

OPERATIONS MANUAL

RS-232 MODEM SHARING DEVICE

Model: MSD-4
4-Port RS-232 Modem Sharing Device

Ordering Part Number: 101012

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SAFETY WARNINGS

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.

AVERTISSEMENTS DE SÉCURITÉ

Respectez toujours les précautions de sécurité standard lors de l'installation, du fonctionnement et de la maintenance de ce produit. Pour éviter tout risque de choc électrique, assurez-vous de débrancher le cordon d'alimentation de la source d'alimentation avant de retirer les fusibles d'alimentation CEI ou d'effectuer toute réparation.



CAUTION: FOR CONTINUED PROTECTION FROM RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATING FUSE.

ATTENTION: POUR UNE PROTECTION CONTINUE CONTRE LES RISQUES D'INCENDIE, REMPLACEZ UNIQUEMENT AVEC UN MÊME TYPE ET UN FUSIBLE DE QUALITÉ.

CAUTION: RISK OF ELECTRIC SHOCK: GROUNDED CONDUCTOR (NEUTRAL) PROVIDED WITH OVERCURRENT PROTECTION. TEST COMPONENTS BEFORE TOUCHING.

ATTENTION: RISQUE DE CHOC ÉLECTRIQUE: CONDUCTEUR MIS À LA TERRE (NEUTRE) ÉQUIPÉ D'UNE PROTECTION CONTRE LES SURINTENSITÉS. TESTEZ LES COMPOSANTS AVANT DE TOUCHER.

FCC CLASS A INFORMATION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this product not expressly approved by East Coast Datacom, Inc. could void the user's authority to operate the equipment.

PROPRIETARY NOTICE

The information contained herein is proprietary to East Coast Datacom, Inc. Any reproduction or redistribution of this publication, in whole or in part, is expressly prohibited unless written authorization is provided by East Coast Datacom, Inc.

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.

CHAPTER 1 - INTRODUCTION

1.1 FUNCTIONAL DESCRIPTION

The MSD-4 provides the network manager with a cost-effective means of expanding existing, leased line polled networks without adding computer ports or communications links. With the MSD-4, up to four 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 MSD-4 is protocol transparent at data rates up to 19.2Kbps. Data arriving at the Master Port is continually broadcast to all Sub-channels. 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 channel 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 in both modes of operation is accomplished from the attached Modem. The MSD-4 may also be used in broadcast only applications as ref. in Section 2.6.

The MSD-4 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 MSD-4 will provide in excess of 100,000 hours of reliable service.

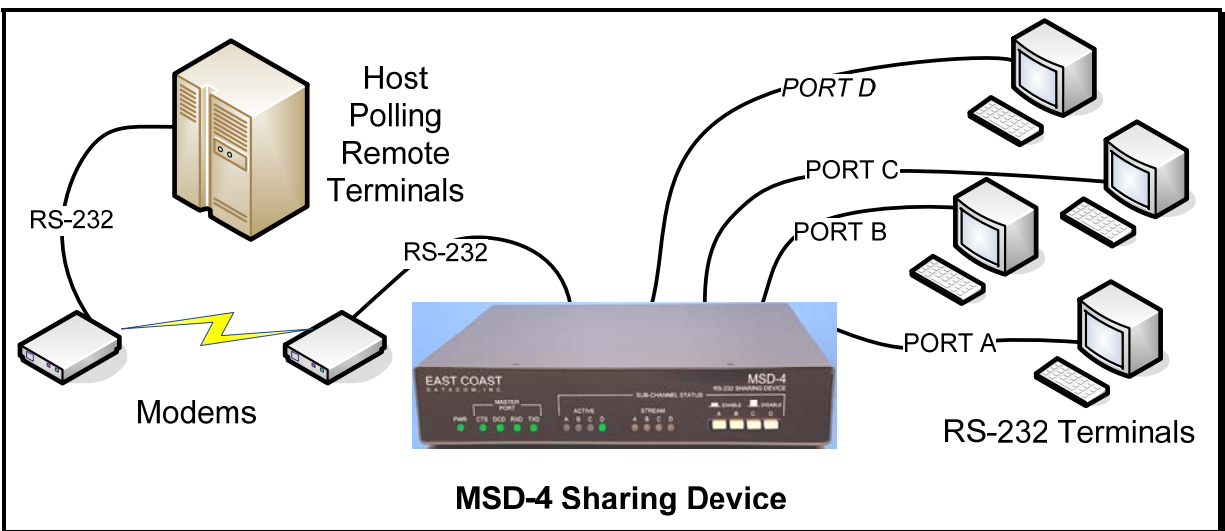


Figure 1 - TYPICAL APPLICATION

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 MSD-4 sub-channel 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 MSD-4 scanner circuitry will lock on to that port and allow that attached DTE device to communicate with 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 any DTE device that the DATA lead transitions from Mark to Hold will have access to the Master Port.(the user system software must only allow one device at a time communicate)

