



## Flexible Provisioning of DSL and VoIP services

- Multi-service Access Node, AC or DC power input with two slide-in slots for various DSL and VoIP line modules
- 12-port ADSL/ADSL2/ADSL2+ line module with a splitter built-in for MTU application
- 8-port G.SHDSL or 16-port G.SHDSL.bis line modules with M-pair bonding feature for business applications
- 24-port VoIP line module with SIP signaling protocol and MLT function support
- Line module cascading with fast Ethernet uplinks
- 802.1p QoS, priority queuing, 802.1q VLAN tagging and multicasting support
- 802.1x authentication, MAC/Packet filtering and ACL filtering support
- Manageable with the Windows-based Element Management System (EMS)



1U IP DSLAM with  
AC/DC Power

**IES-1000**

### Benefits

#### Comprehensive Design for Various Market Demand

IES-1000 is a pizza box IP-based multi-service access node (MSAN). It has two slots for various combinations of DSL and VoIP line modules to provide ADSL2+, G.SHDSL and VoIP services to residential and business customers. It terminates the ATM traffic of DSL connections and POTS voice signals to make them IP packets and route them through IP networks. With the highly compact design (1U height), AC and DC power input as well as simple installation, IES-1000 can be deployed at Telco and SMB environment to meet all kinds of market demands.

#### Robust ADSL2+ Solution for Multiple Tenant Unit (MTU) Services

With ADSL2+ line module, service providers can offer residential users high-bandwidth internet access, on-demand entertainment services and IPTV services on a single network connection. The IES-1000 also offers business subscribers IP connectivity, VPNs, VLANs, high-quality video conferencing and legacy service interconnection with bandwidth up to 24Mbps per port. Moreover, it supports ATM-based 2-port bonding to provide even higher bandwidth to distant customers. The ADSL2+ line module is a sophisticated device fully compliant with existing standards and with modern features like energy-saving, excellent performance and transparent backward to ADSL/ADSL2 compatibility.

#### Lease Line G.SHDSL Service for Enterprise

With G.SHDSL technology, the IES-1000 is applicable for lease line replacement. Using the TC-PAM modulation technique, IES-1000 is compatible with other existing transmission technologies, allowing service providers to deploy at locations where broadband services already exist.

#### M-Pair Bonding G.SHDSL.bis Solution

IES-1000 supports the new-generation G.SHDSL.bis line module to provide transmission rate up to 4096kbps symmetrically in a single pair. It also comes with two 100Mbps Ethernet interfaces toward Ethernet aggregation network. One IES-1000 can accommodate two SAM1216-22 modules to support 32 SHDSL connections. In addition, the SAM1216-22 supports ITU G.991.2 m-pair bonding in a physical layer manner. The m-pair bonding can be 2 or 4 pairs and the aggregated payload rate is around 16Mbps.

#### VoIP Line Module to Provide Media Gateway Feature

In addition to FAX and modem services, VoIP line module provides a parallel and distributed media gateway architecture to empower VoIP services by taking advantage of POTS voice signals. With the architecture, the line module serves up to 24 POTS ports. As part of the benefit, there is no throughput bottleneck or single-point failure issue in this architecture. The media gateway provides G.711, G.723, G.726, G.729a/b and T.38 codecs while RFC3261 SIP network signaling protocols is supported.

## Extensive Management Capabilities

The entire IES-1000 system can be administrated remotely with the Windows-based NetAtlas Access EMS (Element Management System) based on the SNMP-manageable SNMPC platform. NetAtlas Access EMS provides powerful advanced remote management capabilities that help service providers minimize daily operational costs. Its loop-back design helps isolating network problems while the new firmware and IP Express configuration allow changes to be done remotely, eliminating the need for "truck rolls" in order to provision services to new customers or to reconfigure services for existing customers.

