Easy

User's Manual
For the Z-100 family of computers.

Table of Contents

The UCI EasyWIN is an intelligent hard disk interface system that
allows Z-100 computer owners to add and control up to two 5 1/4
inch Winchester drives.

With the addition of UCI's EasyWIN hard disk system, your Zenith
Z-100 computer will have the capacity to store 30 to 120 times
more information on a single drive than is stored on a single
double sided floppy diskette. Besides additional on-line
capacity of stored records, the speed at which that information
may be accessed is increased by a factor of ten to twenty.

The internal UCI EasyWIN Hard Disk System for the Z-100 consists
of the following components:

        1 - S-100 Intelligent Interface Card (STD or RLL)
        1 - Western Digital PC Hard Disk Controller Card
            (1002A-WX1 or 1002A-WX2 or 1002A-WX27)
        1 - Seagate 200 Series Hard Disk Drive or Equivalent
        1 - 64 Position Ribbon Cable
        1 - 34 Position Ribbon Cable
        1 - 20 Position Ribbon Cable
        1 - Half Height Front Bezel
        1 - Full Height Front Bezel
        1 - Floppy Disk with Hard Disk Utilities
        1 - User's Manual

The external UCI EasyWIN Hard Disk System for the Z-100 consists
of the following additional components.

        1 - 34 Position Shielded Ribbon Cable
        1 - 20 Position Shielded Ribbon Cable
        1 - Hard Disk Chassis with 60 Watt Power Supply

The EasyWIN operation is identical to Zenith Z-217 system. You
can prep it, part it, and boot from it.

During the installation procedure, you will be required to
partially disassemble your computer before you can install the
EasyWIN. Please refer to the installation section of this man-
ual.

NOTE: The controller ROM, IC 4, on the EasyWIN intelligent inter-
face card is different for different types of Western Digital
controllers. Check the following table for the correct ROM
description for your particular Western Digital controller.

Western Digital Controller	ROM Description
WX1 or WX2	WX1Vn.n
27X (RLL)	WRLVn.n
	n.n is the revision number

1

Specifications

EasyWIN Intelligent Interface Specifications:

Drives Supported   Two Winchester disk drives. Drives must
                           be ST506 compatible hard disk drives.

Drive Interface   Seagate standard interface.

Interface to Host   Via S-100 bus.

Sector Size   512 bytes with programmable interleave.

Buffering   Buffers all transfers to and from host
                           via on-board multiple-sector buffer.

Data Transfers .   All   transfers made via   TMA   with
                           programmable mode of transfer - burst
                           or byte.   Data transfer can be halted
                           by host using PAUSE command. CONTINUE
                           command resumes the transfer.

I/O Ports   Controller uses two I/O ports. Port
                           address is set by a PAL and is not user
                           selectable.

Error Detection   Detects and corrects data errors.
                           Reports logical errors. Reports drive
                           errors and also issues a HOME command
                           if   the   drive was not   previously
                           accessed.

Power Requirements   + 5 volts, 2 amps
                           +12 to +16 volts, 125 milliamps maximum

Jumper and Switch Settings

Two hardware jumpers, J2 and J6, on the the EasyWIN interface
board must be set for proper hard disk operation. (Refer to
Appendix A for jumper location.)

Jumper J2: Primary/Secondary Setting

Up to two EasyWIN intelligent interface boards can be installed
in a single Z-100 system. Each interface board is capable of
controlling two physical Winchester drives. For Z-100 systems
with a single interface board, jumper J2, is open or without a
shunt. The computer recognizes this board as the primary con-
troller. Every board shipped from the factory is set as the
primary board.

If a second EasyWIN interface board is added to your system,
jumper J2 must be closed or shunted. The computer will recognize
this board as a secondary controller. NOTE: In order for the
second EasyWIN intelligent interface board to operate properly,
the primary EasyWIN interface board must control two physical
hard disk drives.

Jumper J6: INIT Enable/Disable

The INIT utility enables you to initialize the surface of your
Winchester disk, test data retention capabilities and isolate
questionable disk sectors. Before you can run the INIT utility,
you must enable the INIT logic on the EasyWIN interface board.
This is done with jumper J6, a three pin header.

```
        J6
         1   o
         2  |o|
         3  |o|
```
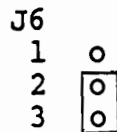
If J6 position 1 and 2 are shunted, INIT is enabled, if J6
position 2 and 3 are shunted, INIT is disabled. The EasyWIN
interface board is shipped from the factory with INIT disabled.

The INIT command will destroy any data that is recorded on the
Winchester disk. After you have initialized your hard disk with
the INIT command, it is recommended you disable the INIT logic.
This will act as a safety feature for any files on the disk.
With the INIT logic disabled it is not possible to accidently
re-initialize the drive with the INIT command.

Switch S101: Z-100 Motherboard Autoboot Switch

Switch S101 on the Z-100 motherboard can be set for autoboot from
Winchester upon power-up. Refer to Appendix B for details.

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Installation

The EasyWIN system was designed for either internal or external
hard disk installation. The following table is a guide to help
you decide the best method of installation for your particular
system.

Table 1
EasyWIN Configuration Guide

Model	Current Drive Configuration	Recommended Hard Disk Installation	Comments
Low Profile			
	1 Full or Half Ht FD	Internal	Mount hard disk drive in empty drive space.
	2 Full Ht FD's	Int or Ext	For internal installation one floppy drive must be removed.
	2 Half Ht FD's	Int or Ext	For internal installation either one floppy drive must be removed or two half height drives must be mounted in the same space on the drive shelf. To stack two half height drives 2 additional mounting brackets, four screws and a Y power cable are needed. These parts are not included in the EasyWIN kit. Note: Zenith Data Systems does not make an escutcheon or front panel plate for this drive configuration. To give the Z-100 a finished look you will have to customize your existing plate.
All-in-One	1 Full or Half Ht FD	Internal	Mount hard disk drive in empty drive space.
	2 Full Ht FD's	Int or Ext	For internal installation one floppy drive must be removed.
	2 Half Ht FD's	Internal	Mount hard disk below the second floppy drive on the drive chassis. Note: A Y power cable is required to connect 3 internal drives. This connector is not included in the EasyWIN kit.

NOTE: The installation of four internal half height drives is NOT recommended because of the
limitation of the Z-100 internal power supply.

Installation requires:

    1. Partial disassembly of your Z-100

    2. The insertion of a S-100 card

    3. The mounting of the hard disk drive (internal or external)

    4. The mounting of a PC hard disk controller card

    5. The connection of 3 cable assemblies

The step by step instructions for both the Low Profile and All-
in-One models are described in the following pages.

Note: Be sure your computer operates properly before you begin
these instructions.

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1. Disconnect all line cords and peripherals to your computer.
2. Move the metal slides on each side of the computer toward the back 1/4 inch (see illustration).
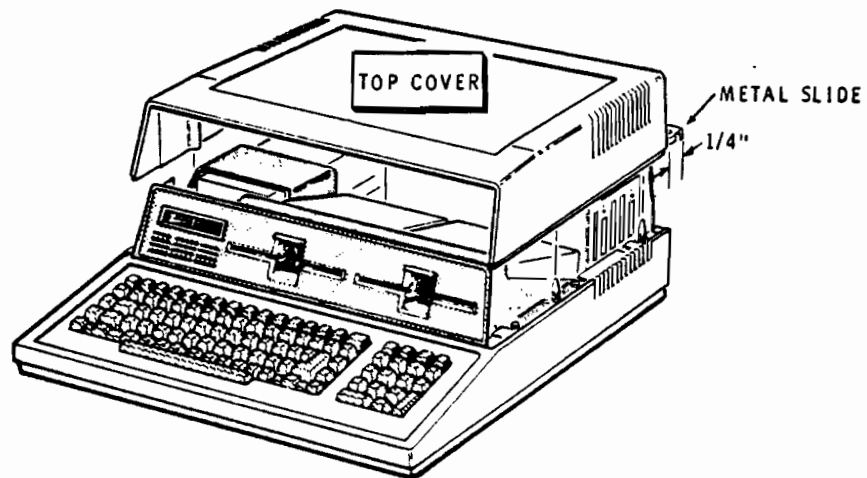3. Lift cabinet top off and set it aside.

Figure 1
Low Profile Cabinet Removal

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4. Remove the four screws labeled A and two locking pins labeled B.
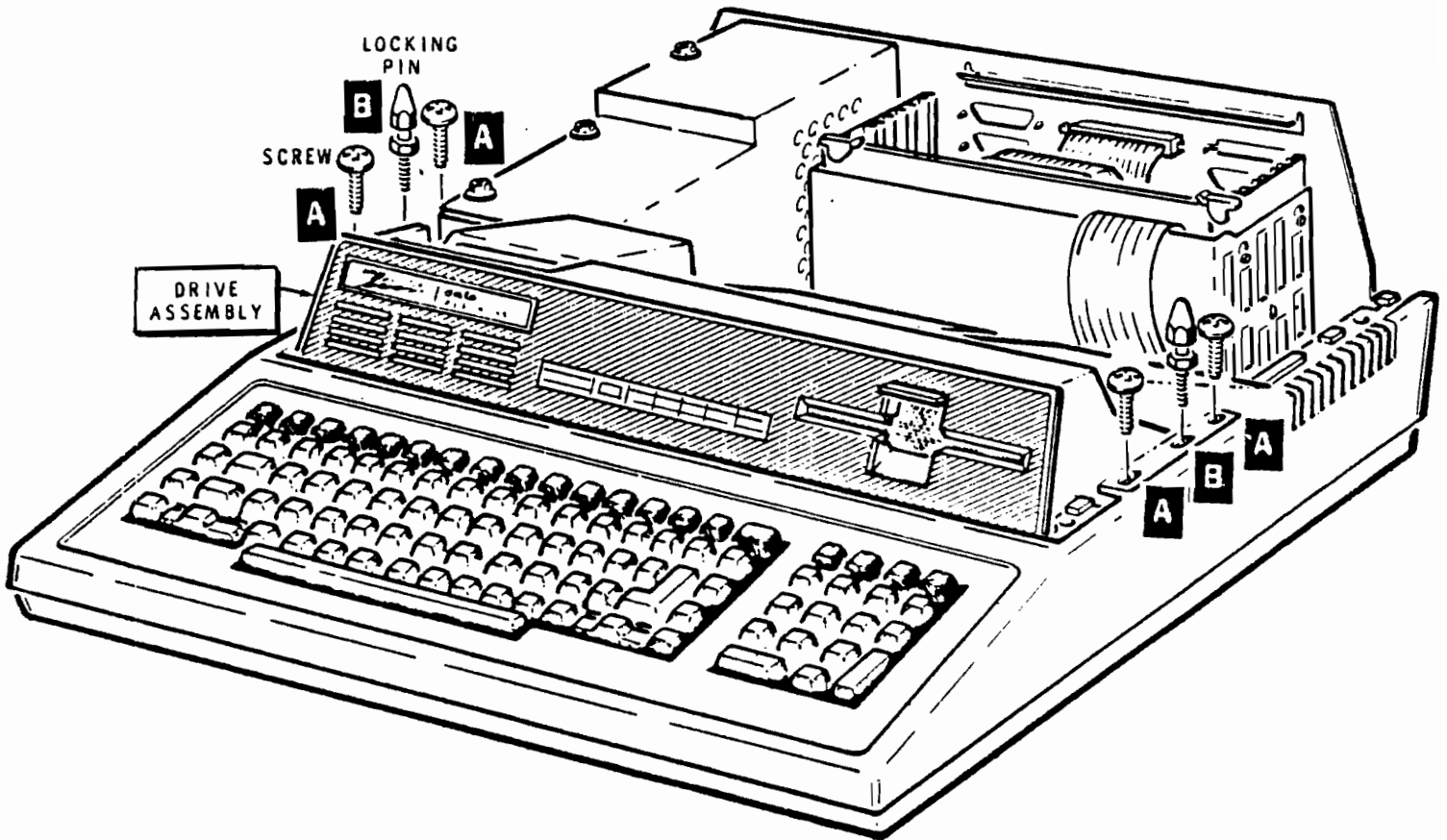
Figure 2
Low Profile Front Panel Assembly Removal

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5. Lift front panel assembly and move it forward slightly to reach the connectors. Remove the flat and power supply cables at the drive(s). Lift the entire assembly and place it on a flat working surface.
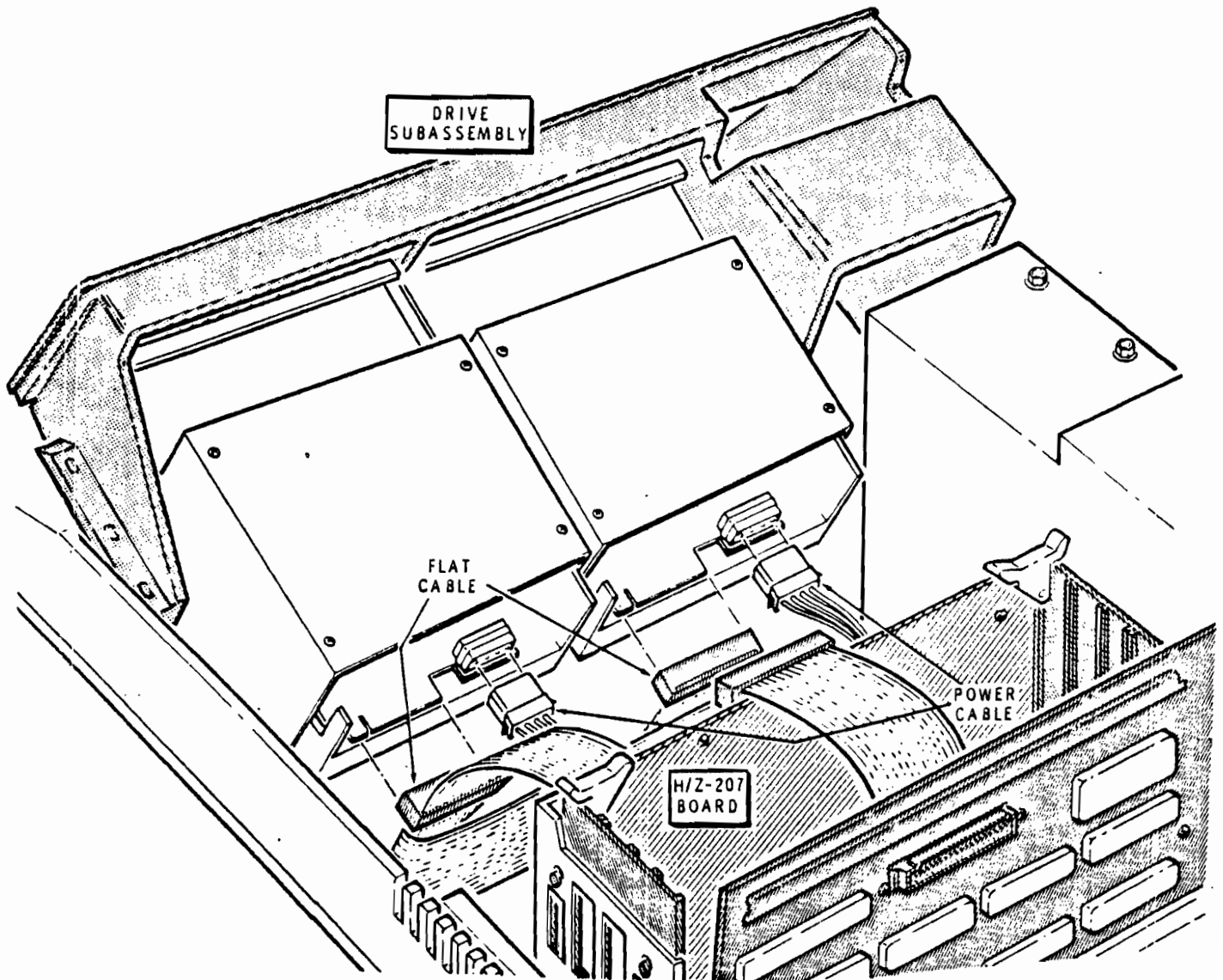
Figure 3
Low Profile Cable Disconnect

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6. If your Z-100 is a two floppy drive system, remove the
   floppy disk drive of your choice. (If your Z-100 has two
   half height floppy drives, you do have the option of mount-
   ing both drives in a single drive bay. Two extra mounting
   brackets, 4 screws and a Y power cable are needed. Zenith
   does not manufacture an escuthcheon or face plate for this
   configuration.)