CHAPTER 2 - BASIC OPERATION AND FUNCTIONS

2.1 FRONT PANEL INDICATORS AND SWITCHES

A *Green* LED illuminates when AC Power has been applied. Four adjacent *Green* LEDs illuminate and identify CTS, DCD, RXD and TXD on the Master Ports RS-232 signal status. Sub-channel Ports A thru D Active LED's are also green and only one of the four LED's will ever illuminate at a single time, when a sub-channel is active. Yellow LEDs are provided as a visual indication of a streaming sub-channel, the LEDs illuminate only if anti-streaming is enabled.

2.2 FRONT PANEL SWITCHES

Positive latching switches are provided for each sub-channel Port A thru D for isolating or removing attached terminals. To disable a sub-channel simply push the switch, so it is in the outer most position. **NOTE:** The switch disables the ability of the sub-channels Pin 2 TXD to transmit back to the Master Port. Pin 3 RXD from the Master Port is always sent out to all sub-channels. This feature is by design for data broadcast applications and data is always outbound.

2.2 REAR PANEL CONNECTORS AND FUSES

Located on the 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.

2.3 CLOCKING

The MSD-4 derives clocking from the attached Modem or DCE.

2.4 ELECTRICAL INTERFACE

The MSD-4 is EIA RS-232 (CCITT V.24) compliant using female DB-25 connectors.

2.5 SUB-CHANNEL CONTENTION MODES

2.5.1 Sub-channel SCANNING Mode

The *Scanning Mode* will allow equal access to the communications link for all connected DTE devices. The Sub-channels are scanned in sequence (1 - 2 - 3 - 4) and the attached sub-channel 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 Sub-channel PRIORITY Mode

The *Priority Mode* allows the user to have channel 1 as the highest priority channel to service the communications link. The Sub-channels are continually monitored. If channel 2 or 3 raises RTS and transmits data and then drops RTS, sub-channel 1 will have the highest priority over the next port that raises RTS, (if sub-channel 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.

2.5.3 Sub-channel SWITCH ON DATA

The Switch on Data Mode allows an attached sub-channel DTE device to access the Master Port when data is sent. In this mode of operation, the network must be disciplined as that no two sub-channels can communicate back to the host at the same time.

2.6 DATA BROADCAST ONLY APPLICATIONS

The MSD-4 may be used in Data/Clock Broadcast applications. This can be accomplished by several methods. **One:** Disable the Front Panel switches and RXD and Clock from the Master Port will always continue outbound to all sub-channels. And data cannot be sent back to the Master Port. **Two:** Remove Pin 2 TXD from the attached sub-channel cables, data and clock will always be broadcast to all sub-channels.

NOTE: The front Panel LED's will show RXD and DCD if sent by the Master Port to the sub-channels. The **Port Active LED's** will not illuminate in a broadcast only application.

2.7 ANTI-STREAMING

2.7.1 Automatic DTE Removal

The MSD-4 incorporates 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 sub-channel activity. Green indicates an active sub-channel and Yellow indicates a streaming sub-channel. 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. **NOTE: Anti-streaming is not functional in Or-Mode**

2.7.2 Manual DTE Removal

The MSD-4 incorporate circuitry that will *manually* remove a terminal from service. Simply push the associated push-button switch for the sub-channel that you wish to remove from service on the front panel. All other sub-channels will continue to operate as normal.

2.7.3 Unexplained Streaming 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 MSD-4 as well a 22k pull-down resistor is on each sub-channel's RTS leads, for long unterminated cables.

2.8 DIAL MODEM SUPPORT

The MSD-4 support dial modem applications by connecting the DTR jumper pin for each DTE port. The jumper pin enables/disables the DTR signal to each DTE sub-channel. If a dial modem is used with terminals, all DTR jumpers must be enabled.(JP15-JP-18).

2.9 CASCADING OR CONCATENATION

The MSD-4 supports cascading and the user simply needs to use DB-25 Male to Male straight through shielded cables. *Sub-channel Port 1* should be used as the concatenation port.

