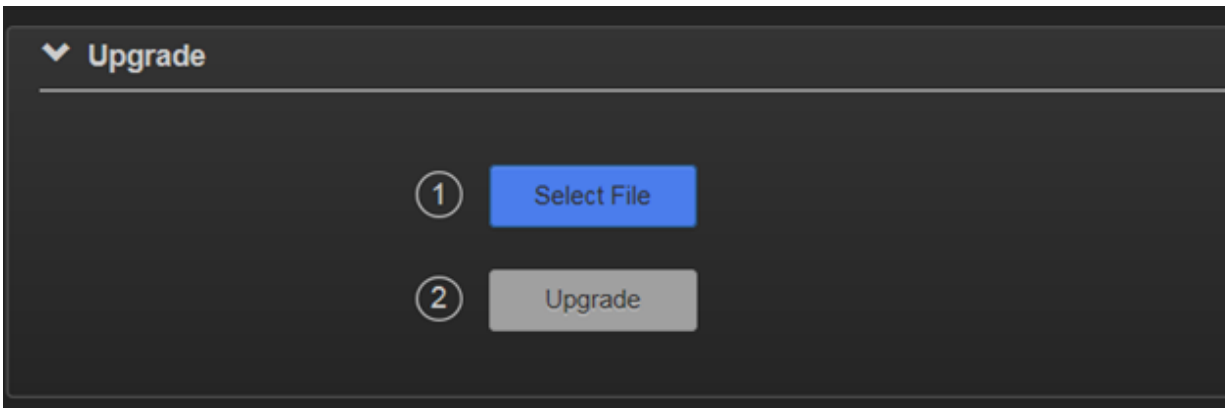
b. From the CCM, navigate to the **Overview** page. This page displays each beltpack and transceiver connected to your system. Right-click on any device to display its firmware version.

13.2 Upgrading the Base Station from the CCM

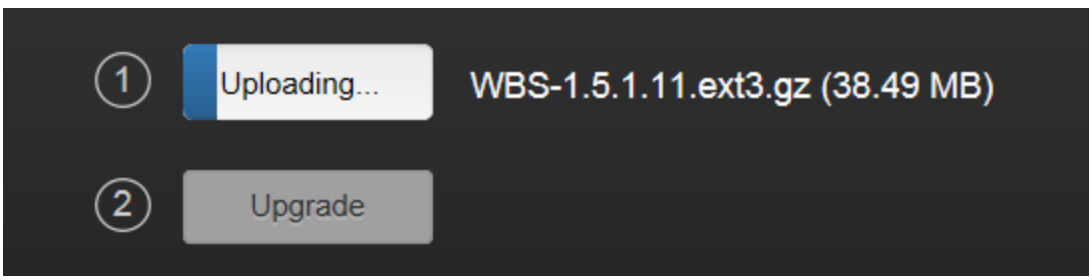
1. From the device tab, navigate to **Upgrade**.







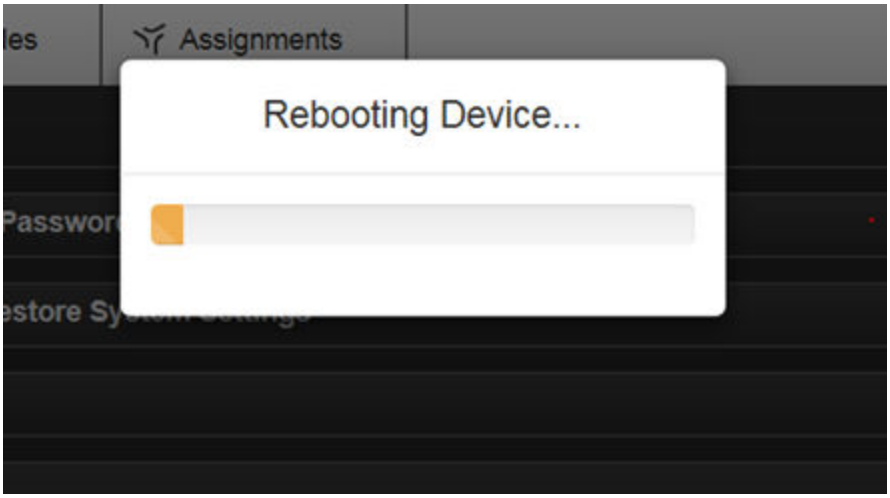
2. Select the file to upload



3. Once validated, click **Upgrade**.

The upgrade will start and the CCM displays a status bar.

