FUJITSU

Fujitsu HDD

Diagnostic User's Manual

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Introduction

The Fujitsu Diagnostic Test (FJDT.exe) is an MS-DOS based utility that can be used as a troubleshooting tool to help determine if your Fujitsu IDE Hard Disk Drive (HDD) is installed correctly and functioning properly in your computer system. The Fujitsu Diagnostic Test can be used to:

- Display the configuration of each HDD (Primary Master/Slave and/or Secondary Master/Slave) installed in your system

- Identify and display the model number of each Fujitsu HDD installed in your system

- Perform a Quick Test on each Fujitsu HDD

- Perform a Comprehensive Test on each Fujitsu HDD

- Display test progress and PASS/FAIL results for both the Quick Test and the Comprehensive Test

The Fujitsu Diagnostic Test performs non-destructive diagnostic tests to determine if your Fujitsu IDE HDD has inherent errors and/or defects. **The FJDT program is designed for use with Fujitsu IDE hard disk drives only**. This manual, along with the Fujitsu Diagnostic Test, can be used to verify the operation of each Fujitsu HDD installed in your system. Detailed information is contained in the following sections of this manual:

- *Disclaimer*

- *Creating a Fujitsu Diagnostic Test Diskette*

Disclaimer

The Fujitsu ATA Hard Disk Drive Diagnostic Tool is provided 'as is' without any warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the program is with you. In no event will Fujitsu Limited or any of its subsidiaries or the author of the program be liable for any damages, including any general, special, incidental or consequential damages arising out of the use or inability to use this program (including, but not limited to, any loss of profit or savings, loss of data, or a failure of the program to operate with any other programs), even if Fujitsu Limited or any of its subsidiaries have been advised of the possibility of such damages.

Creating a Fujitsu Diagnostic Test Diskette

The Fujitsu Diagnostic Test must be run from a bootable diskette in MS-DOS mode. The following sections describe how to create a bootable diskette and download a copy of FJDT.exe from the Internet.

Creating a Bootable Diskette

To create a bootable 3 ½-inch diskette, follow these instructions:

Using Windows 95/98

1. Insert a diskette into the floppy drive of your system.
2. From the Windows desktop, double click on the **My Computer** icon.
3. Click on the icon for your floppy drive.
4. Select **File** on the menu bar.
5. Select **Format**.

Using MS-DOS (Version 6.xx or Earlier)

1. Insert a diskette into the floppy drive of your system.
2. At the command prompt (**C:>**), type:

   Format A: /s

3. After the format completes, remove the diskette from your system.

Downloading the Fujitsu Diagnostic Test

To download the Fujitsu Diagnostic Test, follow these instructions:

1. Make sure that the bootable diskette you created is inserted in your floppy (A:) drive.
2. Activate your Internet browser. Go to the following URL:

   http://www.fcpa.com

3. On the Fujitsu Computer Products home page, click on *Warranties and Service*.

4. On the Warranties and Service page, click on *Warranty Repair Return Procedure*.

5. On the Warranty Repair Return Procedure page, click on *Request New RMA*.

6. On the Request RMA page, click on *Diagnostic Utility*.

7. On the Diagnostic Utility page, click on *Download Diagnostic Utility*, and follow the displayed instructions. Specify your A: drive when prompted for the file destination by your browser software.

Running the Fujitsu Diagnostic Test

This section explains how to execute the Fujitsu Diagnostic Test and the sequence of display screens contained in the test. This process is described in the following sections:

- *Starting the Fujitsu Diagnostic Test*

- *Disclaimer Screen*

- *HDD System Configuration Screen*

- *No HDD Identified Screen*

- *Non-Fujitsu HDD Error Message*

- *Quick Test*

- *Comprehensive Test*

- *Restoring Bad Blocks*

- *Test Results Screen*

Starting the Fujitsu Diagnostic Test

To run the Fujitsu Diagnostic Test, follow these instructions:

1. Save all data files, close all applications, and back up your system, if possible.

2. Insert the Bootable diskette that contains the Fujitsu Diagnostic Test into your system's floppy (A:) drive.

3. To restart your computer, click on the **Start** icon in the lower left-hand corner of your desktop, select **Shut Down**, and then select **Restart the computer?** You should now be in MS-DOS mode.

4. **NOTE:** Some systems are configured to use the C: hard drive as the default boot drive. If this is the case for your system, the BIOS setting for the default boot drive will have to be changed to specify the floppy (A:) drive. Refer to the *BIOS Settings for HDDs* section in the Appendix, or consult your system's *User's Guide* for more information about this setting.

5. At the **A:>** prompt type:

Disclaimer Screen

When the Fujitsu Diagnostic Test starts, the *Disclaimer Screen* shown in **Figure 1** will appear. Please read and understand the information contained in this screen.

Figure 1. Disclaimer Screen (1 of 2)

Press the **Space** key to continue. The *Disclaimer Screen* shown in **Figure 2** will appear. Please read and understand the information contained in this screen before continuing.
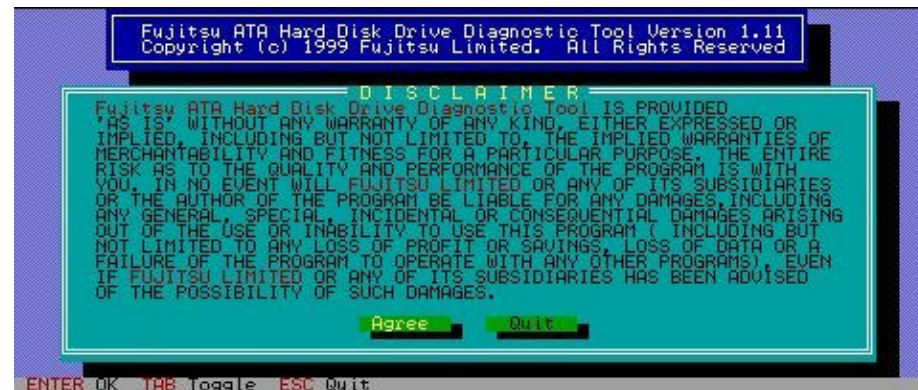
Figure 2. Disclaimer Screen (2 of 2)

If you agree to these terms, press the **Enter** key to continue. Otherwise, press the **Esc** key to exit the Fujitsu Diagnostic Test.

HDD System Configuration Screen

Once you have agreed to the terms of the Disclaimer Screen, the Fujitsu Diagnostic Test attempts to identify the HDDs you have installed in your system. When this function completes, the *HDD System Configuration Screen* shown in **Figure 3** will appear.

All the IDE devices that are correctly installed in your system are listed on the HDD System Configuration Screen in the following order:

- Device 0 (Primary Master)

- Device 1 (Primary Slave)

- Device 2 (Secondary Master)

- Device 3 (Secondary Slave)

Use the up and down arrow keys to highlight the Fujitsu HDD you want to test, and then press the **Enter** key to run the Quick Test on that HDD. **The Fujitsu Diagnostic Test can only be run on Fujitsu HDDs**. If no Fujitsu HDDs are listed and you have one or more Fujitsu HDD(s) installed, refer to the Appendix, *Configuring your Fujitsu HDD,* for more information.

