



# MOTOTRBO FEATURE CATALOG

VERSION 2.3  
29-JUN-2015



# HOW TO USE THIS CATALOG



**Feature Name**

**Category icon**

**Click to return to index (Presentation mode)**

**Single sentence summary**

**Full description**

**Radio Compatibility:**

- Standard (solid outline)
- Optional (dotted outline)
- Not available (strikethrough)

**Link to video (if available)**

**Memorable Tagline**

**Catalog version**

## INTELLIGENT AUDIO

**Summary:**

- Your radio monitors background noise and adjusts the speaker volume, so you don't have to.

**Detail:**

- Intelligent Audio is a receive-only feature that enhances the audibility of voice calls.
- It uses the radio or accessory's microphone to monitor levels of background noise. When it detects that the radio is in a loud environment, the speaker volume is automatically increased. When in a quiet environment, the volume is automatically reduced.
- The radio's volume can still be adjusted using the volume knob, but this feature eliminates the need for continual adjustment.
- Accessories are not required, but selected accessories are supported.



- SL7500
- XPR7550IS
- XPR7500
- XPR7300
- XPR6580IS
- XPR6500
- XPR6300
- XPR6100
- XPR5500
- XPR5300
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- XPR4300
- XPR3500
- XPR3300
- XPR2500
- ~~SL300~~
- ~~CM3000~~
- ~~CM2000~~
- ~~CP2000~~

### YOUR CALLS, ALWAYS AT THE PERFECT VOLUME

V2.3

**NOTE: ONLY DIGITAL FEATURES ARE LISTED**



# CATEGORIES



AUDIO



EFFICIENCY AND PRODUCTIVITY



SAFETY AND SECURITY



CONNECTIVITY



SYSTEMS



# INDEX PAGE 1



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## EFFICIENCY AND PRODUCTIVITY

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IMPRES™ Audio

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Priority Monitor Scan

Screen Backlight Configuration

Windporting

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Hospitality Work Order  
Ticketing

User-Selectable Audio Profiles

IMPRES™ Energy

IMPRES™ Battery  
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Trill Enhancement

Option Board

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Management

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## SAFETY AND SECURITY

Restricted Access to System

Enhanced Privacy

Transmit Interrupt

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Emergency Search Tone

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Radio Disable / Enable

Man Down

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Basic Privacy

## CONNECTIVITY

Bluetooth Audio

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Pre-Configured  
Telephone Patch

## SYSTEMS

Direct Mode / Talkaround

Single Site Conventional

IP Site Connect

Capacity Plus

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Connect Plus

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# INTELLIGENT AUDIO



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# IMPRES™ AUDIO



## Summary:

- Your radio works seamlessly with your accessories to ensure that every call is heard perfectly.

## Detail:

- Your MOTOTRBO radio contains a digital signal processor (DSP) that fine-tunes the audio signal from the microphone, enhancing clarity and reducing background noise. IMPRES™ audio accessories communicate their own unique set of audio parameters to the radio's DSP, to further optimize the audio processing.
- IMPRES technology also optimizes Automatic Gain Control (AGC) to compensate for variability of input level. Maybe some of your users don't speak directly into the microphone while they are operating machinery; maybe some others have to shout over heavy background noise, maybe others work in an environment that requires them to speak quietly. The IMPRES audio AGC optimizes the signal level so all these users are heard at a similar volume.
- A compatible IMPRES audio accessory is required.



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I HEAR YOU, HOWEVER YOU SPEAK



# WINDPORTING



## Summary:

- Your RSM minimizes wind noise, so you can communicate clearly in difficult weather.

## Detail:

- Wherever you work – in howling wind, driving rain, and severe weather – Windporting helps you communicate effectively and helps listeners hear clearly.
- Windporting technology eliminates the booming and howling sounds of wind blowing across your lapel microphone or remote speaker microphone. It also prevents water from clogging the microphone for clearer transmissions.
- Windporting is only available on selected accessories.



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# ACOUSTIC FEEDBACK SUPPRESSOR



## Summary:

- Your radio blocks acoustic feedback from other radios to eliminate unpleasant “howling”.

## Detail:

- Audio Feedback Suppressor is a receive-only feature that improves the overall ability to communicate in the presence of acoustic feedback.
- If you’ve ever been near to a colleague when making a group call, you’re familiar with the acoustic feedback that can result: the audio coming out of the speaker feeds back into the microphone until nobody can hear anything except an unpleasant “howling” noise.
- The latest MOTOTRBO software alleviates this irritating problem. Using a sophisticated software algorithm, your radio is able to recognize the audio feedback from nearby radios and discard it. Now you never need to step away from your colleagues to make a call. And you can trust that your radio will allow your clients to enjoy their peace and quiet.
- This feature was introduced in software release 2.2A



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YOU’LL NEVER NEED TO STEP AWAY TO MAKE A CALL





# AUTOMATIC GAIN CONTROL (AGC)



## Summary:

- Everyone can be heard clearly, whether they whisper or shout into the microphone.

## Detail:

- The DMR vocoder delivers excellent voice quality even when there is high background noise and poor signal conditions – but to produce optimal voice quality, the input level into the vocoder must fall within a specific range: This is difficult, as each user has their own individual style: some hold the microphone close to their mouth; some speak loudly over background machinery, and some use a visor microphone or RSM that doesn't even face their mouth.
- To address this, MOTOTRBO digital employs Automatic Gain Control (AGC) in the audio transmit path. Its primary function is to produce the best voice quality possible under real life conditions. IMPRES audio builds on this technology to deliver optimal voice quality over an even greater input range.
- A secondary function of AGC is to produce uniform speech loudness at the receiving radio: soft talkers, shouters and users who turn away from the microphone will still come through loud and clear.



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**BETTER AUDIO IN REAL LIFE CONDITIONS**

**V 2.3**



# MICROPHONE DISTORTION CONTROL



## Summary:

- Your radio adjusts its microphone to match your voice, so your call is never distorted.

## Detail:

- This is a transmit-only feature. It improves voice quality when the user is speaking loudly into the microphone, and works alongside the standard AGC (Automatic Gain Control) of the radio.
- The radio continuously monitors the quality of the speech data as it is being processed. When it detects early signs of audio distortion, perhaps by someone speaking loudly over background noise, the radio reduces the sensitivity of the microphone until the distortion disappears.
- Microphone Distortion Control is a natural extension of the Automatic Gain Control (AGC) feature, as it monitors and controls distortion of the transmit audio.
- This feature was introduced in software release 2.2A.



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**CRISP AUDIO, HOWEVER LOUDLY YOU SPEAK**



# SWITCH SPEAKER



## Summary:

- You can switch audio from your headset to your radio's speaker without unplugging.

## Detail:

- This feature allows you to direct the audio stream to either an attached accessory or to the radio speaker, without the need to detach the accessory.
- In some situations, you need to wear an earpiece or headset in the office, but take it off when you head outside.
- Previously, the radio's internal speaker would be muted whenever an audio accessory was attached to the radio.
- Now, with the Toggle Audio feature, you can send the audio in either direction without disconnecting the headset or earpiece. The feature is activated through the radio menu or by pressing a pre-programmed button.
- This feature was introduced in software release 2.4.



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# USER-SELECTABLE AUDIO PROFILES



## Summary:

- Your radio's audio characteristics can be tuned to suit your preference and your workplace.

## Detail:

- Everyone's hearing is different. Depending on age and work history, you may have reduced sensitivity to certain frequencies. It doesn't help when your work environment has variable background noise.
- This feature allows you to customize the audio of the radio to suit your preference and work environment. You can select from two different "ambience" settings and six different audio profiles.

### Ambience profiles:

- **Default**
- **Loud:** For loud environments: increases volume and noise suppression
- **Work Group:** For quiet environments: enables feedback suppression

### Audio Profiles:

- **Default**
- **Level 1:** Mild compensation, for users exposed to industrial noise
- **Level 2:** Moderate compensation, for users exposed to industrial noise
- **Level 3:** Maximum compensation, for users exposed to industrial noise
- **Treble Boost:** For a "brighter" sound
- **Mid Boost:** For a more "nasal" tone – similar to legacy radios
- **Bass Boost:** For a deeper sound

- This feature was introduced in software release 2.4.



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# TRILL ENHANCEMENT



## Summary:

- Your radio reproduces more languages with better accuracy.

## Detail:

- The AMBE+2™ vocoder (AMBE = Advanced Multi-Band Exciter) is the industry standard algorithm for converting speech into a narrowband digital data stream. It recognises the sounds made by the human voice and renders them as a set of highly-optimised codes. It allows digital radio to be extremely efficient, and as a side benefit, it helps remove some of the background noise from transmissions.
- However, the algorithm does not reproduce some languages very well. In particular, the “trill” or rolling “rrrr” sound in the Latin languages is transformed into a flattened “r”.
- This feature applies additional audio processing in the transmitting radio to enhance the sharpness of the trill. In this way, speech is more intelligible, but there is minimal impact to the way voice is transmitted: Non-MOTOTRBO radios in the system will receive the benefit of the enhanced transmissions however they will not be able to respond with a similar level of audio clarity.
- This feature was first introduced in software release 2.4.



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# DUAL CAPACITY DIRECT MODE



## Summary:

- Unlock the full capacity of DMR without a repeater, to double your channel capacity at no extra cost.

## Detail:

- To allow both timeslots of a 12.5kHz DMR channel to carry simultaneous and independent traffic, you usually need a repeater (to provide the timing reference). But MOTOTRBO radios are able to synchronize automatically and collaboratively, eliminating the requirement for a central reference.
- This allows you to use both timeslots, doubling capacity and increasing spectrum efficiency without the cost of a repeater and its associated infrastructure.
- This feature was introduced in software release 2.1.



