



ECTS

CONNECTION TECHNOLOGY SYSTEMS INC.



Fiber Metro Ethernet & FTTX Solution

Product Classification Directory

Solutions		Product Lines					
		High Density Converter Chassis	Converter Chassis	Slide-in Converter Modules	Standalone Media Converters	Triple Play & Multimedia	Fiber Switches
Non-Management	10/100M or 100M		CVT-Rack-16 (optional AC/DC power module) CVT-Rack-16S	CVT-100	CVT-100		
	10/100/1000M			CVT-3012SFP	CVT-3012SFP		
	1000M			CVT-3002-PLUS CVT-3002SFP-PLUS	CVT-3002-PLUS CVT-3002SFP-PLUS		
SNMP Management	10/100M or 100M			CVT-2112	CVT-2112	VRG-21412-PLUS VRG-21412-PLUS-RF VRG-21412-WF ESH-2109RF	ESH-2109 SWH-2109 PSH-2109
	10/100/1000M			CVT-3112	CVT-3112	VRG-21812G VRG-31612	ESH-3105 ESH-3605 SWH-3114 SWH-3124GSFP SWH-3614SFP PSH-2109G-PLUS
	1000M			CCT-3102			FOS-3126-PLUS
In Band Management (TS-1000 & Proxy)	10/100M or 100M		CCT-Chassis-II (optional AC/DC power module)	CCT-2212 CCT-2312 CCT-2212FSM	PCT-2212 PCT-2312 PCT-2212FSM		
	10/100/1000M			CCT-3312 CCT-3312FSM	PCT-3312 PCT-3312FSM		
	1000M						
In Band Management (IEEE802.3ah OAM + 802.1ag CFM)	10/100M or 100M	HCIII-Chassis (4U) (optional AC/DC power module)	CIII-Chassis (2U) (optional AC/DC power module)	CIII-2512 CIII-2512FSM CIII-2512R HCIII-2516			
	10/100/1000M			CIII-3512 HCIII-2516	PIII-3512		
	1000M			CIII-3512FSM	PIII-3512FSM		

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Authorized Distributor/Agent:

Point to Point, End to End, Service to Service



Ethernet OAM

Today, virtually all new end-user and most new network device applications are designed around the Internet Protocol (IP). Within 99 percent of Local Area Networks (LANs), Ethernet is used to carry those IP packets. Furthermore, Ethernet can carry almost all of the remaining traffic that is not IP-based, making it a natural candidate for enabling convergence.

Ethernet was not designed with rigorous OAM capabilities, in order to achieve operational visibility in an Ethernet-based WAN, service providers have encapsulated Ethernet signals inside another network protocol and used that protocol's OAM data to monitor performance.

Connectivity OAM is primarily supported by ITU-T Y.1731, IEEE 802.1ag and IEEE 802.3 ah (EFM), describes the instrumentation of telecommunications networks that provide operators with the tools to remotely manage their network. At the device level, OAM protocols generate messages that are used by operations staff to help identify problems that may not be apparent from basic device instrumentation. For example, OAM allows automatic network monitoring so that the

Ethernet Service OAM – Relevant Standards

The following forums are standardizing the relevant Ethernet OAM technology:

IEEE 802.1ah – Ethernet First Mile

IEEE 802.1ag – Connectivity Fault Management

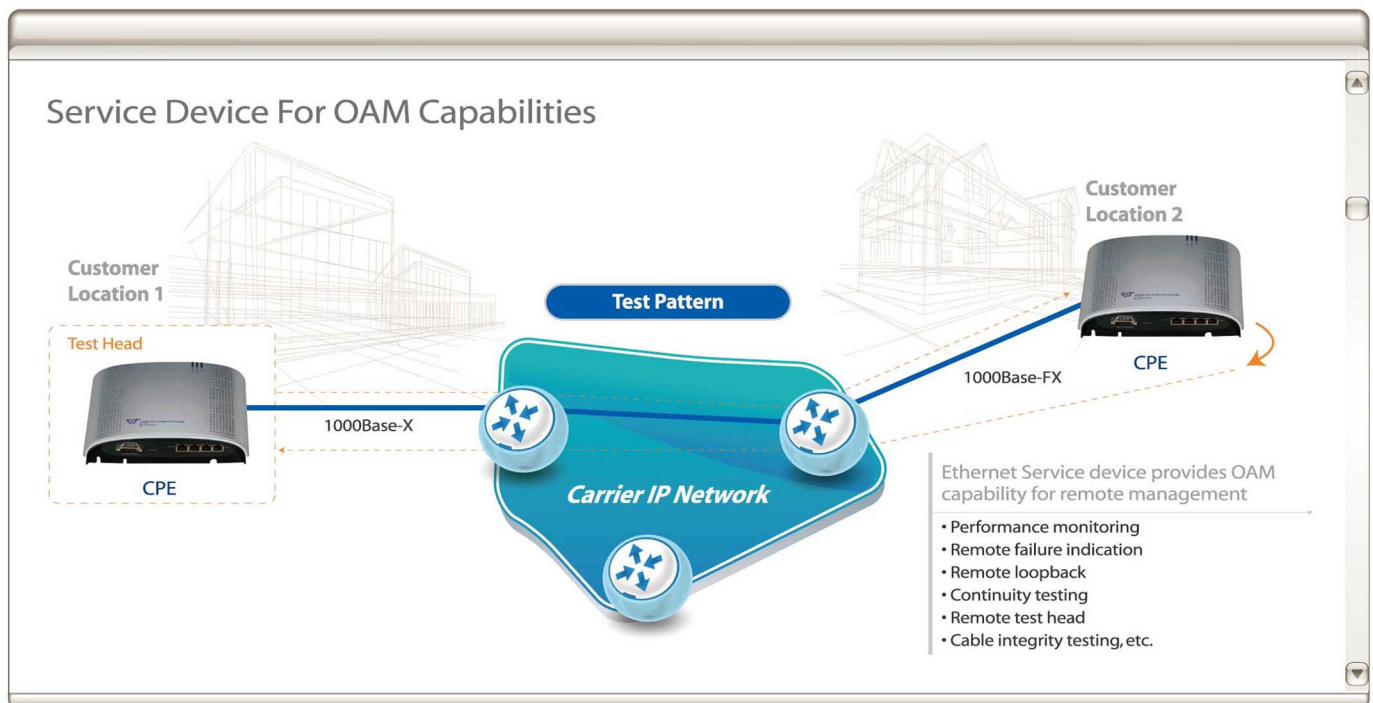
ITU-T Y.1731 – OAM Functions and Mechanisms for Ethernet Based Networks

There are two main areas of OAM: fault management and performance monitoring.

Connectivity Fault Management

Fault management ensures that when a defect occurs in the network that this is reported to the operator, who can then take the appropriate action. This is divided into the following functions:

Fault detection—Continuity check messages (CCMs) are sent from the source to the destination node at periodic intervals. If neither end receives a CCM within a specified duration, then a fault is detected against the service.



operator receives notification of equipment outages. In the event of a fault, the information generated by OAM helps the operator troubleshoot the network to locate the fault, identify which services have been impacted, and take the appropriate action.

Also, just as it is important to keep the customer's service running, it is important that operators be able to prove that is the case; this is usually measured against a service-level agreement (SLA), and the operator needs the performance measurements to manage customer SLAs.

OAM creates the environment that operators require to perform mature network and service management operations that allow them to control their networks cost-effectively and manage customer expectations.

Fault verification—A loopback message (LBM) is sent from the source node to the destination, which responds with a loopback reply (LBR) to verify connectivity between these two service endpoints. This can be used during initial setup or after a fault has been detected to confirm that a fault has occurred between two endpoints.

Fault isolation—The source node initiates a linktrace message (LTM), and each intermediate node along the path forwards the LTM toward the destination node and sends a linktrace reply (LTR) back to the source. This serves two purposes. Under normal conditions, it allows the operator to determine the path used by the service through the network. Under fault conditions, it enables the operator to isolate the fault location without making a site visit.

Fault Notification—ITU-T Y.1731 supports fault notification through Alarm Indication Signal (AIS). The failure between two nodes triggers AIS packets in both directions towards the service end points. This functionality alerts the operator to a fault in the network, before it is reported by customers. Additionally, the AIS packets can be used to trigger a redundancy sub-system.

Point to Point, End to End, Service to Service



Performance Monitoring

Real-time applications such as video and voice services are a major driver for carrier Ethernet and are particularly susceptible to the effects of frame delay and loss. As a result, carrier Ethernet networks require advanced performance monitoring to enforce customer SLAs. This functionality is introduced by the International Telecommunication Union ITU-T Y.1731 which complements IEEE 802.1ag by using many of the same functions and adding to them to deliver the following:

Frame loss ratio—Frame loss can be calculated by sending transmit and receive counters within CCMs for dual-ended measurements. The far end counters can then be compared with those produced locally to derive frame loss as a percentage.

