

RC951E-4FEE1 Single E1 EoPDH Remote Gateway

RC951E-4FEE1 is a single E1 EoPDH remote gateway and also an intelligent Ethernet Demarcation Devices (EDD). The device offers 4 FE downlink ports and 1 E1 uplink, and can be deployed in either a point-to-point topology or a point-to-multipoint topology. HDLC/GFP encapsulation configurable gives the device more flexibility as a CPE. Moreover, as a Raisecom EDD, RC951E-4FEE1 is not only capable of Ethernet switching, but is inherently good at network diagnostics. With standard OAM and CFM, the network administrators are provided with tools to keep the service channel effective. RC951E-4FEE1 can be managed via local/remote CLI, in-band web-based management, and can also be monitored and managed in a centralized way on the GUI of Raisecom NView NNM system.



RC951E-4FEE1

Highlights

- Topology Flexibility** Fits in both point-to-point and point-to-multipoint EoPDH solution
- Standard GFP** makes the device capable of working with other EoPDH device adopt stand GFP encapsulation
- Demarcation Feature** Advanced Ethernet diagnostics tools standard OAM and CFM available on the device
- Easy Management** Management via local/remote CLI, in-band web-based management, and SNMP

Typical Application

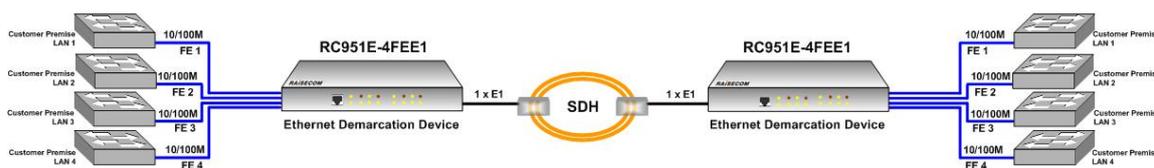


Figure.1 Point-to-Point Topology

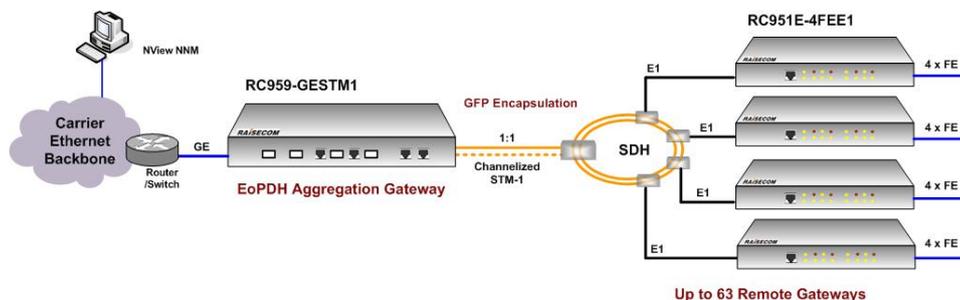


Figure.2 Point-to-Multipoint Topology

Features

EoPDH	4 FE over 1 E1 HDLC/GFP encapsulation, software configurable
E1 port	Framed, PCM31, FAC+CRC4, CRC-auto configurable E1 loopback test Local and remote E1 LOS, LOF, AIS, CRC, GIDerror report
FE port	10/100Mbps auto-negotiation, speed and duplex mode configurable MTU: 1632 Bytes Flow Control: IEEE 802.3x in full duplex mode Back pressure in half duplex mode
Forwarding mode	Store and Forward Buffer size: 128KB
MAC Address Table	8K MAC address Add/remove/search MAC address table entries View MAC address table statistics MAC address aging time configurable: 15-3825s MAC address learning threshold per port Optional MAC address table limit per port: 1-255
VLAN	4K active VLAN Port PVID overwrite Q-in-Q Switch port protect
QoS	4 queue per port CoS/DSCP/port-based Global queue scheduling : SP/WRR WRR weight range: 1-125
Rate Limit	Per port with increments 64Kbps (64K-1M), 1Mbps (1-100M)
Storm Control	Broadcast/Multicast/Unicast DLF storm control
Port Mirroring	Mirroring of egress/ingress/bidirectional traffic of ports
Link Aggregation	4 groups, up to 4 ports in each group
Loopback Detection	Shutdown port when loopback is detected
Packet Relay	Optional STP/DOT1X/LACP relay, threshold configurable
Cable Diagnostics	Cable status report, including position information
OAM	IEEE 802.3ah OAM (discovery, link performance monitor, remote loopback testing, remote failure indication) Extended OAM
CFM	IEEE 802.1ag ITU-T Y.1731
SLA	Layer-2/Layer-3 SLA



