

# PC-Doctor DOS Factory

CONFIDENTIAL

このドキュメントは、PC-Doctor DOS Factory 版の機能概要を把握したいお客様向けに、工場での出荷テストなどで使うことができるPC-Doctor DOS 版のテスト対象範囲の広さ、豊富なコマンドラインやパラメータ、スクリプト自動実行能力を理解いただくために情報をマニュアルから抜粋したものです。ご契約いただいたお客様はフロッピーブートが可能なPC-Doctor DOS版（英語版）と約200ページの機能詳細日本語マニュアルが提供されます。製品とマニュアルの評価をご希望のお客様はWebサイトの「製品の購入」ページの、「評価版の提供」項目をご参照いただきお申し込みください。

PC-Doctor DOS 版は、PC/ATをベースとした様々なシステムを出荷する際のシステムテストやバーンインテストにご利用いただけます。

テストの内容説明に関しては、Webサイト「製品」ページの、「PC-Doctorハードウェア診断ツール 主要テスト項目の詳細」をご参照ください。

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## はじめに

PC-Doctor DOS Factory リファレンスガイドは、PC-Doctor DOS Factory User's Guide の補足資料として提供されています。User's Guide は、基本的な製品の設計概念からテストをどのように実施するかを説明しています。このリファレンスガイドは、PC-Doctor DOS版の使用にあたって必要となる詳細なる情報を提供しています。.ini ファイルで設定するスイッチや、パラメータの記述方法についてや、テスト項目におけるテスト機能の詳細、エラーメッセージの解説などが含まれています。

PC-Doctor DOS Factory User's Guide に説明があるようにテストの実施方法にはいくつか種類があります。コマンドラインから個別テストを実行したり、オーバーレイを実行したり、PCDRAUTO.ini や独自のスクリプトを実行することもできます。コマンドラインスイッチがどのように機能するのかわかりにくい場合があります。例えばPCDRAUTO.INI ファイルを変更してパスカウント2を設定し、実際にはコマンドライン(pcdr /au:fname:PCDRAUTO.INI /pc:3) を実行したとします。どちらが優先し、パスカウントは2なのか3なのか分かりにくいでしょう。このケースでは、コマンドラインからのスイッチ /pc スwitchが優先されパスカウントは3となり、よって3回実行されることとなります。コマンドラインスイッチとスクリプトのパラメータをどのように設定するかは非常に複雑な作業となりがちです。スクリプトファイルでの設定とコマンドラインスイッチの摩擦や矛盾などに注意して設定を行ってください。

## コマンドラインの使い方

PC-Doctor DOS Factory は、コマンドラインによる診断の実行が可能になっています。基本的なコマンドラインスイッチを使ったPC-Doctorの起動は、**pcdr /switch... /switch** です。スラッシュの前に半角スペースがあることを確認してください。一つのコマンドラインには最大128文字を使ってスイッチの指定を行えます。

テストの起動は以下の4種類の方法でスイッチを使って実行します。

- **ba:xx** スイッチは、PCDR.PDO オーバレイファイルに保存された10個のテストセットのうち一つを起動することができます。
- **ms:xx** スイッチは、最大システムロードテストを xx 分間実行します。
- **rt:nn** スイッチは、指定したテストをID nn で実行します。
- **au:fname** スイッチは、自動スクリプトモードで実行します。

**ba:xx** と、**ms:xx** スイッチは、同一コマンドライン上では1回だけ使用できます。これらのスイッチを使用する際は、同一コマンドライン上では、**ba:xx**、**ms:xx** or **rt:nn** などのスイッチを使用しないでください。**rt:nn** スイッチの場合は、同一コマンドライン上に複数の **rt:nn** スイッチを使用することができます。**rt:nn** スイッチでは、最大10回、同一コマンドライン上で使用が可能です。テストカテゴリは各 **rt:nn** スイッチに対して1テストしか指定できません。

**au:fname** スイッチは、自動スクリプトモードで実行できますが、**ba**、**ms**、**rt** スイッチと同一コマンドライン上では使用できません。**au:fname** スイッチの使用制限としては、このスイッチが作成したコマンドライン上複数のオプションやパラメータを含む .ini ファイルを指定している場合、.ini ファイルで指定したオプションのオーバーライドをコマンドラインスイッチで行うことはできません。以下のセクションで、テストの起動で使用できるコマンドラインスイッチの詳細を参照してください。

### .txt ファイルを使ったコマンドラインへの追加パラメータの設定

コマンドラインは128文字までしかサポートしていませんが、.txt ファイルを使ってパラメータを拡張したり、追加パラメータを設定することができます。**pcdr @[filename].txt** をコマンドラインで使用してテキストファイルパラメータを設定します。例えば、次のようなスイッチはコマンドラインパラメータを test.txt ファイルから読み込みます。

```
pcdr @test.txt
```

@.txt ファイルは64kb のサイズ制限があり、100コマンドラインのエントリまで入力可能です。同一

コマンドライン上には、ダイレクトコマンドラインパラメータと、テキストファイルコマンドラインパラメータを使うことができます。しかし、テキストファイルパラメータを設定する場合は、ダイレクトコマンドラインスイッチをテキストファイルパラメータスイッチの前に指定しなければなりません。

```
pcdr /nnp @test.txt
```

テキストファイルコマンドラインスイッチを使用する場合、コマンドライン中でテキストファイルコマンドラインスイッチ以降のコマンドは全て無効とされます。例えば、**pcdr @test.txt /nnp** と入力した場合、全てのパラメータを test.txt から読み込みますが、/nnp スイッチは無効として無視されません。

