SPL - DS

TABLE OF CONTENTS

1. DESCRIPTION

The SPL/DS Drop Switch is a receive only device that decodes a simple network protocol (defined later in this document) and delivers short ASCII text strings to the terminal ports on the SPL/DS. The protocol message format is as follows:

```
<STX>DDPP[data...data]<ETX>
```

The DD string is a drop number in ASCII between "00" and "63". The PP string is the local port number in ASCII between "01" and "14"; the largest SPL unit has 14 ports. The [data...data] portion of the protocol message is an ASCII string with a length limited by the buffer size (about 4000 chars). The protocol message starts with <STX> and ends with <ETX>; these two characters cannot appear in the data portion of the protocol message.

This protocol has been implemented on the SPL platform with front panel switches for each port and one common switch. The common switch sets the drop address to any setting between 0 and 63. Each of the port switches is used to set the data rate on that port; there is no other port option. The front panel LED's show network activity, local drop activity, errors, and network DCD.

2.   SPECIFICATIONS

2.1   Data Ports

   Port Speed
    Asynchronous only
    300, 1200, 1800, 2400, 4800, 9600, or 19,200 bps

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

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

2.2   Network Port

   Speed
   Asynchronous at 1200, 1800, 2400, 4800, 9600, 19,200 or
   38,400 bps

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

2.3   Environmental

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

2.4   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
   Rack mount and rack chassis mounting available

2.5   Network Management Port

   Speed: 9600 bps
   Parity: None (8N1)

2.5.1   Network Management Commands

As displayed by the "Help" command…

```
 GENERAL COMMANDS
 ------------------------- -------
 Help:    Drop Nr............HD
          Port...............HP
 Show:    Port Config........SC
          ID.................SI
          Network Config.....SN
 Change: Port Config........CP
          ID.................ID
          Network Config.....CN
 Activity Counts............AC
 Drop Activity Counts.......DA
 Zero Activity Counters.....Z
 Test Tools.................TT
 Type.......................TY
 Repeat Last Command........*
 Disconnect NMP.............BYE
```

The Test Tools (TT) screen shows commands that are available for testing.

```
 TEST TOOLS
 ------------------------- -------
 Capture Port...............CA#
 Monitor Network............MN
         Port RX............MR#
 NMP Parity.................P
 Reset PORT SWITCH..........RESET
```

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3.   INSTALLATION

3.1   Unpacking

The following is included with each SPL unit

- Unit and external power supply
- Manual
- Information regarding warranty, maintenance contracts and repair

3.2   Location

Place the unit in a clear area where you can reach the front panel for setup and the rear panel to connect the cables. The unit 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

The Network port must be configured properly for the drop number and speed. In addition, each data port must have the proper speed setting. This is done with switches or via the network management port using a terminal. See Section 4 for the location and proper setting of switches.

3.4   Connections

The SPL is connected to the incoming network. Connect the Network port of the unit to the RS-232 interface port on the modem or DSU/CSU. For information regarding data port connections to DTE devices, see Section 6.

3.5   Installation Summary

1. Set the network switches for the drop number.
2. Configure the ports for correct speed.
3. Connect the unit Network port to the modem or DSU/CSU.
4. Connect the data ports to the asynchronous devices using cables shown in Section 6.

4.   CONTROLS AND INDICATORS

4.1   Switches

The front panel of the SPL 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
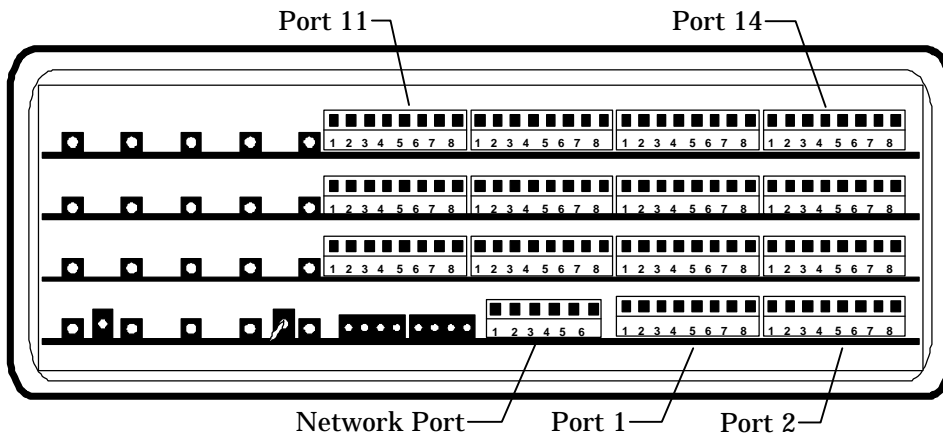several banks of switches called DIP switches.

