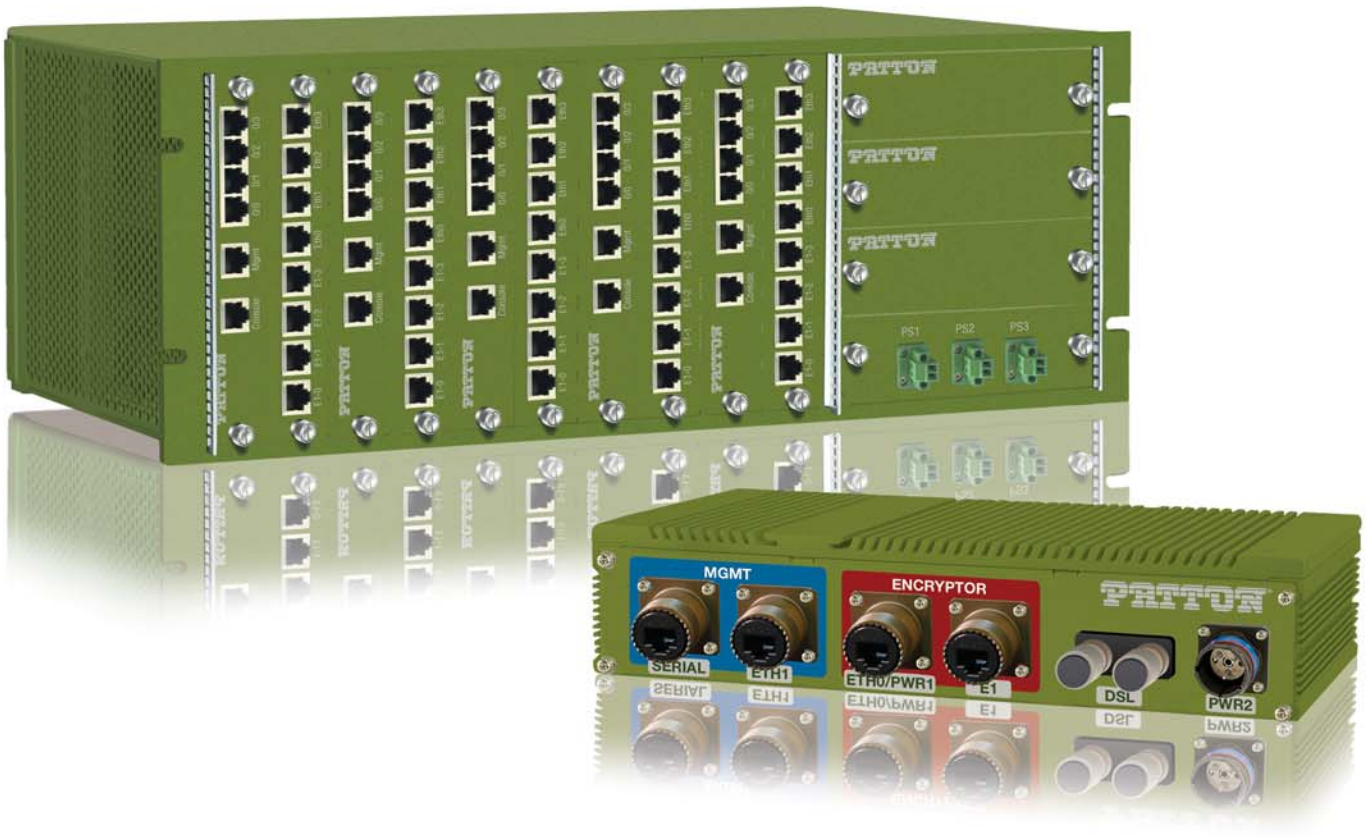
PATTON
let's Connect!™

Long Range Ethernet over Copper Solution



RATE, REACH and RELIABILITY

Modernize

Defense forces around the world are in a constant state of improvement in order to maintain their nations' self defense. Modernizing weaponry always gets top priority, but this often comes at the expense of modernizing core communication systems. Command, control, communications, intelligence, surveillance, and centralized operational control are overlooked while today's world encompassing IP communication systems pass by. For reasons beyond just budget and prestige, IP has not carried its momentum into defense communications systems. These include security, familiarity, and perceived simplicity with the old systems. Of course the old systems are not perfect. Old systems are based on well-defined boundaries between strategic, tactical, and operational verticals of the defense systems. Manual intervention over the PSTN is required to communicate between these modules. Lack of flexibility and mobility poses a major threat in hostile and dynamic environments.

