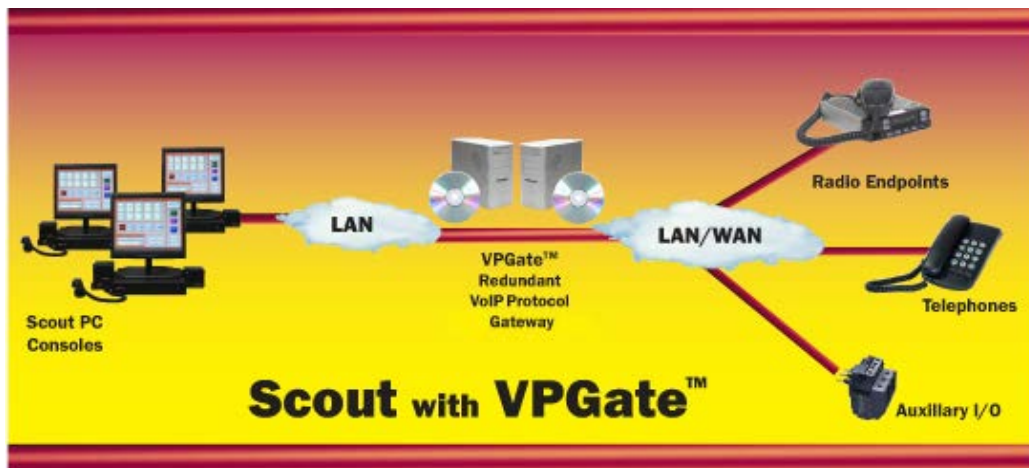




consoles you can count on

Scout VoIP Console System Overview

V3.1



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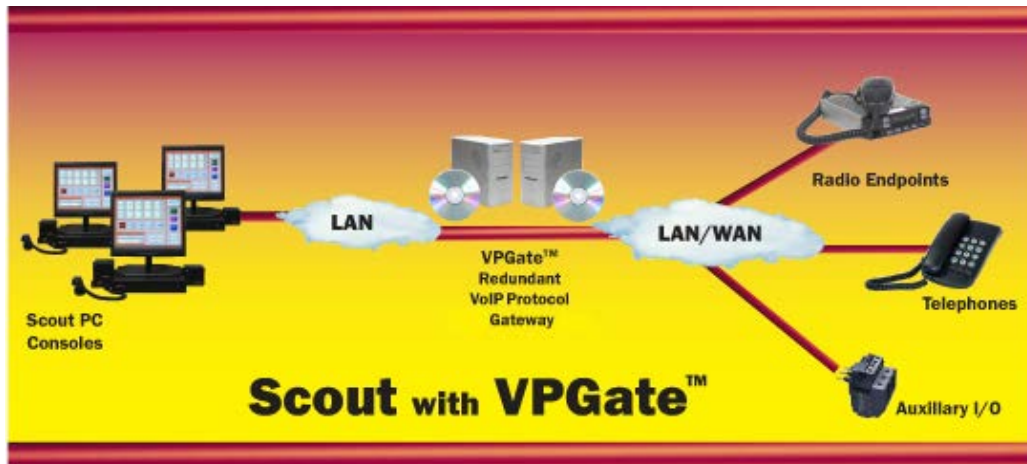
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Executive Summary

In this document, we describe a solution comprised of our Scout™ Console system, along with VPGate™ VoIP protocol gateways and Outpost™ RoIP endpoints. This document covers features of Scout Version 3.1. Unlike custom “one-off” systems, Scout™ is a standard software-based console, meaning that additional features and interfaces are released on a regular basis to enhance product capabilities.



The Scout™ console system delivers “ANY to ANY @ ANYtime™” communications capabilities. The system architecture is built upon a combination of networked Windows PC-based software elements and embedded endpoints to form a distributed console system that provides the features and capabilities of traditional switch-based consoles.

The major system elements are the Scout™ console positions, VPGate™ protocol gateways, IP endpoints (radios and telephony gateways), and an Ethernet network that ties all of the elements together. The Scout Project Manager Software provides remote management capability for configuring consoles, gateways, and endpoints, and supports “pushing” out changes from a centralized database without requiring console restarts.

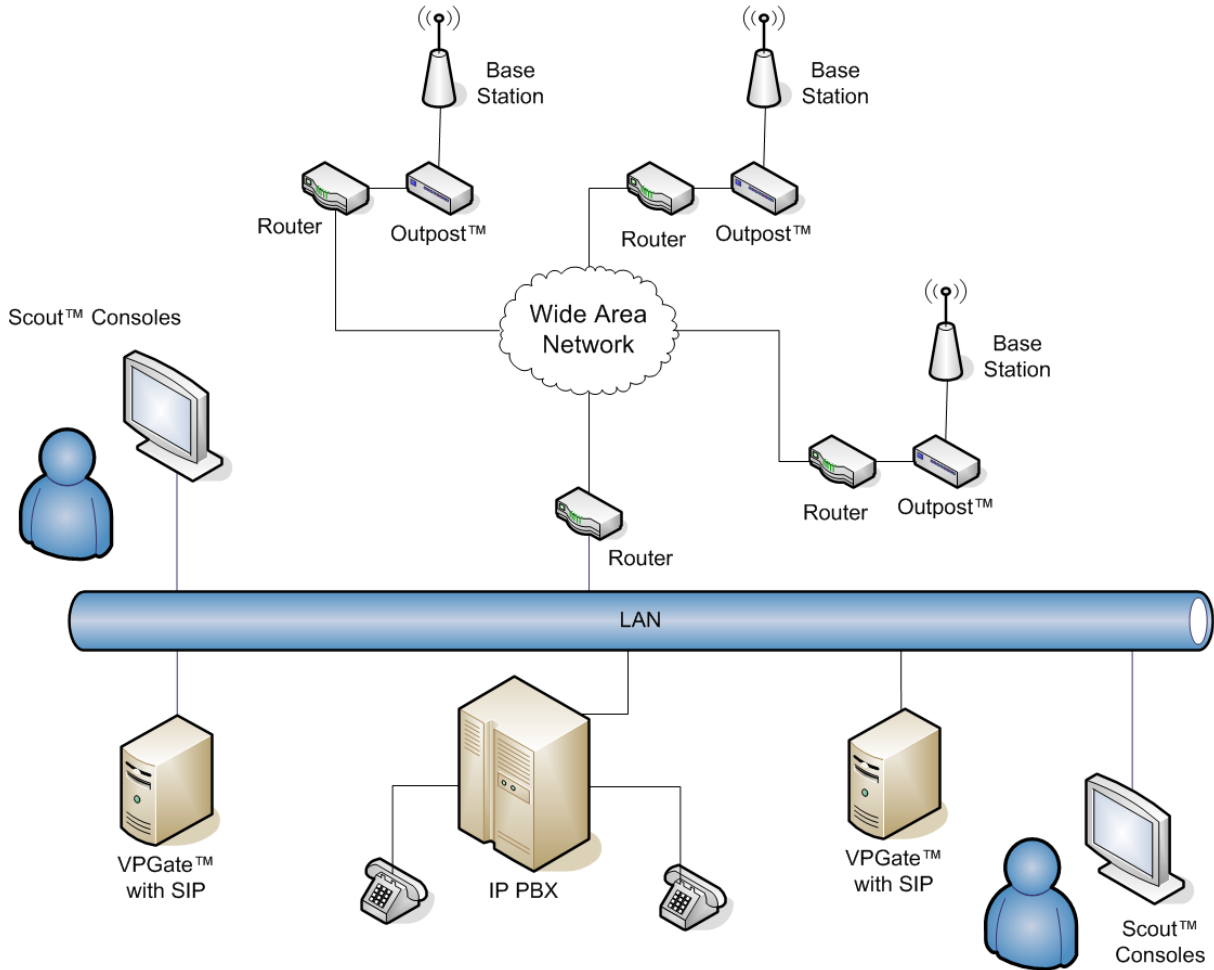
Traditionally, IP consoles from different companies seem to be very similar. They generally use Ethernet to connect their components, encode audio into packets, and provide control of radios and sometimes telephone circuits. The dispatcher interface usually displays on an LCD screen connected to a Windows PC. This precedence leads many people to believe all consoles are equivalent. However, if you look closer you will find that Avtec’s solution is better for a wide variety of reasons.

- **The User Interface:** Scout™ is unparalleled in its elegance and configurability. Different window sizes, web browser objects, map backgrounds, custom buttons, colors, fonts, button icons, and more are created with a simple-to-use graphical Project Manager tool. You can develop unlimited screen configurations and assign them to any or all positions to meet your business needs. Avtec, a pioneer in Touchscreen Consoles, designs all user interface elements for error-free operation.
- **Standard Components:** Scout supports commercial-off-the-shelf (COTS) computers and networking equipment, while only requiring proprietary hardware for components unique to a console system. This allows customers to use their standard PCs and network switches/routers, simplifying procurement, sparing, maintenance, configuration, and reducing life-cycle costs.

- **Ease of Configuration:** The Scout Project Manager software allows you to maintain all of your system components remotely, anywhere you have network access, and it stores screen and console configurations in a standard centralized XML database.
- **Mission Critical Quality:** Scout™ does not use PC sound cards for dispatcher audio. A dedicated embedded media workstation at each dispatch position with six DSP resources provides the ability to select and monitor up to 50 audio sources. You can run other applications on the PC without worrying about audio dropouts. The Scout console provides real console peripherals, with rugged headset jacks, a desktop microphone, and speakers designed for a mission-critical environment.
- **Simulation:** The Scout Project Manager software allows you to run the Scout User Interface off-line, even without the console hardware. Maintenance personnel can test the screen layouts/navigation, graphical elements, browser addressing, and contact groupings on their PCs to ensure everything works as planned. Supervisors can review the design to ensure it fits the organization's workflow and even do introductory training on any new features. Once the design is approved, the configuration can be "pushed" to the live consoles.
- **Redundancy:** VPGate™ is designed so a failure will not affect operations. In fact, VPGate™ is normally licensed in a redundant configuration. Failover capability provides a highly resilient system design that can continue to operate in a number of disaster scenarios. This capability ensures that the endpoints assigned to the VPGate™ continue to be available for uninterrupted operation from all the console positions. Redundancy can also be configured on Outpost™ allowing redundancy for a radio that is connected to an Outpost endpoint.
- **Diagnostics:** Every system element reports to a centralized diagnostic logging application, which then permits "drill-down" capability to observe detailed system behavior, including audio diagnostics, console states, and component health. Each major subsystem has log file capability to allow deeper diagnostic analysis if necessary. The Scout Diagnostics application can also send SNMP messages for its alarms and events to up to four SNMP Managers to allow Network Administrators the ability to view messages through an integrated management console.
- **WAN friendly:** VPGate™ talks to endpoints via unicast. This eliminates the need for multicast traffic to traverse your WAN in many cases. It also arbitrates access to endpoints so multiple consoles can access them. For companies with Scout Systems in different geographical sites, Avtec offers Frontier, a component of the Scout Product Suite that allows autonomous Scout IP Systems to be linked over a wide area network to form a very-large-scale enterprise communication solution.
- **Scalability:** A Scout System is capable of supporting 200 consoles and 2,000 endpoints in a local area network, while maintaining the features inherent in the product today.

Typical Scout™ System Configuration

A typical Scout™ installation, showing consoles configured for both Radio and Telephony access. Redundant VPGate™ PCs are provided to ensure uptime. In this example, no multicast data is required across the WAN.



Scout™ Consoles

Each Console position consists of Avtec software on a standard PC, a separate media workstation, and dispatching peripherals. Scout™ Console Software runs on Windows 7 and/or Windows XP Professional PC with any compatible pointing device, including mice, trackballs, and/or a LCD Touchscreen. The PC and the media workstation connect to their local VPGate™ via Ethernet to access endpoints or other consoles.

The Scout Media Workstation Plus provides the peripheral connections, high quality audio mixing, and an interface to the Scout Console Software running on a PC via Ethernet. The workstation's real-time architecture and dedicated digital signal processors (DSPs) provide precise signal conditioning to ensure the highest quality audio. It converts between packet-based VoIP and analog audio for the dispatchers' peripherals such as select/unselect speakers, desk microphones, handsets, and headsets. It also provides dedicated I/O for footswitches, relay outputs, and other devices.

The Scout User Interface software provides a user-friendly dispatching runtime environment. The console displays virtual buttons called pads. Touch the pads to answer calls, select functions, and move from screen to screen. Pads are designed to operate via touch or by mouse click. Console screens are configured and maintained from the Scout Project Manager application.

