



**IES-5000**  
6.5U IP DSLAM with DC Power



**IES-5005**  
4U IP DSLAM with DC Power

## Removing the Obstacles of Service Provisioning Mid-size Multi-Service Access Platform for Smoothly Migrating to Next Generation Network

- Non-blocking Gigabit Backplane
- IEEE 802.1p Priority Queuing, Packet Classification and Queue Scheduling (SP, WRR)
- VLAN Bridging, VLAN Trunking, and VLAN Stacking
- IGMP v1, v2 Snooping and Proxy
- 256 Multicast Groups
- Anti IP/MAC Address Spoofing
- Rule-based Packet Filtering
- Failover Network Termination
- Single/Dual End Loop Test
- ATM Forum TM 4.0

### Benefits

#### Service Aware

As a flagship product line of ZyXEL IP DSLAM, the IES-5000/5005 Series is equipped with non-blocking gigabit backplane, failover-enabled Management Switch Cards (MSC), dual power modules, high-port density DSL line cards and VoIP line cards. With embedded IP-centric QoS, security and multicasting firmware features, the IES-5000/5005 is a chassis-based system that facilitates Telco/ISP delivering high degree of quality of experience to today's demanding residential and business customers, and achieving its infrastructure provisioning criteria of reliability, flexibility and scalability at competitive CAPEX/OPEX.

#### Scalability

ZyXEL's IES-5000 is a 6.5RU height and 10-slot chassis-based system with separated 5RU splitter frame. Two of the 10 slots are reserved for Management Switch Cards (MSC) and the remaining 8 slots are for DSL line termination cards and VoIP line cards. The ADSL2/ADSL2+ line cards have two options: 48-ports and 72-ports; G.SHDSL.bis/VoIP line cards have 48 ports and the VDSL2 line card comes with 24 ports. In a standard rack, you can install up to 7 units without a splitter chassis or up to 4 units with a splitter chassis. The MSC has 4 GE ports for uplink and subtending. With the subtending feature, the IES-5000 can be cascaded in the rack at a central office, or be connected to remote IES products in the form of a tree, ring, or daisy-chained as needed. The uplinks can be used as a traffic aggregation trunk or set to work in 1+1 redundant mode. Additionally, install two Management Switch cards (MSC) for link redundancy and failover support. In case when an MSC fails, the second MSC takes over control within 1 second.

The compact design of IES-5005 offers a 4RU-height and 5-slot chassis-based system with a separated 3RU splitter frame. One slot is reserved for an MSC card and the remaining 4 slots are for DSL line termination cards and VoIP cards. The ADSL2/ADSL2+/G.SHDSL.bis and VoIP line cards have 48 ports while the VDSL2 line card comes with 24 ports. In a standard rack, you can install up to 10 units without a splitter chassis or up to 6 units with a splitter chassis. The IES-5005 supports remote terminal (RT) and uses the same MSC and line cards as the IES-5000.



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**IES-5005**

## Multiple Standard DSL Services

Five hot swappable DSL line cards (ADSL2+ over POTS, ADSL2+ over ISDN, G.SHDSL, and VDSL2) are available. The ADSL2+ over POTS and the ADSL2+ over ISDN give subscribers with asymmetric transmission bandwidth of up to 25 Mbps/1.2 Mbps. The G.SHDSL.bis provides symmetric transmission bandwidth of 4.096 Mbps, 8.192 Mbps or up to 16.384 Mbps (similar to a lease line). The VDSL2 offers up to 65 Mbps/35 Mbps high speed connectivity per port with various loop distances over copper wiring.

## Advanced Triple Play Functionality

The IES-5000/5005 provides complete ATM QoS (UBR/VBR/CBR) and Ethernet L2 QoS on the line cards. The IP QoS (Packet classification/Rate Limiting/Queue Scheduling) is provided on the Network Termination cards as well. Sophisticated PVC to VLAN bridging and aggregation enables end-to-end QoS and various service allocation and provisioning. In addition, the IES-5000/5005 supports non-blocking traffic forwarding and multicast features with up to 256 multicast groups and 576/384/192 members per group. The IES-5000/5005 can process more than 30 multicast IGMP join/leave requests per second and the maximum channel processing time is less than 250ms. For security, the IES-5000/5005 provides anti MAC/IP address spoofing, broadcast storm prevention, MAC count limiting, and policy-based packet filtering. All these features allow ISPs/Telco operators to provide High Speed Internet access, VoIP, Near VOD, Broadcast TV and TV on demand, and other features easily.