DHCP	Client DHCP Snooping
ACL	IP-based/MAC-based ACL
Keep-Alive	Report device information regularly
RMON	Group 1, 2, 3, 9
Syslog	Support
Routing Protocol	Static routing & default gateway
Auto-Configuration	Automatic configuration loading
Scheduling	Execute command script periodically
Security	User classification and password protection RADIUS TACAS+ Port Isolation PPPoE Agent
Hardware Environment Monitoring	Monitor temperature and voltage
Management	CLI-based management through local CONSOLE or remote Telnet/SSH In-band web-based management GUI-based SNMP management on Raisecom NView NNM system
Cluster Management	Raisecom Neighbor Discovery Protocol (RNDP)

Specifications

Capacity	32MB SDRAM 8MB Flash 128KB Switch buffer
LAN interface	4*10/100Base-TX RJ-45 connector Speed: 10/100Mbps auto-negotiation Duplex Mode: Full/Half Auto-MDI/MDIX support
WAN interface	1*E1 ports 120Ω balanced, RJ-45 connector 75Ω unbalanced, BNC connector Bit Rate: 2048Kbps±50ppm Code: HDB3
CONSOLE port	RS232 Baud Rate: 9600 RJ-45 connector

Compliances

Standards & protocols	IEEE802.3-2002 IEEE802.3 10BaseT IEEE802.3u 100BaseTX IEEE802.3x Flow Control IEEE802.1Q VLAN IEEE802.1ad QinQ IEEE802.3ad Link Aggregation IEEE802.1p CoS Prioritization IEEE802.3ah OAM IEEE802.1ag CFM ITU-T Y.1731 Service OAM Static Routing RMON I and II standards SNMP v1/v2c/v3 ITU-T G.703, G.704, G.823, G.824 ITU-T G.7041, G.7042, G.7043, G.8040
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Indicator	PWR for power supply SYS for system operation LNK/ACT and 100M for each FE port LOS for E1 port
Dimension	44(H)x300(W)x135(D)mm
Weight	≤ 1.425kg
Power supply	AC: 100-240V DC: -48V WP: wide-range
Power consumption	≤ 10W (full load)
Working environment	Temp: -5~55 Celsius RH: ≤ 90% (35 Celsius)
Storage environment	Temp : -40~80 Celsius RH : 5~90% non-condensing

CE marking

Ordering Information

RC951E-4FEE1-AC	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 1 E1 (120Ω balanced, RJ-45 or 75 Ω unbalanced, BNC) port on LAN side, AC power supply
RC951E-4FEE1-DC	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 1 E1 (120Ω balanced, RJ-45 or 75 Ω unbalanced, BNC) port on LAN side, DC power supply
RC951E-4FEE1-WP	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 1 E1 (120Ω balanced, RJ-45 or 75 Ω unbalanced, BNC) port on LAN side, WP wide-range power supply



RC953-4FExE1T1 Series 4/8 E1 EoPDH Remote Gateway

RC953-4FExE1T1 series are 4/8 E1 EoPDH remote gateways and also intelligent Ethernet Demarcation Devices (EDD). The device offers 4 FE downlink ports and 4/8 E1 uplinks, and can be deployed in either a point-to-point topology or a point-to-multipoint topology. HDLC/GF encapsulation configurable gives the device more flexibility as a CPE. Moreover, as a Raisecom EDD, RC953-4FExE1T1 is not only capable of Ethernet switching, but is inherently good at network diagnostics. With standard OAM and CFM, the network administrators are provided with tools to keep the service channel effective. RC953-4FExE1T1 series can be managed via local/remote CLI, in-band web-based management, and can also be monitored and managed in a centralized way on the GUI of Raisecom NView NNM system.



