

DOS Days

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Floppy Disk Drives

Introduction

IBM released the first floppy disk drive in 1972 - these used 8" floppy disks. In 1976 the 5¼" floppy disk, the "minifloppy", was made available. The drives were manufactured by Shugart Associates initially, but by 1978 there were over 10 manufacturers producing 5¼" floppy drives in competing physical disk formats: hard-sectorized (90 KB) and soft-sectorized (110 KB). Before long, the hard-sectorized format disappeared.

The first IBM PC was envisioned with a cassette tape, but typically it came with one or two 5¼" floppy disk drives. The idea behind having more than one drive was so that you could have your 'Program' disk in one (like a Word Processor application), and your 'Working Files' disk in another (where you stored your saved documents). In the earliest PCs these drives were "full-height", meaning they took up two drive bays - one on top of the other. In 1986 the IBM PC XT was made available which introduced the "half-height" drive which took up just one drive bay. This allowed the XT to have two floppy drives plus a full-height hard drive.



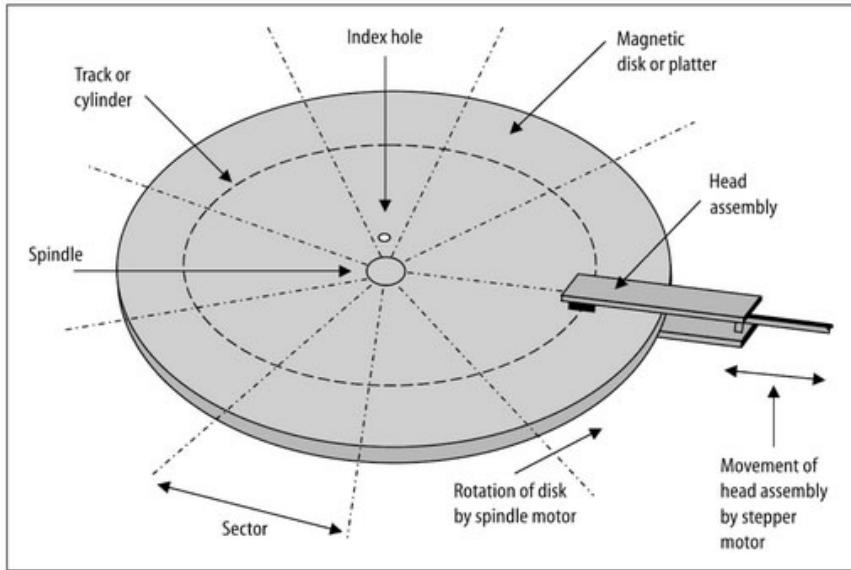
Physical Disk Geometry

A floppy disk is essentially a very flexible piece (hence the term *floppy disk*) of plastic coated on both sides in a magnetic material. This 'disk' of plastic is contained within a protective envelope or hard plastic case, which is then inserted into the drive and automatically locked onto a spindle. It is then rotated at a constant speed (360 rpm for standard PC floppy drives) by means of a

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spindle motor. A *head assembly* consisting of two magnetic read/write heads, one in contact with the upper surface of the disk and one in contact with the lower surface of the disk, may be moved in discrete steps across the disk by means of a stepper motor.



Due to the location of the head assembly and the fact the disk is spinning means the area of magnetic material that is passing under the upper head is seen to be a very narrow circular strip - this is called a *track*. Because there is both a track on the upper side of the disk and the lower side of the disk, both tracks together are called a *cylinder*. The number of possible cylinders for a given drive is clearly determined by the number of discrete steps available to the stepper motor. In practice, a track is considered too large a unit for storing information, so it is divided into *sectors*. Typically, each sector stores 512 bytes of data. The diagram above shows 9 sectors, which is typical of older 5½" floppy disks. Later ones use 15 sectors per track, whilst the standard 3½" 1.44 MB floppy disk has 18 sectors per track. Cylinder numbers are the same as track numbers - they represent the position of the head assembly. The number of heads, tracks and sectors per track a drive has is called its *geometry*. If you multiply the number of heads by the number of tracks by the number of sectors per track a disk has, you will find how many sectors a given disk has. Multiplying that number by 512 will give you the total capacity in bytes.

