



# Loop-IP6704A TDMoEthernet



## Description

The **Loop-IP6704A TDMoEthernet** is an ideal solution for service providers to build their network and achieve a fast return on investment. Currently providers need to transport both TDM and Packet traffic. These can be achieved using the E1/T1\* and Gigabit Ethernet tributary ports of the IP6704A.

The Loop-IP6704A device allows operators to transport E1, T1\*, E&M, X.21, or RS232 data stream with timing information over PSN (Packet Switched Network) via Pseudowire Protocol – SAToP/CESoPSN/MEF8\*. Another IP6704A converts the received packet stream back to original E1, T1\*, E&M, X.21 or RS232 data stream with original timing information. This allows cost-effective migration from existing legacy TDM networks to existing PSN.

For transport of TDM signals, the Jitter and Wander adheres to G.823/G.824 Traffic Interface.

\* Future option

## Product Features

### Mechanical and Electrical

- 1U height, 1/2 19" rack width. ANSI shelf.
- Power module
  - Up to two DC plug-in modules or one AC fixed power module\*
- Temperature range from 0° to 55°C

### Ethernet Interface

- Four Ethernet ports for WAN port assignment
  - Two Gigabit Ethernet (GbE) with 2 SFP housing
  - Two 10/100/1000 BaseT Ethernet
- IEEE 802.3ad Ethernet Link Aggregation\*

### Timing

- Internal/Line
- Adaptive Clock Recovery for TDM Pseudowires
  - Jitter and Wander conforms to G.823/824 for Traffic Interface

### Management

- SNMPv1/v3\*
- DB-9 Console port with VT-100 menu
- Telnet and SSHv1\*/v2\*
- iNET GUI

### Tributary Interface

- Up to one E1/T1\* port or four\* E1/T1 ports.
- Up to two single port DTE modules:
  - X.21 or RS232/V.24 or V.35\* or EIA530\*
- Up to 2 voice modules:
  - Four ports E&M
  - Four ports FXS\*
  - Four ports FXO\*
  - Four ports Magneto\*
  - Supports Echo Cancellation\*

### OAM

- E1/T1 OAM
  - RFC-2495: LOS, LOF, LCV\*, RAI, AIS, FEBE\*, BES, DM\*, ES, SES, UAS and LOMF\*

### QoS

- Ingress Rate Limiting\* per Ethernet port with 64kbps/1Mbps/10Mbps granularity
- Ethernet Network Level:
  - 3-bit Priority Code Point – PCP field within 802.1P/802.1Q Ethernet frame – CoS
  - 4 priority queues per port
- IP Network Level:
  - 6-bit DiffServ Code Point -DSCP field – ToS
- Scheduling Algorithm
  - Strict Priority (SP)
  - Weighted Round Robin (WRR)

## L2 Switching

- VLAN
  - Maximum 4094 concurrent VLAN Groups
  - Support C-VLAN/S-VLAN tag adding and removing on Pseudowire
  - Support 802.1q Port-Based VLAN on Ethernet/SNMP Port
  - Support Q-in-Q
- Support 802.1d MAC Learning
- Support 803.3x Flow control\* on input ports
- Support 802.1D STP, 802.1w RSTP, 802.1s MSTP\*
- Support IGMP Snoopingv2 (RFC 2236)\*
- Jumbo frame up to 10k bytes
- IS-IS Packet transparency\*

## Pseudowires

- TDM Pseudowires
  - Up to 32 concurrent pseudowires\*
  - Pseudowire protocols
    - SAToP
    - CESoPSN
    - MEF-8 (CESoETH)\*
  - Packet Delay Variation Compensation Depth up to 256 ms

## Diagnostics

- E1/T1\* BERT & Loopback

\* 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	Note
Loop-IP6704A-S-PPM-aa-bb-cc-dd-pp1-pp2- <b>G</b>	IP6704A with G.823/G.824 traffic interface, Two Gigabit Ethernet (GbE) with SFP housing Two 10/100/1000 BaseT Ethernet, 1 SNMP port	<ul style="list-style-type: none"> <li>Where <b>aa</b>, <b>bb</b>, <b>cc</b>, <b>dd</b>, <b>add1</b>, <b>pp1</b> and <b>pp2</b> are manufacture options defined in tables below.</li> </ul>

■ Where **aa** is used to select **E1/T1 Interface**. If these modules are not required, leave this field blank.

