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OPERATIONS MANUAL

MODEM SHARING DEVICE

MSD-4 and MSD-8

May 11, 2004

FOR TECHNICAL SUPPORT CALL:

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Manufactured By:
East Coast Datacom, Inc.

PT # 719000-E

SAFETY WARNING

Always observe standard safety precautions during installation, operation and maintenance of this product. To avoid the possibility of electrical shock, be sure to disconnect the power cord from the power source before you remove the IEC power fuses or perform any repairs.

PROPRIETARY NOTICE

WARRANTY NOTICE

WARRANTIES: East Coast Datacom, Inc. (hereafter referred to as E.C.D.) warrants that its equipment is free from any defects in materials and workmanship. The warranty period shall be three (3) years from the date of shipment. E.C.D.'s sole obligation under its warranty is limited to the repair or replacement of defective equipment, provided it is returned to E.C.D., transportation prepaid, within a reasonable period. This warranty will not extend to equipment subjected to accident, misuse, alterations or repair not made by E.C.D. or authorized by E.C.D. in writing.

PUBLICATION NOTICE

This manual has been compiled and checked for accuracy. The information in this manual does not constitute a warranty of performance. E.C.D. reserves the right to revise this publication and make changes from time to time in the content thereof. E.C.D. assumes no liability for losses incurred as a result of out-of-date or incorrect information contained in this manual.

CHAPTER 1 - INTRODUCTION

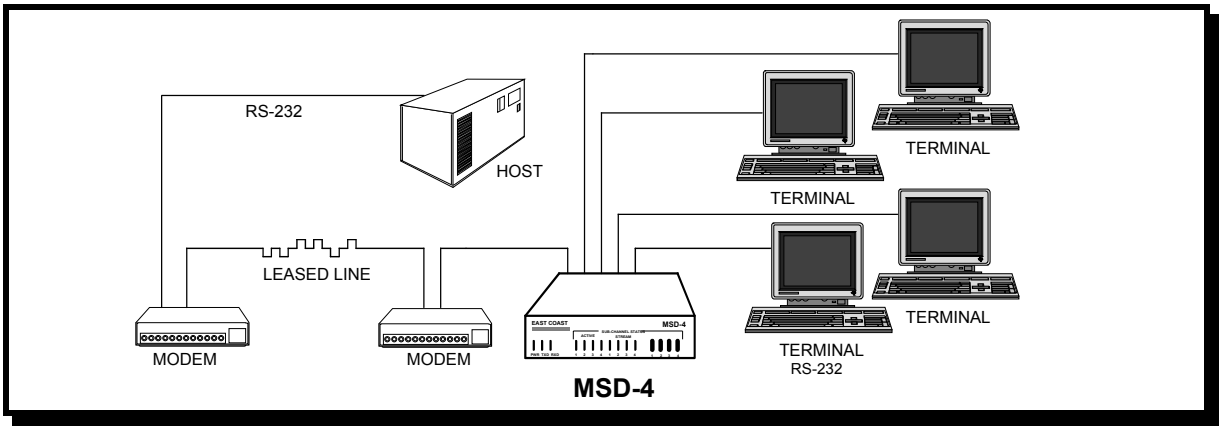
1.1 FUNCTIONAL DESCRIPTION

The Modem Sharing Device (MSD) family consists of 4 and 8 port units. The MSDs provide the network manager with a cost effective means of expanding existing, leased line polled networks without adding computer ports or communications links. With the MSDs, up to eight terminals can share the same port and communications link using the contention and control protocols normally resident in the host hardware and software. Once installed, system and network efficiency are increased through higher host processor utilization coupled with the significant decrease in idle time between host / terminal traffic sessions.

Ideal for either synchronous or asynchronous network environments, the MSDs are protocol transparent at data rates up to 120Kbps. Data arriving at the Master Port is continually broadcast to all Subchannels. The user is presented with two modes of operation for terminal access. The first mode is the attached terminal device(s) that raises the RTS control signal is automatically given control of the MSD until data transmission is complete. The second mode is the attached terminal device(s) that transition data from Mark to Hold is automatically given control of the MSD until data transmission is complete. This is commonly called the “OR” mode of operation. Clocking is accomplished from the attached Modem.

