

# ACE-201/622

## 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-4/OC-12 network interface, supporting service data rates of up to 622 Mbps
- LAN/ATM interworking according to RFC 1483/2684 (bridged PDU), with up to 256 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-201/622 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-201/622 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-201/622, 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-201/622 allows up to 256 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-201/622 provides two levels of traffic management:

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

ACE-201/622 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-201/622 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-201/622 sends a trap to alert the management system, and responds accordingly (RDI upon AIS reception)
- Continuity Check (CC) – used for checking service availability. ACE-201/622 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-201/622 also loops back received LB cells. Roundtrip delay measurements based on loopback cells are also supported.

### GIGABIT ETHERNET CAPABILITIES

ACE-201/622 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-201/622 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.

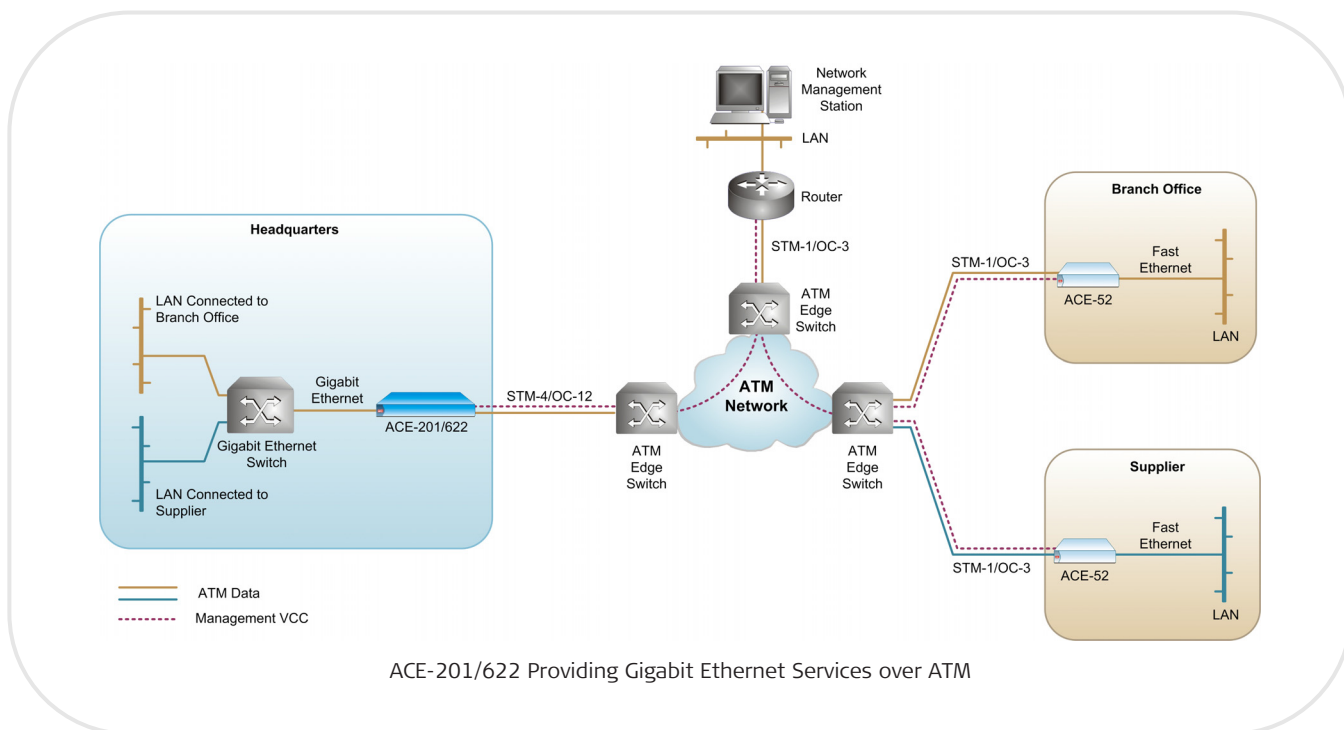
### SDH/SONET CAPABILITIES

The unit's SDH/SONET network interface (fiber optic) supports STM-4/OC-12 framing (VC-4-4C) for traffic speeds of up to 622 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-201/622, 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.



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

- Users cannot not over-utilize the allocated bandwidth
- Statistical efficiency of the link while keeping 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.

## MANAGEMENT

For comprehensive configuration, monitoring and diagnostics, ACE-201/622 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.

ACE-201/622 can be managed by and report to up to 16 different managers simultaneously. This enables viewing the network status from different locations.

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-201/622 via TFTP or XMODEM.

## PLUG-AND-PLAY

The ACE-201/622 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-201/622 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-4/OC-12 (VC-4-4C)

#### Data Rate

622 Mbps

#### Compliance

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

#### Fiber Optic Connector Type

Via SFP transceiver

*Note:* For detailed specifications of the SFP transceivers supported by the STM-4/OC-12 interface, refer to the SFP Transceivers data sheet. SFPs are ordered separately.

#### Virtual Circuit Connections

Up to 256 VCCs

### 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 different Gigabit Ethernet port 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

### GENERAL

#### LED Indicators

ATM Network (green) –

On: At least one cell received (no HEC error) or transmitted within the last second

Off: Cells were not transmitted nor received within the last second

ATM SYNC (green) –

On: The STM-4/OC-12 port is synchronized (no alarms)

Off: LOS, LOF, LOP, AIS

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## GbE LINK (green) –

On: Link 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 the chassis) –

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 1/2 (green/red, on the hot-swappable unit) –

Green: Power supply is OK

Red: Power supply is faulty

Off: Power supply is not in use

**Power**AC: 100–240 VAC ( $\pm 10\%$ ), 47–63 Hz

DC: -48 VDC

**Power Consumption**

23.5W 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/#/E/622**

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*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
E	Gigabit Ethernet interface and connector type:
UTP	1000BaseT, electrical RJ-45
GBE-85M/LC	1000BaseSX, 850 nm multimode laser, LC, SFF
GBE-13L/LC	1000BaseLX, 1310 nm single mode laser, LC, SFF

**Note:** SFP transceivers for the STM-4/OC-12 ports are ordered separately. For more information, refer to the SFP Transceivers data sheet available on RAD's Web site.

**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-201/622 unit in a 19-inch rack

**OPTIONAL ACCESSORIES****CBL-DB9F-DB9M-STR**

Standard DB-9 to DB-9 control port cable

**Note:** It is strongly recommended to order ACE-201/622 with original RAD SFPs installed. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP devices. RAD cannot guarantee full compliance to product specifications for ACE-201/622 units using non-RAD SFPs. The recommended RAD SFPs for ACE-201/622 are **SFP-14D**, **SFP-15** and **SFP-16**.

Product Comparison Table

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

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