aa =	Description	Notes
E75	E1 75 ohm with RJ48C connector	<ul style="list-style-type: none"> <li>RJ48 to BNC conversion cable for <b>E75</b> interface is not included. Please order conversion cable separately. Loop-ACC-CAB-RJ48M-28-2BNCF</li> </ul>
E120	E1 120 ohm with RJ48C connector	
T1*	T1 with RJ48C connector	

■ Where **bb** is used to select **E1/T1 Interface**. If these modules are not required, leave this field blank.

bb =	Description	Notes
E75*	E1 75 ohm with RJ48C connector	
E120*	E1 120 ohm with RJ48C connector	
T1*	T1 with RJ48C connector	

\* Future option

■ Where **cc** and **dd** are used to select **DTE, Voice, and E1/T1 Interfaces**. If these modules are not required, leave these fields blank.

cc, dd =	Description	Notes
X21	X.21 interface module with DB15 female connector	
RS232	RS232/V.24 interface module with DB25 female connector.	
QEMA-wr-m-Tn-x	Quad E&M voice module, adapter cable included for 4 RJ45 connectors.	<ul style="list-style-type: none"> <li>For <b>wr</b>, <b>m</b>, <b>n</b> and <b>x</b> option, please refer to the table below for detail information</li> </ul>
QFXSA-x*	Quad FXSA voice module	<ul style="list-style-type: none"> <li>For <b>x</b> option, please refer to the table below for detail information</li> </ul>
QFXSA-M-x*	Quad FXSA with metering pulse 16KHz voice module	
QFXSA-M12-x*	Quad FXSA with metering pulse 12KHz voice module	
QFXSA-GS-x*	Quad FXSA with ground start voice module	
QFXSA-GM-x*	Quad FXSA with ground start and metering pulse 16KHz voice module	
QFXOA-x*	Quad FXO voice module	
QFXOA-M-x*	Quad FXO with metering pulse 16KHz voice module	
QFXOA-M12-x*	Quad FXO with metering pulse 12KHz voice module	
QFXOA-GS-x*	Quad FXO with ground start voice module	
QFXOA-GM-x*	Quad FXO with ground start and metering pulse 16KHz voice module	
QMAGA-12- x*	Quad Magneto plug-in module w/ L1, L2	For <b>x</b> option, please refer to the table below for detail information
QMAGA-1G2- x*	Quad Magneto plug-in module w/ L1, L2, and L1. GND	
V35*	V.35 interface module with DB25 female connector	
E530*	EIA530 interface module with DB25 female connector	
T1*	1 port T1 module	
E75*	1 port E1 module (75 ohm)	
E120*	1 port E1 module (120 ohm)	
1C37*	1- channel C37.94 interface module	
TS*	Terminal Server module	
ECA *	Echo cancellation module	
1ODP*	1 OCU-DP interface module	
M4E75*	Mini Quad E1 Interface with 75 ohm	
M4E120*	Mini Quad E1 Interface with 120 ohm	

\* Future option

- Where **pp1** is used to select **power module**. Must select one power module from the list below.

pp1= SA*	Description	Notes
	100 to 240 Vac fixed power module. 50 to 60 Hz	<ul style="list-style-type: none"> <li>Order two DC power modules for redundancy.</li> <li>For AC, choose an appropriate power cord.</li> <li><b>pp2</b> option is not available if <b>SA</b> power module is selected in <b>pp1</b> option</li> </ul>
<b>ISD48</b>	Single -48Vdc power plug-in module (-42 to -56 Vdc)	

- Where **pp2** is used to select **redundant DC power module**. Leave the field blank if redundant DC power module is not required, or fixed **SA** power module is selected in **pp1** option.

pp2=	Description	Notes
<b>ISD48</b>	Single -48Vdc power plug-in module (-42 to -56 Vdc)	<ul style="list-style-type: none"> <li>Order two DC power modules for redundancy.</li> <li><b>pp2</b> option is not available if <b>SA</b> power module is selected in <b>pp1</b> option</li> </ul>

### **For QEMA module:**

- where **wr** is used to select E&M wire type (manufacture option):

wr	Description	Notes
<b>2w</b>	2 wire	
<b>4w</b>	4 wire	

- where **m** is used to select E&M signaling side (manufacture option):

m	Description	Notes
<b>B</b>	B (carrier side) connects to A side.	
<b>A</b>	A (exchange side) connects to B side. A side M lead to B side M lead, A side E lead to B side E lead.	

