OUTLINE

This specification provides a description for the TEAC FD-235HF, dual density (2/1MB, 2-modes), 3.5-inch micro floppy disk drive (hereinafter referred to as FDD).

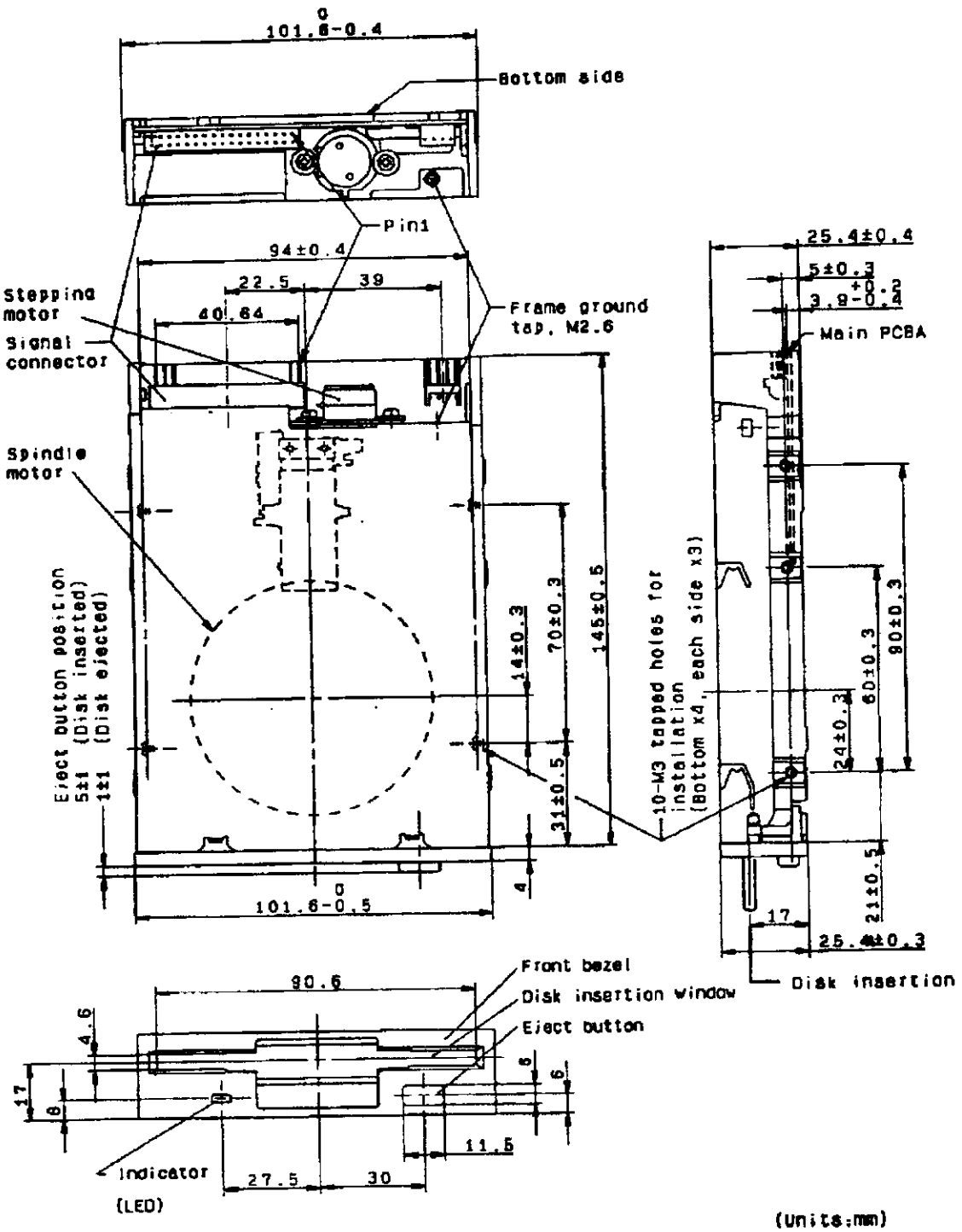
Specification outline

Model name	FD-235HF	
Safety standard	UL, CSA & TÜV	
Operation modes	2MB mode Write and read	1MB mode Write and read
3.5 inch disk used	High density (2HD)	Normal density (2DD)
Unformatted data capacity	2M bytes	1M bytes
Data transfer rate	500k bits/s	250k bits/s
Disk rotational speed	300rpm	300rpm
Track density	5.3track/mm [135tpi]	
Track to track time	3ms	
Required power	+5V single (4.5 ~ 5.5V)	
Signal output driver	Open collector TTL	
Input signal pull-up	1kΩ ±30%	

PHYSICAL SPECIFICATION

Physical specification

Width	101.6mm [4.00 in], Nom.
Height	25.4mm [1.00 in], Nom.
Depth	145mm [5.71 in], Nom., excluding front bezel
Weight	345g [0.76lbs], Nom., 360g [0.79 lbs], Max.
External view	See fig.1.
Cooling	Natural air cooling
Mounting	Mountings for the following directions are acceptable. (a) Front loading, mounted vertically. (b) Front loading, mounted horizontally with spindle motor down. (c) Mounting angle in items (a) and (b) should be less than 25° with front bezel up or down. Note: As to the other mounting directions than the above will be considered separately.