#### ba:xx 、 ms:xx コマンドラインスイッチ

ba:xx コマンドラインスイッチは、xx 番のオーバレイ(またはテストセット)をバッチモードで実行します。オーバレイ番号は1-10の範囲で指定します。オーバレイはPC-Doctorのインターフェースを使って作成します。オーバレイでテストの条件設定を行うことが可能です。オーバレイを実行すると、PC-Doctorは自動的にテストを実行し、完了した後に自動的にDOSへプロンプトへ戻ります。このスイッチの使い方は、**pr:nnnn** スイッチ、**eo** や **he** と使用します。バッチモードの終了時には、エラーがなかった場合は0、テストが失敗している場合は1、中止された場合は2といった ERRORLEVELを返します。ERRORLEVEL 機能に関しては、DOSの資料を参照の上、バッチファイルでの使用方法に基づいてご利用ください。

ms:xx スイッチは、最大システム負荷テストをバッチモードで xx 分間実行します。分の指定は2-9999 の範囲で指定します。PC-Doctorは、自動的に最大システム負荷テストを実行し、終了時にDOSへ戻ります。終了時には、エラーがなかった場合は0、テストが失敗している場合は1、中止された場合は2といった ERRORLEVELを返します。ERRORLEVEL 機能に関しては、DOSの資料を参照の上、バッチファイルでの使用方法に基づいてご利用ください。

以下は、ba:xx と ms:xx スイッチと同一コマンドライン上で使用するスイッチのリストです。

#### Switch Options to Use with the ba:xx and ms:xx Switch

Switch	Function
ac	Alternates colors.
an	Enables automatic test log numbering.
eo	Will log errors only.
fd:x,y,z	Specifies diskette tracks to test.
he	Halts on errors in processing.
id:nnnn	Adds text string to log.
mr:type:start:end	Specifies memory type and range to be tested.
na2f	Returns failures if device not detected.
nn	Disables checking for network cards.

nomouse	Disables the mouse.
np	No prompting.
nps2m	Disables calls for PS/2 mouse.
ns	Disables checking for sound cards.
nsc	Disables checking for SCSI cards.
nv	Disable internal virus checking.
pr:nnnn	Designates file for test log.
pi:n	Specifies path for .ini files.
st	Reports all hardware bugs.
stl:xx	Specifies the amount of ram to use for the test log buffer in bytes.
tm:nn	Sets minimum test time for at test module.
tx:n	Specifies maximum test time for a test module. If the max test time expires before testing completes, it returns a result of FAILED.

In addition to the above switch options, the following three switch options are available for use with the **ba:xx** command line switch:

#### Switch Options to Use with the BA:xx Switch

Switch	Function
nf	Disables floppy drive detection.
nj	Disables checking for Joysicks
pc	Sets the pass count for tests.
pdo:nnnn	Specifies a .pdo file to run where nnnn represents the name of the .pdo file. PC-Doctor defaults to using PCDR.PDO if you do not specify a file name.

The rt:nn, /rt:nn,x and rt:nn/x Command Line Switches

#### Additional AU:Fname Switches

Switch	Function
dj	Direct Joystick I/O. Reads joystick status and position directly from the hardware.
tmx:y	Sets minimum test time for a test set
ttx:y	Specifies maximum test time for a test set. If the max test time expires before testing completes, it returns a result of FAILED.

**Command Line Arguments for Testing Different Ranges of Base and Extended Memory**

	Base	Extended
<b>Fast Pattern</b>	rt:mem&1,0 /mr:b:xxxx:xxxx	rt:mem&1,1 /mr:x:xxxx:xxxx
<b>Fast Address</b>	rt:mem&2,0 /mr:b:xxxx:xxxx	rt:mem&2,1 /mr:x:xxxx:xxxx
<b>Medium Pattern</b>	rt:mem&3,0 /mr:b:xxxx:xxxx	rt:mem&3,1 /mr:x:xxxx:xxxx
<b>Medium Address</b>	rt:mem&4,0 /mr:b:xxxx:xxxx	rt:mem&4,1 /mr:x:xxxx:xxxx
<b>Heavy Pattern</b>	rt:mem&5,0 /mr:b:xxxx:xxxx	rt:mem&5,1 /mr:x:xxxx:xxxx
<b>Heavy Address</b>	rt:mem&6,0 /mr:b:xxxx:xxxx	rt:mem&6,1 /mr:x:xxxx:xxxx
<b>Bus Throughput</b>	rt:mem&7,0 /mr:b:xxxx:xxxx	-----
<b>Code Test</b>	rt:mem&8,0 /mr:b:xxxx:xxxx	rt:mem&8,1 /mr:x:xxxx:xxxx

**Command Line Arguments for Testing Different Ranges of Expanded and UMB Memory**

	Expanded	UMB
<b>Fast Pattern</b>	rt:mem&1,2 /mr:p:xxxx:xxxx	rt:mem&1,3 /mr:u:xxxx:xxxx
<b>Fast Address</b>	rt:mem&2,2 /mr:p:xxxx:xxxx	rt:mem&2,3 /mr:u:xxxx:xxxx
<b>Medium Pattern</b>	rt:mem&3,2 /mr:p:xxxx:xxxx	rt:mem&3,3 /mr:u:xxxx:xxxx
<b>Medium Address</b>	rt:mem&4,2 /mr:p:xxxx:xxxx	rt:mem&4,3 /mr:u:xxxx:xxxx
<b>Heavy Pattern</b>	rt:mem&5,2 /mr:p:xxxx:xxxx	rt:mem&5,3 /mr:u:xxxx:xxxx
<b>Heavy Address</b>	rt:mem&6,2 /mr:p:xxxx:xxxx	rt:mem&6,3 /mr:u:xxxx:xxxx
<b>Bus Throughput</b>	rt:mem&7,2 /mr:p:xxxx:xxxx	rt:mem&7,3 /mr:u:xxxx:xxxx
<b>Code Test</b>	rt:mem&8,2 /mr:p:xxxx:xxxx	rt:mem&8,3 /mr:u:xxxx:xxxx

