



TDMGW11/41/4/8

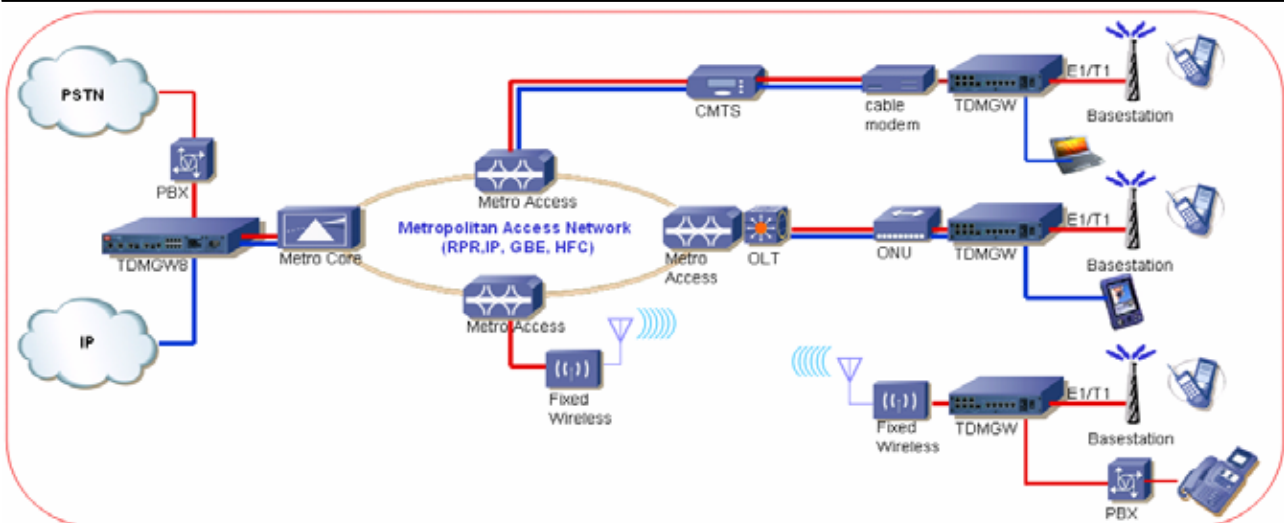


Comtec TDMGW[®] products are highly functional Circuit Emulation Service over Packet (**CESoP**) solution providing transparent interconnection of TDM circuits through Ethernet, MEF, MPLS, and IP network. CESoP technology is innovative and cost-effective solution on the path from Circuit-Switched Network to Packet-Switched Network (PSN).

“Pseudowire Emulation Service over Packet”

Highlights

- CESoP technology implementing the various pseudowire standards from IETF PWE3, MPLS, MEF, and ITU-T
- Transparent to all other signaling protocols running over E1/T1
- High-accurate clock distribution with enhanced adaptive clock recovery algorithm smoothing the impact of network PDV
- Standard compliance to ITU-T clock jitter and wander specification (G.823, G.824)
- Diverse packet encapsulations : Ethernet, MPLS, MEF, IPv4, L2TPv2, L2TPv3, UDP, RTP, and PW
- Unframed, Framed, and Fractional E1/T1 (Nx64)
- DS0 Cross-connection
- HDLC, cHDLC, and FrameRelay
- Point-to-point and Point-to-multipoint connection
- QoS guaranteed transmission of E1/T1 frame
- Full featured L2 switching function
- Local and remote management through CLI, Telnet, SSH, WEB, SNMP, and EMS
- Alarm notification and propagation function
- Easy system setup and backup function
- Hot-swappable dual power redundancy
- Guaranteed Delivery Protocol[®] (GDP[®])
- Path failover for stable E1/T1 service



Comtec TDMGW® products comprise a mix of TDM over IP Gateways from Customer Premises Equipments(CPE) to Central Office Equipments. They give a lot of advantages not only to Enterprises but also to Service Providers.

