adaptec

ACB-2370/ACB-2372

User's Manual

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2.1 INTRODUCTION

This section describes the steps necessary to install the ACB-237X 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-237X 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.

Sectic

pening the shipping container, use the packing slip to verify receipt of After o visual items listed on the slip. Retain the shipping container and packing the indi for possible later reuse should return of the equipment to the factory or materia be necessary.
distribu

ON: THE ACB-237X LIKE ALL ELECTRONIC EQUIPMENT, IS CAUTI SENSITIVE. PLEASE TAKE THE PROPER PRECAUTIONS STATIC HANDLING THE BOARD. KEEP THE BOARD IN ITS WHEN CTIVE WRAPPING UNTIL IT IS READY TO BE CONFIGURED CONDU STALLED IN YOUR SYSTEM.
AND II

CB-2372 BOARD LAYOUT

2.4 A

B-2372 is shown in Figure 2-1. This figure shows the location of the The AC r microcode, ACB-BIOS, jumpers and controll ectors is identified by a square solder pad on the solder side of the board. the conr ensions of the board are:
The dim

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

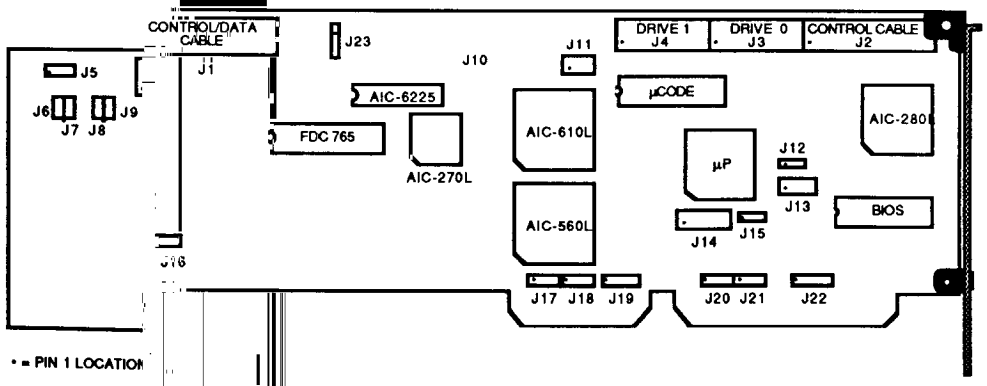

FIGURE 2-1. BOARD LAYOUT

2.5 ACB-2370 BOARD LAYOUT

The ACB-2370 is shown in Figure 2-2. T
controller microcode, ACB-BIOS, jumper
the connectors is identified by a square sold
The dimensions of the board are:

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

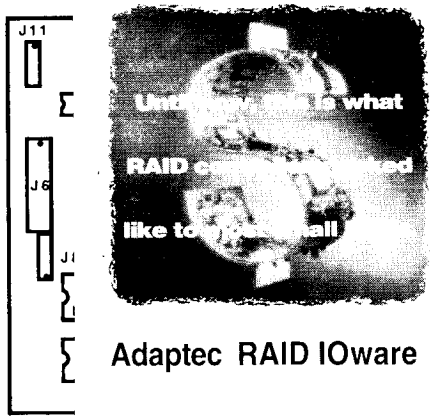

FIGURE 2-2. BOARD L

is figure shows the location of the
and connectors. Note that Pin 1 of
pad on the solder side of the board.

2.6 SYSTEM REQUIREMENTS

The ACB-237X 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-237X SYSTEM MEMORY MAP

I/O Ports	
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	3F0,3F1,3F2,3F3,3F4,3F5
- Secondary	370,371,372,373,374,375
If the BIOS is enabled:	
BIOS Address - Primary	16 Kbytes from C8000H through CBFFFH
- Secondary	16 Kbytes CC000H through CFFFFH
Temporary Drive Parameters Table	Interrupt locations 60H through 67H

* *ACB-2372 only*

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-2372 POWER REQUIREMENTS
(Typical)

+5V Power ——————>	1.5 Amp
–5V Power ——————>	Not Used
+12V Power ——————>	130mA
–12V Power ——————>	50mA

TABLE 2-3. ACB-2370 POWER REQUIREMENTS
(Typical)

+5V Power ——————>	1.5 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.

2.7 INTEGRATION INTO THE SYSTEM

To install the Adaptec ACB-237X 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 of the necessary steps to successfully install this hardware.

Step 1 Controller Jumper Setup and Definition

Check that the jumpers are set correctly for your application. Table 2-4 and 2-5 defines, in detail, connectors and jumper blocks.