The MSDs incorporate optional Anti-Streaming circuitry. If enabled, Anti-Streaming will automatically remove a defective terminal from service if the Data / Control criteria is present for the user predefined clock selection period.

Housed in a sturdy metal enclosure and equipped with a 110/220 VAC switch selectable linear power supply, the MSDs will provide in excess of 100,000 hours of reliable service.



TYPICAL APPLICATION

Figure 1.1

1.2 THEORY OF OPERATION

In a polled or contention environment the typical MSD operation is as follows: Data arriving at the MSD's master port is continually broadcast to all of the MSDs subchannel ports. When one of the DTE devices answers the poll from the host site, that DTE device will raise RTS (Request To Send). When RTS is raised the MSDs scanner will stop and lock on to that port and allow that DTE device to talk to the modem link. The MSD will remain locked onto that port until RTS is dropped and CTS (Clear To Send) is dropped from the modem. After RTS and CTS have dropped, the MSD will automatically begin scanning the ports until another port raises RTS. OPTIONALLY: the “OR” mode of operation may be selected and the contention mode with be any DTE device that the DATA lead transitions from Mark to Hold will have access to the Master Port.(system software must only allow one device at a time)

CHAPTER 2 - BASIC OPERATION

2.1 FRONT PANEL INDICATORS AND SWITCHES

A *Green* LED illuminates when AC Power has been applied. Two adjacent *Green* LEDs illuminate in union with individual *Green* subchannel port activity LEDs and identify Transmit and Receive data transmissions. Yellow LEDs are provided to provide the user with a visual indication of a streaming DTE (ref. 2.6) Positive latching switches are provided for each DTE port for isolating or removing a streaming terminal. Each DTE port has its own switch and operates independently. To disable a subchannel simply push the switch. A channel is disabled when the switch is in the outer most position.

2.2 REAR PANEL CONNECTORS AND FUSES

Located on the back or rear of the product you will find an IEC Power receptacle. The supplied power cord plugs into this receptacle. This receptacle also contains a fuse drawer. Two (2) fuses are located in this compartment. For 110 VAC +/- 10% operation the unit is equipped with slow blow 160ma Fuses, Part # 714000. For 220 VAC +/- 10% operation the unit is equipped with slow blow 80ma Fuses, Part # 714001. Additionally, you will find the Master and Subchannel female DB-25 connectors.

2.3 CLOCKING

Both the MSD-4 and MSD-8 derive their clocking from the attached Modem or DCE.

2.4 ELECTRICAL INTERFACE

The MSDs are EIA RS-232 (CCITT V.24) compliant using female DB-25 connectors. Refer to the interface chart in the Appendix for detailed interface information.

2.5 SUBCHANNEL SERVICE MODES

The MSDs incorporate circuitry that enable the user to provide two separate modes of DTE subchannel access servicing. Either mode of operation is selected upon installation via a Dip Switch located inside the housing.

2.5.1 SUBCHANNEL SCANNING MODE

The *Scanning Mode* will allow equal access to the communications link for all connected DTE devices. The Subchannels are scanned in sequence (1 - 2 - 3 - 4) and the attached subchannel DTE that raises RTS will have access to the communications link. After dropping RTS the MSD will continue scanning in sequential order.

2.5.2 SUBCHANNEL PRIORITY MODE

The *Priority Mode* allows the user to have channel 1 as the highest priority channel to service the communications link. The Subchannels are continually monitored. If channel 2 or 3 raises RTS and transmits data and then drops RTS, subchannel 1 will have the highest priority over the next port that raises RTS, (if subchannel 1 has information to transmit). This will allow a DTE that has more important information to send or retrieve from the host a higher priority than the remaining attached terminals.

2.5.3 SUBCHANNEL RTS TO CTS DELAY

It is important to note that the RTS to CTS delay differences are very, very small for either *Scanning* or *Priority* modes of operation. The *Scanning Mode* RTS to CTS delay times are 4.75 to 8.45 Micro Seconds. The *Priority Mode* RTS to CTS delay times are 4.75 to 5.30 Micro Seconds.

