VES-1616F-34

16-port DMT
5-band VDSL Switch

Recently, Ethernet has been used for access applications, transport, and backbone infrastructure. Today, more service providers are adopting Ethernet as the First Mile (EFM) in their FTTB/C deployment as they discover the convenience of the technology. One such convenience is EFM over copper wire, which fills the bandwidth gap between high-speed, Metro fiber networks and low-bandwidth, copper-based services. It utilizes the existing copper wires, offering a cost-effective solution to service providers for today, tomorrow and beyond. Furthermore, mature Ethernet technology allows EFM to provide seamless connectivity between the enterprise Ethernet LAN and the WAN.

Ethernet over VDSL has changed the fundamental economics of broadband services for the last mile and the MTU market. It allows small to medium size corporations to use high bandwidth services similar to those of larger companies. Residential users can now enjoy video, data and voice services simultaneously through VDSL, without having to suffer from limited bandwidth. VDSL delivers cost-effective, high-bandwidth broadband access to enterprise campuses, hotels, commercial and residential buildings without the cost and effort of installing additional wires.

ZyXEL's VES-1616F-34 is a 16-port 5-band VDSL switch based on Discrete Multi Tone (DMT) modulation and the latest Ethernet technologies. It aggregates traffic from ZyXEL P-871-1/P-871H, DMT-based VDSL CPE.

The VES-1616F-34 has two Giga-bit fiber and two 100/1000Base-TX for either uplink connection to any third-party Ethernet switch or WAN router, or cascading multiple VES switches to service increasing subscribers. The built-in POTS/ISDN splitter splits and sends voice traffic to the PSTN. The VES-1616F-34 supports downstream speeds of up to 100Mbps and upstream speeds of up to 50Mbps while extending Ethernet service up to 1.5km.

The IEEE 802 standard-based firmware provides a rich set of features and ensures interoperability with equipment from other vendors. Additionally, the firmware includes advanced features such as IGMP snooping, broadcast storm control, and MAC address filtering that enhance security and bandwidth utilization.

With a broad array of advanced, fully integrated technologies, the VES-1616F-34 together with the P-871-1/P-871H enable service providers and system administrators to build a cost-effective, full service network that makes all kinds of media-rich applications possible.

ZyXEL
Unleash Networking Power

Benefits

DMT Modulation — Standard Compliance and Outstanding Performance

The VES-1616F-34 with CPE is a DMT (Discrete Multi-Tone)-based VDSL solution. DMT modulation, which dynamically adapts the bit rate to conditions on the local loop, offers excellent performance even over noisy lines. Network administrators become free from manually testing lines and constantly adjusting equipment to noise conditions. Both IEEE's 802.3ah Ethernet in the First Mile (EFM) Task Force and T1E1.4 Working Group selected DMT as its worldwide VDSL line-coding standard.

Port Trunking Provides Higher Availability

The VES-1616F-34 supports IEEE 802.3ad with load distribution control and fail over recovery. The VES-1616F-34 distributes traffic to each trunk port based on the source and destination MAC addresses, balancing the traffic load.

VLAN Offers Both Security and QoS (Quality of Service)

The VLAN feature in the VES-1616F-34 offers the benefits of both security and performance. VLAN is used to isolate traffic between different users in order to provide better security. Different services can be tagged and mapped into different priority queues. Thus, Quality of Service can be achieved and improved.

Multicasting Optimizes Bandwidth Utilization

The IGMP snooping feature forwards traffic only to subscribers that request multicast traffic. This prevents unnecessary forwarding of multicast traffic to all subscribers, thus optimizing bandwidth utilization for bandwidth-consuming applications such as broadcast video.

