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## Video mode types

## Partitioning a hard drive

- Boot up your machine from a floppy disk drive with a copy of DOS and type:

```
DIR C: [ENTER]
```

- If you see the following error message, insert a disk that contains the DOS command **FDISK** into drive A:

```
Invalid drive specifications
```

Type FDISK [Enter], and view the following screen (assuming you are using MS DOS 6.0):

```
MS-DOS Version 6.00  
Fixed Disk Setup Program  
(C) Copyright Microsoft Corp. 1993
```

### FDISK Options

Current fixed disk drive: 1

Choose one of the following:

1. Create DOS **partitions** or Logical DOS Drive
2. Set active partition
3. Delete partition or Logical DOS Drive
4. Display partition information

Enter Choice: [1]

Press ESC to exit FDISK

- If you choose 1, and the disk has not been prepared, the following screen will come up:

```
Create DOS Partition
```

Current Fixed Drive: 1

1. Create Primary DOS partition
2. Create Extended DOS partition
3. Create logical DOS drive(s) in the Extended DOS partition

Enter choice: [1]

Press ESC to return to FDISK Options

## Performing a low-level format on a hard drive

If you have just installed a **new** hard drive, check to see if it was low level formatted at the factory. To check this, type **FDISK** at the DOS command line. If your PC rejects this command then you must do a low level format.

The low level format can also be done on a drive that has been in use, but has **data** related **problems**, or **viruses**. Be careful though, most low level format programs will create a loss of all data stored on a disk.

If your hard drive needs to be low level formatted, you can use a product such as **CheckIt PRO: Tests & Tools**, which includes a universal low-level formatter.

**BE SURE THAT THERE IS NO DATA ON A DRIVE THAT YOU ARE RUNNING THE LOW LEVEL FORMAT ON. LOW LEVEL FORMAT PROGRAMS ARE DATA DESTRUCTIVE. ALL DATA WILL BE LOST.**

***See also:***

[Partitioning a hard drive](#)

## Installing a card

The steps below describe the installation of a **new card**, such as an internal modem or video adapter.

- Turn your PC and Monitor off.
- 
- **Disconnect** the **power** cord from the back of the PC.
- 
- Unscrew the (usually) 5 screws on the back of the PC and **remove** the **cover**.
- 
- **Locate** an empty **slot** on the motherboard. **Remove** the **bracket** covering the slot. You will use the screw to fasten the new card.
- 
- Refer to any documentation that came with the card for **jumper** or dip switch settings that need to be set before installation.
- 
- Use the **Setup Advisor** in WINCheckIt to see which settings (such as **IRQ** and **I/O** address) can be used for your machine. See **Chapter 7** of your manual for more on the Setup Advisor.
- 
- After setting the appropriate configuration for the card, you are ready to install the card. Push the board into the open **expansion slot**. Make sure the board is seated correctly by pressing down on both ends. The board should sit **level** in the expansion slot.
- 
- In machines where you have both 8 and 16-bit expansion slots, you can add an 8-bit card to either slot. 16-bit cards can only be added to 16-bit slots. **Microchannel** and **EISA** bus machines have **32-bit** slots, and their configuration is software driven, as opposed to dip switches or jumpers.
- 
- **Replace** the **screw** you took from the bracket to secure the card.
- 
- Carefully **replace** the **cover** on the machine, and replace the mounting screws. Finally, **re-connect** the **power** cord.
- 
- If the card is not functional after installation, run WINCheckIt again, and **verify** that the **IRQ** and **I/O** settings are correct.

## Installing a clock in a PC or XT

If you own a PC or an XT, you may not have a **clock**. You will see this when you boot up and your machine asks you for the time and date. WINCheckIt will **verify** whether your system has a clock in the **SysInfo** area under the Config menu. There are two different procedures available to add a clock to your machine:

- Add a **multifunction board** to your machine. These boards will not only have a clock, but also another device such as a parallel port or extended memory.

-or-

- Add a **"no-slot" clock**. These can be installed to 28-pin **ROM sockets**. Most motherboards have an empty ROM socket adjacent to the BIOS chip. If there isn't an available socket, you can remove the BIOS chip, plug in the clock chip, and then plug the BIOS chip into the built-in socket of the clock.

**See also:**

[Installing a card](#)

## Installing a co-processor

If you are using applications that do a great deal of math **calculation** such as **spreadsheets**, then you might find the addition of a co-processor helpful. Co-processors can make the operation of math calculation between 5 and 100 times **faster**.

Following are the basic steps to take when installing a Co-processor on your machine:

- Turn off your PC and Monitor.
- 
- **Remove** the **power** supply cord from the back of the PC.
- 
- **Locate** the **socket** for the Co-processor. It will most likely be next to the CPU. A 387 Co-processor for 80386 machines is square, with 128 pins. Co-processors for 8088, and 80286 machines are rectangular, and have 40 pins.
- 
- **Insert** the **Co-processor** in the socket. There will be an indent in the end of the 8087 and 80287 chips. Match this mark with the one on the motherboard. The 80387 chip is square, and will fit only one way into the socket.
- 
- Put the cover back on the machine and replace the screws. You can run WINCheckIt to **ensure** that your PC is finding the Co-processor and that it is functional.

## Installing a floppy drive

The steps below describe the installation of a new floppy drive to your system.

