# PBXpress™

Call Record Buffer - Model 525

User's Manual

Release 1.0

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Call Director Option - Model 324

User's Manual

Release 1.0

# *PBXpress* - Model 525

**Release 2.0**

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# PBXpress Model 525
# User's Manual

This User's Manual describes the operation of the PBXpress Call Record Buffer - Model 525. This manual also gives additional information on the installation of the unit. The information presented here is provided to assist in the installation and use of the Model 525, and is subject to change without notice.



Additional help with the installation and use of the Model 525 can be obtained by calling Omnitronix Technical Support at (206) 624-4985.

## WARRANTY

Omnitronix, Inc. hereby warrants that it will repair or replace, at its option, any part of the PBXpress Call Record Buffer - Model 525 which proves to be defective by reason of improper materials or workmanship, without charge for parts or labor, for a period of 12 (twelve) months. This warranty period commences on the date of original purchase by the buyer for purposes other than for resale, and this warranty only applies to the original purchaser of the unit for purposes other than for resale.

To obtain service under this warranty, you must obtain, either by telephone or letter, a return authorization number from Omnitronix Technical Support. This authorization number may be obtained by contacting Omnitronix Technical Support at the address and/or phone number below. The defective unit is to be returned to Omnitronix with shipping prepaid, and the return authorization number must be clearly marked on the outside of the package containing the defective unit.

The dealer's bill of sale or other satisfactory proof of the date of purchase may be required to be presented in order to obtain service under this warranty.

This warranty applies if your PBXpress Call Record Buffer - Model 525 fails to function properly under normal use and within the manufacturer's specifications. This warranty does not apply if, in the opinion of Omnitronix, Inc., the unit has been damaged by misuse, neglect, or improper packing, shipping, modification or servicing by other than Omnitronix or an authorized Omnitronix Service Center.

In no event shall Omnitronix, Inc. be liable for any loss, inconvenience or damage, whether direct, incidental, consequential or otherwise, with respect to the PBXpress Call Record Buffer -Model 525. Omnitronix, Inc.'s liability shall be limited to the purchase price of the Model 525.

No warranty of fitness for purpose or of fitness of the Model 525 for any particular application is provided. It is the responsibility of the user to determine fitness of the PBXpress Model 525 for any particular application or purpose.

This warranty gives you specific legal rights. These rights may vary from state to state, as some states do not allow limitations on liability.

You may request information on how to obtain service under this warranty by contacting Omnitronix Technical Support at the address and phone number below:

**Omnitronix Technical Support**
**760 Harrison Street**
**Seattle, Wa 98109**
**(206) 624-4985**

## GENERAL OPERATIONAL FEATURES

The PBXpress Model 525 is a data receipt, storage, and transfer device designed for Call Accounting records and other record oriented data applications. It is designed for high reliability, and intelligent processing and transfer of its stored data.

The PBXpress has a male DB25 RS232 compatible input port and a female DB25 RS232 compatible output port. Each can be independently configured for baud rates up to 19,200 baud, plus parity, word length, and handshaking selections. Additionally, the PBXpress has an option for an internal 300/1200 baud modem.

Selections and indicators are provided through a front panel switch and a set of 9 LEDs, three banks of DIP switches accessible from the underside of the unit, and through software control features described herein. The DIP switch selections allow configuration of the RS232 ports, plus selection of a number of operational settings. The front panel controls include a Hold/Release switch controlling the release of stored data. LED indications include Power, Hold, Data In, Data Out, Modem, plus 20%, 40%, 60%, and 80% full.

The PBXpress accepts and stores data from an RS232 source connected to its input port. This data is usually in the form of a sequence of information records, each terminated by a carriage return, linefeed, or both. The PBXpress can be configured to accept all incoming characters, or it can be set to strip out non-printable ASCII control characters, thereby conserving PBXpress memory space. This feature is useful with devices such as the Mitel SMarT-1™ Call Controller or Operator Access Controller. A secondary, intelligent filter can be programed which will analyze and then accept or reject storage of individual call records based upon the information contained in that call record. Examples would be only those call records relating to certain extensions, or within certain hours, or to selected area codes.

The PBXpress has a data compression selection which can increase the effective storage capacity of its internal memory. Once the record has been accepted for storage, it is analyzed and compressed to achieve a 35% to 65% reduction in its size. The records can be output from the buffer still in compressed form or they can be restored to their original form before output.

## METHODS OF RELEASING DATA

The PBXpress can release its stored data using several different data release options. These include:

XON/XOFF or DTR flow control ..... character oriented format

Record Command Mode ..... record oriented format

PROMPT Mode ..... record oriented format

XMODEM Transfer Mode ..... packet oriented format

The XON/XOFF and/or DTR option allows you to use the buffer as a simple storage device controlled only by XON/XOFF codes and/or a valid DTR signal (depending on the handshaking selection of the output port). This is the simplest transfer method but it provides the least reliability. When the buffer is first powered on, it assumes the handshaking status of the output port to be FALSE, meaning no data can be released from the buffer. Then, depending on the DIP switch handshaking selection for the output port, the PBXpress will watch for the receipt of a valid handshaking signal (an XON and/or DTR signal) at which time it will then start releasing its data. The most common use of this mode is with XON/XOFF handshaking. However, this data release method requires that when the buffer is empty, an XOFF code must be sent to the buffer as the last action. Otherwise any new data will just pass right through the buffer without being stored.

The Record Command Mode gives you much better control over the transfer of your data. A series of "data release" commands can be used to transfer information, one or more records at a time, each time you send a certain command. After the desired records have been successfully transferred, you then send a command to "clear" the buffer of the now transferred records. Until you clear the records which have been transferred, they can be re-transferred as many times as necessary.

Prompt Mode provides a method of releasing single records upon receipt of a user programmable prompt character, one record per prompt.

Xmodem Transfer Mode is the easiest, most reliable transfer method to use. In this mode the data is transferred using the popular Xmodem packet oriented transfer format, where "packets" or blocks of data are transferred one after another with accompanying error detection codes to ensure data integrity. If an error in a packet is detected by the polling computer, the Model 525 can re-send that packet to the computer. Using this method requires that you use a program which supports Xmodem transfer protocol. Most popular communications programs, including CrossTalk and Procomm, support Xmodem transfer protocol.

In addition to the data transfer commands, the Model 525 supports a number of commands to access and control other features. These are described in a later section.

## BATTERY BACKUP

A battery backup system has been designed into the PBXpress to allow the unit to continue to operate in the event of loss of the AC power. The PBXpress remains fully active while operating on the internal battery, and can send and receive call record data even though the AC power has failed.

The battery backup circuitry consists of a gelled electrolyte sealed battery which is recharged after any battery use. Maintenance of the battery's charge level is performed by circuitry in the PBXpress unit, so that the battery does not need to be removed from the case for recharging. Power failure circuitry detects that the AC power has failed, and switches operation of the PBXpress power system over to the battery. As the unit is phased over to using the battery for power, the PBXpress will flash the Power indicator LED to show that power is being supplied by the internal battery. Once AC power returns, the power failure circuitry will sense that AC power is available and will switch the power system back to the AC power. At this point the Power indicator LED will stop flashing.

The battery system will run the board for an amount of time that will vary with the amount of memory installed, and the condition of charge of the battery. The PBXpress power system will recharge the battery after a power loss requiring use of the battery. If a second power failure occurs shortly after the battery was used to power the board for an extended period, then the battery will not be fully recharged and the board will run for a shorter amount of time. With 256K of memory installed and a fully charged battery the battery circuitry will power the board for approximately 3-4 hours.

Most power failures that would affect operation of the PBXpress will be of rather short duration, of under one second to a few seconds. Two major causes for these power problems would be short brownouts or blackouts of the AC power line, and human errors (such as turning off the wrong circuit breaker or accidentally unplugging the unit).

## INDICATOR LIGHTS

The front panel of the PBXpress has 9 indicator LEDs. These indicators show the current operating status of the PBXpress unit. Below is a list of the indicator LEDs and their functions. Figure 1 on the next page shows the positions of these indicator LEDs on the front panel of the unit.

### HOLD

This indicator shows if the PBXpress is in Hold mode or Release mode. Hold mode is indicated by the LED being lit, and Release mode is indicated by the LED being off. If the Hold/Release switch is enabled, this indicator will follow the state of the Hold/Release switch. If the Hold/Release switch is disabled, this indicator will always be off, as the PBXpress is always in Release mode. This indicator is also used for the self test and memory test. See the section on TEST FEATURES for information on these uses of the HOLD indicator.

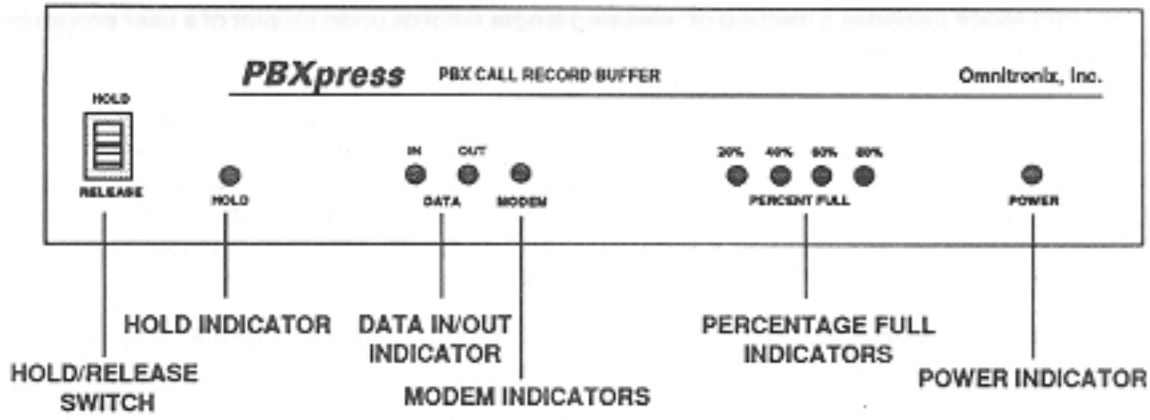



**Figure 1. - PBXpress front panel**

### DATA IN and DATA OUT

These indicators show data flow in and out of the buffer. As data is received on the input port the DATA IN indicator will flicker. As data is sent out from the PBXpress, the DATA OUT indicator will flicker. These indicators give visual feedback of data flow into and out of the buffer, and can be quite useful when installing the unit.

### MODEM

This LED indicates carrier detect present when a modem is used in conjunction with the PBXpress. This is a valid indicator of carrier detect for either the optional internal modem, or with an external modem connected to the PBXpress output port and the PBXpress DIP switches configured for such.

### PERCENTAGE FULL

These four indicator lights are used to show how much of the PBXpress memory contains call record data. As the buffer reaches 20% full the 20% FULL LED will light up. After reaching 40% full the 40% FULL LED will light up, etc. When data is removed from the buffer the percentage full indicators will turn off in the reverse order. This gives the user an indication of how much of the available memory contains call record data.

