

# Broadcast Polling FRAD

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8500079

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**1. DESCRIPTION**

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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 DLCI's 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.

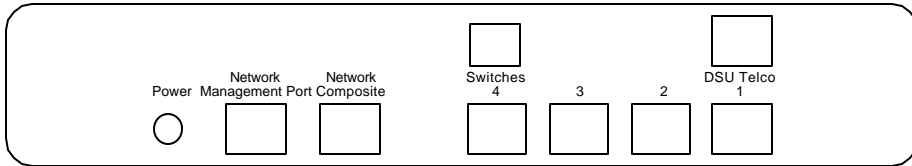
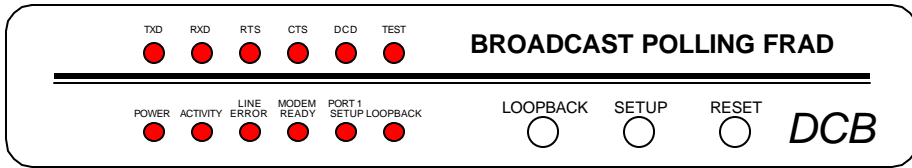
The BPF is configured using a network management port or port one of any unit using an asynchronous terminal or PC with terminal emulation software. BPF configurations are kept in non-volatile memory.

Some features of the BPF include:

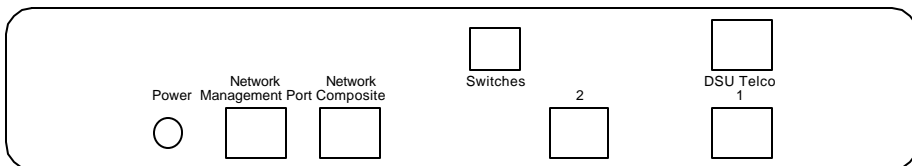
- 1, 4, 8 or 16 port units available.
- Monitor functions allow network management port user to monitor transmit or receive of any data port.
- Many test features allow diagnostics of the system and communications link.
- Power supplies available for 120 and 240 VAC; 12, 24, 48 and 125 VDC.

Options:

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



BPF-04 with optional built-in DSU/CSU



Conitel BPF-02 with optional built-in DSU/CSU

**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. On 8 and 16 port units, up to 20 DLCI's can be configured per BPF port. On 1 and 4 port units, up to 40 DLCI's can be configured per port.

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## **2. SPECIFICATIONS**

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### 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

## 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 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

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## **3. INSTALLATION**

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### 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 accessible 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 Resetting Factory Defaults

The factory default settings for the BPF ports are as follows:

Data Ports:

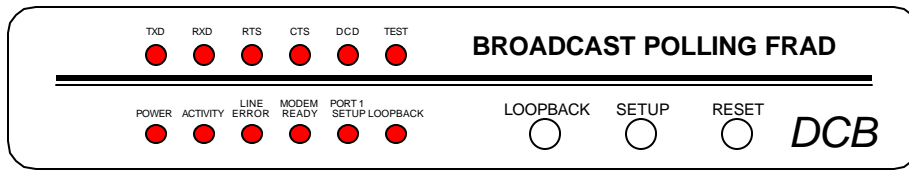
Loop	OFF
Rate	9600
DCD to RxD delay	10ms
DCD holdover delay	2ms

To reset the unit to factory defaults 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.

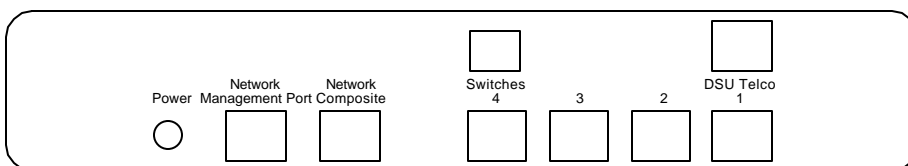
#### 4.1.2 Optional Built-In DSU Switches

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.

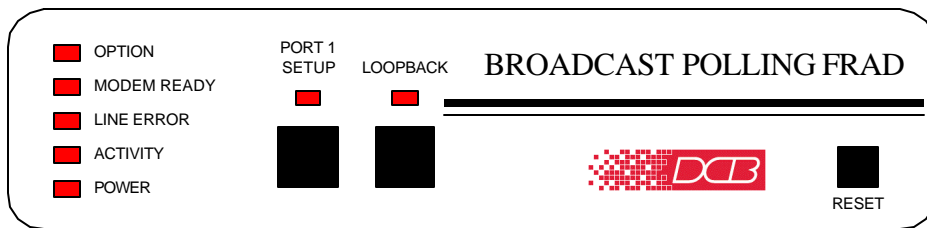


For normal operation with a telephone company line, set the DSU for SLAVE clock timing (switch position 2 DOWN). For in-house line driver applications (56K only), set the host DSU for MASTER timing (switch position 2 UP). The remote unit should remain set for Slave clock.