Figure 1
Configuration Switches

Figure 1 illustrates the Network and Data port configuration switches.
The Network switch contains 6 sections numbered 1 thru 6. The Data
port switches have 8 sections each.

4.1.1   Network

The network switches must be set according to the drop number.
The units are set at the factory for drop number 16. The units are
set at the factory for 9.6 Kbps. Speed can be changed by using a
terminal (or PC running terminal emulation software) connected to
the network management port..

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4.1.1.1 DROP SWITCH ADDRESS

```
     SWITCH              SWITCH              SWITCH              SWITCH
D#  1 2 3 4 5 6     D#  1 2 3 4 5 6     D#  1 2 3 4 5 6     D#  1 2 3 4 5 6
--  - - - - - -     --  - - - - - -     --  - - - - - -     --  - - - - - -
 0  D-D-D-D-D-D     16  D-U-D-D-D-D     32  U-D-D-D-D-D     48  U-U-D-D-D-D
 1  D-D-D-D-D-U     17  D-U-D-D-D-U     33  U-D-D-D-D-U     49  U-U-D-D-D-U
 2  D-D-D-D-U-D     18  D-U-D-D-U-D     34  U-D-D-D-U-D     50  U-U-D-D-U-D
 3  D-D-D-D-U-U     19  D-U-D-D-U-U     35  U-D-D-D-U-U     51  U-U-D-D-U-U
 4  D-D-D-U-D-D     20  D-U-D-U-D-D     36  U-D-D-U-D-D     52  U-U-D-U-D-D
 5  D-D-D-U-D-U     21  D-U-D-U-D-U     37  U-D-D-U-D-U     53  U-U-D-U-D-U
 6  D-D-D-U-U-D     22  D-U-D-U-U-D     38  U-D-D-U-U-D     54  U-U-D-U-U-D
 7  D-D-D-U-U-U     23  D-U-D-U-U-U     39  U-D-D-U-U-U     55  U-U-D-U-U-U
 8  D-D-U-D-D-D     24  D-U-U-D-D-D     40  U-D-U-D-D-D     56  U-U-U-D-D-D
 9  D-D-U-D-D-U     25  D-U-U-D-D-U     41  U-D-U-D-D-U     57  U-U-U-D-D-U
10  D-D-U-D-U-D     26  D-U-U-D-U-D     42  U-D-U-D-U-D     58  U-U-U-D-U-D
11  D-D-U-D-U-U     27  D-U-U-D-U-U     43  U-D-U-D-U-U     59  U-U-U-D-U-U
12  D-D-U-U-D-D     28  D-U-U-U-D-D     44  U-D-U-U-D-D     60  U-U-U-U-D-D
13  D-D-U-U-D-U     29  D-U-U-U-D-U     45  U-D-U-U-D-U     61  U-U-U-U-D-U
14  D-D-U-U-U-D     30  D-U-U-U-U-D     46  U-D-U-U-U-D     62  U-U-U-U-U-D
15  D-D-U-U-U-U     31  D-U-U-U-U-U     47  U-D-U-U-U-U     63  D-U-U-U-U-U
```

NOTE: D means switch DOWN and U means switch UP

4.1.2   Data Port Configuration

Data ports are configured using the 8-position DIP switches. See
Figure 1. Positions 1 through 5 are not used. Positions 6 thru 8 set
speed.