- where **n** is used to select E&M signaling type (manufacture option):

n	Description	Notes
<b>O</b>	For voice transmission only.	<ul style="list-style-type: none"> <li>Circuit type does not matter.</li> </ul>
<b>1</b>	Type I (original) E&M signaling circuit	<ul style="list-style-type: none"> <li>M lead provides discharge for the A side.</li> </ul>
<b>2</b>	Type II circuit. This design attempts to reduce ground noise by adding two leads: SB (signal to battery) and SG (signal to ground).	<ul style="list-style-type: none"> <li>Reduced ground noise. Ground current is eliminated at the cost of two more wires per circuit.</li> </ul>
<b>3</b>	Type III circuit. The SG lead serves as a discharge for the M lead. Reduces delay caused by combination of (a) low current electronic detectors, and (b) long runs of the E and M leads.	<ul style="list-style-type: none"> <li>Type III is area because ground currents on the E return would cause noise.</li> </ul>
<b>4</b>	Type IV circuit. Based on the type II circuit. This E&M circuit provides symmetry.	
<b>5</b>	Type V circuit. For applications where ground noise is not an issue. Based on the type II circuit.	

**For Voice modules (QEMA, QFXSA, QFXO):**

■ where **x** is used to select Voice module signaling bits (manufacture option). If this option is not required, omit the **x** field in the ordering code.






Module Type	x =	Description	Notes
QEMA	E	Follows ETSI signaling bits	<ul style="list-style-type: none"> <li>For <b>S</b> (customer's special bit assignment), please contact your nearest Loop sales representative.</li> </ul>
	A	Follows ANSI signaling bits	
	S	Follows customer's special bits assignment	
QFXSA	E	Follows ETSI signaling bits	
	A	Follows ANSI signaling bits	
	S	Follows customer's special bits assignment	
QFXO	E	Follows ETSI signaling bits	
	A	Follows ANSI signaling bits	
	S	Follows customer's special bits assignment	
	T	Trunk condition OFF-HOOK	
	AT	Follows ANSI signaling bits w/ trunk condition OFF-HOOK	
	ST	Follows customer's special bits assignment w/ trunk condition OFF-HOOK	

**For Magneto Card:**

■ Where **x** is used to select ring generator type:

x=	Description	Note
16	16 Hz ring generator	20 Hz is the general setting for all MAG cards. For special settings (16, 25, 50), please specify your need by filling in the <b>x</b> option.
20	20 Hz ring generator	
25	25 Hz ring generator	
50	50 Hz ring generator	

**Accessories****Power Cord** (All power cords are RoHS compliant)

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	

**Blank Panels**

30.002078.A00LF	Blank panel for empty DC power slot
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**Cable** (All Cables are RoHS compliant.)

Loop-ACC-CAB-DB25M-30-1M34F	DB25 Male to M34 Female Conversion cable for V.35 module. Length: 30 cm
Loop-ACC-CAB-RJ48M-28-2BNCF	RJ48C Male to two BNC Female Conversion cable for E1 75ohm module. Length: 28 cm
Loop-ACC-CAB-DB44M-100-2DB25F-1DB09F-TS	DB44 Male to two DB25 Female and one DB9 Female conversion cable for Terminal server module. Length: 100 cm
Loop-ACC-CAB-DB44M-30-4RJ48M	DB44 Male to four RJ48C Male Conversion cable for QEMA voice module. Length: 30 cm

**User's Manual**

Loop-IP6704A-UM	User's Manual (optional, paper printed copy). An electronic version of the manual on a CD is included with every order.
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**SFP Optical Modules**

Please place your order using the 5-digit alphanumeric codes listed in the separate SFP Optical Module Brochure.

**Ear Mounts**

19" ear mounts	A pair of 19" ear mounts is supplied as part of the standard package. For other sizes please contact your Loop sales representative.
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**Separate Power Module**

Loop-IP6704A-ISD48-G	Single -48Vdc power plug-in module (-42 to -56 Vdc)	<ul style="list-style-type: none"> <li>• Power modules are the same as shown in the Main Unit section above. Use this ordering code if you are ordering backup or additional power modules.</li> <li>• ISD48 power module can't work on IP6704A with fixed AC power module.</li> </ul>
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**Firmware Upgrade**

Loop-IP6704A-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.
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## Ordering Examples

**Example 1:**

Loop-IP6704A-S-PPM-X21-SA-G

IP6704A with G.823/G.824 traffic interface, Two Gigabit Ethernet (GbE) with SFP housing, Two 10/100/1000 BaseT Ethernet, one SNMP port, 1 x X.21 interface with DB15 female connector, 100 to 240 Vac fixed module.