## Specifications

### System Specifications

- Delivery of Ethernet in the first mile using legacy LAN technologies
- End-to-end provisioning by offering DSL circuit configuration through NetAtlas Access EMS
- Support expandable configuration with plug-and-play line cards
- SNMP v1, v2 manageable
- Web management
- FTP/TFTP for firmware upload
- Console port configuration (RS-232)
- Telnet configuration and monitoring
- Spanning tree algorithm (802.1D) for loop free connection
- Configurable MTU value
- PPPoE intermediate agent compliant with TR-101
- G.998.1 ATM bonding
- 802.1Q VLAN aware bridging
  - IGMP snooping supports multicast traffic
  - QoS support with 802.1p
  - DHCP relay agent option 82 per VLAN
  - Port isolation/per VLAN isolation
  - 256 static VLAN entries (full-range VLAN ID 1~4094)
  - 4 K MAC address entries
- Packet prioritizing per 802.1p (QoS)
  - Static configuration – default priority setting
  - 4 priority queues per PVC (up to 4 PVCs)
- Multicast
  - IPv4 multicast forwarding (through L2 MAC)
  - Static multicast membership configuration
  - IGMP v1, v2 snooping & IGMP proxy mode support
  - Shared VLAN multicast
  - 256 multicast groups and each group can contain 18 members
  - IGMP filtering profile
  - IGMP count limiting
  - MVLAN
  - DSL port multicast bandwidth control
- Management support
  - CLI-based management from console/Ethernet port
  - SNMPV1, v2 and telnet through Inband Ethernet interface and NetAtlas Access, PC-based EMS management support

- Web-based management through Inband Ethernet interface.
- Secured Host: configure remote host IP addresses for management
- UNIX syslog
- F/W upgrade, configuration backup & restore via FTP and Web
- Text-based configuration file support
- Port configuration
- Alarm/Status Surveillance
- Performance monitoring
- Security and Memory Backup
- Self diagnostics
- Remote reset
- EMS Management support
- MIB
- SNMP MIB II (RFC1213)
- SNMP v1
- SNMP v2
- RFC1493 Bridge MIB
- RFC1643 Ethernet MIB
- RFC1757 Four group of RMON
- RFC2674
- RFC2662 ADSL line MIB
- RFC4319 (formerly RFC3276) SHDSL Line MIB

### Hardware Specifications

#### IES-1000M

- 19" 1U rack mountable, 2 card slots chassis
- Dimension : 440 mm (W) x 320 mm (D) x 46 mm (H)
- 2 line cards to accommodate different types of DSL services as well as VoIP services
- Fully hot-swappable design
- Support 8 to 32 ports in MDU/central office environment
- Temperature monitoring and alarm
- Auto-shutdown for over temperature
- Surge protection to prevent lightning damage

#### AAM1212-51 line module

- One Telco 50 connectors for 12-port ADSL/ADSL2/ADSL2+ and splitter card over POTS
- One mini RJ11 console port for local management
- Two 10/100Base-TX for uplink

- DELT(Dual Ended Loop Test)
- SELT (Single End Loop Test)
- G.998.1 2-port ATM bonding
- Power enhancement or ADSL power saving mode
- Rate adaptation
- Status LEDs- System Status, Ethernet 1 and 2 Link Status, Ethernet 1 and 2 Active Status, ADSL ports status, Alarm
- ADSL Compliance
  - DMT T1.413, issue 2
  - G.DMT (ITU G.992.1)
  - G.LITE (ITU G.992.2)
  - G.HS (ITU G.994.1)
  - Auto-negotiating rate adaptation
- ADSL2
  - G.992.3 Annex A
  - G.992.3 Annex L (RE-ADSL)
  - Annex M
- ADSL2+
  - G.992.5 Annex A, Annex M
  - G.992.3 Annex L (RE-ADSL)
  - Annex M
- ADSL2+
  - G.992.5 Annex A, Annex M

#### AAM1212-53 line module

- One Telco 50 connectors for 12-port ADSL/ADSL2/ADSL2+ and splitter card over ISDN
- One mini RJ11 console port for local management
- Two 10/100Base-TX for uplink
- DELT(Dual Ended Loop Test)
- SELT (Single End Loop Tets)
- Power enhancement or ADSL power saving mode
- Rate adaptation
- Status LEDs- System Status, Ethernet 1 and 2 Link Status, Ethernet 1 and 2 Active Status, ADSL ports status, Alarm
- ADSL Compliance
  - DMT T1.413, issue 2
  - G.DMT (ITU G.992.1)
  - G.LITE (ITU G.992.2)
  - G.HS (ITU G.994.1)
  - Auto-negotiating rate adaptation
- ADSL2 G.992.3 Annex B
- ADSL2+ G.992.5 Annex B

