Modem Doctor for Windows

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Register Tests

The Uart Chip on a serial card has registers that hold settings important for proper communication between your computer and modem. Modem Doctor checks that these settings are set properly. If a setting is incorrect, Modem Doctor will prompt you and suggest how to correct the problem. The tests below are designed to test your modems ability to properly setup, if your serial cable is properly wired, and if your modem properly handles flow control/handshaking signals.

Quick Register Tests — Checks all Driver Comm parameters are properly set.
Rts/CTS DTR/DSR Echo — Manually Raise or Lower RTS/DTR or run Automatic Tests. Checks cables are wired properly when used with a Loopback plug

Dynamic Tests — Checks Modem and Driver understand handshaking signals

RTS/CTS DTR/DSR Echo Tests

Each serial cable contains 2 control signals and 2 status lines. Each control signal is paired with a status line. These signals and status lines are;

RTS/CTS - RTS (Ready to Send) is a control line that is activated by a device when it is ready to receive data. A DTE (Data Terminal Device) RTS output signal is sent to the CTS (Clear to Send) input of a DCE (Data Communications Equipment) device. So in effect, the RTS of one device is the CTS of another.

DTR/DSR - DTR (Data Terminal Ready) is a control line activated when a DTE device is turned on and ready for use. A DTE DTR output signal is sent to the DSR (Data Set Ready) input of a DCE device in a similar manner as RTS/CTS.

Computers are DTE devices. Modems are DCE devices. Using the signals above, they communicate to each other. This communication is called a Handshake. Modem Doctor can test two types of handshaking; Static and Dynamic.

This test Is a Static test, which means Modem Doctor alternately raises or lowers either the RTS or DTR lines. When a Loopback plug is installed, you can use these static tests to verify your serial cable is wired correctly.

NOTE - Most modems will not echo static tests. This test is designed to test cables and other serial devices. For modem handshaking tests, use the Dynamic Handshaking Tests.

Loopback Plug

Loopback plugs are used to test a Uart for proper operation. You can only use a Loopback with a serial port. Internal modems cannot be tested because a plug cannot be inserted. There are three kinds of serial port connectors, a 9 pin (DB 9), a 10 Pin stake, and a 25 Pin (DB 25) pin connector. To construct a Loopback cable, you need to follow the wiring diagrams below. 9 Pin connectors and 25 Pin connectors are the most common.

9 pin (DB 9)	**10 Pin (Stake)**	**25 Pin (DB 25)**
TxD (3) to RxD (2)	Txd (5) to RxD (3)	TxD (2) to RxD (3)
RTS (7) to CTS (8)	RTS (4) to CTS (6)	RTS (4) to CTS (5)
RTS (7) to RI (9)	RTS (4) to RI (8)	RTS (4) to RI (22)
DTR (4) to DSR (6)	DTR (7) to DSR (2)	DTR (20) to DSR (6)
DTR (4) to CD (1)	DTR (7) to CD (1)	DTR (20) to CD (8)

Dynamic RTS/CTS and XON/XOFF Tests

Every high-speed modem need to tell your computer when to send data. Likewise, each computer needs to be able to tell a modem when it can send data. This is called handshaking.

Handshaking can be done via hardware using the RTS (Ready to Send) and CTS (Clear to Send) signals in your serial cable. It can also be done using the special reserved ASCII characters XON and XOFF.

The Dynamic tests first connect your modem to itself. Then, depending on the test, Modem Doctor either drops the RTS signal or sends an XOFF command to the Modem. Next 20 characters are sent to the modem. If your modem is properly handshaking, NONE of these characters will be echoed back to your computer. In this case, the modem, Comm driver, and computer are properly handshaking. If however any characters are sent back, this usually indicates that your modem is not properly setup or you have a bad serial cable.

XON/XOFF Characters

XON and XOFF are two reserved ASCII characters that are used by some programs and modems for flow control (handshaking).

Sending an XON signal sent from a modem tells the computer its clear to send data. Sending an XOFF signal from a modem tells the computer not to send any data. The reverse scenario between computer and modem is also valid.

Most high speed Comm programs use RTS/CTS handshaking instead. However, there has been a recent trend to using XON/XOFF handshaking in environments such as Win95.

The XON signal usually equates to	17	(CONTROL-Q)
The XOFF signal usually equates to	19	(CONTROL-S)

However, both of these settings can be changed in your modem by changing the value in an S-Register, and in your Comm driver in the data communications block used by Windows.

Register Tests / UART Status

Windows communicates to your modem via a driver. The driver is responsible for properly setting up your Uart. The Uart contains registers that set proper flow control, handshaking signals, serial line control and read line and modem status. When you select Modem and Driver tests, you also can view the S-Registers settings that are critical to proper modem /software communications.

Each of Uart signals are either active (BRIGHT RED) or inactive (DARK RED). Modem Doctor checks each of these settings and will warn you if something is incorrect. Usually, an incorrect setting is a sign of a problem with a cable or your cable wiring. You will also get an error if you do not have a modem attached or turned-on on the serial port you are testing.

For a detailed description of these signals see the following;

Modem Flow Status
Modem Signal Status
Line Control Settings
Line Status Information

Modem Flow Status Signals

RTS/ CTS Ready to Send (RTS) and Clear to Send (CTS) signals in your serial cable are used to control data flow and handshaking. These should always be active.

DTR/DSR Data Terminal Ready (DTR) and Data Set Ready (DSR) signals can also be used for flow control. Modem Doctor does not use this mode, but does check that the driver is properly set. These should always be inactive

Modem Signal Status Signals

RLS Received Line Signal (RLS) is another term for Carrier Detect. This signal when active indicates the presence of a carrier signal from your modem. This signal should be inactive before all tests are run, and active only during the Carrier or Dynamic Handshaking tests. If you get
a warning that this line is active, you need to consult your modem manual. Normally, the command AT&C1 sent to your modem and stored in your modems configuration will clear this error permanently.

RI The Ring Indicator (RI) indicates that the modem has detected a ring signal on your telephone line. You should never see this during testing. If you do, disconnect your telephone line from your modem. If this does not clear your problem, then you may have an incorrectly-wired serial cable between your computer and modem.

