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/FE1,T1/FT1 and Gigabit Ethernet tributary ports of the IP6704A.

The Loop-IP6704A device allows operators to transport E1/FE1, T1/FT1, E&M, X.21, RS232, V.35, EIA530, QFXSA or QFXO, G.703, C37.94 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/FE1, T1/FT1, E&M, X.21, RS232, V.35, EIA530, QFXSA or QFXO , G.703, C37.94 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.

Product Features

Mechanical and Electrical
– 1U height,1/2 19" rack width. ANSI shelf.
– Power module
  ▪ Up to two DC plug-in modules or Hybrid 100 to 240 Vac and -48 Vdc (-36 to -72 Vdc) coexist fixed power supply or Single 125Vdc power plug-in module*
– Temperature range from 0° to 55°C

Ethernet Interface
• Four Ethernet ports for WAN or LAN port by software configuration
  • 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
– SyncE

Management
– SNMPv1/v3
– DB-9 Console port with VT-100 menu
– Telnet and SSH v2

Tributary Interface
- Up to four T1 ports or four E1 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)

– iNET GUI

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 16 concurrent pseudowires
  ▪ 1 E1/T1 can support up to 16 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-opt 1-**G**	IP6704A with G.823/G.824 traffic interface, Two Gigabit Ethernet (GbE) with SFP housing Two 10/100/1000 BaseT Ethernet, 1 SNMP port	• Where **aa, bb, cc, dd, add1, pp1, pp2** and **opt1** are manufacture options defined in tables below.

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

aa =	Description	Notes
E75	E1 75 ohm with RJ48C connector	• RJ48 to BNC conversion cable for **E75** interface is not included. Please order conversion cable separately. Loop-ACC-CAB-RJ48M-28-2BNCF
E120	E1 120 ohm with RJ48C connector	
T1	T1 with RJ48C connector	

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

bb =	Description	Notes
E75	E1 75 ohm with RJ48C connector	RJ48 to BNC conversion cable for **E75** interface is not included. Please order conversion cable separately. Loop-ACC-CAB-RJ48M-28-2BNCF
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** on manufacturing option daughter board . 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-**T**n-x**	Quad E&M voice module, adapter cable included for 4 RJ45 connectors.	• For **wr**, **m**, **n** and **x** option, please refer to the table below for detail information
QFXSA-**x**	Quad FXSA voice module	
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	
QFXO-**x**	Quad FXO voice module	• For **x** option, please refer to the table below for detail information
QFXO-M-**x**	Quad FXO with metering pulse 16KHz voice module	
QFXO-M12-**x**	Quad FXO with metering pulse 12KHz voice module	
QFXO-GS-**x**	Quad FXO with ground start voice module	
QFXO-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 **x** 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 with BNC connector)	
E120	1 port E1 module (120 ohm with RJ48 connector)	
M1C37-**LSFOM**	1- channel C37.94 interface module	
TS*	Terminal Server module	
ECA *	Echo cancellation module	
1ODP*	1 OCU-DP interface module	

cc, dd =	Description	Notes
M4E75*	Mini Quad E1 Interface with 75 ohm	
M4E120*	Mini Quad E1 Interface with 120 ohm	
CD	1-channel G.703 Interface at 64 Kbps data rate	

* Future option

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

pp1=	Description	Notes
P9	Hybrid 100 to 240 Vac and -48 Vdc (-36 to -72 Vdc) coexist fixed power supply	● Order two DC power modules for redundancy.
ISD48	Single -48Vdc power plug-in module (-42 to -56 Vdc)	● For AC, choose an appropriate power cord. ● **pp2** option is not available if **P9** power module is selected in **pp1**
SD125*	Single 125Vdc power plug-in module	● option

■ 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
ISD48	Single -48Vdc power plug-in module (-42 to -56 Vdc)	● Order two DC power modules for redundancy. ● **pp2** option is not available if **P9** power module is selected in **pp1** option

■ Where opt1 is used to select **Synchronous Ethernet(SyncE)**. Leave the field blank if SyncE is not required

opt1=	Description	Notes
SyncE	Support Synchronous Ethernet	

■ Special order information for distributors. Where daughter card is used to select **DTE, Voice, and E1/T1 Interfaces.** Distributors can open the case and change the daughter card by themselves.

