SPL Multidrop

TABLE OF CONTENTS

1.   DESCRIPTION

The DCB SPL MultiDrop Remote (SPLD) multiplexer is used in conjunction with the SRX MultiDrop Host. The SPLD is a DCB SPL hardware platform with optional MultiDrop firmware that allows it to operate on multidrop analog or digital phone lines.

While similar in appearance to the SPL, the SPLD is a totally different product designed for a different application and should be treated as such. Some of the switches perform the same function on both units. Some do not. Please refer to appropriate section of this manual for SPLD switch functions.
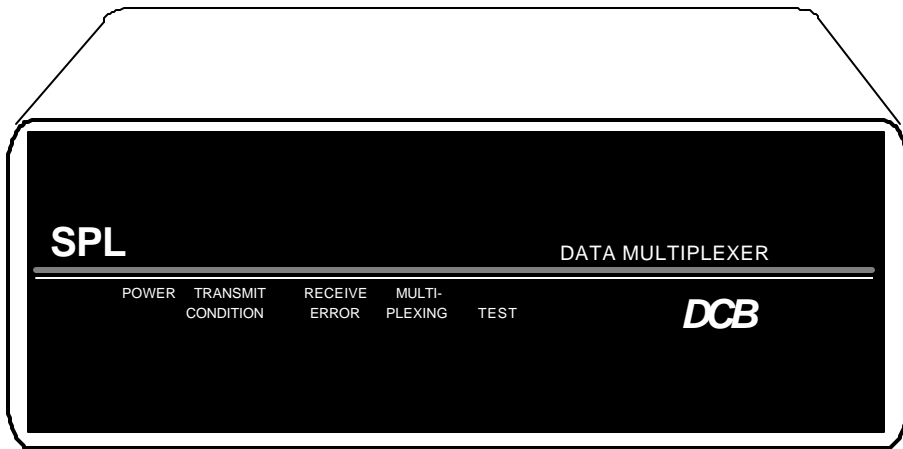
SPL Drop Multiplexer

2.   SPECIFICATIONS

2.1   Product

2.1.1   Data Ports

       Port Speeds
          Asynchronous only
          300, 1200, 1800, 2400, 4800, 9600, 19,200 or 38,400 bps

       Data Format
          10 bits/character, 1 start, 1 stop, 8 data (including parity)

       Interface
          RS-232D, implemented in DB-25 female connectors

2.1.2   Composite Port

       Speed
          Synchronous, to 64 Kbps
          Asynchronous at 1200, 2400, 4800, 9600, 19,200 or 38,400 bps

       Interface
          RS-232D, implemented in DB-25 male connector

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 - 2 thru 6 port units
       10¼" W x 9¾" D x 4¼" H - 8 thru 14 port units
       120 VAC external power supply
       30 watts, .25 amps

2.4   Network Management Port Commands

Help Network
Help Port
Show Port Configuration
Show ID
Show Map
Show Status
Show Network Configuration
Change Port Configuration
Change Delay Timeout
Change ID
Change Network Configuration
Activity Counts
Drop Activity
Zero Activity Counters
Flow Control
Test Tools
    Capture Port
    Copy Command
    Show RS232
    Test Message
    Remote Test Loop
    Monitor Port TX
    Monitor Port RX
    NMP Parity
    Port Reset
    Reset Mux
Type
Repeat Last Command
Disconnect NMP

3.   INSTALLATION

3.1   Unpacking

The following is included with each SPLD multiplexer

- Multiplexer and external power supply
- Cable for connecting a modem or DSU/CSU
- Manual
- Information regarding warranty, maintenance contracts and repair

3.2   Location

Place the multiplexer in a clear area where you can reach the front panel for setup and the rear panel to connect the cables. The multiplexer has an external power supply that requires a properly grounded 120 VAC outlet. The total power cord length is about 12 feet.

3.3   Setup

Each SPLD multiplexer must have a unique DROP ADDRESS set into switches behind the front panel. In addition, each data port must have the proper speed, parity and flow control settings. This is also done with switches. See Section 4 for the location and proper setting of switches.

3.4   Connections

The SPLD is connected to the modem or DSU/CSU using the cable supplied. Connect the Network port on the multiplexer to the RS-232 interface port on the modem or DSU/CSU. The modem or DSU/CSU must be set for controlled carrier operation (RTS controlled from interface). This is absolutely required for the system to operate properly. See your modem or DSU/CSU manual for information on how to set the unit this way. For information regarding data port connections to DTE devices, see Section 6.

