Loop-IP6763
TDMoEthernet Aggregator

Description

As the core communications network migrates from legacy TDM to IP/MPLS or Metro Ethernet to leverage CapEx and OpEx efficiently, the Loop-IP6763 TDMoEthernet Aggregator provides a cost-effective solution which allows operators to transport up to 32 E1/T1, 4 STM-1/OC-3 or 1 STM-4/OC-12* along with 4 Giga LAN traffic over existing IP/MPLS* or Metro Ethernet network. The E1/T1 SCSI interface is fixed on main board while there are two hot-swappable tributary slots for STM-1/OC-3 or STM-4/OC-12* plug-in card types.

Loop-IP6763 TDMoEthernet Aggregator converts the TDM data stream and timing information from both PDH and SDH/SONET ports into packets and transmits to the connected IP/MPLS* or Metro Ethernet network via dual combo Gigabit Ethernet WAN ports with 802.3ad Link Aggregation capability. Another Pseudowire device converts the received packet stream back to original PDH and SDH/SONET data stream along with the original timing information.

Loop-IP6763 TDMoEthernet Aggregator employs various Pseudowire Encapsulation protocols such as SAToP, SONET/SDH CEP, CESoPSN, MEF-8*. To compensate the inherent Packet Delay Variation (PDV) of IP/MPLS* or Metro Ethernet network, Loop-IP6763 TDMoEthernet Aggregator utilizes Jitter Buffer Control and can compensate up to 512 ms with G.823/G.824 Traffic Interface conformance (+/- 1ppm).

Security is highly ensured via SSHv1/SSHv2 function and SNMPv1/v3 management.   * Future option

Features

Mechanics and Electrics

- 1U height, ETSI shelf
- Replaceable FAN and Air Filter
- Power Module: -48Vdc
  (Over-voltage protection and Load sharing)

WAN Aggregate Interface

- 2 Combo GbE with SFP housing and RJ45 Connector
- 802.3ad Link Aggregation
- RSTP/MSTP

User Tributary Interface

- 2 slots for hot-swappable plug-in cards:
  - Up to 2 Dual STM-1/OC-3 cards with MSP(1+1)/cross-card MSP(1+1)
  - Up to 1 Dual STM-4/OC-12* card
- Ethernet Tributary interface:
  - 3 x 10/100/1000 BASE-T Ethernet ports plus 1 user-selectable Ethernet/SNMP port
  - Speed/Duplex Auto-negotiation
  - 802.3ad Link Aggregation
- On-board E1/ T1 Interface:
  - 8*/16*/32 E1/T1 with SCSI connector

L2 Switching

- 10G non-blocking switching capacity
- Jumbo frame size up to 13K bytes

- IS-IS packet transparency*
- VLAN
  - Maximum 4K VLAN ID
  - Support C-VLAN/S-VLAN tag adding and removing on Pseudowire
  - 802.1q Port-based VLAN on Ethernet port
  - VLAN-based packet filtering
  - Support Q-in-Q
- Support 802.1d MAC Learning (max. 26K)
- Support 803.3x Flow control on input ports
- Support 802.1D STP, 802.1s MSTP, 802.1w RSTP
- Support IGMP Snoopingv2 (RFC 2236)

QoS

- Ingress Rate Limiting per Ethernet port with 100kbps granularity
- Ethernet Network Level:
  - 3-bit Priority Code Point – PCP field within 802.1P/802.1Q Ethernet frame – CoS
  - 8 priority queues per port
- IP Network Level:
  - 8 priority queues per port
  - 6-bit DiffServ Code Point -DSCP field – ToS
- Scheduling Algorithm
  - Strict Priority (SP)
  - Weighted Round Robin (WRR)
  - Deficit Weighted Round Robin (DWRR)
- Congestion Avoidance
  - Random Early Detection (RED)
  - Weighted Random Early Detection (WRED)

