

ZyXEL

MSAN/IP DSLAM Product Guide
From IP DSLAM to Multi-Service Access Nodes

**Flexible and Converged Platforms for
Evolutionary IP Access Networks**



2008-09

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- Complete FTTx Broadband Access Solution
- Various Mechanical Housing for Different Market Demands
- Universal Platform for Versatile Line Card Services including xDSL, VoIP and Active Ethernet
- Smooth VoIP Migration Path from Connecting Legacy PSTN to Pure NGN Core



For more product information, visit us on the web at www.ZyXEL.com



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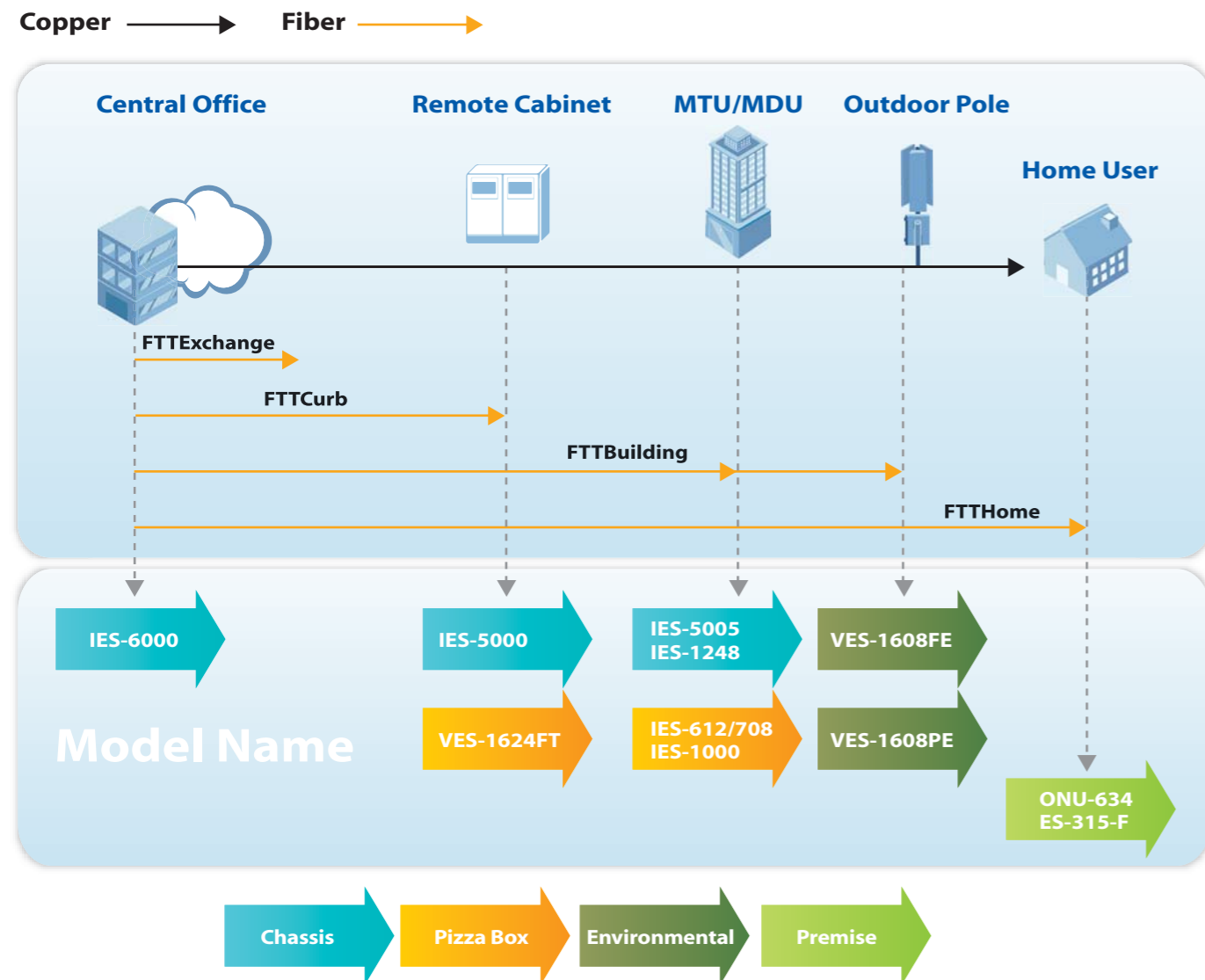


Flexible and Converged Platforms for Evolution of IP Access Networks

ZyXEL's Multi-Service Access Node (MSAN) product portfolio provides the most complete FTTX solutions for various access network constructions. The temperature-hardened design for high, medium and low port density devices facilitates the deployment of Fiber-to-the-Exchange (FTTE), Fiber-to-the-Curb (FTTC), Fiber-to-the-Building (FTTB) and Fiber-to-the-home (FTTH) access infrastructure for the requirements of the rapidly increasing transmission bandwidth. (Figure One)

Figure One

ZyXEL's FTTX Solutions



Triple Play

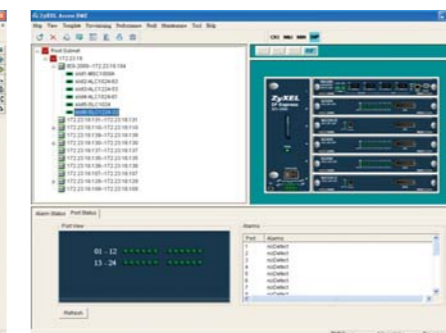
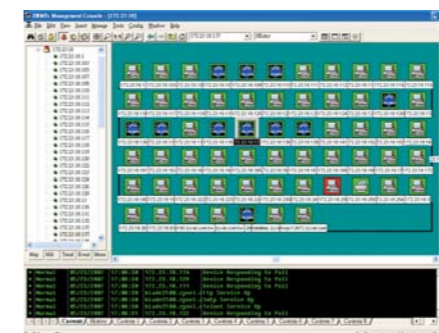
With over million ports deployed in video streaming environments, ZyXEL's MSAN provides comprehensive QoS such as Strict Priority Queuing (SPQ), Weighted Round Robin Scheduling (WRR) as well as IPTV related features including IGMP snooping, proxy and fast leave. The VoIP line card VOP1248G-61 provides aggregated 48 lines of Plain Office Telephone Service toward PSTN network. Each telephone line interface, Foreign Exchange Subscriber (FXS) connected with subscriber's telephone set through copper wire ranged up to 5 km. The analog voice signal from subscriber was converted to packet voice and transmitted toward called party through packet network. The VoIP line card uses either Session Initialization Protocol (SIP) or H.248 protocol for network signaling to establish or tear down a voice call. Advance call features like "three-party conference call," "call forward," "call waiting," etc. are integrated to make NGN migration become easy in access network deployment. Besides, to consider simplify access network convergence toward unified IP packet network, The VoIP line interface can co-exists with deployed ADSL2+ or VDSL2 service in the same paired copper wire without disturbing each other.