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DOUBLE YOUR CAPACITY AT NO EXTRA COST



# HIGH EFFICIENCY GPS



## Summary:

- Increase the precision, capacity and reliability of your GPS solution without adding more channels.

## Detail:

- This feature reduces the size of MOTOTRBO GPS location update messages, increasing the effective GPS capacity of the system. When used with a control station console, capacity increases by 200-350%; and with a wireline console by 200-700%. You can use the additional capacity in one or more of these ways:
  - 1) **Increase the precision** of the location information, by increasing the GPS location update rate (max 1 every 7.5s).
  - 2) **Increase the number of GPS users** without using extra channels.
  - 3) **Increase reliability** by reducing the message collision rate.
- This feature was introduced in software release 2.3.



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**INCREASED PRECISION AT NO EXTRA COST**





# FAST GPS (CONNECT PLUS)



## Summary:

- Increase the efficiency and speed of GPS updates in your MOTOTRBO Connect Plus system.

## Detail:

- This feature allows you to provision dedicated “Fast GPS Report Channels”: up to 28 channels per site
- When radios register at the site, they are allocated a particular timeslot on a particular channel to provide their GPS location updates.
- This reduces load on the control channel and increases speed and reliability.
- Updates can be scheduled for
  - Every 30 seconds (1 report every frame, 16 per superframe)
  - Every 1 minute (1 report every 2 frames, 8 per superframe)
  - Every 2 minutes (1 report every 4 frames, 4 per superframe)
  - Every 4 minutes (1 report every 8 frames, 2 per superframe)
  - Every 8 minutes (1 report every 16 frames, 1 per superframe)
- This feature was introduced in Connect Plus software release 1.6.
- You must purchase a license to use this feature.



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# VOICE ANNOUNCEMENT

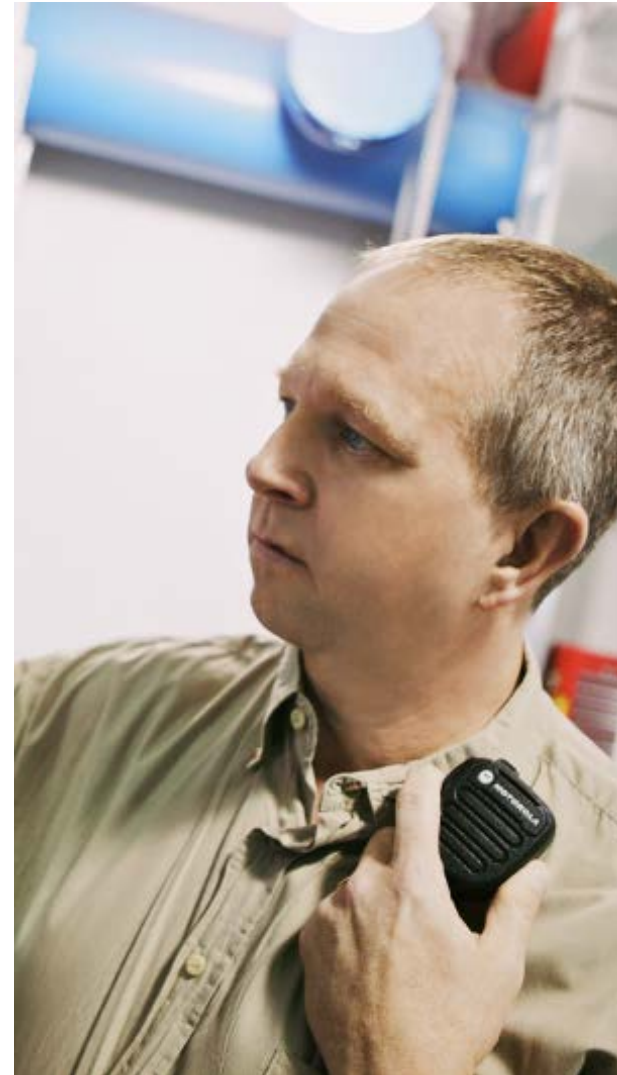


## Summary:

- Your radio can be programmed to confirm actions or alerts with an audio prompt.

## Detail:

- When you're working in limited visibility, or when you need to keep your eyes on the job, or when you just need 100% confidence you've hit the right button, voice announcement can help.
- The feature allows you to associate a pre-recorded audio clip with a radio function. So when you switch channels, your radio will announce the name of the new channel. When you transition between zones, your radio will let you know. And if you need to use programmable buttons without looking at them, your radio can confirm that you hit the right key.
- A large selection of audio files is provided by Motorola, but you can also record your own. Files and associations are managed through the CPS software.



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# TEXT TO SPEECH



## Summary:

- Your radio can now read text out loud: channels, zones, functions, messages and work order tickets.

## Detail:

- This feature is an add-on to [voice announcement](#). It removes the dependency on pre-recorded voice announcement files by installing speech synthesis software on the radio itself. Channel names, zones, programmable button functions, text messages and work order tickets are all read out loud to you.
- You can define a custom dictionary to ensure accurate readout of abbreviations and industry specific terminology, and choose from 27 different languages and several different voices.
- Programmable buttons can be configured to:
  - Turn the feature on and off.
  - Repeat the last announcement.
- All parameters are configurable using the CPS.
- This feature is chargeable. Activation requires the purchase of an Entitlement Identification (EID).
- This feature was introduced in software release 2.4.
- You must purchase a license to use this feature.



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# VOICE OPERATED TRANSMISSION (VOX)



## Summary:

- Voice activation allows your radio to be completely hands-free.

## Detail:

- This feature allows your radio to start transmitting automatically as soon as it hears your voice. This is especially useful when you are operating machinery or driving a vehicle.
- The feature is designed to work with specific accessories that position the microphone close to your mouth.
- You should be aware that VOX will be activated by any voice, so if you are working in close proximity to another person, you may experience some inadvertent transmissions.
- If your radio is operating in a mode that delivers a Talk Permit Tone (TPT), you should start with a “trigger” word, then wait for the Talk Permit Tone before you speak.
- VOX is suspended whenever you press the PTT button on your radio, and can be resumed by pressing a pre-programmed button, changing the channel, or power-cycling the radio.



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# PROGRAMMABLE BUTTONS



## Summary:

- You can personalize your radio to access functions with one touch

## Detail:

- Because MOTOTRBO radios have so many features and functions, it's sometimes useful to program quick access shortcut keys.
- Every MOTOTRBO radio has programmable buttons, and a wide range of different functions can be assigned to them through the CPS.
- More advanced radios have a dedicated (and recessed) orange emergency button, but the emergency function can be assigned to any programmable button on any radio that supports digital emergency.



## Available Functions

- All Alert Tones On/Off
- Backlight Intensity (Mobile)
- Backlight Auto On/Off (Portable)
- Battery Indicator (Portable)
  - Bluetooth Connect
  - Bluetooth Disconnect
- Bluetooth Discoverable On/Off
- Bluetooth Headset Audio Switch
  - Brightness
  - Call Alert
- Call Forwarding Set/Clear
  - Call Log Access
- Channel Announcement
- Channel Down (Mobile)
  - Channel Up (Mobile)
    - Contacts
- Day/Night Display Toggle
  - Emergency Off
  - Emergency On
- Ext PA On/Off (Mobile)
  - GPS On/Off
  - High/Low Power
- Horn & Lights On/Off (Mobile)
  - Intelligent Audio On/Off
  - Keypad Lock (Portable)
    - Man Down
  - Manual Dial For Private
    - Manual Site Room
      - Message
- Microphone AGC On/Off
  - Monitor (Portable)
  - Nuisance Delete
- One Touch Access 1-6
- Option Board Feature 1-6
  - PA On/Off (Mobile)
- Permanent Monitor
  - Phone Call
  - Phone Exit
- Phone Manual Dial
  - Privacy On/Off
  - Radio Check
  - Radio Disable
  - Radio Enable
  - Radio Name
- Radio/Accessory Speaker (Portable)
  - Remote Monitor
- Repeat last voice announcement
  - Repeater Access #1, #2
- Repeater/Talkaround
  - Scan On/Off
  - Site Alias
  - Site Lock On/Off
    - Status
- Telemetry Button 1-3
  - Text Message
- Tight/Normal Squelch
- Toggle AF Suppressor (Portable)
- Toggle External PA On/Off (Mobile)
- Toggle Internal PA On/Off (Mobile)
  - Toggle PA for Voice Announcement (Mobile)
- TX Interrupt Remote De-key
  - Unassigned
- Voice Announcement On/Off
  - Volume Set Tone
  - VOX On/Off
  - Zone Selection
  - Zone Toggle

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3	1	XPR 7300
5	1	XPR 6580 IS
5	1	XPR 6500
3	1	XPR 6300
3	0	XPR 6100
4	(1)	XPR 5500
4	(1)	XPR 5300
4	(1)	XPR 4500
2	(1)	XPR 4300
4	0	XPR 3500
2	0	XPR 3300
4	0	XPR 2500
1	0	SL300
4	0	CM300d
2	0	CM200d
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# IMPRES™ ENERGY



## Summary:

- IMPRES technology gives you the most from your battery investment.

## Detail:

- With manufacturing tolerances, age, history, environmental conditions and general usage, the capacity of a rechargeable battery will vary significantly from its rated value. If you use an ordinary battery, you will encounter situations where it dies unexpectedly; sometimes prematurely; and always at the worst possible moment.
- IMPRES radios, batteries and chargers are different. They have additional built-in circuitry that monitors the exact state of the battery cells. You will get early notification of a battery nearing the end of its life, and can plan replacement accordingly. What's more, you'll never need to throw away a perfectly good battery based only on its age, or keep extra spare batteries "just in case".
- IMPRES chargers sense when a battery needs reconditioning, and automatically schedule a deep discharge and recharge cycle to maximise the life of the cells. The lifetime of IMPRES batteries is on average 40% longer than ordinary batteries.



