# ACE-201

## Multiservice Network Termination Unit

## Extending the reach of Gigabit Ethernet over ATM

- Multiservice network termination unit, allowing service providers to offer Gigabit Ethernet services over existing ATM networks
- STM-1/OC-3c network interface, supporting service data rates of up to 155 Mbps
- LAN/ATM interworking according to RFC 1483/2684 (bridged PDU), with up to 512 virtual circuit connections (VCCs)
- VLAN support according to 802.1p and 802.1Q, including VLAN stacking (Q-in-Q) capabilities, allowing traffic separation and prioritization
- Traffic shaping according to the CBR, VBR, GFR, UBR and UBR+ service classes

ACE-201 is a Customer Located Equipment (CLE) dedicated for provisioning interworking services of Gigabit Ethernet over ATM networks.

Used as a Network Termination Unit (NTU), ACE-201 provides a demarcation point between the provider's network and the customer premises. This enables end-to-end traffic and network management control.

### ATM CAPABILITIES

Using ACE-201, service providers can assign each virtual connection (VC) to different service classes, define the QoS parameters and shape the ATM egress traffic accordingly. By limiting the port ATM egress rate, service providers can control the total bandwidth provided to their users.

ACE-201 allows up to 512 virtual circuit connections (VCCs) to be established and used simultaneously over an ATM network.

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The following service classes are supported: CBR, VBR, GFR, UBR and UBR+.

On the ATM egress, ACE-201 provides two levels of traffic management:

- Shaping per VC
- Rate limiting of the ATM port's outbound traffic.

ACE-201 maps QoS parameters according to the VLAN priority or ToS field. QoS is supported in two modes:

- Mapping to different VCCs (with different traffic descriptors) of the same bridge port according to configured priority
- Mapping to four strict-priority VCC queues according to configuration.

The ATM timing reference for outbound (TX) traffic is based on an internal oscillator or on inbound traffic in loopback timing mode.

ATM OAM functionality supported by ACE-201 reduces operational costs by providing end-to-end traffic manageability and fault localization. OAM functionality complies with ITU-T I.610 and includes:

- AIS/RDI – system indication for local or remote fault conditions. In case these indications are detected in the network interface, ACE-201 sends a trap to alert the management system, and responds accordingly (RDI upon AIS reception)
- Continuity Check (CC) – used for checking service availability. ACE-201 sends a CC cell periodically over a predefined VCC to verify that the link is functional
- Loopback (LB) – used for fault localization. LB cells are sent with a destination address to be looped at any network element that was pre-assigned with loopback point address. ACE-201 also loops back received LB cells. Roundtrip delay measurements based on loopback cells are also supported.

### GIGABIT ETHERNET CAPABILITIES

ACE-201 supports VLAN-aware bridging with full VLAN ID range (1 to 4094). Up to 512 VLANs can be defined.

To allow special traffic formats, including ISL and stacked VLANs, the Ethernet frame can include up to 1594 bytes.

The supported frame types are: untagged, priority-tagged and VLAN-tagged.

ACE-201 provides L2 VPN services. Total traffic separation between customers is achieved by assigning VLAN IDs to virtual connections (VCs). Optionally, different priority levels can be defined within each VPN by mapping VLAN priorities to different VCs with appropriate QoS parameters.

### SDH/SONET CAPABILITIES

The unit's SDH/SONET network interface (fiber optic) supports STM-1/OC-3C framing for traffic speeds of up to 155 Mbps.

Physical layer statistics are provided for the SDH/SONET interface, along with comprehensive diagnostics, alarm generation and alarm forwarding capabilities.

