

ACE-3000 Family **ACE-3400**



Multiservice Aggregation Unit for Cellular Backhaul Applications



ACE

FEATURES

- Carrier-class multiservice aggregation unit, optimized for 2G and 3G cellular backhaul applications
- Traffic optimization for reducing cellular network cost:
 - ATM shaping and scheduling
 - Statistical traffic management
- Efficient handling of multiple traffic types: delay-sensitive (voice, video) and non-delay-sensitive (IP, Internet surfing)
- OAM end-to-end control based on ITU I.610 QoS, including OAM loopback
- 32/63 software-configurable E1, T1 or J1 multiservice ports, supporting ATM UNI, IMA and CES
- Optional optical interfaces:
 - Two STM-1 UNI (ATM-155) ports
 - Additional STM-1 UNI port for Automatic Protection Switching (APS)
- Advanced redundancy and protection options:
 - APS on STM-1/OC-3c ports
 - Dual power supply
 - Multiple internal fans
- Modular hot-swappable architecture for replacing the power supplies, fan tray or STM-1/OC-3c modules in the field, while maintaining service continuity
- Dedicated station clock port for ensuring a reliable timing reference
- Powerful management capabilities, including remote software download and inventory management
- Inband and out-of-band management access via:
 - ASCII terminal/Telnet
 - ConfiguRAD, RAD's Web-based element management application, for remote management using a standard Web browser
 - RADview-EMS, RAD's CORBA-based element management system which can be integrated into any third-party NMS/OSS
- 3U high, fully modular unit with total front access architecture to simplify maintenance

ACE-3400

Multiservice Aggregation Unit for Cellular Backhaul Applications

DESCRIPTION

- ACE-3400 is targeted for 2G/3G cellular aggregation. The unit performs aggregation of multiple circuits over $N \times$ E1/T1/J1 links or STM-1/OC-3c links towards the ATM network or RNC.
- The unit's comprehensive redundancy protection features ensure a fail-safe, continuous operation, making ACE-3400 ideal for carriers and service providers.
- The modular architecture of ACE-3400 allows hot-swappable modules to be replaced in the field while maintaining uninterrupted service. The unit is also fully accessible from the front panel.

E1, T1 AND J1 INTERFACES

- ACE-3400 supports 32 or 63 E1/T1/J1 multiservice ports. Each of the E1/T1/J1 ports can be software-configured to work in ATM IMA, ATM UNI or CES mode.
- Optional patch panel adapters can be used to convert the E1/T1/J1 ports terminated in six 64-pin Telco connectors. Each Telco connector supports up to 14 E1/T1/J1 ports.

- All E1/T1/J1 traffic is handled by the main modules, which incorporate a LED indicator for each E1/T1/J1 port.
- E1/T1/J1 to E1/T1/J1 connections allow aggregation of IMA to IMA, UNI to IMA and CES to IMA.
- E1/T1/J1 to STM-1 connections allow aggregation of IMA/UNI/CES streams into STM-1 trunk.

ATM CAPABILITIES

- Using ACE-3400, carriers can assign each virtual connection (VC) or virtual path (VP) to a service class, define the QoS parameters and shape the ATM egress traffic accordingly. This assures QoS in delay-sensitive applications, and helps conserve network resources.
- At the ATM layer, ACE-3400 supports up to 1024 VP and VC connections with full UNI/NNI VPI and VCI ranges.
- Full OAM is supported according to ITU I.610 requirements:
 - F4 and F5 OAM
 - Configurable OAM mode per connection point
 - Segment/intermediate mode for user connections and end-to-end mode for the management connection
 - AIS and RDI cell detection and generation upon physical layer and ATM layer failures

- CC cell generation and LOC state detection per VP/VC
- Loopback location ID
- Configurable loopback source ID per device.
- ACE-3400 provides traffic shaping according to CBR, VBR1, UBR and UBR+.

STM-1 INTERFACE

- ACE-3400 features up to two STM-1/OC-3c interfaces, and one additional STM-1 UNI port for Automatic Protection Switching (APS).
- The STM-1/OC-3c interface performs physical layer and ATM mapping into STM-1/OC-3c according to ITU I.432. Operation mode (SDH or SONET) is user-selectable.
- Rate limiting can be applied to all STM-1/OC-3c uplink traffic.

SYSTEM TIMING

- The following transmit timing modes are supported:
 - Internal – provided by an internal oscillator
 - Loopback – derived from the receive clock of the current interface
 - Reference – derived from the receive clock of the dedicated station clock port or any of the ACE-3400 E1/T1/J1/STM-1 ports.

