Loop-G7860 mPTN
MPLS/CE Packet Transport Network

Front View

Description

The **Loop-G7860 mPTN** (MPLS/CE Packet Transport Network) is a new and cost-effective solution for transmitting various data service types, including traditional TDM circuit-based traffic, over a packet-based transportation network.

By adopting MPLS-TP (Multi-Protocol Label Switching Transport Profile) and Carrier Ethernet technologies, the G7860 can transport Ethernet (EPL, EVPL, ELAN, EVC defined in MEF), E1/T1 TDMoE, and SDH/SONET CEP traffic.

The unit is also equipped with OAM tools to perform diagnosis on the LSPs (Label Switched Paths), pseudowires as well as Ethernet CFM. The Loop-G7860 series is a perfect packet transport platform for IP-Mobile and lease-line applications containing hub, ring and mesh topologies.

Features

Mechanical and Electrical
– 1U height, 19" width ETSI unit (front access)
– Power supply: hot swappable DC/AC, dual for redundancy
– Harden environment option (-20 ºC to 55 ºC)*

System capacity
– Up to 4 x 10GbE SFP+ ports
– Up to 16 x 1GbE Base-T
– Up to 22 x 1GbE SFP
– Up to 80 x E1/T1 ports
– Up to 8 x STM-1 ports or 2 x STM-4 port

MPLS-TP
– Any Ethernet port can be configured as NNI (MPLS port) or UNI (Ethernet service port)
– Bi-directional LSP
– Static LSP/PW provisioning via NMS
– Any Ethernet and PDH (CESoP and SAToP) service over MPLS-TP
– MPLS-TP OAM per ITU G.8113.2

Carrier Ethernet
– Ethernet OAM – 802.3ah, 802.1ag/Y.1731
– IEEE 802.1d STP, 802.1w RSTP, 802.1s MSTP

TDM Services
– E1/T1 Circuit Emulation per IETF-PW3 SAToP and CESoP
– Timing recovery: ACR/DCR/System
– SDH/SONET Circuit Emulation over Packet (CEP), per RFC 4842
– Encapsulation: PW/LSP (over MPLS-TP), "Dry martini", MEF 8 (TDM over Ethernet), TDM over IP
– Support PDH cross-connection to SDH/SONET*

Ethernet Services
– E-Line, E-LAN, E-Tree services as defined by MEF 9 and 14 and using VPWS/VPLS
– Native Ethernet packets supported
– Encapsulation: PW/LSP (MPLS-TP), VLAN tagging (1Q), VLAN double tagging (Q-in-Q)

VPLS
– VPLS bridging
– H-VPLS bridging
– 32K MAC addresses
– 1K VPLS instances per device
– Split horizon to prevent forwarding loops

(* Future option)

- IEEE 802.3x Flow Control, 802.1q port based VLAN and port isolation, 802.1p QoS
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.1ad VLAN Stacking (Q-in-Q)

Network Protection
- LSP 1+1 protection (send two, pick one) per RFC6378, based on TP OAM as fault detection
- LSP 1:1 protection per RFC6378
- ERPS (G.8032) Ring Protection based on Ethernet OAM as fault detection
- End to end protection switching within sub 50ms

Management
- Fully manageable via SNMP (v1, v2, v3)
- Fully manageable via CLI
- Security
  - Two types of privileges: Operator (read only) and Administrator (read and write)
  - Radius Client Authentication
  - SSH, Telnet
- Upload/Download NE configuration
- Performance management
- Syslog, NTP

CoS/QoS
- 8 Priority Queues
- Scheduling: Strict Priority, WRR with Hierarchy
- Ingress Policing & Egress Shaping per service
- CIR / PIR (EIR) 2-rate-3-color
- MPLS: TC/EXP-Inferred-PSC (Per Hop Behavior Scheduling Class) LSP

Timing
- IEEE 1588 v2 PTP
  - Clock modes: Ordinary/Boundary/Transparent
  - ToD (Time of day)
  - PPS (Pulse per second) output interface
- SyncE
  - Synchronous Ethernet from all GbE ports (not on FET ports)
  - ESMC per ITU-T (Ethernet Synchronous Message Channel)
- Stratum 3 timing
- External clock input and output* (2 Mbps / 2 MHz)

(* Future option)

Ordering Information

Note: RoHS compliant units are identified by the letter **G** appearing at the end of the ordering code.

