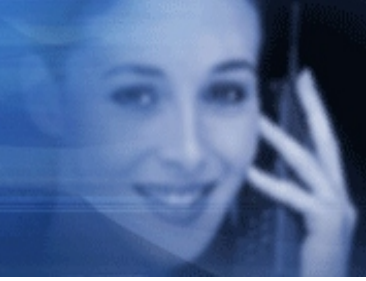


COMARRA

TELECOM TRANSMISSION SOLUTIONS



STM-1 (Optical / Electrical) Add-Drop Multiplexer (with upto 16 E1 & 4 Ethernet) SDH Equipment

Product Brochure & Data Sheet

COMARRA

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Product Overview

STM-1 (Optical / Electrical), E1 and Ethernet Multi-Service SDH Transmission Unit is a modular platform unit with two 155.52Mbps optical / electrical interfaces, which may be used in a point-to-point, chain or ring application to provide an ultra-compact, cost effective and flexible multi-service platform.



**STM-1 (Optical/Electrical)
Add-Drop Multiplexer**

Interface card options include the 8xE1 interface card (120 Ohms [RJ-45] and 75 Ohms [BNC]), 4x100BaseT Ethernet interface card (1 VCG, 4 Ports 1 Channel), 4x100BaseT Ethernet interface card (4 VCG, 4 Ports 4 Channels) and Gigabit Ethernet interface card options along with Engineering Order Wire is available. The user removable / replaceable STM-1 Optical / Electrical interface option makes it easy to meet various and changing user requirements. Comarra's STM-1, E1 and Ethernet over SDH Transmission Equipment provides full capability to cross-connect at VC-12 level between all tributaries.

The equipment can be used as Terminal Multiplexer (TM) or an Add-Drop-Multiplexer (ADM) to build a point-to-point, ring and chain (add-drop) transmission network.

Features

- 1U height, 19-Inch standard rack-mountable chassis
- Service interfaces
 - › 2 x STM-1 optical interfaces, MSA compliant SFP (pluggable) optical module (LC connector) based design, which supports onsite optical port replacement
 - › 2 x STM-1 electrical interfaces, SFP electrical module (Mini BNC connector) Optional
 - › Maximum 16 E1 interfaces compliant with ITU-T G.703 (8 E1 interfaces per card)
 - › 120 Ohms E1 and 75 Ohms E1 interfaces options available
 - › 4 x 10/100BaseT Ethernet (electric) interface
 - › 10/100BaseT (FE) Ethernet Interface Options
 - ✓ 4 Ports, 4 Channels (4 VCG), and
 - ✓ 4 Ports, 1 Channel (1 VCG)
 - › 1 x GigE (Gigabit) Ethernet interface Options
 - ✓ Optical GigE (Gigabit) Ethernet interface
 - ✓ Electrical 1000BaseT (Gigabit) Ethernet Interface
- Provides complete diagnostics facilities to the user for monitoring optical ports and provide reading of optical transmit and receive power, laser temperature, bias current in voltage alarms etc.
- Performance Monitoring and Alarms - Error counts for B1, B2, B3
- Performance Analysis - Error Seconds (ES), Several Error Seconds (SES), Unavailable seconds (UAS), Higher Order Virtual Container - Remote Error Indication (HOVC-REI), Higher Order Virtual Container - Pointer Justification Event (HOVC-PJE)
- Management and Maintenance interfaces
 - › 10/100BaseT Ethernet management interface
 - › RS232 serial management interface
 - › Remote (Telnet) management interface
 - › Windows XP based Graphical User Interface (GUI)
 - › Windows 7 based Graphical User Interface (GUI)

