



P25 Ready



## FEATURES

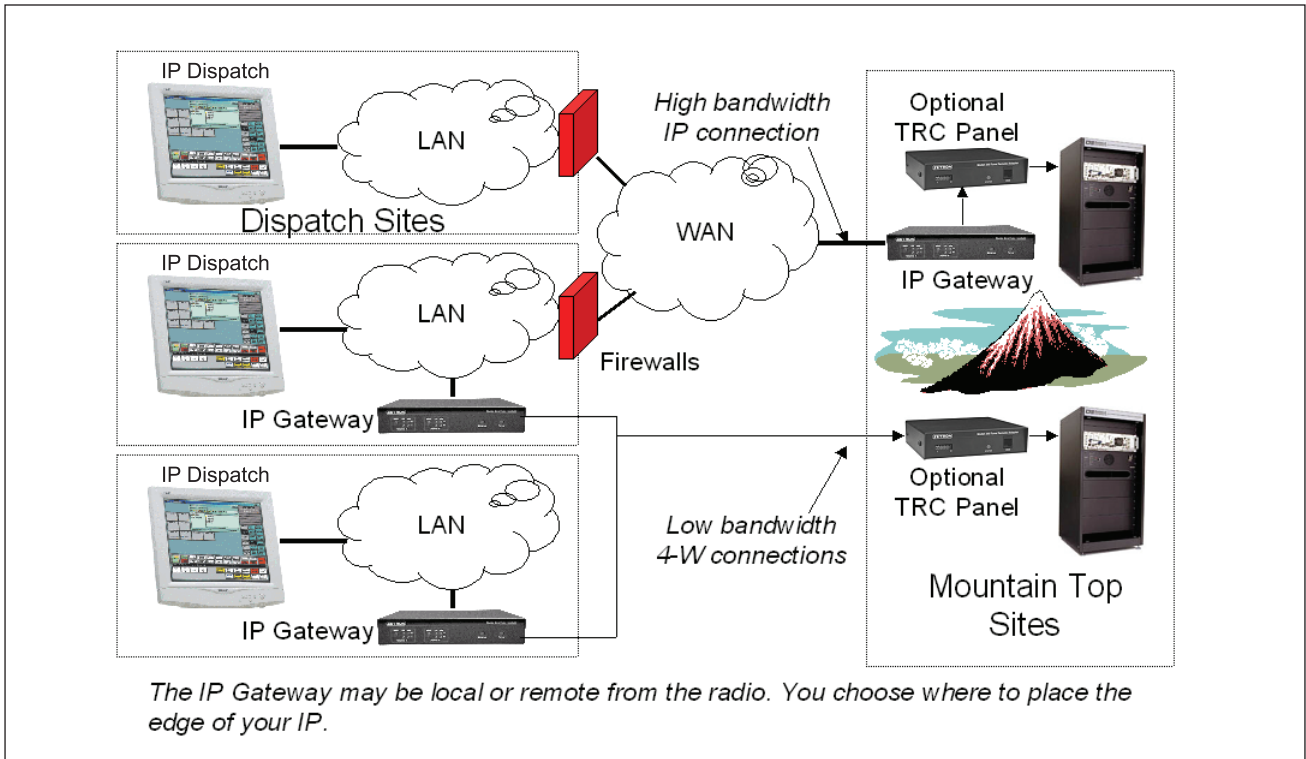
- Inherently distributed – avoids concentrating equipment in a single vulnerable site – improves survivability.
- Flexible edge placement – does not require IP connectivity all the way to the radio sites. Can avoid costly firewall traversal.
- IP network assessment tool- identifies network issues before deployment, avoiding costly surprises.
- Reliable radio gateways – designed for harsh RF site environments – no moving parts, no PC operating system.
- Professional grade – supports full range of dispatcher audio devices with predictable audio quality. Able to monitor 20 or more radios simultaneously.
- Cost-effective – much lower cost than traditional circuit-switched solutions.
- Conforms with Project 25 Fixed Station Interface (AFSI).
- Interfaces to analog and digital conventional radio systems.

## INTRODUCTION

Zetron's VoIP Radio Dispatch System (RDS) is a pure, end-to-end VoIP radio dispatching solution designed for applications requiring dispatcher access of multiple radios from geographically diverse, remote or backup locations. It is ideal for public & private utilities and air & rail transportation companies, whose radio networks and dispatching points are spread out. The system consists of PC operator positions running application software and Series 6000 IP Radio Gateways. The connection between the operator positions and gateways is an IP Local Area Network (LAN) or Wide Area Network (WAN). The architecture of the system makes it inherently distributed, avoiding the requirement to concentrate equipment in a single vulnerable site. The VoIP RDS is available in configurations that assure the high voice quality required for mission critical communications.