Installation	With installation holes on the frame of the FDD.
Material of flame	Aluminium die-cast
Material of front bezel	PPHOX (Complying with UL94-5V)



FDD external view

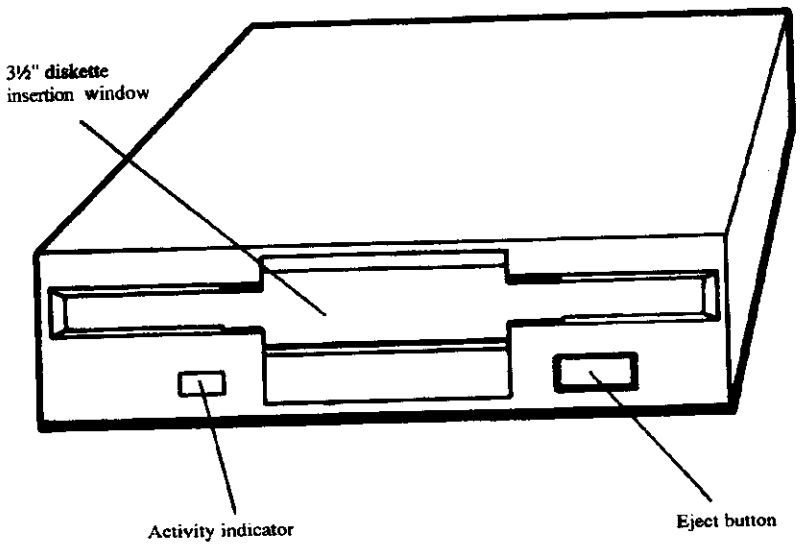
ENVIRONMENTAL CONDITIONS

	Operating	Storage	Transportation
Ambient temperature	4~51.7°C [39~125°F]	-22~60°C [-8~140°F]	-40~65°C [-40~149°F]
Temperature gradient	20°C [36°F] or less per hour	30°C [54°F] or less per hour	30°C [54°F]or less per hour
Relative humidity	20~80% (no condensation) Max. wet bulb temperature shall be 29.4°C [85°F]	5~90% (no condensation) Max. wet bulb temperature shall be 40°C [104°F]	5~95% (no condensation) Max. wet bulb temperature shall be 45°C [113°F]
Vibration	14.7m/s² [1.5G] or less (10~100Hz, 1 octave/m sweep rate)		19.6m/s² [2G] or less (10~100Hz, 1/4 octave/m sweep rate)
	9.8m/s² [1.0G] or less (100~200Hz, 1 octave/m sweep rate)		
	4.9m/s² [0.5G] or less (200~600Hz, 1 octave/m sweep rate)		
Shock	Write & read: 49m/S² [5G](11ms, 1/2 sine wave) or less		686m/S² [70G] (11ms, 1/2 sine wave) or less
	Read only: 98m/S² [10G](11ms, 1/2 sine wave) or less		
Altitude	-300m [-980feet]~ 5,000m[16,400feet]		
	Notes: The above requirements are applied for the FDD without shipping box. When a long period is required for transportation such as by ship, storage environmental conditions should be applied.		