Pseudowire Capability

- Support SAToP, SONET/SDH CEP, CESoPSN, MEF-8*
- Support framed/unframed E1/T1
- Support VC4 transparent/channelized STM-1 and STS3C transparent/channelized OC-3
- Support TDM traffic emulation over MPLS*, UDP/IP and Metro Ethernet Network*
- Support Timeslot Grooming
- Backplane capacity: up to 252xVT11/VT12 bandwidth
- Maximum 512 Pseudowires
- Up to 32 Pseudowires can apply Adaptive Clock Recovery (ACR) mechanism
- PDV Compensation Depth: up to 512 ms
- Jitter Buffer Size: up to 256 frames

- Supports IPv4 and IPv6* addressing
- Excel calculator is provided*

Pseudowire Diagnostics Function

- ARP, Ping and Trace Route
- IP – MAC Table Display
- Pseudowire Information
  - Maximum 4K VLAN ID
  - Packet Creation Time (ms)
  - Jitter-Tolerance Delay (ms)
  - Single-Trip Delay (ms)
  - Total Frame Length (bytes)
  - Packet per second
  - Required Bandwidth (Mbps)
  - Header Overhead (%)
  - Remaining WAN Bandwidth (Mbps)
  - Remaining Memory

Jitter and Wander

- PPM version: conforms to G.823/G.824 Traffic Interface (+/- 1ppm)

Timing Reference

- Internal
- External
- Line(both PDH and SDH)
- Adaptive Clock Recovery

OAM Capability

- Support 2 SNTP Timing References
- Multi-color LED indicators
- Alarm Relay
- ACO (Alarm Cutoff) button

Management Interface

- 1 user-selectable Ethernet/SNMP Port
- SNMP v1/ v3
- DB9 Console port with VT100 menu
- Telnet and SSHv1/SSHv2
- C-VLAN/S-VLAN tag on management traffic
- Support IPv4 Routing & IPv6* Routing over DCC channel on SDH/SONET interface
  - Static Route, RIP I/II, OSPFv2*
  - RIPng*, OSPFv3*

Standards Compliance

- SAToP, SONET/SDH CEP, CESoPSN, MEF-8*

* Future Option

Ordering Information

Note: RoHS compliant units are identified by the letter **G** appearing immediately at the end of ordering code. SFP optical modules are **NOT** included. See separate SFP Optical Module brochure.

Main Unit

Model	Description	Note
Loop-IP6763-1UE-PPM-s1-s2-pp1-pp2-add1-**G**	1U height ETSI chassis with G.823/G.824 traffic interface, 2 Combo Gigabit Ethernet (GbE) WAN ports (SFP optical module not included), 3 LAN ports, and 1 SNMP port. **Fan and filter module are also included.**	• Replace the **s1**, **s2**, **pp1**, **pp2** and **add1** fields with your selection from the choices below. If not needed then leave field blank. • If your original fan breaks, it is **required** to order a new one so that IP6763 can work normally.

■ Replace **s1** with your selection for your choice of **plug-in module for slot 1**. Otherwise leave blank.

s1=	Description	Note
2B16	Dual STM-1/OC3 or STM-4/OC12* card software configurable	• The card in slot 1 only supports STM-1/OC3. • When the card in slot 2 is configured STM-4/OC12*, the card in slot 1 is not available. • To get more detailed information, please refer to the capacity table on page 7.

■Replace **s2** with your selection for your choice of **plug-in module for slot 2**. Otherwise leave blank.

s2=	Description	Note
2B16	Dual STM-1/OC3 or STM-4/OC12* card software configurable	• The card in slot 2 supports STM-1/OC3 or STM-4/OC12*. • When the card in slot 2 is configured STM-4/OC12*, the card in slot 1 is not available. • To get more detailed information, please refer to the capacity table on page 7.

■Replace **pp1** and **pp2** with your selection for your choice of **power modules**. Otherwise leave blank.

pp1, 2=	Description	Note
SD48	Single -48Vdc power plug-in module (-36 to -72 Vdc).	• For redundancy purpose, ordering a second plug-in module will provide dual power.