2.6 ANTI-STREAMING

2.6.1 AUTOMATIC DTE REMOVAL

The MSDs incorporate circuitry that will (when enabled) *automatically* remove a streaming terminal from service. A streaming terminal is defined as a terminal that has RTS *high* longer than the user predefined anti-stream timer has been set. Upon installation, the user can set or actually fine tune the timer to your network requirements. Each channel has a Green and a Yellow LED to indicate subchannel activity. Green indicates an active subchannel and Yellow indicates a streaming subchannel. Once a terminal has gone into the streaming condition (RTS continually high) the DTE will automatically be removed from service until the DTE fault has been corrected by the user. All other DTE's will continue to be serviced by the MSD.

2.6.2 MANUAL DTE REMOVAL

The MSDs incorporate circuitry that will (when enabled) *manually* remove a streaming terminal from service. A streaming terminal is defined as a terminal that has RTS continually *high*. With Anti-streaming disabled, the associated streaming DTE will *NOT* illuminate a Yellow LED on the front of the MSD. If the automatic anti-streaming circuitry is disabled and a streaming condition occurs, the other DTE devices will be blocked from accessing the communications link. To correct this condition, simply push the associated push-button switch for the subchannel that is streaming. All other DTE's will now continue to be serviced by the MSD. However, you still need to fix the offending DTE that has RTS continually raised.

2.6.3 UNEXPLAINED STEAMING TERMINALS

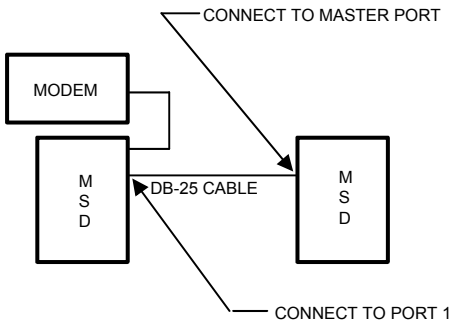
Many different types of terminals have been manufactured over the years. A typical problem is unexplained lockup or lockout problems. The most common cause is when, four terminals are running just fine and when one of the terminals is powered down, the remaining terminals are locked out of service. This may be explained by a missing or incorrect Termination Resistor that has been overlooked by your terminal manufacturer. This is the main reason that Anti-Streaming circuitry has been designed into the MSDs and we encourage the user to take advantage of this feature.

2.7 DIAL MODEM SUPPORT

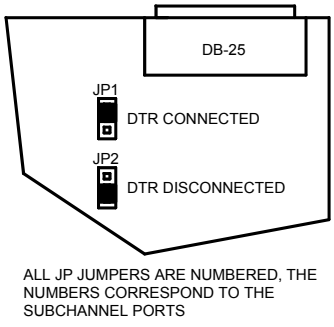
The MSDs support dial modem applications by connecting the DTR jumper pin for each DTE port. The jumper pin enables or disables the DTR signal to each DTE subchannel. If a dial modem is used with terminals, all DTR jumpers must be installed or enabled.

2.8 CASCADING OR CONCATENATION

The MSDs support cascading and the user simply needs to use DB-25 Male to Male straight through shielded cables. It should be noted that the DTR jumper pin may or may not be required for your network. Older competing MSD models typically do not support the DTR pin and thus the jumper should be disabled. *Subchannel Port 1* should be used as the concatenation port.



CASCADING DIAGRAM



DTR JUMPER DIAGRAM

CHAPTER 3 - INSTALLATION

CAUTION: Disconnect Power Before Servicing
ATTENTION: Couper Le Courant Avant l' Entretien
VORSICHT: Befor Deckung Abnehmen Mach Strom Zu

3.1 VOLTAGE SELECTION

It is *very* important to check that the unit is set to the correct voltage setting for your application before applying AC power. Located on the rear of the unit you will find a rotary 110/220 VAC switch. Using a coin or small screwdriver, *gently* turn the switch to the appropriate power position as required for your installation (110 or 220 VAC).