RELIABILITY

MTTF		30,000 power on hours or more (for typical operation duty)
MTTR		When failure, the FDD should be replaced in unit of the drive and not repaired in unit of parts or assemplies.
Design component life		5 years
Disk life		3×10^6 passes/track or more
Disk insertion		1.5×10^4 times or more
Seek operation		1×10^7random seeks or more
Preventive maintenance		Not required (for typical operation duty)
Error rate	Soft error	1 or less per 10^9 bits read A soft (recoverable) error means that it can be recoverred correcty within three retries.
	Hard error	1 or less per 10^{12} bits read A hard (unrecoverable) error means that it cannot be recovered correstly within three retries. However, it is recommended to be followed by a recalibration to track 00 and four additional retries.
	Seek error	1 or less per 10^6 seeks A seek error means that it can seek to a target track within one retry includlng a recalibration to track 00.
Safety standard		Approved by UL, CSA and TÜV
Electro-static dischange test		15kV (150pF, 330Ω) or more No hard error and/or no component damage occur when the test is applied to the operator access area (front bezel area).

TEAC FD-235 Series
3½" 1.44 MB Floppy Disk Drive
Installation Guide



Your FD-235 package includes:

- ☑ (1) FD-235 3½" floppy disk drive
- ☑ (1) 5¼" Mounting Kit
- ☐ (1) Installation Guide

Introduction

Thank you for purchasing the TEAC FD-235 Series 1.44 MB floppy disk drive. This product is intended for use in IBM@ PC/XT/AT@ compatible computers. Upgrading IBM/AT systems requires Bastech driver installation. It allows you to expand the usefulness of your present computer by providing a 3½" diskette compatibility.

This quality drive will provide trouble-free operation for your computer system if properly installed. PLEASE READ THE ENTIRE INSTALLATION GUIDE THOROUGHLY BEFORE YOU BEGIN THE INSTALLATION. Use a high density controller with optional bios to support 3%" high density drive, if this option is not available on your system bios. If you have questions or comments on the installation, please call TEAC Technical Support Center at the telephone number listed on the back page of this Guide.

Tools You May Need

Depending on the design of your computer, you may need the following tools to complete the installation.

- ❑ a flat blade screwdriver
- ❑ a Phillips screwdriver
- ❑ needle-nosed pliers

Handling the FD-235 Series 3%" Drive

Your FD-235 drive must be handled with care. Avoid applying undue force or abnormal strain to the spindle motor, stepping motor or printed circuit board. Avoid placing your fingers on the **printed circuit hoard.** It is best to hold the FD-235 by the diecast frame, as indicated by the arrows in Figure A. Never loosen the fixing screws of the printed circuit board, etc.

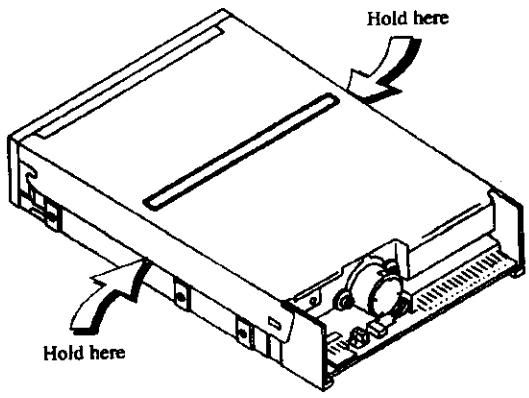


Figure A

Preparing your Personal Computer for FD-235 Floppy Drive Installation

CAUTION: TURN OFF YOUR COMPUTER AND UNPLUG IT FROM THE AC POWER SOURCE BEFORE INSTALLING THE FD-235. FAILURE TO DO SO MAY RESULT IN ELECTRIC SHOCK.