**Language Options to use with /SL:n**

Language	Code
Simplified Chinese	2
Dutch	4
French	7
German	8
Italian	14
Japanese	15
Portuguese	18
Spanish	20
Traditional Chinese	24

**CPU and Coprocessor Test IDs**

Test Name	Test ID
CPU Registers	CPU&1
CPU Arithmetics	CPU&2
CPU Logical Operations	CPU&3

CPU String Operations	CPU&4
CPU Interrupts/Exceptions	CPU&5
CPU Buffers/Cache	CPU&6
CPU C&T/Cyrix Specific	CPU&7
CoProc Registers	CPU&8
CoProc Commands	CPU&9
CoProc Arithmetics	CPU&10
CoProc Transcendental	CPU&11
CoProc Exceptions	CPU&12
CoProc Cyrix/IIT	CPU&13
MMX Test	CPU&14
CPU Miscellaneous Operations	CPU&15

### RAM Test IDs

Test Name	Test ID
Fast Pattern	MEM&1
Fast Address	MEM&2
Medium Pattern	MEM&3
Medium Address	MEM&4
Heavy Pattern	MEM&5
Heavy Address	MEM&6
Bus Throughput	MEM&7
Code Test	MEM&8

### Systemboard Test IDs

Test Name	Test ID
System Timer	MB&1
BIOS Timer	MB&2
IRQ Controller	MB&3
DMA Channels	MB&4
RAM Refresh	MB&5
RTC Clock	MB&6
CMOS RAM	MB&7
Keyboard	MB&8
External Cache	MB&9
PCI	MB&10
PCMCIA	MB&11
PCMCIA External Loop	PCMCIA&2
USB Port	MB&12
USB Port External Loop (front)	USB&2
USB Port External Loop (rear)	USB&3
Joystick External Loop	MB&13

Rambus	MB&14
AGP	MB&15
IEEE1394 Port	MB&17
Temperature Sensors	LM75TEST&1

### Video Adapter Test IDs

Test Name	Test ID
Video Memory	VID&1
Video Pages	VID&2
VGA Controller Registers	VID&3
VGA Color-DAC Registers	VID&4
VESA Full Video Memory Test	VID&5
Video Memory (non-linear)	VID&9
AGP	AGP&1

### Serial Port Test IDs

Test Name	Test ID
Registers And Interrupts	COM&1
Internal Loopback	COM&2
External Loopback	COM&3
FIFO Buffers (16550A)	COM&4

### Parallel Port Test IDs

Test Name	Test ID
Command And Data Port	LPT&1
External Loopback And IRQ	LPT&2

### Fixed Disk Test IDs

Test Name	Test ID
Controller	HD&1
Hi-Low Seek	HD&2
Funnel Seek	HD&3
Track To Track Seek	HD&4
Random Seek	HD&5
Linear Verify	HD&6
Random Verify	HD&
SMART Test	HD&8
Read Test (Surface Scan)	HD&9
Write/Verify (Surface Scan)	HD&10
Write/Read (Surface Scan)	HD&11

### Diskette Drive Test IDs

Test Name	Test ID
Hi-Low Seek	FD&1
Funnel Seek	FD&2
Track To Track Seek	FD&3
Random Seek	FD&4
Linear Verify	FD&5
Random Verify	FD&6
*Linear Write/Read	FD&7
*Linear Write/Random Read	FD&8

\*WARNING! The Linear Write/Read and Linear Write/Random Read tests will destroy any data already on the floppy disk. Use only a newly formatted disk for these tests.

### Other Devices Test IDs

Test Name	Test ID
Sound Card	MSC&1
Sound card test	SBTEST&1
CAS Diagnostic	MSC&2
Stacker	MSC&3
CD-ROM/DVD	MSC&4
CD-ROM/DVD	CDTEST&1
LS-120/240 Drive	LS12TEST&1
SCSI	MSC&5
Asset ID	RFIDTEST&1
Alert on LAN	AP_TEST&1
Year 2000 Test	Y2KTEST&1
DIMM/RIMM EEPROM ID	DIMMTEST&1
SMBUS	SMBTEST&1
Hardware Monitoring	LM80TEST&1
Temperature Monitoring	LM75TEST&1
Inventory	INVTEST&1
Modem	MSC&6
Modem	MDMTEST&1
Intel Ethernet Test	IE55x&1
PCI COM Port	MSC&11
PCI COM Port External Loopback	MSC&12
Battery test	BATTTEST&1
IOmega ZIP drive test	ZIPTTEST&1
AC Charger (Adapter) test	ACCHTEST&1
Fan test	FANTEST&1
PCMCIA external loopback test	PCMCIA&2