### POWER

This indicator shows that power is available to the PBXpress, and that the unit is working. Under normal operating conditions, the POWER light will stay on steady with a slight blink every 10 seconds to indicate proper operation. If this indicator LED is flashing on and off steadily, then power is being supplied by the internal battery.

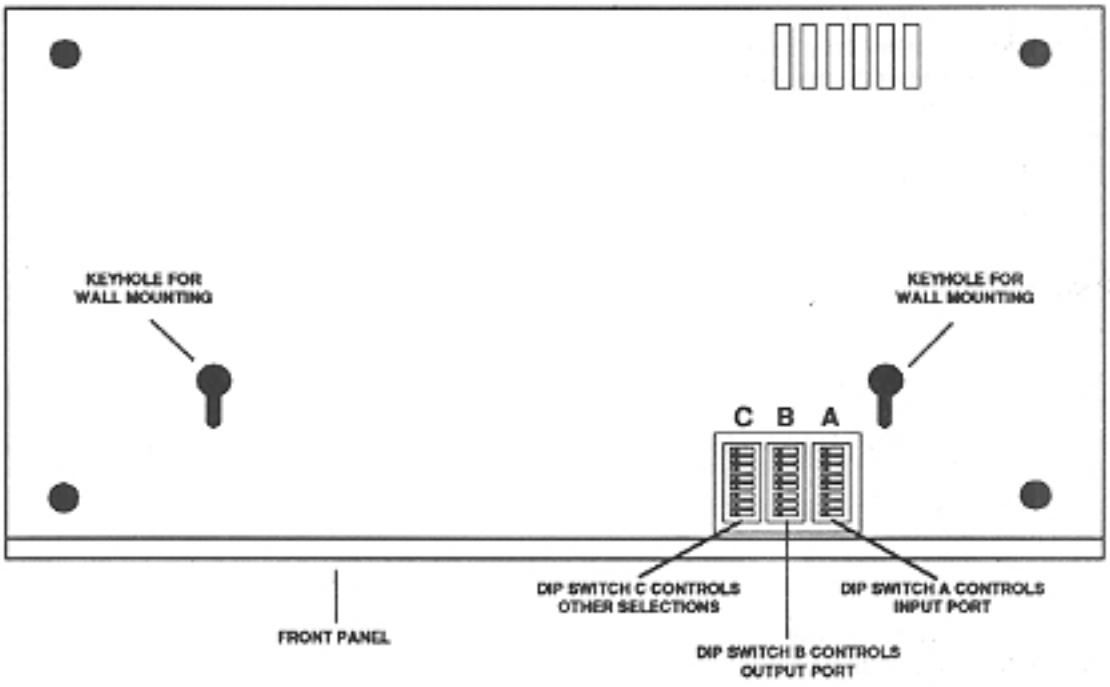
## CONFIGURING THE DIP SWITCH SELECTIONS

The PBXpress has three DIP switch selections, referred to as DIP switches A, B, and C. DIP switch A is the top switch, B is the middle switch, and C the lower switch. Refer to Figure 2 on the next page.

DIP switches A and B control the baud rate, parity, word length, and handshaking of the input and output ports. DIP switch A control the input port and DIP switch B controls the output port. The DIP switch selections and options for switch A and B are identical, the only difference being that switch A is for the input port and switch B is for the output port. In order to configure these switches, you must know the settings you want to select. This is determined by refering to the baud rate settings of the switch or PBX the PBXpress is connected to, and also knowing the baud rate of the polling computer.

DIP switch C controls other various selections and options of the PBXpress Model 525. You will need to review each one of these selection and decide on which settings you will require.

## Figure 2. - PBXpress bottom panel




### DIP SWITCHES A AND B

The first three switches control the baud rate for the serial ports. The chart below shows selections for these three switches, and the corresponding baud rate.

**Baud Rate Switch Selections (DIP Switch A & B)**

| SELECTION | #1 | #2 | #3 |
|---|---|---|---|
| 150 | OFF | OFF | OFF |
| 300 | OFF | OFF | ON |
| 600 | OFF | ON | OFF |
| 1200 | OFF | ON | ON |
| 2400 | ON | OFF | OFF |
| 4800 | ON | OFF | ON |
| 9600 | ON | ON | OFF |
| 19200 | ON | ON | ON |

Switch 4 selects the word length.

**Word Length Switch Selections (DIP Switch A & B)**

| SELECTION | #4 |
|---|---|
| 7 BIT WORD | OFF |
| 8 BIT WORD | ON |

Switches 5, and 6 set the data parity. Four selections may be made. Below is a chart showing switch positions for switches 5 and 6 and the corresponding parity selection.

**Parity Bit Switch Selections (DIP Switch A & B)**

| SELECTION | #5 | #6 |
|---|---|---|
| No Parity | OFF | OFF |
| Space Parity | ON | OFF |
| Odd Parity | OFF | ON |
| Even Parity | ON | ON |

Switches 7 and 8 determine the type of handshaking to be used on the port. There are 3 different options that may be chosen. The DTR selection chooses only a positive signal on pin 20 DTR of the port as the indication of handshaking. The XON/XOFF selection uses only those flow control codes for handshaking, ignoring DTR. The XON/XOFF & DTR selection uses XON/XOFF flow control codes but also requires the presence of a valid DTR signal.

**Handshaking Selections (DIP Switch A & B)**

| SELECTION | #7 | #8 |
|---|---|---|
| DTR | OFF | OFF |
| XON/XOFF | ON | OFF |
| XON/XOFF &DTR | OFF | ON |
| (Reserved) | ON | ON |

**DIP SWITCH C**

DIP switch C controls other functions of the PBXpress Model 525.

DIP switch C-1 controls whether XON/XOFF or DTR flow control signals alone will cause data release to occur. For more information on this, read the section TRANSFERING DATA USING SIMPLE FLOW CONTROL. If you are using the RELEASE or TRANSFER commands, you can set this switch OFF.

**Disable XON/XOFF & DTR Only Data Release**

| SELECTION | #C-1 |
|---|---|
| DisableXON/XOFF or DTR Release | OFF |
| Enable XON/XOFF or DTR Release | ON |

DIP switch C-2 controls Data Compression. An efficient data compression technique has been implemented allowing average call records to be compressed to less than half of their original size. Any data stored in the buffer in compressed format is expanded back to its original size before it is released (unless you specify otherwise). Data compression can only be used with character codes which are less than ASCII 128 (80 Hex) in order for the compression techniques to work properly. This should be true of the call data in almost all cases.

**Data Compression**

| SELECTION | #C-2 |
|---|---|
| No Compression | OFF |
| Use Compression | ON |

**External Modem**

Switch C-3 selects the the PBXpress to operate with an external modem connected to its output port. This causes the PBXpress to ask for a Password, to indicate modem activity with the MODEM indicator, to send a regular setup string to the modem, and other necessary steps. If you are using an external modem on the output port, set this switch ON.

| SELECTION | #C-3 |
|---|---|
| No External Modem | OFF |
| External Modem Present | ON |

Switch C-4 controls the "End of Record" character. The PBXpress takes incoming data record by record, so it must know what the last character of the record is. This is usually a Carriage Return <CR> or Linefeed <LF> character. This switch should be set OFF for data which ends in a <LF> character or a <CR> and <LF> character. This switch should be set ON for data which ends in only a <CR> character.

**End of Line Character**

| SWITCH POSITION | #C-4 |
|---|---|
| <LF> End of Record | OFF |
| <CR> End of Record | ON |

Switches C-5 and C-6 control the character filter. This features causes unwanted control codes to be removed from the input data before they are buffered. For example, when a series of Mitel SMarT-1s are chained together, they generate a series of Control A (01 Hex) characters which will rapidly fill up the buffer memory. The character filter feature can remove these and other unwanted control characters. The first selection shown allows any and all characters to be buffered. The Filter Control A selection will remove

all Control A codes from the incoming data. The third selection removes any and all incoming characters below ASCII 32 except for carriage return and linefeed characters.

**Character Filter Selection**

| SELECTION | #C-5 | #C-6 |
|---|---|---|
| No Filter Used | OFF | OFF |
| Filter Control A | ON | OFF |
| Filter All Control Codes | OFF | ON |
| Programmable Mask | ON | ON |

Switch C-7 enables or disables the Hold/Release switch on the front panel of the PBXpress. If this switch is OFF, then the Hold/Release switch will have no effect on the control of data flow. If this switch is ON, then the Hold/Release switch is enabled. The Hold/Release switch is active only when releasing data using XON/XOFF or DTR handshaking as the sole control of data release. In other release methods the Hold/Release switch is ignored anyway.

**Disable Hold/Release Switch**

| SELECTION | #C-7 |
|---|---|
| Disable Hold/Release | OFF |
| Enable Hold/Release | ON |

Switch C-8 enables the modem password requirement on the PBXpress when used with a modem. When this switch is set ON, the PBXpress will request a password before further access will be allowed. When this switch is set OFF, no password will be requested. The default password is SMDR.

**Modem Password Selection**

| SELECTION | #C-8 |
|---|---|
| Modem Password Disabled | OFF |
| Modem Password Enabled | ON |

## RS232 PORT CONFIGURATIONS

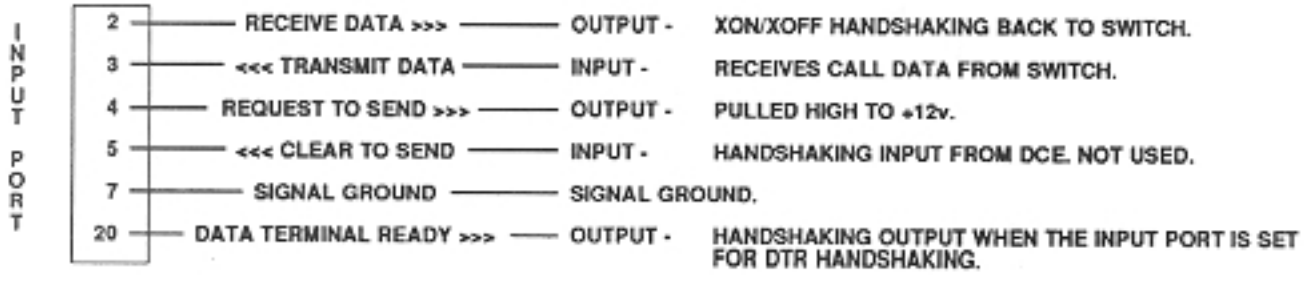
The input and output RS232 ports of the PBXpress use standard 25 pin DB25 type connectors. The input connector is a male connector, and the output connector is a female connector. The unit was constructed this way so that the connecting cables can be connected directly together to easily bypass the PBXpress if needed.

The input port connects to the switch or other source of call records. This port is configured in a DTE configuration. The input port is similar to an IBM PC™ or compatible computer's RS232 port.

