adaptec



# ACB-2600 Series OEM Manual

Preliminary

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# Section One Introduction

## 1.1 SCOPE AND PURPOSE OF MANUAL

This manual provides the information required to install, program, configure, and operate the Adaptec ACB-2600 Series controllers in a PS/2 Micro Channel computer.

The Adaptec ACB-2600 Series controllers provide an interface between the Micro Channel Architecture and ST412/506 MFM or ESDI hard disk drives. The Adaptec ACB-2610 and ACB-2620's purpose, is to provide a hard disk solution for Micro Channel applications.

## 1.2 PRODUCT FEATURES

### 1.2.1 ACB-2610 Features

The Adaptec ACB-2610 is a high performance ST412/506 MFM hard disk controller for the Micro Channel. The ACB-2610 is software and hardware compatible with the IBM Fixed Disk Driver Adapter interface.

The Adaptec ACB-2610 ST412/506 MFM hard disk controller has the following features:

- *IBM PS/2 Micro Channel compatible.* 100% Port and register compatible with IBM PS/2 Models 50, 50Z, 60, 70, and 80 (not compatible with IBM model 80-111).
- *Supports two ST412/506 MFM drives.* Supports two drives that are different capacity, different access time and different manufacturers without controller modification. Drives with up to 16 heads and 2048 cylinders are supported.
- *Highest Micro Channel ST412/506 performance.* The combination of non-interleave operation, low controller overhead, and burst DMA up to 5 Mbytes/sec or programmed I/O host transfers in 8 or 16 bit modes give the ACB-2610 the highest ST412/506 MFM transfer rate available today.
- *Non-interleaved operation.* 1:1 interleave gives the ability to read one track of data in one disk revolution, the maximum rate the drive can give data to the controller. This provides the fastest controller/drive performance.
- *Sectors per track.* The ACB-2610 supports 17 sectors per track and is capable of multisector transfers of up to 255 sectors, including automatic head and track switching.
- *ECC.* The ACB-2610 uses a 48-bit ECC Polynomial, for data error detection and correction.
- *Read-ahead cache.* The ACB-2610 has optional buffer sizes of 8k or 32k, which is used for the read-ahead cache that allows the controller to speed up disk access by pre-filling the buffer with subsequent sectors.
- *Programmable Option Select (POS).* The ACB-2610 POS register implementation is identical to that of the IBM MFM controller.

- *Onboard Micro Window™ Advanced Diagostic Port.* This is a physical serial port connection which allows the user to view results of what the controller is doing internally through the monitor at any time.

### 1.2.2 ACB-2620 Features

The Adaptec ACB-2620 is a high performance ESDI hard disk controller for the Micro Channel. The ACB-2620 is port and register compatible with the IBM Fixed Disk Driver Adapter interface.

The Adaptec ACB-2620 ESDI Hard Disk Controller has the following features:

- *IBM PS/2 Micro Channel compatible.* Port compatible with IBM PS/2 Models 50Z, 60, 70, and 80 (not compatible with IBM model 80-111).
- *Supports two enhanced small disk interface (ESDI) drives.* Runs High performance 10 MHz and 15 MHz ESDI drives from all major ESDI manufacturers. Supports two drives that are different capacity, different access time and different manufacturers without controller modification. Drives with up to 16 heads and 2048 cylinders are supported. Provides both the highest capacity and highest performance.
- *Highest Micro Channel ESDI performance.* The combination of non-interleave operation, low controller overhead, burst DMA up to 5 Mbytes/sec or programmed I/O host transfers in 8 or 16 bit modes, and 36 sectors per track, give the ACB-2620 the highest transfer rate available today.
- *Non-interleaved operation.* 1:1 interleave gives the ability to read one track of data in one disk revolution,the maximum rate the drive can give data to the controller. This provides the fastest controller/drive performance.
- *Sectors per track.* The ACB-2620 supports 32 sectors per track for 10 MHZ ESDI drives and supports up to 63 sectors per track for 15 MHz ESDI drives and is capable of multisector transfers of up to 255 sectors, including automatic head and track switching.
- *ECC.* The ACB-2620 uses a 48-bit ECC Polynomial, for data error detection and correction.
- *Read-ahead cache.* The ACB-2620 has optional buffer sizes of 8k, 16K, 32k, or 64k which is used for the read-ahead cache that allows the controller to speed up disk access by pre-filling the buffer with subsequent sectors.
- *Programmable Option Select (POS).* The ACB-2620 POS register implementation is identical to that of the IBM MFM controller.
- *Onboard Micro Window™ Advanced Diagostic Port.* This is a physical serial port connection which allows the user to view results of what the controller is doing internally through the monitor at any time.