Integrated Management Platform for All DSLAM/MSAN Products

NetAtlas Access EMS can manage all kinds of ZyXEL's IP DSLAM/MSAN product portfolios, including IES-1000 series, IES-1248 series, IES-2000 series, IES-3000 series, IES-5000 series, IES-5005 series and IES-6000 series. Any of these ZyXEL devices can be automatically detected and represented by an icon on the map view of the EMS; and network operators can monitor the status with the icon colors, and read further OAM&P operation data by double-clicking on the icons. Key features including:

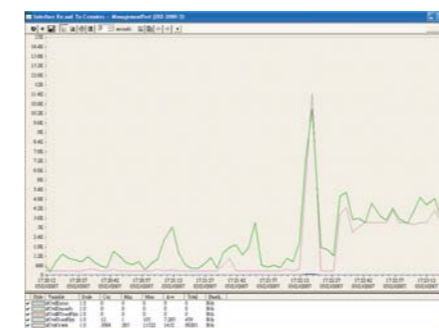
Features at a Glance

Network Topology View



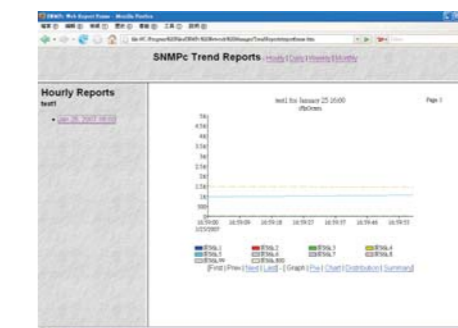
- **Tree View**
 - All managed network elements are shown in a tree structure of up to three layers: root map node, submap nodes and device nodes.
 - Each node contains its specific data.
- **Device View**
 - Add/delete a submap or device node and update device topology.
 - Query the status of a managed network element.

Performance Monitoring and Statistics Report



- Graph view and table view are supported for performance monitoring.

Trend Report

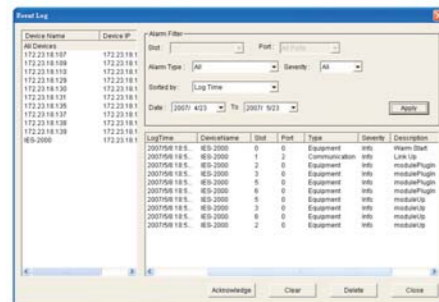


- Automatically generates scheduled daily, weekly, and monthly statistic reports. Report formats include graph, bar chart, distribution, and summary, and can be exported to a variety of destinations, including printers, files, or a WEB server.



Which ZyXEL Product is Right for You?

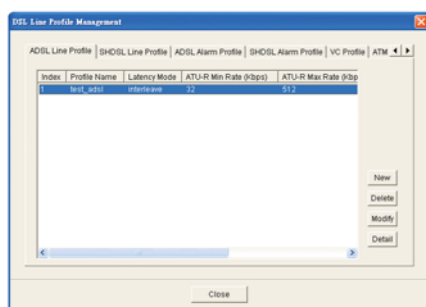
Alarm/Event Management



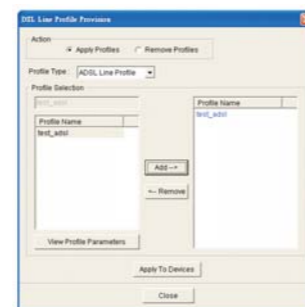
The NE will generate an alarm or event to notify the EMS via SNMP. The SNMP traps are defined in standard MIB and private MIB. The EMS receives and logs the SNMP traps generated by the NE.

- The EMS supports event browsing function by specifying the query conditions including IP address of NE, card ID, port ID, the event type, the severity, time period and the acknowledge status.
- The EMS supports the function to acknowledge alarms for keeping track of every alarm about by whom and at what time it is taken cared.
- The EMS supports the function to enable the clear flag of alarms for keeping track about by whom and at what time the alarms are cleared.

Template Setting for Fast Provisioning

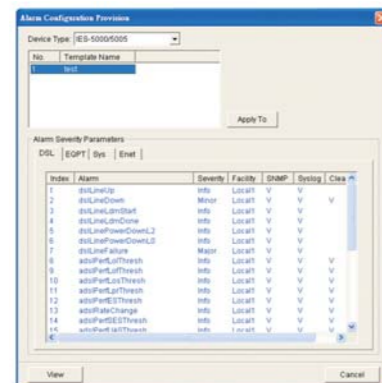
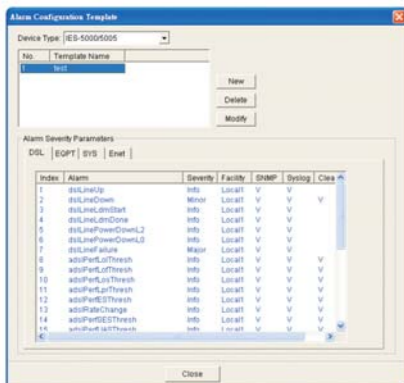


- The "Template setting" saves configuration templates for future use. The templates include DSL line profile template, service profile template, static VLAN template, static multicast group template, IGMP filtering template, alarm configuration template, multicast VLAN template and ACL rule template.



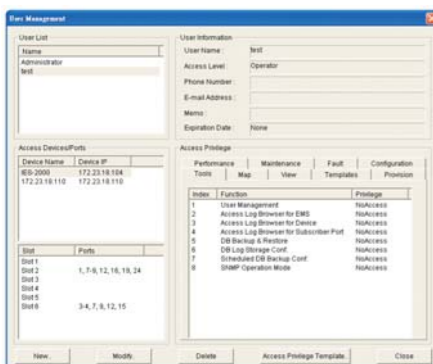
- The "Provisioning" function allows users to apply configuration templates to multiple network elements or device ports

Alarm Configuration



- The function specifies the severity, facility and actions (including send trap, syslog or both) for each alarm in the alarm configuration template. The template is then provisioned to the network elements to enable the alarm mechanism.

