

adaptec

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# ACB-2320/ACB-2322

*User's Manual*

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## Section Two                      Hardware Installation

### 2.1 INTRODUCTION

This section describes the steps necessary to install the ACB-232X board into the computer. First, the operating environment, unpacking procedure and board layout are described. This section also describes the integration of the drive and controller into the computer.

### 2.2 ENVIRONMENTAL REQUIREMENTS

The ACB-232X will perform properly over the following range of conditions:

	Operating	Storage
Temperature:	0° to 55°C (32° to 131°F)	-40° to 75°C (-8° to 167°F)
Humidity (Noncondensing):	0% to 95%	10% to 95%
Altitude (Feet):	Sea level to 10,000	Sea level to 20,000
MTBF (Hours):	20,000 at 55°C	

### 2.3 UNPACKING PROCEDURE

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 or distributor be necessary.

*CAUTION: THE ACB-232X 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 CONFIGURED AND INSTALLED IN YOUR SYSTEM.*

## Section Two

### 2.4 ACB-2322 BOARD LAYOUT

The ACB-2322 is shown in Figure 2-1. This figure shows the location of the controller microcode, ACB-BIOS, jumpers and connectors. Note that Pin 1 of the connectors is identified by a square solder pad on the solder side of the board. The dimensions of the board are:

Width: 3.9 Inches  
Length: 13.0 Inches  
Height: 0.75 Inches

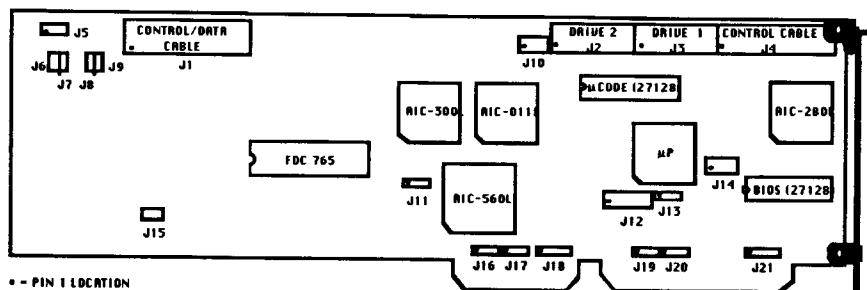


FIGURE 2-1. BOARD LAYOUT

## Hardware Installation

### 2.5 ACB-2320 BOARD LAYOUT

The ACB-2320 is shown in Figure 2-2. This figure shows the location of the controller microcode, ACB-BIOS, jumpers and connectors. Note that Pin 1 of the connectors is identified by a square solder pad on the solder side of the board. The dimensions of the board are:

Width: 3.9 Inches  
Length: 8.0 Inches  
Height: 0.75 Inches

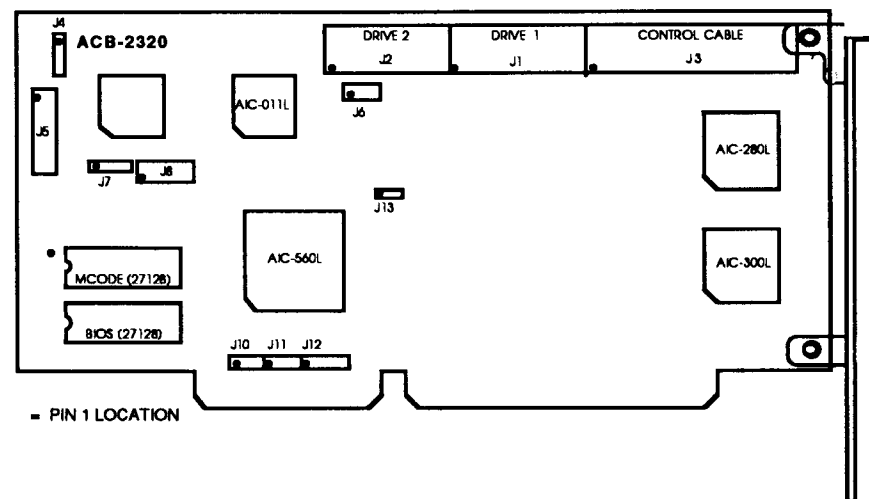


FIGURE 2-2. BOARD LAYOUT

## Section Two

### 2.6 SYSTEM REQUIREMENTS

The ACB-232X was designed to be installed in an IBM PC AT-compatible personal computer; thus, it requires the same system resources as the IBM AT hard disk controller.

