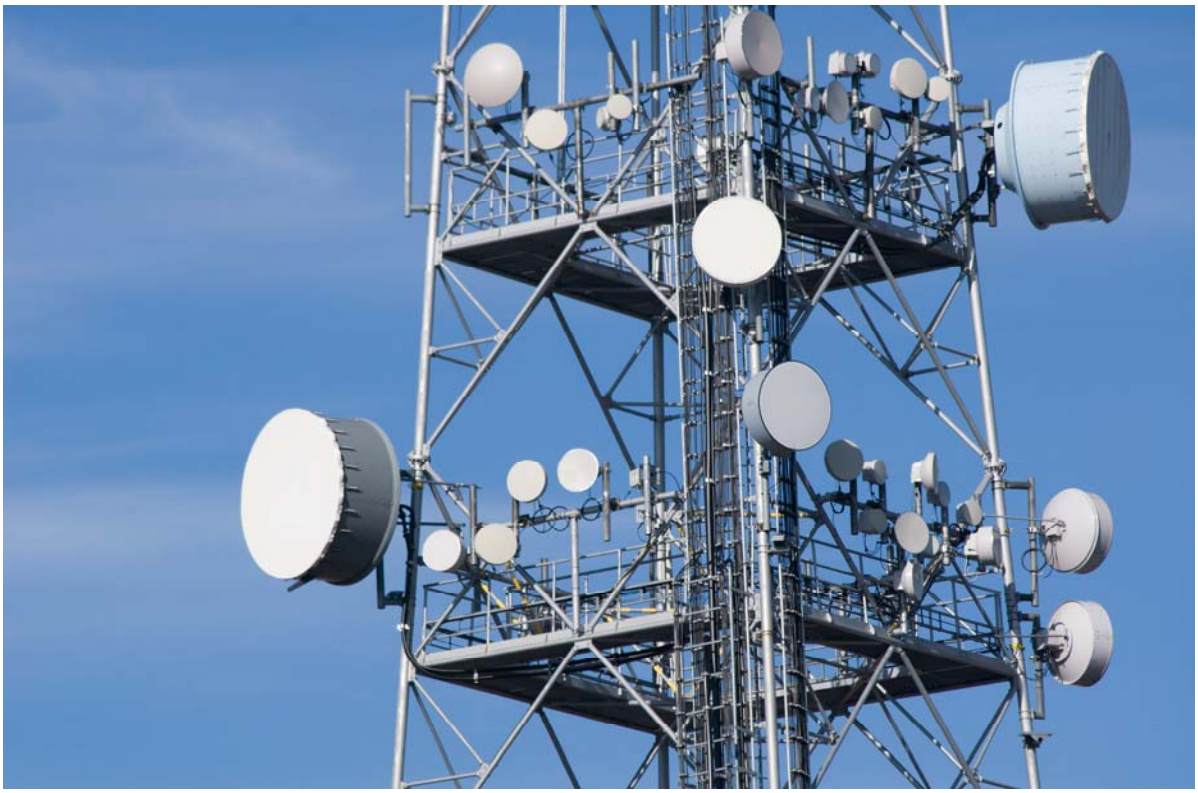
Loop Telecom
Access solutions to support Mission Critical Communications over MicroWaves or Fiber links



- *TDM/PDH Multiservice access for analog, voice, sync/async data, SCADA*
- *PMR, Trunked Radio, GSM-R, 2G/LTE, Conference communication,*
- *IP/Ethernet SCADA, critical...with ultra-stable bandwidth, low latency...*
- *Teleprotection for power distribution*

Transport of Multiservice and Ethernet services over fiber and Radios as:

- *SDH/SONET*
- *TDMoE or TDM PseudoWire Emulation transport over IP/Ethernet*
- *10GE/GE PTN with MPLS-TP or Carrier Ethernet*
- *CWDM fibers*