View-based Network Management Functions (VBNMF)



- The system administrator can assign the access privilege and the access object scope of the network elements to different users. A MIB object can only be accessed by the users with authenticated access right and access scope privilege.

Product Family	Your Requirement	Typical Application
IES-6000 12.5U Central MSAN 17 slots	<ul style="list-style-type: none"> 10G, Central, High Capacity Chassis based & hot swappable Ring or tree topology DHCP/PPPoE/PPPoA Mass flat layer-2 deployment Redundant Management Card & power supply 6 SFP + 4 100/1000Base-T/2 10G SPF + 6 100/1000Base-T ADSL2+, VDSL2, G.SHDSL.BIS, VoIP and fiber-based Ethernet line cards Multicast/Unicast IPTV service PSTN service replacement 	Up to 1152 per node, xDSL service for mass residential and SMB services. 10G upgrade available to prevent limitation of future bandwidth requirement such as PON. Design for flat layer-2 mass deployment with Layer-2+ deployment that overcome 16K MAC address limitation of networks as well as legacy authentication.
IES-5000 6.5U Central/Remote MSAN 8 slots	<ul style="list-style-type: none"> Central/Remote, temperature-hardened Chassis based & Hot Swappable Ring or tree topology DHCP/PPPoE/PPPoA Mass flat layer-2 deployment Redundant Management Card & power supply 4 SFP + 2 100/1000Base-T ADSL2+, VDSL2, G.SHDSL.BIS, VoIP and fiber-based Ethernet line cards Multicast/Unicast IPTV service PSTN service replacement 	High density 576-port IP DSLAM that is well-suited for large-scale deployments in central office sites. Flexible xDSL provisioning to server residential and business coverage. Service aware for all application demands such as Internet access, streaming audio and video, online gaming, VoD, IPTV, and VoIP applications.
IES-5005 4U Remote MSAN 4 slots	<ul style="list-style-type: none"> Remote & temperature-hardened Chassis based & hot swappable Ring or tree topology DHCP/PPPoE/PPPoA 4 SFP + 2 100/1000Base-T ADSL2+, VDSL2, G.SHDSL.BIS, VoIP and fiber-based Ethernet line cards Multicast/Unicast IPTV service PSTN service replacement 	For around 200~300 ports density in space-limited environments and requiring chassis-based DSLAMs. Suitable for a central office or remote site to fulfill users with high-bandwidth demand such as Internet access, streaming audio and video, online gaming, VoD, IPTV, and multimedia applications. Enhanced backplane capacity for VDSL2 provisioning.
IES-1248 1.5U Temperature-hardened IP DSLAM	<ul style="list-style-type: none"> Remote & temperature-hardened Stand-alone & built-in splitter Ring or tree topology DHCP/PPPoE/PPPoA Wire Speed & redundant uplink Hot swappable Fan Multicast/Unicast IPTV service Triple play services 2 Gigabit SFP/Copper Combo 48 ports ADSL2+ 	Typical FTTC/FTTB deployment for up to 144 ports per PoP density or for NGN IP migration. Temperature-hardened for setting up networks in remote locations to maximize ADSL bandwidth. Advanced QoS features for Internet access, streaming audio and video, online gaming, VoD, IPTV, and multimedia applications.
IES-1248-51V 1.5U Temperature-hardened Remote MSAN 2 Gigabit SFP/Copper Combo 48 ports ADSL2+/VoIP	<ul style="list-style-type: none"> Remote & temperature-hardened Stand-alone & splitter built-in Ring or tree topology DHCP/PPPoE/PPPoA Wire Speed & redundant uplink Hot swappable Fan Multicast/Unicast IPTV service PSTN service replacement (SIP, H.248) 2 Gigabit SFP/Copper Combo 48 ports ADSL2+/VoIP 	Focusing on future benefit of IMS IP core that Access Gateway is expecting to replace traditional class 4, class 5 switches via VoIP. Medium-size for density lower than 96 ports that two mature technology ADSL2+ and VoIP could be deployed at the same port. Aim for new community as well as business model of two play services. Full control of VoIP service at the CO site.
IES-1000 1U Mini MSAN 2 slots	<ul style="list-style-type: none"> Low density & multi-services AC/DC power input Max. 24-port ADSL2+ Max. 32-port G.SHDSL.bis Max. 24-port VoIP (SIP & H.248) 	Application that requires low density connections but needs the flexibility of multi-services. Perfect solution for government wide areabroadband coverage deployment campaign.
IES-612-51 1U Standalone Mini IP DSLAM	<ul style="list-style-type: none"> Low density ADSL2+ solution AC/DC power input Max. 12-port ADSL2+ 	Perfect solution for entry level and low-density ADSL2+ solution deployment areas.
IES-708-22 1U Standalone Mini IP DSLAM	<ul style="list-style-type: none"> Low density G.SHDSL solution AC/DC power input Max. 8-port G.SHDSL.Bis ATM-based Multi-Pair Bonding (G.998.1) support 	Perfect solution for entry level and low-density G.SHDSL solution deployment areas.
P-663H-51 ADSL2+ Bonded 4-port Router CPE	<ul style="list-style-type: none"> 2 ADSL2+ port bonding CPE ATM-based Multi-Pair Bonding (G.998.1) support DC Power Jack. (12 V, 1.5 A) 4-Port RJ-45 LAN connectors for 10/100 Mbps with Auto MDI/MDIX 	Application that requires high bandwidth performance at a long distance.



Product Line Highlight

Excellent system scalability and flexibility

- Comprehensive port density from a maximum of 1152 ports to a minimum of 12 ports for various deployment scenarios
- Diversified user interfaces including ADSL2+, G.SHDSL.bis, VDSL2, VoIP and active Ethernet fiber connections for various service requirements
- Provides future-proof 10G interface design for central office solutions and temperature-hardened capability for remote terminal/node solutions.
- Best suited for changing bandwidth requirements, the wire speed backplane is able to transfer at up to 2G per blade in remote VDSL2 applications.