#### 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.

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.

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## **5. NETWORK MANAGEMENT PORT**

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### 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 ?)

<u>COMMAND</u>	<u>LOCAL</u>	<u>REMOTE</u>	<u>PARAGRAPH</u>
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
FR Config	FR		5.4.8
Config Internal DSU	CN		5.4.9
Set ID	ID	RID#	5.4.10
Set Password	PW		5.4.11
Activity Counters/Zero	AC/Z	RAC#/RZ#	5.4.12
Test Tools	TT		5.4.16
Type	TY	RTY#	5.4.13
Repeat Last Command	*		5.4.14
Disconnect NMP	BYE		5.4.15

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 (Port) Configuration

The Show Config (SC) command shows the current port configuration settings for either the local or the remote (RSC#) 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.

## 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 20 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 and rate configuration for each data 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.

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 20 DLCIs can be mapped to a single data port on 8 and 16 port units. A maximum of 40 on 1 and 4 port units.

#### 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 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.

#### 5.4.9 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 or line driver (56K only). The default is Standard Clock 56K.

#### 5.4.10 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.

#### 5.4.11 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.

#### 5.4.12 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.

#### 5.4.13 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.

#### 5.4.14 Repeat Last Command

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

#### 5.4.15 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.

#### 5.4.16 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.

<u>COMMAND</u>	<u>LOCAL</u>	<u>REMOTE</u>	<u>PARAGRAPH</u>
Monitor Port Tx	MT#		5.4.17
Monitor Port Rx	MR#		5.4.17
Monitor Network Status	MS		5.4.18
NMP Parity	P		5.4.19
Ping DLCI	PING#		5.4.20
Reset BPF	RESET	RRESET#	5.4.21

#### 5.4.17 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.

Using these commands on a 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.

