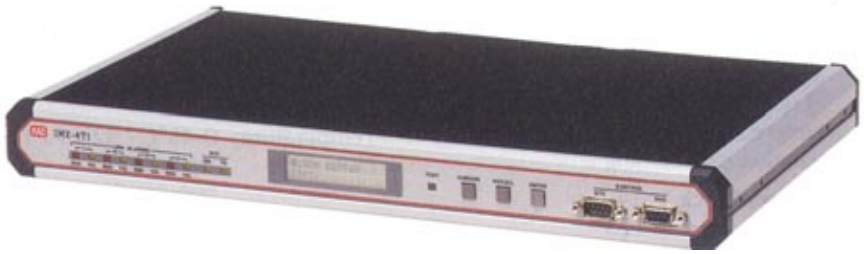
IMX-4T1

T1 Inverse Multiplexer



FEATURES

- Provides inverse multiplexing to transmit a single high speed data channel over up to four T1 links
- Data rates from 1.472 to 5.888 Mbps, with automatic rate fallback
- Sync data port interfaces: V.35, RS-530, V.36/RS-449, X.21 or HSSI
- Features Ethernet/Fast Ethernet bridge with VLAN support as DTE interface to connect 10BaseT and 100BaseT LANs and VLANs over T1 services
- Compensates for differential delay of up to 64 msec
- Built-in BERT (V.52) and remote/local loopbacks

DESCRIPTION

- The IMX-4T1 Inverse Multiplexer enables splitting and transmitting a high speed data channel of up to 5.888 Mbps, over up to four T1 links. IMX-4T1 spans the bandwidth gap between T1 and T3, providing increased bandwidth where services higher than T1 are either not available or are too expensive.
- IMX-4T1 can be ordered with either two or four T1 links. For long range applications, a built-in CSU for each of the links is available.
- IMX-4T1 compensates for up to 64 msec differential delay between the T1 lines. The end-to-end delay of IMX-4T1 is no more than the maximum differential delay between the links.
- The automatic rate fallback feature ensures that the logical channel remains open even if individual T1 links fail, by automatically dropping to the next lower rate. When failed links are recovered, IMX-4T1 automatically returns to the original rate.
- The synchronous user data port rate can be any multiple of 1.472 Mbps, up to a total of 5.888 Mbps.
- An IR-ETH/QH Ethernet interface module can be ordered instead of a sync data port interface. When equipped with this module, IMX-4T1 transparently connects distant LANs over up to four unframed T1 links utilizing the full T1 bandwidth.
- IMX-4T1 with the IR-ETH/QH bridge filters Ethernet/Fast Ethernet frames, forwarding only frames destined to the WAN. The IR-ETH/QH module can also block broadcast and multicast messages.
- Two user-selectable clock modes are available for the sync type data port:
  - DCE: IMX-4T1 provides both TX and RX clocks to the user DTE.
  - External-DCE: IMX-4T1 provides RX clock to the user while receiving TX clock from the user.
- System timing options include:
  - Internal clock: the internal oscillator is the source for T1 links
  - Loopback: the T1 transmit clock is derived from one of the T1 receive clocks
  - Station clock: the T1 transmit clock is the source for framed/unframed all "1"s or G.703 compatible.
- Diagnostics capabilities include:
  - Local/remote data port loopback
  - Local/remote T1 links loopback
  - V.52 BERT
  - T1 network loopback per AT&T 62411 (inband code activated), with statistical diagnostic capability according to AT&T PUB 54016.
- Setup, control, status, alarms and diagnostic information are provided via the front panel LCD display or an ASCII terminal/Telnet.
- The supervisory port supports dial-in/dial-out for remote out-of-band configuration and monitoring (dial-in), as well as for alarm reporting (dial-out).
- 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 or 4
- **Compliance:**
  ITU Rec. G.703, G.704;
  AT&T TR-62411, PUB 54016
- **Data rate:**
  1.544 Mbps (per link)
- **Line code:**
  AMI or B8ZS
- **Framing:**
  D4 or ESF

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- **Signal level**
  Receive level:
  0 to -34 dB with CSU
  0 to -10 dB without CSU
  Transmit level:
  0 dB, -7.5 dB, -15 dB with CSU
  3V (±10%) soft-adjustable to be measured at 0 to 655 feet with or without CSU
- **Impedance**
  100Ω
- **Connectors**
  8-pin RJ-45

DATA PORT INTERFACE

- **Data rate (sync type only)**
  n x 1.472 Mbps (where n=1 to 4), up to 5.888 Mbps
- **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
  - HSSI with 50-pin SCSI-2 connector
  - IR-ETH (Ethernet bridge): RJ-45
  - IR-ETH/QH (Ethernet/Fast Ethernet bridge): RJ-45

Note: *For specifications of Ethernet interface, refer to Table 1*

SUPERVISORY PORT

- **Interface**
  V.24/RS-232, async
- **Connector**
  9-pin D-type, female
- **Speed**
  300-9600 bps, autobaud

GENERAL

- **Sync Data Port Timing**
  DCE or External-DCE
- **System Timing**
  Loopback (from any T1 link)
  Internal (±32 ppm)
  Station clock
- **T1 Differential Delay**
  Up to 64 msec
- **Station Clock**
  Bit rate: 1.544 Mbps
  Line code: AMI or B8ZS
  Impedance: 100Ω
  Pulse shape: ITU G.703
  Connector: 8-pin RJ-48C
  Format: Framed/Unframed all "1"s
- **Diagnostics**
  - Local/remote loopbacks for data port and T1 links
  - 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
- **Front Panel Controls**
  LCD: 2 rows x 16 characters
  Push-buttons: Cursor, Scroll, Enter
- **Indicators**
  T1 (per link): Red and Yellow alarms
  Data port: TD, RD, 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**
  100 to 240 VAC, 18.5W
  -48 VDC, 18.5W
- **Environment**
  Temperature: 0-45°C / 32-113°F
  Humidity: Up to 90%, non-condensing

ORDERING

IMX-4T1/#/*/~/%
T1 Inverse Multiplexer

Specify number of T1 links
2 for 2 T1 links
4 for 4 T1 links

***** Specify data port interface
V35 for V.35
530 for RS-530
V36 for V.36/RS-449 (via supplied conversion cable)
X21 for X.21
HSSI for high speed serial
ET for IR-ETH (UTP)
ET/QH for IR-ETH/QH (UTP)

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

% Specify **CSU** for built-in CSU (default is without CSU)

Table 1. Ethernet Interface Modules Characterisitics

Interface Module	LAN Table (addresses)	Filtering & Forwarding (frames/sec)	Buffer (frames)	Delay (frames)	Line Code	WAN Protocol	VLAN Support
IR-ETH	10,000	15,000	256	1	Manchester	HDLC	No
IR-ETH/QH	1,000	150,000	170	1	• Manchester (10BT) • MLT3 (100BT)	PPP	Yes

Note: *Both Ethernet interface modules conform to the IEEE 802.3/Ethernet V2 standard.*

APPLICATION

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