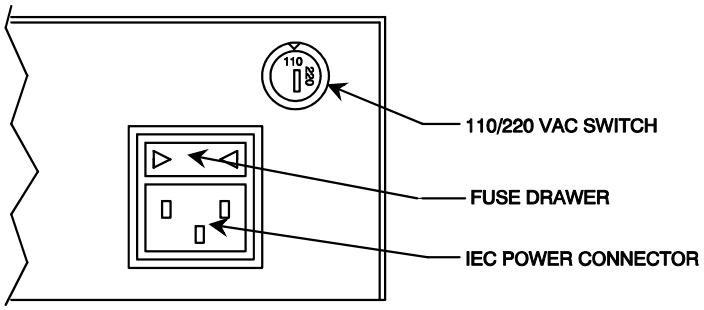
3.2 VOLTAGE SELECTION FUSES

Located on the back or rear of the product you will find an IEC Power receptacle. This receptacle contains a fuse drawer. Two (2) fuses are located in this compartment. For 110 VAC +/- 10% operation the unit is equipped with slow blow 5 x 20mm 160ma Fuses, E.C.D. Part # 714000. For 220 VAC +/- 10% operation the unit is equipped with slow blow 5 x 20mm 80ma Fuses, E.C.D. Part # 714001. Spare fuses may be purchased by calling East Coast Datacom or by calling the fuse manufacturer: Little Fuse at (312) 824-3024 or Shurter, Inc. at (707) 778-6311
Little Fuse Part #'s are: 160ma = 218.160 and 80ma = 218.080
Shurter, Inc. Part #'s are: 160ma = 034.3109 and 80ma = 034.3106

3.3 POWER CONNECTION

Before connecting the MSDs to an AC power source the top cover should be installed with the supplied #4-40 screws. AC power is supplied to the MSDs through a 2.3m (6.6 ft) cord terminated by a grounded 3-prong plug. Select an appropriate location accessible to and within four to five feet of an AC outlet. The AC Power source MUST be grounded or the MSDs Warranty will be void.

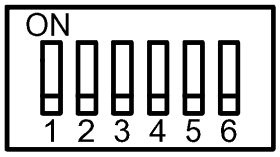
Power Connection
Figure 3-1



3.4 DEFAULT CONFIGURATION SWITCH SETTINGS

The MSDs are configured prior to shipping with the Dip Switches set as follows:

1) Anti-Streaming - *Disabled*
2) Scanning / Priority - *Priority Mode*
3) Frame / Signal Ground - *Not Connected*
4) DTR Option - *Not Connected*



If your system application requires one or more of the default setting to be changed, it will be necessary to remove the top cover of the MSD. Remove the AC Power source or Disconnect the AC Power before servicing the unit. Removal of the top cover is accomplished by using a small Philips screwdriver and removing the four outside screws. After setting the switches, replace the top cover before applying AC power.

3.5 MODEM (DCE) AND TERMINAL (DTE) CONNECTION

Before applying AC Power to the unit, the DCE and DTE cabling should be connected. Straight through Male to Male DB-25 shielded cables, no longer than 50 feet in any direction should be used. If your cables are not shielded or over 50 feet long, transmission errors are very likely.

3.6 INTERNAL SWITCH SETTINGS

3.6.1 DIP SWITCHES

The MSDs have an internal *Dip Switch* that is accessible by removing the Top Cover. Located safely inside the unit, you will find a 6 position Dip Switch. To change the settings, you may use your finger tip or a small nonconductive instrument. It is recommended NOT to use metal objects to push on the *Dip Switches*, as you may slip and damage a component trace.

3.6.2 DTR JUMPER OPTION

The MSDs have an internal *Jumper Option* (3 position stick header) associated with each subchannel port. In order to use the MSDs in a dial environment, the jumper option *Must be Enabled* on each subchannel port. Dial modems must have DTR present. Additionally, DTR may or may not be required when cascading with other competing manufacturers Modem Sharing Devices.

