PPP-SR

TABLE OF CONTENTS

1.   DESCRIPTION

The DCB PPP-SR is a simple router with one or four local asynchronous ports, one synchronous WAN port, and synchronous to asynchronous PPP translation. It connects remote PCs to the Internet or an Intranet. The PPP-SR accepts IP encapsulated in frame relay or synchronous PPP from a host router. It converts these protocols to asynchronous PPP which is passed to the PCs through its asynchronous com ports.

The PPP-SR also mimics a generic modem handshake to allow PCs using Microsoft Windows95 (and similar Internet dialers) to use the built in dial-up networking function, including its PPP protocol. Just select the generic high speed modem, set up a fixed or dynamic TCP/IP address, and go on-line.

The PPP-SR may contain a built-in 56/64Kbps DSU (PPP-SR01DSU and PPP-SR04DSU models) for direct connection to leased telephone lines. With a built-in DSU, it can be connected directly to DDS or frame relay telephone company lines. Without the built-in DSU, it must be connected to an external DSU, ISDN Terminal Adapter, modem, radio, or FRAD.

Since it connects to the PC using a serial (COM:) port, the PPP-SR provides a simple way to connect small remote offices or SOHO locations to the host router without installing a complex LAN at the remote office.   It provides a dedicated remote connection without the complexity that is normally associated with a LAN and remote connections.

The PPP-SR is especially cost effective in areas with ISDN usage billing and in areas where frame relay is economical. Multiple PPP-SR sites can be connected to the same host router port through the frame relay cloud. This allows a single host router port to support a hundred or more remote sites.

The PPP-SR is easy to install and operate. Controls on the unit include the loopback push button and the Setup switch used to set the asynchronous terminal interface to 115,200 bps if the user chooses not to use the default rate of 57,600 bps. The minimum number of controls and comprehensive indicators make installation and troubleshooting easy. Diagnostic aids built into the PPP-SR include LED indicators, ping, a management interface, and statistics.

Features

- 56 or 64 Kbps line speed with optional built-in DSU
- Up to 128 Kbps line speed with external DSU
- RS-232 interface rates to 115.2 Kbps
- Converts synchronous PPP protocol to asynchronous PPP
- "AT" command spoofing for Microsoft Windows95 dialer and similar dialers
- Use over DDS or DDS/frame relay
- Ideal for Internet or Intranets
- Cost effective versus router + NIC + HUB + DSU
- Reliable, high speed private line service alternative to dial-up modems

2.   SPECIFICATIONS

2.1   General

   PC port interface: RS-232 implemented in 8-wire RJ-45 jack per
                EIA/TIA 561
   PC port rate: up to 115.2 Kbps asynchronous
   Router Indicators: Power, Activity, Line Error, Modem Ready,
             Port 1 Setup
   DSU Indicators: Transmit Data, Receive Data, Request to Send,
             Clear to Send, Data Carrier Detect, Test
   DSU Telco Interface: 8-wire RJ-48S DDS (with built-in DSU)
   Composite rate: 56 or 64 Kbps synchronous with built-in DSU
                up to 128 Kbps with external DSU

2.2   Environmental

   Operation: 0 to 65° C, 10 to 85% relative humidity
   Storage: -40 to 85° C, 10 to 85% relative humidity

2.3   Physical / Electrical

   10¼" W x 9¾" D x 2½" H
   9 VDC external power supply

2.4   Management Port Commands

   Help
   Show Configuration
   Show IP Address
   Show Status (Frame Relay)
   Configure Ports
   Configure IP Address
   Configure Options
   Frame Relay Configure
   Set Identifier
   Activity Counter
   Zero Counter
   Type
   Repeat Last Command
   Disconnect NMP
   Test Tools
       Ping IP Address
       Show RS-232
       Reset SR

3.   INSTALLATION

3.1   Unpacking

The following is included with each PPP-SR:

- PPP-SR and external power supply
- Cable for connection to an external DSU or phone line
- Cable for connection to a PC
- Manual
- Information regarding warranty, maintenance contracts and repair

3.2   Location

Place the PPP-SR in a clear area where you can reach the front panel for setup and the rear panel to connect the cables. The PPP-SR has an external power supply that requires a 120 VAC outlet. The power cord length is about 6 feet.

3.3   Setup

If an IP address is desired, use the Network Management Port CI command to assign a WAN IP address to the PPP-SR. If the default PC port rate of 57.6 Kbps isn't wanted, use the CP command to set the PC port rate to 9.6, 19.2, 38.4, 57.6, or 115.2 Kbps.