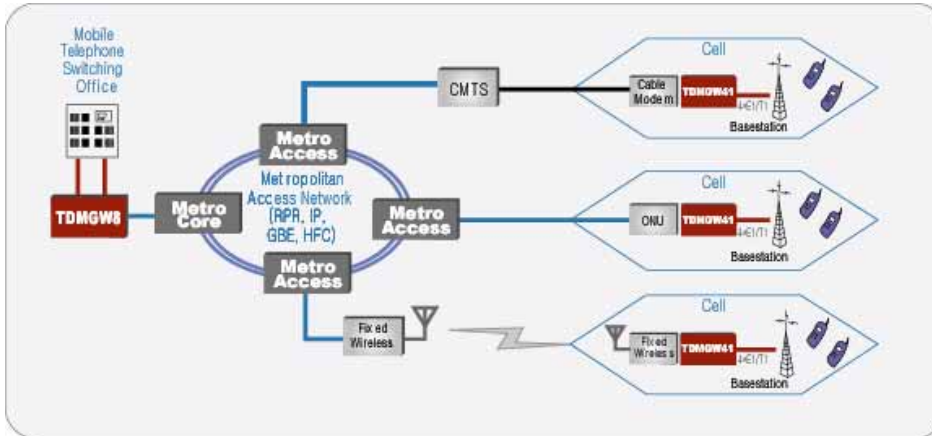
For Customer (Enterprise)	For Service Provider (Carrier)
<ul style="list-style-type: none"> • Keep the legacy TDM equipment and investment • Single network connection of Ethernet and TDM • Lower cost on bundled services • TDM equivalent QoS over Packet Network • Safe from VoIP threat from hackers 	<ul style="list-style-type: none"> • Maintain TDM services while upgrading to packet network • Ability to take TDM services from out of 'footprint' location via the packet network • Offer video/voice/data triple play service • Simplicity and no more investment for legacy network
<p>Performance</p> <p>Packet Delay Variation (PDV) compensation up to 128 ms Dynamic adjustment using enhanced adaptive clock recovery algorithm</p> <p>Guaranteed Delivery Protocol (GDP)* - Guaranteed packet transmission over unstable packet network</p> <p>E1/T1 Transmission</p> <p>Configurable protocol stacks using Layer 2,3, and 4 Minimized end to end delay (625µs plus network delay jitter) Configurable packet size per PW tunnel HDLC*, cHDLC*, FrameRelay*</p> <p>Timing</p> <p>Loopback : Recovered clock sourced from E1/T1(Unframed) LineRx : Recovered clock sourced from E1/T1(Framed) Internal : Clock from the internal oscillator External : Recovered clock sourced from external clock port Adaptive : Recovered clock by gathering the information of incoming packets.</p> <p>Differential : Recovered clock by using the information of packet and common reference clock</p> <p>Stability : 24-hour holdover stability of ±0.28 ppm (-20 ~70) all-causes stability of ±4.6 ppm over 20 years (compliance with Telcordia and ITU-T Stratum3)</p> <p>QoS</p> <p>IEEE802.1p/1Q, IP ToS, and DiffServ (DSCP), SPQ Ingress/Egress Rate Limit Control L4 port priority, Ethernet port priority</p> <p>Security</p> <p>Auto log-out Secure Socket Layer (SSL) Multi-level access privileges Remote management access control SSH (Secure Shell)*</p> <p>OA&M</p> <p>System OA&M : Fan and system status Packet Network OA&M : Link up/down Ethernet loopback Port statistics Protocol statistics Unavailable service perception Circuit Network OA&M : E1/T1 line loopback E1/T1 Payload loopback E1/T1 Remote loopback LoS/LoF, AIS perception PMON status notification and statistics</p> <p>PW Signaling*</p>	<p>Redundancy</p> <p>Ethernet link failure detection and recovery within 50ms End-to-end path redundancy* Hot swappable and load sharing power redundancy with any combination of AC and DC power supplies (TDMGW4/8) Dual-slot system OS recovering from the system crash Primary and secondary clock redundancy System configuration backup and restore</p> <p>System Management</p> <p>Console: RS-232C interface Management port :10/100Mbps (TDMGW4/8) Convenient CLI using console, telnet, and SSH System Software Upgrade (via FTP) EMS* SNMP v1, v2c Standard and Comtec Enterprise MIB RMON 4 Groups (1,2,3,9) Log management (syslog) Web GUI</p> <p>Ethernet Interface</p> <p>10/100 Mbps speed Full, half duplex, and auto-negotiation Auto MDI/MDI-X Tx and SFP module combo</p> <p>E1 Interface</p> <p>Line Interface : ITU-T G.703, G.704 Line Speed : 2.048 Mbps ± 50ppm Line Coding : HDB3, AMI Framing : Unframed, Framed (E1, E1-CRC4 multi-frame) Line Impedance : Balanced (120Ω with RJ-48c), Unbalanced (75Ω with balun) Jitter/Wander Performance : ITU-T G.823 Error Performance : ITU-T G.821, G.826 Bring-Into-Service (BIS) : ITU-T M.2100 Standard : ITU-T G.703, G.704, G.706, G.711, G.732, G.755, G.796, G.823, G.826, I.431</p> <p>T1 Interface</p> <p>Line Interface : ITU-T G.703, ANSI T1.102, ANSI T1.403, AT&T TR 62411, ETSI 300-011 Line Rate : 1.544 Mbps ± 32ppm Line Code : B8ZS, AMI Framing : Unframed, Framed (ESF, SF, T1DM) Line Impedance : Balanced (100Ω with RJ-48c) Jitter/Wander Performance : AT&T TR-62411, ITU-T G.824 Error Performance : ITU-T G.821, G.826 Bring-Into-Service (BIS) : ITU-T M.2100 Standard : AT&T TR62411, ITU-T Rec. G.703, G.704, G.802, G.824, ANSI T1.403, Telcordia GR-303-CORE, TTC JT-G703, JT-G704 , T1.231</p> <p>Certification : FCC, UL, CE, MIC</p>