Figure 3. HDD System Configuration Screen

NOTE: If the Fujitsu Diagnostic Test displays an HDD which is not visable when using the operating system, the BIOS settings for this HDD may be incorrect. Refer to the *BIOS Settings for HDDs* section in the Appendix, or consult your system's *User's Guide* for more information.

No HDD Identified Screen

If the Fujitsu Diagnostic Test cannot detect any HDDs in your system, the screen shown in **Figure 4** will appear:

Figure 4. No HDD Identified Screen

If this screen appears, press any key to exit the Fujitsu Diagnostic Test, **TURN OFF** your system, and check the following items:

- MASTER/SLAVE jumper settings (see **Figures A-1** through **A-5**).

- POWER CABLE installation (see **Figure A-6**).

- INTERFACE CABLE (see **Figures A-7** and **A-8**).

For additional information, refer to the Appendix, *Configuring your Fujitsu HDD*.

Non-Fujitsu HDD Error Message

If you attempt to execute the Fujitsu Diagnostic Test on a non-Fujitsu drive the error message shown in **Figure 5** will appear, indicating that the Quick Test cannot start. Press **_Enter_** to continue, and select a Fujitsu drive to test.

Figure 5. Non-Fujitsu HDD Error Message

Quick Test

After a Fujitsu HDD has been selected from the HDD System Configuration screen, pressing the *Enter* key will start the Quick Test. While the Quick Test runs the screen shown in **Figure 6** is displayed. This screen shows the test's status as it performs the following checks on the HDD:

- *Pre-SMART Check* — Performs a Self Monitor and Report Technology (S.M.A.R.T.) status check before executing the Quick Test. The S.M.A.R.T. status is maintained by the HDD during the course of normal operation, and reflects the overall performance of the HDD.

- *Buffer RAM Write/Read Test* — Compares data written to and read from the HDD Random Access Memory (RAM) data buffer.

- *Media scan for Outer Area* — Reads and verifies the data on the first 150 MB of data in the outer cylinders of the HDD.

- *Media scan for Inner Area* — Reads and verifies the data on the last 50 MB of data in the inner cylinders of the HDD.

- *Fundamental Seek Test* — Performs random seek and random read commands.

- *Post-SMART Check* — Performs a S.M.A.R.T status check after the Quick Test has completed.

Figure 6. Quick Test Status Screen

If the Quick Test completes without errors, the screen shown in **Figure 7** will appear:
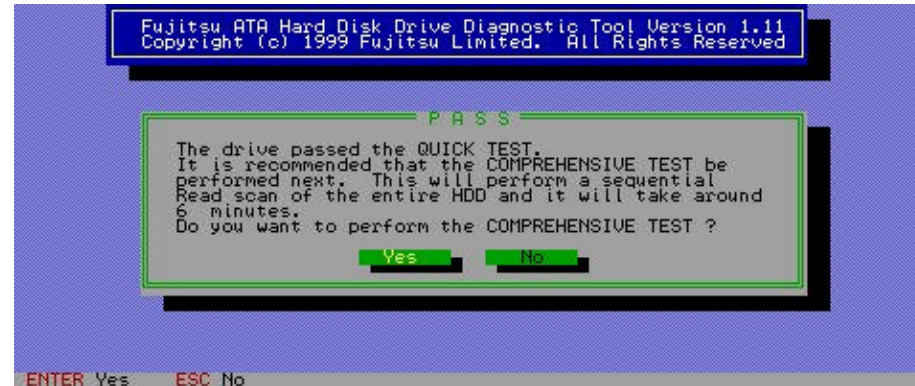
Figure 7. Quick Test Pass Screen

Successful completion of the Quick Test verifies that the HDD has been installed correctly. Normally, it is not necessary to run the Comprehensive Test. However, if you want to verify the entire media surface, press **Enter** to run the Comprehensive Test and proceed to the *Comprehensive Test* section which follows. Otherwise, press **Esc** and go to the *Test Results* section of this manual.

If the Quick Test detects a bad data block while testing, but detects no other errors, the screen shown in **Figure 8** will appear:
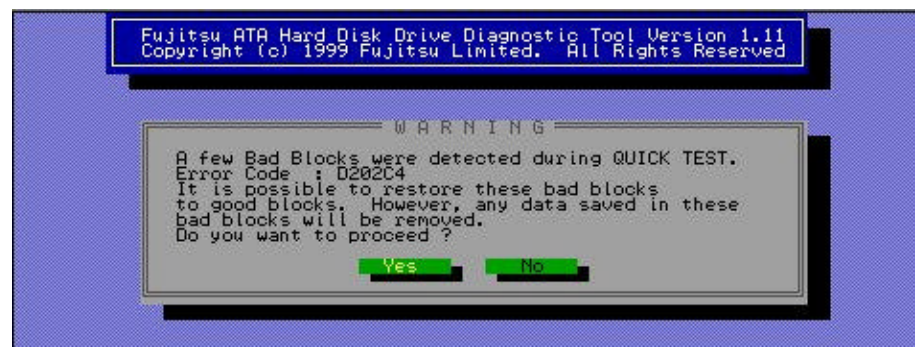
If the HDD fails the Quick Test, the screen shown in **Figure 9** will appear:

Figure 9. Quick Test Failure Screen

Please make a note of the error code displayed in the Fail screen - you must provide this code to obtain a Return Material Authorization (RMA) number. Refer to the *What to do with a Fujitsu HDD that Fails* section of this manual for further instructions.

Comprehensive Test

Pressing **Enter** from the Quick Test Pass Screen starts the Comprehensive Test. During this test the screen shown in **Figure 10** is displayed:

Figure 10. Comprehensive Test Status Screen

 The Comprehensive Test performs the following:

- *Media Scan for All Areas* — Reads the entire media surface of the HDD.
- *Post-SMART Check* — Performs a S.M.A.R.T. status check after the media scan completes.

