Porter ™

Code activated switch

INSTALLATION
AND
OPERATIONS MANUAL

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Introduction

This manual contains information for the installation and operation of the Porter, Rose Electronics' name for its series of code activated switches. The Porter consists of a switch unit and a separate wall mounted power adapter. You have chosen a versatile microprocessor controlled switch that allows a computer to access serial devices such as modems or instruments. The selection is through a code that is transmitted intermixed with the normal data to the device. Since the Porter has buffer memory, each device may simultaneously load data into the unit. The serial models allow different baud rates and protocols to operate independently on each port with full duplex communications. All equipment is connected by cables to the Porter's rear panel. The unit's external power adapter connector and on/off switch are also n its rear panel. The Porter's front panel has 13 LEDs which display status information and switches which are used to manually control the unit and run the unit's diagnostics.

Features

- One computer to many peripherals
- Compatible with any computer – PCs, Macs, minis
- Compatible with all printers and plotters
- Simultaneous inputs from all computers
- Up to 256K buffer
- Serial (RS232) or parallel (Centronics)
- Models for either four or eight devices
- Advanced features for trouble-free performance
- LEDs show data activity and status
- Self-text and diagnostic features
- Made in USA

Model Number and Options

The Porter is available in several models, 4 or 8 channels, serial or parallel, and with a 16K base buffer (Expandable to 256K). The model numbers are:

PO-4S – 4 port serial PC-8S – 8 port serial PO-4P – 4 port parallel PO-8P – 8 port parallel /B buffer options = 64K or 256K	Serial models have 2 options: 1- RS422 type ports 2- Max baud rate of 38400 (All standard baud rates are doubled with this option)

Getting Started

First Steps

Congratulations! You have chosen one of the best code activated switches on the market. The paragraphs below summarize the steps to integrate the Porter into your environment.

Contents

You should have received the Porter system unit, a power adapter, and this Porter installation and operations manual. If additional cables were ordered, they usually arrive in the same package.

Connecting the Cables

Cabling is one area you should pay careful attention to. Consult the cabling guides in this manual for the correct pin outs. If you need assistance, contact our tech support, we will be happy to assist you.

Configuring the Porter

The Porter is a versatile unit. It can be configured to match the type of equipment that you have. To configure the switch requires connecting a computer or terminal to the configuration port on the porter – port 0.

If you have a PC, then you run a terminal emulation program to setup the Porter. The parameters are saved in the Porter. From time to time as you change the configuration of your equipment, you may need to adjust the configuration of the Porter. You do not have to have a PC to use the switch or configure it.

Configuring your Computers

The final step is to make sure that your computer's software is configured to access the features of the Porter. This involves setting up the proper communication settings for serial ports and providing a method to issue commands to the Porter. The commands are typically issued from PCs by user software or from batch files. If you use serial ports on PCs, it is required to setup the AUTOEXEC,BAT file with the proper DOS MODE statements.

If You Have A Problem

Well we certainly hope all goes well with your installation, but if there is a problem, we are only a phone call away. If you have already installed the switch and something is not right, it can be helpful to be at the switch location and at the computer connected to port 0 on the Porter when you call. The front panel of the Porter is very useful to diagnose problems that can occur.

Where to Go From Here

We would like to think that you would read the rest of this manual, it may not be the most exciting reading material, but at least scan through it for the key points. Use it to get the correct cabling information. Thank you for choosing Rose Electronics and the Porter.

MODELS

<u>Front panel</u>
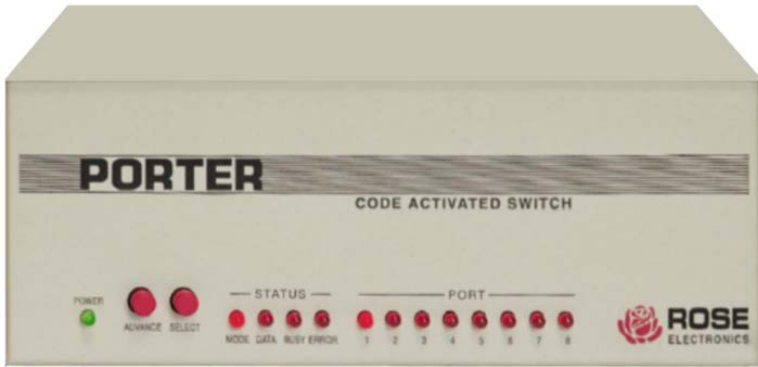
Indicators	Description
Power	Green LED
Status	
Mode	On=manual / Off = normal
Data	On=data being transferred
Busy	On = dataflow inhibited
Error	On = data error received on serial ports
Port	
(1-8)	On = active port
Buttons	
Advance	Advance to next port
Select	Select port

M	D	B	E	1	2	3	4	5	6	7	8	
o	o	o	o	●	o	o	o	o	o	o	o	Note 1
o	o	o	o	o	o	o	o	o	o	o	o	Note 2
o	o	o	o	●	●	●	●	●	●	●	●	Note 3
●	o	o	o	x	x	x	x	x	x	x	x	Note 4
●	●	●	o	o	o	o	o	o	o	o	o	Note 5

Note 1 ….. Unit operational, normal mode, connected to port 1
Note 2 ….. Unit operational, normal mode, null destination
Note 3 ….. Unit operational, broadcast mode, all ports selected
Note 4 ….. Unit in manual mode, displays current port connected
Note 5 ….. Unit in configuration (setup) mode

Rear panel (Serial model)
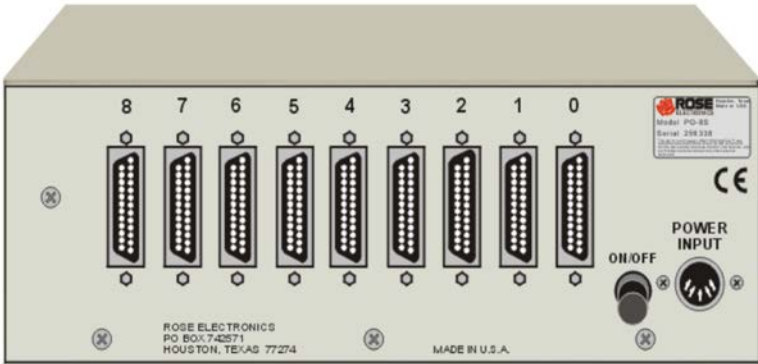
Connectors	Description
Port 0	DB25F – Connects to computer
Ports 1-8	DB25F - Connects to 8 serial devices
Power input	Din5F
Switch ON/Off	Turn unit on or off

Serial 25 pin PC to PO-8S
Rose part # CAB-PCRSx

Serial Printer to PO-8S
Rose part # CAB-PRRSx

Modem to PO-8S
Rose part # CAB-SMMx

DB-25F		DB-25M
2	-	3
3	-	2
7	-	7
5-6-8	-	20

DB-25M		DB-25M
2	-	3
3	-	2
7	-	7
20	-	6

DB-25M		DB-25M
2	-	2
3	-	3
6	-	6
7	-	7
20	-	20

Serial 9 pin PC to PO-8S
Rose part # CAB-ATRSx
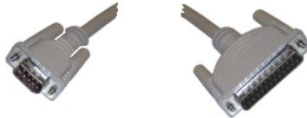
DB-9F		DB-25M
2	-	2
3	-	3
5	-	7
1-6-8	-	20

Rear panel (Parallel model)
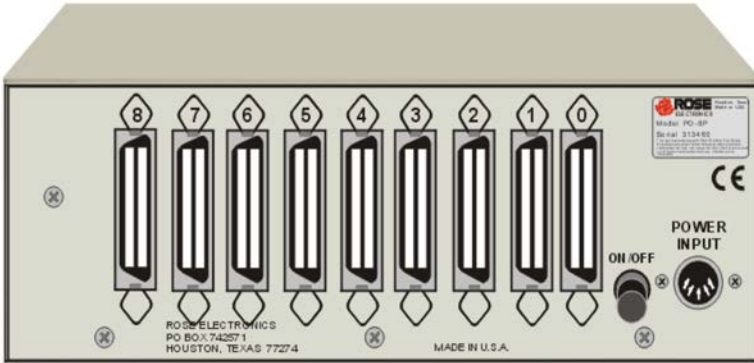
Connectors	Description
Port 0	Centronics – Connects to computer
Ports 1-8	Centronics - Connects to 8 parallel devices
Power input	Din5F
Switch ON/Off	Turn unit on or off