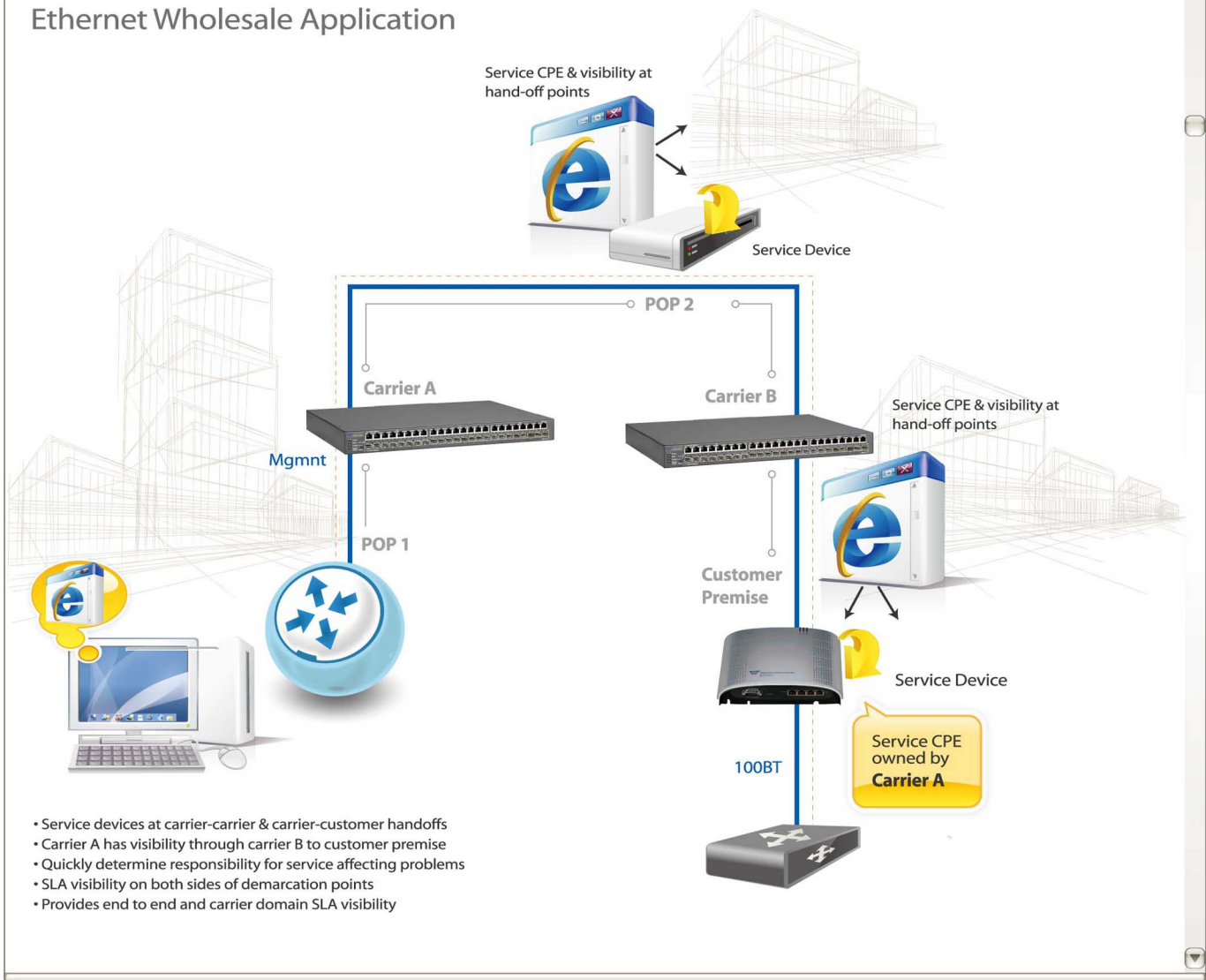
Frame delay—Similarly, by using a time stamp in the delay measurement (DM), the receiving end can derive the time delay experienced across the network. This requires each service endpoint to have synchronized clocks. Alternatively DM message (DMM)/DM reply (DMR) can be used to calculate the two-way frame delay; this method does not require clock synchronization.

Frame delay variation—Finally, ITU-T Y.1731 calculates frame delay variation (or jitter) by tracking frame DMs.

Summary

The emergence of carrier-grade Ethernet has driven the need for improved Ethernet OAM functionality. Ethernet OAM allows the exchange of management information from the network elements to the management layer. Without this capability it is impossible to provide the comprehensive network management tools that operators have today in their TDM networks. The combination of IEEE 802.1ag and ITU-T Y.1731 gives Ethernet powerful fault management and performance monitoring capabilities. This improved network instrumentation allows network operators to manage carrier Ethernet networks effectively and brings the operational values previously only available in traditional TDM networks to the packet-based networks that are replacing them.

