



ERM-Mux / Plus-E1

G.703 E1 Aggregate Card

The ERM-Mux/plus has two dedicated slots for installing E1 aggregate cards. Currently E1 cards are available with 2, 4 or 8 E1 ports. In the backplane design of the ERM-Mux/plus, a maximum of 4 E1s can carry data to and from tributary (I/O) cards. One typical application could be to install two 4E1 cards in the chassis and have the cards act as one master and one hot-standby card for E1 redundancy. For other applications, an 8E1 card could be used to cross connect E1 timeslots prior to assignment to the four available backplane channels. Another application can use the 'extra' E1 aggregate channels for drop & insert (Sub-E1) rather than performing cross connection. It can quickly be seen that a large number of applications are possible with the ERM-Mux/plus's flexible design.

- Available in 2, 4, 8 E1 channels
- Supports PCM31 or PCM30 framing

- Path / Card Redundancy / Hot Swappable
- E1 timeslots can support cross-connect function
- E1 channel can act as Sub-E1 for drop & insert

Specifications

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|----------------|--|
| Frame format | CAS(PCM30) / CCS(PCM31) ; CRC on/off |
| Bit rate | 2.048Mbps |
| Line codes | HDB3/AMI |
| Rx sensitivity | 0 ~ -43dB |
| Tx driver | 1.5km over 0.5mm E1 cable |
| Line impedance | 75 ohms (unbalanced) 120 ohms (balanced) |

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| Pulse amplitude | nominal 2.37V (75ohm) nominal 3.00V (120ohm) |
| Pulse shape | According to ITU-T G.703 |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |



ERM-Mux / Plus-Data

Nx64 Synchronous Serial Tributary Card

The ERM-Mux/plus Nx64 Serial Tributary Card provides V.35/ X.21/ RS-530/ RS-449 Synchronous data capability. Incorporating four separate channels, each channel can independently assign any Nx64 timeslots from the aggregate E1. The single HD68 connector mates to a 1 to 4 cable that terminates to the required connector type. Four different cables provide connection to V.35's MB34, X.21's DB15, RS-530's DB25 or RS-449's DB37 female connectors. Please be sure to select the right cable for your application when ordering this card.

- Four independent Synchronous channels
- Nx64 setting from any E1 channel

- Each channel operates in native DCE mode
- Diagnostic loop backs & Hot Swappable
- LED indicators for Power, Alarm, RD/TD activity

Specifications

| | |
|---|---|
| ITU-T and ANSI compliant Datacom interfaces | |
| Multiplexing Nx64K data onto E1 time-slot. | |
| Data speed | Nx64K(N=1 to 30, or 31) |
| Data access | RS-530, RS-449, V.35, X.21, supplied with corresponding interface cable |

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|-------------|------------------------------------|
| Access mode | DCE |
| Diagnostics | Local /Remote /Bi-directional Loop |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |



ERM-Mux / Plus-G64K

G.703 64K Co-directional Tributary Card

The ERM-Mux/plus G64K Tributary Card provides 4 independent G.703 64Kbps Co-directional data channel capability. Each channel can independently assign any 64Kbps timeslot from the aggregate E1. Individual Shielded RJ-45 connectors that conform to USOC RJ-48C standard wiring provide the G.703 connections. Standard UTP or alternately shielded UTP are both acceptable cabling media. These data channels may be linked to multiplexers, terminal equipment or satellite/micro-wave transmission equipment. In Co-directional signaling, the clock signals are recovered from the received G.703 data stream. Only Tx and Rx pairs or a total of 4 wires are required in 64Kbps co-directional transmission.

- 4 independent channels
- 1x64 setting from any E1 channel
- Transparent synchronous rate of 64kbps

- Co-directional clock recovered from Rx G.703
- Diagnostic loop backs / LED indicators for Power, Alarm, Tx/Rx activity / Hot Swappable

Specifications

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|--|--------------------------------|
| ITU-T G.703, G.823 64kbps compliant interfaces | |
| Multiplexing 1x64K data onto E1 time-slot | |
| Data speed | 64Kbps +/-100ppm |
| Data access | RJ-45 per USOC RJ-48C standard |
| Line code | Co-directional |
| Pulse shape | according to G.703 |

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|-------------------|------------------------------------|
| Transmit distance | 600M or less (0.5~0.7mm TP) |
| Diagnostics | Local /Remote /Bi-directional Loop |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ERM-Mux / Plus-CPU