Parallel 25 pin PC to PO-8P
Rose part # CAB-IBMPx

Parallel printer to PO-8P
Rose part # CAB-PMMx

Pinout is that of a standard
PC parallel printer cable

Cable has Centronics male
Connectors on each end

Quick set-up

Serial Porter

1. Connect your computer terminal to port 0 with the proper cable.
   Refer to Appendix B for a list of common cables
2. Connect the power adapter, turn on the unit, power LED = Green
   Power-up sequence test will start
3. If the serial factory default protocol of 9600 BAUD, no parity, 8-bits, 1-stop, and DTG flow control for all ports is acceptable, skip step 4.
4. In this step, you will be shown a quick method of configuring the Porter. For additional help, refer to the "Configuration" section for more detailed information.
   a. Connect a computer (running a terminal emulator communication program such a Procomm, or MasterLink supplied by Rose Electronics) or a dumb terminal to port 0 on the Porter. Set your computer or terminal to 9600 baud, no parity, 8 bits, 1 stop bit, and full duplex.
   b. Send *ESC@S* to the Porter. The MODE, DATA, and BUSY LEDs will light, the configuration menu will appear.
   c. For this step, you will be prompted to enter a choice of menu select numbers (followed by a carriage return) for the item you wish to configure. You will be prompted for all the proper responses. Enter 1 to change the protocol of any port. Enter 7 to save the changes. Enter 8 to exit the configuration menu. A configuration termination message appears, and the MODE, DATA, and BUSY LEDs will go out. Note that you must save your changes before exiting the configuration menu or they will be lost when you do step D.
   d. Turn off the Porter.
5. Connect the Porter's ports 1-4 (or 8) to your devices with the correct cables. Connect your computer to port 0. Cables must be wired correctly according to the section on cabling.
6. If the Porter is not already on, power it on. The LEDs will sequence through power up tests.
7. Send data from your application or print program. Data will be routed automatically to the current connect port
8. Read this manual and use the configuration procedure if you want to change the prefix, power-on connect port, or the broadcast group. See the section on "Configuration" for further information.

Parallel Porter

1. Cable your devices to ports 1-4 (or 8) with a straight-through cable that has male Centronics connectors on each end.

2. Cable your computer to port 0 with your computer standard parallel Centronics cable.

3. Connect the power adapter and turn the unit on. The power light should glow green. The LEDs sequence through the power up tests. The ERROR LED will be on for any errors. See Tables II and III for the LED sequences.

4. Send data from your application or print program. Data will be routed automatically to the current connect port.

5. Read this manual and use the configuration procedure if you want to change the prefix, power-on connect port, or the broadcast group. See the section on PORTER COMMANDS for further information.

Configuring Your PC

If you have a serial Porter, you must make sure that you set up your serial port for the correct baud rate and LPT1; redirection (if necessary). Redirection refers to the ability for data sent to a parallel port to be sent to a serial port instead. Dos has a command (the MODE command) to do this. So, for example, if you will be using the factory default protocol of 9600 baud, 8-bit word length, no parity, and 1 stop bit, then you need to include in your AUTOEXEC.Bat file the following statements:

MODE COM1;96,N,8,1,P

MODE LPT1:=COM1

Your application software must be set up to match the setting of the port on the Porter that you will be using. If you will be using redirection, you must install your program(s) to use the parallel port; otherwise, the setting of the serial port must exactly match the setting of the Porter's port that you will be using. Many of today's software packages have a flexible method of printing such as using the settings from the DOS MODE command or a configurable printer setup. For these programs, setting up the program to use the parallel port, and then redirecting LPT1 to COM1 using the DOS MODE command is the simplest method.

However, some programs have fixed settings that can't be changed; and example of this type of program is AutoCAD, Ventura Publishing, and others. Some of these programs such as Ventura, can be setup to use the parallel port and redirect the output with the DOS MODE command. For the rest of these programs this method will not work; in these cases, you must set the serial port of your computer to exactly match the setting of the Porter's port that you will be using.

If you have a parallel Porter, you don't need to worry about serial protocols and redirection. You should install your software package(s) to use the parallel port when printing. It will also be useful to put the following statement in your AUTOEXEC.BAT file:

MODE LPT1:;;P

This statement will set the parallel port for infinite retry.

Installation

You should have received the Porter switch unit and a power adapter that connects to the rear of the unit. You should have the necessary cables, supplied separately, to interconnect the Porter with your other equipment. Ensure that the power switch is in the off (out) position. Connect the AC power converter to a power outlet. Connect the other end to the power input on the rear of the Porter.

Cable connection

Using the cables as described below connect your computer to the port labeled "0" on the rear of the Porter. Connect your peripheral devices to the numbered ports on the rear of the Porter.

Serial cables

Since industry standards vary regarding RS232 cabling, caution must be observed when interconnecting your equipment with the Porter. Generally 5 signals or less must be connected. They are receive, transmit, signal ground, busy in, and busy out. Porter's RxD (pin 3) must be wired to the equipment transmit and Porter's TxD (pin 2) must be wired to the equipment receive. Porter's signal ground (pin 7) must be connected to the equipment signal ground. Busy in and busy out are not required when sing the X-on/X-off protocol. When X-on/X-off is not used, busy out of the equipment must be wired to DSR (pin 6) of the Porter and busy in of the equipment must be wired to DTR (pin 20) of the Porter.

Busy out on the equipment is required to prevent the Porter from sending more data than the equipment can handle. Conversely, busy in on the equipment prevents the equipment from sending more data than the Porter can handle. While the Porter is capable of handling data bursts at maximum baud rates, if it can not resend the data received as fast as it gets the data, due to the equipment being busy and the input buffer being full, then busy in on the equipment must be used. Consult your equipment manual for information on pin numbers of your signals. Several popular cable pin outs are given in Appendix B.

Additionally the Porter's RTS (pin 4) will be high when the Porter is powered on and may be used to monitor whether the Porter is connected to your equipment. Refer to Appendix A for further Porter pin out information. Refer to Appendix B for cable pin out information. If you have a Porter with the /422 (RS-422) option, refer to Appendix A.

Parallel cables

For a parallel unit the computer to Porter cable is the same one that would normally connect to your printer. The Porter uses industry standard female Centronics connectors the same as used on most parallel printers. So, instead of connecting your computer cable t your printer, connect it to the port on the rear of the Porter labeled "0". Parallel Porter to printer cables should have 36 pins male Centronics connectors at each end. Connect these cables from your printers to connectors numbered 1-8 on the rear of Porter.

Configuration

After installing the Porter, it must be configured to match the protocol for your equipment. This consists of identifying the desired characteristics of your system and sending the appropriate control bytes to the Porter. Serial Porter units also can be configured through an interactive menu. The configuration may be stored in the Porter's non-volatile memory, whose contents will not be lost when removing the Porter's power.

Configuration of Serial Units

The proper protocol, baud rate, number of stop / data bits, and parity information must be set for each channel. This is done by using the interactive configuration menu, or by sending the proper format commands to the Porter. The Porter factory set default is 9600 baud, 1 stop bit, no parity, 8 data bits, DTR/DSR handshaking. Refer to the format command for further information.

The Serial Configuration Menu

You invoke the configuration menu – only on port 0 – by sending the command <prefix>S from a computer funning a communication program or a dumb terminal set at 9600,N,8,1. the configuration menu will then appear as shown in Table 1. <prefix> is factory set for the two characters ESC @ on a new unit, so initially use the string ESC @ S to get the menu.

Table 1 Configuration Menu Display

PORTER CONFIGURATION MENU REV 3.5 COPYRIGHT 1985 – 1991 ROSE ELECTRONICS

Installed memory . . . . 64K Prefix . . . .@

Power-on connect port . . 1 Broadcast group 1 2 3 4 5 6 7 8

Front panel switches . . . ENABLED Command purge . . . . . DISABLED

	- - - - - - - - - - Current protocol - - - - - - - - - -						- - - - - - - - - - Power up protocol - - - - - - - - - -					
Port	Baud	Parity	Len	Stop	Flow	DHS	Baud	Parity	Len	Stop	Flow	DHS
0	9600	NONE	8	1	DTR		9600	NONE	8	1	DTR	
1	9600	NONE	8	1	DTR	OFF	9600	NONE	8	1	DTR	OFF
2	9600	NONE	8	1	DTR	OFF	9600	NONE	8	1	DTR	OFF
3	9600	NONE	8	1	DTR	OFF	9600	NONE	8	1	DTR	OFF
4	9600	NONE	8	1	DTR	OFF	9600	NONE	8	1	DTR	OFF

1- Change port protocol
2- Change prefix
3- Change power-on connect port
4- Change broadcast port group
5- Change front panel switch control
6- Change command purge timeout
7- save new configuration
8- Exit configuration

Enter choice (1-8 or H for help)

Serial Configuration Menu Items

In the examples below, <ENTER> means "press the ENTER key", not type the characters <ENTER>. Output from the Porter is shown in Courier type. Input from the user to the menu is shown in Underlined Courier type.