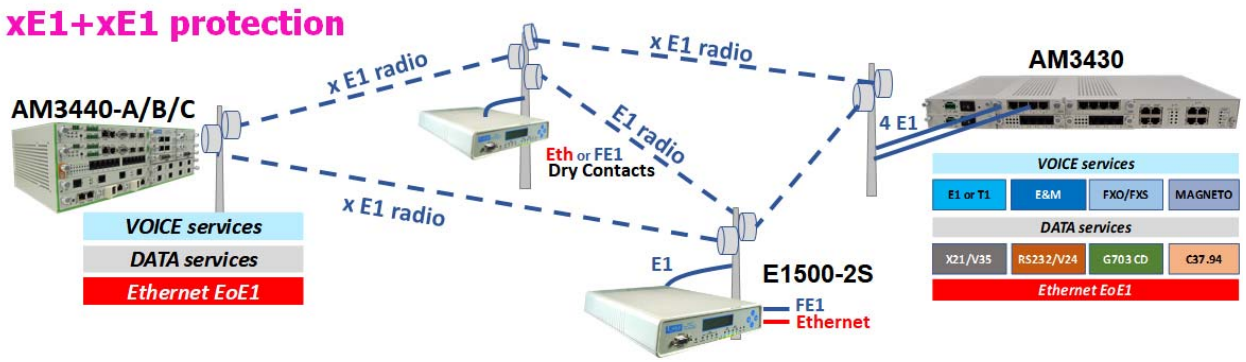
...with Intelligent NMS and EMS systems

Loop Telecom produces Multiservice Access and multiples interfaces grooming over Microwave links or network infrastructures. Our multiplexer, DACS, converters can be connected to Microwaves Radio by E1, T1, E3, DS3 or STM1-4 /OC3-12 and provide link and ring protections over Microwaves or Fiber...

Loop Telecom actively supplies such Mission Critical Communications to target the following markets:

- ***Military and National infrastructures,***
- ***Transportation including: Air traffic Control, Railway/LRT/MRT and ITS,***
- ***Power Companies,***
- ***Oil and Gas Companies,***
- ***Telco for Utilities or Industries ...***

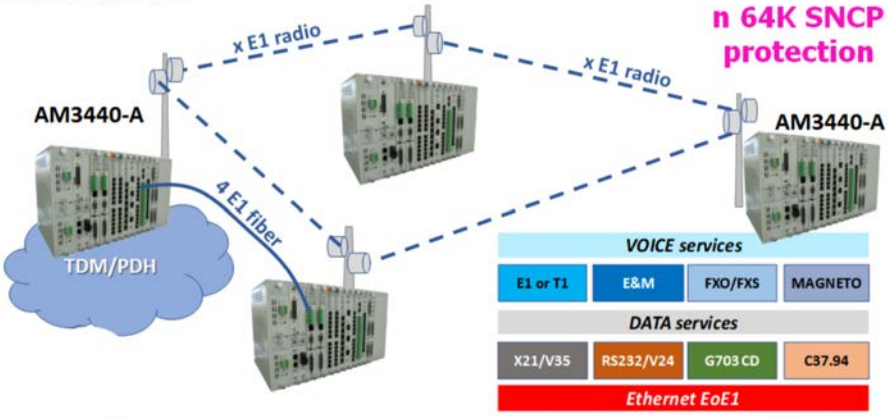
TDM Multiservice and Ethernet Critical Communications over n E1 PDH Radio



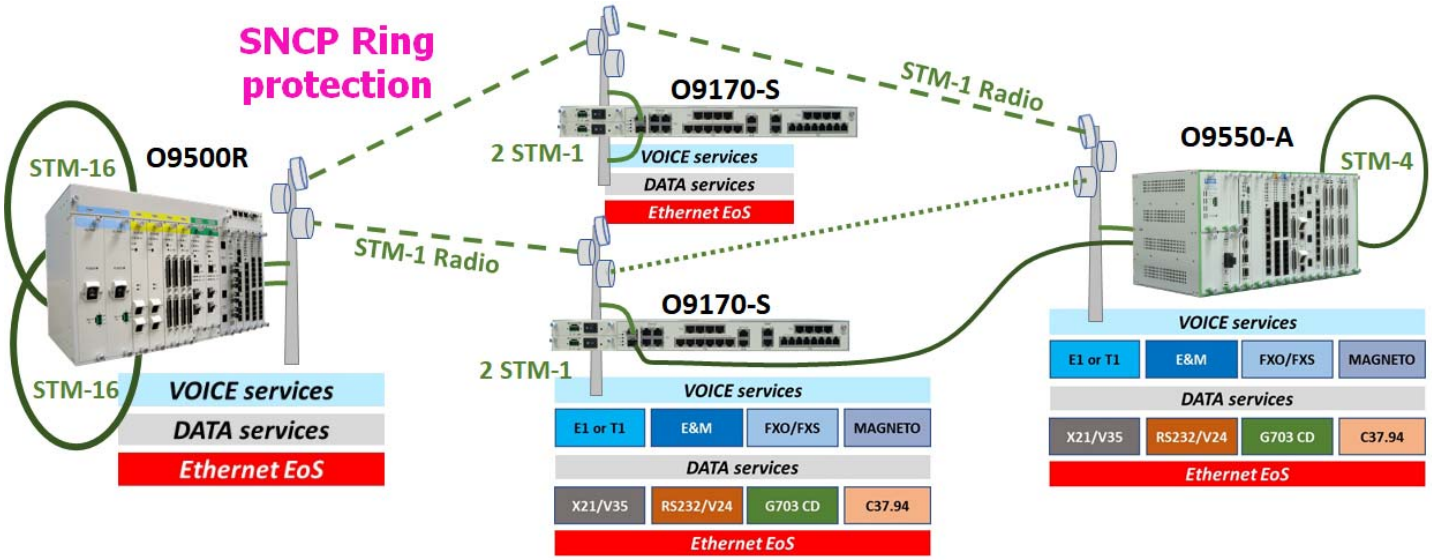
Multiservice Critical Communications over PDH Radio network with n 64K SNCP protection