#### 5.4.18 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. 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...
```

#### 5.4.19 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).

#### 5.4.20 Ping DLCI

The Ping DLCI (PING#) command measures the round trip time, to the selected remote unit, and displays the result in milliseconds. This information is useful when troubleshooting the frame relay network. Excessive delay may indicate problems with the network configuration.

#### 5.4.21 Reset BPF

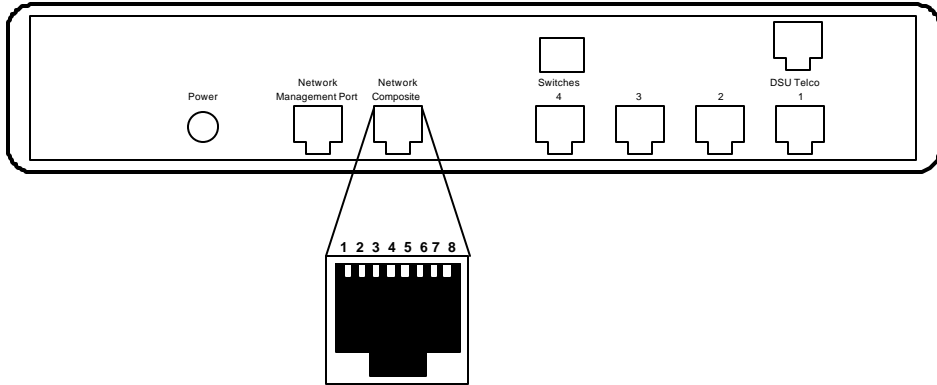
The Reset BPF (RESET) command performs a local BPF reset. To reset the remote BPF use RRESET# where # is the DLCI of the remote BPF unit.

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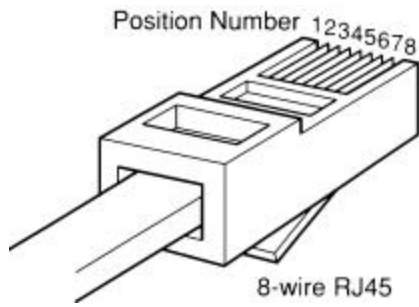
## 6. INTERFACE SIGNALS AND CABLING

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### 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)

<u>Pin</u>	<u>Signal</u>	<u>In/Out</u>
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)

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

### 6.2.3 Network Management Port (RJ-45)

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

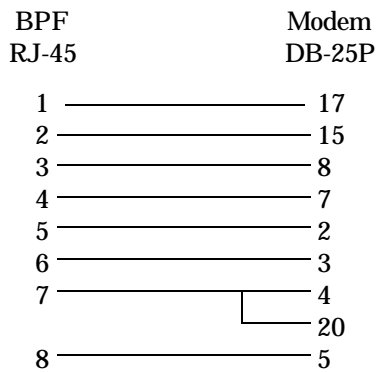
### 6.2.4 Optional Built-In DSU Interface (RJ-48S)

<u>Pin</u>	<u>Signal</u>	<u>In/Out</u>
1	Transmit Data	OUT
2	Transmit Data	OUT
7	Receive Data	IN
8	Receive Data	IN

### 6.3 Cables

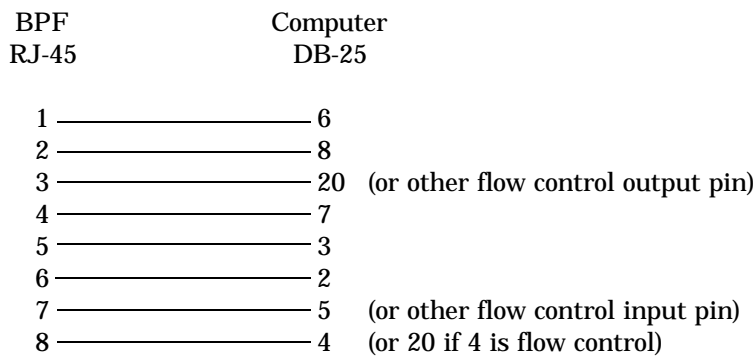
#### 6.3.1 Composite Port to Modem or DSU

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



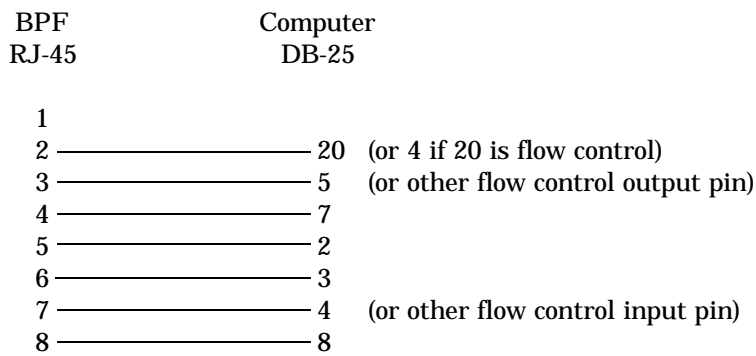
#### 6.3.2 Data Ports to Host Computer

Configured as DTE

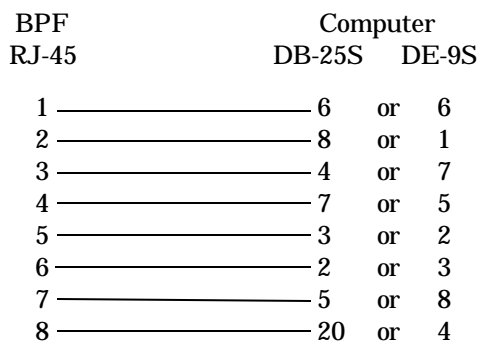


### 6.3.2 Data Ports to Host Computer, continued

Configured as DCE



To a PC Com Port

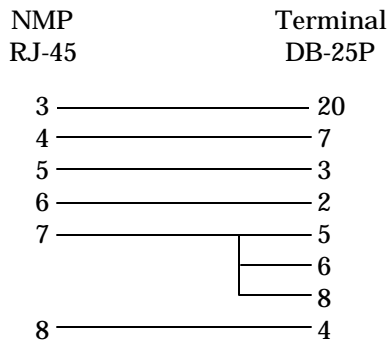


### 6.3.3 Data Port to ASYNC Polling Modem

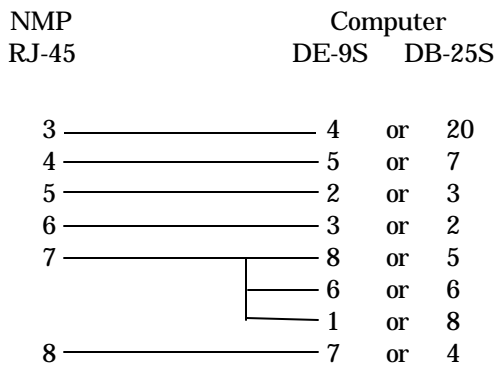


### 6.3.4 Network Management Port

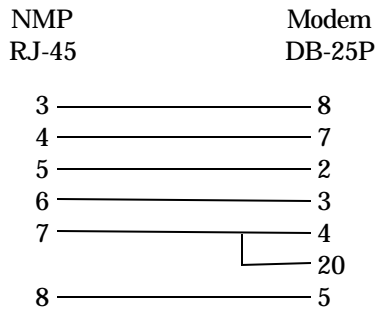
To a TERMINAL



To a PC using terminal emulation



To a dial-up MODEM for remote access



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## 7. TROUBLESHOOTING

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### 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.

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**8. WARRANTY**

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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 CR 1000E  
Dewey, IL 61840

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

Tel (217) 897-6600  
Fax (217) 897-1331  
Email [support@dcbnet.com](mailto:support@dcbnet.com)