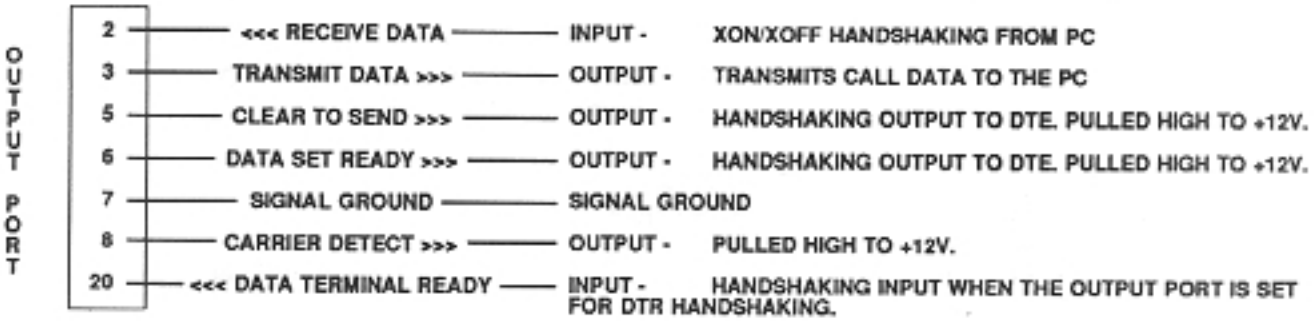
The output port from the PBXpress is configured in a DCE configuration. This would normally be similar to the configuration of a PBX or call controller unit. The cable to carry the call record data to the computer that processes the data is connected to this port.

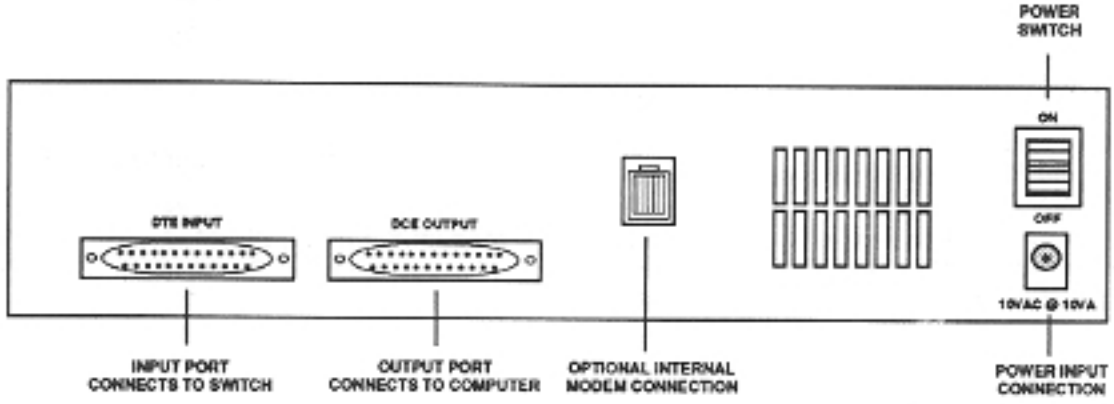
Figures 3 and 4 show the pins used on the input and output ports. Note that some lines are pulled high by the PBXpress to facilitate connection to other devices. The PBXpress does not require any specific lines to be pulled high in order for it to operate. If the unit is set on DTR type handshaking for its output, then DTR will need to be high for data transmission to be allowed.

### Figure 3. - PBXPRESS INPUT PORT - CONFIGURED TO LOOK LIKE A PC COM PORT



## Figure 4. - PBXPRESS OUTPUT PORT - CONFIGURED TO LOOK LIKE A SWITCH




## Figure 5. - PBXpress back panel connections

### PBXpress INSTALLATION

Before applying power to the PBXpress, the connecting cables should be installed on the input and output RS232 ports. The wall-mounted power transformer should be plugged into a 120 VAC wall socket (standard AC supply), and the power cable should be connected to the PBXpress socket on the rear panel. To turn the unit ON, use the switch on the rear panel. Figure 3 is a view of the rear panel of the PBXpress unit, and this figure shows the positions of each of these connectors and the power switch.

When powering the unit up, the PBXpress unit will execute a series of power up steps which will be reflected in several changes in the LEDs. These are:

1) Turn off all lights and then turn on the power LED.
2) Check for a base 64K memory and flash the 80%, 60%, 40%, and 20% Full lights in that sequence if the base 64K memory is found.
3) Determine the full amount of memory installed and flash all the Percentage Full lights to indicate what was found. Memory size indications are:

| Flashes | Memory Size Found |
|---|---|
| 1 | 64K |
| 2 | 256K |
| 3 | 512K |
| 4 | 1 Megabyte |
| 5 | 2 Megabytes |
| 6 | 3 Megabytes |
| 7 | 4 Megabytes |

If no valid memory configuration is found (an improper amount or type of memory is installed or the memory is not operating properly) then the percentage full LEDs will all flash repetitively to indicate this error. This is a fatal error.

4) The PBXpress will then execute a full RAM test and will indicate this by a varying rotation of the percentage full lights. The varying lights on the Percentage Full indicators represent a different section of memory being tested.

5) When the PBXpress finishes the memory test, the Hold indicator LED will flash about 20 times to indicate that the memory test was successful. If the Percentage Full indicator LEDs all flash, then the PBXpress found that the memory failed the test. In this case you should contact Omnitronix Technical Support. After the Hold LED stops flashing the PBXpress goes into its normal operating mode, and is ready to buffer call record data.

## RESETTING THE PBXPRESS

When setting up or working with the PBXpress, you may have occasion to reset the buffer. Sometimes you might wish to erase all memory with this reset and sometimes you may wish to preserve your call records. If you wish to erase your call records then the best way to reset the buffer is to turn the power switch off. The power switch should be left off for 10 seconds to let the memory discharge. If you wish to preserve your call records, you can turn the power switch off and back on rapidly (within 1 second). The PBXpress detects upon its re-power up that it has valid memory and so preserves the call records. This type of reset can also be done from software by giving the RESTART command (covered in the section on ABORT/DISCONNECT COMMANDS). Both of these methods will preserve your call records, unless some occurance has actually corrupted the memory already (such as a severe power glitch).

## PBXPRESS MODEL 525 COMMAND FEATURES

The PBXpress Model 525 has a number of intelligent commands and controls programed into its operation. These commands are based on English type words or abbreviations. Additionally some of the commands may be shortened to two or three letter codes.

All commands may be entered in either upper or lower case, or any combination of upper and lower case letters. Some commands have parameters that follow the command key word. The parameters may be separated from the command key word with a space, although no spaces are needed. For example, the commands RELEASE 34 @ 187 and RELEASE34@187 are equivalent commands. However, the command to set the data header literally uses the spaces so any spaces that are desired in the data header must be typed in.

Each command line terminates with a carriage return or carriage return and linefeed combination. Multiple commands may be placed on a command line. You must include a separator between commands. The separator can either be one or more space characters, or one or more colons (:) or one or more slash characters (/).

For example, the command line below executes 4 commands, one after another:

RECORDS:FREE:RELEASE 10:NEXT <cr>

Each command, when executed, will either return data or a message. Depending on the setting of the response code command, these responses will be word type responses or single character responses. The single character code responses are intended for computerized control of the buffer, and the word response codes are intended for human operators.

Until the current command line is fully executed the Model 525 will not accept a second command line. Any new command line sent during this time will be discarded. The exception to this is the use of the ESCAPE

command. If the ESCAPE command is received then the operations on the current command line will complete or terminate at that point in time, and the rest of the command line will not be executed.

The command line is limited to 128 characters total, including the carriage return at the end of the command line. Characters beyond the first 128 characters will cause the command line to not be used, as the command line has an error in its format.

## DATA RELEASE RELATED COMMANDS

### RELEASE

| | |
|---|---|
| *RELEASE* | *Send all records starting at record 1* |
| *RELEASE XX@YY* | *Send XX records at a time,starting at record YY* |
| *RELEASE XX* | *Send XX records at a time, starting at record 1* |
| *RELEASE @YY* | *Send all records starting at record YY* |

XX and YY are decimal numbers, with or without leading zeros. Record numbering starts at #1.

The RELEASE command will start sending data immediately unless the WAIT ON command has been used to tell the Model 525 to wait on a RELEASE command until a NEXT command is issued.

This command can be aborted by the ESCAPE command. The Model 525 will stop transmission at the end of the record being transmitted when the ESCAPE command is received.

When the RELEASE command is received, a partition is established. This partition represents the end of available data to be released. The partition will be set at the end of the last record that is in the buffer at the time when the RELEASE command is received. Records that arrive to be buffered after the RELEASE command is received are placed behind the partition and not sent out until a new RELEASE command is used.

If records are released using the RELEASE command, an acknowledgment of completion will be returned when all the data up to the partition has been sent. The acknowledgment returned depends on the RESPONSE command setting. If the response codes are set to words, then the response ACK CR END DATA CR is sent (linefeeds may follow the carriage returns depending on the setting of the ADDLF command). The ACK is ASCII character 6, the CR is a carriage return code (ASCII 13) and the LF is a linefeed character (ASCII 10). If the response codes are set to be character codes, then only the ACK character is sent.

If there is no data in the Model 525 buffer when a RELEASE command is received, then the end of data response is sent.

The abbreviation for this command is RL.

### NEXT

The NEXT command is used with no parameters. This tells the buffer to send the next block of records. If no block size for records was set with the RELEASE command, the NEXT command will start the transmission of all records. If a block size was specified with the RELEASE command, then the NEXT command will send the next XX records, where XX is the block size specified in the RELEASE command.

The end of data message is sent when the end of the data partition is encountered, as described above under the RELEASE command.

The abbreviation for this command is NX.

### RESEND

The RESEND command is used with no parameters. The buffer will retransmit the last block of records that was sent using the NEXT command. If no block size was specified in the RELEASE command, then the transmission will restart at the first record and all records will again be sent. If a block size was specified, then the RESEND command will result in the immediately previous block of records being sent again.

The abbreviation for this command is RS.

### WAIT

*WAIT ON*
*WAIT OFF*

The WAIT command is used to instruct the buffer regarding the RELEASE command. If the wait function is ON, then the buffer will not send data when the RELEASE command is received, and will instead wait for the first NEXT command to send the data. If the wait function is OFF, then the buffer will start sending the requested data as soon as the RELEASE command is recognized.

The default setting for this feature is with the wait function OFF.

There is no abbreviation for this command.

### HEADER

*HEADER?*
*HEADER="MESSAGE UP TO 96 CHARACTERS"*

The HEADER= command establishes a data header which is stored in the memory of the buffer. This message may be up to 96 characters in length. The quotes preceding and ending the message must be present.

Since the command line ends with a carriage return and/or linefeed, these codes cannot be used directly in the HEADER= command. If a carriage return is desired in the data header, use the | character (ASCII 124) to represent a carriage return. If a linefeed character is desired use the ~ character (ASCII 126) to represent the linefeed. If a quote character is desired in the data, then the backslash character (\) (ASCII 92) can be used to represent the quote character.

