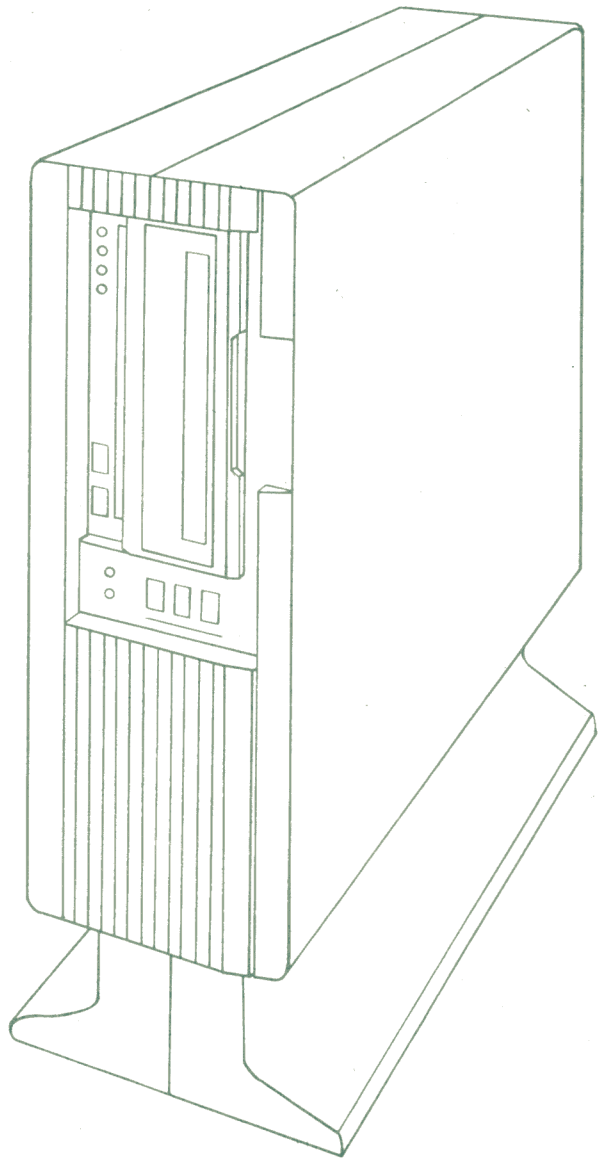
Ford Higgins Ltd.

PowerFrame



Troubleshooting Guide

Ford
Higgins Ltd.

Troubleshooting Guide

PowerFrame

Microcomputer Systems

4755 Walnut Street
Boulder, Colorado 80301
(303) 449-8803
TLX: 752267 FHL BLDR
TWX: 910-997-0429
EASYLINK: 62317580

PART NO. 20224701

CONTENTS

Publication History

Version 1.0	Aug. 1, 1984	Original Version
Version 2.0	Nov. 28, 1984	Added explanation to 40MB Error Codes section

SWITCHES, LIGHTS AND CONNECTIONS...

FCC Compliance

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the operating instructions, reference manuals, and the service manual, may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1) Reorient the receiving antenna.

2) Relocate the equipment with respect to the receiver.

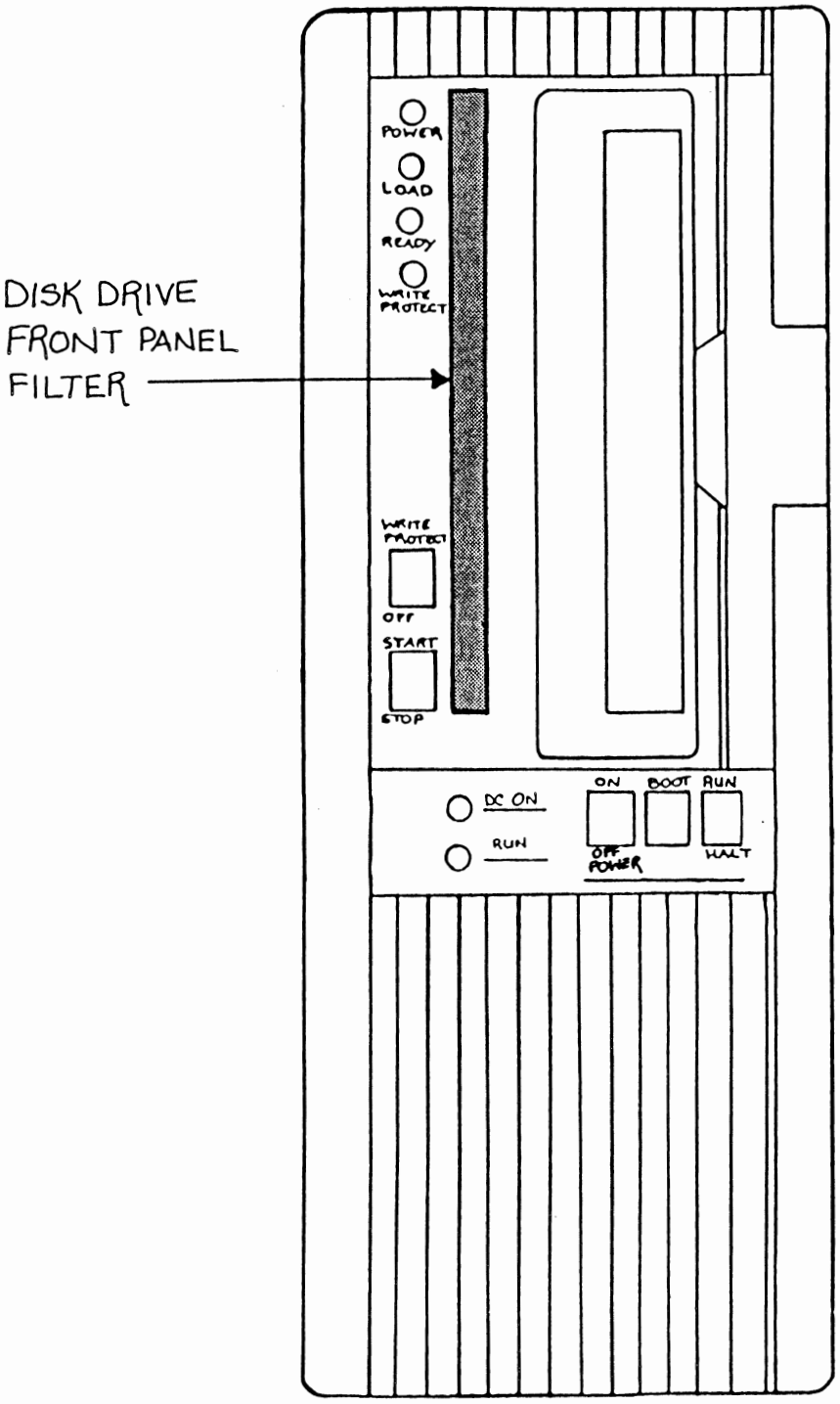
3) Move the equipment away from the receiver.

4) Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, consult your dealer service representative for additional suggestions.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

User Information...



User Maintenance

In order to keep your computer unit running at maximum efficiency, we recommend that you observe the following preventative maintenance measures.