1. Unplug your computer.
2. Detach all input and output devices from your computer, such as printer, keyboard, monitor, etc.
3. Remove cover from your computer. Refer to your computer system manual for this procedure.
4. If you are replacing a current floppy, note the cables that are connected to your floppy disk drive, as these same cables will be required to install your FD-235. The floppy interface cable is the flat "ribbon" type, and the power connector consists of the 4 separate wires attached to a single connector. See Figure B.
5. Your system may also have a single ground wire attached to the floppy disk drive. Carefully remove all cables from your floppy disk drive.
6. If not installing the FD-235 floppy disk drive into a standard 1" bay, use the enclosed 5¼" adapter kit and mounting hardware to install in a 5¼" bay.
7. Install the FD-235 Series 1.44 MB into an available drive bay.

Note: The FD-235 comes with two optional pieces of hardware to assist you with correctly installing your floppy drive. The two pieces are: a power connector adapter cable and an edge card adapter (PCBA adapter).

Installing the 5¾" Adapter Kit

Instructions for installing the 3¾" floppy disk drive universal adapter kit are printed on the kit box.

Rear View of FD-235

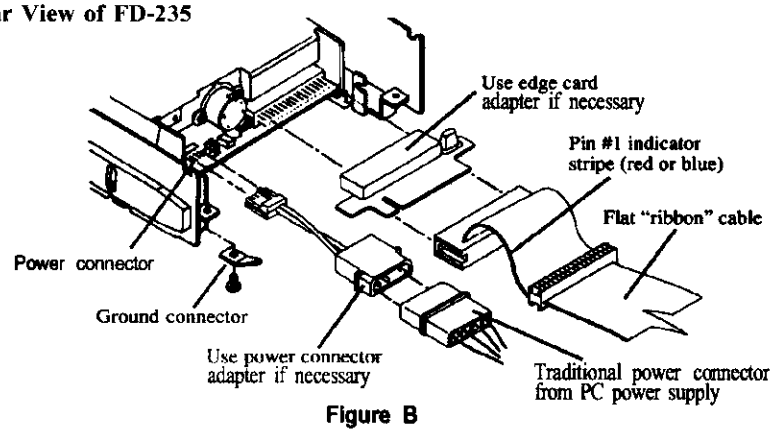


Figure B

Configuring for A: or B: drive

Use a standard IBM PC compatible cable with a twist at the end connector (Figure C) and the **factory default strap settings** (shown in Figure D) to complete installation.

a) To configure as your A: drive, connect the FD-235 Series floppy drive to **Connector A:** on the flat "ribbon" cable. **Connector A:** is the end connector of the cable as shown in the sketch.

b) To configure as your B: drive, connect the FD-235 Series floppy drive to **Connector B:** on the flat "ribbon" cable. **Connector B:** is the middle connector of the cable as shown in the sketch.

c) Verify that jumpers are set as indicated in Figure D.

d) Connect the ground cable if your system requires it.

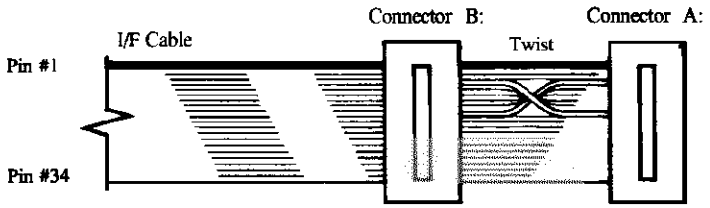
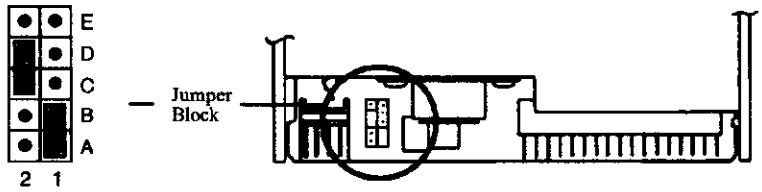


Figure C

Note: Be sure to make the correct changes to the CMOS BIOS setup after you install your FD-235.