3.5   Installation Summary

1. Set the proper Drop Address into the 6-position DIP switch.

2. Configure the ports for correct speed, parity and flow control.

3. Set the modem or DSU/CSU for controlled carrier operation.

4. Connect the multiplexer Network port to the modem or
   DSU/CSU using the cable supplied.

5. Connect the modem or DSU/CSU to the phone line.

6. Use the DA command, from Port 1 Setup, to verify the drop is
   being polled. See paragraphs 5.2.1 and 5.4.12.

7. Check mapped ports for a login prompt from the host.

4. CONTROLS AND INDICATORS

4.1   Switches

The front panel of the SPLD is held in place with magnets. It can be easily removed by pulling on the small handles provided. Behind this panel are one or more circuit boards. Each circuit board has several banks of switches called DIP switches.
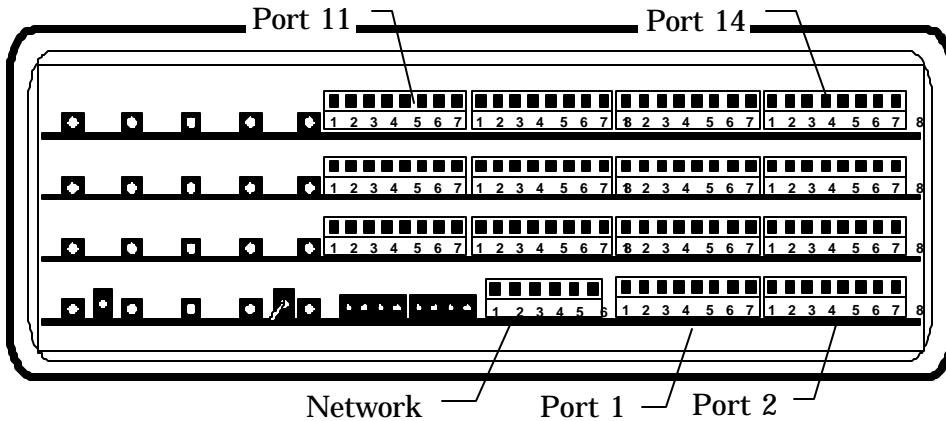
Figure 1
Configuration Switches

Figure 1 illustrates the Network and Port Configuration switches. The Network switch contains 6 sections numbered 1 thru 6. The Port switches have 8 sections each.

4.1.1   Network Switch

4.1.1.1 Sync / Async

Position 1 of the Network switch is used to select synchronous or asynchronous operation. When DOWN the network operates in SYNCHRONOUS mode receiving clocks from the attached modem device. When UP the network port operates ASYNCHRONOUS at the rate set by the CN command (see paragraph 5.4.12).

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4.1.1.2 Drop Address

For a multidrop network to work properly, each SPLD multiplexer must have a unique drop address. The Drop Address is set using positions 2-6 of the Network switch. Firmware version 16.xx supports 16 drops (0 thru 15). Version 32.xx supports 32 drops.

Network Switch Position

Drop #	2	3	4	5	6
0	Down	Down	Down	Down	Down
1	Down	Down	Down	Down	Up
2	Down	Down	Down	Up	Down
3	Down	Down	Down	Up	Up
4	Down	Down	Up	Down	Down
5	Down	Down	Up	Down	Up
6	Down	Down	Up	Up	Down
7	Down	Down	Up	Up	Up
8	Down	Up	Down	Down	Down
9	Down	Up	Down	Down	Up
10	Down	Up	Down	Up	Down
11	Down	Up	Down	Up	Up
12	Down	Up	Up	Down	Down
13	Down	Up	Up	Down	Up
14	Down	Up	Up	Up	Down
15	Down	Up	Up	Up	Up
16	Up	Down	Down	Down	Down
17	Up	Down	Down	Down	Up
18	Up	Down	Down	Up	Down
19	Up	Down	Down	Up	Up
20	Up	Down	Up	Down	Down
21	Up	Down	Up	Down	Up
22	Up	Down	Up	Up	Down
23	Up	Down	Up	Up	Up
24	Up	Up	Down	Down	Down
25	Up	Up	Down	Down	Up
26	Up	Up	Down	Up	Down
27	Up	Up	Down	Up	Up
28	Up	Up	Up	Down	Down
29	Up	Up	Up	Down	Up
30	Up	Up	Up	Up	Down
31	Up	Up	Up	Up	Up

4.1.2   Port Configuration

Ports are configured using the 8-position DIP switches. See Figure 1.
Position 1 is not used. Position 2 sets port loopback for troubleshooting.
Positions 3 thru 5 set flow control and parity. Positions 6 thru 8 set speed.