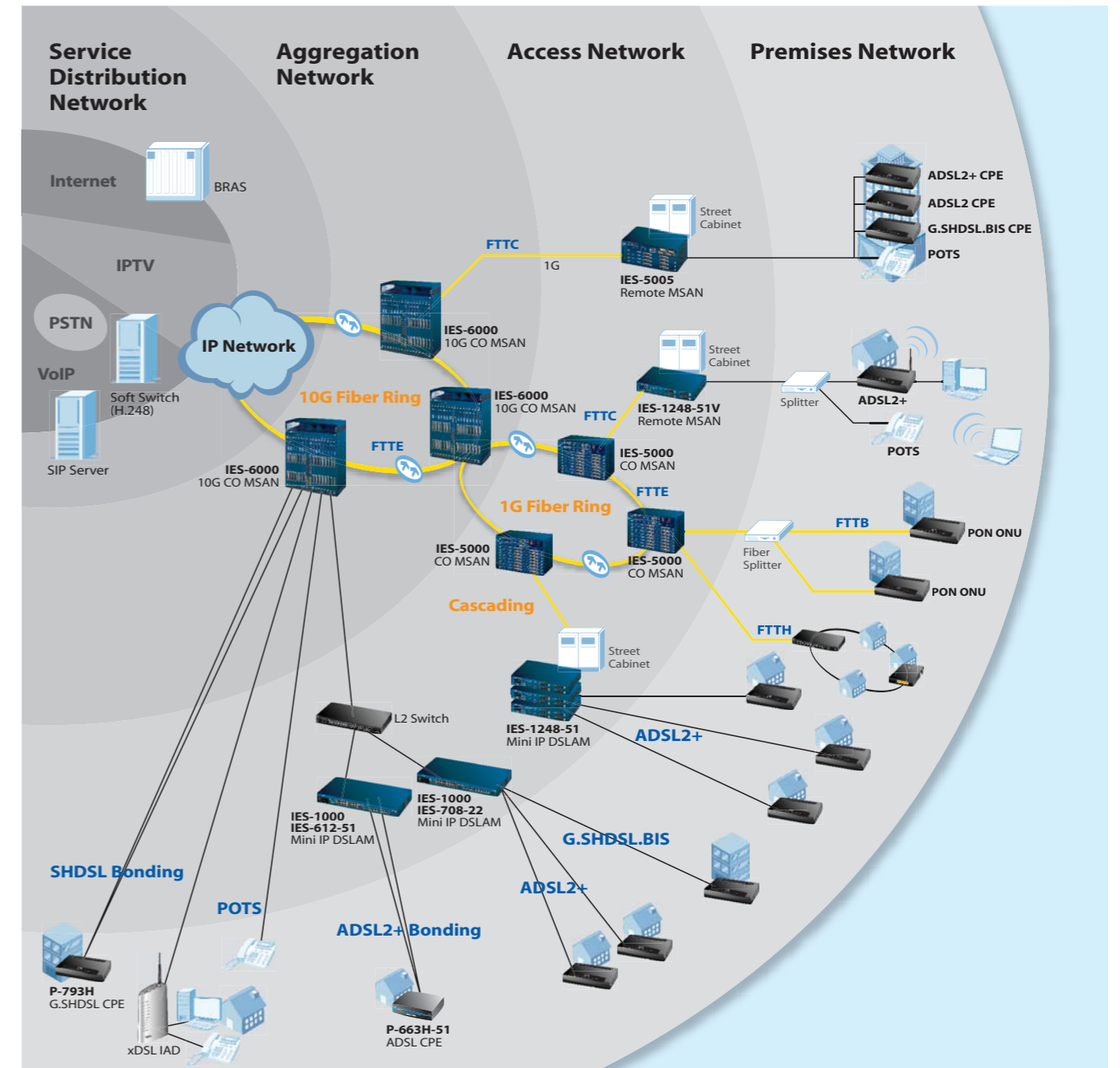
Field proven triple play service support

- Comprehensive QoS features that include 802.1p, ToS, DSCP mapping and ATM shaping
- Distributed multicasting implementation of IGMP V1, V2 snooping and proxy
- Fast leave and IPTV channel zapping time performance

Security enhancement for large-scale layer-2 infrastructure requirement

- Improved network stability via DHCP option 82 relay and built-in ARP proxy
- Support IP-aware bridging, Access Control List, VLAN aware DHCP and Anti-IP/MAC address spoofing features

Network Topology for MSAN Products





Product at a Glance

IES-6000

12.5U Central MSAN

The 12.5U high IES-6000 is a central office MSAN with Gigabit backplane which supports up to 16 vertical slots for any combination of the supported 48-port G.SHDSL/G.SHDSL.bis, 48-port or 72-port ADSL/ADSL2/ADSL2+ line cards and 24-port or 48-port VDSL2 line cards with ADSL2+ fallback capability. Carrier-class redundancy is also supported by the 2-slot MSC1024G/MSC1224G cards and 2 power input modules. The MSC cards provide sophisticated layer-2+ switching features and aggregate traffic from xDSL users into eight Gigabit Ethernet uplink interfaces. The maximum port capacity can be up to 768/1152 ports.



Key Features

- ▶ Gigabit backplane and DC powered
- ▶ 2 management switching cards and 2 power modules for redundancy
- ▶ 16 vertical slots for ADSL2+/G.SHDSL/G.SHDSL.bis/VoIP/VDSL2 line cards and 20-port SFP-based Fast Ethernet line card, hot swappable CO splitter cards in a separate splitter chassis
- ▶ 8 Gigabit Ethernet interfaces or 10G for uplink and subtending
- ▶ 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicast support
- ▶ 802.1x authentication, MAC/Packet filtering, and ACL filtering support

IES-5000

6.5U Central/Remote MSAN

The IES-5000 is a high-density IP DSLAM with Gigabit backplane which supports up to 8 slots for any combination of the supported 48-port G.SHDSL/G.SHDSL.bis, 48-port or 72-port ADSL2+ line cards and 24-port or 48-port VDSL2 line cards with ADSL2+ fallback capability. Carrier-class redundancy is also supported by the 2-slot MSC cards and 2 power input modules. The MSC cards provide sophisticated layer-2+ switching features and aggregate traffic from xDSL users into four Gigabit Ethernet uplink/subtending interfaces. The maximum port capacity can be up to 384/576 ports.



