IPR 100 / 400

voice over IP for analogue radio systems.

General features :

- 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.

Other features :

- VoIP using Multicast and supporting a number of codecs.
- 10/100 Base T Ethernet port via RJ 45 connector.
- Transceiver port provides 4-wire plus E&M signals and is directly compatible with TSLO Télécom 619 audio bridges.
- Electrically isolated radio interface.
- Software adjustments for gain and attenuation.
- Handset port on the IPR 100 fully compatible with TSLO Télécom range of handsets / consoles.
- SELCAL, DTMF and CTCSS operation.
- Site monitoring I/O on the IPR 400.
- 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 analogue 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.

Overview

The IP Remote family is designed to provide Voice over IP extensions for analogue radio equipment. The devices enable analogue 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. Analogue 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 analogue signalling tones and encoding them into data messages. Similarly, the reverse operation (analogue 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.

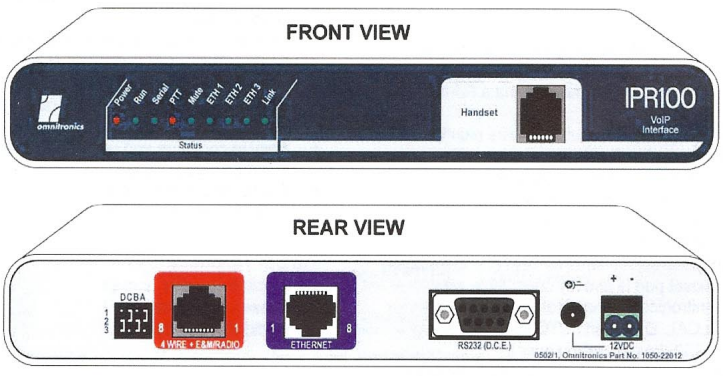
The DSP also provides Voice Activity Detection (VAD) and silence suppression. Together, these features enable the products to make optimal use of the available IP bandwidth. With VAD and silence suppression audio packets are generated only whilst a person is actually talking. As soon as silence is detected, 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 analogue 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.



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.
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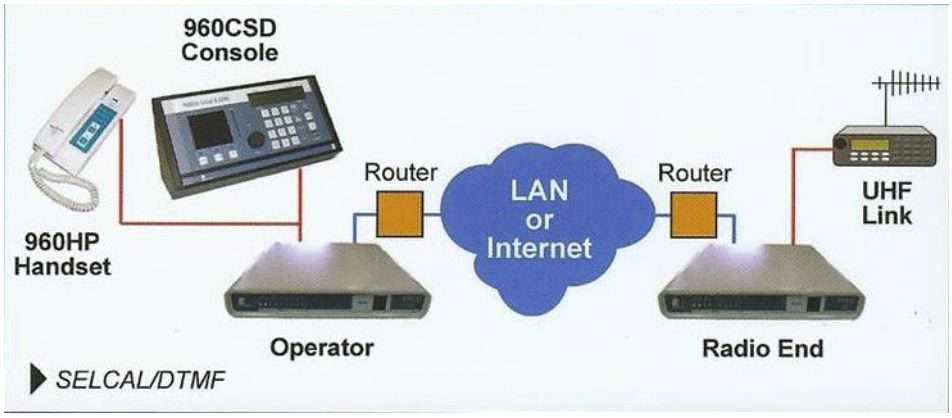
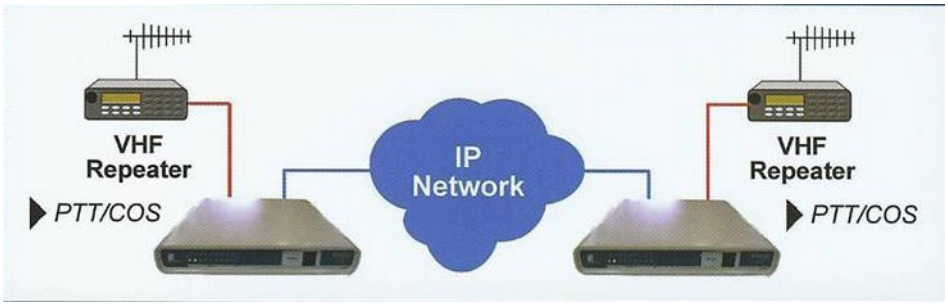


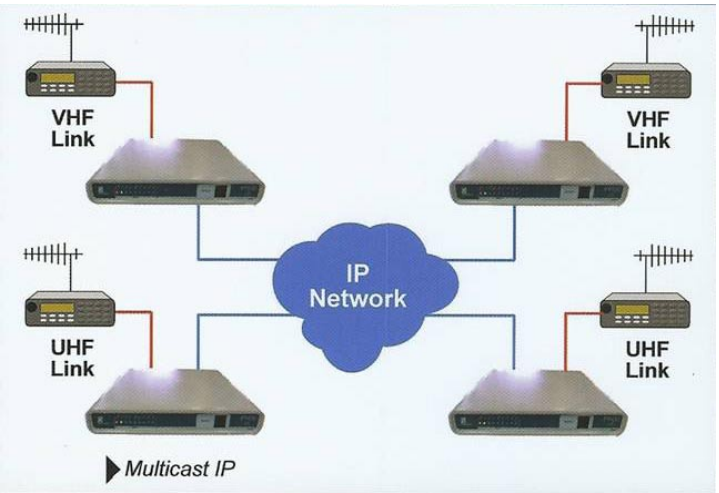
Leased line replacement

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.