4.1.2.1 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	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

4.1.3   Port 1 Setup

Port 1 setup is enabled by a three position toggle switch located on the
bottom circuit board between the fourth and fifth 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 unit 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 unit. If this fails to
clear a problem, disconnect power from the unit for five seconds and
then reconnect.
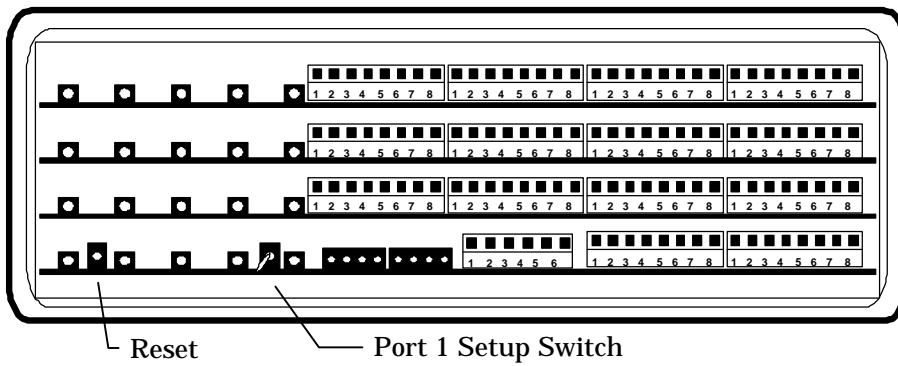
Reset — Port 1 Setup Switch

Figure 2
Special Switches

4.2   Indicators

The LED's on the SPL/DS continuously show operational status.
Listed below is a summary of the indicators from left to right.

POWER: ON when the unit is powered.

MODEM READY: ON when DCD is detected on the network port,
OFF otherwise.

ERROR: Flashes with every network error or protocol message
error.

ACTIVITY: Flashes when a protocol message is received for this
unit.

TEST: OFF always; this indicator is not used.

The following LED's are the four small ones just to the left of the drop address switch. (See Figure 3)

PORT 1 EXEC: ON when the front panel switch enabled Port 1 management port.

NETWORK ACTIVE: ON for about 30 seconds after a valid protocol message is detected.

PORT LOOP: OFF always; this indicator is not used.

SWITCH DIFFERENT: Flashes when any configuration differs from the switch setting.
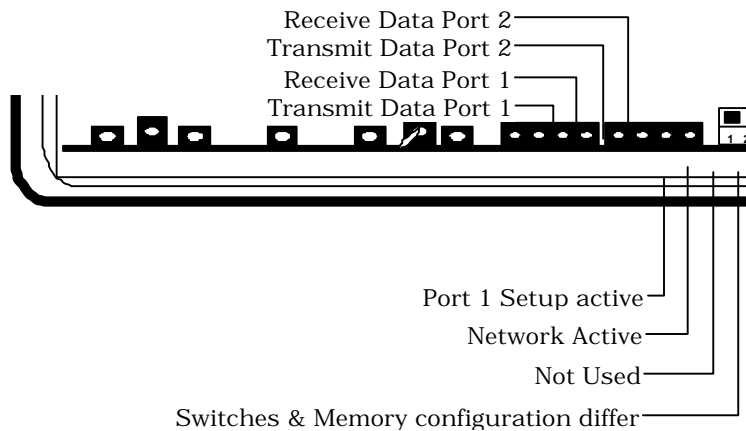
Figure 3
Mini LEDs

4.3   Operation

Example Function:

The host end of the system has a host computer or multiple input data streams on the same RS-232 line. This host computer sends commands to the common data line. This data line is split up into multiple lines (by other equipment). Each of the multiple lines feeds a single SPL unit that is connected to end user equipment. The host computer data blocks contain commands to be passed to one and only one of unit of the end user equipment. There may be multiple ports on the SPL, and they are addressed as ports under the unit ID.

Data Block Format:

The data block is a variable length block containing framing information, address information, and the user's data. The block begins with a start of text, STX, character (hex 02) and ends with and end of text, ETX, character (hex 03). Immediately following the STX is a two ASCII character block containing the unit address (ASCII characters "00" through ASCII characters "64".). Immediately following the unit address is a two ASCII character block containing the port address (ASCII characters "00" through ASCII characters "14". These addresses are followed by the user data. The block is terminated with an end of text character (hex 03). Characters 02h and 03h are not allowed in the user's data stream. If the data stream does not conform to proper format, it is discarded.

