



MOTOTRBO™ Connect Plus

Capability Guide

Introduction

Avtec's Scout VoIP Console System features support for MOTOTRBO™ Connect Plus, a multi-site digital radio trunking system.

Scout interfaces to the MOTOTRBO™ Connect Plus system with a direct IP wireline connection that allows Scout to support native AMBE+2 encoded audio without requiring external vocoder dongles or control stations. Scout leverages the unique features of MOTOTRBO™ Connect Plus to provide dispatchers with the best-in-class console features for which Scout is known. For those considering an upgrade to a MOTOTRBO™ Capacity Max system, Scout features proven support for Connect Plus to Capacity Max migration.

Capabilities-at-a-Glance

In addition to all the standard features of Scout console, the following MOTOTRBO™ Connect Plus features are available to the dispatcher:

Capability	Description
Interface Method	Scout supports a wireline VoIP connection between the Scout IP Console System and Motorola's XRT/XRC.
Unit Call (Private Call)	Allows a unit to send and receive a direct voice call to and from a single unit. Units can be either dispatchers or subscribers in the system.
Group Calls	Allows a dispatcher to establish voice communication with a group of subscriber radios or consoles. All members of the group hear the conversation.
Announcement Calls (Multi-Group Calls)	Allows a dispatcher to establish voice communication with multiple groups of subscriber radios. In MOTOTRBO™ systems, allows a dispatcher to call a pre-configured group of groups.
System All Calls	Allows a dispatcher to establish voice communication with all subscriber units in a radio system. NOTE: All Calls originating from a subscriber are NOT heard by the dispatcher.
PTT-ID/ANI Alias	Gives a dispatcher a visual indication of the identity associated with the last voice transmission. An identity can represent the raw subscriber unit ID (PTT-ID) or an alphanumeric string representation of it (ANI Alias). The identity can display in the Activity History and on the associated endpoint pad using the ANI pad extender. For example, a PTT ID of 2527 can be aliased to "Fire 1."



Capability	Description
Console-Controlled Encryption	<p>Allows a dispatcher to enable encryption to prevent unauthorized listening to outbound voice communication.</p> <p>The interface supports Enhanced Privacy encryption. Encryption key management is handled using the Avtec Encryption Key Manager. The dispatcher can dynamically change encryption keys.</p>
Transmit Encryption Mode	<p>Allows a Scout System Administrator to set a transmit encryption mode. Encrypted Only sets the endpoint to transmit encrypted audio at all times. Clear Only sets the endpoint to transmit unencrypted audio at all times. Dynamic allows a dispatcher to toggle between the two. Received audio is not affected by this feature.</p>
Auto Transmit Encryption Key	<p>Allows a dispatcher, upon PTT, to automatically apply a transmit encryption key, matching the received key of the last incoming encrypted audio.</p>
Encryption Key Manager	<p>Allows a Scout System Administrator to load multiple encryption keysets for use by VPGate endpoints.</p> <p>Encryption keys are entered manually.</p>
neoConneX® Text Messaging and AVL	<p>Allows a dispatcher to use text messaging and AVL (Automatic Vehicle Location) using the neoConneX® web interface.</p>
Tone Generation	<p>Allows a dispatcher to send tones or to send tone specifications when WAV files cannot produce the desired output. For example, a dispatcher could send an alert tone to announce bad weather or other alarm conditions. These tones include:</p> <ul style="list-style-type: none"> • Alert Tones • Paging Tones • Channel Marker Tones • Keying Tones • Guard Tones • Function Tones • DTMF Tones
Channel Marker Tones	<p>Allows a dispatcher to send channel marker tones or to send tone specifications when WAV files cannot produce the desired output. For example, a dispatcher could send a channel marker tone to indicate the channel is in priority status and should not be used for routine transmissions.</p>
Connect Plus XRT Redundancy	<p>Scout supports Motorola's redundant XRT solution that automatically switches from a primary gateway to a secondary gateway to minimize system down time. Scout also supports a Dual XRT redundancy provided by Avtec's Redundant Controller driver. The configuration defines a preferred and a backup XRT for a single endpoint so that VPGate can switch between the two devices should one become unavailable.</p>
Unit Alert (Call Alert)	<p>Allows a unit to send or receive a request for another unit to call them back. Units can be either dispatchers or subscribers in the system.</p>



Capability	Description
Unit Check (Radio Check)	Allows a dispatcher to verify operational status of a subscriber.
Unit Monitor (Radio Monitor)	Allows a dispatcher to hear any audio picked up by a designated subscriber's microphone. Depending on the system, there might be no indication to the subscriber that a Unit Monitor is in progress.
Stun/Revive (Enable/Disable)	Allows a dispatcher to temporarily stun a radio so that it cannot transmit, receive, or power on and off. Reviving a stunned radio returns it to an operational state.
Emergency Calls/State	Notifies a dispatcher of an emergency situation in the field using a unique ring and visual indication. When a subscriber presses the emergency button or dials the emergency DTMF string, the endpoint generates an emergency call and activates the emergency state. Until the emergency state is cleared by the dispatcher, no further emergency calls from that subscriber can generate an Emergency Call.