## 1.3 PRODUCT SPECIFICATIONS

### 1.3.1 Physical Dimensions: (refer to Figures 1-1 and 1-2)

**ACB-2610 and ACB-2620**

Length 11.5"
Width 3.5"
Height 0.6"

### 1.3.2 Power Requirements (typical)

**ACB-2610:** +5V +/-0.5 Volts at 0.5 Amps Maximum
+12V +/-0.5 Volts at 0.5 Amps Maximum

**ACB-2620:** +5V +/-0.5 Volts at 0.5 Amps Maximum

### 1.3.3 Environmental Requirements

**ACB-2610 and ACB-2620**

| | Operating | Storage |
|---|---|---|
| Temperature F/C: | 32/0 to 129/50 | -40/-40 to 167/75 |
| EMI: | 10% to 95% | 10% to 95% |
| Altitude (feet): | Sea level to 10K | Sea level to 20K |
| MTBF (hours) | TBD | TBD |

### 1.3.4 BOARD LAYOUT

These Figures show the location of the connectors and key components, plus the board dimensions. Note that the arrows point to Pin 1 on the connectors, are identified by a notch in the PCB found on the actual controller. Pin assignments for these connectors are found in Section 3.3.

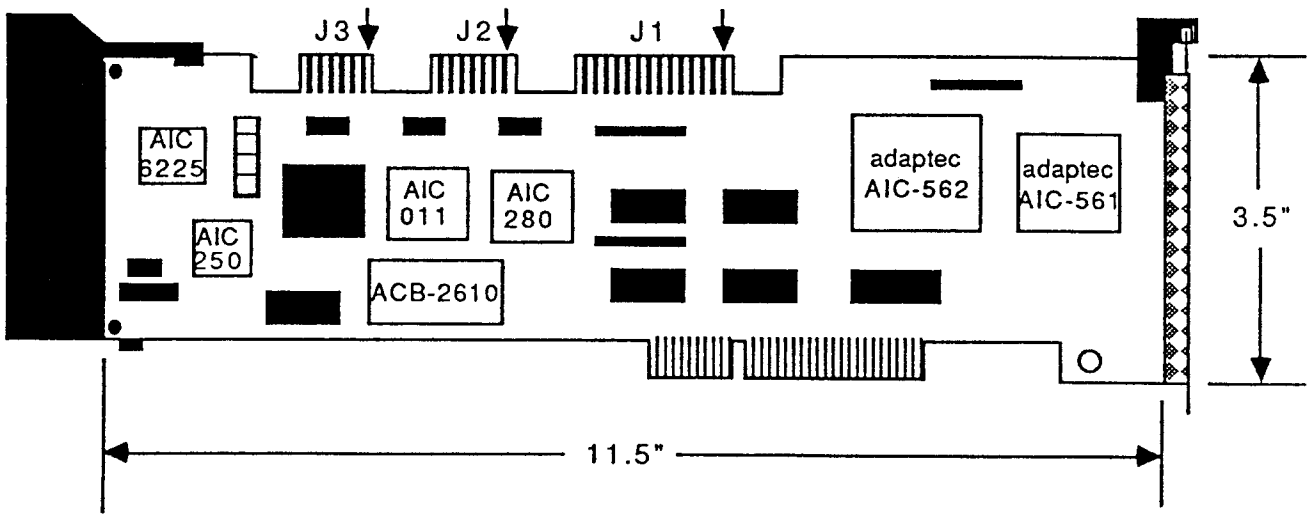


FIGURE 1-1 ACB-2610 Board Layout

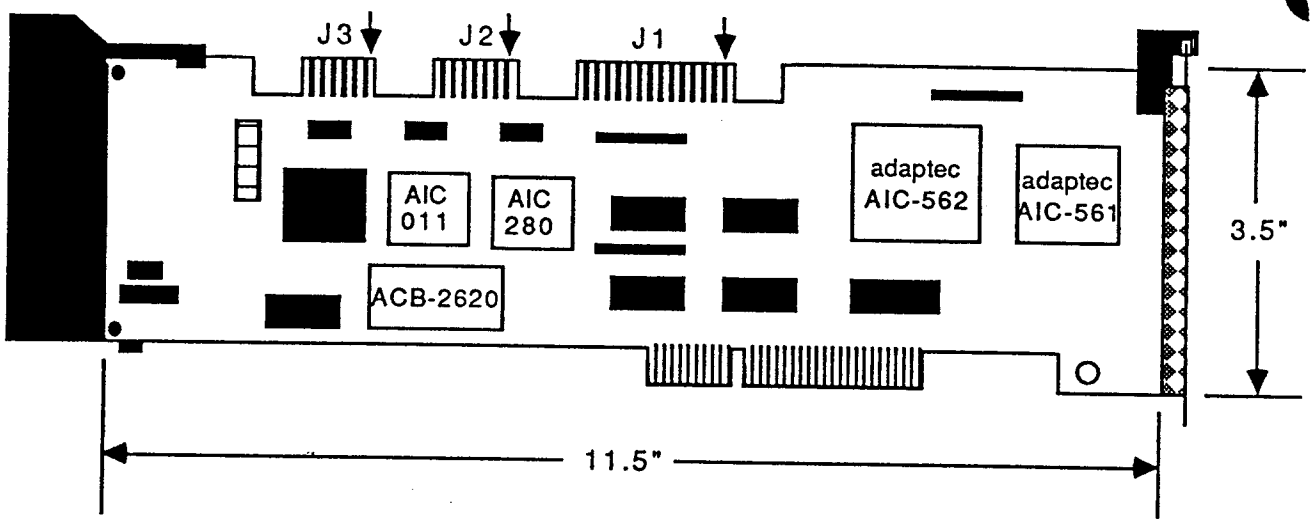


FIGURE 1-2 ACB-2620 Board Layout

## 1.4 FCC AND UL APPROVAL

TBD

## 1.5 REFERENCE DOCUMENTS

- IBM PS/2 Micro Channel Guide to Operations Manual
- IBM PS/2 Micro Channel Technical Reference Manual
- Appropriate Operating System Reference Manual
- Appropriate Manufacturer's Disk Drive User's Manual

# Section Two Installation

## 2.1 INTRODUCTION

This section describes the steps necessary to install the ACB-2610 or ACB-2620 controller into a Micro Channel PS/2 computer with the appropriate drives.

## 2.2 UNPACKING AND INSPECTION

The carrier is responsible for damage incurred during shipment. In case of damage, have the carrier note the damage on both the delivery receipt and the freight bill, then notify your freight company representative so that the necessary insurance claims can be initiated.

After opening the shipping container, use the packing slip to verify receipt of the individual items listed on the slip. Retain the shipping container and packing material for possible later reuse should return of the equipment to the factory be necessary.

CAUTION: THE ACB-2610 AND ACB-2620, LIKE ALL ELECTRONIC EQUIPMENT IS STATIC SENSITIVE. PLEASE TAKE THE PROPER PRECAUTIONS WHEN HANDLING THE BOARD. KEEP THE BOARD IN ITS CONDUCTIVE WRAPPING UNTIL IT IS READY TO BE INSTALLED IN YOUR SYSTEM.