TABLE 2-1. ACB-232X SYSTEM MEMORY MAP

<i>I/O Ports</i>		
Hard Disk	- Primary	
1F0,1F1,1F2,1F3,1F4,1F5,1F6,1F7,3F6,3F7	- Secondary	
170,171,172,173,174,175,176,177,376,377		
*Floppy Disk	- Primary	3F0,2F1,3F2,3F3,3F4,3FF5
	- Secondary	370,371,372,373,374,375
If the BIOS is enabled:		
BIOS Address	- Primary	16 Kbytes C8000H- CBFFFH
	- Secondary	16 Kbytes CC000H-CFFFFH
Temporary Drive		
Parameters Table Interrupt locations 60H through 67H		

\*ACB-2322 only

## Hardware Installation

### Drive Power

The IBM PC AT internal power supply does have sufficient current to power most hard disk drives in addition to its present load. Check with your drive vendor for an accurate estimate of its specific power requirements.

TABLE 2-2. ACB-2322 POWER REQUIREMENTS  
(Typical)

+5V Power	—————>	1.7 Amp
-5V Power	—————>	Not Used
+12V Power	—————>	90mA
-12V Power	—————>	50mA

TABLE 2-3. ACB-2320 POWER REQUIREMENTS  
(Typical)

+5V Power	—————>	1.1 Amp
-5V Power	—————>	Not Used
+12V Power	—————>	Not Used
-12V Power	—————>	Not Used

*CAUTION: THE VALUES FOR THE POWER REQUIREMENTS WERE DETERMINED BY ACTUAL MEASUREMENTS IN AN IBM PC AT WHILE THE CONTROLLER WAS READING A HARD DISK. IF THESE VALUES ARE TO BE USED TO DESIGN THE CONTROLLER INTO A SPECIFIC APPLICATION, AT LEAST 20% SHOULD BE ADDED TO THESE LISTED VALUES AS A SAFETY MARGIN.*

## Section Two

### 2.7 INTEGRATION INTO THE SYSTEM

To install the Adaptec ACB-232X board into your system, you must first configure the drive(s), set the controller jumpers, and connect the drive cables properly. This section describes all the necessary steps to successfully install this hardware.

#### Step 1 Controller Jumper Setup and Definition

Before the Adaptec ACB-232X can be used, some initial setup may be required. Table 2-4 defines, in detail, connectors and jumper blocks for the ACB-2322. Table 2-5 defines, in detail, connectors and jumper blocks for the ACB-2320.

## Hardware Installation

TABLE 2-4. ACB-2322 CONTROLLER JUMPER DEFINITIONS

*Note: Jumper positions and pin numbers are defined from left to right, or top to bottom, where applicable per Figure 2-1. An asterisk (\*) denotes jumpers that are installed for a standard configuration.*

J1	Floppy Disk control and data cable (34-pin), Both drives
J2	Hard disk data cable (20-pin), Second drive (Drive 2)
J3	Hard disk data cable (20-pin), First drive (Drive 1)
J4	Hard disk control cable (34-pin), Both drives
J5	Drive activity LED - Pins 1,4 are +5 Volts, Pins 2,3 are Signal Ground
J6	Manufacturing Test Points
J7	Manufacturing Test Points
J8	Manufacturing Test Points
J9	Manufacturing Test Points
J10	Manufacturing Test Points
J11	Adaptec ACB-BIOS address selection
	*Position 1 and 2      Jumpered for BIOS address C8000 - CBFFF
	Position 2 and 3      Jumpered for BIOS address CC000 - CFFFF
	No jumper              ACB-BIOS disabled