DCTS Delta CTS (Clear to Send) indicates that the CTS signal is active. NOTE - There is an error in Microsofts Comm.drv for Win 3.1(x) that all programs mimic. This error incorrectly displays the DCTS setting. Modem Doctor properly detects the CTS setting using special coding
in its interface to the Comm driver. All other Windows versions operate correctly

DDSR Delta DSR (Data Set Ready) indicates that the DSR signal is active. Like DCTS, this also is a true indicator in Modem Doctor for Windows.

Line Control Settings

STP Stick Parity - a mode currently not used by windows Comm drivers
EPS Even Parity Signal - When bright red indicates even parity active. Dark red indicates odd parity will be used. Both settings only have meaning if Parity is enabled. This signal is normal inactive.

PEN Parity Enabled - Parity checking is used between modem and serial port. Rarely is this used in modem communications. Some terminal emulators however do use this mode to verify proper operation. Normally, this signal is inactive.

BIN Binary Mode Enabled - Windows Comm drivers can operate in a character or a binary mode. Modem Doctor, and most communication programs, use the binary mode. This signal should be active during all Modem Doctor testing.

Line Status Information Settings

TXE Transmitter Enabled - Should be active for all testing.

BI Break Indicator - A break signal was received from the modem. This should be inactive for all Modem Doctor testing.

FE Framing Error - Indicates a problem with the serial data sequence received. This should never be active during Modem Doctor testing. If it is continuously active, it could indicate a serious hardware problem.

PE Parity Error - If Parity checking is enabled, this indicates a bad parity bit was detected between modem and computer. This should never be active during Modem Doctor testing. If it is continuously active, it could indicate a serious hardware problem.

OE Overrun Error - Indicates too many bits were received in a serial stream from your modem. This should never be active during Modem Doctor testing. If it is continuously active, it could indicate a serious hardware problem.

DR Data Ready - Indicates that the driver and Uart can accept new characters from the modem. This should ALWAYS be active during Modem Doctor testing. If it is not, it indicates that data is present in the Uart that has not been read by the computer.

Uart Chips

A serial port is made from input and output circuits that communicate to a Uart (Universal Asynchronous Receiver Transmitter). The Uart is the physical device that takes serial data from your modem and converts it to parallel data for use in your computer. Likewise, the Uart converts parallel data from the computer to serial data for your modem.

There are various types of Uarts;

8250 These were the original Uarts used in the first PCs

16450 This was an updated 8250 with improved circuitry

16550 A further improvement of the 16450 design

16550A The most recent version which includes an on-chip buffer that helps in multi-tasking environments.

Login Commands

Login Commands allow you to find your installed serial ports, and make changes to the way Windows uses your serial port hardware. Commands include the following;

Auto Login	Automatically Detects installed hardware.
Manual Login	Allows you to manually change your system settings.

The Auto Mode is called when first starting Modem Doctor. It displays a snapshot of your system serial port base addresses and IRQ assignments, the current character settings of your driver, and the status of the 16550A buffer. Using this information, Modem Doctor runs a preliminary test of your modem and verifies the existence of serial port hardware. A check symbol in the VF column means Modem Doctor has found your hardware.

Modem Doctor also looks for problems with your configuration. Any problems found are displayed as a Warning. These warnings should be taken seriously, for they may point to future or current serial port problems.

Advisories are also displayed when the program first runs. These are less serious in nature, and usually inform you that you have some setting in a default or non-standard mode.

Warning Window

Modem Doctor will display warning information when it finds a setting that may cause you problems with Windows communication programs. Usually these warnings are serious, and you should take corrective action. The Window will explain what is wrong and suggest what you should do to correct the problem.

Advisory Window

Advisory Windows inform you of non-standard settings or similar problems. By themselves, these settings usually will not affect Windows communications, however if you experience unexplained communication errors under Windows, try some of these suggestions to see if they eliminate your errors.

S-Registers

S-Registers are used by your modem to store operating information. Changing a register will change how your modem operates. Modem Doctor will display the first 16 registers from the Uart Menu if you chose to test the modem and Uart from the setup menu. Modems have many more registers that 16, and their use varies between manufacturers. However, the first 16 set the features critical to proper operation.

S0 - Answer on Ring - A 0 disables auto answer, any other value sets the number of rings your modem will answer on. If your modem answers calls by itself, and this action is not wanted, type ATS0=0 from the Modem Doctor Interactive window.
S1 - Ring Count - Counts the number of rings your modem detects. This is used by BBS software to determine how many rings have occurred.
S2 - Escape Character - Usually the + sign (ASCII 43), this character is scanned by your modem. Receiving 3 of these characters inside of the escape guard time will place your modem into the command mode, ready to receive instructions.
S3 - Carriage Return - Usually ASCII 13.
S4 - Line Feed Character - Usually ASCII 10.
S5 - Backspace Character - Usually ASCII 8
S6 - Dial tone Wait - Determines how long your modem will wait for a dial tone before dialing. Usually 2 or 3.
S7 - Carrier Wait - Determines how long your modem will wait for a carrier. This should at least be set to 60. If lower, make sure your communication program has the command ATS7=60 (or higher) in its init string.
S8 - Comma Pause - Determines how long the modem will pause when a comma (,) is inserted into the dial command. This is useful for accessing an outside line from an office or private PBX system.
S9 - Carrier Detect Time - Determines how long (in tenths of a second) your modem will wait before recognizing a remote carrier signal. Setting this value higher if you keep connecting at the wrong speed may help your modem pick the proper speed that matches current phone conditions.
S10- Hang-up Time - Determines how long (in tenths of a second) that your modem waits after it looses a carrier before it hangs up. If you have unexplained carrier drops, or if you have call waiting, you can adjust this setting higher to get through these types of problems. Usually a value of 30 is sufficient (this means wait 3 seconds).
S11- Touch Tone Speed - Determines the quickness in milliseconds for touch tone dialing. A speed of 55-60 results in faster dialing than the default of 70.
S12- Escape Time - Determines the guard time for escape code sequences. Normally set to 0. Any value in here adds extra time to the already required 50 msec delay used by most modems.
S13- Bitmap Register #1
S14- Bitmap Register #2
S15- Bitmap Register #3 - These are used to setup many of the self diagnostic and self resetting features of modems. The settings vary depending on modem manufacturer and current modem of operation.
S16- Self Test Register - Used by most modems to indicate they are in a testing mode. Should be 0 at all other times.