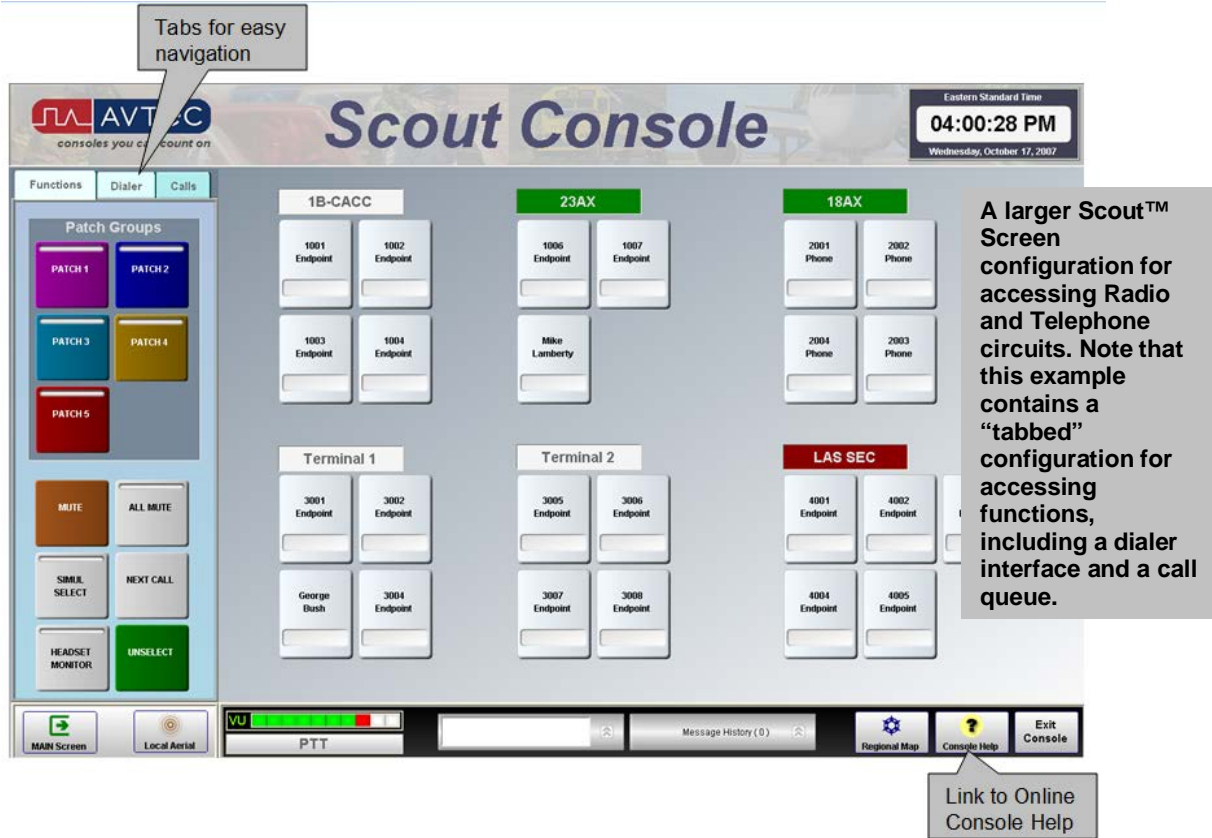


A small, simple Scout™ Screen configuration for accessing Radio circuits. Note in this example it contains a “tabbed” configuration for accessing different geographical territories, as well as navigation pads on the right side for other functions.

One of the configuration options available through the Scout Project Manager application is to offer user names and passwords for operator login. The Operator Login feature allows a dispatch center to use free seating with customized configuration. When Operator Login is in use, the operator can occupy any console position and log in to a console that displays the user-defined screens associated with the unique login. To support touchscreen console set-ups, the login dialog accesses a software keyboard.

Another feature of the Scout System is Console Intercoms. This feature provides dispatchers the ability to have two-way conversations with one another from their Scout Consoles. The dispatchers can place an intercom call as either a regular call or an emergency call. Dispatchers can also send one-way intercom page announcements to multiple dispatchers and make All-Call announcements. The Intercom endpoint pad can be configured to notify the dispatcher that he missed an intercom call and must call back another dispatcher. The notifications can include both visual and audible indications. In addition, intercoms can be configured in PTT mode or in full duplex mode.

The Scout software provides the most feature-rich and configurable interface in the console industry. Every screen element, from graphical backgrounds to pad sizes, colors, and fonts, can be configured to meet your needs. Despite the wide array of features, it is very simple to design, maintain, and deploy console screens using the Scout Project Manager. Refer to the following pages for additional user interface examples showing some of the possibilities.



AVTEC consoles you count on

Scout Console

Eastern Standard Time
04:00:28 PM
Wednesday, October 17, 2007

Functions | Dialer | Calls

Patch Groups

- PATCH 1
- PATCH 2
- PATCH 3
- PATCH 4
- PATCH 5

MUTE | ALL MUTE

SMIL SELECT | NEXT CALL

HEADSET MONITOR | UNSELECT

1B-CACC

- 1001 Endpoint
- 1002 Endpoint
- 1003 Endpoint
- 1004 Endpoint

23AX

- 1006 Endpoint
- 1007 Endpoint
- Mike Lamberty

18AX

- 2001 Phone
- 2002 Phone
- 2004 Phone
- 2003 Phone

Terminal 1

- 3001 Endpoint
- 3002 Endpoint
- George Bush
- 3004 Endpoint

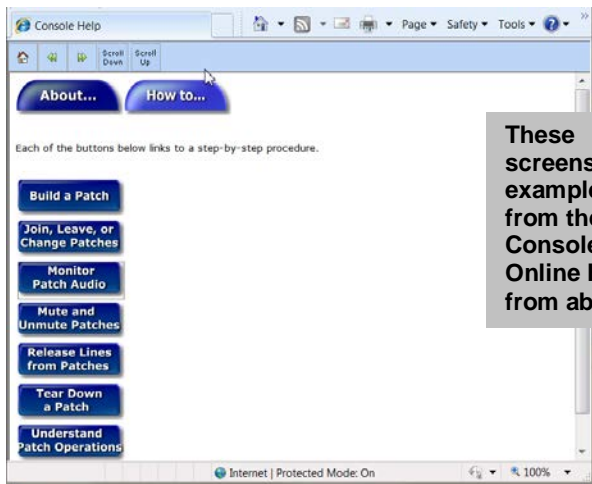
Terminal 2

- 3005 Endpoint
- 3006 Endpoint
- 3007 Endpoint
- 3008 Endpoint

LAS SEC

- 4001 Endpoint
- 4002 Endpoint
- 4004 Endpoint
- 4005 Endpoint

MAN Screen | Local Aerial | VU | PTT | Message History (0) | Regional Map | Console Help | Exit Console



Console Help

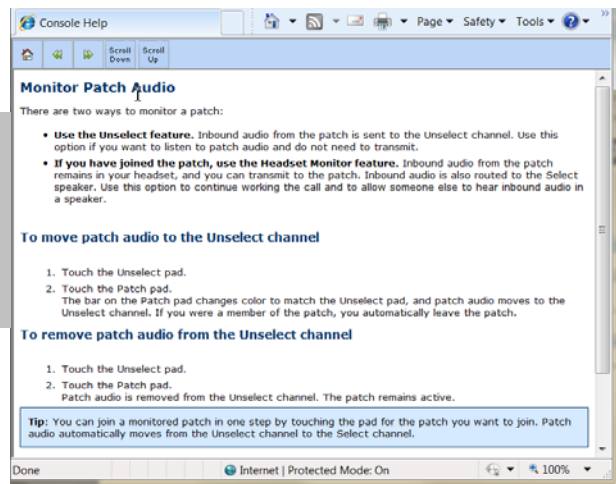
About... | How to...

Each of the buttons below links to a step-by-step procedure.

- Build a Patch
- Join, Leave, or Change Patches
- Monitor Patch Audio
- Mute and Unmute Patches
- Release Lines from Patches
- Tear Down a Patch
- Understand Patch Operations

Internet | Protected Mode: On

These screens are examples from the Console Online Help from above.



Console Help

Monitor Patch Audio

There are two ways to monitor a patch:

- Use the **Unselect feature**. Inbound audio from the patch is sent to the Unselect channel. Use this option if you want to listen to patch audio and do not need to transmit.
- If you have **joined the patch**, use the **Headset Monitor feature**. Inbound audio from the patch remains in your headset, and you can transmit to the patch. Inbound audio is also routed to the Select speaker. Use this option to continue working the call and to allow someone else to hear inbound audio in a speaker.

To move patch audio to the Unselect channel

- Touch the Unselect pad.
- Touch the Patch pad.

The bar on the Patch pad changes color to match the Unselect pad, and patch audio moves to the Unselect channel. If you were a member of the patch, you automatically leave the patch.

To remove patch audio from the Unselect channel

- Touch the Unselect pad.
- Touch the Patch pad.

Patch audio is removed from the Unselect channel. The patch remains active.

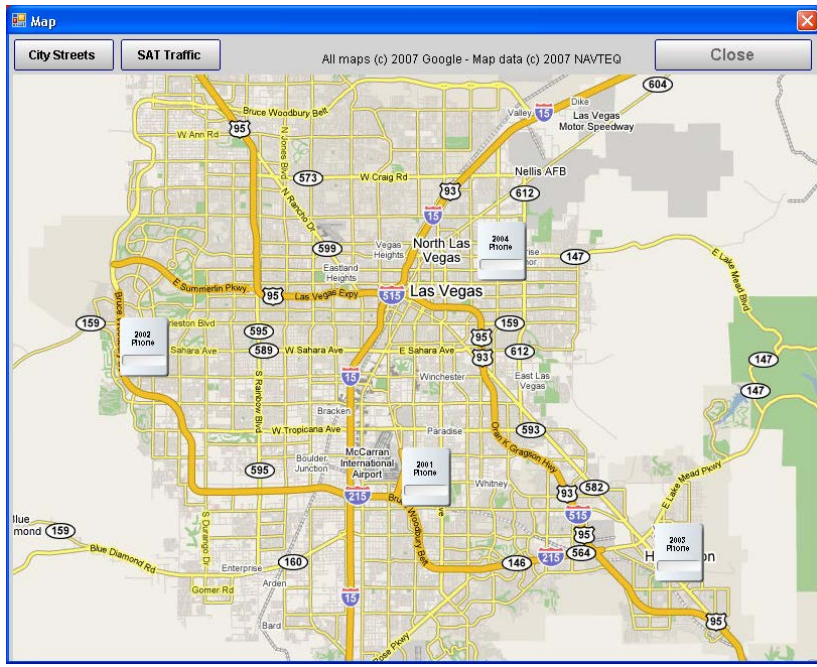
Tip: You can join a monitored patch in one step by touching the pad for the patch you want to join. Patch audio automatically moves from the Unselect channel to the Select channel.

Done | Internet | Protected Mode: On

In this example, a row of pads are configured to control embedded web browser to access traffic cameras, while associated Radio circuits are located below. The I-495 bridge radio is transmitting, and the dispatcher's voice is displayed on the VU Meter. If necessary, a phone number can be quickly dialed from the on-screen dialer at left.

The screenshot shows a software interface with several key components:

- On screen dialer:** A numeric keypad on the left side of the interface, used for entering phone numbers.
- Embedded Web Browser:** A window titled "TrafficLand" displaying a live video feed from a camera. Below the video are buttons for "W. Mountain Camera", "River Camera", and "I-495 W. W. Bridge Camera".
- VU Meter:** A red and green bar at the bottom right, labeled "PTT" (Push-to-Talk), indicating the status of the radio transmission.
- Other UI Elements:** A status bar at the top left shows "US Mountain Standard", "08:44:45", and "10/19/2007". A "Full Screen Toggle" button is visible on the right.



In this example, a "pop-up" screen with a background map is shown, with various phone lines placed with geographic reference. These pads could represent radios or even take the user to a different map screen with a "zoomed-in" view.



In this Public Safety Customer example, a variety of Scout user interface tools were used to build an attractive and functional console GUI. Multiple tabbed areas were used to maximize screen real estate. For example, when a HQ door control is actuated, the corresponding vehicle graphic is no longer displayed.