For example:

A 5½" double-sided low-density floppy disk has 9 sectors and 40 tracks per side, so 80 tracks in total if you count both the upper and lower side of the disk, so to calculate the total capacity:

$$9 \times 80 = 720 \text{ [total sectors]}$$

$$720 \times 512 \text{ [bytes]} = 368,640$$

$$368,640 / 1024 = 360 \text{ KB (kilobytes)}$$

This same logic above works just as well for hard disks as it does for floppy disks, except a hard disk contains multiple heads, whereas a floppy drive has just one head.

Storage Capacities



The first PC 5 1/4" floppy disks were single-sided, capable of storing 160 KB. In 1982 [MS-DOS v1.1](#) added support for [double-sided disks](#), increasing capacity to 320 KB (160 KB on each side). These disks allowed for 48 tracks per inch - after formatting they contained a total of 40 tracks with 8 sectors per track, and each sector could store 512 bytes. The formula for calculating disk capacity is:

(bytes per sector) x (sectors per track) x (number of tracks)

e.g. $512 \times 8 \times 40 = 163,840$ bytes (160 KB) x two sides = 320 KB

By 1983 and the introduction of [DOS 2.0](#), support for 9 sectors per track arrived, which provided two more capacities: 180 KB (single-sided) and 360 KB (double-sided). Then, coinciding with the launch of the IBM PC/AT in 1984, came high-density disks which used 96 tracks per inch. This meant a formatted 5 1/4" floppy disk could now hold 1,200 KB (1.2 MB) of data. High-density drives could also read double-density floppy disks, which permitted owners of older media to be able to upgrade without concern. These new high-density drives in the IBM were typically the Y-E Data model YD-380. If a customer opted for a low-density drive with their AT, they would have Y-E Data model YD-580, which supported up to 360 KB disks.

Meanwhile, 3 1/2" floppy disks, known as "microfloppy" and first invented by Sony, had been introduced in 1983. For the IBM PC world, these started off as single-sided double-density (SS/DD), which gave a formatted capacity of 360 KB - the same as a double-sided 5 1/4" floppy disk. Very soon after, double-sided double-density (DS/DD) 3 1/2" disks were made available, giving a formatted capacity of 720 KB. In 1987, "high"-density 3.5" disks were introduced by IBM with the launch of their PS/2 Models 50, 60 and 80 which got a high-density 3.5" floppy drive - this doubled the 3.5" capacity to 1.44 MB.

In short, the following formats were commonplace in the PC world from 1983 to the early 2000s:

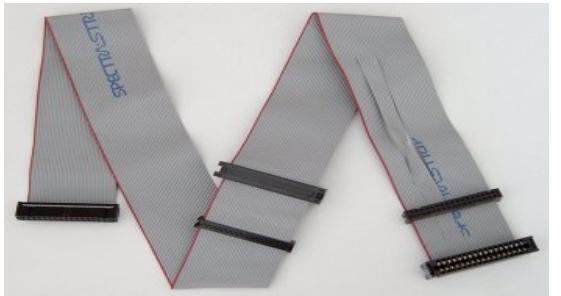
Physical Size	Sides/Density	Formatted Capacity
5 1/4"	Double-Sided, Double-Density (DS/DD)	360 KB
5 1/4"	Double-Sided, High-Density (DS/HD)	1.2 MB
3 1/2"	Double-Sided, Double-Density (DS/DD)	720 KB
3 1/2"	Double-Sided, High-Density (DS/HD)	1.44 MB

High-density floppy disks were so ubiquitous throughout the 80s and into the 90s partly due to the high relative cost of hard disk drives at the time - in 1989 the typical hard disk drive ranged from 20 MB up to 80 MB with an entry-level price point of £170 for 20 MB. This compared to 5 1/4" high-density floppies which sold in boxes of 10 for £14 (£1 per MB for floppy storage vs £8.50 per MB for a hard disk). In the U.S., prices were similar (1.56:1 exchange rate at the time) - a 20 MB hard disk drive went for \$260 whilst a box of 10 floppies was \$12.

The Floppy Drive Cable

The standard PC floppy drive cable has several connectors, usually either 3 or 5. The connector furthest away from the others connects to the 'host' (the motherboard header or your floppy disk controller header). There are then either 1 or 2 pairs of

connectors - these are used to support either a 3.5" floppy drive or a 5.25" floppy drive. It is not advisable to use both connectors in a single pair - this is the reason for having the second pair.



You may also notice the cable has a "twist" before the last pair of connectors. This is used to determine which drive [in a multi-drive] system is drive 'A' or 'B' [also called drive '1' or '2']. From the pin out table below; the swapped pins determine the "floppy drive enabled" flag, and which drive motor is enabled. The pins are line 10, line 12, line 14, and line 16, while the other lines in the twist are ground lines.