4.1.2.1 Port Loopback

Individual ports may be put in loopback using position 2 of the port
configuration switch. When UP, loopback is enabled. Port loopbacks
are used during troubleshooting and will be discussed in more detail in
Section 7. Normally this switch should be left down.

4.1.2.2 Flow Control and Parity

Flow control and parity must be set for each port using positions 3,
4 and 5 of the port DIP switch. This setting must match the
configuration of the attached DTE device and should match the
configuration of the host computer ports. The factory default is
Xon/Xoff Even.

Port Switch Position

3	4	5	Option
Down	Down	Down	Xon/Xoff Even Parity
Down	Down	Up	Xon/Xoff Odd Parity
Down	Up	Down	Xon/Xoff Mark Parity
Down	Up	Up	Xon/Xoff Space Parity
Up	Down	Down	Xon/Xoff Transparent
Up	Down	Up	CTS / No Busy
Up	Up	Down	CTS / Busy Low
Up	Up	Up	CTS / Busy High

4.1.2.3 Port Speed

Port speed is set using positions 6, 7 and 8 of the port DIP switch. The
port speed must match the speed of the attached DTE device. The
factory default is 9600.

Port Switch Position			
6	7	8	Speed
Up	Up	Down	38400 BPS
Up	Up	Up	19200 BPS
Down	Down	Down	9600 BPS
Down	Down	Up	4800 BPS
Down	Up	Down	2400 BPS
Down	Up	Up	1800 BPS
Up	Down	Down	1200 BPS
Up	Down	Up	300 BPS

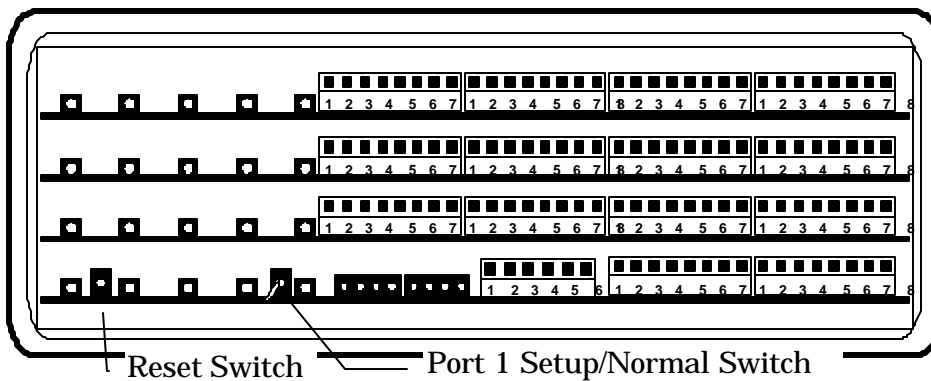Reset Switch   Port 1 Setup/Normal Switch

Figure 2
Special Switches

4.1.3   Port 1 Setup

Port 1 setup is controlled by a three position toggle switch located on the
bottom circuit board between the Multiplexing and Test indicators (Figure
2). Normally this switch is left in the center position. When this switch
is pushed to the left, port 1 setup is enabled. This allows a terminal
connected to port 1 of the multiplexer to perform the functions of the
Network Management port. See Section 5 for information about Network
Management port functions.

4.1.4   Reset

The reset switch is a small pushbutton switch located on the bottom
circuit board between the Power and Transmit Condition indicators
(Figure 2). Pressing this switch will reset the multiplexer. If this fails
to clear a problem, disconnect power from the unit for five seconds and
then reconnect.

4.2   Indicators

There are five indicators visible on the front panel. These indicators
provide information about the multiplexer's operation. You should
become familiar with which lights are on during normal operation. If
this pattern changes, there may be a problem.

The indicators and their function are:

    POWER
        ON when power is applied to the unit.

    TRANSMIT CONDITION
        ON when there is activity on the network.
        OFF means the network is down.

    RECEIVE ERROR
        Flashes when a data error is detected.

    MULTIPLEXING
        Flashes rapidly when the multiplexer is on-line.
        OFF means this drop is not active.

    TEST
        Flashes when drop polling has been killed or suspended for
        troubleshooting.