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# OPTION BOARD

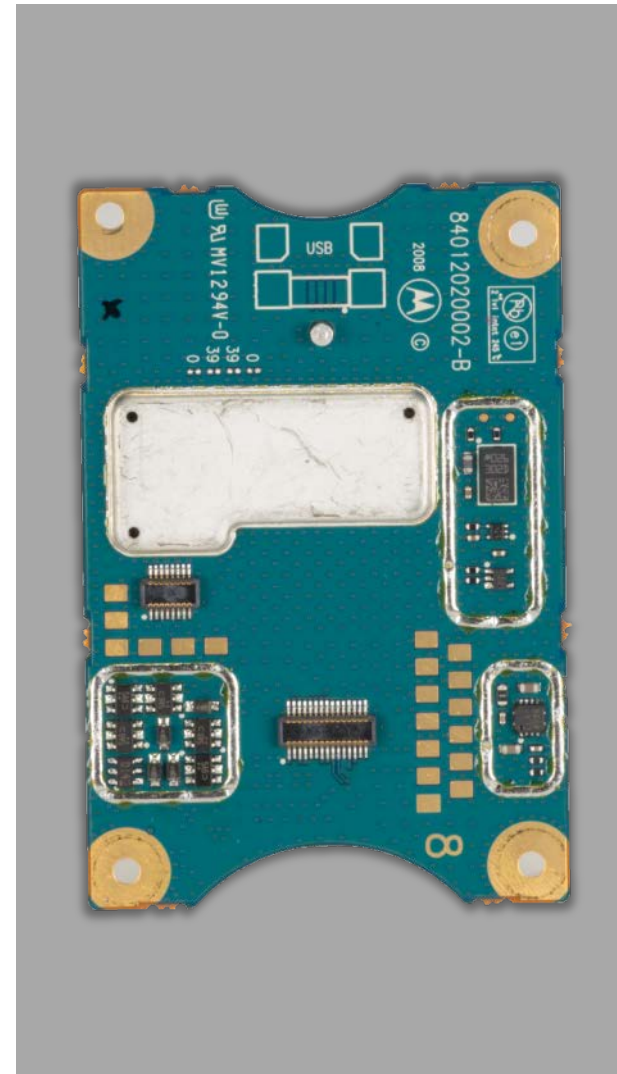


## Summary:

- An extra internal processor for your radio, allowing developers to customize your radio's functionality.

## Detail:

- MOTOTRBO radios have an internal physical interface to accommodate an option board with its own onboard processor and software. The option board can interoperate with the radio to create a custom end-user feature or solution, which can be as simple as Man Down, or as complex as Connect Plus trunking.
- The option board has access to the radio inputs (for example button presses and system signals), and can instruct the radio to perform certain actions (for example display text or re-route audio). It can also activate or de-activate specific functions such as Scan or Text Messaging.
- The option board also allows the radio to communicate with other devices within the radio system, such as a server hosting a database.



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# SCAN



## Summary:

- You can program your radio to listen out for calls across your whole team.

## Detail:

- This feature instructs a radio to listen for activity on several channels and/or talkgroups, as defined by a **Scan List**. When the radio detects a call in progress on one of these channels or talkgroups, it pauses the scan and plays the transmission. If “talkback” is configured, the user can then push the PTT button and reply to that channel / talkgroup.
- The scanning of multiple talkgroups on the same channel is called **Group Scan**. It’s simple and ideal for small, simple systems. Because only one call takes place on a channel at any given time, the scanning radio will never miss a transmission.
- The scanning of multiple channels is called **Channel Scan**. It is more flexible and the Scan List can even include analog channels, but you may miss calls, as the radio cannot tune to multiple frequencies / technologies at the same time. It is therefore recommended that the Scan List is kept as short as possible.
- The Scan List can contain one Priority-1 and one Priority-2 channel; all others are considered Non-Priority. Higher priority channels are scanned more frequently. During playback, the radio will continue to scan higher priority channels periodically, producing short “audio holes” while the radio re-tunes.



- SL 7500
- XPR 7550 IS
- XPR 7500
- XPR 7300
- XPR 6580 IS
- XPR 6500
- XPR 6300
- XPR 6100
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- XPR 5300
- XPR 4500
- XPR 4300
- XPR 3500
- XPR 3300
- XPR 2500
- SL300
- CM300d
- CM200d
- CP200d





# PRIORITY MONITOR SCAN (CONNECT PLUS)



## Summary:

- Your Connect Plus radio will interrupt your call when a higher priority calls starts.

## Detail:

- This feature allows you to manage calls according to their priority in a busy environment.
- When the system is set up, talkgroups can be assigned priority levels (1 or 2).
- Calls are initiated on these talkgroups in the normal way. Idle radios will be listening on the control channel, and will join if they are members of the talkgroup.
- However, radios participating in other calls will be on trunked channels, would not hear the call announcement on the control channel, and so would not know that the priority call has started.
- Priority Monitor Scan therefore announces the priority call to all radios in calls. Announcements are made 4x per second (2x per second if the repeater is also hosting the control channel).
- If the new priority call is relevant to them, radios will leave the call in progress, and make a Late Entry to the priority call.
- Radios will not leave Emergency, Multi-Group, Private or Site All Calls.
- The feature was introduced in Connect Plus release 1.6



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# HOME CHANNEL REMINDER

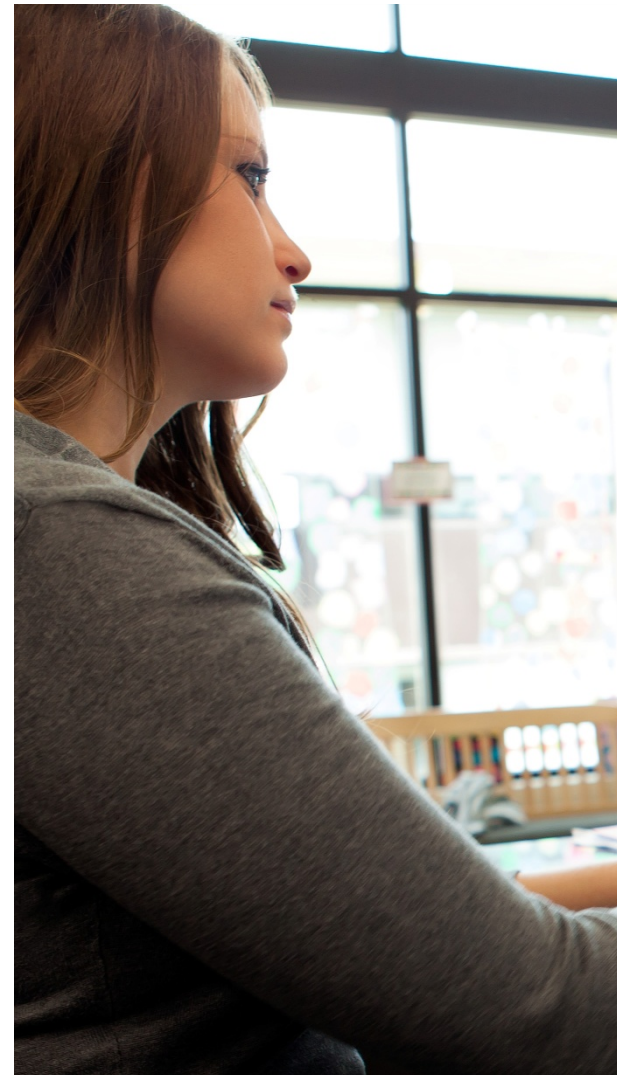


## Summary:

- Your radio reminds you when you're away from your regular channel.

## Detail:

- When a user primarily uses just one channel, you can program the radio to set that as the "Home Channel".
- This is particularly useful for inexperienced workers: they can stay on the same channel except when a special situation arises.
- If the user changes the channel – either deliberately or by accident, and does not return within a time limit, the radio can be configured to sound a "reminder".
- The reminder can be a pre-programmed voice announcement or a text-to-speech programmed prompt.
- This feature is configured through the CPS software
- This feature was introduced in software release 2.4A.



- SL 7500
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# TEXT MESSAGING

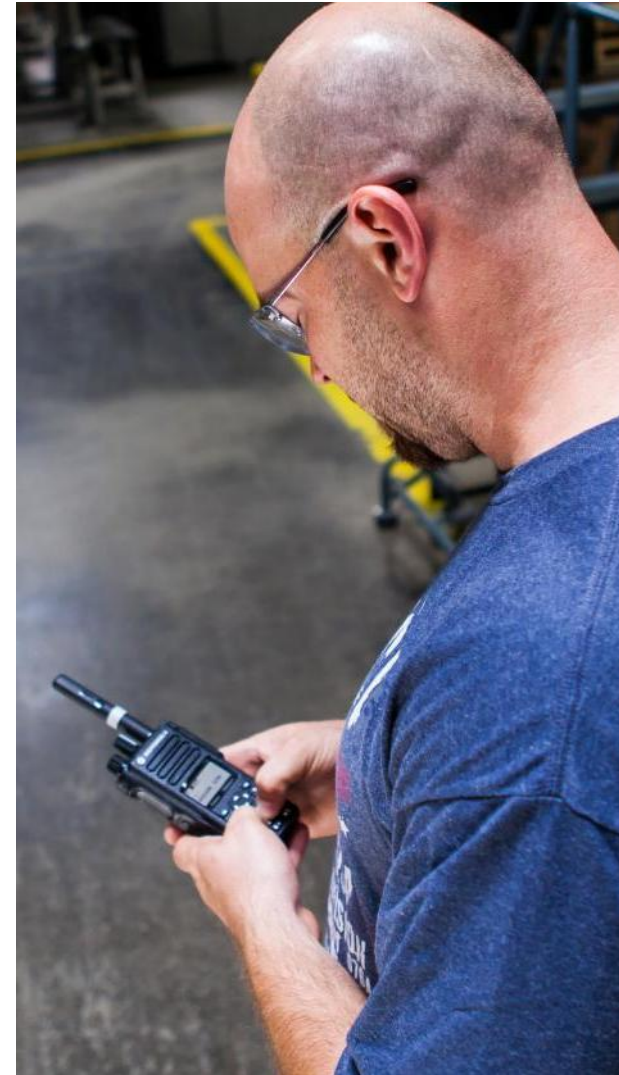


## Summary:

- Connect with your colleagues even when it's not appropriate to talk.