Scout Media Workstation Plus

The limitations of both PC audio processing and peripheral interfaces drive the need for the Scout Media Workstation Plus. Instead of a PC sound card, Avtec provides a robust embedded controller based upon a real-time operating system, with six dedicated DSPs to manage audio manipulation. It interfaces all of the dispatcher's peripherals such as speakers, headsets, handsets, and push-to-talk switches. The Media Workstation Plus converts the analog audio from these peripherals to VoIP audio for connection to the various IP endpoints (via VPGate™). In addition, it provides “transcoding” between different audio codecs (G.711, G.729a, G.726, etc.) and audio mixing for the console “patch” function. Up to five patches per Scout™ Console can operate simultaneously.

Connectors located on the rear of the unit provide for headset jack boxes, footswitch, select speakers, and unselect speakers. A maximum of 11 audio peripherals are supported at each console position. A front-panel reset switch is provided along with an LED to provide the power status indication. The Media Workstation Plus can be placed on the desktop, or mounted out of the way to conserve valuable desktop space. Under-desk mounting kits are available.



Desktop Speakers

The desktop speakers provide Select and Unselect speakers for the console. The speakers are compact and easily stackable, ideal for confined spaces. Each has a volume control, a Power/Audio Activity LED indicator, and an adjustment that permits setting a minimum volume level. For the Media Workstation Plus, Scout supports up to 10 speakers per console position assuming a single jack box or desk microphone is also used.



Jack Box

The Scout jack box provides a standard PJ327 jack for 4W/6W handsets and headsets. A minimum and maximum volume level is set under software control from the Media Workstation Plus. A manual volume control is provided as well as a mute-indication LED.



Desk Microphone

The Desk Microphone features a sturdy weighted base, a flexible neck, and connects to the Media Workstation Plus. The microphone features a large button for Push-to-Talk (PTT) which is labeled TRANSMIT and a smaller button for Continuous Tone-Coded Sub-audible Squelch (CTCSS) which is labeled MONITOR. In addition, a top-surface Avtec logo illuminates when the microphone is active. The profile of the microphone prevents dispatchers from engaging PTT accidentally.



Operator Console PC and Monitor

Each console is required to have a PC running the Windows operating system. Scout supports Windows XP Professional OS (SP3) or Windows 7 32- and 64-bit. Unlike competitors' systems, the PC is not proprietary and can be customer supplied.

Each console is required to have a display monitor. There are no special requirements for this monitor except compatibility with the selected PC. Scout supports screen resolutions up to 2560 x 1600. For most users, Avtec recommends using 1280 x 1024 resolution, 17" or 19" LCD Touchscreen.



Scout Console Options

Software Audio Package

For customers who need a flexible, mobile software-based dispatching option, Avtec offers the Scout Software Audio Package. The Software Audio Packages provides portability for a dispatch center or expands dispatch capability quickly for disaster management or during special events. To minimize dependencies on computer hardware and sound cards, the console software, when integrated with Scout's Software Audio Workstation, handles all of the audio processing, such as patching, transcoding, gain control, and mixing. The Software Audio Package is compatible with USB or built-in audio devices.

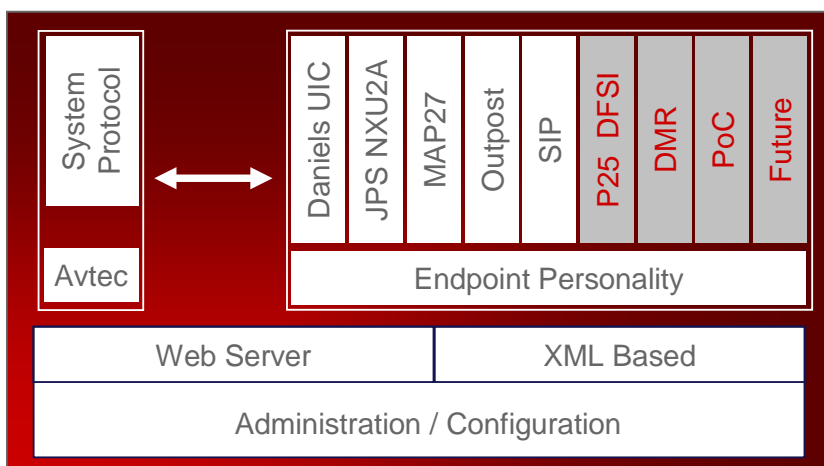
Ranger

Ranger, a unique Scout accessory that offers full connectivity for up to four radio channels, is ideal for management, IT professionals, senior staff, and anyone who has an occasional need for monitoring or communicating across the radio infrastructure. Ranger, which runs on Windows 7, provides a concentration of Scout's key features including endpoint cross indications, activity history and more. Ranger leverages the full capability of the Scout console system and pure-IP architecture to provide connectivity to the widest audience possible. When installed, Ranger includes a 90-day trial license. When the trial license expires, the customer contacts an Avtec sales representative to purchase a regular license.

VPGate™

VPGate™ is a software product that translates both VoIP traffic as well as a variety of open and proprietary communication protocols to a "common language" used to communicate to Scout Consoles and other VPGate systems over a LAN/WAN. It runs as a service under Windows. For purposes of discussion, this document uses the terms "VPGate" and "VPGates" to reference PCs running this software.

VPGate™ allows for the abstraction of the console system interface from third-party interface personalities. This allows Avtec to develop different personalities without affecting the console software or system interface protocol. At the same time, VPGate™ provides extensibility, so that new personalities can be added or existing personalities can be changed without affecting the core system interface. In addition, since VPGate™ runs multiple personalities, audio and protocol control is automatically converted between them offering inherent interoperability.



VPGate translates a variety of open and proprietary communication protocols to a "common language" used to communicate to Scout Consoles. In this diagram, note the Avtec System Protocol interface to consoles and endpoint personality protocols. By adding new endpoint protocols in the future the system is always up to date.

In a Scout Console System, radio, telephone circuits, and other devices are considered “endpoints.” Every endpoint is assigned to a VPGate™; a maximum of 160 endpoints are supported per VPGate based on licensing. To ensure reliability, **VPGate is usually licensed in a redundant pair arrangement**; two copies are provided to ensure that every endpoint is available at all times, even if a VPGate PC fails. If the system needs to support more than 160 endpoints, additional VPGate pairs are added. The Avtec System Protocol supports multiple VPGates. Generally, VPGates are co-located with consoles, and use multicast over the LAN to send audio to Scout for efficiency.

For smaller systems (less than 40 endpoints), VPGate™ can execute on the same PC as the consoles. For larger installations with many endpoints, dedicated PCs are recommended. VPGate™ communicates via Ethernet to VoIP endpoints using unicast transmissions; this simplifies its use in WAN environments. For non-IP devices such as Control stations or Cimarron ANI decoders, a serial protocol is used. In these cases, two drivers can be chained together for an endpoint. One converts the serial protocol to IP and another converts the proprietary protocol to the Avtec system protocol.

VPGate™ is configured and managed via a built-in web server. All updates/modifications take effect immediately after editing, so there is no need to reboot or restart the gateway. Using an embedded server to serve configuration and status pages allows access to any VPGate™ over the network from any location from the Scout Project Manager, or even using a standard web browser like Internet Explorer.

For security purposes, the VPGate Web Server can be configured to require one or more User IDs and passwords before it will allow a user to view or modify any of the configuration information displayed on its webpage. Although Avtec offers a robust dedicated VPGate computer, it can be customer supplied.

Scout Integration Technology

VPGate™ integrates with equipment from the following companies*:



consoles you can count on



List of Technologies by Manufacturer

- EDACS Control Station – Harris M7100
- P25 Trunked Systems – Cassidian and Tait Radio Communications
- P25 Conventional – Daniels Electronics and Tait Radio Communications
- P25 Control Stations – Kenwood and Tait Radio Communications
- MPT1327 Trunk Systems – Tait Radio Communications
- NXDN – Kenwood NEXEDGE and ICOM IDAS
- FleetSync Radios – Kenwood
- Conventional Radio Interfaces – Avtec, Inc. Outpost, Raytheon NXU2A, Motorola MOTOTRBO IP Site Connect
- MDC1200 and FleetSync ANI Encoder/Decoders - Cimarron
- Session Initiation Protocol (SIP) Telephony Systems – Avaya, Cisco, Quintum, others
- iDEN/NEXTEL – SyTech
- Analog/IP Logging Recorders – Eventide, Exacom, Higher Ground, and VPI
- IP Auxiliary Input and Output Panels - Avtec, Inc.
- Trunked Radio Interfaces – Motorola MOTOTRBO Connect Plus
- Time Synchronization – Spectracom NetClock

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Scout™ Project Manager

The Project Manager is an Avtec software application that runs on a Windows XP Pro or Windows 7, 32- or 64-bit. Each collection of configuration settings for a particular Scout system, including settings for the consoles, screens, and endpoints, is considered a “project.” Project configuration data is saved in industry standard XML format. The Scout Centralized Project Storage (CPS) application provides centralized system management, storing all the console screens and configurations in a single location and pushing changes out to the console positions.

For security purposes, the system uses several layers of password protection: Project Manager, webpage, and Operator Login.

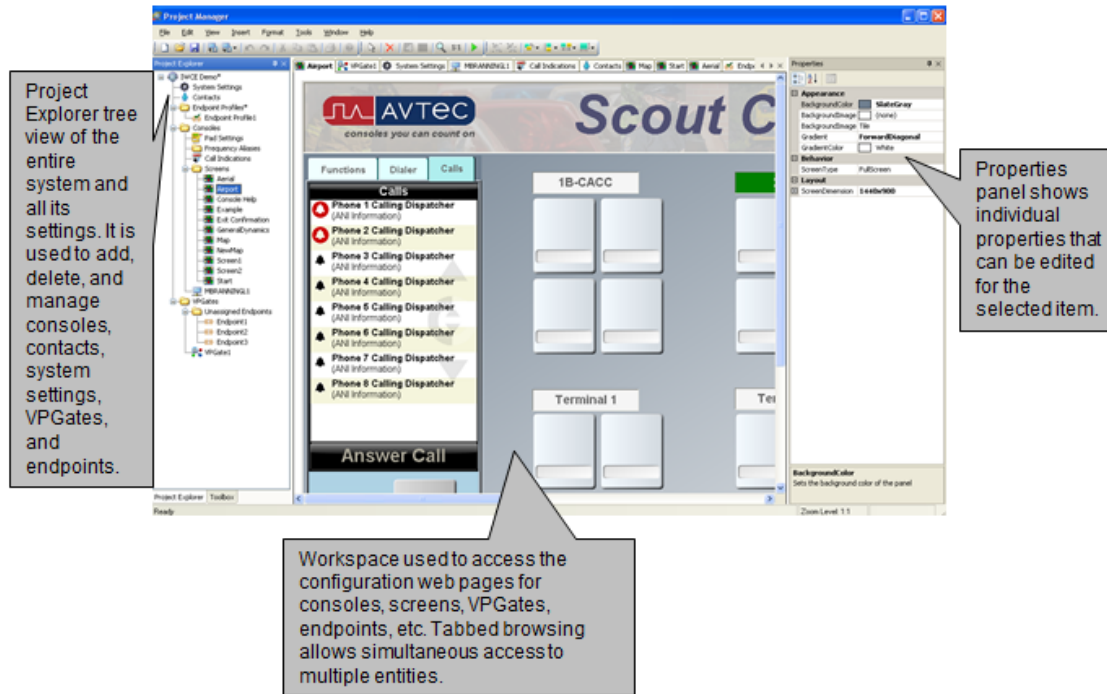
To prevent Project Manager from unauthorized updates, the Scout System Administrator has the option to configure Project Manager to require login with a user name and password. When Project Manager is configured to require login, the user is prompted to enter the user name and password as soon as Project Manager starts. The login dialog includes a software keyboard to support consoles that do not include a keyboard.

The Scout System Administrator can create users, known as maintainers, who have rights to access Project Manager. Each maintainer can have varying levels of access, as needed: No Access, Read-only Access, or Full Access. Maintainers can also have the rights to create additional maintainers, assigning rights as necessary. Maintainers' rights can be assigned differently for each portion of Project Manager that can be updated. Verified against a master list at login, the maintainer user names and passwords allow access to Project Manager on any computer where the project resides.