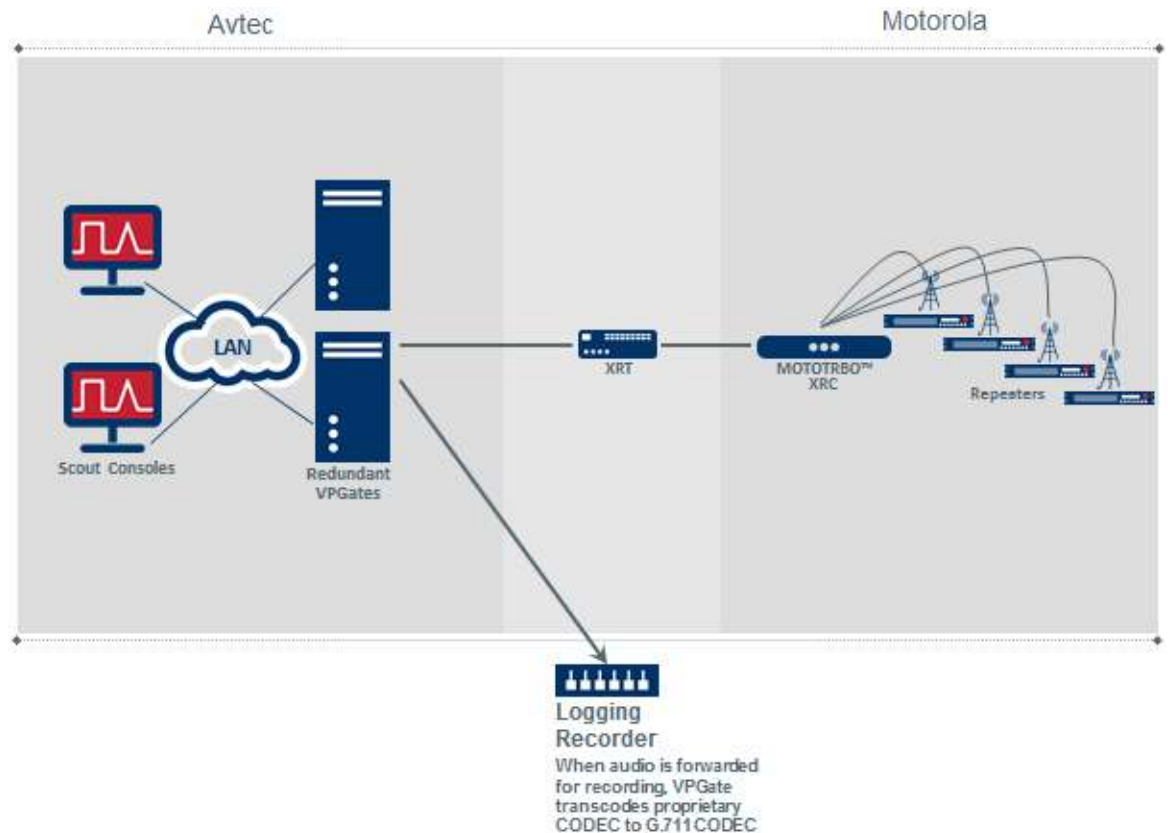
**B.C.
COMMUNICATIONS**

**106- 1515 Barrow Street
North Vancouver, BC, V7J1B7
604-985-0340
info@bccommunications.ca**

Connections

Basic System Setup

In a simple setup, the Scout consoles connect to VPGate, which connects to the XRT over the same Local Area Network (LAN). The XRT connects to the MOTOTRBO™ Connect Plus system through the MOTOTRBO™ XRC trunking controller. The XRC, in turn, connects to radio repeaters over IP. The XRT can be located on the same LAN with the trunking device and repeaters or it can be located on the LAN with VPGate.



The diagram above shows a typical setup for the Scout Console System and the XRT gateway that provides the connectivity to the MOTOTRBO™ Connect Plus system (XRC). Note that a logging recorder can record console and endpoint audio. For endpoint audio, VPGate transcodes Motorola's proprietary codec to G.711 codec before forwarding the audio to the recorder.

