TANDY®

Technician Series
Diagnostics Software

IOTEST

Serial/Parallel Port and
Modem Diagnostics

01-0220 Computer Technical Services

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IOTEST

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IOTEST

TABLE OF CONTENTS

GENERAL DESCRIPTION

IOTEST is an input/output diagnostic for use in various Tandy MS-DOS computers. IOTEST is designed to test serial ports, printer ports, and various types of modems for Tandy MS-DOS computers. The program utilizes easy to use pop up window menus.

FEATURES

IOTEST will run on all current Tandy MS-DOS computers. It will test all legitimate combinations of word length, parity, and stop bits at all MS-DOS supported baud rates on standard serial ports; it also has a built in dumb terminal program which can be used for communications. The modem test is both Tandy and Hayes compatible, and may be used with both internal and external modems. The comprehensive printer port test will exercise the printer as well as help in diagnosing problems with the parallel printer port. A windowed user interface allows easy configuration.

EQUIPMENT REQUIRED

Current Tandy MS-DOS compatible computer.

Loopback connector for serial port. (Needed for external loopback test.)

Parallel printer for parallel port tests.

Loopback connector for parallel port. (Needed for bidirectional parallel port test.)

Tandy or Hayes compatible modem for modem tests and communications.

LOADING IOTEST

The IOTEST program may be loaded either by selecting the appropriate menu selection from a diagnostic diskette menu, or by typing the program name at the MS-DOS prompt, i.e.:

A> IOTEST<ENTER>

DISPLAY DESCRIPTIONS

Startup

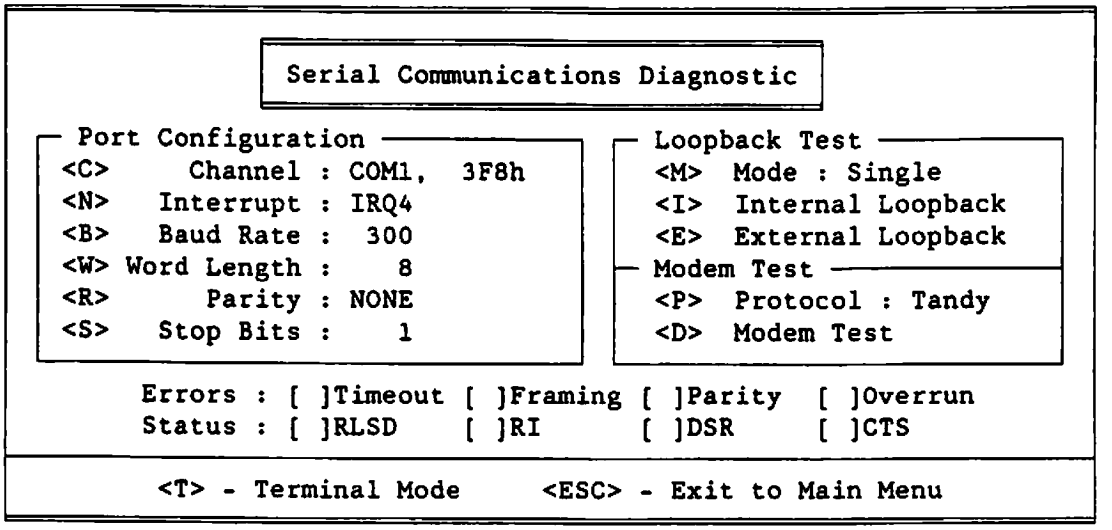
When the program is first executed, a menu appears with the copyright notice and the startup commands:

```
I/O DIAGNOSTIC
xxxxxxxxx xx, 199x  Version x.xx
Tandy Corporation, Copyright 1988-199x.
All Rights Reserved.

<S> - Serial Port Test
<P> - Printer Port Test
<Q> - Quit I/O Diagnostic

Press Indicated Key for Desired Option
```

One of these options must be selected to start testing, or to exit the test.