Change port protocol

This option allows the serial parameters for a port to be changed. The changeable items are baud rate, parity, word length (data bits), stop bits, flow control, and DHS (direct handshake). If the protocol for port 0 is changed, the menu will prompt you to change your PC or terminal to the new baud rate and press <ENTER> to continue. Changes to the port parameters are not made permanent until either the "Save new configuration" option or the Keep command is used. You will be asked which port you want to change. Enter the port number or R to change a range of ports.

The range option will set any changed item(s) (i.e. baud rate, parity, etc.) to the new common value(s) for all the ports selected; however, any unchanged item(s) will remain at the previous setting(s). If you enter "R", you will be asked for the range of ports you want to change. The ending port number *must* be greater than or equal to the starting port number. Note that if you hit just a return to the ending port number, that port number will be the same as the starting port number and only one port will be changed.

Single Port
Enter choice (1-8 or H for help) <u>1<ENTER></u>
Enter the port number (0-8 or R) <u>3<ENTER></u>
Enter baud rate (19200, 9600, 7200, 4800, 3600,
   2400, 1800, 1200, 600, 300, 150, 134.5, 110, 75, 50) <u>1200<ENTER></u>
Enter parity type (N=None, E+Even, O=Odd, M=Mark, S=Space) <u>E<Enter></u>
Enter word length (5, 9, 7, 8) <u>7<ENTER></u>
Enter stop bits (1,2) <u>1<ENTER></u>
Enter flow control (D=DTR, X=XON/XOFF) <u>X<ENTER></u>
Use DHS (direct handshaking) (Y/N) <u>N<ENTER></u>

Range of Ports
Enter choice (1-8 or H for help) <u>1<ENTER></u>
Enter the port number (0-8 or R) <u>R<ENTER></u>
Enter the starting port number (0-8) <u>3<ENTER></u>
Enter the ending port number (0-8) <u>4<ENTER></u>
Enter baud rate (19200, 9600, 7200, 4800, 3600,
   2400, 1800, 1200, 600, 300, 150, 134.5, 110, 75, 50) <u>1200<ENTER></u>
Enter parity type (N=None, E=Even, O=Odd, M=Mark, S=Space) <u>E<Enter></u>
Enter word length (5, 9, 7, 8) <u>7<ENTER></u>
Enter stop bits (1,2) <u>1<ENTER></u>
Enter flow control (D=DTR, X=XON/XOFF) <u>X<ENTER></u>
Use DHS (direct handshaking) (Y/N) <u>N<ENTER></u>

Single Port with 38400 baud rate
Enter choice (1-8 or H for help) <u>1<ENTER></u>
Enter the port number (0-8 or R) <u>R<ENTER></u>
Enter baud rate (38400, 19200, 9600, 7200, 4800, 3600,
   2400, 1200, 600, 300, 150, 100) <u>1200<ENTER></u>
Enter parity type (N=None, E=Even, O=Odd, M=Mark, S=Space) <u>E<Enter></u>
Enter word length (5, 9, 7, 8) <u>7<ENTER></u>
Enter stop bits (1,2) <u>1<ENTER></u>
Enter flow control (D=DTR, X=XON/XOFF) <u>X<ENTER></u>
Use DHS (direct handshaking) (Y/N) <u>N<ENTER></u>

Range of Ports with 38400 baud rate
Enter choice (1-8 or H for help) <u>1<ENTER></u>
Enter the port number (0-8 or R) <u>R<ENTER></u>
Enter the starting port number (0-8) <u>3<ENTER></u>
Enter the ending port number (0-8) <u>4<ENTER></u>
Enter baud rate (38400, 19200, 9600, 7200, 4800, 3600,
   2400, 1200, 600, 300, 150, 100) 24<u>00<ENTER></u>
Enter parity type (N=None, E=Even, O=Odd, M=Mark, S=Space) <u>E<Enter></u>
Enter word length (5, 9, 7, 8) <u>7<ENTER></u>
Enter stop bits (1,2) <u>1<ENTER></u>
Enter flow control (D=DTR, X=XON/XOFF) <u>X<ENTER></u>
Use DHS (direct handshaking) (Y/N) <u>N<ENTER></u>

* This question is not asked when configuring Port 0

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Change prefix
This option allows changing of the Porter's prefix. As shipped, the unit's prefix is set to the two characters ESC@. The prefix change is not made permanent until either the "Save new configuration" option or the Keep command is used.

Enter choice (1-8 or H for help) 2<ENTER>
Enter new prefix (1-6 characters) #S#<ENTER>

Change power-on connect port
This allows changing of the port that the Porter initially connects to when it is powered on. You may enter a port number (except port 0), N for null destination, or B for broadcast. See the section on operation for more information on null destination and broadcast mode.

Enter choice (1-8 or H for help) 2<ENTER>
Enter power-on connect port (1-4,N,B) 1<ENTER>

Change broadcast port group
This option allows you to change the broadcast mask. This determines which ports have data transmitted out to them when broadcast mode is used. You may enter any combination of ports (except 0), but you must select at least one port or the change is ignored. The following example sets ports 1, 2, and 4 to get data during broadcast. The factory set default is for all ports (except 0) on the unit to be enabled for broadcast. The broadcast mask can also be changed with the <prefix> + Mxx command (see the sections on "Commands".

Enter choice (1-8 or H for help)   4<ENTER>
Enter a port number to select for broadcast,
      return only to terminate (1-4) 1<ENTER>
Enter a port number to select for broadcast,
      return only to terminate (1-4) 2<ENTER>
Enter a port number to select for broadcast,
      return only to terminate (1-4) 4<ENTER>
Enter a port number to select for broadcast,
      return only to terminate (1-4) <ENTER>

Change front panel switch control
This allows locking the front panel switches to prevent manual changing of the connect port (see "Manual Mode"). You can also unlock the switches with this option. The factory set default is to have the switches unlocked. Locking the switches does not prevent use of the diagnostic modes at power-up.

Enter choice (1-8 or H for help) 5<ENTER>
Disable front panel switches (D=disables, E=Enables) E<ENTER>

Change command purge timeout
The command purge timeout determines whether to treat a partial prefix as a command that hasn't finished being received, or as data. When a value other than 0 is entered, it is treated as a 20th of a second time value (if 38400 baud option is present, a 40th of a second time value is used). If a command prefix is entered partially, and this time period elapses, the partial prefix is purged and transmitted to the current connect port(s) as if it were data. This is useful for certain programs that may leave a partial prefix at the end of a data block. When this value is set to 0, partial prefixes will be held in the unit until either the command is completed or a non-prefix character is received. This is the factory set default.

Enter choice (1-8 or H for help) 6<ENTER>
Enter new command purge timeout in 20ths of a second (0-254;
    0 disables) 30<ENTER>

With 38400 baud option
Enter choice (1-8 or H for help) 6<ENTER>
Enter new command purge timeout in 40ths of a second (0-254;
    0 disables) 80<ENTER>

Save new configuration
This option allows the current configuration to be saved permanently in non-volatile memory. Do not use this option until you are sure that the current settings are working properly.

Enter choice (1-8 or H for help) 7<ENTER>
Are you sure (Y/N) Y<ENTER>

Exit configuration
This option exits the configuration menu and returns the Porter to normal operation. All data in buffer memory is erased. The default connect port is selected as if the unit was just powered up.
Enter choice (1-8 or H for help) <ENTER>

Help
This option gives a brief description of what each command does.
Enter choice (1-8 or H for help) H<ENTER>

The configuration menu shows the amount of memory installed, other various settings, and the current and power-on protocol settings for each port. Configure the Porter by entering the number of an item on the menu

1-	PROTOCOL	The protocol means the . . .
2-	PREFIX	The programmable part . . .
3-	POWER-ON CONNECT	Port 0 connects to . . .
4-	BROADCAST GROUP	Several ports that . . .
5-	FRONT SWITCHES	To disable/enable . . .
6-	PURGE TIMEOUT	After this time . . .
7-	SAVE CHANGES	Saving changes puts . . .
8-	EXIT	Exit from the . . .
H-	HELP	Displays this screen . . .

Hit enter key to see configuration parameters or enter choice

Configuration of Parallel Units

The Centronics parallel interface is usually implemented consistently; however there are some variations. Three lines are used to implement the flow control part of the interface. They are strobe, acknowledge, and busy. Most Apple computer parallel interface cards do not implement the busy signal. Some Radio Shack printers do not issue an acknowledge signal. Most other printers use both the acknowledge and busy. There is a provision for the Porter to handshake with all of this equipment. Each port except the master port may be configured to ignore acknowledge, busy, or both signals by sending the proper format commands to the Porter. The settings made by these format commands can then be made permanent by using the keep command.

The Porter factory set default is to require acknowledge and busy for each port. Refer to the format command for further information.

