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OPERATIONS MANUAL

ROUTER DELAY SIMULATOR

RDS

5 August 2003

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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.

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CHAPTER 1 - INTRODUCTION

1.1 FUNCTIONAL DESCRIPTION

The Router Delay Simulator(RDS) allows Router(DTE)-to-Router(DTE) connections at data rates up to 2.048Mbps while simulating network delays. The user selectable delays are for both data and control signals and range from 5 milliseconds(mS) to approximately 1250 mS, in 5 mS increments. The RDS allows users to test and pre-configure Routers (with software applications)and other critical DTE equipment for reliable network operation while simulating network delay times. The unit may be clocked internally. Delay times are for one direction, so a ping will result in two times the delay setting.

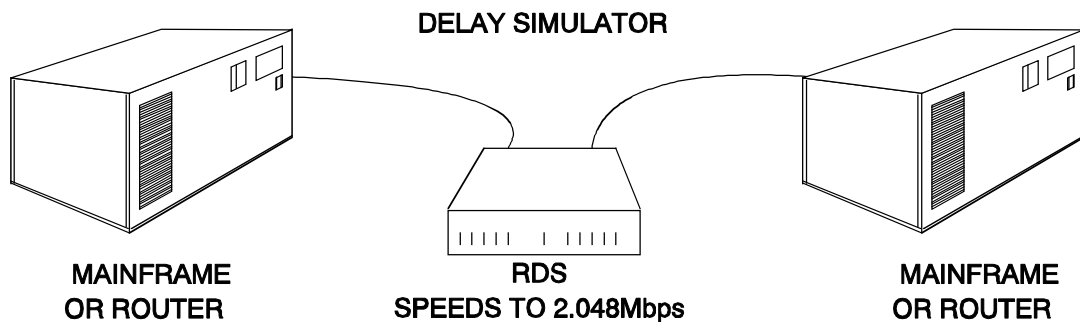
The RDS has individual data interfaces that allow V.35, RS-530, RS-422/449, RS-232 and X.21 connections. The data interfaces may also be mix and matched such as V.35-to-RS-530 connections.

The RDS has status LED's for each attached DTE device which allows the user to visually confirm the presence of control signals.

The RDS utilizes state of the art digital CMOS technology to provide a feature filled product at a very affordable price. Our Field Programmable Gate Array (FPGA) design has allowed us to offer this product with a wide selection of user delay settings and baud rates.

The RDS is housed in a sturdy metal enclosure and operates on 110/220VAC.

The unit has a three year warranty and a 24 hour turnaround on warranty repairs.



TYPICAL APPLICATION

Figure 1.1

HAPTER 2 - BASIC OPERATION

2.1 FRONT PANEL INDICATORS

A *Green* LED marked **POWER** illuminates when AC Power has been applied. Two adjacent sets of *Green* LEDs, one for **PORT A** and another for **PORT B**, illuminate in union with individual port control signal activity. Both Port A and Port B indicators flash in union with Port A and Port B data interfaces(see section 2.4 Data Interfaces)

2.2 FRONT PANEL SWITCHES

User configuration Dip Switches are marked **S1** and **S2**. The function of these switches are for Baud Rate, Delay Time and Control Signal functions. Additionally, a red momentary switch is marked as "**DELAY ENTER**". Delay Enter allows the user to enter the delay time into the RDS after dip switch selection. Each time a new delay is entered via the dip switch, Delay Enter **MUST** be pushed to initialize the new delay time.

2.3 REAR PANEL POWER CONNECTOR

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.

2.4 REAR PANEL DATA INTERFACE PORTS

located adjacent to the IEC Power receptacle are the user selectable **DATA INTERFACE PORTS**. The ports are marked PORT A and PORT B. The data interfaces plug into the RDS main printed circuit board through these openings. The top two screws on the interface module hold the card into place. Both Port A and Port B indicators flash in union with Port A and Port B data interfaces.

2.5 CLOCKING

The RDS may be internally or externally clocked at data rates up to 2.048Mbps.

2.6 DATA INTERFACES

The RDS has selectable **DATA INTERFACES** of V.35, RS-422/449, RS-530, X.21 and RS-232. The data interfaces are purchased separate from the main RDS unit.

2.7 CLEAR TO SEND(CTS) CONTROL SIGNAL

The CTS control signal is controlled in two separate ways via Dip Switch. Each port may have CTS follow RTS or each port may have CTS forced high or ON.

2.8 DATA INTERFACE MODULE STRAPS

The RDS has user selectable data interfaces that are purchased separately from the main RDS unit. The available interfaces are V.35, RS-422/449, RS-530, X.21 and RS-232. Each Data Interface Module has straps(3 pin header) that force select data interface signals. Please refer to each interface modules documentation for a detailed explanation of both control signals supported and the available options for forcing control signals.

2.9 DATA INTERFACE REMOVAL

Disconnect the AC power source from the RDS and disconnect the users data cables from the Data Interface Module(DIM). Located on the back panel of the RDS are PORT A and PORT B. Each DIM is plugged into and out of these ports through mating connectors. Using a phillips screwdriver, remove the top two screws of the DIM. Gently pull the module from the RDS housing. It may be easier to remove the top cover and while holding the edges of the DIM, rock the DIM back and forth as you pull the DIM out of the socket.

2.10 CASCADING RDS UNITS

The RDS has the capability to be cascaded together with multiple RDS units to provide long delay times. This is accomplished via a cross over cable from the first clock source and setting the remaining RDS units to external clock on one of the selected ports.