Besides these five main indicators there are eight smaller indicators located behind the front panel directly to the left of the network switch.
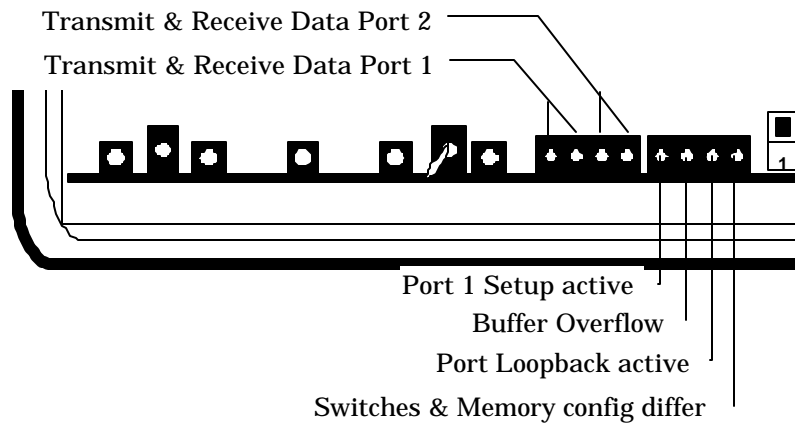
Transmit & Receive Data Port 2

Transmit & Receive Data Port 1

Port 1 Setup active

Buffer Overflow

Port Loopback active

Switches & Memory config differ

Figure 3
Mini LEDs

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.

5.2   Connections and Setup

Connection to the NMP is made either through a port on the rear of the multiplexer 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 connected to port 1 of the multiplexer. A switch located behind the front panel performs this function. See paragraph 4.1.3 for information. Once the switch is set, no further setup is required. This option cannot be used if a printer is connected to port 1.

5.2.2   Dedicated Terminal

The NMP functions are also available through a port on the rear of the unit labeled Exec 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 Exec 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 (H or ?)

COMMAND		LOCAL	REMOTE	PARAGRAPH
Help:	Network	HN		5.4.2
	Port	HP		5.4.3
Show:	Port Config	SC		5.4.4
	ID	SI		5.4.8
	Map	SM		5.4.10
	Status	SS		5.4.11
	Network Config	SN		5.4.12
Change:	Port Config	CP	RCP	5.4.5 & 6
	Delay Timeout	CD		5.4.7
	ID	ID		5.4.9
	Network Config	CN		5.4.13
Activity Counts		AC		5.4.14
Drop Activity		DA		5.4.15
Zero Activity Counters		Z		5.4.14
Flow Control		FC		5.4.16
Test Tools		TT		5.4.20
Type		TY	RTY	5.4.17
Repeat Last Command		*		5.4.18
Disconnect NMP		BYE		5.4.19

5.4.2   Help Network

The Help Network (HN) command displays the drop address settings
for the 6-position drop address switch.

5.4.3   Help Port

The Help Port (HP) command displays switch settings for the 8-
position port configuration switches.

5.4.4   Show Port Config

The Show Port Config (SC) command shows the current port
configuration settings for both the local and the remote ports. Port
numbers may be included with this command to limit the display
range. If no port numbers are included, settings for all ports are shown.
Use this command to verify proper port configuration.

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NOTE

Several commands allow port numbers or port number ranges to be included on the command line. When port numbers are included, the syntax is as follows:

(Command)1	Port 1
(Command)1,2,6	Ports 1, 2 & 6
(Command)1 2 6	Ports 1, 2 & 6
(Command)2-6	Ports 2 thru 6
(Command)1,5-8	Ports 1 and 5 thru 8

5.4.5   Change Port Config

The Change Port Config (CP) command sets the local port loopback, flow control and rate configuration. One or more ports may be set with a single command by selecting a range of port numbers. The factory default setting is Xon/Xoff Even, 9600 bps.

5.4.6   Remote Change Port Config

The Remote Change Port Config (RCP) command sets the remote port configuration. This command requires a **local** (Drop) port number argument. The multiplexer sends the configuration to the proper host port number based on the system map. One or more ports may be set with a single command by selecting a range of port numbers. The syntax is the same as the CP command.

5.4.7   Change Delay Timeout

The Change Delay Timeout (CD) command is used to change three timing parameters on the data ports.

Transmit data send timeout (0-250ms)
DCD to Receive data delay (0-250ms)
DCD holdover delay (0-250ms)

These parameters are set automatically depending on port speed and should not require further adjustment.

5.4.8   Show ID

The Show ID (SI) command is used to view both multiplexer and port identifiers.

5.4.9 Change ID

The Change ID (ID) command allows you to set/change both multiplexer and port identifiers. Port IDs are entered in pairs, first drop, then host, referenced to the local (Drop) port number. Pressing <Enter> with no entry will leave the ID unchanged.

5.4.10 Show Map

The Show Map (SM) command shows the mapping and IDs of all drop ports. If mapping for a particular port or range is desired, that port number or range may be added to the command line.

5.4.11 Show Status

Show Status (SS) displays the status of the drop including number of active ports and poll response time.