Power Up Tests

Power Up Initial Display

Push in the power switch to turn the unit on. Porter goes through a power up self-test which checks the main functions of its electronics. The leftmost LED labeled POWER should glow green and the other red LEDs should all turn on. Then the unit will cycle through four tests lighting up LEDs 1 through 4 as each test is performed. Errors are indicated by the ERROR LED lighting and the unit halting. See TABLE II for the full sequence of the power up LED display and TABLE III for error displays.

Table II LED Power up Display

Legend: M=Mode LED   D=Data LED   B=Busy LED   E=Error LED
○ = LED off   ● = LED on

	M	D	B	E	1	2	3	4	5	6	7	8	
1st	●	●	●	●	●	●	●	●	●	●	●	●	All LEDS on
2nd	○	○	○	○	●	○	○	○	○	○	○	○	Test 1: EPROM checked
3rd	○	○	○	○	○	●	○	○	○	○	○	○	Test 2: 16K RAM buffer
	○	○	○	○	○	●	○	○	○	○	○	●	Test 2: 64k RAM buffer
	○	○	○	○	○	●	○	○	○	○	●	●	Test 2: 256k RAM buffer
4th	○	○	○	○	○	○	●	○	○	○	○	○	Test 3: Static ram
5th	○	○	○	○	○	○	○	●	○	○	○	○	Test 4: Non-Volatile ram
6th	○	○	○	○	○	○	○	○	○	○	○	○	Unit ready

Program Checksum Test

This test verifies that the unit's internal program is valid by performing a checksum test. If a fault exists, a program checksum error shows on the LEDs as error 1, as shown in TABLE III. The unit will immediately halt. This error requires that the unit be serviced.

Buffer Memory Sizing And Read/Write Test

In this test, the Porter automatically determines the amount of butter memory present and indicates the amount via the status LEDs as shown in TABLE III. The buffer memory is then tested to ensure that the memory system is operational. Any failure will cause the error 2 condition to be displayed, as shown in TABLE II, indicating that a buffer memory data error has occurred. The unit will not continue its further tests and will halt. An error indicates that the unit requires servicing.

Static Ram Read/Write Test

The next test is for static ram. Since the Porter has no static ram, this test is displayed as shown in TABLE II for consistency with other Rose products.

Non-volatile Ram Tests

The fourth and final power-up test is for the non-volatile memory. A series of tests are performed. An error shown by the LEDs as error 4 indicates that the data in the non-volatile memory has been corrupted. To attempt to rewrite the default parameters push the SELECT switch then the ADVANCE switch. If the error condition goes out, the unit may be powered up again to see if it halts at error 4 again. If it still displays error 4, a fatal error has occurred and servicing is required. If the unit displays an error 45, the default parameters were not written correctly. This is a fatal error and servicing is required.
If the unit recovers from the error the configuration parameters have been returned to their default settings and the unit must be configured again if these default settings are unacceptable. This condition should not normally occur.

If it does it indicates that possibly the unit has been subjected to a strong static discharge or surge on its incoming power or signal lines. The other possibility is an internal chip failure.

In addition to the data in the non-volatile ram, several other tests on the non-volatile ram are done. If any error 4 occurs and a reset t defaults does not correct it, the unit needs servicing. The additional errors listed below are for technical support purposes only.

Table III LED Error Display

Legend: M=Mode LED   D=Data LED   B=Busy LED   E=Error LED
○ = LED off   ● = LED on

M	D	B	E	1	2	3	4	5	6	7	8	
○	○	○	●	●	○	○	○	○	○	○	○	Error 1
○	○	○	●	○	●	○	○	○	○	○	○	Error 2
○	○	○	●	○	○	●	○	○	○	○	○	Error 3
○	○	○	●	○	○	○	●	○	○	○	○	Error 4
○	○	○	●	●	○	○	●	○	○	○	○	Error 41
○	○	○	●	○	○	●	●	○	○	○	○	Error 43
○	○	○	●	○	○	○	●	●	○	○	○	Error 45
○	○	○	●	○	○	○	●	○	●	○	○	Error 46
○	○	○	●	○	○	○	●	○	○	●	○	Error 47
○	○	○	●	○	○	○	●	○	○	○	●	Error 48

Error 1   . . . . . .   EPROM checksum failure
Error 2   . . . . . .   RAM buffer memory failure
Error 3   . . . . . .   Static ram failure
Error 4   . . . . . .   Non-volatile ram checksum failure
Error 41   . . . . . .   Non-volatile ram in wrong box type
Error 43   . . . . . .   Non-volatile ram memory failure
Error 45   . . . . . .   Restore to default configuration failure
Error 46   . . . . . .   A port that is not allowed is present
Error 47   . . . . . .   More ports in box than listed in the non-volatile ram
Error 48   . . . . . .   Wrong EPROM version
Any error not listed requires that the unit be serviced.

Operation

Initial state
Following the successful completion of its power up test, the Porter turns all its LEDs off. The port LEDs will display the initial connect state (all dark for null destination, several lit for broadcast mode, or one lit for single port connect). The status LEDs will display the current port activity.

Operating Modes
The Porter has several operating modes. Normal, null destination, and broadcast modes are used for data transfer. Configuration (menu) mode is used to set up the unit. Diagnostic mode is used to check the unit for faults. Manual mode allows front panel switches to change the currently connected port.

Normal mode
Data flow is controlled by sending commands which may be intermixed with data. The port selected may be changed by sending the proper command. When a port is selected, normal communication occurs between the master port and the selected port. For serial models full duplex communication is in effect; data may flow in either direction between the master port and the selected port. For parallel models data is strobed into the master port and out of the selected port. Also the status signals such as "PAPER END" are passed through. Different protocols may be l effect on each port with the Porter making the conversions automatically.

Sending data from the master to the selected port
When transmitting data from the master port to the selected port the data will immediately be sent unless the selected port is busy, in which case the data will go into the selected port's transmit buffer memory. If the buffer becomes full, the master port will be signaled to stop sending data according to the flow control protocol set for it.

When a new port is selected and data remains in the previously selected port's buffer, data will continue to be sent from the previous port's buffer to the device it is connected to according to the flow control protocol currently in operation. Further data sent from the master will go to the newly selected port or its buffer. Thus each port has its own transmit buffer memory and data may be transmitted from each port's buffer memory simultaneously.

Receiving data from a selected port
Data may be received from a selected port only on the serial models. Parallel units do not allow incoming data on ports 1-8. Data received from a selected port will be immediately sent out on the master port unless the master port is bus, in which case the data will go into the selected port's receive buffer. If the buffer becomes full the selected port will be signaled to stop sending data according to the flow control protocol in operation.

Data received on a port which is not selected will be put in to that port's receive buffer. If a new port is selected which has data in it's receive buffer, that data will immediately be sent to the master port according to the flow control protocol in operation. Further data received on the newly selected port will be sent to the master port immediately or placed at the end of data currently in the buffer.

Null destination
When the null destination (prefix + 9) command is in effect, no ports are considered connected. Any data received on ports 1-8 will go into the respective receive buffer. All the port LEDs remain off. Commands received via port 0 will continue to be recognized, all other data received on port 0 is discarded. Null destination is terminated by sending another connect command or the broadcast mode command.

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Broadcast mode
When the <prefix>B broadcast mode command is entered, all ports enabled for broadcast (via the configuration menu or the <prefix> +Mxx command) will light their corresponding port LEDs. On serial units, all ports enabled for broadcast will immediately have their receive buffers cleared.

Any data sent to port 0 during broadcast mode is transmitted simultaneously to all enabled ports. Commands, with the exception of the <prefix>+Mxx command, continue to be processed normally. Broadcast mode is terminated by sending a connect command or the null destination command.

Side effects of broadcast mode
On serial units, port 0 must not be set to 19,200 baud (38400 baud if that option is present) during broadcast mode. Due to the overhead of transmitting to multiple ports, the Porter cannot process incoming data for broadcast at tis baud rate. Attempting this will cause the ERROR LED to flicker and characters to be lost on output.

Also, on serial units during broadcast mode, incoming data on ports 1-8 is ignored. However, X-on and X-off characters sent into ports set for X-on / X-off handshaking continue to be processed.

On parallel units, the ERROR LED is always off during broadcast mode.
Also on parallel units the BUSY LED reflects the state of BUSY out on port 0, not BUSY in on the connected port.

Also, on parallel units all ports enabled for broadcast must be hooked up to something. If this is not done, broadcasting will stop when the unconnected port transmit buffer fills up, as unconnected parallel ports are not set ot ready as with serial ports.

As mentioned before, the <prefix>Mxx (change broadcast mask) command does not function during broadcast mode. To change the mask you ust first exit broadcast mode (preferably with the <prefix>9 null destination command), issue the <prefix>Mxx command, then reenter broadcast mode.