## Robust Physical Safety Design

ZyXEL's IES-5000/5005 guarantees physical safety by embedding voltage, temperature and FAN speed sensors. When an abnormal condition is detected, the LED displays and/or the corresponding alarms alert you to the situation. In cases when the system temperature goes higher than the configured threshold, thermal cutoff protection kicks into action and the system will shut down automatically.

## Sophisticated OAM&P Element Management System (EMS)

ZyXEL's IES-5000/5005 provides various management methods: local console port, Web-based configuration, Telnet, and SNMP v1/v2/V3-based EMS (NetAtlas Access EMS). Included management functions are Alarm and Status Surveillance, Configuration management, Performance management, and Fault management. The IES-5000/5005 allows you to create multiple administrative accounts and 3 levels of access rights. Accounts with the first-level privilege have full access rights. Second-level privilege accounts have the same access rights as first-level accounts except for account management. Third-level accounts can only view configuration settings and performance statistics. NetAtlas Access EMS also provides view-based MIB management and XML-based north bound interface. These features allow Telco operators to provide wholesale service to smaller CLECs and ISPs.

## Distributed and QoS-assured Media Gateway

The ZyXEL IES-5000/5005 provides a parallel and distributed media gateway architecture to empower VoIP services taking advantage of POTS voice signals, in addition to FAX and modem services. With the architecture, each media gateway serves up to 48 POTS ports and operates independently with each other. As part of the benefit, there is no throughput bottleneck or single-point failure issue in this architecture, the performance and reliability of the VoIP/fax/modem services are outstanding as well. The media gateway provides G.711, G.723, G.726, G.729a/b and T.38 codecs while RFC3261 SIP and H.248 network signaling protocols are supported as well.

# Specifications

## System Specifications

### DSL Compliant

- ADSL:
  - G.992.1 Annex A, G.992.3 Annex A, G.992.5 Annex A
  - G.992.1 Annex B, G.992.3 Annex B, G.992.5 Annex B
    - Support G.992.3 and G.992.5 Spectral Mask
    - Support Annex M and Annex L in G.992.3 and G.992.5
    - Support EOC and Overhead Channel Access
    - Support the latency path function
    - Support loop diagnostic function specified
    - Support the power management capability
    - Support the capability of the Seamless Rate Adaptation (SRA) on-line configuration
      - Dual end loop test
- SHDSL: G.991.2, G.991.2.bis
- VDSL2: G.993.2, G.994.1, G.997.1

### ATM Traffic Management

- 8 VPC/VCC per DSL port
- Support UBR, CBR, rt-VBR, nrt-VBR QoS Mechanisms
- Support ATM Forum TM 4.0 peak cell rate traffic parameter
- Support downstream traffic shaping function per ATM PVC
- Support ATM F5 OAM cells for End-to-End Loop back test (ITU-T Rec. I.610)

### Performance

- IEEE 802.1p CoS with priority queuing
- Eight queues with packet priority scheduling (SPQ, WFQ, WRR)
- Support 256 multicast groups
- Support 384 copies for each multicast group
- The maximum channel zapping processing time is 250 ms
- DSCP to 802.1p mapping

### Security

- Port isolation
- IEEE 802.1x (Authentication)
- Rule-based packet filtering (L2 ~ L4 ACL)
- MAC count limiting
- ARP broadcast filtering
- DHCP broadcast filtering
- DHCP snooping
- NetBIOS filtering

- IGMP filtering
- Anti IP/MAC address spoofing

### VLAN

- 4096 IEEE 802.1Q compliant VLAN tagging
- Port-based VLAN
- VLAN stacking
- VLAN Bridge Function (multiple PVCs to one VLAN)(N:1)
- PVC and VLAN one to one mapping (1:1)
- VLAN Trunking (Single PVC join Multiple VLAN)(1:N)
- Support GVRP function

### Traffic Management

- Tunneling: PPPoE, MP encap. over ATM (RFC 2684)
- STP: IEEE 802.1d, IEEE 802.1w, IEEE 802.1s
- IEEE 802.3ad (Link Aggregation Control Protocol)
- IP multicast forwarding
- IGMP v1, v2 snooping/proxy
- IGMP multicasting channel limiting
- DHCP Relay Option 82
- Multicast bandwidth control
- L2 ~ L4 ACL
- IGMP group count/filtering profile