## Detail:

- MOTOTRBO has a built-in text messaging service that can be expanded for even greater capability.
- Using the **built-in text messaging services**, radio users can create, send, receive, store and display text messages to and from other radio users: individuals or groups. Messages can be freeform (with optional predictive text entry), or one of up to 10 pre-programmed "quick texts".
- Non-display radios can only send quick texts (using programmable buttons). Display radios can send and receive freeform and quick texts, and can store up to 30 received or sent text messages.
- The **MOTOTRBO Text Messaging Server** extends the service:
  - Radios can send/receive texts to/from email accounts
  - The **MOTOTRBO Text Messaging Application** can be run on a Windows PC connected to a MOTOTRBO radio
  - Dispatchers can use the Application to access an extended feature set, including presence.
- Third party applications are also available to extend text messaging capabilities even further.



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- ~~XPR 2500~~
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# RADIO MANAGEMENT



## Summary:

- Program your radios efficiently, in batches, to standardized templates.

## Detail:

- Radio Management is an extension to the MOTOTRBO CPS (Customer Programming Software) that allows you to streamline the programming of large fleets of radios.
- Rather than keeping individual local codeplugs for each radio, Radio Management uses a centralized server to store a database of configurations. Codeplugs for multiple radios are based on templates, to reduce errors and give consistency across your fleet.
- To update the radios, a Device Programmer is used. This application runs on a Windows PC, and can program up to 16 radios simultaneously. When a radio is connected, the Device Programmer queries the RM Server, and makes changes to the codeplug as scheduled. These changes can be:
  - Firmware updates
  - Enablement of new features
  - New or modified channels, talkgroups and aliases
  - New language packs
- Radio Management also gives you a clear centralized view of the status of all your radios through the CPS.
- You must purchase a license to use this feature.



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- XPR 3300
- XPR 2500
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- CM300d
- CM200d
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# OVER-THE-AIR PROGRAMMING (OTAP)



## Summary:

- The benefits of Radio Management, without the need to touch your radios.

## Detail:

- Over The Air Programming allows you to use the data capabilities of MOTOTRBO to update your radios' configurations.
- Using Radio Management, you can define and schedule changes to your radio codeplugs, to be implemented over-the-air. These changes can be:
  - Enablement of new features
  - New or modified channels, talkgroups and aliases
- Updates are downloaded to the radio in the background, and are implemented according to the schedule you define. The radios do not need to be taken out of service or returned to a central location.
- Your business is not disrupted and users can continue to communicate throughout the process.



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# HOSPITALITY WORK ORDER TICKETING



## Summary:

- Improved efficiency and accountability for differentiating the guest experience.

## Detail:

- Work Order Ticketing allows you to co-ordinate activities and manage issues more efficiently within the hotel or resort.
- MOTOTRBO has been integrated into the world's leading hospitality Work Order Ticketing solutions:
  - HotSOS
  - SynergyMMS
  - eConnect
  - Guestware
- Tickets use pre-configured templates on the radio, simplifying entry and translation. Tickets are allocated to the right users in the right language.
- The work order ticket process can be more discreet than a voice conversation: there are no need to speak any sensitive information or room numbers. The accountability of a ticket also leads to better employee ownership, and can even be linked to staff rewards and compensation.
- Software release 2.3A added new features: Log In/Out, Create Ticket On Radio, Room Status Update.



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# IMPRES™ BATTERY MANAGEMENT



## Summary:

- Check the long-term health of your radio batteries whenever they're inserted into a charger

## Detail:

- IMPRES Battery Management allows you to check and record the condition of your batteries.
- Whenever a battery is inserted into an IMPRES charger, the charger will read its state and condition, and upload that data to the Battery Management Application (BMA). The BMA maintains a record for each battery, showing age, type, serial number, condition, charging history and health. From this data, you can tell which batteries need to be replaced, and when.
- From this data, you can:
  - Reduce unplanned downtime from unexpected battery failures.
  - Eliminate the waste of premature battery disposal.
  - Reduce your holding of spare batteries.
  - Identify and correct poor workplace charging practices.
  - Identify missing or lost batteries.
- Chargers must be connected to the BMA using USB or Ethernet.
- You must purchase a license to use this feature.



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# IMPRES™ OTA BATTERY MANAGEMENT



## Summary:

- Track the long-term health of your radio batteries while they're in use.

## Detail:

- IMPRES Battery Management now supports automatic collection of battery information over the air. This removes the need for wired connections to charger units.
- In the same way as “wired” [IMPRES Battery Management](#), the Battery Management Application (BMA) maintains a record for each battery that’s used on the system. But now the BMA can get its data via the MOTOTRBO radio network itself, either through a direct MNIS (IP) connection to a repeater, or using a control station.
- Parameters are configurable through the CPS – but by default, radios register their battery one hour after they power-up, and a battery’s data is read once every 21 days.
- Over-the-air Battery Management manages the long-term health of batteries. **It is not meant to show real-time energy levels.** If immediate battery data is needed, a manual read of a battery can be requested via the BMA, but this results in additional data traffic.
- This option is available for all system types except Connect Plus.
- This feature was introduced in software release 2.4.



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# EVENT-DRIVEN LOCATION UPDATE



## Summary:

- Your radio can be configured to send an alert and location update whenever an event occurs.

## Detail:

- To give you better visibility of your fleet and better accountability of your workforce, this feature enables the reporting of events and their locations.
- The MOTOTRBO radio must be connected to the external “trigger” device via the accessory connector GPIO lines. The corresponding “GPS Report” entry in the radio’s CPS must also be enabled.
- An alert will then be sent to the dispatcher whenever the event occurs, identifying incident and location. Event examples include:
  - School bus / truck door opening or closing
  - Snowplow vehicle’s salt spreader being activated
  - Security guard’s weapon being drawn
  - Refinery worker’s breathing apparatus low air alarm
- Using a suitable application, you can also record alerts with their time and location and archive them for future reference.
- This option is available for all system types except Connect Plus.
- This feature was introduced in software release 2.4.



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# SCREEN BACKLIGHT CONFIGURATION



## Summary:

- Your radio screen can be configured to light up whenever you need it, and for as long as you need it.

## Detail:

- If you can't hear your radio – perhaps you're working in an extremely noisy environment, or you turned the volume all the way down – you can use the screen backlight as an alert.
- Rather than just illuminating in response to a key-press, the backlight can be configured to illuminate whenever a call is received:
  - Voice call
  - Text message
  - Job ticket
  - Telemetry message
  - Call alert
  - Emergency alarm
- The display can be configured to stay on for a suitable interval:
  - 5, 10, 15, 20, 25, 30, 40, 50 or 60 seconds, or indefinitely.
  - Extended backlight use will drain the battery prematurely.
- This feature was introduced in software release 2.4.



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# MULTI-BUTTON PTT



## Summary:

- You can create your own radio interface with individual buttons for each channel.

## Detail:

- For specific applications, you may need to embed your MOTOTRBO radio interface in a vehicle or control panel, and key up different channels with different external buttons. This feature allows you to realize that. Interfacing to the radio's accessory connector, you can assign inputs to channels.
- For example, you could design an interface panel with 4 buttons and configure it such that pressing button 1 calls dispatch; button 2 calls the supervisor; button 3 calls the maintenance team, and button 4 calls the emergency response crew.
- This is a chargeable feature. To use it, you must first purchase the Entitlement Identification (EID). Button assignments and functions can then be configured through CPS.
- Motorola does not produce customized interface panels, but can advise you on the design of your own.
- This feature is chargeable. Activation requires the purchase of an Entitlement Identification (EID).
- This feature was introduced in software release 2.4.
- You must purchase a license to use this feature.



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# RESTRICTED ACCESS TO SYSTEM



## Summary:

- Unauthorized users are prevented from communicating through your repeater.

## Detail:

- RAS (Restricted Access to System) provides two methods to prevent unauthorized subscribers from accessing the system: RAS Key Authentication and Radio ID Range Check. When used together, they provide robust and flexible options to control access.
- **RAS Key Authentication:** Through the CPS, the repeater and the radios are configured with RAS “keys” (between 6 and 24 characters long). The radio uses its RAS key to encode transmissions, and the repeater uses its key to decode them. If the radio’s RAS key is incorrect or missing, the repeater will disregard the transmission.
- **Radio ID Range Check:** A range of radio IDs is configured in the repeater. Only if the transmitting radio ID is within this range will its transmissions be repeated.
- This feature is available on Conventional, IP Site Connect, Capacity Plus, Linked Capacity Plus systems.
- This feature was introduced in software release 2.2.
- You must purchase a license to use this feature (per repeater).



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# TRANSMIT INTERRUPT



## Summary:

- Use your radio to clear the channel so that urgent traffic can get through.

## Detail:

- The Transmit Interrupt suite of features allows a supervisor or dispatcher's radio to clear a channel when it is in use.

**Voice Interrupt** allows a supervisor's radio to stop and clear down a voice transmission, then start a new voice transmission. It is typically used to communicate urgent information to a group in an emergency situation.

**Emergency Voice Interrupt** allows a supervisor's radio to stop a voice transmission, and start its own emergency transmission.

**Remote Voice De-key** allows a supervisor's radio to stop a voice transmission, for example to silence a radio that is inadvertently transmitting.

