

FCD-2L

E1 or Fractional E1 Access Unit



FEATURES

- E1 or Fractional E1 access unit with one digital data port
- Selectable synchronous data rates of $n \times 64$ kbps or $n \times 56$ kbps, up to 1984 kbps
- V.35, RS-530, V.36/RS-449, X.21 synchronous data interfaces
- Optional high-performance built-in Ethernet bridge, with or without VLAN support
- Framing format: 2 or 16 frames per multiframe, with or without CRC-4, or unframed over E1
- E1 interface complies with: ITU G.703, G.704, G.732, G.823, G.706
- E1 link available with or without LTU

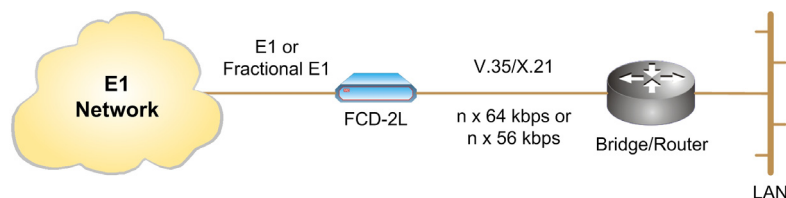
FCD-2L

E1 or Fractional E1 Access Unit

DESCRIPTION

- FCD-2L is a single-port access unit for E1 or Fractional E1 services. Data port rates are selectable for any multiple of 64 or 56 kbps, up to 1984 kbps. User data is placed into an E1 frame using only the required number of timeslots.
- FCD-2L is available with or without an LTU (Line Termination Unit). This allows connection directly to the service provider's line or, alternatively, via an integral LTU ensuring a range of up to 2 km (1.2 mi).
- The E1 interface of FCD-2L is compatible with virtually all carrier-provided E1 services and meets the requirements of ITU recommendations G.703, G.704, G.706, and G.732. It supports either 2 or 16 frames per multiframe, with or without CRC-4, as well as unframed data streams. Line coding is HDB3.
- FCD-2L can also be used as a rate and interface converter between the user data port interface and E1 (G.703, G.704) lines.
- FCD-2L has a single user port, which can be a synchronous data port with V.35, RS-530, V.36/RS-449 or X.21 interface, or a single LAN port with built-in bridge.
- The synchronous data ports can operate in the following clock modes:
 - **DCE:** FCD-2L provides both transmit and receive clocks to the connected user equipment, with optional sampling of the incoming data with an inverted clock
 - **DTE1:** FCD-2L provides the transmit clock; connected user equipment provides the receive clock
 - **DTE2:** connected user equipment provides both transmit and receive clocks to FCD-2L.
- When equipped with optional IR-ETH or IR-ETH/Q bridge, FCD-2L can transparently connect remote LANs over unframed E1 links, utilizing the full E1 bandwidth. It filters Ethernet frames, forwarding only the frames destined to the WAN. The IR-ETH/Q Ethernet port also supports VLANs.
- The LAN ports are available with a 10BaseT (UTP) Ethernet interface. The ports operate in full-duplex mode.
- Timeslot assignment is according to the data port speed and is consecutive, starting from any timeslot.
- The E1 link timing may be taken from the recovered receive clock (LBT) or from an internal oscillator.
- FCD-2L is set up and controlled by internal jumpers. Front-panel switches control all diagnostic options.
- Diagnostic capabilities include user-activated local loopbacks on the E1 link and on the digital data port. The data port can respond to an inband ANSI FT1 loop code that can be generated from the remote FCD-2L data port. A pseudo-random data pattern (BERT) can be activated and detected on the data channel.
- The FCD-2L front panel can display Major and Minor alarms. FCD-2L also has a high Bit Error Rate (BER) indicator, which lights when the BER on the E1 line is higher than 1×10^{-3} .
- FCD-2L is available as a standalone unit or as a card for the 19-inch rack mount enclosure, ASM-MN-214. A rack-mount adaptor kit (RM-9) enables installation of one or two standalone units in a 19-inch rack.

APPLICATION



E1 or Fractional E1 Access Unit

SPECIFICATIONS

E1 PORT (NETWORK)

- **Framing**
256N (no MF, CCS)
256N (no MF, CCS) with CRC-4
256S (TS16 MF, CAS)
256S (TS16 MF, CAS) with CRC-4
Unframed mode
- **Data Rate**
2.048 Mbps
- **Line Code**
HDB3
- **Impedance**
Balanced: 120Ω
Unbalanced: 75Ω
- **Signal Level**
Receive:
0 to -36 dB with LTU
0 to -10 dB without LTU
Transmit:
Balanced: 3V (±10%)
Unbalanced: 2.37V (±10%)
- **Jitter Performance**
As per ITU G.823
- **Connector**
Balanced: RJ-45, 8-pin
Unbalanced: pair of BNC coaxial
- **Transmit Timing**
Internal clock: ±30 ppm
Loopback timing: ±130 ppm
- **Timeslot Allocation**
Consecutive (bundled) starting from any timeslot
- **Compliance**
ITU G.703, G.704, G.706, G.732