RC953-4FE8E1T1-BL

Highlights

- Topology Flexibility** Fits in both point-to-point and point-to-multipoint EoPDH solution
- Standard GFP** makes the device capable of working with other EoPDH device adopt stand GFP encapsulation
- Demarcation Feature** Advanced Ethernet diagnostics tools standard OAM and CFM available on the device
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Typical Application



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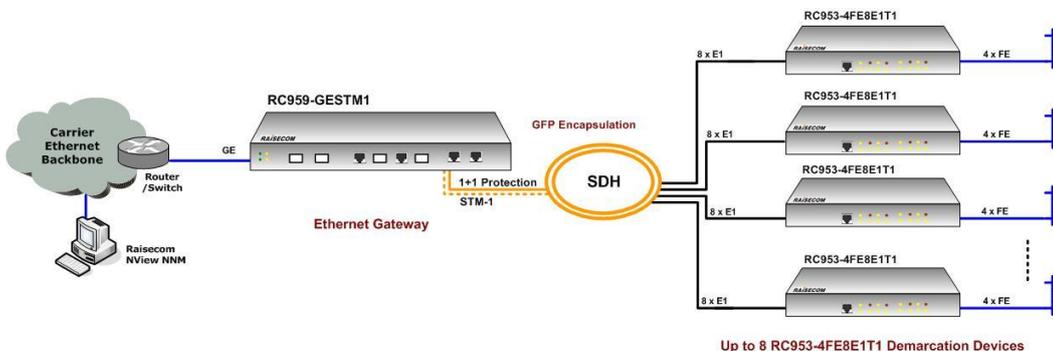


Figure.2 Point-to-Multipoint Topology

Features

EoPDH	4 FE over 4/8E1 HDLC/GFP encapsulation, software configurable HDLC: 1 virtual-channel, 1-4/8 E1 members allowed Automatic link adjust when E1 members down GFP: 1 VCG, 1-4/8 E1 members allowed Standard VCAT, LCAS
E1 port	Framed, PCM ₃₁ , FAC+CRC ₄ , CRC-auto configurable E1 loopback test Local and remote E1 LOS, LOF, AIS, CRC, GIDerror report
FE port	10/100Mbps auto-negotiation, speed and duplex mode configurable MTU: 1632 Bytes Flow Control: IEEE 802.3x in full duplex mode Back pressure in half duplex mode
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QoS	4 queue per port CoS/DSCP/port-based Global queue scheduling : SP/WRR WRR weight range: 1-125
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Port Mirroring	Mirroring of egress/ingress/bidirectional traffic of ports
Link Aggregation	4 groups, up to 4 ports in each group
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Cable Diagnostics	Cable status report, including position information
OAM	IEEE 802.3ah OAM (discovery, link performance monitor, remote loopback testing, remote failure indication)



	Extended OAM
CFM	IEEE 802.1ag ITU-T Y.1731
SLA	Layer-2/Layer-3 SLA
DHCP	Client DHCP Snooping
ACL	IP-based/MAC-based ACL
Keep-Alive	Report device information regularly
RMON	Group 1, 2, 3, 9
Syslog	Support
Routing Protocol	Static routing & default gateway
Auto-Configuration	Automatic configuration loading
Scheduling	Execute command script periodically
Security	User classification and password protection RADIUS TACAS+ Port Isolation PPPoE Agent
Hardware Environment Monitoring	Monitor temperature and voltage
Management	CLI-based management through local CONSOLE or remote Telnet/SSH In-band web-based management GUI-based SNMP management on Raisecom NView NNM system
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WAN interface	4/8*E1 ports 120Ω balanced, RJ-45 connector 75Ω unbalanced, BNC connector Bit Rate: 2048Kbps±50ppm