The **AM3440** Multiservice DACS cross-connect supports the access and the multiplexing of analog, serial, Ethernet interfaces in TDM (PDH) n x 64Kbps (DS0) circuits to transport in E1 over Microwave Radio or fiber for:

Voice Services with E1-CAS, FXS, FXO, PLAR, Conference, Magneto and VoIP interfaces,
Trunked Radio or PMR or TETRA which are using E1 links or IP radio in EoPDH or EoS,
Analog Services E&M or conference interfaces for analog RTUs, Vxx modem, SCADA,
Serial Synchronous/Asynchronous services are RS232, RS485, RS422, X21, V35, IEA530, G703 64kbps co/contra -directional from 300bps to 2Mbps rates.
Teleprotection C37.94 and Digital Tripping Lines, **Dry Contact** and **Ethernet** interfaces
The AM3440 is secured by redundant CPU, cross-connect matrix, power supply, WAN cards and SNCP DS0 64Kbps protection with recovery time < 50ms.



Multiservice and Ethernet Critical Communications over SDH Radio with SNCP protection



Loop Telecom produces Multiservice Access and multiple interface grooming multiplexer over IP or Ethernet Microwaves links or permit to build mix wireless/fiber network infrastructures.
Our TDM PseudoWire Gateways and MPLS-TP systems can provide:

- ***Voice and DS0 services over Microwaves Packet links,***
- ***Multiservice TDM PseudoWire protected Network over existing IP/Ethernet Microwaves network,***
- ***Build MPLS-TP Network with Multiservice and GE services over Microwaves and 10GE optical links.***

PBX, PMR... Voice and serial data transmissions over Wireless

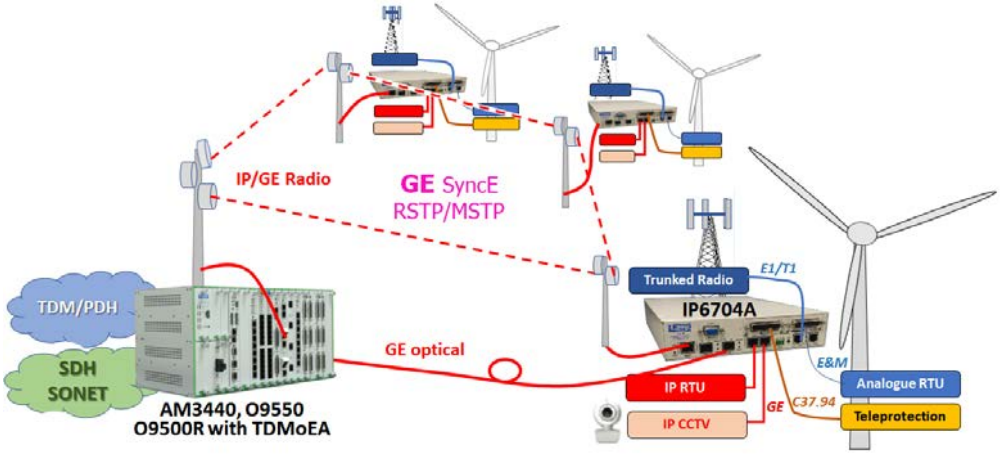
Transport of Multiservice Voice/Data/SCADA/Teleprotection over IP/Ethernet Radio

The TDM Multiservice circuits are transported over IP/Ethernet Radio in TDM PseudoWire Emulation End to End (PWE3) over Ethernet Layer2 RSTP/MSTP network with IP services.

IP6704A is a Multiservice access multiplexer, it supports E1/T1, E&M, FXS, FXO, Magneto voice, serial data n 64K/2Mbps, G703 64k, C37.94...links. This Gateway supports 16 PW.

TDMoEA is a card for AM3440 DACS, O9550 and O9500 hybrid DACS+SDH. This Gateway with a 4 E1 backplane supports 64 PW for all TDM services.