	Description	Notes
IP6704A-X21-**G**	X.21 interface module with DB15 female connector with 4 screws and panel.	
IP6704A-RS232-**G**	RS232/V.24 interface module with DB25 female connector. with 4 screws and panel.	
IP6704A-QEMA-**wr-m**-T**n**-**x**-**G**	Quad E&M voice module, adapter cable included for 4 RJ45 connectors. with 4 screws and panel.	● For **wr**, **m**, **n** and **x** option, please refer to the table below for detail information
IP6704A-QFXSA-**x**-**G**	Quad FXSA voice module. with 4 screws and panel.	
IP6704A-QFXSA-M-**x**-**G**	Quad FXSA with metering pulse 16KHz voice module with 4 screws and panel.	
IP6704A-QFXSA-M12-**x**-**G**	Quad FXSA with metering pulse 12KHz voice module with 4 screws and panel.	
IP6704A-QFXSA-GS-**x**-**G**	Quad FXSA with ground start voice module with 4 screws and panel.	● For **x** option, please refer to the table below for detail information
IP6704A-QFXSA-GM-**x**-**G**	Quad FXSA with ground start and metering pulse 16KHz voice module with 4 screws and panel.	
IP6704A-QFXO-**x**-**G**	Quad FXO voice module with 4 screws and panel.	
IP6704A-QFXO-M-**x**-**G**	Quad FXO with metering pulse 16KHz voice module	

	Description	Notes
	with 4 screws and panel.	
IP6704A-QFXO-M12-**x**-**G**	Quad FXO with metering pulse 12KHz voice module with 4 screws and panel.	
IP6704A-QFXO-GS-**x**-**G**	Quad FXO with ground start voice module with 4 screws and panel.	
IP6704A-QFXO-GM-**x**-**G**	Quad FXO with ground start and metering pulse 16KHz voice module with 4 screws and panel.	
IP6704A-QMAGA-12- **x**-**G** *	Quad Magneto plug-in module w/ L1, L2 with 4 screws and panel.	For **x** option, please refer to the table below for detail information
IP6704A-QMAGA-1G2-**x**-**G** *	Quad Magneto plug-in module w/ L1, L2, and L1. GND with 4 screws and panel.	
IP6704A-V35-**G**	V.35 interface module with DB25 female connector with 4 screws and panel.	
IP6704A-E530-**G**	EIA530 interface module with DB25 female connector with 4 screws and panel.	
IP6704A-T1-**G**	1 port T1 module with 4 screws and panel.	
IP6704A-E75-**G**	1 port E1 module (75 ohm with BNC connector) with 4 screws and panel.	
IP6704A-E120-**G**	1 port E1 module (120 ohm with RJ48 connector) with 4 screws and panel.	
IP6704A-M1C37-**LSFOM**-**G**	1- channel C37.94 interface module with 4 screws and panel.	For LSFOM option, please refer to the table below for detail information
IP6704A-TS-**G** *	Terminal Server module with 4 screws and panel.	
IP6704A-ECA-**G** *	Echo cancellation module with 4 screws and panel.	
IP6704A-1ODP-**G** *	1 OCU-DP interface module with 4 screws and panel.	
IP6704A-M4E75-**G** *	Mini Quad E1 Interface with 75 ohm with 4 screws and panel.	
IP6704A-M4E120-**G** *	Mini Quad E1 Interface with 120 ohm with 4 screws and panel.	
IP6704A-CD-**G**	1-channel G.703 Interface at 64 Kbps data rate with 4 screws and panel.	

For QEMA module:

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

wr	Description	Notes
2w	2 wire	
4w	4 wire	

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

m	Description	Notes
B	B (carrier side) connects to A side.	
A	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
O	For voice transmission only.	• Circuit type does not matter.
1	Type I (original) E&M signaling circuit	• M lead provides discharge for the A side.
2	Type II circuit. This design attempts to reduce ground noise by adding two leads: SB (signal to battery) and SG (signal to ground).	• Reduced ground noise. Ground current is eliminated at the cost of two more wires per circuit.
3	Type III circuit. The SG lead serves as a discharge for the M lead. Reduces delay caused by combination of (a) low current	• Type III is area because ground currents on the E return would cause

4	Type IV circuit. Based on the type II circuit. This E&M circuit provides symmetry.	
5	Type V circuit. For applications where ground noise is not an issue. Based on the type II circuit.	