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Standards & protocols	IEEE802.3-2002 IEEE802.3 10BaseT IEEE802.3u 100BaseTX IEEE802.3x Flow Control IEEE802.1Q VLAN IEEE802.1ad QinQ IEEE802.3ad Link Aggregation IEEE802.1p CoS Prioritization IEEE802.3ah OAM IEEE802.1ag CFM ITU-T Y.1731 Service OAM Static Routing
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CONSOLE port	Code: HDB3 RS232 Baud Rate: 9600 RJ-45 connector	RMON I and II standards SNMP v1/v2c/v3 ITU-T G.703, G.704, G.823, G.824 ITU-T G.7041, G.7042, G.7043, G.8040
Indicator	PWR for power supply SYS for system operation LNK/ACT and 100M for each FE port LOS for each E1 port	
Dimension	44(H)x300(W)x135(D)mm	
Weight	≤ 1.425kg	
Power supply	AC: 100-240V DC: -48V WP: wide-range	
Power consumption	≤ 10W (full load)	
Working environment	Temp: -5~55 Celsius RH: ≤ 90% (35 Celsius)	
Storage environment	Temp : -40~80 Celsius RH : 5~90% non-condensing	

Ordering Information

RC953-4FE4E1T1-BL-AC	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 4 E1 (120Ω balanced, RJ-45) ports on LAN side, AC power supply
RC953-4FE4E1T1-BL-DC	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 4 E1 (120Ω balanced, RJ-45) ports on LAN side, DC power supply
RC953-4FE4E1T1-BL-WP	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 4 E1 (120Ω balanced, RJ-45) ports on LAN side, WP wide-range power supply
RC953-4FE8E1T1-BL-AC	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 8 E1 (120Ω balanced, RJ-45) ports on LAN side, AC power supply
RC953-4FE8E1T1-BL-DC	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 8 E1 (120Ω balanced, RJ-45) ports on LAN side, DC power supply
RC953-4FE8E1T1-BL-WP	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 8 E1 (120Ω balanced, RJ-45) ports on LAN side, WP wide-range power supply
RC953-4FE4E1-AC	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 4 E1 (75Ω balanced, BNC) ports on LAN side, AC power supply
RC953-4FE4E1-DC	Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 4 E1 (75Ω balanced, BNC) ports on LAN side, DC power supply



side, DC power supply

RC953-4FE4E1-WP

Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 4 E1 (75Ω balanced, BNC) ports on LAN side, WP wide-range power supply

RC953-4FE8E1-AC

Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 8 E1 (75Ω balanced, BNC) ports on LAN side, AC power supply

RC953-4FE8E1-DC

Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 8 E1 (75Ω balanced, BNC) ports on LAN side, DC power supply

RC953-4FE8E1-WP

Intelligent EoPDH remote gateway, 4 10/100M FE ports on WAN side, 8 E1 (75Ω balanced, BNC) ports on LAN side, WP power supply

RC959-4FE16E1 Ethernet over 16E1 Inverse Multiplexer

RC959-4FE16E1 is Raisecom latest Inverse Multiplexer which transmits Fast Ethernet service over bonded E1 circuits, achieving a seamless interconnection between customers connected over the TDM network and customers connected over the packet network. It is highlighted for its industry-leading bonding technology which allows the transportation of one Fast Ethernet over 16 bonded E1 circuits, increasing the transmission capacity effectively. By employing standard encapsulation and bonding protocols such as GFP and LCAS, RC959-4FE16E1 provides carriers and service providers with a flexible and convenient

Ethernet over TDM bandwidth provisioning.

The device supports VLAN based E1 circuit resource assignment and allocates different service with different bandwidth according to their application requirement. The VLAN stacking (Q-in-Q) features keeps all user VLAN setting intact and transmits all user traffic transparently. Additionally RC959 supports various diagnostic tools such as local and remote loopback, fault pass through and BERT for immediately fault isolation, saving time and cost for carriers and service providers.