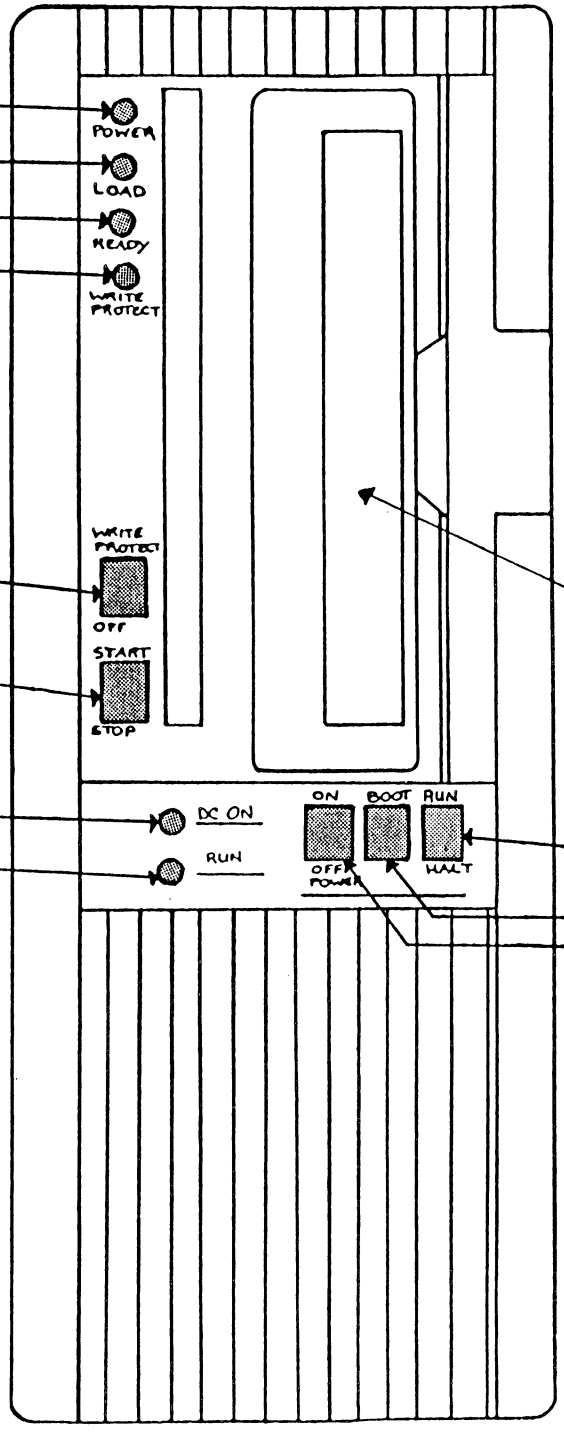
Periodically brush off the disk drive front panel filter. If this filter becomes blocked, the disk drive will overheat.

Every 90 days, check the fans for proper operation.

Every 90 days, inspect all I/O cables and line cords for frayed ends, broken strain reliefs, damaged insulation, and other hazardous conditions.

The exterior of the machine can be cleaned with a mild detergent and a lint-free cloth.

Front of Unit



INDICATOR LIGHTS

- DISK POWER
- LOAD
- READY
- WRITE PROTECT

ROCKER SWITCHES

- WRITE PROTECT
- DISK START/STOP

INDICATOR LIGHTS

- DC POWER ON
- CPU RUN/HALT

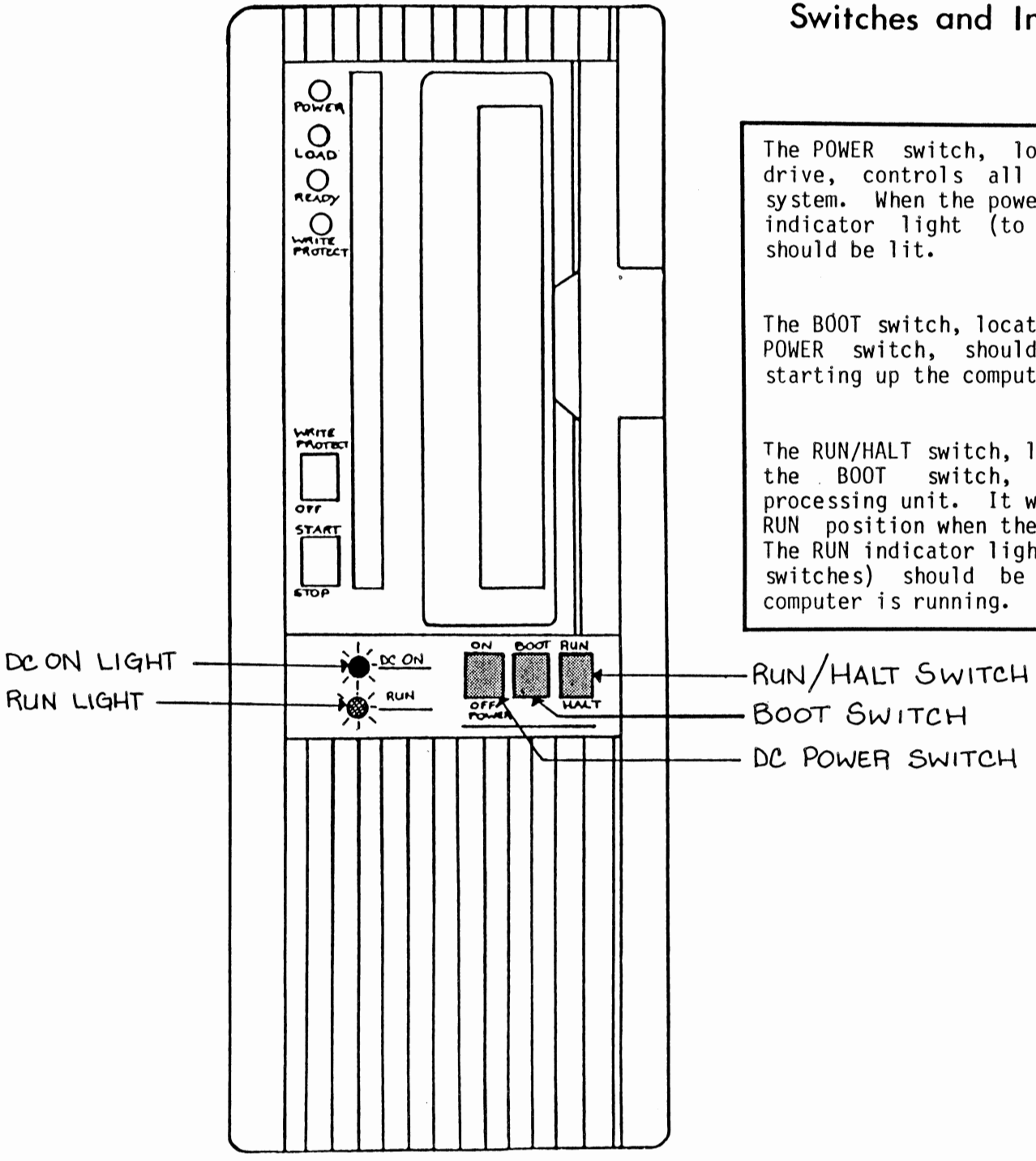
DISK DRIVE

ROCKER SWITCHES

- CPU RUN/HALT
- BOOT
- SYSTEM POWER (DC) ON/OFF

The top half of the computer contains the disk drive. In the top left-hand corner of the unit are four indicator lights (POWER, LOAD, READY, and WRITE PROTECT). Below that are two rocker switches (WRITE PROTECT, START/STOP). Below the disk drive are two more indicator lights (DC ON and RUN) and a row of three rocker switches (POWER, BOOT, RUN/HALT). The functions associated with these switches and lights are discussed in the following pages.