Collector Chip	CCTEST&1
PC System Monitoring	LMXXTEST&1

### Interactive Test IDs

Test Name	Test ID
Keyboard Keys	I_KBD&1
Keyboard LED's	I_KBD&2
Keyboard Repeat	I_KBD&3
Video Character Set	I_VID&1
Video Color Palette	I_VID&2
Video Monitor Quality	I_VID&3
Video Mode	I_VID&5
Internal Speaker	I_SPKR&1
Mouse Test	I_MOUSE&1
Diskette Change Signal	I_DSK&1
Diskette Write Protect	I_DSK&2
CD-ROM/DVD Open Tray	I_CDR&1
CD-ROM/DVD Close Tray	I_CDR&2
CD-ROM/DVD Drive Capabilities	I_CDR&3
CD-ROM/DVD Reset Test	I_CDR&4
CD-ROM/DVD Linear Scan	I_CDR&5
CD-ROM/DVD Random Scan	I_CDR&6
CD-ROM/DVD Funnel Scan	I_CDR&7
Joystick Test	I_JOY&1
Maximum load test	I_MSL&1
Printer Test	I_PRN&1
SCSI Devices Test	I_SCSI&1
Stereo Speaker Test	I_SND&1
LCD Panel Test	I_LCD&1

### Zip Drive Test IDs

Test Name	Test ID
Controller	ZIP&1
Hi-Low Seek	ZIP&2
Funnel Seek	ZIP&3
Track To Track Seek	ZIP&4
Random Seek	ZIP&5
Linear Verify	ZIP&6
Random Verify	ZIP&7
Eject Disk	ZIP&8

### LS Drive Test IDs

Test Name	Test ID
Controller	L12&1
Hi-Low Seek	L12&2
Funnel Seek	L12&3
Track To Track Seek	L12&4
Random Seek	L12&5
Linear Verify	L12&6
Random Verify	L12&7
Eject Disk	L12&8

### HiFD Drive Test IDs

Test Name	Test ID
HiFD Drive Controller	HFD&1
HiFD Drive Hi-Low Seek	HFD&2
HiFD Drive Funnel Seek	HFD&3
HiFD Drive Track To Track Seek	HFD&4
HiFD Drive Random Seek	HFD&5
HiFD Drive Linear Verify	HFD&6
HiFD Drive Random Verify	HFD&7
HiFD Drive Eject Disk	HFD&8

### SCSI Fixed Disk Test IDs

Test Name	Test ID
Controller	SHD&1
Hi-Low Seek	SHD&2
Funnel Seek	SHD&3
Track To Track Seek	SHD&4
Random Seek	SHD&5
Linear Verify	SHD&6
Random Verify	SHD&7

### CD-Rom/DVD Drive Test IDs

Test Name	Test ID
CD-ROM/DVD Linear Seek	MSC&7
CD-ROM/DVD Random Seek	MSC&8
CD-ROM/DVD Funnel Seek	MSC&9

### Return Codes for PC-Doctor Test Results

PC-Doctor Test Results	Return Code
PASSED	0
FAILED	1

ABORTED	2
N/A	3
OTHER ERROR	4

### Valid Memory Type Values

Value	Meaning
-1	Don't Care
02	EPO DRAM
04	SDRAM

### **iSlotxErrorDetection=0**

This indicates the type of error detection that the DIMM in slot "x" must have. This key example is set for no error detection. Look for the "Error detection" field in DIMM/RIMM Info for the data source. Valid values are:**iCapacityMB1=**

### Valid Error Detection Field Values

Value	Meaning
-1	Don't Care
00	No error detection
01	Parity error detection
02	ECC error detection and correction

This key is a feature of the Snapshot utility. PCDR calculates the value of this key using the Serial Presence Detect EEPROM Data. The value for this key indicates the size of the DIMM or RIMM module found in the tested PC.

### Valid IDE Controller Values

Value	Meaning
0	Primary controller (1F0H)
1	Secondary controller (170H)

### **iDriveldx=0**

This indicates the IDE device drive ID for hard disk drive "x." This key example is set to indicate that IDE hard disk drive "x" is the master. For the data source, look in the "Primary IDE Master," "Primary IDE Slave," "Secondary IDE Master," and "Secondary IDE Slave" fields in the System Configuration report for an indication hard disk drive "x" is using the master or slave channel. Valid values are:

### Valid IDE Drive ID Values

Value	Meaning
0	Master device
1	Slave device

### Valid ATAPI Device Type Values

Value	Meaning
00H	Direct-access device (e.g. magnetic disk)
05H	CD-Rom
07H	Optical memory device (e.g. optical disk)

### Valid ATAPI Controller Values

Value	Meaning
0	Primary controller (1F0H)
1	Secondary controller (170H)

### Valid ATAPI Drive ID Values

Value	Meaning
0	Master device
1	Slave device

[CPU] Section

### Valid CMOS RAM Configuration Values for Floppy Disk Drives

Value	Meaning
40H	1.44 MB
50H	2.88 MB

[HD] Section - hard drive (BIOS information)

### [REMOVETESTS]

Test ID	Test Name
1=MSC&1	SoundBlaster Test
2=MSC&6	Modem Test
3=ACCHTEST&1	AC Adapter Test

Removing Tests Remotely

Use this section to specify the removal of specific tests when running PCDR remotely. This

section contains the following variables:

**Variables for removing tests remotely**

Variable	Description
dwMemoryAdress=	Specify a 32-bit number that is the absolute memory address of the "remote" flag.
iBitsHighMask=	8-bit mask, 1's indicate which bits MUST be on (or high)
iBitsLowMask=	8-bit mask, 1's indicate which bits MUST be off (or low)
num=CAT&#	"num" specifies the sequential number, "CAT" specifies the test category and "#" specifies the test number within the test category.

```
[RemoteRemoveTests]
dwMemoryAddress=04B4h
iBitsHighMask=02h
iBitsLowMask=0FDh
1=FD&7
2=FD&8
```

