

FEATURES

- Provide connectivity for TDM devices, such as PBXs, multiplexers and channel banks
- Support structured and unstructured services in accordance with ATM Forum Circuit Emulation Service (CES) specifications
- Available CES modules:
 - Single port E1 balanced
 - Single port E1 unbalanced
 - Single port T1
 - 4-port E1 balanced
 - 4-port E1 unbalanced
 - 4-port T1
 - 8-port E1 balanced
 - 8-port E1 unbalanced
 - 8-port T1

CES

TDM Circuit Emulation Service (CES) Modules

DESCRIPTION

- The CES modules emulate full-duplex E1/T1 links that allow ACE-2002/2002E/202 to interconnect PBXs, TDM multiplexers and video conferencing equipment, over an ATM network (see *Figure 1* and *Figure 2*).
- The E1/T1 CES modules support structured (with or without CAS) and unstructured circuit emulation services.
- The modules support three clocking modes:
 - Synchronous timing (ATM network derived)
 - SRTS (in unstructured mode only) as defined in T1.630
 - Adaptive (in unstructured and E1/T1 modes only), as defined in AF-VTOA-0078.
- CES modules are available with a single, four or eight port interface. See *Ordering*.

SPECIFICATIONS

STANDARDS

- **CES**
ATM Forum CES 2.0, AF-VTOA-0078, ITU-TI.363.1
- **T1 Port**
G.703, ANSI T1.403, AT&T TR-62411
- **E1 Port**
G.703, G.732, G.823

APPLICATIONS

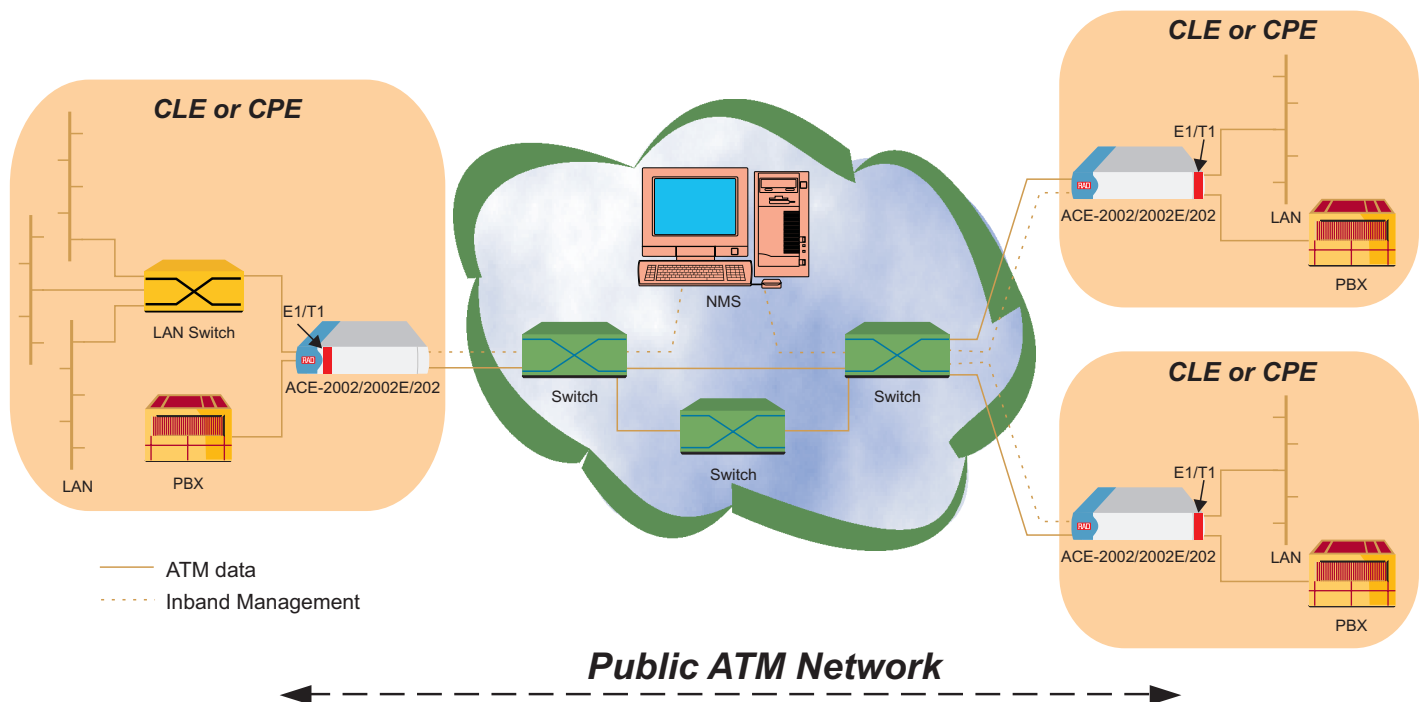


Figure 1. Multiservice over ATM

TDM Circuit Emulation Service (CES) Modules

E1 PORT

- **Capacity**

Structured
 Single-port module up to
 31 VCCs
 Four-port module up to
 124 VCCs
 Eight-port module up to
 248 VCCs
 Unstructured
 Single VCC per port

- **Data Rate**

2.048 Mbps

- **Line Code**

HDB3

- **Line Impedance**

Balanced 120 Ω , unbalanced 75 Ω

- **Signal Levels**

Receive: 10 to 32 dB / 0 to 10 dB
 (selectable)

