# Broadcast Polling
# FRAD

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## 1.    DESCRIPTION

The DCB Broadcast Polling Frad (BPF) is a FRAD (Frame Relay Access Device) for frame relay networks that will accommodate most byte oriented async polling protocols and allow those protocols to be transported over a synchronous frame relay multi-point network. The BPF encapsulates async polling protocols into frame relay format for private or public frame relay networks.

The BPF is easily configured. A host BPF port is simply mapped to the remote DLCIs that will receive the host polling data.  No knowledge of the system's internal polling protocols is required.

The BPF makes it easy to convert async polling networks from multi-point modems to frame relay.  Low cost analog lines for polling modems are disappearing from the market place at the same time async polling systems are requiring more bandwidth as their requirements move from 1200 to 9600 bps and faster.  As remote terminal units become more capable, more data must be exchanged from the host to the remote units for financial, traffic and SCADA networks.  The BPF is the ideal product for this requirement.  It supports async port speeds up to 57.6 Kbps and synchronous frame relay composite speeds to 128 Kbps.

BPF host units can have from one to sixteen ports.  Remote units are usually single port hardware.  The four port unit can be used at a remote location where there is more than one remote terminal unit (RTU).  Host units can have more than one DLCI per port and can have more than one port mapped to the same DLCI.
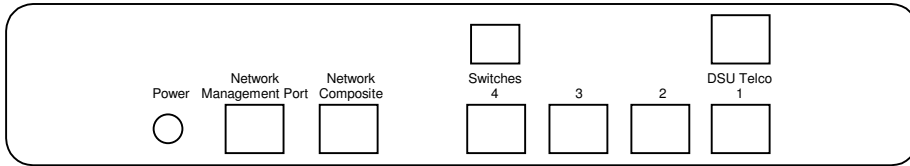
The BPF is configured using a network management port or port one of any unit using an asynchronous terminal or PC with terminal emulation software.  BPF configurations are kept in non-volatile memory.

Some features of the BPF include:
- 1, 4, 8 or 16 port units available.
- Monitor functions allow network management port user to monitor transmit or receive of any data port.
- Many test features allow diagnostics of the system and the communications link.
- Power supplies available for 120 and 240 VAC; 12, 24, 48 and 125 VDC.

Options:
- Built-in 56 Kbps DSU/CSU.
- Rack mount options available.

## BROADCAST POLLING FRAD

TXD   RXD   RTS   CTS   DCD   TEST

POWER ACTIVITY LINE ERROR MODEM READY PORT 1 SETUP LOOPBACK
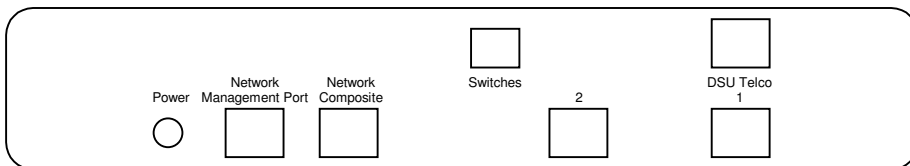
LOOPBACK   SETUP   RESET

*DCB*

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Power   Network Management Port   Network Composite   Switches 4   3   2   DSU Telco 1

BPF-04 with optional built-in DSU/CSU

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Power   Network Management Port   Network Composite   Switches   2   DSU Telco 1
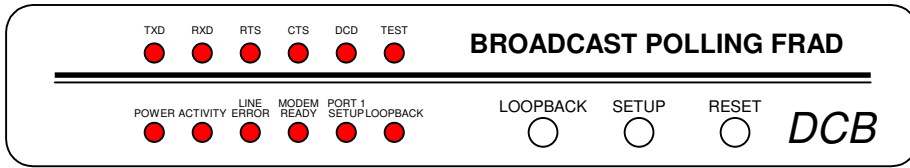
Conitel BPF-02 with optional built-in DSU/CSU

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Application:

Frame relay point to multipoint for async polling protocols. The 1 or 4 port BPF is used at the remotes in conjunction with a 1, 4, 8 or 16 port BPF at the host. A maximum of 42 DLCIs can be configured per BPF port.

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## 2.    SPECIFICATIONS

2.1      Product

2.1.1    Data Ports

Port Speeds
   Asynchronous only
   300, 1200, 2400, 4800, 9600, 19,200, 38.4 or 57.6 Kbps

Port Rate Selection
   Selected per port through network management port control
   with an asynchronous terminal.

Data Format
   10 bits/character, 1 start, 1 stop, 8 data (including parity)
   Special firmware is available for 8 data bits plus a parity bit.