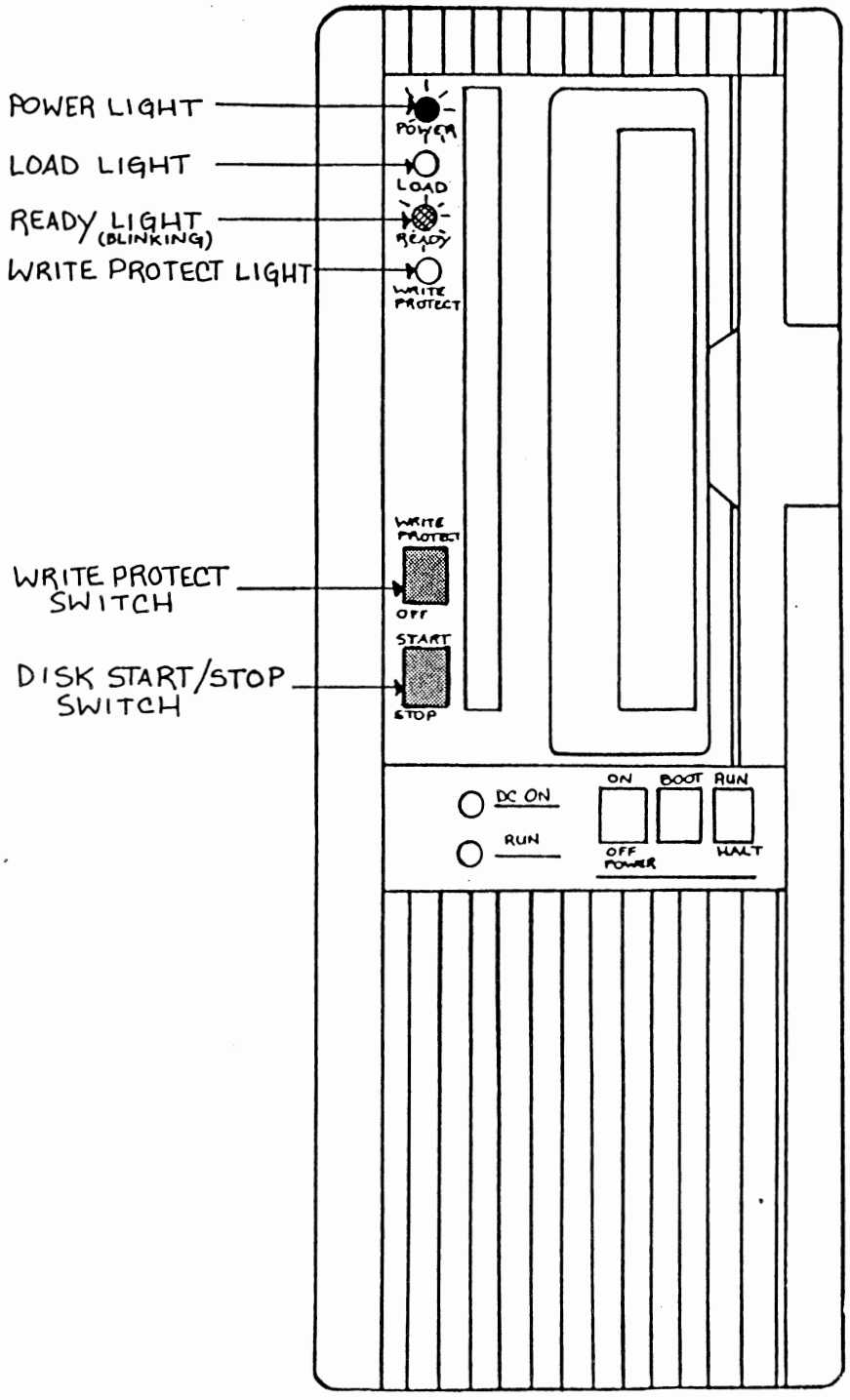
Switches and Indicator Lights



The POWER switch, located below the disk drive, controls all the DC power in the system. When the power is ON, the DC ON indicator light (to the left of the switch) should be lit.

The BOOT switch, located to the right of the POWER switch, should be depressed only when starting up the computer from a halted state.

The RUN/HALT switch, located to the right of the BOOT switch, controls the central processing unit. It will normally be in the RUN position when the computer is operating. The RUN indicator light (to the left of the switches) should be green and red when the computer is running.



Switches and Indicator Lights

The START/STOP switch spins up the disk drive. During normal operations, the START/STOP switch (to the left of the disk drive) will be in the START position. The indicator light marked POWER, located at the top left-hand corner of the unit, will be lit.

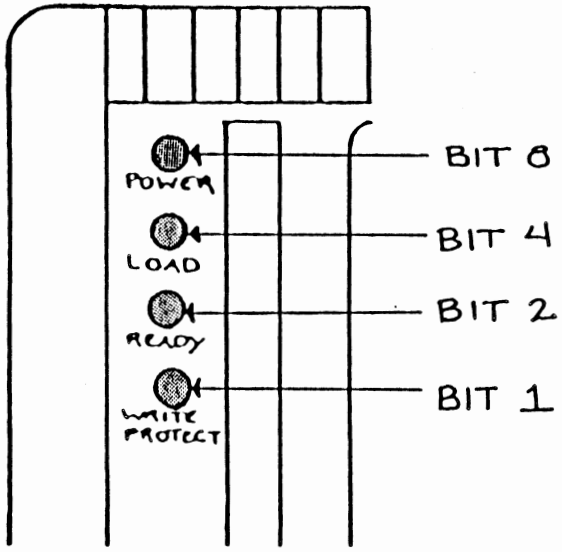
The WRITE PROTECT switch (directly above the START/STOP switch) will typically be in the OFF position. If WRITE PROTECT is enabled, the WRITE PROTECT indicator light (directly above) will be illuminated. The WRITE PROTECT mechanism will only protect the fixed disk; it will not protect the disk cartridge.

During normal operations, the READY indicator light (directly above the WRITE PROTECT light) will be blinking on and off, indicating that data is being stored and retrieved.

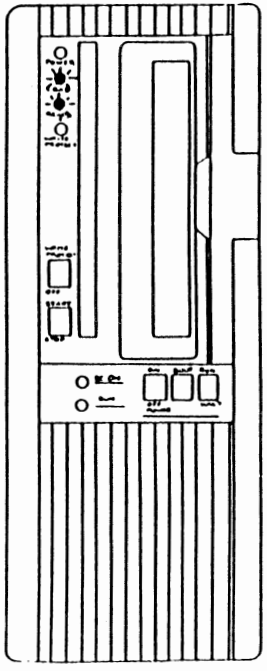
The LOAD indicator light (directly above the READY light) comes on only when the START/STOP switch has been placed in the STOP position, and the disk drive door is ready to be opened. DO NOT ATTEMPT TO REMOVE OR LOAD A DISK CARTRIDGE UNLESS THE LOAD INDICATOR LIGHT IS ON.

DISASSEMBLY FOR SERVICE...

Self-Diagnostics Indicators



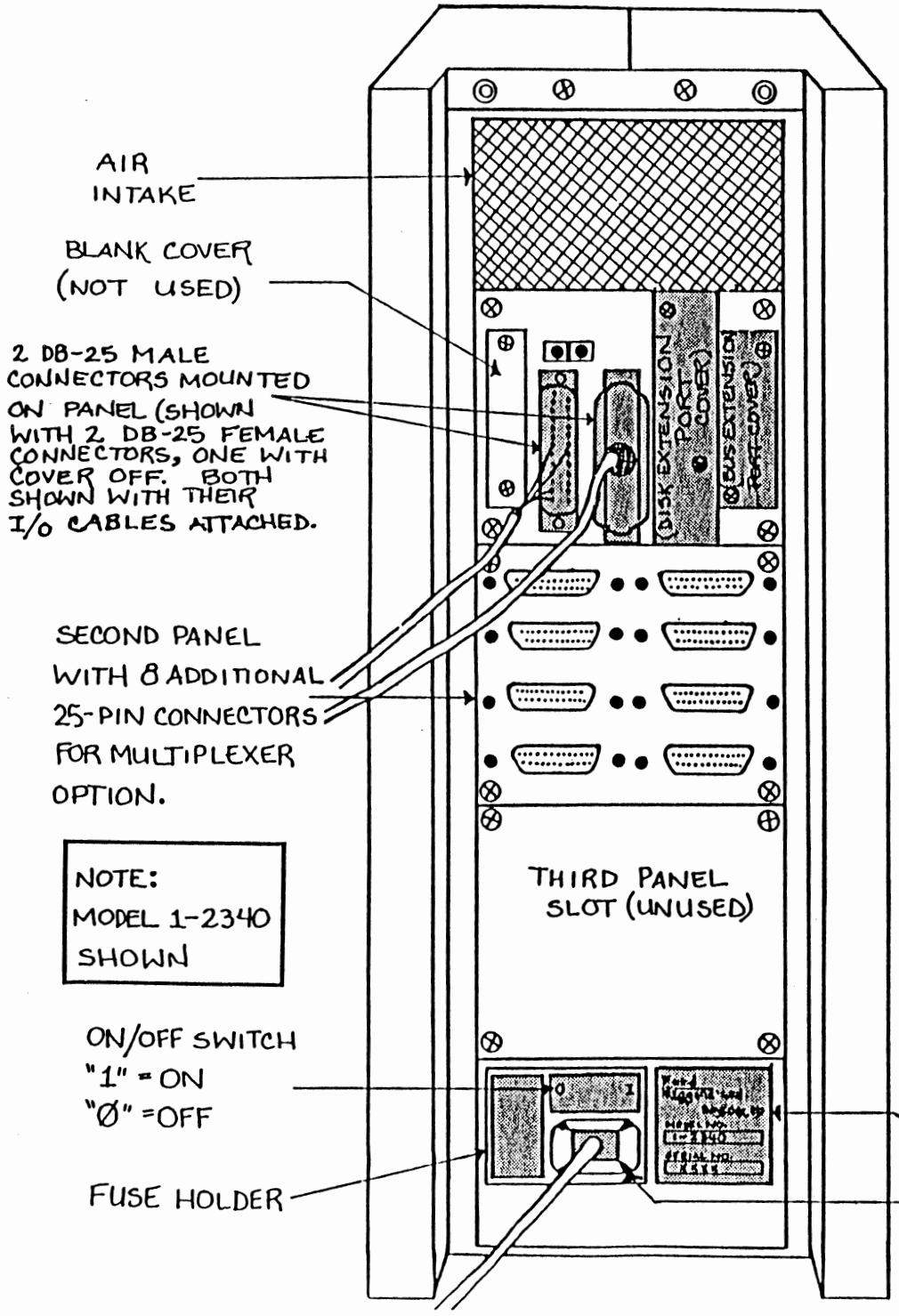
A	= 10
B	= 11
C	= 12
D	= 13
E	= 14
F	= 15