5.4.12 Show Network Configuration

The Show Network Config command (SN) displays the current network port configuration (synchronous or asynchronous) and whether to use or ignore modem DCD.

5.4.13 Change Network Configuration

The Change Network (CN) command is used to select half duplex or full duplex operation. In full duplex mode there is an additional option to ignore modem DCD. This is required in some multipoint radio applications. The default is to use modem DCD.

If the multiplexer is set for asynchronous operation (see paragraph 4.1.1.1) this command is used to set the speed.

5.4.14 Activity Counts

The Activity Counts (AC) command shows the current statistics for all ports. A range of ports may be included with this command to reduce the number of ports shown.

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

5.4.15   Drop Activity

The Drop Activity (DA) command shows polling statistics for the drop. The Zero Activity Counters (Z) command is used to zero the counters.

5.4.16   Flow Control

The Flow Control (FC) command displays the current port flow control status for both drop and host ports. A port range may be included with this command.

5.4.17   Type

The Type (TY) command displays information about the local multiplexer. The Remote Type (RTY) command is used to display similar information about the remote multiplexer.

5.4.18   Repeat Last Command

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

5.4.19   Disconnect NMP

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

5.4.20 Test Tools

The Test Tools (TT) menu summarizes the test and troubleshooting
commands. These commands are listed separately to reduce the clutter
in the main help list, but are always active at the command prompt.

COMMAND	LOCAL	REMOTE	PARAGRAPH
Capture Port	CA#	RCA#	5.4.21 & 22
Copy Command	CC#	RCC#	5.4.23 & 24
Show RS232	SR	RSR	5.4.25 & 26
Test Message	TM#	RTM#	5.4.27 & 28
Remote Test Loop		RTL#	5.4.29
Monitor Port TX	MT#		5.4.30
Monitor Port RX	MR#		5.4.30
NMP Parity	P		5.4.31
Port Reset	PR		5.4.32
Reset MUX	RESET		5.4.33

5.4.21 Capture Port

The Capture Port command (CA#) permits the network management
port to capture any of the local ports. While this command is active, the
normal data path is interrupted and a two-way communication link is
established between the network management port and the captured
port. A port number must be included on the command line.

The Capture command is active until two consecutive ESC characters
are issued.

5.4.22 Remote Capture Port

The Remote Capture port command (RCA#) connects the network
management port to any mapped host port. During this time, normal
data communications are suspended and the NMP terminal can talk
directly to the host computer port. The number argument must be a
mapped drop port number.

The Remote Capture command is active until two consecutive ESC
characters are issued.

5.4.23 Copy Command

The Copy Command (CC#) is used for training. This command is used when the instructor is at the host site and the trainee is at the remote. The command is followed by a port number which must be the host port that is mapped to the remote port used by the trainee.

After the command is entered, all data from the local port will be displayed on both terminals. Keyboard inputs from either terminal will be sent to the host port.

The Copy command is active until two consecutive ESC characters are issued by the instructor.

5.4.24 Remote Copy Command

The Remote Copy Command (RCC#) performs the same function when the instructor is located at the remote site. In this case, the port number is the port to which the trainee's terminal is attached. This command is used only at the remote site.

The Remote Copy command is active until two consecutive ESC characters are issued by the instructor.

5.4.25 Show RS-232

The Show RS-232 (SR) command shows the current state of RS-232 control signals on the local ports. A range of port numbers may be included to limit the display.

5.4.26 Remote Show RS-232

The Remote Show RS-232 (RSR) command shows the status of RS-232 control signals at the remote ports. As with the SR command, a range of port numbers may be included on the command line.

5.4.27 Test Message

The Test Message (TM#) command sends a Quick Brown Fox... message to a local port. The QBF message continues until any key is pressed on the network management port terminal. A local port number must be included on the command line.

5.4.28   Remote Test Message

The Remote Test Message (RTM#) command sends a QBF test message to a remote (Host) port. The message continues until any key is pressed on the network management port terminal. A local port number must be included on the command line. If the port is not mapped, an error message is returned.

5.4.29   Remote Test Loop

The Remote Test Loop (RTL#) command is used to test a data path from end to end. This command enables port loopback in the remote (Host) multiplexer, then sends a test message to that port. If all is working correctly, the test message is displayed on the network management port terminal. A local port number must be included on the command line. If the port is not mapped, an error message is returned.

5.4.30   Monitor Port TX or RX

The Monitor Port TX (MT#) command monitors data transmitted from the selected port to the corresponding port of the remote (Host) multiplexer. The Monitor Port RX (MR#) command monitors data received by the selected port from the corresponding port of the remote multiplexer. A local port number must be included on the command line. When port monitor is active, two ESC characters are needed to end the test.