3.4   Connections

Using the cable provided, connect the line port to the DSU or phone line. Connect PCs to the PC ports using the cable illustrated in paragraph 6.3.1. One PC connection cable is supplied with the unit. To connect more than one PC, optional cables must be ordered.

4.   CONTROLS AND INDICATORS

4.1   Front Panel Controls (shown with built-in DSU)
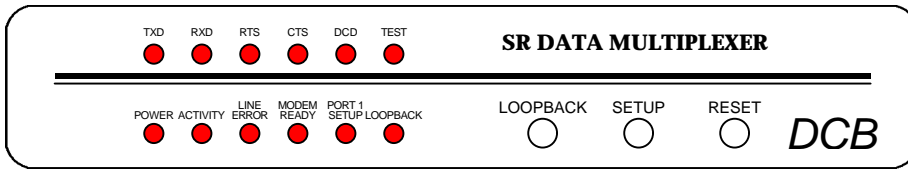
4.1.1   Loopback Switch

        Not Implemented

4.1.2   Setup Switch

        Enables the unit to be configured using the PC connected to port 1. The
        Port 1 Setup indicator will light. This makes port 1 operate as a
        temporary set-up management port. In this state, port 1 should be
        accessed using a terminal emulator program such as Hyperterm. Press
        the switch again to return to normal operation.

4.1.3   Reset Switch

        Performs a hardware reset. Configuration settings are retained
        through the reset.

4.2   Rear Panel Controls

4.2.1   Dip Switches (for built-in DSU only)

The DSU switches are located at the rear of the unit. Switch
functions are shown in the following table:

Switch	Down	Up
1	56K	64K (optional)
2	Slave Clock	Master Clock
3	Must Be Down	
4	RTS Normal	RTS Forced ON
5	Normal	Local Loop ON
6	Not Used	

NOTE

RTS mode (sw 4) is active in 56Kbps mode only. In 64Kbps mode,
RTS is forced on.
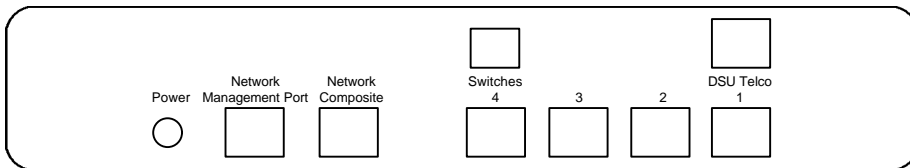
For normal operation with a telephone company line, set the DSU for
SLAVE clock timing (switch position 2 DOWN). For in-house line
driver applications (56K only), set the host DSU for MASTER timing
(switch position 2 UP). The remote unit should remain set for Slave
clock.

4.3   Indicators

Indicator	Condition	Meaning
Power	ON	Unit has power.
Activity	ON	Unit is in on-line mode.
Line Error		Not Used
Modem Ready	ON	Network DCD is high.
Port 1 Setup	ON	Network Management Port functions have been mapped to Port 1 for unit configuration. To return to normal operation, press the front panel Port 1 Setup switch.
	OFF	Normal operation. Configuration must be done from the Network Management Port.
Loopback		Not used.
TxD	Flashing	Data is being sent over the link.
RxD	Flashing	Data is being received from the link.
RTS	ON	Forced on or high from the router
	OFF	No RTS from the router.
CTS	Follows RTS	CTS signal to the DTE device
DCD	ON	Normal condition.
	OFF	No carrier signal received from the far end.
TEST	Flashing	Telephone line in loopback.

5.   NETWORK MANAGEMENT PORT

5.1   Introduction

The Network Management port (NMP) provides access to vital
statistics and troubleshooting tools. By connecting a terminal or
modem to the NMP a vast array of information is at your finger tips.
This information can also be accessed via a terminal device (or PC
using terminal emulation software) on port 1 when the port 1 setup
switch is depressed.

5.2   Connections and Setup

Connection to the NMP is made either through a port on the rear of
the router or by using Port 1 Setup.

5.2.1   Port 1 Setup

The easiest way to access the NMP functions is by using a terminal
or PC connected to port 1 of the router. A switch located on the front
panel performs this function. See paragraph 4.1.2 for information.
Once the switch is set, no further setup is required.