Diagnostic mode
This mode allows the unit to self test itself. You can also restore the factory set configuration from this mode. Refer to the section on "Diagnostic Modes" for information on this mode.

Configuration mode
This mode is activated by the configuration menu command <prefix>S. When this mode is active, the MODE, DATA, and BUSY LEDs will all be lit. Data transfer from or to ports 1-8 is ignored in this mode. See "The Configuration Menu" for more information on this mode.

Manual mode
This feature is used for manually establishing a port connection. It is useful for port selection where software codes may not be desired to be sent. To enter the manual mode, momentarily press both switches. The mode light will illuminate to indicate that the manual mode has been entered. Pressing the ADVANCE switch will cause the port selected to be changed to the next port. To leave the manual mode, momentarily press both switches again. The mode light will go blank to indicate you are in the normal mode. In the manual mode, connect commands sent to port 0 will still take effect.

The manual mode can be used to exit the null destination state, but it cannot be used to set the unit to the null destination state. You must use the (prefix + 9) command to do this.

Manual mode may be entered if the front panel switches have been disabled (locked) by the <prefix>Lx command or the configuration menu. Manual mode may be entered and then exited without altering the unit's operating mode and port connection if the advance switch is not pressed by itself while manual mode is active

Front Panel

The front panel is useful for observing the status of the Porter and manually changing the port selection.

The front panel switches, labeled SELECT and ADVANCE are used to manually change modes and port selection as described in the section on operating modes. They may be disabled or enabled under program control
(see "Commands").

The front panel LEDs are in two groups, the status LEDs and the port select LEDs. The port select LEDs display the currently selected ports as long as the error light is not lit. The status LEDs consist of Power, Mode, Data, Busy, and Error. The PORT SELECT LEDs display the current connection between the master port and the peripheral ports. The POWER LED is lit when power is connected to the unit and the on/off switch is in the on position. The MODE LED displays the current mode that the Porter is in. When the LED is lit the unit is in the manual mode, when it is dark the unit is in the normal mode. If it is on along with the DATA and BUSY LEDs, the unit is in the configuration menu. The DATA LED displays the presence of data being sent across the selected port. When illuminated data is being transferred across the selected port connection. The BUSY LED displays the state of the flow control of the selected port. When it is illuminated it indicates that the flow of data has been inhibited across the selected port connection. The ERROR LED displays any data receive errors encountered on serial ports and reflects the state of the ERROR pin within the connected port on parallel ports.

Table IV LED Operation Display

Legend: M=Mode LED   D=Data LED   B=Busy LED   E=Error LED
⭕= LED off   ⚫= LED on
X + may vary, described below

M	D	B	E		1	2	3	4	5	6	7	8	
⭕	⭕	⭕	⭕		⚫	⭕	⭕	⭕	⭕	⭕	⭕	⭕	Note 1
⭕	⭕	⭕	⭕		⭕	⭕	⭕	⭕	⭕	⭕	⭕	⭕	Note 2
⭕	⭕	⭕	⭕		⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	Note 3
⚫	⭕	⭕	⭕		X	X	X	X	X	X	X	X	Note 4
⚫	⚫	⚫	⭕		⭕	⭕	⭕	⭕	⭕	⭕	⭕	⭕	Note 5

Note 1 . . . . . . Unit operational, connected to port 1
Note 2 . . . . . . Unit operational, null destination mode set
Note 3 . . . . . . Unit operational, in broadcast mode with all ports enabled
Note 4 . . . . . . Unit is in manual mode, displays current port connected
Note 5 . . . . . . Unit is in configuration (setup) mode

Porter Commands

The command codes shown below control various functions of the Porter. All codes begin with a user defined prefix that is 1-6 characters long. Zero (null, not ASCII "O") may not be used as part of the prefix. The prefix can be stored in non-volatile memory to become a semi-permanent part of the control codes. The prefix should be chosen so as not to interfere with other control codes used in you equipment. The purpose of the prefix is to uniquely separate the code from the data you are transmitting. The factory set prefix is 27,64 (the two characters ESC,@).Following the prefix is a one character command and optional operands. The 8th (high) bit is ignored when setting a new prefix or checking for an incoming prefix on port 0.

The + signs under "Code" are for illustrative purposes only. Do not use them in the command string. All command letters are case sensitive – use upper case letters only.

Porter command set

Code	Description
Prefix + 1	Connect port 1 to port 0
Prefix + 2	Connect port 2 to port 0
Prefix + 3	Connect port 3 to port 0
Prefix + 4	Connect port 4 to port 0
Prefix + 5	Connect port 5 to port 0
Prefix + 6	Connect port 6 to port 0
Prefix + 7	Connect port 7 to port 0
Prefix + 8	Connect port 8 to port 0
Prefix + 9	Set null destination (connect to nothing)
Prefix + A	Any data available
Prefix + B	Set Broadcast mode
Prefix + Cnxx	Copy buffer n xx times xx is decimal, leading zero required is xx < 10
Prefix + Dn	Set initial power-up destination n = 1-8 for ports, 9 for null, B for broadcast
Prefix + Fnxxxx	Set serial format and baud rate / xxxx in hexadecimal
Prefix + Gn	Go, resume flow of data on port n
Prefix In	Initialize printer on port n; valid on parallel units only
Prefix K	Keep current setup in non-volatile memory
Prefix Lx	Enable/Disable front panel switches x = 0 unlocks, x = 1 locks
Prefix Mxxx	Set broadcast Mask (which port to broadcast to) xx = two hexadecimal digits
Prefix + Pxxxxxx = null	Set new Prefix from 1 to 6 characters must be terminated with null to delimit string
Prefix + Rn	Report state of Ready (DSR) on port n
Prefix + S	Start setup (configuration menu)
Prefix + Tnnn	Set prefix purge Timeout of nnn/20 seconds with 38400 baud option, nnn/ 40 seconds
Prefix + Wn	Wait, suspend flow of data on port n
Prefix + Zn	Zero (clear) buffer n

Connect commands 1-8

The connect commands allow selection of the current port connection. Commands 5-8 on a 4 port unit will connect to ports 1-4, respectively. The format of this command is prefix + ASCII port number to connect to.

Connect to Null Destination (9) command

This command selects the null destination. No further data is passed through to the ports 1-8 transmit buffers until a connect 1-8 or broadcast mode command is received. For further information see "Null Destination" under "Operating Modes".

Any Data Available Command

This command, applicable on serial units only, checks the buffers of ports 1-8 to see if there is any data available and returns a coded byte containing the results. In this coded byte, each bit position corresponds to a port; i.e. bit 0 corresponds to port 1, bit 1 corresponds to port 2, etc. If the port has any data available, the corresponding bit is set to 1. The format of this command is prefix + A.

Broadcast mode command

This command places the Porter into broadcast mode. See the section on "Broadcast Mode" for further information. To end broadcast mode, send any connect command.

Set port format command

The serial format consists of the flow control protocol, baud rate, word length, parity, and number of stop bits. Each port can be individually programmed with this command. The format is the prefix + F + port number + wxyz where wxyz are send in hexadecimal notation. The binary value of each bit is shown below. The default for each channel is 9600 baud, 8 bits, no parity, one stop bit, DTR/DSR handshake. For example to set the default value on Port 5 the string would be prefix + F + 000E. Four hex digits are required to enter the format code correctly. Note that with the 38400 baud option, the baud rates are doubled. The only parameters changeable on parallel ports are bits 9,8 in character x. These are also descried below.