## 2.3 HARDWARE AND SOFTWARE REQUIREMENTS

The ACB-2610 can be installed in any Personal System/2 Models 50, 50Z, 60, 70, and 80. The ACB-2620 can be installed in any Personal System/2 Models 60 and 80 (The model 50 supports MFM drives only). The successful installation of the Adaptec ACB-2600 Series controllers to their respective drive type, requires the following hardware and software:

*Hardware:*

1. Personal System/2 Model 50, 50Z, 60, 70, or 80
   a. One floppy disk drive
   b. One available Micro Channel expansion slot
   c. Room for one 5 1/4" or 3 1/2" hard disk drive
2. With the ACB-2610 - One hard disk drive supporting the ST412/506 disk interface.
   a. One 20-pin flat ribbon cable
   b. One 34-pin flat ribbon cable or w/5-wire twist.
3. With the ACB-2620 - One hard disk drive supporting the ESDI disk interface, 10 or 15 MHz data rate.
   a. One 20-pin flat ribbon cable.
   b. One 34-pin flat ribbon cable or w/5-wire twist.

*Software::*

1. Model 50, 50Z, 60, 70, or 80 Reference diskette.
2. Operating System source diskette.

## 2.4 INTEGRATION INTO THE SYSTEM

To install the Adaptec ACB-2610 or ACB-2620 board into a system, the drive(s) and drive cables must be configured properly. This section describes all the necessary steps to successfully install the ACB-2610 or ACB-2620.

### 2.4.1 ACB-2610 Installation

**STEP 1** Drive Selection and Termination

The drive changeable parameters are the the drive selection switches (or jumpers) and the drive termination. These parameters allow a drive to be selected as drive 1, 2, 3, or 4. This is accomplished by changing the drive address selection switches or jumpers. Refer to your drive manual for location and definition of the switches or jumpers.

Before the drives can be cabled to the ACB-2610. the drive cable termination must be properly set. The terminator must be at the end of the cable in order to have the ACB-2610 and drive communicate properly. The disk drives, since they can be connected in a daisy chain configuration, have a removable terminator. This is usually a 16-pin DIP resistor package (refer to your drive manual). The last physical drive in the chain must have its terminator installed.

**STEP 2** Install the Drive and ACB-2610 into your PS/2 Model 50, 50Z, 60, 70, or 80 compatible computer.

**STEP 3** Drive and Controller Cabling

The ACB-2610 has three cable connectors (J1, J2, & J3). Refer to Figure 1-1 found on page 1-5 for connector location and pin 1 orientation.

J1 is the drive control cable. One end of this cable connects to J1. The other end of the cable connects onto the drive. Make sure there is a pin 1 to pin 1 orientation between the drive and controller.

If using a control cable that has a five-wire address selection twist, both drives should have their drive select jumpers set for drive address 1 (base 0, the second available drive address). The first drive in the system must then be attached at the end of the cable (the connector after the twist). The second drive should be connected to the connector in the middle of the cable (before the twist).

When using flat cables, the drives may be attached at either connector. The first drive in the system must be selected as drive address 0. The second drive should have its drive select set for drive address 1 (see Figure 2-1).