5.2.2   Dedicated Terminal

The NMP functions are also available through a port on the rear of
the unit labeled Network Management Port. To connect a dedicated
terminal to this port, use the cable described in paragraph 6.3.3. Set
the terminal for 9600 bps, 8 data bits, no parity and one stop bit.

5.2.3   Dedicated Modem

For remote access to NMP functions, a dial-up modem may be
connected to the Network Management Port. You must fix the DTE
interface speed of the modem at 9600 bps, 8 data bits, no parity and
one stop bit. Refer to your modem manual for appropriate setup
procedures. Use the appropriate cable from paragraph 6.3.3 for
connection.

5.3   Using the Network Management port

        To activate the NMP, press the ENTER key. When you see **AT YOUR COMMAND** >>, the NMP is active and ready for your commands. Type H <Enter> to display the command set.

5.4   Commands

5.4.1   Help

        Displays all available commands.

COMMAND		PARAGRAPH
Show Configuration	SC	5.4.2
Show IP Address	SI	5.4.3
Frame Relay Status	SS	5.4.4
Change Port Configuration	CP	5.4.5
Change IP Address	CI	5.4.6
Change Options	CO	5.4.7
Change Frame Relay Conf.	FR	5.4.8
Set ID	ID	5.4.9
Activity Counters/Zero	AC/Z	5.4.10
Test Tools	TT	5.4.14
Type	TY	5.4.11
Repeat Last Command	*	5.4.12
Disconnect NMP	BYE	5.4.13

5.4.2   Show (Port) Configuration

        Displays the current PC port rate. All PC ports are set at the same rate.

5.4.3   Show (WAN/Port) IP Address

        The Show IP Address (SI) command displays the assigned and actual IP addresses for all ports and the PC port status. It also displays a WAN IP address for the PPP-SR unit.

5.4.4   Frame Relay Status

        The SS command displays the status of the frame relay connection to the telephone company. This includes DLCI(s), counters, and other management information

5.4.5   Change Port Configuration

The Change Port Config (CP) command is used to set the PC port
rate. Rates from 9600 to 115,200 bps can be set. The default rate is
57,600 bps.

5.4.6   Change (WAN/Port) IP Address

The Change IP Address (CI) command is used to set the IP addresses
for the WAN and all PC ports. The default address is 0.0.0.0. The
WAN address is needed only if the PPP-SR will be assigning IP
addresses to the PC ports or for troubleshooting.

5.4.7   Change Options

The Change Options (CO) command is used to configure the WAN
port for either SYNC network or Frame Relay network.

5.4.8   Change Frame Relay Configuration

The FR command is used to configure the line port for frame relay.
The frame relay management type (Annex D, LMI, Auto, or none),
Poll Interval and Full Status Interval can be set. Default settings
normally work for all these values.

5.4.9   Set ID

The Set ID (ID) command allows you to set or change the local unit
identifier. IDs can be a maximum of 15 characters in length.
Pressing <Enter> with no entry will leave the ID unchanged. The
ID is used only when accessing the PPP-SR from the NMP. Its use is
optional.

5.4.10   Activity Counts / Zero

The Activity Counts (AC) command shows transmit and receive data
statistics for all ports. The data are presented in terms of blocks of
information sent and received by the network and each data port.
Error counts are also shown.

The Z command is used to zero the counters so that current activity
can be monitored.

5.4.11   Type

The Type (TY) command displays information about the PPP-SR
including firmware version, number of ports, unit ID, frame relay
parameters, and IP address.

5.4.12 Repeat Last Command

To repeat the last command, simply press the * key. This is handy for repeating screens of constantly changing data.

5.4.13 Disconnect NMP

The BYE command toggles the RTS output from the Network Management port. This is used to disconnect equipment such as dial-up modems or the DCB Access Switch.

5.4.14 Test Tools

There are several test tools for diagnosing problems with the PPP link. Although the Help command doesn't display a list of testing tools, it displays a TT command that details available testing tool commands.

