

communications for life



IPR100/400

*voice over IP
for analog radio systems*



omnitronics

>>> IPR100/400



FEATURING

- Connection to both transceivers and dispatch consoles/handsets
- SELCAL, CTCSS and DTMF support over highly compressed links
- Multicast Voice Over IP protocol
- Voice Activity Detection (VAD) with silence suppression
- Point-to-point tunnelling for RS232 data
- Web browser configuration
- Encryption

Target Markets

- Emergency services/public safety
- Power/Water utilities
- Telecommunications providers
- Transport industries
- Mining companies
- Local government

Features

- VoIP using Multicasting and supporting a number of Codecs
- 10/100 BaseT Ethernet port via RJ-45 connector
- Transceiver port provides 4-wire plus E&M signals and is directly compatible with Omnitronics 619 Audio Bridges
- Electrically isolated radio interface
- Voice Activity Detection with silence suppression
- software adjustments for gain and attenuation
- SELCAL, DTMF and CTCSS operation
- RS-232 data tunnelling over IP
- Site monitoring I/O on the IPR400
- Front panel activity and diagnostic indicators
- In-built test facilities

- In-built web server for software configuration
- FLASH re-programmable on-site
- Static or dynamic (LAN) IP address configuration
- Optional AES encryption

Benefits

- Removes the need for expensive leased lines or radio links
- Optimises the use of available IP bandwidth
- Enables the use of traditional analog signalling schemes with voice compression
- Provides VOX functionality for radios that do not have a COS output
- Easy to configure and upgrade through standard web browsers
- Offers secure communications
- Simplifies problem diagnosis.

Target Applications

- remote operator access
- leased line replacement
- radio bridging over IP



voice over IP for analog rad

OVERVIEW

The IP Remote family is designed to provide Voice over IP extensions for analog radio equipment. The devices enable analog two-way radios to be remotely controlled over an IP link, either in a LAN or WAN environment. The IPR100 is a single channel device with a local handset/console port whilst the IPR400 provides the ability to interface four radios from a compact 1-RU housing. IP Remote units can be used to create back-to-back IP links between two or more radios using point-to-point or point-to-multipoint communications. The handset port on the IPR100 enables it to provide remote control and monitoring of a single radio from an operator's handset or console.

The IP Remote family has been specifically designed to transport signalling schemes such as SELCAL, DTMF and CTCSS over data networks. Analog signalling schemes will not work reliably through a data network when audio compression below 64kbps is used. Compression algorithms tend to degrade audio tones resulting in poor signal decoding at the end stations. The IP Remote family overcomes this problem by directly decoding analog signalling tones and encoding them into data messages. Similarly, the reverse operation (analog encoding) is performed at the transmission end.

The radio ports provide four-wire audio with E & M signalling on RJ45 connectors. Each port is balanced with 600-Ohm transformer coupling. This provides isolation between the unit and the radio and virtually eliminates ground noise and induced signals. The E & M facilities also provide isolation and can be configured for relay control or opto (voltage) input/output. Links, accessible from the rear panel, also allow the PTT and COS signals to be configured to source or sink power.

The handset port on the IPR100 provides a balanced, half-duplex, connection to a standard Omnitronics 960 Handset or Console. Multiple peripherals can be attached to the handset port allowing a number of operators to share a single radio.

The audio from both the radio and handset ports is digitised using a Codec with G.711 compression. However, an on-board DSP allows further compression down to 13kbps, using a GSM-compliant algorithm. The audio is then transported over IP using Multicasting.

The DSP also provides Voice Activity Detection (VAD) and silence suppression. Together, these features enable the products to make optimal use of the available IP bandwidth. With VAD and silence suppression audio packets are generated only whilst a person is actually talking. As soon as silence is detected, the transmission of data packets is suspended. VAD is also useful when connecting to communications equipment that do not provide a COS or Mute output. It performs a VOX function.

The IP Remote family can be configured within the LAN or WAN environment, using a standard web browser. Each unit can be configured for mode of operation, compression level, audio adjustments and signalling parameters.

Another major feature of the IP Remote family is its built-in security. The devices support AES 128-bit encryption which can be enabled for all voice and data transmissions.

The IPR400 has the added ability to provide site monitoring functions through 8 analog inputs. These are typically used to monitor RSSI and TX power. There are also 2 digital-opto inputs and 2 relay outputs that be used for application specific purposes.

Both devices can also be powered from 12V DC including a plug pack.