CPU Control Card

CPUA and CPUB slots can insert two CPU modules that automatically work in redundant operation mode. CPU modules are responsible for all parameter setup from local PC or from the selected in-band E1 line. The setup of the ERM-MUX/Plus may be accomplished by:
 Local PC connected by Ethernet to SNMP (can extend to multiple chassis with RS485 twisted-pair)
 Local PC connected by serial NMP port to Windows® NMP GUI. E1 network connected to SNMP/NMP GUI. Local terminal console mode

- RS-232 port for dumb terminal at 9.6k, 8bit, no parity
- MIB file compliant to MIB-II ASN.1
- Firmware upgrade by TFTP
- Hot swappable



ERM-Mux / Plus-ET100

Fast Ethernet Bridge Tributary Card

The ERM-Mux/plus Ethernet Bridge Tributary Card provides Ethernet over E1 capability. Incorporating two separate channels, this transparent bridge supports industry standard HDLC encapsulation. The WAN data rate depends on the number of E1 timeslots assigned (Nx64). The front panel has two RJ-45 shielded connectors for connection of 10Base-T or 100Base-TX Ethernet and status LEDs for each channel to display link state, speed, duplex and activity. Rounding out each bridge channel are support for 256 MAC filter address learning table and 340 packets buffer to aid in handling LAN side burst traffic.

- Two independent Ethernet over E1 channels
- Utilizes HDLC WAN encapsulation
- MAC Address learning table with 5 minute aging
- Auto-MDIX and Auto-Negotiation & Hot Swappable

Specifications

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| Standards | IEEE 802.3, IEEE802.3u |
| Automatic address learning, aging and deletion after 5 min. | |
| Throughput latency | 1 frame |
| MDI / MDIX | Auto |
| Filtering | 256 MAC address table |
| Buffer | 340 packets |

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|---|--------------------------|
| Encapsulation | HDLC |
| 10Base-T/100Base-TX, Full or half duplex | |
| Packet sizes | 64 ~ 1522 bytes |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% (non-condensing) |
| MTFB | 65,000 hrs |



ERM-Mux / Plus-RS485

Asynchronous RS-485/422 Serial Tributary Card

The ERM-Mux/plus Asynchronous RS485/422 Serial Tributary Card provides six independent RS-485/ RS-422 data channel capability. Incorporating six separate channels, each channel can independently assign any Nx64 timeslots from the aggregate E1. Each channel uses a pluggable 4-pin terminal block for connection one or two twisted pair wires. No cables are provided with this card. When connecting to RS-485, the channel supports 4-wire Full Duplex or 2-wire Half Duplex RS-485 transmissions for serial control or data acquisition.

- Six independent channels
- Nx64 setting from any E1 channel
- Transparent asynchronous rates up to 128kbps
- Diagnostic loop backs & Hot Swappable

Specifications

| | |
|----------------|--------------------------------|
| Interface | RS-422 4 wire, RS485 4/2 wire |
| LEDs | RS-485/422 TD/RD, Power, Alarm |
| Baud Rate | Async mode <= 128K |
| Bit Error Rate | Less than 10 ⁻¹⁰ |
| Connector | 4pin Terminal Block x 6 |

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|-------------|-------------|
| Duplex | Full / Half |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |



ERM-Mux / Plus-RS232

RS232 Sync/Async Tributary Card

The ERM-Mux/plus Sync/Async RS232 Serial Tributary Card provides six independent RS-232 data channel capability. Incorporating six separate channels, each channel can independently assign any Nx64 timeslots from the aggregate E1. The single DB62 connector mates to a 1 to 6 cable that terminates to DB25 female connectors. These serial data channels may be linked to leased line modems for further extension or connected to other data terminal or data acquisition devices. When configured for synchronous use, the data connectors carry both clock and data. For asynchronous use, the clock signals can be ignored.

- Six independent channels
- Nx64 setting from any E1 channel
- Transparent asynchronous rates up to 115.2kbps
- Synchronous 64 or 128Kbps, DCE mode
- Diagnostic loop backs & Hot Swappable
- LED indicators for Power, Alarm, RD/TD activity

Specifications

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|--|---|
| ITU-T V.24 compliant Datacom interfaces | |
| Multiplexing Nx64K data onto E1 time-slot | |
| Data speed | Nx64K(N=1 to 2) |
| Data access | RS-232, supplied with corresponding interface cable |
| Access mode | DCE |

| | |
|-------------|------------------------------------|
| Diagnostics | Local /Remote /Bi-directional Loop |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |



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ERM-Mux / Plus-E&M

E&M Voice Tributary Card

The ERM-Mux/plus E&M Voice Tributary Card provides six independent Ear & Mouth Voice channel capability. Each channel can independently assign any 64Kbps timeslot from the aggregate E1. Individual Shielded RJ-45 connectors provide the voice connections. Standard UTP or alternately shielded UTP are both acceptable cabling media. These voice channels may be linked to PBX (Private Branch Exchange) to facilitate voice to voice connections. The channels support selection of Type 1~5, support 2 or 4 wire operation and have 0.5dB steps for signal attenuation. When using this card, an appropriate voice compatible power module must be used in the ERM-MUX/Plus.