CHAPTER 3 - INSTALLATION

Disconnect Power Before Servicing - Coupez l'alimentation avant l'entretien

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 of the product you will find an IEC Power receptacle. This receptacle contains a fuse drawer. Two (2) fuses are located in this compartment.

Little Fuse Part #: 0.160ma = 218.160 for 110VAC or 0.080ma = 218.080 for 220VAC

Shurter, Inc. Part #: 0.160ma = 034.3109 for 110VAC or 0.080ma = 034.3106 for 220VAC

3.3 POWER CONNECTION

Before connecting the MSD-4 to an AC power source the top cover should be installed with the supplied #4-40 screws. AC power is supplied to the MSD-4 via the supplied power 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.

3.4 INTERNAL DIP SWITCH AND PIN-HEADER SETTINGS

Remove the power to set the dip switch and jumper settings.

3.4.1 SW1 Dip Switch Settings

The following options are supported on SW1 Dip Switch

3.4.1.2 Anti-Streaming (SW1-4)

Anti-Streaming is set with Dip Switches *SW1 1-4* as shown in the chart below. To Disable *Anti-Streaming*, set dip switches *SW1, 1-4* all to the OFF position.

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

3.4.2.2 Channel Service Modes (SW1-5)

Dip Switch position *SW1-5* provides the sub-channel service modes of operation. The ON position provides *SEQUENTIAL SCANNING*. The OFF position provides the *PRIORITY MODE*, with sub-channel 1 having the highest priority over all other attached Sub-channels.

3.4.2.3 Frame to Signal Ground (SW1-6)

Dip Switch position *SW1-6* provides the following functions:
 ON (or up) RS-232 DB-25 Pin # 1, (Frame Ground) Connected to Pin # 7, (Signal Ground).
 OFF (or down) RS-232 DB-25 Pin # 1, (Frame Ground) Not Connected Pin # 7, (Signal Ground).

3.5 SUB-CHANNEL CONTENTION MODES

To set the MSD-4 to operate in “RTS” or the “OR-MODE”, set as shown below for Jumpers JP11, JP12 & JP13. **Move the Pin Header Jumpers** located on the printed circuit card.

RTS/CTS Operation to Sub-Channel Contention(Hand Shaking)

JP11, Pins 2-3
JP12, JP13 Pins 1-2

Optional: DTR & RTS Required to Switch Sub-Channels

JP15, JP16, JP17, JP18

1-2 RTS only

2-3 RTS & DTR

OR-MODE Operation (System doesn't care about RTS or DTR. Any port data gets thru)

JP11 Pins 1-2
JP12, JP13 Pins 2-3

3.6 MASTER PORT OPTIONS

JP5 CTS Master Port Operation

1-2 Force

2-3 Pass (Normal)

JP6 RTS Master Port Operation

1-2 RTS to Master is forced ON

2-3 Normal RTS to Master port. Any Sub-channel port RTS gives RTS to master.

JP7 DTR Master Port Operation

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

2-3 DTR to Master is forced on.

3.7 SUB-CHANNEL PORT OPTIONS

JP1, JP2, JP3, JP4 CTS Sub-Channel Control(per port control)

1-6 CTS to user port follows RTS

NOTE: In this setting If the attached Terminal(DTE) raises RTS, CTS is locally sent back to the DTE from the MSD sub-channel port you are attached to on the MSD.

2-5 CTS to user port follows RTS from user port.

NOTE: In this setting 2-5, RTS from sub-channel port flows thru MSD master port to attached modem, then the modems CTS flows back thru the MSD to the attached Terminal(DTE)

