



## RS232 Over IP



- **RS232 Circuit Extension Over Ethernet, HDLC Over IP**

### **Flexible Synchronous Serial Data Extensions over Packet Switch Networks**

The **IP•Tube RS232** facilitates the interconnection of the synchronous serial interfaces of Data Terminals, WAN Routers and Bridges via LANs, WANs, MANs, Satellite and Wireless Ethernet. The **IP•Tube RS232** encapsulates synchronous serial layer 1 or layer 2 data into IP packets. The **IP•Tube RS232** is available as a DCE or a DTE model that support 2.4 to 250 Kilobits.

#### Layer 1

In Layer 1 operating mode every bit is encapsulated into an IP packet. The size and frequency of the IP packets can be set with data bit rates from 2.4 to 250 Kilobits per second. Latency minimization is accomplished with multidimensional adaptive clock configurations. The receiving IPTube removes the Ethernet/IP envelope and reconstructs the original data stream. The gateways regenerate the clocks and keep both ends synchronized with no bit slips. A configurable number of incoming packets are buffered in order to compensate for the packet delivery jitter introduced by the network. The size of this buffer needs to accommodate the peak amount of jitter.

#### Layer 2

In Layer 2 operating mode HDLC Data frames, such as those used by Wide Area Networking protocols PPP and Frame Relay or proprietary Data Links, are transported within IP packets as HDLC over IP. The latency introduced is dependent upon the clocking rate and the HDLC frame size. Minimum latency is obtained by maximizing the clock rate and minimizing the MTU. HDLC Over IP frames are directly sent out the Serial interface since Clock synchronization is not required. WAN security provisioning, such as firewalling, is maintained.

### **IP•Tube RS232 Standard Features**

#### **Dual LAN Interfaces**

All **IP•Tube RS232** models ship with dual 10/100BaseT Ethernet LAN ports. The dual Ethernet interfaces provide for:

- Management interface on LAN port 2 when LAN port 1 is connected to a VPN tunnel
- The LAN ports can be configured to support connections over 2 Asymmetrical bandwidth links
- Alternator Option for load balanced SDSL interconnects
- Protector Option for Redundant Packet Path connections with Constant or Switch Over Criteria

#### **Management Interface**

Management of the **IP•Tube RS232** is accomplished with a Command Line Interface that is accessed through a Console or Telnet connection. Templates of the most common configuration provide for an Edit and Paste configuration. **SNMP** public and private MIB support, with traps, is a standard feature.

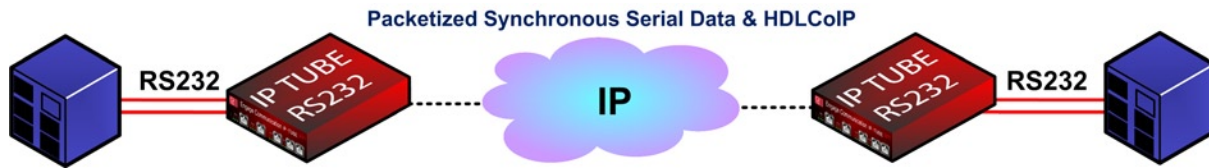
#### **Assured Delivery Protocol**

In order to assure high quality communications over links with intermittent or noisy performance, such as Wireless or Broadband over Power Line, the **IP•Tube RS232** employs Engage's robust Assured Delivery Protocol with the following benefits:

- Packet out of sequence detection and re-sequencing
- Duplicate skipping,
- Lost packet retransmission(s) with configured delay.

#### **Service Quality Packet Prioritizing**

The **IP•Tube RS232** uses the Type of Service byte in the IP packets or 802.1p/q mac levels for prioritization of the encapsulated T1 frames. QOS is used to ensure that the real time Circuit data from the **IP•Tube RS232** is ensured high priority.



## IP•Tube RS232 Optional Features

### Protector OPTION -PRO

The protector option utilizes the second LAN interface as a redundant path for the interconnection of the IP encapsulated RS232 data. The extension of the RS232 has a fault tolerant link that is configured to always on, or with switch over criteria.

### Alternator Load Balancing OPTION -ALT

The Alternator option alternatively sends the IP packetized RS232 data on LAN 1 and LAN 2. The Alternator option enables the packetized RS232 data to be split over two IP WAN connections such as SDSL.

## Technical Specifications

### LAN Network Interface:

- Two 10/100BaseT Full/Half Ethernet

### LAN Network Protocols Supported:

- IP, TCP, UDP, ICMP, Telnet, DHCP, DDNS, SSH

### RS232 Interface:

- DCE or DTE Standard DB25 Female
- DTR Controllable Transmission • CD Reception Indicator

### RS232 Interface Clocking:

- 2.4k to 256 Kilobit per second data rate
- N times 2.4K/56K/64K Clock Modes

### RS530 Over IP Protocol:

- TDM Over IP • Circuit Extension Services Over IP • HDLC Over IP

### WAN Network Protocols Supported:

- HDLC, SDLC, PPP, Frame Relay

### Regulatory:

- CE • Safety -IEC60950 • EMC - CFR 47 Part 15 Sub Part B:2002, EN55022:1994+A1&A2, EN55024, ICES-003 1997, CISPR 22 Level A

### Management:

- Secure Socket Shell - SSH
- Telnet support with Edit and Paste Template Files
- Console Port for Out of Band Management
- SNMP Public and Private MIB support with configured traps

### TFTP Online Upgrade Capable (FLASH ROMs)

- Black•Tube is fully operational during upgrade

### Dimensions:

- Dimensions: 9" (L) x 7.3" (W) x 1.50" (H)

### Environmental:

- 0° to 132° F (-10° to 50°C ) operating temperature
- Up to 90% operating humidity (non-condensing)
- Optional Extended Temperature Range available

### Power:

- 10-30 VDC, 1.0A. • Screw Locking Connector
- Universal Adapter 100/240 VAC 50/60 Hz
- Optional -48V 0.25 Amp • Hot Standby

## How to Order — IP•Tube RS232

Part No.	Description	Notes
040-0232-DCE	IP•Tube RS232 DCE	Data Communication Equipment Interface
040-0232-DTE	IP•Tube RS232 DTE	Data Terminal Equipment Interface
Base Option		Specify as suffix
-PRO	Protector Option	Fault Tolerant Network Interconnect
-ALT	Alternator Load Balancing Option	Load Balancing Inverse Mux
Power Options	Specify as suffix	Hot Standby Configuration 2nd Power Suffix
-DCMOD	Power Supply Module 12/26 VDC ADP CON	Ships with Universal Adapter 90/240 50/60
-WIRED	Power Supply Module 12/26 VDC Screw Term	
-N48VDC	Power Supply Module Negative 48 Volt DC	Isolated Negative 48 Volt Power
Rack Mount Option		Specify as suffix
-RACKMNT	19" Wide Rack Mount Brackets	Enclosure Nut Serts Installed