**Data Over Voice Interrupt** allows a data application to stop a voice transmission and start a data transmission.

- Only designated radios can issue Transmit Interrupt commands.
- All MOTOTRBO radios can decode Transmit Interrupt commands.
- You must purchase a license to use this feature on XPR 3500, 3300 and 2500 radios.



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# DIGITAL EMERGENCY



## Summary:

- A MOTOTRBO user in distress can sound an alarm to summon assistance.

## Detail:

- Digital Emergency can be triggered by a feature (e.g. Man Down), or by pressing the Emergency button or footswitch.
- When the emergency is initiated:
  - Supervisor(s) receive(s) audio and visual alerts with the initiator's ID.
  - Initiating and supervisor radios enter Emergency Mode.
    - Calls contain an emergency indication, and are transmitted using Emergency Voice Interrupt.
- The radio can be configured to do the following:
  - **Emergency Alarm** only
  - **Emergency Alarm** and **Emergency Call**
  - **Emergency Alarm** with **Voice to Follow**
  - **Emergency Voice Interrupt** for **Emergency Alarm**
  - **Emergency Voice Interrupt** for **Emergency Voice**
- Once the situation is resolved, the Emergency is cleared by the supervisor and initiator radios.



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# EMERGENCY SEARCH TONE



## Summary:

- Your radio will sound a loud audio alarm when it enters Emergency Mode.

## Detail:

- When you trigger an Emergency Call, you may not be able to describe your location. If the alarm is triggered by a Man Down notification, you may not even be able to speak
- The Emergency Search Tone feature causes your radio to emit a continuous attention-grabbing sound as soon as it enters Emergency Mode. Rescuers can then come to your assistance by following the sound of the radio.
- The tone also has some deterrence effect: for example if a security guard feels threatened by a crowd, the Emergency Search Tone will clearly signal to all present that reinforcements are on the way.
- This feature was introduced in software release 2.4A.



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# REMOTE MONITOR



## Summary:

- You can discreetly activate another radio's microphone, and listen in to what's happening

## Detail:

- Sometimes you need to find out more about a radio's situation. For example when one of your staff is incapacitated or unresponsive, or when a radio is suspected stolen.
- The Remote Monitor command instructs the target radio to initiate a private call to the commanding radio. The microphone is activated for a set duration, but without giving any indication to the user.
- Only designated radios can issue Remote Monitor commands.
- All MOTOTRBO radios can decode commands.



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# RADIO DISABLE / ENABLE

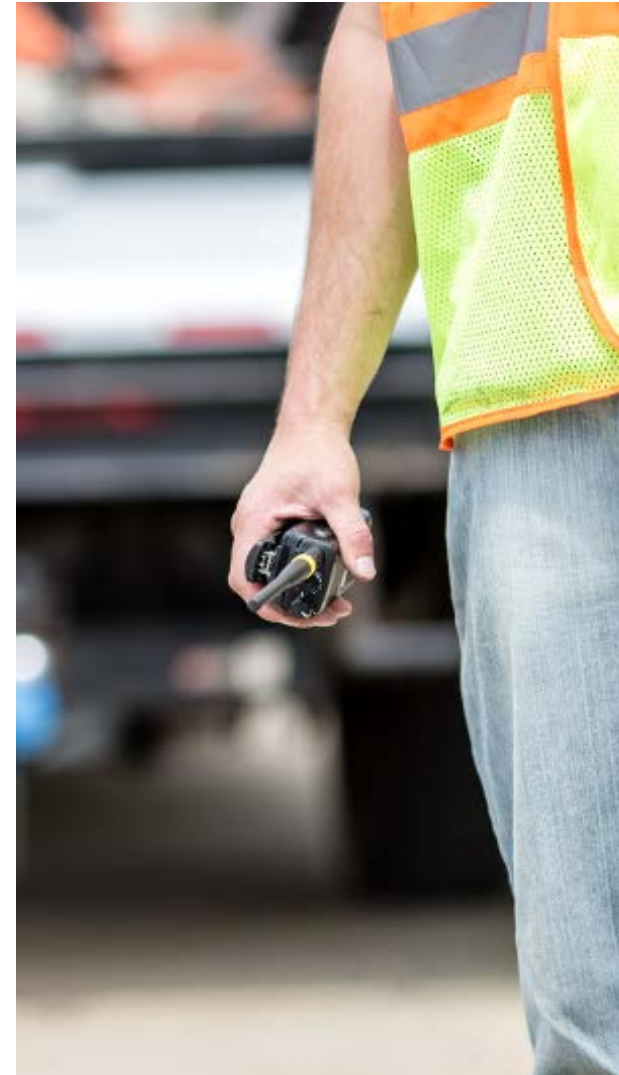


## Summary:

- You can use your radio or application to remotely disable and re-enable other radios.

## Detail:

- To have proper control over your radio fleet, you need to be able to remove rogue or stolen radios from service – then re-enable them when they're recovered. This feature gives you that capability.
- The “Disable” command disables a radio, and can be sent from a suitably configured radio, or from a third-party application.
- Once a radio is disabled, it will show a blank display, will not be able to make or receive calls, and will be locked to its site or channel.
- Radios can be re-enabled by using the “Enable” command from a radio or application. The target radio must be turned on and be within coverage of the site or channel where it was disabled.
- Radios can also be re-enabled through the CPS.
- Only designated radios can issue Radio Enable or Disable commands.
- All MOTOTRBO radios can decode commands.



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# MAN DOWN



## Summary:

- If the radio's position or movement falls outside normal user behavior, it initiates an emergency call.

## Detail:

- This feature is designed to safeguard workers who are at risk of being incapacitated in a hazardous environment.
- The radio contains a timer which can be programmed to start if:
  - The radio moves
  - The radio stops moving
  - The radio is tilted beyond a certain angle
- When the timer expires, the radio will sound a warning to the user. If the user does not acknowledge the warning promptly, the radio will initiate an emergency call. At the same time it will start audible and visual beacons on the radio, to help rescuers find the incapacitated user quickly.
- This feature is available on CSA radios (Canada), and XPR 6000/7000 radios on a Connect Plus system.
- You must purchase a license to use this feature.



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# LONE WORKER

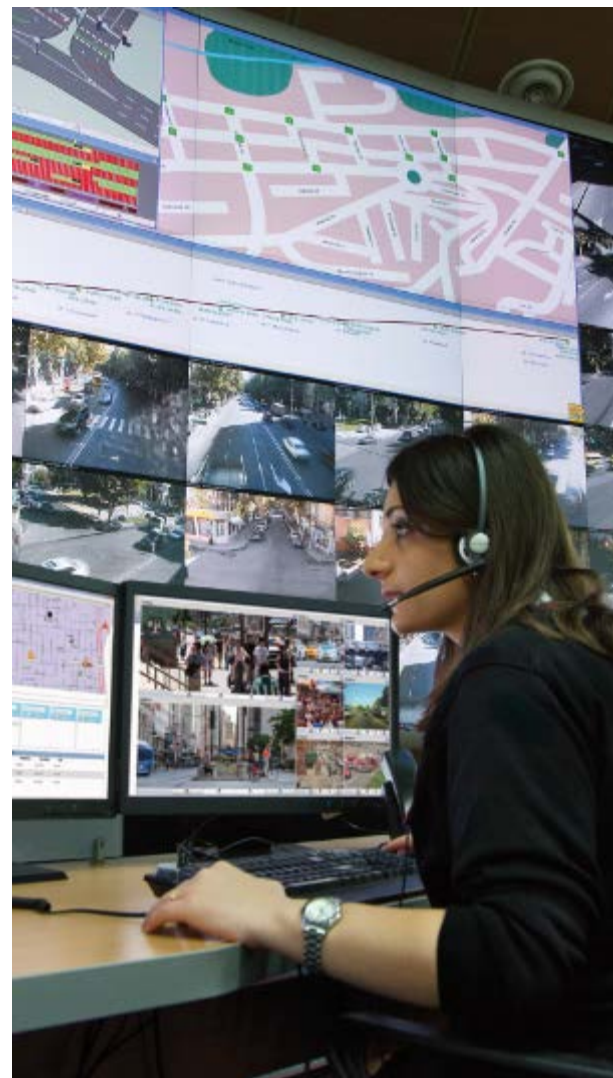


## Summary:

- If a user shows no signs of activity for a period, the radio will initiate an emergency call.

## Detail:

- This feature is designed to safeguard workers who are working alone. All parameters are configured through the CPS software.
- If there is no activity on the radio for a period of time, the radio will issue an alert to the user. If the user does not acknowledge the alert promptly, the radio will initiate an emergency call. At the same time it will start audible and visual beacons, to help rescuers find the user quickly.



SL 7500

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# BASIC PRIVACY



## Summary:

- Your radio encodes your voice and data to prevent you being overheard.

## Detail:

- Basic Privacy is a simple feature that helps keep your voice and data calls confidential without impacting your system performance.
- The feature is designed to prevent casual eavesdropping, but does not provide strong protection against a determined hacker. It uses a digital algorithm to encode voice and data, using a single 16-bit key from the 255 predefined keys available. Signalling and control messages are not encoded.
- Basic and Enhanced Privacy features use Motorola proprietary mechanisms, and are not interoperable. Privacy types cannot be mixed within a system.
- Enhanced Privacy provides a higher level of protection than Basic Privacy, but may result in slightly lower voice quality and slightly increased system access times.



SL 7500

XPR 7550 IS

XPR 7500

XPR 7300

XPR 6580 IS

XPR 6500

XPR 6300

XPR 6100

XPR 5500

XPR 5300

XPR 4500

XPR 4300

XPR 3500

XPR 3300

XPR 2500

SL300

CM300d

CM200d

CP200d



# ENHANCED PRIVACY



## Summary:

- Your radio encodes your voice and data to protect your calls.