*Note: Install only one jumper on J11. No jumper should be installed if ACB-BIOS Disabled*

J12	BOARD CONFIGURATION JUMPERS
	Position 1      Hard Disk Port Addresses Not installed: primary address 1F0 - 1F7 Installed: secondary address 170 - 177
	Position 2      Floppy Disk Port Address Not installed: primary address 3F0 - 3F7 Installed: secondary address 370 - 377
	Position 3      Bus Wait State Not installed: Enabled Installed: Disabled
	Position 4      Not Used
	Position 5      Not Used
	Position 6      Serial Monitor Mode Not installed: Disabled Installed: Enabled (2400 baud)
	Position 7      Manufacturing Test Point

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TABLE 2-4. ACB-2322 CONTROLLER JUMPER DEFINITIONS (Continued)

*Note: Jumper positions and pin numbers are defined from left to right, or top to bottom, where applicable per Figure 2-1. An asterisk (\*) denotes jumpers that are installed for a standard configuration.*

J13	Serial Monitor Output
J14	Manufacturing Test Points
J15	Manufacturing Test Points
J16	Not Used
J17	Not Used
J18	Controller's system interrupt selection *Pins 1 and 2 jumpered for IRQ14 Pins 2 and 3 jumpered for IRQ15 Pins 3 and 4 DO NOT USE
J19	Floppy Disk DMA Acknowledge signal selection *Pins 1 and 2 jumpered for DACK2 Pins 2 and 3 jumpered for DACK3
J20	Floppy Disk Interrupt Request signal selection *Pins 1 and 2 jumpered for IRQ6 Pins 2 and 3 jumpered for IRQ10
J21	Floppy Disk DMA Request signal selection Pins 1 and 2 jumpered for DREQ3 *Pins 2 and 3 jumpered for DREQ2

## Hardware Installation

TABLE 2-5. ACB-2320 CONTROLLER JUMPER DEFINITIONS

*Note: Jumper positions and pin numbers are defined from left to right, or top to bottom, where applicable per Figure 2-1. An asterisk (\*) denotes jumpers that are installed for a standard configuration.*

J1	Hard disk data cable (20-pin), First drive (Drive 1)
J2	Hard disk data cable (20-pin), Second drive (Drive 2)
J3	Hard disk control cable (34-pin), Both drives
J4	Drive activity LED - Pins 1,4 are +5 Volts, Pins 2,3 are Signal Ground
J5	BOARD CONFIGURATION JUMPERS
	Position 1      Hard Disk Port Addresses Not installed: primary address 1F0 - 1F7 Installed: secondary address 170-177
	Position 2      Not Used
	Position 3      Bus Wait State Not installed: Enabled Installed: Disabled
	Position 4      Not Used
	Position 5      Not Used
	Position 6      Serial Monitor Mode Not installed: Disabled Installed: Enabled (2400 baud)
	Position 7      Manufacturing Test Point
J6	Manufacturing Test Points
J7	Serial Monitor Output
J8	Manufacturing Test Points
J9	Not Used
J10	Not Used
J11	Not Used
J12	Controller's system interrupt selection *Pins 1 and 2 jumpered for IRQ14 Pins 2 and 3 jumpered for IRQ15 Pins 3 and 4 DO NOT USE
J13	Adaptec ACB-BIOS address selection *Position 1 and 2 Jumpered for BIOS address C8000 - CBFFF Position 2 and 3      Jumpered for BIOS address CC000 - CFFFF No jumper      ACB-BIOS disabled

*Note: Install only one jumper on J13. No jumper should be installed if ACB-BIOS Disabled*

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### Step 2 Hard Disk Cabling, Drive Selection and Termination

The drive changeable parameters that must be set are the drive selection switches (or jumpers) and the drive termination. The drive selection switches and cabling select the address (drive address 1-4) to which the drive will respond. This is accomplished either by setting both drives to be the second lowest address and using a twisted 34-pin cable, or by setting the drive address to the lowest two addresses and using a flat cable.