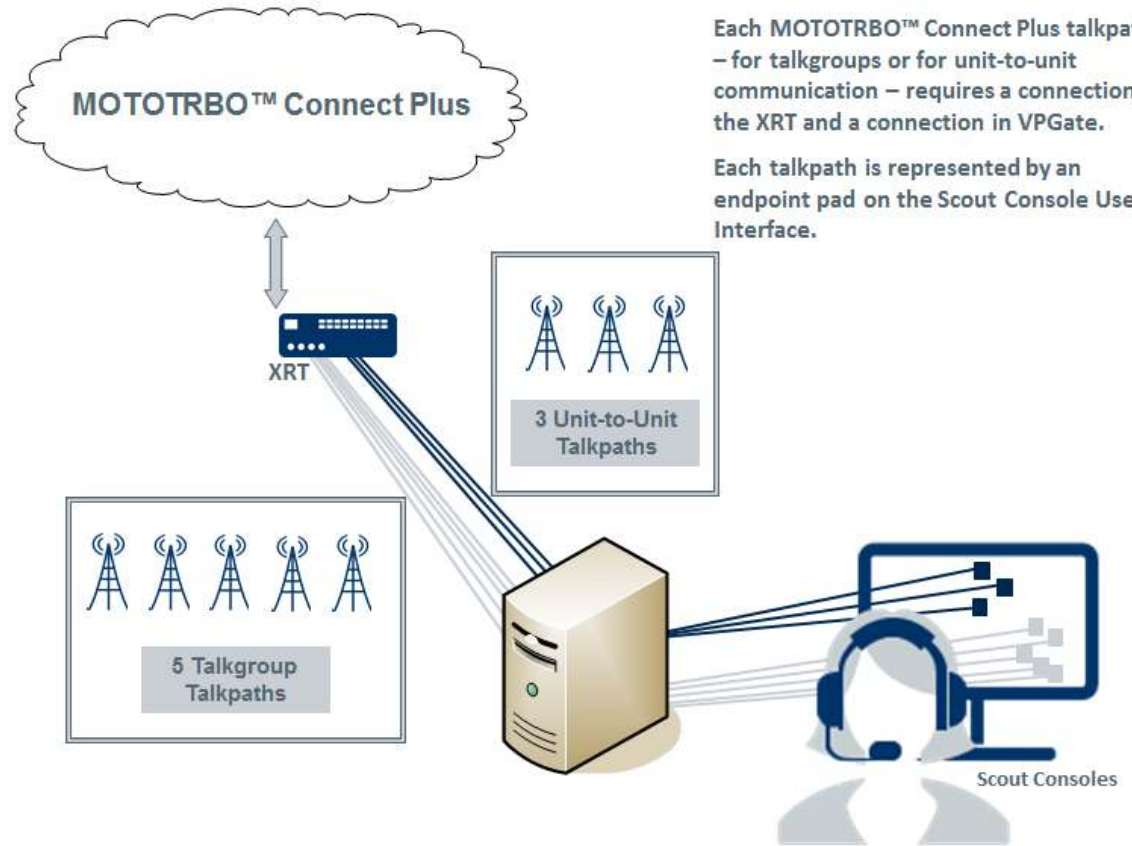
When endpoints are registered through the XRT, the audio can be forwarded to an IP-capable logging recorder. This applies to endpoints used for group calls as well as endpoints used for private calls to individual subscribers through the console. When forwarding endpoint audio for MOTOTRBO™ Connect Plus, VPGate transcodes the proprietary codec to G.711.



**B.C.
COMMUNICATIONS**

**106- 1515 Barrow Street
North Vancouver, BC, V7J1B7
604-985-0340
info@bccommunications.ca**

Talkpath Connections



The diagram above shows the talkpaths required from MOTOTRBO™ Connect Plus to VPGate and Scout consoles. Each talkpath requires a separate connection between the XRT and VPGate. Each talkpath, whether a group talkpath or a unit talkpath, is represented by a pad on the Scout Console User Interface. Each Scout console that holds a seat license for MOTOTRBO™ Connect Plus can be configured to access any or all of the MOTOTRBO™ Connect Plus endpoints.

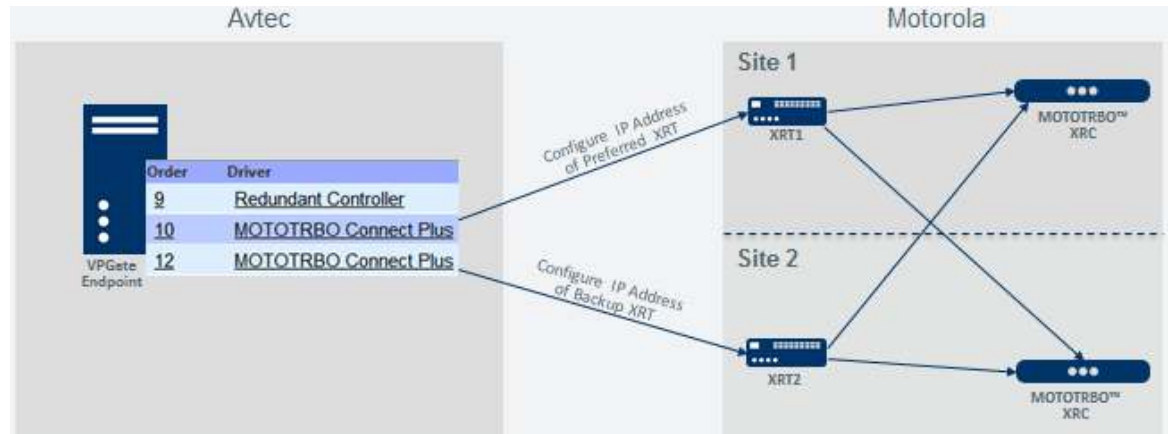


**B.C.
COMMUNICATIONS**

**106- 1515 Barrow Street
North Vancouver, BC, V7J1B7
604-985-0340
info@bccommunications.ca**

XRT Redundancy

In addition to Motorola's XRT redundancy solution, Scout supports Dual XRTs with redundancy provided by Avtec's Redundant Controller driver. The configuration defines a preferred and a backup XRT device for a single endpoint so that VPGate can switch between the two devices if one should become unavailable.



The diagram above illustrates a VPGate endpoint's driver chain using the Redundant Controller driver and two Connect Plus drivers to configure dual XRTs for Avtec's redundancy solution.

Scalability

The design for a Scout-MOTOTRBO™ Connect Plus system is determined by the number of endpoints required and the number of consoles that require access to those endpoints. An endpoint is an IP talkpath between the console subsystem and the radio subsystem. An endpoint (talkpath) can represent either a talkgroup or a unit-to-unit resource. When designing a system, the number of desired endpoints and geographical locations for consoles determines the number and type of the licenses needed. Review the information below to understand how the various components in a Scout–MOTOTRBO™ Connect Plus system scale.