Carrier Tests

Carrier tests place your modem into a special diagnostic mode. In this mode, the modem connects to itself and simulates an on-line connection (minus the telephone line). When in this mode, Modem Doctor can use several different tests to determine if your modem is operating properly. The test is run twice. Depending on your modem and the driver interface that is loaded, , one test uses the Originate mode for testing, and the other test uses the Answer mode. These are indicated in the lower left hand corner of the testing window. There are three tests in all;

Burst ASCII Test - This test simulates an on-line connection and sends all 255 character combinations to your modem. Depending on the font in use, all characters sent may not print to a window, but they are all transmitted. Modem Doctor then checks the communication buffer to make sure each character was sent properly.

Data Pattern Test- A special data pattern is sent to the modem that is designed to stress the serialization process in your computers Uart. The pattern equates to ASCII character 5A, which in binary is 01011010.

Alt Pattern Test- Like the Data Pattern Test, a special data pattern is sent to the modem to stress the serialization process. This pattern equates to ASCII 5A followed by ASCII character A5 (binary sequence 01011010 10100101).

After each test, Modem Doctor calculates your modem/driver/Uart throughput, or the speed at which characters are moved in transmit and receive. Normally, you should see a value equal to the baudrate divided by 10 for speeds up to 9600 bps. Speeds above 9600 depend on many factors including; Uart chip in use, Comm driver in use, and how many other programs are running during the testing of your modem. The higher each figure is, the faster your modem and Comm port can handle data transfers.

Modem Drivers

Modem Drivers are similar to printer drivers. These drivers make it possible to send special commands to a specific make and model of modem. When Modem Doctor starts, it attempts to determine the type of modem installed based on the return code it receives. Sometimes dissimilar modems have similar return codes, so Modem Doctor may guess incorrectly.

The special commands contained in drivers normally deal with handshaking. If Modem Doctor cannot make a choice, it uses a Generic &T driver for modems over 2400 bps and a Generic S driver for 1200 bps modems.

The Generic &T driver will successfully test and setup nearly every modem made after 1992. To load a driver, select its name from the driver listbox. If your modem manufacturer is not listed, select the Generic &T driver.

Loopback Tests

The Analog Loopback test is designed to check Uarts and serial cables. It is not a modem test, although most modem will run this satisfactorily.

This test is similar to the Carrier tests, and has similar choices for test patterns. In place of a modem, you connect a special Loopback Plug to your serial port (or to the end of its serial cable). Without this cable, these tests will not run. As mentioned above, you can use a modem for this test, but results may or may not be in error.

Burst ASCII Test - This test simulates sends all 255 character combinations to your modem. Depending on the font in use, all characters sent may not print to a window, but they are all transmitted. Modem Doctor then checks the communication buffer to make sure each character was sent properly.

Data Pattern Test- A special data pattern is sent that is designed to stress the serialization process in your computers Uart. The pattern equates to ASCII character 5A, which in binary is 01011010.

Alt Pattern Test- Like the Data Pattern Test, a special data pattern is sent to stress the serialization process. This pattern equates to ASCII 5A followed by ASCII character A5 (binary sequence 01011010 10100101).

After each test, Modem Doctor calculates your driver/Uart throughput, or the speed at which characters are moved in transmit and receive. Normally, you should see a value equal to the baud rate divided by 10 for speeds up to 9600 bps. Speeds above 9600 depend on many factors including; Uart chip in use, Comm driver in use, and how many other programs are running during the testing of your modem. The higher each figure is, the faster your modem and Comm port can handle data transfers.

Options Menu

 Interactive Terminal **-**This mode activates an ASCII terminal that allows you to type information to your modem. This mode is handy for editing or updating modem configurations. It can also be used as a communications terminal if you manually dial a phone number.

 Fax Modem Info**-** If you have a fax modem, Modem Doctor will return information about its fax capabilities

View Statistics Modem Doctor collects information on tests it runs and will display the number of tests, the number of test passes, the number of errors detected, and the speeds that were tested.

Generate Hardware Report Modem Doctor can save all test information and configuration settings to a file, MDRWRPT.TXT. You can use this file for future reference.

MDR for DOS Settings Modem Doctor for DOS 7.0 writes a special file, MDRD.INI to your windows directory that allows Modem Doctor for Windows to compare the actual DOS hardware settings against those detected from your Windows Configuration files.

Interactive Terminal

The Interactive mode simulates an ASCII terminal with several hundred lines of scroll-back capabilities. When you activate this mode, an 8K communications buffer is created that allows you to type information to your modem. To scroll back or forward, simply use the scroll-bars on the side of the Interactive window.

You can use this mode to change your modems configuration, send your own commands to your modem, or using the ADTD command, you can dial a phone number and connect to a BBS. The baud rate used by the Interactive mode is that which was used for any previous testing.

The terminal mode is not meant to be a replacement for a communications program, but it will handle text-based communications without a problem.

Check the AT Commands section for more info on modem commands. Check the S-Register section for more information on S register usage.

Fax Modem Information

Most modems made during the 1990s also include some sort of Fax support. Modem Doctor can determine the fax capabilities of your modem. Fax devices are classified by Group and Class. All Fax modems (and modern fax machines) are Group III devices. Modem Doctor sends a series of commands to determine the characteristics of your fax modem. These are displayed in the Sent to Modem window. The Received from Modem window displays the raw results of these commands. The Message window displays a running commentary on all tests, while the results are interrogated and displayed in the Diagnostic Information Window.