CHAPTER 3 - INSTALLATION

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 RDS to an AC power source the top cover should be installed with the supplied #6-32 screws. AC power is supplied to the unit 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 units Warranty will be void.

Power Connection

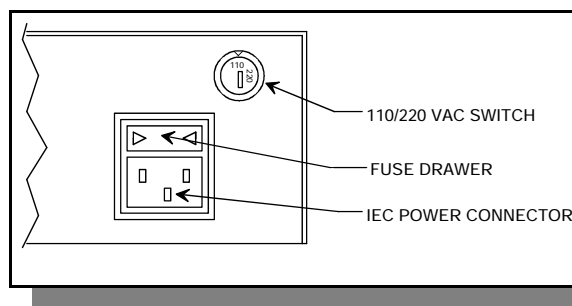


Figure 3-1

3.4 DEFAULT CONFIGURATION SWITCH SETTINGS

The RDS is configured prior to shipping with the Dip Switches set as follows:

- 1) Clock Rate - *56Kbps*
- 2) Port A / Port B Clock source - *Internal*
- 3) Port A / Port B CTS - *Follows RTS*
- 4) Control Signals - *Not Forced*
- 5) Chassis to Signal GND - *Not Connected*
- 6) Delay Time - *5mS*

If your system application requires one or more of the default settings to be changed, this is accomplished via the front panel switches.

3.5 TERMINAL (DTE) CONNECTION

Before applying AC Power to the unit, the users cabling to the RDS Data Interfaces should be connected. Straight through shielded cables should be used.

3.6 SWITCH SETTINGS

3.6.1 DIP SWITCHES

The RDS has two *Dip Switch's* that are accessible via the front panel. The Dip Switch's are marked **S1** and **S2**.

Switch **S1** allows the user to set the baud rate, Port A and Port B clock source and the function of the Request To Send(RTS) and Clear To Send(CTS) control leads.

Switch **S2** allows the user to set the Delay Time. The delay time is for data and RTS in both directions through the RDS. The delay time range is from 5ms to 1.280 seconds. Delay time is **not** effected by clock rate. However, if the user changes to a different internal baud rate or the users external baud rate changes, it will be necessary to press the DELAY ENTER switch to re-establish the proper delay time. The RDS has 256 user selectable delay times.

To change the settings, you may use your finger tip or a small non-conductive instrument. It is recommended NOT to use metal objects to push on the *Switches*.

3.6.2 DELAY ENTER SWITCH FUNCTION

If the *Delay Time* or *Clock Rate* are changed, the user **MUST** push the Delay Enter switch.

DELAY ENTER allows the user to enter the user selectable delay time into the RDS after dip switch selection. Each time a new delay is entered via the dip switch, Delay Enter **MUST** be pushed to initialize the new delay time.

Additionally, if the Clock Rate is changed, the user **MUST** push the Delay Enter switch. The user selected delay time will not be effected by the clock rate change.

4.0 - APPENDIX

4.1 V.35 INTERFACE CHART

V.35 INTERFACE CHART

Pin No	CCITT Circuit No.	Circuit Name	Signal Description	From DCE	To DCE
A	101	AA	Protective Ground	---	---
B	102	AB	Signal Ground	---	---
P	103	BA(A)	Transmit Data (A)		X
S	103	BA(B)	Transmit Data (B)		X
R	104	BB(A)	Receive Data (A)	X	
T	104	BB(B)	Receive Data (B)	X	
C	105	CA	Request to Send		X
D	106	CB	Clear to Send	X	
E	107	CC	Data Set Ready	X	
H	108	CD	Data Terminal Ready		X
F	109	CF	Received Line Signal Detect	X	
U	113	DA(A)	External Transmit Timing (A)		X
W	113	DA(B)	External Transmit Timing (B)		X
Y	114	DB(A)	Transmitter Signal Element Timing (A)	X	
AA	114	DB(B)	Transmitter Signal Element Timing (B)	X	
V	115	DD(A)	Receiver Signal Element Timing (A)	X	
X	115	DD(B)	Receiver Signal Element Timing (B)	X	

5.0 - TECHNICAL SPECIFICATIONS

Application

Interconnection of two Routers or DTE (Terminal) devices located within proximity of each other while simulating network delays times

Simulation Delay Times

5 milliseconds(mS) to approximately 1250 mS, in 5 mS increments, 256 possible settings

Capacity

Two (2) Routers or DTE's

Data Rates

Up to 2.048Mbps
Option for T2 (6.312Mbit)

Data Channel Interfaces

Available in V.35, RS-530, RS-422/449, RS-232 or X.21

Surge Protection

Main power supply

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....32° to 122° F (0° to 50° C)
Relative Humidity.....5 to 95%
Non-Condensing
Altitude.....0 to 10,000 feet

Dimensions

Height 1.75 inches (4.44 cm)
Width 17.00 inches (43.18 cm)
Length 9.00 inches (22.86 cm)

Weight

2 pounds (0.914Kg)

Warranty

Three Years, Return To Factory

ORDERING INFORMATION

Part No: 129000
Model: Router Delay Simulator W/Internal Clocking
Interfaces Available:
V.35, PT# 129010
RS-530, PT# 129011
RS-422/449, PT# 129012
X.21, PT# 129013
RS-232, PT# 129014

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

For further detailed technical information on this product, contact East Coast Datacom Technical Assistance toll free in the US at (800) 240-7948 or (321) 637-9922 or Email: info@ecdata.com

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