Features

- › SNMP V2 Monitoring
- › Engineering Order Wire (EOW) interface (RJ-11)
- › NMS (Network Management System) for monitoring multiple units from a single / central location.
- Timing mode
 - › Synchronization with STM-1 line timing
 - › Synchronization with timing from any of the E1 interfaces (1-16 E1 tributary interfaces)
 - › External timing source option - 120 Ohms 2MBps (External Bits Clock)
 - › External timing source - 120 Ohms 2MHz (External TTL Clock) - Factory Configurable
 - › Internal Clock - ITU-T G.813 internal oscillator (Stratum 3)
 - › The timing source can be auto-switched according to default or operator programmed settings
- Ethernet Standards Conformity
 - › Generic Framing Procedure GFP-F compliant with ITU-T G.7041
 - › VCAT compliant with ITU-T G.707 and LCAS compliant with ITU-T G.7042
 - › Ethernet flow control on WAN port and LAN port.
 - › Large buffer size upto 410,000 bytes
 - › Maximum Frame length (MTU size):1552 bytes with Gigabit Ethernet Card
 - › Maximum Frame length (MTU size):1536 bytes with 4 port 1 channel (1 VCG) Ethernet Card
 - › Maximum Frame length (MTU size): 2036 bytes with 4 port 4 channel (4 VCG) Ethernet Card
 - › Electrical Gigabit compliant with 802.3ab
 - › Optical Gigabit compliant with 802.3z
 - › Auto MID/MID-X for Ethernet Interfaces
 - › Support 802.1Q based VLAN tagging (4 ports 1 channel (1 VCG) Ethernet Card only)
 - › Support Port based VLAN tagging (4 ports 1 channel (1 VCG) Ethernet Card only)
 - › Performance Analysis
 - ✓ All Received Packets
 - ✓ All Transmitted Packets
 - ✓ Received Dropped Packets
- Supports 1+1 Line Protection and Automatic Protection Switching (APS) with less than 50ms recovery
- Supports point-to-point, ring and chain topology (4 VCG card only)
- Local management and network-based management via a unified platform
- Supports Remote Power Down Detection and Auto Laser Shutdown
- Supports STM-1 and E1 loop-back for troubleshooting
- 850nm multi-Mode, 1310nm Single Mode and 1550nm Single Mode optical interface options offered
- Ethernet mapping adopts GFP/VC-12 virtual concatenated technology; according with MSTP criterion
- Provides Ethernet over SDH mapping through standard GFP and VC-12 virtual concatenation (VCAT)
- Ethernet bandwidth can be adjusted by the user between 2MBps ~126 Mbps (VC-12 mapping)
- Supports MAC Address list filtration, learning and updating function
- Easy to operate

Features

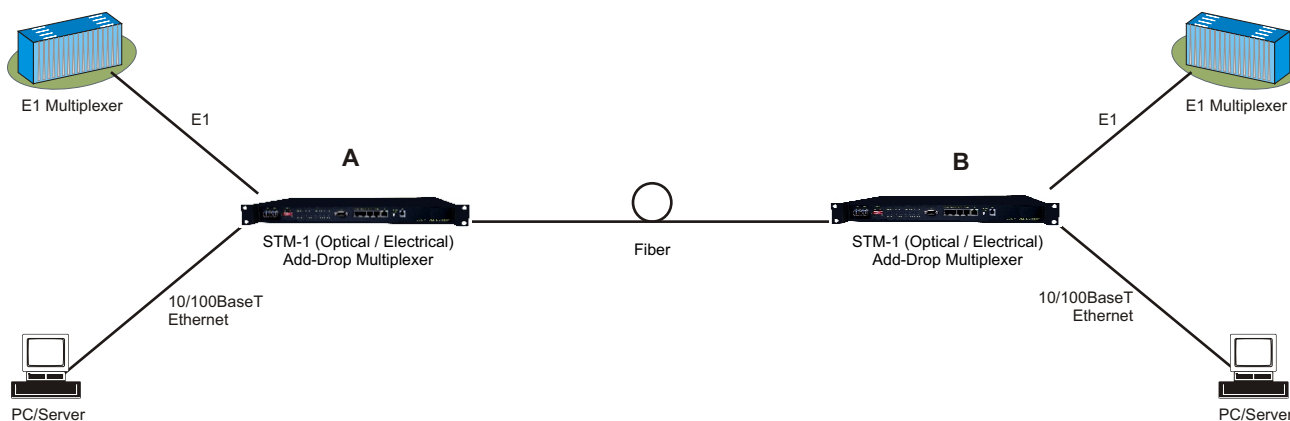
- Redundant power supply card options AC+DC, DC+DC and AC+AC
 - › 110V AC - 240V AC (50/60 Hz) power options available
 - › -48V DC power option available
 - › -24V DC power option available
- Power consumption less than 17W.

