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OPERATIONS MANUAL

PART NUMBER: 162000
MODEL: DMM-4DC
DESCRIPTION: DIGITAL MIXING MODULE
-48VDC POWER SUPPLY

January 22, 2002

FOR TECHNICAL SUPPORT CALL:

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PT # 162012-A

Manufactured By:
East Coast Datacom, Inc.

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 DC power source from the DMM-4DC unit before you remove the cover 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 E.C.D. assumes no liability for losses incurred as a result of out-of-date or incorrect information contained in this manual.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 RS-232 Digital Mixing Module (DMM-4DC) is a network expansion device for modem sharing or port sharing applications in polled or contention environments. The DMM-4DC allows up to four devices to share a modem / DSU or computer port. Any combination of terminals and modems may be used in a network environment. Each port of the DMM-4DC may be selected as a DCE or DTE interface.

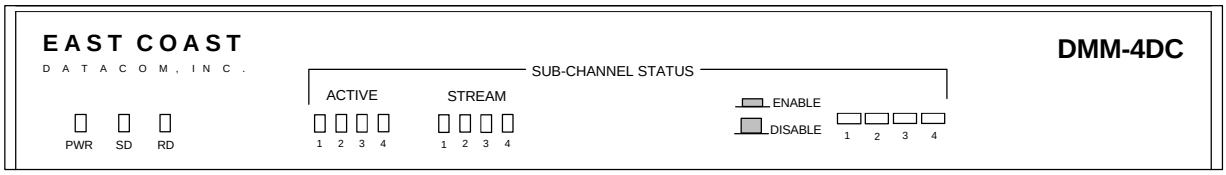
Once installed, system and network efficiency are increased through higher host processor utilization coupled with the significant decrease in idle time between host / terminal traffic sessions.

Ideal for either synchronous or asynchronous network environments, the DMM-4DC is protocol transparent at data rates up to 128Kbps. The DMM-4DC may be configured to provide clocking for the entire network. To prevent data transmission errors caused by clock differentials throughout a synchronous network, a 8 bit ring buffer is provided. In applications where the master port and the selected port provide their own clocks, data is clocked into the buffer at the receive clock rate of the active port and clocked out using the master port transmit clock.

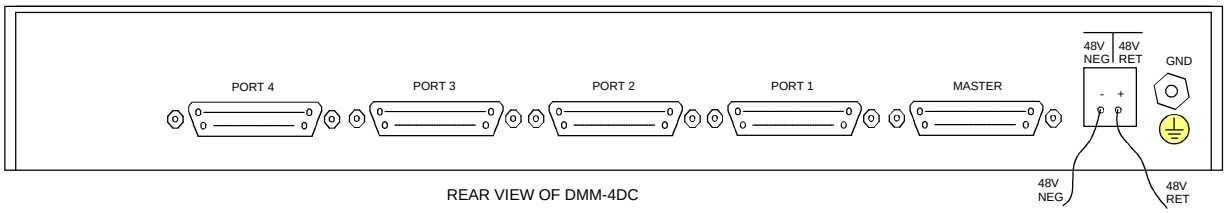
In applications where the Clear To Send(CTS) control signal is not provided by the master port, an option for forced CTS is available via 3-position stick headers. Additionally, several user defined RTS/CTS delay settings are available.

The DMM-4DC also provides optional Anti-Streaming circuitry. Once enabled, Anti-Streaming will automatically remove a defective terminal or modem from service if the Data / Control criteria is present for the user predefined selection period.

Housed in a sturdy aluminum enclosure and equipped with an internal -48 VDC power supply, the DMM-4DC will provide in excess of 400,000 hours of reliable service.