Example: If LOAD (bit 4) and READY (bit 2) light up, this indicates that "6" (4 + 2) is one of the digits in the error code.

Refer To Error Code Section Beginning On Page 21

Rear of PowerFrame



At the top of the rear panel is a screen. This is an air-intake. Below the air-intake are three similarly sized panels.

The Computer system has two 25-pin "male" connectors in the top panel. These two ports are the console ports. The Model 1-0040 will normally have covers over these two positions. The Model 1-2340 will typically have a small rectangular plate on the port farthest to the right and another plate immediately to its left. In certain cases, a bus extension connector will be installed on the right, and a disk extension connector may be installed to its immediate left. The small rectangular cover to the left of the RS232 connectors covers a hole that does not presently have a designated use.

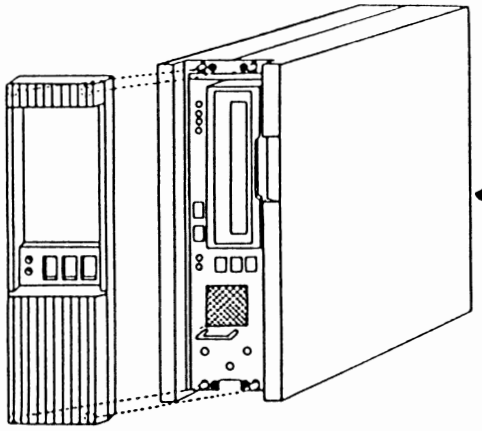
If a "multiplexer" option has been installed, there will be eight additional 25-pin connectors located in the second panel.

The third large panel is a blank cover and does not presently have a designated use.

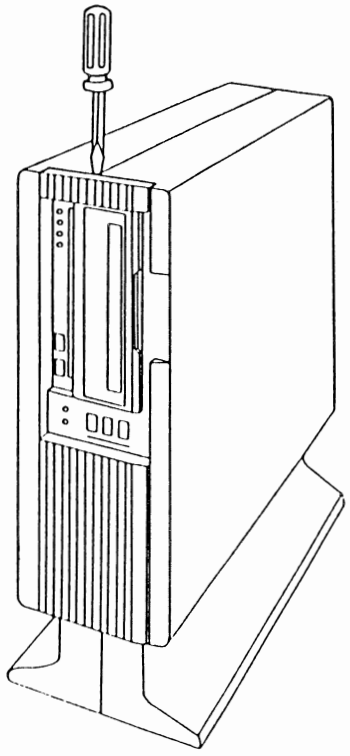
At the bottom of the machine on the far right-hand side is the unit's serial tag. To the left of the serial tag is the input socket for AC power, and directly above that is the ON/OFF switch ("1" indicates "ON"; "0" indicates "OFF"). To the left of this is the fuse holder.

WARNING: For continued protection against risk of fire, replace only with the same type and rating of fuse.

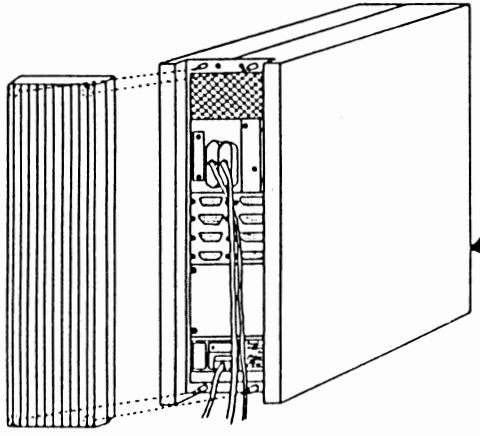
Removing Panels



← REMOVING FRONT PANEL



IF NECESSARY, USE A SCREWDRIVER TO GENTLY PRY THE PANELS LOOSE.



← REMOVING REAR PANEL

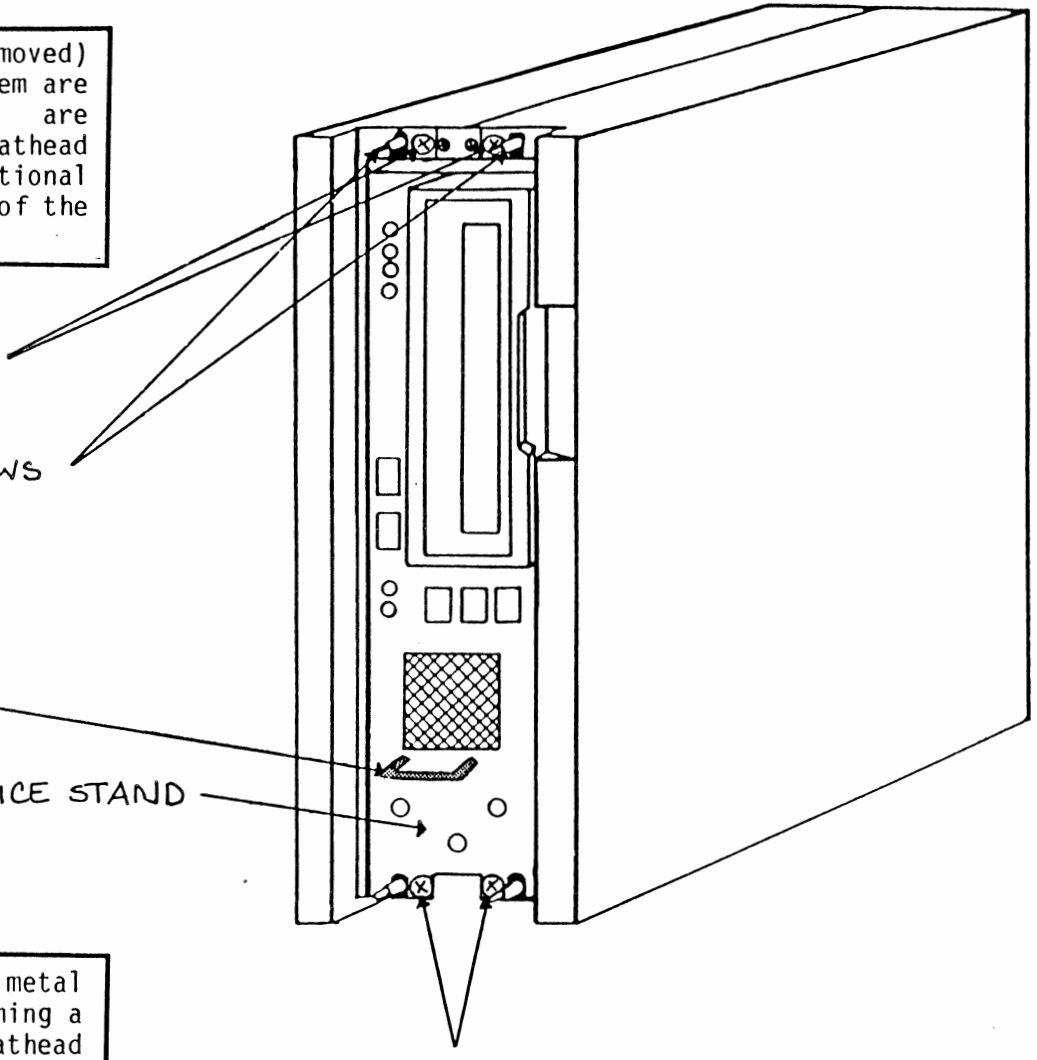
If AC power is not needed for servicing, turn the POWER switch at the back of the unit OFF and unplug the line cord from the wall receptacle.