Block Example:

STX | UNIT_NUMBER | PORT_NUMBER | USER_DATA | ETX

[02h] 1402POWER_ON[c/r]MODE_3[c/r] [03h]

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 unit 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 unit. 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

Like other DCB products, the SPL/DS has help commands to list command options and switch settings. Here is the startup prompt followed by the main help summary:


```
SPL-02 Drop Switch V0.1   ID: Port Selector

AT YOUR COMMAND >> H

 GENERAL COMMANDS              LOCAL
-------------------------- -------
 Help:    Drop Nr............HD
          Port...............HP
 Show:    Port Config........SC
          ID.................SI
          Network Config.....SN
 Change: Port Config........CP
          ID.................ID
          Network Config.....CN
 Activity Counts............AC
 Drop Activity Counts.......DA
 Zero Activity Counters.....Z
 Test Tools.................TT
 Type.......................TY
 Repeat Last Command........*
 Disconnect NMP.............BYE

AT YOUR COMMAND >>
```

5.4.1 HELP Commands

The HD and HP commands show the front panel switch options to set the
drop address and the port data rate, respectively.

```
AT YOUR COMMAND >> HD

 DROP SWITCH ADDRESS
------------------------------

    SWITCH           SWITCH           SWITCH           SWITCH
D# 1 2 3 4 5 6   D# 1 2 3 4 5 6   D# 1 2 3 4 5 6   D# 1 2 3 4 5 6
-- - - - - - -   -- - - - - - -   -- - - - - - -   -- - - - - - -
 0 D-D-D-D-D-D   16 D-U-D-D-D-D   32 U-D-D-D-D-D   48 U-U-D-D-D-D
 1 D-D-D-D-D-U   17 D-U-D-D-D-U   33 U-D-D-D-D-U   49 U-U-D-D-D-U
 2 D-D-D-D-U-D   18 D-U-D-D-U-D   34 U-D-D-D-U-D   50 U-U-D-D-U-D
 3 D-D-D-D-U-U   19 D-U-D-D-U-U   35 U-D-D-D-U-U   51 U-U-D-D-U-U
 4 D-D-D-U-D-D   20 D-U-D-U-D-D   36 U-D-D-U-D-D   52 U-U-D-U-D-D
 5 D-D-D-U-D-U   21 D-U-D-U-D-U   37 U-D-D-U-D-U   53 U-U-D-U-D-U
 6 D-D-D-U-U-D   22 D-U-D-U-U-D   38 U-D-D-U-U-D   54 U-U-D-U-U-D
 7 D-D-D-U-U-U   23 D-U-D-U-U-U   39 U-D-D-U-U-U   55 U-U-D-U-U-U
 8 D-D-U-D-D-D   24 D-U-U-D-D-D   40 U-D-U-D-D-D   56 U-U-U-D-D-D
 9 D-D-U-D-D-U   25 D-U-U-D-D-U   41 U-D-U-D-D-U   57 U-U-U-D-D-U
10 D-D-U-D-U-D   26 D-U-U-D-U-D   42 U-D-U-D-U-D   58 U-U-U-D-U-D
11 D-D-U-D-U-U   27 D-U-U-D-U-U   43 U-D-U-D-U-U   59 U-U-U-D-U-U
12 D-D-U-U-D-D   28 D-U-U-U-D-D   44 U-D-U-U-D-D   60 U-U-U-U-D-D
13 D-D-U-U-D-U   29 D-U-U-U-D-U   45 U-D-U-U-D-U   61 U-U-U-U-D-U
14 D-D-U-U-U-D   30 D-U-U-U-U-D   46 U-D-U-U-U-D   62 U-U-U-U-U-D
15 D-D-U-U-U-U   31 D-U-U-U-U-U   47 U-D-U-U-U-U   63 D-U-U-U-U-U

NOTE: D means switch DOWN and U means switch UP

AT YOUR COMMAND >> HP
PORT CONFIG SWITCH
------------------------------
   6    7    8     RATE
 --- --- ---   -----
 UP--UP--UP    19200
 DWN-DWN-DWN    9600
 DWN-DWN-UP     4800
 DWN-UP--DWN    2400
 DWN-UP--UP     1800
 UP--DWN-DWN    1200
 UP--DWN-UP      300

AT YOUR COMMAND >>
```