FRONT VIEW OF DMM-4DC



REAR VIEW OF DMM-4DC

1.2 THEORY OF OPERATION

The DMM-4DC allows up to four DCEs or DTEs to share one DCE or DTE communications link. In a broadcast, polled or contention environment, the typical DMM-4DC operation is as follows:
Data arriving at the DMM-4DC's master port is continually broadcast to all subchannel ports. When one of attached DCE or DTE devices answers a poll from the host site, that device will raise RTS (Request To Send for terminals) or DCD (Data Carrier Detect for modems). When RTS or DCD is raised, the DMM-4DC will lock on to that port and allow that device to communicate to the Host Site. The DMM-4DC will remain locked onto that port until RTS or DCD is dropped. After RTS or DCD has dropped, the DMM-4DC will automatically begin scanning the ports until another port raises RTS or DCD.

CHAPTER 2 - BASIC OPERATION

2.1 FRONT PANEL INDICATORS AND SWITCHES

A *Green* LED illuminates when DC 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 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

Located on the rear panel of the product are the RS-232 user data ports and the -48VDC input connector.

2.3 CLOCKING, INTERNAL AND EXTERNAL

Three modes of clocking are available to the DMM-4DC user.
1) Clocking may be set as *Internal Timing* utilizing the internal Baud Rate Generator.(JP5, connect 1 and 2)
2) Clocking may be set as *External Timing* utilizing a DCE device attached to the Master Port .(JP5, connect 2 and 3)
3) Clocking may be set as *Telco Timing* from an attached DCE via Port 1 .(JP5, connect 2 and 4)

Internal Timing mode will facilitate user defined operational speeds from 450bps to 76.8Kbps. Networks such as 56/64k DDS (Digital Circuits) should be timed via **Port 1**.

2.4 RS-232 ELECTRICAL INTERFACE

The DMM-4DC user data ports are EIA RS-232 compliant, utilizing female DB-25 connectors. Refer to the interface chart in the Appendix for detailed interface information. The maximum data rate is 128kbps. The unit incorporates surge protection on each RS-232 data port.

2.5 SUBCHANNEL SERVICE MODES

The DMM-4DC incorporates circuitry that enables the user to scan each sub-channel port.

2.5.1 SUBCHANNEL SCANNING

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

2.5.2 SUBCHANNEL RTS TO CTS DELAY

RTS to CTS delays of 0, 5, 10 and 20ms are user selectable.

2.6 ANTI-STREAMING

2.6.1 AUTOMATIC DTE REMOVAL

The DMM-4DC incorporates circuitry that will (when enabled) *automatically* remove a streaming DCE or DTE 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.

2.7 SYNC AND ASYNC SELECTION

The DMM-4DC incorporates circuitry that allows the user to select *Synchronous* or *Asynchronous* operation.

2.8 MANUAL DTE/DCE REMOVAL

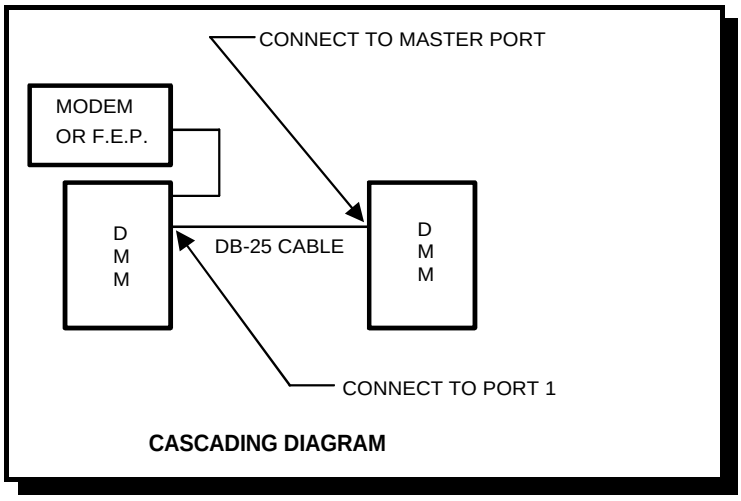
The DMM-4DC incorporates circuitry that will (when enabled) *manually* remove a streaming terminal from service. A streaming terminal is defined as a terminal that has RTS continually *high*. With Anti-streaming disabled, the associated streaming DTE will *NOT* illuminate a Yellow LED on the front of 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 DMM-4DC. However, you still need to fix the offending DTE or DCE device that has RTS or DCD continually raised.

