



### Bell 202T Modem Serial to Ethernet IP Packet Converter

The IP•Tube CEP 202T has integrated Bell 202T modem interfaces that connect to the Bell 202T 4 Wire modem interface of Data Communication Equipment and transports their serial communication over IP Packet networks. This conversion facilitates a cost effective path for Utility and Pipeline industries to migrate their SCADA communication from end of life analog circuits to Ethernet based LAN/WAN/MAN wired and wireless networks.

Utility and Pipeline industries use 4 wire leased line communication circuits to connect remote SCADA equipment to control centers. A significant number of SCADA Remote Telemetry Units only have integrated 4 wire modem interfaces. The IP•Tube CEP 202T extends the life of proven SCADA systems by converting 4 Wire modem interfaces to Ethernet for IP Packet network connectivity.



IP•Tube CEP 202T interfaces directly to the 4 wire analog interface for the RTU, transparently encapsulates SCADA protocols from the RTU into IP packets, and transports those packets onto the IP network. At the control center, the central site CEP 202T seamlessly converts the packets back into their original 202T modem data format; or directly to an RS232 DCE interface with an IP•Tube CEP RS232.



### Asynchronous Serial Over IP

Asynchronous characters with 5 to 8 data bits, a baud rate 1.2 kilobits, 1 or 2 stop bits, and with or without parity are efficiently encapsulated into IP packets. The latency is controlled by setting the maximum number of consecutive async characters per IP packet.

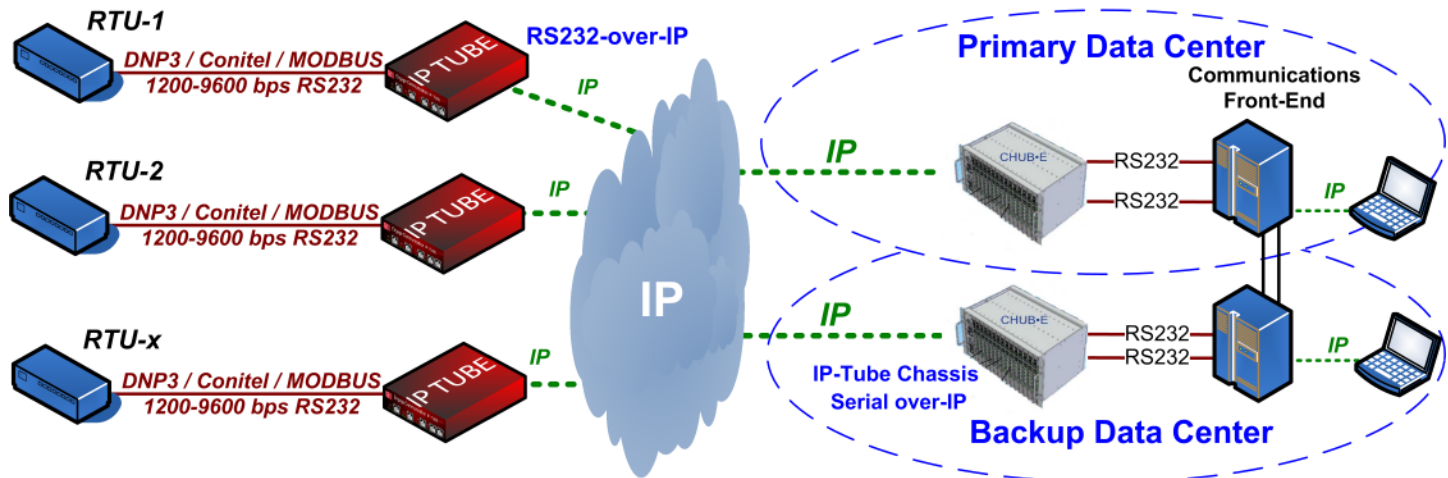
### SCADA Protocol Transparency

The IP•Tube CEP transports legacy bit or byte SCADA protocols transparently because of its unique TDM circuit emulation capability. RTU transmit data is encapsulated into IP packets at 64,000 samples per second and de-encapsulated at the far end at the same rate, ensuring proper RTU receive data delivery. Multiple RTUs can be IP multiplexed onto T1 circuits for routing to existing cross-connect and channel bank equipment.