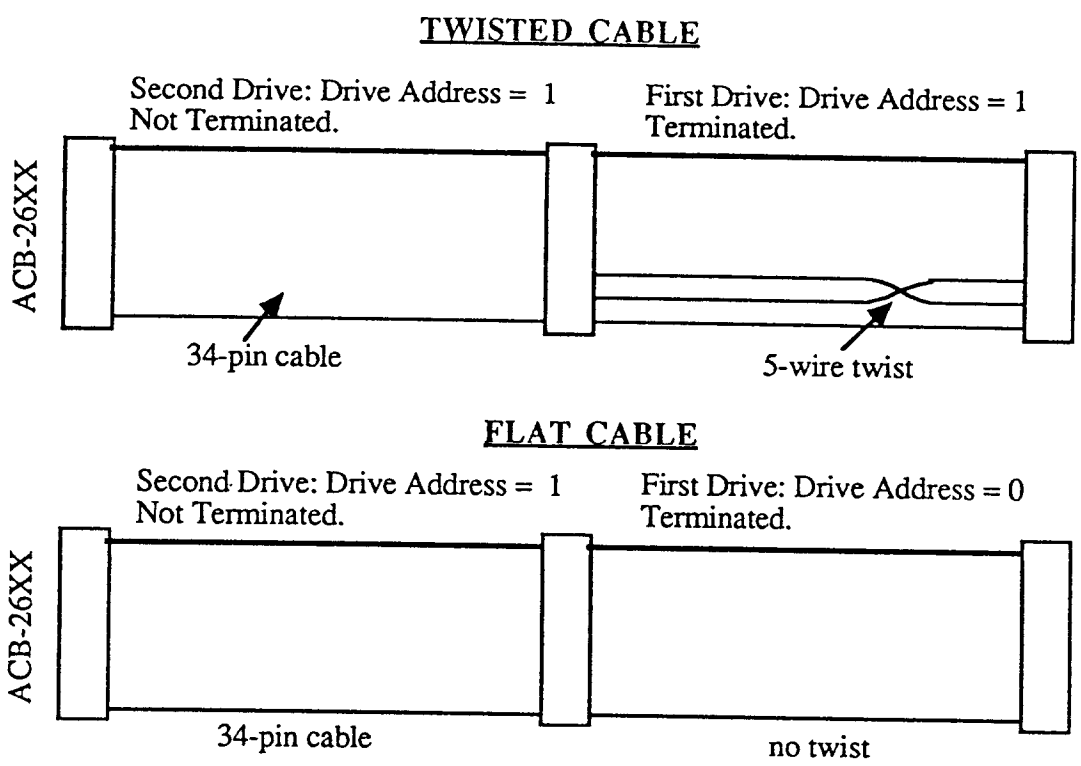


FIGURE 2-1 TWISTED VS. FLAT CABLES

J2 and J3 are the drive data cables and requires a 20-pin flat cable. One end of this cable can be connected to EITHER J2 OR J3. These connectors will auto-sense for drive select 1 or 2. The other end of this cable is connected to the disk drive's 20-pin connector. Make sure there is a pin 1 to pin 1 orientation between the drive and controller.

STEP 4 Controller Configuration

Once the hardware has been installed, boot the computer from the IBM Model 50, 50Z, 60, 70, or 80 Reference diskette. **Do not attempt to automatically configure the PS/2.** Instead, go to the main menu of the system configuration program and select the option to change change the configuration parameters. The system expansion slot will now be displayed on the screen. Page down to the description of the Micro Channel slot in which the ACB-2610 has been installed. The information displayed will indicate that an IBM fixed disk adapter has been installed. Check the values displayed for priority level and drive type. A priority level of 3 for the fixed disk is suggested. If the drive type does not correspond to the drive that you are using, change the table number to the correct value.

Note: The IBM Model 50 BIOS only supports one fixed disk. If more than one fixed disk is desired, it is possible to install one with the ACB-2610. However, the second drive must use the parameters from the drive type for the first drive. Only one drive type may be specified in this machine.

STEP 5 Formatting (when using the IBM Reference diskette)

Once the controller configuration has been completed, return to the main menu of the configuration program. Press Ctrl-a to access the fixed disk preparation menu. After a several second delay, the menu will be displayed with the option for formatting the fixed disk displayed. Select this option and follow the instructions given for initiating the drive format procedure.

Since the fixed disk is not pre-formatted, several error messages may be displayed when you invoke the hard disk formatter. The first message you may receive indicates that the configuration area on the disk is unreadable. Press escape then "Y" to continue. Next, you may receive a message stating that a necessary system area on the disk is unreadable. Again, press escape, then "Y" to continue with the "factory preparation".

Once the format has completed successfully, insert your operating system source diskette in the floppy drive of the computer and reboot the system. Follow the operating system fixed disk installation instructions to complete the installation procedure.

### 2.4.2 ACB-2620 Installation

**STEP 1** Drive Selection and Termination

The drive changeable parameters are the the drive selection switches (or jumpers) and the drive termination. These parameters allow a drive to be selected as drive 1, 2, 3, or 4. This is accomplished by changing the drive address selection switches or jumpers. Refer to your drive manual for location and definition of the switches or jumpers.

