



RS530 Over IP



- RS530 Circuit Extension Over Ethernet, HDLC Over IP

Flexible Serial Data Extensions over Packet Switch Networks

The IP•Tube CEP RS530 converts RS530 serial data connections into IP packets that extend the circuit over very cost effective Ethernet based LAN/WAN/MAN wired and wireless networks. The IP•Tube CEP RS530 encapsulates Asynchronous, Synchronous and HDLC serial data into IP packets. The IP•Tube CEP RS530, which is available with one to four RS530 interfaces software configurable as DCE or DTE, facilitates the interconnection of Serial Data Over IP between Serial Bulk Encryptions (KG-84/KIV7/OMNI), Data Terminals, Data Acquisition Systems, WAN Routers and Bridges....

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 rates from 75 bits to 2.048 Megabits per second. Latency minimization is accomplished with FIFO sizing for the low data rate settings. A configured number of incoming packets are buffered in order to compensate for the packet delivery jitter introduced by the Ethernet network. The size of this buffer is configured to accommodate the peak amount of jitter.

Asynchronous Over IP

Asynchronous characters from the RS530 interface with 5 to 8 data bits, baud rates from 1.2 to 38.4 kilobits, 1 or 2 stop bits that are with or without parity are efficiently encapsulated into IP packets. The encapsulation supports block mode transfers to minimize the bandwidth required. Additionally the latency is controlled by setting the Tube Bytes per packet.

HDLC Over IP

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 CEP RS530 Standard Features

Three LAN Interfaces

All IP•Tube CEP RS530 models ship with three 10/100BaseT Ethernet LAN ports. The Ethernet interfaces provide for:

- Management interface on MLAN
- The Dual LAN Data Plane ports can be configured for:
 - Connections over 2 Asymmetrical bandwidth links
 - Protector Option for Redundant Packet Paths with Constant or Switch Over Criteria

Assured Delivery Protocol

In order to assure high quality communications over links with intermittent or noisy performance, such as Wireless, the IP•Tube CEP RS530 employs Engage's robust Assured Delivery Protocol with the following benefits:

- Packet out of sequence detection and re-sequencing
- Duplicate skipping
- Lost packet retransmissions with configured delay

IP•Tube CEP RS530 Applications

Flexible Synchronous Serial Data Extension Over IP

The IP•Tube CEP RS530, whose serial interfaces are configurable as DCE or DTE, facilitates the transport of bulk data across a combination of IP and WAN infrastructures. The IP•Tube CEP RS530's flexibility supports internetworking across varied LAN/WAN/MAN/Satellite networks. The size and frequency of the IP packets can be set with data bit rates from 76 bits per second to 16 million bits per second. Latency minimization is accomplished with multidimensional adaptive clock configurations.

Typical Applications

- RS530 LAN to LAN interconnect
- Secure Video TeleConferencing
- Field Command Centers
- Secure Wireless Bridge connections
- SIPRNet or NIPRNet access