The HEADER? command is used to read the data header stored in the buffer. The response to the HEADER? command will be the sending of the data header, followed by a carriage return and optional linefeed character (the carriage return and any linefeed code at the end of the response are automatically added, and do not need to be represented in the data header).

The abbreviation for this command is HD.

### DECOMPRESS

*DECOMPRESS ON*
*DECOMPRESS OFF*

The DECOMPRESS command allows you to output your data in a compressed format. This command can be used whether data commpresion internally is being used or not. When doing transfers over a phone line, sending data in compressed format can reduce phone charges. However, this requires a means of decompressing the data once the polling computer has received it (call our technical support department for details on this). All methods of data release can be used to transfer data in compressed format. The default setting for this command is ON.

The DECOMPRESS command can be abbreviated with the command DCM.

## TRANSFER

*TRANSFER XMODEM*
*TRANSFER XON*

The TRANSFER command is used to initiate a data transfer using either a) an Xmodem packet oriented protocol through either the output serial port or the internal modem or b) simple Xon/Xoff handshaking transfer through the internal modem or external modem.

The XMODEM parameter causes a data transfer using Xmodem protocol. The checksum method or the CRC method of error detection is employed, depending on which is supported by the computer polling the buffer. This command may be used either on the output port or with the internal or external modems.

The Xmodem transfer option is compatible with popular terminal software which supports Xmodem transfer capabilities. In most software it is quite automated. For example using Procomm (a popular terminal program), all you do is choose the selection to do an Xmodem download and give it a filename the data should be stored under, and the program does the rest. Once the transfer is complete you have a file on your disk of your data which you can then process as you wish.

The XON transfer option allows the internal modem to be used with Xon/Xoff handshaking only. No error detection and correction scheme is employed. This could be used in cases where you have a data accounting or processing program which expects to be hooked directly up to the source of data and has no option for taking its raw data from a disk file. In this case you would use a terminal program to call up the PBXpress and establish modem contact. You would send the TRANSFER XON command, then exit the terminal program and enter your accounting software. To your software, it would then look as though it was hooked directly up to the buffer, even though it was actually over a phone line. Your software would send an XON code over the modem to the buffer and data transfer would begin. The TRANSFER XON option can be used regardless of the setting of the FLOW command.

The command may be abbreviated with the command TX.

## CD

*CD ON*
*CD OFF*

This is a feature related to data transmission over the internal or external modem. It selects that the PBXpress should start transmitting its data 8 seconds after receiving a valid carrier detect signal. XON/XOFF handshaking is permitted. A password may or may not be asked for first depending on the setting of the password DIP switch and/or the use of the PASSWORD command. When carrier detect is lost, data transmission will cease. This command allows the possibility of using data transmission over a modem in conjuntion with software which is expecting a direct connection to the data source (PBX). You can autodial the remote number then immediately load your call accounting software, which will then start collecting the call records via the modem.

The default for this command is OFF.

### PROMPT

| | |
|---|---|
| *PROMPT ON* | *Turns prompt mode on.* |
| *PROMPT OFF* | *Turns prompt mode off.* |
| *PROMPT =* | *Establishes prompt character.* |
| *PROMPT ?* | *Display prompt mode status and prompt character.* |

The PROMPT command is used to establish an alternate method of data release from the buffer. When the prompt mode is on, the receipt of a certain character (the prompt character) will cause the buffer to release one data record. If no record exists in the buffer, then the buffer will take no action. After a record is released from the buffer, another prompt char ac ter will be required to release the next record.

The default prompt character is the ACK character, ASCII 06. Prompt mode is disabled as a default setting, and needs to be enabled in order to use this feature.

The prompt command can be abbreviated with the command PM.

### STAMP

*STAMP ON*
*STAMP OFF*

The STAMP command enables adding a date/time stamp to each incoming record. The use of this command requires the installation of the internal modem (which includes the date/time clock). When this feature is enabled, a date/time stamp will be attached to the beginning of each record, following this format:

```
MM/DD HH:MM 000000  11111111     2222222    3333333
{     stamp    }{                 record               }
```

MM is a two digit character indicating the month. DD is a two digit character indicating the day. HH is a two digit character indicating the hour. MM is a two digit character indicating the minute. The default for this command is OFF.

## CLEAR MEMORY COMMANDS

### CLEAR

The CLEAR command is used to release memory that was used to store records so that this memory can be used to store new records. After the records have been read using the RELEASE and/or NEXT commands, the memory must be cleared to allow the buffer to use the memory that was occupied by the now transferred records. If the CLEAR command is not used, then the same records will be retained until the CLEAR command is sent. This allows records to be read and processed in any order and allows the records to be re-read any number of times as required. Once the processing of the records is completed, then the CLEAR command will release the memory that was used by the call records that have been sent out. Note that the CLEAR command will release all memory up to and including the last record sent out. If the RELEASE command is used and terminated before the end of the data records in the buffer (using the ESCAPE command), then the CLEAR command will only clear memory up to the last record sent out. It will not clear the records that were retained in the buffer and not sent on the RELEASE command.

Once the CLEAR command is sent, the memory that was in use in the current partition will be cleared. The ESCAPE command can not be used to terminate the CLEAR command if the command is sent in error.

This command does not have an abbreviation.

### ZERO

The ZERO command is a version of the CLEAR command. On receipt of this command, the buffer will clear all records that are currently contained in the buffer memory. New records will be allowed to be placed into the buffer, but all current records will be cleared.

This command is mainly for use in testing the setup configuration for the buffer and in debugging a setup after receiving improper records due to improper filter formats, using the wrong character filter, etc.

The difference between this command and the CLEAR command is that the CLEAR command only clears records in the current partition, while the ZERO command clears all records both inside of and behind the partition.

As with the CLEAR command, the ZERO command can not be terminated with the ESCAPE command.

This command does not have an abbreviation.

### SAFETY

*SAFETY ON*
*SAFETY OFF*

The SAFETY command is used to prevent the automatic clearing of data memory when using the Xmodem transfer protocol.

The default selection is with the SAFETY function off, so that data is cleared from memory as each packet is successfully transmitted. It may be desirable to not clear the data from memory until the Xmodem transfer is completed. This would eliminate the possibility of a transfer failure from losing data.

If the SAFETY function is on, data may be cleared with the CLEAR command once the Xmodem transfer is completed. The PBXpress unit will clear memory up to and including the last block of data transferred.

If the internal modem is used to transfer data with the Xmodem protocol and the safety function is on, then the CLEAR command must be used before disconnecting.

The abbreviation for this command is SF.

## ABORT/DISCONNECT COMMANDS

### ESCAPE

The ESCAPE command is used to exit from or abort out of various commands.

The ESCAPE command can be abbreviated with the command ESC. The ESCAPE command should be the only command on a command line where it is used. Any other commands on the command line after the ESCAPE command will not be executed.

### BYE

The BYE command is used when polling the buffer via a modem. It informs the buffer that the phone call is terminating and that the buffer should hang up its modem. This command is not required, as the modem will detect the loss of carrier when the polling computer hangs up its modem, but can be used to immediately disconnect the buffer from the phone line.

As this command is already only three characters long, there is no abbreviation.

### RESTART

The RESTART command does a "soft" reset of the buffer. All settings will be set to their defaults, but record memory will be preserved unless memory itself has been corrupted. This can be used if the buffer has hung up in some way and you with to reset it but you want to preserve your records. (Another way to achieve this is to turn the PBXpress power switch off and back on within a second or less. This will also reset the buffer without destroying memory).

## INPUT FILTER COMMANDS

There are three possible input filters your data may have to go through before it is buffered. These are the Character Filter, the Format Filter, and the Record Filter. If you wish to set up both the Format Filter and the Record Filter at the same time, you will need to understand the order in which they affect the incoming data.

The first possible filter your record will encounter is the Character Filter. This is set via DIP switch. This filter ON or OFF does not really affect the other filters.

The next possible filter your record will encounter is the Format Filter. The filter fields for this function are set based upon what the record looks like coming from the PBX. This filter function takes the record as it comes from the PBX and reformats as you wish.

The third possible filter your record will encounter is the Record Filter. The filter fields for this function are set based upon what the record looks like after it goes through the Format Filter.

If you want to set up both the Format Filter and the Record Filter, you should FIRST set up the Format Filter so you are completely satisfied with it, and then you should set up the Record Filter.

Additionally, if you select Date/Time Stamping, the date time stamp is added to the front of the record after the record passes all the above steps.

### FIELD

| | |
|---|---|
| *FIELD SET* | *Used to set up filter fields.* |
| *FIELD ?* | *Used to display current field settings.* |

The FIELD command has two uses. The first is to set the fields that the record filter is to act upon, and the second is to display how the fields are currently set.

When the FIELD command is used with the parameter SET, then an interactive display is provided to allow the user to set the fields. This consists of typing in spaces for areas where no field is to be active, and typing the number of the field for the areas where that particular field is to be active. There can be up to 10 fields active, using the field numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The backspace key or character can be used to backspace if an error is made while entering the fields. A carriage return character will end the entry of the fields.

The FIELD command, with a question mark as a parameter, will return a display of the positions of the currently selected fields. The display will terminate in a carriage return and a linefeed character.

Using the FIELD command to establish the fields for the record filter will automatically clear all of the filter statements used by the record filter.

The FIELD command can be abbreviated with the command FLD.

Example:

0000000————11111———2222222222————333———444444

## FILTER

| | |
|---|---|
| *FILTER =* | *Used to set a filter statement* |
| *FILTER ?* | *Used to display all filter statements* |
| *FILTER ON* | *Used to turn the record filter on* |
| *FILTER OFF* | *Used to turn the record filter off* |
| *FILTER NONE* | *Used to clear all filter statements.* |

The FILTER command is used to assign a filter statement, display the current filter statements, clear all filter statements, and to turn the record filter on and off.

If the FILTER ON/OFF commands are used, then the record filter will be activated or made inactive based on this command. The start of data filtering or the stop of the filter use will occur on the next call record received after the FILTER ON/OFF command is received.

The FILTER ? command will return a listing of the filter statements, each followed by a carriage return and linefeed character. If there are no currently active filter statements, then the response will be the message "NO FILTER STATEMENTS" followed by a carriage return and linefeed character.

The FILTER = command is used to set the filter statements. Each statement allows the user to select a set of parameters that the record must meet in order to be stored in the buffer. If any one of the filter statements has its conditions met, then the record will be stored in the buffer.

The format for the filter statement command is

FILTER = XZZZZ,XZZZZ,XZZZZ,XZZZZ etc. <CR>

X is a single digit number 0 to 9 which tells which field is being addressed.

ZZZZ is a parameter which is used to set the condition which must be met.

Commas can be used to separate multiple conditions which a record must meet to pass the filter.