Main Unit

Model	Description	Notes
Loop-G7860-S-**te1-tpr**-**G**	1U height ETSI chassis with 6 FE/GbE SFP ports, 2 10GbE SFP+ ports, 1 Console, and 1 NMS RJ45 port Two general purpose plug-in slots are available for plug-in modules specified in section below, please order separately. Two power slots are available for power modules specified in section below, please order separately. Power consumption is 45W.	

■ **te1** is used to specify the E1/T1 support on the Main Unit. Please replace **te1** with your selection or leave it blank for nothing.

te1 =	Description	Notes
8TE1	8 port E1/T1 with SCSI interfaces	Please order separately for conversion panels and cables listed in below tables.
16TE1	16 port E1/T1 with SCSI interfaces	
[blank]	Once blanked, it means **NO E1/T1 ports** equipped on the Main Unit.	

■ **tpr** is used for operation temperature range selection. Please select one from the table below.

tpr =	Description	Notes
FAN	Chassis with 1 internal fan and 1 air filter for operating temperature: 0 to 50 ºC	
FL	Chassis with fan-less version for harden operating temperature: -20 to 55 ºC	

Plug-in Modules

Plug-in Modules for Main Unit with FAN version (Loop-G7860-S-**te1**-**FAN**-**G**)

Model	Description	Notes
Loop-G7860-8GE-**G**	Eight port Gigabit Ethernet (1000/100/10M BaseT) card with RJ45 interfaces for normal operating temperature: 0 to 50 ºC	Please order SFP+ optical modules separately. See separate SFP+ module brochure.
Loop-G7860-8SFP-**G**	Eight port GbE/FE card with SFP interfaces for normal operating temperature: 0 to 50 ºC	
Loop-G7860-2XG-**G**	Two port 10GbE card with SFP+ interfaces for normal operating temperature: 0 to 50 ºC	Only available for Slot 1
Loop-G7860-32TE1-**G**	32 port E1/T1 card with SCSI interfaces for normal operating temperature: 0 to 50 ºC	Please order separately for conversion panels and cables listed in below tables.
Loop-G7860-B16-**G**	Dual STM-1/OC3 or STM-4/OC12 interfaces without SFP (mini-GBIC) optical modules for normal operating temperature: 0 to 50 ºC. SDH/SONET software configurable.	Please order SFP optical modules separately. See separate SFP module brochure.

Plug-in Modules for Main Unit with Fan-Less version (Loop-G7860-S-**te1**-**FL**-**G**)

Model	Description	Notes
Loop-G7860-8GE-FL-**G**	Eight port Gigabit Ethernet (1000/100/10M BaseT) card with RJ45 interfaces for harden operating temperature: -20 to 55 ºC Supports fan-less operation	
Loop-G7860-8SFP-FL-**G**	Eight port GbE/FE card with SFP interfaces for harden operating temperature: -20 to 55 ºC Supports fan-less operation	Please order SFP optical modules separately. See separate SFP module brochure
Loop-G7860-2XG-FL-**G**	Two port 10GbE card with SFP+ interfaces for harden operating temperature: -20 to 55 ºC Supports fan-less operation	Only available for Slot 1
Loop-G7860-32TE1-FL-**G**	32 port E1/T1 card with SCSI interfaces for harden operating temperature: -20 to 55 ºC Supports fan-less operation	Please order separately for conversion panels and cables listed in below tables.
Loop-G7860-B16-FL-**G**	Dual STM-1/OC3 or STM-4/OC12 interfaces without SFP (mini-GBIC) optical modules for harden operating temperature: -20 to 55 ºC SDH/SONET software configurable. Supports fan-less operation	Please order SFP optical modules separately. See separate SFP module brochure

Power Modules

Power Module		
Loop-G7860-SD48-**G**	Single -48Vdc power plug-in module (Input voltage: -36 to -72 Vdc)	- Order two power modules to provide power redundancy. - Applicable for both fan and fan-less version. - For AC, please order an appropriate power cord separately from accessary section below
Loop-G7860-SA-**G** *	Single AC power plug-in module (Input voltage: 95 to 240 Vac)	
Loop-G7860-DD12-**G**	Power plug-in module with dual DC 12V inputs (Input voltage: 12 Vdc)	- Can work with up to two external adapters (Loop-ACC-APx-12V-130-3070-**G**) to provide power redundancy - Applicable for both fan and fan-less version.

AC to DC Power Adaptors		
Loop-ACC-APx-12V-130-3070-**G**	Max. 130 Watts, AC (85 ~ 264Vac) to DC (12 Vdc, 11.5A) adaptor, temperature range: -30 to 70°C	- Can work with Loop-G7860A-DD12-**G** - Order two adapters to provide power redundancy.