7. Examine your hard disk drive. If a single hard drive is to
   be installed, be sure the drive select jumper is set on DS1,
   drive select one. If a second hard disk is to be installed,
   set the jumper on the second drive to DS2, drive select two,
   and remove the second resistor terminator pack. For Seagate
   200 and 4000 series drives see the figure below. (Note: Two
   half height hard disk drives can be mounted in the same
   drive bay as two half height floppy drives. Again, two
   additional mounting brackets, 4 screws and a Y power cable
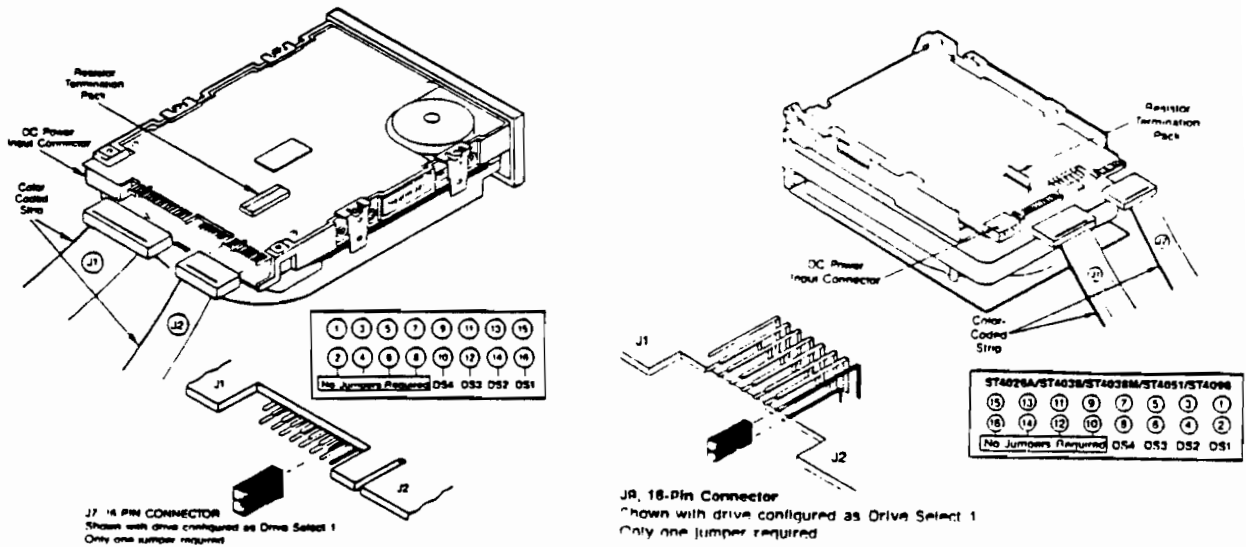   are required.)

Figure 4
Seagate Disk Drive Connectors, Jumpers and Terminators

8. If a full height front bezel is desired, remove the half
   height bezel on the drive and mount the full height bezel
   provided with the drive kit.

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9. Mount the hard disk drive on the drive shelf as shown.

USE
FIRST
HOLE

DRIVE
SHELF

#6 EXTERNAL
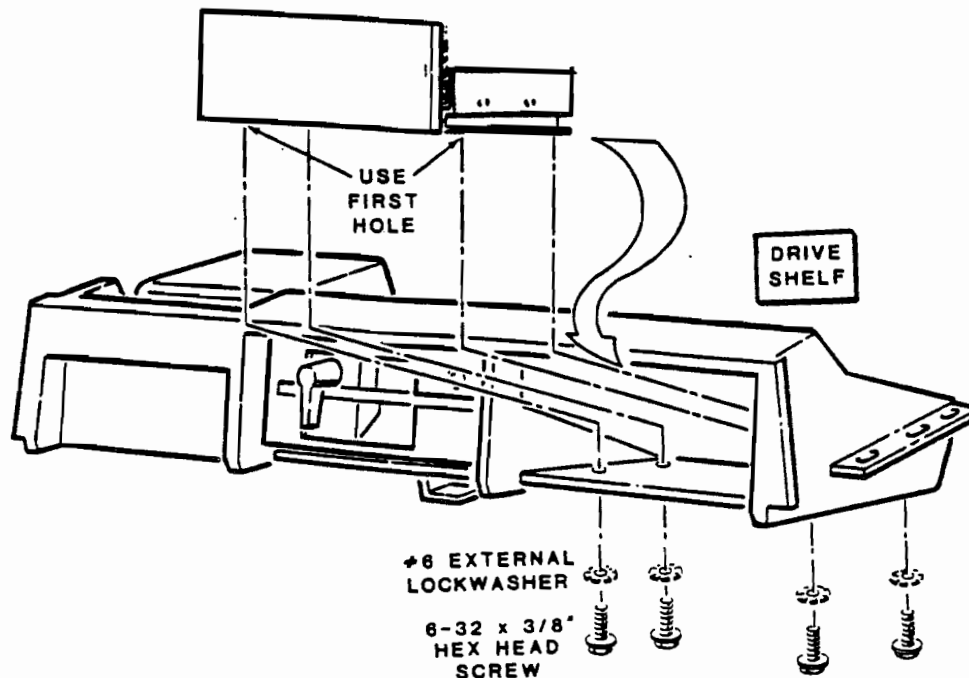LOCKWASHER

6-32 x 3/8"
HEX HEAD
SCREW

Figure 5
Winchester Disk Mount

10. Connect the hard disk drive cables to the hard disk drive.
    The large 34 position ribbon cable is attached to J1 on the
    circuit board of the hard drive and the small 20 position
    ribbon cable is attached to J2 on the circuit board of the
    hard drive. The colored line on the cables represent pin
    one. The notch on the circuit board of the hard disk also
    represents pin one. Pin one on the cable set must connect
    to pin one on the drive. See figure 4 on page 8.

11. Reassemble the drive assembly back into the Z100 system.
    Connect the power cables to all drives and the flat cable(s)
    to the floppy drive(s). Anchor with the four screws and two
    locking pins removed in disassembly (Figure 2).

12. Insert the end marked Al of the 64 position ribbon cable
    onto the gold fingerboard of the Western Digital controller
    card. Pin 1 of the cable, marked with a striped edge, must
    be located on the right as you look at the component side of
    the board. See figure 6 on page 10.

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13. Insert the 34 position hard disk cable onto J1 of the
    Western Digital controller board. Pin 1 is on the left of
    header J1. Likewise connect the 20 position hard disk cable
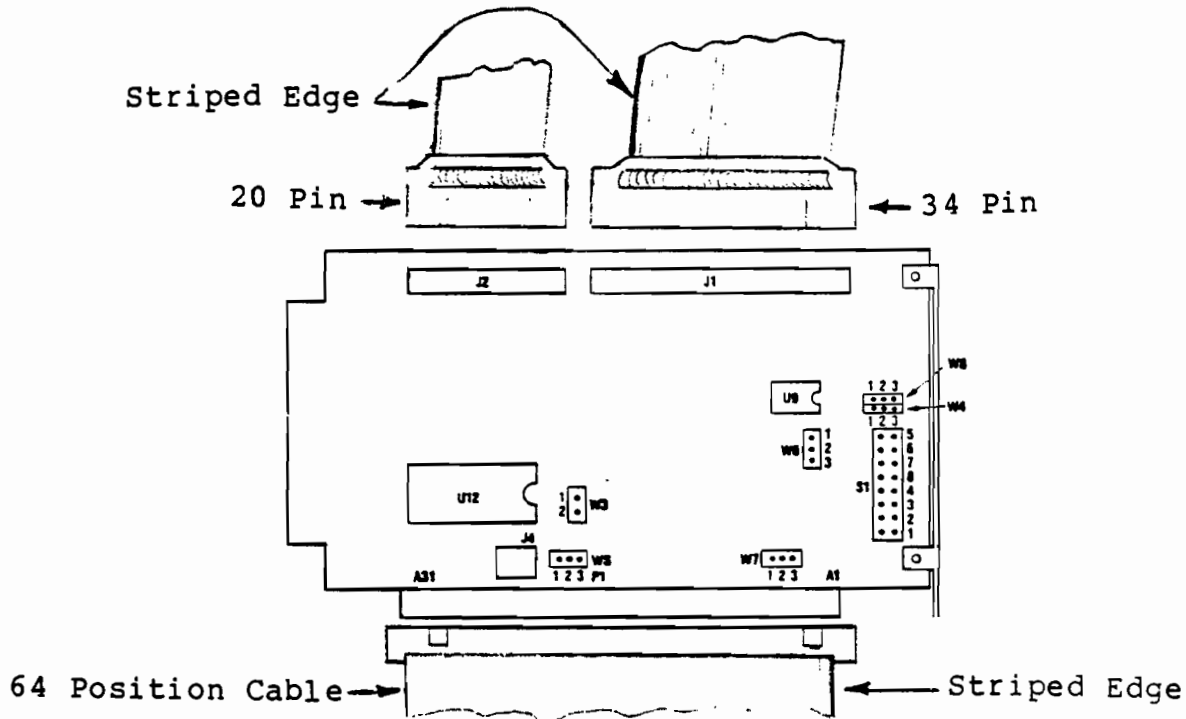   to J2. Pin 1 is also on the left of J2. See figure 6.

Figure 6
Western Digital Controller Cable Connections

14. Strip the protective paper off the four sticky foam stand
    offs on the back of the WD controller card. Position the
    card over the hard disk case and press firmly onto the hard
    disk case. (If your Western Digital controller was not
    purchased from UCI, the card will not have the foam stand
    offs on the back. Adhesive foam tape can be used and is
    available at any department store.) This complete installa-
    tion of the WD controller.

15. Insert the EasyWIN intelligent interface board into a free
    S-100 slot on the motherboard. Flip the 64 pin edge card
    cable attached to the WD controller's fingerboard over.
    Align pin 1 (striped edge) over B1 on fingerboard P2 of the
    interface board. Press down on the connector firmly until
    seated. See figure 7.

16. Fold or tie any loose cables so cabinet can be reassembled.

17. Reassemble the cabinent top. The installation of the
    EasyWIN is now complete. Proceed to the operation section
    of this manual.
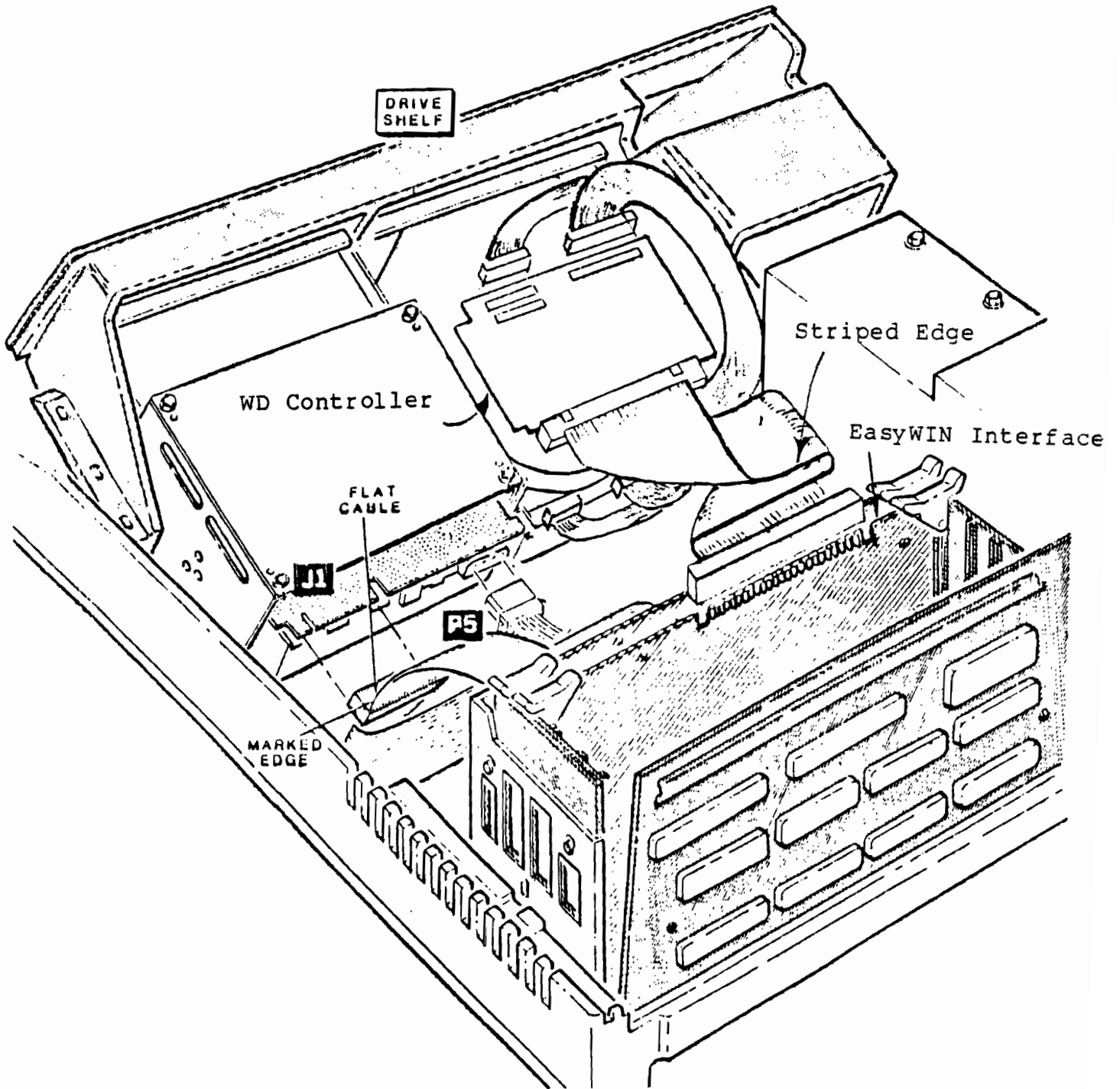
Figure 7
Interface and Controller Board Installation

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1. Disconnect all line cords and peripherals to your computer.

2. Move the metal slides on each side of the computer toward the back 1/4 inch with a flat headed screwdriver (see illustration).