Alarm and Indicator Monitoring

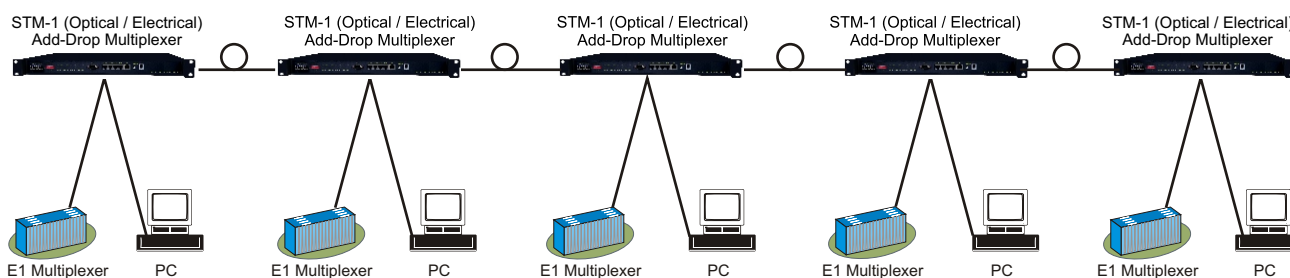
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| <ul style="list-style-type: none"> • Power Indicator • Current Status (integrity and activity) Indicator • Urgent Alarm Indicator • Minor Alarm Indicator • Optical Signal Loss Alarm Indicator • Remote Device Power-down Indicator • Ethernet Card Status Indicator • General Alarm Indicator for Ethernet Card (including Link-down of Ethernet Port) | <ul style="list-style-type: none"> • Auto Laser Shutdown (ALS) Indicator • Engineering Order-Wire (EOW) Indicator • Ethernet Link Indicator • Ethernet Speed Indicator • E1 Card Status Indicator • Dry contact via 9-pin, D-type male connector • Buzzer Alarm • SNMP Diagnostic and Monitoring |
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Network Application