■ Replace **add1** with your selection for E1/T1 modules. Otherwise leave blank.

add1=	Description	Note
8TE	8 E1/T1 card*	• Support E1 75/120ohm and T1 100ohm.
16TE	16 E1/T1 card*	• Please order separately for conversion panel.
32TE	32 E1/T1 card	

(* Future Option)

Order Example 1:
Main unit: Loop-IP6763-1UE-PPM-2B16-SD48-G
Description: 1U height ETSI chassis with G.823/G.824 traffic interface, 2 Combo Gigabit Ethernet (GbE) WAN ports, 3 LAN ports, and 1 SNMP port. Fan and filter are also included. 1 dual STM-1/OC3 or STM-4/OC12* plug-in module and 1 single -48Vdc power plug-in card (-36 to -72 Vdc).
(**Note**: When only one 2B16 card is purchased, it will be installed on slot 2 in production.)

Order Example 2:
Main unit: Loop-IP6763-1UE-PPM-2B16-2B16-SD48-SD48-G
Description: 1U height ETSI chassis with G.823/G.824 traffic interface, 2 Combo Gigabit Ethernet (GbE) WAN ports, 3 LAN ports, and 1 SNMP port. Fan and filter are also included. 2 dual STM-1/OC3 or STM-4/OC12* plug-in module and 2 single -48Vdc power plug-in card (-36 to -72 Vdc).

Accessories

User's Manual		
Loop-IP6763-UM	User's Manual (paper copy -optional). A CD version of the manual is already included as standard equipment.	

Firmware Upgrade	
Loop-IP6763-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.

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 nearest Loop sales representative.

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

Blank Panel	
30.001757.A00LF	Blank panel to cover empty power slot
30.001758.A00LF	Blank panel for empty plug in module slot 1 or 2.

Conversion Panels		
Loop-ACC-P-1SCSI-16RJ-**G**	One SCSI to sixteen RJ (1U height) without cable.	
Loop-ACC-P-1SCSI-16BNC-**G**	One SCSI to sixteen BNC (1.5U height) without cable.	

Conversion Cable		
Loop-ACC-CAB-SCSI68M-60-1SCSI68M-**G**	SCSI68; Male to one SCSI68 / Male; Length: 60cm	• Used for all conversion panels.

Additional Modules

All items in this section are included as part of the main unit order. Use these ordering codes if you are ordering extra modules or replacement parts.

STM-1/4 Module	
Loop-IP6763-2B16-**G**	Dual STM-1/OC3 or STM-4/OC12* card software configurable

Power Module	
Loop-IP6763-S-SD48-**G**	Single -48 Vdc power plug-in module (-36 to -72 Vdc)

Fan Module	
Loop-IP6763 -FANA-**G**	Fan module with "fan power" and "fan fail" LED indicator lights, including four 3 Vdc (0.6W) cooling fans.

Filter Module	
Loop-IP6763-FIL-**G**	Air filter

Specifications

SFP Optical Module
Please refer to SFP optical module brochure for detail.

WAN Aggregate Interface
Number of Ports : 2 Combo GbE (Including Electrical and Optical ports; Auto-detection of SFP for highest priority)

Electrical Port		**Optical Port**	
Speed:	10/100/1000 BaseT (802.3i, 802.3u, 802.ab) Auto-negotiation (10/100/1000) Auto MDI/MDIX Full/half Duplex	Speed:	100/1000 BaseFX (802.3u, 802.3z)
		Connector:	SFP
Connector:	RJ45		

Ethernet Tributary Interface
Number of Ports:	4
Speed:	10/100/1000 BaseT (802.3i, 802.3u, 802.ab) Auto-negotiation (10/100/1000) Auto MDI/MDIX Full/Half Duplex
Connector :	RJ45

STM-1/OC3 Tributary Interface

		STM-4/OC12 Tributary Interface*	
Number of Ports:	2	Number of Ports:	2
Line Rate:	155.52 Mbps	Line Rate:	622.08 Mbps
Line Code:	Scrambled	Line Code:	Scrambled
Jitter and Wander:	ITU G.813	Jitter and Wander:	ITU G.813

E1 Tributary Interface

Number of Ports:	8 or 16 or 32, manufacture option	Input Signal:	ITU G.703
Line Rate:	2.048Mbps ± 50 ppm	Output Signal:	ITU G.703
Line Code:	AMI/HDB3	Jitter and Wander:	ITU G.823
Framing:	ITU G.704 (CRC: on/off, CAS: on/off, Unframed)	Connector:	SCSI-II 68 pin