3-4 CTS to user port is forced ON

OVERVIEW, MSD-4 PCB & SWITCH SETTINGS

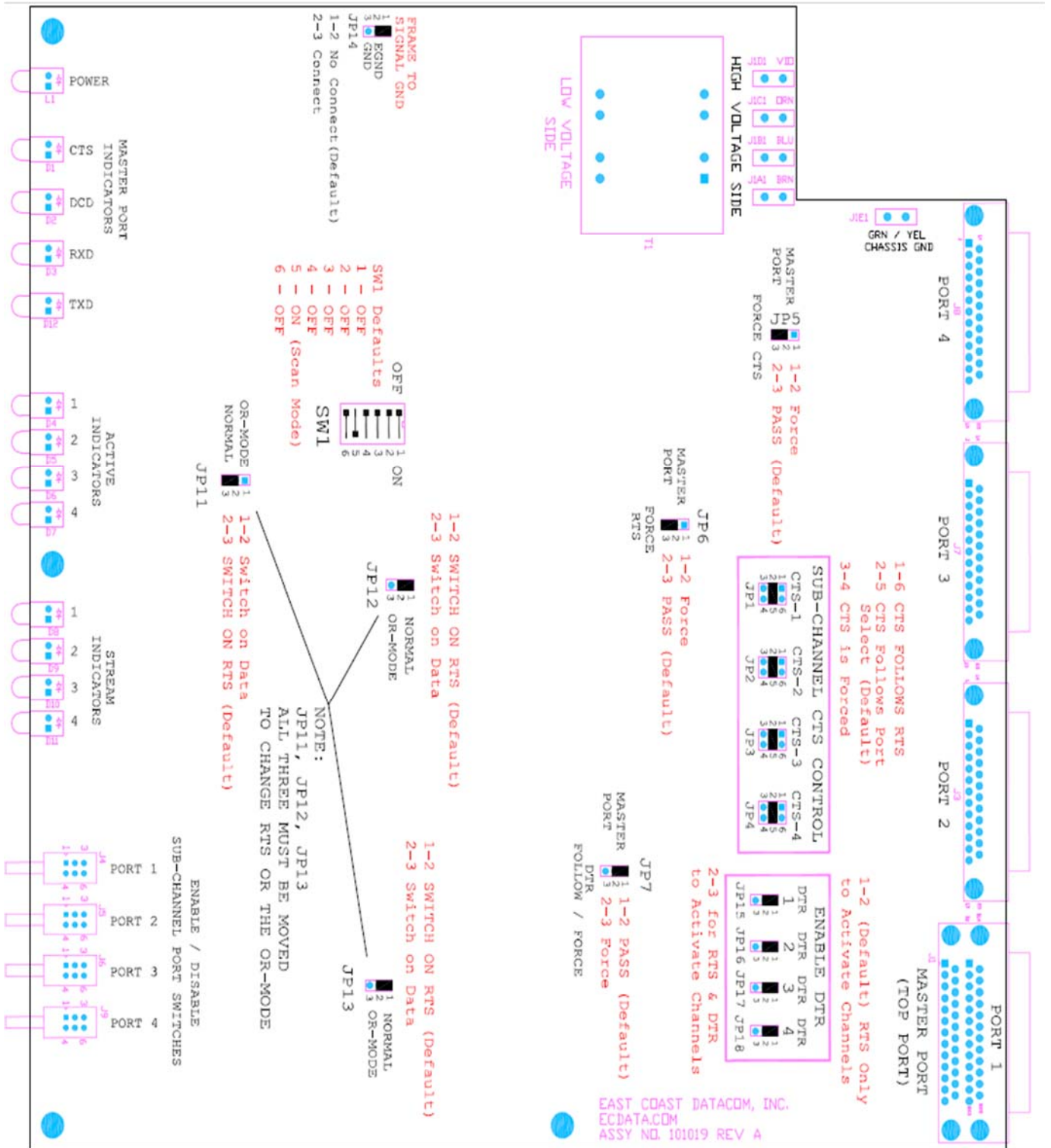


Figure 2 - PCB OVERVIEW MSD-4

4.0 - APPENDIX

4.1 Serial Port Pinouts

MASTER PORT IS A DTE – Connect to a DCE

Pin No.	CCITT Circuit	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

SUB-CHANNEL PORT IS A DCE – Connect to a DTE

Pin No.	CCITT Circuit	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	

OVERVIEW, MSD-4 FRONT AND REAR VIEWS

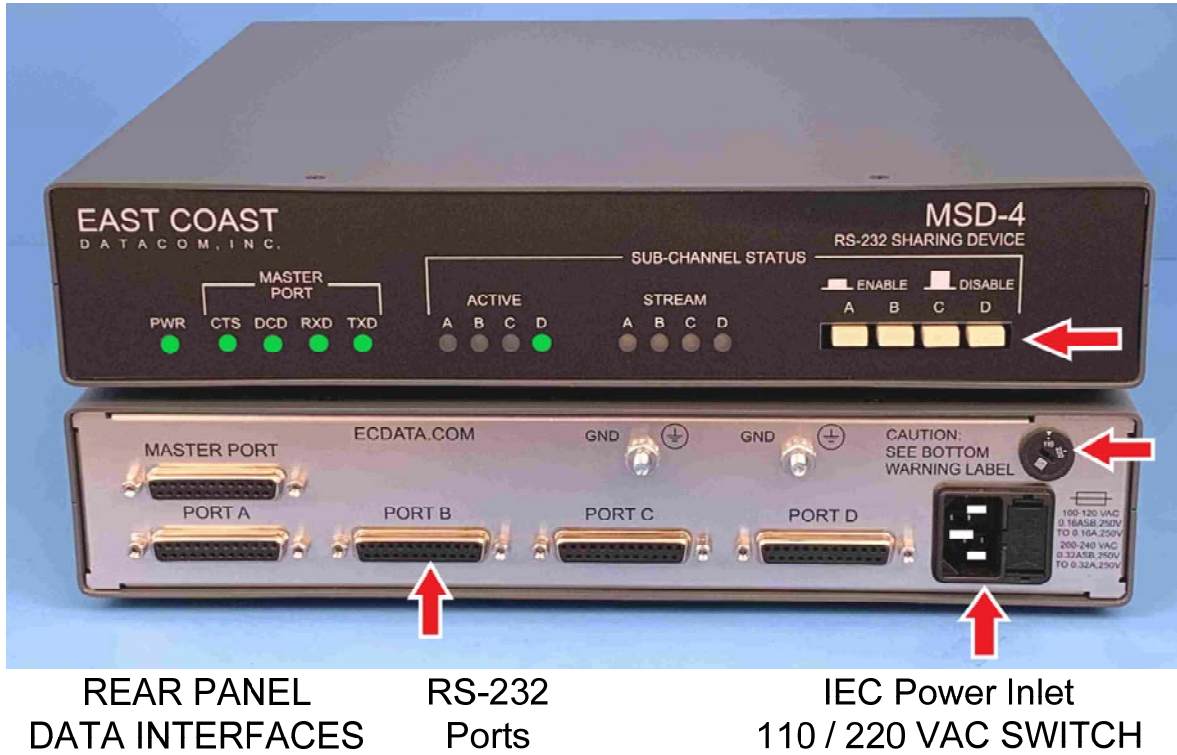


Figure 3 - FRONT & REAR VIEWS, MSD-4

5.0 – TECHNICAL SPECIFICATIONS

Application

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

Capacity

One to four RS-232 Sync/Async devices

Interface

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

Data Rates

Up to 19.2Kbps (Higher Rates can be utilized)

Data Format

Data transparent at all data rates

Timing

External; from attached Modem

Handshaking

RTS / CTS
OR-MODE (Switch on Data)

Anti-Streaming

Automatic...Selectable time out intervals
Disable.....Selectable via dip switch

Terminal Service Modes

Rotational sequence for equal access
Priority Mode Optional

Front Panel

Indicators: Power, CTS, DCD, RXD, TXD
Channel Active
