

ACE-2002/2002E

Multiservice Access Concentrators



Delivering LAN, IP
and voice/TDM
services over ATM
backbones

Ace

- Converged WAN services in a complete ATM-featured product
- Seamless migration of traditional services (LAN, Frame Relay data and voice) to ATM, including ATM link protection
- Differentiates between services by mapping Layer 2 VLAN and Layer 3 Class of Service to ATM Quality of Service (QoS)
- Operation and Maintenance (OAM) for QoS assurance, end-to-end service control, statistics collection and fault localization (ITU-T I.610 compliant)
- Advanced traffic shaping and service policing (CBR, VBR, UBR, UBR+ and ABR)

ACE-2002 and ACE-2002E are advanced multiservice access concentrators, used as carrier-owned demarcation devices or as concentrators connected to the public ATM network.

As demarcation devices, ACE-2002 and ACE-2002E enable carriers and service providers to define the boundary between their ATM public services and the customer's network. A clear demarcation point at the customer premises (see *Figure 1*) increases service reliability, improves network efficiency and ensures end-to-end quality of service (QoS).

By using its TDM (CES) ATM UNI and IMA features, carriers and service providers can use ACE-2002/2002E to aggregate traffic from 2G/2.5G and 3G cellular base stations towards the ATM network (see *Figure 2*).

Advanced end-to-end QoS and service control features allow efficient utilization of the network resources, while significantly reducing operational costs.

RAD

data communications
The Access Company

ACE-2002/2002E

Multiservice Access Concentrators

The additional interfaces and aggregation abilities of ACE-2002E enable operators to reduce the number of radio access links needed for connecting the cellular base stations to the terrestrial network, thus cutting down transport costs.

ACE-2002/2002E can be used as a demarcation device for native ATM or for legacy services, such as voice, LAN or HDLC.

Using ACE-2002/2002E, ATM network facilities like traffic management (shaping, policing) and full OAM flow are extended up to the customer premises. In addition, the wide range of plug-in modules further enhances service flexibility.

When used as an interworking device, ACE-2002/2002E facilitates the migration of legacy traffic, originating from PBXs and routers, to ATM networks.

Using multi-port modules and up to three user-side slots, ACE-2002/2002E can be used as a concentrator for medium to large corporations, allowing different types of corporate traffic to pass over public ATM networks most efficiently.

ATM CAPABILITIES

Up to 1024 VPC and/or VCC connections can be established over the ATM network, using both NNI and UNI cell headers with full bit range of VPI/VCI fields.

Advanced VP tunneling increases QoS versatility, enabling multiple VCCs to be bundled into a single VPC while maintaining all the VCC QoS characteristics and OAM capabilities at the F4 and F5 layers.

Up to 30 VP tunnels are supported. Each tunnel is shaped as a CBR connection, which can be defined with end-to-end OAM flow and act as a regular VP in the public network.

The Call Admission Control (CAC) feature prevents network congestion, by checking the network resources when a request to open a new connection is received. If network resources are insufficient, the request for a new connection is rejected.

TRAFFIC MANAGEMENT

Traffic management is performed on several levels: VC, VP, VP tunnel or per user interface.

The following traffic management options are supported:

- Monitoring – the unit monitors and gathers statistical information on the violations of the traffic contract
- Policing – the unit compares the user traffic with the SLA parameters. In case the user traffic exceeds the SLA parameters, violating cells are tagged or discarded
- Spacing – both user and network operator benefit from spacing bursty traffic. For the user, more traffic can pass through the link at no additional cost. For the operator, spacing enables better statistical efficiency while keeping the same backbone equipment and QoS.