**Interpreting Test Results Using the LPT Port Loopback Adapter**

Test Status	LED 1	LED 2	LED Behavior
Testing Active	Blink	Dark	
Testing Active - Test(s) Failed	Blink	Steady	
Testing Complete	Blink	Blink	Synchronized
Testing Complete - Test(s) Failed	Blink	Blink	Alternating
Machine Frozen	No change in over one minute		

This feature allows burn-in testing to occur without keyboards or monitors, and test results to be available at a glance. This test requires a special customized external loopback adapter. For more information contact your PC-Doctor Account Exec.

```
[PCDR]
iShowLptLedStatus=x
```

Valid Values for iShowLptLedStatus=x

0 = PC-Doctor Standard Loopback Adapter (default) (no LEDs)

1 = Enable PC-Doctor LED Status Loopback Adapter

#### Often Used Scan Codes

Code	Corresponding Key
011BH	ESC
3B00H	F1
3C00H	F2
3D00H	F3
3E00H	F4
3F00H	F5
4000H	F6
4100H	F7
4200H	F8
4300H	F9
4400H	F10

represents device 0.

#### Decimal and Bitfield Combinations for use with the Command Line

Decimal	Bitfield	Result
1	00000001	Will run tests on device 1.
2	00000010	Will run tests on device 2.
3	00000011	Will run tests on devices 1 & 2.
4	00000100	Will run tests on device 4.
5	00000101	Will run tests on device 1 & 3.

This example will run all hard drive tests on first and third hard drives.

*[Set1]*

*1=HD&\*/5*

#### Valid Sound Loopback Input Values

Settings	Input Port
0	Microphone
2	CD
6	Line-In Plug

#### Valid CD Sound Input Values

Settings	Input Port
0	Microphone

2	CD
6	Line-in plug

### Test Result Codes

Result	Description
PASSED	No errors were detected.
FAILED	One or more errors caused the test to fail. Additional details are added to the test log.
ABORTED	User aborted the test.
N/A	The selected device is not available or the current state of the computer prevented testing.
<ERROR>	An error not related to testing occurred or a module returned an unexpected return code. Additional details are added to the test log.

### Estimated Test Times for Memory Tests

Test Function	Base Memory	Extended Memory
Fast Pattern	0:00:01	0:00:29
Fast Address	0:00:01	0:00:04
Medium Pattern	0:00:02	0:01:20
Medium Address	0:00:01	0:00:04
Heavy Pattern	0:00:03	0:02:28
Heavy Address	0:00:01	0:00:21
Bus Throughput	0:00:01	----
Code Test	----	0:02:15
Random Pattern	N/A	0:00:15
Advanced Pattern	N/A	0:06:00

### Estimated Times for Completion of Systemboard Tests

System Timer	0:00:01
BIOS Timer	0:00:03
IRQ Controller	0:00:01
DMA Channels	0:00:01
RAM Refresh	0:00:01
RTC Clock	0:00:03
CMOS RAM	0:00:03
Keyboard Controller	0:00:03
PCI Bus	0:00:01
USB Port	0:00:01
USB Port External Loop	0:00:03
IEEE 1394 port	N/A

### Estimated Test Times for Video Adapter Tests

Video Memory	0:02:43
Video Pages	0:01:05
VGA Controller Registers	0:00:07
VGA Color-DAC Registers	0:00:05

### Estimated Test Times for Serial Port Tests

Registers & Interrupts	0:00:01
Internal Loopback	0:00:13
External Loopback	0:00:13
FIFO Buffers (16550A)	0:00:13

### Estimated Test Times for Parallel Port Tests

Command & Dataport	0:00:01
External Loopback & IRQ	0:00:02

### Estimated Test Times for Fixed Disk Tests

Controller	0:00:01
Hi-Low Seek	0:00:01
Funnel Seek	0:00:21
Track To Track Seek	0:00:07
Random Seek	0:00:02
Linear Verify	0:24:33
Random Verify	0:00:05
SMART or SMART Status Check	0:00:01
SMART Self-Test Short	0:05:00 (80 GB)
SMART Self-Test Long	0:45:00 (80 GB)

### Estimated Test Times for Zip Drive Tests

Hi-Low Seek	0:00:46
Funnel Seek	0:01:03
Track To Track Seek	0:00:26
Random Seek	0:00:37
Linear Verify	0:00:58
Random Verify	0:01:18
Linear Write/Read	0:01:47
Linear Write / Random Read	0:02:03

### Estimated HiFD Test Times

Controller	
------------	--



Hi-Low Seek	0:00:29
Funnel Seek	0:00:45
Track To Track Seek	0:00:21
Random Seek	0:00:29
Linear Verify	0:00:50
Random Verify	0:01:04
Eject Disk	

### Estimated Test Times for LS Drive Tests

Controller	
Hi-Low Seek	0:00:29
Funnel Seek	0:00:45
Track To Track Seek	0:00:21
Random Seek	0:00:29
Linear Verify	0:00:50
Random Verify	0:01:04
Eject Disk	

### Estimated Test Times for SCSI Fixed Disk Tests

Controller	0:00:01
Hi-Low Seek	0:00:01
Funnel Seek	0:02:09
Track To Track Seek	0:00:10
Random Seek	0:00:03
Linear Verify	0:08:57
Random Verify	0:00:32

### Estimated Test Times for Zip Drive Tests

Controller	
Hi-Low Seek	0:00:29
Funnel Seek	0:00:45
Track To Track Seek	0:00:21
Random Seek	0:00:29
Linear Verify	0:00:50
Random Verify	0:01:04
Eject Disk	