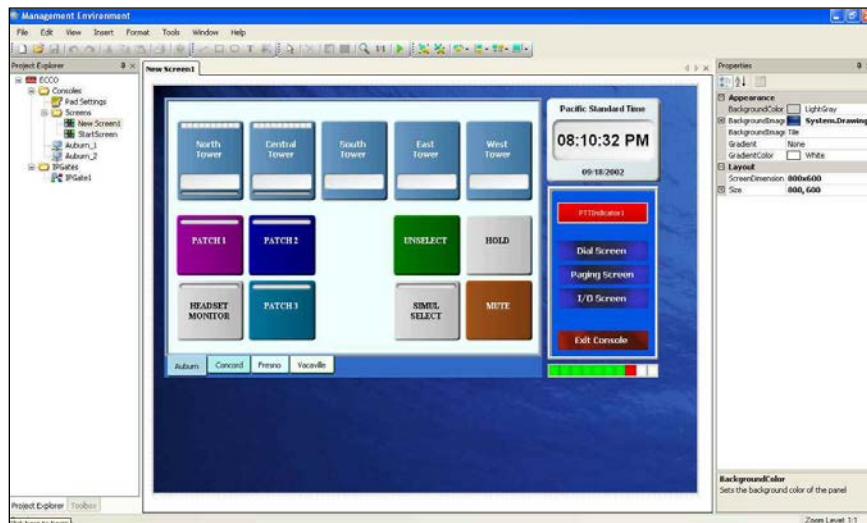
The webpage password protection feature provides a method of ensuring that only authorized personnel access the internal webpages to make changes to the system configuration. The user names and passwords assigned apply only to the system component where the name and password is created. For example, an instance of VPGate that enables users to update the pages only allows update by the users that were created within that instance of the software. Components of Scout that allow authorized web users include Outpost, VPGate, Console, CPS, and Frontier.

Another layer of security is available through the Operator Login feature. Scout Consoles have the configuration option to require user names and passwords for login. If configured for Operator Login, the consoles display the user-defined screens associated with the unique login. The Operator Login feature is an optional configuration for consoles that need it within the command center; other consoles can have assigned functionality without requiring operator login.

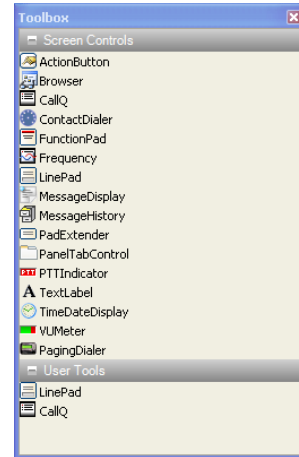
Project Manager provides the centralized management advantage of a traditional Console system in a distributed architecture. The Project Manager has three main panels or sections.



One of the key functions of the Scout Project Manager is the capability to build and manage console screens. Essentially, the user interface presented to the Console operator can be built from the ground up. Graphical “components” such as Line Pads, Function Pads, Call Queues, Dialer interfaces, Web Browsers, Text fields, etc. can be “dragged and dropped” onto the screen workspace from the “Toolbox” in the left panel. Individual pad properties, such as pad color or pad name are then set using the Properties panel.



The Toolbox function has a customizable “User Tools” area at the bottom. It allows screen controls, once customized, to be saved back to the Toolbox. The color schemes, fonts, and other options for that control are saved and it can be used as the “standard” control for that Project.



To assist in building the console user interface, the ability to preview in runtime mode is available from within the Scout Project Manager. This allows testing the user interface, including navigation between screens, accessing the contact database, and controlling embedded web browsers. This capability is available even if the PC is not connected to a media workstation. Other possible uses include demonstrations or introductory training.

All console settings and screens can be saved locally on the PC running the Scout Project Manager and/or in the Scout Centralized Project Storage (CPS). Saving to the CPS allows system settings and screens to be “pushed” to Consoles allowing these devices to update dynamically without having to shut down or reboot them.

Outpost™ Radio Controller

The Avtec Outpost™ endpoint is a solid-state embedded IP controller that interfaces analog radio equipment to an IP network. It performs analog-to-digital conversion of the audio as well as remote monitoring and control. Outpost™ works in conjunction with VPGate™ to provide interoperability with other types of endpoint devices from different manufacturers.

Outpost supports a feature called In Cabinet Repeat. Also known as Console Repeat, Self Repeat, or Talk Through, this feature allows Outpost to create the appearance of a repeater from an ordinary base station. When enabled, any audio received on the 4-wire input side is retransmitted on the 4-wire output side. This feature can be configured to operate at all times, or it can be configured to operate when the Scout Console dispatcher enables it.



Outpost™ is equipped with two radio ports. Each port’s interface can control a “direct connected” local radio or a tone remote controlled radio (locally or over a telephony circuit). In addition, each radio interface is also equipped with a serial data port, which can tunnel serial protocols via IP to VPGate for translation.



Rear View of Outpost

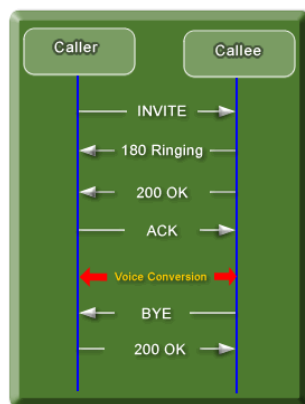
Outposts can be rack mounted if desired. Four units fit into a 3 U rack space. For security purposes, Outpost can be configured to require user ID and password before it will allow a user to view or modify any of the configuration information displayed on its webpage.

When interfacing a radio, the multifunction ports perform the following functions under software control:

- Analog audio interface to/from the radio, and decoding of DTMF digit(s) for calls
- Generating tones for transmission by the radio, either as an answerback event or upon a command from the dispatcher
- Detecting a carrier operated relay (COR) signal from the radio
- Detecting a radio signal strength indicator (RSSI) from the radio for call voting
- Providing a push-to-talk (PTT) control to the transmitter
- Selecting a frequency of the transmitter, if the station supports this function
- Providing LED indication of connectivity and control status

Telephony with Session Initiation Protocol (SIP)

Scout™ and VPGate™ support Session Initiation Protocol (SIP) for connection to VoIP telephony devices. Scout Consoles display pads on the user interface that map to telephony “circuits.” These can be actual phone lines tied to a gateway, or a VoIP “extension” off an IP PBX. Scout supports Cisco Unified CallManager V6.1+ and 8.0+, Avaya IP Office, Generic SIP PBXs and Quintum Survivable SIP gateways.



Avtec consoles, including Scout™, treat telephone “circuits” similarly to radios. A console can have multiple line appearances on its screen, and allow multiple phone calls to be active simultaneously. Calls may be active, put on hold, and patched to other phone lines and/or radio endpoints. Avtec consoles are not restricted to one “phone patch” like traditional consoles from the public safety world.

VPGate™ contains the SIP stack, and manages SIP connections. In simple applications, small 4- or 8-port SIP telephony gateways can be used to connect to POTS (Plain Old Telephone System) lines. In a VoIP PBX-equipped installation, VPGate™ registers with the IP PBX and functions with the existing gateways and desk telephones.

Scout includes an extensive contact database, organized into groups. Telephony functions include recall dial tone, call, display caller ID (name and number) in the call queue, transmit caller ID, patch, call transfer, automatic answer, and more.

VPGate™ complies with the following SIP Standards:

- RFC 2617 – HTTP Authentication: Basic and Digest Access Authentication
- RFC 2833 – RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals
- RFC 3261 – SIP: Session Initiation Protocol
- RFC 3264 - An Offer/Answer Model with the Session Description Protocol (SDP)
- RFC 3550 – RTP: A Transport Protocol for Real-Time Applications (without RTCP support)
- RFC 4566 – SDP: Session Description Protocol

Scout™ System Features

Scout™ offers a variety of system-level features that provide the ability to configure the business rules of system operation. System-level business rules refer to the configuration parameters that enforce the system’s conceptual behavior as well as how information is presented to dispatchers to make their experience more intuitive, which reduces stress and errors. Some examples of system-level configuration include how calls are presented, how lines move between states, into which states certain lines can be placed, how audio is cross muted, and frequency aliases.

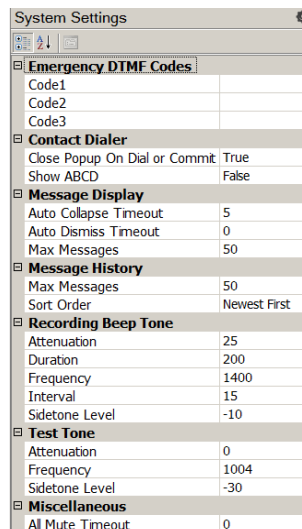
The system features and examples listed are representative of the information contained in Scout.

System Settings

System settings are applied to all consoles in the project. Some of these properties can be overridden by other project settings which are noted in the individual descriptions.

Examples:

- Emergency call codes
- Contact dialer behavior
- Call alert and progress tones
- Message display and history settings



System Settings	
Emergency DTMF Codes	
Code1	
Code2	
Code3	
Contact Dialer	
Close Popup On Dial or Commit	True
Show ABCD	False
Message Display	
Auto Collapse Timeout	5
Auto Dismiss Timeout	0
Max Messages	50
Message History	
Max Messages	50
Sort Order	Newest First
Recording Beep Tone	
Attenuation	25
Duration	200
Frequency	1400
Interval	15
Sidetone Level	-10
Test Tone	
Attenuation	0
Frequency	1004
Sidetone Level	-30
Miscellaneous	
All Mute Timeout	0

Contact Editor

A contact can have multiple pager, telephone, and/or radio numbers. Using the **Add Phone**, **Add Pager**, and **Add Radio** buttons located at the bottom of the Contact Properties pane, multiple pager, phone, and radio numbers can be added.

A contact can be added to multiple groups and accessed through auto contact pads or the contact dialer.

Contacts

- Adam Stancil
- Al Jackson
- Darby Jones
- Richard Smith
- Sam Malone

New Contact Delete

Groups

- [All Contacts]
- Emergency
- Fire
- Police
- Security

New Group Delete

Contact

General

Company

E-Mail

Hunt Group: <Unassigned>

Name: **Adam Stancil**

Pager(s)

Pager

Phone(s)

Business Phone: **8952181892**

Cell Phone: **8955189175**

Home Phone: **8952181765**

Radio(s)

Radio

Company
Company name of the contact.

Add Phone Add Pager Add Radio Remove

Cross Muting

Cross muting configures how and to what degree audio is muted. This can mean that whenever a nearby console is transmitting, all the other nearby consoles' speakers (and potentially their headsets) will be fully muted; or it can be more selective and mean that whenever a nearby console is transmitting on a specific frequency and the other consoles are listening to a radio's audio on the same frequency in a speaker. The following pictures show the settings for cross muting using frequency and nearby consoles. The third picture shows the properties for cross muting.

Cross Mute Configuration

View: By Frequency By Group Name Nearby Consoles

Endpoints	F1	F2	F3	F4	F5
Endpoint1	Police	Rescue	Police		
Endpoint2	Police	Fire	Rescue	<Unassigned>	<Unassigned>
Endpoint3	Fire	Rescue	Police		

Cross Mute Configuration

View: By Frequency By Group Name Nearby Consoles

Consoles	Operator 1	Operator 2	Operator 3
Operator 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Operator 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Operator 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Frequency Configuration

Properties

Console

Headset Attenuation: 0

Release Delay: 0

Select Attenuation: 0

Unselect Attenuation: 0

Audio Settings - VOX Detection

Attack Time: 40

Level: -20

Release Time: 1000

Call Settings

Dial On Contact Selection: False

Screen Saver Disengage On: True

Cross Muting

Mute Headset: **True**

Nearby Consoles: **(Collection)**

Range: **No Cross Muting**

DTMF Call-In Codes

Nearby Consoles Configuration

Local Muting

Local Mute provides the capability to mute receive audio from certain radio endpoints automatically at the dispatcher's console as soon as the dispatcher engages PTT (push to talk). The audio that is muted includes voice, paging tones, and alert tones. By locally muting certain radio endpoints, the dispatcher's conversation is free from feedback that could occur as a result of cross channel interference. The Scout System Administrator configures each console for the Local Mute settings that should apply. The local mute settings are under software control, and do not require hardware modifications to add or change configuration settings. These settings include whether or not muting occurs when a headset is being used, which RF channels are muted when PTT is active, the text on the indication displayed to the dispatcher on the channel control to let him know which channels are being muted, and the duration the mute function persists after PTT ends.

Call Monitoring

When a DTMF directed call (regular or emergency) is received from the field on a radio that is in disconnect, the system automatically places the receive audio from this radio into an unselect speaker.