Serial format codes by character

Character w Parity	Character x Handshake	Character y Stop & Data Bits	Character z Baud rate
0 = none	0 = DTR/DSR	0 = 1 stop, 8 data	1 = 50
2 = odd	4 = Direct (DHS)*	2 = 1 stop, 7 data	2 = 75
6 = even	8 = X-on / X-off	4 = 1 stop, 6 data	3 = 110
A = mark	C = X-on / X-off + DHS*	6 = 1 stop, 5 data	4 = 134.5
E = space		8 = 2 stop, 8 data	5 = 150
		A = 2 stop, 7 data	6 = 300
		C = 2 stop, 6 data	7 = 600
		E = 1.5 stop, 5 data	8 = 1200
			9 = 1800
			A = 2400
			B = 3600
			C = 4800
			D = 7200
			E = 9600
			F = 19200

Format codes by bit

Character w: bits 15 - 12

Bits 15 – 14	00 = Odd parity	10 = Mark parity	
	01 = Even parity	11 = Space parity	
Bit 13	0 = Parity off	1 = Parity on	
Bit 12	unused		

Character x: bits 11 - 8

Bit 11	0 = DTR flow control	1 = X-on/X-off flow control
Bit 10	0 = No DHS*	1 = Use DHS*
Bit 9**	0 = Busy required	1 = Busy ignored
Bit 8**	0 = Ack required	1 = Ack ignored

Character y: bits 7-4

Bit 7	O = 1 stop bit	1 = 2 stop bits
Bit 6-5	00 = 8 data bits	10 = 6 data bits
	01 = 7 data bits	11 = 5 data bits
Bit 4	Unused	

Character z: bits 3-0

Character	Binary	Baud Rate	Character	Binary	Baud Rate
1	0001	50	9	1001	1800
2	0010	75	A	1010	2400
3	0011	110	B	1011	3600
4	0100	134.5	C	1100	4800
5	0101	150	D	1101	7200
6	0110	300	E	1110	9600
7	0111	600	F	1111	19200
8	1000	1200	0	0000	INVALID

Serial format codes by character for 38400 baud option

Character w Parity	Character x Handshake	Character y Stop & Data Bits	Character z baud Rate
0 = none	0 = DTR/DSR	0 = 1 stop, 8 data	1 = 100
2 = odd	4 = Direct (DHS)*	2 = 1 stop, 7 data	2 = 150
6 = even	8 = X-on/X-off	4= 1 stop, 6 data	3 = INVALID
A = mark	C = X-on/X-off + DHS*	6= 1 stop, 5 data	4 = INVALID
E = space		8= 2 stop, 8 data	5 = 300
		A= 2 stop, 7 data	6 = 600
		C= 2 stop, 6 data	7 = 1200
		E= 1.5 stop, 5 data	8 = 2400
			9 = 3600
			A = 4800
			B = 7200
			C = 9600
			D = INVALID
			E = 19200
			F = 38400

Format codes by bit for 38400 baud option

Character w: bits 15 - 12

Bits 15 – 14	00 = Odd parity	10 = Mark parity
	01 = Even parity	11 = Space parity
Bit 13	0 = Parity off	1 = Parity on
Bit 12	unused	

Character x: bits 11 - 8

Bit 11	0 = DTR flow control	1 = X-on/X-off flow control
Bit 10	0 = No DHS*	1 = Use DHS*
Bit 9**	0 = Busy required	1 = Busy ignored
Bit 8**	0 = Ack required	1 = Ack ignored

Character y: bits 7-4

Bit 7	O = 1 stop bit	1 = 2 stop bits
Bit 6-5	00 = 8 data bits	10 = 6 data bits
	01 = 7 data bits	11 = 5 data bits
Bit 4	Unused	

Character z: bits 3-0

Character	Binary	Baud Rate	Character	Binary	Baud Rate
1	0001	100	9	1001	3600
2	0010	150	A	1010	4800
3	0011	INVALID	B	1011	7200
4	0100	INVALID	C	1100	9600
5	0101	300	D	1101	INVALID
6	0110	600	E	1110	19200
7	0111	1200	F	1111	38400
8	1000	2400	0	0000	INVALID

* If DHS (direct handshake) is set on a given port, the port, when selected, will pass its DSR signal directly back to port 0's DTR signal, and port 0's DSR signal will pass directly to the DTR signal on the selected port. DHS cannot be set on port 0. This is useful for dealing with modems.

** For parallel units only. These are the only parameters used by parallel units. Ignored if set on a serial unit. These parameters cannot be set for port 0.

Copy from buffer command

The copy command is useful for sending multiple files of data while only storing one copy of the data. The command requires an additional operand of the number of times to copy the buffer. The format of this command is the prefix + the port number + a two digit decimal number specifying the number of copies to be made. The zero buffer command may be used to cancel a copy in progress. The maximum number of copies allowed is 14. Entering the copy command with > 14 copies causes it to be ignored.

Example of the copy command

To use the copy command, first connect to the port you wish to send copies out of. Use the Z (Zero Buffer) command to clear the buffer, and then send the first (original) copy. Then issue the copy command to send the remaining copies. After sending the copy command you may connect to other ports without disturbing the copying process.

Set Initial destination command

This command is used to set the initial destination the Porter selects when it is powered up. The syntax of this command is prefix + Dx, where x is the port number (1-8), 9 for null destination, or B for broadcast.

Go command

The Go command reverses the action of the Wait command. (See "Wait Command", below.) The port's DTR is set to high, and if the port is configured for X-on/X-off operation a X-on character is sent. Also, transmission suspended by a Wait command is resumed. The syntax of this command is prefix + G + port number.

Initialize command (Parallel units only)

The initialize command causes a parallel port INIT signal to be pulsed low. This initializes a printer if one is connected. The command is ignored on serial units. The syntax of this command is prefix + I + port number.

Keep command

This command allows the current setup parameter to be saved in non-volatile memory and to become the default configuration. The parameters saved are the prefix characters, initial destination, timeout, and format control. You should ensure that the unit is working properly before using this command. Also make a written record of the configuration for your future reference. The format of this command is prefix + K.

Enable/Disable front panel switches command

This command allows you to disable (lock) or enable (unlock) the front panel switches. The syntax of this command is prefix + Lx, where x = 0 to unlock, or 1 to lock. Locking the switches does not prevent use of the diagnostic mode at power up.

Set broadcast mask command

This command lets you change which ports are enabled for data transmission when the broadcast mode is used. The factory setting is to have all available ports except port 0 enabled for broadcast. The syntax of this command is prefix + M + xy, where xy are two hex digits. X controls ports 8-5, and y controls ports 4-1. The most significant bit controls port 8, the next bit port 7, and so on with the least significant bit controlling port 1. Setting a bit to 1 enables the corresponding port for broadcast; setting a bit to 0 disables the port for broadcast.

Set prefix command

This command alters the prefix used at the beginning of all commands. The new prefix will take place immediately after receipt. It is recommended that the prefix be chosen once and used consistently. Altering the prefix is useful for separating Porter's select codes from other device codes which may be used for other functions. It is also useful for chaining multiple Porters together, described further in the section on chaining.

The syntax for this command is the old prefix + P + the new prefix + null. The null (byte = 0, Ctrl-@ on a PC keyboard) is used to terminate the prefix code and is required to determine the amount of characters in the prefix. Null may not occur as part of the prefix code. The factory default for the prefix is ascii 27,64 representing the two characters ESC@. The high (8th) bit is always set to 0 when entering a new prefix, as the 8th bit is ignored when the unit checks for an incoming prefix on port 0.

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Ready (Check DSR) command

This command allows a program to determine if a given serial port's DSR (pin 6) is in the ready state (+12V), or the busy state (-12V). The syntax of this command is prefix + port number 0-8. A single byte is returned: ASCII "0" if the specified port is in the busy state, and "1" if it is in the ready state. Note that a port with no device connected will read as "ready" due to the internal pull-up resistor provided for pin 6.

Since this command returns an answer, you must ensure that no reverse channel data (data coming from ports 1-8) is present when this command is issued. The safest way to use this command is to use the connect 9 (Null Destination) command first, then after issuing the Ready command and receiving its answer re-issue the appropriate connect command to re-connect.

If this command is issued when there is reverse channel data traffic, it may not respond.

Setup (Configuration) menu commands

The configuration menu is invoked by the prefix + S command. You would normally not issue this command except by manual entry from a communication program or dumb terminal. For more information on the configuration menu see "The Configuration Menu".

Timeout (command purge) command

This allows changing the command purge timeout. The timeout value may range from 000-255. Setting a value of 000 disables the command purge timeout. The syntax of this command is prefix + T + nnn. Leading zeros are required. For more information on te command purge timeout se the "Configuration Menu" section under "Change command purge timeout value".

Wait command

The Wait command causes two things to happen to the port n that it is used on. First, any transmission that may be in progress is suspended. Second, the port's DTR is set to low, and if the port is configured for X-on/X-off operation a X-off character is sent. This state is cleared with the Go command. The syntax of this command is prefix + W + port number.

Zero (clear) command

This command is used to clear the buffer and cancel any pending data transfers on the port specified. This command should be used prior to using the copy command to ensure that the proper data will be copied. Zero is set for an individual port buffer by sending the prefix + Z + port number.

Applications

Buffering

The switch may have a buffer of 16, 64, or 256 Kbytes of memory. The memory is allocated evenly to each port. For the serial models half of the memory for each port would be allocated to the transmit buffer and the other half to the receive buffer. For example for an 8 channel serial model with 16k bytes of buffer each port would have 1k for transmit and 1k for receive. For parallel models each port has only a transmit buffer with the buffer being divided equally among all channels. For example a 4 channel parallel model with 64k bytes of buffer would have 16k bytes allocated to each port.

When broadcast mode is used, the main port will go "busy" if any of the buffers belonging to ports enabled for broadcast become full.