End to End Service Ethernet Wholesale Application



Non-Management



SNMP Management

CVT-RACK-16 / CVT-RACK-16S

16 Slots Universal Media Converter Rack

- › Support 16 slots for CVT series media converters
- › 19-inch rack mount, 2U height
- › 3 hot-swappable fans
- › Plug & Play operation
- › RACK-16
 - 2 slid-in hot-swappable power supply system
 - Redundant and load sharing power supply system
 - LED indicator for primary and backup power supplies
- › RACK-16S
 - 1 fixed AC power supply
 - Small form factor converter chassis
 - LED indicator for power supply



CVT-100BTFX / W2X

Fast Ethernet 10/100Base-TX to 100Base-FX Switch Converter

- › Comply with IEEE 802.3, 802.3u 100Base-TX & 100Base-FX
- › Store and Forward switching mechanism
- › Auto-crossover for MDI/MDIX in TP port
- › 10/100Mbps Auto-Negotiation in TP port
- › Support Link Alarm
- › Support Manual-Set speed and duplex
- › Support switch mode & pure converter mode
- › Voltage supervisor



CVT-3012SFP

10/100/1000Base-T to 1000Base-X (SFP Slot) Switch Media Converter

- › Comply with IEEE 802.3, 802.3u, 802.3ab and 802.3z standards
- › Store and Forward switching mechanism
- › Support Link Alarm
- › Support Jumbo Frame up to 9728 bytes
- › Support Auto & Force mode configuration

CVT-3002BTFX / W2X-PLUS CVT-3002SFP-PLUS

Gigabit Ethernet 10/100/1000Base-T to 1000Base-SX/LX Converter with SFP Slot

- › Comply with IEEE 802.3, 802.3u, 802.3ab and 802.3z standards
- › Equipped with 1 SFP slot (for CVT-3002SFP-PLUS only)
- › Auto-crossover for MDI/MDIX in TP port
- › Support Link Alarm
- › Support Jumbo Frame up to 9216 bytes
- › Support Auto & Force mode configuration
- › Plug-and-Play installation



FOS-3126-PLUS

24 Combo ports (10/100/1000 copper and Dual-Speed SFP) Uplink 2 Combo Ports (10/100/1000 Copper and Giga SFP) Managed Ethernet Switch **

- › Comply with IEEE 802.3, 802.3u, 802.3ab and 802.3z standards
- › 24 combo ports (10/100/1000 copper and Dual-Speed SFP) + 2 uplink combo ports (10/100/1000 Copper** and Giga SFP)
- › Support SNMP, Web, Telnet, CLI * and Console management
- › Support IEEE 802.3ah OAM and 802.1ag CFM *
- › Comply with IEEE 802.1p Priority Mapping
- › Comply with IEEE 802.1q Tag VLAN/ Q-in-Q VLAN
- › Comply with IEEE 802.1w RSTP
- › Support QoS classification based on IEEE 802.1p, VID, TOS/DSCP, EtherType and L4 port
- › IPV4 and IPV6 DSCP remarking *
- › Support Port Monitoring
- › Support SNTP time server
- › Support IGMP Snooping v1, v2 and v3 *
- › Support DHCP client and prevision server
- › Support FTP/TFTP firmware upgrade
- › Support Radius Authentication
- › Support SNMP v1, v2c and v3 * network management
- › Support power down trap management

** Currently support 1000Mbps, and 10/100/1000Mbps coming soon

CVT-2112BTFX / W2X / SFP

10/100Base-TX to 100Base-FX Managed Switch Media Converter

- › Comply with IEEE 802.3, IEEE 802.3u standard
- › Auto-Cross over for MDI/MDIX in TP port
- › Support SNMP and Web management
- › Support Power down trap management
- › Support Link Alarm

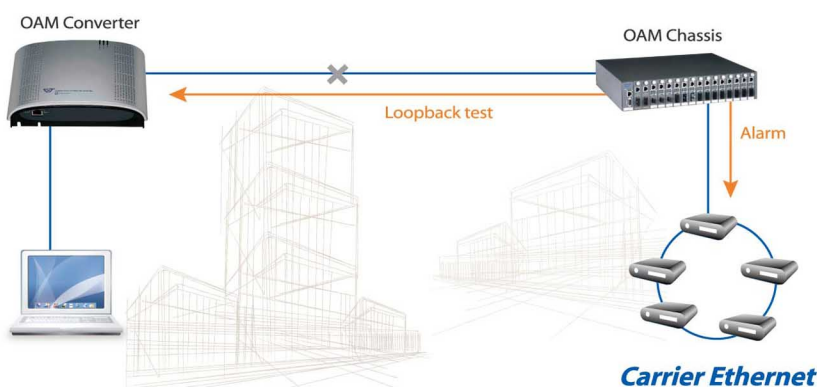
CVT-3112BTFX / W2X / SFP

10/100/1000Base-T to 1000Base-X Managed Switch Media Converter

- › Comply with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab and IEEE 802.3z standard
- › Auto-Cross over for MDI/MDIX in TP port
- › Support SNMP and Web management
- › Support Power down trap management
- › Support Selectable ISP Ethernet Tag Type
- › Support Q-in-Q Double Tag configuration
- › Support Link Alarm
- › Support Jumbo Frame up to 9K bytes