Rate Limiting Allows Service Differentiation

In order to fulfill the needs of different customers, service providers need a network infrastructure that combines guaranteed performance and flexibility in service provisioning. Rate limiting on the subscriber ports allows for service in increments of 1Kbps, allowing service providers to offer tiered service.
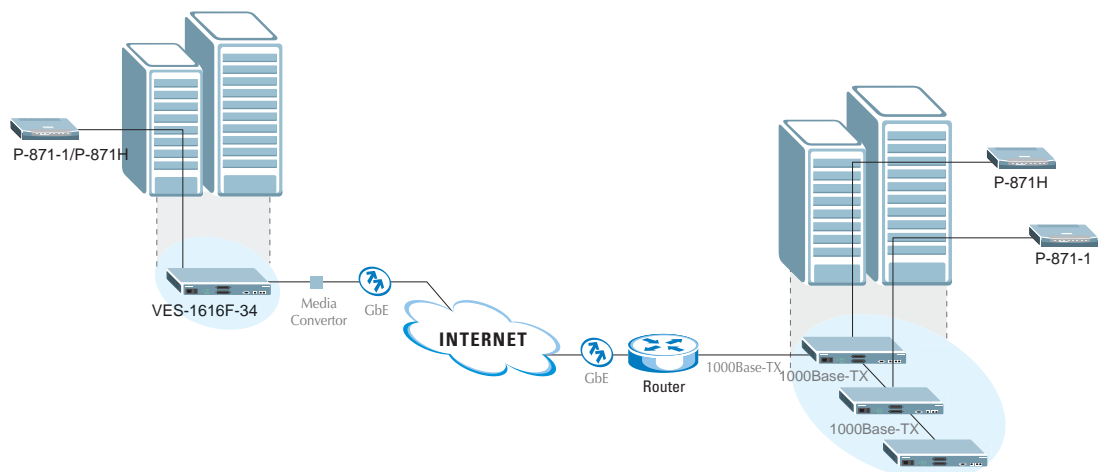
Access Control Enhances Network Security

The VES-1616F-34 supports not only 802.1x port-based access control for subscriber authentication, but also allows systemadministrators to define a limited number of MAC addresses that can access the network from a particular port. This feature denies access of unauthorized devices to communicate through the switch and highly enhances network security. Another access control feature is the capability to limit the number of users (MAC addresses) that can access the network simultaneously on a per-port basis, allowing the service provider to offer flexible billing plans.

Configuration and Management Simplifies Daily Operation

The VES-1616F-34 offers service providers extensive management capabilities. The Web-based management interface of the VES-1616F-34 offers an easy-to-use platform, independent management, and configuration options. The VES-1616F-34 supports SNMP and MIBs, both of which can be managed via standard-based management software. In addition to remote management capabilities, a console port is available for local management.

Single IP management design enables system administrators configure and manage multiple cascading VES devices through a single IP address. Network expansion can be accomplished without increasing management efforts.

Application Diagram

Features

General

Uplink/Cascade Interface
- Two Giga-bit fiber module
- Two 100/1000Base-TX module

VDSL Interface
- 16-port VDSL
- One Telco-50 connector to CPE
- Ethernet over VDSL
- Maximum downstream: 100Mbps
- Maximum upstream: 50Mbps
- Power back-off algorithm
- Rate adaptation at 64 Kbps
- Support resynchronization
- Support RFI configuration
- Support VDSL profile setup

POTS/ISDN Interface
- Built-in POTS/ISDN splitter
- 16-port POTS/ISDN
- One Telco-50 connector to PBX or CO

Performance & Management

Bridging
- 16K MAC addresses
- Static MAC address filtering/forwarding
- Limited max. number of MAC addresses per port

Switching
- Switching fabric: 12.8Gbps, non-blocking
- Frame size: 1522 bytes
- Forwarding frame: 802.3, 802.1q, Ethernet II, PPPoE
- Prevent the forwarding of corrupted packets
- Configurable aging time

STP
- 802.1d spanning tree protocol
- 802.1w rapid spanning tree protocol

VLAN
- Port-based VLAN
- IEEE 802.1Q tag-based VLAN
- No. of VLAN ID: 4K
  No. of static VLAN entries: 256
- Support automatic member registration; GVRP