5.4.2 SHOW Commands

The Show Config (SC) command lists the current settings for all ports in the local unit. The port data rate is set by the front panel switch or with the Config Port (CP) command. If the current data rate differs from the front panel setting, an asterisk (*) is displayed before the port rate as shown below:

```
AT YOUR COMMAND >> SC
 SHOW PORT CONFIG
 ------------------------------

 PORT   Port ID            RATE
 ----  ----------------- -------
   1    Port #1             9600
   2    Port #2           *19200
 NOTE: (*) means config differs from switch.
AT YOUR COMMAND >>
```

The Show ID (SI) command lists all of the ports and any current ID's assigned to those ports. Because this firmware keeps track of counts for ports beyond the ones present in the unit, all 14 ports are shown in with the SI command and the last column indicates whether the port is physically present. The ID command lets you set any port ID, even if that port is not physically present. As in other DCB products, the ID strings are limited to 15 characters, maximum, and they can be upper/lower case.

```
AT YOUR COMMAND >> SI

 SHOW ID
 -------------------------------
 PORT SWITCH ID: Port Selector

 PORT   PORT ID          PORT PRESENT
 ----  ----------------- ------------
   1    Port #1            YES
   2    Port #2            YES
   3    Port #3            no
   4                       no
   5                       no
   6                       no
   7                       no
   8                       no
   9                       no
  10                       no
  11                       no
  12                       no
  13                       no
  14    Port #14           no
```

The Show Network Config (SN) command shows the current network data rate setting; there is no other network port option. In addition, this command indicates whether any network activity has been detected in the past 60 seconds or so.   Network activity is detected even if the protocol message is for a different drop number, however only valid protocol messages trigger the active network status message.

```
AT YOUR COMMAND >> SN

 SHOW NETWORK CONFIG
 ------------------------------
 ASYNC MODEM: 38,400 bps
 NO Network activity detected...

AT YOUR COMMAND >> SN

 SHOW NETWORK CONFIG
 ------------------------------
 ASYNC MODEM: 38,400 bps
 Network activity detected...

AT YOUR COMMAND >>
```

5.4.3 CONFIG Commands

The Change Port Config (CP) command works as it does in all other DCB products except that the only port configuration option is the port rate.

```
AT YOUR COMMAND >> CP

CHANGE PORT CONFIG
 ------------------------------
 Select Port #(s)

 Examples:
   1     = Port 1
   1,2,6 = Ports 1,2, & 6
   1-6   = Ports 1 to 6
   ALL   = All Ports
   RESET = Read Switches

 Enter PORT #(s) >> 1

 PORTS:
 1
```

```
 Port RATE: 300, 1200, 2400, 4800, 9600, 19200
Enter NEW Rate >> 24

Use "SC" to see changes.

AT YOUR COMMAND >>
```

Note that the short hand version of the CP command is also available in this firmware:

```
AT YOUR COMMAND >> CP2;24

 PORTS:
 1

Use "SC" to see changes.

AT YOUR COMMAND >>
```

The Change ID (ID) command is used to set both the local mux ID and the port ID's.   These ID strings are used in the Show Config (SC) and the Activity Counts (AC) screens to help identify the devices attached to each port.

```
AT YOUR COMMAND >> ID

 CHANGE ID
------------------------------
 Enter "D" for Drop or "P" for Port >> D

        DROP ID:
 Enter NEW ID >> Unit #1

AT YOUR COMMAND >> ID

 CHANGE ID
------------------------------
 Enter "D" for Drop or "P" for Port >> P

 Enter PORT # >> 1
        PORT ID:
 Enter NEW ID >> Port #1

 Enter PORT # >>
```

The Config Network (CN) command sets the common channel serial data rate. The factory default setting for the network rate is 9600 bps.


```
AT YOUR COMMAND >> CN

 CONFIG NETWORK
 ------------------------------
 ASYNC MODEM: 9,600 bps

New ASYNC rate? [1200/2400/4800/9600/19200/38400] >> 38
 ASYNC MODEM: 38,400 bps

AT YOUR COMMAND >>
```


5.4.4 ACTIVITY Counts

The Acitivity Counts (AC) screen shows the number of protocol messages received on the network and transmitted to each of the ports. As a trouble shooting aid, the AC command shows protocol messages received for ports that are not physically present in the unit. A non-zero count on one of these ports suggests that some process at the host site does not know that this port is missing.

