



FEATURES

- Conforms with Project 25 Fixed Station Interface (AFSI).
- Supports optional DIU-3000 gateway.
- Supports future DFSI and CSSI gateways.
- 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.
- 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.
- Interfaces to analog and digital conventional and trunked 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 radio networks and dispatching points that are spread out. The system consists of PC operator positions running application software and Series 6500 VoIP 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 VoIP 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. BAHA Fixed Station Interface, AFSI standard.

RELIABLE REMOTE EQUIPMENT

For installations where the radio gateways must reside at radio sites, Zetron's VoIP Radio Gateways are designed to handle the harsh site environment. The Series 6500 IP Radio Gateways have 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.

PROFESSIONAL GRADE

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) and VoIP RDS application software. Zetron's high-quality, 5-watt amplified 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 specification.

VOIP P25 RDS FEATURE MATRIX

P25 Radio Feature	Analog Fixed Station Interface	Motorola Quantar & DIU-3000	Kenwood TK-5710 & TK-5810
Supported Modes	Conventional only	Conventional only	Conventional or Trunked
Compliance Standards	TIA102-BAHA, Section 7	N/A	N/A
Fixed Station Control¹			
Analog/Digital RF mode selection	Yes	Yes	Yes
Coded/Clear encryption selection	Yes	Yes	Yes
Positive Encryption mode control	Manufacturer Option	Yes	No
Encryption Key selection	Manufacturer Option	Yes	Yes
Channel Selection ²	Yes	Yes	Yes
NAC Selection	Yes	Yes	
NAC Monitor	Yes	Yes	Yes
Repeat On/Off	Yes (repeaters only)	Yes (repeaters only)	Yes (Talk-around)
Dispatcher Interrupt	Yes	Yes	No
Subscriber Signaling			
Incoming PTT-ID	No	Yes ³	Yes
Incoming Emergency	No	Yes	Yes
Incoming Encryption Key ID	No	Yes ³	No
Incoming Talk Group ID	No	Yes ³	No
Outgoing Supplemental Services ⁴	No	No	No
Incoming Call Filtering ⁵	No	Yes	No

Notes:

1. The VoIP P25 RDS supports selection of up to 15 fixed station functions.
2. In most cases, the fixed station's "channel" can define a combination of NAC, Talk Group, RF Mode, Encryption Mode, Encryption Key and RF Frequency.
3. When used with the DIU-3000, the installer may choose to display to the dispatcher one of the three IDs; PTT-ID, Key ID or Talk Group ID.
4. Outgoing Supplemental Services include Individual Call, Call Alert, Status Check, Radio Check, Radio Monitor and Radio Inhibit.
5. When used with the DIU-3000, the installer may choose to filter the audio of incoming calls based on some combination of the Encryption Key ID and Talk Group ID.

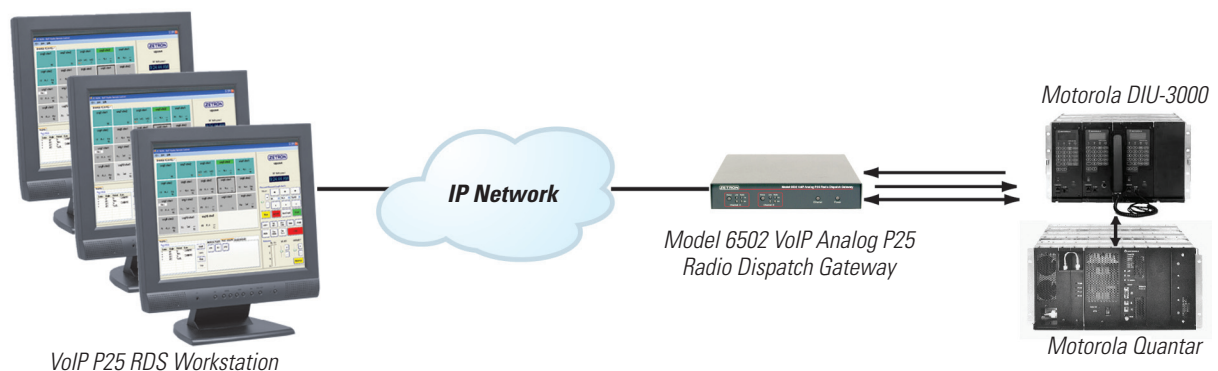
MOTOROLA QUANTAR DIU-3000 INTERFACE

The interface to the Motorola Quantar and DIU-3000 provides not only audio and fixed station control, it also provides enhanced status allowing the dispatcher to both view incoming call IDs and to audibly filter those incoming calls based on the call's IDs.