Fax Classes Details the Class support of your Fax Modem
FAX DCE Model Returns model info (not supported by all classes).
DCE Manufacturer Returns manufacturer info (not supported by all classes).
DCE Revision Returns firmware (ROM) revision info (not supported by all classes).
Auto Answer Mode Your modem can auto answer in data, fax, or data/fax mode. This can be determined by the Class setting or by your modem when it receives each call. Auto-determines is the normal setting.

Fax Flow Control Fax modems return the following;

0 = No Flow Control
1 = Xon/Xoff Control
2 = RTS/CTS flow control

These settings are not used when you are in the data mode. Most modems will not return info for this command, since flow control is set by your communications or fax program.

Voice Capability If your modem returns an 8 for fax class, it is also voice capable. Note - not all modems that are voice capable return this information.

Receive Capability Your fax modem can either receive message data or poll a remote device for data, or not. This command is of little importance except in a stand-alone configuration. Most modems will not return any information.

Note - Modem Doctor will display the raw data from all commands and tries to interpret their meanings. Some modems return trash for valid commands, so dont be surprised to see oddball characters line / or p displayed in the diagnostic information section.

Fax Classes

Class 0 Class 0 indicates that your modem supports data operations. All fax modems support this class. Fax modems are placed into Class 0 operation in order to allow operation in the data mode.

Class 1 Class 1 fax modems use a simple instruction set to handle faxes. Most of the fax work is done by a fax-modem program.

Class 2 Class 2 fax modems use an expanded instruction set and are more powerful. These modems are easier for programmers to support and interface to because most of the work is done by the modem itself.

Class 2.0 This is a fax modem that uses a superset of the Class 2 instruction set, which returns more information and controls more capabilities of your modem.

Any Fax Class indicated above Class 2.0 is a propriety command set. Some modem manufacturers use these special modes to add such items as voice support or special AT commands to enhance the flexibility of their modem. If you see a number greater than 2.0 returned, check your modem manual for details on these enhanced features.

View Test Statistics

After each test is run, Modem Doctor updates results for each of the Comm ports youve tested. You can review these tests at any time by activating this feature. When you do, you will see the following information displayed;

Results of Comx Testing (can hold up to 9 separate Comm port results)

Test	Total Sent	Char Sent	Errors	MDRW Test
Originate Tests	0	0	0	Carrier Test
Answer Tests	0	0	0	Carrier Test
Microprocessor	5	n/a	0	Autofind/Setup
Register Tests	17	n/a	0	Uart
Digital Tests	0	0	0	Loopback

Speeds Tested at: 57600

You can save these results plus system configuration information to a file from the Generate Hardware Report. You can look at this file anytime you wish with a simple text file viewer (such as the Windows notepad).

Generate Hardware Report

One of the purposes of Modem Doctor is to determine the configuration of your installed hardware. This section places all of that information together for you, including a summary of all tests that were run, and places that information inside of a scroll-back window. You can review any of this information by using the scroll-back control on the side of the window.

Once you are done reviewing and press OK, Modem Doctor asks you if you wish to save this information in a file. If you say YES, this information is saved in a text file using the name MDRWRPT.TXT. Modem Doctor saves this file in the current working directory and will prompt you to let you know where you can find it.

Format of File

```
--------------------------------------------------------------------------
                        Modem Doctor for Windows   Ver 1.0
                    Summary of Installed Hardware and Settings
            Modem Doctor has tested your system and found the following
--------------------------------------------------------------------------


Verified Hardware settings
----------------------------------
Com1Base              03F8[D]          Your installed Com1 is using a default setting [D]
Com1IRQ                     4[D]
Com1FIFO                    Off
                            No Com2 or Com3 is declared in your system/win.ini files

Com4Base              02E8  Com4 is defined
Com4IRQ                     3
Com4FIFO                Off

Comm Driver           comm.drv     The driver windows uses to communicate to your
modem
CommBoostTime           10         How many extra milliseconds comm.drv gives to Comm
pgms
Terminal Port         COM4   The declared TERMINAL port in Win.ini
Mouse Port             COM1  The declared Mouse port from MOUSE.INN
IRQSharing             Off          Use only for EISA or PS/2 machines

Results of Com4 Testing       Each Test is detailed in this manner
---------------------------------
Test                    Total Sent    Char Sent             Errors
Originate Tests        0                 0                     0
Answer Tests            0                      0                     0
Microprocessor         5                 n/a                   0
Register Tests        17                 n/a                   0
Digital Tests           0                      0                     0

Speeds Tested at: 57600
```

Modem Doctor for DOS Settings

Modem Doctor for DOS has some advantages over the Windows version. All Windows programs have to work through a kernel of functions and cannot physically control hardware without violating system integrity and generating General Protection Faults. DOS programs however can and usually do take direct control of your system. Modem Doctor for DOS physically verifies the existence and settings for every Comm port you use. Version 7.0 has the ability to save this in a Windows-compatible .INI file (MDRD.INI) which is placed in your windows subdirectory.

When you run the Modem Doctor for DOS settings mode, it compares all of your Window INI file settings for communication ports against those found by Modem Doctor for DOS. ANY DIFFERENCE between the two settings may lead to communication errors or problems under Windows. It is recommended you use the Manual Login feature of Modem Doctor for Windows to correct these settings.

See the ~~Modem Doctor for DOS~~ section for more info about this program or See the Order form for Modem Doctor for DOS ordering information.

Modem Doctor for DOS

Modem Doctor for DOS is a powerful diagnostic tool for testing modems/serial ports and Uarts and is the DOS compliment of Modem Doctor for Windows.

Unlike the Windows version, Modem Doctor for DOS can directly verify and check serial port hardware and system board devices (such as interrupt controllers) without the need of special drivers or working through control kernels (such as with Windows).

Version 7.0 of Modem Doctor for DOS also has a unique feature that allows it to save test information in a Windows-compatible .INI file for use by Modem Doctor for Windows. The two programs together are the most comprehensive serial port diagnostics you can find anywhere.

For ordering information, see the Order form section for more information.

Setup Menu

S This section is used to select the serial ports and modems for testing. You select the port, the baud rate, and if you wish to test the modem and the comm driver, or just the driver only.