## Detail:

- Enhanced Privacy is a feature that helps keep your voice and data calls highly confidential.
- The feature is designed to be a strong protection against a determined attack. It uses the ARC4 cryptographic digital algorithm to encode voice and data using a 40-bit key. The radio can store 16 different keys, and can use different keys for different channels. All voice and data calls are encoded, but signaling and control messages are not.
- Basic and Enhanced Privacy features use Motorola proprietary mechanisms, and are not interoperable. Privacy types cannot be mixed within a system.
- Enhanced Privacy provides a higher level of protection than Basic Privacy, but may result in slightly lower voice quality and slightly increased system access times.
- You must purchase a license to use this feature on XPR 3500, 3300 and 2500 radios.



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<del>CP200d</del>



# IP RATING



## Summary:

- Your radio is built to be tightly sealed against dust and moisture.

## Detail:

- The IP Rating (International Protection or Ingress Protection) is a 2-digit code that declares how well a product is sealed.
- The first number refers to protection against solid objects:

#	Object Size	Example
0	—	No protection against contact and ingress of objects
1	>50 mm	Protected against large objects
2	>12.5 mm	Protected against fingers
3	>2.5 mm	Protected against tools
4	>1 mm	Protected against wires
5	Dust	Dustproof: Dust may enter, but not enough to interfere with product operation
6	Dust	Dust-tight: No dust may enter

- The second number refers to protection against liquids:

#	Protection
0	Not protected against liquid intrusion
1	Protected against vertical dripping water
2	Protected against water dripping at an angle
3	Protected against spraying water
4	Protected against splashing water
5	Protected against water jets
6	Protected against powerful water jets
7	Protected against immersion (up to 1m / 3ft)
8	Protected against immersion (beyond 1m / 3ft)

- For example, a radio rated **IP56** is **dustproof and waterproof, but not submersible**.
- Portable radios generally require better sealing than mobile radios.



IP54	SL 7500
IP67	XPR 7550 IS
IP57	XPR 7500
IP57	XPR 7300
IP67	XPR 6580 IS
IP57	XPR 6500
IP57	XPR 6300
IP54	XPR 6100
IP54	XPR 5500
IP54	XPR 5300
IP54	XPR 4500
IP54	XPR 4300
IP55	XPR 3500
IP55	XPR 3300
IP54	XPR 2500
IP54	SL300
IP54	CM300d
IP54	CM200d
IP54	CP200d



# BLUETOOTH AUDIO



### Summary:

- Step away from your desk, step out of your driving seat, and still stay connected.

### Detail:

- The Bluetooth Audio feature allows you to connect wireless audio accessories such as headsets, earpieces and push-to-talk buttons to your radio.
- You are free to roam up to 10 meters (30 feet) from your radio, but still stay connected to your colleagues.
- For users of mobile radios, you can step out of the cab, check the load of your truck, supervise the children in the back of the bus and deliver the package to the front door – all without losing connectivity.
- For users of portable radios, you can leave your radio on your desk, move freely around your office and still stay in touch.
- Bluetooth Audio also enables the use of specialised accessories, such as an in-ear earpiece for covert communications.



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- XPR 7300
- XPR 6580 IS
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- ~~XPR 3300~~
- ~~XPR 2500~~
- SL300
- CM300d
- CM200d
- CP200d





# BLUETOOTH DATA



### Summary:

- Your radio can interface with other Bluetooth devices, for easier data entry and control.

### Detail:

- To enhance the data capabilities of MOTOTRBO radios, you can interface a Bluetooth data entry device to the radio – for example a barcode scanner. When used with a Work Order Ticketing system, this significantly increases the convenience of the user interface.
- Other smart devices can also use the Bluetooth data connection as a network interface (Personal Area Network, or PAN). For example, a PC or tablet can use the secure, resilient MOTOTRBO network to connect to a database of biometric records or license plate information.
- You must purchase a license to use this feature.



- SL 7500
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- ~~XPR 2500~~
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- ~~CM200d~~
- ~~CP200d~~







# SCADA AND TELEMETRY



## Summary:

- Use your radio network to interconnect people, machines and sensors.

## Detail:

- MOTOTRBO radios have a programming interface that can also support GPIO (General Purpose Input / Output) and USB signalling for telemetry purposes.
- This can be used to connect MOTOTRBO users to sensors:
  - For example, your alarm system can be connected to a MOTOTRBO radio, so you receive a text alert on your radio when an intrusion is detected. Or your production machinery can be connected to a MOTOTRBO radio, so your maintenance technicians receive breakdown notifications on their radios – including diagnostic information, if required.
- It can also be used to connect MOTOTRBO users to actuators:
  - For example you can connect a MOTOTRBO radio to the door lock of a secure facility – and lock and unlock the door remotely using your radio.
- And it can be used for a combination of both:
  - For example a remote environmental sensor can send periodic readings to a remote server, using a data channel on the MOTOTRBO system.



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- ~~XPR 3300~~
- ~~XPR 2500~~
- SL300
- CM300d
- CM200d
- CP200d



# PRE-CONFIGURED TELEPHONE PATCH



## Summary:

- Telephone users can connect to a pre-configured radio channel quickly and easily.

## Detail:

- The existing MOTOTRBO telephone patch offers flexibility, but access can be time-consuming:
  - The telephone user dials a specific number or extension
  - After hearing the tone, they have 3 seconds to enter the radio ID and repeater slot number on their telephone keypad.
  - They will then be connected to the radio user or talkgroup.
  - If there is an error, the tone will repeat, prompting them to re-enter the radio ID and repeater slot number.
- This new enhancement allows the configuration of a “default” radio user – for example Security. If the system does not detect an entry within 3 seconds of the tone, the telephone user is automatically connected to Security.
- So, for example, all the desk-phones at a facility can be pre-programmed with an “Emergency” number that will always reach Security. Advanced users know they can reach other radio users by entering additional information.
- This option is available for all system types except Connect Plus.
- This feature was introduced in software release 2.4.



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XPR 6580 IS

XPR 6500

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SL300

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CP200d



# DIRECT MODE / TALKAROUND

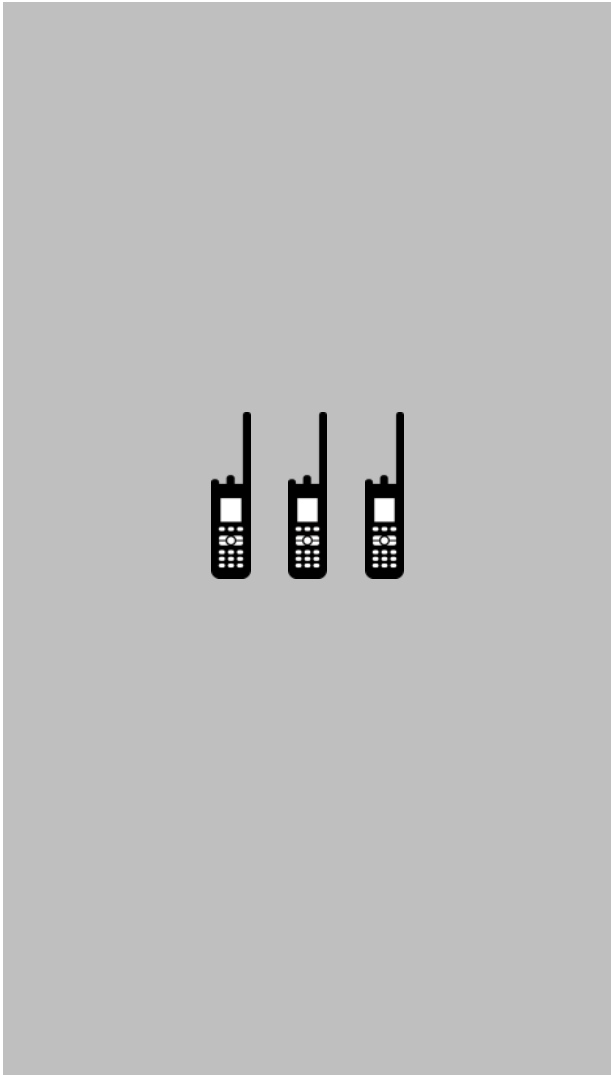


## Summary:

- Fallback connectivity, for local area communications or during power outages.

## Detail:

- All MOTOTRBO radios are able to connect to each other directly, without the need for any infrastructure such as a repeater. Coverage and capacity are limited, but for a situation such as a power outage, a basic level of communications is still possible.
- Radios communicate on a single 12.5kHz channel. If Dual Capacity Direct Mode is configured, the radios can use both timeslots on the channel for independent conversations.
- Coverage (range) is limited, as the power of a radio is much less than that of a repeater.
- “Direct Mode” usually refers to a system that is solely capable of radio-to-radio communications. “Talkaround” is a fallback mode of operation for conventional or trunked systems.