If the Comprehensive Test completes without errors the screen shown in **Figure 11** will appear:
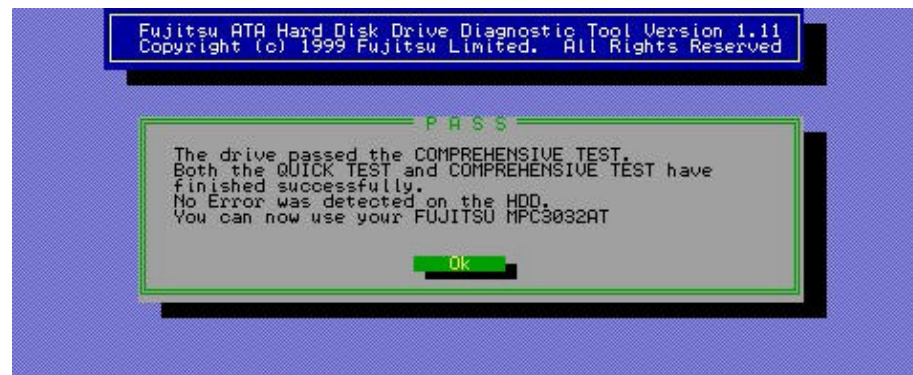
If the Comprehensive Test detects one to four defective data blocks, the screen shown in **Figure 12** will appear:
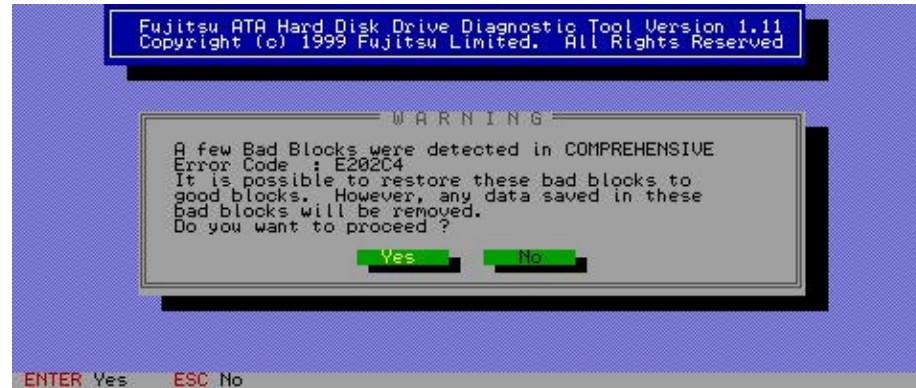
Figure 12. Bad Blocks Detected Warning Screen

Refer to the *Restoring Bad Blocks* section of this manual for instructions on how to proceed.

If the HDD fails the Comprehensive Test, or more than four bad blocks are detected, the screen shown in **Figure 13** will appear:
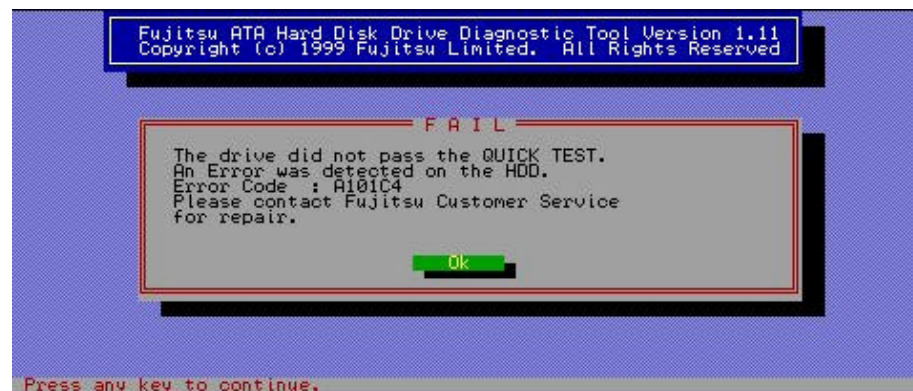

Figure 13. Comprehensive Test Failure Screen

Please make a note of the error code displayed in the Fail screen - you must provide this code to obtain a Return Material Authorization (RMA) number. Refer to the *What to do with a*

Restoring Bad Blocks

If the Fujitsu Diagnostic Test detects bad data blocks during the Quick or Comprehensive Tests, the program will give you the option to recover the bad blocks if:

- One bad block is detected without any other error occurring during the Quick Test.

- One to four bad blocks are detected without any other error occurring during the Comprehensive Test.

With the Bad Block Warning screen shown in **Figure 8** or **Figure 12** displayed, press **Enter** to begin the error recovery process. This process will preserve the data contained in these blocks if it is still recoverable. If the bad blocks are successfully recovered, a screen similar to the one shown in **Figure 14** will appear:
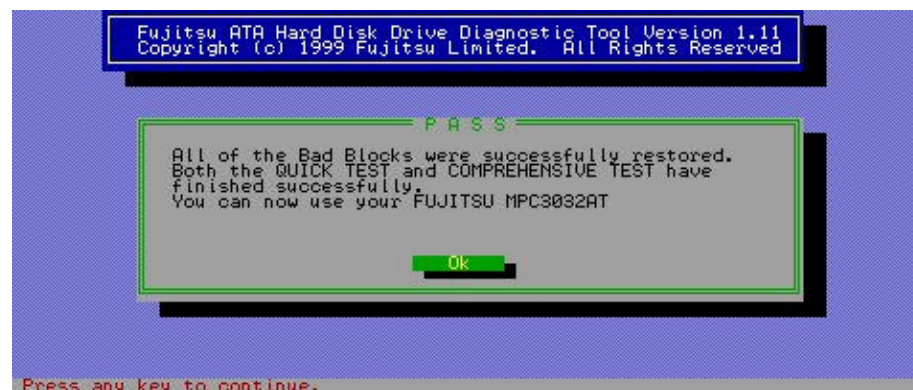
Figure 14. Block Recovery Complete Screen

Press **Enter** to exit the error recovery process and proceed to the *Test Results* section.

Test Results

After completing the Fujitsu Diagnostic Test on a Fujitsu HDD, the results appear in *the HDD System Configuration Screen* shown in **Figure 15**:

Figure 15. HDD System Configuration Screen (with Status)

If an error code appears in the screen, please make a note of it - you must provide this code to obtain a Return Material Authorization (RMA) number. Refer to the *What to do with a Fujitsu HDD that Fails* section that follows for further instructions.

To execute a test on another Fujitsu HDD, use the up and down arrow keys to highlight the Fujitsu HDD you want to test, and press the **Enter** key to begin executing the Quick Test. Follow the instructions in the *Quick Test* section of this manual.

What to do with a Fujitsu HDD that Fails

This section describes how to return a Fujitsu HDD to the Fujitsu Computer Products of America (FCPA) Customer Service Center. This is explained in the following sections:

- *How to Contact the FCPA Customer Service Center*

- *How to Avoid Electro-Static Discharge (ESD) Damage*

- *How to Package and Return an HDD*

- *Warranty Exclusions*

How to Contact the FCPA Customer Service Center

Call **1-800-626-4686** (5am - 9pm M-F, 7am - 3pm Saturdays PST) and you will be automatically transferred to the Technical Assistance Center. If the product is determined to be defective, you will be issued a Return Material Authorization (RMA) number. **To obtain an RMA number you must supply the test error code!** This code is displayed in the Test Failure Screens shown in **Figures 9** and **13**, and the HDD System Configuration Screen shown in **Figure 15**.

A credit card is required to secure a replacement HDD. After credit card verification, the replacement product will be shipped to you within two business days. If the defective product is not returned within 10 days to FCPA, your credit card account will be billed at the current list price.