Radio systems

APPLICATIONS

Radio Access Over the Internet

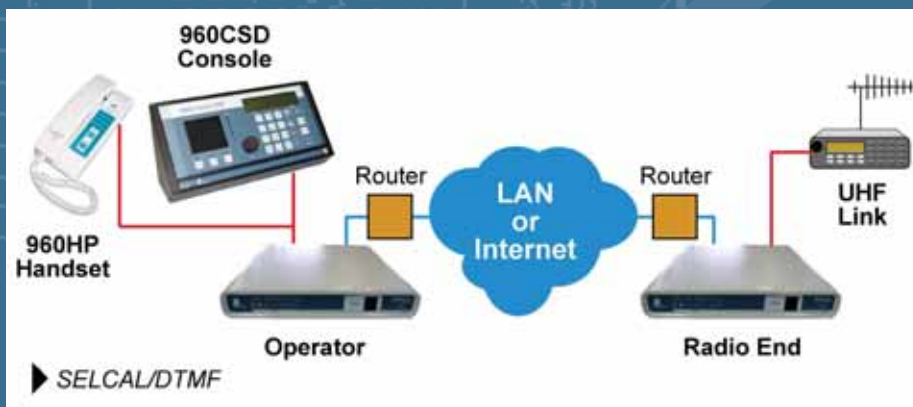
An operator can control and monitor a remote transceiver across a Local Area Network or over the Internet. The IPR devices could be connected together through ADSL routers that communicate with an Internet Service Provider (ISP). Each router would be configured with Port Forwarding, or as a DMZ Host, to allow access to the IPR devices from the Internet side. Voice and data packets will be transported between the two end points. SELCAL and DTMF are also transported reliably, regardless of the level of compression that is employed.

Multiple Omnitronics handsets and consoles can be multi-dropped to allow shared access to the transceiver by a number of operators.

Leased Line Replacement

Two radios can be connected back-to-back over an IP link. This can typically be used to interconnect two repeater sites over a Wide Area Network. PTT and COS signals are transported over the link as data messages. The IPR100 will provide a configurable PTT output to the radio. It will also accept a configurable COS input from the radio. An active COS signal from the radio will enable the transmission of voice packets over the IP network and generate a PTT output at the opposite end.

Full duplex operation is supported.

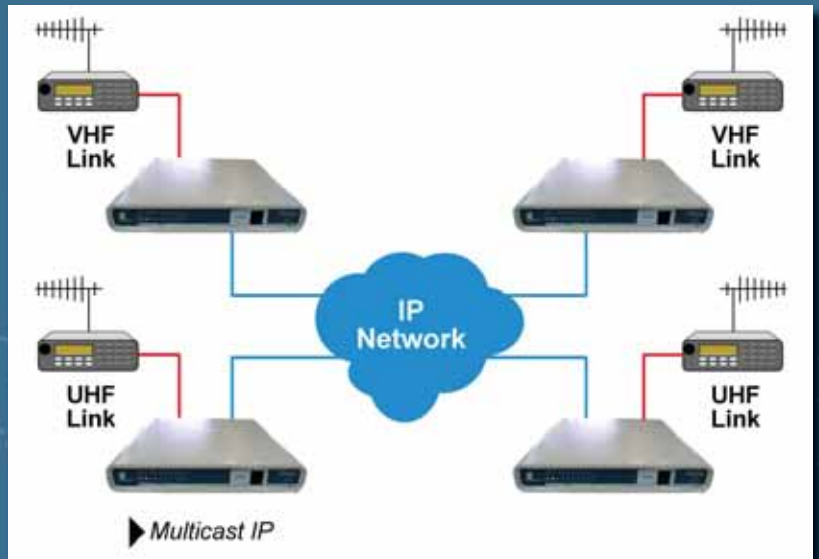


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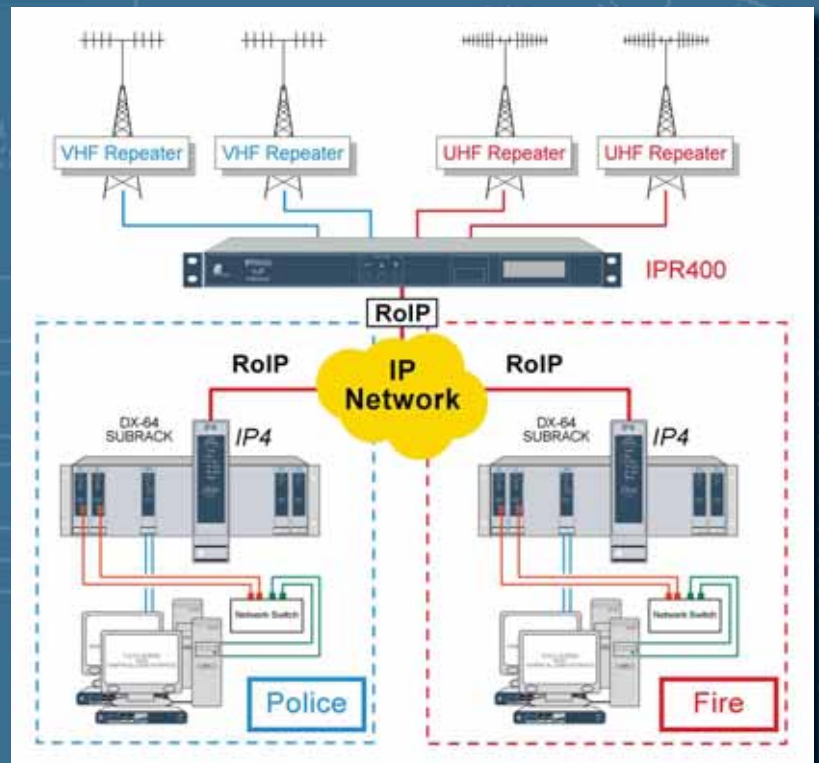
Radio Bridging Across IP

The third application scenario makes best use of the multicasting technique. The IPR100 allows a number of transceivers to be interconnected over a LAN or WAN. Each IPR100 unit is linked to a common multicast group address. When one transceiver receives audio, voice packets are transmitted to the multicast address. Any other IPR100 unit that is linked to that address will accept those VoIP packets and re-transmit the audio to its respective radio.