- SL 7500
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# SINGLE SITE CONVENTIONAL

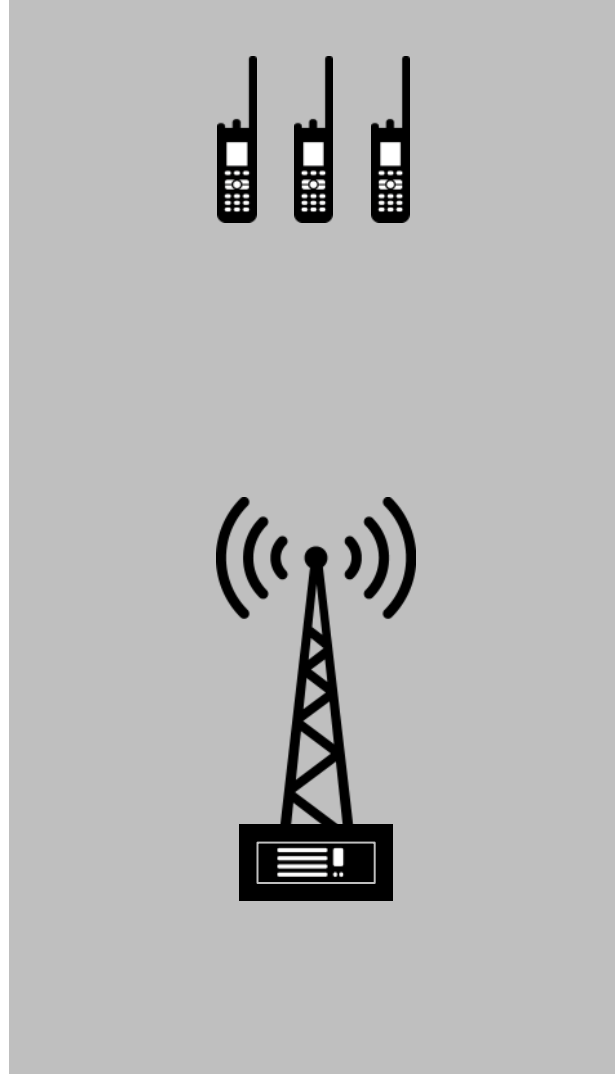


## Summary:

- Baseline single site capacity and coverage.

## Detail:

- The **Single Site Conventional** architecture consists of a single repeater supporting communications for up to 200 users. This configuration provides capacity and coverage over a wide area using a pair of 12.5kHz channels, one of which is used for radio transmissions, the other for repeater transmissions.
- Each channel is further divided into two independent timeslots. To the end user, this means they now have two voice or data channels that can be managed independently, instead of one.
- This configuration can also support **Dynamic Mixed Mode**, where the repeater dynamically switches between analog and digital based on the call it receives from the radio:
  - If an analog radio transmits, the repeater switches to analog mode to repeat the analog call (one call per channel)
  - If a digital radio transmits, the repeater switches to digital mode to repeat the digital call (up to 2 calls per channel)



- SL 7500
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# IP SITE CONNECT

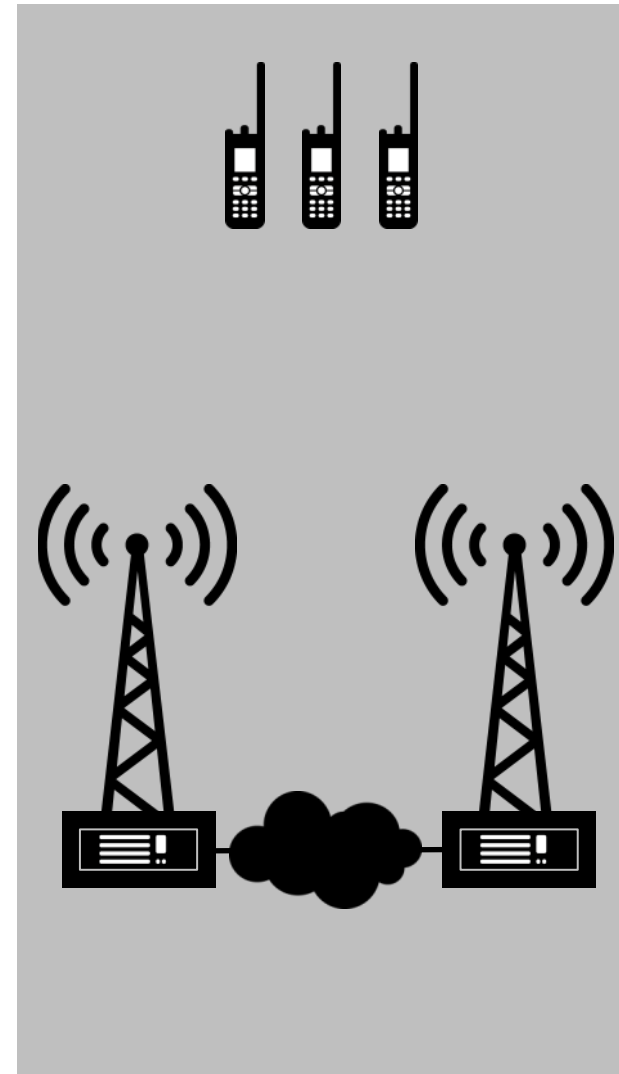


## Summary:

- Multi-site interconnection, for better coverage.

## Detail:

- **IP Site Connect** allows you to interconnect up to 15 MOTOTRBO repeaters to increase the coverage area of a system. The repeaters can be in adjacent locations, or geographically isolated.
- The interconnection is directly between repeaters, using an IPv4 network. No new hardware is required, besides backend network devices such as routers. Traffic on the IP network is authenticated and can be protected. VPNs are also supported.
- All calls are repeated by all repeaters, so the capacity of the system is approximately the same as the capacity of a single digital repeater. Roaming is supported, but not during an active call.
- The RDAC (Repeater Diagnostics and Control) tool is available to manage all repeaters from a single location.
- IP Site Connect can also be used to provide multi-band support on a single site – for example by interconnecting an 800 MHz repeater with a UHF repeater.
- You must purchase a license to use XPR 3500, 3300 and 2500 radios on an IP Site Connect system.



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# CAPACITY PLUS

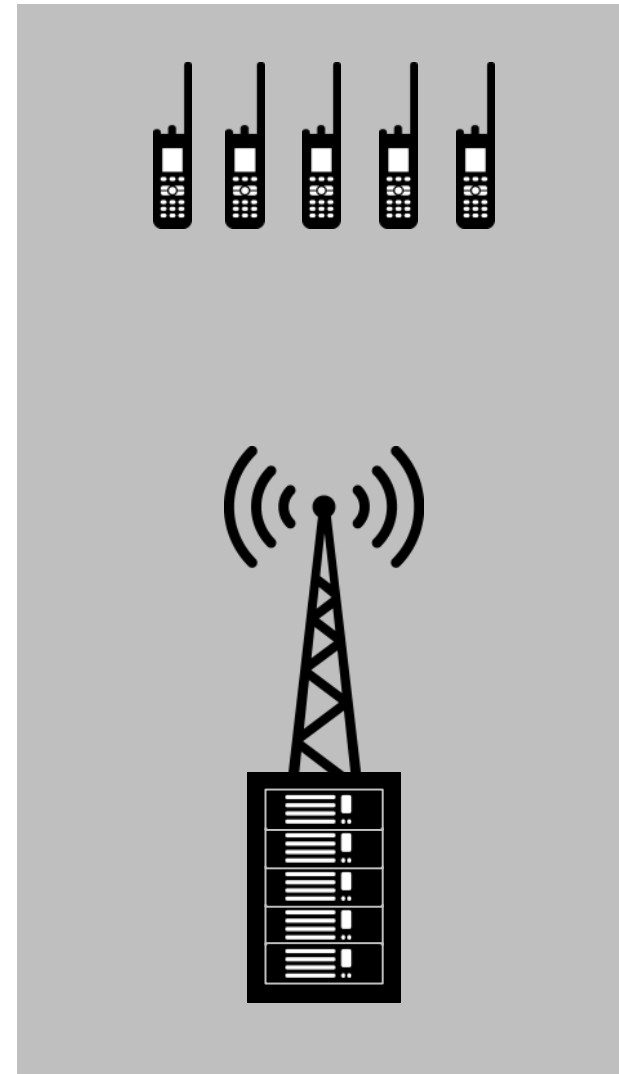


## Summary:

- Single site dynamic trunking, for better capacity.

## Detail:

- Capacity Plus trunks up to 8 repeaters (for a total of 16 logical channels) at a single site, enhancing capacity and efficiency, and reducing the chances of a blocked call. You can also configure up to 12 additional “data revert” repeaters (24 channels) for a total of up to 20 repeaters per site (40 channels).
- It uses an innovative “dynamic trunking” scheme:
  - All radios start on a “rest channel”.
  - When one radio requests a channel, the repeater turns the rest channel into a traffic channel, and initiates the call there.
  - The repeater then finds an unoccupied channel and directs all radios not participating in the call to adopt this as the new rest channel.
- Capacity Plus does not require the allocation of a dedicated control channel. It has no centralized controller and is therefore robust to individual repeater failures. It automatically detects most types of failures, reconfigures itself, and continues to operate with reduced capacity.
- Prior to software release 2.3, capacity was up to 6 trunked repeaters and up to 12 data revert repeaters.
- You must purchase a license to use XPR 3500, 3300 and 2500 radios on a Capacity Plus system. A license is also required for each repeater.



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# LINKED CAPACITY PLUS

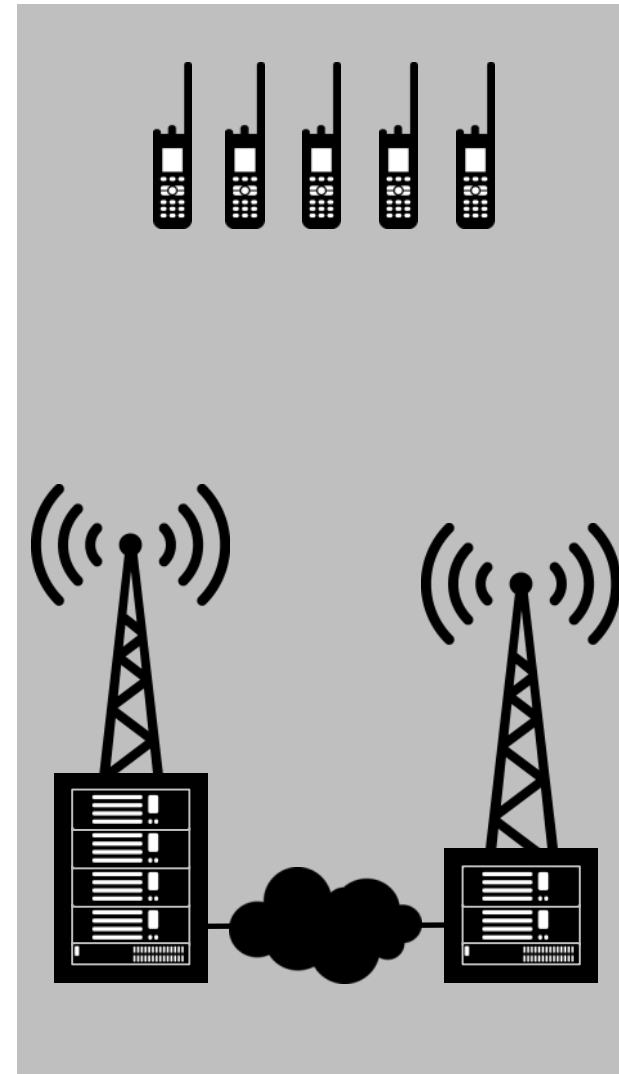


## Summary:

- Multi-site dynamic trunking for better capacity and coverage.