Point to Point OAM



PSH-2109G-PLUS

8 Ports 10/100Base-TX Managed Ethernet Switch with 1 Combo SFP Slot

- › Comply with IEEE 802.3, 802.3u, 802.3ab and 802.3z standards
- › Support SFP-8472 diagnostic monitoring interface
- › Support Rate Limit/Broadcast & Multicast storm suppression
- › Support IEEE 802.1p QoS/IP TOS/Application QoS
- › Support IEEE 802.1q VLAN/Q-in-Q VLAN Tunneling
- › Support IEEE 802.1w RSTP
- › Support IEEE 802.1x secure authentication *
- › Support priority override and remap *
- › Support port mirroring *
- › Support IGMP snooping v1, v2 and v3 *
- › Support SNMP v1, v2 and v3 *



ESH / SWH-2109FX / W2X PSH-2109FX / W2X

8 Ports 10/100Base-TX Managed Ethernet Switch with 100Base-FX Uplink

- › Comply with 802.3u standards
- › Support IEEE 802.1p QoS/IP TOS/Application QoS
- › Support IEEE 802.1q VLAN/Q-in-Q VLAN Tunneling
- › Support Spanning Tree
- › Management interface: Web/SNMP/Telnet/Console
- › FTP/TFTP firmware upgrade
- › Support User Account/IP Security/RADIUS authentication
- › Event log & power down trap
- › Build-in cable tray (for ESH-2109 only)
- › Ingress & Egress rate limiting operation



* Coming Soon

SWH-3124G

22 ports 10/100/1000Base-T Uplink 2 Combo ports (10/100/1000 copper and 100/1000 SFP) Managed Ethernet Switch

- › Comply with IEEE 802.3, 802.3u, 802.3ab and 802.3z standards
- › 22 ports 10/100/1000Base-T + 2 Combo ports (10/100/1000 copper and 100/1000 SFP)
- › Support SNMP/ Web *, /Telnet /Console management
- › Support IEEE 802.3ah OAM network management and IEEE 802.1ag CFM *
- › Comply with IEEE 802.1p Priority
- › Comply with IEEE 802.1q Tag VLAN/ Q-in-Q VLAN Tunneling
- › Support IEEE 802.1w RSTP
- › Comply with IEEE 802.1x secure authentication
- › Support IEEE 802.3ad Aggregation of Multiple Link Segments
- › Support jumbo frame on all ports up to 9600 bytes size
- › Support QoS Classification on IEEE 802.1p, VID, TOS/DSCP, EtherType and L4 Port
- › IPv4 and IPv6 DSCP Marking
- › Support DHCP Snooping
- › Support Rate Limit Control
- › Support SNTP Time Server
- › Support Static Multicasting
- › Support IGMP Snooping v1, v2, fast leave, and filtering
- › Support Multicast channel limitation per port
- › Support Multicast VLAN Register
- › Support DHCP client and provision server/DHCP relay agent.
- › Support FTP,TFTP server and client firmware upgrade
- › Support Access Control List
- › Support Radius Authentication
- › Support SNMP v1, v2c and network management
- › Support private, RFC-1213, RMON MIBs
- › Support Port Mirror
- › Support Power Down Trap Management



SWH-3114FX / W2X

SWH-3614SFP

12 Ports 10/100/1000Base-T Managed Ethernet Switch with Gigabit Fiber Uplink

- › Comply with IEEE 802.3, 802.3u, 802.3ab and 802.3z standards
- › 1x 1000Base-X port and 1 x SFP slot for SWH-3114-F1
- › 2x 1000Base-X ports for SWH-3114; 2x SFP slots for SWH-3114SFP
- › Comply with Metro Ethernet MEF9 UNI standard *
- › Management interface: Web/SNMP/Telnet/Console
- › Comply with IEEE 802.1p QoS/IP TOS/Application QoS
- › Comply with IEEE 802.1q Tag VLAN/Q-in-Q VLAN Tunneling
- › Support IEEE 802.1w RSTP
- › Support IEEE 802.3ad LACP; Support SNTP
- › Support IGMP Snooping v1, v2 and v3 *
- › Support DHCP client and provision server
- › Support FTP/TFTP Firmware Upgrade
- › Support SNMP v1, v2c, v3 * network management
- › Support power down trap management (SWH-3114 series only)
- › Support Radius Authentication