3. Lift cabinet top off and set it aside.
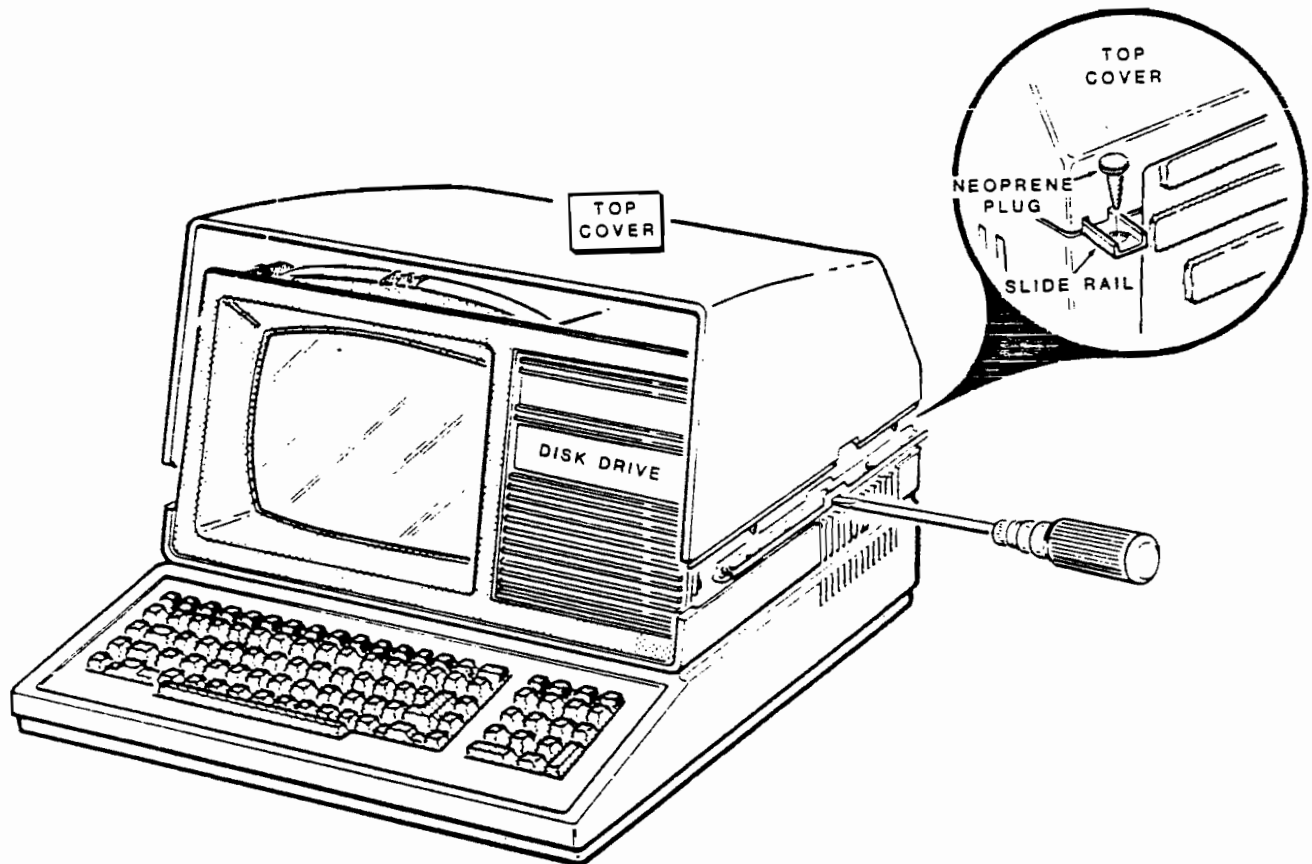
Figure 8
All-in-One Cabinet Removal

12

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4. Remove the one screw labeled A and the four screws labeled B.
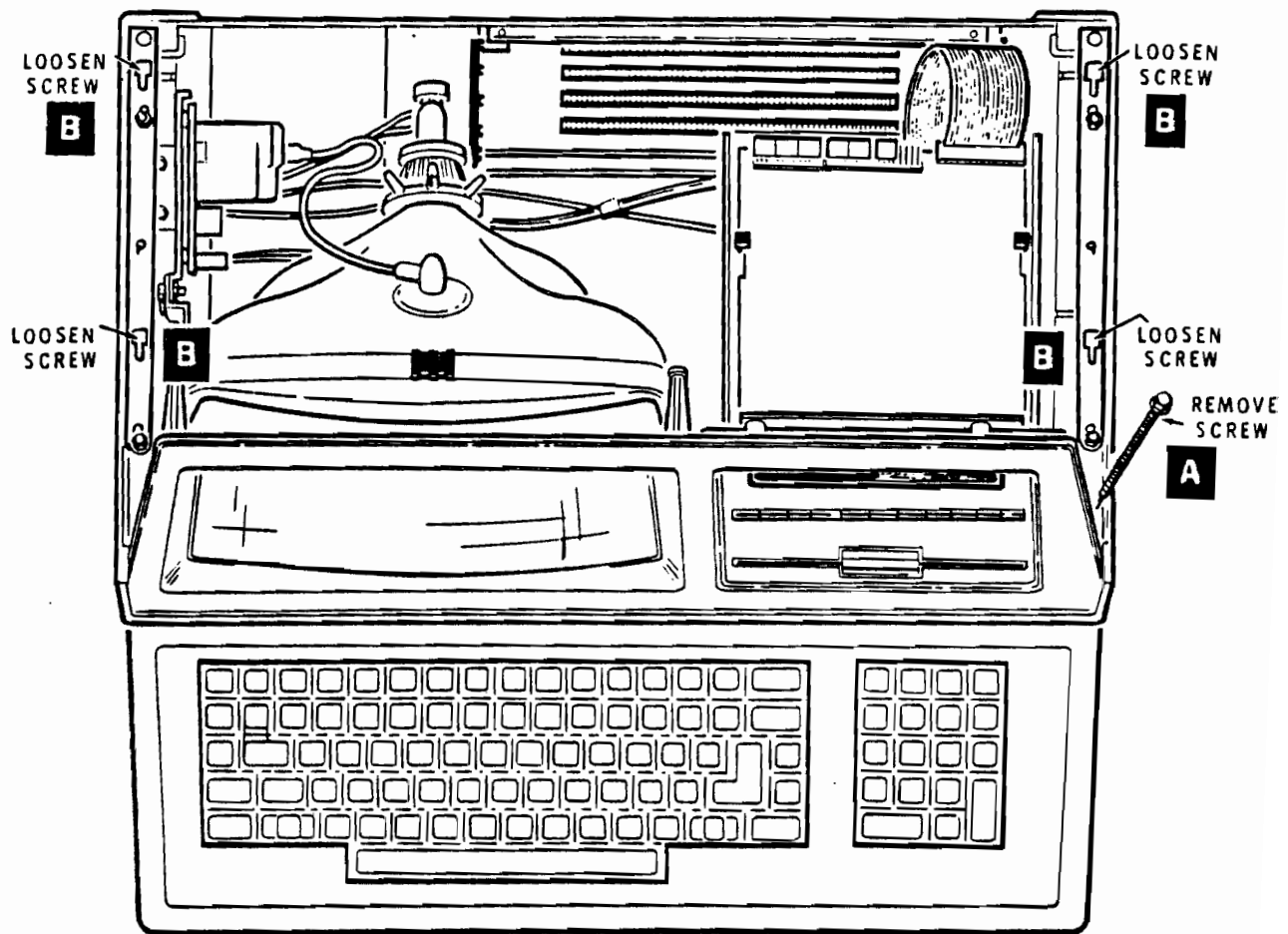
Figure 9
All-in-One Front Panel Assembly Removal

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5. Lift the display and disk drive assembly up and forward
   slightly to reach the connectors. Remove the flat cable
   from the floppy disk controller card, the power supply
   cable(s) at the drive(s), and the video signal/power cable
   on the video deflection board. Lift the entire assembly and
   place it face down on a flat working surface.
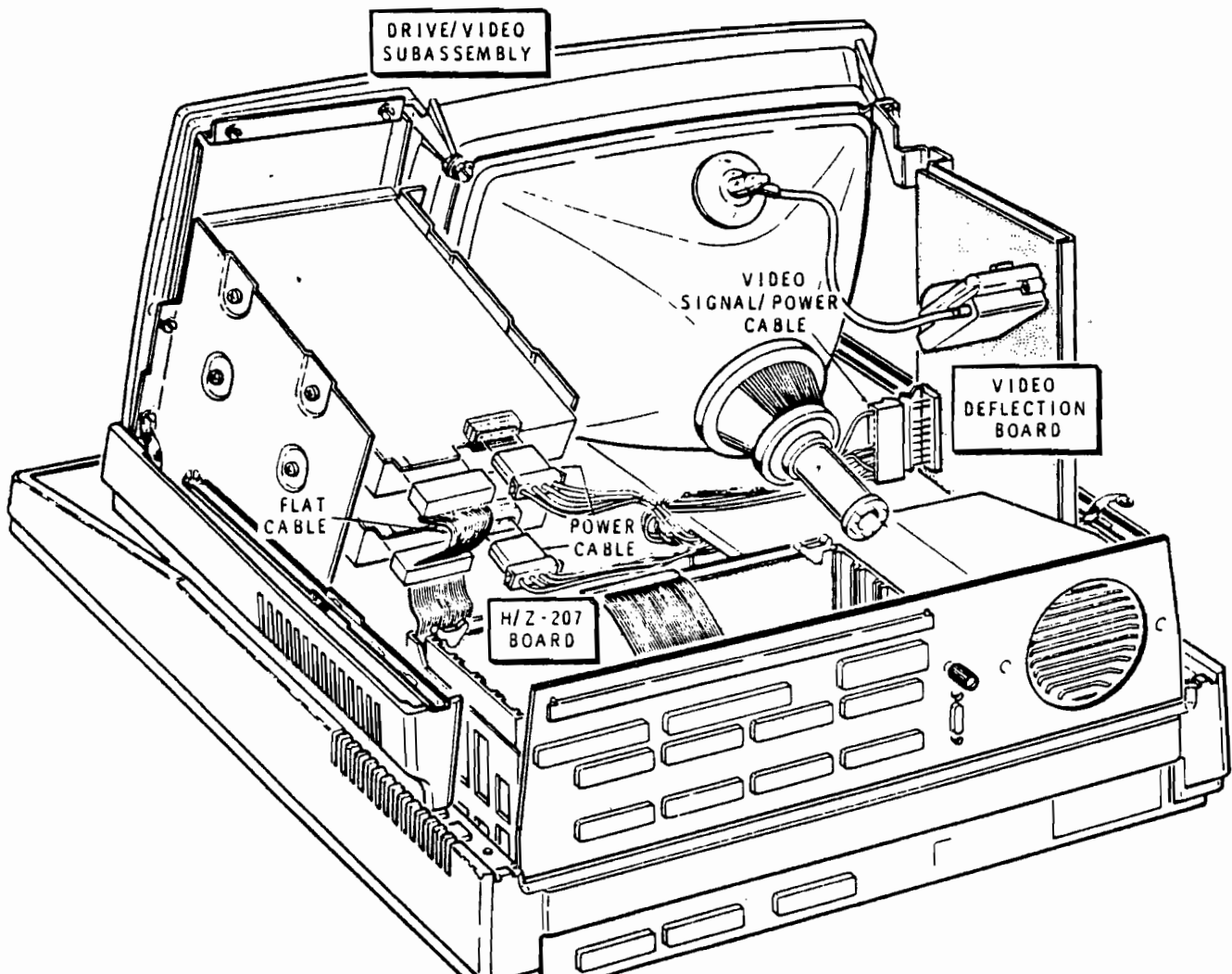
Figure 10
All-in-One Cable Disconnect

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6. To remove the disk drive assembly, remove the six screws (A)
   which hold the disk drive assembly to the front panel, and
   the four screws (B) underneath which secure it to the drive
   shelf.
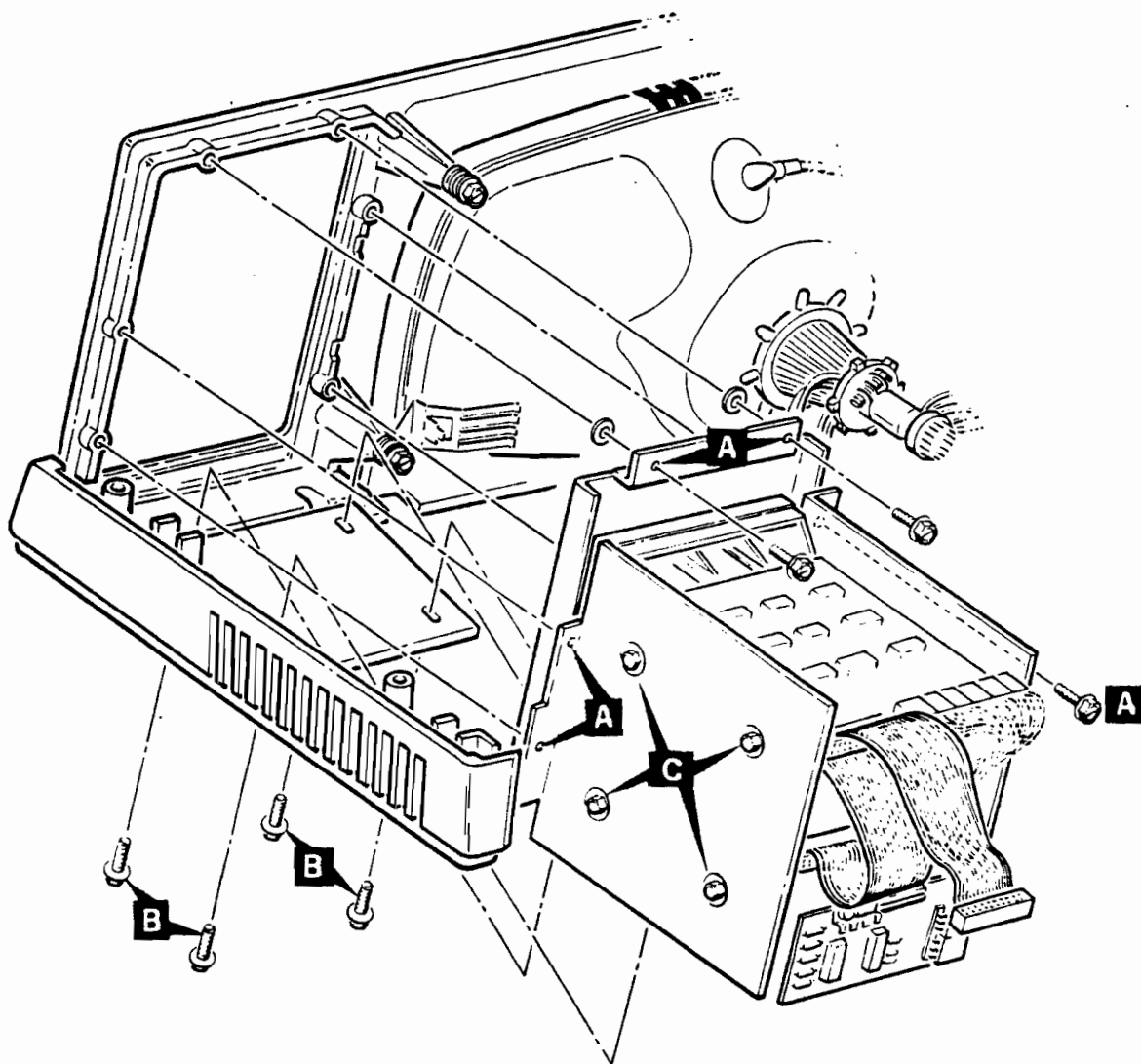
Figure 11
Disk Drive Removal

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7. Examine your hard disk drive.   If a single hard drive is to
   be installed, be sure the drive select jumper is set on DS1,
   drive select one.   If a second hard disk is to be installed,
   set the jumper on the second drive to DS2, drive select two,
   and remove the second resistor terminator pack.   For Seagate
   200 and 4000 series drives see figure 4 on page 8.