Key Features

- ▶ Gigabit backplane and DC powered
- ▶ 2 management switching cards and 2 power modules for redundancy
- ▶ 8 slots for ADSL2+/G.SHDSL/G.SHDSL.bis/VoIP/VDSL2 line cards and 20-port SFP-based Fast Ethernet line card, hot swappable CO splitter cards in a separate splitter chassis
- ▶ 4 Gigabit Ethernet interfaces for uplink and subtending
- ▶ 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- ▶ 802.1x authentication, MAC/Packet filtering, and ACL filtering support

IES-5005

4U Remote MSAN

The IES-5005 is a remote chassis-based MSAN with Gigabit backplane which uses the same MSC and line cards as the IES-5000. Each IES-5005 provides one slide-in slot for an MSC card and four additional slots for any combination of the supported xDSL line cards. Two power input modules are provided for power redundancy. The maximum port capacity can be up to 192/288 ports.



Key Features

- ▶ 2 Gigabit backplane and DC powered
- ▶ One management switching card and two power modules for redundancy
- ▶ 4 slots for ADSL2+/G.SHDSL/G.SHDSL.bis/VoIP/VDSL2 line cards and 20-port SFP-based Fast Ethernet line card, hot swappable CO splitter cards in a separate splitter chassis
- ▶ 4 Gigabit Ethernet interfaces for uplink and subtending
- ▶ 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- ▶ 802.1x authentication, MAC/Packet filtering, and ACL filtering support

IES-1248-51

Temperature-Hardened Mini IP DSLAM

As a standalone remote IP DSLAM with the highly compact and temperature-hardened design, the IES-1248 supports 48-port ADSL/ADSL2/ADSL2+ over POTS/ISDN with a built-in CO splitter. Each IES-1248 has two telco-50 connectors for ADSL/ADSL2/ADSL2+ lines and two telco-50 connectors for the built-in CO splitters. In addition, there are two combo Gigabit interfaces to support flexible uplink and subtending.



Key Features

- ▶ Remote IP DSLAM with AC or DC input connector
- ▶ Highly compact and temperature-hardened design
- ▶ In-band management and one mini RJ11 for local console
- ▶ 48-port ADSL/ADSL2/ADSL2+ module with built-in splitter
- ▶ Hot swappable fan module for flexibility
- ▶ Two Gigabit Ethernet interfaces for uplink and subtending
- ▶ 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- ▶ 802.1x authentication, MAC/Packet filtering, and ACL filtering support
- ▶ Element Management System (EMS) for Windows or Unix



IES-1248-51V

Temperature-Hardened Remote MSAN

As a remote MSAN with the highly compact and temperature-hardened design, the IES-1248-51V supports 48-port ADSL/ADSL2/ADSL2+ over POTS with a built-in CO splitter. Each IES-1248-51V has two telco-50 connectors for either ADSL/ADSL2/ADSL2+ lines or POTS connections. In addition, it comes with two combo Gigabit interfaces to support flexible uplink and subrending.

Key Features

- ▶ Remote MSAN with DC input connector
- ▶ Temperature-hardened design
- ▶ One mini-RJ11 port for local console management and two RJ-45 ports for Test In/Out loop test
- ▶ Support ADSL/ADSL2/2+ CPE, POTS phone, Fax, Analog Modem and Pay phone connections
- ▶ Hot-swappable fan module for flexibility
- ▶ Two combo GE ports for uplink and cascading with RJ-45 connectors and two SFP connectors.
- ▶ Support G.711 a/μ law, G.726, G.729 a/b, G.723.1, T.38 Fax/Modem signal coding & Fax Relay (G.711 a/μ).
- ▶ Support silence detection/suppression and Comfort Noise Generation (CNG), Voice Activity Detection (VAD), Caller ID detection, Caller ID generation.
- ▶ MLT (Metallic loop testing for subscriber lines) and GR-909/GR844 loop diagnostics



IES-1000

Mini MSAN

As a stand-alone multi-service access node, the IES-1000 system supports VoIP, G.SHDSL and ADSL2+ subscriber interfaces with built-in splitter. Each IES-1000 has two slide-in slots where either 24-port VoIP, 8 or 16-port G.SHDSL or 12-port ADSL2+ line cards can be installed. The network administrator may determine the line card combination to be used. Each ADSL2+/G.SHDSL.bis/VoIP line card can support two 10/100Base-T Fast Ethernet interfaces as uplink ports.

Key Features

- ▶ Mini MSAN with AC or DC powered
- ▶ Two slide-in slots for various xDSL modules
- ▶ 12-port ADSL/ADSL2/ADSL2+ modules with built-in splitter
- ▶ 8-port G.SHDSL or 16-port G.SHDSL.bis module for long each and business applications
- ▶ 24-port VoIP module for pure voice over broadband implementation
- ▶ One or two Fast Ethernet interfaces for uplink
- ▶ 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- ▶ 802.1x authentication, MAC/Package filtering, and ACL filtering support



IES-612-51

Standalone Mini IP DSLAM

The IES-612-51 is a standalone mini IP DSLAM supporting 12 standard ADSL2+ ports, and the design makes it easy for network administrators to determine the combination of line cards used. Each IES-612-51 supports two 10/100Base-T Fast Ethernet interfaces as uplink ports.

Key Features

- ▶ Mini IP DSLAM with AC or DC powered
- ▶ 12-port ADSL/ADSL2/ADSL2+ with built-in splitter
- ▶ Two Fast Ethernet interfaces for uplink
- ▶ 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- ▶ 802.1x authentication, MAC/Package filtering, and ACL filtering support



IES-708-22

Standalone Mini IP DSLAM

The IES-708-22 is a standalone mini IP DSLAM supporting 8 standard G.SHDSL ports, and the design makes it easy for network administrators to determine the combination of line cards used. Each IES-708-22 supports two 10/100Base-T Fast Ethernet interfaces as uplink ports.