SYNC DATA PORT

- **Interface**
 - RS-530
 - V.35, V.36/RS-449 and X.21 available via adapter cables (see *Ordering*)

- **Connector**
25-pin D-type, female
- **Data Rate**
 $n \times 56$ kbps or $n \times 64$ kbps,
 $n=1$ to 32
- **Clock Modes**
DCE: Rx and Tx clock to synchronous DTE
DTE1: Rx clock to synchronous device; Tx clock from synchronous device
DTE2: Rx and Tx clock from DCE
- **Control Signals**
 - CTS follows RTS or constantly ON, strap selectable
 - DSR constantly ON, unless in test mode
 - DCD constantly ON, unless in local sync loss

ETHERNET BRIDGE PORTS

- **LAN Table**
 - IR-ETH: 10,000 addresses
 - IR-ETH/Q: 2,000 addresses
- **Filtering and Forwarding**
 - IR-ETH: 15,000 pps
 - IR-ETH/Q: 2,000 pps
- **Buffer**
256 frames
- **Delay (IR-ETH only)**
1 frame
- **Line Code**
Manchester
- **WAN Protocol**
HDLC

Note: IR-ETH and IR-ETH/Q interface modules conform to the IEEE 802.3/Ethernet V2 standard. Additionally, IR-ETH/Q supports the IEEE 802.1/Q frames.

- **Connector**
Shielded RJ-45

GENERAL

- **Diagnostics**
Local loopback on E1 port
Local and remote loopbacks on data port
BER test on data port
- **Indicators**
PWR, RTS, TEST, ERR,
 10^{-3} , TD, RD
SYNC LOSS: LOC, REM
ALARM: MIN, MAJ
- **Physical**
 - Standalone:
Height: 4.4 cm (1.7 in) (1U)
Width: 19.3 cm (8 in)
Depth: 24 cm (9.5 in)
Weight: 1.3 kg (2.9 lb)
 - Card:
Dimensions: fits the ASM-MN-214 modem rack
Weight: 360 g (10 oz)
- **Power**
AC: 100 to 240 VAC; 47 to 63 Hz
DC: -48 VDC (-40 to -57 VDC)
24 VDC (18 to 36 VDC)
- **Power consumption:**
5W
- **Environment**
Temperature: 0°-50°C (32°-122°F)
Humidity: Up to 90%,
non-condensing

FCD-2L

E1 or Fractional E1 Access Unit

ORDERING

FCD-2L/~/&/@

E1 or Fractional E1 Access Standalone Unit

FCD-2L/R/&/@

E1 or Fractional E1 Access Card for ASM-MN-214 Rack

~ Specify power supply voltage:

AC for 110 VAC to 240 VAC

48 for -48 VDC

24 for 24 VDC

& Specify data port interface:

530 for RS-530

V35 for V.35

X21 for X.21

V36 for V.36/RS-449

ETUB for UTP (10BaseT) Ethernet bridge

ETUQ for UTP (10BaseT) Ethernet bridge with VLAN support

@ Specify **LTU** for integral line termination unit

Default is without LTU

SUPPLIED ACCESSORIES

AC power cord (if AC power supply is ordered)

DC adapter plug (if DC power supply is ordered)

CABLES

Interface adapter cables for DB-25 channel connectors (DCE clock mode only). Cable length is 2m (6 ft).

CBL-HS2/V/1/# for 34-pin V.35, DCE

CBL-HS2/R/1/# for 37-pin V.36, DCE

CBL-HS2/X/1/# for 15-pin X.21, DCE

Specify cable connector type:

F for female

M for male

OPTIONAL ACCESSORIES

RM-9

Hardware kit for mounting one or two units side-by-side in a 19-inch rack

CABLES

Interface adapter cables for DB-25 channel connectors (DTE1 and DTE2 clock modes). Cable length is 2m (6 ft).

CBL-HS2/*/#

* Specify interface, clock mode:

V/2 for 34-pin V.35, DTE1

V/3 for 34-pin V.35, DTE2

R/2 for 37-pin V.36/RS-449, DTE1

R/3 for 37-pin V.36/RS-449, DTE2

Specify cable connector type:

F for female

M for male

CIA-FCD2L/*

Mechanical adapter for converting DB-25 connectors into standard connectors for FCD-2L/R

* **V35/1** for V.35 interface

X21/1 for X.21 interface

ETU/1 for Ethernet interface



data communications

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