Serial Communications Diagnostic

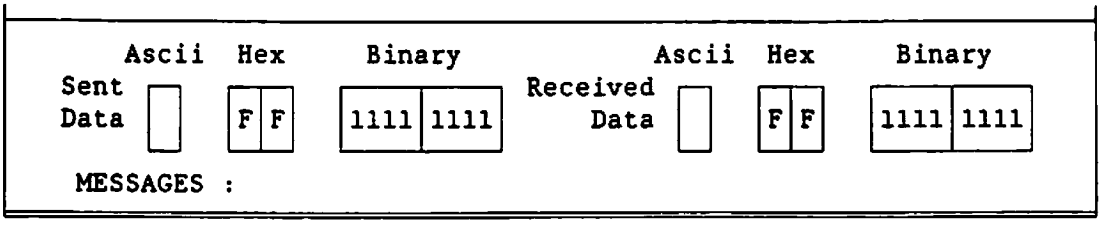
When the "Serial Port Test" option is selected from the startup menu, this screen appears:



This screen is divided into several areas. The upper left hand portion provides options for configuring the serial ports; the upper right hand section gives serial port and modem test selections. Below these two menu areas, a status and error line area is provided, and in the initial menu state, some additional commands are presented beneath these status and error indicators.

When running a serial loopback test, the bottommost window shows transmit and receive data and displays messages on test status. A small window in the middle of the screen provides additional options and user prompts.

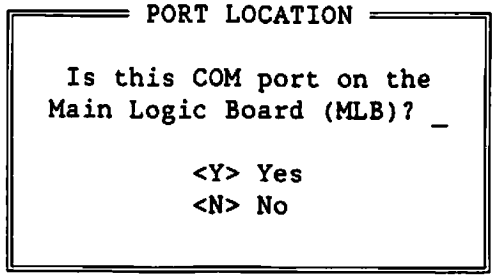
Loopback Test Screen



If either an **Internal Loopback** or an **External Loopback** test is selected, this screen is displayed. This screen displays what data has been sent and received, and also test status messages.

Loopback Test Port Location

When the "Internal Loopback" test option is selected from the above menu, the following screen is displayed if the diagnostic is being executed on a Tandy 1000 SL, 1000 TL, 1000 SL/2, or 1000 TL/2.



If the communications port you are testing is located on the main logic board, press the **Y** key, otherwise press the **N** key. The above screen will only appear when you are testing COM1 or COM2.

Terminal Mode Display

When terminal mode is entered, this screen will appear:

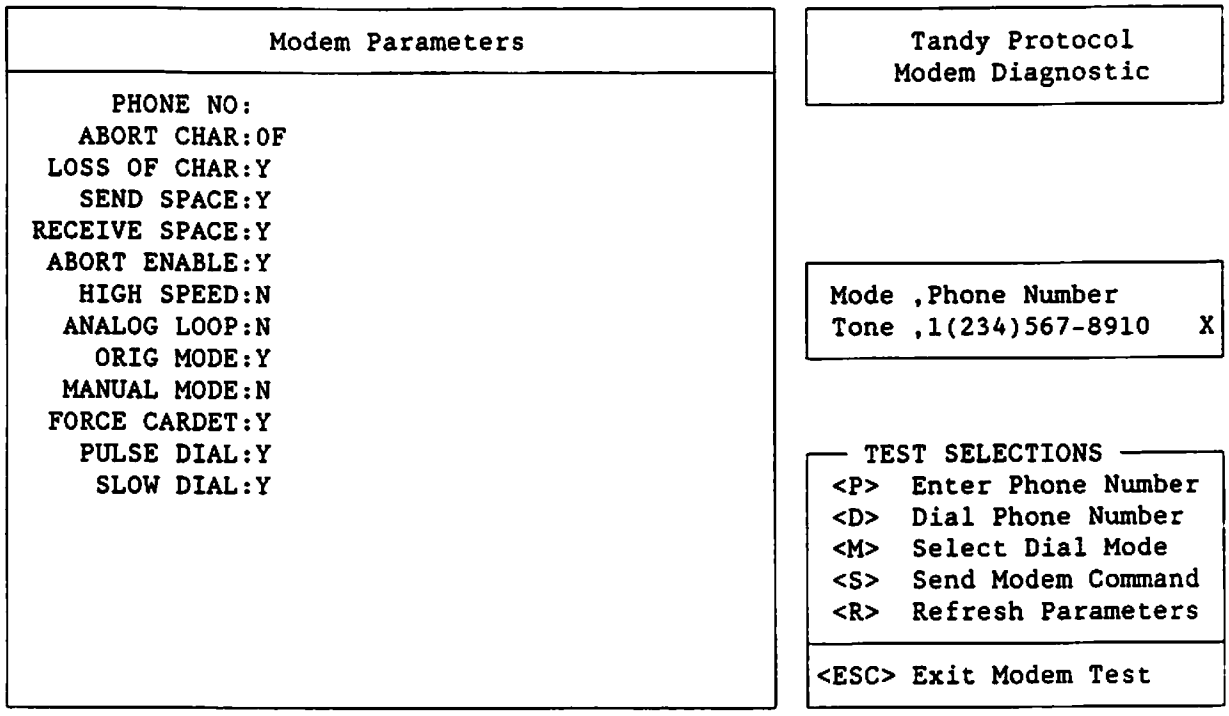
```
TERMINAL MODE:        COMMUNICATION PORT #1          BAUD RATE :  300




<CTRL-B> BREAK   <CTRL-E> ECHO ON/OFF   <CTRL-X> ASCII/HEX DISPLAY   <ESC> EXIT
```