- Turn off your PC and monitor.
- 
- **Remove** the **power** supply cord from the back of the PC.
- 
- Prepare the machine for the new floppy by **removing** the drive **port cover**. If you have a 3 1/2 inch drive, there will most likely be an expansion bracket included with the drive to mount the drive.
- 
- Refer to the documentation that came with the drive for any **jumper settings** that need to be assigned for the drive. You can use WINCheckIt to determine what **IRQs** are available. See **Chapter 5** of your manual for information.
- 
- **Connect** the **power** and data cables. Check to see if pin 1 is connected to the marked end of the ribbon cable. The power cable should have guides so that it only will go in one way.
- 
- **Mount** the **drive** to the chassis.
- 
- **Replace** the **cover** and screws. You can use WINCheckIt to **ensure** the floppy drive has been installed correctly and that it is **functional**.



## Installing a hard drive

Below are the steps to follow when installing a hard drive to your system:

- Turn off your PC and Monitor.
- 
- Remove the power cord from the back of the PC.
- 
- Remove the (usually) 5 screws from the back of the PC and slide off the cover.
- 
- Check the instructions that were shipped with the hard drive and set any jumpers necessary.
- 
- Mount the drive into the drive bay in the PC's case.
- 
- Next, check the controller board instructions for any switches or jumpers that may need to be set.
- 
- Insert the controller board into an empty slot on the motherboard. It is best to choose a slot near the drive itself, so that the cables are not draped over several cards.
- 
- Attach the cables to the drives. There will be two flat ribbon cables, one with 34 wires, and one with 20. One end of the cable will have a different colored wire for pin one. It is possible to connect the ribbon in backwards. To avoid this, look at the disk drive connectors for a space or line between pin 2 and 3. The ribbon side with the different color for pin 1 goes on this side.
- 
- If your controller handles both hard and floppy drives, there will be a 34 wire cable from the floppy drives, and one from the hard disk. The controller instructions will direct you as to which ribbon cable goes where. Check the board for an indication of which pin is pin one. Plug the cable in with the colored end going into pin one.
- 
- Next, plug in the sets of 20 wire cables. The row closest to the hard disk 34 wire cable is for hard disk one. When installing a second drive, the 20 wire cable will plug into the second set of pins.
- 
- Attach the power cables from the hard drive to the PC's power supply. The cables can only be plugged in one way.
- 
- You are now ready to replace the cover and screws to the PC's case.
- 
- If you are running a 80286, 386, or 486, you will need to edit your CMOS table regarding the type of your new hard drive. When you boot up the machine, you will see a key combination to enter the CMOS table edit area. The instructions that came with the drive will tell you which hard drive type to enter.

You can use WINCheckIt to save the CMOS table, and to ensure that the drive is set up properly.

### **See also:**

[Performing a low-level format](#)

## IRQs and configuration for common devices

Below you will find a chart of common devices and [IRQ](#), [I/O](#) and memory assignments. Keep in mind that these are possible assignments only. You should run the **Setup Advisor** in WINCheckIt to verify that these assignments are available on your machine before using them.

<b>DEVICE</b>	<b>COMMON IRQ</b>	<b>I/O DECODE</b>	<b>MEM DECODE</b>
COM1	4	3F8-3FF	---
COM2	3	2F8-2FF	---
LPT1	7	378-37F	---
LPT2	5	278-27F	---
XT DISK CNTRLR	5	320-32F	C8000-CBFFF
AT DISK CNTRLR	14	1F0-1F8	---
VGA	2/9	3C0h-35Ah color	A000-BFFF0
VGA	3	C0h-3BAh mono	C000-C7FFF
EGA	2	3C0-3CF	A000-AFFFF
MONO	*	3B0-3BF	B0000-B3FFF
CGA	*	3D0-3DF	B8000-BBFFF
HGA	*	3B4-3BF	B0000-B7FFF
AST CLOCK	*	2C0-2C7	---

\* NO SPECIFIC IRQ SUGGESTED

## Power Supply Capacity Testing

To **avoid exceeding** your PC's power-supply **capacity**, use the following formula to test its usage:

$$\text{Wattage} = \text{Volts} \times \text{Current}$$

The Volts and Current information can be found on the power supply case. Below are the typical wattage ranges for popular components:

<b>Component</b>	<b>Watts</b>
Basic Motherboard	15-25
Expansion or Memory board	10
1 MB of RAM	3-5
Disk Controller board.	3
SCSI Controller board	10-15
Parallel/Serial board	3
Mono or Color video card	6
5.25 inch floppy	5-10
3.5 inch floppy	5
CD ROM Drive	5-20
Sound Card	5
Internal Modem	5

## Memory conserving tips

Listed below are several steps you can take to conserve memory on your PC:

- Use a low version of DOS, such as 3.3.
- When using DOS V.5.0, load DOS=HIGH,UMB in your CONFIG.SYS file, and then load some TSR programs in upper memory blocks.
- When editing the CONFIG.SYS file, use entries that minimize the amount of RAM used by DOS. In many cases where networks are used, commands such as BUFFERS=, LASTDRIVE= and DEVICE=ANSI.SYS can be avoided or removed.
- Use of memory managers that utilize normally empty RAM areas that exist between the addresses of 640K to 960K. This area is often referred to as HIGH RAM. [TSR](#) programs, such as E-Mail, pop-up calculators, and NetWare IPX and NETX fit into this HIGH RAM area.

## Protected mode

If your PC has an 80286, 80386, or 80486 processor, WINCheckIt will test your processor's ability to function in protected mode. Under DOS, your CPU is operating under 8086 emulation. This mode is called "Real Mode." When your PC is accessing DOS extended memory or running OS/2 or Xenix, your CPU is running under its native mode called "Protected Mode." So a failure at this stage of the test only indicates a problem under this mode of operation; your PC may work fine under normal DOS operation. Ultimately, it could mean that your PC will not function correctly if you add extended memory or when you run an advanced operating system like OS/2 or Xenix.