(continued from above: electronic detectors, and (b) long runs of the E and M leads. — noise.)

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	
	A	Follows ANSI signaling bits	
	S	Follows customer's special bits assignment	
QFXSA	**E**	Follows ETSI signaling bits	
	A	Follows ANSI signaling bits	• For **S** (customer's special bit assignment), please contact your nearest Loop sales representative.
QFXO	**S**	Follows customer's special bits assignment	
	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 **x** option.
20	20 Hz ring generator	
25	25 Hz ring generator	
50	50 Hz ring generator	

For mini LS Optical module (mini C37.94):
■ Where **LSFOM** is to select **LS**-**F**iber **O**ptical **M**odule option, each module has 5 letters.

LSFOM Code	Description										Notes
	Mode		Data Rate		Wave Length		Distance		Connector		
	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	
ZHHTT	Z	Multi-mode	H	155 M	H	820nm	T	2km	T	ST connector	1 * 8 Separate transceiver & receiver
QHATT	Q	Multi-mode	H	155 M	A	850nm	T	2km	T	ST connector	1 * 9
NFB3T	N	Single mode	F	125 M	B	1310nm	3	30km	T	ST connector	
QFBTT	Q	Multi-mode	F	125 M	B	1310nm	T	2km	T	ST connector	
NHC2S	N	Single mode	H	155 M	C	1550nm	2	20km	S	SC connector	

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	

Tray	
81.TRAY19.0000G	19" Tray for rack mount (One tray for two base units)
Blank Panels	
30.002078.A00LF	Blank panel for empty DC power slot

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-60-4RJ48M	DSUB-44pin/Male to RJ48 Male (8P8C) Plug * 4 extension cable for QEMA module. Length: 60 cm
Loop-ACC-CAB-DB25M-100-8BNCM*	DB25/Male to eight BNC/Male cable; Length: 100 cm For Mini Quad E1 Interface with 75 ohm
Loop-ACC-CAB-DB25M-100-8BNCF*	DB25/Male to eight BNC/Female cable; Length: 100 cm For Mini Quad E1 Interface with 75 ohm
Loop-ACC-CAB-DB25M-100-4RJ48M*	DB25/Male to four RJ48C/Male (8P8C Plug) cable; Length: 100 cm Mini Quad E1 Interface with 120 ohm
Loop-ACC-CAB-DB25M-300-8BNCM*	DB25/Male to eight BNC/Male cable; Length: 300 cm For Mini Quad E1 Interface with 75 ohm
Loop-ACC-CAB-DB25M-300-8BNCF*	DB25/Male to eight BNC/Female cable; Length: 300 cm For Mini Quad E1 Interface with 75 ohm
Loop-ACC-CAB-DB25M-300-4RJ48M*	DB25/Male to four RJ48C/Male (8P8C Plug) cable; Length: 300 cm Mini Quad E1 Interface with 120 ohm

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.	
SFP Optical Modules		
Please place your order using the 5-digit alphanumeric codes listed in the separate SFP Optical Module Brochure. **Note:** Non-Loop SFP modules are not guaranteed to work with our equipments. It is strongly recommended to buy Loop-logo SFP modules.		
Separate Power Module		
Loop-IP6704A-ISD48-G	Single -48Vdc power plug-in module (-42 to -56 Vdc)	• 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. • ISD48 power module can't work on IP6704A with fixed P9 power module.
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.	

Ordering Examples

Example 1:
Loop-IP6704A-S-PPM-X21-P9-**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, Hybrid 100 to 240 Vac and -48 Vdc (-36 to -72 Vdc) coexist fixed power supply

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   SSH v2, Telnet
SNMP   SNMP v1, v3
Support RADIUS checking login.