Key Features

- ▶ Mini IP DSLAM with AC or DC powered
- ▶ MAX. 8-port G.SHDSL.Bis
- ▶ ATM-based Multi-Pair Bonding (G.998.1) support
- ▶ Two Fast Ethernet interfaces for uplink
- ▶ 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- ▶ 802.1x authentication, MAC/Package filtering, and ACL filtering support



System Architecture

System	Main Chassis	Splitter Chassis	Management and Switching Card	Line Card	Splitter Card
IES-6000	IES-6000M	IES-3016ST	MSC1024G MSC1224G (10G)	ALC1248G-51 ALC1248G-53 SLC1248G-22 VOP1248G-61 (SIP) VOP1248G-61 (H.248) ALC1272G-51 VLC1324G-51 VLC1324G-53 VLC1348G-51 ELC1220G-55	ASC1224-61 ASC1224-63U SEC1224 VSC1224-1 VSC1224-43U
IES-5000	IES-5000M	IES-5000ST	MSC1000G	ALC1248G-51 ALC1248G-53 SLC1248G-22 VOP1248G-61 (SIP) VOP1248G-61 (H.248) ALC1272G-51 VLC1324G-51 VLC1324G-53 VLC1348G-51 ELC1220G-55	ASC1024-61 ASC1024-63/63U SEC1024 VSC1024-41
IES-5005	IES-5005M	IES-5005ST	MSC1000G	ALC1248G-51 ALC1248G-53 SLC1248G-22 VOP1248G-61 (SIP) VOP1248G-61 (H.248) ALC1272G-51 VLC1324G-51 VLC1324G-53 VLC1348G-51 ELC1220G-55	ASC1024-61 ASC1024-63/63U SEC1024 VSC1024-41
IES-1248	IES-1248-51 (DC) IES-1248-53 (DC) IES-1248-51A (AC)	NA	NA	(built-in)	NA
	IES-1248-51V (DC)	NA	NA	(built-in)	NA
IES-1000	IES-1000 (DC)	NA	NA	SAM1008 SAM1216-22 AAM1212-51 AAM1212-53 VOP1224-61	NA
	IES-1000 (AC)	NA	NA		
IES-612-51	Standalone ADSL2+ Mini IP DSLAM	NA	NA	NA	NA
IES-708-22	Standalone G.SHDSL Mini IP DSLAM	NA	NA	NA	NA
P-663H-51	ADSL2+ 4-port Router CPE	NA	NA	NA	NA

P-663H-51

ADSL2+ 4-port Router CPE

The P-663H-51 is a router-based CPE, whose purpose is to co-work with ZyXEL series DSLAM/MSAN to provide ADSL2+ bonding solution for areas where more bandwidth is required, but VDSL solution is not feasible.

Key Features

- ▶ 2 ADSL2+ port bonding CPE
- ▶ ATM-based Multi-Pair Bonding (G.998.1) support
- ▶ DC Power Jack (12 V, 1.5 A)
- ▶ 4-Port RJ-45 LAN connectors for 10/100 Mbps with Auto MDI/MDIX
- ▶ Provide an end-to-end solution for ADSL2+ bonding with any of above IP DSLAM products



MSAN Feature Matrix

Model	IES-612-51	IES-708-22	IES-1000	IES-1248-51
System Overview				
Category	IP DSLAM for Outside Plant (ADSL2+ only)	IP DSLAM for Outside Plant (G.SHDSL.bis only)	Mini MSAN (ADSL2+, G.SHDSL.bis & VoIP)	IP DSLAM for Outside Plant (ADSL2+ only)
Dimensions W x D x H (mm)	270 x 350 x 44.45	270 x 350 x 44.45	440 x 320 x 44.5	270 x 350 x 44.45
Splitter	Built in		Built in	
Rack Mountable	19" 1U	19" 1U	19" 1U	19" 1U
Total Slots	Standalone	Standalone	2	Standalone
Max. xDSL Slots	Standalone		2	Standalone
Max. xDSL Ports	12 (ADSL2+)	8 (ADSL2+)	24/32	48
Management & Switching Card Redundancy				
Power Input	AC or DC	AC or DC	AC or DC	AC or DC
Power Redundancy				
Hot Swappable			•	
Interfaces				
Uplink	2FE	2FE	2FE	2 100/1000Base-T or 2 Mini GBIC
Subtending	•	•	•	•
ADSL2/2+ Line Card	•		•	•
G.SHDSL.bis Line Card		•	•	
VDSL2 Line Card			• (Future)	
VoIP Line Card			•	
Ethernet Line Card				
ADSL2/2+				
Annex M	•		•	•
SRA	•		•	•
INP (Min=2)	•		•	•
SELT	•		•	•
DELT	•		•	•
ADSL2+ Bonding	•		•	•
G.SHDSL				
N-wire Bonding (G.991.2)		•	•	
ATM-based Multi-Pair Bonding (G.998.1)		•		
VDSL2				
DS/US Speed (Mbps)				
Max. Ports				
ADSL2+ Fallback				
CFM (802.1ag)				
SELT				
DELT				
VoIP				
Signaling Protocol			SIP/H.248 (Future)	
Voice Codec (G.711a/u, G.723, G.726, G.729ab)			•	
Metallic Line Test (MLT)			•	
DTMF			•	
Fax/Modem (T.38)			•	
Call Waiting/Hold/Transfer			•	
Dial Tone, Ringing Tone, Busy Tone			•	
QoS				
802.1p	4 queue	4 queue	4 queue	4 queue
802.1q (VLAN#)	256	256	256	1024
SPQ/WRR	SPQ	SPQ	SPQ	SPQ
Security				
IEEE 802.1x	•	•	•	•
Multiple PVC	8	8	8	8
Q in Q (VLAN Stacking)	•	•	•	•
DHCP Snooping	•	•	•	•
DHCP Relay option 82	•	•	•	•
MAC/Packet Filtering	•	•	•	•
MAC Count Filtering	•	•	•	•
802.3ad Link Aggregation				
IP Bridge				•
Multicast Function				
IGMP v1/v2/v3	Snooping	• (no v3)	• (no v3)	•
	Proxy	• (no v3)	• (no v3)	•
	Multicast Group	256	256	512
Multicast VLAN	Static Multicast	•	•	•
	Multicast VLAN	•	•	•
Network Management				
SNMP v1, v2	•	•	•	•
SNMP v3				
Web Management	•	•	•	•
CLI Management	•	•	•	•
EMS Management	NetAtlas Access	NetAtlas Access	NetAtlas Access	NetAtlas Access