The memory test sends an 80286 or 80386 processor into protected mode and back into real mode. In protected mode, the processor can access memory above the 1MB address range. While the processor is in protected mode, interrupts are ignored.

## Shadowing

Because ROM (Read Only Memory) is much slower than RAM (Random Access Memory), a way of copying the essential ROM contents to RAM at startup has been devised. This copying from ROM to RAM, called shadowing, can **double** the **speed** of actions usually taken by ROM.

One negative side to shadowing is that it **takes** away **extended memory** space. Some BIOS manufacturers automatically subtract the amount of available extended memory used by shadowing.

To enable shadowing of ROM, run the setup program offered during your system's boot-up. This can be done by pressing the key-combination recommended during boot-up.

## Audible beep error indicators

### IBM BIOS

#### Indicator

One Short Beep  
Two Short Beeps  
No Beeps  
Continuous Beep  
Repeating Short Beep  
One Long and One Short Beep  
One Long and Two Short Beeps  
One Long and Three Short Beeps  
Three Long Beeps  
One Beep, Blank or Incorrect Display

#### Message

Normal POST system OK  
POST error, see screen for error code  
Power, Power Supply Loose Card or Short  
Power, Power Supply Loose Card or Short  
Power, Power Supply Loose Card or Short System Board  
Video (Mono/CGA Display Circuitry)  
Video (EGA) Display Circuitry  
Keyboard Card Error  
Video Display Circuitry

### AMI BIOS

#### Indicator

One Short Beep  
Two Short Beeps  
Three Short Beeps  
Four Short Beeps  
Five Short Beeps  
Six Short Beeps  
Seven Short Beeps  
Eight Short Beeps  
Nine Short Beeps  
One Long and Three Short Beeps  
One Long and Eight Short Beeps

#### Message

DRAM Refresh Failure  
Parity Circuit Failure  
Base 64k RAM Failure  
System Timer Failure  
Processor Failure  
Keyboard Controller Error  
Virtual Mode Exception Error  
Display Memory Failure  
ROM BIOS Checksum Failure  
Base/Extended Memory Failure  
Display/Retrace Test Failure

### Award BIOS

#### Indicator

One Long and Two Short Beeps  
Two Short Beeps  
One Short Beep

#### Message

Video Error  
Any Non-Fatal Error  
No Error During POST

### Award BIOS 286, 386, and 486

#### Indicator

One Long and Three Short Beeps

#### Message

Keyboard Controller Error

### Phoenix BIOS

#### Indicator

One, One & Three Beeps  
One, One & Four Beeps  
One, Two & One Beep  
One, Two & Two Beeps  
One, Two & Three Beeps  
One, Three & One Beep  
One, Three & Three Beeps  
One, Four & Two Beeps  
One, Four & Three Beeps  
One, Four & Four Beeps

#### Message

CMOS Read/Write Failure  
ROM BIOS Checksum Failure  
Programmable Interval Timer Failure  
DMA Initialization Failure  
DMA Page Register Read/Write Failure  
RAM Refresh Verification Error  
First 64K RAM Chip/Data Line Failure  
Parity Failure First 64K RAM  
Fail-Safe Timer Feature (EISA Only)  
Software NMI Port Failure (EISA Only)

Two, One & One through	First 64K RAM Chip/Data Line Failure
Two, One & Four;	
Two, Two & One through	
Two, Two & Four;	
Two, Three & One through	
Two, Three & Four;	
Two, Four & One through	
Two, Four & Four	
Three, One & One Beep	Slave DMA Register Test Failure
Three, One & Two Beeps	Master DMA Register Test Failure
Three, One & Three Beeps	Master Interrupt Mask Register Failure
Three, One & Four Beeps	Slave Interrupt Mask Register Failure
Three, Two & Four Beeps	Keyboard Controller Failure
Three, Three & Four Beeps	Screen Memory Failure
Three, Four & Two Beeps	Screen Retrace Failure
Four, Two & One Beep	Timer Tick Failure
Four, Two & Two Beeps	Shutdown Failure
Four, Two & Three Beeps	Gate A20 Failure
Four, Two & Four Beeps	Unexpected Interrupt in Protected Mode
Four, Three & One Beep	RAM Test of Memory Above 64 Failed
Four, Three & Two Beeps	Programmable Interval Timer, Channel 2 Test Failure
Four, Three & Four Beeps	Realtime Clock Test Failure
Four, Four & One Beep	Serial Port Test Failure
Four, Four & Two Beeps	Parallel Port Test Failure
Four, Four & Three Beeps	Math Co-processor Test Failure

Note: The Phoenix BIOS beep codes are in a different format.  
They are three groups of beep counts.