5.4.31   Parity

The Parity command (P) sets the parity for the network management port. The factory default is SPACE.

5.4.32   Port Reset

The Port Reset (PR) command is used to reset flow control to hung ports. A range of local port numbers or ALL may be included with this command. Flow control leads at both the drop and host ports are reset.

5.4.33   Reset Mux

The Reset Mux (RESET) command performs a local multiplexer reset.

6.   INTERFACE SIGNALS and CABLING

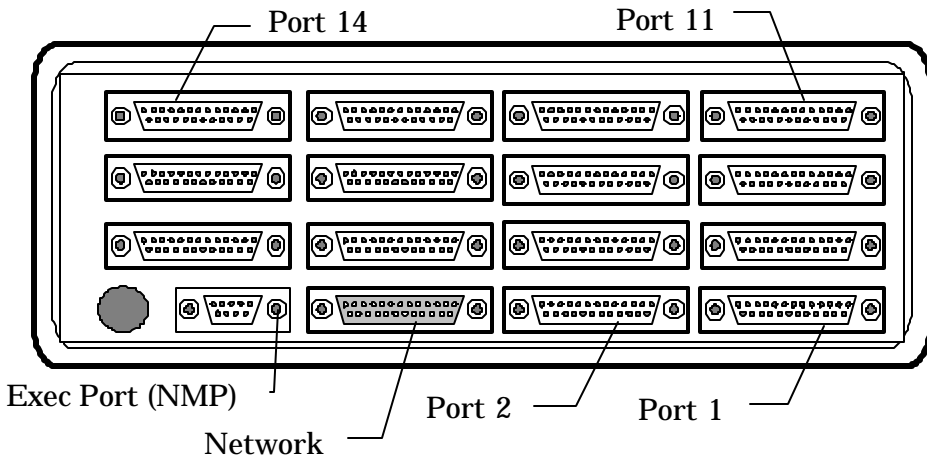6.1   Connector Location and Pin Reference

Port 14   Port 11
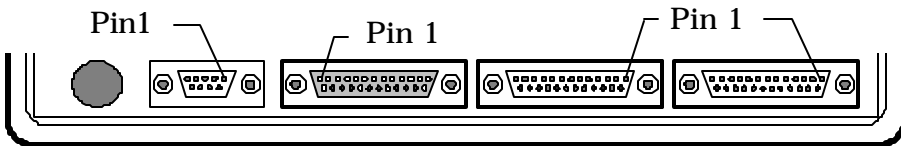
Exec Port (NMP)
        Network   Port 2   Port 1

Figure 4
Connector Location - Rear View

Pin1   Pin 1   Pin 1

Figure 5
Connector Pin Reference

6.2   Port Interface

6.2.1   Network Port (DB-25P)

Pin	Signal	In/Out
1	Frame Ground	---
2	Transmit Data	OUT
3	Receive Data	IN
4	Request to Send	OUT
5	Clear to Send	IN
6	Data Set Ready	IN
7	Signal Ground	---
8	Data Carrier Detect	IN
15	Transmit Clock	IN
17	Receive Clock	IN
20	Data Terminal Ready	OUT

6.2.2   Data Ports (DB-25S)

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

6.2.3   Network Management Port (DE-9S)

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

6.3   Cables

6.3.1   Network Port to Modem

A 25 conductor cable is supplied with the SPL multiplexer for this
purpose. If a longer cable is needed, a minimum of 10 conductors are
required.

```
        SPL                 Modem
        DB-25S              DB-25P

         2 ——————————————— 2
         3 ——————————————— 3
         4 ——————————————— 4
         5 ——————————————— 5
         6 ——————————————— 6
         7 ——————————————— 7
         8 ——————————————— 8
        15 ——————————————— 15
        17 ——————————————— 17
        20 ——————————————— 20
```
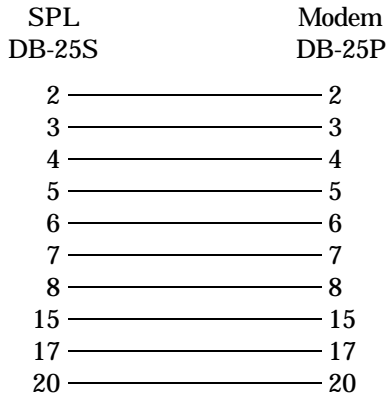