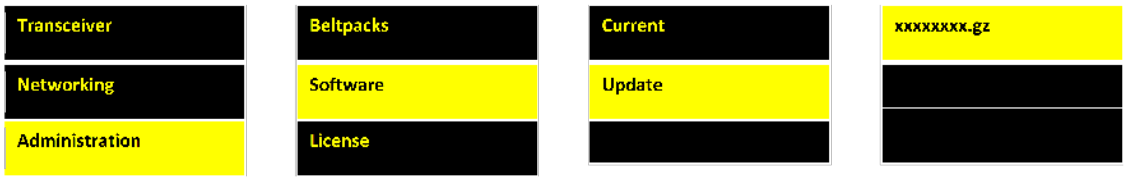
When the upgrade is completed, the Base Station will reboot.



The new firmware version will be displayed in **Device > General**.

13.3 Upgrading the Base Station from the front panel

1. Insert a USB memory stick containing the firmware file into the Base Station. The firmware file (FSII_xxx,xx.gz) must be in the root directory (it cannot be in a folder).
2. Press the **Menu** key.
3. Scroll to **Administration > Software > Update**.

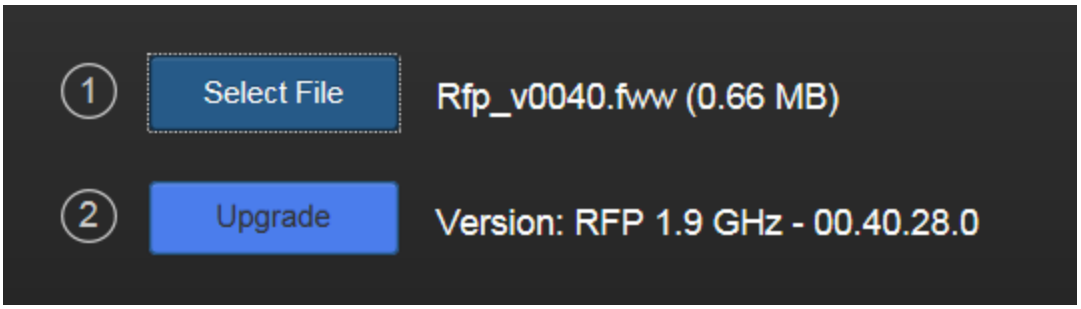


4. Select **Update**.

The system will reboot when software update is completed.

13.4 Upgrading the transceiver

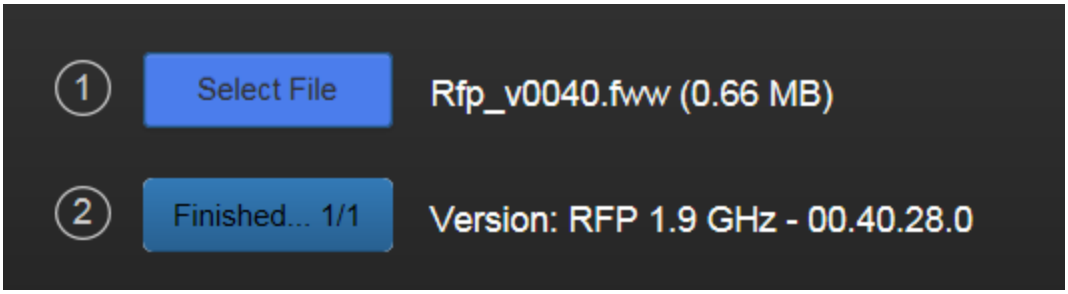
1. Select the file to upload and validate.



2. Select **Upgrade**.

The transceiver will flash amber light during upgrade, and the green light will be on.