Call Indication Configuration

View call indications by:

Console Endpoint
 AV-05-02 1001

Description: Console 1 - Right Table

Endpoint	Regular Call Visual	Regular Call Audible	Regular Call Monitor	Emergency Call Visual	Emergency Call Audible	Emergency Call Monitor
1001	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None
1002	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Unselect 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Unselect 2
1003	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None
1004	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None
1005	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

Console Monitor

Console Monitor is a Scout feature that allows a supervisor or administrator to listen to the conversations in a console's Select audio. The Console Monitor feature only involves listening; the supervisor who is listening cannot communicate with the dispatcher or anyone else participating in the call.

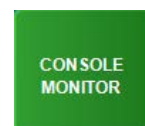
A Scout console must have Console Select Monitor configured as an audio device to allow monitoring. With that configuration in place, a supervisor who chooses to listen to the console uses a secondary touch function pad with the intercom pad for the dispatcher to be monitored.

The intercom pad changes colors to indicate to the supervisor which console is being monitored. However, the dispatcher does not receive any indication that calls are monitored. With this new feature, several supervisors can monitor one console at the same time, or one supervisor can monitor several different dispatching consoles at the same time.

Properties

Function Pad

- Appearance
 - Flat: False
 - Font: Arial, 9pt, style=Bold
 - Show Icon: False
- Behavior
 - Function: Console Monitor
- Layout
 - Icon Location: Top
 - Location: 431, 193
 - Size: 100, 90



Frequency Alias

Frequency aliases provide additional information to the dispatcher to make the experience more intuitive and to minimize errors. Alias information is displayed on each line in extender as well in the frequency selection control.

Frequency Alias Config

Frequency	Alias
Freq 1	Engine 301
Freq 2	Engine 302
Freq 3	Engine 303
Freq 4	Ladder Truck
Freq 5	Pump Truck
Freq 6	Maintenance
Freq 7	Fire Chief

a pad

Recording Beep Tone

Recording Beep Tone properties specify settings for the beep tone that is heard at the endpoint and the sidetone that is heard at the console when audio recording is used.

Max Messages	50
Sort Order	Newest First
Recording Beep Tone	
Attenuation	25
Duration	200
Frequency	1400
Interval	15
Sidetone Level	-10
Test Tone	
Attenuation	0
Frequency	1004
Sidetone Level	-30

Workstation Relays

Workstation Relays provide visual indications of the current console status to external devices. For example, supervisors and co-workers can see lights on a pole to recognize the dispatcher's status instantly. The status notifications include: Any System Alarm, Major System Alarm, Minor System Alarm, Emergency Call, Channel Marker, Regular Call, Busy, PTT (transmitting audio), and Transmitting.

Workstation Relay Configuration

Console:

The Duplicate... button displays a dialog for copying the selected relay settings to chosen Consoles. Selected relays are shown by the highlighted row indicators in the far left column.

Relay	Notifications	Enabled	Endpoint Profiles	Action	ON Time	OFF Time	Min Inactive Time
▶ Relay 1	Any System Alarm, Em...	<input type="checkbox"/>					
	Any System Alarm	<input type="checkbox"/>	<Unassigned>	Continuous	1000	250	0
	Emergency Call	<input checked="" type="checkbox"/>	Intercom	Continuous	1000	250	0
	Channel Marker	<input type="checkbox"/>	Phone	Continuous	1000	250	0
	Regular Call	<input type="checkbox"/>	<Unassigned>	Continuous	1000	250	0
	Busy	<input type="checkbox"/>	<Unassigned>	Continuous	1000	250	0
	PTT	<input type="checkbox"/>	<Unassigned>	Continuous	1000	250	0

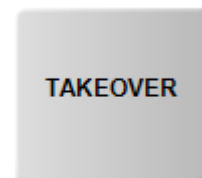
Notification Pad

When the Scout Diagnostics application receives a system alarm, it sends a notification to an administrator who has a Scout Console. A tool on the console screen, the Notification Pad, changes colors and, if desired, produces an audible tone to notify the administrator that a new alarm was recorded in the Scout Diagnostics application. The Notification Pad can be configured to send a signal for any system alarm, for only major system alarms, or for only minor system alarms. The alert can also be configured through the workstation relays to indicate the system alarm by activating a relay that can be attached to an external device.



Supervisory Takeover

The Supervisory Takeover feature allows a supervisor to take control of an endpoint, if necessary. The endpoint can be in any state, in simul-select, a member of a talkgroup, or even a member of a patch when the takeover occurs.



The supervisor takes over the endpoint by activating the Takeover function pad to gain exclusive use of the endpoint. When the supervisor relinquishes control of the endpoint, other dispatchers can transmit as usual. Console configuration determines which Scout Systems display the Takeover function pad; any dispatcher's console with the Takeover function pad can take over another endpoint as described.

Barge-In

Scout provides Barge-in capability on telephone endpoints. Barge-in allows a dispatcher to join a conversation that another dispatcher has in progress by simply selecting the line. The result: multiple dispatchers can select and talk to a telephone endpoint at the same time. This feature could allow a dispatcher to receive on-the-line support from a co-worker or supervisor. Each Barge-in conversation can support 11 simultaneous talkers: one field endpoint and 10 dispatchers, and VPGate can support up to 250 talkers in various conversations depending upon codecs in use and their effect on performance. A telephone endpoint must be configured in VPGate to allow Barge-in conversation.

SNMP Traps

The Scout Diagnostics application can be configured to send SNMP messages, called traps, for its alarms and events. When the various Scout applications generate alarms and events, Scout Diagnostics catalogs them. In addition, Scout Diagnostics can be configured to send traps to one or more SNMP Managers.

Scout™ Screen Controls

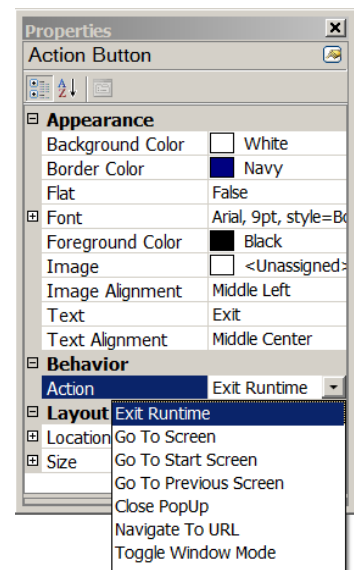
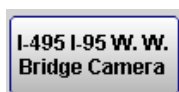
In addition to some of the dispatching functions described earlier in the document, Scout™ offers a wide variety of other functions. These provide the ability to create graphical rich and intuitive screens for the Scout™ user interface. Note that while the configuration options (fonts, colors, images, etc.) are extensive, generally a control is customized only once, and then copied into the User Tool “Toolbox” for reuse with all screens built. This provides speed, simplicity, and consistency when building user screens. In some cases, it is necessary to upgrade VPGate or Outpost software or to add additional hardware to enable these features.

Action Button

A Pad used for GUI navigation and other actions. Action Buttons can be configured with colors, fonts, graphics, and behaviors.

Examples:

- Direct a Browser window to retrieve the contents of a URL
- Exit the Application
- Navigate to a different screen, which could contain help, other circuits, maps, or functions
- Close this window and return to the previous window
- Toggle between full screen and window modes



Configuration Options

Activity History

The Activity History control displays the console's VOX activity to the dispatcher on a per line/per talkspurt basis. A talkspurt is defined as VOX that occurs on an active line. Every time this condition exists, a new talkspurt is created. Activity History also allows you to play recorded talkspurts if you have Scout Instant Recall Recorder installed.

Activity History (11)				
Start Time	Endpoint	Talkgroup / F...	Status	Indications
Dur / Play	ANI / Caller ID	NAC Code		
14:20:43 00:18 ▶	Endpoint 1001 555 555-1212	Freq 1 297	1000 1000	🔴 🔒
14:20:43 00:18 ▶	Endpoint 1004 555 555-1212	Freq 4 29A	1000 1000	🔴 🔒
14:20:43 00:18 ▶	Endpoint 1007 555 555-1212	Freq 7 29D	1000 1000	🔴 🔒
14:20:43 00:18 ▶	Endpoint 10010 555 555-1212	Freq 10 2A0	1000 1000	🔴 🔒

0 00:18

Start: 14:20:43 Endpoint 1001

Prev for Line Play Next for Line Stop

Example

Audio Priorities	
Audio Settings	
Audio Settings - Breakback	
Audio Settings - VOX Detection	
Call Settings	
Cross Muting	
DTMF Call-In Codes	
Options	
Activity History Retention	10
Call Monitor Timeout	0
Patch Auto Join	No
Talkspurt Release Time	0
Paging Settings	

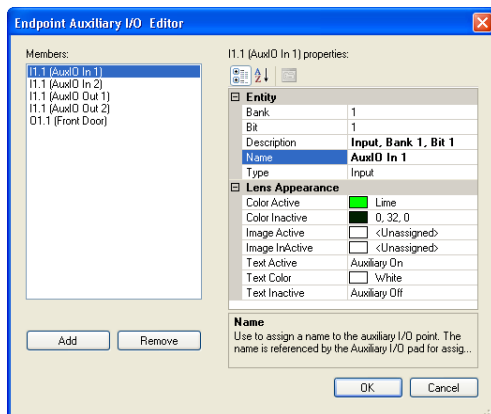
Configuration Options

Auxiliary I/O

The Auxiliary I/O Pad is used to display state information such as if a door is open, or to control a remote device such as a voter. The colors of the active and passive states and the text are configurable. In addition, an input alert can be configured to trigger an audible notification and a flashing notification.

Example:

- A door opened making the indicator reflect the "active" state
- A door is closed making the indicator reflect the normal passive state.



Configuration Options

Browser Object

A Browser Object allows you to create an Internet Explorer compatible Web browser which may be placed anywhere in the user interface. Multiple instances are supported, with each having a dedicated, fixed URL. Action buttons can relate to this object to allow navigation to other URLs if desired. **Note:** Controls are limited to any that appear within the window, to inherently restrict usage.



Call Queue

The Call Queue provides the dispatcher a central place to reference all pending calls. The calls are listed first by priority (Emergency calls first over Regular calls), then by arrival time (oldest calls first). Each call can be displayed with an icon indicating whether the call is an emergency or a regular call. Default icons are provided.



Example

Appearance	
BackgroundColor	Black
ButtonFont	Arial, 18pt, style=Bold
CallEmergencyIcon	CallEmergencyIcon
CallRegularIcon	CallRegularIcon
Flat	False
ItemAlternateColor	Beige
ItemBackgroundColor	White
ItemSelectColor	LightGray
ListFont	Arial, 10pt, style=Bold
TitleFont	Arial, 12pt, style=Bold
Layout	
Location	286, 268
Size	240, 355

Configuration Options

Contact Dialer

The Contact Dialer control serves two purposes: First, it is used for DTMF dialing from its dial pad. Second, it can display contact groups and individual contacts within the groups. By selecting a contact from the group, the contact displays on the dial pad allowing the dispatcher to dial the number of the contact by simply pressing the Dial key on the dial pad. The Contact Dialer can be configured, on a per-console basis, to display the contact's name, the contact's number, or both. As an option, Scout supports the use of a commercial-off-the-shelf external keypad to use in place of the Contact Dialer, if desired. **Note:** The control can be displayed as a static control on a full screen or as a popup screen.



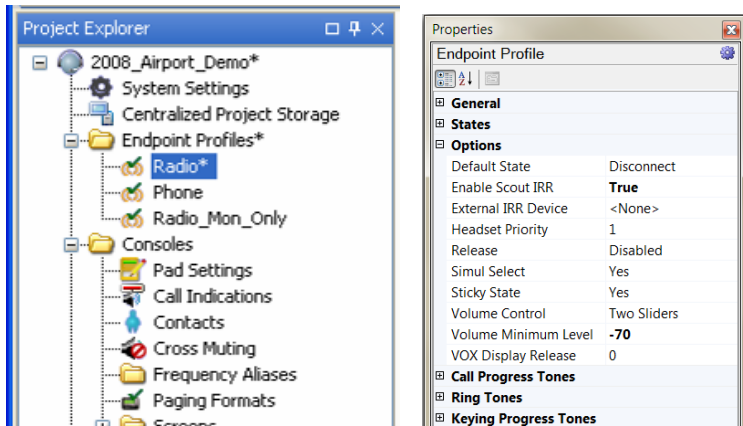
Example

Properties	
Appearance	
DisplayColor	Gray
DisplayFont	Arial, 18pt, style=Bold
Flat	False
Font	Arial, 12pt, style=Bold
ForegroundColor	Black
IconLabelFont	Arial, 8pt, style=Bold
SuperscriptFont	Arial, 8pt, style=Bold
Behavior	
Mode	Dialer
Contacts Appearance	
ContactsBackground	Contacts
ContactsItemAlternateColor	ContactsShiftLock
ContactsItemBackgroundColor	white
ContactsItemFont	Arial, 9pt, style=Bold
Layout	
Location	211, 89
Size	250, 500

Configuration Options

Default Unselect

This feature allows administrative personnel to define if a specific radio (or other non-supervised circuit) on a dispatcher's screen should always be in a non-disconnected state.



