INSTALLATION NOTES FOR THE TOSHIBA ND352/356 3.5" DISKETTE DRIVE

TOSHIBA

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Congratulations and thank you for purchasing a Toshiba disk drive. Your Toshiba disk drive is of the highest quality and should be fully compatible with industry standards. When properly installed and configured, your drive is designed to give you years of trouble-free operation.

The following systems are supported:
- IBM PC
- IBM XT
- IBM AT (Old and new versions)

IMPORTANT NOTE:

The TOSHIBA ND352/356 3.5" floppy drive may or may not be compatible with non-IBM types of computers. If you have any problems with the installation, contact your dealer or distributor who supplied you with the product.

You should not have any trouble with the physical installation, the drive and installation kit assembles and fits in the computer as described in this manual.

Parts List – 3.5" Universal Installation Kit
- Mounting bracket with connector and hardware
- DC power cable adapter
- 5.25" black faceplate

Parts List – Computer Specific (for AT systems)
- 5.25" AT gray faceplate
- Gray ejection button
- AT mounting rail mounting kit

## ATTACHING UNIVERSAL BRACKET TO THE DRIVE

IMPORTANT NOTE:
When handling disk drives, grasp the drive at the frame. Never apply force to any other areas of the drive.

1. Faceplate Removal and Installation
- Remove the cardboard shipping protector.
- Gently push the upper tabs outward and carefully pull the 3.5" faceplate away from the top of the drive until it snaps loose.

Gray faceplate only:

• *Gray Eject Button – Turn the drive upside down with the front facing away from you. Locate the black eject button (Figure 1A) and place the flat blade screwdriver between the two metal tabs inside the button. Push gently until the eject button slides off. Replace with the gray eject button found in the Universal Kit. On the FDD4210/4216GOK remove the eject button by placing a small flat blade screwdriver behind the eject button and gently pry off (see Figure 2). Install the new button in the same manner as the old one came off. To fully seat the new button, place the screwdriver between the PCB and the vertical lip of the button shaft, pressing the button until it is seated against the vertical lip. If you have to force the button, it may be necessary to slightly bend the two tangs of the button shaft inward, facilitating installation.*
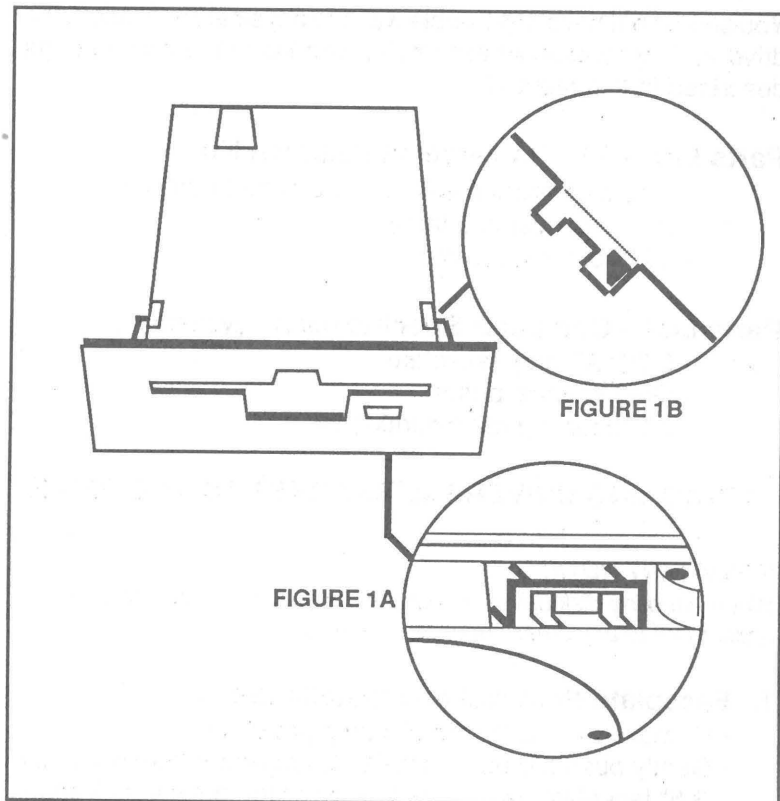
FIGURE 1B

