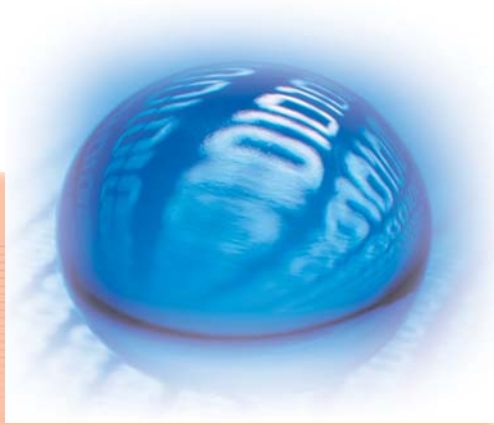
Fractional E1 Time Division Multiplexer Rack Type

ERM-MUX/PLUS



The ERM-MUX/PLUS is a Rack Type E1 CSU/DSU Time Division Multiplexer for Fractional E1 network access which is designed for non-stop operation and provides an economic solution for central site installations. There are 10 slots available for hot-swappable ERM-MUX/PLUS-I/O cards for installation into the ERM-MUX/PLUS Rack. Two slots are provided for MUX-E1 cards, which may be configured as four separate E1 links or for redundant 2+2 operation of the E1 lines, safe guarding against expensive network down time. Two slots are also available for CPU cards, with the second CPU card acting as a hot stand by in case of primary card failure. Each MUX-E1 card may be linked to another ERM-MUX/PLUS Rack to provide a variety of Datacom & Voice over E1 network services.

The ERM-MUX/PLUS optionally accommodates up to two separate power supplies, which may derive power from AC (110/220) or DC (-48V) power sources. When two power supplies are installed, the modules provide complete power redundancy and are hot swapable even during the E1 cards' transmission. The ERM-MUX/PLUS provides all interface connections on the front panel. BNC and RJ-45 are used for E1 Line interface connections, RJ-45 connections are used for all voice and for 10/100 Ethernet Bridge (FXO, FXS, E&M), G.703/64K Co-directional. Optional cable adapters are used to convert the DB-62F DCE ports of the I/O cards to RS-232 or HP68F DCE port of I/O card to V.35, RS-232, RS-530, RS-449, RS-422, X.21 and X.50. When cards are inserted in slots, LEDs will show the Line status on the front panel.

Features

- CPU redundancy (1+1)
- E1 redundancy (1+1)
- Power redundancy (1+1) [AC+AC, DC+DC, AC+DC]
- DTE plug-in card types
  - * 6-channel magneto card
  - * 6-channel 2W/4W E&M card
  - * 6-channel FXS card
  - * 6-channel FXO card
  - * 6-channel RS-232 card (low speed)
  - * 5-channel X.50 card
  - * 4-channel G.703/64K-CO card
  - * 4-channel V.35 card (n*64K)
- Drop & Insert function
- NMP & SNMP management

G.703 E1 I/O Specifications

- **Framing** Unframed / Framed
  CCS(PCM31) / CAS(PCM30)
  CRC4 On/Off
- **Bit rate** 2.048Mbps±50 ppm
- **Line code** AMI / HDB3
- **Line impedance** 75 ohm, unbalanced (BNC)
  120 ohm, balanced (RJ-45)
- **Relative receive level** 0 / -43dB
- **Transmit level**
  Pulse amplitude Nominal 2.37V ±10% for 75ohm
  Nominal 3.00V ±10% for 120ohm
  Zero amplitude ±0.1V
- **Transmit frequency tracking**
  Internal timing±30 ppm
  Loopback timing±50 ppm
  External timing±100 ppm
- **Jitter performance** According to ITU-T G.823
- **Complies with** ITU-T G.703, G.704, G.706 and G.732.
- **Interface connectors** BNC for unbalanced
  RJ-45 Connector for balanced

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Other Datacom I/O Specifications

N x 64 Module, 4 channels, High Speed Data Interfaces)

- Interfaces types: RS-530, X.21, V.35, RS-449 and RS-232
- Interface connector: High density HD68 Female with appropriate cable adapter.
- Line code: NRZ
- Data rate: N x 64kbps, where N equal 1 to 31 in CCS and N equal 1 to 30 in CAS

Async Module, 6 channels, <= 38.4kbps Async or 6 channels, 128kbps Sync

- Interfaces types: RS-232(V.24)
- Interface connector: High density HD62 Female with appropriate cable adapter.
- Line code: NRZ
- Data rate: <=19.2kbps x 6ch or 64kbps x 6channels

