Engage Communication

Black•Tube T1

Encrypted T1 Over IP

• Secure T1 Circuit Extension for Voice, Video and Data

Transparent AES Encryption of T1 Circuits Over Packet Networks

The Black•Tube T1 provides organizations with the ability to securely interconnect PBXs, Cellular Base Stations, Telecom Switches and T1 based communication systems over flexible bandwidth lines that are used to carry data, voice, and video. The Voice Only Leased Line Toll charges assessed by long distance and local carriers are eliminated or dramatically reduced by transporting voice traffic via LANs, WANs, MANs, Satellite and Wireless Ethernet.

The Black•Tube T1 encapsulates full and fractional T1 circuits, along with their framing and signaling bits, into AES encrypted IP packets. Encryption of the packetized T1 protects vital information from eavesdropping, tampering and regulatory compliance violations.

Black•Tube T1s secure the Critical Infrastructure utilized by highly competitive businesses, government operations, banking and finance, telecommunications, emergency services, gas and oil, electric and energy, water, and transportation.

The Black•Tube T1's transparent operation maintains the proprietary signaling required to support PBX features such as call conferencing, call forwarding, caller ID and SS7. Legacy phone equipment investment is preserved. Transparent support for Modem, Fax, or Data circuits. Voice quality is not compromised.

AES Encryption of Packetized T1
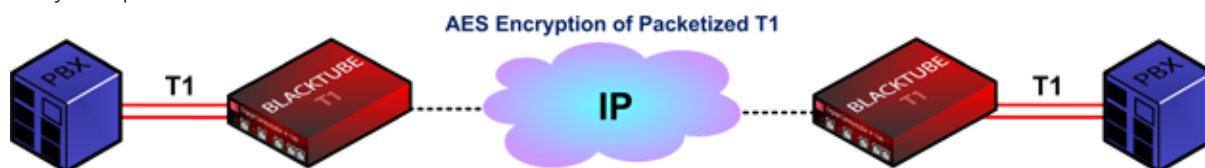
Black•Tube T1 Standard Features

Dual LAN Interfaces

All Black•Tube T1 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 Black•Tube T1 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 Black•Tube T1 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 Black•Tube T1 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 Black•Tube T1 is ensured high priority.

Technical Specifications

Encryption Algorithm:
• AES 256-bit
• Fully Automatic key management

LAN Network Interface:
• Two 10/100BaseT Full/Half Ethernet

LAN Network Protocols Supported:
• IP, TCP, UDP, ICMP, Telnet, DHCP, DDNS, SSH

T1 Over IP Protocol:
• TDM Over IP • Circuit Extension Services Over IP • HDLC Over IP

WAN Network Protocols Supported:
• HDLC, SDLC, PPP, Frame Relay

T1/Fractional T1 Specifications:
• Framing ESF or SF/D4
• Coding - B8ZS or AMI

Echo Canceller:
• Voiceband Echo Cancelling according to ITU G.165 and G.168
• u- and A-Law coding according to ITU G.711
• 32 channels with end echo path delay of less than 63.75 ms

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
• Telecom Part68

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

Black•Tube T1 Optional Features

Echo Canceller OPTION
The Black•Tube T1-**Ecan** has an Optional 1-3 port T1 Echo Canceller card that cancels up to 64 milliseconds of Far End echo. The echo canceller meets ITU-T G.164, G.165 and ITU-T G.168 requirements for echo cancellation.

Enable One to Three T1 interfaces
The Black•Tube T1 is available with one to three T1 interfaces and a 10/100 BaseT Full/ Half Duplex Ethernet Interface. The T1 interfaces have configurations that provide for independent protocol, compression, packet sizing, buffering, clocking, framing, coding and channel settings. Enable additional T1 Ports as needs expand using a software-based license key. The protocols supported are BlackTube, Assured Delivery, CESoIP, and HDLCoIP.

T1 Protection Switch OPTION -TPS
The T1 Link Protector provides an automatic backup for T1 circuits with a second T1. The switch over criteria is configured.

T1 Link Protector OPTION -LPT
The T1 Link Protector provides an automatic backup for T1 circuits with T1 Over IP connecting via Wireless Ethernet, Gigabit Ethernet, IP Satellite Services, xDSL,...

Lossless Data Compression
The Black•Tube T1 compression model continuously detects idle/ redundant data within each T1 Voice circuit resulting in as much as a 40 to 1 bandwidth savings. The compression works from the lowest latency setting of 8 T1 frames to the highest setting of 56 T1 frames per packet.

How to Order — Black•Tube T1

Part No.	Description	Notes
747-1544-0x	Black•Tube T1, xT1 (x=1 - 3 Ports)	Base Model Specify # of T1 Ports Enabled
U47-1544-0x	Black•Tube T1 Port Upgrade	Enable Additional T1 Ports (up to 3)
749-1544-0x	Black•Tube T1-w/xT1 Compression	w/Lossless Data Compression Option
U77-1544-Cx	Black•Tube T1-Compression Upgrade	Enable Lossless Compression T1 (up to 3)
Base Option		Specify as suffix
747-ECAN_0x	Echo Canceller Card 1 to 3 T1	Add Echo Cancellation Specify # of T1s
-PRO	Protector Option	Fault Tolerant Network Interconnect
-ALT	Alternator Load Balancing Option	Load Balancing Inverse Mux
Power Options	Specify as suffix	Hot Standy Configuration 2nd Power Suffix
-DCMOD	Power Supply Module 12/26 VDC ADP CON	Ships with Universal Adapter 90/240 50/60
-WIREDC	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