### Estimated Times for Other Device Tests

Sound Card	0:00:10
CAS Diagnostic	0:00:05
Stacker	0:00:05

CD-ROM/DVD	0:01:50
ZIP Drive	0:02:15
SCSI	0:00:10
Year 2000 Test	0:00:10
Asset ID	0:00:05
Alert on LAN	0:00:05
DIMM EEPROM	0:00:08
SMBUS	0:00:03
Hardware Monitoring	0:00:06
Temperature Monitoring	0:00:02
Inventory	0:00:30
Modem	0:00:20
Gigabit Ethernet Card	
PCI COM Port	
PCI COM Port External Loopback	

### Known Chipsets that Support AC'97

PCI Vendor ID	PCI Device ID
0x8086, 0x2415	Intel ICH
0x8086, 0x2425	Intel ICH0
0x8086, 0x2445	Intel ICH2
0x8086, 0x7195	Intel 440MX Audio Component

### Information Displayed for Inventory Devices

Component Category	Type of Information Available
PCI Devices	Vendor / device ID.
Plug n Play ISA Devices	Vendor / device ID.
DIMM Memory Modules	Slot filled, speed, maker, type, error detection.
SMBus Devices	SMBus device ID.
IDE Devices	device size, controller (Primary, secondary) and Drive ID (Master, slave).
ATAPI Devices	device type, controller (Primary, secondary) and Drive ID (Master, slave).
CPU Type	String (maker), speed (MHz) and CPU ID.
Installed Memory	Minimum installed MB.
Floppy Drives	Number and CMOS configuration.
Hard Drives	Minimum size (MB).
Mouse	Device is required or optional.
BIOS Info	BIOS date (the system's BIOS date must be newer than that listed).
USB Info	Device is required or optional.
Keyboard Info	Device is required or optional.
Serial Ports Info	Base address.

Parallel Ports Info	Base address.
Network Card Info	Unique MAC address

### Mouse Data Box Explanations

Left button : OFF	Toggles ON when you click the left mouse button.
Center button : OFF	Toggles ON when clicked. Please note your mouse may not support this button. However, in the case of a two-button wheel mouse (Microsoft IntelliMouse), clicking the wheel will toggle the center button ON.
Right button : OFF	Toggles ON when you click the right mouse button.
X-coordinate : xxx	Displays the X-axis coordinate (0-632) of the mouse pointer as it is moved around the screen. The coordinates move in increments of 8 for each character block.
Y-coordinate : xxx	Displays the Y-axis coordinate (0-192) of the mouse pointer as it is moved around the screen. The coordinates move in increments of 8 for each character block.

## Automation Alternative - Diagnostic Testing

### Automotive Testing Factors for Diagnostic Tests

Description	Test Set Files (PCDR.PDO)	Run Test (/RT) Switches	Auto Scripts (PCDRAUTO.INI)
Complexity - Building Test Sets	Easy	Moderate	Difficult
Complexity - Maintaining Test Sets	Easy	Moderate	Difficult
Complexity - Using Test Sets	Easy	Moderate	Easy
Tests run in menu order (CPU 1st, RAM 2nd, etc.)	YES	YES	YES (1)
Can run multiple test sets without reloading	no	no	YES
Can make environment changes (pass count, log error only, halt on error) without reloading	no	no	YES
Can run Interactive Tests	no	YES	YES
Can select which sub tests on which devices to run (hard drive controller on HD 1 and HD 3, external loopback on COM 2, etc.)	YES	YES	no
Pre test prompts can be customized ("Please insert floppy, loopback adapters, /")	no (2)	no (2)	YES
Test results are easy to see at a glance (screen is green and says "PASSED" or red for "FAILED")	no (2)	no (2)	YES
Test log can be viewed, saved & printed by pressing one button	no	no	YES

(1) Since the Auto Script mode allows multiple test sets, you could create a different test set for each test category and call them in the order you choose. For example, Test Set 1 could run the Hard Drive tests and Test Set 2 the CPU tests.

(2) A DOS batch file could be created to add this functionality.

## Automation Alternative - Other Functions

### Automotive Testing Factors for Other Functions

Function	Command	Comments
Maximum System Load	/MS:xx	Can be set from 2-1440 minutes
System Information Modules	/SI:xx	See the Hardware Information menu. Select module number based on position in the menu, top to bottom.
Battery Run Down	/BRD	Runs battery until dead or power management shuts system off.
Snapshot	/SN:nnnn	Enables snapshot functionality. nnnn is the name of the filename where the snapshot information is recorded
Snapshot	/invsl:nnnn	Creates a output log file for for the Inventory test. nnnn is the name of the file where the log information is recorded.
Inventory Test	/RT:INVTEST&1	Can be used with the Snapshot function. .

## Appendix B. PC-Doctor Loopback Adapters

PC-Doctor for DOS provides several color-coded devices for testing I/O port signals called loopback adapters. When you run a test with a loopback adapter, PC-Doctor sends a signal or data to the port, the signal or data “loops” through the adapter and sends it “back” to the port. If PC-Doctor detects a mismatch in data or an error between the two signals, it will record a FAILED result in the Test Log.