The top line of the screen provides status information. The bottom line of the screen has the available commands to transmit a true break (RS-232 Space), configure half or full duplex operation, provide ASCII or hexadecimal display, or exit the terminal mode.

Modem Test Display Screens

Two different modes are available for modem testing. Sample displays for each mode are given below:

Tandy Mode:



In the Tandy mode, the modem test screen is divided into five areas. The large area to the left of the screen displays the current operational parameters set in the modem. The upper right hand corner of the screen displays the modem protocol selected for testing. The center right portion of the screen displays the currently selected dial mode and number for testing. The lower right hand area of the screen presents the test selections available for the user. The bottom line of the screen is used as a status line.

Hayes Mode:

Register Number	Register Value	Register Number	Register Value
0	>	18	
1		19	
2		20	
3		21	
4		22	
5		23	
6		24	
7		25	
8		26	
9		27	
10		28	
11		29	
12		30	
13		31	
14		32	
15		33	
16		34	
17		35	

Hayes Protocol
Modem Diagnostic

BAUD Rates that Sync

Mode ,Phone Number
Tone ,1(234)567-8910

TEST SELECTIONS
<P> Enter Phone Number
<D> Dial Phone Number
<M> Select Dial Mode
<S> Set Register Value
<B> Sync BAUD Rates

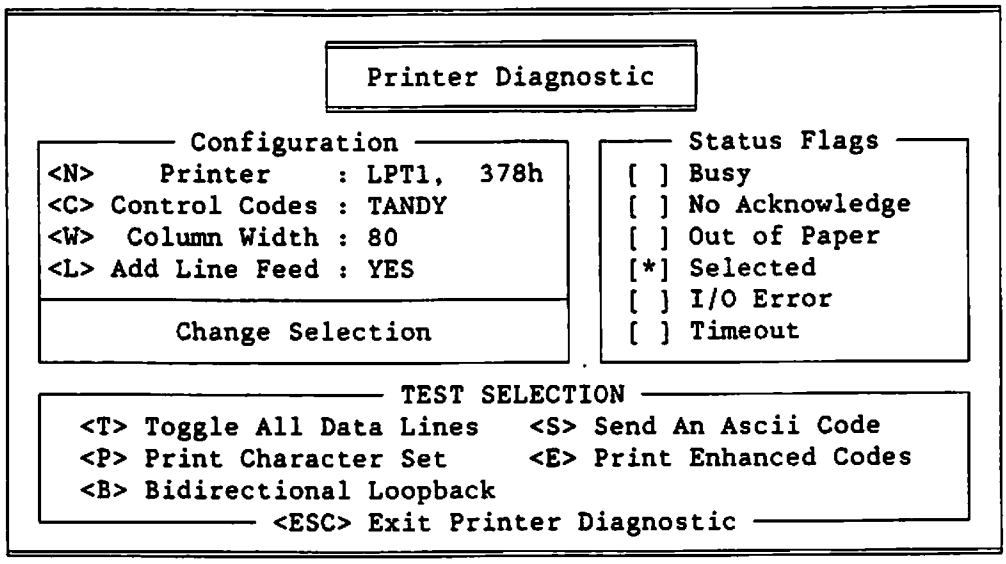
<ESC> Exit Modem Test

COMMUNICATION PORT #1 BAUD RATE : 300

In the Hayes protocol mode, the modem test screen has six display areas. The large block on the left side of the screen shows the contents of the Hayes compatible S-registers. The uppermost right-hand block gives the protocol being tested. Directly below the protocol block is an area which will show which baud rates the modem will support. In the center right hand portion of the screen is a section which displays the dial mode and test telephone number selected. The lower right hand area of the screen provides a menu of available user test selections. The bottom line of the screen is used as a status line.

Parallel Port Diagnostic

When the parallel port selection is chosen from the main menu, this screen will appear:



The screen is divided into four areas. The upper left hand portion of the screen allows configuration of the parallel port; the upper right hand section displays the current printer port status. Immediately below these two areas, a test selection menu is provided. A small message window will appear below the main portion of the test screen to provide user feedback and instructions during testing.