3.6.3 “OR” MODE JUMPER OPTIONS

The MSDs have an “OR” mode of operation. This allows DTE devices to access the Master Port without RTS/CTS handshaking. When set to “OR” mode, any DTE subchannel device data lead that transitions from MARK to HOLD will be given access to the Master Port. All subchannel data leads are “OR”ed together. System software

must only allow one DTE device to access the Master Port at a time or the data will be garbled.

3.6.4 ANTI-STREAMING (SW1-4)

Anti-Streaming is set with Dip Switches *SW1-4* as shown in the chart below. To Disable *Anti-Streaming,* set dip switches *SW1-4* all to the down position (off).

Anti-Streaming Time-out				
SW-1	SW-2	SW-3	SW-4	Time (Sec)
D	D	D	U	0.02
U	D	D	U	0.04
D	U	D	U	0.08
U	U	D	U	0.3
D	D	U	U	1
U	D	U	U	5
D	U	U	U	20
U	U	U	U	40
D	D	D	D	Disabled

3.6.5 CHANNEL SERVICE MODES (SW-5)

Dip Switch position *SW-5* provides the subchannel service modes (ref. section 1.3) of operation. The ON (or up) position provides *SEQUENTIAL SCANNING* of the channels. This mode provides all users with equal access. The DOWN (or off) position provides the *PRIORITY MODE*, with subchannel 1 having the highest priority over all other attached Subchannels.

3.6.6 FRAME TO SIGNAL GROUND (SW-6)

Dip Switch position *SW-6* provides the following functions:

ON (or up) EIA Pin # 1, (Frame Ground) Connected to Pin # 7, (Signal Ground).

OFF (or down) EIA Pin # 1, (Frame Ground) Not Connected Pin # 7, (Signal Ground).

3.6.7 "OR" MODE AND OTHER OPTIONS

MSD-4 OPTIONS

To set the **MSD-4** to operate in "OR" mode, set as shown below for **JP5 & JP6**. Move the jumper located on the printed circuit card.

JP5 1-2 Normal mode, for RTS/CTS & DTR operation
2-3 "Or" mode. System doesn't care about RTS or DTR. Any port with data gets thru.

JP6 1-2 Normal Anti stream
2-3 "OR" mode. Anti stream is disabled. Must be set when JP5 is set to "OR" mode.

JP7 1-2 Normal RTS to Master port. Any port RTS gives RTS to master.
2-3 RTS to Master is forced on

JP8,9,10,11 1-2 CTS to user port follows RTS from that user port.(That port had to be active.)
2-3 CTS to user port is forced on
2-4 CTS to user port follows RTS from user port. (Port does not have to be selected).

JP12 1-2 DTR to Master is turned ON if any DTR from User ports is turned on.

2-3 DTR to Master is for forced on.

MSD-8 OPTIONS

To set the **MSD-8** to operate in "OR" mode, set as shown below for **JP9**. Move the jumper located on the printed circuit card.

JP9 1-2 Normal mode, for RTS/CTS & DTR operation
2-3 "Or" mode. System doesn't care about RTS or DTR. Any port with data gets thru.

JP11 1-2 Normal RTS to Master port. Any port RTS gives RTS to master.
2-3 RTS to Master is forced on

JP12 - 19 1-2 CTS to user port follows RTS from that user port.(That port had to be active.)
2-3 CTS to user port is forced on
2-4 CTS to user port follows RTS from user port. (Port does not have to be selected).

JP10 1-2 DTR to Master is turned ON if any DTR from User ports is turned on.

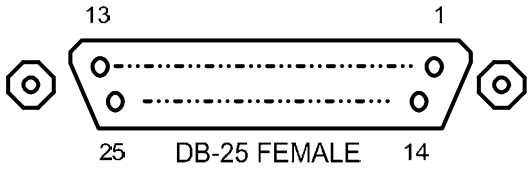
2-3 DTR to Master is for forced on.