FIGURE 1A

FIGURE 1 – FACEPLATE REMOVAL AND INSTALLATION

VERTICAL LIP
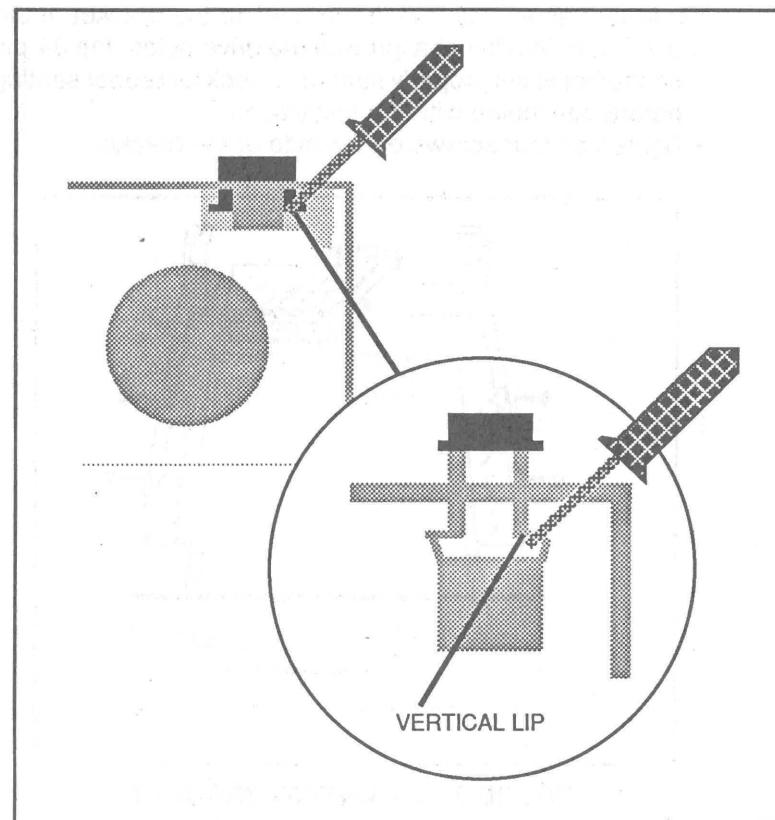
FIGURE 2 – NEW BUTTON INSTALLATION

• To install the faceplate, locate the two tabs found on both the top and bottom. Hook these to the notches on the corner of the drive frame (Figure 1B).
• Be sure that the eject button properly passes through the faceplate hole.

2. Install the Drive into the Mounting Bracket

• Place the bracket on a flat surface.
• Place drive inside bracket (Figure 3).
• Carefully connect the 34-pin connector at the back of the drive to the printed circuit board socket mounted on the bracket (if not properly connected, the drive light will stay on all the time).

- Use four screws to mount the drive to the bracket. If the bracket holes do not align with the drive holes, the 34-pin connector is not properly seated. Check for proper seating before continuing with the installation.
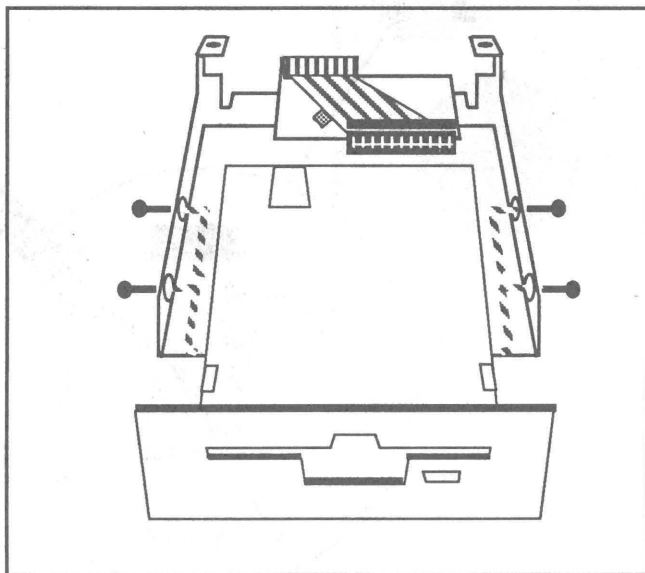- Tighten all four screws on the side of the bracket.

FIGURE 3 – MOUNTING BRACKET

3. Set Jumper Pins and Install the DC Power Cable
- See Pages 16 – 17 for information on setting Jumper Pins.
- To install the DC power cable, locate the notch on the smaller end of the DC power cable. With the notch faced down, slide the connector onto the adapter pins until it clicks into place (Figure 4B).