8. Depending on your floppy drive configuration, serveral
   options are available for mounting the hard disk drive.

   Floppy Drive   Hard Disk
   Configuration   Location
   ------------------   ---------------------------------------
   1 Full Height   Under the floppy

   2 Full Height   Remove lower floppy, replace with hard
                             drive

   1 Half Height   Either above or below floppy

   2 Half Height   Below second floppy

   Figure 12 and 13 show the details.   NOTE: Unless you have
   the proper escutcheon or face plate, the front bezel on the
   hard disk drive will have to be removed in order for the
   drive chassis to be reassembled.
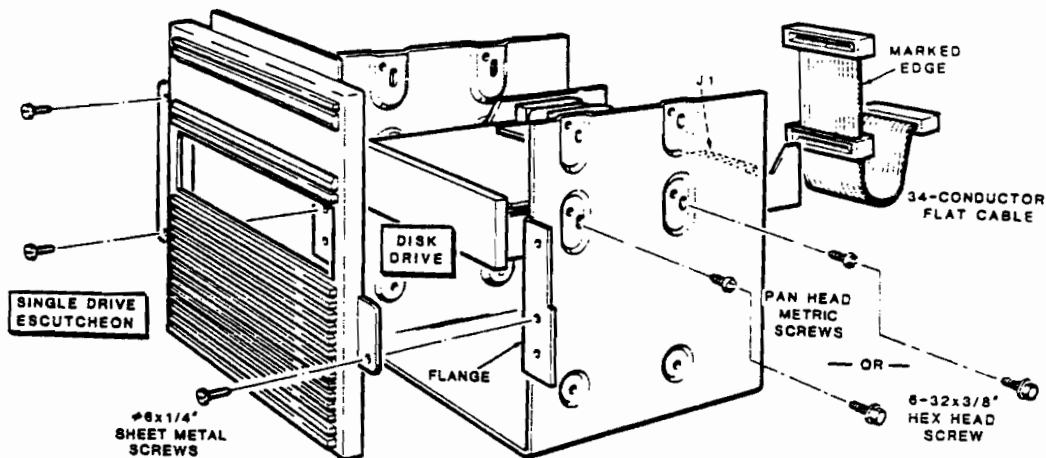
Figure 12
Single Floppy Drive Assembly
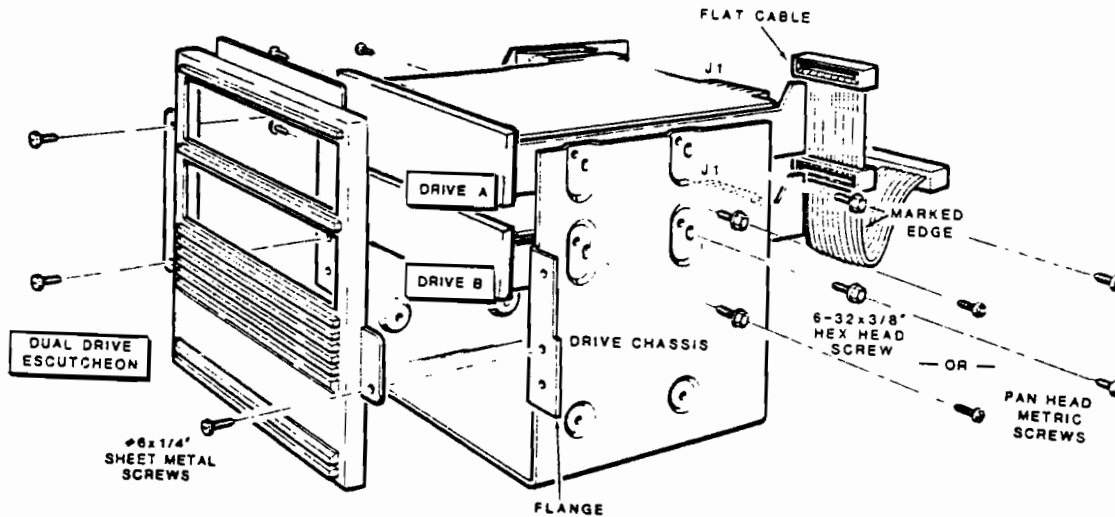
Figure 13
Dual Floppy Drive Assembly

9. After mounting the hard disk drive connect the hard disk
   cables to the drive. The large 34 position ribbon cable is
   attached to Jl on the circuit board of the hard drive and
   the small 20 position ribbon cable is attached to J2 on the
   circuit board of the hard drive. The striped edge on the
   cables represent pin one. The notch on the circuit board of
   the hard disk also represents pin one. Pin one on the cable
   set must connect to pin one on the drive. See figure 4 on
   page 8.

10. Locate the the 64 position ribbon cable. Insert the end
    marked Al onto the gold fingerboard of the Western Digital
    controller card. Pin 1 of the cable, marked with a striped
    edge, must be located on the right as you look at the
    component side of the board. See figure 6 on page 10.

11. Insert the 34 position hard disk cable onto Jl of the
    Western Digital controller board. Pin 1 is on the left of
    header Jl. Likewise connect the 20 position hard disk cable
    to J2. Pin 1 is also on the left of J2. Again see figure 6
    on page 10.

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12. Strip the protective paper off the four sticky foam stand
    offs on the back of the WD controller card. Position the
    card over the hard disk case and press firmly onto the hard
    disk case. (If your Western Digital controller was not
    purchased from UCI, the card will not have the foam stand
    offs on the back. Adhesive foam tape can be used and is
    available at any department store.) This complete installa-
    tion of the WD controller.

13. Reassemble the floppy drive(s) into the chassis. Reassemble
    the drive chassis and front panel assembly back into the
    system. Reverse the disassemble procedures described above.
    Be sure to connect the power cables to all drives and the
    flat cable(s) to the floppy drive(s). (For a three drive
    system, a Y power cable is required.)

14. Insert the EasyWIN intelligent interface board into a free
    S-100 slot on the motherboard. Flip the 64 pin edge card
    cable attached to the WD controller's figerboard over. Align
    pin 1 (striped edge) over B1 on figerboard P2 of the
    interface board. Press down on the connector firmly until
    seated. See figure 14.

16. Fold or tie any loose cables so cabinet can be reassembled.

17. Reassemble the cabinent top. The installation of the
    EasyWIN is now complete. Proceed to the operation section
    of this manual.

WD Controller

VIDEO
DRIVER
BOARD

P101

DRIVE B

MARKED
EDGE

EasyWIN Interface
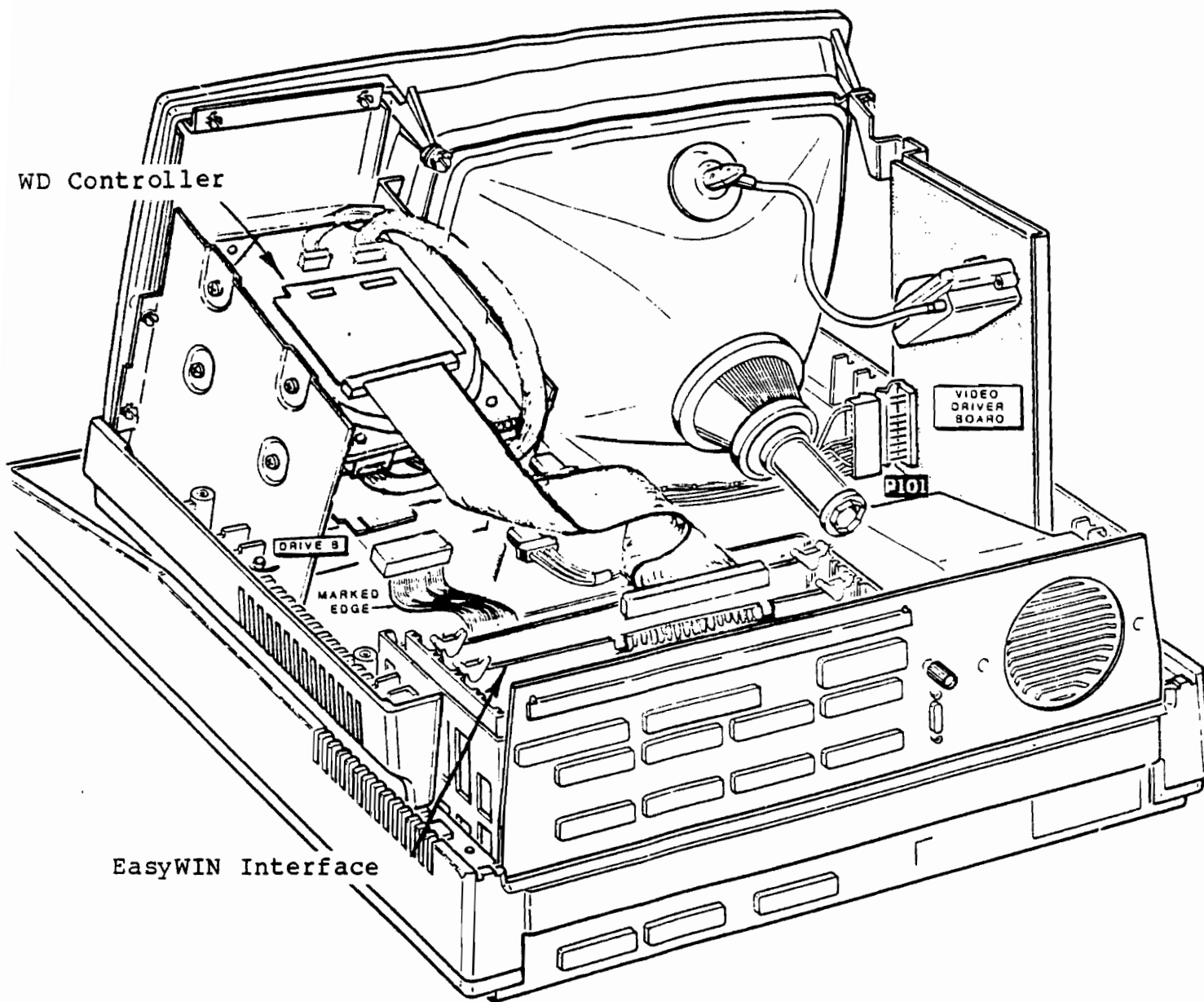
Figure 14
Interface and Controller Board Installation

----

1. Disconnect all line cords and peripherals to your computer.

2. Move the metal slides on each side of the computer toward
   the back 1/4 inch.

3. Lift cabinet top off and set it aside.

Figure 15
Low Profile Cabinet Removal

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4. Locate the the 64 position ribbon cable. Insert the end marked A1 onto the gold fingerboard of the Western Digital controller card. Pin 1 of the cable, marked with a striped edge, must be located on the right as you look at the component side of the board. See figure 6 on page 10.

5. Strip the protective paper off the four sticky foam stand offs on the back of the WD controller card. Position the card over one of the floppy disk drive shields and press firmly onto the disk shield as shown. (If your Western Digital controller was not purchased from UCI, the card will not have the foam stand offs on the back. Adhesive foam tape can be used and is available at any department store.)
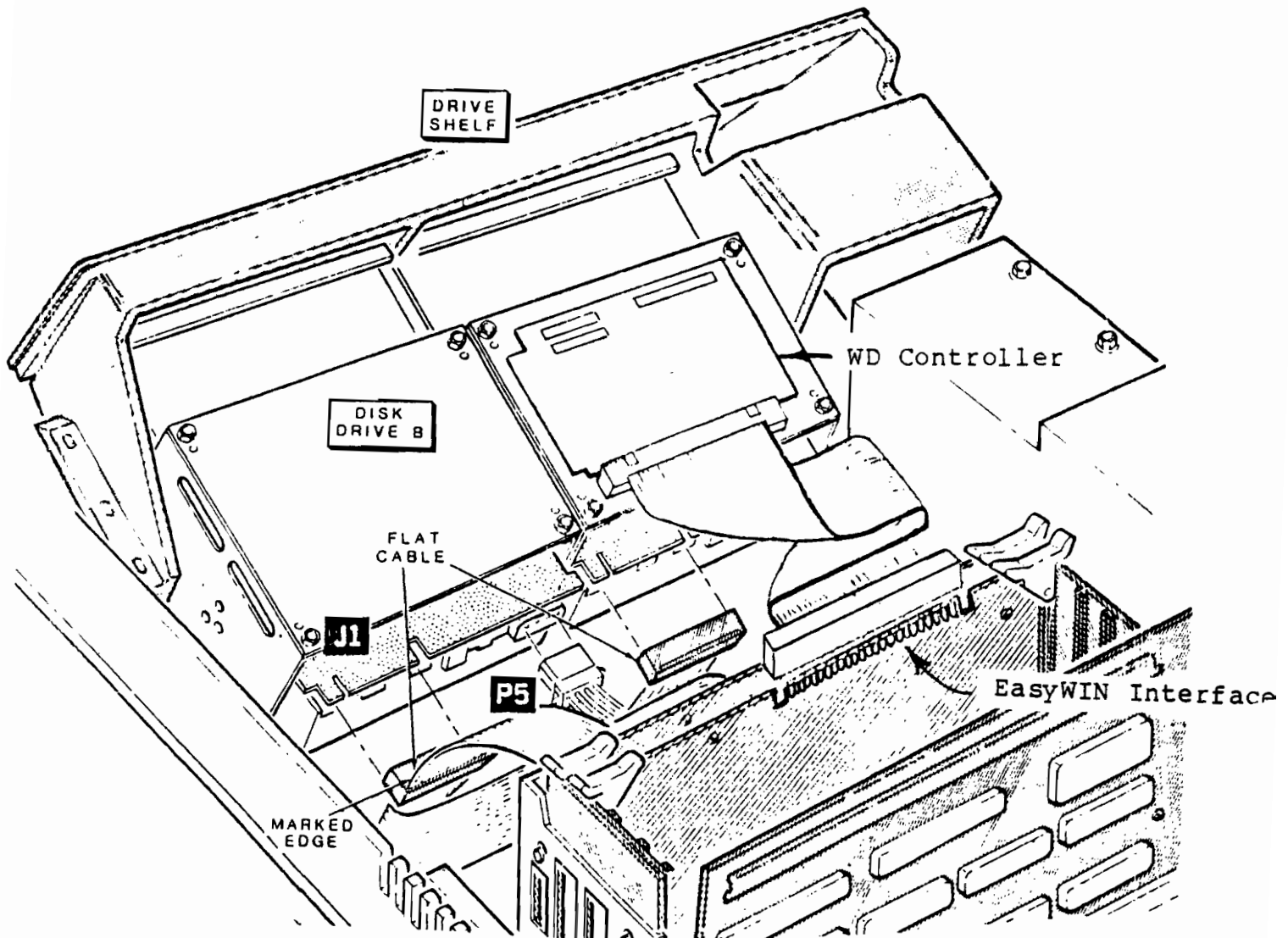
Figure 16
Interface and Controller Board Installation

----

6. Insert the EasyWIN intelligent interface board into a free
   S-100 slot on the motherboard.   Flip the 64 pin edge card
   cable attached to the WD controller's fingerboard over.
   Align pin 1 (striped edge) over B1 on figerboard P2 of the
   interface board.   Press down on the connector firmly until
   seated. See figure 16.

7. Remove cable clamp bar on the rear panel of the Z-100
   chassis.

8. Thread the female socket ends of the two shielded hard disk
   cables from the external hard disk chassis through the long
   cable clamp opening. (If a complete external EasyWIN system
   was purchased from UCI, the hard disk with its cables were
   assembled in the external chassis at the factory.   If you
   purchased the disk drive or chassis from another vendor, you
   will have to mount the drive(s) and cables yourself. Follow
   the instructions provided with your expansion chassis.)

9. Insert the 34 position hard disk cable onto J1 of the
   Western Digital controller board.   Pin 1 is on the left of
   header J1. Likewise connect the 20 position hard disk cable
   to J2.   Pin 1 is also on the left of J2. See figure 6 on
   page 10.

10. Reassemble the cable clamp bar.

11. Reassemble the cabinet top.   The EasyWIN is now completely
    installed. Proceed to the operation section of this manual.

DRIVE SHELF

DISK DRIVE B

FLAT CABLE

J1

P5

External Chassis

20 Pin Shielded

34 Pin Shielded
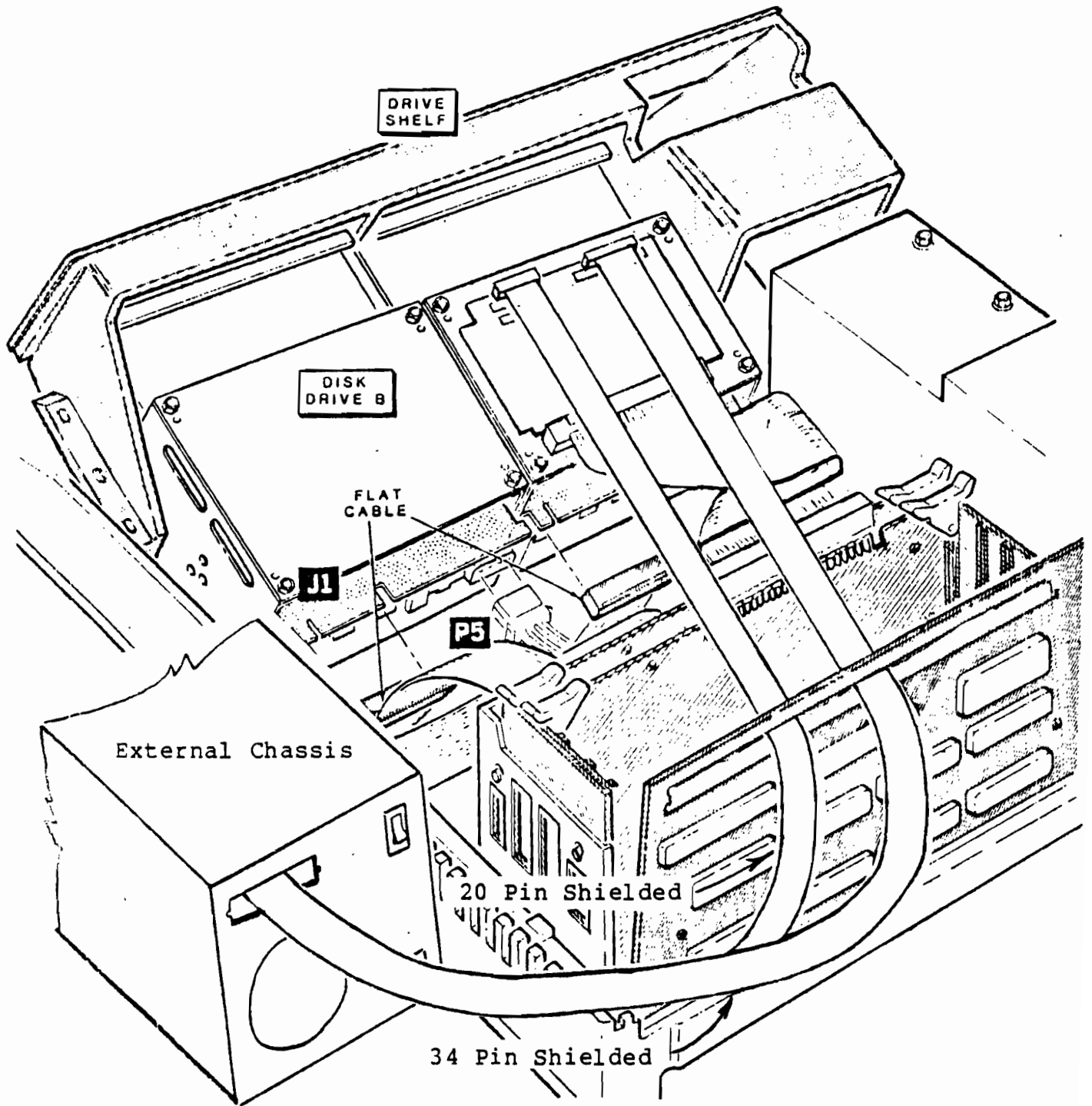
Figure 17
External Chassis Cable Installation

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1. Disconnect all line cords and peripherals to your computer.