To remove the front panel, grasp the panel at the top and the bottom and pull it straight off. It may be necessary to use a screwdriver to pry it off. If so, insert the screwdriver between the panel and the case at the top rear of the front panel. Pry the panel off gently to avoid damaging the case. Repeat this procedure at the bottom of the panel. The rear panel may be removed in the same manner.

WARNING: No operator-serviceable parts inside unit.

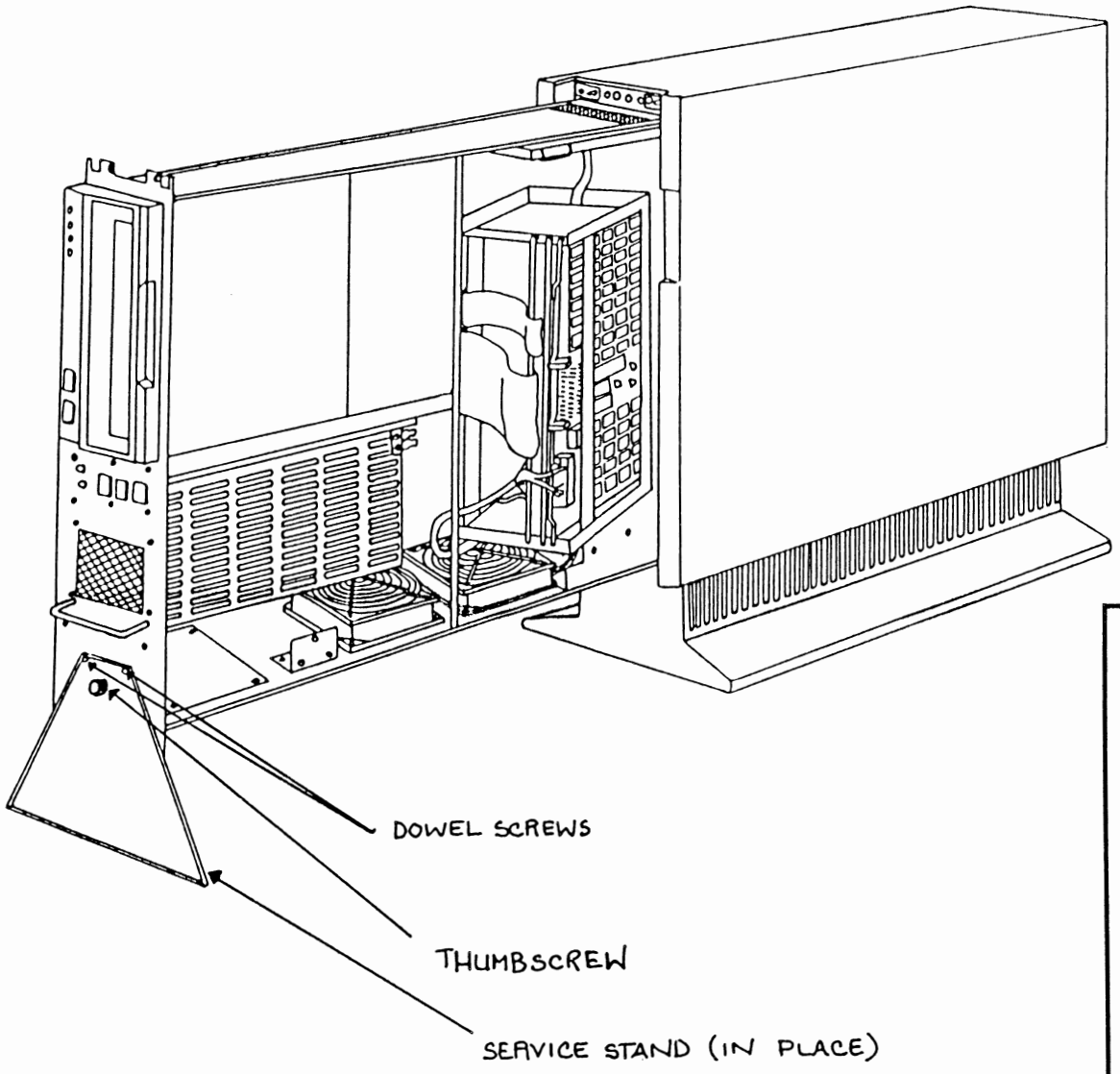
Removing Unit From Case

At the top of the unit (front panel removed) you will see four screws. Two of them are "flathead" screws and two of them are "panhead" screws. Remove the two flathead screws. Then remove the two additional flathead screws located at the bottom of the unit.



Below the disk drive you will notice a metal handle and below it three holes forming a triangle. After removing the four flathead screws as described in the above step, grasp the handle and pull the unit about half-way out of the case. CAUTION: IF YOU PULL TOO FAR, THE UNIT WILL BE FRONT-HEAVY AND WILL TIP FORWARD.

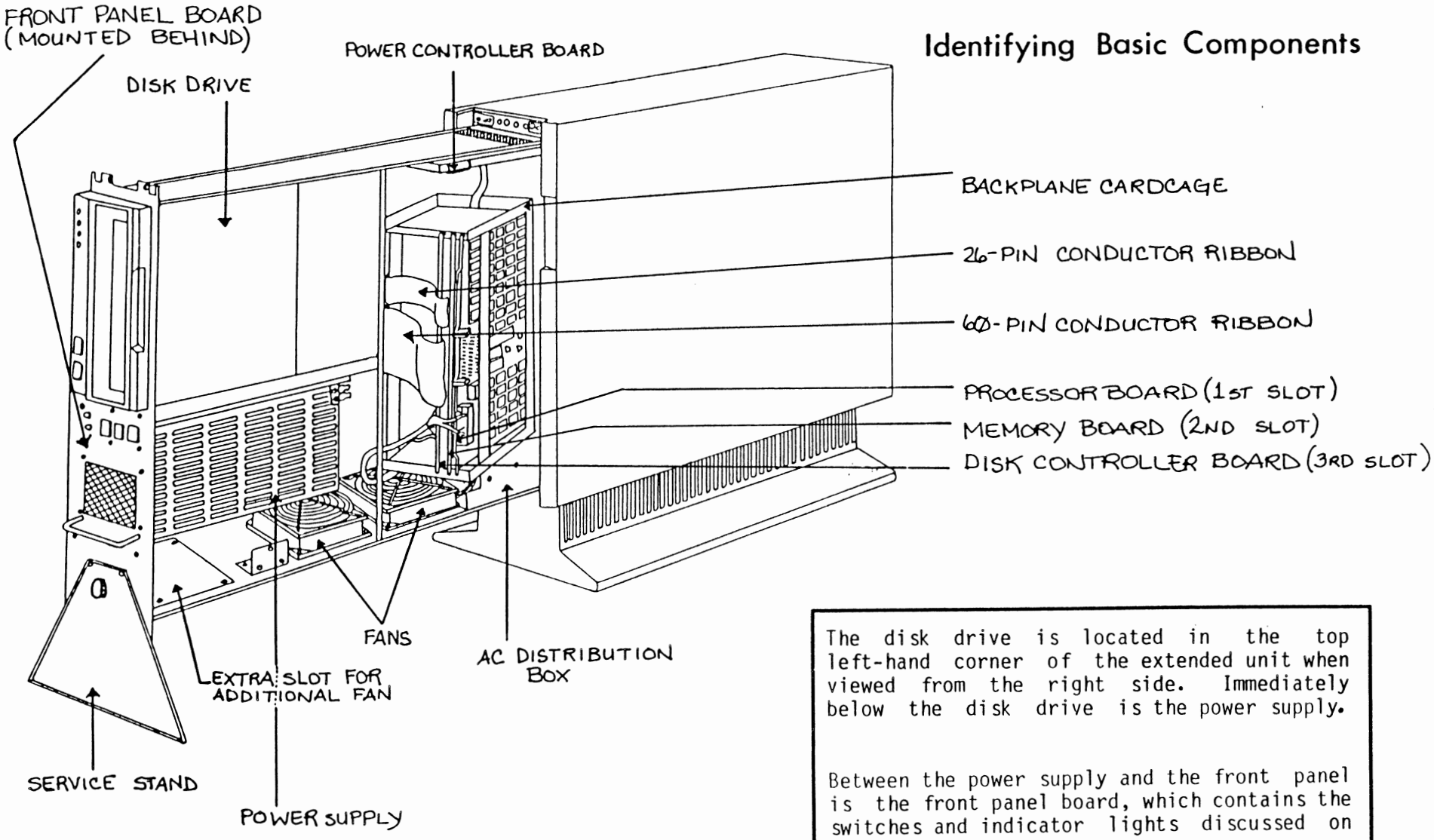
Assembling Service Stand



Viewing the extended case from the right side, you will notice a triangle-shaped service stand which is held in place by a thumbscrew. Unscrew the thumbscrew and remove the service stand from the case. Attach the service stand to the front of the unit by placing the two dowel pins on the service stand into two of the holes located under the metal handle on the front of the unit. Screw the thumbscrew into the third hole. The service stand should now be securely in place, so you may slide the unit out of the case until it reaches a point where it will go no further.