COMMANDS

Startup Menu Commands:

<S> - Serial Port Test

The serial port test checks the serial channels and various modems. IOTEST can also communicate with other computers with the terminal mode enabled.

<P> - Parallel Port Test

The printer port test checks the functioning of the parallel printer ports on the computer.

<Q> - Quit I/O Diagnostics

Quits IOTEST and returns to the diagnostics menu or to MS-DOS, whichever was in use prior to executing IOTEST.

Serial Test Menu Commands:

Port Configuration Commands:

<C> - Channel

Pressing <C> will toggle through COM1, COM2, COM3, and COM4. The default setting on startup is COM1. Also displayed is the associated port address the BIOS has assigned to this port number.

<I> - Interrupt

Pressing <I> will toggle through IRQ2, IRQ3, IRQ4, IRQ5, IRQ6, IRQ7 and None. If choosing "None" (no interrupt), note that the maximum reliable baud rate is 1200 baud. The default setting on startup is IRQ4.

<B> - Baud Rate

Pressing <B> will toggle through the available baud rates. The baud rates available to IOTEST are 300, 600, 1200, 2400, 4800, and 9600 baud. The default setting is 300 baud.

<W> - Word Length

Pressing <W> toggles between a 5, 6, 7, or 8 bit word. The default setting is for an 8 bit word.

<R> - Parity

Pressing <R> toggles between even, odd, or no parity. The default setting is for no parity (none).

<S> - Stop Bits

Pressing <S> will toggle between 1 or 2 stop bits. The default setting is for 1 stop bit.

Loopback Test Commands:

<M> - Mode

Pressing <M> will select either single or continuous test mode. Single pass mode is the default setting.

<I> - Internal Loopback

The selected serial channel's UART is tested with this diagnostic. There are two parts to this test.

The first portion of this test checks the RS-232 handshaking lines to ensure that they will turn on and off correctly.

The second portion transmits and receives data. A byte of data is sent to the internal register of the UART and then read back. This is repeated until all the bit patterns available for a given word length have been tested. (For example, configuring the port for 8 bit words will mean that 256 patterns are used, for 7 bit words, 128 patterns will be used, and so on). Status registers in the UART are set and read as well. This test does not require the loopback connector because this test does not transmit the data to the serial connector.

<E> - External Loopback

This test requires that a loopback connector be installed on the serial channel to be tested because the data sent to the UART will be transmitted to the serial connector. This test verifies proper operation of the UART and of the serial line drivers and receivers. Refer to the loopback connector information section to properly configure a loopback connector.

There are two parts to this test. The first part checks the handshaking capabilities of the port by alternately turning on and off the RS-232 control lines. The second part tests data transmission by sending a byte and then checking the received byte to be sure they are the same.

NOTE: The Pass/Fail status flag only applies to the transmission portion of this test.

Modem Test Commands:

<P> - Protocol

Selects either Tandy or Hayes compatible modem protocols.

<D> - Modem Test

This selection will bring up one of two modem test menus that will allow you to program and exercise all aspects of the modem. If the modem is a Tandy modem, IOTEST will bring up the current parameters set in the modem. If the modem is a Hayes compatible modem, IOTEST will read the registers in the modem and display them. This can be aborted by a key press. See the Tandy Modem Test Menu Commands and Hayes Modem Test Menu Commands sections for available commands within these tests.

Miscellaneous Commands:

<T> - Terminal Mode

This command enters terminal mode with the current serial port settings. This mode is for communicating with other computers or for direct communication with an intelligent modem. See the Terminal Mode Commands section for available commands within this test.

<ESC> - Exit to Main Menu

Using the <ESC> key will exit the serial test menu and will return the user to the startup menu.

Serial Error Indicators:

Timeout - Timeout on receive

The receiver failed to receive a character that was transmitted within the time limit allowed.

Framing - Framing error

The received character did not have a valid stop bit.

Parity - Parity error

The parity of the received character was incorrect. This error should only be generated if ODD or EVEN parity is selected.

Overrun - Overrun error

The character in the receiver buffer register was not read before another character was received.

Serial Status Indicators:

RSLD - Receive Line Signal Detect

This signal alerts the serial port that a carrier has been detected. Also known as CD or Carrier Detect.

RI - Ring Indicator

This signal alerts the serial port that the modem senses a ringing phone line.

DSR - Data Set Ready

This signal tells the serial port that the device connected to it is ready to send or receive data.