Modernizing military communications to IP would benefit all the elements of a defense ecosystem, from front line trenches to the communication headquarters. The need for a robust high bandwidth system providing constant, rich, and real time exchange of information in a secure and seamless manner is critical to a nations self defense. To secure trust in IP, these systems must take into account the ever growing threat to IP network devices via cyber and electronic domain attacks.

A modern IP network must be designed to keep seamless communication intact while providing both physical and IP security. In order to meet federal and defense encryption requirements, all communications must be encrypted using regulated encryption techniques. To ensure security, no level of information exchange should be able to occur between nodes until both encrypt and decrypt cards are introduced into the communications link at the hardware abstraction layer.

Solutions

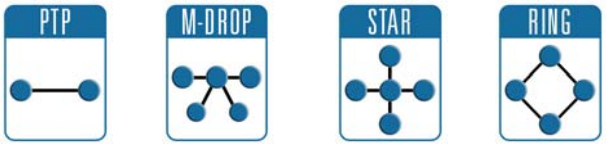
The greatest challenge to IP enabling any defense system is the lack of comprehensive off-the-shelf products that can be readily deployed and offer high level and multi-tier security. There is a wide variety products and hardware components that do not serve the purpose of a unified platform. The security part of these commercial platforms is often based on known algorithms and logics which can be easily manipulated and breached. Also, in extreme mobility environments where wired communication is the backbone of the system, IP systems pose distance limitations. Fiber optics can be used to resolve the distance issues but installing it is cumbersome and physical properties of fiber also become a challenge in harsh conditions. Another modern alternative, WiMAX, is subject to electromagnetic interference during warfare.

Because of such challenges, the only way forward is to look for an option which is:

- Easy to deploy,
- Offers high bandwidth,
- Able to integrate with custom defined security,
- Closely integrated and fool-proof architecture,
- Able to work in warfare conditions, and additionally
- Offers fallback to PSTN in case of IP failures.

With 30 years of designing and manufacturing networking, datacom and telephony equipment, Patton has the expertise and product breadth to meet just about any requirement. Patton's long-range Ethernet-over-Copper (EoC) solution consists of headend units, the ForeFront EFM DSLAM, and customer premise units, OnSite EFM IAD. Patton's end-to-end solution securely interconnects IP devices or nodes at distances up to and in excess of 7km.

Patton's long-range Ethernet-over-Copper transport equipment is highly flexible, allowing for topologies such as star, point-to-point (PTP), point-to-multi-point (PTMP), and even combinations of these. The multiple topologies and long reach ensures flexible node locations and full network coverage over a vast geographical area.