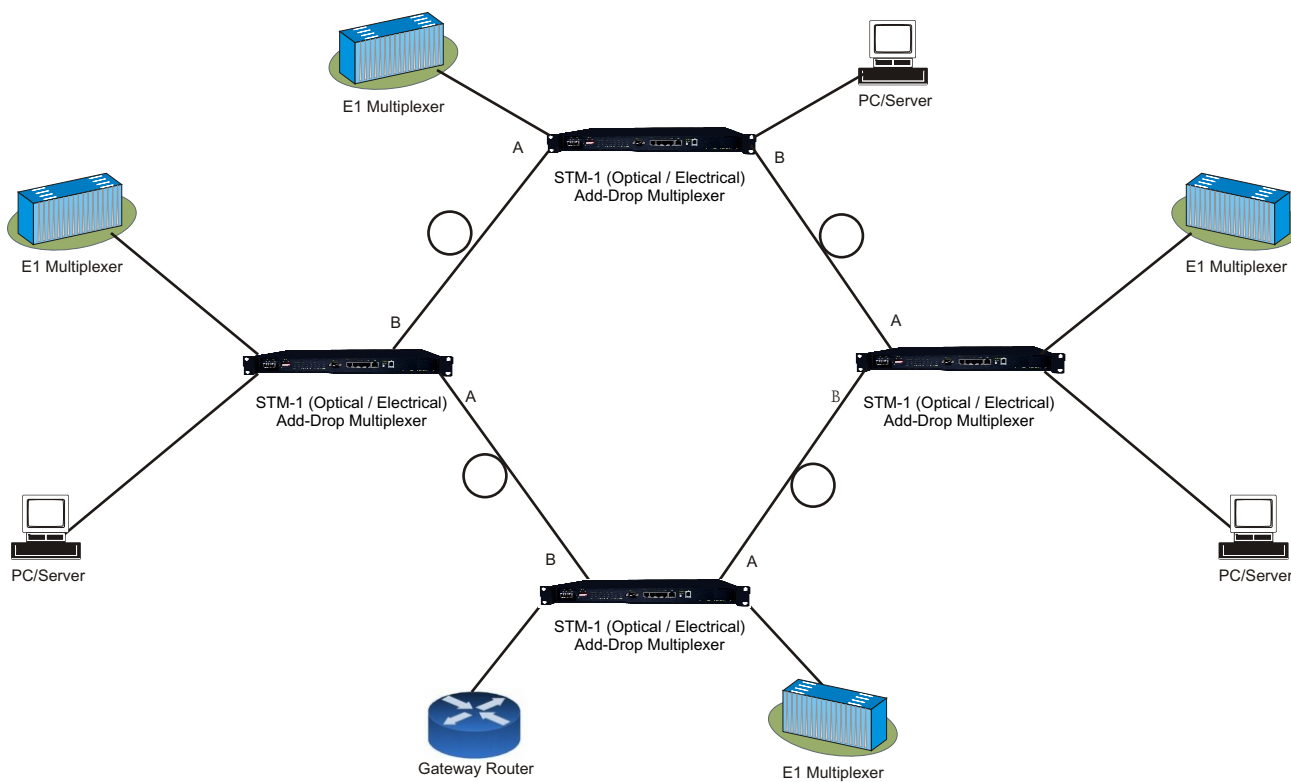
Point to point network application diagram



Chain network application diagram



Ring network application diagram



Technical Specifications

Network Topology and Interfaces

Network topology	Point to point network, Ring and Chain
Service interfaces	STM-1 SDH single optical or double optical ports (1+1 protection) supported - 8/16 E1 Interfaces - 1 VCG, 4 VCG or GigE Ethernet Interfaces

STM-1 Electrical Interface - Technical Specifications

Data Rate	155.52 Mbps
Standard	ITU-T G.703 Compliant
Line Code	CMI
Physical Connector	Mini BNC
Automatic 1+1 line protection	Less than 50 ms switching / recovery

STM-1 Optical Interface - Technical Specifications

Data Rate	155.52 Mbps
Standard	ITU-T G.957 compliant
Bit rate	155.520Mbps
Coding	NRZ
Connector	LC
Light source	Class 1 Laser
Wave length	850nm/1310nm/1550nm (optional) - 1310nm Std.
Transmit power	S 1.1, L 1.1, L 1.2 (- 11 dBm to - 2.5 dBm - as may be ordered)
Receive sensitivity	S 1.1, L 1.1, L 1.2 (- 28 dBm to - 34 dBm - as may be ordered)
Automatic 1+1 Line Protection	Less than 50 ms switching / recovery
Automatic Laser Shut Down Option	User selectable options

STM-1 Monitoring and Performance Analysis

Performance Monitoring and Alarms	Error counts for B1, B2, B3
Performance Analysis	Error Seconds (ES), Several Error Seconds (SES), Unavailable Seconds (UAS), Higher Order Virtual Container - Remote Error Indication (HOVC-REI), Higher Order Virtual Container - Pointer Justification Event (HOVC-PJE)

Optical Interfaces

Type	Wavelength (nm)	Mean launched power (dBm)	Receiver sensitivity (dBm)	Receiver overload (dBm)	Connector	Configuration
Double fibers, Two Direction	1310	-8 ~ -12	-36	-3	LC	Standard (S1.1)
	1310	0 ~ -5	-36	-3	LC	Optional (L1.1)
Single fiber, One Direction	1310/1550	-8 ~ -14	-30	-3	LC	Optional
	1310/1550	0 ~ -5	-30	-3	LC	Optional