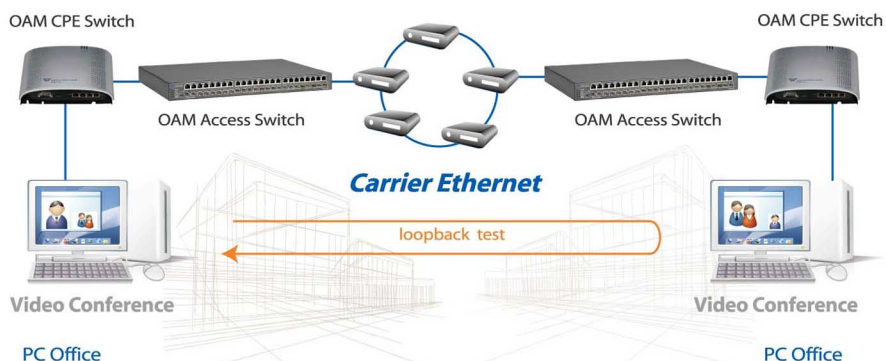
ESH-3605BTFX / W2X / SFP ESH-3105BTFX / W2X / SFP

4 Ports 10/100/1000Base-T Managed Ethernet Switch with 1 Port 1000Base-X Uplink

- › Comply with IEEE 802.3, 802.3u, 802.3ab and 802.3z standards
- › Four 10/100/1000Base-T ports and one 1000Base-X port
- › Support IEEE 802.3ah OAM network management
- › Support IEEE 802.1ag CFM
- › Support ITU-T Y.1731 OAM Fault Management (For ESH-3605 series)
- › Comply with IEEE 802.1p Priority
- › Comply with IEEE 802.1q Tag VLAN/Q-in-Q VLAN Tunneling
- › Support Selectable ISP Ethernet Tag Type
- › Support IEEE 802.1p, MAC *, Port, TOS, and DiffServ QoS for four queue
- › Support IGMP Snooping v1, v2
- › Support SNMP v1, v2c, network management
- › Support RADIUS Authentication
- › Support DHCP client and auto configure
- › Support DoS attack prevention
- › Management interface: Web/SNMP/Telnet
- › Support FTP/TFTP Firmware Upgrade



End to End OAM



In-Band Management

TS-1000 & Proxy / IEEE802.3ah OAM + 802.1ag CFM



CIII / PIII-2512BTFX / W2X

CIII / PIII-2512FSM

10/100Base-TX (100Base-FX) to 100Base-FX
IN-BAND Management Switch Media Converter & Module

- › Comply with IEEE 802.3u/802.3ah OAM
- › Support link pass through/power down trap
- › Comply with IEEE 802.1p QoS/IP TOS/Application QoS
- › Support IEEE 802.1q Tag VLAN/ Q-in-Q VLAN Tunneling
- › Support rate limit control/loop back diagnostic
- › Local/Remote module monitor & configuration (Local for CIII-2512 series; Remote for PIII-2512 series only)
- › On-time system & module firmware upgrade
- › Built-in cable tray (for PIII-2512 series)
- › Support fiber redundant line (for CIII/PIII-2512R only)

CIII/ PIII-3512BTFX/W2X

CIII/ PIII-3512FSM

10/100/1000Base-T (1000Base-X) to 1000Base-X
IN-BAND Management Switch Media Converter & Module

- › Comply with IEEE 802.3ab/802.3z standards
- › Support link pass through/power down trap
- › Comply with IEEE 802.1p QoS/ IP TOS/Application QoS
- › Support IEEE 802.1q Tag VLAN/Q-in-Q VLAN Tunneling
- › Support rate limit control/loop back diagnostic
- › Local/Remote module monitor & configuration (Local for CIII-3512 series; Remote for PIII-3512 series only)
- › On-time system & module firmware upgrade
- › Built-in cable tray (for PIII-3512 series)

HCIII-CHASSIS / HCIII-CHASSIS

IN-BAND Management 18 Slots High Density
Media Converter Chassis Center

- › Comply with IEEE 802.3ah and IEEE 802.1ag OAM standard
- › Support up to 54 media conversion pairs in 4U mechanism design (for HCIII-CHASSIS only)
- › Support 18 hot-swappable converter module
- › Support 2 (CIII)/4 (HCIII) hot-swappable AC/DC power modules
- › Support hot-swappable cooling fan
- › Support swappable management module
- › Support 4 chassis stack in on network with redundancy*
- › Management interface: Web/SNMP/Telnet/Console
- › Support 4 levels user account/IP security/RADIUS Authentication
- › Local/Remote module monitor & configuration
- › Support redundant configuration
- › Wire-speed in-band loop diagnostic, jitter and latency for network performance maintenance
- › One-time system & module firmware upgrade
- › Auto configuration backup via FTP/TFTP
- › SNMP agent support MIB II/Private MIB/RMON MIB
- › Support power down trap