INSTALLING DRIVE IN COMPUTER

1. AT Systems Only
Prior to installation into an AT system, it will be necessary to install side rails to the bracket.
- Locate the black AT side rails in the kit, and find the "R" (right) and "L" (left) indicators.

FIG. 4B

FIG. 4A
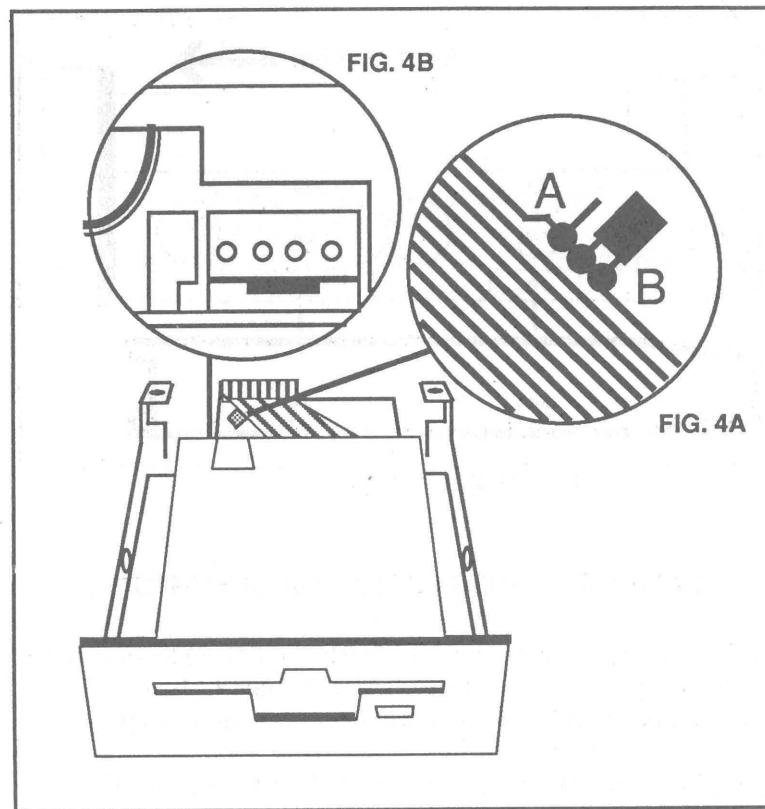
FIGURE 4 – DC POWER CABLE

- Mount each rail to the bracket (Figure 4) using the screws supplied. Notch should be facing front of drive.
- Refer to your System Operations Reference Manual for details on installation of drive into system.

2. Final Inspection
- Ensure that all screws have been mounted firmly to the metal chassis or brackets.
- Refer to your System Operations Reference Manual for details on power and data cable attachments. Also, verify if any system switches on the motherboard need to be altered.

FIGURE 5 – SIDE RAILS

GENERAL INSTALLATION INFORMATION

The 3.5" drive format is relatively new to the PC world, and there are a few things you should know. Not all systems have BIOS or DOS support for 3.5" drives, depending on their vintage.

If you plan to install a 1.44mb drive, such as the FDD4603, in an XT you will need a controller capable of supporting 1.2mb floppies, having a data transfer rate of 500kbs. If the BIOS does not support 1.44mb directly you will also need an external software driver. You will also need a copy of DOS 3.2 or later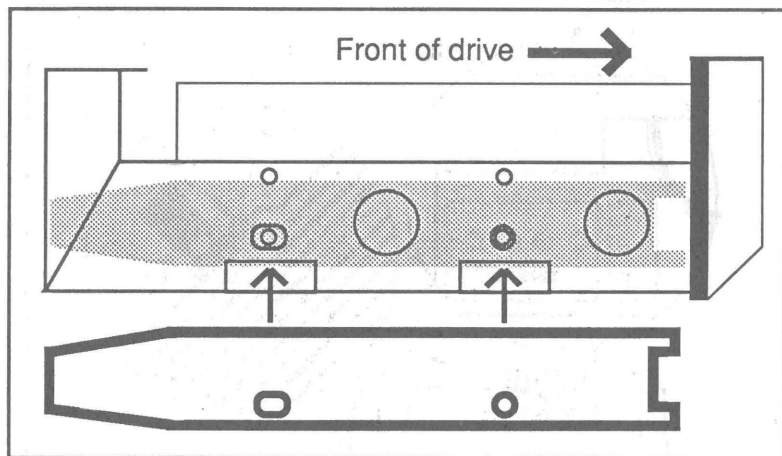 to support the requirements of the 3.5" 720K drive, and DOS 3.3 for the 1.44mb drives (see Page 9 for additional information).