Model	IES-1248-51V	IES-5005	IES-5000	IES-6000
System Overview				
Category	MSAN for Outside Planet (Both ADSL2+ & VoIP)	MSAN for Outside Planet (ADSL2+, VoIP, G.SHDSL.bis, VDSL2, Active Fiber-base Ethernet)	MSAN for Central Office (ADSL2+, VoIP, G.SHDSL.bis, VDSL2, Active Fiber-base Ethernet)	MSAN for Central Office (ADSL2+, VoIP, G.SHDSL.bis, VDSL2, Active Fiber-base Ethernet)
Dimensions W x D x H (mm)	440 x 251 x 66	440 x 250 x 152	440 x 289 x 249	440 x 281 x 544
Splitter	Built in	Separated, IES-5005ST	Separated, IES-5005ST	Separated, IES-3016ST
Rack Mountable	19" 1.5U	19" 4U	19" 6.5U	19" 12.5U
Total Slots	Standalone	5	10	17
Max. xDSL Slots	Standalone	4	8	16
Max. xDSL Ports	48	192/288	384/576	786/1152
Management & Switching Card Redundancy			•	•
Power Input	AC or DC	DC	DC	DC
Power Redundancy		•	•	•
Hot Swappable		•	•	•
Interfaces				
Uplink	2 100/1000Base-T or 2 Mini GBIC	4GE	4GE	8GE or 2 x 10G + 6 x GE
Subtending	•	•	•	•
ADSL2/2+ Line Card	•	•	•	•
G.SHDSL.bis Line Card		•	•	•
VDSL2 Line Card		•	•	•
VoIP Line Card	Build in	•	•	•
Ethernet Line Card		•	•	•
ADSL2/2+				
Annex M	•	•	•	•
SRA	•	•	•	•
INP (Min=2)	•	•	•	•
SELT	•	•	•	•
DELT	•	•	•	•
ADSL2+ Bonding	• (Future)	•	•	•
G.SHDSL				
N-wire Bonding (G.991.2)		•	•	•
ATM-based Multi-Pair Bonding (G.998.1)		•	•	•
VDSL2				
DS/US Speed (Mbps)		100/45	100/45	100/45
Max. Ports		24/48	24/48	24/48
ADSL2+ Fallback		•	•	•
CFM (802.1ag)		•	•	•
SELT		•	•	•
DELT		•	•	•
VoIP				
Signaling Protocol	SIP, H.248 (Future)	SIP, H.248	SIP, H.248	SIP, H.248
Voice Codec (G.711a/u, G.723, G.726, G.729ab)	•	•	•	•
Metallic Line Test (MLT)	•	•	•	•
DTMF	•	•	•	•
Fax/Modem (T.38)	•	•	•	•
Call Waiting/Hold/Transfer	•	•	•	•
Dial Tone, Ringing Tone, Busy Tone	•	•	•	•
QoS				
802.1p	4 queue	8 queue	8 queue	8 queue
802.1q (VLAN#)	1024	4k	4k	4k
SPQ/WRR	SPQ	SPQ, WRR	SPQ, WRR	SPQ, WRR
Security				
IEEE 802.1x	•	•	•	•
Multiple PVC	8	8	8	8
Q in Q (VLAN Stacking)	•	•	•	•
DHCP Snooping	•	•	•	•
DHCP Relay option 82	•	•	•	•
MAC/Packet Filtering	•	•	•	•
MAC Count Filtering	•	•	•	•
802.3ad Link Aggregation		•	•	•
IP Bridge	•	•	•	•
Multicast Function				
IGMP v1/v2/v3	Snooping	•	•	•
	Proxy	•	•	•
	Multicast Group	512	256	256
Multicast VLAN	Static Multicast	•	•	•
	Multicast VLAN	•	•	•
Network Management				
SNMP v1, v2	•	•	•	•
SNMP v3				
Web Management	•	•	•	•
CLI Management	•	•	•	•
EMS Management	NetAtlas Access	NetAtlas Access	NetAtlas Access	NetAtlas Access

Model Description

IES-6000	Descriptions
IES-6000M	IES-6000 main chassis with 16 slots, two slots for MSC1024G cards and 15/16 slots for line cards, DC power input Dimensions: 440 (W) x 280 (D) x 540 (H) mm
MSC1024G	Management and switching card with 8 GE uplink ports
MSC1224G	Management and switching card with two 10G and 6 Gigabit Ethernet uplink ports
ALC1248G-51	48-port Annex A ADSL2/ADSL2+ line card (over POTS)
ALC1248G-53	48-port Annex B ADSL2/ADSL2+ line card (over ISDN)
ALC1272G-51	72-port Annex A ADSL2/ADSL2+ line card (over POTS)
SLC1248G-22	48-port G.SHDSL/G.SHDSL.bis line card
VLC1324G-51	24-port DMT-based VDSL2 line card (Annex A, 17a profile)
VLC1324G-53	24-port DMT-based VDSL2 line card (Annex B, 17a profile)
VLC1348G-51	48-port DMT-based 5-band VDSL2 line card (17a profile)
VOP1248G-61 (SIP)	48-port VoIP line card with supporting SIP
VOP1248G-61 (H.248)	48-port VoIP line card with supporting H.248
ELC1220G-55	20-port Fast Ethernet SFP (100Base-FX, 100Base-BX, and 100Base-LX)
IES-3016ST	IES-3016ST splitter chassis with 16 slots for 24 port splitter cards. 3 x 3016ST to support full-loaded ALC1272G-51 line cards at IES-6000M. 2 x 3016ST to support full-loaded ALC1248G-51 line cards at IES-6000M. Dimensions: 434.1 (W) x 219.4 (H) x 280 (D) mm
ASC1224-61	24-port Annex A ADSL/ADSL2+ splitter card (over POTS)
ASC1224-63U	24-port Annex B ADSL/ADSL2+ splitter card (over ISDN)
SEC1224	24-port G.SHDSL extension card
VSC1224-41	24-port DMT-based 5-band VDSL2 splitter card (over POTS)
VSC1224-43U	24-port VDSL2 universal splitter card (Over POTS and ISDN)
IES-5000	Descriptions
IES-5000M	IES-5000 main chassis with 10 slots, 8 slots for line cards and 2 slots for MSC cards for redundancy, DC power input Dimensions: 440 (W) x 288.9 (D) x 248.8 (H) mm
MSC1000G	Management and switching card with 4 GE uplink/subtending ports
ALC1248G-51	48-port Annex A ADSL2/ADSL2+ line card (over POTS)
ALC1248G-53	48-port Annex B ADSL2/ADSL2+ line card (over ISDN)
ALC1272G-51	72-port Annex A ADSL2/ADSL2+ line card (over POTS)
SLC1248G-22	48-port G.SHDSL/G.SHDSL.bis line card
VLC1324G-51	24-port DMT-based VDSL2 line card (Annex A, 17a profile)
VLC1324G-53	24-port DMT-based VDSL2 line card (Annex B, 17a profile)
VLC1348G-51	48-port DMT-based 5-band VDSL2 line card (17a profile)
VOP1248G-61 (SIP)	48-port VoIP line card with supporting SIP protocol
VOP1248G-61 (H.248)	48-port VoIP line card with supporting H.248 protocol
ELC1220G-55	20-port Fast Ethernet SFP (100Base-FX, 100Base-BX, and 100Base-LX)
IES-5000ST	IES-5000 splitter chassis with 16 slots for 24-port POTS/ISDN splitter cards. The splitter card uses a telco-50 (RJ-21) cable that connects to xDSL subscriber interface module for xDSL services. The other connector links to MDF for POTS or ISDN access. Dimensions: 437.2 (W) x 239.1 (D) x 292 (H) mm
ASC1024-61	24-port Annex A ADSL/ADSL2+ splitter card (over POTS)
ASC1024-63	24-port Annex B ADSL/ADSL2+ splitter card (over ISDN)
ASC1024-63U	24-port ADSL/ADSL2+ universal splitter card (over POTS/ISDN)
SEC1024	24-port G.SHDSL extension card
VSC1024-41	24-port DMT-based 5-band VDSL2 splitter card (over POTS)