Interface
   CCITT V.24, RS-232D, implemented in RJ-45, 8 position
   connectors.  (EIA-561 standard physical pin-out used on RJ-
   45 connectors)

2.1.2    Composite Port

Full Duplex

Speed
   Synchronous up to 128 Kbps

Interface
   RS-232D, implemented in RJ-45, 8 position connector

2.1.3    Protocols

Supports DNP3, Modbus and other asynchronous byte oriented
protocols

Special firmware available for 31 bit Conitel protocol

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2.1.4    Network Management Port Commands

       Show Port Configuration
       Show Port Map
       Show Frame Relay Status
       Change Port Configuration
       Change Port Map
       Change Delay Timeout
       Change BPF Options
       Change Frame Relay Configuration
       Configure Internal DSU  (8 and 16 port units only)
       Show / Change ID
       Set NMP Password
       Show Activity Counters
       Zero Activity Counters
       Test Tools
           Monitor Port Tx
           Monitor Port Rx
           Monitor Network Status
           NMP Parity
           Ping DLCI
           Reset BPF
       Type
       Repeat Last Command
       Disconnect NMP


2.2      Environmental

       Operation:  -40 to +70° C, 10 to 95% relative humidity
       Storage:    -40 to +85° C, 10 to 95% relative humidity


2.3      Physical / Electrical

       10¼" W x 9¾" D x 2½" H
       120 VAC external power supply
       Optional 240VAC power supply available
       30 watts, .25 amps


2.4      Optional Built-In DSU/CSU Specifications
       Compatible with Common Carrier digital signalling
       56 Kbps
       4 wire digital line
       Can be used as high speed 4 wire line driver

## 3.    INSTALLATION

### 3.1    Unpacking

Remove the BPF from the shipping container and examine it carefully for external damage. If shipping damage is apparent, notify the shipper immediately.

The following accessories are included with each BPF:

- external power supply
- manual
- warranty, maintenance contract and repair information
- Modem to Composite cable (black) for connecting the BPF to an external DSU/CSU
- Network Management Port cable (green) for connecting the BPF network management port to an asynchronous terminal or PC for configuration
- If your unit has the optional built-in DSU/CSU, a cable is included for connection to the phone line.


### 3.2    Setup

The frame relay options for the BPF can be configured using the Frame Relay (FR) command from the network management port. The configurable parameters are:

Management (Type) - Auto, LMI, Annex D or None
Poll Interval - (5-30 sec)
Full Status Interval - (1-255 polls)


### 3.2.1    Management Type

When set to AUTO, the BPF will automatically determine the correct management type for your network.


### 3.2.2    DLCI

In a point-to-multipoint environment, the host BPF must be mapped using the DLCIs that correspond to each remote location.  Your service provider should supply you a list of DLCIs for your network. These should match the DLCIs listed on the last line of the Show Status (SS) command screen of the BPF.

### 3.2.3 Poll Interval

The poll interval determines how often a "keep alive" frame is sent to the network. The default is 10 seconds. This is adequate for most installations.

### 3.2.4 Full Status Interval

The full status interval determines how often a full status request is sent to the network. The default is 6 polls. So every sixth poll will be a full status request.

### 3.3 Connecting the DSU/CSU

Connect the DSU/CSU to the phone line and power ON the DSU/CSU. Confirm the presence of carrier at each DSU/CSU. If carrier is not detected at both ends, recheck the option settings. If carrier is still not present, check the cable from the telephone line to the DSU/CSU. If everything is correct and still no carrier call the manufacturer of the DSU/CSU or contact the telephone company for assistance.

Connect the BPF composite port to the DSU/CSU using the Modem to Composite cable supplied.

Connect the BPF to power. The Power and Modem Ready indicators on the front panel of the BPF should be ON indicating the on-line condition. (See Section 4). This may take up to one minute. If Modem Ready continues to flash, the BPF was unable to connect to the local frame relay network. Use the SS command to see if the network is responding to Full Status and Keep Alive messages. If not, contact the telephone company for assistance.

### 3.4 Optional Built-In 56 Kbps DSU/CSU

The optional DSU/CSU in 1 or 4 port units is configured using DIP switches accessable from the rear of the unit. See Section 4 for a description and location of these switches. The default settings should be correct for most applications.

The optional DSU/CSU in 8 or 16 port units is configured using the CN command. See Section 5 for a description of this command. The default setting is 56K, Standard Clock.

For line driver applications over customer owned wire set one unit for Master (Line Driver 56) Clock and the other unit to Slave (Standard) Clock.

3.5     Managing the frame relay links

Use the network management port of the unit. Connect the NMP to an ASCII terminal or PC terminal program using the supplied green management cable and connectors. See Section 5 for more information.