G.703/64K Co-directional Module, 4 channels, Co-directional 64K

- Interfaces type: G.703/64K Co-directional
- Interface connector: RJ-45 x 4
- Line impedance: 120 ohm(balanced)
- Frame mode: Unframed only
- Line code: ITU-T G.703/64K, Co-directional
- Data rate: 64Kbps±100ppm x 4 channels

X.50 Module, 5 channels, <=19.2kbps, supports Async or Sync

- Interfaces type: RS-232(V.24)
- Interface connector: High density DB62 connector, Female(DCE) with appropriate cable adapter.
- Line code: NRZ
- Data rate: From 2.4k ~ 19.2kbps x 5ch
- Loopback type: Local loopback, Remote loopback

Sub-E1 I/O Specifications

- Each card provides two E1 loops, each loop provides E1A/E1B channel independently
- Hot-Swappable
- Each first E1 loop provides external clock to be used as system clock source
- Balance and unbalance switchable

- Framing: Unframed / Framed; CCS(PCM31) / CAS(PCM30); CRC4 On/Off
- Bit rate: 2.048Mbps±50 ppm
- Line code: AMI / HDB3
- Line impedance: 75 ohm, unbalanced / 120 ohm, balanced
- Relative receive level: 0 / -43dB
- Transmit level
- Pulse amplitude: Nominal 2.37V ±10% for 75ohm; Nominal 3.00V ±10% for 120ohm
- Zero amplitude: ±0.1V
- Jitter performance: According to ITU-T G.823
- Complies with: ITU-T G.703, G.704, G.706 and G.732.
- Interface connectors: BNC for unbalanced; RJ-45 Connector for balanced
- Loopbakc type: Remote digital loopback

Ethernet I/O Specifications

- Bridge module - 2 channels
- 10BASE-T/100BASE-TX, Full Duplex or Half Duplex
- HP Auto-MDI/MDIX detects and corrects crossed cable
- IEEE 802.3x flow control
- Real-time filtering with 256 address tables
- Automatic address learning, aging and deletion after 5 minutes
- Up to 340 packet-buffering capacity
- Forwarding and filtering rate at wire speed with through put latency of 1 frame.
- Auto padding of undersized packets to meet the minimum Ethernet packet size requirement
- Buffering modes can be selected according to the setting of WAN and LAN line speeds
- Ethernet interface has automatic Twisted Pair polarity correction

LAN

- Standard: Fully compliant with IEEE 802.3/802.3u
- Connector: Shielded RJ-45
- Speeds: 10BASE-T/100BASE-TX, Full or Half Duplex
- Frames: Supports 64 to 1522 byte packet lengths, standard and extended
- Length: Frames for VLAN tagging, etc.

WAN

- Protocol: Synchronous HDLC
- Rates: n x 64(56)Kbps, up to 2048Kbps

Fractional E1 Time Division Multiplexer Rack Type

ERM-MUX/PLUS

FXS Voice I/O Card

- FXS card provides 6 independent channels.
- Card has one alarm LED and 6 ring indicator LEDs..
- Effective ring voltage: AC 75VRMS ±15V@25Hz ±3Hz sine less than 10% THD.
- Ring voltage: >AC50VRMS at 300mA load
- Loop resistance: <1.8K Ohms; voltage -48VDC including 300 Ohms
- Handset current: >18mA
- On-hook current: 10mA ±3mA
- Loop current range: 18-50mA(off-hook)
- Surge protection: 1000V, 10uSec transient response, decay to 50% in 700uSec 300VRMS for less than 200mSec; no damage to any components 220VRMS for 15 minutes damage only local loop, no fire hazard
- Input level: 0 to -5dBr, adj. in 0.5dB steps.
- Output level: 0 to -7.5dBr, adj.in 0.5dB steps.
- Impedance: 900 or 600 Ohms; option.
- Return loss: 300-600Hz: >12dB; 600-3400Hz: >15dB
- Group delay: @-10dBm0: <750uSec
- Total Distortion: according to ITU-T G.223.
- Channel crosstalk: not exceed -65dB, 1020Hz@0dBm0.
- Out-of-band signal attenuation; -25dBm@4.6K-72KHz ; not to exceed -50dBm.
- Noise: <-65dBm0p weighted
- Interface connectors: RJ-45 x 6