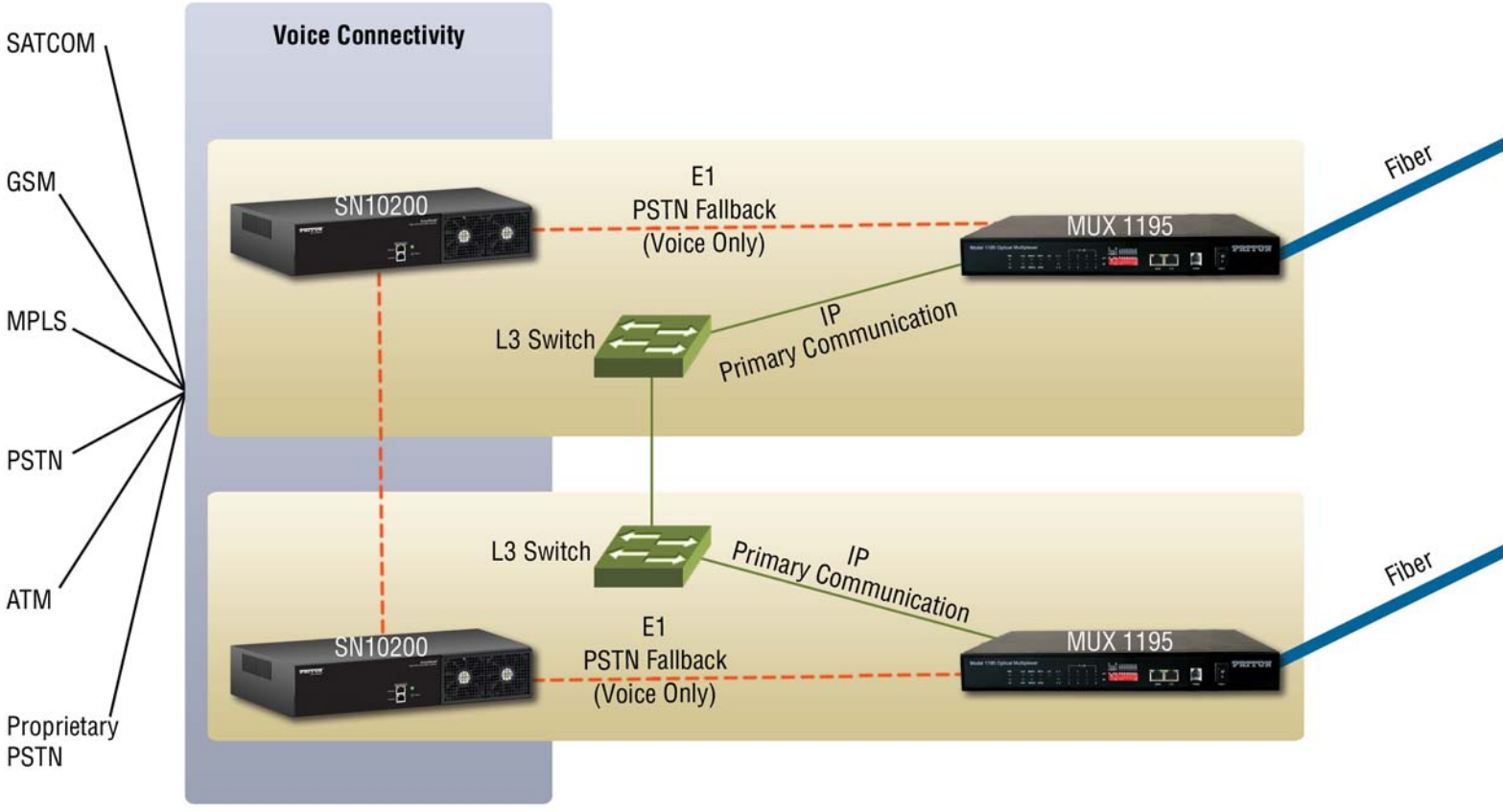


Patton recognizes the transportation system must be simple to use which is why we have designed a system that does not require configuration at the headquarters (DSLAM) or nodes (CPE). Furthermore, the devices are completely transparent to voice, video, and data compression schemes. In this application security can be ensured because the devices are built to not allow for any operation unless their communication ports are connecting into an external device providing both encrypt and decrypt algorithms.