Preliminary



RC959-4FE16E1 Ethernet over 16E1 Inverse Multiplexer

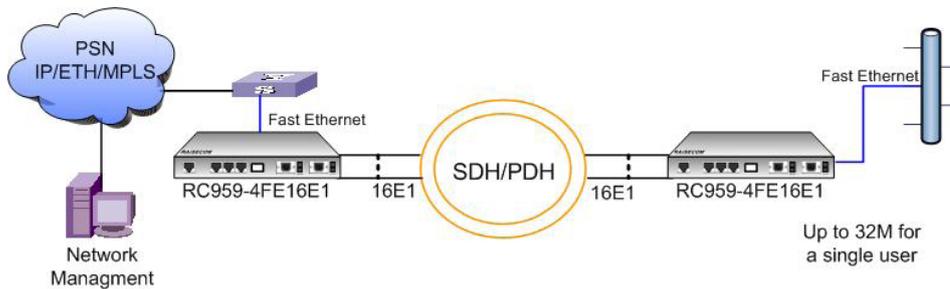
Feature

Working mode	VLAN-unaware mode; VLAN-aware mode; Double-tag (Q-in-Q) mode;
E1 mode	Framed
LCAS	The LCAS (Link Capacity Adjustment Scheme) enables the dynamically increasing or decreasing the bandwidth of VCG, allowing a high-reliable service transmission
SLA assurance	Bandwidth allocation based on VLAN ID gives mission critical services a better service
E1 interface type	120ohm balanced
E1 Loop Back	Support local and remote loop back
BERT function	Inner BERT enables a flexible way of testing E1 links
Enhanced E1 link monitor	Traffic counter provides an effective E1 link monitoring by statistics collection of Rx, Tx, total and error packets amount on E1 port
Encapsulation	GFP
Maximum Transmission Unit	12000 bytes
Flow control	IEEE802.3x in full duplex
VLAN	4096 VLAN ID VLAN stacking (Q-in-Q)
Transparent transmission	Support BPDU, Dot1x, GMRP, GVRP, and ICMP on per port
ALS	TX of optical Ethernet port will be shutdown automatically if there is no optical RX signal
Management	In-band and out-of-band (SNMP, Telnet, CONSOLE) management
Enhanced remote management	Remote RC959-4FE16E1 can be remotely managed by central one
Upgrade	Support local and remote on-line upgrade through FTP/TFTP
Redundant Power Supply	Two power supply modules enable the most uptime

Specification

Electrical fast Ethernet port	3* 10/100BaseT Connector: RJ-45 MDI/MDIX auto crossover IEEE802.3x flow control
Optical fast Ethernet port	1*100M FX Connector: LC IEEE802.3x flow control
E1 port	16*E1 Connector: RJ-45 Impedance: 120 Line coding: HDB3
CONSOLE Port	RJ-45
System Indicator	SYS, Flashing indicates CPU works normally
Power Supply Indicaor	PWR, ON indicates the device is powered on; PWR1, ON indicates first power supply works normally; PWR2, ON indicates second power supply works normally.
Indicators for Ethernet ports	LNK/ACT and 100M indicator for each Ethernet port
Indicators for E1 ports	LOS
Dimension	430(W)*266(D)*444.5(H)mm
Weight	3.3kg
Power supply	AC: 90~264V, 47~63Hz DC: - 36~-75V

Typical Application 1



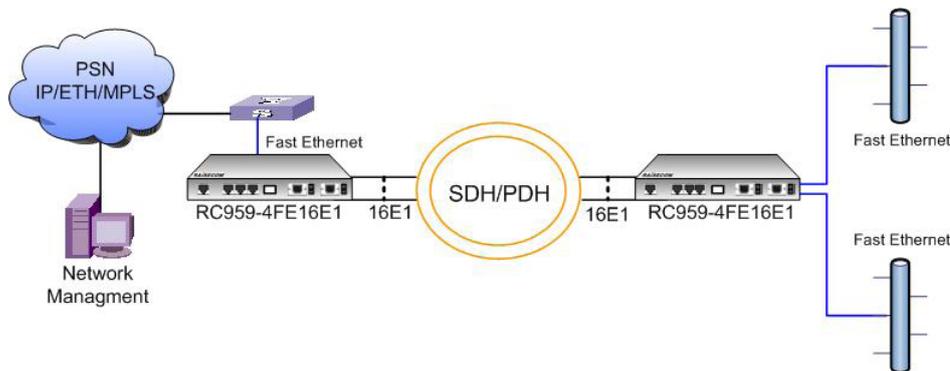
Scenario 1 presents a typical solution for transmitting one Fast Ethernet over 16 bonded E1 circuits, increasing the bandwidth of a single subscriber up to 32M. By adopting international GFP protocol for encapsulation, RC959-4FE16E1 satisfies the demand of enterprise customer conveniently by utilizing existing TDM network resource cost-efficiently.