This twisted cable idea came about as a convenience, as it meant PC builders didn't need to fiddle with the floppy drive jumpers for each customer's configuration. Back when floppy drives were prevalent, customers chose either a single or dual floppy drive, since hard disks were so expensive.

All floppy drives were factory-configured as Drive B: - any signals that went to the last pair of connectors (after the twist) got their signals reversed so the drive motor and 'floppy enable' signal would be interpreted as Drive A: due to the twist.

Here are the pinouts of the cable:

Floppy Drive A/B Twist Pinout

-	Host/Controller	Drive A	Drive B	Description
Wire 1-9	1-9	1-9	1-9	No Change
Wire 10	10	16	10	Motor Enable Drive 0/1
Wire 11	11	15	11	Ground, No Change
Wire 12	12	14	12	Drive Select 0/1
Wire 13	13	13	13	Ground, No Change
Wire 14	14	12	14	Drive Select 0/1
Wire 15	15	11	15	Ground, No Change
Wire 16	16	10	16	Motor Enable Drive 0/1
Wire 17-34	17-34	17-34	17-34	No Change

The 2.88 MB Floppy

A 2.88 MB floppy drive was developed by Toshiba (and manufactured by Mitsumi) in the late 1980s for IBM's new PS/2 range, but failed to catch on in large numbers outside of IBM. These drives employed a very tightly-packed 36 sectors per track, and required special "ED" (Extra Density) 2.88 MB disks to work. These look almost identical to high-density 3.5" floppy disks, but have an "ED"

symbol and have their "media sensing" hole further down from the top-left corner than on a high-density disk - this allows 2.88 MB drives to recognise when ED media has been inserted.

One recognised contributing factor to this format not being widely accepted by other manufacturers is that the floppy disk controller needed to support a transfer speed of 1 Mbps (most could only cope with a maximum transfer speed of 256 Kbps on 720 KB drives and 500 Kbps on 1.44 MB drives). Since this meant a new controller card would be needed as well as the floppy drive itself, the cost of a PC manufacturer moving to the 2.88 MB floppy format was prohibitive.

IBM first fitted 2.88 MB floppy disk drives to their PS/2 Model 50, 60, 70 and 80 ranges. The drives had no separate power connector - instead the ribbon cable also supplied power to the drive. Some of these drives that were sold independently of an IBM PS/2 came with an adapter that converted the FDD interface from the proprietary IBM floppy interface to a standard 2-row 34-pin FDD connector and separate power connector. Even if your PC's BIOS supports 2.88 MB floppy drives, you still need this adapter for the drive to function.

3.5" Floppy Drives with 26-pin Connector

Some PC-compatible floppy drives used a 26-pin connector rather than the more commonly seen 34-pin one. Examples of this were the "combo" drives such as the Teac FD-505 that incorporated a 3.5" and 5.25" floppy drive in a single unit which were common in older Compaq PCs. Other examples are the Teac FD05 (used in a number of laptops/notebooks), Sony OA-D30, and Citizen U1DA-38A found in the Amstrad 5286HD.

3.5" Floppy Drives with Edge Connector

Some early IBM PS/2s and other PCs had 3.5" floppy disk drives that had a 40-pin edge connector instead of the later 34-pin 2-row header. These include the PS/2 Model 50, 60, 70 and 80. These older drives require an adapter or special cable that converts its 40-pin edge connector to a 34-pin header.

These 40-pin edge connectors are NOT the same as those used by 5.25" floppy drives, as the IBM drives had their power supplied through this interface.

To make a cable that connects the 40-pin edge connector to a 34-pin header connector, use this diagram:

Cable to convert 40-pin edge connector to a 34-pin header connector:

Edge connector pin	Header connector pin	Signal	Edge connector pin	Header connector pin	Signal
1	1	Ground	21	21	Ground
2	2	-High Density Select	22	22	-Write Data
3	NC	Reserved	23	23	Ground
4	4	Drive Type ID 1	24	24	-Write Enable
5	5	Ground	25	25	Ground

6	NC	Reserved	26	26	-Track 0
7	7	Ground	27	27	Ground
8	8	-Index	28	28	-Write Protect
9	9	Ground	29	29	Ground
10	10	Reserved	30	30	-Read Data
11	11	Ground	31	31	Ground
12	12	-Drive Select	32	32	-Head 1 Select
13	13	Ground	33	33	Ground
14	14	Reserved	34	34	-Diskette Change
15	15	Ground	35	NC	Ground
16	16	-Motor Enable	36	NC	Ground
17	17	Ground	37	NC	Ground
18	18	-Direction In	38	3	+5V DC
19	19	Ground	39	NC	Ground
20	20	-Head Step	40	6	+12V DC