Electrical
ISD48 Power Module   48 V (-42 to -56 Vdc)
P9 Power Module   Hybrid 100 to 240 Vac and -48 Vdc (-36 to -72 Vdc) coexist fixed power supply
SD125 Power Module*   Single 125Vdc power plug-in module
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   It is fanless unit

Standards Compliance

| IEEE		IETF	
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
		ITU	
MEF		G.823/G.824	Traffic Interface
8	CESoETH		

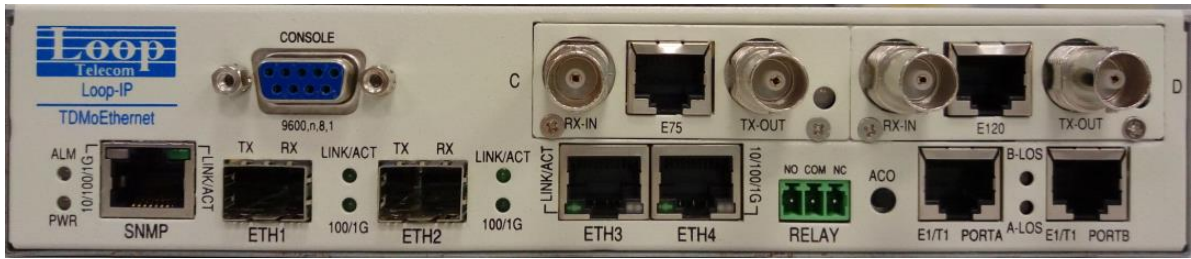*Certifications*
EMC   EN55022 Class A, EN50024,   FCC Part 15 Subpart B Class A,
Safety   EN60950-1(CE), IEC 61850-3* only Compliance on power module ISD48 -48Vdc.
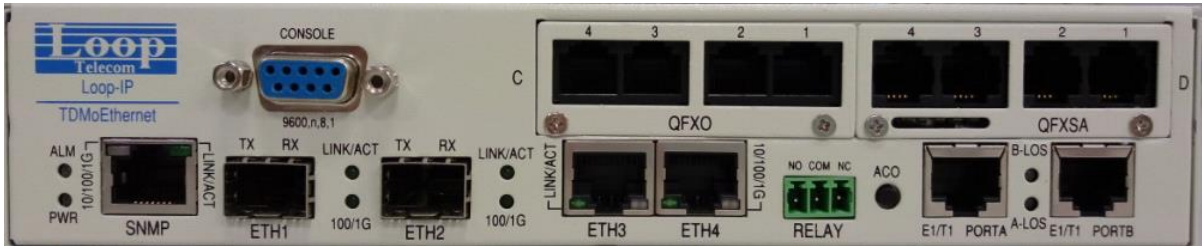
* Future option

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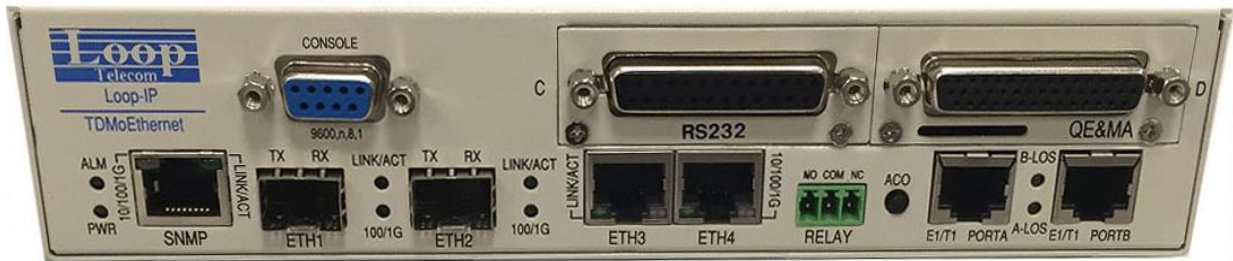
Front Panel View with 2 X E1/T1, 1 x RS232, 1 x QE&MA Tributary