Note that the Network Error count is incremented when an overrun or framing error occurs on the network port, and when an invalid protocol message is received from the network. Invalid protocol messages include any string that starts with <STX> and has an invalid drop number or an invalid port number.

```
AT YOUR COMMAND >> AC

 BLOCKS    RECVD    ERROR      Last Cleared: 2 days, 3 hrs, 45 min
           ------- -------
 NETWORK    1446       5

 PORT  ID                 RECVD  PORT PRESENT
 ----  ------------------ ------ -----------
   1   Port #1              720  YES
   2   Port #2              720  YES
   3   Port #3                0  no
   4                         0  no
   5                         0  no
   6                         0  no
   7                         0  no
   8                         0  no
   9                         0  no
  10                         0  no
  11                         0  no
```

```
 12                           0    no
 13                           0    no
 14    Port #14               6    no

NOTE: Use the Z command to Zero Counters.

AT YOUR COMMAND >>
```

The Drop Activity (DA) screen shows the number of protocol messages
received on the network for all valid drop addresses. An asterisk (*)
indicates this unit's drop number in the summary.


```
AT YOUR COMMAND >> DA

 DROP ACTIVITY
 ------------------------------
 DROP   RCVD    DROP   RCVD    DROP   RCVD    DROP   RCVD
 ----  -------  ----  -------  ----  -------  ----  -------
    0        6    16        0    32        0    48        0
    1        0    17        0    33        0    49        0
    2        0    18        0    34*    1446    50        0
    3        0    19        0    35        0    51        0
    4        0    20        0    36        0    52        0
    5        0    21        0    37        0    53        0
    6        0    22        0    38        0    54        0
    7        0    23        0    39        0    55        0
    8        0    24        0    40        0    56        0
    9        0    25        0    41        0    57        0
   10        0    26        0    42        0    58        0
   11        0    27        0    43        0    59        0
   12        0    28        0    44        0    60        0
   13        0    29        0    45        0    61        0
   14        0    30        0    46        0    62        0
   15        0    31        0    47        0    63        6

AT YOUR COMMAND >>
```

The Zero Counts (Z) command clears all of the activity and error counts.
When the counters are cleared, the "Last Cleared" time is also reset so that
any time the AC command is executed we will know how long the counters
have been running since last cleared.

```
AT YOUR COMMAND >> Z
*** Activity Counters Cleared

AT YOUR COMMAND >>
```

5.4.5 TYPE Command

The Type (TY) command summarizes information about the local unit. Note that we have a new Uptime indication instead of the last reset date and time. The Uptime report is cleared every time the unit is reset.

```
AT YOUR COMMAND >> TY

 LOCAL Type: SPL Drop Switch
       Ports:  2
     Drop Nr: 34
     Version: 0.1
     Drop ID: Unit #1
      Uptime: 2 days, 3 hrs, 45 min

AT YOUR COMMAND >>
```

5.4.6 TEST TOOLS

The Test Tools (TT) screen shows commands that are available for testing.

```
AT YOUR COMMAND >> TT

 TEST TOOLS                   LOCAL
 ------------------------- -------
 Capture Port...............CA#
 Monitor Network............MN
         Port RX............MR#
 NMP Parity.................P
 Reset PORT SWITCH..........RESET

AT YOUR COMMAND >>
```

5.4.7 CAPTURE Command

The Capture Port (CA) command enables the terminal connected to the network management port to send keyboard characters to any port. Because the SPL/DS is receive only, the characters typed when CA is active are echoed to the network management port, and the CR character transmitted and echoed as a CR/LF pair.

```
AT YOUR COMMAND >> CA2

*** CA Port:  2.  Type ESC ESC to Stop
This is a test message for Port 2 with local echo...
```