> **Note: RMA numbers are valid for 15 days only**. If the shipment is not received at Fujitsu Computer Products of America within the 15 day period, a new request will have to be initiated and a new RMA authorized. **The Fujitsu RMA number must be written on the outside of the shipping package to identify it or the unit will be returned to the originator.**

How to Avoid Electro-Static Discharge (ESD) Damage

Your HDD contains sensitive semiconductor circuits that can be destroyed by a discharge of static electricity. To avoid ESD damage:

- Keep the HDD in the anti-static bag it was shipped in AT ALL TIMES when the HDD is not installed in your system.

How to Package and Return an HDD

CAUTION: Please read the following packaging/shipping instructions carefully! HDDs contain mechanisms that are aligned to precise tolerances, and can be irreparably damaged if subjected to excessive shock. To mitigate the effects of rough handling during shipment, HDDs must be packaged properly. **Any HDD received that exhibits physical damage will void all expressed or implied warranties applicable to the HDD.**

Packaging

Return only the bare HDD. Remove and retain all "add-on" items, (i.e. adapters, brackets, cables, software, manuals, etc.). Fujitsu does not accept responsibility for these items, and they will not be returned with your replacement HDD.

A defective HDD should be returned to FCPA in its original shipping package as shown in **Figure 16**, or a suitable replacement (see below). **The HDD must be placed in an anti-static bag!**

Multiple defective HDDs must be returned to FCPA in their original shipping package as shown in **Figure 17**, or an AUTHORIZED replacement. **Each individual item must be placed in its own anti-static bag!**

If you do not have your HDD's original shipping package, you must package your HDD(s) as follows:

- Each HDD must be packaged in an individual box - multiple HDDs will only be accepted if returned in the original factory multi-pack package. Use a corrugated box with a Minimum Bursting Rating of 200 psi. (The rating is marked on the bottom of the box.)

- **The HDD must be enclosed in an anti-static bag**. The bag should be neatly folded and taped shut.

- Use foam inserts with a minimum of 2-inches of foam/surface to enclose the HDD completely on all sides. Use enough foam to completely fill the box and stabilize the HDD. The HDD should exhibit no movement inside the package. Bubble-wrap may be used as a substitute for foam, as long as it is tightly wrapped with a depth of at least 2 inches on all six sides of the HDD.

Conductive Bag

HDD PCBA Side

The opening of the conductive bag shall be neatly folded and taped.

Spacer (If Required)

HDD Supports (Front / Rear)
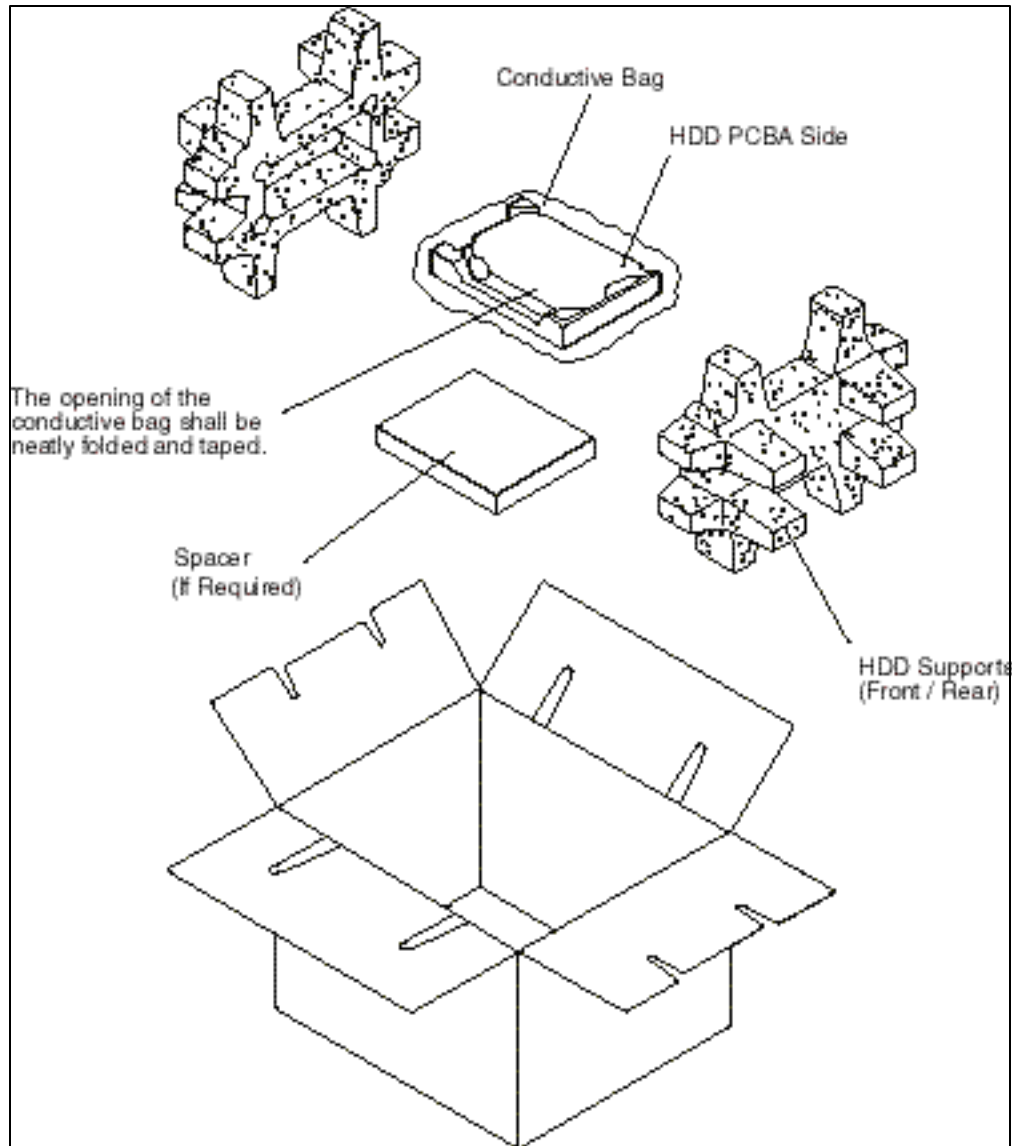
Figure 16. HDD Individual Packaging