Before the drives can be cabled to the ACB-2620, the drive cable termination must be properly set. The terminator must be at the end of the cable in order to have the ACB-2620 and drive communicate properly. The disk drives, since they can be connected in a daisy chain configuration, have a removable terminator. This is usually a 16-pin DIP resistor package (refer to your drive manual). The last physical drive in the chain must have its terminator installed.

**STEP 2** Install the ESDI Drive and ACB-2620 into your PS/2 Model 50Z, 60, 70, or 80 compatible computer (the Model 50 will only support MFM).

**STEP 3** Drive and Controller Cabling

The ACB-2620 has three cable connector (J1, J2, & J3). Refer to Figure 1-2 found on page 1-5 for connector location and pin 1 orientation.

J1 is the drive control cable. Attach this control cable (34-pin cable) from connector J1 to the control cable on the drive. Make sure there is a pin 1 to pin 1 orientation between the drive and controller.

If using a control cable that has a five-wire address selection twist, both drives should have their drive select jumpers set for drive address 1 (base 0, the second available drive address). The first drive in the system must then be attached at the end of the cable (the connector after the twist). The second drive should be connected to the connector in the middle of the cable (before the twist).

When using flat cables, the drives may be attached at either connector. The first drive in the system must be selected as drive address 0. The second drive should have its drive select set for drive address 1 (see Figure 2-1).

If more than one drive is installed, the second drive should be connected to the same control cable by using a "daisy-chain" cable. Note that the terminator on the drive that is between the controller and the last drive on the the daisy-chain should be removed and the terminator on the end of the chain should be installed.

J2 and J3 are the drive data cables and requires a 20-pin flat cable. One end of this cable can be connected to EITHER J2 OR J3. These connectors will auto-sense for drive select 1 or 2. The other end of this cable is connected to the disk drive's 20-pin connector. Make sure there is a pin 1 to pin 1 orientation between the drive and controller.

**STEP 4** Controller Configuration

Once the hardware has been installed, boot the computer from a DOS system diskette. Next, use the drive type initialization program DVCTYPE.EXE, supplied with your ACB-2620 controller to set up your computer's CMOS RAM with the correct drive parameters for your ESDI drive.

## USING DVCTYPE

A. Invoke by typing DVCTYPE

B. Place cursor over "First Drive" and press enter to select drive.

C. Place cursor over "Device Type" and press enter.

D. Select Type 255

E. Select and change drive parameters as required to set up the drive

F. When parameters are set, select "Write CMOS" to save the new

G. Select QUIT to leave the Device Type Program.

When the drive parameters have been set with DVCTYPE, reboot the system from the PS/2 model 60 or 80 Reference Diskette. Since the CMOS RAM has been modified by DVCTYPE.EXE, the reference programs must be used to set your system's configuration. Use the reference diskette to select drive type 255 for your system configuration (this sets CMOS CRC byte).

**Do not attempt to automatically configure the PS/2.** Instead, go to the main menu of the system configuration program and select the option to change change the configuration parameters. The system expansion slot will now be displayed on the screen. Page down to the description of the Micro Channel slot in which the ACB-2620 has been installed. The information displayed will indicate that an IBM fixed disk adapter has been installed. Check the values displayed for priority level and drive type. A priority level os 3 for the fixed disk is suggested.

The drive type displayed should be type 255. Once these entries have been verified, save the configuration. This will recompute the CMOS checksum and store the value so that the computer will boot without reporting errors.

STEP 5 Formatting (when using the IBM Reference diskette)

Once the controller configuration has been completed, return to the main menu of the configuration program. Press Ctrl-a to access the fixed disk preparation menu. After a several second delay, the menu will be displayed with the option for formatting the fixed disk displayed. Select this option and follow the instructions given for initiating the drive format procedure.

Since the fixed disk is not pre-formatted, several error messages may be displayed when you invoke the hard disk formatter. The first message you may receive indicates that the configuration area on the disk is unreadable. Press escape then "Y" to continue. Next, you may receive a message stating that a necessary system area on the disk is unreadable. Again, press escape, then "Y" to continue with the "factory preparation".

Once the format has completed successfully, insert your operating system source diskette in the floppy drive of the computer and reboot the system. Follow the operating system fixed disk installation instructions to complete the installation procedure.