APPLICATIONS

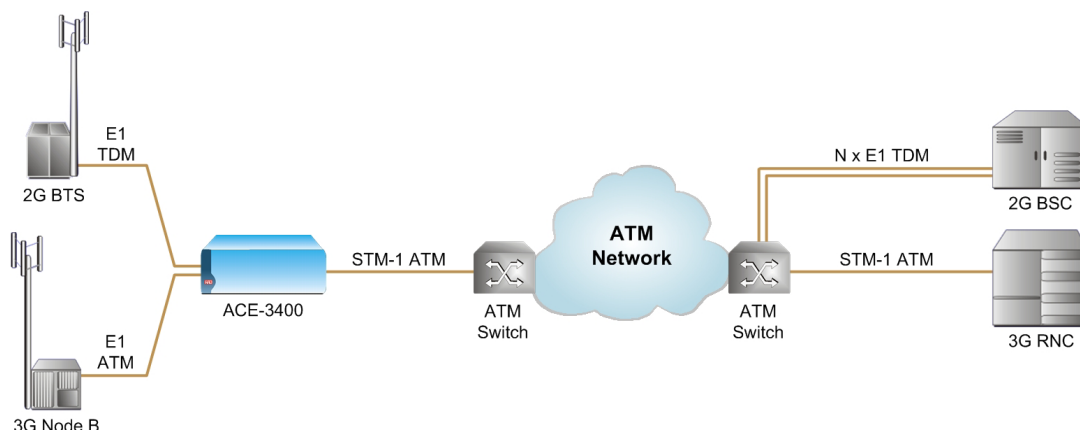


Figure 1. 2G/3G Multiservice Traffic Aggregation

Multiservice Aggregation Unit for Cellular Backhaul Applications

MANAGEMENT CAPABILITIES

- ACE-3400 can be managed using different access methods:
 - Out-of-band – via dedicated RS-232 or 10/100BaseT ports
 - Inband – via a dedicated VC defined on any ACE-3400 ATM port.
- The following applications can be used for ACE-3400 management:
 - Menu-driven terminal utility via an ASCII terminal connection
 - Telnet via an IP-based connection
 - ConfiguRAD, Web-based element management tool via an IP-based connection
 - RADview-EMS, RAD's CORBA-based network management application via an IP-based connection.
- Software upgrades and configuration files can be downloaded/uploaded to/from ACE-3400 via TFTP or XMODEM.
- The unit can be managed by and report to up to 16 different managers simultaneously. This enables viewing the network status from different locations.
- Access control restricts access to approved managers only, and can be used to enable/disable Telnet, HTTP or SNMP based access.

DIAGNOSTICS AND STATISTICS

- ACE-3400 collects statistics per physical port and per VCC/VPC for 15-minute intervals. Statistics for the last 6 hours are stored in the device and can be retrieved and viewed at the network management station.
- Comprehensive diagnostic capabilities include:
 - External and internal physical loopbacks on STM-1/OC-3c, E1, T1 and J1
 - Cell test towards the ATM ports.

- ACE-3400 maintains a cyclic event log file that stores up to 4096 time-stamped events.

SPECIFICATIONS

TRIBUTARY E1/T1/J1 INTERFACE

- **Number of Connectors**
6
- **Number of Interfaces Per Connector**
Up to 14
- **Connector Type**
64-pin Telco connector

E1 INTERFACE

- **Number of Ports**
32 or 63
- **Data Rate**
2048 kbps
- **Compliance**
G.703, G.704, G.732
- **Jitter Performance**
 - Output and tolerance: according to G.823
 - Transfer: according to G.705
- **Operation Mode**
UNI, IMA, CES
- **Line Code**
HDB3
- **Framing**
 - MF, CRC-4 enabled
 - MF, CRC-4 disabled
 - Unframed (in CES mode only)
- **LIU Support**
Short haul
- **Monitoring Support**
 - Idle channel code insertion
 - Alarm detection and insertion
 - Errors statistics
- **Line Impedance**
 - 120Ω, balanced
 - 75Ω, unbalanced
- **Connectors**
 - RJ-45, balanced
 - BNC Coaxial, unbalanced

Note: E1, T1 and J1 connectors are provided via a dedicated patch panel adapter, connected to two tributary connectors. For more information, refer to the Patch Panel Adapters data sheet.

T1/J1 INTERFACE

- **Number of Ports**
32 or 63
- **Data Rate**
1544 kbps
- **Compliance**
ANSI T1.101, ITU-T G.703
- **Jitter Performance**
According to AT&T PB-62411
- **Operation Mode**
UNI, IMA, CES
- **Line Code**
B8ZS
- **Line Mode**
DSU
- **Framing**
 - ESF
 - Unframed (in CES mode only)
- **CRC-6 Calculation**
According to G.704
- **Monitoring Support**
 - Idle channel code insertion
 - Alarm detection and insertion
 - Errors statistics
- **Line Impedance**
 - 100Ω, T1
 - 110Ω, J1
- **Line Length**
Transmit gain up to 655 ft
- **Connectors**
RJ-45 (via a dedicated patch panel adapter; see previous note)