If you are running a DOS version earlier than 3.2, and wish to have BIOS support for your 720K or 1.44mb 3.5" drives, upgraded BIOS ROM's are available from Phoenix, Award, etc. (see your local dealer). Your system may also require an external software driver to format properly.

The following items are required when installing a 3.5" floppy disk drive:

- Floppy Drive
- Toshiba Universal Installation Kit
- Phillips Screwdriver and Flat Blade Screwdriver
- High Density diskette for 1.44mb (2 DHD)
- Double-sided, Double density (2S/2D) for 720K

On the left side of the drive there is a paper label containing, among other things, the drive model number. This is a number beginning with the letters FDD (Floppy Disk Drive). Enter the number here.

FDD# _____

This number will prove vitally important should you ever need assistance with your drive, and must be known before you can set the jumpers on the drive.

JUMPERS AND CABLES

The Drive Select jumpers are always set to the second position (D2) in an IBM (PC/XT/AT) or compatible system. This reason being, IBM switches the lines around in the cable to produce dedicated cable positions. If your floppy drive ribbon cable has a split and twisted portion between A: and B:, this applies to you. The second position can be labelled DSI or DS2, depending on which labelling system the drive itself uses (see Table 1).

OLD STYLE		NEW STYLE
DS0	is equal to	DS1
DS1	is equal to	DS2 - the only IBM jumpers
DS2	is equal to	DS3
DS3	is equal to	DS4

TABLE 1 – LABELLING SYSTEMS

TABLE 2 – DRIVE INFORMATION

FDD	SERIES	FORMATTED	DRIVE SUPPORT CAPACITY	PIN 34	TYPICAL APPLICATION	CONTROLLER CAPACITY
4202	ND352	720K	DOS 3.2 or BIOS upgrade or Software Driver	READY	XT	Low
4206	ND352	720K	DOS 3.2 or BIOS upgrade or Software Driver	READY	XT	Low
4210	ND352	720K	DOS 3.2 or BIOS upgrade or Software Driver	DC	XT or AT	Low
4216	ND352	720K	DOS 3.2 or BIOS upgrade or Software Driver	DC/RDY	XT or AT	Low
4601	ND356	720K/1.44mb	DOS 3.3 or BIOS upgrade or Software Driver	DC	*XT or AT	High
4602	ND356	720K/1.44mb	DOS 3.3 or BIOS upgrade or Software Driver	DC	*XT or AT	High
4603	ND356	720K/1.44mb	DOS 3.3 or BIOS upgrade or Software Driver	DC	*XT or AT	High

NOTE: An external software driver or a BIOS ROM upgrade supporting 720K/1.44mb operation may be used with earlier versions of DOS
* See Page 6, General Installation Information.

Your Toshiba 3.5" drive uses the NEW STYLE jumper labelling, and should almost always be jumpered to DS2 in a PC or compatible. The drive may have been shipped to you jumpered to DS1, consult the jumper diagram on Pages 16 – 18 and reset it before installing it in your computer.

DRIVE LOCATION AND TERMINATION

We suggest that the 3.5" drive be installed only as the B: drive and that the A: drive remain terminated. If you have any questions about termination, please consult your local distributor.

SOFTWARE CONFIGURATION AND DRIVERS

1. **When installing your drive use only one of the following methods:**

		METHOD 1	METHOD 2	METHOD 3
720K	DOS 3.2 or higher	BIOS ROM upgraded to support 720K	Ext. Software Driver Stand Alone driver to support 720K	DRIVER.SYS or DRIVPARM
1.44mb	DOS 3.3	BIOS ROM upgraded to support 1.44mb	Ext. Software Driver Stand Alone driver to support 1.44mb	N/A

2. **Problem Determination Procedures**
   - Error message
        BAD OR MISSING DRIVER.SYS
   - Possible Solutions:
        - DRIVER.SYS is not located in the ROOT directory.
        - Verify that there is a space before the slash in the statement. Example:
        DEVICE=DRIVER.SYS /D:1

IMPORTANT NOTE:
In some situations, the presence of another driver, memory resident program(s) or excessive disk buffers will prevent DRIVER.SYS from operating properly.