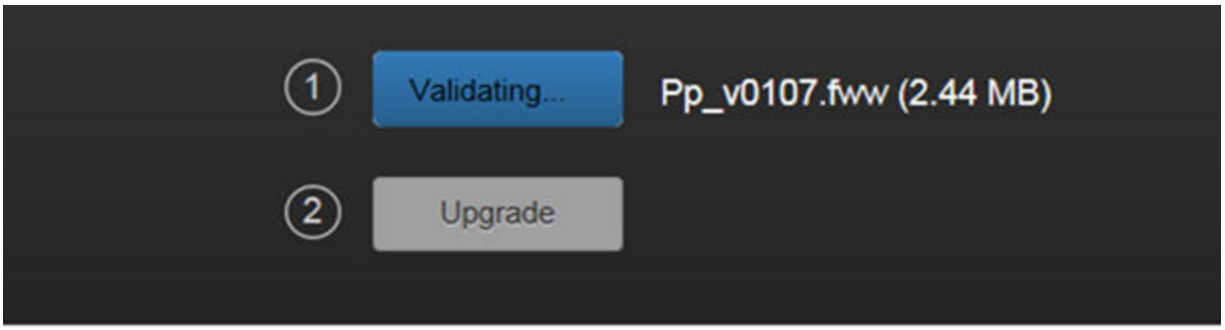
When the upgrade is complete, the CCM displays **Finished**. The upgrade takes 1 to 2 minutes.



13.5 Upgrading the beltpacks

1. Select the firmware file to upload.

2. Once Validated, select **Upgrade**.



Upgrading will take five to ten minutes. The beltpack screen will go black. The A and B keys will be green while validating.

The beltpack screen will display Firmware update with Status during update.

Note: *If a beltpack upgrade stops unexpectedly, reboot the beltpack. The upgrade will restart.*

The beltpack will reboot, and you will need to select role.

For large systems, Clear-Com recommends that you upgrade beltpacks in batches of five to ten. To do so:

1. Power down all your beltpacks.
2. Power up a batch of between five and ten beltpacks, and begin the upgrade.

3. When the upgrade is complete power down the beltpacks, and repeat this procedure with a new batch of five to ten beltpacks.

14 Specifications

14.1 Base Station

Specification	Value
Base Station to beltpack frequency response	100 - 7.1 Hz
Number of FS II beltpacks per Base Station	5 (FS-BASE-II-5) or 25 (FS-BASE-II), depending on model
Number of transceivers (FS-TA) supported by Base Station	2 direct or 10 via transceiver splitters
Number of transceiver ports	2 x RJ45 & 2 x Fiber (2 active at any time)
Programming port	2 x LAN
GPIO port	DB15: • 4 x relay outputs, normally open and normally closed wiring • 2 x GPI
Partyline: A,B,C,D	• XLR-3F, **ON/OFF** termination control. • Power **ON/OFF** (A/B, C/D paired)
4 -wire	4 X RJ45 for 4-wire
Program input	XLR-3F, transformer isolated, line-level input, indpendent Program Input level control via rotary encoder
Stage Announce output	XLR-3M, transformer isolated, line-level output with dedicated front panel Talk key
Radio frequency (RF) sync	Rear RF input and output sync connectors

Specification	Value
Power input	• Internal power supply with IEC C14 connector (male) • DC input connection for 12V DC. • The Base Station is a class II device.
Power specification	• Input - 100 to 240V AC, 1.4A max. • Output - 12V DC, 60W, 5A • Current draw - 12V, 4A max., 48W max.
Front panel headset	4-pin (or 5-pin male connector depending on model). Automatic mic detect
4 x programmable front panel keysets	• 128 x 64 OLED • Talk and Call keys with LEDs • Listen key on rotary encoder for level control (with LED)
Front panel buttons	• Headset mic ON/OFF • Monitor display (**Mode**) • Configuration **Menu** • Stage announce Talk (**SA**) • **All Talk** • Remote mic kill (**RMK**)
Front panel indicators	• Transceiver status • Beltpack status
Front panel encoders	Program input level control with cut and LED indication
Dimensions	1 RU: 44 x 442 x 250 mm (1.75 x 17.4 x 9.8 inches)
Weight	Approx 2.3 kg (5 lb)

14.2 FreeSpeak II Base II 4-wire analog ports, input and output

4-wire ports - input	
Level	0 dBu nominal /18 dBu max.
Impedance	200 ohms balanced
Frequency Response	80 Hz – 22 kHz ± 3 dB
Distortion	<0.2 %, @ 0 dBu (80 Hz to 22 kHz)