T1 Tributary Interface

Number of ports:	8 or 16 or 32, manufacture option	Input Signal:	DS1
Line Rate:	1.544Mbps ± 32 ppm	Output Signal:	DS1 with LBO Setting
Line Code:	AMI / B8ZS (selectable)	Surge Protection:	GR-1089 Intra-Building
Framing:	D4 / ESF/ OFF (clear channel)	Pulse Template:	ITU G7.03
		Connector:	SCSI-II 68 pin

Timing Source
Primary/Secondary Clock:	Internal, External, Line Clock from SDH/SONET, Line Clock from E1/T1and Adaptive Clock Recovery

External Timing
Input Signal:	E1, T1, 2.048 MHz, 1.544 MHz (user selectable)
Output Signal:	E1, T1, 2.048 MHz, 1.544 MHz (user selectable)
Connector:	RJ48C, 2.048MHz, 1.544MHz

Alarm Input/Output

Input Port		**Output port**	
Number of Ports:	1	Number of Ports:	4
Connector:	RJ45	Connector:	RJ45
Internal Resistance:	1000 ohm	Initial Insulation Resistance:	Minimal 1000 ohm (at 500Vdc)
Activation Current:	3mA	Maximum Current:	1A for 30Vdc, 0.3A for 125 Vac
Deactivation Current:	1.5mA		

Network Management

Console Port		**SNMP Port**	
Electrical:	RS232, DCE	Protocol:	SNMPv1/v3*
Terminal:	Menu-driven VT-100	Connector:	RJ45 at front panel
Connector:	DB9, female		

Performance Monitors

Performance Store: The last 24-hour performance in 15-minute interval

Performance Reports: Date &Time, Error Block (EB), Background Block Error (BBE), Error Second (ES), Burst Error Second (BES), Severe Error Second (SES), Unavailable Second (UAS)

System Performance	RX-Lost, Cell-Lost, Jit-UR, Jit-OR
SDH/SONET Performance	RS-BIP(B1), MS-BIP(B2), MS-REI, HP-BIP(B3), HP-REI, LP-BIP(V5), LP-REI(V5)
E1/T1 Performance	CRC, OOF

Alarm Reports

Alarm History:

System Alarm		Alarm Cut Off, Power Loss/Uneqp, Fan Fail, Overheat, System Clock Loss, Log on and Log off, Optical Port Uneqp, Ethernet Link, Card In, Card Out, Card Type Mismatch, Card Port Number Mismatch, Card Fail, Card Registration, MSP Switch, SFP Tx Fail, SFP Rx Fail, SFP Temperature
SDH/SONET Alarm	SDH	Line, HO-Path, LO-Path
	SONET	Line, STS-Path, VT-Path
	Multiplexing E1/T1	LOF, AIS, UAS, RAI/YEL
E1/T1 Alarm*		LOS, LOF, AIS, UAS, RAI/YEL

Alarm Queue: Contains up to 200 alarm records of latest alarm types, alarm severity, date and time.
Currently-Active Alarm Summary (CAAS)

Diagnostics Test

SDH/SONET		**E1/T1**	
Loopback:	Local loopback, Line loopback	Loopback:	Local loopback
		BERT:	To WAN direction/To Line direction, N*64K or Full, 2^11-1, 2^15-1, 2^20-1

Power

-48 Vdc Module:	-36 to -72 Vdc
Consumption:	Maximum 65 W

Physical and Environmental

Dimensions:	438 x 44 x 225.5mm (W x H x D)
Net Weight:	4.0 Kg
Temperature:	0 to -50°C (operational)
Humidity:	5-95% RH (non-condensing)
Mounting:	Desk-top stackable, 19"/23" Rack mountable