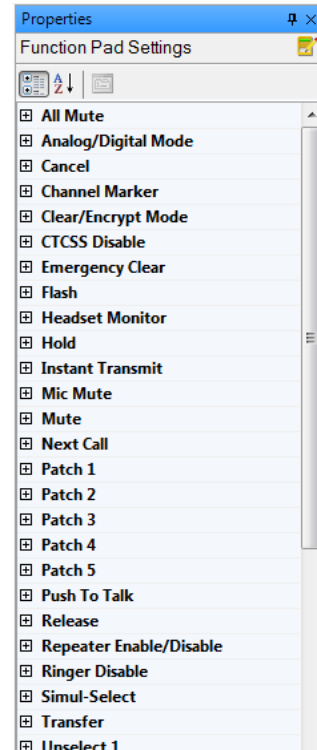
Example

Configuration Options

Function Pads

Like the name infers, Function pads are used to initiate a particular screen "function" or action. A Function pad can be configured to perform one of the following functions:

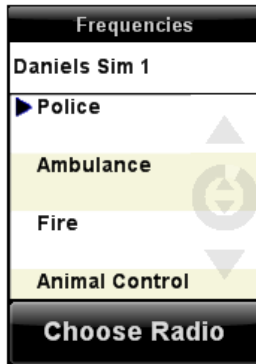
- All Mute or Mute
- Analog or Digital Mode
- Callback
- Cancel
- Channel Marker
- Channel Release
- Console Monitor
- CTCSS Disable
- Encrypt or Clear Encrypt
- Flash
- Forward Calls
- Headset Monitor
- Hold
- Instant Transmit
- Mic Mute
- Next Call
- Patch
- Push To Talk
- Release
- Repeater Enable/Disable
- Ringer Disable
- Set Frequency
- Simul-Select
- Supervisory Takeover
- Transfer
- Unselect



Note: Pad configuration options vary depending on the function selected.

Frequency Change

The Frequency Control allows a dispatcher to change the frequency on endpoints that are multi-frequency radios. Instead of F1, F2, F3, etc., Scout™ provides for a set of user assigned frequency aliases.



Example

Frequency Alias Configuration

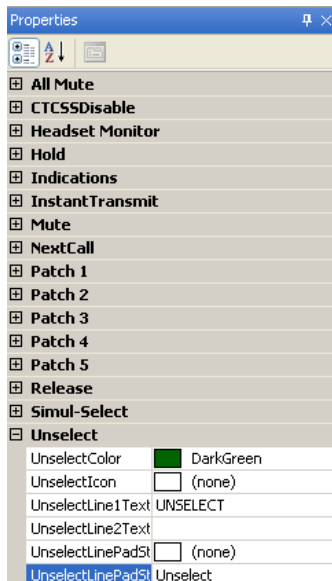
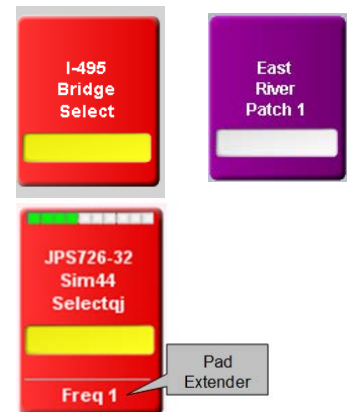
Frequency	Alias
Freq 1	Police
Freq 2	Ambulance
Freq 3	Fire
Freq 4	Animal Control
Freq 5	Freq 5
Freq 6	Freq 6
Freq 7	Freq 7
Freq 8	Freq 8
Freq 9	Freq 9
Freq 10	Freq 10

Configuration Options

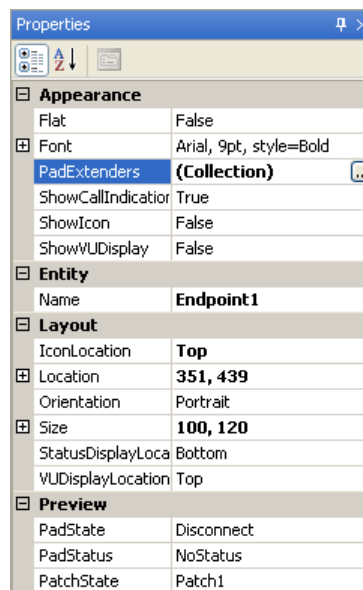
Line Pad

The Line Pad appears deceptively simple, yet it is the one of the most powerful and configurable parts of the Scout™ User Interface. Some Line pad properties are project-level properties, meaning that you edit the property once and the change is applied to all of the Line pads on all of the screens in your project. Other Line pad properties are control-level properties, which means that property changes are applied only to the currently-selected control.

A Line Pad Extender control is also available. The pad extender can be used to display ANI information, in raw form or Aliased. See below for an example.



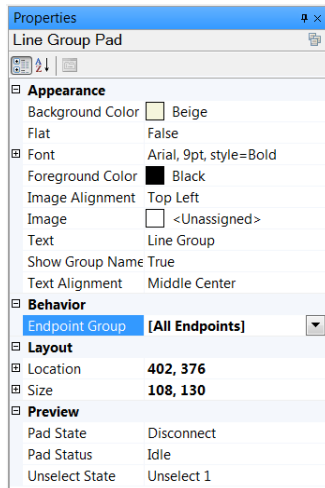
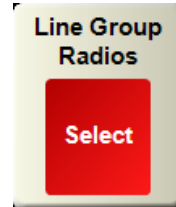
Project-Level Configuration Options



Control-Level Configuration Options

Line Group Pad

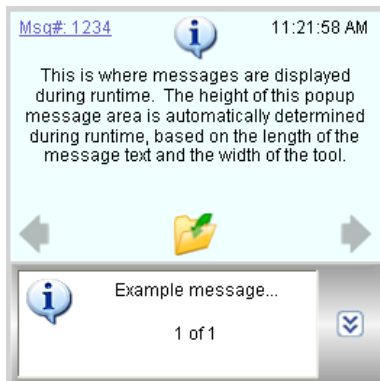
The Line Group pad allows the dispatcher to perform actions on a group of endpoints reducing the amount of time needed for repeat operations on large groups of endpoints.



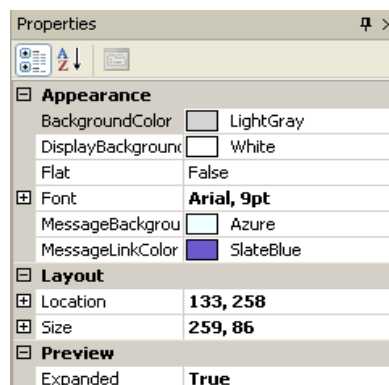
Configurable Options

Message Display

The Message Display control displays console messages to the dispatcher. It is comprised of two parts; the main control and the popup message box. The main control displays a one line message summary and buttons to open or close the popup message box which displays the full message, timestamp, and message ID number.



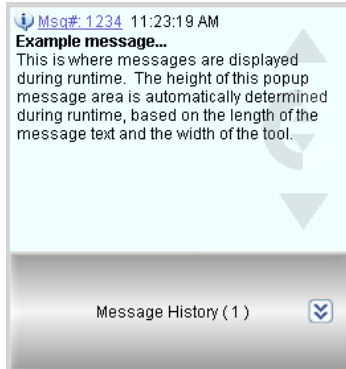
Example



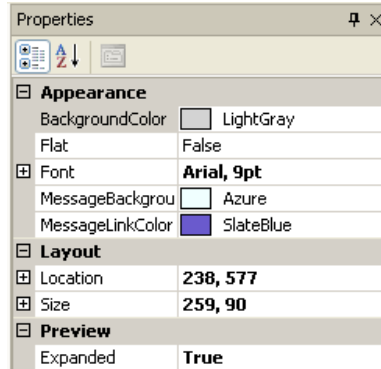
Configuration Options

Message History

The Message History control displays messages that the dispatcher has removed from the Message Display. It works like the Message Display. Also, note the touch-friendly scroll control that allows rapid scrolling on touchscreens, working much like an iPod control.



Example



Configuration Options

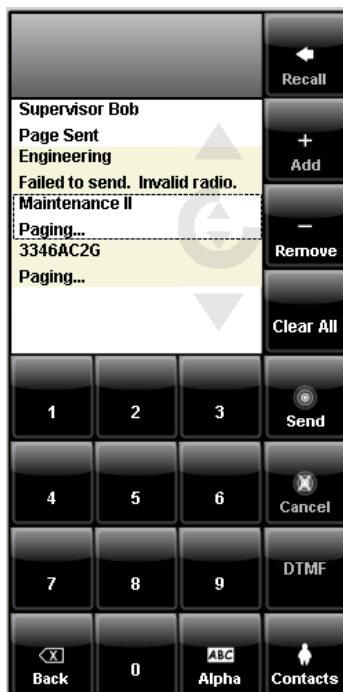
NENA Deskset

This interface provides connectivity and control signaling between the Scout console and a NENA-compliant external E911 Telephone deskset. This allows the Scout console to share a headset with a deskset in cases where fully integrated telephone operation is not desired or possible.

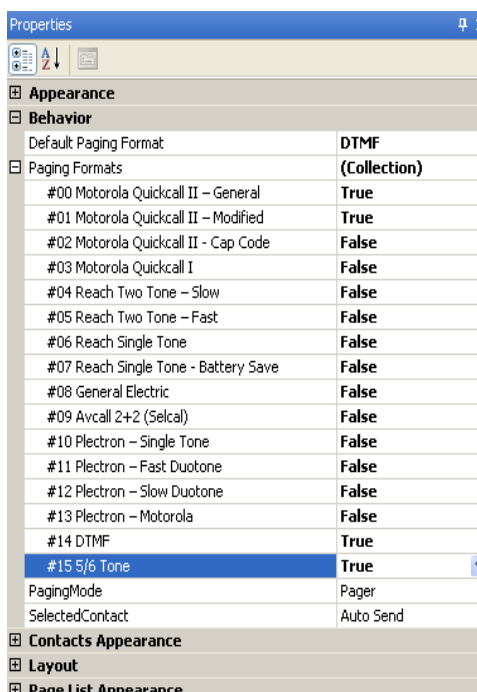


Paging Dialer

The Paging dialer is a control that supports a variety of paging formats, as shown in the Properties menu. You can also add a custom format by modifying an existing format. Stacking, Steering, and Auto-paging features are all supported. Scout supports both sequential paging and parallel paging.



Example



Configuration Options

Panel Tab Control

Tab controls allow creation of embedded tabbed panels within the user interface.

Can be configured for:


- Font
- Color
- Size
- Appearance



Patch Functions

There are many patching features that allow administrative personnel the flexibility to configure patching behavior. They include whether:

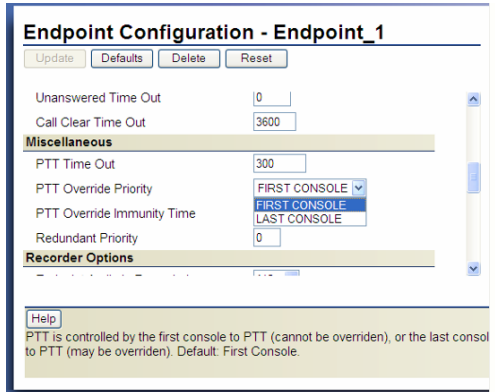
- A console automatically joins a patch when a line has been placed into the patch
- PTT is required when a patch is full duplex
- A dispatcher can place a call directly into a patch without leaving the patch
- A dispatcher can remove a line from a patch without leaving the patch
- A dispatcher receives a patch timeout notification
- A dispatcher can use */# patch keying for telephone endpoints

Console	
	
Device	
Startup	
Activity History	
Alert Tones	
Audio Priorities	
Audio Settings	
Audio Settings - Breakback	
Audio Settings - VOX Detection	
Call Settings	
Cross Muting	
DTMF Call-In Codes	
Options	
Paging Settings	
Patch Settings	
Auto Answer	False
Auto Full Duplex	False
Auto Join	False
Auto Line Release	False

Configuration Options

PTT Override

This feature allows administrators to configure VPGate to allow dispatchers to override each other's PTT for cases where multiple dispatchers have the same simplex endpoint on their screen and are using Monitor Outbound Audio to hear each other's outbound conversation to the field in a party-line fashion.