Note that the length of the ZZZZ operator must be the same as the length of the defined filter field in order that they will match up. If field 1 contains 6 characters, then the ZZZZ operator for field 1 must contain 6 characters. The filter statement will be rejected if it doesn't match up.

The ZZZZ parameters may be preceded by a logical operator. The operators that may be used are:

= Equal. Must be equal to ZZZZ (Equal is the default operator, and may be omitted.)
> Greater than or equal to the ZZZZ operator
< Lesser than or equal to the ZZZZ operator
! Not equal to the ZZZZ operator

Additionally the ZZZZ operator may contain one or more * characters to indicate that the character position containing the * symbol will automatically match to any character in that position. The equal and not operators will use the * character when looking for a match. The * character may not be used when the operator is the greater than or lesser than operator.

Each of the parameters in the filter statement must be separated by a comma.

The length of a filter statement is limited by the limit on the length of a command line, at 128 characters including the carriage return to end the command line. This limit still allows over 120 characters for the filter statement parameters, and this should be quite sufficient for most applications.

If a field is not given any parameters in a filter statement, then the contents of that field are not examined (they are considered to always be acceptable).

Examples:

In the examples below, field 0 is a 4 character wide field giving the length of the call in tenths of minutes, field 1 is an 11 character wide field giving the phone number dialed, and field 2 is a three character wide field giving the extension number of the calling phone.

FILTER=0>0100,11********** <CR>

This filter statement would cause the buffer to only store calls that were more than 10 minutes in length and that had a 1 dialed as the first digit (long distance).

FILTER =1!* ******* <CR>

This filter statement would cause the buffer to store all calls with an area code, as they would all not have spaces in the designated positions. The * characters make the filter just look at the area code section to search for the spaces not matching.

FILTER =0>0010,1!* *******,2>020 <CR>

This filter statement only stores calls that have a duration of greater than 1 minute, are long distance (they do not have a blank area code), and that are made from extensions numbered greater than 020.

FILTER=1***976**** <CR>

This filter statements causes all calls to a 976 prefix to be stored in the buffer.

To clear all filter statements so that there are no active filter statements, the command FILTER NONE is used. If the record filter is set on with the FILTER ON command, yet there are no filter statements, then the buffer will store no records. The user of the Model 525 should ensure that if no filter statements are used, that the record filter is turned off so that records are stored in the buffer, unless it is desired that no records at all are recorded for a period of time.

The filter command may be abbreviated by the command FLT.

**FORMAT**

| | |
|---|---|
| *FORMAT SET* | *Set fields for Format function.* |
| *FORMAT =* | *Set Format Statement.* |
| *FORMAT ?* | *Display Format fields and Statement.* |
| *FORMAT ON* | *Turn Format Function on.* |
| *FORMAT OFF* | *Turn Format Function off.* |

The FORMAT function can be used for two different reasons. The first use is for altering the format of the call record, such as changing it to look like a different call record type. The second use of the Format function is to eliminate unnecessary data from the record to achieve greater record capacity in a given amount of memory.

The FORMAT SET command allows you to establish a set of fields which the reformating will be based upon. All data required in the final record output would have to be designated with a field. Unneeded data from the call record need not be designated by a field. Prior to using this command, the buffer should contain several call records of the exact type you will be reformating. Just before you give the command FORMAT SET, release one record onto your screen (RELEASE 1). This will put a record there which you can then use to guide your field settings. You can specify up to 15 fields. The fields are designated with the letters A through O. An example of setting these fields is given below. Once this is done, the format fields are established. After you follow the above procedure, use the ZERO command to erase any call records in the buffer. If you issue

the FORMAT SET command again, the previous format field settings will be erased.

The FORMAT = command is used to specify the desired output format of the record. This statement determines which fields are saved in the memory of the PBXpress, what order the fields have in the outpr record, and any other information concerning how the records are to be reformatted. Using the FORMAT = command, you specify the order the fields should appear in the record. Using a field identifying letter in the Format Statement will result in that field having that position in the output record. Other parameters can be used in the FORMAT = command. These other commands enter various ASCII data into the call record at the time it is output, rather than putting the data in memory with each record.

, Used to represent one space character.

| Used to represent a CR.

~ Used to represent a LF.

\ Used to represent a Quote character.

"XXX" Used to add literal text XXX to the record.

(nn) Used to represent NN space characters.

; Used to show that the default EOL character is not to be sent on output of the record.

FORMAT SET example: Below is an example of a Format field and some Format Statements to change the format of the record.

```
Record:   09/21 08:20   00:01:02   18187776509 234
Fields:   AAAAA BBBBB   CCCCCCCC   DEEEFFFFFFF GGG
```

The above example shows basically what you would enter when establishing the format fields. You can set up to 15 fields, from A to O. You might need 15 if you had to do more complicated reformating like changing the order of the hours, minutes, and seconds in the time field and the same for the date.

```
FORMAT = B,,A,,C(10)D,E,F(5)G

Original:  09/21 08:20   00:01:02   18187776509 234
Result:    08:20 09/21 00:01:02      1 818 7776509   234
```

The format statement above would take the time and date fields and switch them around, follow them with the duration of the call, add in 10 spaces, then add in the phone number with a space between any 1 digit and the area code and another space between the area code and the dialed number, then 5 more spaces, and then the extension.

```
FORMAT = A,,B(5)C(5)DEF,,G

Original:  09/21 08:20   00:01:02   18187776509 234
Result :   09/21 08:20   00:01:02   18187776509 234
```

This format statement keeps the record the same, but reduces the amount of memory used for the record. Only the fields are stored and the spaces are added in on the output of the record. If PBXpress data compression was selected, you would still save 4 bytes per record in the above record.

```
FORMAT = A,,B(5)C(5)DEF,,G,"SITE 1"
```

```
Original:  09/21 08:20   00:01:02   18187776509 234
Result :   09/21 08:20   00:01:02   18187776509 234 SITE 1
```

This format statement would keep the record as it was received, but would also add text "SITE 1" to the end of the record as a buffer identification. Additionally, 4 bytes per record would be saved.

There are several other parameters described above which can be used within this FORMAT = command. The reformated output record is normally terminated by the default End of Line character. If this was a carriage return, then all new output records would be terminated with a carriage return. However some PBXs have nonstandard EOL characters such as a Control C. If you wish to change this to a carriage return, you could use these other parameters. The ! and ~ characters represent the carriage return and linefeed characters. The ; characters suppresses the default EOL character. To change a Control C to a carriage return you could do something like this:

FORMAT = A,,B(5)C(5)DEF,,G!;

This would insert a carriage return and also suppress adding the default EOL character which in this example would be a Control C.

The FORMAT? command can be used to view the format fields and the current format statement.

FORMAT ON and FORMAT OFF are used to enable and disable the FORMAT function.

The FORMAT command can be abbreviated with the command FM.

## MASK

The MASK function is a specialized input character filter which allows you to specify a set of characters which are the only allowable input characters into the buffer.

The MASK command allows you to establish the mask to be used, read back the current MASK settings, and the ability to load in a default mask.

In order for the MASK function to be turned on and used, DIP switches C-5 and C-6 on the PBXpress must be turned ON. These switches control the character filter, and the MASK function is valid only when these two switches are ON. The DISPLAY command will return the settings of the MASK function.

The MASK command has three ways in which it can be used:

| | |
|---|---|
| MASK ? | Gives a listing of the current mask settings. |
| MASK = | Used to set up a mask. |
| MASK * | Used to load up the default mask. |

The MASK = command uses the following abbreviations to specify what characters to store:

| Abbrev. | Characters | (ASCII Codes) |
|---|---|---|
| CR | Carriage Return | (13) |
| LF | Linefeed | (10) |
| SP | Space | (32) |
| UC | Upper Case Letters | (65-90) |
| LC | Lower Case Letters | (97-122) |
| # | Numbers | (48-57) |
| : | Colon | (58) |
| / | Slash | (47) |
| nn | Char. Number nn | (nn is the ASCII value) |

The MASK = command is used to specify which characters are to be allowed by the mask function. For example, the command below would set up a mask which would allow a carriage return, a linefeed, a space character, number characters, and upper case letters:

MASK = CR LF SP # UC

The order of the abbreviations in the MASK command does not make any difference.

Any characters that are not listed in the MASK command are removed directly from the data input and the buffer acts just like these characters were never received.

Be very sure to include the End of Line character in the mask of characters allowed, or else the PBXpress will never see an end of record.

If there is a character which is not listed in the abbreviations above that you want to be stored, the ASCII value of the character in decimal can be used to represent the character. For example, if you need to store a Control-B and Control-C (ASCII 2 and ASCII 3) in the record in addition to the other characters in the mask statement above, then the MASK statement could be:

MASK = CR LF SP # UC 3 2

If an error exists in the MASK = command line then an error message will be returned and the mask will remain unchanged. The MASK command has no abbreviation, and the MASK = command cannot be followed on a command line with another command.

A default mask can be used by using the MASK * command. The default mask is equal to the following MASK command:

MASK = CR LF SP # UC : / 45

This mask allows a carriage return, a linefeed, the space character, the number characters, the upper case characters, a colon, a slash, and the dash (45) character to be buffered.

If no MASK = command is used then the default mask is what the buffer will use when the mask function is turned on. However, if the EEROM option exists then the mask to use will be loaded in from the EEROM.

The MASK ? command will return a listing of which characters are allowed to be buffered by the current mask setting. The data returned is a listing of the ASCII codes in decimal for the characters that will be stored.

## EOL

*EOL=NN*

The EOL command is used to set a new end of line character for received call records. The CR or LF characters maybe selected for the call record end of line character through the use of the DIP switch #C-4 selection. If the CR or LF character does not end the line for the record, then the EOL command may be used. The character value for the new end of line character is set to NN. For example, if a control-C character ends the call record, then the command to set the end of line character to the control-C character would be EOL=03.

The CR character should not be set as the end of line character through the use of this command, as the CR must be used to end the command lines. If the CR character is the end of line char ac ter, then the DIP switch #C-4 selection must be used to select the CR as the end of line character.

If the SWITCH3= command is used, then the EOL character will be set to the selection of the #C-4 DIP switch. The same will occur when the DEFAULT command is used. In either of these cases the EOL= command will need to be used to restore the EOL character to the desired value.

## CALLOUT RELATED COMMANDS

The PBXpress unit, when provided with either an external or an internal modem, may initiate a phone call to transfer data from the buffer. There are four methods of causing the PBXpress unit to initiate a phone call. These are:

1. Percentage Full.

2. Scheduled Callbacks.

3. Disconnection Callback.

4. Power Failure Alert.

All of the callback functions are set via the use of the CALLBACK command, as described below. The CALLBACK command is used to set the phone number to call, the number of times to retry the phone number if no connection is made, the timeout value, the percentage full callback percentage, the callback schedule, etc. The functions to set up the callback parameters are entered in an interactive display performed by the CALLBACK command. Additionally the CALLBACK command can be used with parameters to display the callback settings and to initiate the disconnection callback.