Power consumption	≤ 25W (at max load)
Working ambience	Temp: -5~50 centigrade RH: ≤90% non-condensing
Storage ambience	Temp: -25~85 centigrade RH: 20~90% non-condensing
Safety compliance	CE certification

Compliance

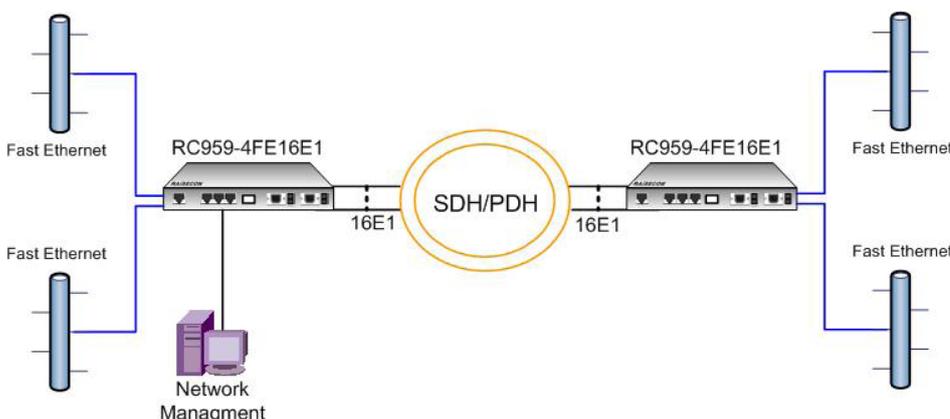
Standards & protocols	IEEE802.3 Ethernet IEEE802.3x full duplex on 10BaseT, 100BaseTX, 100BaseFx ports IEEE802.3u 100BaseTX SNMPv1/v2c/v3 ITU-T G.703 ITU-T G.704 ITU-T G.823
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Typical Application 2



Scenario 2 depicts an ideal solution addressing to enterprise customers who have dispersed branches far away from central office. Through different VLAN tags, RC959-4FE16E1 can realize the Ethernet traffic aggregation in hub-and-spoken topology. For example, assign 26M (13 E1 lines) to one branch for mission critical services and give the rest 6M (3 E1 lines) to another branch which does not have so much bandwidth demand. In this case, all the traffic from branches will be aggregated to one Fast Ethernet port in central office, reducing the cost of upstream devices such as routers.

Typical Application 3



Scenario 3 shows another available application of RC959-4FE16E1 which allows multiple departments to communicate with their counterparts by sharing the whole 16 E1 lines. Each department is assigned with a certain VLAN ID and connects to one of the four Ethernet ports of RC959-4FE16E1, then at the other end of the SDH network, the opposite RC959-4FE16E1 will transfer the traffic to its counterpart exactly according to the VLAN ID, realizing a flexible Ethernet over TDM network transmission for multiple subscribers.

Ordering Information

RC959-4FE16E1- Inverse Multiplexer 16*E1, 4*FE (3 copper ports and 1 SFP-based optical BL-AC port) ,120ohm balanced RJ-45 E1 connector with redundant AC power supply.

RC959-4FE16E1- Inverse Multiplexer 16*E1, 4*FE (3 copper ports and 1 SFP-based optical BL-DC port) ,120ohm balanced RJ-45 E1 connector with redundant DC power supply.

Annex - Fiber Interface Specification

Part Number	Optical Connector	Wavelength (nm)	RX sensitivity (dBm)	Tx Power (dBm)	Typical distance (km)
USFP-03/M	LC	1310	<-29	-20 ~ -14	2
USFP-03/S1	LC	1310	<-34	-15 ~ -8	15
USFP-03/S2	LC	1310	<-34	-5 ~ 0	40
USFP-03/S3	LC	1550	<-34	-5 ~ 0	80
USFP-03/SS13	LC	1310	<-28	-15 ~ -8	15
USFP-03/SS15	LC	1550	<-28	-15 ~ -8	15
USFP-03/SS23	LC	1310	<-32	-5 ~ 0	40
USFP-03/SS25	LC	1550	<-32	-5 ~ 0	40