- One VPGate Bundled with MOTOTRBO™ Connect Plus Software license can control 40, 80, or 160 total endpoints, depending upon the license purchased. Of the total endpoints in the license, up to 30, 60, or 100 endpoints, respectively, can be MOTOTRBO™ Connect Plus endpoints.
- The XRT can register a maximum of 100 talkpaths and it can handle 30 simultaneous talkpaths. (XRT licensing is also required and must be obtained from Motorola or an authorized vendor.)
- One XRT can connect to a maximum of six XRC trunking controllers. For example, each XRC could represent a different geographical site.

The diagrams that follow provide layouts of possible system setup scenarios that include:

- Multiple VPGates connected to one XRT
- One VPGate connected to one XRT which connects to multiple MOTOTRBO™ Connect Plus sites
- One VPGate connected to one XRT which connects to multiple MOTOTRBO™ Connect Plus systems with different configurations

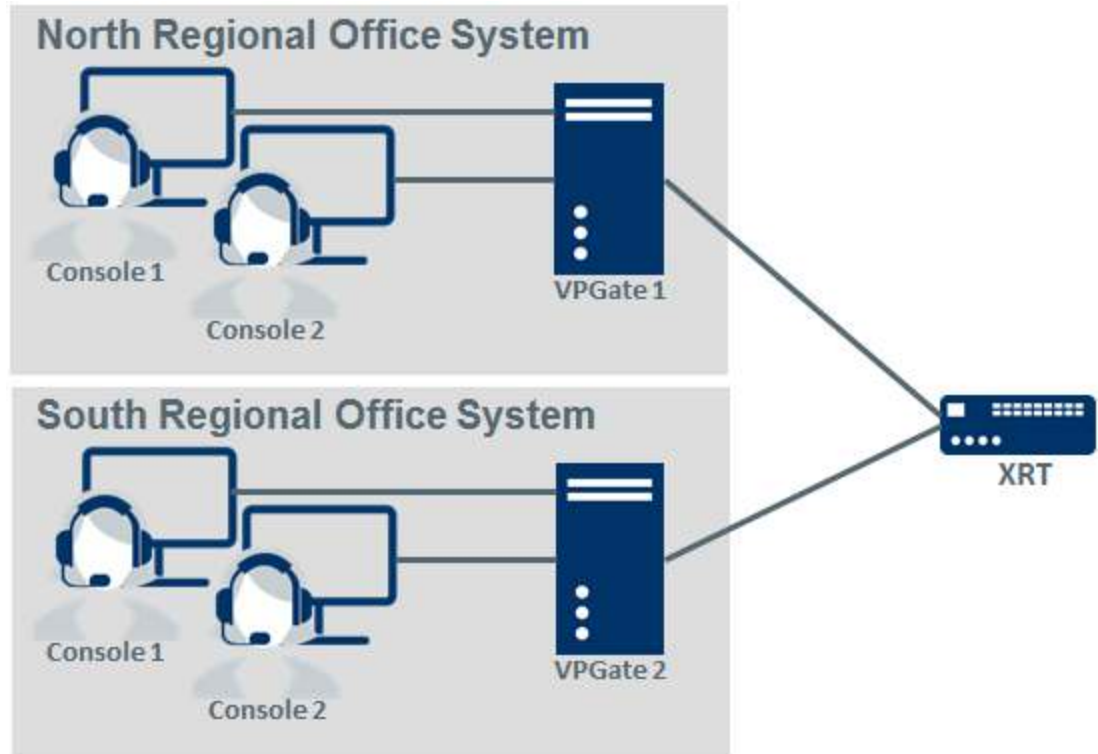


**B.C.
COMMUNICATIONS**

**106- 1515 Barrow Street
North Vancouver, BC, V7J1B7
604-985-0340
info@bccommunications.ca**

Multiple Locations with One XRT

Within one VPGate, multiple Scout consoles can have the same talkgroups on their screens. Multiple VP Gates can connect to the same XRT system.



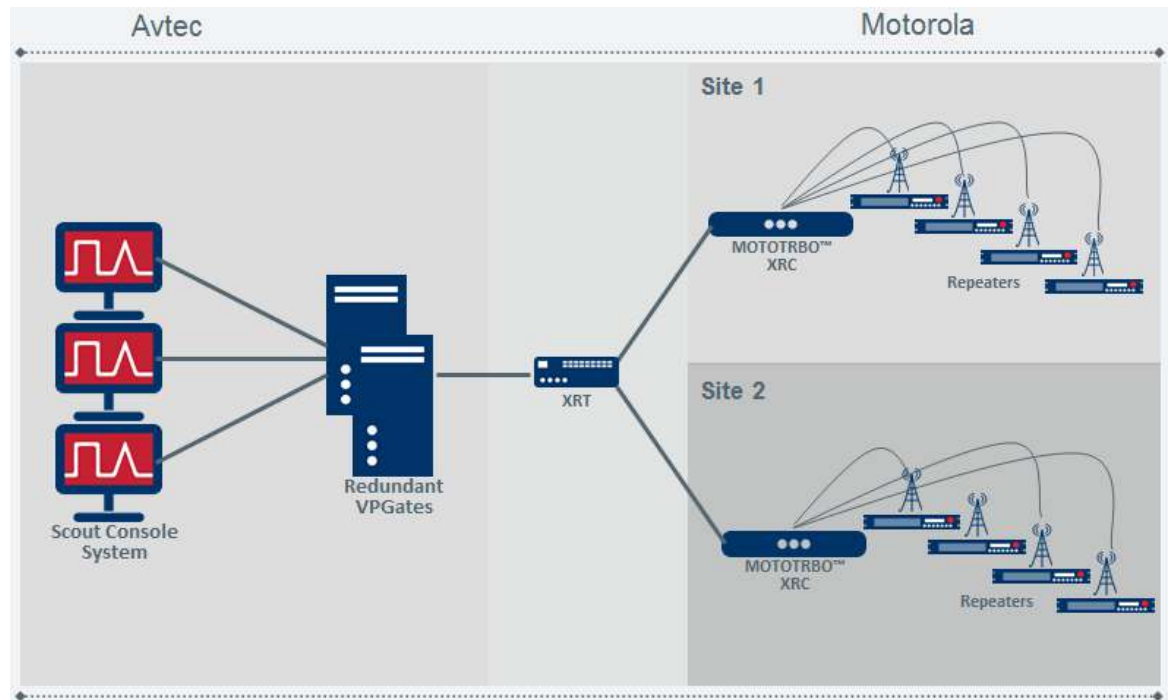
This diagram shows how consoles in different locations connect with one XRT for connectivity to the MOTOTRBO™ Connect Plus trunking system. The example demonstrates how different branches of a company can use one MOTOTRBO™ Connect Plus system, each with its own VP Gate audio gateway.