#### A. Twisted 34-Pin Cable

The typical AT 34-pin cable has three connectors. Between the first (middle) drive connector (for drive D) and the second drive connector (for drive C) wires 25 through 29 are twisted, thus inverting the drive selection wires. This type of twisted cable allows both drives to have their drive selection switches (or jumpers) to be the same. Both drives must be set to the SECOND lowest drive address. The controller will see the two drives to be drive 1 and drive 2, depending on the position of the connector that is used.

#### B. Flat 34-Pin Cable

In some cases a 34-pin flat (non-twisted) cable is used. This cable does not invert the drive selection wires but relies on the drive addresses to be unique for each drive. Now drive 1 must have its drive selection switches (or jumpers) set to be the lowest drive address (typically 1). Drive 2 must have its selection switches (or jumpers) set to be the second lowest drive address (typically 2). The controller will see the two drives to be drive 1 and drive 2, independent of the position on the connector that is used.

Before the drives can be cabled to the controller, the drive cable terminator must be properly set. The terminator is used to reduce signal "ringing" in the cables. The terminator, as its name implies, must be at the end of each cable in order to have the controller and drive communicate properly. The controller has a permanent terminator built into it. 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 located on the drive PCB. The last physical drive in

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the chain must always have its terminator installed. When two drives are connected to the same controller, only the last one in the daisy chain is terminated. The other drive must have the terminator resistor removed.

Now select the proper drive addresses and remove or install the required terminators for your system.

### Step 3 (ACB-2322 Only) Floppy Disk Cabling, Drive Selection and Termination

The typical AT 34-pin floppy disk cable has three connectors. Between the first (middle) drive connector (for drive B) and the second drive connector (for drive A) wires 10 through 16 are twisted, thus inverting the drive selection wires. This type of twisted cable allows both drives to have their drive selection switches (or jumpers) to be the same. Both drives must be set to the SECOND lowest drive address (typically 1 since floppy drives are addressed as 0-3). The controller will see the two drives to be drive 0 and drive 1, depending on the position of the connector that is used.

Termination of the floppy disk drives is the same as the hard disk drives in step 2.