2. With a flat headed screwdriver move the metal slides on each side of the computer toward the back 1/4 inch.
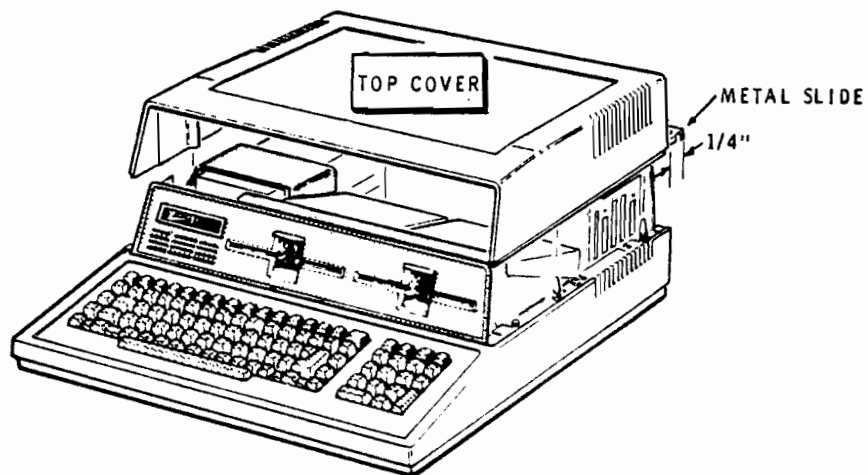
3. Lift cabinet top off and set it aside.
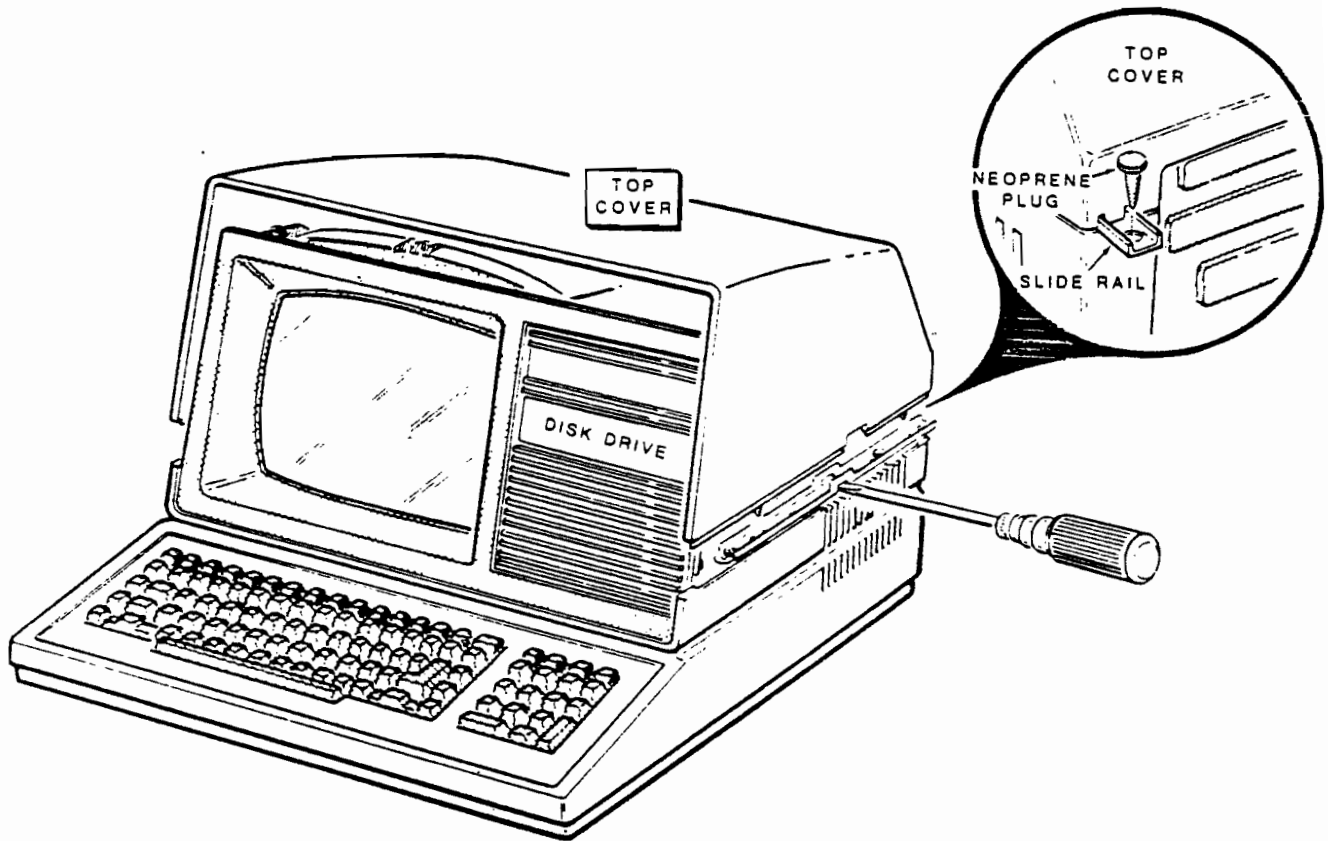
Figure 18
All-in-One Cabinet Removal

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4. Remove the one screw labeled A and the four screws labeled B.

LOOSEN
SCREW
B

LOOSEN
SCREW
B

LOOSEN
SCREW
B

LOOSEN
SCREW
B
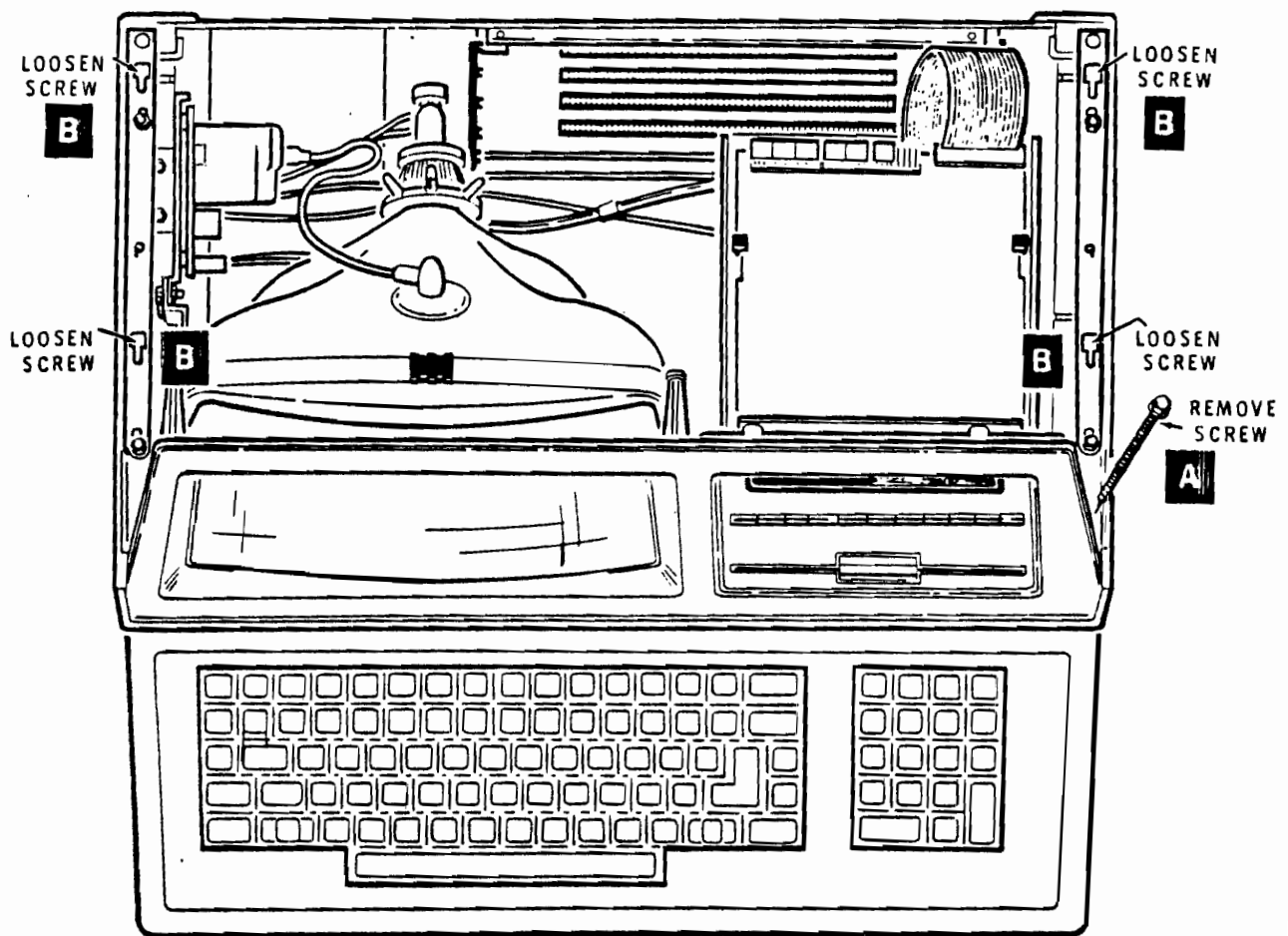
REMOVE
SCREW
A

Figure 19
All-in-One Front Panel Assembly Removal

5. Lift the display and disk drive assembly up and forward slightly to reach the connectors. Remove the flat cable from the floppy disk controller card, the power supply cable(s) at the drive(s), and the video signal/power cable on the video deflection board. Lift the entire assembly and place it on a flat working surface.
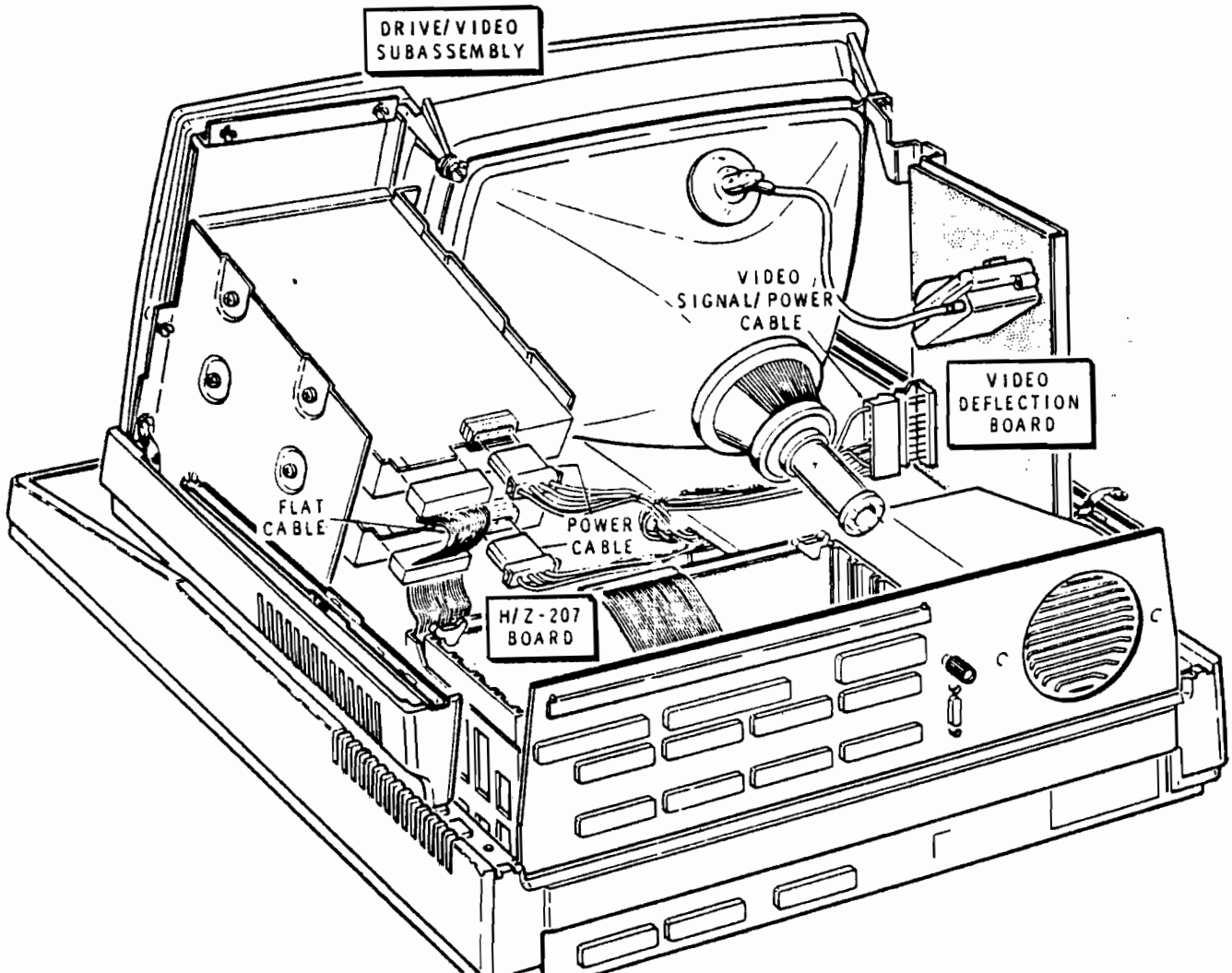
Figure 20
All-in-One Front Panel Cable Disconnect

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6. Locate the the 64 position ribbon cable. Insert the end
   marked Al onto the gold fingerboard of the Western Digital
   controller card. Pin l of the cable, marked with a striped
   edge, must be located on the right as you look at the
   component side of the board. See figure 6 on page 10.