HCIII-2516BTFX/W2X

3-Pair 10/100Base-TX to 100Base-FX High Density
IN-BAND Management Switch Media Converter Module

- › Comply with IEEE 802.3u/ 802.3ah OAM
- › High density with 3 media conversion pairs per module
- › Support link pass through/ power down trap
- › Comply with IEEE 802.1p QoS/ IP TOS/ Application QoS
- › Support IEEE 802.1q Tag VLAN/ Q-in-Q VLAN Tunneling
- › Support rate limit control/ loop back diagnostic
- › Local/Remote module monitor & configuration
- › On-time system & module firmware upgrade



CCT-CHASSIS-II

IN-BAND Management 16 Slot Media Chassis Center

- › Support 16 hot-swappable converter module
- › Support 2 hot swappable AD/DC power
- › Support management module with RS232 and Fast Ethernet interface
- › Management interface: Web/ SNMP/Telnet/Console
- › Local/Remote module monitor and configuration
- › Wire-speed in-band loop diagnostic (Lookback test)
- › Auto configuration backup via FTP/TFTP
- › SNTP time server
- › 4 levels user account management
- › Support IP security
- › SNMP agent support MIB II, Private MIB and RMON
- › SNMP trap with power down trap



CCT / PCT-2312BTFX / W2X

CCT / PCT-2212BTFX / W2X

CCT / PCT-2212FSM

10/100Base-TX (100Base-FX) to 100Base-FX
IN-BAND Management Switch Media Converter & Module

- › Comply with IEEE 802.3u standard
- › Comply with Japan TS-1000 standard (CCTT/PCT-2212 series)
- › Comply with Proxy management standard (CCT/PCT-2312 series)
- › Support hot swappable for CCT-CHASSIS-II (CCT-2312 and 2212 series)
- › Support loop back and diagnostic test
- › Support link pass through
- › Local/ Remote module monitor & configuration via CCT-CHASSIS-II
- › Support in-band module firmware upgrade (CCT/PCT-2312 series)
- › Rate limiting configuration
- › Support fiber redundant configuration

CCT / PCT-3312BTFX / W2X

CCT / PCT-3312FSM

CCT-3102BTFX / W2X

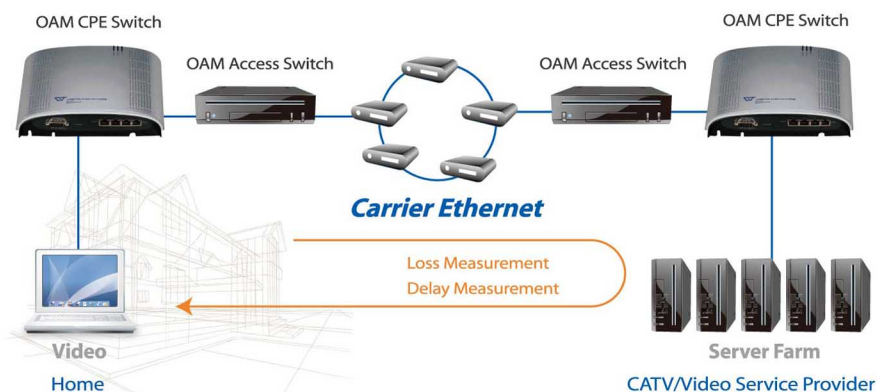
10/100/1000Base-T to 1000Base-X IN-BAND
Management Switch Media Converter & Module

- › Comply with IEEE 802.3, 802.3u, 802.3ab and 802.3z standard
- › Comply with proxy management standard (CCT/PCT-3312 series)
- › Support hot-swappable to CCT-CHASSIS-II
- › Support loop back and diagnostic test
- › Support link pass through/ power down trap
- › Local/ Remote module monitor & configuration via converter center
- › Rate limiting configuration (CCT/PCT-3312 series)



* Coming Soon

Service to Service OAM



Triple Play & Multimedia



ESH-2109W2X-RF

8 Ports 10/100Base-TX Managed Switch 1 Port 100Base-FX Uplink with Optic TV RF Receiver

- › Comply with IEEE 802.3u standard
- › Support 1 port of TV optic fiber
- › Support 1 port of NTSC/PAL RF
- › Comply with IEEE 802.1p QoS/ IP TOS/ Application QoS
- › Support IEEE 802.1q Tag VLAN/Q-in-Q VLAN Tunneling
- › Support IEEE 802.1d Spanning Tree
- › Support DHCP Client
- › Support IGMP Snooping
- › Management interface: Web/SNMP
- › Support NTP
- › FTP/TFTP firmware upgrade
- › Support rate limiting control/power down trap
- › Support RADIUS Authentication
- › Built-in cable tray

