

Highlights

- Up to 4.64Mbps
- Automatic Rate/Distance Sensing
- Full Duplex transmission over a Single twisted pair
- High noise immunity allowing different types of traffic into the same cable bundle
- Choice of interfaces:
 - 10Base-T Ethernet (full bridging)
 - T1
 - E1 (G.703/G.704)
 - V.35
 - X.21
 - RS-232
 - J64
- Built-in 8 Port Ethernet Hub (opt)
- Rack mount and Desktop models
- Compatible with AMS Universal chassis and Management System
- Alarm Relay

The **CXR-Anderson Jacobson MD-2000 Series™** is based on the Multi-rate Symmetrical Digital Subscriber Line technology (MSDSL), the MD-2000 transmission performance is maximized over a single-pair of copper lines at speeds up to 4.64Mbps while providing easy provisioning through an automatic rate/distance adjustment technique.

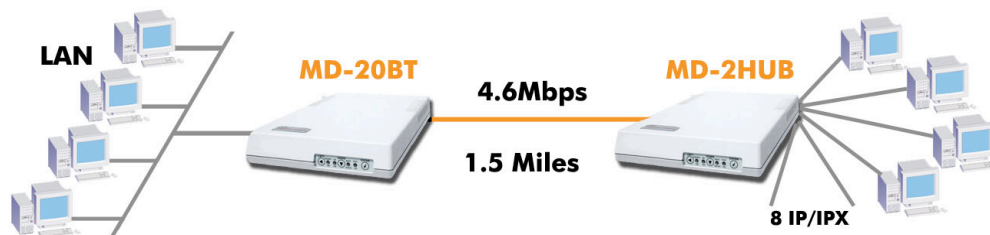
Applications

Unlike the first generation of singlerate technologies, MSDSL allows the transmission of data over longer distances by automatically or manually adjusting the link speed. Equally important, it is much more tolerant to other types of traffic that may exist on the same cable bundle. The MD-2000 Series greatly reduces the cost,



complexity and time required to provision FT1 and FE1 circuits. At T1(E1) speed the MD-2000 can symmetrically transmit data over a distance exceeding 2.6 miles on 26 AWG copper lines. The MD-2000 is available both as a desktop unit and as a rackmount card to be used inside the AMS Universal managed chassis where it can be co-located with other members of the AJ product family (VF modems, ISDN terminal adapters, Fiber Optic modems, CSU/DSUs and so forth). Existing shelves can be used to their maximum capacity by reducing the required floor space while minimizing capital expenditure.

The MD-2000 can be factory equipped with a variety of interfaces including 10Base-T Ethernet (with full bridging capabilities), T1/FT1, RS-232/X.21/V.35 and G.703/G.704. An 8-port Ethernet hub desktop configuration is also available.



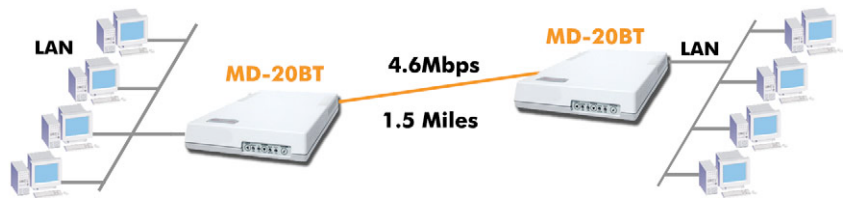
LAN Extension

This application facilitates a quick migration of connecting small remote topologies to a backbone central network. The MD-2000 Series provides a bridging function with a built-in 8-port hub. This enables you to connect up to 8 nodes directly onto the LAN without having to define detailed parameter settings on a router.

Anderson Jacobson MD-2000 Series

LAN-to-LAN Bridging

This interconnection provides an immediate LAN-to-LAN bridge architecture and is transparent to the data traffic. The MD-2000 optimizes the traffic by compressing short frames and allowing only traffic through that is intended for the distant network.



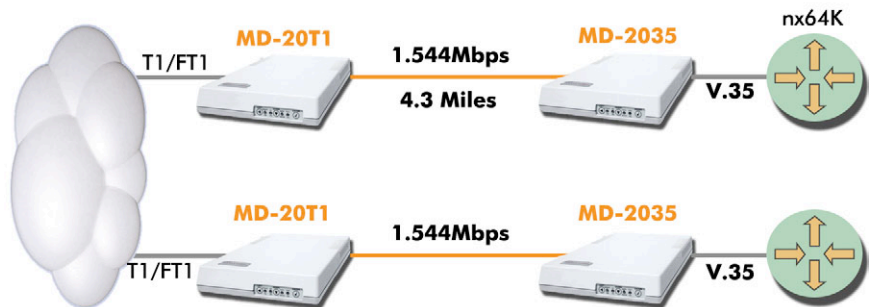
Interconnecting Routers

The MD-2000 Series quickly and easily interconnects two routers while optimizing the data flow with all the possibilities of clock source or speed. It is also possible to mix the interfaces between the ends of the circuits with either X.21 or V.35.



WAN Extension w/ Interface Conversion

With the assortment of interfaces available on the MD-2000, you gain the advantage and flexibility of connecting and adapting to various wide area networks and converting them to the signals required by the attached terminal equipment.



Interconnecting PABX Systems



The MD-2000 Series has been designed for interconnecting PABX systems with minimum setup effort while providing maximum operability. In fact, if the modems are too distant from each other or if the line is bad, the MD-2000 Series can be configured to operate at lower speeds to insure the transport of some data that are always presented to the PABX on an interface at either 1.544Mbps (for T1 equipment), or 2.048Mbps (for G.703/G.704 equipment).