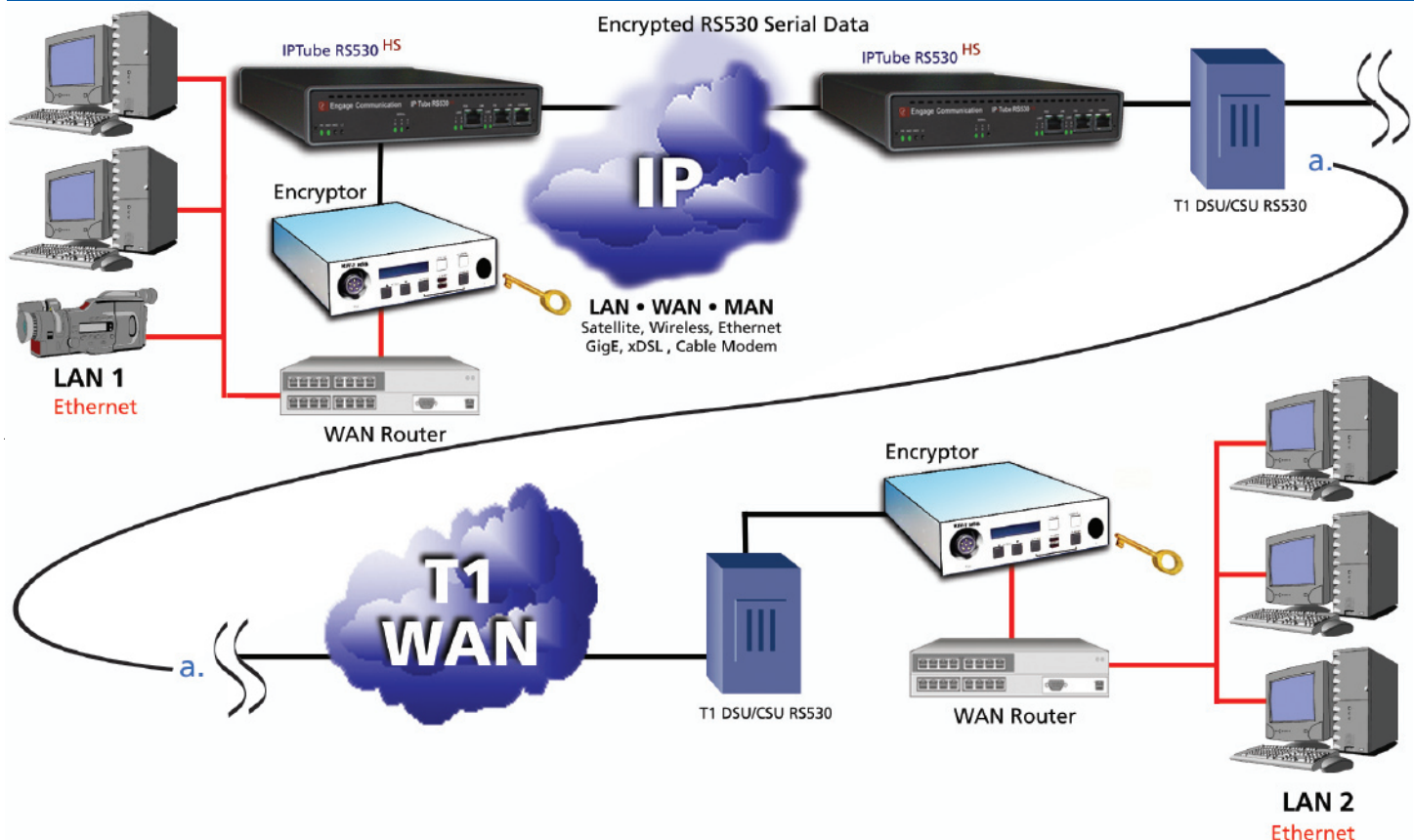
IP•Tube CEP RS530 for Type 1 Encrypted Data Over Internet Protocol Connections

Defense and other Government agencies and Contractors face an ever-increasing need to establish Type 1 secure data communications links. These organizations often have access to flexible IP services such as Intranets, LANs, Metropolitan-Area Networks, WANs, or Wireless Ethernet. The Engage IP•Tube CEP RS530 allows users to leverage existing Bulk Data Encryption Modules for use over IP/Ethernet connections. Encrypted Data over IP with the IP•Tube CEP RS530 is a very economical solution that leverages a proven installed base.

Encrypted Bulk Data-over-IP utilizing the IP•Tube CEP RS530 is an economical "Purpose Built" proven solution that leverages an installed base of high-performance INFOSEC devices. Approved Data Encrytors include:

- KIV-7 • KIV-19 • OMNI • KG-84

Flexible DCE to DTE Synchronous Serial Data Extensions over IP



IP•Tube CEP Management

Management Module

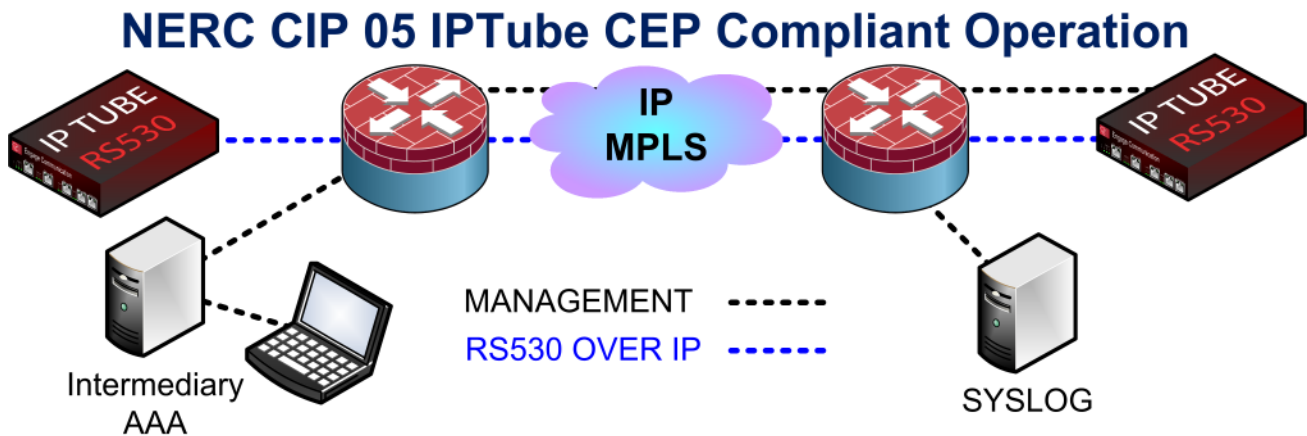
IP•Tube CEP isolates management and data plane functionality with the use of two separate processor modules. Management processor access is limited to encrypted sessions via SSH, or SNMPv3, that employ AES 256 bit keys and sophisticated NIST passwords. These sessions may be established after authentication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

CEP security features include:

- Administrative policies for adding, removing, disabling and renaming authorized users; limiting user access to assigned commands; and enabling only desired port numbers.
- User authentication directly to the IP•Tube CEP or in conjunction with TACACS+ or RADIUS servers
- RSA SecureID support for two factor trusted compliance.
- An SSH command interface encrypting management traffic with powerful 256 bit symmetric keys and NIST based passwords.



NERC Critical Infrastructure Protection 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 Radius or 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+

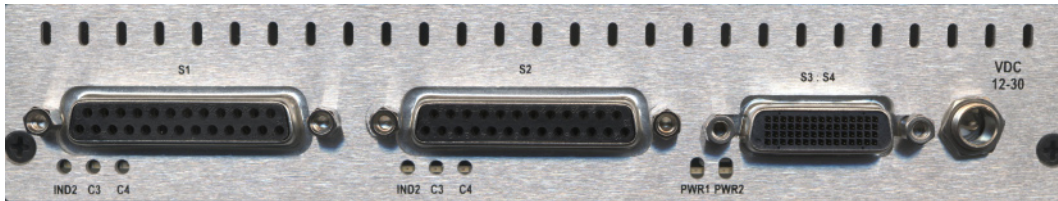
IP•Tube CEP RS530 Optional Features

Protector OPTION -PRO

The protector option utilizes the second LAN interface as a redundant path for the interconnection of the IP encapsulated SER RS530 data. The extension of the SER RS530 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 SER RS530 data on LAN 1 and LAN 2. The Alternator option enables the packetized SER RS530 data to be split over two WAN connections such as xDSL.



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

RS530 Interfaces:

- 1-4 Sync/HDLC, DCE/DTE RS530: 1 to 2 DB25M; a DB60F connector supports 1 to 2 RS530s with DB25M adaptor cables

RS530 Interface Clocking:

- 75 bits to 2.048 megabits per seconds
- Nx75,Nx1.2K,Nx56K,Nx64K; Max N = 32
- Internal, External and Adaptive

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 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

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:

- 12-30 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 CEP RS530

Part No.	Description	Notes
CEP-040-2530-0x	IP•Tube CEP RS530	Base Model Specify # of RS530 Ports Enabled
CH-CEP-040-2530-0x	Chassis Slot Card: IP•Tube CEP RS530	Slot Card for CHUB Chassis
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