Chaining Multiple Porters Together

The units may be chained together in an unlimited fashion to connect 1 master port to more than the number of peripheral ports available on one Porter unit by interconnecting more than one Porter unit. The peripheral ports on a master unit are connected to the master ports on the expansion units. In order to access ports on the expansion unit(s), a different prefix code must be set into the expansion units. By sending the master unit's code followed by the expansion unit's code, a peripheral port may be accessed.

For example, use the default prefix on the master unit. Set the prefix on the expansion unit to %^. Connect peripheral port 2 on the master unit to the master port on the expansion unit. To access port 5 on the expansion unit from the master port on the master unit send the code ESC@2%^5. There is no limit to the number of expansion units that may be added.

Writing Programs to Control the Porter

Procedure for sending Data

The procedure for sending data to multiple output devices using the Porter is straightforward and easy to implement from a program.

1. Initialize the serial port connected to the Porter
2. Send the control code to connect to the first device.
3. Send the data to the first device.
4. Continue to step 2.

Procedure for Receiving Data

One common use of the Porter is to interrogate a group of devices to collect data from them. A program that does this should use the following algorithm:

1. Initialize the serial port connected to the Porter, prepare to receive characters.
2. Use the any data available command and read the coded byte returned. If there is any data available follow steps 3-5 below.
3. Send the control code to connect to the first device.
4. Receive and store data fro this device.
5. When the program wishes to change ports to listen to another device:
   A. Either drop DTR (hardware handshake) or send an X-off (X-on/X-off).
   B. Check the receiver to ensure that a character was not received while step 4a was being carried out. Read and store the character if this happened.
   C. Send the control code to connect to the next device
   D. Carry out any steps needed to prepare to receive data from the next device.
   E. Either raise DTR (hardware handshake) or send an X-on (X-on/X-off)
   F. Proceed to step 3.

Diagnostic

You can execute some special diagnostic tests to determine if the Porter has any problems. There are three groups of tests as shown below.

The short test, which is exactly the same as the power up test, is executed by pressing both ADVVANCE and SELECT while powering up the unit. The long test without loopback is selected by powering on while holding in the SELECT switch only. The long test with loopback (which requires loopback connectors as described below) is selected by powering on while holding in the ADVANCE switch only.

The long tests do a more extensive memory test and do tests on the ports. For this reason, all devices (except the loopback connectors on the loopback test) must be disconnected from the unit's ports when the long tests are running. The short test is similar to the power up test but continuously cycles, and allows reloading of the factory default settings. The tests continuously cycle and halt if an error is determined. See Tables V and VI for the various LED displays.

Diagnostic Tests

Short Test
This group of tests is entered by pressing both the ADVANCE and SELECT switches while powering up the unit. They are also executed once on every power-up. These tests are exactly the same tests as those performed during power up sequence. You enter this state for a continuous test of the Porter functions or to reload the factory default settings as described below.

Test 1 – EPROM program checksum test
Test 2 – Buffer memory sizing and read/write test
Test 3 – Static ram read/write test
Test 4 – Non-Volatile ram checksum test
Tests 1 – 4 are the same as the power-up test.

Long test without loopback

This group of tests are entered by pressing the SELECT switch only while powering up the unit with the on/off switch. All equipment should be disconnected from the Porter prior to running this test.

Test 1 – EPROM program checksum test
This test is the same as the "Short Test" described above.

Test 2 – Extended dynamic ram test
This test checks the dynamic ram more extensively than the short test or the power up test. The test takes longer to perform. If this test fails (see Table VI) then the unit must be serviced. Other LEDs may be lit also indicating the amount of memory that is installed (see Table V). The failing board and memory device can be determined by pressing the ADVANCE switch. The BUF LED will be lit if the failing board is the base mother board or the bottom-most memory board installed. The DATA LED will be lit if the failing board is the second from the bottom. The BUSY LED will be lit for the third board, and the LED #0 will be lit for the fourth board. The LEDs 1-8 correspond to the physical placement of the failing chip. If the failing chip is the one all the way to the left, then LED 1 will be lit. If the failing chip is the one all the way to the right, then LED 8 will be lit. The chips in the middle correspond appropriately. Hitting the SELECT switch will retry the test. In order to bypass this test completely, both the ADVANCE and SELECT switches may be pressed.

Test 3 – Static ram read/write test
This test is the same as in the 'Short Test'

Test 4 – Non-volatile RAM checksum test
This test is the same as in the 'Short Test'

Test 5 – Port addressing test
This test ensures that the contents of non-volatile memory agree with the port configuration. If this test fails (see Table VI) then the configuration memory has been corrupted or a port communication chip has failed. Reload the factory default settings as described below and retry the test. Make sure there are no cables connected to the Porter. Re-run the test, if the test still fails then the unit must be serviced. The ADVANCE switch may be pressed to determine which port is the failing port. BUF, DATA, and BUSY LEDs will all be lit. The LEDs of all ports which pass will be it. A failing port will have its corresponding LED off. The SELECT switch may be pressed to execute the test again. In order to bypass this test completely, both the ADVANCE and SELECT switches may be pressed.

Test 6 – Module test without loopback
This test ensures that there are no signal shorts on a port. In order for this test to pass, no equipment should be connected to the Porter. If this test fails (see TABLE VI) then a port communication chip has failed and the unit must be serviced. The ADVANCE switch may be pressed to determine which port is the failing port. BUF, DATA, and BUSY will all be flashing. The LEDs of all ports which pass will be flashing. A failing port will have its corresponding LED steadily lit. Ports not installed will have their corresponding LEDs off. This test will continuously execute until all ports pass or the test is bypassed. In order to bypass this test completely, both the ADVANCE and SELECT switches may be pressed.

Table V Diagnostics LED Display

Legend: M=Mode LED   D=Data LED   B=Busy LED   E=Error LED
○= LED off   ●= LED on

	M	D	B	E	1	2	3	4	5	6	7	8	
1st	●	●	●	●	●	●	●	●	●	●	●	●	All LEDS on
2nd	○	○	○	○	●	○	○	○	○	○	○	○	Test 1: EPROM checked
3rd	○	○	○	○	○	●	○	○	○	○	○	○	Test 2: 16K RAM buffer
	○	○	○	○	○	●	○	○	○	○	○	●	Test 2: 64k RAM buffer
	○	○	○	○	○	●	○	○	○	●	○	●	Test 2: 256k RAM buffer
4th	○	○	○	○	○	○	●	○	○	○	○	○	Test 3: Static ram
5th	○	○	○	○	○	○	○	●	○	○	○	○	Test 4: Non-Volatile ram
6th	○	○	○	○	○	○	○	○	●	○	○	○	Test 5: Port type test
7th	○	○	○	○	○	○	○	○	○	●	○	○	Test 6: Module test

Table VI Diagnostic LED Error Display

Legend: M=Mode LED   D=Data LED   B=Busy LED   E=Error LED
○= LED off   ●= LED on

M	D	B	E	1	2	3	4	5	6	7	8	
○	○	○	●	●	○	○	○	○	○	○	○	Error 1
○	○	○	●	○	●	○	○	○	○	○	○	Error 2
○	○	○	●	○	○	●	○	○	○	○	○	Error 3
○	○	○	●	○	○	○	●	○	○	○	○	Error 4
○	○	○	●	●	○	○	●	○	○	○	○	Error 41
○	○	○	●	○	○	●	●	○	○	○	○	Error 43
○	○	○	●	○	○	○	●	●	○	○	○	Error 45
○	○	○	●	○	○	○	●	○	●	○	○	Error 46
○	○	○	●	○	○	○	●	○	○	●	○	Error 47
○	○	○	●	○	○	○	●	○	○	○	●	Error 48
○	○	○	●	○	○	○	○	●	○	○	○	Error 5
○	○	○	●	○	○	○	○	○	●	○	○	Error 6

Error 1	. . . . . .	EPROM checksum failure
Error 2	. . . . . .	RAM buffer memory failure
Error 3	. . . . . .	Static ram failure
Error 4	. . . . . .	Non-volatile ram checksum failure
Error 41	. . . . . .	Non-volatile ram in wrong box type
Error 43	. . . . . .	Non-volatile ram memory failure
Error 45	. . . . . .	Restore to default configuration failure
Error 46	. . . . . .	A port that is not allowed is present
Error 47	. . . . . .	More ports in box than listed in the non-volatile ram
Error 48	. . . . . .	Wrong EPROM version
Error 5	. . . . . .	Wrong port found
Error 6	. . . . . .	Module(s) failed test

Any error not listed requires that the unit be serviced.

Long test with loopback

This test is entered by pressing the ADVANCE switch only while powering up the unit with the on/off switch. Special loopback connector should be connected to each Porter port.