### SLA DIFFERENTIATION

Using ACE-201, service providers can offer SLA (Service Level Agreement) differentiated services to generate revenues from their existing ATM infrastructure. In order to guarantee the SLA, it is important to maintain end-to-end control over the QoS.
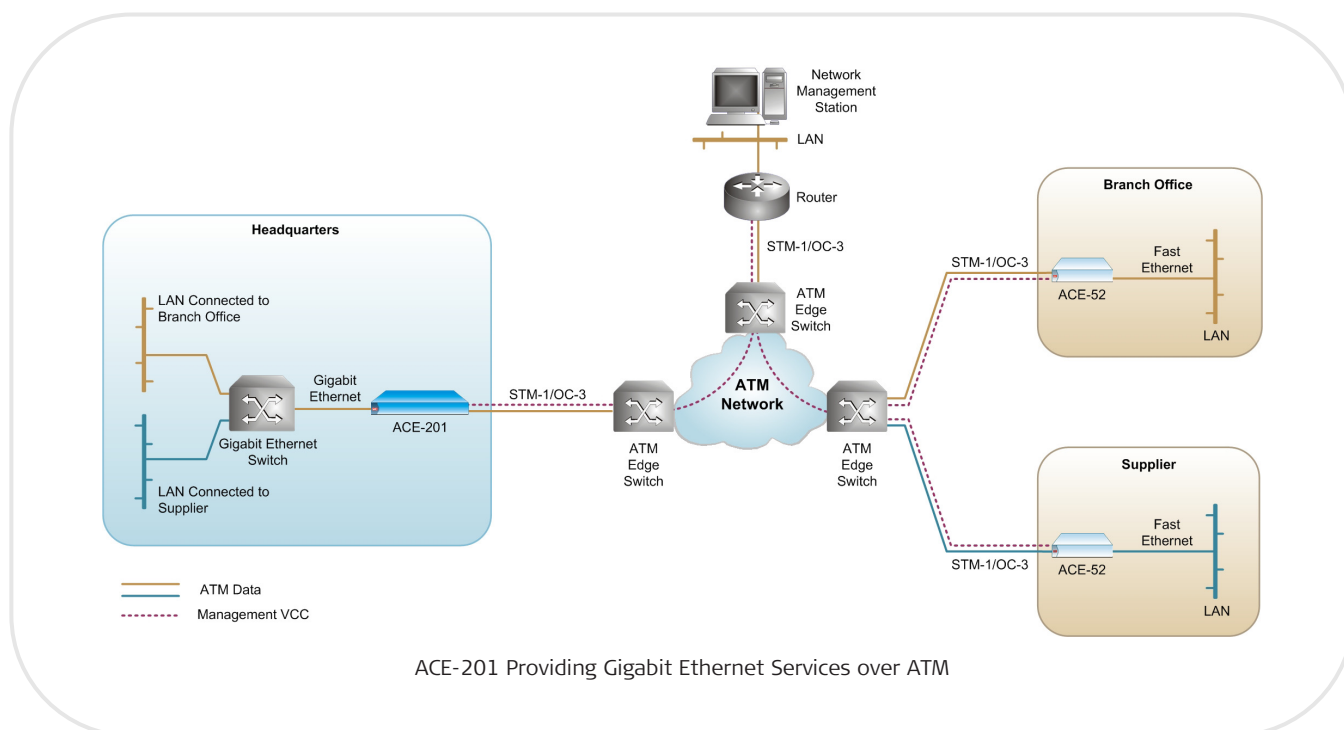


ACE-201 Providing Gigabit Ethernet Services over ATM

By defining and monitoring traffic management parameters from the customer's premises, carriers gain the following advantages:

- Users cannot over-utilize the allocated bandwidth
- Statistical efficiency of the link while using the same backbone equipment
- Complete information on service performance. Access to this information can optionally be opened to users
- Proactive readiness for changes required on the network, before services run into problems.

### ALARM FORWARDING

ACE-201 supports bidirectional alarm forwarding. If enabled, an alarm detected at either the SDH/SONET or ATM level disables the unit's Ethernet port. ACE-201 then sends an SDH/SONET alarm or ATM OAM cells towards the ATM network, to notify the remote end about the local Ethernet link disabling.

### MANAGEMENT

For comprehensive configuration, monitoring and diagnostics, ACE-201 can be managed:

- Locally, by connecting an ASCII terminal to the unit's RS-232 port
- Remotely, over the ATM network using a dedicated VC
- Inband, via the Gigabit Ethernet port
- Over a bridge, via the unit's bridge VCCs connection.

The RADview-EMS network management application monitors, configures, isolates faults and presents network statistics using a graphical, user-friendly display. This PC or Unix-based application alerts in real-time on service availability and faulty network conditions.

Software upgrade and configuration files can be remotely downloaded or uploaded to ACE-201 via TFTP or XMODEM.

### PLUG-AND-PLAY

The ACE-201 plug-and-play feature enables device installation without any pre-configuration or on-site setup to minimize truck-roll. When plugged into the network, ACE-201 automatically learns both its own (host) and the NMS (manager) IP addresses. A required configuration is then downloaded to the device from a remote site.

## Specifications

### SDH/SONET INTERFACE

**Number of Ports**
1

**Framing**
STM-1/OC-3C

**Data Rate**
155 Mbps

**Fiber Optic Interface Type**
Single mode, multimode, short haul or long haul laser

**Compliance**
I.432, G.957 (S 4.1 or L 4.2), G.825 (jitter)

**Fiber Optic Connector**
SC or ST

**Wavelength**
1310 nm

**Optical Output Power**
-8 to -15 dBm (short haul)
0 to -5 dBm (long haul)

**Optical Input Range**
-8 to -28 dBm (short haul)
-10 to -34 dBm (long haul)

**Typical Range***
15 km (9.4 miles), short haul
40 km (25 miles), long haul

\* The typical range is calculated using common peripheral equipment and environment conditions.

*Note:* The SDH/SONET interface types are non-modular ordering options. For more information, refer to the Ordering section.