- Six independent channels
- 2/4 wire independent setting
- 1x64 setting from any E1 channel

- E&M Signaling PBX trunks & Supports types I, II, III, IV or V
- Provides E line, M line, SB (battery) and SG (ground) lines
- G.711 Codec & Hot Swappable
- LED indicators for Power, Alarm, activity

Specifications

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|------------------|--|
| Loop current | 5~30 mA, maximum 70 mA |
| Return loss | 300-600Hz >12dB (2W) 600-3400Hz >15dB (2W) 300-3400Hz >20dB (4W) |
| Group delay | @-10dBm0 <750uSec(2W) <600uSec(4W) |
| Total Distortion | according to ITU-T G.223 |

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|-------------------|----------------------|
| Channel crosstalk | < -65dB, 1020Hz@0dBm |
| Noise | < -65dBm0p weighted |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |

ERM-Mux / Plus-FXO

FXO Voice Tributary Card

The ERM-Mux/plus FXO Voice Tributary Card provides six independent Foreign Exchange Office Voice channel capability. Each channel can independently assign any 64Kbps timeslot from the aggregate E1. Individual Shielded RJ-45 connectors provide the voice connections. Standard UTP or alternately shielded UTP are both acceptable cabling media. These voice channels may be linked to PBX (Private Branch Exchange) or PSTN (Public Switched Telephone Network) to facilitate voice to voice connections. When using this card, an appropriate voice compatible power module must be used in the ERM-Mux/plus.



- Six independent channels
- 2 wire / G.711 Codec
- 1x64 setting from any E1 channel

- PCM30 R2 Signaling PSTN trunks
- Links PBX to PBX or extends POTS & Hot Swappable
- LED indicators for Power, Alarm, activity

Specifications

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|------------------------|----------------------|
| On-hook DC resistance | > 100K Ohms |
| Ring AC resistance | > 7.5K Ohms |
| Ring power sensitivity | < 50mW |
| Off-hook DC resistance | < 300 Ohms |
| Max. Input Voltage | 70VDC |
| Max. Input Current | 150mA |
| Channel crosstalk | < -65dB, 1020Hz@0dBm |

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|-------------|--|
| Noise | < -65dBm0p weighted |
| Return loss | 300-600Hz >12dB (2W) 600-3400Hz >15dB (2W) 300-3400Hz >20dB (4W) |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |

ERM-Mux / Plus-FXS

FXS Voice Tributary Card

The ERM-Mux/plus FXS Voice Tributary Card provides six independent Foreign Exchange Station Voice channel capability. These 6 channel tributary cards are designed for voice applications over E1. Typically, an FXS connects to a standard telephone set. The FXS needs to sense on-hook, off-hook or disconnected status. It also must be able to provide ring function to a telephone set and it must pass caller-ID information. In the ERM-Mux/plus point-to-point application, the FXS can connect to a remote FXO (Foreign Exchange Office) when deployed as an extension from PBX (Private Branch Exchange) or PSTN (Public Switched Telephone Network). It may also connect to a remote FXS, also for extension from PBX or as a direct 'hotline' voice connection. Individual Shielded RJ-45 connectors provide the voice connections. When using this card, an appropriate voice compatible power module must be used in the ERM-Mux/plus.



- Six independent channels
- 2 wire & G.711 Codec
- 1x64 setting from any E1 channel

- Provides ring function
- Supports caller-ID forwarding / PSTN extension or direct "Hot-line"
- Links telephone to telephone or extends POTS
- LED indicators for Power, Alarm, activity / Hot Swappable

Specifications

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| Effective ring voltage | AC 75VRMS +/-15V@25Hz +/-3Hz, <10% THD |
| Ring voltage at 300mA load | >50VACRMS |
| Loop resistance | <1.8K Ohms, including 300 Ohms for telephone |
| On-hook current | 10mA +/-3mA |
| Off-hook loop current | 18-50mA |
| Channel crosstalk | < -65dB, 1020Hz@0dBm |

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| Noise | < -65dBm0p weighted |
| Surge protection | 1000V, 10uSec transient response, decay to 50% in 700uSec 300VRMS for less than 200mSec; no component damage 220VRMS for 15 minutes; damage only local loop |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |

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