COMMAND		PARAGRAPH
Ping IP Address	PI	5.4.15
Show RS-232	SR	5.4.16
Reset SR	RESET	5.4.17

5.4.15 Ping IP Address

The Ping command allows you to ping any IP address on the network. Command syntax is PI 206.3.230.1 to ping IP address 2065.3.230.1 . One ping packet is sent.
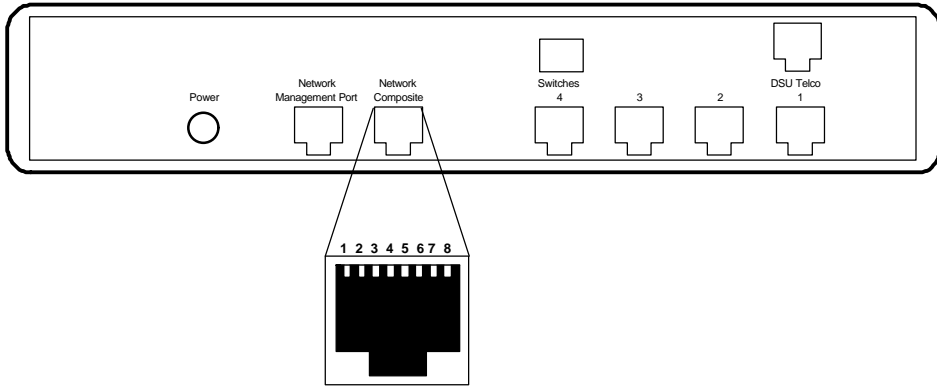
5.4.16 Show RS-232

The SR command displays the current state of the five RS-232 control signals for each PC port.
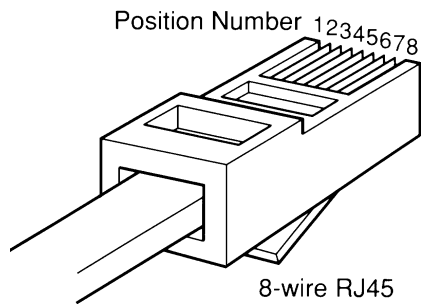
5.4.17 Reset SR

To reset the PPP-SR unit type "reset".

6.   INTERFACE SIGNALS AND CABLING

6.1   Connector Location and Pin Reference

PPP-SR Rear Panel and RJ-45 Jack

RJ-45 Plug Positions

6.2   Port Interface

6.2.1   Line Port (RJ-45) For external DSU

Pin	Signal	In/Out
1	Receive Clock	IN
2	Transmit Clock	IN
3	Data Carrier Detect	IN
4	Signal Ground	
5	Transmit Data	OUT
6	Receive Data	IN
7	Request to Send	OUT
8	Clear to Send	IN

6.2.2   PC Ports (RJ-45)

Pin	Signal	In/Out
1	Data Set Ready	OUT
2	Data Carrier Detect	OUT
3	Busy	IN
4	Signal Ground	
5	Receive Data	OUT
6	Transmit Data	IN
7	Clear to Send	OUT
8	Request to Send	IN

6.2.3   Network Management Port (RJ-45)

Pin	Signal	In/Out
1	Not Used	
2	Not Used	
3	Data Carrier Detect	IN
4	Signal Ground	
5	Transmit Data	OUT
6	Receive Data	IN
7	Request to Send	OUT
8	Clear to Send	IN

6.3   Cables

6.3.1   PC port cable

```
   PC Port                      PC
    RJ-45              DB-25S    DE-9S

      1 ————————————————— 6    or   6
      2 ————————————————— 8    or   1
      3 ————————————————— 4    or   7
      4 ————————————————— 7    or   5
      5 ————————————————— 3    or   2
      6 ————————————————— 2    or   3
      7 ————————————————— 5    or   8
      8 ————————————————— 20   or   4
```
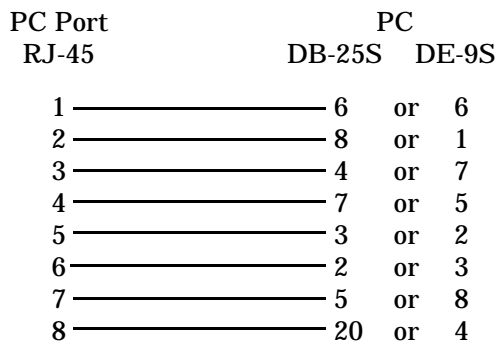
6.3.2   Network Management Port

To a TERMINAL

```
    NMP                  Terminal
    RJ-45                DB-25P

      3 ————————————————— 20
      4 ————————————————— 7
      5 ————————————————— 3
      6 ————————————————— 2
      7 ————————————————— 5
                        ┌— 6
                        └— 8
      8 ————————————————— 4
```