Both include 4 FE/GE Layer2 switch with support of RSTP/MSTP protection, Q-in-Q, OoS, CoS with dynamic bandwidth control for PW and LAN over IP/Ethernet Microwaves radios.

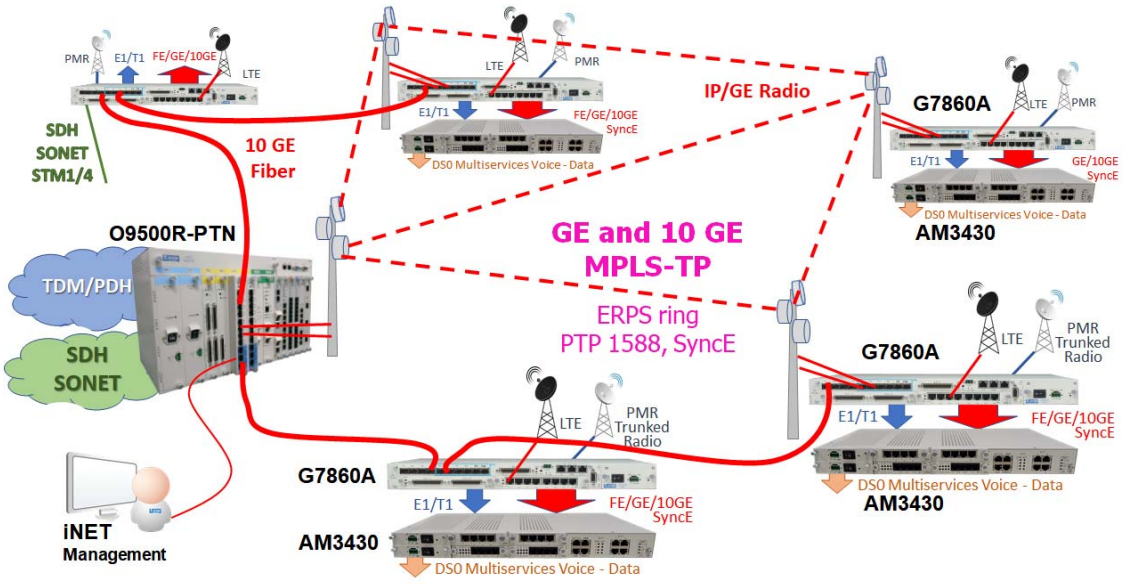


Build a MPLS-TP Network for Multiservice Voice/Data/SCADA and high volume of packets

Loop Telecom produces GE/10GE PTN equipment with MPLS-TP for transport of TDM PW Multiservice together with large Ethernet services over LSP and VLSP with ERPS protection, OAM and bandwidth control instead of SDH and working over **Gigabit SyncE MicroWaves Radio**.

G7860A PTN MPLS-TP/CE switch supports multiple GE/10GE G.8032 ring and is gateway up to 20 GE, 80 E1/T1, 4 STM-1/OC-3 in PW/LSP.

O9400R-PTN SDH or **O9500R-PTN** Multiservice PDH + SDH multiservice equipped with PTN 10G switch card run MPLS-TP protocols transport over 6 GE/10GE and support E1, T1, DS0 interfaces, STM-x/OC-x, IP circuits In PW, simultaneously with TDM/PDH, SDH networks.



Thanks to GE/10GE SyncE WAN and PTP 1588v2 slave these MPLS-TP devices support time/frequency synchronization and multiservice with connection to AM34x0 DS0 DACS to deploy sensitive and low latency Voice/Data/Ethernet for GSM-R, RTUs, SCADA, Teleprotection together with high rate Ethernet services.

MPLS-TP Layer2 network has static deployment simply as SDH circuits with multiple LSP, PW, PTN protections and full OAM. GE/10GE interfaces support Layer 3 Routing feature*.

Theses equipment provide the MPLS-TP network deployment over mix MW and fiber links for MAN and long distances infrastructures.