**B.C.
COMMUNICATIONS**

**106- 1515 Barrow Street
North Vancouver, BC, V7J1B7
604-985-0340
info@bccommunications.ca**

Multi-Site MOTOTRBO™ Connect Plus System



This multi-site layout illustrates the use of one XRT to connect to multiple MOTOTRBO™ sites (each MOTOTRBO™ XRC represents a separate site). Notice that Scout interfaces to a multi-site trunking system in the same way that it would with a single-site trunking system. The XRT hides the details of the site configuration from Scout. That is, Scout cannot tell if there is one MOTOTRBO™ site or multiple sites beyond the XRT.

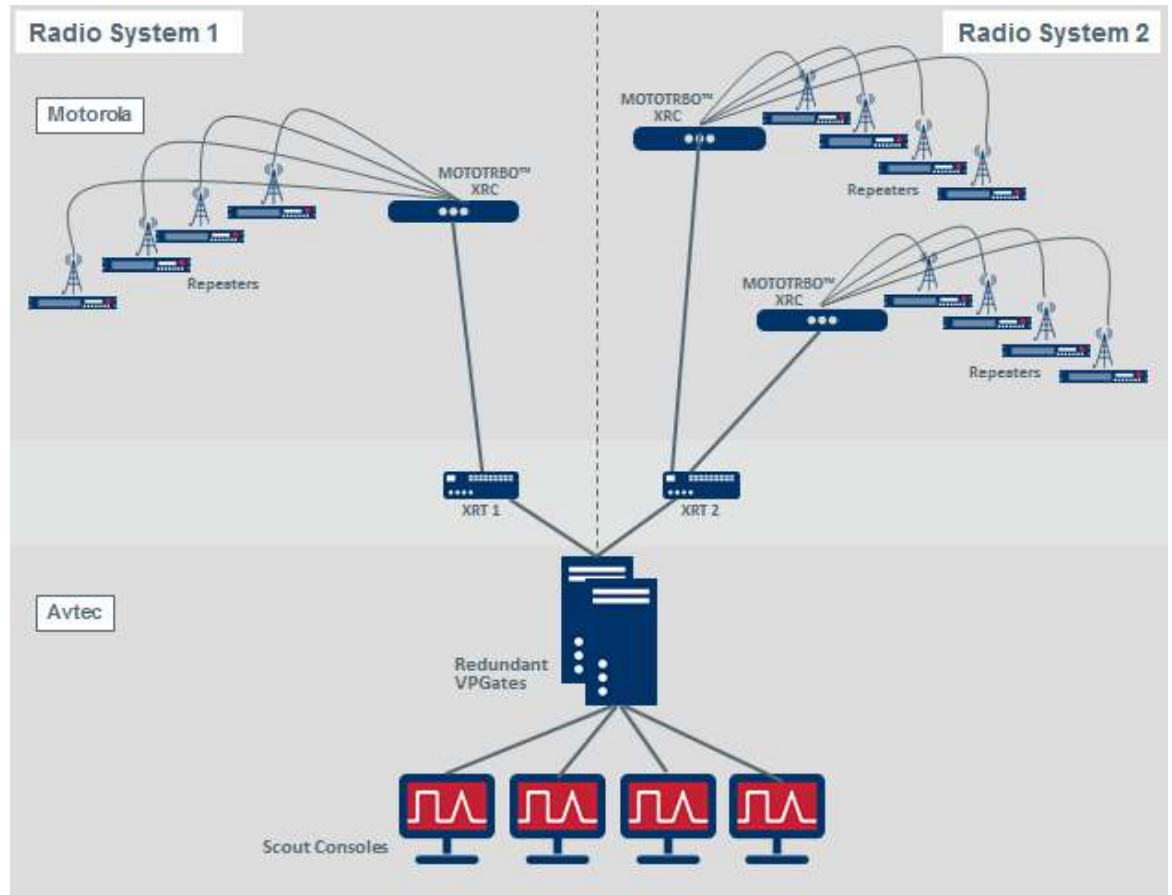


**B.C.
COMMUNICATIONS**

**106- 1515 Barrow Street
North Vancouver, BC, V7J1B7
604-985-0340
info@bccommunications.ca**

Multi-System MOTOTRBO™ Connect Plus System

Scout can interface with more than one MOTOTRBO™ Connect Plus system. When Scout connects to more than one XRT, each XRT represents a unique system. In other words, multiple MOTOTRBO™ Connect Plus systems, each with its own XRT, can connect to a single Scout Console System. But the two MOTOTRBO™ Connect Plus systems, System 1 and System 2 in the diagram, remain isolated from each other, yet still accessible by the Scout consoles.