1 VCG - Ethernet Interface Specification: 10/100BaseT (Electrical)

Number of Interfaces	4
Number of VCG/Channel	1
Interface Types	10/100BaseT
Ethernet Mode	Half/Full
MDI/MDI-X Support	Yes
VCAT Compliance	ITU-T G.707
LCAS Compliance	ITU-T G.7042
GFP-F	ITU-T G.7041
Frame Size	1536 bytes
Transmission Bit Rate	10/100 Mbps
Connectors	RJ-45 Electrical
802.1Q MAC packet transparent transmission supported	
Ethernet data rate can be adjusted from 2M to 100M	

4 VCG - Ethernet Interface Specification: 10/100BaseT (Electrical)

Number of Interfaces	4
Number of VCG/Channels	4
Interface Types	10/100BaseT
Ethernet Mode	Half/Full
MDI/MDI-X Support	Yes
VCAT Compliance	ITU-T G.707
LCAS Compliance	ITU-T G.7042
GFP-F	ITU-T G.7041
Frame Size	2036 bytes
Transmission Bit Rate	10/100 Mbps
Connectors	RJ-45 Electrical
802.1Q MAC packet transparent transmission supported	
Ethernet data rate can be adjusted from 2M to 126M	

GigE - Ethernet Interface Specification

Number of Interfaces	2 Electrical (Comply with IEEE 802.3ab)
	1 Optical - Optional (Comply with IEEE 802.3z)
Interface Types	10/100/1000BaseT or 1000Base-FX (LC)
MDI/MDI-X Support	Yes (Electrical port)
VCAT Compliance	ITU-T G.707
LCAS Compliance	ITU-T G.7042
GFP-F	ITU-T G.7041
Frame Size	1552 bytes
Transmission Bit Rate	10/100/1000 Mbps
Connectors	RJ-45 Electrical / LC - Optical
802.1Q MAC packet transparent transmission supported	
Ethernet data rate can be adjusted from 2M to 126M	

Ethernet port (1 VCG/4 VCG/GigE) Performance Analysis

- All Received Packets
- All Transmitted Packets
- Received Dropped Packets

E1 Interface Specification - 120 Ohms

Number of E1s (Max) per system	16 E1 Interfaces
Number of E1s per E1 service card	8 E1 per card
E1 Interface option	8 E1 / 16 E1 (Optional)
Line Rate per E1	(2.048 Mbps \pm 50 bps)
Line Code	HDB3
Framing Structure	As per ITU (CCITT) G.704
Framing Options	Un-Framed/PCM 30/PCM 31
Electrical	As per ITU-T G.703
Jitter	As per ITU-T G.823
Impedance	120 Ohms balanced
Nominal Pulse Width	244ns
Connector	RJ-45 (F)

E1 Interface Specification - 75 Ohms

Number of E1s (Max) per system	16 E1 Interfaces
Number of E1s per E1 service card	8 E1 per card
E1 Interface option	8 E1 / 16 E1 (Optional)
Line Rate per E1	(2.048 Mbps \pm 50 bps)
Line Code	HDB3
Framing Structure	As per ITU (CCITT) G.704
Framing Options	Un-Framed/PCM 30/PCM 31
Electrical	As per ITU-T G.703
Jitter	As per ITU-T G.823
Impedance	75 Ohms unbalanced
Nominal Pulse Width	244ns
Connector	BNC

E1 port (TU 12) Performance Analysis

- Error Bits (EB)
- Error Seconds (ES)
- Several Error Seconds (SES),
- Unavailable seconds (UAS)
- Remote Error Indication (REI)
- Code Violation (CV)