### VoIP Features

- Codes: G.711, G.726, G.729a/b, G.723.1
- Network signaling protocols: ITU-T H.248 v2, SIP v2 (RFC3261)
- RTP (RFC 1889)
- RTCP (RFC 1890)
- FAX/Modem pass through (T.38) via RTP
- Tone detection and generation (bi-directional)- RFC2833 RTP Payload for DTMF
- Echo cancellation and auto gain control (G.165, G.168)
- VAD (voice activity detection)
- CNG (comfort noise generation)
- Caller ID generation and detection
- Supplementary services
  - local dial available
  - Emergency call local route
  - Do not Disturb
  - Selective/Anonymous call rejection
  - Call waiting

- Call hold
- Call transfer (blind and attended transfer)
- Call return and call back on busy
- Off hook warning tone
- Three way conference

### Network Management

- Local management through a craft terminal
- Web-based Management Interface
- In-band and out-of-band IP interface for management (SSH, SFTP)
- SNMP Management (through ZyXEL NetAtlas Access EMS)
  - SNMPv1/v2c/v3 agent/traps
  - Standard MIBs
    - RFC 1213 MIB II
    - ADSL Line MIB (RFC2662)/Extension Line MIB (RFC 3440)
    - SHDSL Line MIB (RFC 3276)
    - VDSL Line MIB (RF3728)
    - Bridge MIB/Extension MIB
    - RMON MIB (RFC 1757)
  - Vendor specific MIBs, e.g.,
    - Chassis Management MIB (Fan Speed, Voltage, Temperature)

### Hardware Specifications

#### IES-5000M

- 10-slot rack mountable enclosure, 19" or 23" chassis
- 8 slots for DSL line termination cards
- 2 slots for management and switch cards
- 2 DC power input module and filter
- One FAN and dust filter module

#### IES-5005M

- 5-slot rack mountable enclosure, 19" or 23" chassis
- 4 slots for DSL line termination cards
- 1 slots for management and switch cards
- 2 DC power input module and filter
- One FAN and dust filter module

#### AL1248G-51/ALC1272G-51

- Hot swappable 48-port/72-port ADSL2/ADSL2+ Annex A line card
- Maximum transmission rate up to 25 Mbps/1.2 Mbps for ADSL2+
- One mini-RJ11 console port
- One gigabit backplane

- Support G.992.3 and G.992.5 Spectral Mask
- Support EOC and Overhead Channel Access defined in G.992.3 and Rec.G.997.1
- Support the latency path function specified in G.992.3 and G.992.5
- Support Annex L and Annex M specified in G.992.3 and G.992.5
- Support loop diagnostic function specified in G.992.3 and G.992.5
- Support the power management capability specified in G.992.3 and G.992.5
- Support the capability of the Seamless Rate Adaptation (SRA) on-line configuration specified in G.992.3 and G.992.5

#### ALC1248G-53

- Hot swappable 48-port ADSL2/ADSL2+ Annex B line card
- Support Annex M and Annex L specified in G.992.3 and G.992.5
- Maximum transmission rate up to 25 Mbps/ 1.2 Mbps for ADSL2+
- One mini-RJ11 console port
- One gigabit backplane

#### SLC1248G-22

- Hot swappable 48-port SHDSL/SHDSL.bis line card
- Symmetric transmission rate of 4.096 Mbps (2-wire), 8.192 Mbps (4-wire) and 16.384 Mbps (8-wire)
- One mini-RJ11 console port
- One gigabit backplane

#### VLC1224G-41

- Hot swappable 24-port VDSL2 line card
- Support G.993.2, G.994.1, G.997.1
- Maximum transmission rate up to 65 Mbps/ 35 Mbps
- One mini-RJ11 console port
- Two gigabit backplane
- Support VDSL2 profiles 8a, 8b, 8c, 8d, 12a
- Support frequency allocation bandplan 998 and 997 (\*)
- Support US0 band, customer PSD, RFI notch, single latency in PTM mode (64/65 encapsulation)
- Support UPBO, Reed Solomon and Trellis coding

#### VOP1248G-61

- Hot swappable 48-port POTS line card
- Two RJ45 ports for loop test in and test out
- One mini-RJ11 console port
- One gigabit backplane
- Ringer Max output power: 15 Watt
- Support H.248 version 2 or SIP singling protocol
- Support G.711 a/μ, G.726, G.729a/b, G.723.1
- 20 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
- Emergency call local route\*
- Local dial available\*
- MLT (Metallic loop testing for subscriber lines) and GR-909 loop diagnostic