The percentage full callback is initiated when the buffer reaches a predetermined percentage full. The default value for the percentage full is 80%, and this can be changed with the CALLBACK command. The buffer can be allowed to collect data until it is nearly full, then initiate a call to download the data. Either the internal or external modem can be used with the percentage full callback.

The scheduled callbacks are used to cause the buffer to download its data on a schedule based on time. Each day of the week can be selected to have a callback time, and the buffer will initiate a call to download data at that time. This callback method requires the use of the internal modem/clock card, and cannot be used with the external modem.

The disconnection callback can be used by connecting to the buffer via the internal or external modem, and issuing the CALLBACK command. The CALLBACK command has a parameter for how much time the PBXpress unit should wait before placing the call. With this method a transfer can be initiated by the polling computer, but the phone call charges can be reversed by having the buffer place the call. This callback method is available with either the internal or the external modem.

The power failure alert callback can be used it initiate a call to download data in the event of a power failure. The CALLBACK command is used to set this function on and off, and to establish the amount of time that the power must fail for before the callback is initiated. This feature allows the buffer to place a call and download data in the event of a power failure, so that data is not lost if the power failure extends beyond the capacity of the battery backup time. This feature can also be used to alert the polling computer of the power failure at a remote site. The power failure alert callback can be used with either the internal or the external modem.

When the PBXpress places a callback, the reason for the callback can be sent from the buffer. Additionally, the data header can be sent to identify the buffer. The CALLBACK command can be used to cause the data header to be sent or not, and the reason for callback to be sent.

The real time clock provided on the modem/clock card can be set using the CLOCK command. The use of this command is setting the real time clock and reading the time and date from the clock is described below.

## CLOCK

*CLOCK SET* *Use the interactive routine for setting the clock*
*CLOCK?* *Display the clock setting*

The CLOCK command is used to set the time for the real time clock, or to read the time and date from the clock. If the CLOCK command is used with the SET parameter, then an interactive clock time and date setting routine is entered. If the CLOCK? command is used then the current date and time are returned as a response.

When using the CLOCK SET command, any invalid entry will result in an error message. Pressing ENTER only at any entry request will result in the clock set routine being aborted with no clock update done.

## CALLBACK

*CALLBACK SET* *Sets the Callback parameters*
*CALLBACK ##* *Callback on Disconnect, ## seconds after disconnect.*
*CALLBACK ?* *Display all callback parameters.*
*CALLBACK ** *Display reason for callback*

The CALLBACK command is used to set up callback parameters, read the callback parameters, display the reason for a callback, and to cause the disconnection callback.

With no parameters, the CALLBACK command will enter an interactive routine to set the callback parameters (such as the phone number to call, retries, timeout time, percentage full callout on/off and percentage, etc).

With a number for a parameter, the CALLBACK command will cause the buffer to perform a callback after disconnection. The amount of time, in seconds, to wait before placing the call is sent as the numerical parameter.

The ? parameter may be used to display all the callback parameters for examination.

The * parameter is used to display the reason for a callback. After the call is answered this command can be used to determine the reason for the callback. The callback reason can be sent by the PBXpress immediately after the callback is answered by the host computer, if the reason for callback function is enabled with the CALLBACK parmeter setting function. The * parameter can be used if the reason for callback function is off.

## MODEM

*MODEM 7E*
*MODEM 7O*
*MODEM 8N*
*MODEM="SETUP STRING"*

The MODEM command is used to set the parity and word length for the internal modem. The parameters specify either 7 data bits and even parity, 7 data bits and odd parity, or 8 data bits and no parity. The default setting is 8 bits with no parity.

The MODEM command can be used to change the modem to 7 data bits with a parity selection so that the computer polling data from the model 525 via the internal modem can check for parity errors.

The MODEM= selection allows you to specify a modem setup string for use with an external modem. If you select to use an external modem, the PBXpress will send this command to the modem every two minutes when it is not in use. This ensures that the modem will be operate correctly, even if it is reset for some reason. If a custom setup string is not specified using this command, the PBXpress will use the default setup strin of ATS0=1E0V0.

Due to the nature of the Xmodem transfer protocol, when the Xmodem transfer protocol is used the modem must be set for 8 bits with no parity. The PBXpress unit will automatically reconfigure the modem for 8 bits with no parity when the TRANSFER XMODEM command is used. After the XMODEM transfer is completed, the PBXpress will automatically change the modem parity and word length configuration back to the setting before the Xmodem transfer was initiated.

The MODEM command can be abbreviated with the command MD.

## DIP SWITCH OVERRIDE COMMANDS

### PASSWORD

*PASSWORD ON*
*PASSWORD OFF*
*PASSWORD = "NEW PASSWORD"*

The password is used when the external or internal modem answers a phone call. A message is sent to identify the PBXpress unit and the model 525 then waits for the proper password if the password function is enabled. The DIP switch C-8 determines if the default is to require or not require a password.

The PASSWORD ON and PASSWORD OFF commands enable and disable the requiring of the password, and these function will override the DIP switch selections until the password DIP switch C-8 is changed.

The default password is "SMDR". This password can be changed to a user specified password with the PASSWORD = command. The password may be up to 12 characters in length. If a new password is entered that is longer than 12 characters, only the first 12 characters will be used.

The abbreviation for the password command is PS.

### FLOW

*FLOW ON*
*FLOW OFF*

This is a software override for the Flow Control DIP switch selection. Essentially, if the FLOW function is OFF, then the only way to release data from the PBXpress is by using a TRANSFER or RELEASE command. The presence of XON/XOFF or DTR handshaking signals on the output port will, by themselves, not release any data.

If the FLOW function is ON, then XON/XOFF or DTR handshaking alone may be used to control data output from the buffer, in addition to and as an alternative to using a TRANSFER or RELEASE command. If the FLOW function is ON, data release will commence upon receipt of an XON code, or a valid DTR signal (depending on how the handshaking is set on the DIP switch for that port).

This command overrides the DIP switch selection that controls the FLOW function, and will remain in effect until either a new FLOW command is received or the corresponding DIP switch is changed to a new position.

If a data transfer command (e.g. RELEASE) is used, then the data transfer method will change to the command oriented data transfer. However, if the FLOW function is ON, the receipt of the proper handshaking signals will cause data transfer from the buffer. In this mode the data is cleared from the buffer when it is sent out. This enables the buffer to be set up to use simple Xon/Xoff and/or DTR handshaking to control data transfer, without the use of the command structure.

The hold/release switch is only active when the FLOW function is ON or the DIP switch selection has selected the FLOW function to be active. When the switch is in the hold position, no data may be transferred from the buffer (except by the command structure and by the internal modem). When the switch is in the

release position, then data transfer based solely on the handshaking may occur.

The FLOW command may be abbreviated with the command FW.

### SWITCH

*SWITCH1=X*
*SWITCH2=X*
*SWITCH3=X*
*SWITCH?*

The SWITCH function is used to override the current hardware DIP switch selections and establish a new selection. Switch 1 sets the parameters for the input port, switch 2 for the output port, and switch 3 for the other DIP switch programmable functions.

X may be either a decimal number 0 to 255, a hexadecimal number from 00 to FF, or a binary number from 00000000 to 11111111. If a hexadecimal number is used it must be followed by the character H, and if a binary number is used it must be followed with the character B.

The new switch value will remain valid until a change is made to the corresponding DIP switch.

This command is intended for use in remote debugging especially via the internal modem, and is not for general use. It is recommended that any DIP switch changes established by the use of the SWITCH commands are implemented by changing the corresponding DIP switches on the Model 525 at the first possible opportunity.

The SWITCH? command will return the current settings of the DIP switches. The format for the response is a binary representation of the switch positions, with a zero representing the switch as OFF, and a 1 representing the switch as ON. The digits from the left to the right correspond to switches 1 through 8. There will be three sets of digits (one for each set of switches) followed by a carriage return for each line, and the entire block of information is followed by another carriage return.

The command may be abbreviated with the command SWT.

### COMPRESS

*COMPRESS ON*
*COMPRESS OFF*

The COMPRESS command is used to turn data compression on and off. If data compression is being used, then the data is compressed before it is stored in the buffer. Data compression cannot be used if there are data characters in the record which have a value greater than 127 (80 hexidecimal or greater). This command overrides the switch setting on the Model 525 DIP switches, and will remain in effect until either a new COMPRESS command is sent or the data compression switch on the DIP switches is changed from its current setting.

The COMPRESS command can be abbreviated by the command CMP.

## TEST AND DEBUG COMMANDS

### MEMTEST

The MEMTEST command causes the buffer to perform a memory test on the buffer's memory. This test will destroy all data in the memory, and so will also act like the ZERO command.

The buffer will test the memory and respond with the results of the test, including how much memory was found, if there was an error, and the location of the first error found.

Due to the data destroying nature of this command, there is no abbreviation, and its use is in testing and setup of the buffer.

### TESTMSG

The TESTMSG (test message) command causes a test message to be sent out the output serial port continuously. This can be used to test the configuration of the output serial port and test the cabling setup. The test message is "THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 0123456789" with a carriage return at the end of the message. This message is repeated over and over, until and unless the ESCAPE command is sent.

The TESTMSG command can be abbreviated with the command TM.

### ECHO

The ECHO command is used to relay out the output port any characters received on the output port. It is used to test the output port configuration and the cabling between the buffer and the host computer. Any characters that are received are sent back out the output port as they are received. The ESCAPE command is used to terminate the command. Any other commands or characters received are just echoed out the output port, so no other commands will have any effect until the ESCAPE command is used.

The ECHO command does not have an abbreviation.

### BYPASS

The BYPASS command bypasses the buffer to give you 2-way communication directly with your switch or PBX. No data is stored in this mode. A 256 byte buffer is provided to allow for different data rates between the input and output ports. However, if the input port is running at a higher baud rate than the output port the data may not be able to be relayed out the output port as fast as data is received. For this reason it is recommended that this command be used only when the input and output ports use the same baud rate, or the output port uses a higher baud rate than the input port.

The BYPASS command may be terminated by the END character (see next command). Other commands will not have any action until the END character has been used to terminate the BYPASS mode.

The BYPASS command can be abbreviated with the command BP.

### END

*END=nn*

The END command allows you to specify the END character which will terminate BYPASS mode. The defulat is 27. This command is used as in END=27 or END=128.

### DEBUG

The DEBUG command is used to analyze call records as they are received by the buffer. In this mode each call record that arrives at the buffer on the input port is transmitted out the output port as well as stored in the buffer. I f the record filter is ON then the record is analyzed by the filter and may not be stored in the buffer memory. However the record will always be sent out the output port. The same restrictions on baud rate which apply to the BYPASS command also apply to the DEBUG command. The DEBUG command is terminated by sending the END character. Commands can be sent to the buffer. Use of the RELEASE command will terminate the DEBUG command.

## STATUS COMMANDS

### RECORDS

The RECORDS command returns a number that is the count of how many complete records are in the buffer memory.