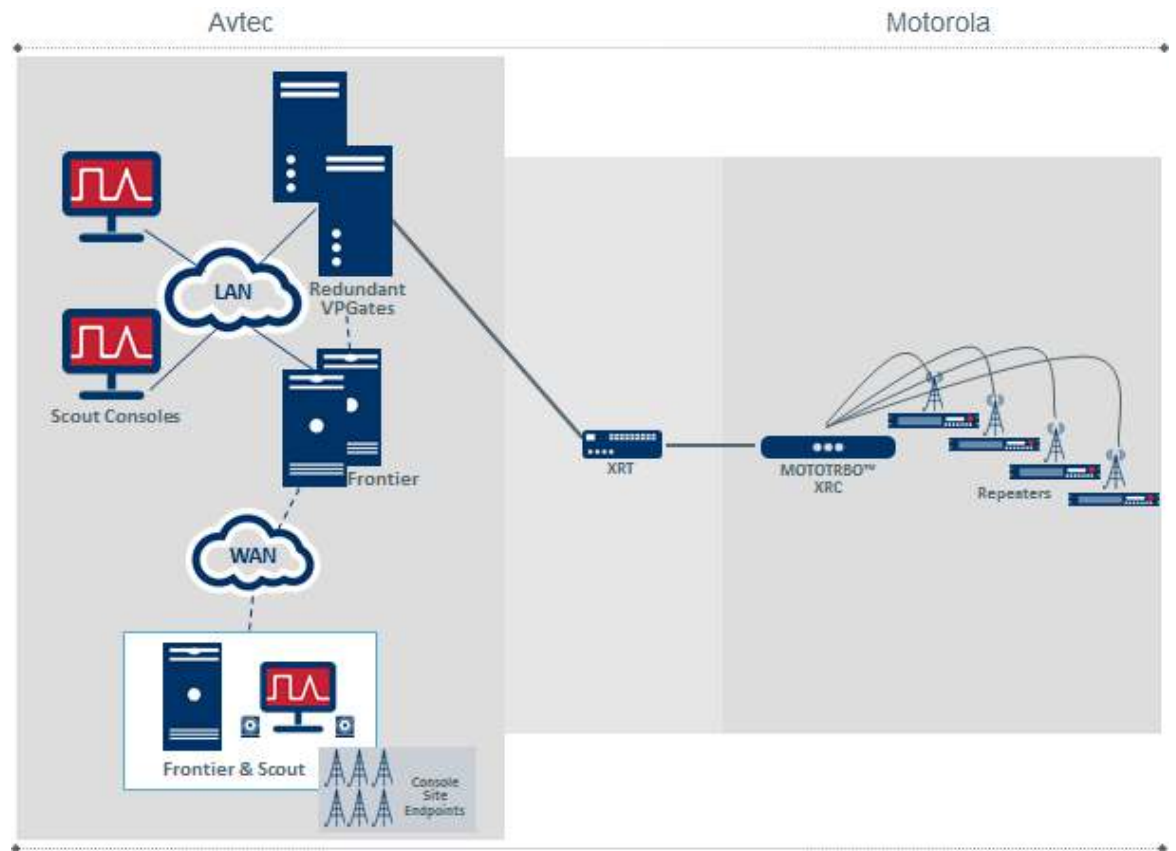
As the diagram above indicates, one Scout Console System can handle multiple MOTOTRBO™ Connect Plus systems. In any multi-system environment, Scout unifies a command center by connecting simultaneously to multiple radio systems for different reasons. For example, the systems could represent different agencies or different locations for one agency.

Notice in the diagram that Radio System 1 is a single site system, while Radio System 2 is a multi-site system. And while Scout can operate both MOTOTRBO™ Connect Plus systems, the two MOTOTRBO™ Connect Plus systems do not communicate with one another. However, the Scout dispatcher could use Scout's patch function to patch calls from one system through to the other.



Console Site and Remote Localhost Console

Scout supports localhost console deployments with Connect Plus. While multiple VPGate/console sites are not currently supported on Connect Plus, you can cover a remote area with a localhost console. The following illustration shows a remote localhost console where the Scout console and Frontier reside on the same computer and communicate with one another via the localhost ports instead of multicast. The localhost console registers its endpoints from the **Console Site's** VPGate.



NOTE
 Frontier is approved for use on MOTOTRBO™ Connect Plus in these remote localhost console deployments with a single multicast domain only. Multi-site console system deployments are not currently approved on MOTOTRBO™ Connect Plus.



Licensing

In contrast to systems with a backroom TDM switch to control the system's capacity and scalability, the direct IP interface between the Scout VoIP Console System and MOTOTRBO™ Connect Plus radio system is controlled by software licensing in both the Scout console system and the XRT. Although not controlled by Avtec, licensing for the XRT is required in addition to the licensing required for the Scout system.

Review the following information to learn more about the type and quantity of licenses required in the Scout VoIP Console System for a direct IP interface.