■ Where **x** is used for selecting AC power plug type:

x =	Description	Note
A	adaptor power plug type for USA and Taiwan	
E	adaptor power plug type for Europe	
U	adaptor power plug type for UK	

* Future option

Order Example1:
    Main unit:
        Loop-G7680-S-16TE1-FAN-G x 1
    Plug-in modules:
        Loop-G7860-8GE-G x 2
    Power modules:
        Loop-G7860-SD48-G x 2
    Description:
        1U height ETSI fan version Main Unit with 16 x E1/T1 with SCSI interfaces, 6 x FE/GbE SFP ports; 2 x 10GbE SFP+ ports, Console, and NMS RJ45 ports, operation temperature range is 0 to 50 °C;
        2 plug-in modules each with 8 x GbE (10/100/1000BaseT) RJ45 ports, operation temperature range is 0 to 50 °C;
        2 DC (-48Vdc input) power modules.

Order Example2:
    Main unit:
        Loop-G7680-S-FL-G   x 1
    Plug-in modules:
        Loop-G7860-2XE-FL-G   x1
        Loop-G7860-32TE1-FL-G   x 1
    Power modules:
        Loop-G7860-DD12-G   x 1
        Loop-ACC-APx-12V-130-3070-G   x 2
    Description:
        1U height ETSI fan-less Main Unit with 6 x FE/GbE SFP ports; 2 x 10GbE SFP+ ports, Console, and NMS RJ45 ports, Operation temperature range is -20 to 55 °C for harden environment;
        1 Plug-in module of 2 ports of 10GbE SFP+, Operation temperature range is -20 to 55 °C;
        1 Plug-in module of 32 ports of E1/T1 with SCSI interface, operation temperature range is -20 to 55 °C;
        1 DC power module with dual DC12V inputs.
        2 pieces of AC to DC12V adapters with 130w

Accessories

Power Cord		
Loop-ACC-PC-USA	AC power cord for Taiwan/America	
Loop-ACC-PC-EU	AC power cord for Europe	
Loop-ACC-PC-UK	AC power cord for UK	
Loop-ACC-PC-AUS	AC power cord for Australia	
Loop-ACC-PC-CH	AC power cord for China	

Conversion Panels		
Loop-ACC-P-1SCSI-16RJ-**G**	One SCSI to sixteen RJ (1u height) without cable	Used with: Loop-G7860-32TE1-**G** and Loop-G7860-32TE1-FL-**G**
Loop-ACC-P-1SCSI-16WW-**G**	One SCSI to sixteen Wire Wrap (1u height) without cable	Used with: Loop-G7860-32TE1-**G** and Loop-G7860-32TE1-FL-**G**
Loop-ACC-P-1SCSI-16BNC-**G**	One SCSI to sixteen BNC (1.5u height) without cable	Used with: Loop-G7860-32TE1-**G** and Loop-G7860-32TE1-FL-**G**
Conversion Cable		
Loop-ACC-CAB-SCSI68M-200-1SCSI68M	SCSI68/ Male to one SCSI68/Male; Length 200 cm	Used for all Conversion Panels
Loop-ACC-CAB-7860-CLK-100	Cable for G7860 clock I/O with length 100 cm	

User's Manual	
Loop-G7860-UM	User's Manual (optional, paper printed copy). An electronic version of the manual on a CD is already included with every order.

SFP Optical Modules
SFP (small form-factor pluggable) optical modules are **NOT** included. To order please check the SFP optical module brochure or contact your Loop sales representative.   **NOTE:** Non-Loop SFP modules are not guaranteed to work with our equipments. It is strongly recommended to buy Loop-logo SFP modules.

Blank Panels		
30.001863.A00LF	Blank panel to cover empty power slot	
30.001862.A00LF	Blank panel to cover empty slot 1 or slot 2	

Firmware Upgrade	
Loop-G7860-FWUPGR	Firmware Upgrade. Customers who desire to have a firmware upgrade after their warranty has expired can purchase this option. This will upgrade the firmware to the most current version and provide an additional 12 months of software repair and patches on existing functionality as necessary.