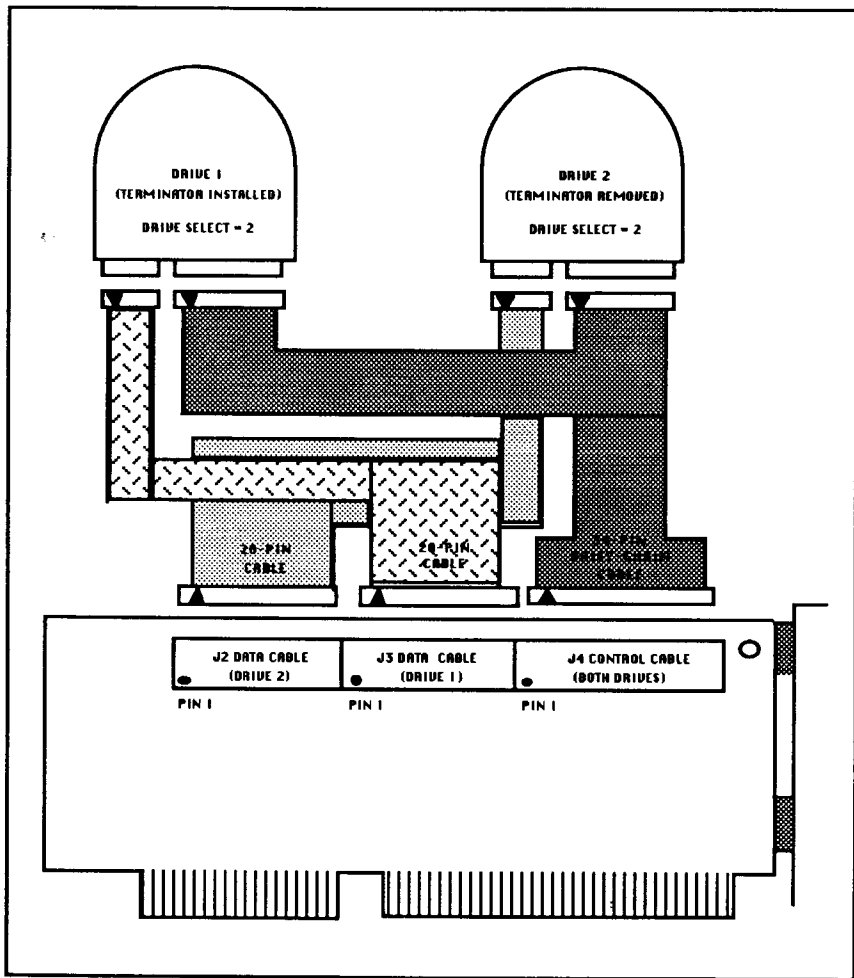


FIGURE 2-3. ACB-2322 CONTROLLER AND DRIVE CABLING-TWISTED CABLE (HARD DISK CABLES)

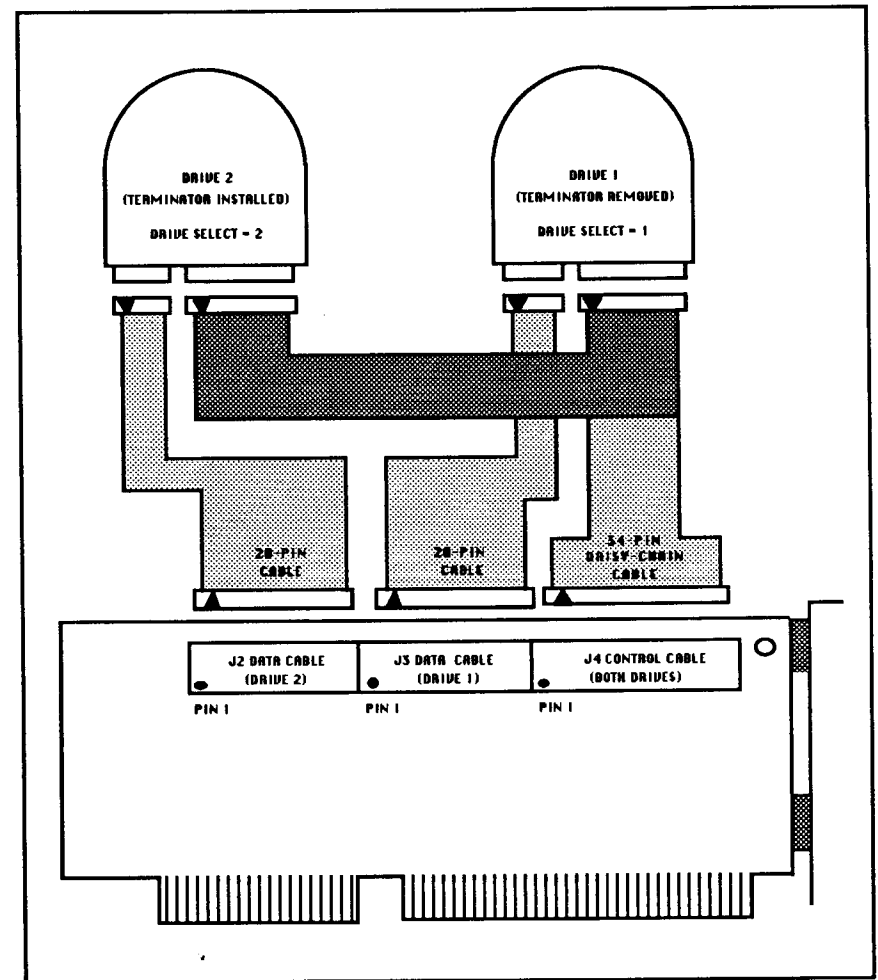


FIGURE 2-4. ACB-2322 CONTROLLER AND DRIVE CABLING-FLAT CABLE (HARD DISK CABLES)