TABLE 2-4. ACB-2372 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 control cable (34-pin), Both drives
J3	Hard disk data cable (20-pin), First drive (Drive 1)
J4	Hard disk data cable (20-pin), Second drive (Drive 2)
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	Manufacturing Test Points
J12	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 J12. No jumper should be installed if ACB-BIOS Disabled.

TABLE 2-4. ACB-2372 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	Manufacturing Test Points
J14	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 Drive Recal goes to track 0 minus 1
	Not installed: Enabled (ST238)
	Installed: Disabled (ST4144R)
	Position 5 Not Used
	Position 6 Serial Monitor Mode
	Not installed: Disabled
	Installed: Enabled (2400 baud)
	Position 7 Manufacturing Test Point
J15	Serial Monitor Output
J16	Manufacturing Test Points
J17	Not Used
J18	Not Used
J19	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
J20	Floppy Disk DMA Acknowledge signal selection
	*Pins 1 and 2 jumpered for DACK2
	Pins 2 and 3 jumpered for DACK3
J21	Floppy Disk Interrupt Request signal selection
	Pins 1 and 2 jumpered for IRQ10
	*Pins 2 and 3 jumpered for IRQ6
J22	Floppy Disk DMA Request signal selection
	Pins 1 and 2 jumpered for DREQ3
	*Pins 2 and 3 jumpered for DREQ2

TABLE 2-5. ACB-2370 CONTROLLER JUMPER DEFINITIONS

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

J1	Hard disk data cable (20-pin), second drive (Drive 2)
J2	Hard disk data cable (20-pin), first drive (Drive 1)
J3	Hard disk control cable (34-pin), both drives
J4	Manufacturing test points
J5	Drive activity LED - Pins 1,4 are +5 Volts, Pins 2,3 are signal ground
J6	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 Wait state (C & T) Not installed: enabled Installed: disabled
	Position 4 Drive recal goes to track 0 minus 1 Not installed: enabled (ST238) Installed: disabled (ST4144R)
	Position 5 Not used
	Position 6 Serial monitor mode Not installed: disabled Installed: enabled (2400 baud)
	Position 7 Manufacturing test point
J7	Manufacturing test points
J8	Manufacturing test points
J9	Manufacturing test points
J10	Serial monitor output
J11	Manufacturing test points
J12	Manufacturing test points
J13	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
J14	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 J14. No jumper should be installed if ACB-BIOS is disabled

J15	Manufacturing test points

Step

Hardware Installation

The
(or j
2 Hard
selec
b Disk Cabling, Drive Selection and Termination
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drive c
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jumpers
angeable parameters that must be set are the drive selection switches
addr
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and the drive termination. The drive selection switches and cabling
plish
dress (drive address 1-4) to which the drive will respond. This is
A. T
g a twi
either by setting both drives to be the second lowest address and
sses a
sted 34-pin cable, or by setting the drive address to the lowest two
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using a flat cable.
drive
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25 t
34-Pin Cable
twis
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connector 34-pin cable has three connectors. Between the first (middle)
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(for drive D) and the second drive connector (for drive C), wires
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ed cab
25 are twisted, thus inverting the drive selection wires. This type of
jers) t
allows both drives to have their drive selection switches (or
B. F
ss. T
be the same. Both drives must be set to the SECOND lowest drive
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the controller will see the two drives to be drive 1 and drive 2,
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on the position of the connector that is used.
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each
Pin Cable
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If the
uses a 34-pin flat (non-twisted) cable is used. This cable does not
con
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ive selection wires but relies on the drive addresses to be unique for
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e the
Now drive 1 must have its drive selection switches (or jumpers) set
ches (
west drive address (typically 1). Drive 2 must have its selection
Bef
oller
jumpers) set to be the second lowest drive address (typically 2). The
be
tion o
see the two drives to be drive 1 and drive 2, independent of the
The
the connector that is used.
hav
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per
properl
drives can be cabled to the controller, the drive cable terminator must
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termin
set. The terminator is used to reduce signal "ringing" in the cables.
Thi
the
ator, as its name implies, must be at the end of each cable in order to
manen
ontroller and drive communicate properly. The controller has a
daisy
terminator built into it. The disk drives, since they can be connected
s is us
in configuration (see Figure 2-4), have a removable terminator.

physical drive in 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 (see Figures 2-3 and 2-4 for the ACB-2372. See Figures 2-5 and 2-6 for the ACB-2370). The other drive must have the terminator resistor removed.