CAUTION: IF AC POWER WAS LEFT ON, BE AWARE THAT THERE IS STILL LIVE AC POWER IN THE BOX. BE CAREFUL WHERE YOU PUT YOUR FINGERS AND TOOLS!

Identifying Basic Components



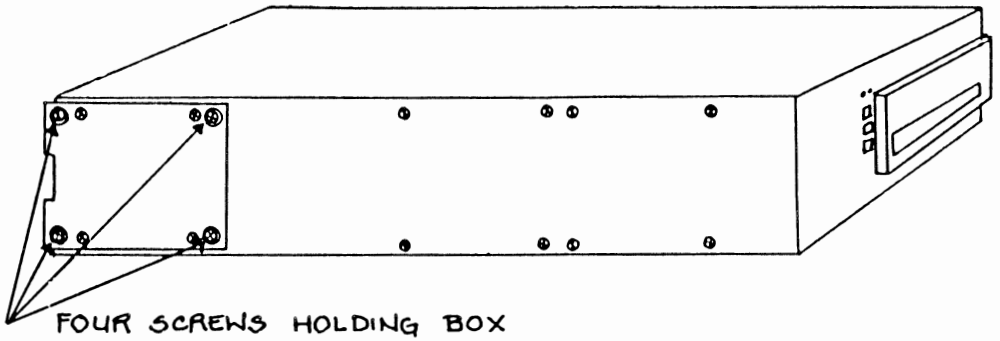
The disk drive is located in the top left-hand corner of the extended unit when viewed from the right side. Immediately below the disk drive is the power supply.

Between the power supply and the front panel is the front panel board, which contains the switches and indicator lights discussed on page 2.

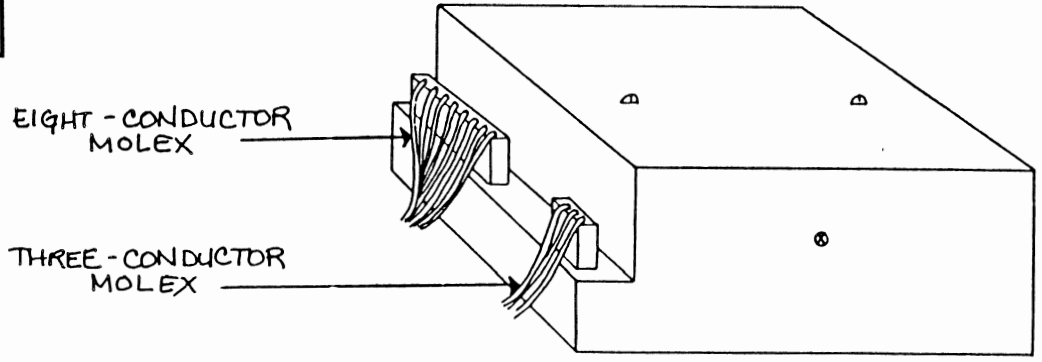
At the bottom of the computer are two cooling fans and an extra slot available for an optional fan. To the right of the fans, at the back of the computer is the AC distribution box.

Removing AC Distribution Box

Before attempting to remove the AC distribution box, be sure that the AC power switch (on the back of the unit.)) has been turned OFF and disconnect the line cord from the wall receptacle. Remove the chassis completely from the case and set it on its side. Unscrew the four screws in the bottom panel that hold the AC distribution panel in place. Next, disconnect the 3-conductor and the 8-conductor Molex connectors from the AC distribution box. Slide the box out from underneath the backplane, lifting the box slightly in order to clear the pem nuts installed in the bottom panel. It may be necessary to swing the backplane out of the frame.



FOUR SCREWS HOLDING BOX
(OTHER FOUR SCREWS HOLD METAL PANEL IN PLACE; DO NOT REMOVE)