STM-1/OC-3c INTERFACE

- **Number of Ports**
3 (field-replaceable)
- **Data Rate**
155 Mbps
- **Operation Mode**
UNI
- **Compliance**
Physical layer and ATM mapping into STM-1 according to I.432
- **Jitter Performance**
 - Output: according to G.825
 - Tolerance: according to G.823
 - Transfer: according to G.783

ACE-3400

Multiservice Aggregation Unit for Cellular Backhaul Applications

- **Fiber Optic Interface Type**
1310 nm – multimode, single mode or single mode long haul

ETHERNET CONTROL PORT

- **Type**
10/100BaseTx, full or half duplex
- **Compliance**
IEEE 802.3
- **Connector**
RJ-45

TERMINAL CONTROL PORT

- **Type**
RS-232/V.24 (DCE)
- **Data Rate**
9.6, 19.2, 38.4, 57.6 or 115.2 kbps, user-configurable
- **Connector**
RJ-45 (adapter cable is supplied)

STATION CLOCK INTERFACE

- **Type**
E1, T1 or J1 (user-configurable)
- **Connector**
RJ-45

GENERAL

- **Physical Loopbacks**
STM-1/OC-3c, E1, T1 and J1 – Internal and external
- **Alarms and Statistics**
 - STM-1, E1, T1 and J1 physical layer alarms and counters
 - ATM layer counters
- **Power Supply**
Two hot-swappable AC or DC:
 - AC: 100 to 230 VAC, 47–63 Hz
 - DC: -41 to -71 VDC

Note: AC and DC power supplies cannot be installed together in the same unit.

- **Power Consumption**
80W max
- **Fan Tray**
Field-replaceable, two independent cooling fans
- **Physical**
Height: 133.3 mm (5.2 in / 3U)
Width: 440.0 mm (17.3 in)
Depth: 250.0 mm (9.0 in)
Weight 10.0 kg (22.0 lb)
- **Environment**
Temperature:
Operating: 0°–50°C (32°–122°F)
Storage: -20°–70°C (-4°–158°F)
Humidity: Up to 90%, non-condensing

ORDERING

ACE-3400/#

Multiservice Aggregation Unit for Cellular Backhaul Applications

- # Specify power supply type and redundancy:
AC for single 100 to 240 VAC
DC for single -41 to -71 VDC
ACR for dual 100 to 240 VAC
DCR for dual -41 to -71 VDC

ACE-3400-MC/*

ACE-3400 main module

- * Specify main module type:
MC32E1B for 32 balanced E1s
MC32E1U for 32 unbalanced E1s
MC32T1 for 32 T1s
MC32J1 for 32 J1s
MC63E1B for 63 balanced E1s
MC63E1U for 63 unbalanced E1s
MC63T1 for 63 T1s
MC63J1 for 63 J1s

ACE-3400-IF/155/#

ACE-3400 optical interface module

- # Specify optical interface type:
MM13/SC for multimode, 1310 nm, 2 km, SC connector
SM13/SC for single mode, 1310 nm, 15 km, SC connector
SM13LH/SC for single mode, 1310 nm, long haul, 40 km, SC connector

SUPPLIED ACCESSORIES

AC power cord or a DC power connection kit (if a DC-powered unit is ordered)

RM-39

Hardware kit for mounting one ACE-3400 unit into a 19-inch rack

CBL-RJ45/D9/F/STR

Control port adapter cable (RJ-45 to DB-9)

OPTIONAL ACCESSORIES

ACE-PPANEL/RJ45/28

Patch panel adapter with 28 balanced RJ-45 connectors

ACE-PPANEL/BNC/21

Patch panel adapter with 21 unbalanced BNC connectors

ACE-PPANEL/BNC/14

Patch panel adapter with 14 unbalanced BNC connectors

Note: Patch panels are supplied with a Telco cable.

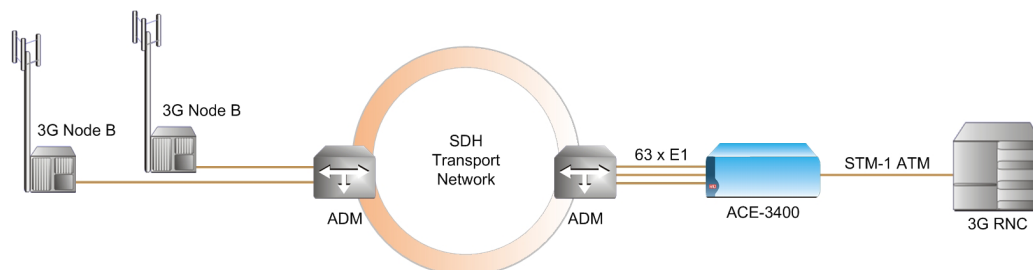


Figure 2. 3G ATM Traffic Concentration



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