Ports Section displays all of the serial ports you can use for testing. You may have more serial ports installed, however Modem Doctor will not test any ports in use by other programs or assigned to your Mouse.

Speed section displays only valid baud rates for testing. In the Shareware version, the maximum baud rate is limited to 2400 bps. The Registered version supports speeds to 115,200 bps (limited only by the maximum speed of your installed communication driver).

Mode section allows you to either test your modem and serial port, or just test the serial port alone. For most applications, you would choose to test both, however you can test the hardware alone if you suspect a modem problem or just wish to test a serial port that does not have a modem attached.

Underneath the mode section, Modem Doctor displays all the Comm ports it has located that have active serial devices attached. Any Comm port displayed here is probably the place you currently have a modem installed. A modem must be turned on in order for this feature to work properly.

Initial Diagnostics

When you choose to test the modem and driver, Modem Doctor sends a series of commands to your modem and driver that verify both units are working properly together.

For a detailed explanation see the following;

Scrolling Windows
Diagnostic Info

Scrolling Windows

Sent to Modem	Displays commands Modem Doctor sends to the modem
Received From Modem	Echoes commands and shows your modems response to them
Messages	Step-by-step explanation of each stage of testing.

Diagnostic Information

Baud Rate Selected Displays the baud rate you selected for testing.

Baud Rate Driver Pgm Displays the comm.drv baud rate which should be the same as the baud rate you selected.

Modem Microprocessor Indicates your modem acknowledge at least one valid command.

Modem ID Type Derived from the code returned from your modem. This might not be accurate, since many modem manufacturers use the same number, however it will be accurate enough for testing.

Modem Fax Ability Your modem responds to a T.30 Instruction Class command indicating some kind of fax capability.

Modem Memory/ROM Your modem responded OK to the command to run a checksum test of its memory/program ROM.

Differences between Modem Tests and Driver Only Tests

Modem Doctors Setup Mode gives you the ability to test a modem and driver together, or just the Windows Comm driver.

The Modem Test is a series of comprehensive commands that are designed to determine the type of modem, its proper settings and features, plus check all of the control lines are properly set between modem and driver. Use this test if you have a modem attached to a serial port.

The Driver Test checks all of the control lines are properly set, however it does not send commands to a modem. Use this test to check a serial port or a serial cable.

Exit Menu

Use this command to close all comm ports used by Modem Doctor and exit the program

Help Menu

The help menu contains information on how Modem Doctor operates. You can access it with the icon above, or from any of the help buttons in each Modem Doctor for Windows section.

Contents Help topic contents.

Testing a Modem

Testing a modem with Modem Doctor is a simple procedure. Follow these instructions;

1) Make sure your modem is turned on and attached to your computer. For internals, this step is not necessary.

2) Press the  AutoFind Icon or activate the Login | Auto Login mode from the menu. Modem Doctor will then display all of your comm settings. Press OK

3) Press the  Setup Icon or activate the Setup mode from the menu. Modem Doctor will then give you choices for port and baud rate. Select TEST MODEM/DRIVER mode. **TIP for Port Selection** - Look at the lower right white window. It will show you a list of comm ports that Modem Doctor has found with active serial devices. It is recommended you choose one of those unless you know for sure your modem is installed somewhere else.

From this point on, Modem Doctor will check out your modem and let you know of any errors it has found. With a successful setup, you are ready for serious system testing using these modes;

Register /Uart Tests	Test Driver/Uart interface, Handshaking
Carrier Tests	Simulate an on-line Modem Test
Loopback Tests	Check out serial cables and serial data links
Options Menu	Type your own commands, view or save test information
Exit Menu	Exit Modem Doctor

Testing a Serial Port

Testing a serial with Modem Doctor is a simple procedure. Follow these instructions;

1) For simple verification of a port, you can directly proceed to step 2. If however you wish to make sure all of the control signals for a serial port are properly functioning, you need to have a modem attached and turned on, or a Loopback Plug installed on the end of your serial cable or serial port connector.

2) Press the  AutoFind Icon or activate the Login | Auto Login mode from the menu. Modem Doctor will then display all of your comm settings. Press OK

3) Press the  Setup Icon or activate the Setup mode from the menu. Modem Doctor will then give you choices for port and baud rate. Select TEST DRIVER ONLY mode. **TIP for Port Selection** - Look at the lower right white window. It will show you a list of comm ports that Modem Doctor has found with active serial devices. It is recommended you choose one of those unless you know for sure your modem is installed somewhere else.

From this point on, Modem Doctor will check out your serial port and let you know of any errors it has found. With a successful setup, you are ready for serious system testing using these modes;

Register /Uart Tests	Test Driver/Uart interface, Handshaking
Carrier Tests	Simulate an on-line Modem Test
Loopback Tests	Check out serial cables and serial data links
Options Menu	Type your own commands, view or save test information
Exit Menu	Exit Modem Doctor

Exiting

To exit Modem Doctor for Windows choose Exit command from the main menu.

Configuring Port Information

Modem Doctor for Windows reads your system.ini and win.ini files and verifies that the settings are accurate. Unlike DOS programs, Windows configurations for serial ports come directly from these two ini files (or the registry in Win95).

There are several ways you can change your configuration.

1) **Using Windows Notepad** you can edit your system.ini and win.ini files
2) **Using Windows Control Panel** you can change basic port and baud rate settings
3) **Using Modem Doctor for Windows** Manual Login-you can use a simple, window-driven routine to change all important comm settings. If you make an error, you can restore your original configuration from a special backup file created by Modem Doctor.

You can use Modem Doctor for Windows Generate Hardware Report to save all your current information to a text file. Finally, you can use Modem Doctor for DOS Ver 7.0 to generate a hardware comparison file for tracking down elusive bugs.

Sending Commands to your Modem

Modem Doctor for Windows includes a simple ASCII terminal that allows you to send your own commands to the modem. Your modem understands a series of instructions that start with the two letters **AT**. AT stands for Attention, and these must be the first two characters on a new line. Below is a summary of the basic AT instruction set commands common to nearly all Modems.

