IMX-2T1/E1

E1 to T1 Inverse Multiplexer

FEATURES

- Inverse multiplexing of a standard E1 frame on two T1 links
- Complies with:
  - ITU Rec. G.703, G.704
  - AT&T TR-62411, TR-54019
  - ANSI T1.403
  - AT&T ACCUNET Fractional T45 Service
- Several timing options
- Compensates for differential delay
- Control via front panel or ASCII terminal / Telnet
- Telnet using SLIP protocol
- Inband remote management
- Data port supporting n x 128 kbps
- Fractional T1 port supporting n x 128 kbps
- Transparent to E1 timing
- Built-in CSU on the T1 links
- Call-in and call-out functions
- Built-in BERT and loopbacks

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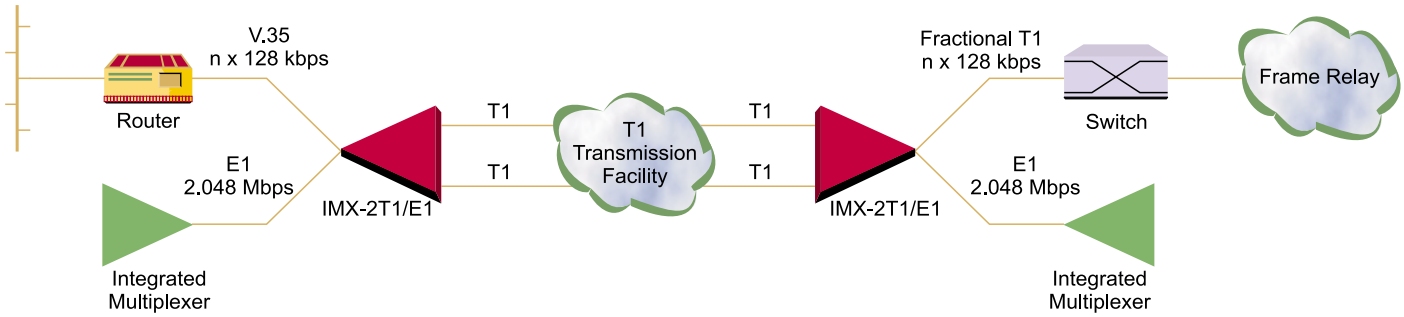
DESCRIPTION

- IMX-2T1/E1 Inverse Multiplexer enables E1 equipment to utilize T1 transmission facilities by converting any E1 frame (2.048 Mbps) received by the E1 port, into two T1 frames (1.544 Mbps), and then transmitting them simultaneously over two separate T1 links. The E1 frame (256 bits) is equally divided between both T1 frames. Operation of the IMX-2T1/E1 is transparent to the E1 framing pattern.
- Compensation is provided for any differential delay of up to 64 msec between the T1 lines, for proper reconstruction of the original data stream.
- IMX-2T1/E1 provides support for various timing options. These include:
  - Transparent timing: T1 transmit clock of both links is locked to E1 receive clock, and the E1 transmit clock is locked to T1 link 1 or link 2 receive clock.
  - External E1 timing: T1 transmit clock of both links and E1 transmit clock are locked to the E1 receive clock.
  - Loopback timing: the transmit clocks of both T1 links and E1 transmit clock are derived from the receive clock of T1 link 1, link 2 or fractional T1.
  - Internal timing: an internal oscillator with 32 ppm accuracy is the source for all the E1 and T1 transmit clocks.
  - Station Clock timing: the source for both E1 and T1 transmit clocks is the framed/unframed "all ones" 1.544 Mbps AMI or B8ZS-coded signal.
- A separate data port or Fractional T1 port utilizes unused timeslots on the T1 links to pass additional data. The data port supports rates of n x 128 kbps (where n = 1...7), up to 896 kbps. Available interfaces for the data port include V.35, RS-530, X.21, V.36/RS-449 and Ethernet 10BaseT (UTP).
- Timing mode for the data port is user-selectable for DCE or External-DCE. In DCE mode, the data port provides both receive and transmit clocks to the attached user DTE equipment. In External-DCE mode, the data port provides the receive clock to the user equipment, while receiving the transmit clock from the user equipment.
- Setup, control, status, alarms and diagnostic information is provided via the front panel LCD display or an ASCII terminal / Telnet.

APPLICATION



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- IMX-2T1/E1 features call-in and call-out functions. The call-in function allows a remote operator at a central site to perform all functions available through the supervision terminal. The call-out function allows dialing a preprogrammed number when an alarm event occurs.
- IMX-2T1/E1 includes an SNMP agent that enables SNMP traps using the UDP over IP protocol. Communication is performed:
  - Inband, using a dedicated 8 kbps channel
  - Out-of-band, using SLIP protocol through the serial port.
- Diagnostics capabilities include:
  - Local/remote E1 loopback
  - Local/remote T1 loopback
  - Local/remote data port or fractional T1 loopback
  - E1, data port or fractional T1 BER testing
  - Inband code activated loopback on data port or fractional T1.