2.9 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 DMM-4DC and we encourage the user to take advantage of this feature. An additional feature is a 4.7k Pull Down resistor tied to the RTS or DCD control leads.

2.10 CASCADING OR CONCATENATION

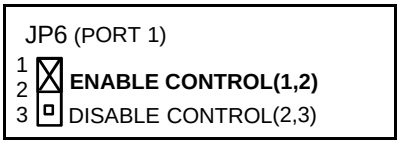
The DMM-4DC supports cascading by utilizing DB-25 Male-to-Male straight through shielded cables. *Subchannel Port 1* should be used as the concatenation port.



CASCADING DIAGRAM

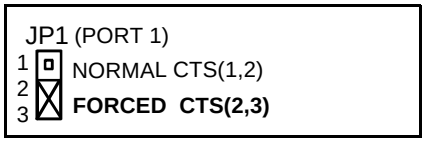
2.11 ENABLE CONTROL (PORTS 1 - 4)

The DMM-4DC has internal jumpers(JP6-JP9) for *Enable Control*. This option will allow attached sub-channel devices that do not respond to RTS or DCD control signals. This option will monitor Transmit Data (TXD). When data is present, the DMM-4DC will lock onto the attached subchannel device. To *Enable Control*, move the jumper so that both headers are connected on positions 1 and 2.



2.12 NORMAL OR FORCED CLEAR TO SEND (CTS) (PORTS 1 - 4)

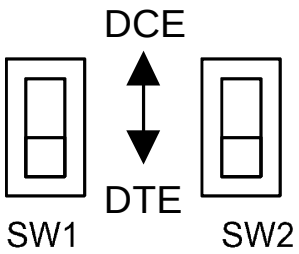
The DMM-4DC has internal jumpers(JP1-JP4) for *Normal or Forced Clear To Send (CTS)*. This option will allow attached sub-channel devices that do not receive CTS control signals from the attached DMM-4DC Master Port to have CTS selectively Forced High to the attached sub-channel device. To *Force CTS*, move the jumper so that both headers are connected on positions 2 and 3.



2.13 DCE / DTE SWITCHES

Located internally are five sets of two (2) DCE/DTE slide switches located in front of each RS-232 port. Silkscreened on the Printed Wiring Board are **DCE** and **DTE**. Slide *BOTH* switches to the same position to configure each of the RS-232 ports as a DTE or a DCE interface.

When set to DCE, the RS-232 port *MUST* connect to a DTE device.
When set to a DTE, the RS-232 port *MUST* connect to a DCE device.



CHAPTER 3 - INSTALLATION

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

3.1 INPUT VOLTAGE

The DMM-4DC is designed to accept DC voltages of 36 to 72 vdc, with 48 vdc as the nominal input voltage. Located on the back of the DMM-4DC is a 2-position terminal block. The block is removable and accepts a small slotted screwdriver to fasten the users DC voltage wires. The wire strip length should be 7mm or .24 inches.

3.2 VOLTAGE FUSES

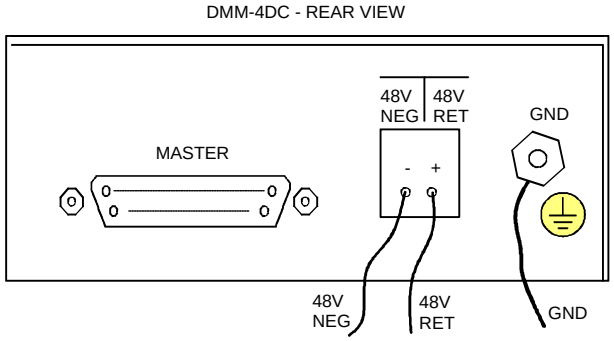
The DMM-4DC is designed with internal safety fuses for your protection. Located inside the product are two 315ma slow blow 5 x 20mm fuses. If the power LED is not illuminated, ***disconnect the input DC power source***, remove the top cover and inspect the fuses. Spare fuses may be obtained by calling East Coast Datacom Replacement fuse Part # 714003 or by calling:
Little Fuse at (312) 824-3024, Part # 218.315
Shurter, Inc. at (707) 778-6311, Part # 034.3112
Panel Components (800) 662-2290, Part # 81412321

3.3 POWER/GROUND CONNECTION

Before connecting the DMM-4DC to a DC power source the top cover MUST be installed with the supplied #8-32 screws.