A Answer Incoming Call
A/ Repeat Last Command
B0 CCITT Answer Sequence
B1 Bell Answer Sequence
Dn Dial a Phone Numbers
E0 Command Echo Disabled
E1 Command Echo Enabled
H0 Hang Up
H1 Off Hook
I0 Product Information
I1 ROM Checksum
Ln n=0-7,Speaker Volume
M Speaker Control
M0 Speaker off
M1 Speaker On Until CD
M2 Speaker Always On
M3 Speaker Off during Dialing
O Return On-Line State
P Pulse Dialing
Q Result Codes
Q1 Quiet (No Result Codes)
Q2 Quiet on Answer Mode Only
V0 Return Numeric Codes
V1 Return Verbose (word) codes
X0-9 Result code format
Z Reset the modem

There are other instructions that use the & and * symbols as well. Consult your modem manual
for a summary of these advanced commands.

The Toolbar

The Toolbar is a row of buttons at the top of the main window which are shortcuts to commonly used commands. Clicking one of the buttons is a quick alternative to choosing a command from the menu. Buttons on the toolbar activate and deactivate according to the state of the application.

Button	Action	Menu Equivalent
	Setup Modem/Uart for Testing	Setup
	Select a Driver for your modem	Carrier| Select Modem Drivers
	Autofind Hardware	Login | Auto Login
	Uart Register/S Register Tests	Register | Quick Register Tests
	RTS/CTS or DTR/DSR Echo	Register | RTS/CTS DTR/DSR Echo
	Carrier Tests	Carrier Tests| Carrier Test
	Loopback Tests	Loopback Tests | Analog Loopback
	Display Fax Information	Options | Fax Modem Info
	Interactive Terminal Mode	Options | Interactive Terminal
	Display help file contents	Help | Contents

Windows Keys

Windows allows you operate without the use of a mouse. In some cases, key strokes are easier and faster to use. This information is generic, and applies to all Windows applications.

Cursor Movement Keys

Key(s)	Function
Arrow key	Moves the cursor left, right, up, or down in a field.
End or Ctrl+Right Arrow	Moves to the end of a field.
Home or Ctrl+Left Arrow	Moves to the beginning of a field.
Pape Up or Page Down	Moves up or down in a field, one screen at a time.

Dialog Box Keys

Key(s)	Function
Tab	Moves from field to field (left to right and top to bottom).
Shift+Tab	Moves from field to field in reverse order.
Alt+letter	Moves to the option or group whose underlined letter matches the one you type.
Arrow key	Moves from option to option within a group of options.
Enter	Executes a command button. Or, chooses the selected item in a list box and executes the command.
Esc	Closes a dialog box without completing the command. (Same as Cancel)
Alt+Down Arrow	Opens a drop-down list box.
Alt+Up or Down Arrow	Selects item in a drop-down list box.
Spacebar	Cancels a selection in a list box. Selects or clears a check box.
Ctrl+Slash	Selects all the items in a list box.
Ctrl+Backslash	Cancels all selections except the current selection.
Shift+ Arrow key	Extends selection in a text box.
Shift+ Home	Extends selection to first character in a text box.
Shift+ End	Extends selection to last character in a text box

Editing Keys

Key(s)	Function
Backspace	Deletes the character to the left of the cursor. Or, deletes selected text.
Delete	Deletes the character to the right of the cursor. Or, deletes selected text.

Help Keys

Key(s)	Function
F1	Gets Help and displays the Help Index for the application. If the Help window is already open, pressing F1 displays the "Using Windows Help" topics. In some Windows applications, pressing F1 displays a Help topic on the selected command, dialog box option, or system message.

Menu Keys

Key(s)	Function
Alt	Selects the first menu on the menu bar.
Letter key	Chooses the menu, or menu item, whose underlined letter matches the one you type, when a menu has focus.
Alt+Letter key	Pulls down the menu whose underlined letter matches the one you type.
Left or Right Arrow	Moves among menus of the main menu bar.
Up or Down Arrow	Moves among menu items within a drop-down menu.
Enter	Chooses the selected menu item.

System Keys

The following keys can be used from any window, regardless of the application you are using.

Key(s)	Function
Ctrl+Esc	Switches to the Task List.
Alt+Esc	Switches to the next application window or minimized icon, including full-screen programs.
Alt+Tab	Switches to the next application window, restoring applications that are running as icons.
Alt+PrtSc	Copies the entire screen to Clipboard.
Ctrl+F4	Closes the active window.
F1	Gets Help and displays the Help Index for the application. (See Help Keys)

Text Selection Keys

Key(s)	Function
Shift+Left or Right Arrow	Selects text one character at a time to the left or right.
Shift+Down or Up	Selects one line of text up or down.
Shift+End	Selects text to the end of the line.
Shift+Home	Selects text to the beginning of the line.
Shift+Page Down	Selects text down one window. Or, cancels the selection if the next window is already selected.
Shift+Page Up	Selects text up one window. Or, cancels the selection if the previous window is already selected.
Ctrl+Shift+Left or Right Arrow	Selects text to the next or previous word.
Ctrl+Shift+Up or Down Arrow	Selects text to the beginning (Up Arrow) or end (Down Arrow) of the paragraph.
Ctrl+Shift+End	Selects text to the end of the document.
Ctrl+Shift+Home	Selects text to the beginning of the document.

Window Keys

Key(s)	Function
Alt+Spacebar	Opens the Control menu for an application window.
Alt+Hyphen	Opens the Control menu for a document window.
Alt+F4	Closes a window.
Alt+Esc	Switches to the next application window or minimized icon, including full-screen programs.
Alt+Tab	Switches to the next application window, restoring applications that are running as icons.
Alt+Enter	Switches a non-Windows application between running in a window and running full screen.
Arrow key	Moves a window when you have chosen Move from the Control menu. Or, changes the size of a window when you have chosen Size from the Control menu.

AUTO LOGIN

The AUTO Login command searches your system.ini and win.ini configuration files. After it reviews all your settings, Modem Doctor uses this information and verifies that hardware is installed and configured properly. There are three main sections displayed; System.ini settings, Communication Driver Info, and Uart FIFO Status.