Control and Monitor Repeater Sites

The IPR400 is ideally suited to repeater sites that feature shared equipment or multiple transceivers. Through its site monitoring facilities, the device can provide status and alarm reporting to the communications center. Consider the following example of a repeater site with two UHF and two VHF transceivers, belonging to two different agencies. The IPR400 acts as the IP gateway for the analog radios. Any audio that is received from either of the four radios will be multicast to the WAN. Dispatch systems such as the DX64 will receive and process the audio. This means that dispatch operators at the different agencies can monitor all communications through that repeater site. It would also be possible for the different operators to broadcast on any of the remote transceivers, if desired.



SPECIFICATIONS

| | IPR100 | IPR400 |
|--------------------------------------|---|---|
| Power | | |
| Voltage | 12Vdc (11.5V to 13.8Vdc) | 12Vdc (11.5V to 13.8Vdc) |
| Current | 300mA | 500mA |
| Radio Port | | |
| Number of channels | 1 | 4 |
| Connector | 8-way US modular | 8-way US modular |
| Configuration | Four wire, transformer coupled | Four wire, transformer coupled |
| Input Impedance | 600 ohms | 600 ohms |
| Output Impedance | 600 ohms | 600 ohms |
| Input Levels | -27dBm to +4dBm (-10dBm nominal) | -27dBm to +4dBm (-10dBm nominal) |
| Output Levels | -27dBm to +4dBm (-10dBm nominal) | -27dBm to +4dBm (-10dBm nominal) |
| Software level attenuation | 0 to -18dB in 3dB steps | 0 to -18dB in 3dB steps |
| Frequency Response | 300 to 3000 Hz (within 1 dB) | 300 to 3000 Hz (within 1 dB) |
| E-Input Lead | Opto coupled @ 5 to 50Vdc. Link configurable for voltage, contact, switched ground or switched power. | Opto coupled @ 5 to 50Vdc. Link configurable for voltage, contact, switched ground or switched power. |
| M-Output Lead | Relay contacts limited to 30W (30Vdc or 1A). Link configurable for voltage, contact, switched ground or switched power. | Relay contacts limited to 30W (30Vdc or 1A). Link configurable for voltage, contact, switched ground or switched power. |
| Handset/Console Port | | |
| Connector | 6-way US modular | - |
| Configuration | Two wire, balanced half-duplex | - |
| Input Impedance | 50K ohms | - |
| Output Impedance | 500 ohms | - |
| Input Level Range | -27dBm to +4dBm (-10dBm nominal) | - |
| PTT Input | Contact to 0Vdc | - |
| Busy Output | +12Vdc | - |
| RS-232 Port | | |
| Number of channels | 1 | 4 |
| Connector | DB9 Female (DCE) | DB9 Female (DCE) |
| Standard Data Rate | 19200 baud | 19200 baud |
| Network Interface | | |
| Connector | 8-way RJ45 | 8-way RJ45 |
| Interface | 10 BASE-T or 100 BASE-TX Ethernet with autodetect | 10 BASE-T or 100 BASE-TX Ethernet with autodetect |
| Protocol | Multicast RTP | Multicast RTP |
| Vocoders | G.711, G.726 ADPCM, GSM (13Kbps) | G.711, G.726 ADPCM, GSM (13Kbps) |
| Site Monitoring I/O | | |
| Analog inputs | - | 8 + temperature |
| Digital I/O | - | 2 opto inputs, 2 relay outputs |
| Front Panel Facilities | | |
| 2 line by 16 character LCD | - | System status, RS232 activity, radio activity |
| User push buttons | - | Menu control, user commands |
| Front Panel Indicators | | |
| System | Power OK, CPU RUN, VoIP Link OK | - |
| RS-232 | Activity | - |
| Radio Port | PTT output active, COS input active | - |
| Ethernet | 10Mbps/100Mbps, Link Active, Activity | - |
| Physicals & Environmental | | |
| Style | Desk mount | 1RU 19 inch rack mount |
| Weight | 0.7 kg | 1.7 kg (unpackaged) |
| Dimensions | 220mm(W) x 35mm(H) x 230mm(D) | 484mm(W) x 44mm(H) x 265mm(D) |
| Operating Temperature | 0 to 60 degrees C. | 0 to 60 degrees C. |

Note. Specifications are subject to change without notice.



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