1) Connect the ground lead to the #6 stud located on the rear of the DMM-4DC marked **GND** (ground)
2) Connect the -48V wire to the termial block labeled **48V NEG**.
3) Connect the 48V RTN (return or +) wire to the termial block labeled **48V RTN**.

Power Connection
Figure 3-1



3.4 DEFAULT CONFIGURATION SWITCH SETTINGS

The DMM-4DC is configured prior to shipping with the Internal Switches set as follows:

1) Master Port - *DCE*
2) Sub-channel Ports - *DTE*
3) Timing - *Internal*
4) CTS, Ports 1 through 4 - *Normal*
5) Enable Control, Ports 1 through 4 - *Disabled*
6) CTS Delay - *0ms*
7) Anti-Streaming - *Disabled*
8) Clock Select - *9600*
9) Async/Sync Selection - *Sync*

If your system application requires one or more of the default settings to be changed, it will be necessary to remove the top cover of the DMM-4DC. Remove the DC Power source or Disconnect the DC Power before servicing the unit. Removal of the top cover is accomplished by using a small Philips screwdriver and removing the outside screws. After setting the switches, replace the top cover before applying DC power.

3.5 MODEM (DCE) AND TERMINAL (DTE) CONNECTION

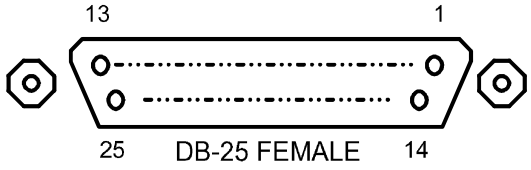
Before applying DC Power to the unit, the DCE and DTE cabling should be connected. Straight through Male-to-Male DB-25 shielded cables should be utilized.