Standards Compliance

IEEE		**IETF**	
802.1d	STP and MAC Learning	RFC2236	IGMP Snooping v2
802.1p	Priority Code Point	RFC3411	SNMPv1, v3
802.1q	VLAN Tagging	RFC4553	SAToP
802.1s	MSTP	RFC4842	SONET/SDH CEP
802.1w	RSTP	RFC5086	CESoPSN
802.1ad	Q-in-Q		
802.1ag	Ethernet CFM	**ITU**	
802.3i	10 BaseT	G.703	E1/T1
802.3u	100 BaseT, 100 BaseFX	G.704	DS0
802.3x	Flow Control	G.823/G.824	Traffic and Synchronous Interface
802.3z	1000 BaseFX	PWE3	Pseudo Wire Emulation Edge-to-Edge
802.3ab	1000 BaseT	**MEF**	
802.3ab	Link Aggregation	8*	CESoETH
RoHS	Restriction of Hazardous Substances Directive		

Certifications

EMC/EMI:	EN55022 Class A*, EN55024*, FCC15*
Safety:	EN60950-1*

* Future Option

IP6763 Capacity Reference Table

SLOTS / Optical Card Modes		**Slot1**: optical card		**Slot2**: optical card		**Slot3**: 8*,16*or 32 E1/T1 card
		Port1	Port2	Por1	Port2	
STM-1/ OC3 mode	Scenario 1:	✓	✓	Empty	Empty	Empty
	Scenario 2:	Empty	Empty	✓	✓	Empty
	Scenario 3:	✓	✓	✓	✓	Empty
	Scenario 4:	**Reserved (See Note 1)**	✓	Empty	Empty	✓
	Scenario 5:	Empty	Empty	✓	✓	✓
	Scenario 6:	**Reserved (See Note 1)**	✓	✓	✓	✓
STM-4/ OC12 mode*	Scenario 7:	N/A	N/A	*Only for protection*	✓	Empty
	Scenario 8:	N/A	N/A	*Only for protection*	✓ **(See Note 2)**	✓

(***** Future Option)

Note1: Under STM-1 mode, the Slot 1 Port1 was reserved for the Slot 3 when the Slot 3 was inserted with the E1/T1 card.

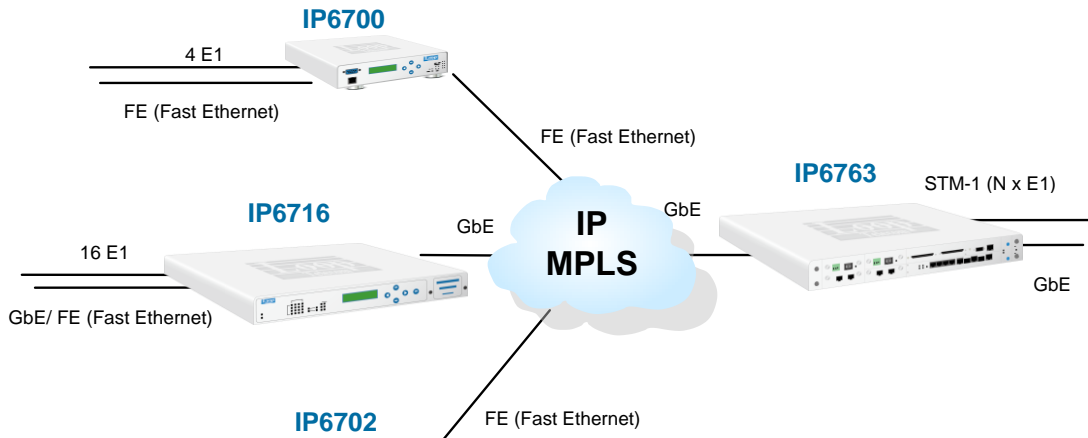**Note2:** Under STM-4 mode, the 4th VC4 will be reserved for the Slot 3 when the Slot 3 was inserted with the E1/T1 card.