**See also:**  
[System error codes](#)



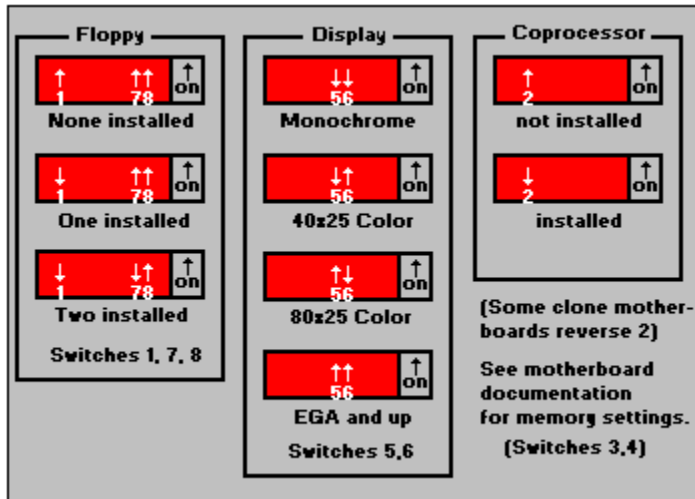
## Common floppy disk parameters

Listed below are the common parameters for floppy drives:

<b>DRIVE</b>	<b>360K</b>	<b>1.2Mb</b>	<b>720K</b>	<b>1.44Mb</b>
Tracks/Side	0-39	0-79	0-79	0-79
Sectors/Track	9	15	9	18
Track 0 Length	15 in.	15 in.	10 in.	10 in.
Sector Length	1.66 in.	1 in.	1 in.	.55 in.
Inner Track Length	9.9 in.	9.9 in.	6.5 in.	6.5 in.
Sector Length	1.1 in.	.66 in.	.73 in.	.37 in.
Oerstedse	300	600	600	700
Pack Density BPI	6000	9869	8717	16000

## Dip Switch Settings - PC/XT Only

Unlike AT and above models that have CMOS, PC and XT machines have DIP switches. The picture below shows standard switch settings for these machines.



## Hexadecimal numbers

Hexadecimal numbers use a **base of sixteen**, unlike the decimal system base of ten. The number system is as follows:

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F

When counting in the Hexadecimal system, you will not "carry over" to the next place until you pass the F. Hexadecimal numbers are used as a simple way to express binary numbers (0s and 1s). Replacing binary with hexadecimal numbers is convenient because binary numbers use a base of two, and grow in length very quickly.

With each four-digit set of binary numbers, there are **sixteen combinations** possible of 0s and 1s. Therefore, Hexadecimal numbers can be used to provide a clean way to represent four-digit clumps of binary numbers.

Binary	Hex	Decimal	Binary	Hex	Decimal
0000	0	0	1000	8	8
0001	1	1	1001	9	9
0010	2	2	1010	A	10
0011	3	3	1011	B	11
0100	4	4	1100	C	12
0101	5	5	1101	D	13
0110	6	6	1110	E	14
0111	7	7	1111	F	15

## Intel microprocessor types

### INTEL 8086

The 8086 microprocessor was introduced in 1978, and has a **16-bit** data bus structure. The 8086 was found to be faster than the 8088 in communication speed with the other computer components, but lost out in popularity to the 8088 due to the high cost of 16-bit support chips and peripherals.

### INTEL 8088

Also introduced in 1978, the 8088 microprocessor has an **8-bit** external data bus and an 16-bit internal data bus. The original 8088 operated at 4.77 MHz, and has since been expanded to up to 10 MHz. The **10 MHz** speed in "XTs" use chips known as turbo chips.

### INTEL 80286

The 80286 microprocessor was introduced in 1984, and included a **16-bit** data structure and the ability to address up to 16 MB of RAM. The 80286 machines run in two distinct modes. Under "Real Mode", the 80286 runs DOS programs at an 8086 pace, and only uses 1MB of RAM. In "Protected Mode", the 80286 uses up to 16MB of RAM.

### INTEL 80386

The 80386 microprocessor was introduced in 1986, and included a **32-bit** data bus structure and the ability to address up to 4GB of memory. The 80386 allows memory to be broken up into blocks, allowing applications to be run simultaneously.

### INTEL 80386SX

The 80386SX microprocessor was introduced in 1988, and shared the same electronic characteristics as the 80386, except that the SX included a **16-bit** data structure. It therefore could use the add-on chips designed for the 80286, which are much **less expensive**.

### INTEL 80486

The 80486 microprocessor was introduced in 1989, and included a **32-bit** data bus structure, and the ability to address up to 64GB of memory.

### INTEL Pentium

The Pentium processor is on the leading edge of technology, with a **64-bit** data bus structure.

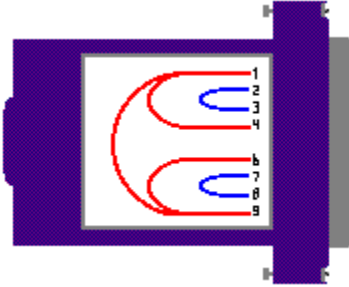
## Layers of DOS as PC boots

- ROM Bootstrap program/ROM BIOS
- Network cards, Video, and Expanded memory
- Transient portion of COMMAND.COM
- Transient programs and applications
- Networks Shell and TSRs
- Resident portion of COMMAND.COM
- File Control Blocks
- Disk buffers/cache
- DOS Kernel
- BIOS
- DOS and System parameters
- Interrupt vector table

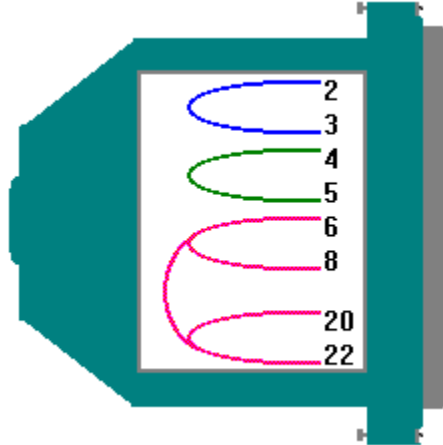
## Loopback plugs

When testing ports from DOS, the CheckIt PRO test applets can use three loopback plugs. The parallel loopback plug can also be used when collecting [IRQ](#) data for more accurate results. You can use the diagrams below to build your own plugs, or order them directly from TouchStone Software.

