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Macintosh Desktop & PowerBook Computers: IDE Hard Drive (10/95)

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TOPIC ----------

This article describes the IDE (integrated drive electronics) hard drive, the 40-pin IDE connector pinouts, and IDE signals currently used on the following computers:

Macintosh 630 Family computers*
Macintosh LC 580
Macintosh Performa 5200 series computers
Macintosh Performa 5300 series computers
Macintosh Performa 6200 series computers
Macintosh Performa 6300 series computers
Macintosh PowerBook 150 series computers
Macintosh PowerBook 190 series computers
Macintosh PowerBook 2300 series computers
Macintosh PowerBook 5300 series computers
Power Macintosh 5200/75 LC
Power Macintosh 5300/100 LC

*Note: The Macintosh 630 Family includes the following computers: Macintosh LC 630, Quadra 630, and Performa 630, Performa 635, Performa 636, Performa 637, and Performa 638.

DISCUSSION ----------

The computers mentioned above all have an internal hard disk using the IDE interface. This cost-effective interface, used on IBM AT–compatible computers, is also referred to as the ATA interface. The implementation of the ATA interface on the Macintosh LC 630 and Macintosh Quadra 630 computers is a subset of the ATA interface specification, ANSI proposal X3T9.2/90-143, Revision 3.1.

An IDE drive does not have any address conflicts, specific cabling, or termination issues normally found in a SCSI chain. Performance of an IDE hard

drive will be similar to a comparable SCSI hard drive.

Any hard drive utilities you may have for SCSI drives will likely have to be revised to function properly with an IDE drive. Check with the vendor of the utility for compatibility information.

Note: The internal hard disk in the Macintosh 630 Family computers is an IDE drive, not a SCSI drive. To avoid possible problems in formatting, be sure to use the supplied Internal HD Format software with the internal IDE drive.

Hard Disk Connectors

The internal hard disk has a standard 40-pin IDE connector and a separate 4-pin power connector. The 40-pin connector cable is part of the cable harness attached to the main logic board by the internal chassis connector. The power cable is attached directly to the power supply.

Pin Assignments

The Table below shows the pin assignments on the 40-pin IDE hard disk connector. A slash (/) at the beginning of a signal name indicates an active-low signal.

Begin_Table

Pin assignments on the IDE hard disk connector:

Pin number	Signal name	Pin number	Signal name
1	/RESET	2	GROUND
3	DD7	4	DD8
5	DD6	6	DD9
7	DD5	8	DD10
9	DD4	10	DD11
11	DD3	12	DD12
13	DD2	14	DD13
15	DD1	16	DD14
17	DD0	18	DD15
19	GROUND	20	KEY
21	Reserved	22	GROUND
23	DIOW	24	GROUND
25	DIOR	26	GROUND
27	/IORDY	28	Reserved
29	Reserved	30	GROUND
31	INTRQ	32	/IOCS16
33	DA1	34	/PDIAG
35	DA0	36	DA2
37	/CS0	38	/CS1
39	/DASP	40	GROUND

End_Table

Note: The IDE data bus is connected to the I/O bus through bidirectional bus

buffers. To match the big-endian format of the MC68030-compatible bus, the bytes are swapped. The lower byte of the IDE data bus, DD(0–7), is connected to the high byte of the upper word of the I/O bus, IOD(24–31). The higher byte of the IDE data bus, DD(8–15), is connected to the low byte of the upper word of the I/O bus, IOD(16–23).

IDE Signal Descriptions

The Table below describes the signals on the IDE hard disk connector.

Begin_Table

Signal name	Signal description
DA(0–2)	IDE device address; used by the computer to select one of the registers in the IDE drive. For more information, see the descriptions of the CS0 and CS1 signals.
DD(0–15)	IDE data bus; buffered from IOD(16–31) of the computer's I/O bus. DD(0–15) are used to transfer 16-bit data to and from the drive buffer. DD(8–15) are used to transfer data to and from the internal registers of the drive, with DD(0–7) driven high when writing.
CS0	IDE register select signal. It is asserted high to select the additional control and status registers on the IDE drive.
CS1	IDE register select signal. It is asserted high to select the main task file registers. The task file registers indicate the command, the sector address, and the sector count.
/IORDY	IDE I/O ready; when driven low by the drive, signals the CPU to insert wait states into the I/O read or write cycles.
/IOCS16	IDE I/O channel select; asserted low for an access to the data port. The computer uses this signal to indicate a 16-bit data transfer.
/DIOR	IDE I/O data read strobe.
/DIOW	IDE I/O data write strobe.
INTRQ	IDE interrupt request. This active high signal is used to inform the computer that a data transfer is requested or that a command has terminated.
/RESET	Hardware reset to the drive; an active low signal.
Key	This pin is the key for the connector.

End_Table

Article Change History:
16 Oct 1995 - Added new computers.
28 Sep 1995 - Reviewed for technical accuracy.
08 Sep 1995 - Added new computers.
04 Apr 1995 - Added Macintosh LC 580 and Power Macintosh 5200/75 LC.

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