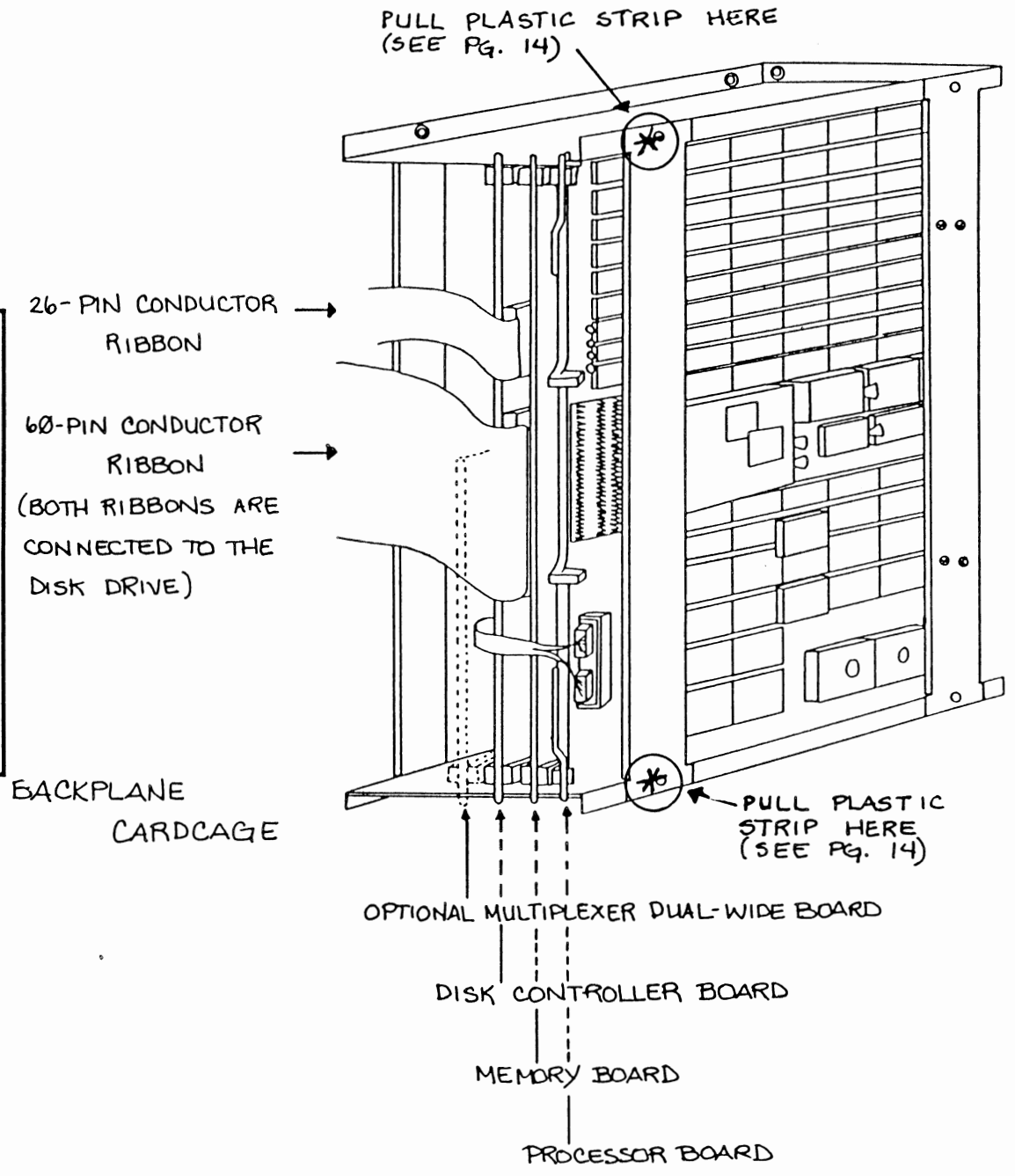


AC DISTRIBUTION BOX

Cardcage/Backplane Components

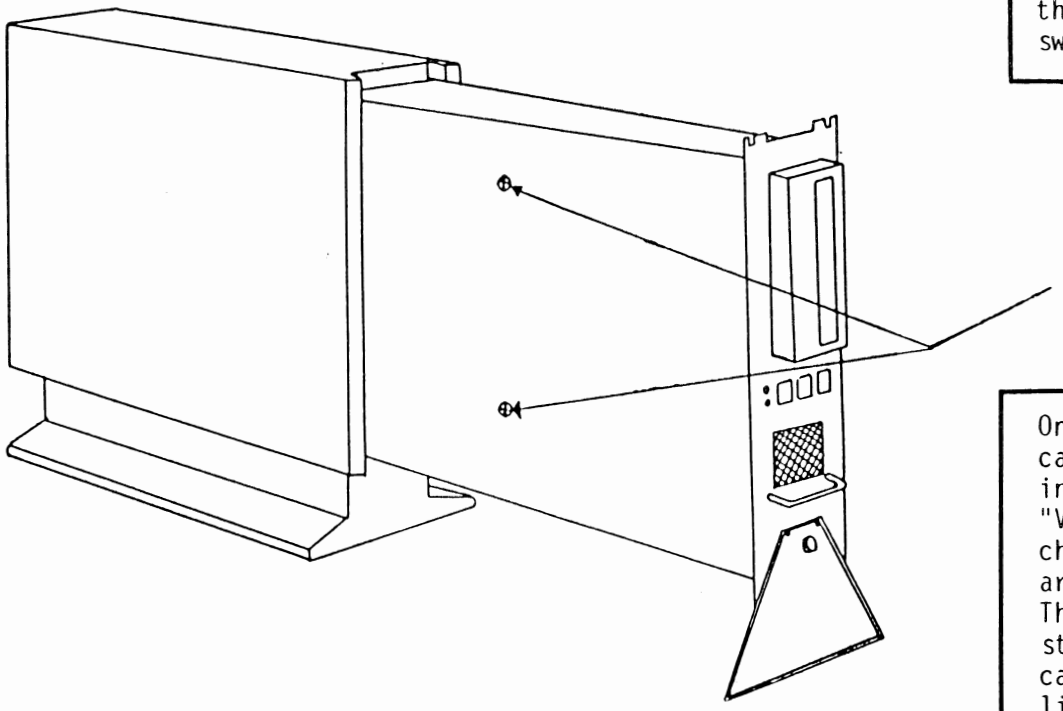
Above the AC distribution box is the backplane. In a basic computer system, a backplane contains three boards. In the first slot (the slot nearest to you) is the processor board. The second slot is the memory board. The third slot is the disk controller board. If the system contains an optional multiplexer board, this dual-wide board will be in the fourth slot at the bottom of the backplane. Because of its size, this board must be secured to the cardcage with a cable tie on the bottom front corner of the card.

Above the backplane, mounted to the top of the chassis, is the power controller board.



Removing Cards

There are two ways to remove cards from the cardcage. Some computer units have the backplane screwed to the sheet metal case. In this instance, it is necessary to remove these two screws (4-40 flathead), which are located on the left side of the computer when it's in the extended service position. Once the screws are removed, the cardcage will swing out freely.

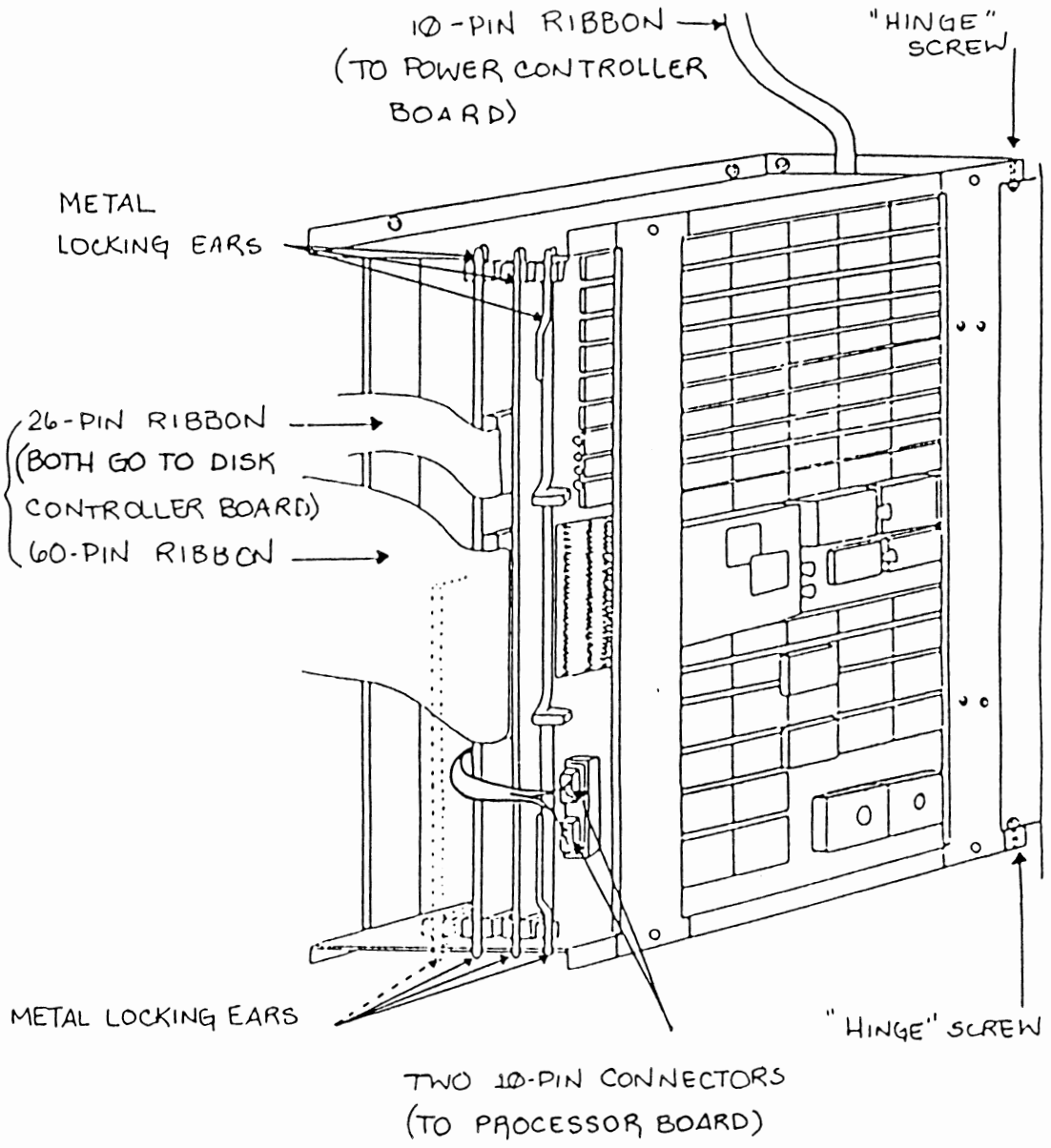


On most computer units, however, the cardcage is secured to the chassis with interlocking plastic strips, similar to "Velcro." To release the cardcage from the chassis on these units, grasp the unit at the areas marked with an asterisk (*) on page 13. Then pull the plastic strips apart using a steady, even force. When reattaching the card cage to the chassis on these models, listen for an audible "click," indicating engagement of the plastic strips.