Multiservice TDM/PDH DACS

Models	E1500-2S	AM3430	AM3440-A/B/C/D	O9550R-A/C/D	V4150
Multiplexer	CSU/DSU	Multiservice: Voice - Data - Teleprotection - Ethernet DS0/n.64Kbps			-
	DS0 DCS	TDM/PDH - DS0 Cross-connect DCS - Non blocking			
SDH/SONET	-			SDH/SONET ADM/TM	SDH/SONET
TDMoE PWE3	-		With TDMoEA card		-
Aggregate Inf.	1 E1	4 E1/FE1 copper/fiber	Any E1/T1 copper/fiber	4 STM1/4, any E1 or T1	Any E1, T1, STM/OC
PDH protection	-	1+1, SNCP 64K	1+1, SNCP-64K	1+1, SNCP-64K	E1/T1 1+1
SDH protection	-			SNCP & MSP 1+1	SNCP & MSP 1+1
Tributaries slots		4	A= 16, B=7, C=9, D=9	A= 16, C=9, D=9	8 slots
FE1/FT1	0, 1 or 2 E1	4 E1/FE1	A= 64E1/T1, B= 28E1/T1, C=36E1/T1, E1/FE1/CAS		504 E1/T1
Voice	-	E&M 2w/4w, FXO, FXS, E1-CAS, Magneto*, Conferences* , VoIP*, Echo Cancel			-
Serial sync	-	V35, X21*	X21, V35, V36, IEA530, n 64Kbps to 2Mbps		-
RS232/RS485	-	RS232/RS485	RS232/RS485/RS422 sync, async		-
Teleprotection	-	Fiber C37.94	Fiber C37.94, TTA card : Teleprotection Tripping lines		-
Others	Dry contact, G703	G703 64K co-dir	G703 64K co-directional, Dry contact , G.SHDSL 2w/ 4w		-
ETHERNET EoPDH	Bridge/Router	Bridge	Bridge - Router		-

SDH/SONET/Hybrid and PTN with MPLS-TP transport

System	O9150	O9170	O9400R	O9500R	IP6750	G7860A
SDH	SDH	SDH	SDH/SONET	SDH/SONET	-	SDH/SONET
Multiservice n 64K	-	TDM/PDH	-	TDM/PDH	-	-
MPLS-TP	-	-	PTN MPLS/CE with card	PTN MPLS/CE with card	PTN CE	PTN MPLS/CE
Chassis	Fixed 1U	Fixed 1U	Modular 6U	Modular 6U	Modular 1U	Modular 1U
Aggregate	2 STM1	2 STM1	4 STM1/4/16 - 4 OC3/12/48 6 x 10GE MPLS/CE for PTN version		2 GE	6 x 10GE PTN
SDH protection	MSP, SNCP	MSP, SNCP	MSP, SNCP, MESH SNCP, MS-SPRING*		-	Access MSP
CE/MPLS-TP	-	-	6 x 10GE, 16 GE		2 GE SFP,8 GE,Cb	6 x 10GE, 20 GE
EoSDH	4 FE , GE*	4 FE, GE*	4 GE + 4 GX SFP per card		-	No
Maximum E1/T1	16 E1	8 E1	504 E1/T1,E3/T3	252 E1/T1, E3/T3	16 E1/T1	80 E1/T1
PDH services		E1, FE1, G703 CD		E1/FE1, T1, G703 CD		
Voice, Serial,	-	FXS, FXO, E&M, RS232,RS485	-	idem AM3440	-	-

TDM PseudoWire Emulation End to End Gateway and Switch

Models	IP6702A	IP6704A	IP6750	IP6763	TDMoEA card AM3440/O9550	TDMoG card O9400R
System	PseudoWire Gateway standalone 1U				Card for DACS PDH	Card for SDH
PseudoWire Emulation (PWE3)	SAT unframed, CESoPSN framed,MEF 8 (CESoEth)*					
				CEP SDH		CEP SDH
Number of PW	16	16	64	512	64	512
Emulation of services	E1/FE1, T1/FT1, serial	E1/FE1,T1/ FT1,serial,voice	E1/FE1, T1/FT1	E1/FE1,T1/FT1,VC12/3/4	E1/FE1,T1/FT1,serial,voice	E1/FE1,T1/FT1,VC12/3/4
Clock recovery	ACR for 4 remotes	ACR for 4 remotes	ACR for 64 rem.	ACR for 32 rem.	ACR for 16 rem.	ACR for 32 rem.
WAN or LAN	1 FX SFP + 3 FE	2 FX/GX SFP + 2 FE/GE	2 GX SFP + 4 x 2 GE Cb	2 GE Cb GE + 3 FE/GE	2 GE Cb GE + 2 FE/GE	2 GE Cb GE + 4 FE/GE
		SyncE	SyncE & PTP1588v2		SyncE	SyncE
Tributaries SDH/SONET	-	-	-	4 STM1 or 1 STM4	-	STM1/4/16 O9400R
Tributary PDH	1 E1/T1	2 to 10* E1/T1	0 to 16 E1/T1	0 to 32 E1/T1	4 E1/T1 backplane	up 388 E1/T1,18 E3/DS3
DTE n x 64K	1 RS422/V11, X21	X21,RS232, V35	-	-	see AM3440	-
Voice	-	FXO, FXS, E&M, Magneto				* = in development
G703 64k, C37.94		G703, C37.94				

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