Tests 1-5
These are the same as tests 1-5 of the 'Long test without loopback'>

Test 6 – Module test with loopback
This test verifies that all port signals are functional. In order for this test to pass, special loopback connectors must be installed on each port, see TABLE VII. If this test fails (see TABLE VI) then a port communication chip has failed and the unit must be serviced. The ADVANCE switch may be pressed to determine which port is the failing port. BUF, DATA, and BUSY will all be flashing. The LEDs of all ports which pass will be flashing. A failing port will have its corresponding LED steadily lit. Ports not installed will have their corresponding LEDs off. This test will continuously execute until all ports pass or the test is bypassed. In order to bypass this test completely, both the ADVANCE and SELECT switches may be pressed.

Table VII Loopback Test Connectors

Porter parallel loopback connector
male 36 pin Centronics connector

1-----------------	8
2-----------------	13
3-----------------	32
4-----------------	12
5-----------------	31
6-----------------	36
7-----------------	14
9-----------------	11
10-----------------	34

Porter serial loopback connector
Male 25 pin subminiature D connector

2-----------------	3
6-----------------	20

Reloading Factory Defaults

There are two ways to reload the factory default configuration. The first is if an error occurs in powering up the unit and the unit halts with error 4 (see TABLE VI). To reload the defaults, first, push the SELECT switch then push the ADVANCE switch; the unit is then ready for operation.

The other method of reloading the factory defaults is through the 'short test' diagnostic mode of the Porter. This mode is entered by powering the unit off, pressing (and holding) both the ADVANCE and SELECT switches, and then powering up the unit. Hold the SELECT switch down. When the LEDs stop on test 4 (see TABLE V), release the SELECT switch and press the ADVANCE switch; the Porter will load the factory default configuration. The unit stays in the 'short test' diagnostic mode and continuously cycles through the four tests. To resume normal operation, you must power the unit off and back on. The unit is now set at its factory defaults. You must reconfigure the Porter, if necessary, to correspond to your equipment settings.

Maintenance and Repair

The exterior surface of the unit may be wiped with a damp cloth to keep it clean. The unit does not contain any jumpers or serviceable parts inside. Opening the unit invalidates the warranty except in the case of an authorized memory upgrade or firmware update. Any malfunction with the unit should be reported to a factory authorized repair center for service. Any discrepancies in the operation of the unit according to this manual should be reported to the Technical Support department of Rose Electronics.

Appendix A – Porter Pin outs

Serial model
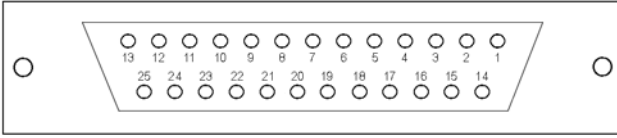
| Pin	Signal Name	Abbrv.	I/O	Description
2	Transmit data	TXD	Output	Serial data from port
3	Receive data	RXD	Input	Serial data to port
4	Request to send	RTS	Output	Always high
6	Data set ready	DSR	Input	Low inhibits TXD data*
7	Signal ground	GND	Common	Ground reference
20	Data term. ready	DTR	output	Low should inhibit RXD

* Pin 6 has an internal pull-up to set it high (ready) when no signal is connected and when no hardware flow control is required.

Parallel Model
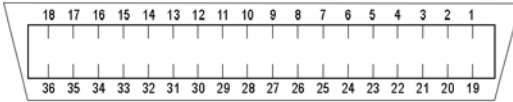
Pin	Signal	Port 0	Port 1-8	Description
1	STROBE	Input	Output	Data transfer when pulsed low
2	Data 0	Input	Output	Data LSB
3	Data 1	Input	Output	.
4	Data 2	Input	Output	.
5	Data 3	Input	Output	.
6	Data 4	Input	Output	.
7	Data 5	Input	Output	.
8	Data 6	Input	Output	.
9	Data 7	Input	Output	Data MSB
10	ACK	Output	Input	Pulsed low for next data transfer
11	BUSY	Output	Input	When high inhibits flow of data
12	PE	Output	Input	When high printer is out of paper
13	SELECT	Output	Input	General purpose signal
14	AF	Input	Output	General purpose signal
16	Ground	Common		
18	+5 volts			
19-30	Ground	Common		
31	Init	Output	Input	When pulsed low resets printer
32	ERROR	Output	Input	When high printer has an error
33	Ground			
34	Spare	Input	Output	General purpose signal
36	SLCTIN	Input	Output	General purpose signal

General purpose signals may vary in various equipment or not be present.

Serial Model with / 422 option
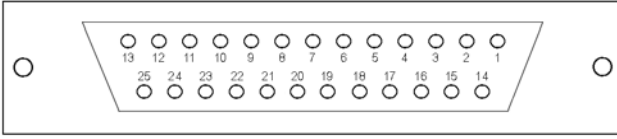
Pin	Signal Name	Direction	Description
1	Chassis Ground	Common	Connect to cable shield or equipment frame
2	TXD -	Output	Inverted transmit data out
3	RXD -	Input	Inverted receive data in
4	DTR -	Output	Inverted handshake signal; high when ready
5	DSR -	Input	Inverted handshake input; drive high when ready
7	Ground	Common	Logic ground
15	TXD +	Output	Positive transmit data out
16	RXD +	Input	Positive transmit data in
17	DTR +	Output	Positive handshake signal; low when ready
18	DSR +	Input*	Positive handshake input; drive low when ready

* = If hardware handshake is not used, connect this line to pin 7 (Ground)

PORTER INSTALLATION AND OPERATIONS MANUAL

Appendix B – Cable Pin outs

The diagrams below show the Porter's pin out on the left and all other devices on the right. Read across to find the pin out.
Connector types shown below refer to the connector on the device, not on the cable.

Serial Computers

Porter 25 pin female	IBM PC 25 pin male	IBM AT 9 pin male	Mac 9 pin female	Mac + 8 pin circular
2	3	2	9	5
3	2	3	5	3
7	7	5	3-8	4-8
20	5-6-8	1-6-8	7	2

Serial Printers

Porter 25 pin female	Hp Laser Jet 25 pin female	Xerox 4045 Laser 25 pin female	Apple Image- writer 25 pin female	Apple Image- Writer II 8 pin circular
2	3	3	3	5
3	2	2	2	3
7	7	7	7	4-8
6	20	20	20	1
4		5-6-8		

Serial Printers/Plotters

Porter 25 pin female	Epson MX type	Okidata* 82-193	Diablo 630	NEC spinwr.	HP plotters	Calcomp. plotters	Hou.Inst. plotters
2	4	3	3	3	3	3	3
3	6	2	2	2	2	2	2
7	5	7	7	7	7	7	7
6	2	11	11	19	20	20	20
4	7	6	5-6	5-6-8	5-6	5-6	5-6

* Jumper setting for ready on pin 11

Other Devices

Porter 25 pin female	Hayes modem	Multi- plexers	VT-100 terminal	Rose* 25 pin female	Rose** 8 pin RJ45	VAX 25 pin female
2	2	2	3	3	6	3
3	3	3	2	2	4	2
4	4	4	-	-	-	-
6	6	6	-	20	3	-
7	7	7	7	7	5	7
20	20	20	-	6	2	-

* Refers to any Rose switching device with a 25 pin serial port (Caretaker, Caretaker plus, Porter, Super Switch, or Master switch).
** Refers to any Rose switching device with a RJ35 8 pin serial port (MSU or MSN Series Master Switch, or FastPrint).

Appendix C – Specifications

Interface Specifications

Serial models
Electrical: RS232 + 9 and -9 volts
Protocol: Asynchronous DTR/CTS, X-on/X-off
Baud rate: 50-19200 baud (limited to 9600 baud during broadcast mode)
Word length: 7 or 8
Parity: Odd, even, mark, space, or none
Stop bits: 1 or 2

Parallel models
Electrical: TTL levels
Protocol: Centronics compatible
                       May use STB/ACK, STB/BUSY
                       or STB/ACK/BUSY interface
                       If busy not used must be connected low.

General Specifications

Size: 10.5" wide X 3.5" high x 5.0" deep
Weight: 4 channels – 7 lbs / 8 channels – 8 lbs
Power: 110 volt external wall mount adapter 10 watts
Display: Port select LEDS: 1-8
Status LEDs: Power, Data, Mode, Busy, Error, Port LEDs 1-8
Environment: 0 to 70 degrees C. 0 to 95% relative humidity

Connectors:
    Serial: DB25 female
    Parallel: Centronics 36 female

Signals switched:
    Serial: 5 signals
    Parallel: 17 signals

Configuration: Stored in non-volatile memory
Warranty: 1 year parts and labor

10707 Stancliff Road   Houston, Texas 77099
Phone: (281) 933-7673   Internet: WWW.ROSE.COM