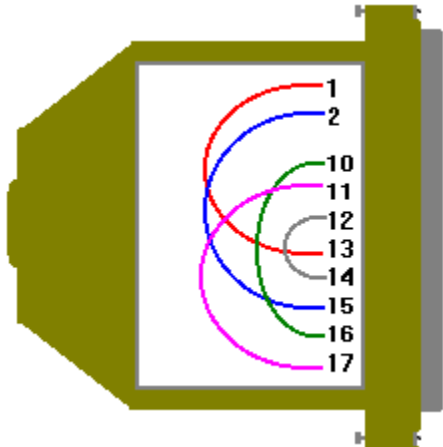
### DB-9 Female



### DB-25 Female



### Parallel Male



## Standard DMA channel assignments

Listed below are standard DMA channels for PC compatibles. Note that there are more DMA channels for AT and better machines than for PCs and XTs.

### PC and XT compatible machines:

DMA0 Used by system (not available on bus)  
DMA1 \*  
DMA2 Floppy disk controller  
DMA3 Hard disk controller

### AT compatible machines:

DMA0 Used by system (16 bit)  
DMA1 \* (8 bit)  
DMA2 Floppy disk controller (8 bit)  
DMA3 \* (8 bit)  
DMA4 [CASCADE] - Slave DMA controller input into master  
DMA5 \* (16 bit)  
DMA6 \* (16 bit)  
DMA7 \* (16 bit)

\* = No standard DMA assignment; you can assign these DMA channels to devices not listed that can be configured for DMA.

## System error codes

Listed below are **standard** system error codes which are reported during boot-up when there is a problem:

<b>Codes</b>	<b>Problem Area</b>
02x	Power Supply Problem
100	Option configuration wrong
101	System Board Interrupt Circuitry
102	System Board Timer Circuitry
103	System Board Timer Interrupt
104	System Board Protected Mode
105	System Board last 8042 command
106	System Board Converting Logic Test
107	System Board NMI Test
108	System Board System Timer Bus Test
109	DMA Test Error
121	Unexpected Hardware Interrupt
131	Cassette Port Error
161	System Option Failure(Low Battery?) Run Setup
162	System Options Incorrect Run Setup
163	Time and Date Not Set Run Setup
164	Memory Size Setting Incorrect
991	Run Setup
199 100	Software Option Config Error Check Switches
2xx	RAM Memory Error
201	Memory Test Failure
xxxx=201	Memory Failure
1055=201	DIP Switches Incorrect
2055=201	DIP Switches Incorrect
xxxx=201	Parity Check X RAM Chip Malfunction
202	Memory Address Error
203	Memory Address Error
301	Keyboard Errors
3xx	Keyboard Malfunction (Check Cable/Keyboard; no response to reset)
xx301	Keyboard Circuitry (stuck Key)
49 301	Key 73 Bad (49H=73 decimal)
302	User Indicated error From Keyboard Test , or AT keyboard is Locked
303	Keyboard or System Unit Failure
304	Keyboard or System Unit Error; CMOS RAM Configuration doesn't match
4xx	Monochrome Adapter Card Error
401	Monochrome Memory, Horizontal Sync Frequency, or Video Test Failed
408	User Indicated Display Attribute Failure
416	User Indicated Character Set Failure
424	User Indicated 80 by 25 Failure
432	Parallel Port Test Failure (Monochrome Adapter Card)
5xx	Color Graphics Card Adapter Failure
501	Color Memory Test, Horizontal Sync Frequency, or Video Test failure
508	User Indicated Display Attribute Failure
516	User Indicated Character set Failure
524	80 by 25 Mode Failure
532	40 by 25 Mode Failure
540	320 by 200 Graphics Mode Failure
548	640 by 200 Graphics Mode Failure
6xx	Diskette Drives Failure
601	Diskette Power on Diagnostics Test Failure (Interface Malfunction)
602	Diskette Test Failure
606	Disk Verify Function Failure
607	Diskette is Write Protected, Disk not Inserted Properly, or Controller Fail
608	Diskette Bad
610	Diskette Initialization Failure
611	Diskette Controller, Drive, or Data Cable (Timeout Failure)
612	Diskette Controller or Data Cable
613	Diskette Controller or Data Cable (DMA Failure Indicated)
621	Drive Assembly Seek Failure
622	Drive Assembly CRC Failure
623	Drive Assembly; Record not Found
624	Drive Assembly; Bad Address Mark