*NC = Not Connected

By 1993, PC compatibles were being sold with 3½" floppy drives made by the following manufacturers:

CHINON CITIZEN™  **SONY**

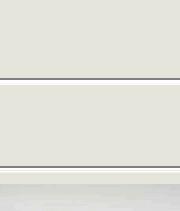
 **Y-E DATA**  **Canon** 

Y-E Data was a wholly owned subsidiary of the Yaskawa Electric Corporation, in Otsuka, Japan. Y-E Data Inc (YED) began in September 1973 and was one of the first Japanese businesses to venture into computer peripherals.

They saw IBM move from punched cards to floppy disk drives and imported technology from an American company called Orbis, Inc. Initially they simply resold the Orbis 8" single-sided drive domestically. It was capable of storing 128 KB on a disk. In 1974, they designed and produced their own floppy disk drive, the YD-74C - this was also an 8" single-sided drive.

It was followed in 1977 with an 8" double-sided drive, model YD-174. In 1978 their first 5.25" floppy drive was launched - model YD-274. Their first 3.5" drive would arrive much later in 1987 - the YD-800 series. The C-series was designed for portables. A later F-

series arrived in 1989. These were 'slim', and had models YD-3042 and YD-3082. Y-E Data continued to produce floppy drives into the late 1990s when there was a shift to the USB interface for these drives.

Make	Model	Image	Specs	Notes/comments
Alps	FPP110U02 / 15F7503 / DFP723D12B		3.5" Double sided, High Density 1.44 MB	Standard floppy drive found on IBM Model 70
Canon	221		5.25", Double Sided, Double Density 720 KB	Half-height internal desktop drive
Canon	530		5.25", Double Sided, Double Density 720 KB	Half-height internal desktop drive
Canon	MDD531		5.25", Double Sided, Double Density 360 KB	Half-height internal desktop drive
Canon	3361		3.5", Double Sided, High Density 1.44 MB	Half-height internal desktop drive
Canon	5201		5.25", Double Sided, Double Density 360 KB	Half-height internal desktop drive
Canon	MD5501		5.25", Double Sided, High Density 1.2 MB	Half-height internal desktop drive. Also available in black with same model number.
Canon	MD5511		Dual 5.25" 1.2 and 3.5" 1.44 MB drive	Half-height internal desktop drive
Chinon	FZ-357		3.5" 1.44 MB, DS/HD	Internal desktop drive. Similar model is the FG-357.
Chinon	FZ-502		5.25" 360 KB, DS/DD	Internal desktop drive. Also available in black.

Chinon	FZ-506		5.25" 1.2 MB, DS/HD	Internal desktop drive. Similar model is FR-506.
Chinon	506-L		5.25" 1.2 MB, DS/HD	Internal desktop drive
Citizen	OSDA-01D		3.5" 720K, Double Sided, Double Density	Internal desktop drive
Citizen	OSDA-14A		3.5", Double Sided, High Density	Internal desktop drive
Citizen	OSDA-39D		3.5", Double Sided, High Density	Internal desktop drive
Citizen	OSDA-51B (Compaq)		3.5", Double Sided, High Density	Internal desktop drive
Citizen	OSDA-52B (Compaq)		3.5", Double Sided, High Density	Internal desktop drive
Citizen	OSDA-53B (Compaq)		3.5", Double Sided, High Density	Internal desktop drive
Citizen	OSDA-77D		3.5", Double Sided, Double Density	Internal desktop drive
Citizen	OSDA-81F		3.5", Double Sided, High Density	Internal desktop drive
Citizen	OSDA-90E-U		3.5", Double Sided, Double Density	Internal desktop drive. Similar model is OSDA-90G-U.
Citizen	OPDB-22A		3.5", Double Sided, Double Density	Internal desktop drive
Citizen	OSDD-05B		3.5", Double Sided, Double Density	Internal desktop drive
Citizen	OSDD-57		3.5", Double Sided, Double Density	Internal desktop drive
Citizen	OSDD-57B		3.5", Double Sided, Double Density	Internal desktop drive
Citizen	U1DA-14A		3.5", Double Sided, High Density	Laptop drive
Citizen	V1DA-10A		3.5", Double Sided, High Density	Laptop drive
Citizen	V1DA-27A		3.5", Double Sided, High Density	Laptop drive