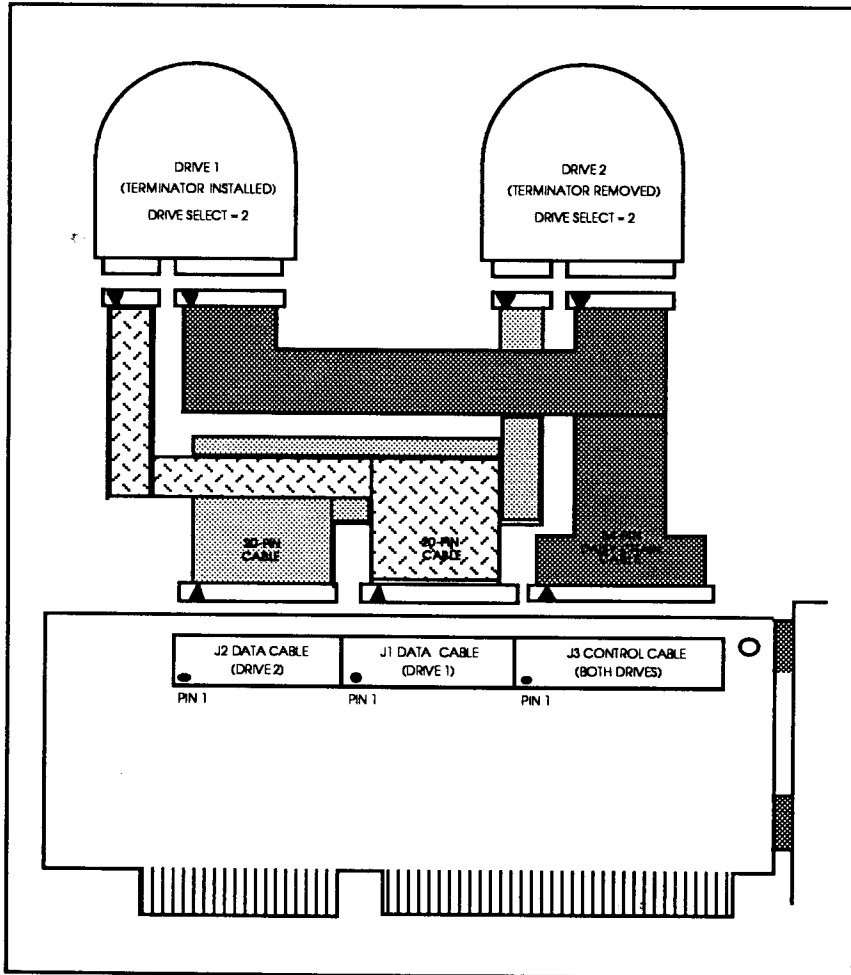


FIGURE 2-5. ACB-2320 CONTROLLER AND DRIVE CABLING-TWISTED CABLE

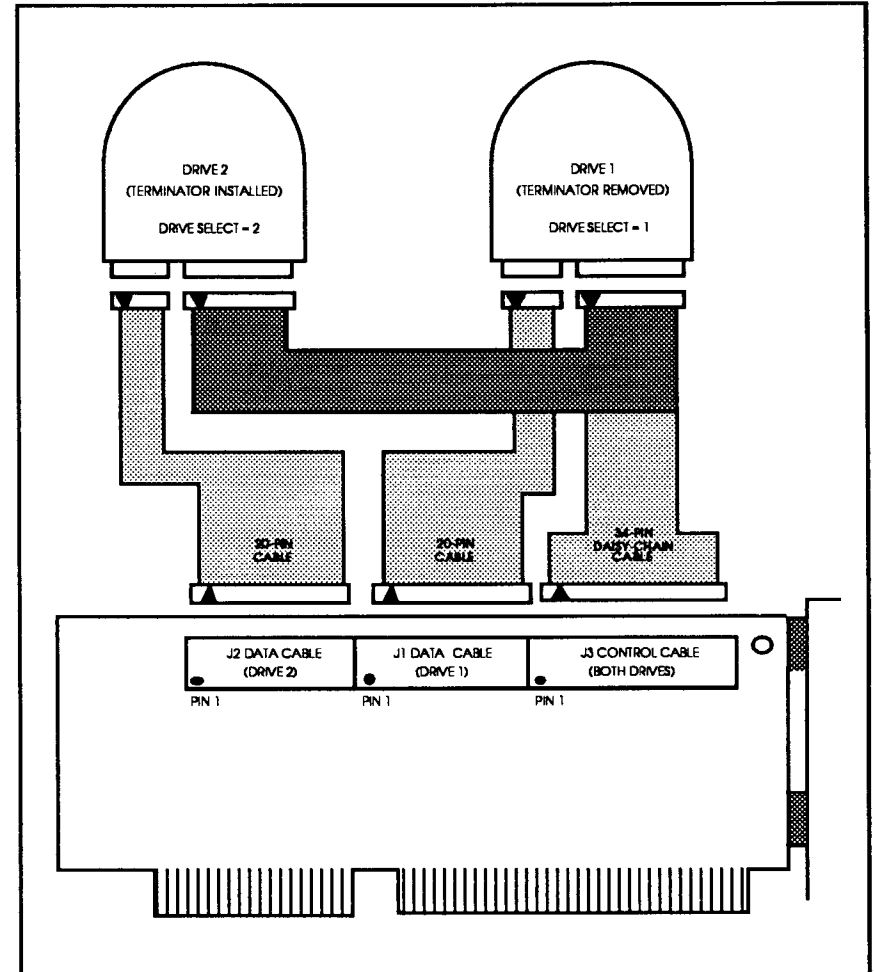


FIGURE 2-6. ACB-2320 CONTROLLER AND DRIVE CABLING-FLAT CABLE

## Section Two

### Step 4 Mounting the Drives and Controller in the PC AT

Now that the drives and controller are configured, they can be connected and installed in the system.

#### ACB-2322

The controller has four cable connectors: J1, J2, J3, and J4. Their function, suggested connector plugs and maximum cable length are described in Table 2-6.

TABLE 2-6. ACB-2322 CONTROLLER CONNECTOR DEFINITIONS

<i>Connector</i>	<i>Signals</i>	<i>Cable</i>
J1	Control/Data	34-pin flat ribbon cable. Connected to both floppy drives 0 and 1.
J2	Data	20-pin flat ribbon cable. Connected to ESDI drive 2.
J3	Data	20-pin flat ribbon cable. Connected to ESDI drive 1.
J4	Control	34-pin flat ribbon cable. Connected to both ESDI drives 1 and 2.

<i>Connector</i>	<i>Recommended Plug</i>	<i>Maximum Length</i>
J1	3M Part #3414	20 feet (6 meters)
J3	3M Part #3421	20 feet (6 meters)
J2	3M Part #3421	20 feet (6 meters)
J4	3M Part #3414	20 feet (6 meters)

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#### ACB-2320

The controller has three cable connectors: J1, J2, and J3. Their function, suggested connector plugs and maximum cable length are described in Table 2-7.

TABLE 2-7 ACB-2320 CONTROLLER CONNECTOR DEFINITIONS

<i>Connector</i>	<i>Signals</i>	<i>Cable</i>
J1	Data	20-pin flat ribbon cable. Connected to drive 1.
J2	Data	20-pin flat ribbon cable. Connected to drive 2.
J3	Control	34-pin flat ribbon cable. Connected to both drives 1 and 2.

<i>Connector</i>	<i>Recommended Plug</i>	<i>Maximum Length</i>
J1	3M Part #3421	20 feet (6 meters)
J2	3M Part #3421	20 feet (6 meters)
J3	3M Part #3414	20 feet (6 meters)

Attach the cables to the controller, making sure that the pin 1 indicator on the cable goes to pin 1 on the controller.

Now the controller must be installed into a 16-bit slot on the PC AT motherboard. Next, mount the drive(s) in any available drive bay in the AT. Consult your PC AT owner's manual for details of performing the installation of options into the motherboard expansion slots and for instructions on mounting a hard disk and floppy disk in the system.