3. DRIVPARM

The DRIVPARM command is only available in Microsoft MS-DOS™ version(s) 3.20 and above, excluding all IBM PC-DOS versions after the first release of 3.20. DRIVPARM was never included in IBM's documentation, but a Microsoft MS-DOS™ manual will support it. DRIVPARM is not a driver file, and will not show up on your directory. It is an internal DOS command, much like BUFFERS or FILES. If you have the proper DOS, you may use DRIVPARM instead of DRIVER.SYS in your CONFIG.SYS file. The line should read: **DRIVPARM=/D:1** (with no spaces). DRIVPARM will sometimes work where DRIVER.SYS will not, and has the added advantage of leaving your B: drive at B: (unlike DRIVER.SYS).

4. DRIVER.SYS

IMPORTANT NOTE

*When you install **DEVICE=DRIVER.SYS /D:1** in your CONFIG.SYS file, the letter designation D: does not refer to a particular drive, it stands for "Drive". The number following the colon (is :1, not :01), tells DOS where to find the physical drive, which it will then assign to the next available drive address. DRIVER.SYS **does not** let you choose what the letter designation will be for the affected drive. In a system where you have two floppies (one 5.25" as A: and one 3.5" as B:) and one hard disk (as C:), and provided that all else is installed properly, and that there is no other software or hardware interfering with DRIVER.SYS that could impede proper operation, the following message will appear at boot-up:*
"INSTALLING DRIVER FOR EXTERNAL DRIVE D:"

1. Installing DRIVER.SYS
• Copy DRIVER.SYS to the root directory of the BOOT drive.

2. Modify CONFIG.SYS File
• Modify the CONFIG.SYS file by adding the followng line to the end of the CONFIG.SYS file:
DEVICE=DRIVER.SYS /D:1

If you do not have or have not created a CONFIG.SYS file, **refer to your systems reference manual for details.**

3. Activating the new CONFIG.SYS File
• As soon as the file has been modified and saved, it will be necessary to reboot (CONTROL-ALT-DELETE). During the reboot the following message will be displayed:
"INSTALLING DRIVER FOR EXTERNAL DRIVE X:"
(where X: is the assigned drive letter)

• If problems occur after the driver is properly installed:
  • Remove all statements except:
DEVICE=DRIVER.SYS /D:1
  • Reboot.
  • Remove **AUTOEXEC.BAT** and reboot.
  • Set BUFFERS to 10 or less.
If this solves the problem, replace the software that was deleted (a line at a time) until the "problem software" can be identified.

4. General Information

If you use DRIVER.SYS, your 3.5" disk will always be used as X: and never as B:. The drive cannot be used as Drive B: because the hardware will still think of it as a 360K drive. If your total number of drives (including logical drives, such as DRIVER.SYS and VDISK.SYS) exceeds 5, you will need to extend your LASTDRIVE value. (See your DOS manual).

CLONE AT's/BIOS REVISIONS/THIRD PARTY SOFTWARE AND NEW DIAGNOSTICS

IBM AT compatible 80286 and 80386 processor-based computer owners may experience some difficulty with the installation of any 3.5" diskette drive. This will usually show up as some sort of problem with formatting, and is caused by a point of incompatibility between BIOS and DOS. In some cases, an upgrade of BIOS is necessary and is available from your computer manufacturer. At other times, your BIOS is sufficient, but you may need new diagnostic software which will support 3.5" drives. Do not assume that your BIOS is capable of handling all of the possible installations on your DIAGNOSTIC/SET UP disk. If your computer manufacturer has no upgrade available, there are a number of third-party software drivers on the market that will probably overcome the problem. **If you are having trouble with an AT clone Installation, call your computer manufacturer's tech**

support line. They can tell you what level of support their systems are capable of.

SOFTWARE REQUIREMENTS

It is required that you use DOS version 3.2 or above for 720k drives and DOS 3.3 for 1.44mb drives. Earlier versions of DOS do not support 3.5" drives and **will not** allow formatting over 360K unless special drivers are used.

If, for any reason you must use an earlier release of DOS (earlier than 3.20) there are a number of third party 3.5" software driver products on the market. Some of these will also support DOS 2.0 and up, and some of them will fix the AT clone problem. Call your distributor for further information.