Fiber RF Receiver Features (for -RF model only)

- › Support frequency bandwidth 54~870MHz for TV broadcasting
- › Excellent CNR/CSO/CTB performance
- › Optical input power range -8~-2 dBm
- › AM-FDM transmit method
- › Comply with NTSC/PAL standards



* Coming Soon

VRG-21412W2X-PLUS

VRG-21412W2X-PLUS-RF

VRG-21412W2X-WF

4 Ports 10/100Base-TX 1 Port 100Base-FX Uplink with 2 Ports FXS VoIP Residential Gateway/with Optic TV RF Receiver

Hardware Feature

- › Comply with IEEE 802.3u standard
- › Support 1 port of TV optic fiber input (-RF only)
- › Support 1 port of NTSC/PAL RF coaxial output (-RF only)
- › Additional two USB 2.0 expansion ports (for VRG-21412W2X-WF only)

VoIP Features

- › Echo cancellation (G.165,G.168)
- › DTMF digits carriage for SIP UA (RFC 2833 via SIP INFO)
- › Support G.711/G.729/G.729 Annex A/B; Support SIP & MGCP
- › Support T.38/G.711 Fax *
- › Support SIP & MGCP *
- › Allow remotely control from centralized center (follow TR-69)

Layer 2/3 Features

- › Comply with IEEE 802.1p QoS/IP TOS/Application QoS
- › Support IEEE 802.1q Tag VLAN/Q-in-Q VLAN
- › DHCP Client/Server and auto configuration
- › Support bridge mode ;Support Routing (static routing table) *
- › Support IGMP Snooping v1/v2/v3 *
- › Support NAT, NTP, DNS client
- › Support DMZ host* , Dynamic port opening/virtual server
- › Radius Authentication*
- › PPPoE client*/pass through *
- › Management interface: Web/SNMP/Telnet
- › Support FTP/TFTP Firmware Upgrade

Fiber RF Receiver Features (for -RF model only)

- › Support frequency bandwidth 54~870MHz for TV broadcasting
- › Excellent CNR/CSO/CTB performance
- › Optical input power range -8~-2 dBm
- › AM-FDM transmit method
- › Comply with NTSC/PAL standards



VRG-21812GFX / W2X / SFP

6 Ports 10/100Base-TX+2 Ports 10/100/1000Base-T and Dual Speed SFP slot for WAN Uplink with 2 Ports FXS VoIP Residential Gateway/with Optional Optic TV RF Receiver Module

VRG-31612W2X/SFP

6 Ports 10/100/1000Base-T+1 Port 1000Base-X Uplink with 2 Ports FXS VoIP and Optic TV RF Receiver Residential Gateway/with Optional Optic TV RF Receiver Module

Hardware Features

- › Comply with IEEE 802.3 , 802.3u , 802.3ab , 802.3z standards
- › 6x 10/100Base-TX ports plus 2x 10/100/1000Base-T and 1x 100BaseFX/1000Base-X SFP slot for WAN uplink (for VRG-21812 series)
- › 6x 10/100/1000 Base-T and 1x 1000Base-X port for WAN uplink (for VRG-31612 series)
- › 2x FXS RJ11 ports
- › 2x USB 2.0 expansion ports (for VRG-21812 series only)
- › 1 port of TV optic fiber input (for VRG-21812 and VRG-31612 series with optional RF module only)
- › 1 port of NTSC/PAL RF coaxial output (for VRG-21812 and VRG-31612 series with optional RF module only)

VoIP Features

- › Echo cancellation(G.165,G.168)
- › Support SIP protocol
- › Support codec G.711/G.729 /G.729 Annex A/B
- › Support T.38 / G.711 fax *

Layer2/3 Features

- › Comply with IEEE 802.1p Priority
- › Comply with IEEE 802.1q Tag VLAN/Q-in-Q VLAN tunneling
- › Bridge mode
- › DHCP Client & Server/Auto Configure
- › Support IGMP snooping V1/V2
- › Support NAT, NTP, DNS Client
- › Radius authentication
- › PPPoE Client and pass through *
- › Support DMZ host, Firewall, Attack detection and blocking
- › Support WEB/SNMP/Telnet Management Interface
- › FTP/TFTP firmware upgrade
- › Power down trap(SNMP) *