## Detail:

- Linked Capacity Plus combines the advantages of Capacity Plus and IP Site Connect: Up to 15 sites can be interconnected, with up to 8 trunked voice and data repeaters (16 channels) per site. You can also configure up to 12 “data revert” repeaters (24 channels) per site, but the total repeaters per site cannot exceed 12 (24 channels).
- Like Capacity Plus, it uses “dynamic trunking”:
  - All radios start on a “rest channel”
  - When one radio requests a channel, the repeater turns the rest channel into a traffic channel, and initiates the call there.
  - The repeater then finds an unoccupied channel and directs all radios not participating in the call to adopt this as the new rest channel.
- Linked Capacity Plus does not require the allocation of a dedicated control channel. It has no centralized controller and is therefore tolerant to failures. It automatically detects most types of failures, reconfigures itself, and continues to operate (with reduced capacity).
- You must purchase a license to use XPR 3500, 3300 and 2500 radios on a Capacity Plus system. A license is also required for each repeater.





# CONNECT PLUS

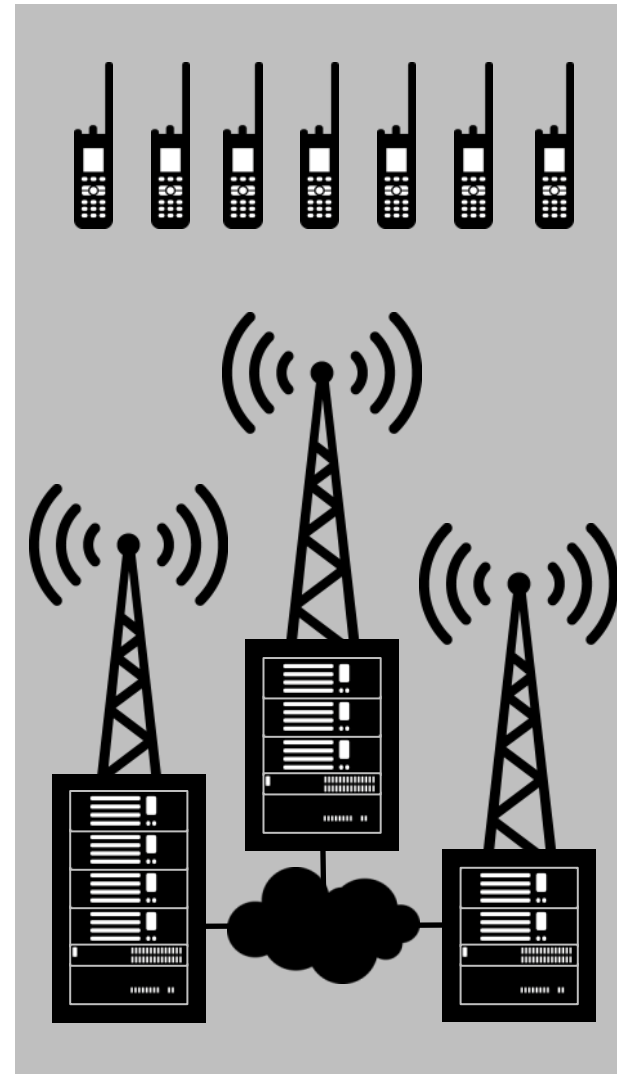


## Summary:

- Full trunking for single and multi-site deployments, with enhanced control capabilities.

## Detail:

- Connect Plus is a full trunking solution based on DMR technology. It uses a dedicated control channel for channel requests and allocations.
- Connect Plus can be deployed as a single or multi-site system, up to a maximum of 250 sites. A maximum of 15 repeaters can be trunked per site; maximum system total cannot exceed 420 repeaters.
- An XRC controller is located at each site. Voice and data consoles are connected to the system using the XRT Gateway, and the XRI Interconnect Gateway provides telephone interconnect capability.
- The system provides enhanced **security**. Registration is controlled by Unit ID, Serial number, Site ID and Talkgroup ID. Voice traffic is encrypted, and radios can be remotely deactivated in case of loss or theft.
- To enhance **resiliency**, there is periodic rollover of the control channel, and soft failover in response to IP connectivity failure. Redundant controllers and gateways can also be provisioned.
- The XRT gateway can also be used to interconnect a WAVE server, enabling PTT services over a cellular network.



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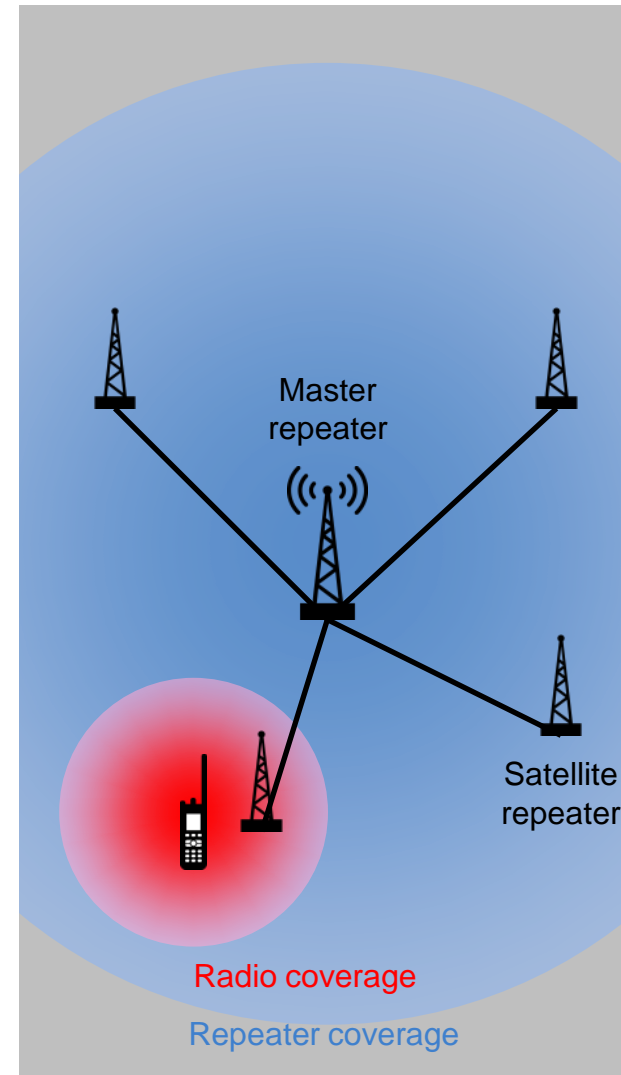


## Summary:

- Cover a wider area with your MOTOTRBO system, without the cost of adding transmitters

## Detail:

- Because of its better transmitter power and antenna height, a repeater can transmit a signal much further than a user's radio can. This means that system coverage is usually limited by "talk-back" range rather than "talk-out" range.
- The Digital Voting solution introduces extra repeater sites, configured in receive-only mode. The "Master Repeater" analyzes the signals received from the "Satellite Repeaters" and selects (votes) on which one to repeat.
- This feature improves coverage without the need to invest in extra transmitter frequencies. The satellite sites are also lower cost to implement, as they need less power, fewer antennas and lower bandwidth connections.
- This feature is available on Conventional, IP Site Connect, Capacity Plus, Linked Capacity Plus systems.
- This feature was first introduced in software release 2.3
- This feature is chargeable (per repeater).



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- CP200d

**THANK  
YOU**



# VERSION HISTORY



1.0	Initial release		26-Feb-2014
1.11	Update	Corrections Added Digital Voting	06-Mar-2014
1.12	Update	Remote Radio Enable/Disable	13-Mar-2014
2.0	Update	Added new features, added systems, added introduction, added version number, corrected errors.	11-Sep-2014
2.1	Update	Add SL300	7-Oct-2014
2.11	Update	Corrected errors	9-Oct-2014
2.2	Update	Added release 2.4 features, corrected errors	1-Dec-2014
2.21	Update	Corrected Lone Worker radio compatibility	5-Dec-2014
2.3	Update	Added release 2.4A and Connect Plus 1.6 features, general updates to format, added navigation.	29-Jun-2015

Please send feedback to Ben Ansell: [ben.ansell@motorolasolutions.com](mailto:ben.ansell@motorolasolutions.com)



# ADDITIONAL INFORMATION



NEW PROFESSIONAL & COMMERCIAL RADIO VIDEOS

**CONFIGURE, ENABLE  
AND OPTIMIZE YOUR  
RADIO FEATURES**

WATCH THE TRAINING VIDEOS



A selection of training videos have been produced to show you how to configure these features.

They are available on the Motorola Solutions YouTube channel:

[http://www.youtube.com/playlist?list=PL-qcM\\_OQqRgggcuaNUDp68piyNIa8HFTV](http://www.youtube.com/playlist?list=PL-qcM_OQqRgggcuaNUDp68piyNIa8HFTV)

**DETAILED TRAINING VIDEOS ARE AVAILABLE**

V 2.3



# PRODUCT TRAINING



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