This number will be a seven digit number representing in decimal the number of records stored in the buffer. Any leading zeros in the response will be replaced with spaces. The response will end in a carriage return and optional linefeed code.

When polling records from the Model 525 the user may want to know how many records exist to be polled. When the RECORDS command is used then a new partition will be established and the records will be counted. The number of records returned therefore represents the number of records that are available for transfer at that point in time.

If one or more records arrive to be buffered between the time that the RECORDS command is used and the time when the RELEASE command is used, then the actual number of records to be transferred will be different than reported by the RECORDS command. Since both the RECORDS command and the RELEASE command can establish the partition, the proper sequence for use would be to use the RELEASE command to set the buffer up for data release (using the WAIT function so that data is not immediately released) and then using the RECORDS command to determine the number of records to be transferred. The partition used by both the RECORDS command and the data release function will then agree.

The abbreviation for this command is RC.

### FREE

The FREE command will return the free memory space that the buffer has available for records. The value returned will be a seven digit number with the leading zeros replaced with spaces. The response will terminate in a carriage return and optional linefeed code. Essentially this value is the amount of memory space available in the buffer that is outside of the current partition.

The abbreviation for this command is FE.

### AVERAGE

The AVERAGE command is used with no parameters. This command can be used to compute the average number of bytes that are used in memory to store the call records, and compare the stored number of bytes versus the number of bytes that the call record originally contained. This feature requires that there is at least one record in the buffer. If no records are cur rently stored in the buffer the average cannot be computed, and an error message will be returned. By com par ing the size of the record in buffer memory and the received size of the record, the efficiency of the data com pres sion technique can be analyzed. Once a realistic average record size for the stored records is established, the number of records that the buffer can store for a particular ap pli ca tion can be well approximated.

The AVERAGE command can be abbreviated with the command AVG.

### POWER

The POWER command has no parameters. The buffer will return one of two responses. If power is being derived from the AC power supply, the response will be "AC LINE" followed by a carriage return and optional linefeed character. If the buffer is being powered by the internal battery, then the response will be "BATTERY" followed by a carriage return and optional linefeed code.

The command may be abbreviated with the command PW.

### PERCENT

The PERCENT command returns a value for the percentage of memory used by records, both inside of and outside of any partition. The percentage will range from 00 to 99 %.

The response will be followed by a carraige return (and a linefeed if the ADDLF function is ON).

The abbreviation for this command is PC.

### DISPLAY

The DISPLAY function presents a response that describes the various settings of the PBXpress unit.

The abbreviation for this command is DSP.

## OTHER VARIOUS COMMANDS

### STORE

The STORE command is used when the optional EEROM is installed. This command stores in the EEROM the current settings of the buffer. If this optional EEROM is not installed, this command will give you an error message.

### LOAD

This command loads the parameters settings from the EEROM (if one exists). On power-up this command is automatically used to set up the PBXpress based on information in the EEROM. If the buffer has some functions changed after power-up the LOAD command can be used to restore the settings to those in the EEROM.

### SCRATCH

The SCRATCH command clears the EEROM of any stored settings. The PBXpress will use its standard power up default settings when next powered up, until a new STORE command is done.

### DOWN

The DOWN command causes the PBXpress to output a file which represents all the current settings and parameters of the unit. This file can be used to configure a PBXpress unit to those same settings. After entering the DOWN command, the PBXpress will prompt the user for a CR. At this point you should prepare to capture and save this file to disk. Any popular terminal program should have this capability. After the CR is received by the PBXpress, a file of data will be sent which contains information on all settings of the PBXpress. This file can be used to set up the same or other PBXpress buffers, including format fields and statements and filter fields and statements.

The first line of the downloaded file contains the command UP. This command is not intended for use by the user directly, only when used with a downloaded file.

To configure a buffer with the downloaded file set the PBXpress up and turn it on, and use a terminal program to download the file (in a straight ASCII transfer) to the PBXpress. Another method to configure the buffer would be to copy the downloaded file out the COM port of the computer to the buffer. With this method you must ensure you have set the baud rates of the PC correctly. A batch file could be written to upload this file. An example would be:

```
MODE COM1:2400,N,8,1,P
COPY SETTINGS.DAT COM1:
```

## EXEC

| | |
|---|---|
| *EXEC=* | *Set EXEC command line.* |
| *EXEC?* | *Read EXEC command line.* |
| *EXEC ON* | *Enable EXEC function.* |
| *EXEC OFF* | *Disable EXEC function.* |

The EXEC function controls an autoexecute function for use with modem communications. The EXEC = command allows you to set a sequence of commands the buffer should execute. When the EXEC function is enabled this command line can be automatically executed after the modem makes a connection. When answering a phone call or when making a callback, the PBXpress will wait for a command line for 15 seconds. If no command line is entered within this time, the EXEC command line will be executed.

If the password function is enabled then the 15 second waiting period will commence after recognition of a valid password.

EXEC= is used to set the EXEC command line.

Example:

```
EXEC=HEADER?:RELEASE:CLEAR:BYE
```

This command line would cause the buffer to display the header, release all records, clear all records released and terminate the phone call.

EXEC? will display the current EXEC command line.

EXEC ON and EXEC OFF are used to enable and disable the EXEC function.

## RESPONSE

*RESPONSE WORD*
*RESPONSE CODE*

The RESPONSE command tells the buffer whether the responses, acknowledgments, and error messages to commands should be in English text or in single character codes.

The default for this command is the WORD mode, so that responses are given in English.

This command can be abbreviated with the command RP.

### DUPLEX

*DUPLEX HALF*
*DUPLEX FULL*

This command determines if the buffer echos back out the output port the command line characters. HALF sets the buffer to not echo the command line, and FULL sets the buffer to echo the command line characters.

The function is only valid for command lines. The default setting for the duplex function is HALF, so that the command line is not echoed back out the output port while the command is received.

This command can be abbreviated to DP.

### ADDLF

*ADDLF ON*
*ADDLF OFF*

The ADDLF command is used to instruct the model 525 regarding the addition of linefeeds to carraige returns. When the buffer sends a carraige return, either contained in a response or in echoing a command line, the ADDLF function determines if a linefeed is added to the carraige return or not. The default is to not add the linefeed character (ADDLF OFF). Depending on the terminal program that is being used, it may be desireable to change this so that linefeeds are added by the PBXpress to the carraige returns.
This function does not apply to the transfer of data records. The data records will retain the same format as they were recorded with.

The abbreviation for this command is LF.

### DEFAULT

The DEFAULT command does not have any parameters. It is used to set all settings for the buffer to their default values.

The DEFAULT command may be abbreviated with the command DF.

## RESPONSE WORDS AND CODES

When any command is issued to the PBXpress, a response will occur. Some responses are in the form of the PBXpress providing the requested data, such as call records. Other responses would be an acknowledgement of completion of a command or an error in attempting to execute a command.

The RESPONSE command allows you to select whether you should receive responses in the form of English words or as single character acknowledgement codes. The form of the command is RESPONSE WORD or RESPONSE CODE. Some responses to commands will always be in word form, such as with RELEASE or BYE.

The following chart gives the various responses which would result from each command, in both the word and code forms.

| Command | Word Responses | Code Responses |
|---|---|---|
| RELEASE | OK or Data | ACK or Data |
| NEXT | Data | Data |
| RESEND | Data | Data |
| | *if end of data partition, RESEND responds with:* | |
| | ACK CR END DATA CR | ACK |
| HEADER = | OK | ACK |
| HEADER ? | Data | Data |
| BYE | DISCONNECTING | DISCONNECTING |
| RECORDS? | Data | Data |
| FREE? | Data | Data |
| CLEAR | OK | ACK |
| ZERO | OK | ACK |
| TESTMSG | Message | Message |
| ECHO | OK | ACK |
| BYPASS | OK | ACK |
| DEBUG | OK | ACK |
| ESC | OK | ACK |
| | *(Response is not sent when ESCAPE is interrupting a function)* | |
| FIELD SET | FIELD STATEMENT ACCEPTED | SAME |
| | or INVALID FIELD STATEMENT | SAME |
| FIELD ? | Data | Data |
| FILTER NONE | FILTER STATEMENTS CLEARED | SAME |
| FILTER ON | OK | ACK |
| FILTER OFF | OK | ACK |
| FILTER ? | Data | Data |
| | or NO FILTER STATEMENTS | SAME |
| FILTER = | FILTER STATEMENT ACCEPTED | SAME |
| | or INVALID FILTER STATEMENT | SAME |

| Command | Word Responses | Code Responses |
|---|---|---|
| DEFAULT | OK | ACK |
| COMPRESS | OK | ACK |
| DECOMPRESS | OK | ACK |
| RESPONSE | OK | ACK |
| DUPLEX | OK | ACK |
| FLOW | OK | ACK |
| SWITCH = | OK | ACK |
| SWITCH ? | Data | Data |
| POWER | BATTERY | SAME |
| | or AC LINE | |
| MEMTEST | Data | Data |
| TRANSFER | Data | Data |
| PASSWORD | OK | ACK |
| MODEM | OK | ACK |
| SAFETY | OK | ACK |
| ADDLF | OK | ACK |
| PERCENT | Data | Data |
| DISPLAY | Data | Data |
| CLOCK SET | OK | ACK |
| | or NO CLOCK INSTALLED | |
| CLOCK ? | Data | Data |
| | or NO CLOCK INSTALLED | |
| CALLBACK | OK | ACK |
| | or Data | Data |
| STAMP | OK | ACK |
| | or NO CLOCK INSTALLED | |

A bad command will result in the BAD COMMAND message in word response mode and the NAK character response in code response mode.

A missing or invalid parameter will result in the MISSING OR INVALID PARAMETER message in word response mode, and the NAK character in code response mode.

Linefeeds are added to the responses when a carriage return is sent if the ADDLF function is set on. The default is the ADDLF function off.

## TRANSFERRING DATA USING SIMPLE FLOW CONTROL (XON/OFF)

Data flow control for the PBXpress can be accomplished using DTR or XON/XOFF handshaking (among others). Additionally, the Hold/Release switch can be used to augment this release method.

When the PBXpress is first turned on, it sets the output port to a busy status. Then, upon receipt of a valid handshaking signal (based on the DIP switch setting), the PBXpress will commence release of its data. This method is used most often with XON/XOFF handshaking. When the PBXpress powers up with XON/XOFF handshaking selected on the output port, the output port is then set in an "XOFF" state. The buffer will wait for an XON before releasing any data.

This is one of the simplest methods of data storage and release using the PBXpress. A vital factor when using only XON/XOFF flow control is that you must send an XOFF code before you disconnect from the buffer. If you were using terminal software to download your data and after downloading you left the program without sending an XOFF to the buffer, all subsequent data coming in to the buffer would just go right out the output port.