Look at the SS status screen. The number of keep alives sent and received should be the same, as well as the number of full status messages. The counters can be zeroed with the Z command.

The BPF sends a keep alive or full status inquiry every 10 seconds. One full status is sent for every 5 keep alive requests. The frame relay vendor equipment responds to each keep alive request and full status request.

Full status responses from the frame relay vendor include the DLCI addresses assigned to the frame relay drop. The BPF reports these addresses on the SS status screen.

If the keep alive and full status messages are sent and received in equal numbers as shown on the SS screen, the frame relay circuit should be up and operational. This is not, by itself, however, a guarantee that the complete frame relay network is up, since the keep alive and full status management messages are only from the customer equipment to the nearest frame relay switch port. The link at the far end must also be up for the circuit to be complete.

3.6     Cabling

Cabling between the BPF and the computer ports or terminal devices (RTUs) is a common source of installation problems. The BPF must have data from attached terminal devices or computer ports, as an input on position 6 of the RJ45 connector. Data from the BPF to any attached equipment will be transmitted on position 5 of the RJ45 connector. See Section 6 for position locations on the RJ45 connector.

See Section 6 to determine the correct cables for your computer and terminal devices.

3.7     Using AT Port Dialing

A new port AT-Dial feature allows an operator on one BPF unit to connect to a port on a remote BPF using AT-like commands.

AT-Dial is enabled on a per-port basis using the CP command. Note that the CP command has two new configuration parameters, AT and DP, for AT-Dial and Data Port operation, respectively. The SC command shows the current status. AT enabled ports do not have to

be mapped to a DLCI.  Since AT-Dialing requires DLCI+PORT mapping to be enabled, this mode is enabled automatically when AT-Dialing is enabled on any port.

Also note that the new CO command includes options to enable AT Verbose Response mode (default on) and AT Local Echo (default on). These settings are not implemented on the ports themselves; you must use CO to enable these features.  If verbose response is set to off, numeric result codes are sent.  The following table shows the numeric and verbose result codes and their meanings.

| Numeric | Verbose | Meaning |
|---------|---------|---------|
| 0 | OK | Command accepted. |
| 1 | CONNECT | Connected to remote port. |
| 3 | NO CARRIER | Port disconnected at remote, still in command mode. |
| 4 | ERROR | Illegal DLCI or port number. |
| 7 | BUSY | Remote port DTR not asserted. |
| 8 | NO ANSWER | Remote port not AT enabled or port does not exist. |

When a port has AT-Dialing enabled, it acts like a simple dialup modem.  Data port pin 3 is the DTR signal.  When DTR turns ON the port is enabled in AT command mode.  To connect to a remote port, a dial command is sent to the port in the form <ATD> <DLCI> <Space> <Port number>.  Dial command formats include ATD16 3 and ATDT16 3.

When this command is received, the BPF transmits a connect protocol message to the remote DLCI and port number.  If the remote port has DTR turned ON, a "CONNECT" message is sent to the local port, DCD turns ON, and the data connection begins.  If the remote port DTR is OFF, a "BUSY" message is sent to the local port, and the port remains in command mode.

The active data connection can be disconnected by dropping the local or remote DTR input, or by transmitting <+++> (OK) <ATH><Enter>. "OK" is sent to the local port when the connection is dropped.

3.8    Resetting Factory Defaults

The factory default settings for the BPF are as follows:

Frame Relay:
    Line                    Single BPF
    Management              Auto
    Poll Interval           10 sec
    Full Status Interval    6 polls

BPF Options:
    DLCI+Port Mapping    OFF
    Extended Frame ID    Disabled

Data Ports:
    Loop                 OFF
    Rate                 9600
    Type                 Data
    DCD to RxD delay     10ms
    DCD holdover delay   2ms

To reset the unit to factory defauls use the !R command from the network management port or perform the following steps using the front panel switches:

1.    Depress and hold the PORT 1 SETUP switch while depressing the RESET switch.

2.    Be sure to continue to hold the Port 1 Setup switch until its LED has gone OFF and returned ON.

3.    Release and depress the Port 1 Setup switch again to return management control to the network management port.

4.    All port settings should be at the factory defaults. Use the SC (Show Configuration) command to check the port settings.

# 4.    CONTROLS AND INDICATORS

## 4.1    BPF 1 and 4 Port Units
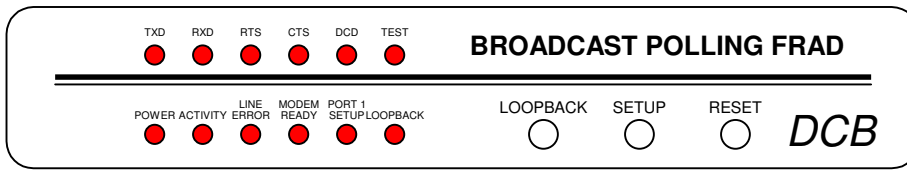


### 4.1.1   Front Panel Switches (shown with built-in DSU)

Setup – Maps the network management port commands to the terminal attached to data port 1.  When Port 1 Setup is active, the indicator is on.