Step 3 Floppy Disk Cabling, Drive Selection and Termination (ACB-2372 only)

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.

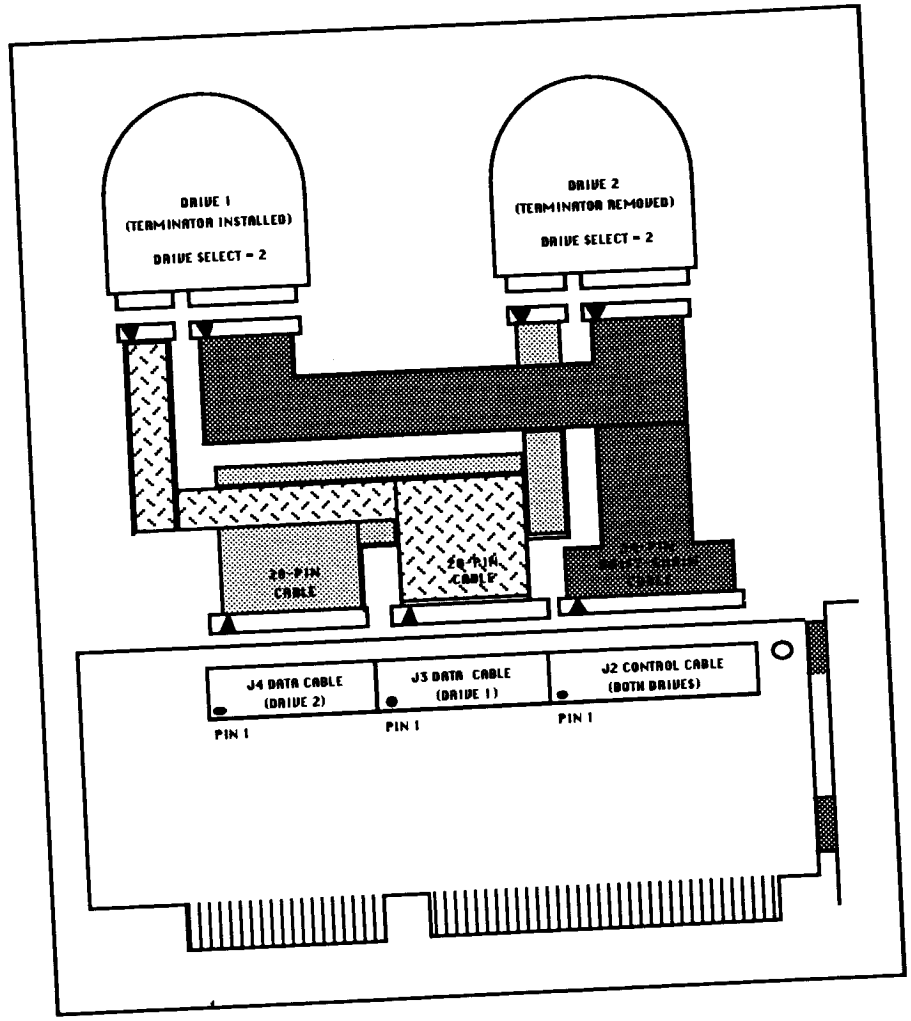

FIGURE 2-3. ACB-2372 CONTROLLER AND DRIVE CABLING-TWISTED CABLE
(HARD DISK CABLES)