Citizen	V1DA-31B		3.5", Double Sided, High Density	Laptop drive
Citizen	V9DA-55A		3.5", Double Sided, High Density	Laptop drive
Citizen	V9DA-55B		3.5", Double Sided, High Density	Laptop drive
Citizen	V9DA-71B		3.5", Double Sided, High Density	Laptop drive
Epson	170-SMD		3.5", Single Sided, Double Density 400 KB	Half-height
Epson	180		3.5", Double Sided, Quad Density 720 KB	Half-height
Epson	200P-053		3.5", Double Sided, Quad Density 720 KB	Half-height
Epson	200P-055		3.5", Double Sided, Quad Density 720 KB	Half-height
Epson	200P-073		3.5", Double Sided, Quad Density 720 KB	Half-height
Epson	280		3.5", Double Sided, Quad Density 720 KB	Half-height
Epson	SMD-300		3.5", Double Sided, High Density 1.44 MB	Half-height
Epson	SD321		5.25", Double Sided, Double Density 360 KB	Half-height
Epson	SMD340		3.5", Double Sided, High Density 1.44 MB	Half-height
Epson	400 W/Frame		3.5", Double Sided, High Density 1.44 MB	Half-height
Epson	400P-4		3.5", Double Sided, High Density 1.44 MB	Half-height
Epson	SD-500		5.25", Double Sided, Double Density 360 KB	Half-height

Epson	521		5.25", Double Sided, Double Density 360 KB	Half-height
Epson	521L		5.25", Double Sided, Double Density 360 KB	Half-height
Epson	SD600		5.25", Double Sided, Double Density 360 KB	Half-height
Epson	SD621L		5.25", Double Sided, Double Density 360 KB	Half-height
Epson	SD680L		5.25", Double Sided, High Density 1.2 MB	Half-height. Also sold in grey.
Epson	SD-700/800		Dual 5.25" and 3.5" high density	Half-height
Epson	1000		3.5", Double Sided, High Density 1.44 MB	Laptop drive
Epson	1000P		3.5", Double Sided, High Density 1.44 MB	Laptop drive
Epson	SMD-1100		3.5", Double Sided, High Density 1.44 MB	Half-height.
Epson	SMD-1300		3.5", Double Sided, High Density 1.44 MB	Half-height. Similar to SMD-1340.
Hitachi	HFD 305S		5.25", Single-Sided Double Density 360 KB	Internal desktop drive
Hitachi	FD532EIU		5.25", Double-Sided High Density 2.4 MB	Internal desktop drive
Hitachi	FDD412A		5.25", Double-Sided High Density 1.2 MB	Internal desktop drive

Mitsubishi	353AF		3.5" 720 KB	Internal desktop drive
Mitsubishi	353B-12		3.5" 720 KB	Internal desktop drive
Mitsubishi	353B-82		3.5" 720 KB	Internal desktop drive
Mitsubishi	353C		3.5" 720 KB	Internal desktop drive
Mitsubishi	353-12		3.5" 720 KB	Internal desktop drive
Mitsubishi	355B-52		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355B-82UF		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355B-88UF		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355BA-82UF/W51/4		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355BA-88UF/W51/4		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-12		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-37/W51/4		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-58UF		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-82UF/W51/4		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-88UF/W51/4		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-215		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-222		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-258MC		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-352		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C-526		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C599MA (PS/2)		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C599MB (PS/2)		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C599MQ41 (PS/2)		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355C599MQ4 (PS/2)		3.5" Double Sided, High Density	Internal desktop drive

Mitsubishi	MF355F258		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	355W99M1 (PS/2)		3.5" Double Sided, High Density	Internal desktop drive
Mitsubishi	MF501A/B/C		5.25" Double Sided, Double Density	Internal desktop drive
Mitsubishi	MF503		5.25" Double Sided, Quad Density (720K)	Internal desktop drive
Mitsubishi	MF504A/B/C/S		5.25" Double Sided, High Density	Internal desktop drive
Mitsumi	D359C		3.5", Double Sided, High Density 1.44 MB	Laptop drive
Mitsumi	D359T2		3.5", Double Sided, High Density 1.44 MB	Half-height
Mitsumi	D359T3		3.5", Double Sided, High Density 1.44 MB	Half-height
Mitsumi	D359T5		3.5", Double Sided, High Density 1.44 MB	Half-height
Mitsumi	D503		5.25", Double Sided, Double Density 360 KB	Half-height
Mitsumi	D509V		5.25", Double Sided, High Density 1.2 MB	Half-height
NEC	1035		3.5", Double Sided, Double Density 720 KB	Half-height
NEC	1036A		3.5", Double Sided, Double Density 720 KB	Half-height
NEC	1037A		3.5", Double Sided, Double Density 720 KB	Half-height
NEC	1053		5.25", Double Sided, Double Density 360 KB	Half-height
NEC	1055		5.25", Double Sided, Double Density 720 KB	Half-height
NEC	1137H		3.5", Double Sided, High Density 1.44 MB	Half-height