Loopback – The loopback function is disabled in this product.

Reset – Performs a hardware reset of the BPF.

### 4.1.2   Optional Built-In DSU Switches

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.
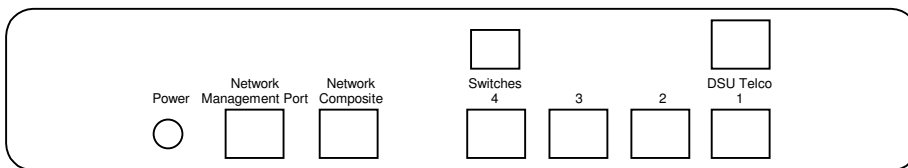
For normal operation with a telephone company line, set the DSU for SLAVE clock timing (switch position 2 DOWN).  For in-house line driver applications (56K only), set the host DSU for MASTER timing (switch position 2 UP).  The remote unit should remain set for Slave clock.

### 4.1.3    Optional DSU/CSU Indicators

| | | |
|---|---|---|
| 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 BPF. |
| | OFF | No RTS from the BPF. |
| CTS | Follows RTS | CTS signal to the BPF. |
| DCD | ON | Normal condition. |
| | OFF | No carrier signal received from the far end. |
| TEST | ON | Unit is in loopback (DIP switch 5 UP) |
| | Flashing | Telephone line is in loopback. |

## 4.2    BPF 8 and 16 Port Units



### 4.2.1    Front Panel Switches

Port 1 Setup – Maps the network management port commands to the terminal attached to data port 1.  When Port 1 Setup is active, the indicator is on.

Loopback – The loopback function is disabled in this product.

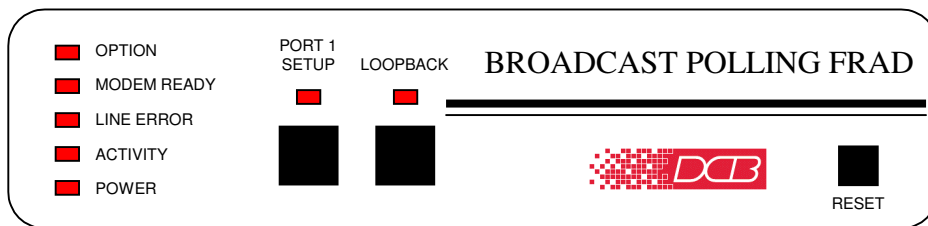Reset – Performs a hardware reset of the BPF.

4.3     BPF Indicators (all units)

POWER – is ON when the BPF is connected to power.

ACTIVITY – ON whenever data is transmitted from the unit.

LINE ERROR – not used

MODEM READY:

ON – Data Carrier Detect is present from the composite link
device indicating an active composite link.

SLOW FLASHING – The BPF has lost communication with the
local frame relay network.  There is no response to Keep Alive
or Full Status requests.

OFF – Data Carrier Detect is not present from the composite
DSU/CSU indicating a problem with the composite link.

PORT 1 SETUP – is ON when the network management port
functions have been mapped to data port 1 by depressing the
front panel switch. To return these functions to the network
management port, depress the front panel switch again.

LOOPBACK – The loopback function is disabled in this product.

## 5.    NETWORK MANAGEMENT PORT

5.1     Introduction

The Network Management port (NMP) is used to configure the BPF
for proper operation.  This connection must be used to configure and
map the data ports.  The NMP can also be used to configure remote
BPF ports after a link is established between the host and remote
sites.


5.2     Connections and Setup

Connection to the NMP is made either through a port on the rear of
the BPF 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 BPF.  A switch located on the front panel
performs this function.  See paragraph 4.1.1 for information.


5.2.2   Dedicated Terminal or PC

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 green cable provided and the
appropriate adapter for either a terminal or PC.  Set the terminal
device for 9600 bps, 8 data bits, no parity, one stop bit and no flow
control.