625 Drive Assembly; Bad FDC Seek  
626 Drive Assembly; Data Compare Error  
7xx Coprocessor Error  
9xx Parallel Printer Adapter Error  
901 Parallel Printer Adapter Error (Could Be The Printer)  
10xx Reserved For Parallel Printer Adapter  
11xx Async. Comm. Port Adapter Error  
1101 Async. Comm. Port Adapter Test Fail  
12xx Alternate Async. Comm. Ports Adapter Errors  
1201 Alternate Async. Comm. Ports Adapter Test Failure  
13xx Game Control Adapter Controller  
1301 Game Control Adapter Controller Test Failure  
1302 Joystick Test Failure  
14xx Printer Interface Error  
1401 Printer Test Failure  
1404 Matrix Printer Failure  
15xx Synchronous Data-Link Control Comm. Adapter  
1510 8255 Port B Failure  
1511 8255 Port A Failure  
1512 8255 Port C Failure  
1513 8253 Timer 1 did not Reach Terminal Count  
1514 8253 Timer 1 Stuck  
1515 8253 Timer 0 did not Reach Terminal Count  
1516 8253 Timer 0 Stuck  
1517 8253 Timer 2 did not Reach Terminal Count  
1518 8253 Timer 2 Stuck  
1519 8273 Port B Error  
1520 8273 Port A Error  
1521 8273 Command/Read Timeout  
1522 Interrupt Level 4 Error  
1523 Ring Indicate Stuck  
1524 Receive Clock Stuck  
1525 Transmit Clock Stuck  
1526 Test Indicate Stuck  
1527 Ring Indicate not on  
1528 Receive Clock not on  
1529 Transmit Clock not on  
1530 Test Indicate not on  
1531 Data Set Ready not on  
1532 Carrier Detect not on  
1533 Clear to Send not on  
1534 Data Set Ready Stuck  
1536 Clear to Send Stuck  
1537 Level 3 Interrupt Failure  
1538 Receive Interrupt Results Error  
1539 Wrap Data Did not Compare  
1540 DMA Channel 1 Error  
1541 DMA Channel 1 Error  
1542 8273 Error Checking or Status Reporting Failure  
1547 Stray Interrupt Level 4  
1548 Stray Interrupt Level 3  
1549 Interrupt Presentation Sequence Timeout  
16xx Display Emulation Error (327X, 5520, 525X)  
17xx Fixed Disk Drive Errors  
1701 Fixed Disk Post Error  
1702 Fixed Disk Drive Controller Error  
1703 Fixed Disk Drive Error  
1704 Fixed Disk or Controller Error  
1780 Fixed Disk 0 Error  
1781 Fixed Disk 1 Error  
1782 Fixed Disk Controller Failure  
1790 Fixed Disk 0 Error  
1791 Fixed Disk 1 Error  
18xx I/O Expansion Unit or Cable to Expansion Unit Errors  
1801 I/O Expansion unit Post Errors  
1810 Enable/Disable Failure  
1811 Extender Card Wrap Test Failed (Disabled)  
1812 High-Order Address Lines Failure (Disabled)  
1813 Wait-State Failure(Disabled)

1814 Enable/Disable Could not be Set  
1815 Wait-State Failure(Enabled)  
1816 Extender Card Wrap Test Failed (Enabled)  
1817 High-Order Address Lines Failure (Enabled)  
1818 Disable not Functioning  
1819 Wait Request Switch not Set Correctly  
1820 Receiver Card Wrap Test Failure, Expansion Unit Cable Failure  
1821 Receiver High-Order Address Lines Failure  
19xx 3270 PC Attachment Card Error  
20xx Binary Synchronous Comm. Adapter Error  
2010 8255 Port A Failure  
2011 8255 Port B Failure  
2012 8255 Port C Failure  
2013 8253 Timer 1 did not Reach Terminal Count  
2014 8253 Timer 1 stuck on  
2016 8253 Timer 2 did not Reach Terminal Count, or Timer 2 Stuck on  
2017 Data Set Ready Failed to Come on  
2018 8251 Clear to Send not Sensed  
2019 8251 Data Set Ready Stuck on  
2020 8251 Clear To Send Stuck on  
2021 8251 Hardware Reset Failed  
2022 8251 Software Reset Failed  
2023 8251 Software "Error Reset" Failed  
2024 8251 Transmit Ready did not come on  
2025 8251 Receive Ready did not come on  
2026 8251 Could not Force "overrun" errors Status  
2027 Interrupt Failure(no timer Interrupt)  
2028 Interrupt Failure(Transmit, Replace Card or Plannar  
2029 Interrupt Failure Transmit Replace Card  
2030 Interrupt Failure (Receive, Replace Card or Plannar)  
2031 Interrupt Failure (Receive Replace Card)  
2033 Ring Indicate Stuck on  
2034 Receive Clock Stuck on  
2035 Transmit Clock Stuck on  
2036 Test Indicate Stuck on  
2037 Ring Indicate not on  
2038 Receive Clock not on  
2039 Transmit Clock not on  
2040 Test Indicate not on  
2041 Data Set Ready not on  
2042 Carrier Detect not on  
2043 Clear To Send not on  
2044 Data Set Ready Stuck on  
2045 Carrier Detect Stuck on  
2046 Clear To Send Stuck on  
2047 Unexpected Transmit Interrupt  
2048 Unexpected Receive Interrupt  
2049 Transmit Data did not Equal Receive Data  
2050 8251 Detected Overrun Error  
2051 Lost Data Set Ready During Data Wrap  
2052 Receive Timeout During Data Wrap  
21xx Alternate Binary Synchronous Comm. Adapter Error  
2110 8255 Port A Failure  
2111 8255 Port B Failure  
2112 8255 Port C Failure  
2113 8253 Timer 1 did not Reach Terminal Count  
2114 8253 Timer 1 Stuck On  
2115 8253 Timer 2 did not Reach Terminal Count or Timer 2 Stuck on  
2116 Data Set Ready Failed to Come On  
2117 8251 Clear To Send not Sensed  
2118 8251 Data Set Ready Stuck on  
2119 8251 Clear To Send Stuck on  
2120 8251 Hardware Reset Failed  
2121 8251 Software Reset Failed  
2122 8251 Software "Error Reset" Failed  
2123 8251 Transmit Ready did not come on  
2124 8251 Receive Ready did not come on  
2125 8251 Could not Force "Overrun" Error Status  
2126 Interrupt Failure- No Timer Interrupt