#### MSC1000G

- Failover-enabled Network Termination Card (IES-5000 only)
- Embedded 24G, non-blocking full duplex switching fabric
- Two 1000M interface modules (SFP + copper) for subtending
- Two 1000Base SX/LX/EX/ZX (mini-GBIC, SFP) interface for uplink
- One RS232 (DB-9) serial console port
- One 10/100M out-of-band Mgmt interface
- One external alarm IO port

### Physical Specifications

#### IES-5000M

- Dimensions: 440 (W) x 250 (D) x 288.9 (H) mm
- Weight: 10 Kg

#### IES-5005M

- Dimensions: 440 (W) x 250 (D) x 151.9 (H) mm
- Weight: 5 Kg

#### ALC1272G-51

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.7 Kg

#### ALC1248G-51

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.5 Kg

#### ALC1248G-53

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.5 Kg

#### SLC1248G-22

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.5 Kg

#### VLC1224G-41

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.5 Kg

#### VOP1248G-61

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.5 Kg

#### MSC1000G

- Dimensions: 267.4 (W) x 240 (D) x 37.55 (H) mm
- Weight: 0.4 Kg

### Environmental Specifications

- Operating temperature: -40°C ~ 70°C
- Storage temperature: -40°C ~ 85°C
- Humidity: 5 ~ 95% (non-condensing)
- Power Supply: -48 V DC
- Full Load Power Consumption :
  - IES-5000M : 55W
  - IES-5005M : 47W
  - MSC1000G : 19W
  - ALC1272G-51 : 95W
  - ALC1248G-51/53 : 69W
  - VLC1224G-41 : 74W
  - VOP1248G-61 : 84W
  - SLC1248G-22 : 47W

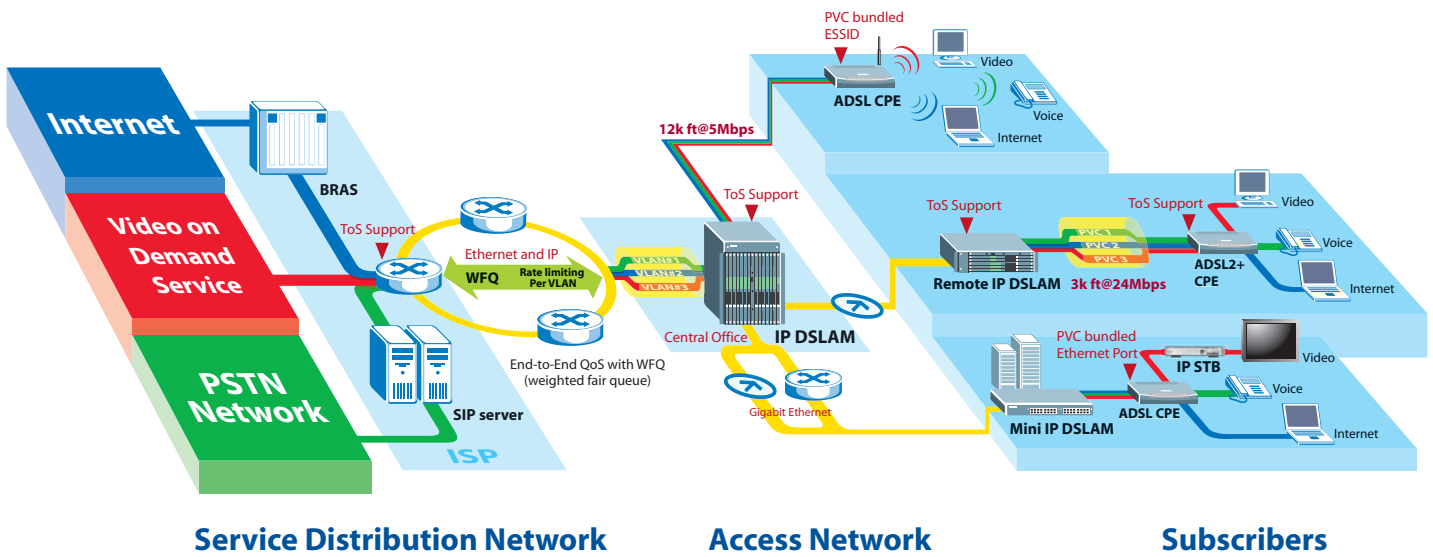
### Certification

- CE
- UL 60950, CSA 60950
- FCC part 15 class A
- ITU-T K.20
- ETSI 300 019
- EN55022 class A
- EN55024 class A
- ETSI 300 386
- NEBS Level 3 compliance

\*Future enhancement



# Application Diagram



For more product information, visit us on the web [www.ZyXEL.com](http://www.ZyXEL.com)



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