Avtec licenses required for a direct IP interface in a Scout–MOTOTRBO™ Connect Plus system include the following:

- VPGate License Bundled with MOTOTRBO™ Connect Plus Software**—The MOTOTRBO™ Connect Plus driver is licensed as a supplemental VPGate driver and uses a variation of the base VPGate license with the option of including Frontier. The license size represents the number of active endpoints that VPGate and MOTOTRBO™ Connect Plus control. This VPGate license is available in four sizes: 24, 40, 80, or 160 total endpoints. To use more endpoints, the system requires additional VPGate bundled licenses. The following table lists the license options and the maximum number of endpoints of each type allowed with the license. The model numbers ending in -FTR are Frontier-enabled versions.

Avtec Model Number	Total Category A&B Endpoints	Maximum SIP Endpoints (Category B)	MOTOTRBO™ Connect Plus, MSCP, and Capacity Max Endpoints	Redundant
SFW-VPG-MTCP-L0NR SFW-VPG-MTCP-L0NR-SK	24	12	16	No
SFW-VPG-MTCP-L0NR-FTR SFW-VPG-MTCP-L0NR-FTR-SK	24	12	16	No
SFW-VPG-MTCP-L0 SFW-VPG-MTCP-L0-SK	24	12	16	Yes
SFW-VPG-MTCP-L0-FTR SFW-VPG-MTCP-L0-FTR-SK	24	12	16	Yes
SFW-VPG-MTCP-L1 SFW-VPG-MTCP-L1-SK	40	20	30	Yes
SFW-VPG-MTCP-L1-FTR SFW-VPG-MTCP-L1-FTR-SK	40	20	30	Yes
SFW-VPG-MTCP-L2 SFW-VPG-MTCP-L2-SK	80	40	60	Yes



Avtec Model Number	Total Category A&B Endpoints	Maximum SIP Endpoints (Category B)	MOTOTRBO™ Connect Plus, MSCP, and Capacity Max Endpoints	Redundant
SFW-VPG-MTCP-L2-FTR SFW-VPG-MTCP-L2-FTR-SK	80	40	60	Yes
SFW-VPG-MTCP-L3 SFW-VPG-MTCP-L3-SK	160	100	100	Yes
SFW-VPG-MTCP-L3-FTR SFW-VPG-MTCP-L3-FTR-SK	160	100	100	Yes

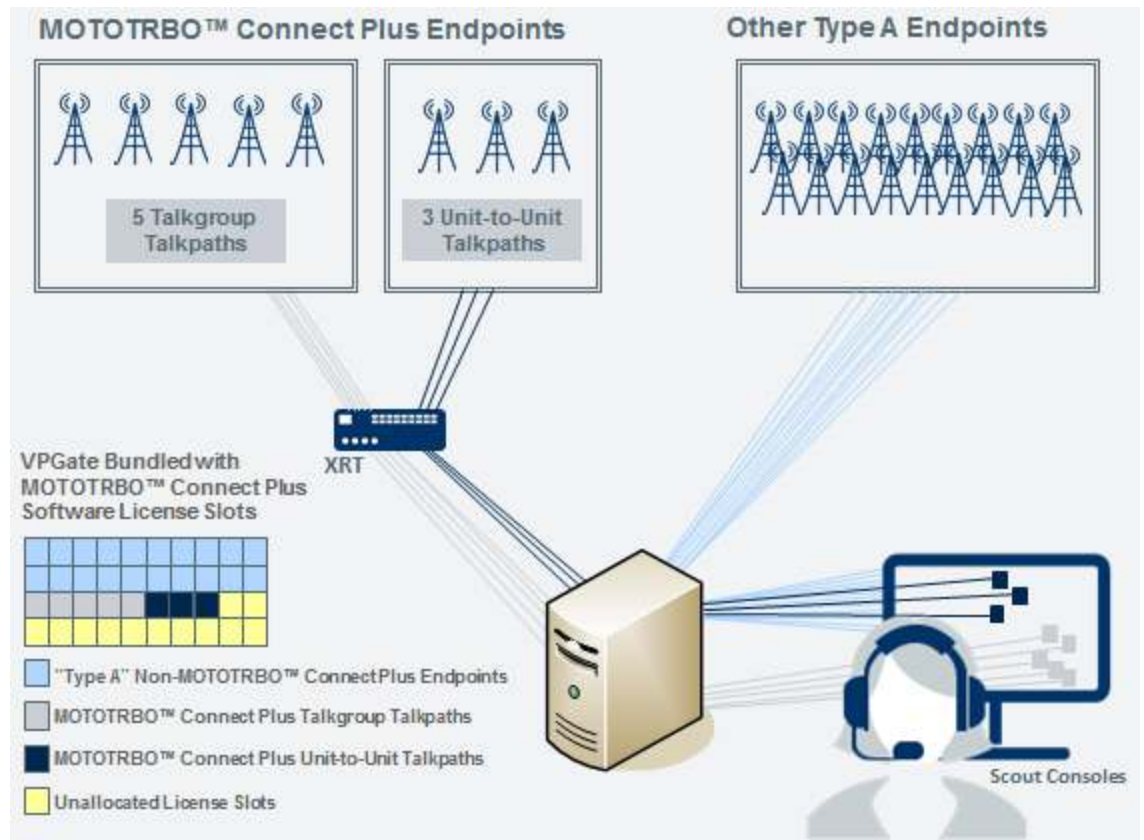
In addition to the VPGate Bundled with MOTOTRBO™ Connect Plus Software license, each MOTOTRBO™ Connect Plus position requires the following Scout package.