4.0 - APPENDIX

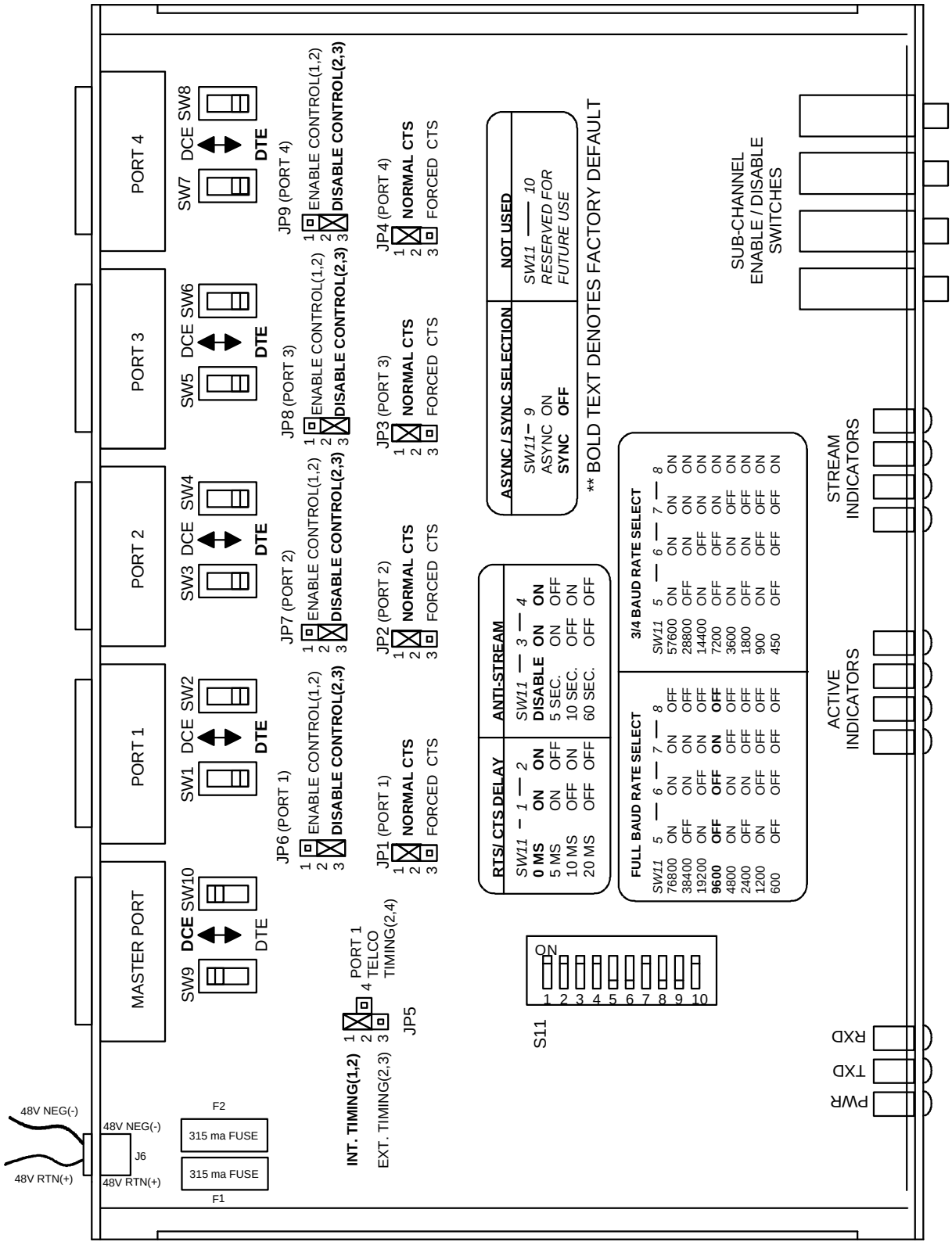
4.1 EIA INTERFACE CHART

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

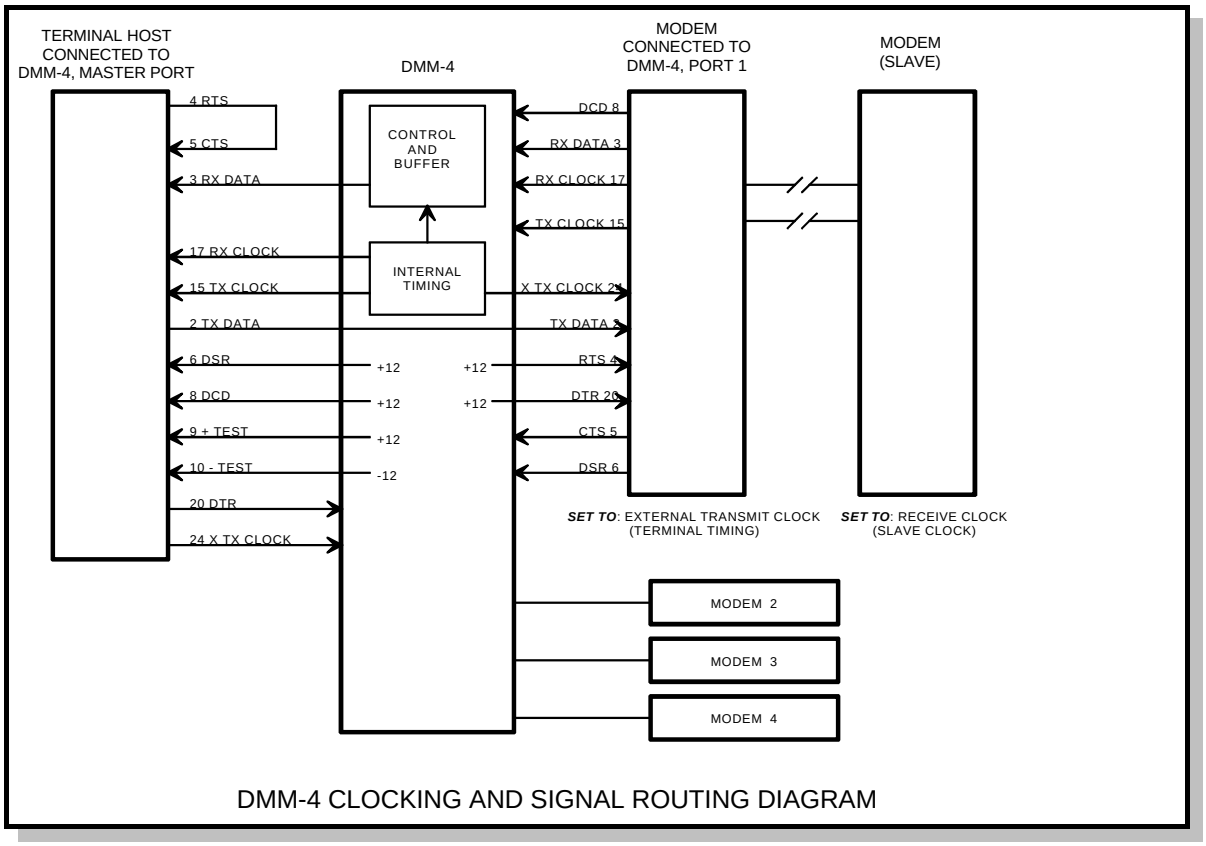
Pin No.	CCITT Circuit No.	Circuit Name	Signal Description	To DTE	To DCE
1	---	---	Shield	---	---
2	103	BA	Send Data		X
3	104	BB	Receive Data	X	
4	105	CA	Request To Send		X
5	106	CB	Clear To Send	X	
6	107	CC	DCE Ready	X	
7	102	AB	Signal Ground	---	---
	109	CF	Receive Line Detector	X	
9			+ Voltage(+9v)		
10			- Voltage(-9v)		
15	114	DB	Send Timing	X	
17	115	DD	Receive Timing	X	
20	108.2	CD	Terminal Ready		X
24	113	DA	External Timing		X