4-wire ports -output	
Level	0 dBu nominal /18 dBu max.
Impedance	>10K Ohms balanced
Frequency Response	80 Hz – 22 kHz ± 3 dB
Distortion	<0.2 %, @ 0 dBu (80 Hz - 22 kHz)
On Noise	< – 62 dBu (80 Hz - 22 kHz)

14.3 FreeSpeak II Beltpack

Specification	Value
Beltpack frequency response	100 Hz – 7.1 kHz
Beltpack assignment-select buttons	Four buttons (A, B, C and D) used for intercom and menu operation
Number of full-duplex audio paths	4, with individual level control. Up to 7 talk paths when using XLR7 headset with PTT.
Level controls	2 top-mounted rotary encoders
Headset connector	XLR-4M, Clear-Com standard. Option for XLR5 or XLR7 headsets.
Headphone impedance	≥ 32 ohm
Microphone type	Dynamic or electret, selectable in beltpack menu

Specification	Value
Input level	-70 to -40 dBu
Electret microphone voltage	2.3V
Microphone and headset limiters	Selectable in beltpack menu
Powering	Li-Ion Battery, 3 AA alkaline cells
Battery charging	5 way AC60 charger or using Micro USB connector on the beltpack. The unit will not charge AA batteries.
Battery life	Approximately 18 hours using Li-ion batteries. Approximately 12 hours using AA batteries.
Range from single FSII-TCVR transceiver	Up to 500 m from transceiver/transceiver in line-of-sight conditions; 50 m indoors; use multiple transceivers for larger, custom coverage areas.
Approx. dimensions	38 x 130 x 100 mm (dwh) (1.5 x 5 x 3.75 inches)
Weight (with batteries)	Approx. 400g (9 oz)

14.4 FreeSpeak II Transceiver

Specification	Value
Beltpacks supported per transceiver	• FSII 1.9 GHz devices:5 in one cellular zone • FSII 2.4 GHz devices:4 in one cellular zone
Transceiver transmission range	Up to 500 m (1475 ft), line of sight
Maximum distance from Base Station using transceiver local powering	• 800 m (2625 ft.) using shielded 24 CAT 5e/6 AWG cable. • 400 m (1312 ft) using shielded 26 CAT 5e/6 AWG
Local Powering	Via 24VDC power supply

Specification	Value
Mounting	3 fixing holes
Dimensions	50 x 140 x 175 mm (dwh) (2.0 x 5.5 x 6.9 inches)
Weight	Approx. 460g (16.1 oz)

14.5 FreeSpeak II Splitter

Specification	Value
Number of transceivers supported	5
Number of splitters per Base Station	2
Connection between Base Station and splitter or connection between splitter and transceiver.	4-pair shielded CAT5e/6 cable with RJ-45
Powering of splitter	Must be locally powered via external power supply
Maximum distance from splitter to transceiver (locally powered)	800 m (2625 ft) using shielded 24 AWG Cat5e/6 cable
Maximum distance from splitter to transceiver (no local power)	100 m (328 ft) using shielded 24 AWG Cat5e/6 cable
Maximum distance from splitter to transceiver (locally powered)	400 m (1312 ft) using shielded 26 AWG Cat5e/6 cable
Maximum distance from splitter to transceiver (no local power)	50 m (164 ft) using shielded 26 AWG Cat5e/6 cable

14.6 Transmission Method

Specification	Value
Method of RF operation	DECT and ISM standards, using two DECT timeslots per beltpack
Modulation	GFSK
Frequencies of operation	• FSII 1.9 GHz

Specification	Value
	1880–1900 MHz (Europe), 1920 – 1930 MHz (North America) • FSII 2.4 GHz 2400–2480 MHz (worldwide)
Maximum RF output	• 250 mW burst, average level 2 - 4 mW (Europe) • 100 mW burst, average level 2 - 4 mW (US)
Theory of Operation	Dynamic allocation of frequencies and handoff of beltpacks among the transceiver/transceivers up to their individual limit of 5 connected beltpacks at a time; each beltpack is assigned a “virtual port” within the Base Station.

14.7 Notice about Specifications

While Clear-Com makes every attempt to maintain the accuracy of the information contained in its product manuals, that information is subject to change without notice. Performance specifications included in this manual are design-center specifications and are included for customer guidance and to facilitate system installation. Actual operating performance may vary.