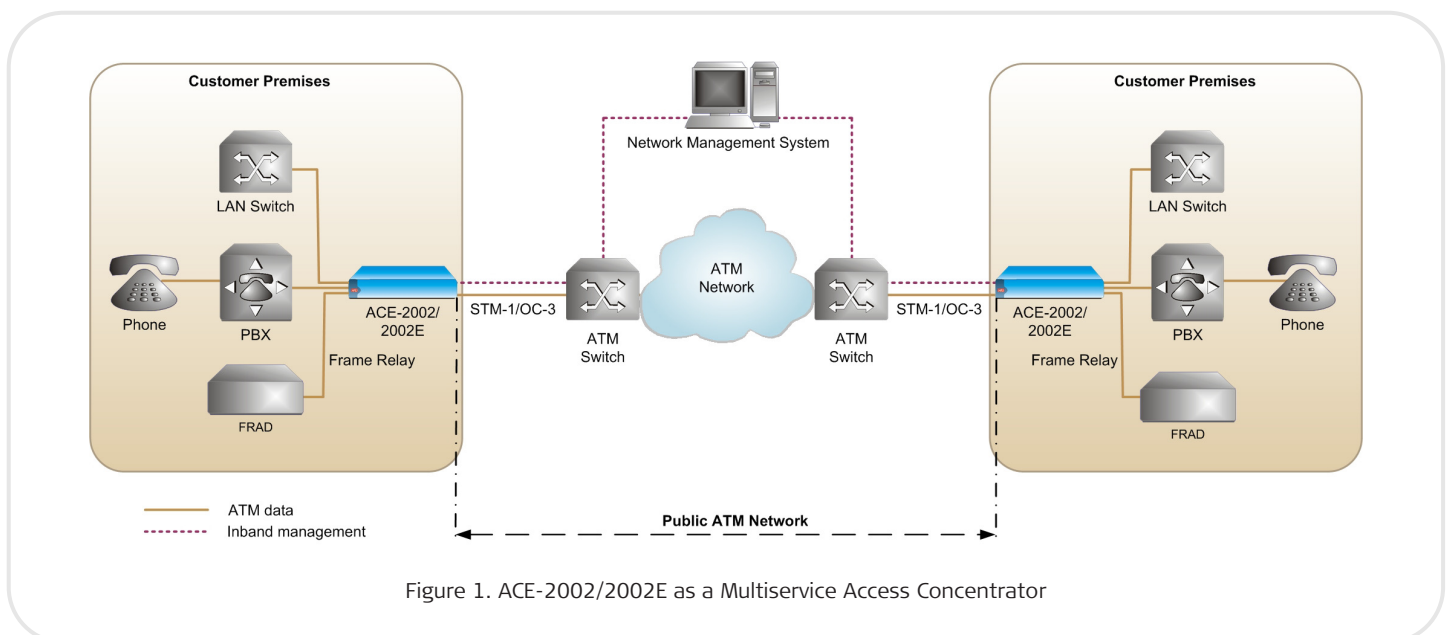


Figure 1. ACE-2002/2002E as a Multiservice Access Concentrator

ENHANCED RELIABILITY

ACE-2002/2002E provides two redundant ATM interface modules with an optional physical link protection using APS (automatic protection switching). Switch-over between the modules is based on G.783 Annex A and Annex B.

The unit's interface modules are hot-swappable. When swapping the same module type, all module configurations are saved and service is easily and quickly resumed.

ACE-2002/2002E can optionally be ordered with two redundant hot-swappable power supplies.

INTERFACES

ACE-2002/2002E is equipped with four plug-in network or user interface modules, and two optional built-in user interfaces.

A variety of single/dual plug-in ATM interface modules can be installed in the unit:

- STM-1/OC-3c (fiber optic)
- STM-4/OC-12 (fiber optic)
- E1/T1 IMA (Inverse Multiplexing over ATM)*
- E1/T1 UNI*
- E3/T3 UNI
- ATM 25 Mbps.

Non-ATM modules may be either of the following:

- 10/100BaseT Ethernet
- E1/T1 CES*
- E3/T3 CES
- HDLC.

Note: ACE-2002E allows bigger modules with additional ports (x8) to be installed in slots 3-4. Slots 1-2 of ACE-2002 and ACE-2002E are identical (see the back panel on page 4).

MANAGEMENT

ACE-2002/2002E can be managed either locally or remotely using different ports:

- The unit's RS-232 port can be used for ASCII-based terminal control, SNMP management using PPP, or remote dial-up modem control.
- The unit can be managed locally via a dedicated Ethernet port, located on the front panel.
- A network management station located anywhere on the ATM public network can be connected to a remote customer device and perform configuration, monitoring and diagnostics using a dedicated inband VC established on the ATM network interface.

The RADview-HPOV network management application monitors, configures and presents network statistics using a graphical, user-friendly interface. This Unix-based application alerts on service availability and faulty network conditions in real-time, and enables chronological sorting of events.

To shorten and simplify its field installation, the RADview application can download and store a complete pre-defined configuration for the unit.

In addition to RADview, ACE-2002/2002E supports the Alcatel 5620 SNMP-based network management system. The Model Descriptor software component fully enables device configuration and monitoring via the Alcatel interface.

The plug & play functionality allows installation of ACE-2002/2002E without on-site pre-configuration.

STATISTICS COLLECTION

ACE-2002/2002E collects statistics on the physical layer, ATM layer and ATM adaptation layer (AAL5). The statistics information is sent to the network management station and can be used for SLA reports and diagnostics.