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 (H or ?)


| COMMAND | | LOCAL | REMOTE | PARAGRAPH |
|---|---|---|---|---|
| Show: | Config | SC | RSC# | 5.4.2 |
| | Port Map | SM | RSM# | 5.4.3 |
| | FR Status | SS | RSS# | 5.4.4 |
| Change: | Port Config | CP | RCP# | 5.4.5 |
| | Port Map | CM | | 5.4.6 |
| | Delay Timeout | CD | RCD# | 5.4.7 |
| | BPF Options | CO | RCO# | 5.4.8 |
| | FR Config | FR | | 5.4.9 |
| Config Internal DSU | | CN | | 5.4.10 |
| Set ID | | ID | RID# | 5.4.11 |
| Set Password | | PW | | 5.4.12 |
| Activity Counters/Zero | | AC/Z | RAC#/RZ# | 5.4.13 |
| Test Tools | | TT | | 5.4.17 |
| Type | | TY | RTY# | 5.4.14 |
| Repeat Last Command | | * | | 5.4.15 |
| Disconnect NMP | | BYE | | 5.4.16 |


This Help screen shows the choice of commands available. The commands allow you to display the selected options, configure the BPF, and perform many different diagnostic functions.  The # character in the remote commands represents the DLCI number of a remote BPF unit and must be included with the command.


5.4.2   Show Configuration

The Show Config (SC) command shows the current BPF configuration settings for either the local or the remote (RSC#) unit.  Port numbers may be included with the SC 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 and option configuration.

**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 |

5.4.3    Show Port Map

Show Map (SM / RSM#) displays port mapping for the local or remote BPF.  Each data port can be mapped to as many as 42 remote DLCIs. The DLCI numbers mapped to each port are displayed in numerical order.

5.4.4    Show Frame Relay Status

The Show Status (SS / RSS#) command displays a report of frame relay statistics including error status, keep alive frames sent and received, full status frames sent and received, and a list of all DLCIs assigned to the local frame relay node.

The Z command (Z / RZ#) is used to zero the counters so that current activity can be monitored.

5.4.5    Change Port Configuration

The Change Port Config (CP / RCP#) command sets the data port loopback, rate and port type configuration for each port.  Port type can be Data port or AT Dial port.  Follow the prompts and examples on the screen to select the port(s) and parameter(s) you wish to change.  One or more ports may be set with a single command by selecting a range of port numbers.  The factory default setting is loop off, 9600 bps, Data.

With optional firmware, this command is also used to set ports for 8 data bits plus EVEN, ODD, MARK, or NO parity.

5.4.6    Change Port Map

The CM command is used to map the host BPF data ports to the
selected remote units.  You may ADD or DELETE remote unit DLCIs
to each port as required.  A maximum of 42 DLCIs can be mapped to
a single data port.


5.4.7    Change Delay Timeout

This command (CD) is used to change two timeout parameters, DCD
to Rx data delay and DCD holdover delay.  These delays may be
adjusted to insure data block integrity.


5.4.8    Change BPF Options

The Change Options (CO) command allows configuration of several
optional parameters.  They are:

> DLCI+PORT Mapping – Normally OFF, this setting can be used
> to map ports in other than a 1 to 1 configuration.  This is required
> for AT Port dialing and is automatically turned ON if any port is
> set for AT dialing.  When first enabled, the BPF will
> automatically perform a reset.
>
> Extended Frame ID – Normally DISABLED  Extended frame ID
> is required for some LINUX Frame Relay implementations and
> should never be required in normal TELCO operation.

If any port is configured for AT dialing, the following two parameters
are also available.

> AT Dial Verbose Responses – default is ON, turn this off if you
> wish to receive numeric result codes when dialing.
>
> AT Dial Echo – default is ON, turn this off if you do not wish to
> see commands echoed when dialing.


5.4.9    Change Frame Relay Configuration

The Frame Relay (FR) command is used to set the frame relay
parameters.  A list of current settings is displayed followed by
prompts for new settings.  To change a setting, follow the prompts.  If
the current setting is correct, press <Enter> to leave the setting
unchanged.

5.4.10   Configure Internal DSU (8 or 16 Port Units Only)

The Configure Internal DSU (CN) command is only available when
the optional internal DSU/CSU is installed.  The command is used to
configure the DSU/CSU clock source to standard clock 64 or 56, or
line driver 56.  The default is Standard Clock 56K.


5.4.11   Set ID

The Set ID (ID / RID#) command allows you to set or change the local
or remote BPF identifier.  IDs can be a maximum of 15 characters in
length.  Pressing <Enter> with no entry will leave the ID unchanged.


5.4.12   Set Password

Use the Set Password (PW) command to set a password for access to
the network management port.  The password may be up to 15
characters long and is case sensitive.

When password is active, the user is allowed three attempts and is
then disconnected.

To clear the password, type DELETE at the PW prompt or reset the
unit to defaults as described in paragraph 3.7.


5.4.13   Activity Counts / Zero

The Activity Counts (AC / RAC#) 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.  A range of ports may be
included with this command to reduce the number of ports shown.