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Optimum Performance

Rate on Line Kbps	144	272	400	528	784	1040	1552	2064	2320	4640
Rate at DTE Kbps	64,128	192,256	320,384	448,512	576 to 768	832 to 1024	1088 to 1536	1600 to 2048	2320	4640
Time Slots	2	4	6	8	12	16	24	32	--	--
Distance (miles)										
26AWG (0.012 inch)	4.4	4.2	3.9	3.8	3.2	2.9	2.6	2.4	2.3	1.5
24AWG (0.015 inch)	6.3	6.2	5.8	5.5	4.7	4.4	3.7	3.4	3.3	--
19AWG (0.027 inch)	7.9	7.7	7.4	7.0	6.0	6.0	4.7	4.4	4.2	--

The **performance** of the MD-2000 Series can simply be expressed in terms of maximum achievable transmission **speed** for a given distance, or conversely in terms of maximum **distance** for a given transmission speed, as illustrated in the table above. This performance however depends on the type of wire used and also the level of noise to which the transmission medium is exposed (line impairments). The type of wire being used (gauge) is very often a given unless a better pair can be found. The larger the diameter of the wire the longer the distance for a given speed. As a rule of thumb, at a line speed of 2.048Mbps, the maximum range can be calculated by simply taking 0.625 mile (or 1 km) per tenth of inch (mm) (3.1 miles (or 5 km) for a 0.015 inch wire or 24 AWG). Given the fact most of the time the copper pair used for the transmission is part of a cable bundle, the major source of noise will come from the adjacent pairs which may or may not be used to transport the same type of traffic (DDS, ISDN, voice and so forth). The result is very complex but the technology used by the MD-2000 Series is one of the most robust techniques for noise immunity which provides the best performance.

Easy Configuration & Diagnostics

The MD-2000 Series is easy to configure and operate. In small point to point installations the modem can be configured via the console port using simple commands or menu driven and a VT100 terminal emulation. Remote configuration is also possible using one of the modem as a master unit and the other one as a slave unit. For large installations where numerous modems have to be installed and mounted in chassis, the management card is highly recommended as it simplifies the configuration process and provide additional features such as alarm reporting and statistic generation. When troubleshooting is required the MD-2000 Series provides an easy to use set of tools to rapidly determine the faulty part of the installation. Local and remote loops can be activated, and when combined with the use of a bit error rate tester can quickly determine the originating point of failure.

8-Port Desktop Model

The desktop version of the MD-2000 Series is available in a number of different configurations depending on the application. In an office environment where cost is an important factor a low cost version is available with an external power-supply, a plastic case and no LCD display. For central office use, the MD-2000 Series is available with an integral 48 VDC power supply.



**Built-in
8-Port Hub with
Address Filtering**

Anderson Jacobson MD-2000 Series

Specifications

mSDSL LINE

Signal format: CAP/QAM
Transmit signal power: -13 dBm
Connector: RJ-11

TERMINAL INTERFACE (Factory Option)

Choice of different physical interfaces:

- Ethernet 10Base-T learning bridge—connector RJ-45 - IEEE 802-3 compatible
 - Learning up to 10,000 MAC addresses
 - Filtering rate 15,000 pps—Forwarding rate 15,000 pps (buffer of 255 Frames)
- Ethernet 10Base-T Hub (desktop version only) 8 ports - RJ-45 connectors
- T1 RJ-45 8 pin connector
 - Line frequency: 1.544Mbps+/- 50ppm
 - Impedance: 100 Ohms
 - LBO: 0, -7.5, -15 and -22.5 dBm
 - Framing: ESF/D4, AT&T 62411, 54016 ANSI, T1.403
- E1 G.703/G.704 RJ-45 8-pin connector 120 Ohms—Data clear channel G.703 2.048Mbps or framed G.704 n x 64 with selectable offset
- V.24, X.21, V.35 through DB-25 connector with adapter cables—Data rate software selectable

FRONT PANEL (Desktop)

LEDs for Power, DTR, CD, CTS, Data, Test. Single push button

RACK-MOUNT CARD

Front panel same as desktop with LEDs 16 cards per chassis. Can be mixed in any order with other CXR cards (modems, T1/E1 CSU/DSU, Fiber Optic Modems, and so forth)

CONFIGURATION INTERFACE

Control port: RS-232 - 8 bits without parity

- 19.2Kbps - VT100 compatible
- AT commands or menu driven

LED DISPLAY

- Remote configuration through central site or local modem without service interruption 24 hours data transmission statistics
- Easy to install with 4 built-in NTU and LTU configurations

MANAGEMENT

- Through universal chassis and CFIP controller card
- Alarm reporting and statistics
- Optional SNMP/TELNET modes

ALARM RELAY

Audio connector, NO/NC, carrier and power loss (50 VDC)

POWER SUPPLY

- Desktop: 96 to 240 VAC internal
- Desktop: 12, 24 or 48 VDC internal
- Universal chassis: 110/240 VAC; 24 or 48 VDC
- Optional redundant power supply with full load sharing

PHYSICAL

Desktop: 11.31 in x 6.63 in x 1.36 in (D x W x H)

ENVIRONMENTAL

Operating Temperature: 32° to 122° F (0° to 50° C)

Ordering Configurations

MD-2XXX—YYU

XXX: Terminal Interface (DTE)

011: V.11
035: V.35
0BT: Port Ethernet 10Base-T
HUB: 8-port Ethernet Hub
0T1: T1 (1.544Mbps) RJ-45
703: E1/G.703 (2.048Mbps)

YY: Standard front panel with LED Display

PC: Desktop with internal 48 VDC power supply
PI: Desktop with internal 96-240 VAC power supply
PV: Stand alone with external power supply
PR: Rackmount card for CXR AMS16/4

U: USA