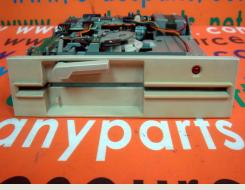
NEC	1155C		5.25", Double Sided, High Density 1.2 MB	Half-height
NEC	1157C		5.25", Double Sided, High Density 1.2 MB	Half-height
NEC	1158C		5.25", Double Sided, High Density 1.2 MB	Half-height
NEC	1165A		8.0", Double Sided, Double Density 160 KB	Half-height
NEC	1165FQ		8.0", Double Sided, Double Density 160 KB	Half-height
NEC	1165F		8.0", Double Sided, Double Density 160 KB	Half-height
NEC	1165H		8.0", Double Sided, Double Density 160 KB	Half-height
NEC	1165S		8.0", Double Sided, Double Density 160 KB	Half-height
NEC	5138A		3.5", Double Sided, High Density 1.44 MB	Half-height
Panasonic/ Matsushita	JU-256A428P		3.5" Double Sided, High Density 1.44 MB	Internal desktop drive. Images courtesy of Ged Haywood. 
Panasonic/ Matsushita	JU-475-4		5.25"	Half-height. Images courtesy of Ged Haywood. 
Sony	17W		3.5", Double Sided, High Density	1/3rd-height desktop drive
Sony	17W-5PF (SUN)		3.5", Double Sided, High Density	1/3rd-height desktop drive
Sony	17W-10		3.5", Double Sided, High Density	1/3rd-height desktop drive
Sony	17W-34		3.5", Double Sided, High Density	1/3rd-height desktop drive
Sony	17W-42		3.5", Double Sided, High Density	1/3rd-height desktop drive

Sony	17W-WFP (SUN)		3.5", Double Sided, High Density	1/3rd-height desktop drive
Sony	17W-90 (Compaq)		3.5", Double Sided, High Density	1/3rd-height desktop drive
Sony	40W-00 (PS2)		3.5", Double Sided, High Density 2.88 MB	1/3rd-height desktop drive
Sony	40W-9E		3.5", Double Sided, High Density 2.88 MB	1/3rd-height desktop drive
Sony	53W		3.5", Double Sided, Double Density 720 KB	1/3rd-height desktop drive
Sony	63W		3.5", Double Sided, Double Density 720 KB	1/3rd-height desktop drive
Sony	73W		3.5", Double Sided, High Density	3/4-height
Sony	73W-34D		3.5", Double Sided, High Density	3/4-height
Sony	75W (Apple)		3.5", Double Sided, High Density	Half-height internal desktop drive
Sony	77W (PS2)		3.5", Double Sided, High Density	Half-height internal desktop drive
Sony	120-04		3.5", Double Sided, High Density	1/3rd-height desktop drive
Sony	420-6		3.5", Double Sided, High Density	1/3rd-height desktop drive
Tandon	TM-100-1(A)		5.25" Single-Sided, Double Density	Full-height desktop drive, used in the IBM PC (Model 5150)
Tandon	TM-100-2(A)		5.25" Double-Sided, Double Density	Full-height desktop drive, used in the IBM PC/XT (Model 5160)
Tandon	TM-100-3			
Teac	35F		3.5", Double Sided, Double Density	Internal desktop drive
Teac	35FN		3.5", Double Sided, Double Density	Internal desktop drive
Teac	35HFN		3.5", Double Sided, High Density	Internal desktop drive
Teac	53B		5.25", Double Sided, Double Density	Internal desktop drive
Teac	54B		5.25" - Unknown specs	Internal desktop drive, found in Sanyo MBC-55X