The Z command (Z / RZ#) is used to zero the counters so that current
activity can be monitored.


5.4.14   Type

The Type (TY) command displays information about the local BPF
including firmware version, number of ports and unit ID.  The
Remote Type (RTY#) command is used to display similar information
about a remote BPF.

5.4.15   Repeat Last Command

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

5.4.16   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.

5.4.17   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 available from the
command prompt.

| COMMAND | LOCAL | REMOTE | PARAGRAPH |
|---|---|---|---|
| Monitor Port Tx | MT# | | 5.4.18 |
| Monitor Port Tx (HEX) | MTH# | | 5.4.18 |
| Monitor Port Rx | MR# | | 5.4.18 |
| Monitor Port Rx (HEX) | MRH# | | 5.4.18 |
| Monitor Network Status | MS | | 5.4.19 |
| NMP Parity | P | | 5.4.20 |
| Ping DLCI | PING# | | 5.4.21 |
| Reset BPF | RESET | RRESET# | 5.4.22 |

5.4.18   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 BPF.
The Monitor Port RX (MR#) command monitors data received by the
selected port from the corresponding port of the remote BPF.  A local
port number must be included on the command line.  To view the
data in HEX instead of ASCII use the MTH# and MRH# commands.

Using these commands on an active line may cause errors when using
time sensitive protocols.  Use the commands as a quick check to see if
data are being sent over the link.  Do not try to use these commands
as a data line monitor.

When port monitor is active, two ESC characters are needed to end
the test.

### 5.4.19  Monitor Network Status

The Monitor Status command (MS) enables or disables a status
monitor function.  Normal NMP commands are still available while
this monitor is active.  Each entry includes a time stamp which is
initialized to zero when the monitor is enabled.  It may be useful to
note the time of day when enabling this command so actual event
times can be calculated.

The format and items monitored are as follows:

```
*** Monitor Network Status ENABLED.  Use MS again to disable.
DD HH:MM:SS     [report]
00 00:00:00     Monitor started...
00 00:00:01     Network RX error!
00 00:00:02     Network DCD ON!
00 00:00:03     Network DCD OFF!
00 00:00:04     FRAD decode failure!
00 00:00:05     FRAD FECN flag set!
00 00:00:06     FRAD BECN flag set!
00 00:00:07     No KEEP ALIVE response!
00 00:00:08     No FULL STATUS response!
*** WARNING: Monitor is running.  Stop monitor? [Y/N] >> Y
00 00:00:09     Monitor stopped...
```

### 5.4.20  NMP Parity

The NMP Parity command (P) sets the parity for the network
management port.  To change, type P followed by E, O, M or S.  The
factory default is SPACE (8,N,1).

### 5.4.21  Ping DLCI

The Ping DLCI (PING#) command measures the round trip time, to
the selected remote unit, and displays the result in milliseconds.  For
PING to work, the local DLCI must be mapped to a port on both the
host and drop BPF.  This information is useful when troubleshooting
the frame relay network.  Excessive delay may indicate problems with
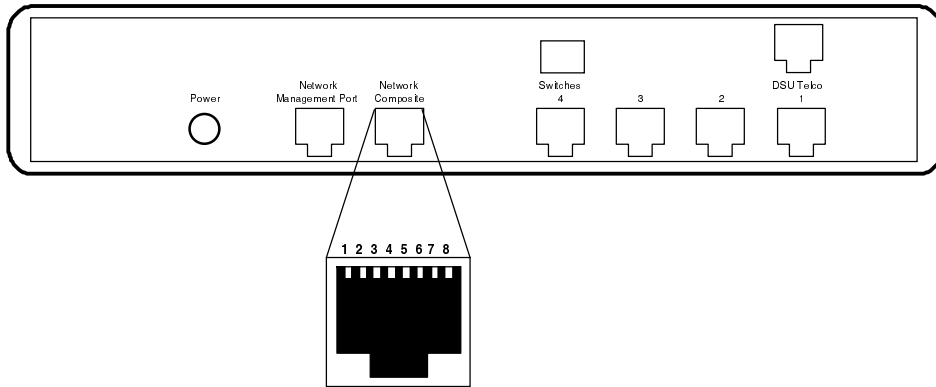the network configuration.

### 5.4.22  Reset BPF

The Reset BPF (RESET) command performs a local BPF reset.  To
reset the remote BPF use RRESET# where # is the DLCI of the
remote BPF unit.