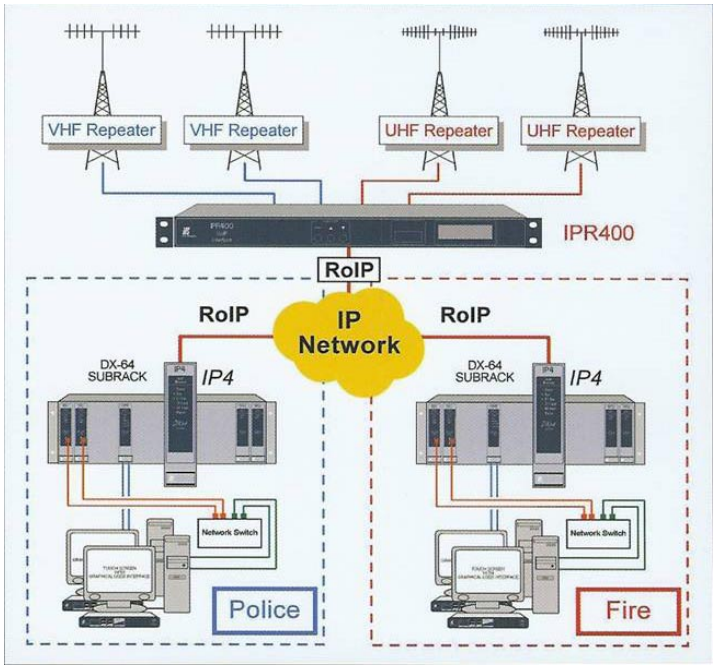
Radio bridging across IP

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 centre. 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 analogue 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 :

	IPR 100	IPR 400
Power supply		
Voltage	12 Vdc (11,5 to 13,8 Vdc)	12 Vdc (11,5 to 13,8 Vdc)
Current	300 mA	500 mA
Radio port		
Number of channels	1	4
Connector	8-way US modular	8-way US modular
Configuration	4 wires, transformer coupled	4 wires, transformer coupled
Input impedance	600 Ω	600 Ω
Output impedance	600 Ω	600 Ω
Input levels	-27 dBm to +4 dBm (-10 dBm nominal)	-27 dBm to +4 dBm (-10 dBm nominal)
Output levels	-27 dBm to +4 dBm (-10 dBm nominal)	-27 dBm to +4 dBm (-10 dBm nominal)
Software level attenuation	0 to -18 dB in 3 dB steps	0 to -18 dB in 3 dB steps
Frequency response	300 to 3000 Hz (within 1 dB)	300 to 3000 Hz (within 1 dB)
E-Input lead	Opto-coupled @ 5 to 50 Vdc . Link configurable for voltage, contact, switched ground or switched power.	Opto-coupled @ 5 to 50 Vdc . Link configurable for voltage, contact, switched ground or switched power.
M-Output lead	Relay contacts limited to 30 W (30 Vdc or 1 A). Link configurable for voltage, contact, switched ground or switched power.	Relay contacts limited to 30 W (30 Vdc or 1 A). Link configurable for voltage, contact, switched ground or switched power.
Handset/Console port		
Connector	6-way US modular	---
Configuration	2 wires, balanced half-duplex	---
Input impedance	50 kΩ	---
Output impedance	500 Ω	---
Input level range	-27 à +4 dBm (-10 dBm nominal)	---
PTT input	Contact au 0 V cc	---
Busy output	+12 V cc	---
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 RJ 45	8-way RJ 45
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 (13 kbps)	G.711, G.726 ADPCM, GSM (13 kbps)
Site monitoring I/O		
Analogue inputs	---	8 + temperature
Digital I/O	---	2 opto inputs, 2 relay outputs
Front panel facilities		
2 lines by 16 characters LCD.	---	System status, RS 232 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	10 Mbps / 100 Mbps, link active, activity	---
Dimensions, weight and environment		
Enclosure	Desk mount	1 RU 19" rack
Weight	0,7 kg	1,7 kg (unpackaged)
Dimensions	W. x H. x D. = 220 mm x 35 mm x 230 mm	W. x H. x D. = 484 mm x 44 mm x 265 mm
Operating temperature	0 to 60 °C	0 to 60 °C

Note : The features described in this document are subject to changes without prior notice. Please ask TSLO Télécom for features confirmation before placing any order. Version 1.0 from December 14th 2006.

TSLO Télécom - 1, rue André-Marie Ampère - 57070 METZ - S.A.R.L. au capital de 30 000 € - RCS METZ 489 223 073
Code APE 742C - Tel. : + 33 (0)3 87 75 54 72 and + 33 (0)3 87 65 37 54 - Fax : + 33 (0)3 87 76 19 81
email : contact@tslotelecom.fr - Web site : www. tslotelecom.fr