## IP•Tube CEP Utility Applications

NERC -CIP mandates control center redundancy. RTUs must be accessible from, and be able to connect to, multiple control centers. IP•Tube CEP continuously monitors connectivity to the active control center and automatically switches to the active backup control center (1 to 4 supported).

- Meets NERC mandates for control center redundancy
- Preserves investment in RTU and Central site SCADA
- Facilitates control center redundancy with IP flexibility
- Supports up to four redundant control centers
- Redundant and diverse connectivity

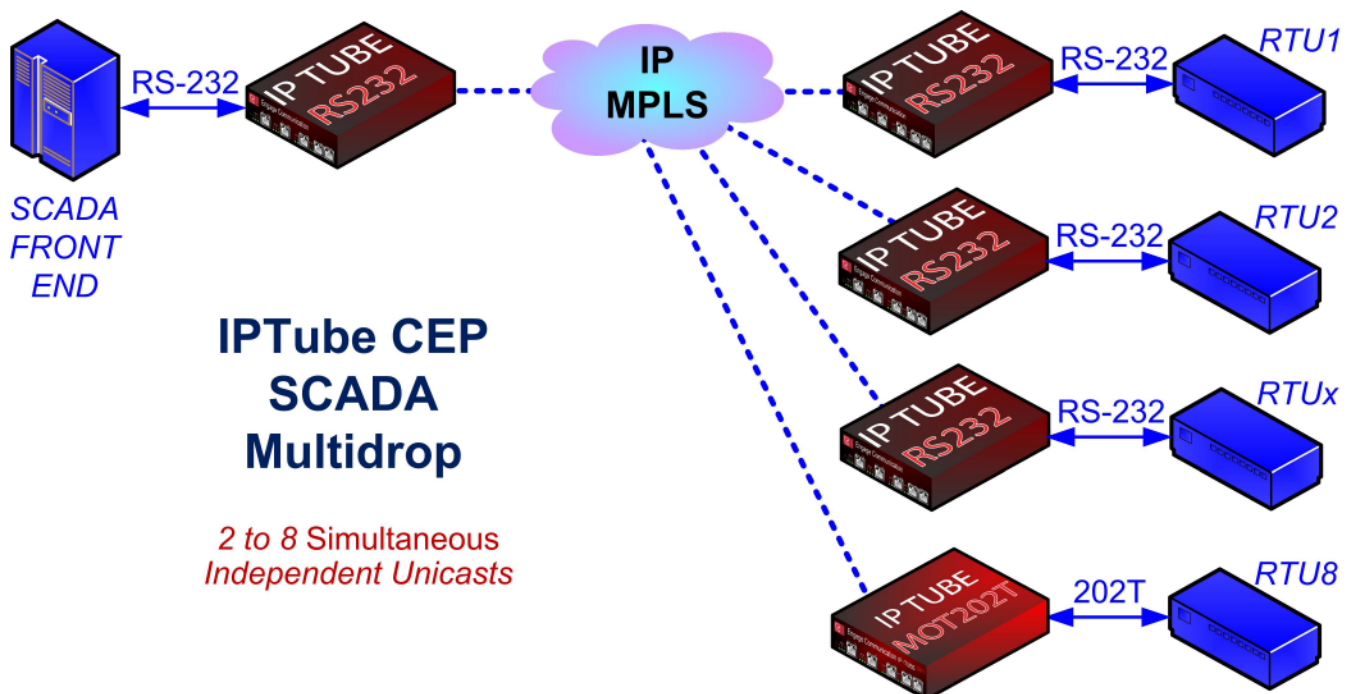


### NERC Redundant and Diverse Connectivity

## IP•Tube CEP Multidrop

In order to minimize the number of analog telephone circuits required to connect Data Center Front End SCADA controllers to Substation Remote Terminal Units Multi-Drop communication protocol was implemented. The CEP Multi-Drop feature allows a single RS-232 SCADA host connection to communicate with up to 8 remote terminals over a packet based network

The IP•Tube CEP transparently supports Multi-Drop by simultaneously transmitting IP packetized Front End SCADA messages to up to eight remote IP•Tube CEPs. The IP•Tube CEP connected to the addressed RTU detects a control signal and sends the SCADA response back to the Serial interface connected to the Front End polling port.