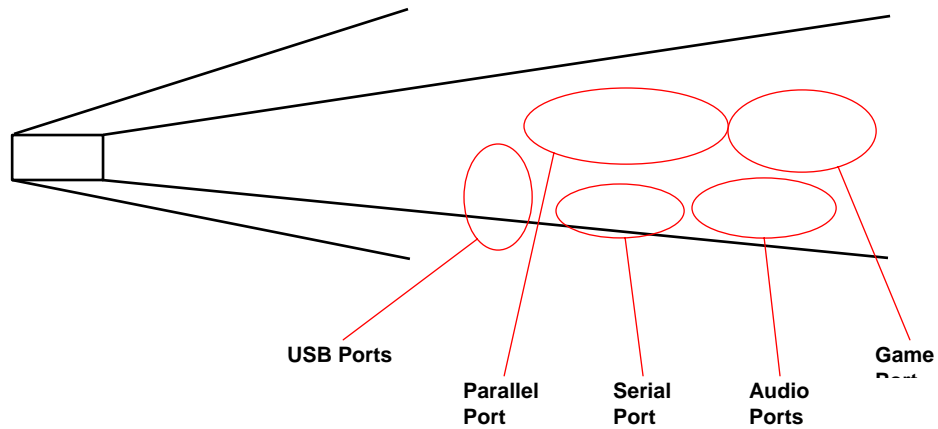
PC-Doctor for DOS offers the following loopback adapters:

- Parallel Port loopback adapter (red)
- USB Ports loopback adapter (black)
- Serial Port loopback adapter (green)
- Audio Ports loopback adapter (black)
- Game Port loopback adapter (yellow)

**Note** For Windows XP/2000 users, you must keep the USB port / parallel port loopback adapter attached to the parallel or USB port at all times while running PC-Doctor for Windows. For all other versions of Windows and DOS, you must keep the parallel port loopback adapter attached to the parallel port at all times while running PC-Doctor

Each port requires only its respective loopback adapter for running loopback tests except the USB ports, which require the USB loopback adapters and the parallel port loopback adapter. PC-Doctor for DOS provides the parallel port and USB port loopback adapters in one assembly.

To use a loopback adapter, attach it to the appropriate I/O port located at the back of your computer (see **Figure B.1**) then run the associated test. The view in Figure C.1 is an I/O port configuration example. Actual port configurations vary.



**Figure B.1 – Typical back panel view for PCs (left) and a close up of I/O ports (right)**

#### Dual USB Port/Parallel Port LoopBack Adapter Assembly

The Parallel port / USB port loopback adapter (see **Figure B.2**) comes with a parallel port loopback adapter (red) on one end and two USB port loopback adapters (black) on the other end. Testing the parallel port requires you to attach only the parallel port loopback adapter. However, testing the USB ports requires you to attach the USB port loopback adapters and the parallel port loopback adapter.

Parallel Port

USB Port (black)

**Figure B.2 - Parallel and USB loopback cables come as one adapter**

#### **Using the Parallel Port Loopback Adapter for Testing the Parallel Port**

The parallel port loopback adapter is necessary to run the **Parallel Port Loopback Test** in PC-Doctor for Windows or the **Parallel Port External Loopback and IRQ** test in PC-Doctor for DOS. Attach the parallel port loopback adapter to your PC's 25-pin parallel port before running these tests (see **Figure B.3**). See the section "Standard Wiring for PC-Doctor Serial and Parallel Port Loopback Adapters" in this appendix for information about parallel port loopback adapter wiring.



**Figure B.3 – Parallel Port**

**Using the USB Loopback Adapters for Testing USB Ports**

The USB port loopback adapters are color-coded black and work together with the parallel port loopback adapter to perform USB port loopback testing. The **USB Port External Loopback** test in PC-Doctor for DOS also requires the parallel port / USB port loopback adapter.

PC-Doctor routes test signals out of the USB ports and into the parallel port loopback adapter. A microcontroller embedded in the parallel port adapter verifies the test signals. Since both the USB and parallel port loopback adapters work together to test the USB ports, you must attach both to their respective ports to perform USB loopback testing.

**Note** By default, PC-Doctor will try to test two USB ports. If your computer has two ports, you must attach one adapter to each port (See **Figure B.4**). If your computer has only one USB port, see the section “Using the USB Loopback Adapter for testing One USB Port” below.

### Using the USB Loopback Adapters for Testing One USB Port

Running the USB Loopback test on PCs with just one USB port requires a simple .ini file. The file is exactly the same for both PC-Doctor for Windows or DOS, but is named differently for each. To create the file, open a text editor or word processing program, create a new file and type the following two lines:

```
[SETTINGS]
iPorts=1
```

Save the file as text only. For testing in DOS, save the file with the name USBTEST.INI in the directory that contains PC-Doctor for DOS.

### Running the USB Loopback Test with one USB port

Attach one of the USB port loopback adapters into your PC's USB port. Only one of the two USB loopback adapter cables will work on a computer with a single USB port. If the test fails after attaching one of the adapters to the port, try the other adapter.



Figure B.4 – Two USB ports

### Serial Port Loopback Adapter

The green serial port loopback adapter is necessary to run the **Serial Port Loopback Test** in PC-Doctor for Windows and the **Serial Port External Loopback** test in PC-Doctor for DOS (see **Figure B.5**). See the section “Standard Wiring for PC-Doctor Serial and Parallel Port Loopback Adapters” in this appendix for serial port loopback adapter wiring information.



Figure B.5 – Serial Port loopback adapter (green)

Attach the serial port loopback adapter to the 9-pin Serial (COM) port on your PC (see **Figure B.6**). Your PC may have more than one serial port.