7. Strip the protective paper off the four sticky foam stand
   offs on the back of the WD controller card. Position the
   card over the base of the floppy disk drive chassis and
   press down firmly. (If your Western Digital controller was
   not purchased from UCI, the card will not have the foam
   stand offs on the back. Adhesive foam tape can be used and
   is available at any department store.)
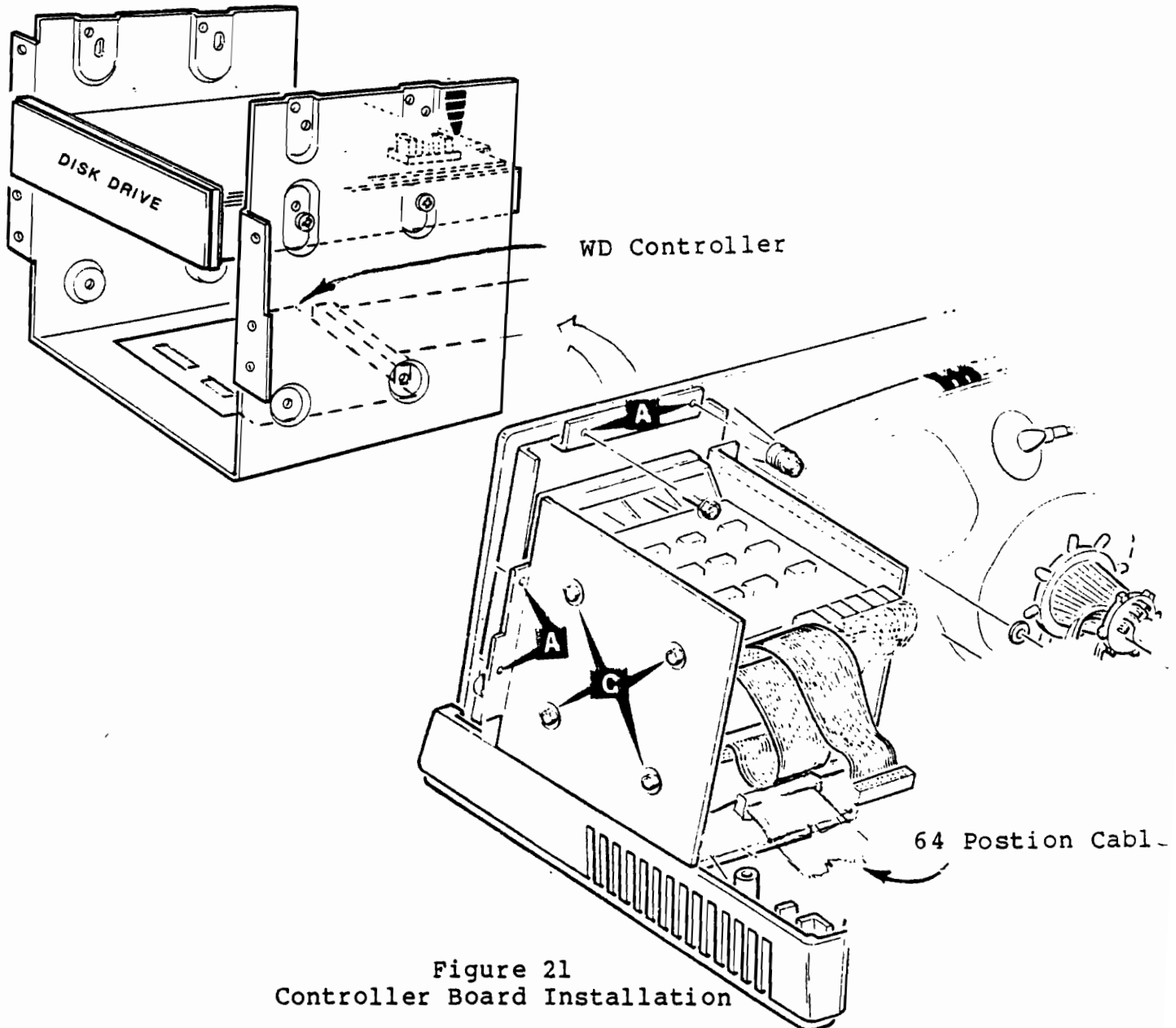
Figure 21
Controller Board Installation

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8. Insert the EasyWIN intelligent interface board into a free
   S-100 slot on the motherboard.

9. Remove cable clamp bar on the rear panel of the Z-100
   chassis.

10. Thread the female socket ends of the two shielded hard disk
    cables from the external hard disk chassis through the long
    cable clamp opening. (If a complete external EasyWIN system
    was purchased from UCI, the hard disk with its cables were
    assembled in the external chassis at the factory. If you
    purchased the disk drive or chassis from another vendor, you
    will have to mount the drive(s) and cables yourself. Follow
    the instructions provided with your expansion chassis.)

11. Place the front panel assembly on the system chassis. Move
    it forward slightly so you can reach the WD controller card.
    Insert the 34 position hard disk cable onto J1 of the
    Western Digital controller board. Pin 1 is on the left of
    header J1. Likewise connect the 20 position hard disk cable
    to J2. Pin 1 is also on the left of J2. See figure 6 on
    page 10.

12. Reassemble the front panel assembly to the system chassis.

13. Locate the free end of the 64 pin edge card cable attached
    to the WD controller. Flip the cable over and align pin 1
    (striped edge) over B1 on figerboard P2 of the EasyWIN
    interface board. Press down on the connector firmly until
    seated. See figure 22.

14. Reassemble the cable clamp bar.

15. Reassemble the cabinet top. The EasyWIN is now completely
    installed. Proceed to the operation section of this manual.

External Chassis

DRIVE A

J1

P4

J1

VIDEO
DRIVER
BOARD

P101

20 Pin Shielded

34 Pin Shielded
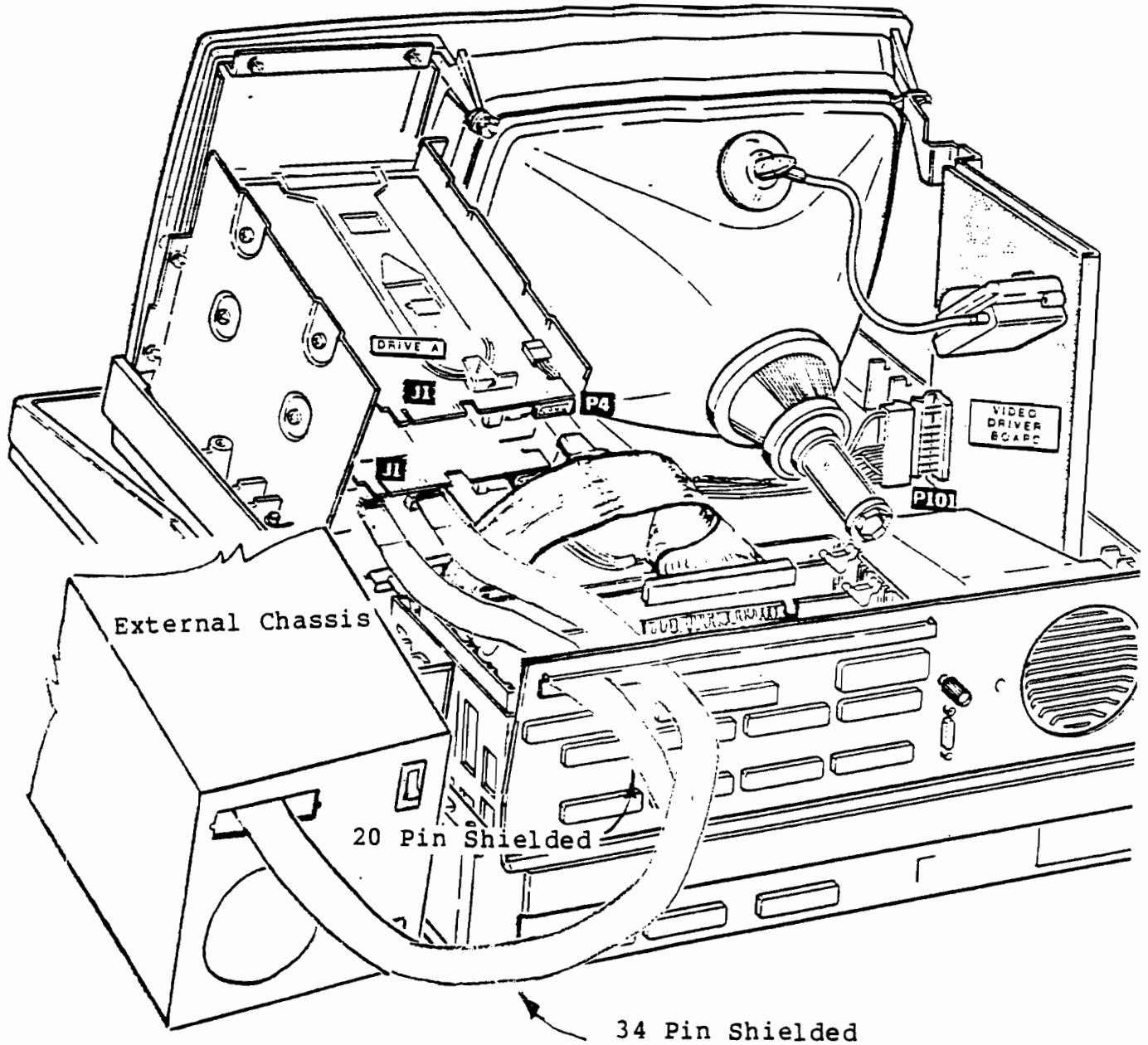
Figure 22
Interface Board and External Cable Installation

Power Up

Your Z-100 system can be set to autoboot from the EasyWIN
Winchester drive. However, the first time you use the system,
the Winchester will not be ready to use because it will not yet
contain an operating system. It is also possible that it may not
have been initialized or partitioned.

The UTILITIES

A utility program called UCIWIN.COM is supplied with each EasyWIN
system.   It consists of four parts - SHIP, DETECT, PART, and
INIT.   Be sure to make a backup of the Utility disk before using
it.   The UCIWIN utility is designed to allow you to use up to
four Winchester disk drives in your system.

The INIT utility allows you to initialize the surface of your
Winchester disk. It will also allow you to check for bad sectors
and "lock out" any that are found.   In addition, INIT will pre-
allocate two "standard" partitions (described later) for
immediate use.

The PART utility allows you to redefine the partitions of your
Winchester disk.

The DETECT utility checks the surface of your Winchester disk for
bad sectors and "lock out" any that are found.   Where INIT
destroys the data you have on the disk, DETECT does not.

The SHIP utility is supplied so you can place the heads in your
system over an unused portion of the Winchester disk.   This
utility should be used whenever you move your computer, even a
short distance.

All four parts of the UCIWIN utility program run from a master
menu.   After you have made a backup copy of the utility disk,
insert the backup copy into the floppy disk drive. Type:

        UCIWIN

and press return. The screen will display the following menu.

Winchester Disk Utilities Program

for Zenith Z-100 Computer

by UCI Corporation

Copyright 1987

Menu

1. SHIP - MOVE HEADS OF SELECTED DRIVE TO THE PARK POSITION

2. DETECT - RUN AFTER INITIALIZATION TO DETECT BAD SECTORS

3. PART - PARTITION MAINTENANCE

4. INIT - INITILIZE SURFACE OF WINCHESTER DRIVE, BE SURE TO
          INSTALL FORMAT ENABLE JUMPER ON YOUR CONTROLLER.
          CAUTION INIT UTILITY WILL DESTROY ALL DATA
          RECORDED ON DRIVE.

Select Operation (1,2,3,4) or any other key to exit... ___

To run any of the four utilities, enter the appropriate number
and press return.   The program will prompt you for   the
information required for each utility.

Disk Initialization (INIT)

The surface of the Winchester disk must be initialized before you
can use it in a system.   This is similar to the FORMAT command
and procedure, except that typical operating system information
(headers, labels, boot code and directories) for a specific
system is not written onto the disk. In addition, INIT will test
the surface and set up standard partitions.   Two are set up -
approximately equal in size - so it is not necessary to run the
PART utility unless you want to use some other partitioning
arrangement.

You need to be aware that while INIT does test the surface of the
disk for retention of data, it will also destroy any data that
you have recorded on the Winchester disk system.   If you do not
want to destroy the data on your disk, but still want to test the
disk for data retention capabilities, you may run the DETECT
utility.   This utility does not destroy the current data .and
partitions that are set up on your Winchester disk, but it does

test for and flag those sectors that are bad so that they can be "locked out" later.

Before you can run the INIT utility, you must set jumper J6 on the EasyWIN interface board. If the jumper is not set, your Winchester disk can not be accidentally initialized. Therefore, the jumper acts as a safety feature for any files that may be on the disk. If you wish to run INIT refer to the Jumper and Switch Setting section of this manual.

Features of INIT

The INIT utility enables you to:

- Initialize the surface of the Winchester disk.
- Test the data retention capabilites of your Winchester disk.
- Isolate questionable disk sectors.
- Divide the surface of the Winchester disk into two equal part-
  itions.

INIT Operation

If your Winchester disk does not contain initialization information, INIT will prompt you to enter characteristics in order to identify the type of Winchester disk you have in your computer. The INIT will display messages that tell you what is happening as it "prepares" and tests your disk. A chart of typical Winchester disk parameters is supplied in Appendix C. Refer to it for the specific answers to the INIT prompts.

Note: INIT requires at least 3 1/2 hours to complete for a 20 MB drive.

Caution: Using INIT will destroy all the files that may exist on your Winchester disk. Do not use INIT until you have backed up the information on your Winchester disk to floppy disks or tape.

Select operation number 4 on the screen menu and press return: You will see the following display:

        Enter Winchester Drive Number (1,2,3,4):__

Remember up to four separate drives can be supported by the EasyWIN controller. Enter the number that represents the disk drive that you wish to initialize and then press the return key.

Next the INIT utility will ask:

        Are you using a RLL controller ? Y/N:__

A RLL controller is a specific type of controller for Winchester
disks. The run lenght limited (RLL) encoding/decoding scheme
increases Winchester capacity by 50%. The EasyWIN intelligent
interface board was designed to work with the Western Digital
1002-27X RLL controller. If this is the type of controller in
your system, type "Y" and press return. If not, type "N" and
press return.

Next, the screen will display:

        Enter maximum number of heads (4 to 16):__

Enter the number of heads corresponding to the type of Winchester
drive in your system (appendix C) and press return.

The screen will display:

        Enter maximum number of cylinders:__

This number is equal to the total number of tracks per platter.
Enter the number and press return.

The screen will now display:

        Enter Reduced Current Cylinders:__

Toward the hub of a hard disk, where the circumference of each
track is smaller, some Winchester systems require that less
electrical current be applied to the write head to avoid having
magnetic pulses overlap adjacent tracks. Enter the number
required for your particular drive and press return.

Next the screen will display:

        Enter Precompensation Cylinders:__

Disk storage devices operate by creating magnetically polarized
areas on the disk surface that correspond to the presence or
absence of "bits" in the information being stored. Since "like"
charges repel and "unlike" charges attract, it is possible for
the charged areas on the disk surface, which represent the data,
to "shift" slightly if they are closely spaced after being
recorded. If such shift occurs, reduced reliability will result.

Precompensation refers to the intentional shifting of data during
the recording process so the combined result of precompensation
and the natural shift (which cannot be prevented) places the data
in the desired position. On the outer tracks of the disk, the

spacing between bits is great enough so no significant shifting occurs and precompensation is not required. However, since the inner tracks have a smaller circumference, the bits are closer together and precompensation is required to maintain acceptable reliability. Enter the cylinder number where precompensation must start and press return.

Next, the screen will display:

        Enter parking cylinder number:__

Enter the cylinder number where the SHIP utility will move the read/write head. Press the return key.

The screen will now display:

        Enter Step Rate Code (1-7):__

Enter the rate code at which the read/write heads step between tracks and press return. UCI recommends the value of 1.

Next, the screen will display:

        Enter Interleave Factor (1 to 17)

Enter the interleave factor desired and press return. UCI recommends the factor of 4.

An additional feature of the UCIWIN INIT utility is to allow you to bypass the media test portion of the initialization. This is called Fast INIT. The user, however, must exercise caution in using the Fast INIT option since it will not detect bad sectors. Fast INIT should only be used if the drive is known to contain no bad sector and is being re-initialized.

        Use fast INIT - Bypass media test, will not detect bad
        sectors (Y/N)...

Now that the necessary information for your hard disk has been supplied, the program will initialize the surface of the disk for the tests that follow. The initialization process is similar to that used by the DOS FORMAT dommand in that the surface of each disk is organized into tracks and sectors. In addition, a "map" is also prepared for keeping track of any sectors that are found to be bad.

During the initializing process, you will see the following display on the screen:

        Intitializing Drive

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If you have not move jumper J6 on the EasyWIN interface board,
the system will immediately display:

     Error During INIT

and return to the DOS prompt. To run the INIT utility, jumper J6
must be properly set on the EasyWIN interface board.