**Example 2:**

Loop-IP6704A-S-PPM-E75-RS232-ISD48-ISD48-G

IP6704A with G.823/G.824 traffic interface, Two Gigabit Ethernet (GbE) with SFP housing, Two 10/100/1000 BaseT Etherne, one SNMP port, 1 x E1 75 ohm with RJ48C connector, 1 x RS232/V.24 with DB25 female connector, two -48Vdc power plug-in module (-42 to -56 Vdc).

## Loop-IP6704A Product Specification

### *E1 Tributary Interface Module*

Line Rate	2.048 Mbps ± 50 ppm
Line Code	HDB3 / AMI
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	RJ48C

### *T1 Tributary Interface Module\**

Line Rate	1.544 Mbps ± 32 ppm
Line Code	AMI / B8ZS
Framing	D4 / ESF/ ESF&T1.403/ OFF (clear channel)
Output Signal	DS1
Input Signal	DS1
Pulse Template	Per AT&T TR 62411
Connector	RJ48C

### *Ethernet Interface (on board)*

Number of Electrical Ports	2 ports with RJ45
Speed	10/100/1000 BaseT
Number of Optical Ports	2
Connector	SFP
Speed	100/1000-LX

### *Serial Tributary Interface*

Number of Ports: 0~2

Type1	DCE, V.35* or EIA530* or X.21	
Line Rate:	Sync mode: V.35*, EIA530* and X.21 N x 56 or 64 kbps, N = 1 to 32	
Interface/ Connector:	V.35*	DB25S
	EIA530*	DB25S
	X.21	DB15S

Type2                    DCE, RS232/V.24  
 Line Rate:                Sync mode: RS232: N x 56 or 64 kbps, N = 1 to 2

Interface/ Connector: RS232/V.24                DB25S

### *Management and Administration*

Management ports	Console RS232 port and and NMS RJ45 port
Remote login	SSHv1* and v2*, Telnet
SNMP	SNMP v1, v3*

### *Electrical*

DC Power Module	48 V (-42 to -56 Vdc)
AC Power Module*	100 to 240 Vac, 50 to 60 Hz
Power Consumption	< 15 W for 1U height

### *Physical and Environmental*

Dimensions(W x H x D)	213 mm x 41 mm x 290 mm (8.39" x 1.61" x 11.42")
Temperature	0°C to +55°C
Humidity	0% to 95% RH (non-condensing)
Mounting	Desktop stackable, rack mount, wall mount
Cooling	Built in fan unit

### *Standards Compliance*

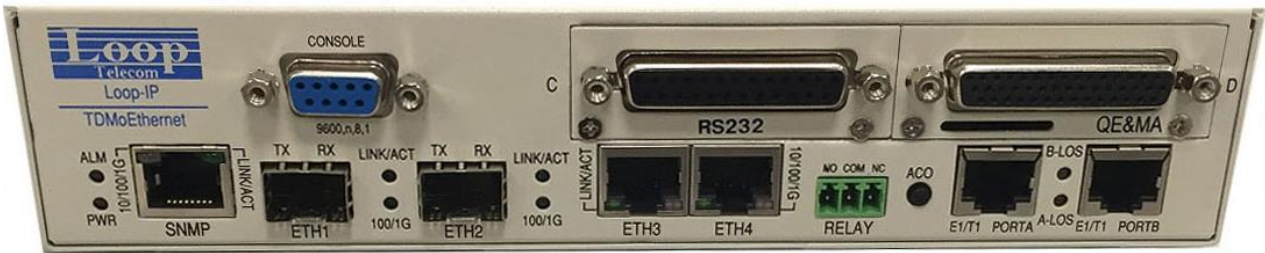
<b>IEEE</b>			<b>IETF</b>	
802.1d	MAC Table Learning and STP		RFC2236	IGMP Snooping v2*
802.1p	Priority Code Point			
802.1q	VLAN		RFC2495	E1/T1 OAM*
802.1s	MSTP*			
802.1w	RSTP			
802.1ad	Tag Stacking (Q-in-Q)		RFC 4553	SAToP
802.3ad	Link Aggregation*		RFC 5086	CESoPSN
			<b>ITU</b>	
<b>MEF</b>			G.823/G.824	Traffic Interface
8	CESoETH*			

*Certifications*

EMC EN55022 Class A, EN50024, FCC Part 15 Subpart B Class A  
 Safety EN60950-1(CE)