### IPTube CEP SCADA Multidrop

2 to 8 Simultaneous Independent Unicasts

## IP•Tube CEP Management

### Management Module

IP•Tube CEP isolates management and data plane functionality with the use of two separate processor modules. Management processor access is limited to encrypted sessions via SSH, or SNMPv3, that employ AES 256 bit keys and sophisticated NIST passwords. These sessions may be established after authentication via TACACS+ or Radius.

The independent Linux based management plane of the IP•Tube CEP ensures Critical Infrastructure Data is isolated from management network access. The Management Module uses internal serial ports to connect to the Data Plane processor.

Administration and User Logs are available with Syslog.

## NERC CIP Compliance

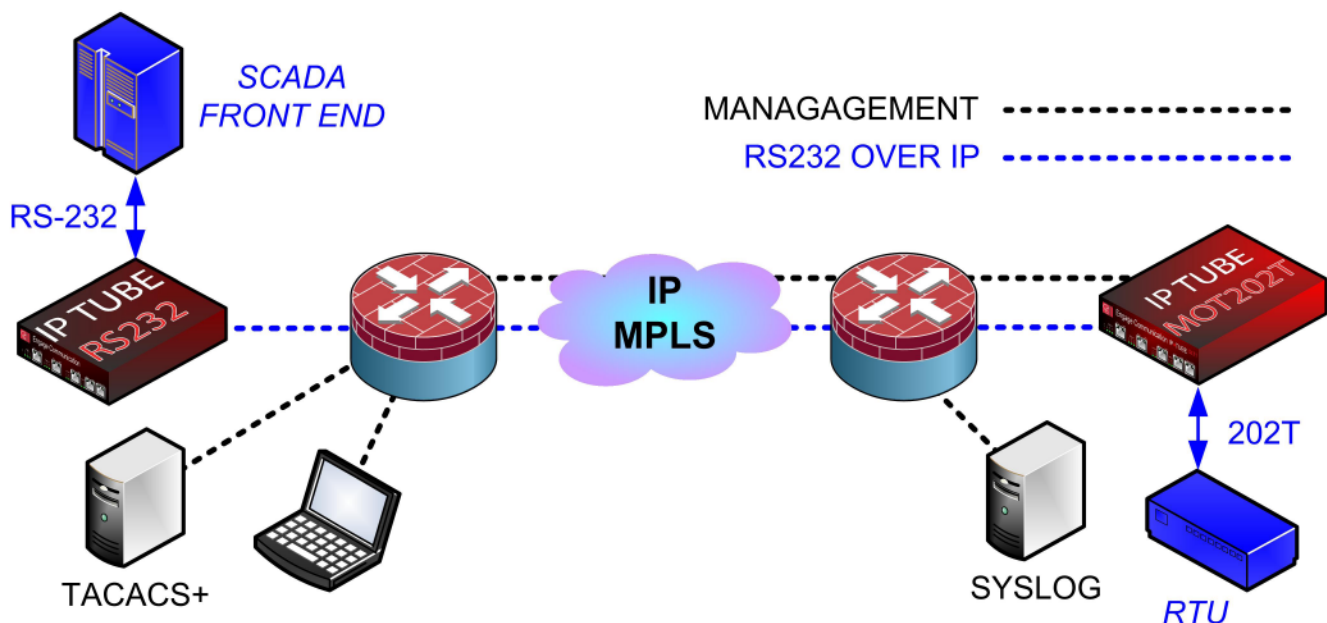
The IP•Tube CEP installations achieve NERC CIP compliance with a combination of internal and external functions.

Internally the Management Module software has the sophistication to implement comprehensive policies and privileges for administrator and user accounts. Administrator policy includes removal, disabling or renaming.

Interoperability with external functions such as Syslog, Network Timing Protocol, TACACS+ and Radius with its support for RSA SecureID delivers trusted compliance.