IEEE 1588 v2 PTP Software Upgrade		
Loop-G7860-1588UPGR	Software Upgrade to support IEEE 1588v2. Customers who desire to use the IEEE 1588 v2 Precision Time Protocol (PTP) function can purchase this option. This option will provide an activation code and instructions on how to unlock the function on the device.	
Fan and Filter Modules		
Loop-G7860-FAN-**G**	Combined Fan/Console port module. The console port is on the exterior, and the fan is located inside.	Fan and filter modules are included in main unit Loop-G7860-S-te1-FAN-**G** model. Use this ordering code if original fan breaks. While for main unit Loop-G7860-S-te1-FL-**G**, fan and filter are not required.
Loop-G7860-FIL-**G**	Air filter module for the G7860	

Ear Mounts	
19"/23" ear mounts	A pair of 19"/23" ear mounts is supplied as part of the standard package. For other sizes please contact your Loop sales representative.

Loop-G7860 Product Specifications

E1 Tributary Interface (E1/T1 software selectable)
Line Rate	2.048 Mbps ± 50 ppm
Line Code	AMI/ HDB3
Framing	ITU G.704 (CRC: on/off, CAS: on/off, unframed)
Output Signal	ITU G.703
Input Signal	ITU G.703
Jitter	ITU G.823
Connector	SCSI-II 68 pin

T1 Tributary Interface (E1/T1 software selectable)
Line Rate	1.544 Mbps ± 32 ppm
Line Code	AMI / B8ZS (selectable)
Framing	D4 / ESF/ ESF&T1.403/ OFF (clear channel)
Output Signal	DS1 with LBO Setting
Input Signal	DS1
Pulse Template	Per AT&T TR 62411
Connector	SCSI-II 68 pin

B155/622 Interface
Line Rate	155/622 Mbps
Protection	MSP (1+1), SNCP
Operational modes	SDH (STM-1/4) or SONET (OC3/12) mode

FE/GbE Interface
Connector	SFP

10GbE Interface
Connector	SFP+

Management and Administration
Management ports	Console and NMS (RJ45 connectors)
CLI	Fully manageable with CLI (command line interface)
Remote login	Telnet, SSH
SNMP	SNMP v1, v2, v3

QoS
Eight priority queues
Scheduling – Strict Priority, Weighted Round Robin with hierarchy
Ingress policing per service
Egress shaping per service
CIR / PIR (EIR) Two-rate, three-color. (committed information rate, peak or expected information rate)
E-LSP: EXP-Inferred PSC (Per Hop Behavior Scheduling Class) LSP. (label switching path)
WRED for congestion management. (weighted random early detection)

Physical and Environmental
Dimensions (W x H x D)	438 mm x 44 mm x 225.5 mm (17.24" x 1.73" x 8.90")
Net Weight	4.0 Kg (8.82 lbs)
Temperature	Normal operating temperature version: 0 to +50°C (operation)
	Harden operating temperature version: -20 to +55°C (operation)
Humidity	5-95% RH (non-condensing)
Mounting	Desk-top stackable, rack mount

Power consumption
Main Unit	45W
32E1/T1 plug-in card	11W
8GE plug-in card	7W
B16 plug-in card	10W
2XG plug-in card	6W

Standards Compliance

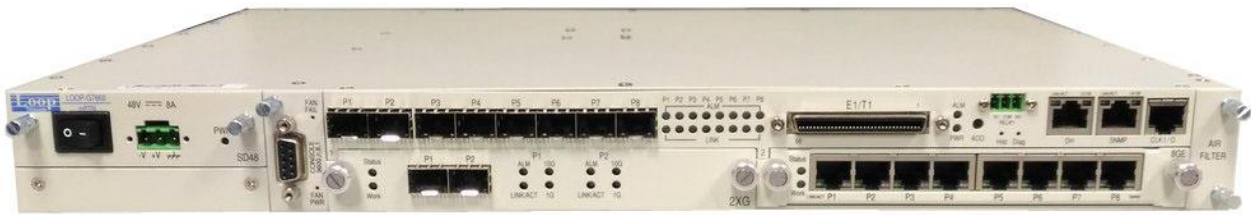| IEEE		RFC (IETF)	
802.1ad	Tag Stacking (Q-in-Q)	2131 & 2132	DHCP
802.3ag	Ethernet OAM	6378	MPLS-TP Linear Protection
802.3ah	Ethernet in the First Mile	**MEF***	

1588 v2	Precision Time Protcol	9
ITU		14
G.8113.2	MPLS-TP OAM	
Y.1731	Ethernet OAM	

Certification

EMC/EMI	FCC15 Class A, EN55022 Class A, EN55024
Safety	EN60950-1
RoHS	EN50518:2012