### SAM1008 line module

- One console port:-Mini-RJ-11(4P4C)
- One Ethernet port - RJ45 10/100 Mbps
- 8-port G.SHDSL- RJ-11 connector
- Status LEDs- System Status, Ethernet Link Status, Ethernet Active Status, G.SHDSL ports status, Alarm
- Compliant with ITU-T G.991.2
- TC-PAM modulation
- Transmission rate: 192k ~ 2.3Mbps, 64kbps increments over single copper pair
- All front access
- Hot-swappable

### SAM1216-22 line module

- One Telco 50 connectors for 16-port G.SHDSL.bis
- One mini RJ11 console port for local management
- Two 10/100Base-TX for uplink
- In-band Ethernet management
- Status LEDs- System Status, Ethernet Link Status, Ethernet Active Status, G.SHDSL.bis ports status, Alarm
- Line coding:TC-PAM
- Transmit power: up to 16.8 dBm
- Density: 16 ports per chip
- SHDSL payload format: ATM
- Rate Adaptation Mode: fixed, line probing
- Up to 4096kbps in single pair, m-pairs (2/4 pairs mode) bonding support up to 16.384Mbps
- Annex A and annex B PSD mask
- SHDSL line profile
- SHDSL alarm profile
- Power backoff
- Standard Compliant
  - ETSI SDSL (ETSI TS 101 524 V 1.2.1)
  - ITU G.shdsl (ITU-T G.991.2 (2001))
  - ITU G.shdls.bis (ITU-T G.991.2 (2004))

### VOP1224-61 line module

- One Telco 50 connectors for 24-FXS ports over POTS
- One mini RJ11 console port for local management
- Two 10/100Base-TX for uplink
- Ringer Max output power : 14 Watt
- Support SIP singling protocol
- Support G.711, G.726, G.729 a/b, G.723.1
- Support T.38 Fax/Modem signal coding & Fax Relay (G.711 a/m)
- Echo cancellation based on ITU-T G.168 , G.165
- Silence detection/suppression and Comfort Noise Generation (CNG)
- Voice Activity Detection (VAD)
- Caller ID detection (for VoIP packets from uplink)
- 10 K Business Hour Call Attempts (BHCA)
- Configurable jitter buffer
- Support the generation of dial tone, second dial tone, ringing tone (ring-back tone), busy tone, off-hook warning tone
- Support call waiting, call hold, call transfer, return and call back on busy
- MLT (Metallic loop testing for subscriber lines) and GR-909 loop diagnostic

### Physical Specifications

#### IES-1000M

- Dimension: 440 (W) x 320 (D) x 46 (H) mm
- Weight : 3.7 Kg

#### AAM1212-51

- Dimension: 170 (W) x 320 (D) x 35 (H) mm
- Weight : 0.9 Kg

#### AAM1212-53

- Dimension: 170 (W) x 320 (D) x 35 (H) mm
- Weight : 0.9 Kg

#### SAM1008

- Dimension: 170 (W) x 320 (D) x 35 (H) mm
- Weight : 0.9 Kg

### SAM1216-22

- Dimension: 170 (W) x 320 (D) x 35 (H) mm
- Weight : 0.9 Kg

### VOP1224-61

- Dimension: 170 (W) x 320 (D) x 35 (H) mm
- Weight : 0.8 Kg

### Environmental specification

- Power Supply (AC/DC)
  - AC Power: 100 ~ 240V AC, 50 ~ 60Hz
  - DC Power: -36 ~ -72 V DC
- Power Consumption
  - AAM1212-51: 25W
  - AAM1212-53: 25W
  - SAM1008: 8.59W
  - SAM1216-22: 25W
  - VOP1224-61 : 30W
- Operating Temperature: 0°C ~ 50°C
- Storage Temperature: -40°C ~ 70°C
- Operating Humidity: 10% ~ 90% (non-condensing)
- Storage Humidity: 10% ~ 95% (non-condensing)

### Certification

- Safety
  - UL 60950-1
  - CSA 60950-1
  - EN60950-1
  - IEC 60950-1
- EMC
  - FCC Part 15B Class A
  - EN55022 Class A
  - EN55024 Class A
  - ETSI 300386
- Reliability
  - ETSI 300019
- Telecom
  - ITU-T K20



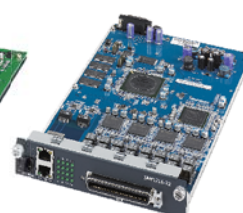
1U IP DSLAM with AC/DC Power  
**IES-1000**