Secure

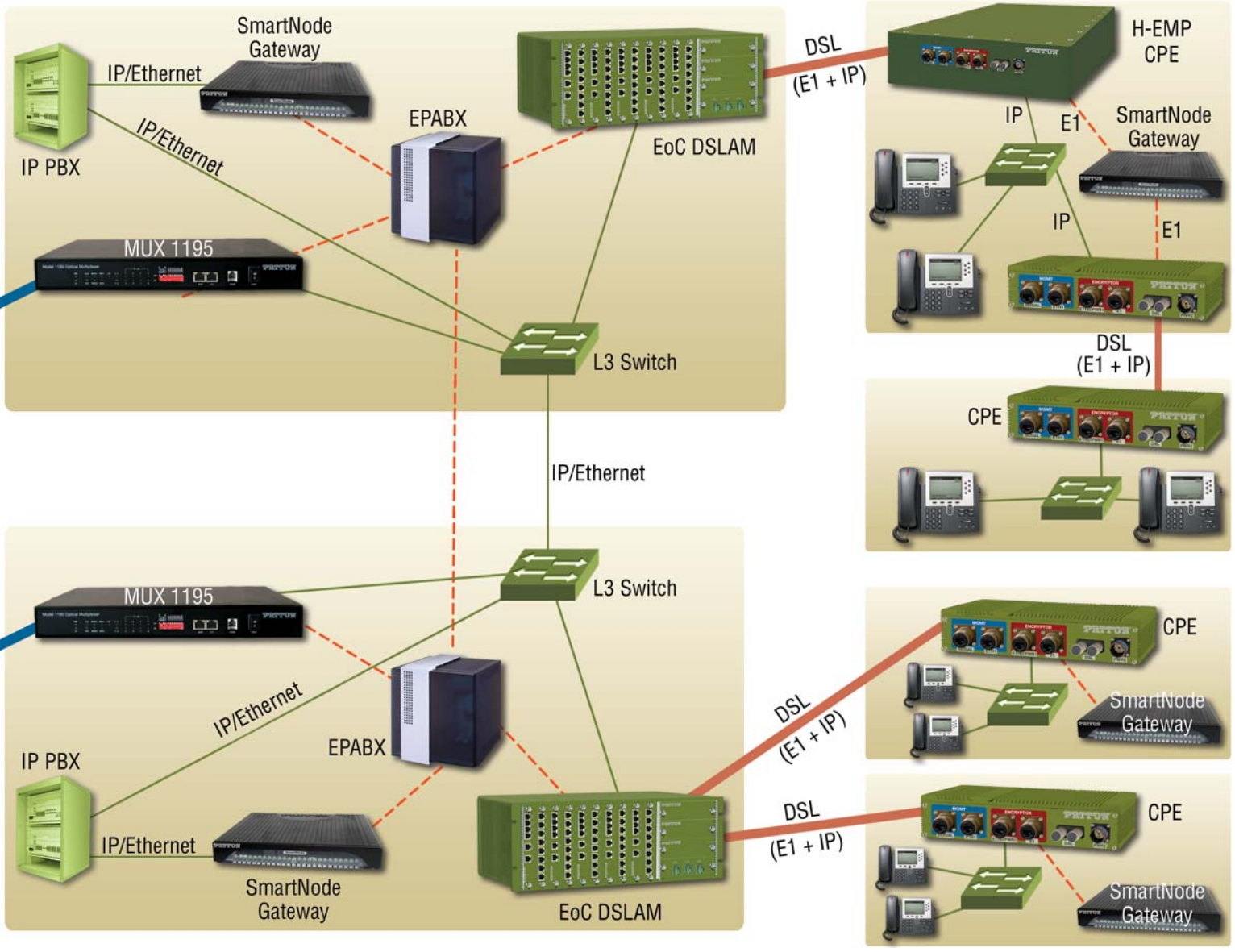
ForeFront devices house an encrypt card (that can be designed by Patton) or customer specific card to scramble data streams. The four-port card capacity offers a minimal disruption to communication in case of failure of any of the physical cards which are field-replaceable.

The chassis is carefully designed to block malicious attempts at overriding the encrypt cards. It also offers a dual communication channel to switch over between an IP network and fallback to PSTN with switching control from a remote NOC.



GET THE MOST OUT OF YOUR COPPER

Survivable



RATE, REACH and RELIABILITY

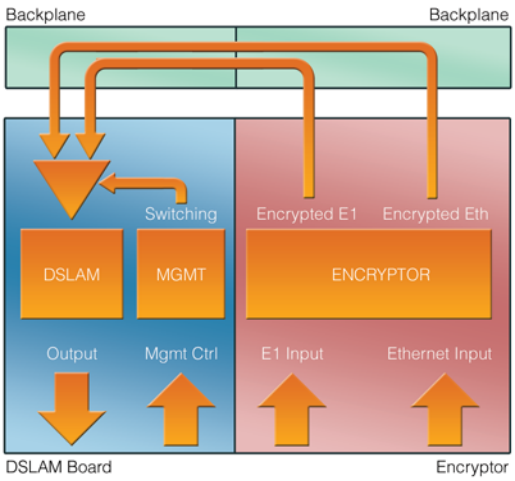
EoC DSLAM

The EoC DSLAM system consists of a metal chassis, backplane, DSL Card, and Encryptor-Interface Card, up to 3 x -48VDC power supplies, and one power input module. The chassis can house up to 5 DSL cards and 5 Encryptor-Interface cards.

Each DSL Card consists of four physical DSL ports (4 pair), one RS-232 console, and one Ethernet management port.

Each Encryptor-Interface Card contains the encryption module and both the E1 (4 x RJ48C) interface ports and the Ethernet (4x RJ45) interface ports.

Every card pair (DSL and Encryptor) in the system is fully operational either on its own or as a system.