15 Regulatory compliance

Applicant Name: Clear-Com LLC

Applicant Address: 1301 Marina Village Pkwy, Suite 105, Alameda CA 94501, United States

Manufacturer Name: Clear-Com LLC

Manufacturer Address: 1301 Marina Village Pkwy, Suite 105, Alameda CA 94501, United States

Country of Origin: USA

Brand: Clear-Com

Caution: All products are compliant with regulatory requirements detailed in this document when the user follows all installation instructions and operating conditions per Clear-Com specifications

Caution: Use of accessories and peripherals other than those recommended by Clear-Com may void the product's compliance as well as the user's authority to operate the equipment.

15.1 FCC Notice

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 received, including interference that may cause undesired operation.

NOTE: 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 communication. 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.

Changes or modifications not expressly approved by Clear-Com, LLC, an HM Electronics, Inc. company could void the user’s authority to operate this equipment.

15.2 FCC/IC/EC RF Exposure Warning

- This product complies with FCC/IC/EC radiation exposure limits set forth for an uncontrolled environment.

- This product may not be co-located or operated in conjunction with any other transceiver or transmitter.

- The beltpack has been tested to comply with FCC/IC/EC RF Exposure requirements in body-worn position. Use of third party clips or holsters with the beltpack may not ensure compliance with FCC/IC/EC RF exposure requirements and should be avoided.

- To comply with FCC/IC/EC RF exposure requirements, the Antenna/Transceiver unit must be installed and operated at least 20 cm (8 inches) from any person.

15.3 Industry Canada Compliance Statement

This Class[A] digital device complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est soumise aux deux conditions suivantes:

(1) cet appareil ne doit pas provoquer d'interféence, et

(2) cet appareil doit accepter toute interféence radioéectrique subie, mêe si l'interféence est susceptible d'en compromettre le fonctionnement.

Cet éetteur exempt de licence est éuipéd'une antenne intéré. Cet éetteur exempt de licence n'est pas autoriséàfonctionner avec une autre antenne.

Cet appareil numérique de la class[*] est conforme à la norme NMB-003 du Canada.

15.4 Korean Notice

A급 기기 (업무용 방송통신기자재)
이 기기는 업무용(A급)으로 전자파적합기기로
서 판매자 또는 사용자는 이 점을 주의하시기
바라며, 가정외의 지역에서 사용하는 것을 목
적으로 합니다.

15.5 KCC 2.4Ghz warning

해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없음

15.6 European Union (CE mark)

CE

The CE marking indicates compliance with the following directives and standards, whenever applicable to the product in question.

Directives:

- Radio Equipment Directive 2014/53/EU
- Electromagnetic Compatibility Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU
- RoHS Directive 2011/65/EU

Standards:

- EN55022/EN55032
- EN55024
- IEC/EN60950-1
- EN300328
- EN301406
- EN301489
- EN50581

Warning:

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

15.7 Taiwan Statements

Taiwan NCC statement:

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾

Taiwan BSMI statement:

R45131

RoHS

警告使用者：

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

15.8 Customs Union EAEU

Russia

Regulatory Models for FSII System Products covered in this User Guide Manual

Regulatory model numbers:

Beltpack 2.4Ghz: BP2G4A

Beltpack 1.9Ghz: BP1G9

Transceiver 2.4Ghz: XCVR2G4A (Modular)

Transceiver 2.4Ghz: MER2G4TCVR (end-device)

Transceiver 1.9Ghz: XCVR1G9 (end-device)

Battery Charger: AC60

Battery Pack: BAT60

15.9 Waste Electrical and Electronic Equipment (WEEE)

The European Union (EU) WEEE Directive (2012/19/EU) places an obligation on producers (manufacturers, distributors and/or retailers) to take-back electronic products at the end of their useful life. The WEEE Directive covers most Clear-Com products being sold into the EU as of August 13, 2005. Manufacturers, distributors and retailers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging which indicates that this product was put on the market after August 13, 2005 and must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of the user's waste equipment by handing it over to a designated collection point for the recycling of WEEE. The separate

collection and recycling of waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local authority, your household waste disposal service or the seller from whom you purchased the product.