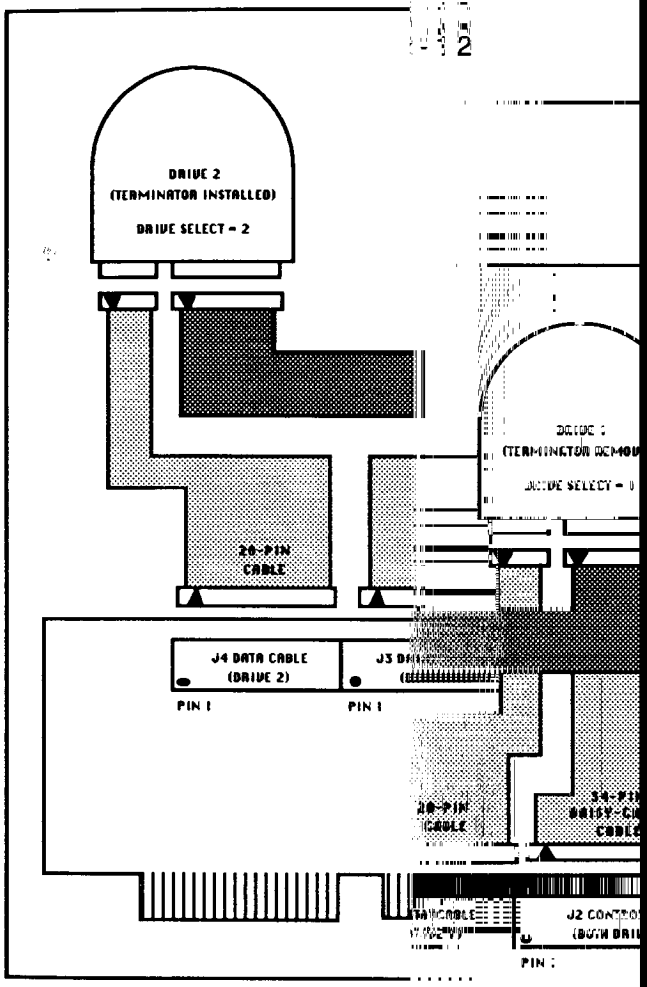

FIGURE 2-4. ACB-2372 CONTR
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(HARD D

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ABLE
SK CABLES)

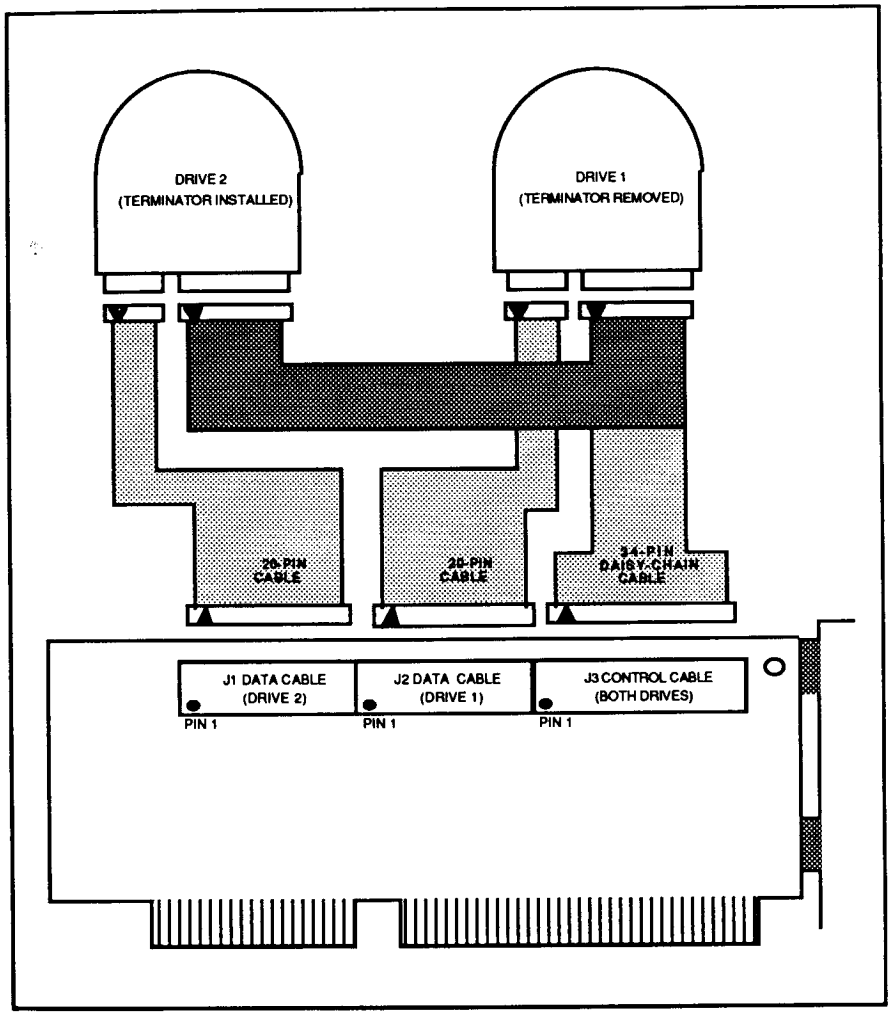

FIGURE 2-6. ACB-2370 CONTROLLER AND DRIVE CABLING-FLAT CABLE
(HARD DISK CABLES)

		RLL drive 2.
2	Data	20-pin flat ribbon c
		RLL drive 1.
3	Control	34-pin flat ribbon c
		both RLL drives 1

able. Connected to 2,7

able. Connected to

and 2.