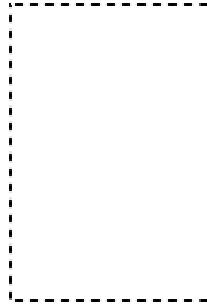


Figure B.6 – A serial port



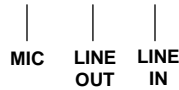
## Audio Ports Loopback Adapter

The audio ports loopback adapter is color-coded black and is necessary to run the **SoundBlaster** test in PC-Doctor for DOS (See **Figure B.7**).



**Figure B.7 – Audio loopback adapter (black)**

Locate the computer's audio ports and attach one connector to the microphone (MIC) jack and the other connector to the line out or Speaker jack (See **Figure B.8**). The position of the microphone and line out jacks may not be the same for all computers.



**Figure B.8 – Audio ports**

## Game Port Loopback Adapter

The game port loopback adapter is color-coded yellow and is necessary to run the **Joystick External Loop** test in PC-Doctor for DOS (see **Figure B.9**). Currently, no test in PC-Doctor for Windows uses the Game Port loopback adapter.



**Figure B.9 – Game Port loopback adapter (yellow)**

Standard Wiring for PC-Doctor Serial and Parallel Port Loopback Adapters

**Parallel Port Pins**

Connector Signals	Pins D25
Strobe/Select In	1, 13
Data0/Error In	2, 15
Auto FD/Paper End In	12, 14
Init/Acknowledge In	10, 16
Select Out/Busy In	11, 17



**Serial Port Pins**

Connector Signals	Pins D25	Pins D9
RX/TX	2, 3	2, 3<Anchor0>

<Anchor0>

RTS/CTS	4, 5	7, 8
DSR/DTR/CD	6, 8, 20	1, 4, 6

## Appendix C. Determining and Using Bitmap Values

A bitmap is a data structure in memory that represents information in the form of a collection of individual bits. The following gives an explanation of how to determine and use bit values in a bitmap.

A bitmap is a set of bits with a single bit representing a 0 or a 1:

*0 0 0 0 0 0 0 0 - Bitmap with all bits set to zero*

Bits are numbered from right to left in a bitmap. Starting first with the far right bit, it is bit number 0. The next bit to the left is bit number 1, the next bit to the left of that one is bit number 2, etc.

*0 0 0 0 0 0 0 0 - Bitmap with all bits set to zero*  
*7 6 5 4 3 2 1 0 - Bit numbers*

Starting from bit number 0, each bit has a value that is half the value of the bit on its immediate left (the bit value is not the same as the bit number). Bit number 0 has a value of 1, bit number 1 has a value of 2, bit number 2 has a value of 4, bit number 3 a value of 8, and so on:

*0 0 0 0 0 0 0 0 - Bitmap with all bits set to zero*  
*7 6 5 4 3 2 1 0 - Bit numbers*  
*128 64 32 16 8 4 2 1 - Bit values*

Each bit in a bitmap can be used to represent one subtest in a test category or a device in the computer system, and with them you can indicate those features or devices that you either do or do not want to use. For example, in the PCDR.INI file a bitmap can specify specific subtests of a test category that you do not want to run in a test set. Or, with the /RT: command line switch, a bitmap can specify multiple devices in a system (i.e., 4 hard drives or 4 serial ports) that you do want to run. Multiple subtests or devices are usually designated with the first one equal to 0 rather than 1. Therefore bit number 0 represents the first subtest or device, bit number 1 represents the second subtest or device, bit number 2 represents the third subtest or device, et cetera.

*0 0 0 0 0 0 0 0 - Bitmap with all bits set to zero*  
*7 6 5 4 3 2 1 0 - Bit numbers*  
*128 64 32 16 8 4 2 1 - Bit values*  
*7 6 5 4 3 2 1 0 - Subtest or device IDs*

To specify a subtest or device for whatever purpose, its assigned bit can be set to a 1. Depending on how the bitmap is used, it can indicate subtests to exclude from running, or devices to include for testing. For example, using the bitmap in the PCDR.INI file, to indicate that you do not want to run the first and third CPU subtests their assigned bits (bits 0 and 2) are set to 1. But used with the /RT switch, a bitmap can specify in a system with 4 hard disk drives that you do want to run the first drive (device 0) and the third drive (device 2) by setting

each of the bits representing those devices (bits 0 and 2) to 1.

```
0 0 0 0 0 1 0 1 - Bitmap with bit numbers 0 and 2 set to 1
0 0 0 0 0 0 0 0 - Bitmap with all bits set to zero
7 6 5 4 3 2 1 0 - Bit numbers
128 64 32 16 8 4 2 1 - Bit values
7 6 5 4 3 2 1 0 - Subtest or device IDs
```

The integer value that is the sum of the values for those bits that are set to one can be used to specify particular subtests or devices. Therefore specifying the integer 5 for a test category's subtests or for x would set to a 1 bit number 0, which has a value of one, and bit number 2, which has a value of 4 (00000101=4+1=5). So if you do not want to run a particular test category's first and third subtests, setting the switch for that test category to 5 in the PCDR.INI file will prevent those subtests from running.

For example, type CPU=5 in the PCDR.INI file in either the [QuickTest] or [NormalTest] sections to disable the first and third subtests in the CPU test category. On the other hand, with the /RT: switch, using the sum of the bit values for those bits set to a 1 you can also indicate devices that you do want to run. Since bit number 0 represents device 0 (the first hard disk drive) and bit number 2 represents device 2 (the third hard disk drive), the first and third hard disk drives will be tested. For example: typing PCDR /RT:HD&4/5 on the command line would start PC-Doctor DOS and run the hard disk seek test on the first (device 0) and third (device 2) hard drives.