FXO Voice I/O Card

- FXO card provides 6 independent channels.
- Card has one alarm LED and 6 ring indicator LEDs
- On-hook resistance: greater than 100K ohms
- Off-hook resistance: less than 300 ohms
- DC voltage: greater than 70V
- DC current: greater than 150mA
- DC voltage: greater than 70V
- Input level: 0 to -5dBr, adj. in 0.5dB steps.
- Output level: 0 to -7.5dBr, adj.in 0.5dB steps.
- Impedance: 600 Ohms
- Interface connectors: RJ-45 x 6

MAGNETO Voice I/O Card

- MAGNETO card provides 6 independent channels.
- Card has one alarm LED and 6 ring indicator LEDs..
- Effective ring voltage: AC 75VRMS ±15V@25Hz ±3Hz sine less than 10% THD.
- Ring voltage: >AC50VRMS at 300mA load
- Surge protection: 1000V, 10uSec transient response, decay to 50% in 700uSec 300VRMS for less than 200mSec; no damage to any components 220VRMS for 15 minutes damage only local loop, no fire hazard
- Input level: 0 to -5dBr, adj. in 0.5dB steps.
- Output level: 0 to -7.5dBr, adj.in 0.5dB steps.
- Impedance: 900 or 600 Ohms; option.
- Return loss: 300-600Hz: >12dB; 600-3400Hz: >15dB
- Group delay: @-10dBm0: <750uSec
- Total Distortion: according to ITU-T G.223.
- Channel crosstalk: not exceed -65dB, 1020Hz@0dBm0.
- Out-of-band signal attenuation; -25dBm@4.6K-72KHz ; not to exceed -50dBm.
- Noise: <-65dBm0p weighted
- Interface connectors: RJ-45 x 6

E&M Voice I/O Card

- E&M card provides 6 independent channels.
- E&M wires used in communicating control information.
- BD/GD wires are for battery and ground detection.
- E&M interface provides 1 pair of E and 1 pair of M.
- Loop current range is normally 5-30mA, 70mA max.
- Each E&M can support Type I, II, III, IV or V.
- Timeslot 16 complies with ITU-T G.711.
- Each E&M voice channel can independently set Type,
- TX / RX attenuation, and 2 / 4 wire operation.
- Input level: 0 to -16dBr, in 0.5dB steps.
- Output level: 0 to -16dBr, in 0.5dB steps.
- Impedance: 900 or 600 Ohms; option.
- Return loss: 2Wire 300-600Hz: >12dB ; 600-3400Hz: >15dB
- Return loss: 4Wire 300-3400Hz: >20dB
- Group delay: 2Wire @-10dBm0: <750uSec
- Group delay: 4Wire @-10dBm0: <600uSec
- Total Distortion: according to ITU-T G.223.
- Channel Cross-talk: not exceed -65dB, 1020Hz@0dBm0.
- Out-of-band signal attenuation; -25dBm@4.6K-72KHz ; Level not to exceed -50dBm.
- Noise: <-65dBm0p weighted.
- Interface Connector: RJ-45 x 6

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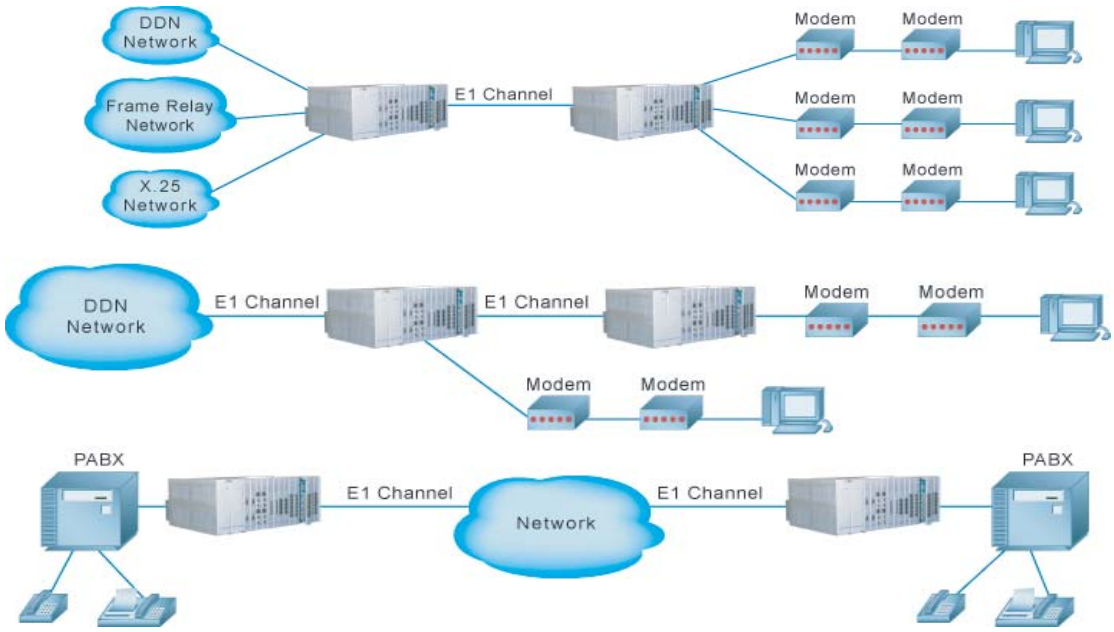
Application