The System.ini settings are taken from your system.ini file, and display the base port address and IRQ settings that are defined for your system. If Modem Doctor finds a valid port, it places a checkmark in the VF column and displays the words Verified in the Defined Column.
Other messages can be returned as well. These include; PortLocked, Port Was Open, IRQ in Use, No Memory, No Hardware, Wont Open, and Error.

The Communications Driver Info Section gives you basic background information on your Windows communication driver including; name, maximum supported ports, maximum supported printers, the type of mouse in use, the CommBoost setting used by the driver, the port assigned to work with Windows Terminal Program, the maximum baud rate of the driver, and if IRQ sharing is in use.

Finally, the Uart FIFO section shows you the active ports and if support for the 16550A Uart is Off or On. Most Comm programs work best with this setting On. You can easily change this setting using Modem Doctors Manual Login section.

Comm Driver Section

Name	Name of the driver used by windows to handle ports
Supported Ports	# of serial ports this driver can handle
Supported Printers	# of printers this driver can handle
Mouse Type	Type of mouse control (Com1-Com9 or Bus)
CommBoost	Extra amount of time Windows gives to comm programs
Terminal Port	Port assigned to be used with Windows Terminal
Driver Max Baud	Highest Supported Baud rate of this driver
IRQ Sharing	For EISA or PS/2 machines, allows 1 IRQ to be used with multiple devices

Meaning of Defined Messages in AutoFind

Port Locked	Windows returned the IE_HARDWARE message, meaning the Hardware is in use by another driver or program.
Port Was Open	This particular Port was already opened and not closed properly by a previous program
IRQ In Use	The IRQ line associated with this port is in use by some other Windows driver or program. (Usually a mouse driver).
No Memory	No memory available to buffer the serial port
No Hardware	The Port Hardware does not exist (no physical port exists at this address).
Wont Open	The Port will not open
Error	Unknown Error

During normal testing, you will routinely see; Port Locked, IRQ in Use and No Hardware. You should never see the Wont Open or Error message. These last two indicate some serious Windows configuration or system problem.

Base Port

This is the hardware port address of a Comm port. This is defined by the ComxBase variable in the system.ini file. Usually, they equate to the following;

Com1 = 03F8 (hex)
Com2 = 02F8 (hex)
Com3 = 03E8 (hex)
Com4 = 02E8 (hex)

There are no standard values for Comm ports above Com5.

IRQ Settings

These are the Interrupt Request Line settings defined in your system.ini files by the variables ComxIRQ= . Usually they equate to the following;

Com1 uses IRQ4
Com2 uses IRQ3
Com3 uses IRQ4
Com4 uses IRQ3

Note that if you have a mouse on Com1, you cannot test or use a modem on Com3 because they cannot share an interrupt. Same with a mouse on Com2 and a modem on Com4.

Manual Login

This feature of Modem Doctor allows you simple and yet powerful access to all the configuration information contained inside of Windows INI files. For Windows 3.x, this information is held inside of two files; Win.ini and System.ini. With Windows 95, true Win95 communication programs may keep this information in the Registry. However, most Win95 communication programs use Win32 or Win16 conventions, and this information is also stored inside of the Win.ini and System.ini files. Normally, to change a system parameter, you need to edit the .ini files. For some comm features, you can use Windows Control Panel. Modem Doctor makes this editing much easier and eliminates the need to worry which ini file you need to use.
In the Upper left corner, you find a listbox that will display selected information;

General Settings	This displays information from your ini files that affect all comm ports and all communication capabilities. The display varies depending on if you have selected the System.ini or Win.ini display.
COM1-COM9	This displays information about a particular comm port

Below this listbox, you will see two buttons for selecting System.ini or Win.ini files. Above these
buttons, you will see the words Using System.ini or Using Win.ini. This informs you of your current file selection.

Display Section
Depending on your choices above, you will see Windows communication parameter settings displayed.

Editing your Choice
To edit your choice, press on the  button. Modem Doctor will then display help text about your selection, show your current choice, and allow you to enter a new choice.
To accept changes, press OK, to abort press Cancel.

Backup Files
If you make any changes, your old configuration is saved in your windows directory with the extension .BMK. Note- Any changes you make are not in effect until you restart Windows.

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To Print, press the PRINT button above

Modem Doctor for Windows is distributed using the Shareware Concept. Shareware is not freeware. If you use any shareware for a period of time and find it useful, you should take the time to register the program. Registration helps guarantee that Shareware software will always be available. **TO PRINT AN ORDER FORM, JUST SELECT FILE, then PRINT TOPIC from the help menu above or press the PRINT BUTTON. The order form is contained directly below these paragraphs.** All product is shipped on 3.5, 1.44mb disks. Please allow 2-4 weeks for order processing.

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Modem Doctor for Windows registration is $24.95, and includes shipping in the US and Canada. International orders require payment in US funds (checks drawn on US banks or Postal Money orders directly redeemable in US Funds)and an additional $2 for shipping. We are honest folks, but please do not send cash! **FOR New Orders of** Modem Doctor for DOS **you can get both Modem Doctor for Windows and Modem Doctor for DOS for a combined price of $40.00.** Also, there are discounts available for multiple disk orders of Modem Doctor for Windows.

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Modem Doctor For DOS
Modem Doctor for DOS is the perfect companion to Modem Doctor for Windows. Running in Real Mode, Modem Doctor for DOS can control and accurately detect all of your installed system hardware. Modem Doctor for DOS also generates a handy hardware report that Modem Doctor for Windows can use to pinpoint configuration errors. Modem Doctor for DOS registration is $19.95, and includes shipping in the US and Canada. International orders require payment in US funds (checks drawn on US banks or Postal Money orders directly redeemable in US Funds) and an additional $2 for shipping. We are honest folks, but please do not send cash! **FOR New Orders of** Modem Doctor for Windows**, you can get both Modem Doctor for Windows and Modem Doctor for DOS for a combined price of $40.00.** Also, there are discounts available for multiple disk orders for Modem Doctor for DOS 7.0;

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Please make all checks payable to; Hank Volpe. Thank you for your order.