2128	Interrupt Failure- Transmit, Replace Card or plannar
2129	Interrupt Failure- Transmit Replace Card
2130	Interrupt Failure- Receive, Replace Card or Plannar
2131	Interrupt Failure- Receive Replace Card
2133	Ring Indicate Stuck on
2134	Receive Clock Stuck on
2135	Transmit Clock Stuck on
2136	Test Indicate Stuck on
2137	Ring Indicate not on
2138	Receive Clock not on
2139	Transmit Clock not on
2140	Test Indicate not on
2141	Data Set Ready not on
2142	Carrier Detect not on
2143	Clear To Send not on
2144	Data Set Ready Stuck on
2145	Carrier Detect Stuck on
2146	Clear To Send Stuck on
2147	Unexpected Transmit Interrupt
2148	Unexpected Receive Interrupt
2149	Transmit Data did not Equal Receive data
2150	8251 Detected Overrun Error
2151	Lost Data Set Ready during data wrap
2152	Receive Timeout During Data Wrap
22xx	Cluster Adapter Errors
24xx	Enhanced Graphics Adapter Errors
29xx	Color Matrix Printer Errors
30xx	Primary PC Network Adapter Error
3001	CPU Failure
3002	ROM Failure
3003	ID Failure
3004	RAM Failure
3005	HIC Failure
3006	(+,-) 12v Failure
3007	Digital Loopback Failure
3008	Host Detected HIC Failure
3009	Sync Failure And No-Go Bit
3010	HIC Test OK and No-Go Bit
3011	Go Bit and no CMD 41
3012	Card not Present
3013	Digital Failure(Fall Through)
3015	Analog Failure
3041	Hot Carrier(not this Card)
3042	Hot Carrier(This Card)
31xx	Secondary Network Adapter Error
3101	CPU Failure
3102	ROM Failure
3103	ID Failure
3104	RAM Failure
3105	HIC Failure
3106	(+,-) 12v Failure
3107	Digital Loopback Failure
3108	Host Detected HIC Failure
3109	Sync Failure and No-Go Bit
3110	HIC Test OK and No-Go Bit
3111	Go Bit and no CMD 41
3112	Card Not Present
3113	Digital Failure(Fall Through)
3115	Analog Failure
3141	Hot Carrier(Not This Card)
3142	Hot Carrier(This Card)
33xx	Compact Printer Errors

**See also:**

[Audible beep error codes](#)

## Video mode details

Listed below are the **standard** video modes for IBM PC and compatibles:

Mode	Type	Colors	Resolution	Adapter
0	Text	16	40x25 chars (320x200 pixels)	CGA,EGA,VGA, Mono
0	Text	16	40x25 chars (320x350 pixels)	EGA,VGA
0	Text	16	40x25 chars (320x400 pixels)	MCGA
0	Text	16	40x25 chars (360x400 pixels)	VGA
1	Text	16	40x25 chars (320x200 pixels)	CGA,EGA,MCGA,VGA
1	Text	16	40x25 chars (320x350 pixels)	EGA,VGA
1	Text	16	40x25 chars (320x400 pixels)	MCGA
1	Text	16	40x25 chars (360x400 pixels)	VGA
2	Text	16	80x25 chars (640x200 pixels)	CGA,EGA,MCGA,VGA
2	Text	6	80x25 chars (640x350 pixels)	EGA,VGA
2	Text	6	80x25 chars (640x400 pixels)	MCGA
2	Text	6	80x25 chars (720x400 pixels)	VGA
3	Text	6	80x25 chars (640x200 pixels)	CGA,EGA,MCGA,VGA
3	Text	16	80x25 chars (640x350 pixels)	EGA,VGA
3	Text	16	80x25 chars (640x400 pixels)	MCGA
3	Text	16	80x25 chars (720x400 pixels)	VGA
4	Graphics	4	320x200 pixels	CGA,EGA,MCGA,VGA
5	Graphics	4	320x200 pixels	CGA,EGA*
6	Graphics	2	640x200 pixels	CGA,EGA,MCGA,VGA
7	Text	2	80x25 chars (720x350 pixels)	MDA,EGA,VGA
7	Text	2	80x25 chars (720x400 pixels)	VGA
0D	Graphics	16	320x200 pixels	EGA,VGA
0E	Graphics	16	640x200 pixels	EGA,VGA
0F	Graphics	2	640x350 pixels	EGA,VGA

\* on EGA, MCGA, and VGA. CGA MCGA has a different palette. VGA

## Video mode types

### MDA -- Monochrome Display Adapter

This video card can display **only text** mode characters and only in **one color**. This standard supports only monochrome mode 7 (720x350 pixel resolution).

### HGA -- Hercules Graphics Adapter

This is an extension of the MDA standard. It adds monochrome **graphics resolution** (720x348) capability to a board that fully supports the MDA standard. Because of its popularity, it has become a de-facto standard for monochrome graphics.

### CGA -- Color Graphics Adapter

This video card can display **text** in any of **16 colors**, and **graphics** in any of **4 colors**. This standard supports video modes 4 and 5 (320x200 4-color graphics) and mode 6 (640x200 2-color graphics).

### EGA -- Enhanced Graphics Adapter.

This video card can display **text** and **graphics** in any **16 colors** from a palette of 64. It also supports a higher resolution than CGA video cards. In addition, it has the unique ability to support either MDA, CGA, or EGA monitors.