TECHNICAL SUPPORT

Should you require any technical support, contact your computer distributor. If your computer distributor is unable to answer your questions, have them call Toshiba Disk Products Division Technical Support, on your behalf (available Monday through Friday from 9 - 12 am and 1 - 5 pm, Pacific Time).

WHEN CALLING FOR TECHNICAL SUPPORT

Call from in front of the computer, and be ready with the FDD number located on the side of the drive. Have the drive in a position where the jumper plugs are visible. Know as much about your system software and hardware, particularly any non-standard hardware (which may have been considered by designers) and any software contained in CONFIG.SYS, AUTOEXEC.BAT, or any RAM-resident software. In general, technical support specialists have experience with a particular "wedge" of the computer market, but may not have the background to support your particular application(s). (Many problems are caused by the interaction of two or more products in your computer, not with your computer itself.)

Keep a written, accurate record of any error messages you see.

Try running the product in question "in isolation" (that is, as if it were the first item added to an original "vanilla" system). Make sure you are using the correct version of DOS.

Check the area code, and see what time zone you are calling from (you can often get through more quickly if you call during off hours, 2 - 5 pm PST).

Your first line of defense should always be the dealer that you purchased the drive.

IMPORTANT ADDENDUM

Some application programs cannot port to a non-standard diskette. If you find that your applications software will not READ/WRITE your 3.5" diskette directly, save on a standard device and copy using DOS.

PIN THIRTY-FOUR

Pin 34 on the floppy disk drive interface, is the main thing that will change from one type of system to the next. Most XT style systems do not use Pin 34, it is a reserved line, according to the manual. In AT systems, using 1.2mb style controllers, Pin 34 is used as a DISK CHANGE line, in most instances. Use DISK CHANGE if you keep getting the same directory, no matter what diskette is installed. In a few systems, Pin 34 is used as a READY line. Table 5 shows the drive revisions, a sample set of computer systems, and the proper settings for each combination.

IMPORTANT NOTE:
PINOUTS: For a more complete description of the drive interface, see your computer's technical or hardware reference manual.

Note that the Drive Select Pins (6 - 14) are in the twisted part of the cable. What this accomplishes is the relocation of the DS lines, to provide for drive selection by means of a dedicated cable position. Generally speaking, this means that a drive on the A: cable will show up as DS1, if it is jumpered as DS2.

See Tables 3 & 4 for instructions on setting your jumper.

Pin No.	Signal Name	Pin No.	Signal Name
2	DENSITY SELECT	1	GND
4	(RESERVED)	3	GND
6	DRIVE SELECT 4**	5	GND
8	INDEX	7	GND
10	DRIVE SELECT 1	9	GND
12	DRIVE SELECT 2	11	GND
14	DRIVE SELECT 3**	13	GND
16	MOTOR ON	15	GND
18	DIRECTION SELECT	17	GND
20	STEP	19	GND
22	WRITE DATA	21	GND
24	WRITE GATE	23	GND
26	TRACK 00	25	GND
28	WRITE PROTECTED	27	GND
30	READ DATA	29	GND
32	SIDE SELECT	31	GND
34	READY/DISK CHANGE*	33	GND

* FDD4601 and FDD4651 are set for READY on Pin 34.
** Not used on FDD4603.