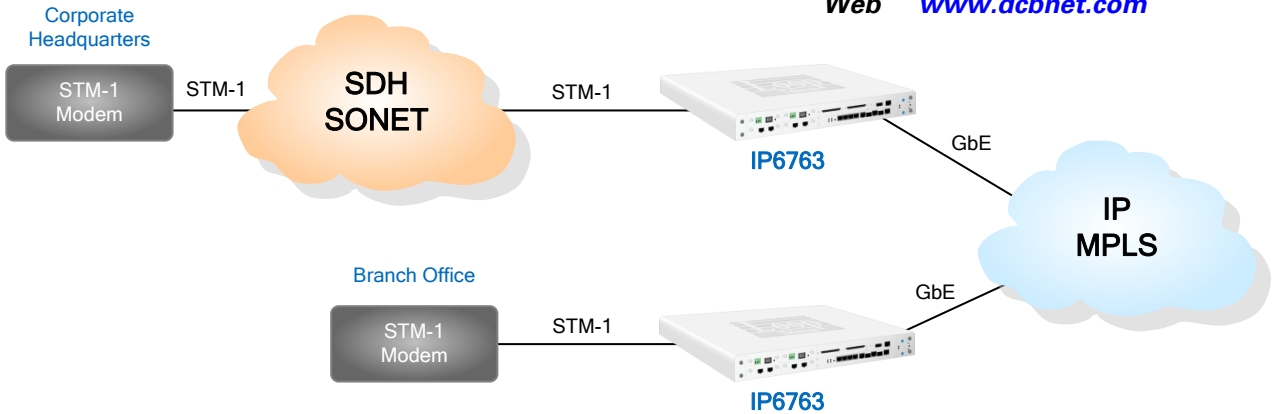# Panel View

2 DC Power Supplies   8/16/32 x E1/T1   DB9 Console port   Alarm I/O

Air Filter   2 x Dual STM-1/OC3 cards   ACO   4 x 10/100/1000 Base-T LAN Ports   2 x Combo GbE WAN Ports   Clock I/O   Fan
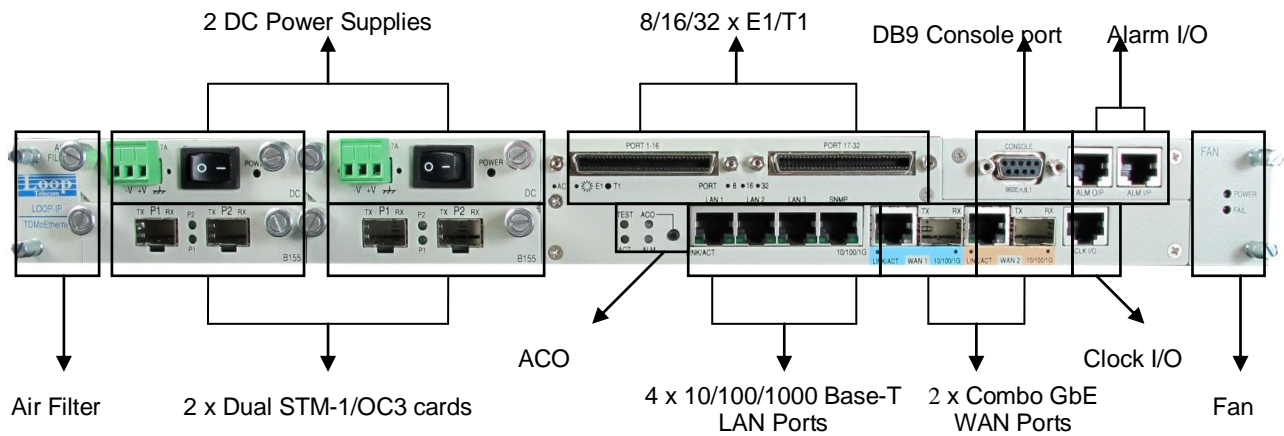
Application Illustrations

⮕ **Transport of E1/T1 & LAN through IP/MPLS**

IP6700

4 E1

FE (Fast Ethernet)

FE (Fast Ethernet)

IP6763   STM-1 (N x E1)

IP6716

GbE   **IP**
MPLS   GbE

16 E1

GbE/ FE (Fast Ethernet)   GbE

FE (Fast Ethernet)

IP6702

2 E1

⮕ **Exten**

Corporate
Headquarters

SDH
SONET

STM-1
Modem   STM-1   STM-1

IP6763   GbE

IP
MPLS

Branch Office

STM-1
Modem   STM-1   GbE

IP6763

Data Comm for Business, Inc.
2949 CR 1000 E
Dewey, IL 61840
Voice   8004DCBNET   (800.432.2638)
Fax   217.897.1331
Info   www.dcbnet.com/contact.html
Web   www.dcbnet.com