## 6.    INTERFACE SIGNALS AND CABLING

6.1     Connector Location and Pin Reference



BPF-04 Rear Panel and RJ-45 Jacks
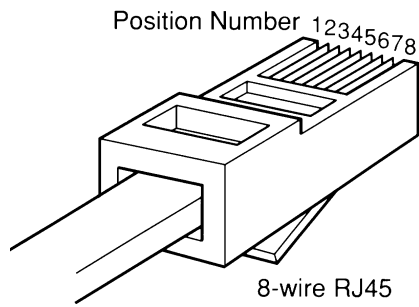


RJ-45 Plug Positions

6.2     Port Interface

6.2.1   Composite Port (RJ-45)

| 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   Data Ports (RJ-45)

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

6.2.4   Optional Built-In DSU Interface (RJ-48S)

| Pin | Signal | In/Out |
|---|---|---|
| 1 | Transmit Data | OUT |
| 2 | Transmit Data | OUT |
| 7 | Receive Data | IN |
| 8 | Receive Data | IN |

6.3     Cables

6.3.1   Composite Port to Modem or DSU

A two-foot modem to composite cable is included with each BPF.  The
configuration is as follows:

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

         1 ───────────────── 17
         2 ───────────────── 15
         3 ───────────────── 8
         4 ───────────────── 7
         5 ───────────────── 2
         6 ───────────────── 3
         7 ─────────────┐    4
                        └─── 20
         8 ───────────────── 5
```
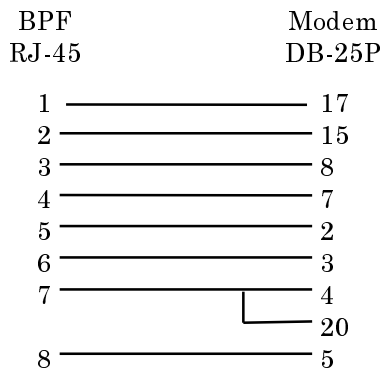
6.3.2   Data Ports to Host Computer

Configured as DTE

```
        BPF                 Computer
        RJ-45               DB-25

         1 ───────────────── 6
         2 ───────────────── 8
         3 ───────────────── 20   (or other flow control output pin)
         4 ───────────────── 7
         5 ───────────────── 3
         6 ───────────────── 2
         7 ───────────────── 5    (or other flow control input pin)
         8 ───────────────── 4    (or 20 if 4 is flow control)
```
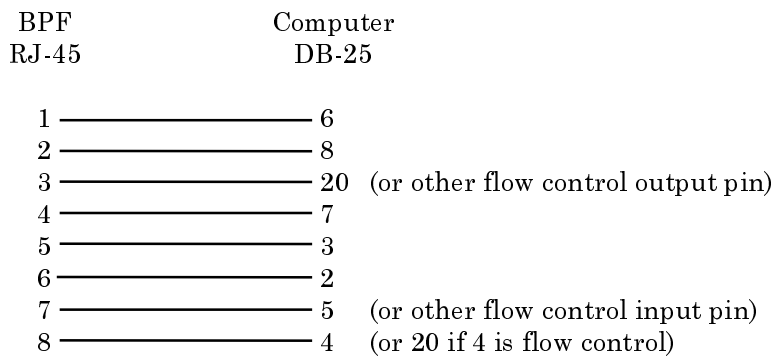
6.3.2    Data Ports to Host Computer, continued

Configured as DCE

```
      BPF                    Computer
      RJ-45                   DB-25

       1
       2 ————————————— 20   (or 4 if 20 is flow control)
       3 ————————————— 5    (or other flow control output pin)
       4 ————————————— 7
       5 ————————————— 2
       6 ————————————— 3
       7 ————————————— 4    (or other flow control input pin)
       8 ————————————— 8
```

To a PC Com Port