Teac	55A		5.25", Single-Sided, Double Density	Internal desktop drive, found in Sanyo MBC-55X
Teac	55B		5.25", Double Sided, Double Density	Internal desktop drive, found in Sanyo MBC-55X
Teac	55BR		5.25", Double Sided, Double Density	Internal desktop drive
Teac	55BV		5.25", Double Sided, Double Density	Internal desktop drive
Teac	55FR		5.25", Double Sided, Double Density	Internal desktop drive
Teac	55FV		5.25", Double Sided, Double Density	Internal desktop drive
Teac	55G		5.25", Double Sided, High Density	Internal desktop drive
Teac	55GFR		5.25", Double Sided, High Density	Internal desktop drive
Teac	55GV		5.25", Double Sided, High Density	Internal desktop drive
Teac	55GFV		5.25", Double Sided, High Density	Internal desktop drive
Teac	55GVF		5.25", Double Sided, High Density	Internal desktop drive
Teac	135FN		Double Sided, Double Density	Internal desktop drive
Teac	135HF		3.5", Double Sided, High Density	Internal desktop drive
Teac	135HFN		3.5", Double Sided, High Density	Internal desktop drive
Teac	FD-235F		3.5", Double Sided, Double Density	Internal desktop drive
Teac	FD-235HF		3.5", Double Sided, High Density	Internal desktop drive
Teac	FD-505		5.25", Double Sided, Double Density	Internal desktop drive

Teac	05HF-030	 A photograph of a bare floppy drive circuit board. The board is light green and populated with various electronic components like chips, capacitors, and connectors. It is labeled "Bare Floppy Drive" at the top and "Teac FD-451F" and "UsedPCHub.Com" at the bottom.	3.5", Double Sided, High Density	Laptop drive
Teac	05HF-532U		3.5", Double Sided, High Density	Laptop drive
Toshiba	0202A		5.25", Double Sided, Double Density 720 KB	Full-height drive
Toshiba	0242A		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	0401GR		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	0801GR		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	0802GR		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	352TH		3.5", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	3527H		3.5", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	3527TH		3.5", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	3561		3.5", Double Sided, High Density 1.44 MB	Half-height drive
Toshiba	3564		3.5", Double Sided, High Density 1.44 MB	Half-height drive
Toshiba	3567		3.5", Double Sided, High Density 1.44 MB	Half-height drive
Toshiba	4210		3.5", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	4202-AOK		3.5", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	4207-AOK		3.5", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	4207-AOK		3.5", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	4261		3.5", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	4449-AOZ (PS/2)		3.5", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	5401		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	5406		5.25", Double Sided,	Half-height drive

			Double Density 360 KB	
Toshiba	5426		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	5451		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	5454		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	5471		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	5472		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	5474		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	5629		5.25", Double Sided, Double Density 720 KB	Half-height drive
Toshiba	5861		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	5863		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	5881		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	5882		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	6371		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	6374		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	6471		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	6474-T2P		5.25", Double Sided, Double Density 360 KB	Half-height drive
Toshiba	6782		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	6784		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	6881		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	6882		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	6890		5.25", Double Sided, High Density 1.2 MB	Half-height drive
Toshiba	BR505930-2		3.5", Double-Sided, Double-Density 720 KB	Found in IBM PC Convertible (Model 5140)
Toshiba	ND-3565-A		3.5", Double Sided, High	Half-height drive

			Density 1.44 MB	
Toshiba	ND-356T-A		3.5", Double Sided, High Density 1.44 MB	Half-height drive
Toshiba	M48D-12		5.25", Double Sided, Double Density 360 KB	Half-height drive
YE-Data	YD-74C		8" SS/SD 128 KB	Launched in 1974
YE-Data	YD-174		8" DS	Launched in 1977
YE-Data	YD-180		8" slim, Double-sided, double-density 160 KB	Launched in 1981. Half-height internal drive.
YE-Data	YD-274		5.25" DS/DD 360 KB	Launched in 1978
YE-Data	YD-280		5.25" DS/DD 360 KB	Launched in 1981. Full-height drive. Report of this being a 720 KB drive?
YE-Data	YD-380		5.25" slim DS/DD 1.2 MB	Launched in 1982. Supplied with the IBM PC/AT.
YE-Data	YD-380B		5.25" slim DS/DD 1.2 MB	Launched in 1982.
YE-Data	YD-380C		5.25" slim DS/DD 1.2 MB	Note the lack of the 'lip' around the drive entry compared to the YD-380. A black version called YD-380T was also produced - the light and arm were reversed on the 380T.
YE-Data	YD-480		5.25" slim	Launched in 1983.