About the Author, Hank Volpe

Lots of people ask, how does one become a Modem Doctor?. Well, the program is a natural evolution from my passion for computers. Im an engineer by trade, and built my first computer from a kit in 1974 for the ridiculous price of $6000. It was an IMSAI 8080, and if you bit-switched it enough, you could actually get it to do something besides flash its LEDs.

I began playing with modems in the late 70s, and helped run a BBS for BIBMUG (Buffalo IBM-PC Users group) from 1984 until 1991. During this time, it became very apparent to me that modem problems and setup questions were difficult for most users. I answered a lot of e-mail and phone calls back then, and sometimes I think I wrote Modem Doctor to get away from all of the questions. Actually, I rather enjoy the questions, and really wrote Modem Doctor to help people solve their modem setup and installation problems. Modem Doctor for DOS Ver 1.0 was released in 1988 and the rest, as they say, is history.

In 1991, I moved to Baltimore MD and setup the Modem Doctor BBS, dedicated to helping users with modem problems. Even though we live in an age of plug-and-play, there are still many things about modems that can drive folks crazy. Modem Doctor and the BBS are quite a labor of love. Although some folks have gotten very wealthy off of shareware, most do not. I do it for the fun of it, and use registrations to help develop new versions of my programs and offset the cost of running the BBS.

As I mentioned, Modem Doctor is a labor of love and I enjoy it. Additionally, I write newsletter articles that are free for non-profit groups to reprint. Topics are usually centered around modems and digital communications. You can find these on the BBS as well.

If you need to help with your modem problems, you can reach me on the Modem Doctor BBSor via the Internet. I also enjoy reading letters sent through the US mail as well. If you have a suggestion or a comment for us, drop us a line. Youll get a quicker response if you use the BBS or Internet e-mail, but I dont mind paper-based mail either.

Modem Doctor Bulletin Board Service

The Modem Doctor BBS is the best place to get quick answers to your modem/communication questions. The BBS operates 24 hours a day at **410-256-3631**, and at baud rates up to 28.8kbps. You will always find the latest versions of Modem Doctor for Windows, Modem Doctor for DOS, modem drivers for Modem Doctor and Comset available on the BBS.

Registrations help defray the costs, keeping this service free to all who call. Not only can you get your questions answered, but the BBS contains an extensive Shareware Communications Software Library.

You can also reach me via the Internet as well as via our voice mail service. However, the fastest response is via the BBS. Give us a call today!

Internet Support

You can contact me via e-mail on the Internet at the following addresses;

modem.doctor@ghawk.com or hank.volpe@ghawk.com

The fastest and best way to reach me is on the Modem Doctor BBS. However, Im also pretty quick to respond on the Internet as well. Make sure you leave your message with enough details so that I can give you the proper advice.

Voice Mail System

Although I enjoy talking to users about their modem problems, probably the slowest way to reach me is via voice mail. We receive many calls from around the world, and its difficult to judge timezones, work schedules and the like. If you need to use voice mail, use it only because your modem is broken or because you need information that cannot be delivered in any other method.

Our voice mail system operates 24 hours a day at **410-256-5767**. When you call, you will be instructed to press one of 4 choices;

Choice 2 - Press this choice for Modem Doctor order information. You will hear a recording giving you price and shipping information. At the end of the message, you will hear a tone. If you wish, you can leave a message regarding your order at this time.

Choice 3 - Press this choice for Modem Doctor Technical Support. You will hear a recording instructing you to leave information regarding your problem and your system.

Choice 1 and 4 are reserved for personal messages. Please do not place Modem Doctor information in these mailboxes.

Please allow at least 4 days for voice messages to be returned. For quicker response, contact me on the Modem Doctor BBS at **410-256-3631** or via Internet e-mail.

Contacting me by U.S. Mail

I enjoy hearing from users and also those who need help. The U.S. Mailing address you can reach me at is;

Hank Volpe
Modem Doctor
PO Box 43214
Baltimore, MD 21236

You can also reach me on the Internet and via my BBS as well. In most cases, these other methods are faster, since they are electronic.

Acknowledgments

Modem Doctor for Windows, like Modem Doctor for DOS, has been an ongoing process. Ive spent hundreds, or perhaps thousands of hours since 1988 writing both programs. Of course, a good author also knows how to find guinea pigs, folks who will help test their program even though it may crash and burn their system. I want to take the time to thank all of you who have helped me write this program, and hope I can count on your help in future versions. I also want to thank some of my best friends in Buffalo NY who have given freely of their time to debug, test, and upload Modem Doctor around the world.

Id love to name names for everyone, but Im afraid Id leave someone out or forget someones kindness (which as well all know causes more trouble than anything). In any case, thanks again to all of you for your help.

Finally, my family has a big role to play as well. Dont forget, as a shareware author, I have to hold down a real job too. Programming is done around family time, and Im not usually in a great mood after programming for hours. Thanks to my wife Cher, and the kids Jenn and Jeff for their patience and understanding.

Hank

Disclaimer Notice

Disclaimer
It is not the intent of the author to recommend any brand of modem over another nor to infringe on the copyrights of the manufacturers by mentioning their products. A modem fits a need, and whatever one works for you is the one you should have. As time goes on, more modems will be added to the list of "special enhanced " tests. The modems mentioned are done so only because of the popularity they enjoy and for no other reason.

All programming of modems for testing is done with simple character strings, similar to any type of data that can be sent to a modem or a serial port. MODEM DOCTOR DOES NOT WRITE ANY PERMANENT CHANGES TO YOUR MODEM. Any modem, whether AT compatible or not, can be handled by the Modem Doctor with special software drivers. These software drivers will be distributed free of charge as needed for general use. Custom drivers created by Hank Volpe for particular clients however will require a fee for handling and programming time.

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1) When the program starts, the welcome window displays the words Shareware or Registered

2) The bottom status bar displays the words Shareware or Registered during most of the programs operating time.

3) You can select the HELP and ABOUT sections from the main menu. A window is displayed with the words Shareware or Registered Displayed

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