- **Scout Console Position**—Each console position that requires access to the MOTOTRBO™ Connect Plus radio system must hold a seat license. This seat license is not sold separately but is offered as part of the MOTOTRBO™ Connect Plus console package. The package includes hardware, software, and software licenses.

Avtec Model Number	Description
CON-SCOUT-MTCP	Scout Console package for MOTOTRBO™ Connect Plus. Includes Scout Console Media Workstation, dual speakers, and serial cable. Licenses include Scout Console, Scout SM, IRR, and MOTOTRBO™ Connect Plus seat. PC, monitor, and other accessories not included.



Licensing Example 1



The diagram above helps demonstrate licensing for a company that uses MOTOTRBO™ Connect Plus in addition to other endpoints. A MOTOTRBO™ Connect Plus endpoint uses one of the allocated MOTOTRBO™ Connect Plus license slots.

In the example depicted above, a company has 8 MOTOTRBO™ Connect Plus endpoints and 20 other Type A endpoints, for a total of 28 endpoints.

- A 40-endpoint VPGate Bundled with MOTOTRBO™ Connect Plus Software license (SFW-VPG-MTCP-L1V1) provides enough licensing for the 28 endpoints, 8 MOTOTRBO™ Connect Plus and 20 other Type A endpoints.
- The VPGate license has 12 unallocated endpoint slots, all of which could be used for MOTOTRBO™ Connect Plus endpoints, if desired.
- The company would also require a Scout Console Position package (CON-SCOUT-MTCP) for every Scout console that accesses the MOTOTRBO™ Connect Plus endpoints.

Licensing Example 2

As another example, a MOTOTRBO™ Connect Plus system with 20 talkgroups and three consoles requiring the ability to do Unit Calls would need 3 Scout Console Position packages and 23 MOTOTRBO™ Connect Plus licenses. This system could operate with a Level 1 base VPGate Bundled with MOTOTRBO™ Connect Plus Software license. There would be room to add 7 more talkgroups and some additional non-MOTOTRBO™ resources.



**B.C.
COMMUNICATIONS**

**106- 1515 Barrow Street
North Vancouver, BC, V7J1B7
604-985-0340
info@bccommunications.ca**

Upgrading to Scout–MOTOTRBO™ Systems

See the following VPGate upgrade license options to field upgrade VPGate base licenses in a non-MOTOTRBO™ Scout system to support MOTOTRBO™ radio endpoints.

VPG-UPG-L0-MTCP VPG-UPG-L0-MTCP-SK	Upgrade Level 0 VPGate base license to enable up to 16 MOTOTRBO™ Connect Plus, Capacity Max, or Multi-Site Capacity Plus talkgroups or private call endpoints.
VPG-UPG-L1-MTCP VPG-UPG-L1-MTCP-SK	Upgrade Level 1 VPGate base license to enable up to 30 MOTOTRBO™ Connect Plus, Capacity Max, or Multi-Site Capacity Plus talkgroups or private call endpoints.
VPG-UPG-L2-MTCP VPG-UPG-L2-MTCP-SK	Upgrade Level 2 VPGate base license to enable up to 60 MOTOTRBO™ Connect Plus, Capacity Max, or Multi-Site Capacity Plus talkgroups or private call endpoints.
VPG-UPG-L3-MTCP VPG-UPG-L3-MTCP-SK	Upgrade Level 3 VPGate base license to enable up to 100 MOTOTRBO™ Connect Plus, Capacity Max, or Multi-Site Capacity Plus talkgroups or private call endpoints.

For detailed licensing information, contact your Avtec sales representative.

Network Requirements

To configure the network requirements for a Scout System with MOTOTRBO™ Connect Plus endpoints, consider the following:

- XRT – One ongoing call requires 16 kilobits (kb) per second.
- Jitter – The XRT allows a maximum jitter of 180 milliseconds (ms). If a delay of more than 180 ms occurs, audio begins to sound choppy. Scout allows jitter ranging from 60 ms to 2.5 seconds.
- QoS – VPGate supports separate Differentiated Services (DiffServ) values for audio and control packets from the VPGate to the XRT. However, the XRT does not support QoS.

NOTE

The capabilities outlined in this document for Scout’s support of MOTOTRBO Connect Plus are available with VPGate version 3.4.14 and later.



**B.C.
COMMUNICATIONS**

**106- 1515 Barrow Street
North Vancouver, BC, V7J1B7
604-985-0340
info@bccommunications.ca**

MOTOROLA and the Stylized M Logo are registered in the U.S. Patent and Trademark Office. All other product and service names are the property of their registered owners. © Motorola, Inc. 2020.

The material in this document is for information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, Avtec, LLC assumes no liability resulting from errors or omissions in this document, or from the use of the information contained herein. Avtec, LLC reserves the right to make changes in the product design without reservation and without notification to its users. Avtec updates capability guides as changes occur. A capability guide could be the most current yet reflect a prior Scout release number if changes were not necessary at each release.

Scout™, VPGate™, Frontier™, Audio Bridge™, Avtec SIP Proxy™, ScoutLink™, CommScape™, and Outpost™ are trademarks of Avtec, LLC.

© Avtec, LLC 2020.



**B.C.
COMMUNICATIONS**

**106- 1515 Barrow Street
North Vancouver, BC, V7J1B7
604-985-0340
info@bccommunications.ca**