4.0 - APPENDIX

4.1 EIA INTERFACE CHART

EIA RS-232-D INTERFACE CHART (DB-25 CONNECTOR)

Pin No.	CCITT Circuit No.	Circuit Name	Signal Description	To DTE	To DCE
1	---	---	Shield	---	---
2	103	BA	Send Data		X
3	104	BB	Receive Data	X	
4	105	CA	Request To Send		X
5	106	CB	Clear To Send	X	
6	107	CC	DCE Ready	X	
7	102	AB	Signal Ground	---	---
8	109	CF	Receive Line Detector	X	
15	114	DB	Send Timing	X	
17	115	DD	Receive Timing	X	
20	108.2	CD	Terminal Ready		X
22	125	CE	Ring Indication	X	
24	113	DA	External Timing		X



4.2 WEB SITES OF INTEREST

http://www.interfacebus.com/
Leroy's Engineering Web Site
An Indexed listing of Electronic Engineering Web Sites of Component and OEM Equipment Manufactures

http://www.itu.int/home/index.html
The ITU, headquartered in Geneva, Switzerland is an international organization within the United Nations System where governments and the private sector coordinate global telecom networks and services.

http://www.ieee.org/portal/index.jsp
The IEEE is a leading authority in technical areas ranging from computer engineering, biomedical technology and telecommunications, to electric power, aerospace and consumer electronics, among others.

http://www.ansi.org/
The American National Standards Institute (ANSI) is a private, non-profit organization (501(c)3) that administers and coordinates the U.S. voluntary standardization and conformity assessment system.

http://www.iso.org/iso/en/ISOOnline.openerpage
A network of national standards institutes from 148 countries working in partnership with international organizations, governments, industry, business and consumer representatives. A bridge between public and private sectors.

http://www.vdslcoalition.net/
The VDSL Coalition is a group of leading semi-conductor, modem, and communications-network equipment firms and network operators who are committed to support the development of Very-High-Speed Digital Subscriber Line (VDSL) standards for the next generation of telecommunications applications.

http://www.bobsguide.com
The Guide to Software & Technology in Asset Management, Banking & Risk Management

http://solar.physics.montana.edu/tslater/real-time/
Well, just a lot of really neat stuff

5.0 - TECHNICAL SPECIFICATIONS

Application
Multiple sync/async terminal or DTE devices operating in a polled environment, to share one Modem

Capacity
One to eight RS-232 Sync/Async devices

Interface
EIA RS-232, CCITT V.24 using DB-25 female connectors

Data Rates
Up to 120Kbps

Data Format
Data transparent at all data rates

Timing
External; from attached Modem

Handshaking
RTS / CTS
Optional "OR" Mode

Anti-Streaming
Automatic…Selectable time out intervals

Disable……Selectable via dip switch

Terminal Service Modes
Rotational sequence for equal access

Front Panel
Indicators....Power, Transmit Data, Receive Data, Channel Active, Channel Stream
Switches.....Enable/Disable of each Subchannel

Power Source
100-120 to 200-220VAC @10%, 50/60Hz, 0.16/0.08A, external 110/220 volt select switch, IEC Power Inlet, (2) 5mm Fuses

Environmental
Operating Temperature....32º to 122º (0º to 50º C)
Relative Humidity.....5 to 95% Non-Condensing
Altitude.....0 to 10,000 feet

Dimensions
MSD-4 and MSD-8
Height ..... 1.75 inches (4.44 CM)
Width ..... 13.35 inches (33.09 CM)
Length ..... 9.00 inches (22.86 CM)

Weight
MSD-4 and MSD-8
4.5 pounds (2.1Kg)

Warranty
Three Years, Return To Factory

Approvals
Safety: UL (1950), CSA (C22.2)

ORDERING INFORMATION
Part Numbers:
PT# 101000, model MSD-4
Description: 4-Port Modem Sharing Device

PT# 102000, model MSD-8
Description: 8-Port Modem Sharing Device

INCLUDED WITH EACH UNIT:
1) Operations Manual
2) U.S.A. Grounded Power Cord, Part # 713015
3) Optional Power Cords
   A) United Kingdom, Part # 713016
   B) Continental Europe, Part # 713017
   C) Other: Specify Country on Purchase Order

OPTIONAL ACCESSORIES
1) Spare Data Center Fuses
   A) 160ma Fuse, Qty (2) Part # 714000
   B) 80ma Fuse, Qty (2) Part # 714001