5.4.8 MONITOR Network

The Monitor Network (MN) command sends all of the characters received on the network port to the network management port in addition to processing the messages normally. Note that the network management port receives the raw characters whether valid protocol messages are detected or not. In addition, when MN is active, the <STX> and <ETX> characters received from the network port are reported as strings instead of ASCII 02 and 03 to make decoding the protocol somewhat easier. In the following example, a QBF message is captured for port 2 on drop 34.

```
AT YOUR COMMAND >> MN

*** Monitor Network RX.  Type ESC ESC to Stop
<STX>3402The quick brown fox jumps over the lazy dog
0123456789 [000]
<ETX>

AT YOUR COMMAND >>
```

5.4.9 MONITOR Receive

The Montor Receive (MR) command sends the characters going to a selected port to the network management port, as well. Note that here we do not see the <STX>, <ETX>, or drop/port addresses since they have been stripped before the protocol message is passed to the port buffer.

```
AT YOUR COMMAND >> MR2

*** Monitor Port:  2-RX.  Type ESC ESC to Stop
The quick brown fox jumps over the lazy dog 0123456789 [000]

AT YOUR COMMAND >>
```

6.   INTERFACE SIGNALS and CABLING
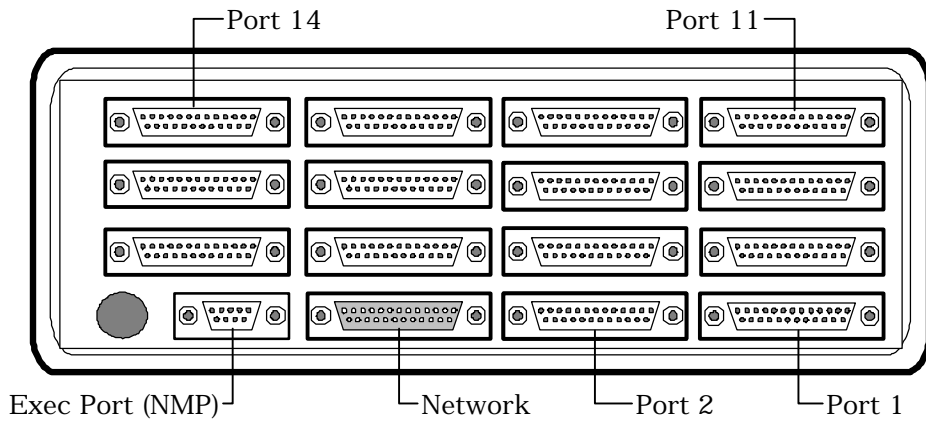
6.1   Connector Location and Pin Reference

Figure 4
Connector Location - Rear View
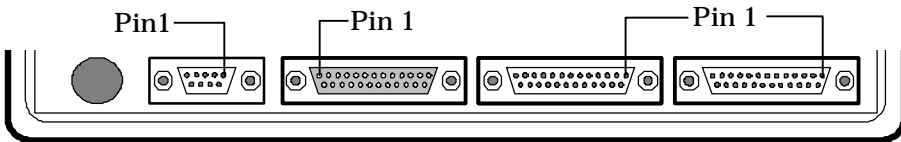
Figure 5
Connector Pin Reference

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


```
        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
```
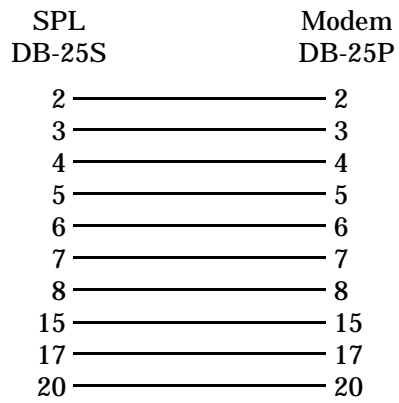