## FLEXIBLE EDGE PLACEMENT

Providing Wide Area Network (WAN) IP connectivity to a remote radio site is often difficult and expensive to achieve. Zetron's VoIP RDS allows flexible placement of the IP end-point. Zetron's IP Radio Gateways may be placed local to the radio, or at any location where 4-wire circuits to remote radios terminate. In many cases, this allows the entire system to reside within a LAN without traversing firewalls. Firewall traversal is usually the most difficult installation issue for any VoIP system. In addition, the IP-based console is compatible with Zetron's iRIMs, allowing the system to control conventional and fixed stations at remote sites, including those conforming with the Project 25 TIA102. BAHF Fixed Station Interface, AFSI standard.



## RELIABLE REMOTE EQUIPMENT

For installations where the radio gateways must reside at radio sites, Zetron's IP Radio Gateways are designed to handle the harsh site environment. The Model 6002 SRG has a wide temperature range, good RF immunity, no moving parts and uses a reliable embedded operating system.

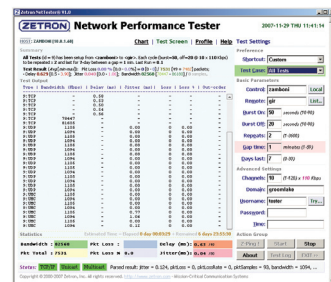
At the same time the IP Radio Gateways allow full remote maintenance via a web browser, including the ability to perform firmware upgrades and make fine and coarse level adjustments without the need for a trip to the site.



## IP NETWORK ASSESSMENT

An IP network serves as the "back-plane" for the VoIP RDS traffic between IP Radio Gateways and dispatching workstation. As such, if the IP data flowing between these end-points is disrupted, the voice and/or performance becomes less than acceptable for mission critical applications. For mission critical applications, it is imperative that the network be able to handle the needs of the VoIP RDS.

Usually the biggest hinderance to deploying any IP-based radio dispatch system is knowing the condition of the IP network that will carry the radio traffic. All too often the network is thought to be ready for deployment only to find out otherwise during installation. Zetron helps minimize these surprises through the use of our IP network assessment tool. This is a Windows-based software tool that is installed locally on one PC and remotely on one or more other PC's located at the other nodes of the IP network. The technician then runs a simple test that verifies IP protocol connectivity between the end-points. The technician can then configure automated periodic bursts of simulated voice traffic to span a specified number of days, during which network delay, jitter and packet loss are analyzed and logged. At the end of the test period the technician is armed with real data that will help them to know whether or not their network is ready for deployment of the VoIP RDS.



## COST-EFFECTIVE SOLUTION

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The radio dispatch system uses the host PC for its VoIP communications, resulting in a significantly lower cost per operator position compared to traditional circuit-switched, central electronic-based systems. Combined with IP network assessment and the ability to avoid high-bandwidth IP connections to the radio sites, both the up-front costs and total cost of ownership are greatly reduced.

## PROFESSIONAL GRADE

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The Zetron VoIP RDS is a notch above many other IP-based radio dispatching products because it is designed for 24 x 7 use. Operator positions consists of a Windows host PC (which either Zetron or the customer may provide) with a Zetron supplied sound card, VoIP RDS application software and Zetron's high-quality, 5-watt amplified speakers. The speakers are tuned for voice communications and include voice modulated LEDs and adjustable minimum volume level so that the chances of missing a call are reduced. Audio options include headset or handset via one or two headset jacks, and a desk-mic. Headsets and handsets are connected using rugged dual-prong connectors commonly used in dispatch centers. The use of the Zetron-supplied sound card and audio accessories ensure that audio levels and audio quality are consistent and within spec.

## FUTURE-READY

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The VoIP radio dispatch system is designed to easily adapt to the ever changing needs of private and land mobile radio systems. The Series 6000 IP Radio Gateway platform comes in various sizes and capabilities supporting various levels of firmware. Periodic releases will add more capacity and features.

## VERSION 1.5 FEATURE SET

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The following are the list of operational features supported by Version 1.5 of the VoIP RDS software and firmware.