Conductive Bag

The opening of the conductive bag shall be neatly folded and taped.
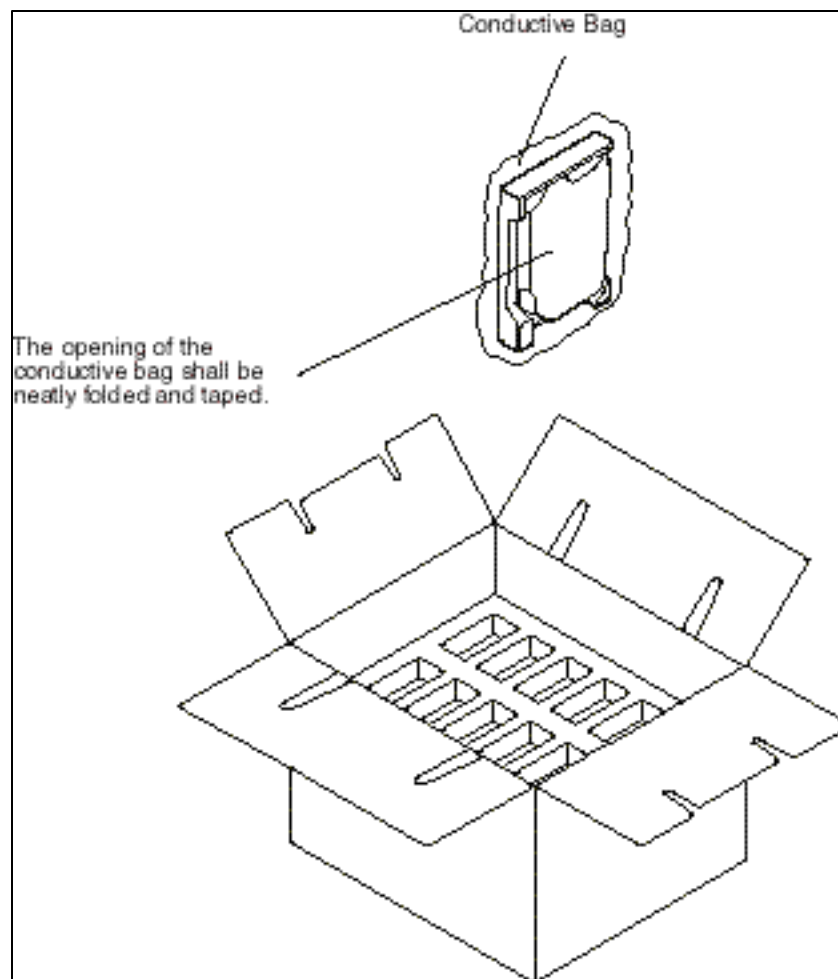
Figure 17. HDD Multiple Packaging

Package Identification

Each box must be clearly labelled with the following information on the outside of the package:

- Customer name

- Return address

- Phone number

- RMA number (issued by Fujitsu Customer Service)

It is a good idea to enclose a sheet of paper listing the same information inside the box.

Shipping

Shipments should be made via a carrier such as FedEx or UPS that can provide a proof of delivery. Ship the defective HDD to:

Fujitsu Computer Products of America
7300 N.W. Evergreen Parkway, Suite A   Dock 7
Hillsboro, OR 97124

Warranty Exclusions

The FCPA Repair Center uses the following criteria in determining warranty obligations. If an HDD as received exhibits any of the following, the HDD warranty will be void and the HDD will be returned to the customer, freight collect.

- Improper packaging (no anti-static bag, inadequate protection, etc.).

- Damage caused by mishandling or improper installation of the HDD (broken connector, broken pins, broken seal, etc.).

- Damage caused by your system.

- Damage due to lack of ESD protection.

- Damage caused by modification or repair not authorized by FCPA.

- Abuse, unreasonable use, mistreatment, or neglect.

Appendix

Configuring your Fujitsu HDD

This Appendix provides information to help you correctly install and configure your Fujitsu HDD. Your Fujitsu HDD will not function properly if:

1. The HDD's jumpers are improperly set for Master or Slave configuration.

2. A power cable is not properly connected to a 3.5-inch HDD.

3. An IDE cable is incorrectly installed between your system and an HDD.

4. One or more BIOS settings are incorrect for your specific configuration.

If the Fujitsu Diagnostic Test does not detect your Fujitsu HDD, or indicates that your Fujitsu HDD's configuration is incorrect, refer to the following sections in this Appendix to ensure your Fujitsu HDD is configured correctly:

-   *IDE Device Configurations*

-   *Setting HDD Master/Slave Jumpers*

-   *Connecting a 3.5-Inch HDD*

-   *Connecting a 2.5-Inch HDD*

-   *BIOS Settings for HDDs*

-   *Getting More Information*

IDE Device Configurations

It is very important to have the Master/Slave jumpers set correctly for each of the IDE devices installed in your system. Each IDE cable can be connected to a maximum of two devices. When two devices are connected to the same cable, one **MUST** be jumpered as a Master device and the other **MUST** be jumpered as a Slave device. If only one drive is attached to the cable, it must be jumpered as a Master device. (Please consult your system's *User's Guide* for more information.) Since most systems have two (Primary and Secondary) IDE bus connectors, four configurations are possible:

Primary Master

Primary Slave

Secondary Master

Secondary Slave

Many CD-ROM drives are not capable of high-speed Direct Memory Access (DMA) transfers on the IDE bus. Attaching an HDD and a CD-ROM drive to the same bus can sometimes affect HDD performance. **Table A1** lists the recommended IDE device configurations for one or more devices:

Bus/Type	1 HDD	1 HDD 1 CD-ROM	2 HDDs	2 HDDs 1 CD-ROM	3 HDDs	3 HDDs 1 CD-ROM	4 HDDs
Bus 1 Master	**HDD** Drive **0**	**HDD** Drive **0**	**HDD** A Drive **0**	**HDD** A Drive **0**	**HDD** A Drive **0**	**HDD** A Drive **0**	**HDD** A Drive **0**
Bus 1 Slave				**HDD** B Drive **1**	**HDD** B Drive **1**	**HDD** B Drive **1**	**HDD** B Drive **1**
Bus 2 Master		**CD-ROM** Drive **1**	**HDD** B Drive **1**	**CD-ROM** Drive **2**	**HDD** C Drive **2**	**CD-ROM** Drive **2**	**HDD** C Drive **2**
Bus 2 Slave						**HDD** C Drive **3**	**HDD** D Drive **3**

Table A1. Recommended IDE Device Configurations

Setting Master/Slave HDD Jumpers

Fujitsu HDDs are jumpered at the factory as Master devices. If you are installing your HDD as a Slave device, then you must change its jumper to the Slave position. The Master/Slave jumper settings are usually shown on a label affixed to Fujitsu 3.5-inch HDDs. If the label is missing, or you have a 2.5-inch HDD, refer to the following examples:

Figure A1: *Factory Jumper Setting for Fujitsu Models MPD3xxxAH, MPD3xxxAT, and MPE3xxxAT 3.5-inch HDDs.*

Figure A2: *Factory Jumper Setting for Fujitsu Models MPA3xxxAT, MPB3xxxAT, and MPC3xxxAT 3.5-inch HDDs.*

Figure A3: *Master/Slave/Cable Select Jumper Settings for Fujitsu 2.5-inch HDDs.*

If your Fujitsu HDD model is not covered in these Figures, refer to the *Getting More Information* section in this Appendix.

> **Note:** Most Fujitsu HDDs support the Cable Select feature. This feature requires the use of a special IDE cable with an open *CSEL* signal line between the two device connectors. When using this feature, **both** devices must be jumpered for Cable Select, not as a Master and a Slave. Your system will then automatically configure the device attached to the middle connector as the Master device and the device attached at the end of the cable as the Slave. **Do not use the Cable Select jumper setting unless you are certain that your system's IDE cable supports this feature!** If you are in doubt as to which type of cable you have, jumper the device on the middle connector as a Master and the device at the end of the cable (if present) as a Slave. This will enable the device(s) to work with either type of cable.