Front Panel View with 2 X E1/T1, 2 FE1 Tributary

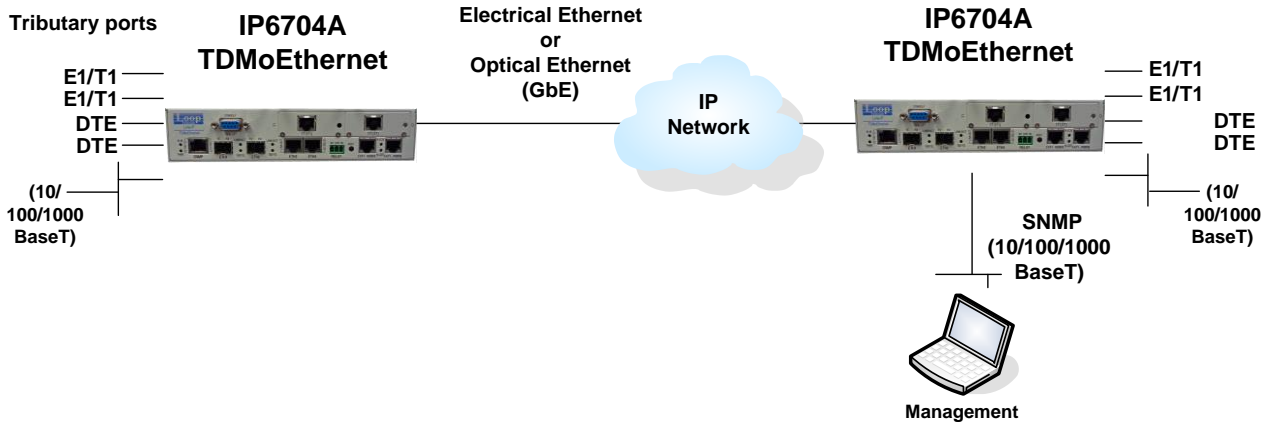**Front Panel View with QFXO & QFXSA Tributary**

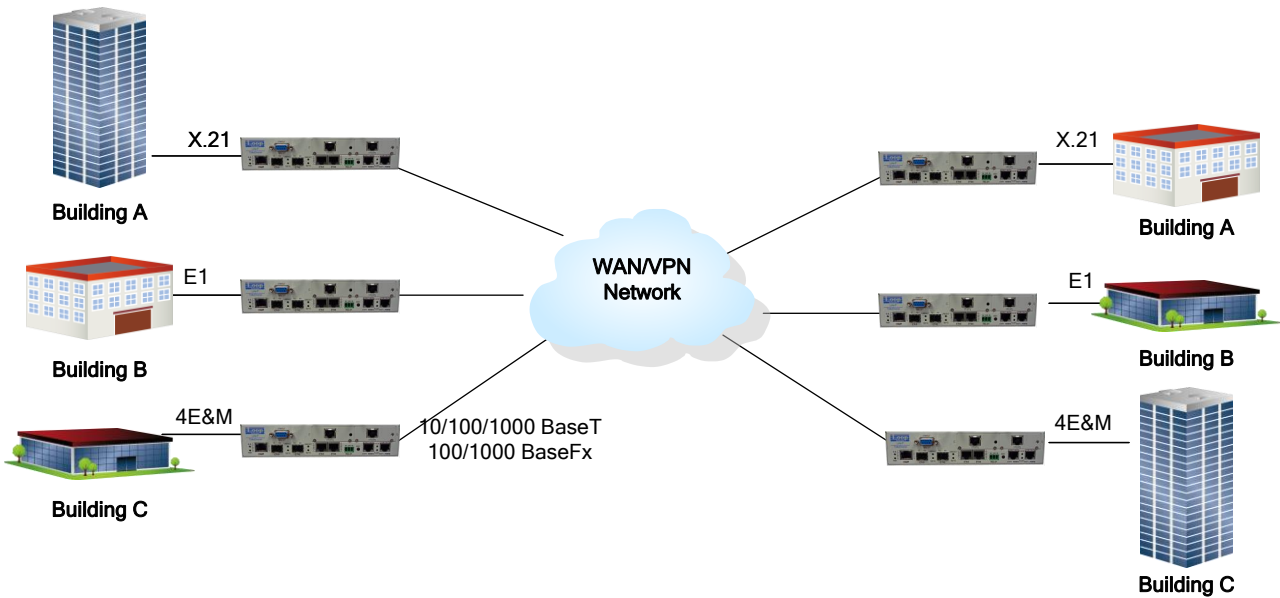**Rear Panel View with DC plug-in Power modules**

Rear Panel View with P9 Power

Application Illustrations

IP6704A Point-to-Point Application.

IP6704A on VPN Network

Data Comm for Business, Inc.
2949 CR 1000 E
Dewey, IL 61840
Voice   8004DCBNET   (800.432.2638)
Fax   217.897.8023
Info   www.dcbnet.com/contact.html
Web   www.dcbnet.com