6.3.2   Data Ports

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)
```
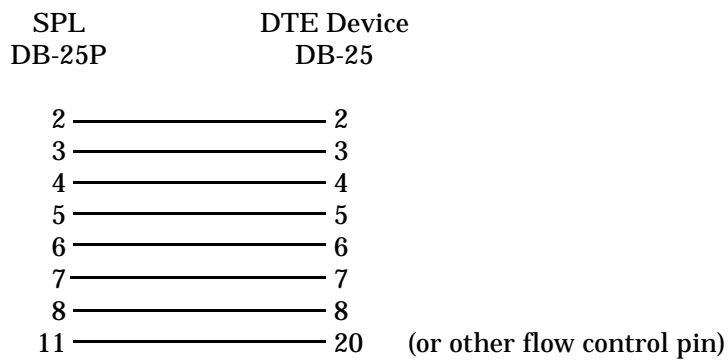
6.3.2 Data Ports, continued

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
```
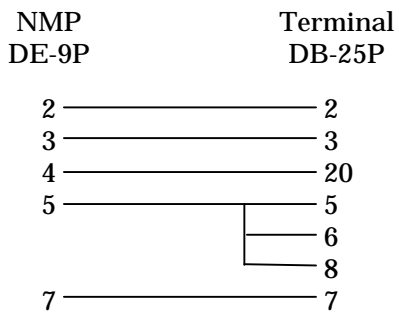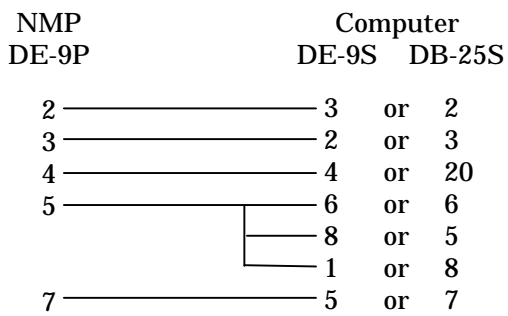
To a dial-up MODEM for remote access

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

   2 ————————————————— 3
   3 ————————————————— 2
   4 ————————————————— 8
   5 ————————————————— 4
                    └— 20
   7 ————————————————— 7
```
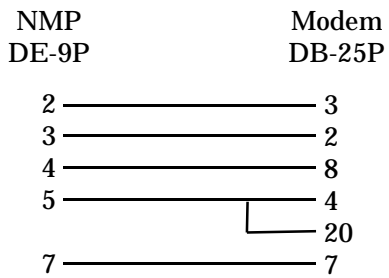
7.   TROUBLESHOOTING

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. If one port is not functional and all others are working, it is a completely different problem than if all ports are non-functional.

2. Determine what events immediately preceded the problem.
    - Was equipment moved or reconfigured?
    - Were any cables moved or replaced?
    - Were there any reported telephone problems?
    - Were there recent storms or electrical interruptions?
    - Is this a new circuit or was the equipment previously working?

3. Draw a picture of the system showing the equipment at both the host and remote ends and the phone line. Use this as a reference to note your observations.

4. Record the front panel indications before changing anything.

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

6. Use the built-in test functions, especially the loopback tests.

7.2   Troubleshooting Units

When troubleshooting a unit link it is important to understand the overall function of the equipment. The units communicate over a telephone line using modems or DSU/CSUs. If a modem or the telephone line fails, the units will be unable to communicate and the link will be down. When this happens, none of the terminals at the remote site will work. In this case, troubleshoot the modems and telephone line. See paragraph 7.3.

If only some remote terminals are having problems then the units may be at fault. Paragraph 7.4 provides guidance for troubleshooting faulty terminals and printers. For further assistance contact DCB Customer Support at (217) 352-3207. Technicians are available between 8:00 am and 5:00 pm central time to assist you.

7.3   Troubleshooting Modems or DSU/CSUs

If none of the remote terminals work, the problem is probably with the modems, DSU/CSUs or the telephone line or an incorrect drop setting in the unit. Check to see if the modems have the Carrier Detect (CD, DCD) light on. If not, reset the modems. If this does not resolve the problem contact the telephone company and have the line checked.

If the phone company says the line is okay and Carrier Detect is still not on, the modem may be bad. Replace the modem that has DCD on (it provides carrier to the other modem) and try the circuit again. If DCD is off on both modems, contact DCB for assistance.

7.4   Troubleshooting connected devices

These problems typically fall into two categories:

1.   The terminal device gets no data
2.   The terminal gets "garbage"

When a terminal or device gets no data, check to see that the cables are wired correctly and that the drop number is correct. Use the testing tools available from the network management menu to send test messages and monitor the incoming data.

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

7.5   In all cases, use the test tools such as Monitor port Rx, Monitor Network, Capture port, and Drop Activity to gain visibility into the system.

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. 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 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.

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