Transmit balanced: $\pm 3V \pm 10\%$

Transmit unbalanced: $\pm 2.37V \pm 10\%$

- **Jitter Performance**

By G.823 standard

- **Compliance**

G.704, G.706

- **Framing**

MF, CRC4 MF, CAS MF,
 Pass through

- **Signaling**

CAS, CCS (transparently)

- **Connectors**

E1 balanced, RJ-45 8-pin

E1 unbalanced, BNC 75 Ω
 (supplied with adapter cable)

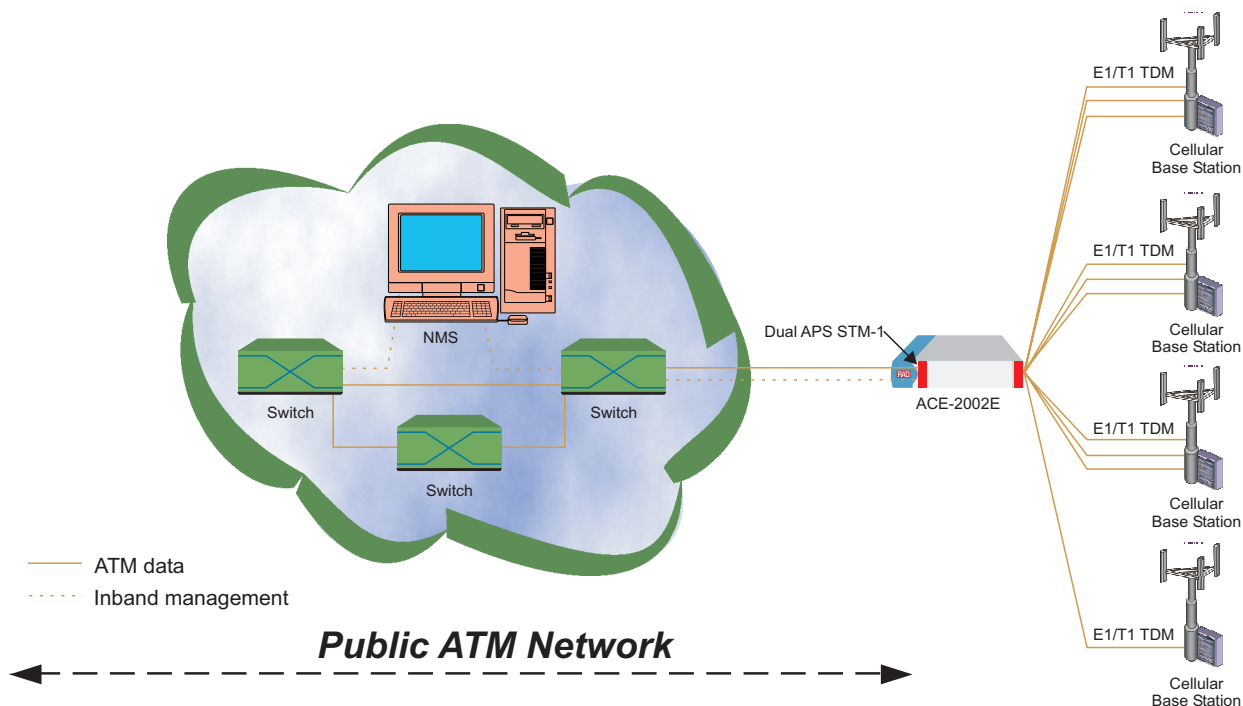


Figure 2. Cellular Back-hauling

TDM Circuit Emulation Service (CES) Modules

T1 PORT

- **Capacity**
Structured
Single-port module up to 24 VCCs
Four-port module up to 96 VCCs
Eight-port module up to 192 VCCs
Unstructured
Single VCC per port
- **Data Rate**
1.544 Mbps
- **Line Code**
AMI, B8ZS, B7ZS
- **Line Impedance**
Balanced 100Ω
- **Signal Levels**
Receive: 0 to -30 dB
Transmit: $\pm 2.75V \pm 10\%$ at 0-655 ft with DSU,
0, -7.5, -15, -22.5 dB user selectable with CSU
- **Input Signal**
0 to 30 dB
- **Jitter Performance**
By AT&T TR-62411, G.824 standards
- **Compliance**
G.704, ANSI T1.403
- **Framing**
SF, ESF, Pass through
- **Signaling**
CAS (bit robbing),
CCS (transparently)
- **Connectors**
T1 balanced, RJ-45 8-pin

 **ORDERING**

ACE-M/+

ACE-2002/2002E/202 modules

- + Specify module interface:
CES/E1 for single balanced E1 CES port, RJ-45 connector
CES/E1/UNBAL for single unbalanced E1 CES port, BNC 75Ω connector
CES/T1 for single T1 CES port, RJ-45 connector
CES/4E1 for four balanced E1 CES ports, RJ-45 connector
CES/4E1/UNBAL for four unbalanced E1 CES ports, BNC 75Ω connector
CES/4T1 for four T1 CES ports, RJ-45 connector
CES/8E1 for eight balanced E1 CES ports, RJ-45 connector (ACE-2002E only)
CES/8E1/UNBAL for eight unbalanced E1 CES ports, BNC 75Ω connector (ACE-2002E only)
CES/8T1 for eight T1 CES ports, RJ-45 connector (ACE-2002E only)

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123-102-02/04