- Select and Unselect 5-watt high-quality speakers
  - On-screen speaker volume controls
  - Receive and transmit on-screen level meter
  - Handset/Headset or Deskmic operation
  - Individual channel volume control
  - Individual channel mute
  - All-mute
  - Cross-console mute
  - Monitoring of parallel transmissions
  - Site intercom
  - Select channel PTT
  - Instant transmit (unselect channel)
  - Simul-select
  - Group select
  - Group transmit
  - Cross-channel patch
  - Voice transmit delay (for TRC)
  - Visual status of network connectivity
  - 24-hour clock display
  - Support for three-button mouse
  - Support for touchscreen
  - Manual and Instant Call Tone Paging
  - Stacked paging with page list
  - Two-Tone standard & custom-call paging
  - Quick-Call I (2+2) paging
  - Stored DTMF paging
  - Multiple alert tones
  - Paging side-tone
  - Channel-steered paging
  - Local and Tone Remote Control (TRC)
  - DC Remote Control option
  - Parallel TRC decode w/ LOTL
  - MDC-1200 PTT-ID
  - Transmit & Receive AGC
  - Radio receive VOX detection
  - Compatible with the Model 6002 SRG
  - SRG configuration using web browser
  - Third-party voice logger support
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## VERSION 1.5 SPECIFICATIONS

### HOST PC REQUIREMENTS

Operating System	Microsoft Windows XP Professional SP2
Multi-Tasking	Operation with non-Zetron supplied software may impact voice quality
Processor	2 GHz Intel Pentium 4 or equivalent or better
Hard Drive	20 GB or more free space
RAM	512 MB or as recommended by the operating system, whichever is more
Removable Media	24x or better CDROM drive for software installation
Pointer	2 or 3 button mouse or trackball and/or touchscreen
Keyboard	Keyboard or numeric keypad suggested for manual paging
Video/Display	1280 x 1024 pixel display size or larger. 17" LCD or larger recommended. 4MB or more video memory
I/O	One free USB 2.0 port, two or more if touchscreen is used (USB hub, if used, must be externally powered)
Audio	Requires Zetron-supplied sound card
Card Slots	One or more PCI full-height slots
Network	RJ45 Ethernet. Must be capable of 100-Base-T speed and auto-negotiation

### NETWORK REQUIREMENTS

SRG IP Payload	1 Kbps idle, 104 Kbps active (136Kbps Ethernet)
VoIP RDS Workstation Payload	1 Kbps idle, 104 Kbps per active monitored radio (136Kbps Ethernet)
Payload to Bandwidth Ratio	< 40% (< 30% mission critical). Bandwidth of IP bearer should be 2 to 3 times actual payload to ensure optimum voice quality
Packet Loss	< 5% (< 0.1% mission critical)
Packet Delay	< 500 ms (< 40 ms mission critical)
Packet Jitter	< 100 ms (< 20 ms mission critical)
Network Type	Fully switched Ethernet, full-duplex, capable of passing multicast UDP. Sharing the network with other IP traffic may negatively impact voice quality and therefore should not be considered for mission critical applications.

### MODEL 6002 SIP RADIO GATEWAY (SRG)

Dimensions	1.5 x 7.75 x 10.25 inches (HxWxD)
Weight	1.9 lbs
Operation Temperature	0 to +60 Celsius

### RANGE

Power Input	10.6 to 16 Vdc, 1 ampere max.
Network Connection	10-Base-T Ethernet connection using RJ45
Compliances	FCC Part 15, RoHS
Vocoder Support	G.711 mu-law
DSP Resources	16K Words Data Memory, 16K Words Program Memory, 72 MIPS

### RADIO GATEWAY AUDIO

Frequency Response	300 Hz to 3400 Hz +1/-3 dB, except for TRC guard tone notch
Hum, Noise & Cross-Talk	45 dB below full rated output
Distortion	3% or less
Line Balance	60 dB @ 1004 Hz
Line Impedance	Normal 600 ohms. Optional 3500 ohms or more for transmit pair while not transmitting, 3500 ohms or more for 4-wire receive pair.
Line Pairs	4-Wire (separate transmit and receive) or 2-Wire (combined transmit & receive), half-duplex
Line Transmit Output Level	-35 dBm to +10 dBm
Line Receive Input Level	-35 dBm to +10 dBm
Call Indicator Sensitivity	-35 dBm to 0 dBm
TRC Guard Tones	2100 Hz, 2175 Hz, 2300 Hz, 2325 Hz, 2600 Hz, 2800 Hz, or 2970 Hz, +/- .2%. HLGT: 0 dB to +10 dB in level (relative), 60 ms to 600 ms in duration LLGT: -30 dB to -10 dB in level (relative)
TRC Function Tones	350 Hz to 2050 Hz in 100 Hz increments (18 total) +/- .2%
Local Receive Input	50K ohm impedance ground referenced, 40 mVpp to 5 Vpp
Local Transmit Output	50 ohm impedance ground referenced, 40 mVpp to 3.6 Vpp.
PTT/M-Lead Signal	50 mA maximum to ground, 24 volts open circuit max.

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