```
      BPF                       Computer
      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
```
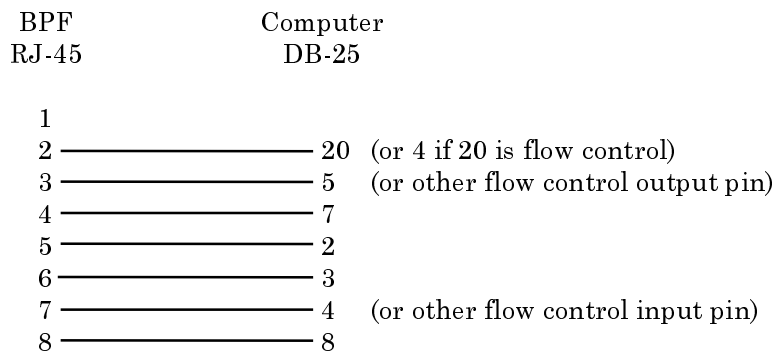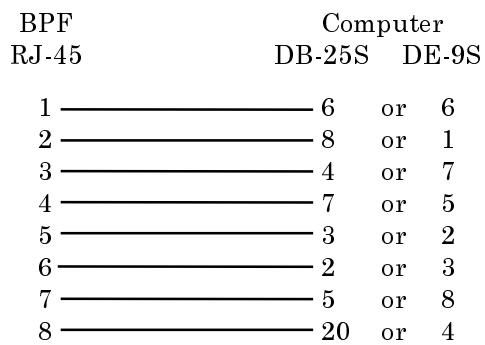
6.3.3    Data Port to ASYNC Polling Modem

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

       1
       2 ————————————— 4
       3
       4 ————————————— 7
       5 ————————————— 2
       6 ————————————— 3
       7
       8 ————————————— 8
```
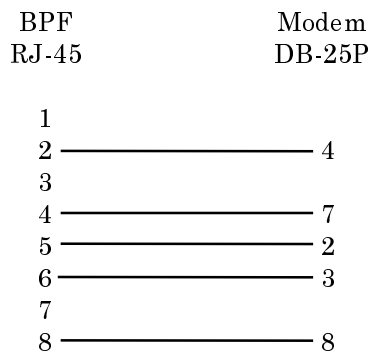
### 6.3.4    Network Management Port

To a TERMINAL

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

         3 ———————————————— 20
         4 ———————————————— 7
         5 ———————————————— 3
         6 ———————————————— 2
         7 ————————————┐  5
                       ├— 6
                       └— 8
         8 ———————————————— 4
```
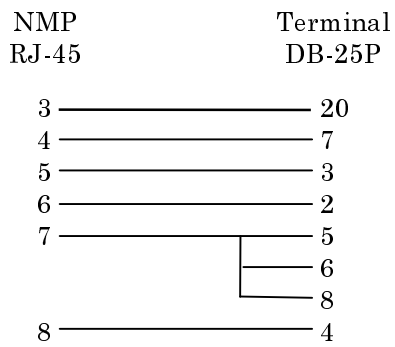
To a PC using terminal emulation

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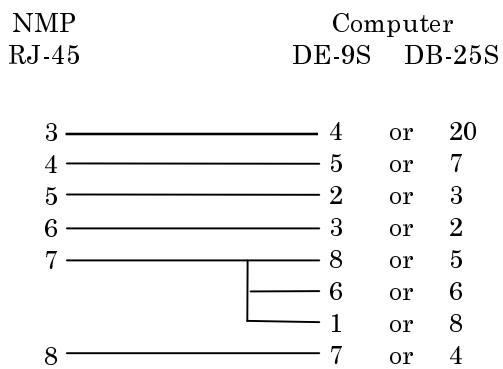
To a dial-up MODEM for remote access

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

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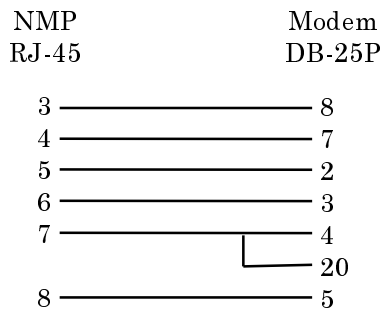
## 7.    TROUBLESHOOTING

### 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 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 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 remote BPF port in loopback and have someone type alpha
characters on the keyboard of the affected terminal.  If the characters
appear correctly on the screen, the port is working.  Next loop the
associated port of the host BPF.  If characters again appear correctly,
the communications link and the ports on both BPFs are working
correctly.  The problem then is with the host computer port or the
cable between the host computer and the BPF.

Port loopbacks can be turned on and off from the Network
Management port of the BPF.  If a NMP terminal is not available,
port loopback can be enabled using the Port 1 Setup function of the
remote BPF.

7.3     Installation Troubleshooting, DSUs

First, set up the DSUs without connecting the BPFs.  The DSUs should be set to constant carrier, also called forced Request To Send, or constant RTS.

Carrier Detect should be ON at both locations.

7.4     Installation Troubleshooting, BPFs

Before trying terminals, make sure the BPFs are able to "see" each other.  Use the RTY# command to verify a response from the remote BPF.  If you get a correct response to RTY#, the link is up and the BPFs are communicating.

7.5     Assistance

If you need assistance troubleshooting your system, contact DCB customer support at (217) 897-6600 between 8:00 AM and 5:00 PM central time Monday through Friday.

# 8. WARRANTY

DCB BPFs are warranted to be free of defects in materials and workmanship for two years.  Data Comm for Business 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:

Data Comm for Business
2949 County Road 1000E
Dewey, IL 61840
ATTN:  your RMA number

Data Comm for Business, Inc.
PO Box 6329
Champaign, IL 61826-6329

Tel        (217) 897-6600
Fax        (217) 897-1331