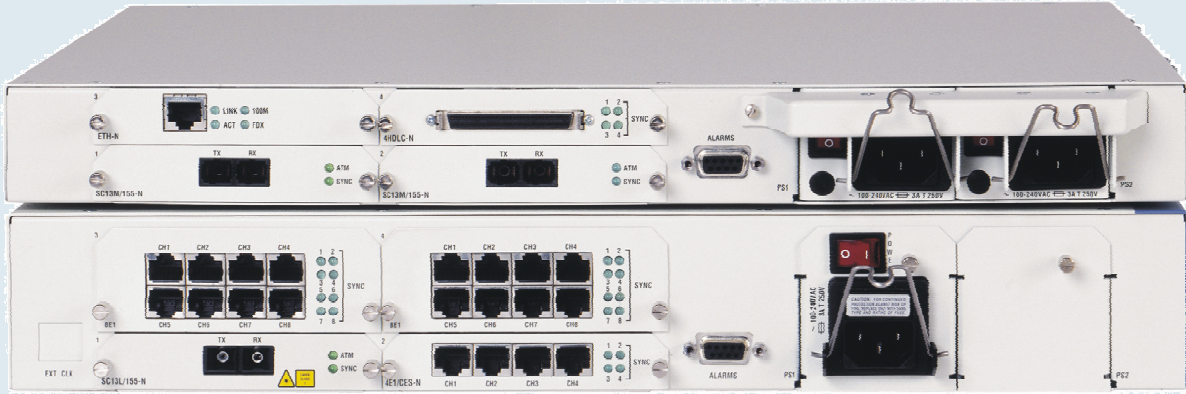
OAM AND DIAGNOSTICS

OAM segment and end-to-end functionality is supported according to ITU-T I.610 and provided on the F4 and F5 ATM levels. This includes:

- AIS/RDI – system indicators for faulty conditions in the network. If these indicators are detected in the user or network modules, ACE-2002/2002E alerts the network management system.
- Continuity Check (CC) – used to check service availability. ACE-2002/2002E sends a CC cell periodically over a predefined VP or VC and verify that the VP or VC is intact.
- Loopback – allows measuring the minimum, maximum and average delay variation, and can also be used for fault isolation. Loopback cells can be sent with source and destination addresses and may be looped back to any network element pre-assigned with a loopback point address.
- Performance Monitoring (PM) – provides values for multiple parameters of the ATM service characteristics, such as cell loss, cell error rate, severely errored seconds and more.

INTERWORKING

To send long frames (mainly IP traffic) over ATM networks efficiently, ACE-2002 and ACE-2002E support Early Packet Discard (EPD) and Partial Packet Discard (PPD) mechanisms. If cells are lost or discarded, and are part of a long frame, ACE-2002 and ACE-2002E can drop the rest of the cells that belong to the same frame. This prevents overload of the network resources by non valid cells.



ACE-2002/2002E

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Specifications

INTERFACE MODULES

Up to 4 modular interface modules in slots 1–4 (see *Table 1* and *Table 2* in the ACE-2002/2002E/202 Modules data sheet)

Note: ACE-2002E allows bigger modules with additional ports to be installed in slots 3–4. Slots 1–2 of ACE-2002 and ACE-2002E are identical.

ATM CONNECTIONS

Up to 1024 connections, 8/12 VPI bits, 16 VCI bits

RATE CONVERSION BUFFER

Buffer size is 64,000 cells in each direction

COMPLIANCE

ATM Forum: UNI 3.1, Circuit Emulation Service 2.0 (at-vtoa-0078), TM 4.0, IMA 1.0 & 1.1

ITU-T: I.363.1, I.371, I.372, I.432, I.610, G.703, G.704, G.706, G.732, G.823, G.957

APS: G.783 Annex A and B

ANSI: ANSI T1.403, AT&T TR-62411

IETF: RFC 1483

TERMINAL CONTROL

Type

RS-232/V.24 (DTE)

Data Rate

9.6, 19.2, 38.4, 57.6 or 115.2 kbps

Connector

9-pin, D-Type, male

ETHERNET CONTROL

Type

10/100BaseT, half-duplex

Data Rate

10 Mbps, 100 Mbps

Connector

RJ-45

GENERAL

Power

ACE-2002:

AC: 100 to 230 VAC, 47–63 Hz

DC: -41 to -72 VDC (-48 nominal)

ACE-2002E:

AC: 100 to 230 VAC, 47–63 Hz

DC: -48 VDC nominal (-41 to -72 VDC)

or 24 VDC nominal (20 to 36 VDC)

Note: ACE-2002/2002E supports redundant hot-swappable power supplies.