Electronic Security Perimeter	CIP-005 Requirement	IPTube CEP Solution
The IP•Tube CEP in combination with industry standard services meets the Electronic Security Perimeter's NERC CIP-005 specifications. In addition Control Plane isolation from the Data plane provides a higher level of security for the Cyber Assets.	R2.1 - Deny Access by Default	• Accounts must be created to allow access
	R2.2 - Enable only needed ports	• Each Port may be enabled or disabled
	R2.4 - Strong Technical Controls	• RSA's SecureID two-factor Authentication
	R3.2 - Unauthorized Access	• Alert messages via Syslog or TACACS+
	R5.3 - Access Logging	• Syslog of Access and Command interactions
System Security Management	CIP-007 Requirement	IPTube CEP Solution
Access control is Authenticated, Authorized and Accounted for with TACACS+.	R2.1-3 - Ports and Services	• Unused Serial Ports and Services are disabled
	R3 - Security Patch Management	• Kernel and application upgrade alerts
Security Patches managed proactively.	R5.3 - Secure Passwords	• Require minimum length, strength, frequency
	R6.4 - Security Status Logs	• Syslog and AAA via TACACS+

## NERC CIP 05 IPTube CEP 202T Compliant Operation



## Technical Specifications

**LAN Network Interface:**

- LAN1/LAN2: Two Data Plane 10/100 Base T
- MLAN: Control Plane 10/100 Base T

**LAN Network Protocols Supported:**

- IP, TCP, UDP, ICMP, Telnet, DHCP, DDNS, SSH
- Network Time Protocol - NTP

**Modem**

- Bell 202T 4-Wire; RJ45 pinout for Straight Cable

**Serial Data**

- 1200 Bits per Second, iSynchronous, Asynchronous

**Serial Over IP Protocol:**

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

**RS232 Interface Control Signal Extension:**

- Comprehensive DTR/DSR/RTS/CTS/DCD State Processing and Extension
- DTR & RTS Enveloped Transmission • CD ReCEption

**RS232 Over IP Protocol:**

- Serial Over IP • Circuit Extension Services Over IP • HDLC Over IP
- Multi-Drop: 2 to 8

**Protocols Supported:**

- HDLC, SDLC, PPP, Frame Relay
- Conitel, Modbus, DNP, Proprietary, Bit or Byte, AutoBaud

**Management:**

- Secure Socket Shell - SSH V2 - Session Encryption
- Centralized Authentication, Authorization and Accounting - TACACS+, RADIUS, Two Factor Authentication
- Syslog with NTP Time Stamping
- Console Port for Out of Band Management
- SNMP V3 Public and Private MIB support with configured traps

**Quality of Service Support:**

- IP Type of Service (TOS) CLI configured
- IANA Registered UDP Port 3175
- 802.1p/q mac level prioritization

**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

**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 (-40°C to 70°C)

**Power:**

- 12-30 VDC, 1.0A. • Screw Locking Connector
- Universal Adapter 100/240 VAC 50/60 Hz
- Optional -48V 0.25 Amp • Hot Standby

## IP•Tube CEP 202T Optional Features

**Protector OPTION -PRO**

The protector option utilizes the second LAN interface as a redundant path for the interconnection of the IP encapsulated CEP 202T data. The extension of the CEP 202T has a fault tolerant link that is configured to always on, or with switch over criteria.

### How to Order — IP•Tube CEP RS232

Part No.	Description	Notes
CEP-040-202T-0x	IP•Tube CEP 202T	Specify # of 202T Ports Enabled (1 to 4)
CH-CEP-040-202t-0x	Chassis Slot Card: IP•Tube CEP 202T	Specify # of 202T Ports Enabled (1 to 4)
Base Option		Specify as suffix
-EXT	Extended Temperature	-40C to 70C
-PRO	Protector Option	Fault Tolerant Network Interconnect
-Y	Serial Redundancy	Serial Interface hardware redundancy
Power Options	Specify as suffix	Hot Standby Configuration 2nd Power Suffix
-HSPDC	Connector for Dual DC Supply	
-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
Wall Mount Option		
-WALLMNT	Right Angle Wall Mount Brackets	Enclosure Nut Serts Installed