Comtec TDMGW® Products



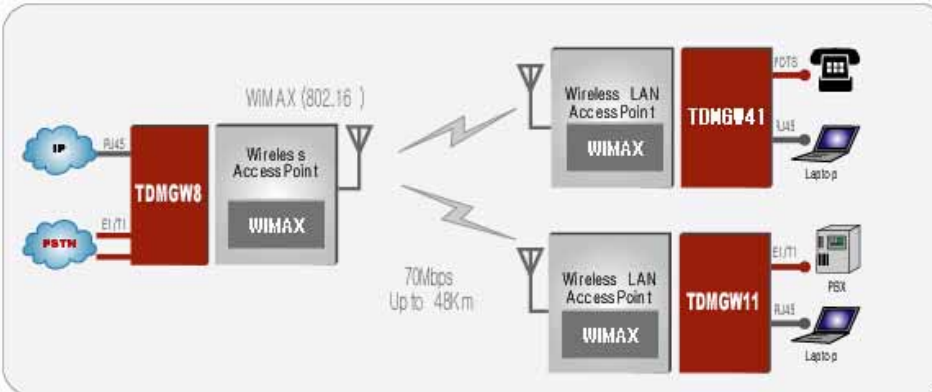
	TDMGW11	TDMGW41	TDMGW4	TDMGW8
E1 / T1	1	4	4	8
LAN (10/100 Mbps)	4 UTP		[Utilize Management Port]	
Uplink (10/100 Mbps)	2 UTP, 1 SFP Combo		2 UTP, 2 SFP Combo	
Management Port	[Utilize LAN Port]		1 (10/100 Mbps)	
External Clock Port	1		1	
Console	1		1	
Dry Contact Port	N/A		1 (DB-9)	
LED	System POWER, RUN, FAN			
	Ethernet LINK/ACT		LINK/ACT, SPEED, FDX	
	E1 / T1 SYNC, ALARM		SYNC	
Dimension (mm)	280(W) x 43.6(H) x 208(D)		440(W) x 43.6(H) x 246(D)	
Power	AC			
	AC : 100~240 VAC 50/60Hz, DC : -40~-60V			
	Max. power consumption : 30W			
Environmental	Operating Temperature : 0 ~ 60 / 32 ~140			
	Humidity : 5 ~ 95 % (relative, non-condensing)			
	RoHS compliant			
Weight	2.4 Kg		2.9Kg	