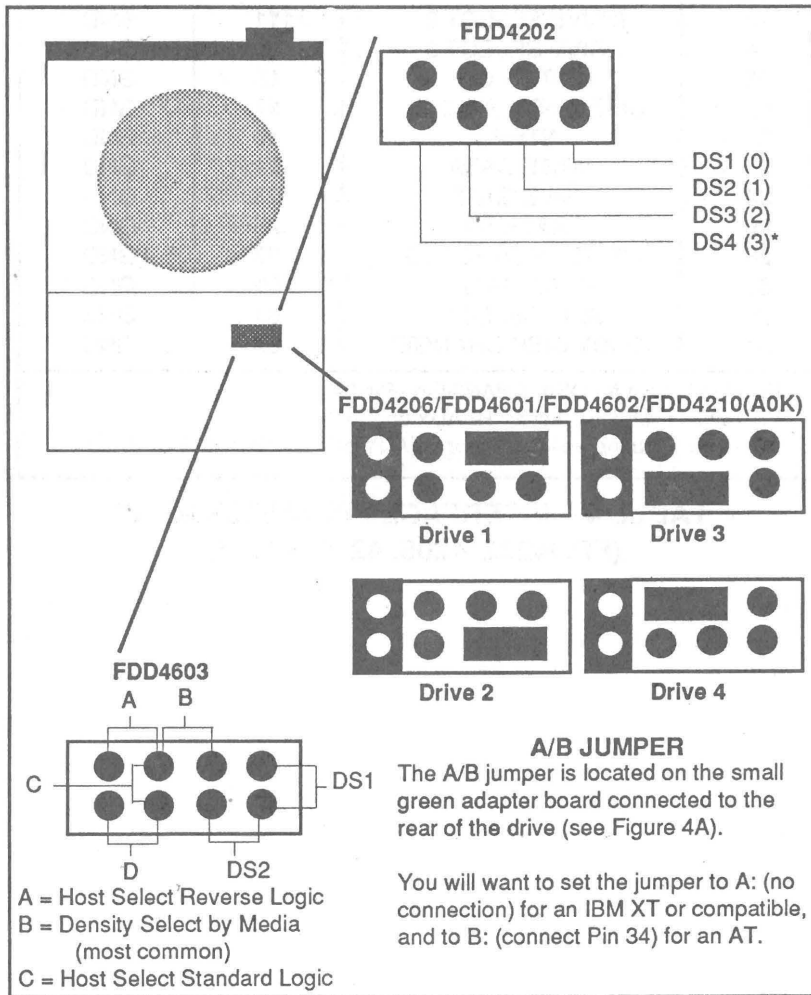### TABLE 3 – INTERFACE PIN ASSIGNMENT
(FDD4601, 4651, 4602 & 4603)

Pin No.	Signal Name	Pin No.	Signal Name
2	DISK CHANGE	1	GND
4	(RESERVED)	3	GND
6	DRIVE SELECT 4	5	GND
8	INDEX	7	GND
10	DRIVE SELECT 1	9	GND
12	DRIVE SELECT 2	11	GND
14	DRIVE SELECT 3	13	GND
16	MOTOR ON	15	GND
18	DIRECTION SELECT	17	GND
20	STEP	19	GND
22	WRITE DATA	21	GND
24	WRITE GATE	23	GND
26	TRACK 00	25	GND
28	WRITE PROTECTED	27	GND
30	READ DATA	29	GND
32	SIDE SELECT	31	GND
34	READY/DISK CHANGE*	33	GND

* FDD4210 is set for DISK CHANGE on Pin 34.
FDD4202 & 4206 are set for READY on Pin 34.
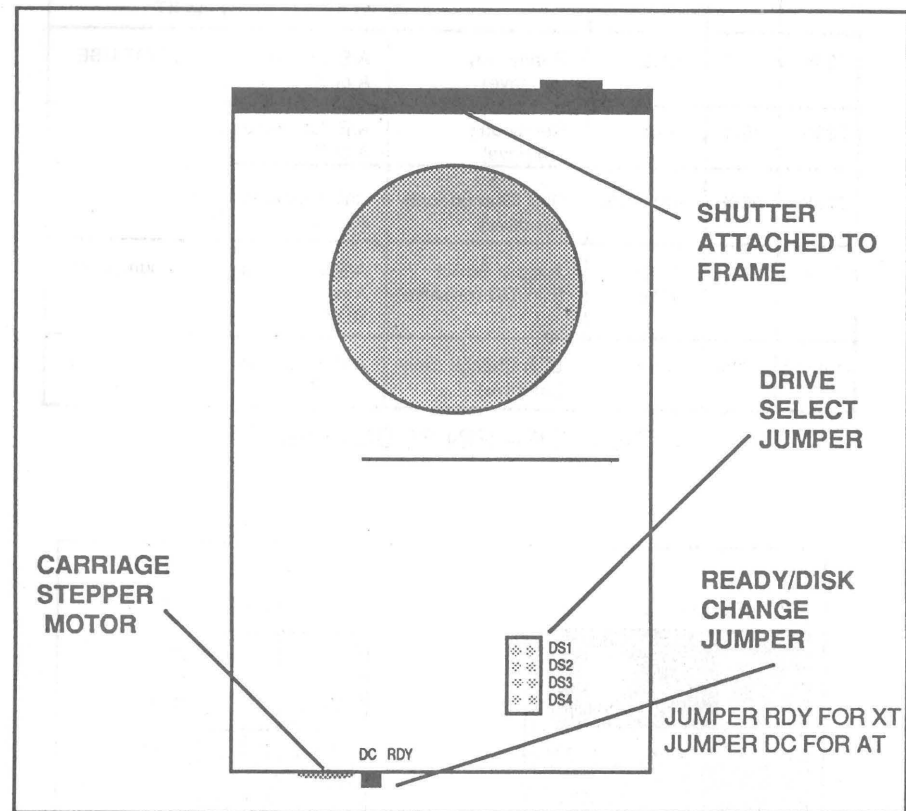FDD4216 is jumper selectable for READY or DISK CHANGE on Pin 34.