ADSL2+ Line Card  
**AAM1212-51/53**



G.SHDSL Line Card  
**SAM1008**



G.SHDSL.bis Line Card  
**SAM1216-22**



VoIP Line Card  
**VOP1224-61**

# IES Series IP DSLAM Family Matrix

Model	IES-612-51	IES-708-22	IES-1000	IES-1248-51	IES-1248-51V	IES-5005	IES-5000	IES-6000
<b>System Overview</b>								
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)	MSAN for Outside Plant (Both ADSL2+ & VoIP)	MSAN for Outside Plant (ADSL2+, VoIP, G.SHDSL.bis, VDSL2, Active Fiber-base Ethernet)	MSAN for Central Office (ADSL2+, VoIP, G.SHDSL.bis, VDSL2, Active Fiber-based Ethernet)	MSAN for Central Office (ADSL2+, VoIP, G.SHDSL.bis, VDSL2, Active Fiber-based Ethernet)
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	440 x 251 x 66	440 x 250 x 152	440 x 289 x 249	440 x 281 x 544
Splitter	Built in		Built in		Built in	Separated, IES-5005ST	Separated, IES-5000ST	Separated, IES-3016ST
Rack Mountable	19" 1U	19" 1U	19" 1U	19" 1U	19" 1.5U	19" 4U	19" 6.5U	19" 12.5U
Total Slots	Standalone	Standalone	2	Standalone	Standalone	5	10	17
Max. xDSL Slots	Standalone	Standalone	2	Standalone	Standalone	4	8	16
Max. xDSL Ports	12 (ADSL2+)	8 (ADSL2+)	24/32	48	48	192/288	384/576	786/1152
Management & Switching Card Redundancy							•	•
Power Input	AC or DC	AC or DC	AC or DC	AC or DC	AC or DC	DC	DC	DC
Power Redundancy						•	•	•
Hot Swappable			•			•	•	•
<b>Interfaces</b>								
Uplink	2FE	2FE	2FE	2 100/1000Base-T or 2 Mini GBIC	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			• (Future)			•	•	•
VoIP Line Card			•		Build in	•	•	•
Ethernet Line Card						•	•	•
<b>ADSL2/2+</b>								
Annex M	•		•	•	•	•	•	•
SRA	•		•	•	•	•	•	•
INP (Min=2)	•		•	•	•	•	•	•
SELT	•		•	•	•	•	•	•
DELT	•		•	•	•	•	•	•
ADSL2+ Bonding	•		•	•	• (Future)	•	•	•
<b>G.SHDSL</b>								
N-wire Bonding (G.991.2)		•	•			•	•	•
ATM-based Multi-Pair Bonding (G.998.1)		•				•	•	•
<b>VDSL2</b>								
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						•	•	•
<b>VoIP</b>								
Signaling Protocol			SIP/H.248 (Future)		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			•		•	•	•	•
<b>QoS</b>								
802.1p	4 queue	4 queue	4 queue	4 queue	4 queue	8 queue	8 queue	8 queue
802.1q (VLAN#)	256	256	256	1024	1024	4K	4K	4K
SPQ/WRR	SPQ	SPQ	SPQ	SPQ	SPQ	SPQ, WRR	SPQ, WRR	SPQ, WRR
<b>Security</b>								
IEEE 802.1x	•	•	•	•	•	•	•	•
Multiple PVC	8	8	8	8	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				•	•		•	•
<b>Multicast Function</b>								
IGMP v1/v2/v3	Snooping	• (no v3)	• (no v3)	•	•	•	•	•
	Proxy	• (no v3)	• (no v3)	•	•	•	•	•
	Multicast Group	256	256	256	512	512	256	256
Multicast VLAN	Static Multicast	•	•	•	•	•	•	•
	Multicast VLAN	•	•	•	•	•	•	•
<b>Network Management</b>								
SNMP v1, v2	•	•	•	•	•	•	•	•
SNMP v3								
Web Management	•	•	•	•	•	•	•	•
CLI Management	•	•	•	•	•	•	•	•
EMS Management	NetAtlas Access	NetAtlas Access	NetAtlas Access	NetAtlas Access	NetAtlas Access	NetAtlas Access	NetAtlas Access	NetAtlas Access

\* Future release

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