QoS
- 802.1P
- 8 queues

Port Trunking
- IEEE802.3ad port trunking and static port trunking

Access Control
- 802.1x

Multicasting
- IGMP snooping
- IGMP filtering

Rate Limiting
- At 1 Mbps increment

Broadcast Storm Control
- Support

Multicast Storm Control
- Support

Port Mirroring
- All ports support port mirroring

IP Forwarding
- DHCP relay
- DHCP server
- DHCP option 82

System Control
- Alarm/status surveillance
- OAM&P
  - Trouble management
  - Configuration management
  - Performance management
  - Status management
  - Security management
- Software upgrade via console, web, FTP
- Configuration backup
- Self diagnostic
- Temperature monitoring

Network Management
- Local console
  - RS-232
  - 10/100 Base-TX
- SNMPv2
- Telnet
- Web-based management
- RMON group 1, 2, 3, 9
- Single IP management

MIBs
- SNMP MIB II (RFC1213)
- Bridge MIB (RFC1493, 2674)
- RMON MIB (RFC1757, group 1, 2, 3, 9)
- Private MIB (Set/Get/trap, etc)

Specifications

Hardware Specification

LED and Switch
- Power: on, off
- System
  - Light on: system ready and running well
  - Light flashing: system booting
  - Light off: system not ready or fail
- Alarm: on, off
- VDSL
  - Light on: link on
  - Light off: link down
- Giga-bit Fiber
  - SX, LX, LHX, ZX
- 100/1000Base-TX
  - 100M, 1000M
- Power switch for power on or off

Physical Specification

Dimensions
- 440(L) x 300(D) x 66.7(H) mm

Weight
- 5.4Kg

Power Requirement

Power Supply
- 100 ~ 240VAC, 50/60Hz

Power Consumption
- 75Watts (Max.)

Operating Requirement

Temperature
- 0ºC ~ 50ºC

Humidity
- 5% ~ 90% (Non-condensing)

Certification

EMC
- FCC Part 15 Class A
- CE-EMC Class A

Safety
- UL60950-1
- CSA60950-1
- EN60950 -1
- IEC60950-1
- ITU-T K.20 (Version 2000)

P-871-1/P-871H
Compatible CPE

F e a t u r e s

VDSL Interface
- One RJ-11 connector
- Ethernet over VDSL
- Data rate following the configuration from VES-1616F-34
- Power back-off design

POTS/ISDN Interface
- POTS splitter built-in
- ISDN splitter built-in

Ethernet Interface
- 10/100 Ethernet port
- RJ-45 connector

System Control
- Plug-and-Play
- Firmware upgrade from VES-1616F-34

Network Protocols
- IEEE 802.3/3u/3x
- Flow control in full duplex mode
- Back pressure in half duplex mode
- Transparent bridging

S p e c i f i c a t i o n s

Hardware Specification

LED and Switch
- Power: on, off
- System
  - Light on: system ready and running well
  - Light flashing: system booting
  - Light off: system not ready or fail
- VDSL
  - Light on: link on
  - Light flashing: training
  - Light off: link down
- 10/100Base-TX
  - 10M, 100M

Physical Specification

Dimensions
- 181(L) x 128(D) x 36(H) mm

Weight
- 0.35kg

Power Requirement

Power Supply
- 100 or 240VAC, 50/60Hz

Power Consumption
- 7 Watts (Max.)

Operating Requirement

Temperature
- 0ºC ~ 50ºC

Humidity
- 5% ~ 90% (Non-condensing)

Certification

EMC
- FCC Part 15 Class B
- CE-EMC Class B

Safety
- UL60950-1
- CSA60950-1
- EN60950 -1
- IEC60950-1
- ITU-T K.21 (Version 2000)

ZyXEL
Unleash Networking Power

65-100-131502