EoC DSLAM Shock rack

Management of the DSLAM system can be done through any assigned DSL card. In the event of one card malfunctioning, the next remaining pre-assigned card will become the master.

The chassis includes slots for up to three -48VDC power supplies. These power supplies offer redundancy x 2 and/or load sharing.

G.SHDSL .bis (RJ45) x 4

- Support ITU-T G991.2/G.994.1, ITU-T G.998.1 (G.bond) standards
- TC-PAM 4,8,16,32,64 & 128
- IEEE 802.3 2Base-TL (aka 802.3ah) compliant
- Rate negotiation—manual or auto
- Data rate selections: Up to Nx239 (5.7Mbps) per pair

Ethernet x 2

- 1 x 10/100 (via Backplane)
- 1 x 10/100 (RJ45) Management

E1 x 4

- 4 x (via Backplane—Output over G.S
  - 24 x DSOs for 24 simultaneous voice calls
  - 120Ω

Switching and Quality of Service

- IEEE 802.1D
- 802.1Q/802.1P
- Link Scheduling

IP Addressing

- DHCP Client/Server/Relay
- SNTP Client IPv4/IPv6
- PPPoE

Management Features

- SNMP v1, v2, v3
- Telnet/SSH/RS-232
- HTTP/HTTPS/ Provisioning
- SYSLOG
- TACACS +
- TFTP, HTTP & HTTPS file management

Compliance

- Environmental meets MIL-STD-810 G/JS55555
- EMI/EMC meets MIL-STD-461 & 462
- Optional high-altitude electromagnetic pulse (HEMP) protection meets MIL-STD-188-125-2

GET THE MOST OUT OF YOUR COPPER

EoC CPE

Patton knows there cannot be network and electrical engineers everywhere, so Patton puts an emphasis on ease of use. Connecting network nodes together with this device is simple. These CPE are completely plug and play. The installer only needs to concern themselves with connecting the cables into the proper, clearly marked ports.

The CPE is equipped with a spring loaded binding post that eliminate the need to solder or crimp the field wire into a COTS type connector, such as RJ45. Powering the CPE can be done in two different ways, either plug into the Encryptor's Ethernet Port, or via the front panel DC power plug located at the front right panel of the CPE.

G.SHDSL.bis (MIL Grade RJ45) x 1

- Support ITU-T G991.2/G.994.1 , ITU-T G.998.1 (G.bond) standards
- TC-PAM line modulation 4,8,16,32,64 & 128
- CO or CPE Mode
- IEEE 802.3 2Base-TL (aka 802.3ah) compliant
- Rate negotiation—manual or auto
- Data rate selections: Up to Nx239 (5.7 Mbps) per pair

Ethernet (MIL Grade RJ45) x 2

- 2 x 10/100BaseTX Ports (RJ45)
  - Management
  - Power, Encrypted

E1 (MIL Grade RJ45/RJ48C)

- 1 x RJ45/RJ48C
  - 24 x DS0's for 24 simultaneous voice calls
  - 120Ω

Switching and Quality of Service

- IEEE 802.1D
- 802.1Q/802.1P
- Link Scheduling

IP Addressing

- DHCP Client/Server/Relay
- SNTP Client IPv4/IPv6
- PPPoE

Security

- Stateful Firewall
- Extended ACLs
- Radius Authentication
- SSH/TLS

Management Features

- SNMP v1, v2, v3
- Telnet/SSH/RS-232
- HTTP/HTTPS/Provisioning
- SYSLOG
- TACACS +
- TFTP, HTTP & HTTPS file management

Physical

Standard Unit

- 7.3 x 6.6 x 1.62 inch (185 x 168 x 41 mm)
- 4.5 lbs (2,041 g)

H-EMP Protected Unit

- 14 x 12 x 3.5 inch (356 x 305 x 89 mm)
- 9.25 lbs (4,196 g)

Power (Redundant)

- PWR1: Power over Eth
- PWR2 Internal DC: 9–32 VDC

Operating Temperature

14 to 131°F (-10 to 55°C)

Compliance

- Environmental meets MIL-STD-810 G/JS55555
- EMI/EMC meets MIL-STD-461F
- Optional high-altitude electromagnetic pulse (H-EMP) protection meets MIL-STD-188-125-2

RATE, REACH and RELIABILITY

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