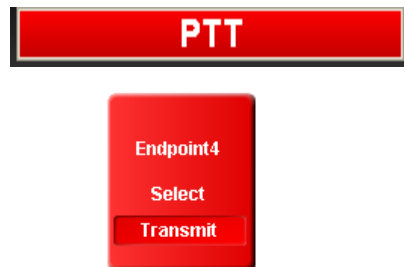


PTT Indicators

There are two types of PTT Indicators: Hardware (input from PTT switch or mouse click) and Positive PTT indication (endpoint confirmation, displayed on line pad).

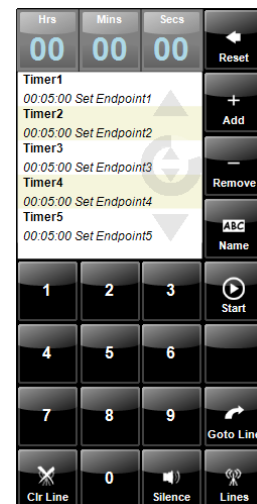
Can be configured for:

- Font
- Color
- Size
- Appearance



Timer Tool

The Console Timer is one tool that provides up to 20 different timer settings that can be used as reminders for any type of need. The dispatcher can set each timer as a standalone timer or as a timer associated with a specific endpoint. Designed to allow settings for hours, minutes, and seconds, the timer can remain on the Scout User Interface to let the dispatcher see the timer count down. When the timed countdown expires, the timer provides both audible and visual indications to the dispatcher. The timer includes a variety of controls including Start, Reset, Remove, Add, Goto Line, and Name, which is used to provide a label for the timer.



Transfer Function

Transferring a call involves receiving a call at one extension and then transferring or passing the call to another extension and freeing your extension.

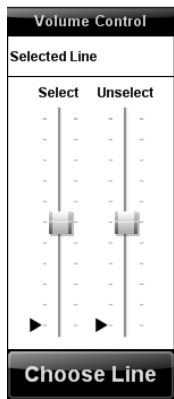


There are three types of call transfers:

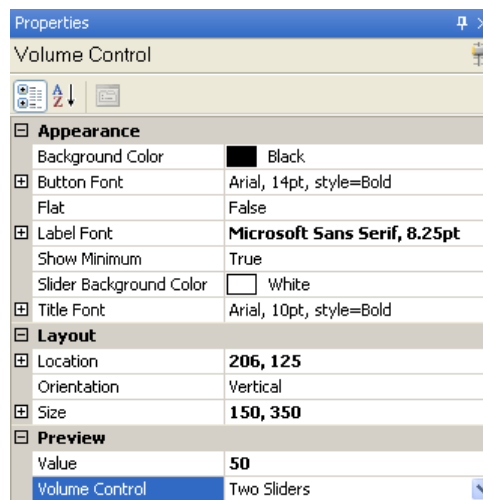
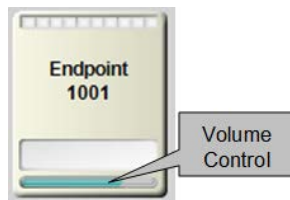
- **Blind Transfer** — The process of transferring a call to another extension or phone number without telling the person who is calling that they are being transferred. Blind transfers are sometimes called cold transfer or unsupervised transfer.
- **Attended Transfer** — The process of transferring a call where before actually transferring to the destination, the call is put on hold and another call is initiated to confirm whether the second party wants to take the call or not. During an attended transfer, you can also flash back and forth between both parties if necessary. Attended transfers are sometimes called supervised or consultative transfers.
- **Console Transfer** — The process of transferring a call from one dispatcher's console to another dispatcher's console. Console transfers support only phone endpoints. Transferring an existing intercom call between two dispatchers to another console is not supported.

Volume Control

The volume control feature manipulates the Select and Unselect volume of individual endpoints, if enabled, for this console position only.



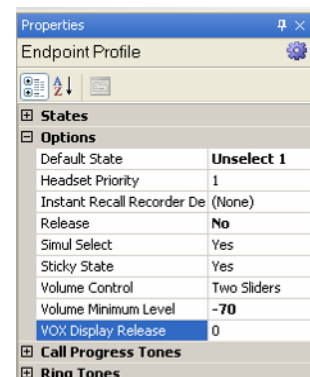
Example



Configuration Options

VOX Display Release

This feature extends the VOX indication (receive audio indication) on a radio pad for up to 30 seconds after audio ends to allow the Dispatcher to more easily see where the audio just heard originated.

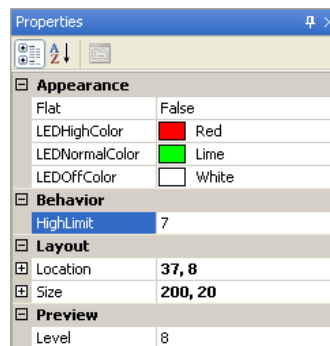


VU Meter

The VU Meter is a control that displays the amplitude of outbound audio from the dispatcher's console position. It can be added to all screens.



Example



Configuration Options

Advanced Radio Control

Scout defines advanced radios as those with features beyond basic “push to talk, release to listen.” Some use legacy technology such as MDC1200 and iDEN while others are on the cutting edge and include DMR, MOTOTRBO, NXDN, and P25. This set of features provides GUI controls to support advanced radio control features for radio systems connected to the Scout system. These same screen controls work the same way for any technology, since VPGate hides the complexity of each radio technology from the Dispatcher.

- **Group Call:** This feature allows the dispatcher to control a talkgroup. If the radio protocol supports it, Scout presents an inbound call; otherwise, Scout provides VOX indications for audio activity.
- **Private Call:** This feature allows the dispatcher to pick a specific mobile or portable radio to establish a conversation. Maintenance personnel can provide a pre-defined list of contacts from which the dispatcher can choose, or he can manually initiate a call to the desired radio. When using the pre-defined list, the contact manager filters the contacts for the appropriate radio infrastructure. For example, if the dispatcher has a MPT1327 radio selected, the list is filtered to show only MPT1327 radios and contacts with an iDEN radio.
- **Call Alert:** Certain radio systems have the concept of Call Alert, iDEN for example. This function allows the dispatcher to alert a specific mobile or portable that the dispatcher wishes to talk with them.
- **Emergency Call Display:** Certain radio systems have the concept of an emergency state. This implies that a mobile or portable can declare an emergency, which is displayed on the console as an emergency call. When the call-in is answered by the dispatcher, the emergency call indication is cleared, however, the radio system still considers the call to be in an emergency state. This feature will allow the dispatchers to know that the calling radio is still in emergency mode.
- **Emergency State Clear:** Once the emergency is resolved, the dispatcher can then use a separate control, Emergency State Clear, to clear the emergency state indication on all the consoles and the radio system.
- **Progress Tones:** Certain radio systems may not always grant a channel to the Dispatcher when they attempt a transmission (PTT). This feature provides the dispatcher with audible indications on the progress of his transmission request. If the failed indication is played, he knows that the system has denied his request for whatever reason and he can release PTT and try again. The

grant indication notifies the dispatcher that the radio system has granted a channel and he can talk over the air. If the Dispatcher is overridden, a cancelled tone will be played to alert them the transmission has ceased.

- **Clear Call:** Message trunked systems like MPT1327 assign a call to a frequency until the call is terminated. If both sides are finished and neither side terminates the call, the frequency is tied up until it is timed out by the radio system. On the console side, it is hard to determine when the "call" is finished. This feature allows the dispatcher to determine when to terminate the call, but not affect the current state of the line. For example, if a talk group is in Select with an active call, this command would tell the trunking controller to terminate the call but leave the line in Select on the Dispatcher's console. This allows the Dispatcher to start up another conversation on the same channel.

Scout Diagnostics

Scout Diagnostics acts as a diagnostic subsystem for Scout by providing statistical reports for call and dispatcher activity and an easy-to-use alarm management feature.

Scout Reports

Scout Reports, an optional statistical reporting feature of Scout Diagnostics, is part of a premium package for the Scout Diagnostics system, available for an additional charge and loaded via a separate Scout Reports CD. Designed to provide a Scout System administrator the capability to manage the dispatch center and its employees based on call activity, Scout Diagnostic's reporting features include a Dashboard, to provide at-a-glance call and activity statistics, and a variety of statistical reports that build in a web browser window.

For customers who purchase Scout Reports, Scout Diagnostics opens to the Dashboard, which is user-configurable to display up to six widgets that provide immediate, real-time summary information. One widget provides Alarm Summary information for each software system including the number of active alarms and the number of unacknowledged alarms. Other widgets present data for active calls and pending calls in addition to call data grouped by console, dispatcher, and endpoints. Once on the Dashboard, the widgets can be dragged and dropped to arrange them as needed.

The statistical reports, which track statistics for calls, dispatcher activity, and trends in the dispatching center, allow the Scout System Administrator to understand resource usage and to level workloads during peak demand times. The reports include a Call Summary Report, a Call Log Report, an Activity Summary Report, an Activity Log Report, and a Trend Analysis Report and they provide data surrounding the following activities:

- Dispatchers with the most activity
- Activities that occur most often
- Amount of time spent with passive monitoring
- Amount of time spent with active calls

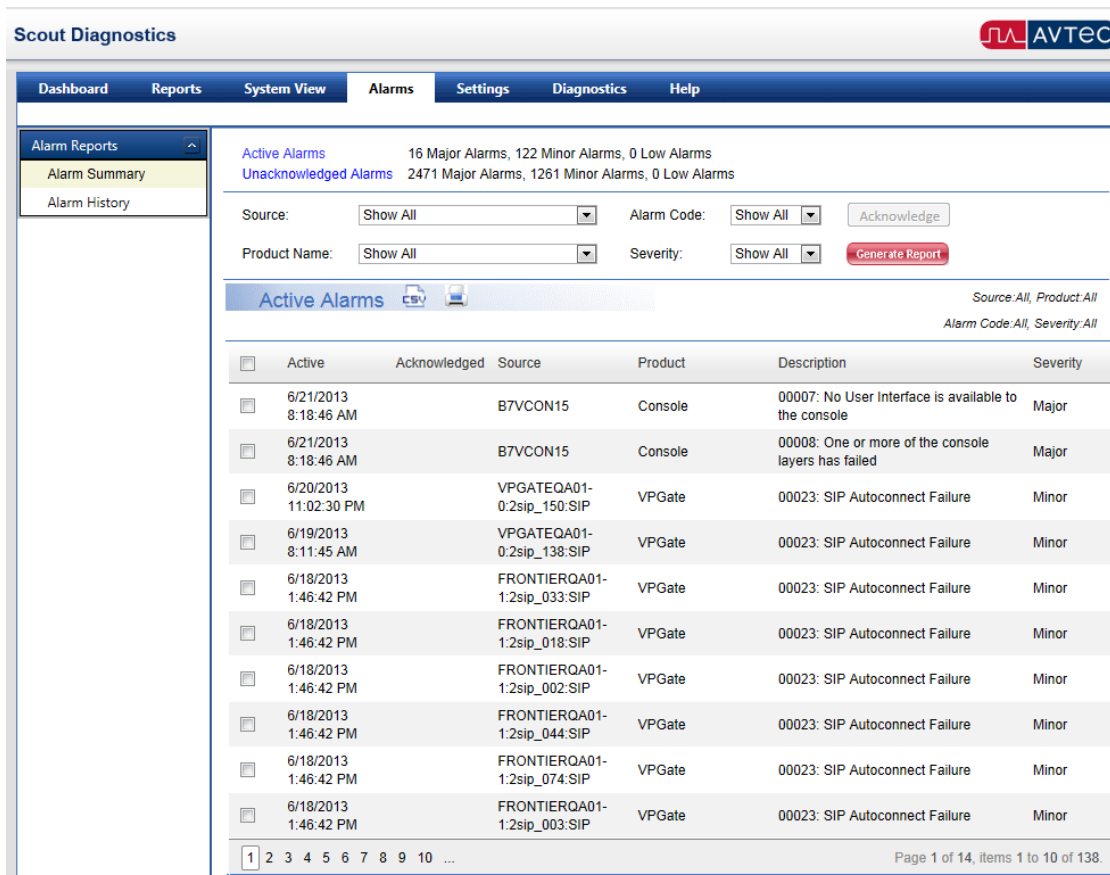
The Scout Reports feature generates reports customized by date range and other specific data. For example, Call Reports includes options for call direction; and the Trend Analysis report includes a choice to limit the report to active dispatchers as well as the choice to include PTT, VOX, and State Change data. When generated, the reports build based on a snapshot of the available data. Most reports can be exported to a file in CSV format or printed, as necessary.