CTS - Clear To Send

This signal tells the serial port when the external device is ready for the serial port to send it the next character.

Terminal Mode Commands:

<CNTL><B> - Break

Simultaneously pressing the <CTNL> and <B> keys will cause a true modem break to be sent. This is an RS-232 space for at least 300ms in duration, and is used by some modems and systems to get attention.

<CNTL><E> - Echo on/off

Simultaneously pressing the <CTNL> and <E> keys will toggle echo on and off. This is equivalent to toggling between half and full duplex operation.

<CNTL><X> - ASCII/hex display

Simultaneously pressing the <CTNL> and <X> keys will toggle the display of characters between ASCII to the equivalent hexadecimal representation.

<ESC> - Exit terminal mode

Pressing the <ESC> key exits the terminal mode and returns to the serial test menu.

Tandy Modem Test Menu Commands:

<P> - Enter Phone Number

This allows you to enter a phone number to dial. The preset number is for tone tests only.

<D> - Dial Phone Number

This will dial the number that is currently programmed. IOTEST will go into terminal mode when it has completed dialing the number.

<M> - Select Dial Mode

This selection toggles between pulse or tone dialing.

<S> - Send Modem Command

When selected, a modem command window appears within the modem parameter window. This menu will allow you to give the modem various commands provided as follows:

<*> - Wake Up Command
<A> - Answer Mode
<C> - Clear Modem Memory
<E> - Echo Enable/Disable
<F> - Fast Dialing Speed
<G> - Forced Carrier Detect Toggle
<M> - Manual/Automatic Operation
<O> - Originate Mode Operation
<P> - Speaker On/Off
<S> - Slow Dialing Speed
<Other> - Not Defined above

The <Other> refers to any other key on the keyboard, which will be sent directly to the modem.

<R> - Refresh Parameters

This command re-displays the status information of the modem.

<ESC> - Exit Modem Test

Use of the <ESC> key returns the user to the serial test menu.

Hayes Modem Test Menu Commands:

<P> - Enter Phone Number

This allows you to enter a phone number to dial. The preset number is for tone tests only.

<D> - Dial Phone Number

This will dial the number that is currently programmed. IOTEST will go into terminal mode when it has completed dialing the number.

<M> - Select Dial Mode

This selection toggles between pulse or tone dialing.

<S> - Set Register Value

This selection allows the registers to be programmed directly. When selected, IOTEST will ask for the register to be changed and then will ask for a new value.

<B> - Sync BAUD Rates

When selected, IOTEST will test the modem at various baud rates and establish which baud rates respond.

<ESC> - Exit Modem Test

Pressing <ESC> will return the user to the serial test menu.

Parallel Port Test Menu Commands:

Port Configuration Commands:

<N> - Printer

Pressing <N> will toggle between LPT1, LPT2, and LPT3. The default setting on startup is LPT1.

<C> - Control Codes

Pressing <C> will toggle between Tandy, IBM, and EPSON control codes. The default setting is Tandy. Please note that the printer being used must be set for the same control codes as the parallel port test settings.

<W> - Column Width

Pressing <W> will toggle between 80 or 132 column mode. The default setting is 80 columns.

<L> - Add Line Feed

Pressing <L> will toggle adding a line feed after a carriage return. The default setting is 'YES'. If the printer is double line feeding, set this to 'NO'. If the printer continuously prints over the same line, set this value to 'YES'.

Parallel Port Test Selections:

<T> - Toggle All Data Lines

Selecting <T> will cause IOTEST to send two alternating 8 bit binary codes to the printer port. The codes are 10101010 and 01010101. This test allows the technician to determine whether or not all data lines on the parallel interface are correctly toggling. The printer will continuously print a capital 'U' and a graphic character during this test. Pressing <ESC> aborts the test.

<S> - Send An Ascii Code

Selecting <S> will pop up a window that allows IOTEST to send a single character to the printer. Pressing <ESC> aborts the test. The three formats that can be sent are:

<C> - Character
<D> - Decimal
<H> - Hexadecimal

<P> - Print Character Set

Selecting <P> will cause IOTEST to print the Tandy printer diagnostics banner, a small test of the basic characters, and finally a continuous test of the character code set between decimal 32 to 126. Pressing <ESC> will abort the test. Note that a form feed will be sent before the test begins.