\* Future option

**Panel Views**



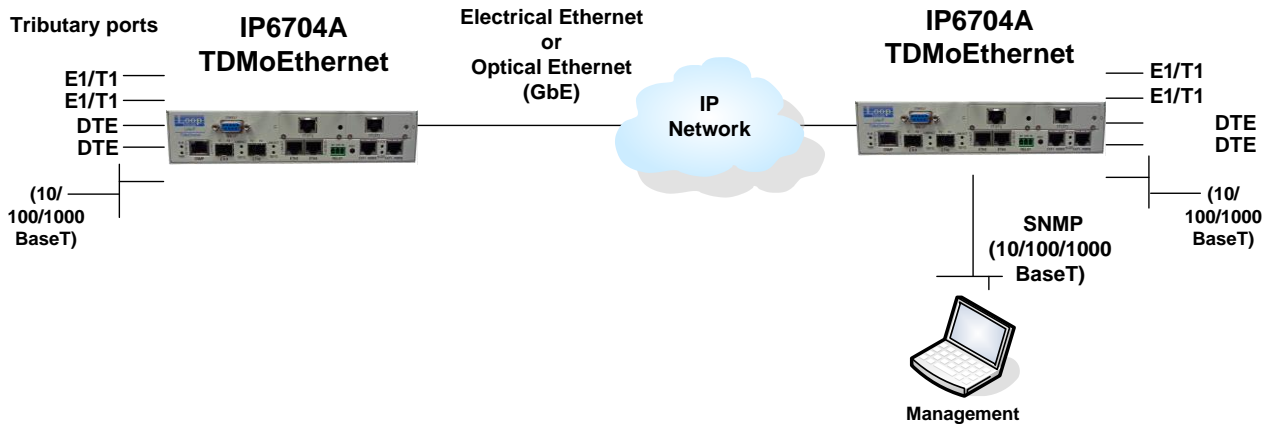
**Front Panel View with 2 X E1/T1, 1 x RS232, 1 x QE&MA Tributary**



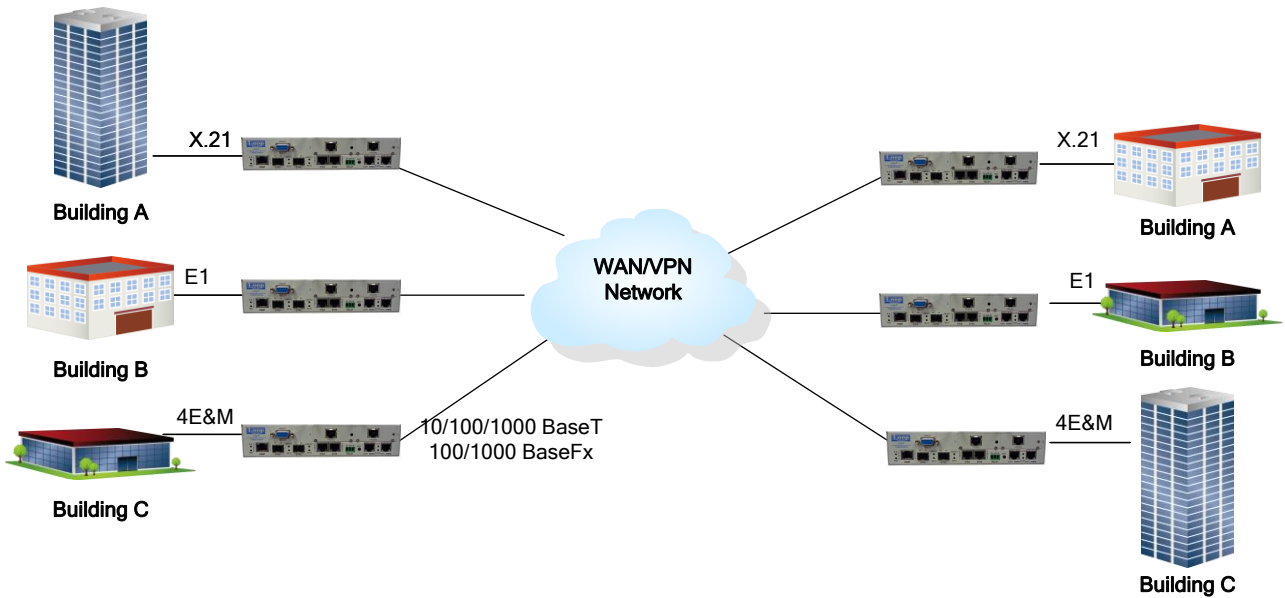
**Rear Panel View with DC plug-in Power modules**



## Application Illustrations



**IP6704A Point-to-Point Application.**



**IP6704A on VPN Network**



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