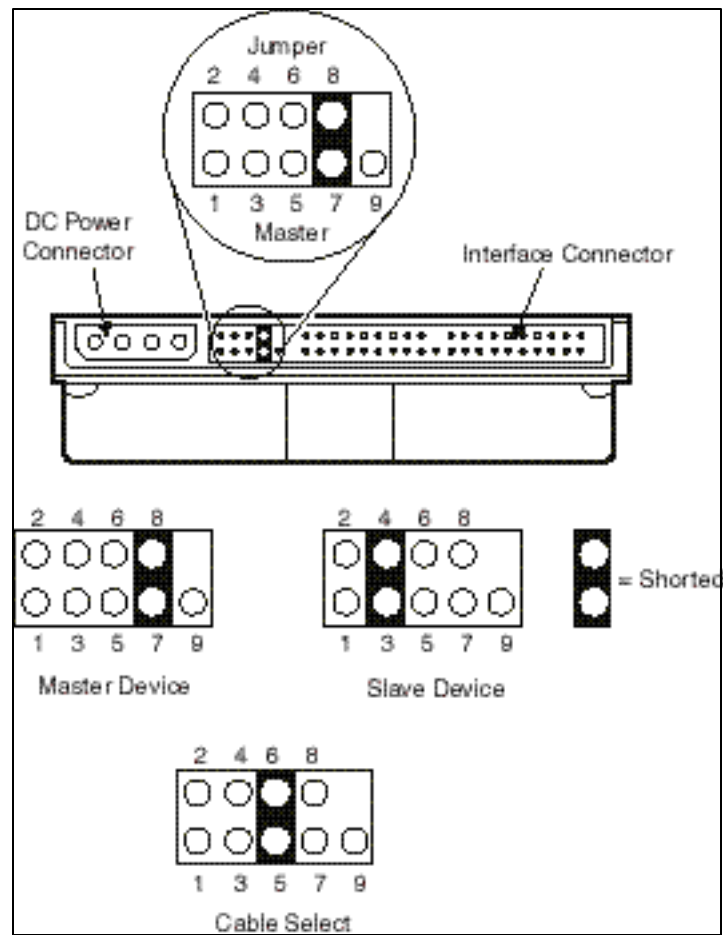**Figure A1. Master/Slave/Cable Select Jumper Settings for Fujitsu Models MPD3xxxAH, MPD3xxxAT, and MPE3xxxAT 3.5-Inch HDDs**
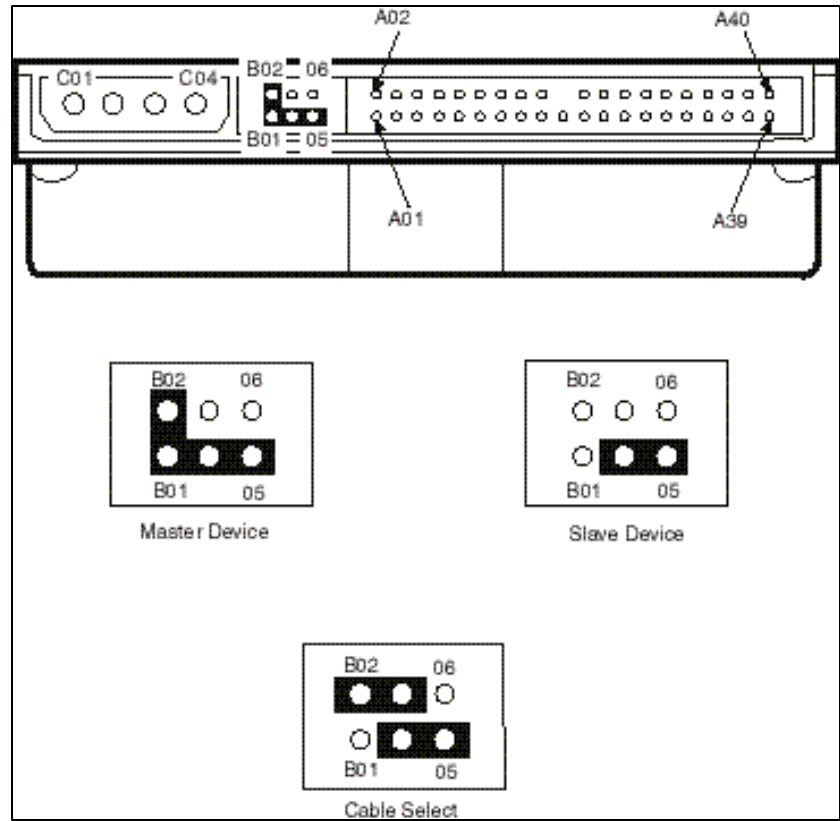
Figure A2. Master/Slave/Cable Select Jumper Settings for Fujitsu Models MPA3xxxAT, MPB3xxxAT, and MPC3xxxAT 3.5-inch HDDs

(viewed from connector side)