Power Consumption

ACE-2002: 75W max

ACE-2002E: 100W max

Physical

ACE-2002:

Height: 4.4 cm (1.7 in)

Width: 43.2 cm (17.0 in)

Depth: 35.0 cm (13.8 in)

Weight: 4.6 kg (10.1 lb)

ACE-2002E:

Height: 6.6 cm (2.6 in)

Width: 44.0 cm (17.3 in)

Depth: 34.8 cm (13.7 in)

Weight: 5.7 kg (12.5 lb)

Environment

Temperature:

Operating: 0°–50°C (32°–122°F)

Storage: -20°–70°C (-4°–158°F)

Humidity: Up to 90%, non-condensing

Product Comparison Table

	ACE-202	ACE-2002	ACE-2002E
Supported VCCs	Up to 256	Up to 1024	Up to 1024
F4/F5 OAM (ITU-T I.610)	✓	✓	✓
Plug-in interface modules	2	4	4
Optional fixed user interfaces	2	N/A	N/A
Optional plug-in IMA UNI ports	Up to 8	Up to 16	Up to 24
Optional plug-in CES ports	Up to 8	Up to 16	Up to 24
Dual fiber optic Fast Ethernet	N/A	N/A	✓
Redundant power supply	✓	✓	✓
Hot-swappable power supply	N/A	✓	✓
Physical width	17"	17"	17.3"
Physical height	1.7" (1U)	1.7" (1U)	2.6" (1.5 U)

ACE-2002/2002E

Multiservice Access Concentrators

Ordering

ACE-2002/#/@

ACE-2002E/#/@

Legend

Power supply type:

AC 100–230 VAC

DC -48 VDC

24DC 24 VDC

@ Number of power supplies (leave empty for single power supply):

R Two redundant power supplies

Note: ACE-2002/2002E requires plug-in interface modules. For more information, refer to the relevant module data sheets.

SUPPLIED ACCESSORIES

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

RM-ACE-2002/P2

Hardware kit for mounting one ACE-2002 unit in a 19-inch rack

RM-ACE-2002E/P2

Hardware kit for mounting one ACE-2002E unit in a 19-inch rack

OPTIONAL ACCESSORIES

CBL-DB9F-DB9M-STR

Standard DB-9 to DB-9 control port cable

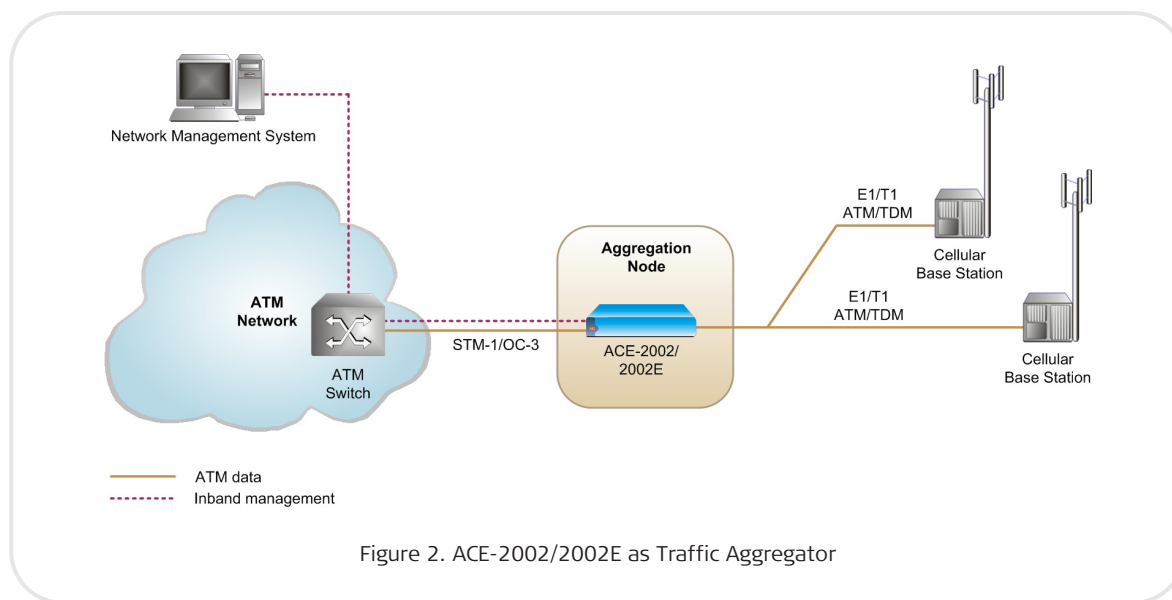


Figure 2. ACE-2002/2002E as Traffic Aggregator

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