Centralized Diagnostics

The Diagnostics component of the Scout Diagnostics system provides an easy-to-use alarm management system. The Diagnostics component provides access to viewing and acknowledging system alarms and events and also provides the option to run alarm and event reports by alarm or event source, by software component name, by alarm code, or by severity. The Diagnostics component addresses all aspects of the Scout Console including Scout™, VPGate™, and Outpost™.

In addition, the Diagnostics component provides a System View for each major component of the Scout System including CPS, Scout Consoles, VPGate systems, and endpoints. The System View provides a quick method for administrators to check network health to help troubleshoot issues that could occur.

Scout Diagnostics is accessible through the Scout Project Manager or a regular web browser from anywhere in the network. Scout Diagnostics displays active alarms and alarm history, and the system supports sorting, filtering and export to Excel functions.



The screenshot displays the Scout Diagnostics web interface. At the top, there is a navigation bar with tabs for Dashboard, Reports, System View, Alarms, Settings, Diagnostics, and Help. The 'Alarms' tab is selected. On the left, a sidebar menu shows 'Alarm Reports' expanded with sub-items for 'Alarm Summary' and 'Alarm History'. The main content area shows a summary of active and unacknowledged alarms, followed by filter options for Source, Product Name, Alarm Code, and Severity. Below this is a table of active alarms with columns for checkboxes, Active status, Acknowledged status, Source, Product, Description, and Severity. The table lists several alarms, including console interface failures and SIP autoconnect failures. A pagination bar at the bottom indicates 'Page 1 of 14, Items 1 to 10 of 138'.

	Active	Acknowledged	Source	Product	Description	Severity
<input type="checkbox"/>	6/21/2013 8:18:46 AM		B7VCON15	Console	00007: No User Interface is available to the console	Major
<input type="checkbox"/>	6/21/2013 8:18:46 AM		B7VCON15	Console	00008: One or more of the console layers has failed	Major
<input type="checkbox"/>	6/20/2013 11:02:30 PM		VPGATEQA01-0.2sip_150:SIP	VPGate	00023: SIP Autoconnect Failure	Minor
<input type="checkbox"/>	6/19/2013 8:11:45 AM		VPGATEQA01-0.2sip_138:SIP	VPGate	00023: SIP Autoconnect Failure	Minor
<input type="checkbox"/>	6/18/2013 1:46:42 PM		FRONTIERQA01-1.2sip_033:SIP	VPGate	00023: SIP Autoconnect Failure	Minor
<input type="checkbox"/>	6/18/2013 1:46:42 PM		FRONTIERQA01-1.2sip_018:SIP	VPGate	00023: SIP Autoconnect Failure	Minor
<input type="checkbox"/>	6/18/2013 1:46:42 PM		FRONTIERQA01-1.2sip_002:SIP	VPGate	00023: SIP Autoconnect Failure	Minor
<input type="checkbox"/>	6/18/2013 1:46:42 PM		FRONTIERQA01-1.2sip_044:SIP	VPGate	00023: SIP Autoconnect Failure	Minor
<input type="checkbox"/>	6/18/2013 1:46:42 PM		FRONTIERQA01-1.2sip_074:SIP	VPGate	00023: SIP Autoconnect Failure	Minor
<input type="checkbox"/>	6/18/2013 1:46:42 PM		FRONTIERQA01-1.2sip_003:SIP	VPGate	00023: SIP Autoconnect Failure	Minor

Remote Console Diagnostics

Detailed console diagnostics are provided to verify status of all console position software modules. The remote diagnostics allow real-time viewing of active calls, internal audio settings, and statistics on network performance per endpoint. Detailed Log files are also stored on all system elements to ensure the ability to pinpoint issues quickly. The Scout system also supports SNMP messages to allow Network Administrators to view events and alarms from an integrated management console for multiple types of equipment.

The Scout Console diagnostics display each software and hardware element of the console position, color coded to indicate status. In this example, the media workstation is not responding. Notice that each element is denoted with its IP port number as well.

Voice Logging Recorder Interface

Scout Logging Recorder Options

There are two methods to connect an archival (logging) recorder to the Scout system, analog or IP. The following table outlines which methods are supported for various audio sources.

Audio Source to be Recorded	Analog Method	IP Method
Console Select	Yes via Media Workstation Plus AP Port	Yes via media workstation audio forwarding
Console Unselect	Yes via Media Workstation Plus AP Port	Yes via media workstation audio forwarding
Radios or other Outpost connected circuits	Yes via 2 nd Radio Port	Yes via VPGate audio forwarding or packet sniffing
SIP Telephony devices	No	Yes via VPGate audio forwarding or packet sniffing
Non-Avtec endpoints (NXU2A, etc.)	No	Yes via VPGate audio forwarding or packet sniffing

Analog Recording

When using the Media Workstation Plus, Analog recording is supported for the console and for Outpost connected radios/circuits only. For analog console recording, audio is sourced on the back of the Media Workstation Plus using an Avtec Audio Peripheral Port. The Software Media Workstation does not support analog recording.

AP Port Configuration is best performed using the Scout Project Manager software via the Console Configuration webpage. The available sources of audio are Console Select audio and Console Unselect audio. **Note:** If analog audio recording is configured, you cannot use IP audio recording for console audio logging. That is with respect to console select and unselect audio, analog or IP logging is a mutually exclusive configuration. You can use analog audio logging for consoles and IP logging for endpoints (lines).

Select Channel Audio

For Select channel audio the configuration options are which AP Port to use to source the audio, should metadata be captured with the voice audio, and whether to include microphone audio with the select audio when recording. For analog audio the electrical interface is 600 ohms balanced at 0 dB levels.

Unselect Channel Audio

For Unselect channel audio the configuration option is which AP Port to use to source the audio. For analog audio the electrical interface is 600 ohms balanced at 0 dB levels.



IP Recording

VoIP recording supports both console and endpoint (line) recording. There are two methods for IP recording: Packet Sniffing and Audio Forwarding. Scout supports Codecs: G.711, G.729.a, and G.726 (16K, 24K, 32K, 40K). Endpoint forwarding and packet sniffing will be based on the endpoint Codec selection. Console forwarding allows the Codec to be selected.

Audio Format

Scout audio streams utilize Real Time Protocol (RTP) packets, which conform to the RFC 3550 standard, without RTCP. A separate stream is transmitted for each side of the conversation, requiring the logging recorder to mix the streams for coherent playback.

For undefined payloads, the following types are used:

- G.726 – 16kb = 96
- G.726 – 24kb = 97
- G.726 – 32kb = 98
- G.726 – 40kb = 99

Packet Sniffing

Packet Sniffing records Endpoint audio only. Packet sniffing requires the Ethernet switch to have a SPAN port. Unlike hubs, Ethernet switches usually prevent promiscuous sniffing. In a switched network environment, an audio recorder would be limited to capturing broadcast and multicast packets. However, most modern switches support SPAN, or so-called "port mirroring", which is an advanced feature that enables Ethernet switches to forward all packets to one or more switch ports and allows the

audio recorder to capture network traffic of the whole LAN. The recorder then has to sort out which packets are audio and then record and tag them with appropriate search criteria.

Audio Forwarding

VPGate can be configured to forward endpoint (line) audio and the Console can be configured to forward Select and/or Unselect audio to an IP logging recorder. Endpoint audio forwarding is configured in the VPGate webpage using the Scout Project Manager software. To forward endpoint (line) audio to an IP logging recorder, an audio forwarding driver is configured for the desired endpoint.

For audio transmitted toward the endpoint (line), VPGate can be configured to forward packets to up to four separate IP addresses and UDP ports. An example of a device might be a recorder or a separate PC with an audio monitoring application.

For audio received from the endpoint (line), VPGate can be configured to forward packets to four separate IP addresses and UDP ports. An example of a device might be a recorder or a separate PC with an audio monitoring application.

Beep Tone

Beep tone is generated by the media workstation and can be configured to alert either the dispatcher or the calling party that they are being recorded. Beep tone toward the dispatcher is mixed in as side tone in the headset or into the select audio speaker.

Beep tone toward the caller is mixed into the transmit audio stream when a line configured for full duplex audio is selected. If the line is not configured for full duplex audio, beep tone is generated only when the dispatcher presses his PTT button to talk. Beep tone frequency, duration and interval are configured on a system wide basis.

Capturing Conversation Talkspurt Metadata

When Scout sends voice audio to logging recorders, the audio can be accompanied by additional data that provides details about the voice conversation. This additional data, often known as descriptive metadata, includes information such as console ID for the console recording the data, the user login name, the endpoint name, and the endpoint type. The group of more than 20 metadata parameters that Scout sends to the logging recorder varies based on the type of endpoint in use. For example, some parameters pertain to only radios while others pertain to both radios and SIP phones. The metadata details that the Scout user sees is dependent upon the type of logging recorder in use and its display capabilities.

Certified Logging Recorders

Avtec certified logging recorders from the following vendors as fully compatible with Scout:

- Eventide, Inc.
- EXACOM, Inc.
- HigherGround, Inc.
- Verint Systems Inc.
- Voice Print International (VPI), Inc.

Ethernet Network, Bandwidth, and QoS

A Scout VoIP Console requires an IP network to interconnect all of the elements, from the consoles, to the VPGates, to the VoIP endpoints. The Customer IT department generally provides Ethernet infrastructure. The minimum requirements are 100Mb switched Ethernet and it must be compatible and configured to recognize DSCP marked packets to ensure the proper Quality of Service (QoS). LAN segments must support multicast. The Scout™ system uses a QoS technique call Diffserv code point (DSCP). Packets are marked using the Type of Service (ToS) field in the packet header. The network infrastructure must be compatible and configured to recognize DSCP marked packets and act on them accordingly to ensure the proper QoS.

Each Scout Console requires two Ethernet connections; one for the PC and one for the media workstation. VPGates each require one Ethernet port, as do each endpoint device. Note: an Outpost™ requires only one Ethernet port even though it supports two audio connections.

Specifying bandwidth needed for VoIP consoles is difficult, as there are a number of variables that come into play. Demand varies and depends on voice activity levels, radio monitoring, maintenance activities, and network design. The segment of the network experiencing the load will depend on the connected devices.

VPGate™ communicates to all endpoints via unicast. In general, adding 16kbps to Codec requirements (Which range from 64kbs for G.711 to 8kbs for G.729a) for the RTP and UDP headers is a reasonable approach for audio transport. For half-duplex devices, such as most radio endpoints, only one-way audio must be counted. Finally, silence suppression must be taken into account. If the radio endpoints are all muted, then little or no data will be transmitted.

A typical Outpost™ to VPGate™ IP connection for one radio will consume 30 kbps to 86 kbps for audio transmission during activity; when the radio is squelched “silence suppression” is used. (Note, unlike other systems, this endpoint traffic is unicast, to reduce multicast on the WAN.) Control and keep-alive messages are trivial, and add only about 1-3 percent additional overhead.

For efficiency on the LAN, VPGate™ forwards the unicast packets from Outpost and other endpoints via Multicast to the Scout™ consoles. Whenever an endpoint is active and transmitting its audio to VPGate, it is automatically forwarded whether one or 50 consoles have that endpoint selected or monitored.

The main contributors to latency in the proposed architecture are the sum of the network transit time and the jitter buffer size. The jitter buffer may be user-tuned on a per-device basis; both the Outpost™ and media workstation have this capability. These products support variable packet sizes down to 20ms, which allows the buffer to be set at 60ms. In some endpoints such as the JPS NXU2A, the minimum packet size is 100ms, requiring a jitter buffer of at least 300ms. A goal of < 150ms end-to-end latency is desirable, but in half-duplex radio communications, < 300ms is generally good enough.



consoles you can count on