<E> - Print Enhanced Codes

Selecting <E> will cause IOTEST to print the Tandy printer diagnostics banner, a small test of the basic characters, and then samples of various special character styles (i.e. bold, compressed, double height,...). Please note that Tandy, IBM, and EPSON control codes are not the same. If IOTEST is not set for the same control code setting as the printer, the special character styles will be missing or incorrect. Pressing <ESC> will abort the test. Note that a form feed will be sent before the test begins.

Note: In the case of Tandy printer codes, not all printers will support all of the available Tandy printer codes. For documentation on the codes supported by a specific printer, refer to the owner's and service manuals for the printer.

<B> - Bidirectional Loopback

Selecting <B> allows you to test the input data portion of the parallel port on systems that have a bidirectional parallel port. This test requires a parallel loopback connector because the control signal SLIN* is used to drive the parallel port data lines.

Note: Not all systems support bidirectional parallel port operation. Please see the Appendix for a list of the systems that do support bi-directional parallel port operation.

<ESC> - Exit Parallel Port Diagnostic

Pressing <ESC> returns the user to the startup menu.

Parallel Port Status Indicators:

Busy

Either the printer is currently busy printing the contents of its buffer or the printer is off line.

No Acknowledge

If this flag is set, it means that the last character sent to the printer was not properly acknowledged by the printer.

Out of Paper

This flag is set if the printer is out of paper. This flag also may be set by some printers if a fault has occurred.

Selected

The printer is on line and ready to print.

I/O Error

This flag corresponds to the printer FAULT line. This means that an alert condition has occurred. This flag may not be set by some printers even though a fault has occurred.

Timeout

The printer did not respond to the sent character within the specified time limit.

APPENDIX

Making the serial loopback test connectors:

To make a nine pin serial loopback test connector, solder between the following sets of pins:

2 to 3
7 to 8
1 to 4 to 6 to 9 (four way jumper)

To make a twenty-five pin serial loopback test connector, solder between the following sets of pins:

2 to 3
4 to 5
6 to 8 to 20 to 22 (four way jumper)

To make a nine to twenty-five pin serial adapter, use the following table:

DB9 connector	DB25 connector
1	8
2	3
3	2
4	20
5	1,7
6	6
7	4
8	5
9	22

Making the parallel bidirectional loopback test connector:

To make a twenty-five pin parallel bidirectional test connector, solder between the following sets of pins:

17 to 2 to 3 to 4 to 5 to 6 to 7 to 8 to 9 (nine way jumper)

Serial Port Pinouts:

The following is a pin description for a nine pin and a twenty-five pin RS232 serial port:

Nine pin (DB9) ports:

Pin 1 - CD or RLSD - Carrier Detect
Pin 2 - DRX or RXD - Received Data
Pin 3 - DTX or TXD - Transmitted Data
Pin 4 - DTR - Data Terminal Ready
Pin 5 - GND - Signal Ground
Pin 6 - DSR or DRDY - Data Set Ready
Pin 7 - RTS - Request To Send
Pin 8 - CTS - Clear To Send
Pin 9 - RI - Ring Indicator

Twenty-five pin (DB25) ports:

Pin 1 - PGND - Frame Ground *
Pin 2 - TXD - Transmitted Data *
Pin 3 - RXD - Received Data *
Pin 4 - RTS - Request To Send *
Pin 5 - CTS - Clear To Send *
Pin 6 - DSR - Data Set Ready *
Pin 7 - GND - Signal Ground *
Pin 8 - CD - Carrier Detect *
Pin 9 - - Positive DC Test
Pin 10 - - Negative DC Test
Pin 11 - QM - Equalizer Mode
Pin 12 - SDCD - Second Carrier Detect
Pin 13 - SCTS - Second Clear To Send
Pin 14 - STD - Second Transmitted Data
Pin 15 - TC - Transmitter Clock
Pin 16 - SRD - Second Received Data
Pin 17 - RC - Receiver Clock
Pin 18 - DSR - Divided Clock Receiver
Pin 19 - SRTS - Second Request To Send
Pin 20 - DTR - Data Terminal Ready *
Pin 21 - SQ - Signal Quality Detect
Pin 22 - RI - Ring Indicator *
Pin 23 - - Data Rate Selector
Pin 24 - TC - Extra Transmitter Clock
Pin 25 - - Busy

* Denotes signals used by Tandy.