Step 4 Mo

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2-15

Now that th
installed in

The control
J2, J3, and
length are d

ware Installation

Hard

TABLE

ing the Drives and Controller in the PC

Co

can be connected and

drives and controller are configured, they

J

e system.

J

) cable connectors: J1,

has three (ACB-2370) or four (ACB-2372

s and maximum cable

J

4. Their function, suggested connector plug

scribed in Table 2-6 and 2-7.

J

OR DEFINITIONS

2-6. ACB-2372 CONTROLLER CONNECT

ector	Signals	Cable
Conn		
	Control/Data	34-pin flat ribbon c
J		both floppy c
J2	Control	34-pin flat ribbon c
		both RLL dr
J3	Data	20-pin flat ribbon c
		RLL drive 1.
J4	Data	20-pin flat ribbon c
		RLL drive 2.

able. Connected to

drives 0 and 1.

able. Connected to

ves 1 and 2.

able. Connected to 2,7

able. Connected to 2,7

TABLE

ector	Recommended Plug	Maximum Length
Con		
J	3M Part #3414	20 feet (6 meters)
J2	3M Part #3414	20 feet (6 meters)
J3	3M Part #3421	20 feet (6 meters)
J4	3M Part #3421	20 feet (6 meters)

OR DEFINITIONS

2-7. ACB-2370 CONTROLLER CONNECT

ector	Signals	Cable
	Data	20-pin flat ribbon c

able. Connected to 2,7

Connector	Recommende	Plug	Maximum Length
J1	3M Part #342		20 feet (6 meters)
J2	3M Part #342		20 feet (6 meters)
J3	3M Part #341		20 feet (6 meters)

Attach the cables to the controller, maki
cable goes to pin 1 on the controller. The
for ACB-2372 connectors are shown in
Figure 2-5 and 2-6.

Now the controller must be installe
motherboard. Next, mount the drive(s)
Consult your PC AT owner's manual for
options into the motherboard expansion
hard disk and floppy disk in the system.
installed in the system, complete the inst
drive 1, connect data to drive 2 and conn
drives (see Figures 2-3 through 2-6
control/data cable from J1 to both flo
power connectors from the PC AT powe

At this point, the floppy disk, hard disk
installed in the PC AT system.

CAUTION: TAKE TIME NOW TO
AND CONTROLLER CABLE C
CONNECTED, AND THAT POWER
DRIVES.

g sure that the pin 1 indicator on the
onnector locations and pin orientation
igure 2-3 and 2-4, for ACB-2370, see

into a 16-bit slot on the PC AT
any available drive bay in the AT.
details of performing the installation of
slots and for instructions on mounting a
nce both the drive(s) and controller are
allation by connecting the data cable to
the daisy-chain control cable to both
For the ACB-2372, connect the
by drives. Finally, connect the drive
supply to all drives.

and controller hardware is completely

ERIFY THAT ALL OF THE DRIVE
ONNECTORS ARE CORRECTLY
ABLES ARE CONNECTED TO ALL

3.1 INTRODUCTION

The following procedure will guide you through the prep
disk using DOS. At the end of this procedure, a 32 MB R
ST-277R 65 MB drive with two 32 megabyte volumes w

This software installation process allows an entire RLL
DOS 3.0, 3.1, 3.2 and 3.3. These all have a 32 MB li
drive. Under DOS 3.3, DOS FDISK permits using drives
creating an Extended Partition that is divided into logical
3.1 and 3.2, the Adaptec Volume Partitioning Program p
Driver allows using drives greater than 32 MB by
volumes of capacities up to 32 MB. The drive can al
controller to be used by non-DOS operating systems and

CAUTION: IF YOU ENCOUNTER ANY PROBLEMS WI
PERFORM THIS INSTALLATION, REFER TO CHAPTER 4, T

Note: There is no software installation required for the f
formatting floppies under DOS.

3.2 ADAPTEC ACB-237X SOFTWARE INST
FLOWCHART

The software installation process is best described by the

Note that four possible paths may be taken. All paths
steps.

Path 1 through 7 and 8 through 12 is used for drives th
32 MB. This applies to any version of DOS 3.x.

Installation

allation of a single hard
drive and a Seagate
be formatted.

drive to be used under
llation for one logical
greater than 32 MB by
rives! Under DOS 3.0,
ns the Adaptec Device
viding the drive into
so be formatted by the
device drivers.

HILE ATTEMPTING TO
ROUBLESHOOTING.

loppy drive(s) other than

ATION

following flowchart.

follow the same first 7

at format to be less than