To a PC using terminal emulation

```
    NMP                        PC
    RJ-45              DE-9S    DB-25S

      3 ————————————————— 4    or   20
      4 ————————————————— 5    or   7
      5 ————————————————— 2    or   3
      6 ————————————————— 3    or   2
      7 ————————————————— 8    or   5
                        ┌— 6    or   6
                        └— 1    or   8
      8 ————————————————— 7    or   4
```
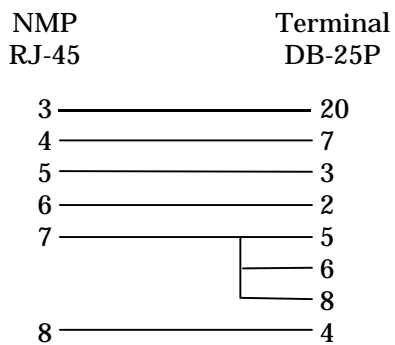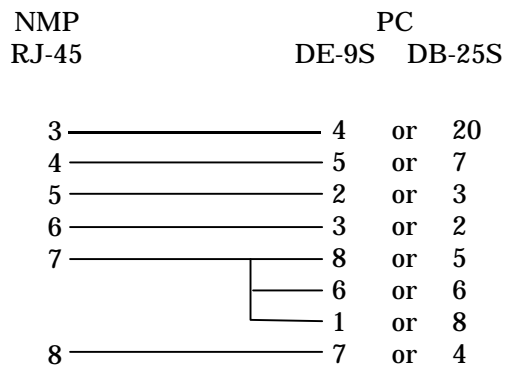
To a dial-up MODEM for remote access

```
      NMP                  Modem
      RJ-45                DB-25P

        3 ──────────────── 8
        4 ──────────────── 7
        5 ──────────────── 2
        6 ──────────────── 3
        7 ──────────┐      4
                    └───── 20
        8 ──────────────── 5
```
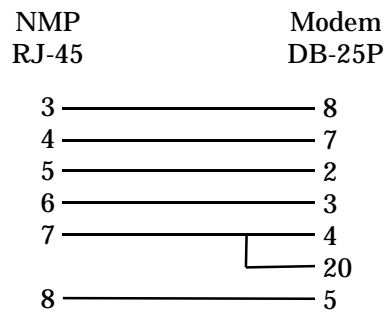
7.   TROUBLESHOOTING

7.1   General Approach

When troubleshooting problems, a rational plan can save you many hours of frustration. The following is a brief outline of standard troubleshooting procedures.

1. Gather the facts to determine the exact nature of the problem.

2. Draw a picture of the system showing all equipment at both the host and remote ends and the phone lines or in-house wiring. Use this as a reference to note your observations, test steps and test results. A picture keeps you focused and often saves duplicate effort.

3. Record the front panel indications and all configuration information before changing anything. This is an important part of fact gathering

4. If you change anything, change only one thing at a time.

5. Use the built-in test functions, record your results.

7.2   Specific test steps

Narrow down the problem to a single component of the system. View the system as made of several parts starting with the host router, telephone line connection, PPP-SR, and PC.

1. First, make sure the PC is operating correctly. The most common problems are due to PC misconfiguration. Verify that the Dial-Up-Network program is working. If it isn't running, determine why it couldn't make a connection. It is usually due to a configuration problem.

    If Dial-Up Networking is running, attempt to PING the PPP-SR from the PC. To do this, open a window (MS-DOS window) on the PC and run the PING program using the IP address of the PPP-SR. For example:

    C:\windows\PING 206.3.230.4

    Reply from 206.3.230.4: bytes=32 time=1ms TTL=64 indicates a good link to the PPP-SR with IP address 206.3.230.4.

2. Verify that the connection between the host router and the PPP-SR is up. First check the host router statistics for a valid PPP link. If it indicates that a link is up, verify it by pinging the PPP-SR from the host router. The PPP-SR does not connect to the host router until a dial-up networking connection is made from a PC, so if no PC has been connected, the host router will show the link as down.

3. Verify the host telephone line connection. The PPP-SR Modem Ready light should be on. If it is off, there is can be no connection to the host router.

8. WARRANTY

The PPP/SR is warranted to be free of defects in materials and workmanship for two years. Data Comm for Business, Inc. will repair or replace any equipment proven to be defective within the warranty period. All warranty work is F.O.B. Champaign, IL. This warranty is exclusive of abuse, misuse, accidental damage, acts of God or consequential damages, etc. DCB liability shall not exceed the original purchase price.

All equipment returned for warranty repair must be accompanied by a Returned Material Authorization (RMA) number. To receive an RMA number, call (217) 352-3207 between 8 AM and 5 PM central time. Equipment must be shipped prepaid to DCB and will be returned at DCB's expense.

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