Parallel Port Pinouts:

The following is a pin description for a DB25 parallel port and thirty-four pin edge card connector parallel port:

DB25 parallel port:

Pin 1 - STROBE*
Pin 2 - PDATA0
Pin 3 - PDATA1
Pin 4 - PDATA2
Pin 5 - PDATA3
Pin 6 - PDATA4
Pin 7 - PDATA5
Pin 8 - PDATA6
Pin 9 - PDATA7
Pin 10 - ACK*
Pin 11 - BUSY
Pin 12 - PE
Pin 13 - SLCTIN*
Pin 14 - AUTOFD*
Pin 15 - FAULT*
Pin 16 - INIT*
Pin 17 - SLCT*
Pin 18 - GND
Pin 19 - GND
Pin 20 - GND
Pin 21 - GND
Pin 22 - GND
Pin 23 - GND
Pin 24 - GND
Pin 25 - GND

Tandy 1000 type 34 pin edge connector (1000A used as example):

Pin 1 - PPSTROBE*
Pin 2 - GND
Pin 3 - PDATA0
Pin 4 - GND
Pin 5 - PDATA1
Pin 6 - GND
Pin 7 - PDATA2
Pin 8 - GND
Pin 9 - PDATA3
Pin 10 - GND
Pin 11 - PDATA4
Pin 12 - GND
Pin 13 - PDATA5
Pin 14 - NC - GND ON SL/TL
Pin 15 - PDATA6
Pin 16 - GND
Pin 17 - PDATA7
Pin 18 - GND
Pin 19 - PACK*
Pin 20 - GND
Pin 21 - PPBUSY
Pin 22 - GND
Pin 23 - PPE
Pin 24 - GND
Pin 25 - PSEL - PPBUSY* ON 1000
Pin 26 - NC
Pin 27 - GND - AF* ON TL
Pin 28 - PFAULT*
Pin 29 - NC
Pin 30 - PPINIT*
Pin 31 - GND
Pin 32 - PPAUTOFEED* - NC ON SX/SL/TL
Pin 33 - GND
Pin 34 - NC - POSITIVE 5V ON EX/SX/SL/TL

Signals with asterisks (*) are active low.

Parallel Port Failures:

The following are a few possible failures and suggestions for parallel port troubleshooting. You must have a known good printer and printer cable. "F" denotes failure and "A" is the possible answer.

F - Printer fails to print anything at all. Sometimes a single character will print when the parallel cable is disconnected after printing has been attempted.

A - Possibly the STROBE line is not being received or BUSY is stuck in an active condition. Check the various status signals for improper activity as they will also cause this type of failure.

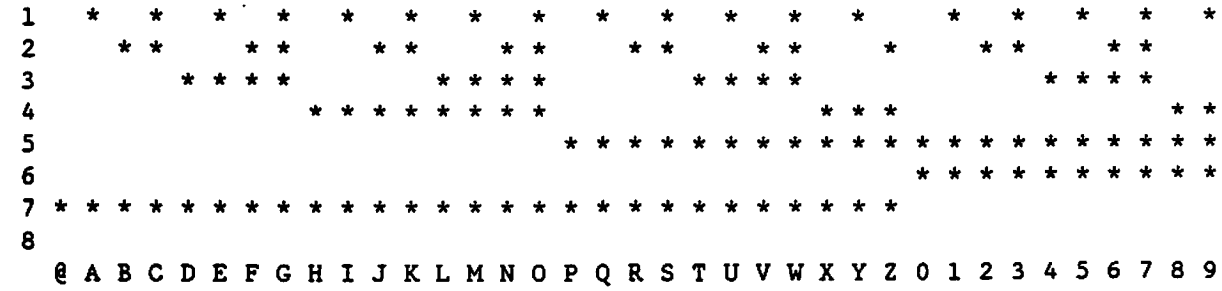
F - Printer seems to lose characters and blocks of information when printing.

A - The printer port is not receiving the BUSY signal so the computer continues to send the data even though the printer is not ready to receive the data.

F - Printer fails to print anything legible but seems to have a pattern. If the test is repeated, the exact same printout occurs. (Ex. 'Tend]dGovtovetmon' is printed instead of 'Tandy Corporation')

A - The printer port is not sending the proper data. In the example above, the third bit on the parallel port is stuck high. Refer to the ASCII chart below:

ASCII Chart - Asterisk (*) Denotes a Logic High



PRINTED CHARACTER

Bidirectional Parallel Ports:

Some systems support using the parallel printer port in both an output, which is the normal printing mode, and an input mode. Because of this, the standard printing test does not test the full functionality of these ports because it only tests the output mode. This is the purpose of the bidirectional port test. It tests the input mode of the parallel printer port by using a loopback connector to connect an output control signal to drive the data lines, thereby testing the input capability.