6.3.2   Data Ports

To a TERMINAL, PRINTER or other DTE Device

```
        SPL                 DTE Device
        DB-25P              DB-25

         2 ——————————————— 2
         3 ——————————————— 3
         4 ——————————————— 4
         5 ——————————————— 5
         6 ——————————————— 6
         7 ——————————————— 7
         8 ——————————————— 8
        11 ——————————————— 20     (or other flow control pin)
```
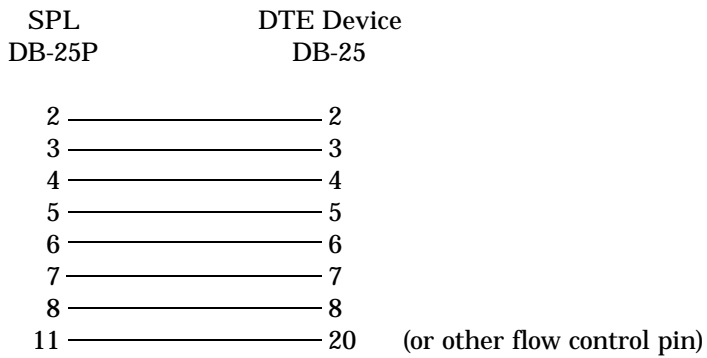
6.3.2   Data Ports, continued

To a PC using terminal emulation

```
        SPL                     Computer
        DB-25P               DB-25S     DE-9S

          2 ————————————— 2      or    3
          3 ————————————— 3      or    2
          4 ————————————— 20     or    4
          5 ————————————— 5      or    8
          6 ————————————— 6      or    6
          7 ————————————— 7      or    5
          8 ————————————— 8      or    1
         11 ————————————— 4      or    7
```

To a MODEM or other DCE Device

```
        SPL                  Modem
        DB-25P               DB-25

          2 ————————————— 3
          3 ————————————— 2
          4 ————————————— 8
          5 ————————————— 4       (flow control)
          7 ————————————— 7
          8 ————————————— 20
         11 ————————————— 5       (flow control)
```

6.3.3   Network Management Port

To a TERMINAL

```
NMP                    Terminal
DE-9P                  DB-25P

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

To a PC using terminal emulation

```
NMP                       Computer
DE-9P                  DE-9S      DB-25S

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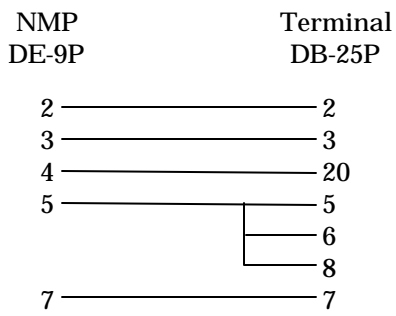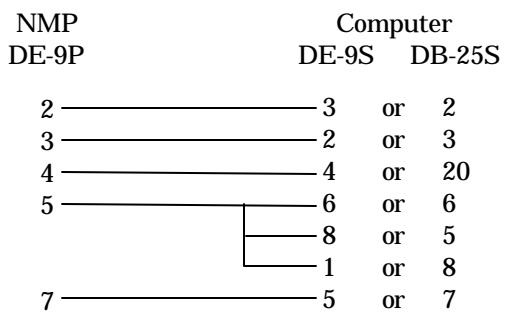
To a dial-up MODEM for remote access

```
NMP                    Modem
DE-9P                  DB-25P

  2 ──────────────────── 3
  3 ──────────────────── 2
  4 ──────────────────── 8
  5 ──────────────┐      4
                  └───── 20
  7 ──────────────────── 7
```
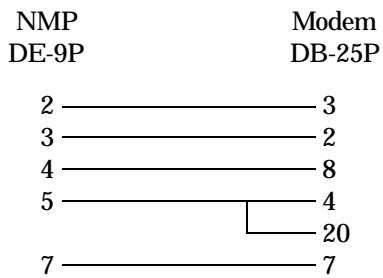
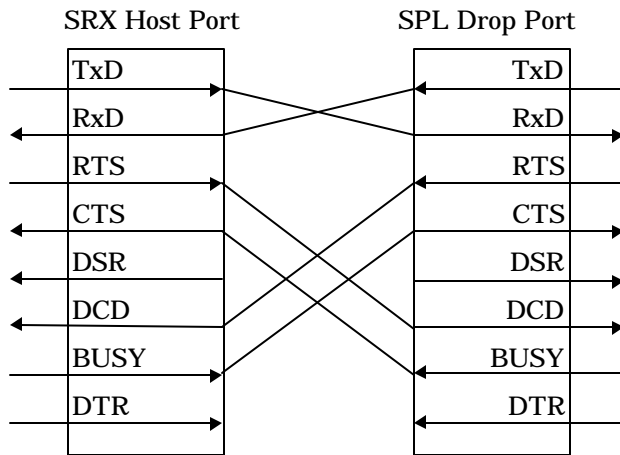## 6.4 Signal Paths through Multiplexers