After initializing the drive, the INIT utility will test the
drive 5 times (unless the Fast INIT option was exercised). Each
test is known as a pass. The five passes of the test that are now
performed are conducted to check the integrity of the disk's
storage capability. During each pass, INIT will write a prede-
termined code in each sector and then will read back that code to
verify that it remained correct. During each test INIT will
display the pass number and the number of kilo bytes.

     Media Test Pass 1 (or 2 or 3 or 4 or 5) nnnnnn

INIT uses a different code on each pass it makes through the
test. If INIT finds questionable areas on the disk, it stores
the address where the error occurred, and later places these
addresses into a bad sector table.

When INIT has finished the five passes, two superblocks and two
bad sector tables are recorded on the disk. While it is doing
this, the following is displayed:

     Completed
     Initializing Disk

A superblock is a portion of the disk surface (on cylinder 0)
that is used to keep track of the disk partition names, the
operating system name assigned to each partition, a flag that is
used to show whether the partition has been formatted or not, and
a pointer (or number) for the first sector of that partition.
The superblock is recorded twice on the Winchester disk. Each
copy is written with a different disk head so that the copies are
physically isolated from each other. If something occurs to
damage one copy of the superblock, the other may remain usable.

During the test passes, INIT kept a record of any bad sectors.
After the tests are finished and the superblocks have been
written, INIT will write the bad sector table. As with the
superblock, the table is recorded twice, each with a separate
read/write head. The bad sector tables are used to flag all
known bad sectors and lock them out or prevent them from being
used by the system for data storage. It is normal to have a
small number of bad sectors out of the thousands on the typical
Winchester disk.

The INIT Utility Continued

After initializing the drive, the utility will display the
following:

        Completed
        INIT Successful, Return to Menu (Y/N)...__

A Y for yes will return you to the Utility Menu, a N for no will
return control to the DOS system.

A typical screen running the INIT utility will appear as shown.

                              Menu

    1. SHIP - MOVE HEADS OF SELECTED DRIVE TO THE PARK POSITION

    2. DETECT - RUN AFTER INITIALIZATION TO DETECT BAD SECTORS

    3. PART - PARTITION MAINTENANCE

    4. INIT - INITILIZE SURFACE OF WINCHESTER DRIVE, BE SURE TO
              INSTALL FORMAT ENABLE JUMPER ON YOUR CONTROLLER.
              CAUTION INIT UTILITY WILL DESTROY ALL DATA
              RECORDED ON DRIVE.

Select operation (1,2,3,4) or any other key to exit... 4
Enter Winchester drive number (1,2,3,4): 1
Are you using a RLL controller (Y/N) ? N
Enter maximum number of heads (4 to 16): 4
Enter Maximum number of cylinders: 612
Enter reduced current cylinders: 612
Enter precompensation cylinders: 256
Enter parking cylinder numnber: 614
Enter step rate code (1 to 7): 1
Enter interleave factor (1 to 17): 4
Use fast INIT - Bypass media test, will not detect
bad sectors (Y/N)...
Initializing drive
Media test pass 5 nnnnn
Completed
INIT successful, Return to Menu (Y/N): N
A>

After INIT has been successfully completed, turn your computer
off and move jumper J6 to its former position. (See jumper
setting section on page 3)

NOTE: After using the EasyWIN utilities, you must reboot your
system in order for the Winchester drive to function.

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The PART Utiltiy

The PART utility enables you to change the names, number, and
sizes of Winchester disk partitions. It also allows you to
specify which partition you want accessed when your computer
boots up.

Partitions

Winchester disks have very large storage capacity when compared
to floppy disks. To make practical use of all this storage
space, partitions divide the disk space into more manageable
sizes. You can establish up to 16 partitions on your Winchester
disk. Each partition will be treated like an individual disk.
Therefore, you may have different operating systems on different
partitions. However, you may not have two different operating
systems on the same partiton.

Each of the two standard partitions that exists on your Winchest-
er disk after you run the INIT utility is approximately one half
of the total available Winchester disk space. Therefore, you do
not need to run PART before you can use your Winchester disk. If
equal partitions meet your needs, then install the operating
system.

Caution: If you make any changes to the size of the partitions on
your Winchester disk with PART, you will destroy existing data on
the disk. Therefore, if you have previously used the drive for
data storage, you should back up all necessary files from each
partition before using the PART program. If you do not change
the size of the partition but merely its name, operating system
or default boot partition, no data or software will be destroyed.

Features of PART

The PART utility enables you to establish and/or change the
following:

   - The name of the partition.
   - The name of the operating system to be used with each parti-
     tion.
   - The size of disk space allocated to each partition.
   - The name of the partition that is selected when you boot your
     computer system.

PART Operation

If you are going to establish several new partitions or rearrange existing partitions, then you will enter partition and operating system names and establish the amount of disk space for each partition. If you are setting up a new default boot drive, then you will only have to specify the desired partition.

To start the PART utility insert the EasyWin utiltiy disk into a floppy drive, type

        UCIWIN

and press the return key. The master menu will appear on the screen:

                              Menu

    1. SHIP - MOVE HEADS OF SELECTED DRIVE TO THE PARK POSITION

    2. DETECT - RUN AFTER INITIALIZATION TO DETECT BAD SECTORS

    3. PART - PARTITION MAINTENANCE

    4. INIT - INITILIZE SURFACE OF WINCHESTER DRIVE, BE SURE TO
              INSTALL FORMAT ENABLE JUMPER ON YOUR CONTROLLER.
              CAUTION INIT UTILITY WILL DESTROY ALL DATA
              RECORDED ON DRIVE.

    Select Operation (1,2,3,4) or any other key to exit... ___

Select opertion 3 and press return. The screen will display:

        Enter Winchester Drive Number (1,2,3,4)__

Enter the number of the disk drive you wish to PART and press the return key. The screen will clear and you will see a PART table apprear.

Partition Maintenance Utility by UCI Corporation

	Partition	System	Size (KB)
1.	Z-DOS	Z-DOS	10413
2.	CPM	CPM	10413·
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

Default boot partition Z-DOS;Z-DOS
 0. Return to MENU 1. Change Partition Data 2. Change Default Boot
    Partition
 Select Operation (0,1,2)...__

The table shows the partiton name, operating system name,
and size in kilobytes for each partition.

You will also see the partiton that is assigned to be the default
boot partition. Below that there is a short menu that will allow
you to select a different default boot partiton, change the
arrangement of your Winchester disk partitions, or return to the
main menu. Your choice is entered by pressing the 0, 1 or 2 key.

Modifying the Default Boot Partition

The default boot partition is the one that will be selected when
you boot your system without specifying a partition name.

To modify the default boot partition select 2 and press return.
The program will display:

        Enter Default Partition Number...__

Enter the number of the partition that you want to establish as
the default boot partition, and press the return key. The number
must be in the range 1 to 16 and have a partition name

established in the table. The screen will clear and the partition
table will reappear with the partition choosen as the default
boot partition.

A disk that has just been prepared with the INIT utility will be
set up with two partitions. The default boot partition will be
set to 1, Z-DOS;Z-DOS.

Partition Maintenance

This section will show you how to add partitions, remove
partitions, change the names of partitions and change the
size of each partition.

To select the partition maintenance option, select opertion 1,
change partition data and press return. The screen will display
the following:

        Enter partition number to be changed...__

Enter any number from 1 to 16 and press return. The program
will prompt you for the new partition name.

        Enter new partition name...__

Enter any name up to 16 characters in length and press return.
If you do not wish to change the system name simply press return.
The screen will now prompt you for the system name.

        Enter new system name...__

Enter any name up to 10 characters in length and press return.
Note: Z-DOS requires that you use Z-DOS as the operating system
name for those partition(s) that you plan to use with Z-DOS.
Operating system names are not mandatory except in the case of Z-
DOS and UCI's EasyPC. If you use the same partition name for
more than one partition, each partition must then have a
different operating system name. Again if you do not wish to
change the system name press return. The screen will display:

        Enter new partition size...__

Enter any size from 32K to the maximum amount of storage not yet
allocated and press return. (The size of any partition is limit-
ed to the size of the Winchester drive in your system less the
size of other partitions previously allocated.) If you should
enter a size greater than available, the program will display an
entry error and ask if you would like to re-enter. If you enter
a size that does not fully utilize the total capacity of the
drive, the portion of the drive unallocated will appear in the

----

partition table below the last partition established. Any
portion of the storage capacity that is unallocated, can at any
time be allocated by the PART utility. If you do not wish to
change the size of the partition press return. The screen will
display:

           Enter default partition number...__

Enter the number of the partition you desire for the default boot
partition. If you do not wish to change the default boot
partition press return. The screen will clear and the new
partition table will appear. If further changes are desired, the
partition maintenance process can be repeated. If no changes are
necessary select 0 and press the return key to return to the main
menu.

NOTE: After using the EasyWIN utilities, you must rebooted your
system in order for the Winchester drive to function.

The DETECT utility enables you to verify the integrity of your
Winchester disk. However, the tests performed by the system are
not destructive. That is, they will not destroy the data that is
recorded on your disk.

Several things could cause a sector to go bad during normal
operation of your system. They include subjecting the computer to
a physical shock (most common cause of sector failure), power
failure during the middle of a disk operation (unlikely) or
electronic component failure (very rare). When a power failure
causes a sector to go bad, you may be able to recover the use of
that sector by reformatting the partition, just as you would
reformat a floppy disk. However, you will want to backup your
data before you do this.

When a bad sector is located by the DETECT Utility, its location
will be stored in memory. At the end of the test, those sectors
that are found to be bad are added to the bad sector table that
was established by the INIT utility. However, the bad sector(s)
located by DETECT will not be locked out until you run your DOS
FORMAT program and reformat the partition. Remember the Format
command will destroy all data stored on the disk.

DETECT Operation

DETECT will take about 15 minutes to complete. During the DETECT
operation the screen will display the sectors being verified. To
use the DETECT utility, insert the utility disk into the floppy
drive and type

        UCIWIN

and press return. The screen will display the following master
menu:

                             Menu

    1. SHIP - MOVE HEADS OF SELECTED DRIVE TO THE PARK POSITION

    2. DETECT - RUN AFTER INITIALIZATION TO DETECT BAD SECTORS

    3. PART - PARTITION MAINTENANCE

    4. INIT - INITILIZE SURFACE OF WINCHESTER DRIVE, BE SURE TO
              INSTALL FORMAT ENABLE JUMPER ON YOUR CONTROLLER.
              CAUTION INIT UTILITY WILL DESTROY ALL DATA
              RECORDED ON DRIVE.

    Select Operation (1,2,3,4) or any other key to exit... ___

Select operation number 2 for DETECT and press return.

The DETECT Utility Continued

The screen will now display:

        Enter Winchester Drive Number (1,2,3,4)...__

Enter the number that represents the disk drive that you wish to
verify and then press the return key. The system will start
testing the disk and will display:

        DETECT in Process, Please Wait nnnnn

The nnnnn represents the sector being verified. After
completion, the screen will display:

        DETECT COMPLETE
        # BAD SECTORS DETECTED AND WRITTEN TO BAD SECTOR TABLE

This message tells you if there were bad sectors located on your
Winchester disk. However, they have only been flagged at this
time and you may continue to access them, though you will
probably experience difficulties when your programs attempt to
use those sectors.

You should now back up your data on the disk and then reformat
your disk partitions using the appropriate operating system(s).
This operation will lock out the bad sectors so that you may be
assured of continued high performance from your Winchester
system.

The DETECT utility will also display

        Return to Menu (Y/N) __

A N for now will return you to the operating system, a Y for yes
will return you to the Winchester master menu.

The SHIP Utility is provided so that you may place the heads of
your Winchester system over a non-vital area of the disks.   Then
if the system is accidentally jarred during movement, damage will
be   limited to an area that is not used by your computer.   The
floating head design of Winchester drives makes them very
sensitive to physical shocks, which can damage the surface of the
disks.   Therefore, you should use this utility whenever you move
your Winchester disk system.

To operate the SHIP utility, insert the utiltiy disk into the
floppy drive and type

        UCIWIN

and press return.   The screen will display the following master
menu:

                              Menu

    1. SHIP - MOVE HEADS OF SELECTED DRIVE TO THE PARK POSITION

    2. DETECT - RUN AFTER INITIALIZATION TO DETECT BAD SECTORS

    3. PART - PARTITION MAINTENANCE

    4. INIT - INITILIZE SURFACE OF WINCHESTER DRIVE, BE SURE TO
              INSTALL FORMAT ENABLE JUMPER ON YOUR CONTROLLER.
              CAUTION INIT UTILITY WILL DESTROY ALL   DATA
              RECORDED ON DRIVE.

    Select Operation (1,2,3,4) or any other key to exit... ___

Select operation number 1 for SHIP and press return.   The screen
will now display.

        Enter Winchester Drive Number (1,2,3,4,)__

Enter the number that represents the disk drive that you wish to
move and then press the return key.   If you have more than one
disk drive, you will have to run this utility for each drive.

The system will correctly position the heads of the designated
drive over unused disk space and display:

        The HEADS OF THIS DRIVE HAVE BEEN MOVED TO THE PARK
        POSITION.

        Return to Menu (Y/N)__

When you start your system after running this utility, the
computer will automatically move the heads back to the correct
position over the disks.

Hardware Features

A Winchester disk drive system is a hard disk or fixed disk
storage system. The disk itself is a carefully machined and
polished metal platter that is coated with a magnetic material,
similar to that used by floppy disks and audio and video tape.

The read/write head records and reads information to and from the
surface of the disk. The head floats on a cushion of air above
the disk as it turns. The distance between the head and the
surface is so small that even a tiny particle could dause
irreparable damage to the disk. For this reason, most disks, are
sealed against contamination.

The organization of the individual hard disk is similar to a
floppy disk. However, a hard disk system may have more than one
platter, and the system may use each side of each platter.
Therefore, each side will have its own read/write head. Each
head is in aligment with the heads for the other platters or
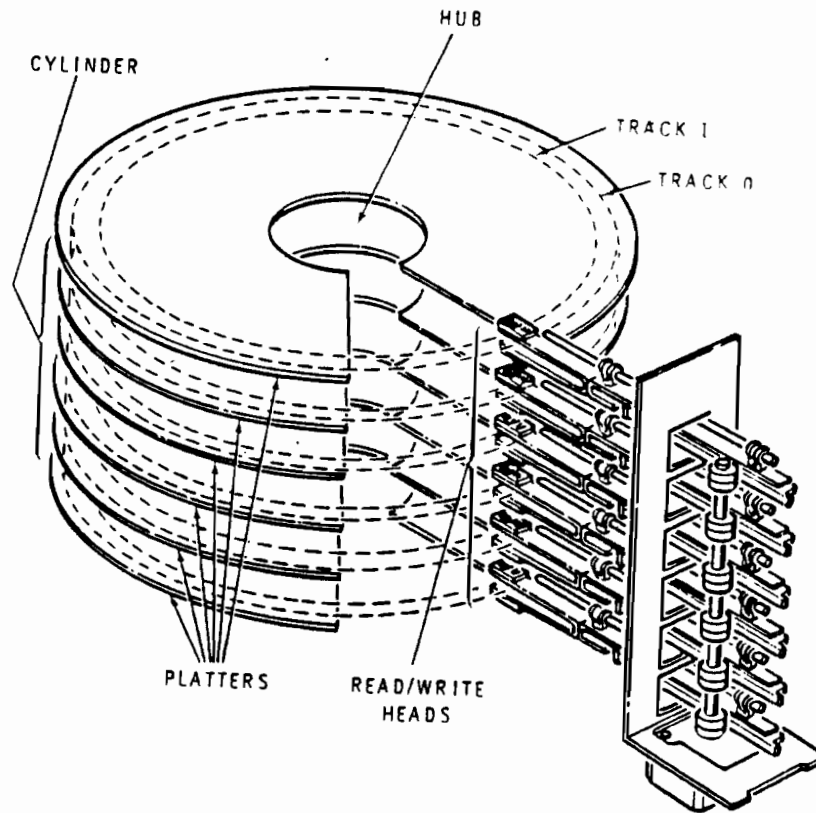sides, and all are moved together.