A C

B D

MASTER

A C

B D

SLAVE

A C

B D

CABLE SELECT
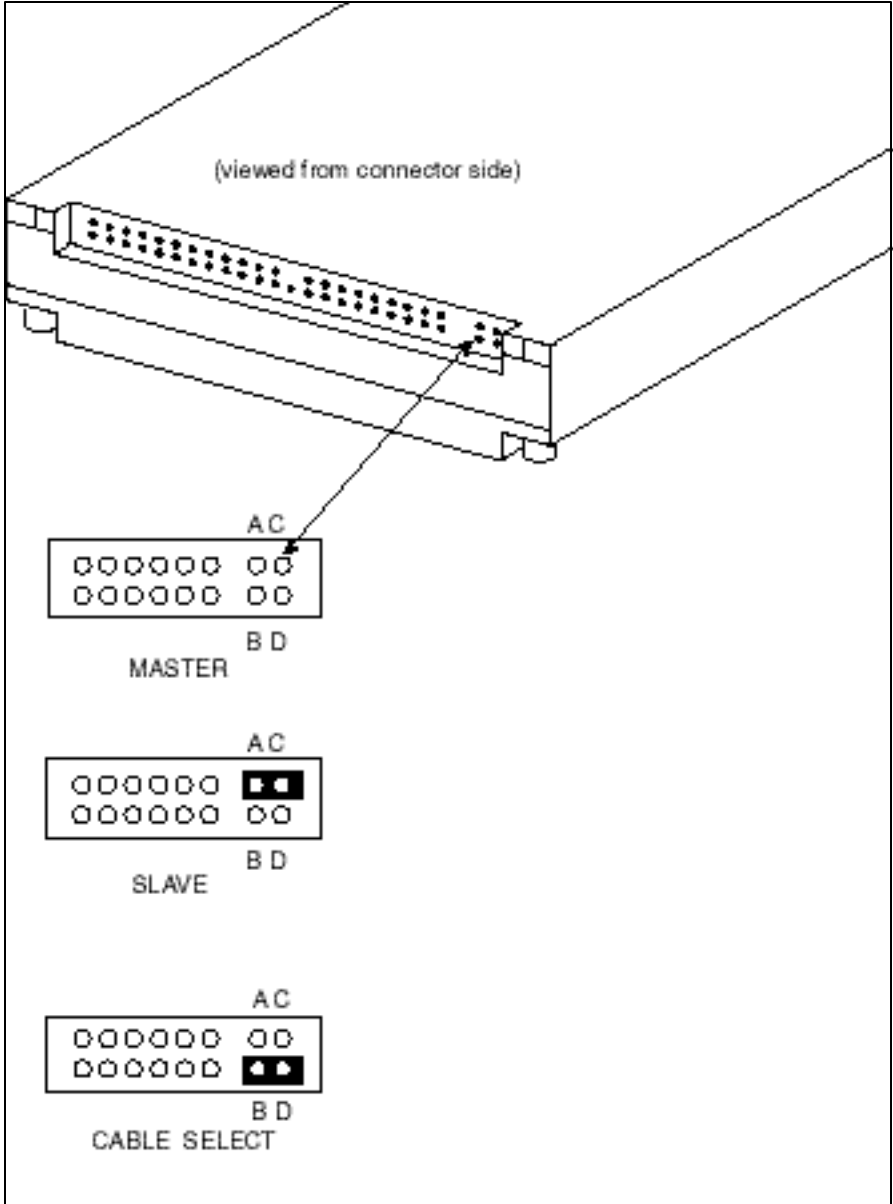
Connecting a 3.5-Inch HDD

Figure A4 shows how to connect power to a 3.5-inch HDD:
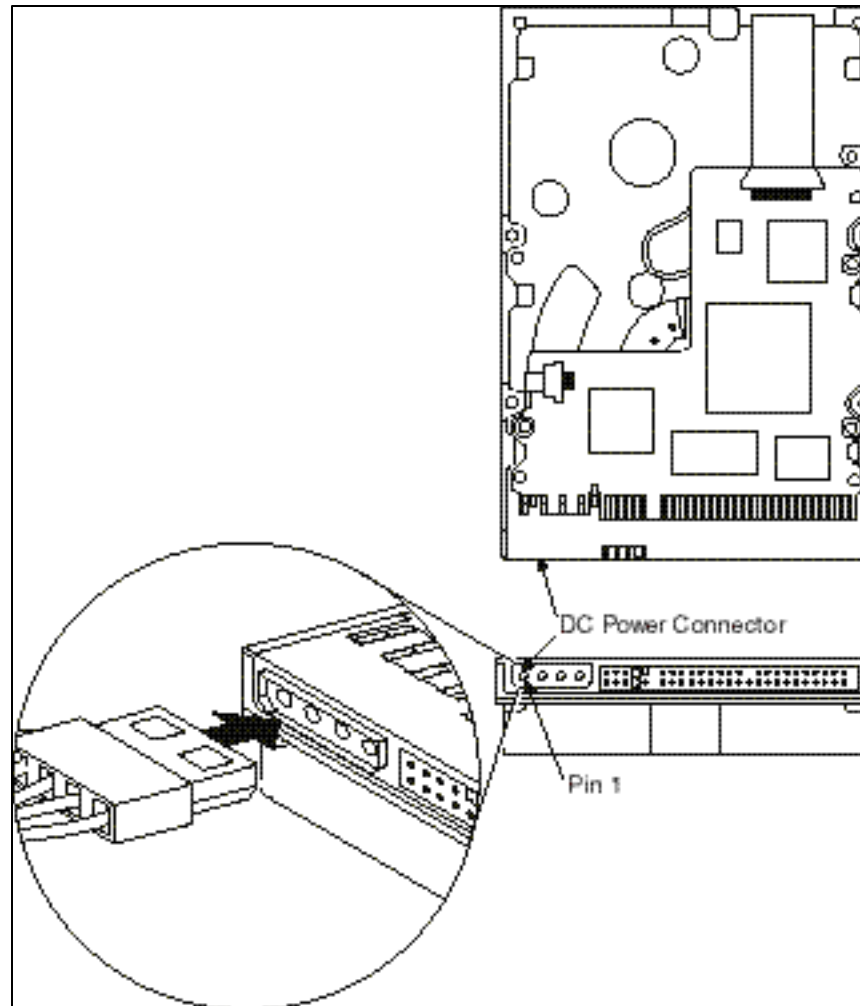
Figure A5 shows how to connect a data cable to a 3.5-inch HDD. Note that Pin 1 on each end of the IDE cable must be aligned with Pin 1 of the HDD connector and Pin 1 of the system board's IDE connector. The colored stripe on one edge of the cable indicates Pin 1. In addition, Pin 1 is usually indicated by a triangle molded on the connector. Refer to your system's *User's Guide* for more detail.

Interface Connector

Colored Stripe
Indicates Pin 1
Location on Connector
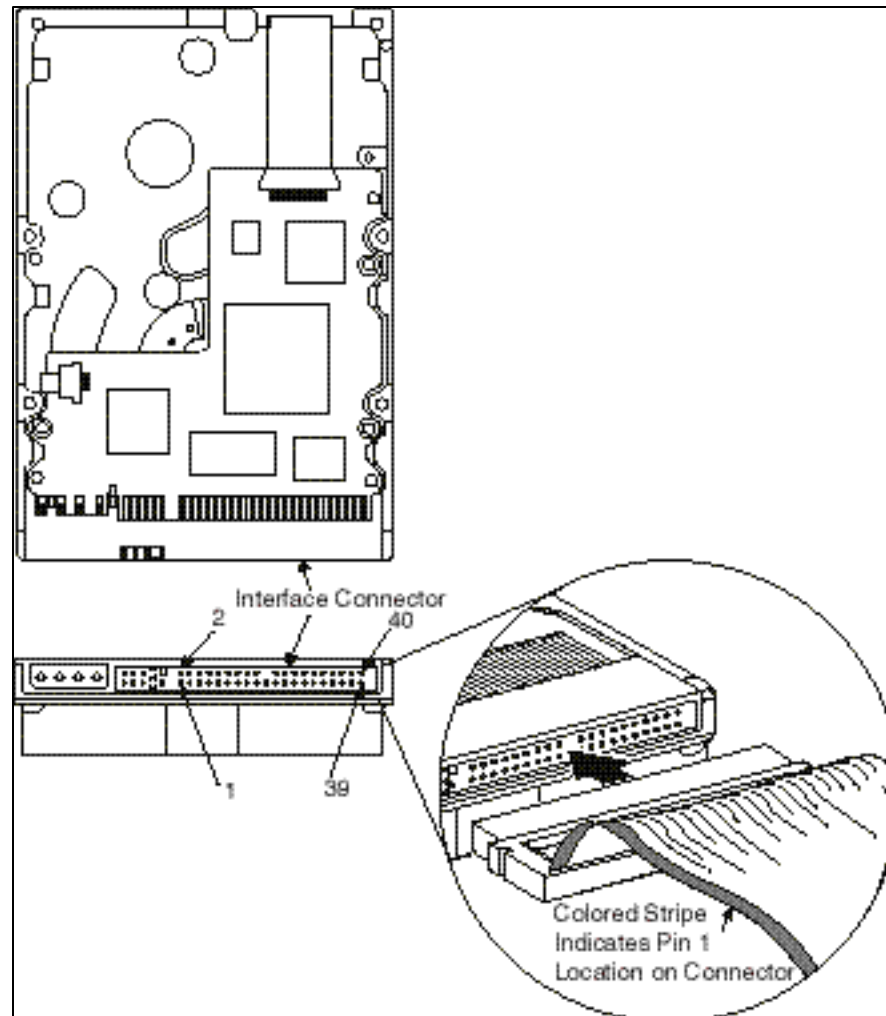
Connecting a 2.5-Inch HDD