The following diagram shows the signal flow between data ports of an SRX Host multiplexer and an SPL Drop multiplexer.

```
        SRX Host Port              SPL Drop Port

        TxD                              TxD
        RxD                              RxD
        RTS                              RTS
        CTS                              CTS
        DSR                              DSR
        DCD                              DCD
        BUSY                             BUSY
        DTR                              DTR
```

Transmit Data to Receive Data is the normal required path for data flow.

RTS to DCD is a hardware handshake path used to wake up the remote device. Many host computers require DCD to issue a login prompt.

Busy to CTS is the hardware flow control path. For CTS/Busy flow control, the hardware flow control pin of the attached device must be wired to Busy on the multiplexer.

The DSR output of the multiplexer port is always asserted (high).

Data Terminal Ready (DTR) is an input to the SPL Drop data ports which is passed through to the attached modem

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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 the 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 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, especially the loopback tests and
    record your results.

7.2   Loopback Tests

It is best to begin loopback testing at the remote terminal and work
toward the host. If all the loopbacks are successful, the data
communications equipment and the terminal are working correctly.

Put the SPL Drop multiplexer port in loopback and have someone type
alpha characters on the keyboard of the affected terminal. If the data
appears correctly on the screen, the port is working. Next loop the
associated port of the host multiplexer. If data again appears correctly,
the communications link and the ports on both multiplexers are
working correctly. The problem then is with the host computer port or
the cable between the host computer and the multiplexer.

Loopbacks can be turned on and off from the Network Management port
of the SPL Drop multiplexer. See paragraphs 5.4.5 and 5.4.6 for details.
If a NMP terminal is not available, drop multiplexer port loopback can
be enabled using a DIP switch on the multiplexer. Refer to Figure 1
and paragraph 4.1.2.1 for switch location and operation.

7.3   Installation Troubleshooting, Modems or DSUs

First, set up the DSUs without connecting the multiplexers. The host
DSU should be set to constant carrier, also called forced Request To
Send, or constant RTS. The remote DSUs must be set to Request To
Send controlled by the terminal. In this case, the SPL Drop
multiplexer.

Carrier Detect should be ON at all the remote drops, even before the
SRX Host and the SPL Drops are connected.

Carrier Detect should be OFF at the host, with or without SPL Drops
connected at the drop sites. For testing the line and DSUs only, you
may wish to momentarily force Request To Send on at a remote DSU to
see if it results in Carrier Detect turning on at the host.

7.4   Installation Troubleshooting, Multiplexers

Before trying terminals, make sure the multiplexers are polling. The
SRX Host should be polling the SPL Drop multiplexers. The host DSU
Send Data, Receive Data and Carrier Detect lights should be flashing.
The polling on DSUs is often so fast that the lights appear to be
constantly on, but dimly. Use the "SS" command from the Network
Management port for a quick check. See paragraph 5.4.10.

Double check the SPL Drop multiplexers. Insure you have drop
firmware installed and the address is set correctly. See paragraph 4.1.1
for address information.

Make sure the SRX host is properly mapped. An SPL Drop must be
mapped in the host before it will be polled and become active.

7.5   Installation Troubleshooting, Terminals

Terminal problems typically fall into four categories:

    1. The terminal or printer gets no data
    2. The terminal or printer gets "garbage"
    3. Blocks of data are lost
    4. The terminal "hangs"

When a terminal gets no data, check to see that the cables are wired
correctly and that flow control is set properly.

If the terminal gets "garbage" data, check the speeds of the host and remote multiplexers, the terminal and the computer ports to make sure they match.

Blocks of data are lost most often when data is sent to a printer, or a lot of data is being displayed on a terminal. Most of these problems are due to flow control not matching between the printer or terminal and the multiplexer.

If terminals and printers work for a while and then "hang", check the flow control settings. When Xon/Xoff flow control is set to a different parity on the multiplexer than on the terminal or printer, the result is either a "hung" device that is flow controlled off but never back on, or the device is never flowed off causing buffer overflow and lost data.

8. WARRANTY

All DCB multiplexers are 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. Dewey, 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) 897-6600 between the hours of 8 AM and 5 PM central time. Equipment must be shipped prepaid to DCB and will be returned at DCB's expense.

Ship returned items to:

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Dewey, IL 61840

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