FD-235 Jumper Matrix

Factory defaults for the **FD-235HF-4XXX** are shaded below.



Factory defaults for the **FD-235HF-1XXX, 5XXX, 6XXX** are shaded below.

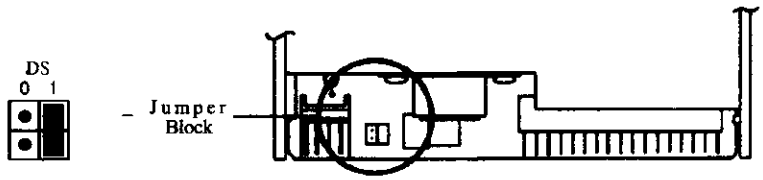


Figure D

Notes on Installing your FD-235

Slide drive into any available standard 1" high bay, or install in an available 5¼" bay with the enclosed mounting kit.

Make sure the mounting rails are aligned into the mating slots.

Locate your system's floppy drive ribbon cable. The cable may be keyed to assist with alignment. If yours is not keyed, it should be attached so that the color strip (red or blue) faces the center of the drive (jumper block). This is Pin 1.

1. Re-attach power connector.
2. Replace the cover.
3. Re-attach all input and output devices.
4. Plug in computer.

Attaching Mounting Rails, if Required

Your system may or may not require rails to mount the floppy drives. If rails are required, please call TEAC parts department and order rail kit for FD-235. Tel: 213-726-0303 Ext. 845 (TEAC P/N: 1000 0000-60). Attach rails as shown in Figure E.

The tapered end of each rail, when mounted, should point toward the back of the floppy drive.

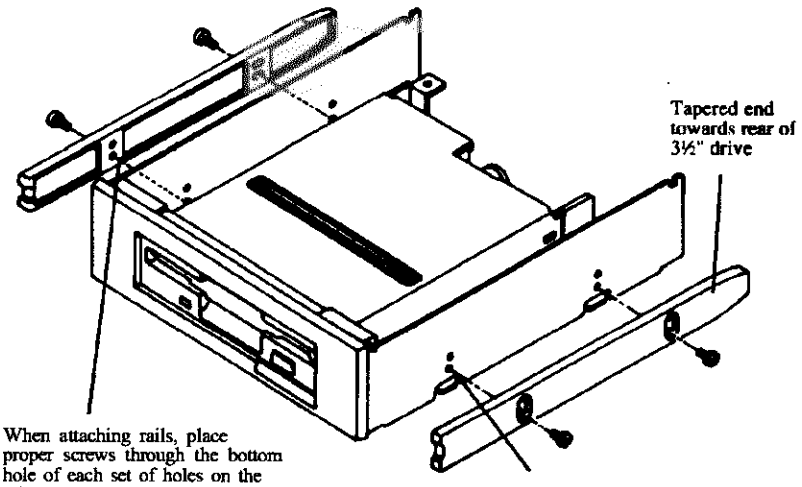


Figure E

Trouble Shooting

Symptom	Solution
Indicator light never turns on when executing READ or WRITE.	Make sure that the interface cable and power cable are properly connected and drive address strap is set correctly.
Indicator light comes on as soon as power is applied and stays on.	The ribbon cable may be reversed. Check pin #1 orientation.
Drive type mismatch during boot.	Check CMOS setup for correct drive type. If the indicator comes on, check for head recalibration to Track 00; if it doesn't, drive may be malfunctioning.
Invalid media or Track 00 bad when formatting.	Attempted to format an HD diskette to 720K or DD diskette to 1.44 MB. Drive is not properly set in CMOS setup. Or controller card is not configured correctly. Check setup by referring to controller documentation. For IBM/AT upgrade, Bastech driver must also be installed.
The same directory is displayed for different diskettes.	Controller card is not receiving disk change signal. Check the drive for the correct disk change strap setting. Pin #34 on the ribbon cable is broken. Or disk drive is malfunctioning.
Drive not ready error reading drive X.	No diskette inserted in the drive or motor not spinning. Drive may need service.
General failure error reading drive X.	Diskette not formatted. Drive out of alignment. LD or ND disk formatted to 1.44MB. HD disk formatted for 720K. Use correct disk.
Sector not found error.	Head seek error or drive out of alignment.