The installer may configure the system to display either the Push-to-Talk (PTT) ID, the Encryption Key ID, or the Talk Group ID. This allows the dispatcher to view either the identity of the individual user or the user's group. Alias translation can be used to display the ID with a meaningful textual name.

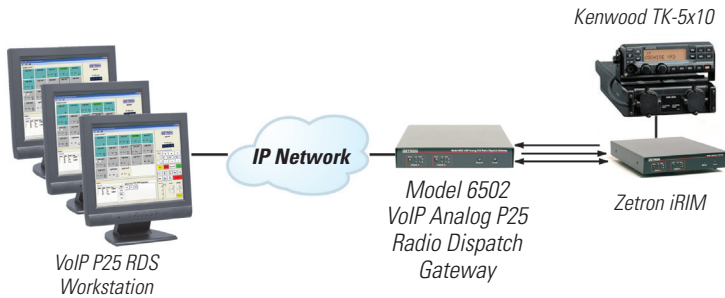
In addition, the installer may configure multiple screen buttons for each radio, and may assign to each button a unique set of IDs. Thus, during incoming calls, only the button whose Encryption Key ID and Talk Group ID match the attributes of the incoming call will show the call. The dispatcher can use the button's Mute feature so that they hear only calls from groups that they are focusing on at the moment.

These display and filtering features allow dispatchers to selectively partition and monitor multiple groups of users on the same channel, and make efficient use of some of the more advanced Project 25 capabilities.



KENWOOD TK-5710/5810 INTERFACE

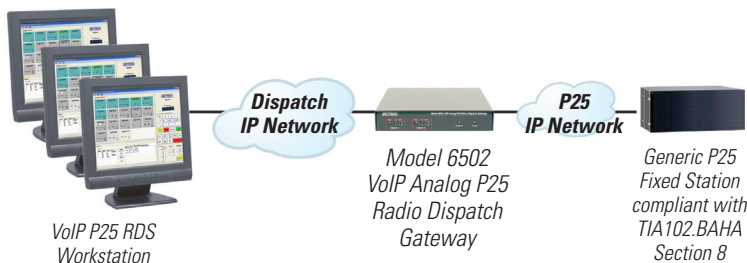
Zetron's Intelligent Radio Interface Module (iRIM) is used to interface with the Kenwood TK-5710/5810 Project 25 mobile radios and provides the VoIP P25 RDS with the ability to work on both conventional and trunked Project 25 systems. The use of mobile radios makes it well suited for situations where the dispatch system is ancillary or mobile, or any other situation where it is not practical to get wired connection to ideal RF sites. This is also well suited for situations where the dispatchers need to assign radios to channels over a wide range of frequencies within the band, making it ideal for gaining interoperability with neighboring agencies who also use P25.



FUTURE IP-DIRECT INTERFACES

The VoIP P25 RDS is designed to be upgradeable to incorporate the open standard P25 digital IP wireline interfaces currently being developed by TIA. This will include the Digital Fixed Station Interface (DFSI) used to connect to conventional fixed stations, and the Console Subsystem Interface (CSSI) used to connect to conventional and trunked RF Subsystems (RFSS).

Thus the VoIP P25 RDS can be purchased, installed and used today with available Project 25 radios, and can be upgraded as needed in the future when Fixed Stations and RF Subsystems are available with the DFSI and CSSI.



FEATURE SET

The following are the list of operational features supported by 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 & 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
- Support for touchscreen
- Manual and Instant Call Tone Paging (2-tone, 2+2, DTMF)
- Stacked paging with page list
- Multiple alert tones
- Paging side-tone
- Channel-steered paging
- Local and Tone Remote Control (TRC)
- DC Remote Control option
- Parallel TRC decode w/ LOTL
- TRC Positive Mode Control
- MDC-1200 PTT-ID
- Transmit & Receive AGC
- Radio receive VOX detection
- Compatible with the Series 6500 VoIP Radio Gateways
- Full duplex audio
- VoIP Radio Gateway configuration using web browser
- Third-party voice logger support

VOIP RDS 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

VoIP Radio Gateway 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.

SERIES 6500 VoIP RADIO GATEWAY

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

VoIP 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% -6 dB to +3 dB in level (relative), 20 ms to 100 ms in duration.
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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