Additionally, the Hold/Release switch can be used to prevent data flow out from the buffer. The main purpose of this switch is to ensure that no accidental release of information from the PBXpress can occur until the user is ready to accept and process that information, in addition to XON/XOFF handshaking. However, the Hold/Release switch could be used alone to release data. For example, if the output port is set on DTR handshaking and the Hold/ Release switch is on Hold, no data will be released from the PBXpress. When you are ready to process your data, switch the Hold/Release switch to Release and the data will be released into your computer.

If the Hold/Release switch is disabled (using the DIP switch C selection) then the Hold/Release switch will have no effect in either position, and data flow will be based only on handshaking.

The Hold/Release switch is only consulted in XON/XOFF or DTR Flow Control release mode. If any other methods of data release are used, such as Record Command Mode, the status and setting of the Hold/Release switch is ignored.

XON/XOFF controlled data transfer can also be done via a modem. In this case you would connect to the buffer modem and issue the command TRANSFER XON. The modem will then respond to XON/XOFF handshaking for the release of buffer data. No XOFF code need be sent at the end of data release with this method, although it is advisable. Upon loss of carrier, any remaining data will be held until called for.

## TRANSFERRING DATA USING RECORD COMMAND FORMAT

Record Command Format is a record oriented release method whereby you use the RELEASE command to specify the number of records to be released at each request, then you use the NEXT and RESEND commands to call for subsequent records. An example of a sequence of commands using this method would be:

| | |
|---|---|
| WAIT ON | (wait for a NEXT command to release data) |
| RELEASE 25 | (release 25 records with each command) |
| NEXT | (send the first set of 25 records) |
| | (check for RS232 parity errors) |
| | (use RESEND if errors are present) |
| | (look for ACK code indicating end of data) |
| | (repeat NEXT command until ACK code received) |
| CLEAR | (clear buffer memory of the now transferred data) |

The above would be a sample sequence of how these commands could be implemented in a program. The only error detection available with this method at this time is parity error detection, and this requires that the modem is set to 7 data bits plus even or odd parity.

## TRANSFERRING DATA USING THE XMODEM TRANSFER PROTOCOL

Whether directly connected to a computer or connected via a modem, this option provides the most reliable data transfer. Xmodem transfer protocol is a widely recognized protocol supported by many terminal programs. To use this feature, you would issue the command TRANSFER XMODEM. The PBXpress will then wait for the proper initiation of the Xmodem protocol by the downloading computer. Normally, you might type this command in a terminal program, then select an Xmodem Download. Your program will probably ask you for a filename to save the data under. Once you give that response, your terminal program takes over and transfers the data from the PBXpress to your computer. Error detection and correction occurs transparently, so you can be sure of getting a reliable transfer of your data. The Xmodem transfer automatically clears the buffer memory as the data is transferred, unless you have specified otherwise using the SAFETY OFF command. Then you would be required to send the CLEAR command after the Xmodem transfer was complete.

## USING THE PBXPRESS WITH A MODEM

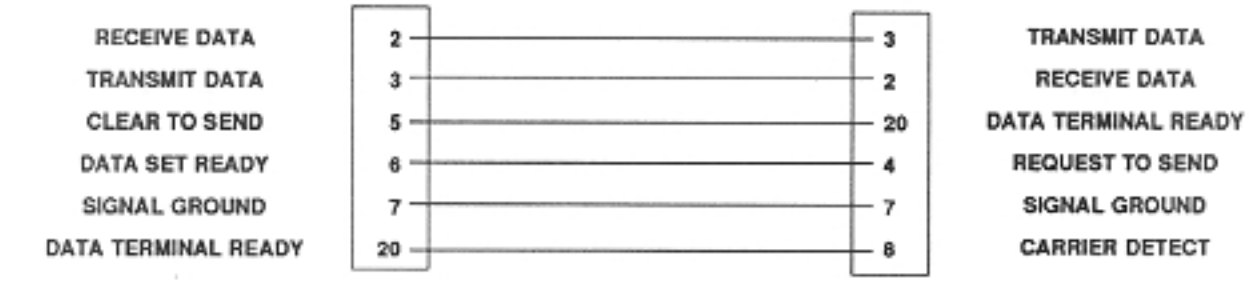
The PBXpress can operate with either an internal 1200 baud modem or with an external Hayes compatible modem connected to its output port. Through either modem you can transfer buffered information and select various parameters and settings. Once connected to the PBXpress through the modem, you can utilize all the command you normally could when connected directly to the PBXpress output port.

With either an internal or external modem, the PBXpress is designed to ask for a password before allowing access to the buffer. This password function can be enabled or disabled via a DIP switch selection on the botton of the buffer. The default modem password of the PBXpress is SMDR. This password can be changed using the MODEM command.

If the PBXpress has an internal modem installed, it detects this and configures the modem for autoanswer of a ringing phone line. If an external modem is used, a DIP switch on the bottom of the PBXpress must be set to indicate an external modem is present.

If an external modem is used, a special cable must be used between the PBXpress output port and the external modem. The connections of this cable are as follows:

### FIGURE 6. - CABLE CONFIGURATION FOR USE WITH AN EXTERNAL MODEM



This cable connects the Carrier Detect output of the modem to the PBXpress Data Terminal Ready input line, allowing the PBXpress to detect when the modem has detected carrier.

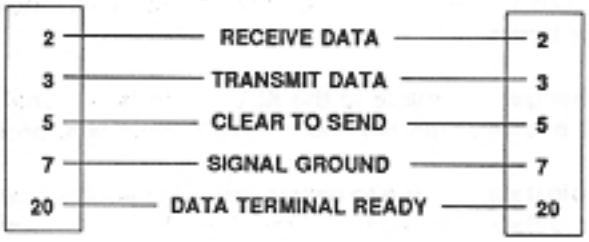
Once carrier has been detected and the password has been accepted, the PBXpress will operate as though you were connected directly to it, with one exception. On a direct non-modem connection, you could issue an XON code and the PBXpress would start releasing data. To release data via XON/XOFF codes on a modem connection, you must first issue the command TRANSFER XON. This command is covered in the section on commands.

## TEST FEATURES

The PBXpress has two built-in test features to allow testing in the field of the unit. To use these test features a direct cable must be connected between the PBXpress input and output RS232 connectors while the power to the PBXpress unit is off. This cable needs to have pins 2, 3, 5, 7, and 20 of the input port connected to the same numbered pin on the output port. The cable may either connect only these pins, or it may make a straight through connection on all 25 pins. Figure 7 on the next page shows a cable designed to be used for this self test feature. The purpose of this cable is to tell the PBXpress to do its self test, and to allow the PBXpress to transmit data back and forth on this cable.

The first test feature is a short test which checks memory and verifies the correct operation of the input/output ports. The second test is an extended memory test which takes about 7-8 minutes. To run the short test, have the Hold/Release switch in the Release position. To run the extended test, have the Hold/Release switch in the Hold position.

### FIGURE 7. - CABLE CONFIGURATION FOR PBXPRESS SELF TEST




To execute a self test, DIP switches A and B should be set so that all switches are OFF except switch 4 which is ON. After the cable is installed and the DIP switches are correctly set then the unit is turned on. The built in test feature will sense that a cable is directly connected between the ports and the test will begin.

With the Release switch set to Release, the PBXpress will test the RS232 ports for sending and receiving of data, and will perform a memory test. A short memory test will be done. A successful test will be indicated by the Hold indicator light flashing about 20 times. The test will then repeat.

With the Release switch set to Hold, a 7-8 minute memory test will be done. No data transmission test is done. A successful test will result in the Hold LED indicator flashing about 20 times. Then, the 20% full light will be left on and the test will be repeated over and over.

If either test fails, then all of the percentage full indicator LEDs will flash on and off repetitively to indicate a failure.

#### SELF TEST STATUS INDICATORS

a) If the self test is passed, the Hold Indicator will flash 20 times.
On the extended test, the 20% Full light will remain on.
b) If the self test fails, the Percentage Full indicator will flash continuously.

## TECHNICAL SPECIFICATIONS

Memory: 64K x 1, 256K x 1, or 1 Meg x 1 Dynamic RAM

CPU: V25 Microcomputer with 64K of EPROM program storage.

RS232 Port Selections:
8 Baud rates from 150 baud to 19200 baud.
7 or 8 bit word length
Even, Odd, or No parity

LED Indicators: Hold, Data In, Data Out, Percentage Full (4), Power, Modem.

Controls: Power switch, Hold/Release switch, three eight position DIP switches for RS232 port configuration and other selections.

Size: 3" x 11" x 7" (HxWxD)

Weight: 5 lbs. (including internal battery)

Battery: 12 Volts 1.2 Amp-hour gelled electrolyte sealed battery.

Power: Wall mount UL approved AC adaptor providing 10 VAC at 10 VA.

## TERMINOLOGY

Definitions for some of the terms appearing in this manual are listed below. This section of the manual can be used to help clarify these terms.

Baud rate: The rate at which changes are made to the RS232 interface signal lines. Roughly the baud rate divided by 10 gives the number of characters per second (1200 baud is approx. 120 characters per second)

Buffer: A device to collect and hold data until it is to be transferred to another device. In this case the PBXpress is a buffer which holds call record data until it can be transferred to a computer.

Call record: A description of one or more phone calls made which is generated for accounting or other record-keeping purposes. Call records are generated by the PBX and buffered by the PBXpress.

Data Compression: A technique to allow more data to be stored in memory than normally would be allowed.

Data Flow: The sending and receiving of data on the RS232 interface. The data flow is controlled by either DTR or XON/XOFF handshaking.

DCE: Data Communications Equipment. One possible configuration of the RS232 interface. Similar in pin connections to a modem or PBX. Compare DTE.

DTE: Data Terminal Equipment. One possible configuration of the RS232 interface. Similar in pin connections to a computer or a printer. Compare DCE.

DTR Type Handshaking: The DTR line is brought high and low to start and stop data transmission. A high signal on the line indicates readiness for data transfer, and a low signal indicates that no data transfer should occur.

Handshaking: The methods used to control the transfer of data are called handshaking. Handshaking is used to start and stop transfers of data so that data is not missed or sent when a device is not ready to receive the data.

Hold Mode: A mode of operation in which the PBXpress collects and buffers data, but does not release any information.

LED: Light Emitting Diode. The red indicator lights on the front panel of the PBXpress are LEDs.

PBX: Private Branch Exchange. A telephone device that controls operation of phone lines, including routing and placement of calls. Most PBXs will send out call records which give information on calls made including duration, number called, and which extension placed the call.

Release Mode: An operating mode of the PBXpress in which data may be released from the internal buffer.

RS232: This is the name of the type of interface used to send and receive the call record data from the PBX and to the computer. Data is sent in a serial fashion using voltages which are typically plus and minus 12 volts.

Switch: An alternative term for the PBX.

XON/XOFF Handshaking: A method of handshaking in which characters are sent to control the flow of data. The X stands for transmission. The XON code, also known as DC1 or CHR$(17), is used to start transmission of data. The XOFF code, also known as DC3 or CHR$(19), is used to stop transmission of data.