Clock Synchronization Options

Clock Synchronization options	Synchronization with STM-1 line timing
	Synchronization with timing from any of the E1 interfaces (1-16 E1 tributary interfaces)
	External timing source option - 120 Ohms 2MBps (External Bits Clock) - Factory Configurable
	External timing source - 120 Ohms 2MHz (External TTL Clock) - Factory Configurable
	Internal Clock - ITU-T G.813 internal oscillator (Stratum 3)
	The timing source can be auto-switched according to default or operator programmed settings

Engineering Order Wire (EOW)

Engineering Order Wire (EOW)	RJ-11 connector
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NMS

- Graphical User Interface (GUI) Windows XP / Windows Vista / Windows 7 compatible
- SNMP V2 based NMS

Power Supply Options

DC Mains Input	- 48V DC (range -18V DC to -72V DC)
AC Main Input	100V AC to 240V AC, 50 / 60 Hz
Power Protection	1+0 (AC, DC), 1+1 (AC+AC, AC+DC, DC+DC)
Power Consumption	< 17 Watts

Operating Conditions

Ambient temperature	-10°C ~ +60°C
Relative humidity	<90% (Non condensing)

Mechanical Specifications

Rack Mounting	Standard 19 Inch. DIN Rack
Height	44 mm.
Depth	256 mm.
Width	440 mm.
Weight	3.75 kg

Ordering Information

S. No.	Part	Description
1	VCL-STM-1-ADM-MUX	STM-1 (Optical/Electrical) Add-Drop Multiplexer Multi-service SDH transmission unit 19" Metal Box 1U High Rack Mount Version

Please specify options

STM-1 Port Options

S. No.	Part	Description
1	OPT-1+0-1310-20KM	1 x Optical SFP - 1310nm, 20KM S1.1 (LC)
2	OPT-1+1-1310-20KM	2 x Optical SFP - 1310nm, 20KM S1.1 (LC)
3	OPT-1+0-1310-40KM	1 x Optical SFP - 1310nm, 40KM L1.1 (LC)
4	OPT-1+1-1310-40KM	2 x Optical SFP - 1310nm, 40KM L1.1 (LC)
5	OPT-1+0-1550-80KM	1 x Optical SFP - 1550nm, 80KM L1.2 (LC)
6	OPT-1+1-1550-80KM	2 x Optical SFP - 1550nm, 80KM L1.2 (LC)
7	OPT-1+0-1550-120KM	1 x Optical SFP - 1550nm, 120KM L1.2 (LC)
8	OPT-1+1-1550-120KM	2 x Optical SFP - 1550nm, 120KM L1.2 (LC)
9	ELE-1+0	1 x Electrical SFP (mini BNC)
10	ELE-1+1	2 x Electrical SFP (mini BNC)

Ethernet Options

S. No.	Part	Description
1	4ETH-1VCG	1 x 4 Ethernet Card- 1 Channel, 4 Ethernet Ports (RJ-45)
2	4ETH-4 VCG	1 x 4 Ethernet Card- 4 Channel, 4 Ethernet Ports (RJ-45)
3	GigE-opt	1 x Gigabit Optical Ethernet Card- (LC)
4	GigE-elec	1 x Gigabit Electrical Ethernet Card- (RJ-45)

E1 Options

S. No.	Part	Description
1	8E1-120	1 x 8 E1 Card with 1 x DB-37 to 8 x RJ-45
2	8E1-75	1 x 8 E1 Card with 1 x DB-37 to 8 x BNC
3	16E1-120	2 x 8 E1 Card with 2 x DB-37 to 8 x RJ-45
4	16E1-75	2 x 8 E1 Card with 2 x DB-37 to 8 x BNC

Power Supply Options

S. No.	Part	Description
1	DC-1+0	1 x DC Mains Input - 48VDC (range 40V to 60V)
2	DC-1+1	2 x DC Mains Input - 48VDC (range 40V to 60V)
3	AC-1+0	1 x AC Mains Input 110Volts-240 Volts, 50Hz/60Hz
4	AC-1+1	2 x AC Mains Input 110Volts-240 Volts, 50Hz/60Hz

Technical specifications are subject to changes without notice.
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