### GIGABIT ETHERNET INTERFACE

**Number of Ports**
1

**Interface Type**
1000BaseT, electrical
1000BaseSX, 850 nm multimode
1000BaseLX, 1310 nm single mode

**Data Rate**
1000 Mbps

**Compliance**
IEEE 802.3, 802.1p, 802.1Q

**Max. Frame Size**
1594 bytes

**Connectors**
1000BaseSX/LX: LC
1000BaseT: RJ-45

**Optical Output Power**
-9.5 to 0 dBm over 1000BaseSX
-3 to -11 dBm over 1000BaseLX

**Optical Input Range**
-17 to 0 dBm over 1000BaseSX
-19 to -3 dBm over 1000BaseLX

**Typical Range***
100m (328 ft) over 1000BaseT
270m (885 ft) over 1000BaseSX
5 km (3 miles) over 1000BaseLX

\* The typical range is calculated using common peripheral equipment and environment conditions.

*Note:* The Gigabit Ethernet interface types are non-modular ordering options. For more information, refer to the Ordering section.

### TERMINAL CONTROL PORT

**Interface Type**
RS-232/V.24 (DTE asynchronous)

**Bit Rate**
9.6, 19.2, 38.4, 57.6 or 115.2 kbps (user-selectable)

**Connector**
9-pin, D-type, female

# ACE-201

## Multiservice Network Termination Unit

## GENERAL

**LED Indicators**

ATM Network (green) –
- On: At least one cell received (no HEC error) or transmitted within the last second
- Off: Cells were neither transmitted nor received within the last second

ATM SYNC (green) –
- On: The STM-1/OC-3c port is synchronized (no alarms)
- Off: LOS, LOF, LOP, AIS

GbE LINK (green) –
- On: Link is OK
- Off: Link is disconnected

GbE ACT (yellow) –
- Blinking: Frame received or sent within the last second
- Off: No frame received or sent within the last second

PS 1/2 (green) –
- On: Power supply 1/2 is in use and OK
- Off: Power supply 1/2 is not in use
- Blinking: Power supply is faulty or not connected

**Power**

AC: 100–240 VAC (±10%), 47–63 Hz
DC: -48 VDC

**Power Consumption**

18W max

**Physical**

Height: 4.37 cm (1.7 in / 1U)
Width:  44.0 cm (17.3 in)
Depth:  24.0 cm (9.4 in)
Weight: 3.5 kg  (7.7 lb; single PS)
　　　　 4.0 kg  (8.8 lb; dual PS)

**Environment**

Temperature:
Operating: 0°–50°C (32°–122°F)
Storage: -20°–70°C (-4°–158°F)

Humidity: Up to 90%, non-condensing

## Ordering

**ACE-201/*/&/#**

Multiservice Network Termination Unit

*Legend*

**\*** Power supply type and redundancy:

| | |
|---|---|
| **AC** | Single 100 to 240 VAC |
| **DC** | Single -48 VDC |
| **ACR** | Dual 100 to 240 VAC |
| **DCR** | Dual -48 VDC |

**&** STM-1/OC-3 ATM port (155 Mbps) and connector type:

| | |
|---|---|
| **SC13M-155** | 1310 nm, multimode, short haul,  SC |
| **ST13M-155** | 1310 nm, multimode, short haul, ST |
| **SC13L-155** | 1310 nm, single mode, short haul, S.1.1, SC |
| **ST13L-155** | 1310 nm, single mode, short haul, S.1.1, ST |
| **SC13LH-155** | 1310 nm, single mode, long haul, L.1.1, SC |
| **ST13LH-155** | 1310 nm, single mode, long haul, L.1.1, ST |

**#** Gigabit Ethernet interface and connector type:

| | |
|---|---|
| **UTP-1000** | 1000BaseT, electrical RJ-45 |
| **LC85SX-1000** | 1000BaseSX, 850 nm multimode laser, LC, SFF |
| **LC13LX-1000** | 1000BaseLX, 1310 nm single mode laser, LC, SFF |

## SUPPLIED ACCESSORIES

AC power cord or a DC power connection kit (depending on the ordered power supply type)

**RM-34**
Hardware kit for mounting one ACE-201 unit in a 19-inch rack

## OPTIONAL ACCESSORIES

**CBL-DB9F-DB9M-STR**
Standard DB-9 to DB-9 control port cable

Product Comparison Table

| | ACE-201 | ACE-201/622 | ACE-52 |
|---|---|---|---|
| STM-1/OC-3c | ✓ | | ✓ |
| STM-4/OC-12 | | ✓ | |
| Gigabit Ethernet | ✓ | ✓ | |
| Fast Ethernet | | | ✓ |
| E1/T1 CES | | | ✓ |
| Supported VCCs | 512 | 256 | 32 |
| End-to-end alarm forwarding | ✓ | | ✓ |
| SFPs for ATM fiber optics | | ✓ | |
| Power supply | Single/dual, fixed | Single/dual, hot-swappable | Single, fixed |
| Physical width | 17.3" | 17.3" | 8.5" |

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