Standard Compliant			
Pseudo-Wire		E1/T1	
IETF RFC3916	Requirements for Pseudo-Wire Emulation Edge-to-Edge(PWE3)	ITU-T Rec. G.703	Physical characteristics PFH
		ITU-T Rec. G.704	Synchronous frame structures
IETF RFC3985	PWE3 Architecture	ITU-T Rec. G.706	Frame alignment and cyclic redundancy check procedures
IETF RFC4197	Requirements for Edge-to-Edge Emulation of TDM Circuits over Packet Switching Networks	ITU-T Rec. G.732	Characteristics of primary PCM M multiplex equipment operating at 2048kbit/s
IETF RFC4385	PWE3 Control Word for Use over a MPLS PSN		
IETF RFC4448	Encapsulation Methods for Transport of Ethernet over MPLS Networks	ITU-T Rec. G.823	The control of jitter and wander (E1)
		ITU-T Rec. G.824	The control of jitter and wander (T1)
IETF RFC4553	Structure-Agnostic TDM over Packet (SAToP)	ITU-T Rec. G.821	Error performance (below primary rate)
IETF RFC5086	Structure-Aware TDM Circuit Emulation Service over Packet Switched Network (CESoPSN)	ITU-T Rec. G.826	End-to-end error performance parameters and objectives
Ethernet		ITU-T Rec. M.2100	Performance limits for bringing-into- service and maintenance
IEEE 802.3	CSMA/CD Access method and physical layer specifications	ANSI T1.403	Network and Customer Installation Interfaces – DS1 Electrical Interface
IEEE 802.3ac	VLAN Tag Task Force		
IEEE 802.3x	Flow control	AT&T TR-62411	Service description and interface specification
IEEE 802.1D	Spanning Tree Protocol	Management	
IEEE 802.1p	Traffic class expediting and dynamic multicast filtering	IETF RFC1157	SNMP
		IETF RFC1213	MIB-II
IEEE 802.3ad	Link Aggregation	IETF RFC1442	SNMPv2 SMI
IEEE 802.1Q	Tag-based VLAN	IETF RFC1493	Bridge MIB
IETF RFC 1516	IEEE 802.3 HUB management	IETF RFC1215	SNMP Traps
IETF RFC 1286	IEEE 802.1 Bridge management	IETF RFC1757	RMON MIB



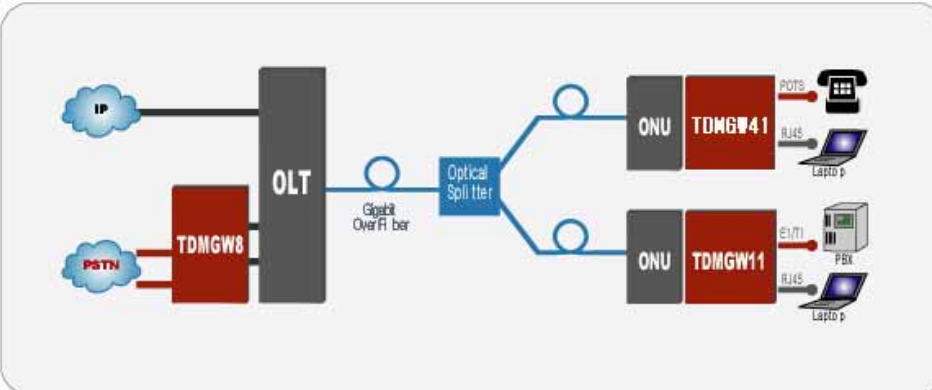
Cellular Backhaul

Mobile operators are facing with two headaches both cost for leased line to connect base stations and new investment for 3G, 4G future expansion. Comtec TDMGW® gives them simple and cost-effective solution by joining TDM and Ethernet traffic through one medium.



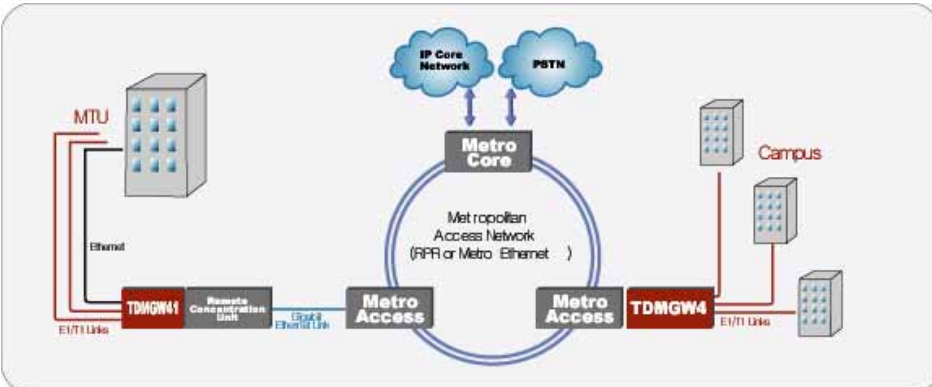
Fixed Wireless

The combination of Comtec TDMGW® and WiMAX can provide an economic wireless point-to-point and point-to-multipoint infrastructure for delivering video, voice, and data service.



FTTx

E-PON (Ethernet-Passive Optical Network) systems are based on Ethernet as the backbone. So, it is easy to carry legacy TDM traffic efficiently across the passive optical network with Comtec TDMGW®.



Metro Ethernet

Comtec TDMGW® provides a chance to generate new revenue by delivering E1/T1 service over simple and scalable Ethernet, MEF, MPLS, and IP network.

CESoP® is a registered trademark of Zarlink Semiconductor
 Features marked by asterisks(*) are available on Q3, 2008



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