The following is a list of systems that support bidirectional printer port operation and any special steps to take to enable bidirectional mode. It assumes that the on-board parallel printer port is being used, and that this port is enabled.

	System	Special Steps to Enable Bidirectional Operation
Tandy	2500XL	Port must be set to Bi-directional mode via **SETUPXL**.
	3000NL	Refer to Technical Bulletin 3000NL:8.
	4016DX	(none)
	4016SX	Refer to Technical Bulletin 4000SX:5.
	4000SX	Refer to Technical Bulletin 4000SX:3.
	4020SX	DIP Switch 1, position 5 must be off.
	4020LX	(none)
	4025LX	(none)
	4033LX	(none)
	5000MC	(none)
GRiD	286mfp	Port must be set to Bi-directional mode via the appropriate setup utility.
	286is	Refer to Technical Bulletin 3000NL:8.
	386is-16	(none)
	386sxmfp	Refer to Technical Bulletin 4000SX:5.
	386isx	Refer to Technical Bulletin 4000SX:3.
	386is-20	(none)
	386is-25	(none)
	386is-33	(none)
	386mc	(none)

Modem Command Set Reference:

Hayes Command Set:

This is not a complete list of all Hayes commands. It is meant for use as a quick reference for use in modem troubleshooting. For a complete list of commands for a particular modem, refer to the owner's manual for the modem.

AT — This is the modem "attention" command. This command must precede any other command (for example, to tone dial the number 555-1212, issue the following command: ATDT555-1212 <ENTER>). Note that all command sequences must be upper case and end with <ENTER> to execute the sequence.

DT — This command tells the modem to dial the phone number using tone dial mode.

DP — This command tells the modem to dial the phone number using pulse dial mode.

M1 — This command will turn on the modem's internal speaker to monitor activity until CD has been detected.

M2 — This command will turn on the modem's internal speaker to monitor activity but will continue to remain on throughout the session.

S16=1 — This command will put the modem into internal loopback self test. Do not have the phone line hooked into the modem during self test. Note that S16 is a register within the modem.

H1 — This command will cause the modem to pick up the phone line.

H0 — This command will cause the modem to disconnect from the phone line.

Z0 — Reset modem to default settings (Ex. ATZ0 <ENTER>).

Sn? — Will return what number is in the 'n' register. The 'n' is the number of the register desired (for example: AT S16? <ENTER>).

+++ — Typing '+++' will return the modem to command mode during an online session.

O — Typing 'O' while in command mode will return the modem to online mode.

Tandy command set:

*	Typing this puts the modem into command mode. All commands must be in upper case and '*' must precede all command sequences.
DT	This command tells the modem to dial the phone number using tone dial mode.
DP	This command tells the modem to dial the phone number using pulse dial mode.
M	This command toggles the mode that the modem is in. The modem must be in 'Auto' mode to automatically dial a number. If the modem is in 'Manual' mode, it will go off hook when told to dial, but will rely on the operator to dial a number from a telephone on the line.
L	This command will tell the modem to list all of its current settings.
A	This command puts the modem into the answer mode.
O	This command puts the modem into the originate mode.
C	This command resets the modem to its default settings.
E	This command toggles echo on and off.
F	This command puts the modem into fast dialing mode (20pps).
S	This command puts the modem into slow dialing mode (10pps).
G	This command toggles forced carrier detect on and off.
Q	This command puts the modem into internal loopback test mode.
P	Tells the modem to pause for three seconds during dialing.
X	Tells the modem to execute the command sequence that was entered (for example: *DT123-4567X).

Commands may be chained together. An example of a command sequence that could be entered follows:

*MOGFDT9P-1-(817)-555-1212X

This command wakes the modem up (*MOGFDT9P-1-(817)-555-1212X), toggles the automatic/manual mode of operation (*MOGFDT9P-1-(817)-555-1212X), sets originate mode (*MOGFDT9P-1-(817)-555-1212X), toggle the state of forced carrier detect (*MOGFDT9P-1-(817)-555-1212X), use the fast dialing speed (*MOGFDT9P-1-(817)-555-1212X), tone dial a '9', pause for three seconds, and dial the rest of the number (*MOGFDT9P-1-(817)-555-1212X), and finally, execute the command (*MOGFDT9P-1-(817)-555-1212X).

SERVICE POLICY

Radio Shack's nationwide network of service facilities provides quick, convenient, and reliable repair services for all of its computer products, in most instances. Warranty service will be performed in accordance with Radio Shack's Limited Warranty. Non-warranty service will be provided at reasonable parts and labor costs.

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