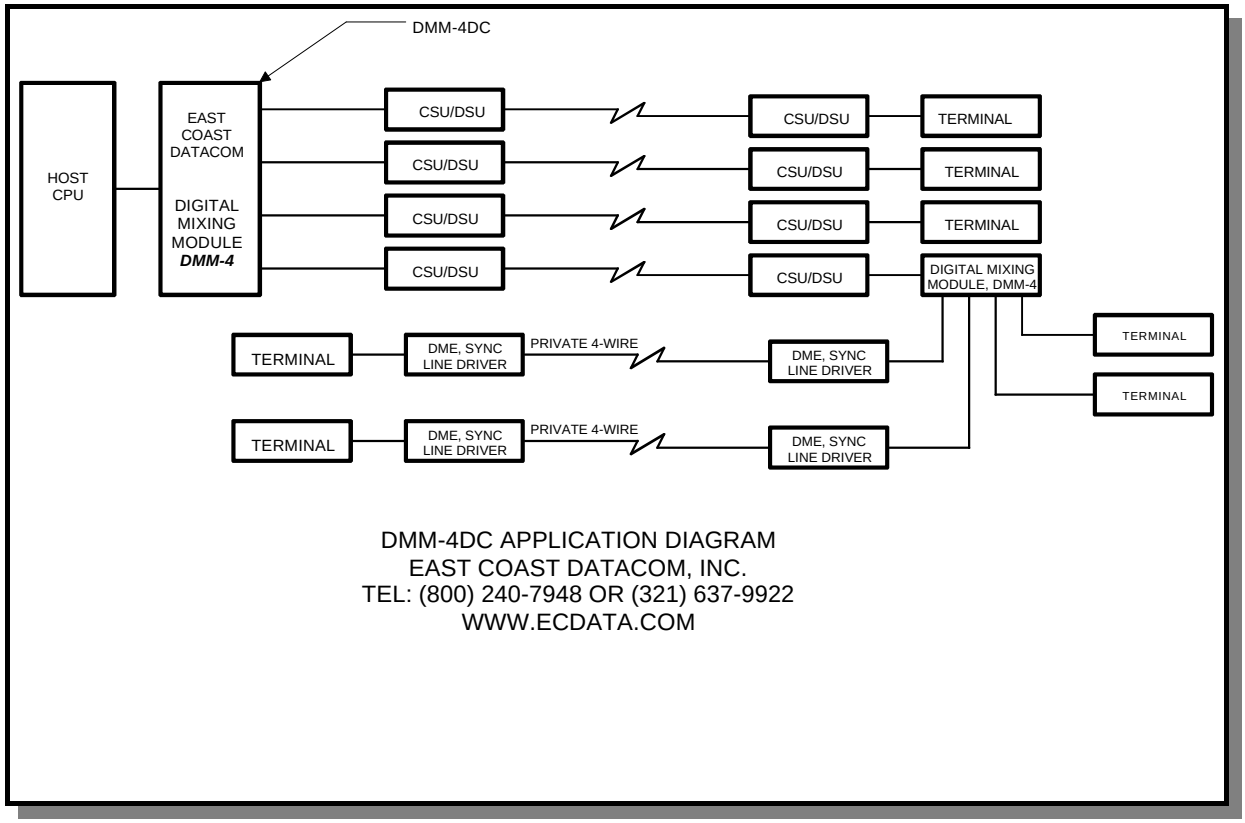
4.2 FACTORY DEFAULT CHART



4.3 CLOCKING / APPLICATION DIAGRAM



DMM-4 CLOCKING AND SIGNAL ROUTING DIAGRAM



DMM-4DC APPLICATION DIAGRAM
EAST COAST DATACOM, INC.
TEL: (800) 240-7948 OR (321) 637-9922
WWW.ECDATA.COM

4.4 USER NOTES:

4.5 TECHNICAL SPECIFICATIONS

Application
Multiple Sync/Async DCE/DTE devices operating in a polled or contention environment, to share one DCE/DTE port

Capacity
Main Input: One RS-232 Port
Subchannel Ports: One to Four RS-232 Sync/Async devices

Interface
EIA RS-232-D, CCITT V.24 using DB-25 female connectors, selectable as DCE or DTE interface

Data Rates
Internal Select: 450bps to 76.8Kbps
External: Up to 128Kbps

Data Format
Data transparent at all data rates

Timing Options
Internal
External: via Input Master Port
External: Telco Timing via Port 1

Anti-Streaming
Automatic: Selectable timeout intervals
Disable: Selectable via dip switch

Terminal Service Modes
Sequential scanning for RTS or DCD control signal, option for switch on RXD Data(JP6-JP9)

Clear To Send
Allows normal RTS/CTS handshaking or has option for Forced CTS on Ports 1-4 (JP1-JP4)

RTS To CTS Delay
Selectable *RTS to CTS delays* of 0, 5, 10 and 20ms

Front Panel
Indicators: Power, Transmit Data, Receive Data, Channel Active, Channel Stream
Switches: Enable/Disable of each Sub-channel

Power Source
DC Voltage, Input Range of 36 to 72vdc
Current Draw at 48vdc: 75ma @ 3.6watts

Safety Approvals
C-UL 60950, CE Safety EN60950 and CE EMC EN300-386-2

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

Dimensions
DMM-4DC
Height: 1.75 inches (4.44 cm)
Width: 17.00 inches (43.18 cm)
Length: 9.00 inches (22.86 cm)

Weight
4.5 pounds (2.1Kg)

Warranty
Three Years, Return To Factory

ORDERING INFORMATION
Part Number: 162000
Model: DMM-4DC
Description: RS-232 Digital Mixing Module

INCLUDED WITH EACH UNIT:
1) Operations Manual
2) Rackmount Kit

OPTIONAL ACCESSORIES
315ma Fuse, Qty (2) Part # 714004