IES-5005	Descriptions
IES-5005M	IES-5005 main chassis with 5 slots, 4 slots for line cards and 1 slot for MSC cards, DC power input Dimensions: 442.7 (W) x 268 (D) x 178 (H) mm
MSC1000G	Management and switching card with 4 GE uplink/subtending ports
ALC1248G-51	48-port Annex A ADSL2/ADSL2+ line card (over POTS)
ALC1248G-53	48-port Annex B ADSL2/ADSL2+ line card (over ISDN)
ALC1272G-51	72-port Annex A ADSL2/ADSL2+ line card (over POTS)
SLC1248G-22	48-port G.SHDSL/G.SHDSL.bis line card
VLC1324G-51	24-port DMT-based VDSL2 line card (Annex A, 17a profile)
VLC1324G-53	24-port DMT-based VDSL2 line card (Annex B, 17a profile)
VLC1348G-51	48-port DMT-based 5-band VDSL2 line card (17a profile)
VOP1248G-61 (SIP)	48-port VoIP line card with supporting SIP
VOP1248G-61 (H.248)	48-port VoIP line card with supporting H.248
ELC1220G-55	20-port Fast Ethernet SFP (100Base-FX, 100Base-BX, and 100Base-LX)
IES-5005ST	IES-5005 splitter chassis with eight slots for 24-port POTS/ISDN splitter cards. The splitter card uses a telco-50 (RJ-21) cable that connects to the xDSL subscriber interface module for xDSL services. The other connector links back to MDF for POTS or ISDN access. Dimensions: 437.2 (W) x 280 (D) x 124 (H) mm
ASC1024-61	24-port Annex A ADSL/ADSL2+ splitter card (over POTS)
ASC1024-63	24-port Annex B ADSL/ADSL2+ splitter card (over ISDN)
ASC1024-63U	24-port ADSL/ADSL2+ universal splitter card (over POTS/ISDN)
SEC1024	24-port G.SHDSL extension card
VSC1024-41	24-port DMT-based 5-band VDSL2 splitter card (over POTS)
IES-1248	Descriptions
IES-1248-51 (DC)	IES-1248 enclosure with 48-port Annex A ADSL2+ line and splitter over POTS, DC power input with temperature-hardened design Dimensions: 442.7 (W) x 250 (D) x 66 (H) mm
IES-1248-53 (DC)	IES-1248 enclosure with 48-port Annex B ADSL2+ line and splitter over ISDN, DC power input with temperature-hardened design Dimensions: 442.7 (W) x 250 (D) x 66 (H) mm
IES-1248-51A (AC)	IES-1248 enclosure with 48-port Annex A ADSL2+ line and splitter over POTS, AC power input Dimensions: 442.7 (W) x 250 (D) x 66 (H) mm
IES-1248-51V (DC)	IES-1248 enclosure with 48-port Annex A ADSL2+ and POTS line, DC power input Dimensions: 439.8 (W) x 251 (D) x 66 (H) mm
IES-1000	Descriptions
IES-1000 (DC)	IES-1000 enclosure with two slide-in slots for DSL modules, DC power input Dimensions: 440 (W) x 320 (D) x 44.5 (H) mm
IES-1000 (AC)	IES-1000 enclosure with two slide-in slots for DSL modules, AC power input Dimensions: 440 (W) x 320 (D) x 44.5 (H) mm
SAM1008	8-port G.SHDSL module
SAM1216-22	16-port G.SHDSL.bis module
AAM1212-51	12-port Annex A ADSL2+ module (over POTS) with splitters built-in
AAM1212-53	12-port Annex B ADSL2+ module (over ISDN) with splitters built-in
VOP1224-61	24-port VoIP module (SIP or H.248)
IES-612-51	12-port ADSL2+ standalone mini-DSLAM, DC or AC power input Dimensions: 270 (W) x 350 (D) x 44.45 (H) mm
IES-708-22A	8-port G.SHDSL standalone mini-DSLAM, AC power input Dimensions: 270 (W) x 350 (D) x 44.45 (H) mm
P-663H-51	ADSL2+ Bonded 4-port Router CPE

Certificate

EMC/ESD

- ◆ FCC Part 15 Class A
- ◆ EN55022 Class A
- ◆ EN55024 Class A
- ◆ ETS300 386
- ◆ NEBS

Safety

- ◆ ITU-T K.20, Appendix C
- ◆ CSA 60950
- ◆ EN60950
- ◆ IEC60950
- ◆ UL60950
- ◆ NEBS

Reliability

- ◆ ETS300 019