Ordering Information

Master Unit : Rack Mount ERM-MUX/PLUS Chassis

ERM-MUX-PLUS/AA-CH	19", 4U rack mount chassis for AC+AC power
ERM-MUX-PLUS/AD-CH	19" , 4U rack mount chassis for AC+DC power
ERM-MUX-PLUS/DD-CH	19" , 4U rack mount chassis for DC+DC power

Optional SNMP Module for ERM-MUX/PLUS

ERM-MUX-PLUS-SNMP	SNMP interface module (installs onto the CPU card)

Optional Cable (Non-included item)

CAB-DB62DB25F6-232-LS	RS-232 adapter cable for low speed: DB62 male to 6 x DB25 female, 2 meter
CAB-HP68MB34F-V35	V.35 adapter cable for high speed: HP68 male to 4 x MB34 female, 2 meter
CAB-HP68DB15F-X21	X.21 adapter cable for high speed: HP68 male to 4 x DB15 female, 2 meter
CAB-HP68DB37F-449	RS-449 adapter cable for high speed: HP68 male to 4 x DB37 male, 2 meter
CAB-HP68DB25F-530	RS-530 adapter cable for high speed: HP68 male to 4 x DB25 male, 2 meter
CAB-DB62DB25F5-X50-1	X.50 adapter cable for low speed: HP62 male to 5 x DB25 female, 2 meter
CAB-RJ45RJ11M-VOICE	Voice adapter cable for FXO, FXS, MAGNETO: RJ45 male to RJ-11 male, 2 meter
CAB-DB62DB62M-EXP	Expanded adapter cable for expanding rack: DB62 male to DB62 male, 0.4 meter
CAB-RJ45RJ45M-485	Connection adapter cable for connecting with SNMP, RJ45 male to RJ45 male, 0.4 meter

Optional Power Module for ERM-MUX/PLUS (Redundant Power Protection Available)

ERM-MUX/AC	AC power plug-in module (110/220 VAC)
ERM-MUX/ACV	AC power plug-in module with Voice Support
ERM-MUX/DC	DC power plug-in module (±48VDC)
ERM-MUX/DCV	DC power plug-in module with Voice Support

Optional LTU Card

ERM-MUX-PLUS-E1	2 channels main E1 LTU card: G.703/G.704 (Fractional E1)
ERM-MUX-PLUS-SubE1	2 channels E1A/E1B card: G.703/G.704

Optional CPU Card

ERM-MUX-PLUS-CPU	CPU card for NMP management (without SNMP I/F module)

Optional Voice Interface Card

ERM-MUX-PLUS-FXO	6 channels FXO voice interface card
ERM-MUX-PLUS-FXS	6 channels FXS voice interface card
ERM-MUX-PLUS-E&M	6 channels 2/4 wires E&M voice interface card
ERM-MUX-PLUS-MAGNETO	6 channels MAGNETO interface card

Optional Low-Speed Interface Card

ERM-MUX-PLUS-LS-232	6 channels RS-232(V.24) interface card
ERM-MUX-PLUS-G64K	4 channels G.703 64Kbps Co-directional interface card
ERM-MUX-PLUS-X50	5 channels RS-232(V.24) interface card

Optional High-Speed Interface Card

ERM-MUX-PLUS-HS-SERIAL	4 channels V.35/X.21/RS-449/RS-530 (cable selected) interface card
ERM-MUX-PLUS-ET10/100	2 Channels Ethernet (10/100Base Tx) interface card