### MCGA -- Multi-Color Graphics Array

This video card is a cross between a CGA and a VGA. Specifically, it supports all CGA modes and can display **graphics** in up to **256** simultaneous colors. This type of adapter is built-in on all IBM PS/2 Model 25 and Model 30 computers, but it has gained little popularity elsewhere in favor of VGA.

### VGA -- Video Graphics Array

This video card can display **text** and **graphics** in any of **256** colors from a palette of 262,144. It also supports a higher resolution than CGA, EGA, or MCGA video cards. This type of adapter is built-in on all mid-to high-range IBM PS/2 Model computers, and most compatibles. It is now the leading standard.

### SVGA -- Super VGA.

These cards are VGA-compatible but offer vendor-specific enhancements, such as **higher resolution** and **enhanced text modes**.

### VESA -- Video Electronic Standard Association

This standard provides a generic way to go **beyond VGA**. It provides an interface layer on top of another video card already installed. The other card must be at least VGA. Most SVGA cards have drivers for VESA.

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Graphics by The Dougster

**FDISK** is a program that is shipped with MS DOS that **configures** a **hard drive** for use with DOS.

**Partitions** are **divisions** of a hard disk that store data. A large drive may be divided up into several partitions (e.g. C:, D: and E:).



A **jumper** is an electronic connection that **allows adjustments** to be made to a card or motherboard to change configuration. Jumpers can be **added, removed,** or **moved.** Documentation for specific devices and motherboards will tell you how to use the jumpers to change the settings.

An **Interrupt ReQuest** is an assigned value which controls **instructions** for hardware and software. Each device requires its own IRQ, or conflicts will occur. The CPU uses these IRQs to determine which devices are **calling** for **input** or **output**. The IRQ Analysis function in WINCheckIt will display which IRQs are being loaded for the machine from where data was collected.

Described in **hexadecimal** format, I/O **assignments** describe the channels in memory by which devices and memory communicate. Each device will have its own **unique** I/O address. The I/O Address Map in WINCheckIt will show you the I/O assignments for the machine from which data was collected.

The **Microchannel** architecture uses **32-bit access**. It can be found in higher-end PS/2 machines. This bus architecture is not down-wardly compatible with the ISA bus.

The **Enhanced Industry Standard Architecture** bus is an **alternative** to the Microchannel but in that it can use 32-bit cards, and ISA boards simultaneously.

**Terminate** and **Stay Resident** programs are loaded into memory, and "called up" when you hit a hot key combination (e.g. Ctrl + E to load an E-mail program). These programs take up memory, even when you aren't using them. You can use the **TSR List** in WINCheckIt to see which TSRs are loaded on the machine from which you collected data.

**Direct Memory Address** assignments allow devices to communicate directly with memory, **bypassing** the **CPU**. This allows for much **faster** access times.

## Manufacturer's BBS Numbers

Listed below are BBS phone numbers for common PC industry manufacturers:

<b>Company</b>	<b>BBS Number(s)</b>
ADAPTEC	(408)945-7727
AHEAD (VIDEO)	(510)623-0961
ALR	(714)458-6834
ALWAYS TECH.	(818)597-0275
AMI	(404)246-8780
AST	(714)727-4723
ATI	(416)764-9404 OR (416)756-4591
AWARD	(408)370-3139
BOCA RESEARCH	(407)241-1601
CALCOMP	(714)236-3045
CARDINAL	(717)293-3074
C&T	(408)432-0369
DIAMOND	(408)730-1100 OR (408)524-9301
DIGITAL RESRCH.	(408)649-3443 (2400 BPS) (408)649-3696 (9600 BPS)
DTK	(818)333-6548
FUTURE DOMAIN	(714)253-0432
GENOA	(408)493-1231
HERCULES	(510)540-0621 OR (510)623-7449
HOUSTON INST.	(512)873-1477
IBM OS/2 BBS	(919)517-0001
INTEL	(503)645-6275
KURTA	(602)243-9440
LOGITECH	(510)795-0480
MAXTOR	(303)678-2222
MCAFFEE	(408)988-4004
MEDIAVISION	(510)770-1661
MICROPOLIS	(818)709-3310
MICROSOFT	(206)936-6735 OR (206)637-9009
MOUSE SYSTEMS	(510)683-0617
NEC	(508)635-4706
NORTON/SYMANTEC	(408)973-9598
NUMBER NINE	(617)862-7502
ONTRACK	(612)937-0860
ORCHID	(510)683-0327 (2400 BPS) (510)683-0555 (9600 BPS) (NOTE: MUST TURN OFF MNP5 FOR ORCHID BBS)
PHOENIX BIOS	(405)321-2616 OR (602)936-3058
PKWARE (PKZIP)	(414)354-8670
PLUS (QUANTUM)	(408)894-3214
QUALITAS	(301)907-8030
SEAGATE	(408)438-8771
SIGMA DESIGNS	(510)770-0111
SMC	(516)434-3162



	OR (714)707-2481
SONY	(408)955-5107
STB SYSTEMS	(214)437-9615
SYQUEST	(510)656-0473
TALL GRASS	(913)492-8751
TOSHIBA	(714)837-4408
TOUCHSTONE	(714)969-0688
TRANTOR	(510)656-5159
TREND	(310)320-2523
TRIDENT	(510)691-1016
ULTRASTOR	(510)623-9091
U.S. ROBOTICS	(708)982-5092
VOLANTE	(512)329-6327
WESTERN DIGITAL	(714)753-1234
WYSE TECHNOLOGY	(408)922-4400
YAMAHA	(408)441-0484
ZENITH	(800)888-3058
ZSOFT	(404)427-1045