TEAC Technical Support : Phone (323) 727-4860
Hours 8AM - 5PM M-F except for Holidays

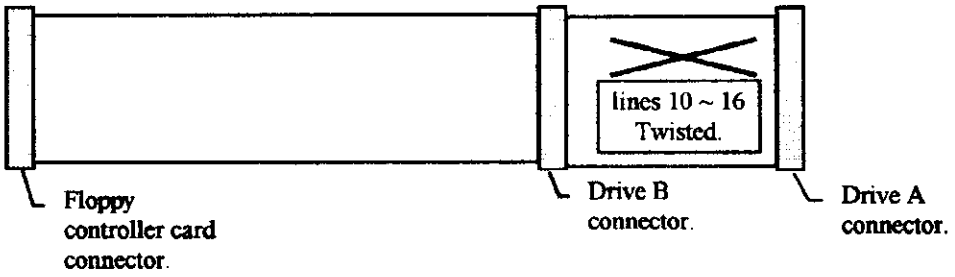
FAX (323) 869 - 8751
EMAIL DSPDTSG@TEAC.COM
WEB SITE ADDRESS AT HTTP://WWW.TEAC.COM

TEAC America Inc.
Floppy Diskette Drives

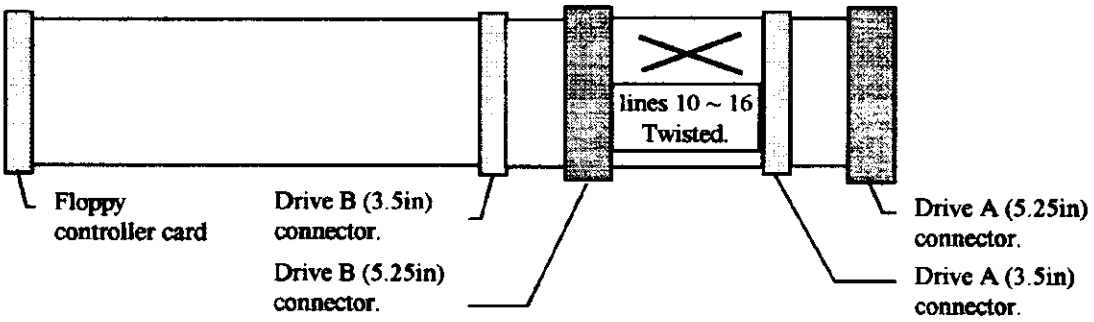
Hardware Connection:

The floppy interface ribbon cable is made up of 34 conductors, with lines 10 through 16 twisted 180°. The ribbon cable will either have three or five connectors. One connector for the floppy disk drive controller, one or two connectors for the B: drive, and one or two for the A: drive.

Three connector cable configuration:



Five connector cable configuration:



System Setup:

CMOS (BIOS) configuration. Your system's hardware configuration is stored in the CMOS Setup utility. Configure your floppy diskette drive while in the CMOS Setup utility.

Example:
Drive A : 1.44MB, 3.5 in.
Drive B : None

Make your selection from the available drive configurations. The typical choices are:

360KB, 5.25 in.
1.2MB, 5.25 in.
720KB, 3.5 in.
1.4MB, 3.5 in (typically the default setting)
2.88MB, 3.5 in.

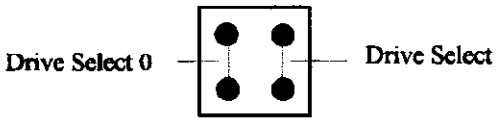
3.5 inch Floppy configuration:

Model #: FD235HF-7240, -7291

These two models are TEAC standard 1.44 mega byte 3.5 inch AT compatible floppy diskette drive. The 7xxx series is factory configured to be an "A" drive or a "B" drive, if connected to the correct drive connector on the interface ribbon cable. This drive is designed without jumper straps.