All Fujitsu 2.5-inch HDDs use a single cable for both power and data. **Figure A6** shows a connector for a 2.5-inch HDD. Many systems use a special adapter to connect the 2.5-Inch HDD to a standard IDE cable. Take care to align Pin 1 at each end of the IDE cable with Pin 1 of the HDD connector (or the HDD connector adapter) and Pin 1 of the system board's IDE connector. The colored stripe on one edge of the cable indicates Pin 1. In addition, Pin 1 is usually indicated by a triangle molded on the connector. Since the method of connecting 2.5-Inch HDDs varies for each type of system, be sure to refer to your system's *User's Guide* for specific installation instructions.

CAUTION: Its easy to install the cable incorrectly – make sure the pins between the cable (or adapter) and the HDD are aligned properly. **Mis-alignment of the cable can damage the HDD circuitry!**
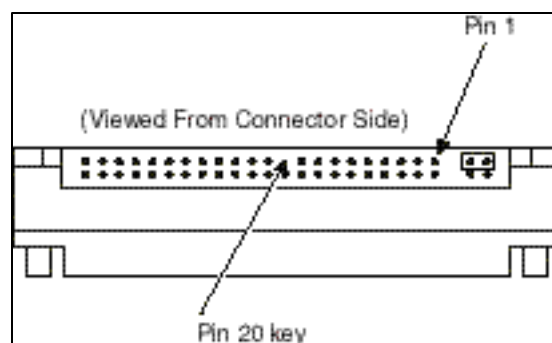
Figure A6. Connecting a 2.5-Inch HDD Power/Data Cable

BIOS Settings for HDDs

It is important to have your system's BIOS settings correctly set to match its specific HDD configuration. This section provides some general information about BIOS settings that pertain to HDDs. Your system's BIOS features and settings may differ somewhat from the ones described below. Refer to your system's *User's Guide* for more specific information about your system's BIOS settings.

Auto-Detecting an HDD

Normally, the best way to set your system's BIOS HDD parameters is to allow the BIOS to autodetect the HDD. If your system BIOS' auto-detection feature is enabled, when the BIOS Setup Utility is activated, it will search for any newly-installed HDDs and set the applicable parameters automatically. **It is recommended that you use auto-detection to configure your BIOS after installing a Fujitsu HDD**.

Manually Defining an HDD

If your system does not support auto-detection or you wish to limit an HDD's capacity, you can enter its specific Cylinder, Head, and Sector configuration using your system's BIOS Setup Utility. The Cylinder, Head, and Sector counts for Fujitsu HDDs are model-specific, and are usually shown on a label affixed to the HDD. If the label is not present, or more detailed information is required (to specify the Write Precompensation and Landing Zone, for example), refer to the *Getting More Information* section of this Appendix.

Integrated HDD Controller Settings

This BIOS setting is generally set to "BOTH" at the factory. This means that both the Primary and Secondary system IDE connections are enabled. This allows devices to be installed on both the Primary cable and the Secondary cable. If the devices connected to one of these cables are not detected by the system, it may be necessary to change this setting.

Changing the Boot Device Sequence

In order to execute the Fujitsu Diagnostic Test, the floppy (A:) drive must be assigned as the default (Primary) boot device. If the floppy (A:) drive is not the default boot drive, it will be necessary to change your system's boot sequence. The most common assignment is:

1. Floppy drive

2. CD-ROM drive

3. HDD drive

The number indicates the device precedence. For example, with this ordering, the system will first attempt to load the boot software from the floppy drive. If a diskette is inserted that does not contain the appropriate operating system files, the system will display an error message indicating that a non-system disk or disk error is present. If the floppy drive is empty, the system will attempt to boot from the CD-ROM drive. If a CD-ROM disk is inserted that does not contain an operating system, a similar error message will be displayed. If both the floppy drive and the CD-ROM drive are empty the system will boot from the HDD.

When changing the boot sequence, be aware of the following:

- Many operating systems, such as Windows 95/98 and Windows NT modify the boot sector of any HDDs that are installed in the system while the operating system is being installed. This can prevent otherwise bootable HDDs from booting.

- In systems where there are two or more bootable HDDs, it is recommended that all bootable HDDs, other than the target of the new operating system, be removed from the system before installing a new operating system. Once you install the operating system, the other HDDs can then be reinstalled. This simple procedure prevents the operating system from modifying the boot sectors of the other bootable drives, thus preserving the capability of choosing one of several HDDs from which to boot.

BIOS Capacity Limitations

Some older operating systems cannot recognize an HDD Cylinder count higher than 4,092. Some higher-capacity Fujitsu HDDs have special jumper settings to allow them to work with this restriction. Alternatively, the *Fujitsu Disk Manager* Formatting Utility can be used to overcome this limitation. For more information, refer to the *Getting More Information* section which follows.

Getting More Information

For software drivers and utilities, special jumper-settings, and model-specific Cylinder/Head/Sector values for Fujitsu HDD products, follow these instructions:

1. Go to the Fujitsu Computer Products of America website at the following URL:

   http://www.fcpa.com

2. On the Fujitsu Computer Products of America home page, click on **Technical Support**.

3. Under *Step 1* on the Technical Support page, select "Hard Drives" on the drop-down **Category** menu.

4. Under *Step 2* on the Technical Support page, select your Fujitsu HDD's model number (found on the Fujitsu Product Label affixed to the HDD's outer case) on the drop-down **Model** menu. Click on **Submit**. If your model number does not appear in the drop-down menu box, click on **Specs for Discontinued Hard Drives**.

5. Under *Step 3* on the Technical Support page, click on **I would like to see the jumper settings only**, then click on **show me**.

If information for your specific model isn't listed, or you don't have access to the Internet, please contact an FCPA Technical Engineer at **(800) 626-4686** from 5AM - 9PM (PST) Monday – Friday, or 7AM - 3PM (PST) on Saturdays.

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