YE-Data	YD-580 YD-580B		5.25" DS/DD 360 KB	Launched in 1983. Supplied with the IBM PC/AT (also in late PC/XT)
YE-Data	YD-625		5.25" DS/HD	Launched in 1997.
YE-Data	YD-665C YD-666C		3.5"	
YE-Data	YD-800 YD-3540		3.5" DS/HD	Launched in 1987.
YE-Data	YD-3042		3.5" DS/DD 720 KB	Launched in 1988.
YE-Data	YD-3082		3.5" DS/HD 1.44 MB	Launched in 1988.
YE-Data	YD-742		3.5" 4MB	Launched in 1990.
YE-Data	YD-700B series		5.25" and 3.5" double-speed drives	Launched in 1991. YD-700B is 1" height. YD-702G is slim.
YE-Data	YD-701		3.5" 1.44 MB	Two IBM PS/2 versions were also created - one which had an edge connector and a second that had pin edge.
YE-Data	YD-750		3.5" large capacity (20MB) floppy drive (SCSI).	Launched in 1992.
YE-Data	YD-702D		3.5" Internal desktop drive-height 1.44 MB.	Launched in 1993.
YE-Data	YD-702J		Super-slim 3.5" FDD for laptops.	Launched in 1993.
YE-Data	?		3.5" double-speed drives - new series	Launched in 1995.
YE-Data	?		3.5" Double-speed drives.	Launched in 1996.

YE-Data	YD-802		5.25" DS/HD	Produced in 1997.
YE-Data	YD-8U10, YD-8U12, YD-8U14		USB interface floppy drive.	Launched in 1998.

Frequently Asked Questions

Q) Can I get a 5.25" floppy drive connected via USB to a modern PC?

A) Yes! A company called [Device Side Data](#) have a product called the FD5025 USB 5.25" floppy controller. One great thing about this interface is that it works with not just PC drives, but also Apple, Commodore, Texas Instruments, Atari and more, and comes with Windows and Mac OS software to pull data off your disks for archival purposes! It costs \$55 plus shipping within the USA.

There is also the [Kryoflux](#) which works a little differently. It's still an adapter but works at the lowest level of reading the magnetic flux from the disk, so it's agnostic of encoding scheme and spin speeds. It should therefore work with just about any format of disk. Software is included, and it's about 124 Euros.

If you want to try other ways... it's not particularly easy. What could be done is to find a 3.5" external floppy drive enclosure and use an adapter or modified cable similar to the one above on this page to convert its edge connector to a standard 34-pin 2-row header. The controller circuitry on the USB interface *may* support 5.25" drives (specifically 1.2 MB high-density ones), but it may not. Also, the HD (high-density) 5.25" drives run their motor at 360 rpm instead of the 300 rpm that all 3.5" drives spin at. SMSC made a USB bridge chip, USB97CFDC2-01. This supports "640K, 720K, 1.44M, 1.2M Windows 98 and 1.2M NEC DOS 6.x Formats" - you can possibly identify if your USB interface has this chip by checking in Device Manager. This chip has a VID of 0424 and a PID of 0fdc.

Power requirements are a little more tricky as many USB powered enclosures will not have enough power for a 5.25" drive. These usually have no more than +5V with a maximum current draw of 500mA. 5.25" floppy drives take power from a Molex 4-pin connector which provides +5V (red), GND (black), GND (black), and +12V (yellow). These drives do require both these voltage lines to function - the 12V line is used to power the stepper motor, and the 5V line is used for the logic board and read/write heads. So you'll need to get the +12V in there from a DC mains adapter.

Also be aware that PC floppy drives are jumpered as drive 1, not drive 0, so you will either have to find a cable with a twist, or determine how to re-jumper your drive.

Standard 5.25" floppy edge connector pinouts:

2	Connector Clamp
4	(Spare)
6	Select 3 (NDS3)
8	Index (NINDEX/ SECTOR)
10	Select 0 (NDS0)
12	Select 1 (NDS1)
14	Select 2 (NDS2)
16	Drive Motor Enable (NMOTORON)
18	Direction
20	Step (NSTEP)
22	Write Data (NWRITEDATA)
24	Write Gate (NWRITEGATE)
26	Track 00 (NTRK00)
28	Write Protect (NWRITEPROTECT)
30	Read Data (NREADDATA)
32	Side Select (NSIDESELECT)
34	Connector Clamp

All pins on the other side are ground.

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