Model #: FD235HF-6240, -6291

These two models are TEAC's standard 1.44 mega byte 3.5 inch AT compatible floppy diskette drive. The 6xxx series is factory configured to be an "A" drive or a "B" drive, if connected to the correct drive connector on the interface ribbon cable. The customer selectable straps are as follows:

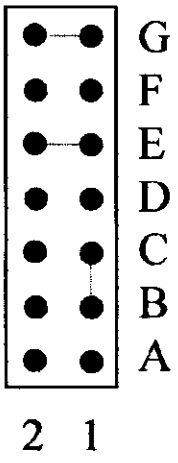


When connecting this drive to an AT compatible computer system, the jumper strap must be set on the **Drive Select 1** position.

Drive Select 0 is typically used on the first drive in a non AT compatible system.

Model #: FD235HF-6391, -6391

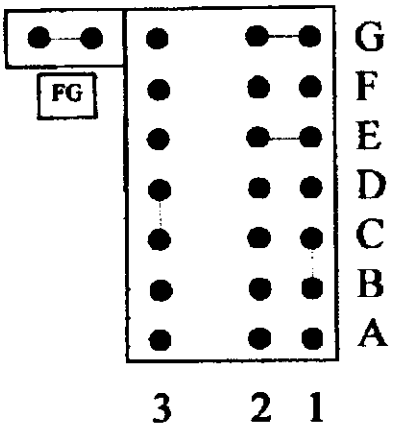
These versions of the 6xxx models were in production for a short period of time. They are fully interchangeable with the standard FD235HF-XXX/ XXXX. Form, fit and function is 100% compatible with the standard models. With these model there are more strap options. However, when installed into a standard AT system the additional straps are not used.



Coordinate	Jumper Name	Jumper (Strap) position description
A B 1	DS0	Drive Select 0.
B C 1	DS1	Drive Select 1 (default).
A B 2	DS2	Drive Select 2.
B C 2	DS3	Drive Select 3.
D E 2	RY34	Ready output on line #34.
E 1 2	DC34	Disk Change output on line #34 (default).
E F 1	DC2	Disk Change output on line #2.
G 1 2	HA	Density set automatically by disk type.
F G 1	HI2	Density set by HD signal in on line #2.
F 1 2	HO2	HD signal out on line #2.

Model #: FD235HF-65xx & -75xx . Multi-function versions.

These models are equipped with a PCB board that has multi-function capability through jumper straps. However, the factory default jumper straps are configured so that these models are 100% interchangeable with the standard models. The jumper (strap) matrix is as follows:



Coordinate	Jumper Name	Jumper (Strap) Position Description.
A B 1	DS 0	Drive Select 0 input on line #10.
B C 1	DS 1	Drive Select 1 input on line #12. **
A B 2	DS 2	Drive Select 2 input on line #14.
B C 2	DS 3	Drive Select 3 input on line #6.
D E 2	*RY 34	Ready signal output on line #34.
E 1 2	*DC 34	Disk Change signal output on line #34. **
E F 1	*DC 2	Disk Change signal output on line #2.
G 1 2	*HA	Density set automatically with diskette type. **
F G 1	*HI 2	Density set by HD signal input on line #2.
F 1 2	*HO 2	HD signal output on line #2.
F G 3	IR	LED on when drive is selected and ready.
D E 3 or E F 3	*ACD	Disable auto- chucking.
C D 3	*REN	Enable Auto Head Recalibration with power up. **
	FG	Frame Ground. **

* These jumper (straps) overlap with other jumper (strap) posts.
** These jumper (straps) are set at the factory, default.

On all of the above mentioned models the factory jumper (strap) setting will allow you to configure your drive as either the "A" drive or the "B" drive with out needing to reconfigure the jumper (strap) settings. Simply connect the drive to the correct connector position on you floppy drive interface cable, as shown on the HARDWARE CONNECTION section.