  Diagnostics can be executed via the front panel or ASCII terminal. IMX-2T/E1 also supports the T1 network loopback per AT&T 62411 (inband code activated), with statistical diagnostic capability according to AT&T PUB 54016.
- Compliance is provided for ACCUNET Fractional T45 Service (AT&T), which allows choosing new transmission speeds higher than T1 rates.

SPECIFICATIONS

- **T1 Interface**
  Number of links: 2
  Compliance:
  ITU Rec. G.703, G.704;
  AT&T TR-62411, TR-54019, PUB 54016
  Data rate: 1.544 Mbps
  Line code: AMI or B8ZS
  Receive level:
  0 to -34dB/with CSU
  0 to -10dB/without CSU
  Transmit level:
  0 dB, -7.5dB, -15dB/with CSU
  3V (±10%) soft-adjustable to be measured at 0 to 655 ft with or without CSU
  Impedance: 100Ω, balanced
  Framing: D4 or ESF
  Connector: RJ-48C, 8-pin
- **E1 Port**
  Compliance:
  ITU Rec. G.703, G.704, G.823
  Data rate: 2.048 Mbps
  Line code: HDB3
  Framing: any E1 frame
  Impedance:
  120Ω, balanced
  75Ω, unbalanced
  Signal level:
  Receive level: 0 to -10 dB
  Transmit pulse:
  Balanced: ±3V (±10%)
  Unbalanced: ±2.37V (±10%)
  Connectors:
  8-pin RJ-45 for balanced
  Two BNC coaxial for unbalanced
- **Data Port**
  Data rate: n x 128 kbps (where n=1...7), up to 896 kbps
  Interfaces and connectors:
  - V.35 with 34-pin connector
  - RS-530 with 25-pin connector
  - V.36/RS-449 with 37-pin connector (using RS-530 port, via supplied conversion cable)
  - X.21 with 15-pin connector
  - Ethernet 10BaseT with shielded 8-pin RJ-45 connector

  Timing:
  DCE or External DCE, user-selectable
- **Fractional T1 Port**
  Compliance:
  AT&T TR-62411, ITU Rec. G.703, G.704
  Data rate: n x 128 kbps (where n=1...7), up to 896 kbps
  Line code: AMI
  Receive level: 0 to -10 dB
  Transmit level:
  3V (±10%) soft-adjustable to be measured at 0 to 655 ft
  Framing: D4 (SF) or ESF
  Impedance: 100Ω, balanced
  Connector: RJ-48C, 8-pin
- **Control Signals**
  CTS
  Follows RTS or constantly ON, soft selectable
  DSR
  Constantly ON unless in test mode
  DCO
  Constantly ON unless in red alarm

GENERAL

- **Compliance**
  AT&T TR-54019
- **Timing**
  - Loopback timing: Link 1 or 2
  - Internal timing: (±32 ppm)
  - Station Clock timing
  - External E1 timing
  - Transparent timing
  - External fractional T1
- **Station Clock Interface**
  Bit rate: 1.544 Mbps
  Line code: AMI/B8ZS
  Impedance: 100Ω
  Pulse shape: ITU G.703
  Connector: RJ-48C, 8-pin
  Format:
  framed/unframed "all ones"
- **T1 Differential Delay**
  Up to 64 msec

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- **Diagnostics**
  - Local/remote E1 loopback
  - Local/remote T1 loopback
  - Local/remote fractional T1 or data port loopback
  - Inband code activated loopback per data port or fractional T1 according to ANSI FT1 RDL (T1E1-2/93-003)
  - BERT V.52, built-in
  - Code activated network loopback per AT&T 62411 (ANSI T1.403)
- **Statistics and Alarms**
  - Full statistical diagnostics ANSI T1.403-1989
  - Local support of ESF diagnostics according to AT&T PUB 54016
  - Alarm buffer size: 100 events
- **Alarm Response**
  Received impairment on T1
  T1 response: Yellow Alarm
  E1 response: AIS signal
  Receive unframed "all ones" on E1
  T1 response: none
  E1 response: Alarm
- **Supervisory Port**
  Interface: V.24/RS-232, async
  Connector: 9-pin D-type, female
  Speed: 0.3 - 9.6 kbps, autobaud
- **Front Panel Controls**
  - LCD (2 rows x 16 characters)
  - Push-buttons (Cursor, Scroll, Enter)
- **Indicators**
  - T1 (per link): Red and Yellow alarms
  - E1 port: RD, TD
  - Data port: DCD, RTS, RD, TD, TEST
- **Physical**
  Height: 4.4 cm / 1.7 in (1U)
  Width: 43.2 cm / 17.0 in
  Depth: 24.2 cm / 9.5 in
  Weight: 2.3 kg / 5.0 lb
- **Power Supply**
  115/230 VAC
  -48 VDC; 18.5W

ORDERING

IMX-2T1/E1/~/*/?
E1 to 2 x T1 Inverse Multiplexer

~ Specify power supply:
AC for 115/230 VAC
48 for -48 VDC

* Specify optional drag-and-insert data port interface:
V35 for V.35 interface
703 for G.703 interface

? Specify optional **CSU** for built-in CSU on T1 ports (default is without CSU)

RAD
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