TABLE 4 – INTERFACE PIN ASSIGNMENT
(FDD4202, 4206, 4210 & 4216)

ND352/356 jumper options are selected by mounting shorting plugs on the connectors found on the drive's PCB (see Figures 6 and 7).

FDD4202

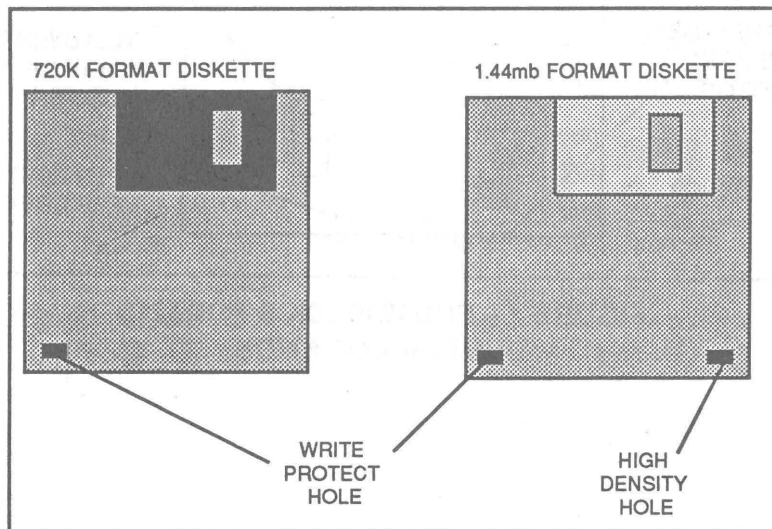DS1 (0)
DS2 (1)
DS3 (2)
DS4 (3)*

FDD4206/FDD4601/FDD4602/FDD4210(A0K)

Drive 1   Drive 3

Drive 2   Drive 4

FDD4603

A   B

C   DS1

D   DS2

A = Host Select Reverse Logic
B = Density Select by Media
    (most common)
C = Host Select Standard Logic

A/B JUMPER
The A/B jumper is located on the small green adapter board connected to the rear of the drive (see Figure 4A).

You will want to set the jumper to A: (no connection) for an IBM XT or compatible, and to B: (connect Pin 34) for an AT.

FIGURE 6 – JUMPER SELECTIONS

SHUTTER
ATTACHED TO
FRAME

DRIVE
SELECT
JUMPER

CARRIAGE
STEPPER
MOTOR

READY/DISK
CHANGE
JUMPER

DS1
DS2
DS3
DS4

JUMPER RDY FOR XT
JUMPER DC FOR AT

DC RDY

**FIGURE 7 – FDD4210G0K & FDD4216
JUMPER LOCATION**

| DENSITY | | DRIVE | SIGNAL AT | SETTINGS | SETTINGS |
HIGH	LOW	(FDD#)	PIN 34	FOR XT	FOR AT
720K	360K	4403/4408	Jumper Select RDY/DC (on drive)	RDY DS2 XT/AT Jumper to AT	DC DS2 XT/AT Jumper to XT
720K	360K	4202	Ready only (on drive)	A/B Jumper to A or B	DO NOT USE
720K	360K	4206	Ready only (on drive)	A/B Jumper to A or B	DO NOT USE
720K	360K	4210A0K	Disk Change only (on drive)	A/B Jumper to A or B	A/B Jumper to B
720K	360K	4210G0K 4216	Jumper Select RDY/DC (on drive)	A/B Jumper to A or B RDY	A/B Jumper to B DC
1.44mb	720K	4603	Disk Change only (on drive)	A/B Jumper to A or B	A/B Jumper to B

TABLE 5 – PIN 34 SETTINGS

FIGURE 8 – DISKETTE TYPES

NOTES