Figure 23
Elements of a Hard Disk

A track is that portion of the disk that passes under a
read/write head. If you have four read/write heads on four
different platter sides, you will have four tracks that are
passing under the heads at one time. These four tracks make up a
cylinder. A cylinder has as many tracks as there are heads in
any particular hard disk system.

In addition to being divided into cylinders, tracks and sectors,
a hard disk may be partitioned. A partition is a group of tracks
or cylinders that you use as a logical drive for a particular
application or operating system.

A logical drive acts like a floppy disk. Because a partition is
considered to be a logical drive, it will be treated the same as
any individual floppy disk drive. It will be uniquely identified
with a drive name, such as A or B. It may contain an operating
system or may be used strictly for data storage.

Before a hard disk can be used, the disk surface must be prepared
(formatted - like a floppy disk) and partitioned. A diskette is
packed with your EasyWIN that contains four utility programs:
PART, INIT, SHIP and DETECT. These programs are used to prepare
your system and are discussed under the operation section of this
manual.

IEEE 696 (S-100) Interface

Slave Interface - The EasyWIN uses two I/O (Input/Output) ports.
The upper eight addresses are optionally used to decode the part
address and must be at a logical "0" to access this board.

The lower eight address lines are decoded for port addressing by
a PAL. Eight vectored interrupts are used, any one of which can
be addressed and used by the interface board by connecting jumper
J4.

Master Interface - Temporary Master Access (TMA) performed by the
EasyWIN conforms to all IEEE-696 requirements. One wait state is
automatically added during read cycles to allow it to work in the
Z-100. The arbitration level (all sixteen priority levels are
available) for the TMA is selected by jumper J3. Twenty-four bit
addresses are used for TMA across 64K memory boundaries.

Interrupt Handling - Normal operation of the EasyWIN in a Z-100
does not use interrupts. Thus none of the vectored interrupts
are connected at the factory.

Theory of Operation Continued

Command Philosophy

There are two levels of commands associated with the EasyWIN hard
disk system.

First level commands are direct commands that are written
directly into the controller's command register and executed
immediately. They are used to call second level commands.

Second level commands are used for the primary communication mode
between the controller and the operating system. They are placed
in a memory buffer until fetched by the controller executing a
first level command. The controller uses a TMA to transfer
commands into its internal command buffer. Once a command has
been completed, the status is returned to the memory buffer via
TMA.

A

Data Transfers

All data transfers take place via TMA; programmed input-output is
not allowed. A 2K x 8 buffer on the interface board handles
entire sectors of data at a time. When transferring from the
disk to memory, the buffer is used to correct any errors detected
by the ECC (Error Correction Code) before the data is transferred
to system memory. When writing to the disk, the buffer is used
to make an entire sector of data available for the disk.

The system can handle a minimum interleave of three to one.

Direct Access Registers

The EasyWIN occupies two I/O ports (command and reset) in the
system.

Writing to the command port places commands in the controller's
command register. Reading this port yields the controller's
hardware status.

Writing to the reset port causes the controller to execute a
hardware reset. Reading this port is used for interrupt
acknowledge and resets the interrupt latch and causes the status
to be read.

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Direct Mode Commands (First Level)

The EasyWIN reponds to the following direct mode commands:

08   SETUP   Uses the following three bytes to specify the TMA address for commands (MSB is first, least significant last) You must use this command before the first EXECUTE command is sent to the interface.

10   EXECUTE Causes the interface to fetch a command from the memory buffer.

18   PAUSE   Halts any TMA in progress until a CONT command is received.

20   CONT   Restarts any TMA that was stopped by a PAUSE command.

Control Block Commands (Second Level)

The controller responds to the following commands when they are the first byte in the control block of system memory.

Type 0

00   RECAL   Causes the selected drive to step outward one cylinder at a time until cylinder zero is reached. No data is transferred.

01   STATUS   Returns the status for the selected drive to the TMA address. The format of the status is shown on page 57.

Type 1

10   WRITE   Writes the specified number of sectors (up to 256) from the TMA address to the specified drive. Error Correction Code is generated and written to the disk at this time also.

11   READ   Reads the specified number of sectors (up to 256) from the specified drive to the TMA address. Any errors detected by the ECC are corrected (if enabled).

13   SEEK   Positions the heads of the specified drive to the specified logical address.

Type 2

20	FORMAT	Formats the specified drive.
21	FORMAT TRACK	Formats only the specified track.
22	SET DRIVE	Sets drive parameters.

Type 3

30	WRITE ABS	Writes one sector using absolute addressing
31	READ ABS	Reads one sector using absolute addressing
33	SEEK ABS	Positions the heads of the specified drive to the specified cylinder.

Format of Commands

Type 0 and Type 1

	Byte	Bit 7	6	5	4	3	2	1	0
	1	Command OP Code							
	2	Drive Select			MSB—Logical Sector No.				
C	3	MB—Logical Sector No.							
O	4	LSB—Logical Sector No.							
M	5	Sector Count							
M	6	MSB—Data TMA Address							
A	7	MB—Data TMA Address							
N	8	LSB—Data TMA Address							
D	9	MSB—Next Command Address							
	10	MB—Next Command Address							
	11	LSB—Next Command Address							
	12	Flags							
	13	Error Code							
S	14	Drive Select			MSB—Logical Sector # of Error				
T A									
T	15	MB—Logical Sector # of Error							
U									
S	16	LSB—Logical Sector # of Error							

MSB - Most Significant Byte
MB - Middle Byte
LSB - Least Significant Byte

Flag byte:

Bit #	If set
7	Interrupts Enabled
6	Use Burst Mode TMA
5	Ignore PAUSE and CONT Commands
4	
3	
2	Disable Retries
1	Disable ECC
0	Chain Nex Command Immediately

Note: Only Type 0, 1, and 3 commands can be chained. Bytes 9, 10, and 11 are the starting address of the next command block to be executed. These three bytes must be valid or a new setup command must be issued before the next execute command. Also, this address must be valid if the chain flag (bit 0) is set.

Type 2

	Byte	Bit 7	6	5	4	3	2	1	0
	1	Command OP Code							
	2	Drive Select		N/A			Max Head No.		
C	3	Max Cylinder Number (MSB)							
O	4	Max Cylinder Number (LSB)							
M	5	Reduced Write Current (MSB)							
M	6	Reduced Write Current (LSB)							
A	7	Precomp Cylinder (MSB)							
N	8	Precomp Cylinder (LSB)							
D	9	Step Rate (LSB $\pm$ 20 μS)							
	10	ECC Span							
	11	N/A		N/A		Interleave Factor			
	12	Fill Character							
S	13	Error Code							
T	14	Head # of Error			Sector # of Error				
A									
T	15	Cylinder # of Error (MSB)							
U									
S	16	Cylinder # of Error (LSB)							

MSB - Most Significant Byte
LSB - Least Significant Byte

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Type 3

	Byte	Bit 7	6	5	4	3	2	1	0
	1	Command OP Code							
	2	Drive Select		N/A			Head Select		
C	3	Cylinder Number (MSB)							
O	4	Cylinder Number (LSB)							
M	5	N/A			Sector Number				
M	6	Data TMA Address (MSB)							
A	7	Data TMA Address (MB)							
N	8	Data TMA Address (LSB)							
D	9	Next Command Address (MSB)							
	10	Next Command Address (MB)							
	11	Next Command Address (LSB)							
	12	*	Flags						
S	13	Error Code							
T	14	Head # of Error			Sector # of Error				
A									
T	15	Cylinder # of Error (MSB)							
U									
S	16	Cylinder # of Error (LSB)							

* 0 = Disable Interrupts
  1 = Enable Interrupts

MSB - Most Significant Byte
MB - Middle Byte
LSB - Least Significant Byte

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Theory of Operation Continued - Software Access

Format of Status Register

   Bit

   7   Interrupt
   6   .Busy
   5   Burst Mode
   4   TMA in Progress
   3   Error
   2   Immediate Mode Error
   1   Paused
   0   Done

Format of Status Returned by 01 Command

Byte	Bit 7	6	5	4	3	2	1	0
1	Reserved				B3	B2	B1	B0
2	Maximum Cylinder No. (MSB)							
3	Maixmum Cylinder No. (LSB)							
4	Reduced Wnte Current Cylinder Number (MSB)							
5	Reduced Write Current Cylinder Number (LSB)							
6	Precomp Cylinder No. (MSB)							
7	Precomp Cylinder No. (LSB)							
8	Current Cylinder No. (MSB)							
9	Current Cylinder No. (LSB)							
10	Step Rate							
11	Span							
12	Interleave Factor							
13	Cell Size							
14	Maximum Head #							
15	Fill Character							
16	Reserved							

B0 = Drive Ready
B1 = Accessed
B2 = Seek Complete
B3 = Track 0

Step Rate = Value x 20 uS

Cell Size = 512 Bytes/Sector

Fill Character = The charac-
ter used during format to
fill the data fields.

MSB - Most Significant Byte
MB - Middle Byte
LSB - Least Significant Byte

Note: Bytes 8 and 9 will not
be recognized unless Bit 1
of Byte 1 (B1) is set.

Error Codes

Type 0

    00   No Error
    01   Drive Not Ready
    02   No Seek Complete
    03   No Track 0
    04   No Index
    05   No Drive Selected

Type 1

    10   Header Address Mark Not Found
    11   Seek Error (Bad Cylinder Number in Header)
    12   Sector Number Not Found
    13   ECC Error in Header
    14   Data Address Mark Not Found
    15   Non-Correctable ECC Error in Data Field
    16   Correctable ECC Error in Data Field
    17   Write Fault

Type 2

    20   Illegal Op Code
    21   Illegal Disk Address
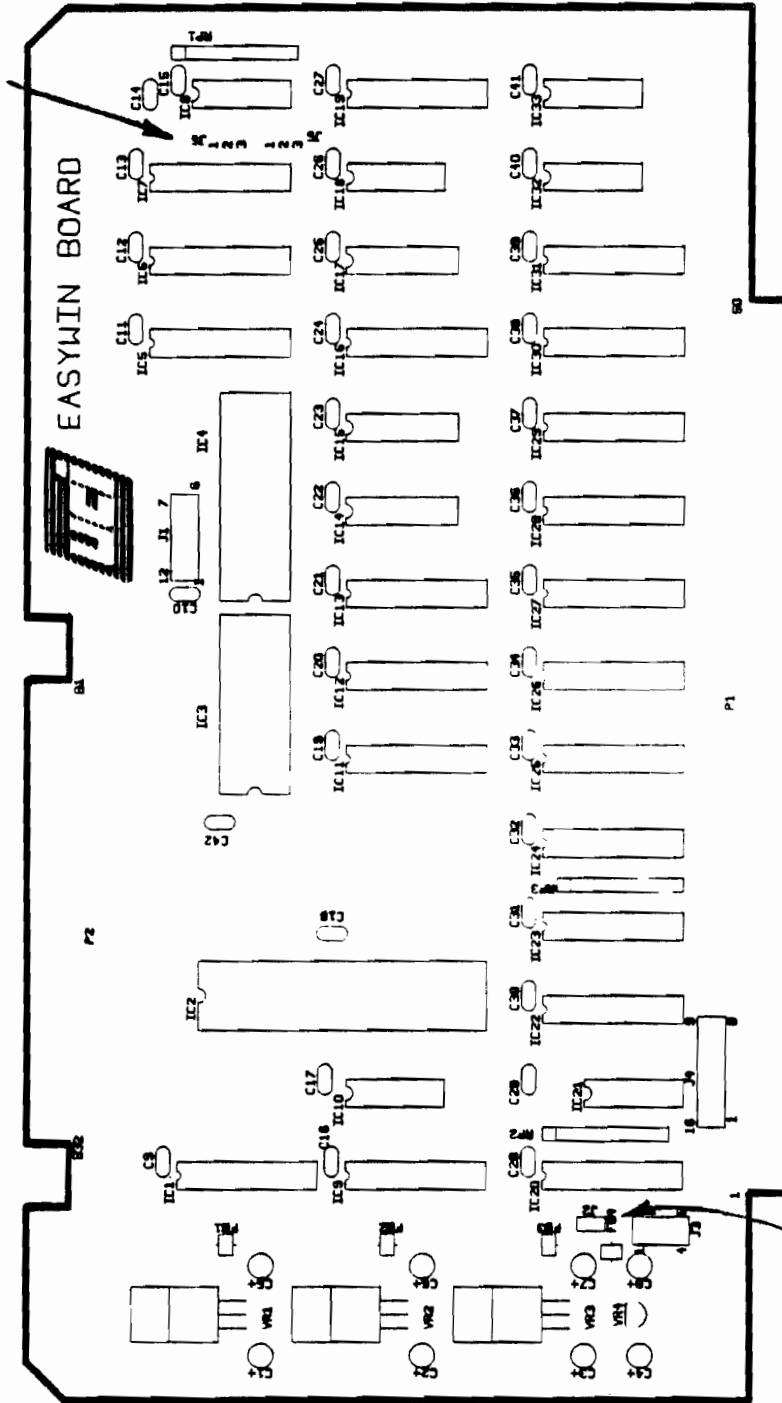   22   Format Protected
    23   Write Protected

Type 3

    30   Miscellaneous Error

Type 4

    40   Error During Diagnostic

DIP Switch 101, on the Z-100 motherboard, selects the following functions during power-up or master reset. Set the switches for your system and preferences. 0 = on and 1 = off.

Switch 101 Section	Description
0	Default boot device
1	Default boot device
2	Default boot device
3	1 = Auto boot, 0 = Manual boot
4	Not used
5	Not used
6	0 = PC mode, 1 = Z-100 mode
7	0 = 60 Hz, 1 = 50 Hz; for video vertical scan frequency.

Sections 0, 1, and 2 should be set to reflect the type of drive that the system is to be booted from:

Switch Section 2 1 0	Device Type
0 0 0	5-1/4" floppy disk drive (internal)
0 0 1	8" floppy disk drive (external)
0 1 0	5" Winchester disk (internal)
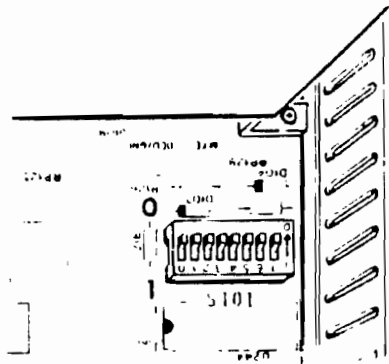
Appendix C Winchester Disk Parameters

Manufacturer and Model	No. of Cylinders	No. of Heads	Write Current Cylinder	Precomp Cylinder	Step Rate Code	SHIP Cylinder
Seagate						
ST-212	298	4	307	128	5	309
ST-213	612	2	613	300	5	615
ST-225	612	4	613	300	5	615
ST-238	612	4	613	300	5	615
ST-251	815	6	821	300	5	823
ST-412	298	4	307	128	5	309
ST-506	153	4	128	64	5	130
ST-4026	612	4	613	300	5	615
ST-4038	733	5	734	300	5	736
ST-4051	977	5	978	300	5	980
Miniscribe						
3425	612	4	613	300	5	615
3438	612	4	613	300	5	615
Rodime						
RO252	298	4	307	128	5	309
RO202E	640	4	641	300	5	643
RO203E	640	6	641	300	5	643
RO204E	640	8	641	128	5	643

ADDENDUM TO EASYWIN USER'S MANUAL

6/4/87

Before attempting installation of Easywin, Please note the
following installation change.

Becasuse of a shorter cable length, the HARD DISK CONTROLLER
board must be mounted with its component side facing down.
The illustrations on pages 11, 19, 21, 23, and 27 which
show the board mounted with the component side up are incorrect.

Following the step by step installation procedure in the manual
for your particular system. At the point of mounting the Hard
Disk Controller Board:

     1. Flip the board upside down.

     2. Insert the end marked A1 of the 64 position blue
        ribbon cable onto the gold fingerboard of the
        Hard Disk Controller Board

     3. Insert the 34 position hard disk cablle onto J1 and
        the 20 position cable onto J2 . Be sure the striped
        edge is positioned properly. (See Manual)

     4. Remove the protective paper off the sticky foam tape
        on the 64 position blue edge card connector. Press
        the connector down firmly onto the mounting area
        described in the manual for your configuration.

Continue with the remaining instructions in the mannual.