Switches: Enable/Disable of each Sub-channel

Power Source

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

Dimensions

MSD-4

Height 2.53 inches (6.426 CM)
Width 12.13 inches (30.810 CM)
Length 11.13 inches (28.270 CM)

Weight

6 pounds (2.72Kg)

Warranty

Three Years, Return to Factory

MTBF

601,328 Hours
Benign Ground, Controlled, Telcordia Issue 1

Approvals – EMI / Safety / Environmental

EMI Approvals

FCC 47CFR, Part 15, Subpart B for conducted emissions from a Class A
FCC 47CFR, Part 15, Subpart B for radiated emissions from a Class A

Safety Approvals

UL 62368-1

ESD - Electric Discharge Approval

IEC EN-61000-4-2, Level 4

Environmental Testing Approvals

ETSI EN 300 019-2-4 v2.4.6 (2018-03)
Operating Temperature: 50° to 160° F (10° to 60° C)
Operational Alt.: 0 to 2000 Meters above sea level
Operational Relative Humidity: 10% to 80%
Non-Operational Temperature: -30 degC to 70 degC
Non-Operational Alt.: 0 to 50,000 feet above sea level

ORDERING INFORMATION

PT# 101012

Model: MSD-4

Description: 4-Port RS-232 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

OPTIONAL ACCESSORIES

- 1) Spare MSD-4 Power Entry Fuses
 - A) 0.160ma Fuse, Qty (2) Part # 714000
 - B) 0.080ma Fuse, Qty (2) Part # 714001