* Future option

Front Panel View

Loop-G7860 Front Panel View

32T1/E1 Plug-in Module

8GbE Plug-in Module

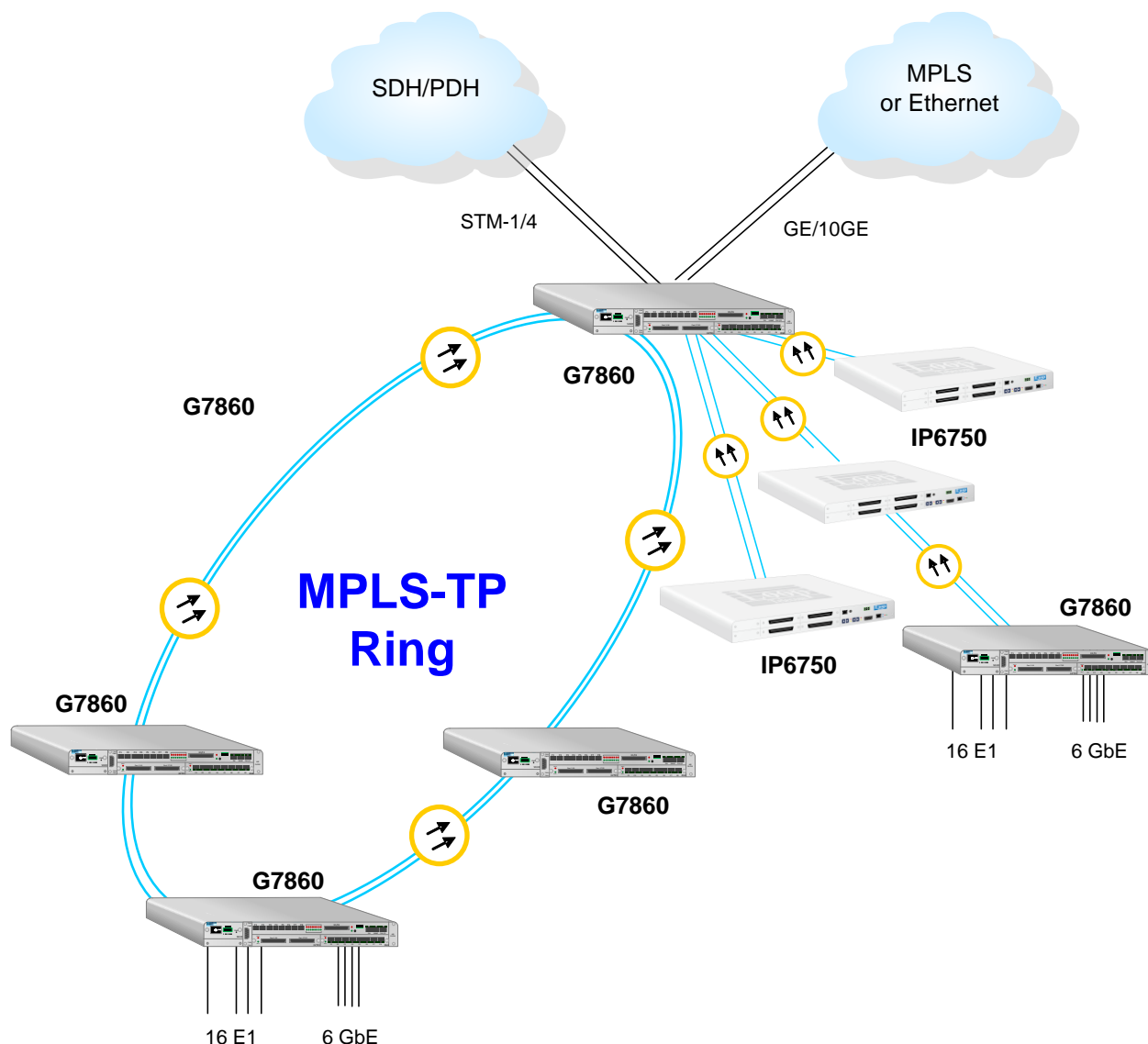*B16 (STM-4/1) Plug-in Module*

8GbE SFP Plug-in Module

2XG (10GbE) Plug-in Module

Dual DC Power Module

MPLS-TP Ring Application

SDH/PDH

MPLS
or Ethernet

STM-1/4

GE/10GE

G7860

G7860

IP6750

**MPLS-TP
Ring**

IP6750

G7860

G7860

16 E1

6 GbE

G7860

G7860

16 E1

6 GbE