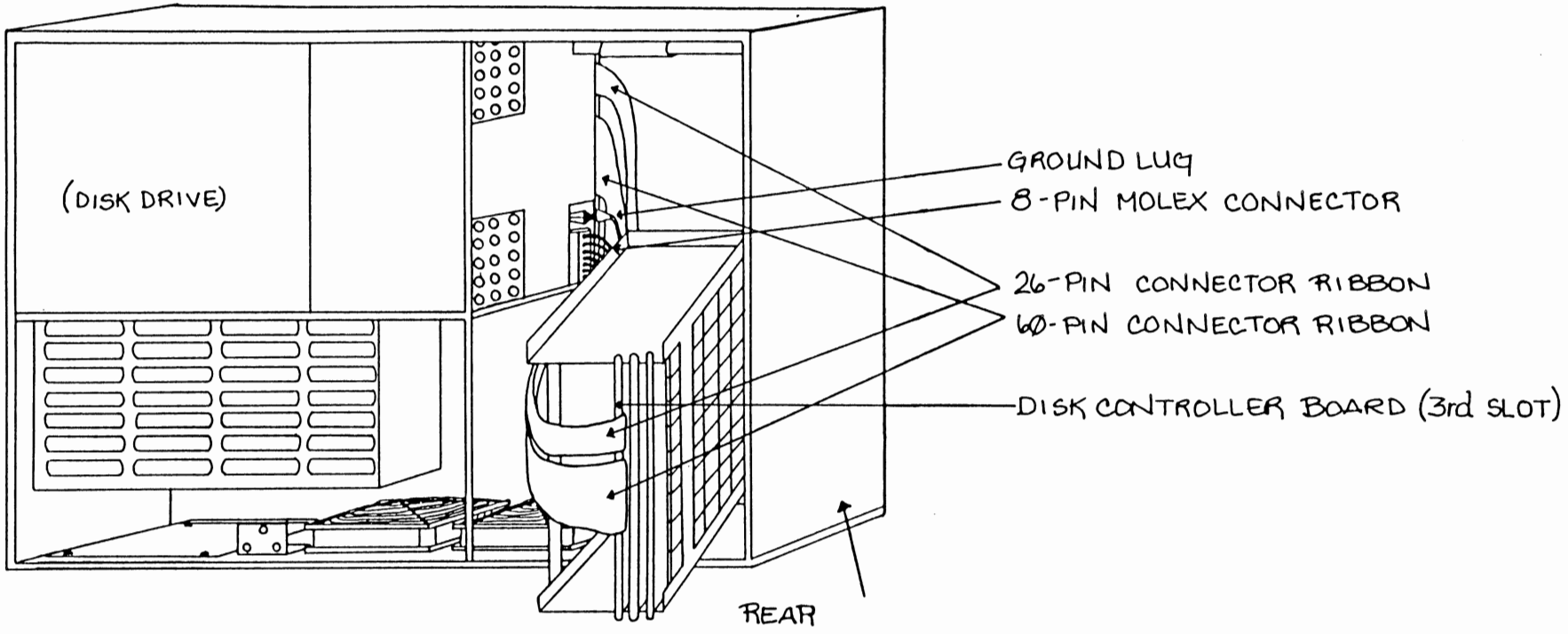
Once the cardcage has been released from the chassis, gently pull the cable connectors (if any) off the cards. This applies to both models. Cards can now be removed by unlocking the ears on the top and bottom of the cards and then sliding them out of the cardcage.

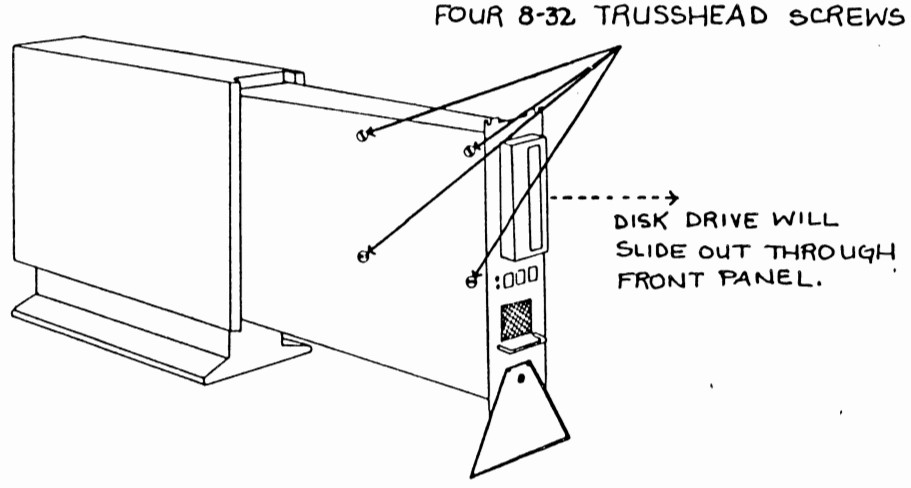
Removing Cardcage/Backplane

To remove the backplane, first disconnect all connections to the boards in the backplane. In a basic computer system, that will include two 10-pin connectors going to the processor board and a 60- and a 26-conductor ribbon cable going to the disk controller board. Remove each card from the backplane by grasping the metal locking ears and pulling the card straight out. Remove all lugs screwed into the barrier strip at the bottom of the backplane. Next, remove the 10-conductor ribbon cable which connects the bottom of the backplane to the power controller board. You need only unhook the end which connects at the power controller board in order to remove the backplane. Remove the two screws that act as "hinges," holding the backplane into the frame. The backplane cardcage should now easily detach from the frame. Be sure to re-install the 10-pin conductor ribbon connecting the backplane to the power controller board when replacing backplane.



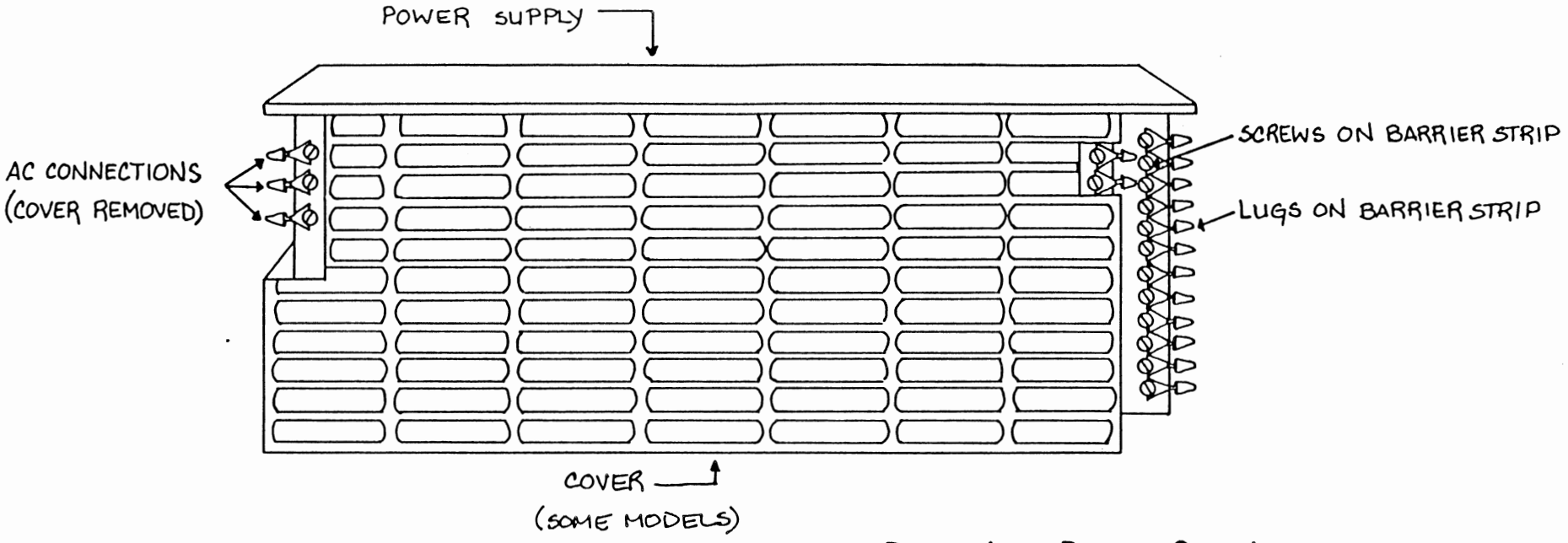
Removing Disk Drive

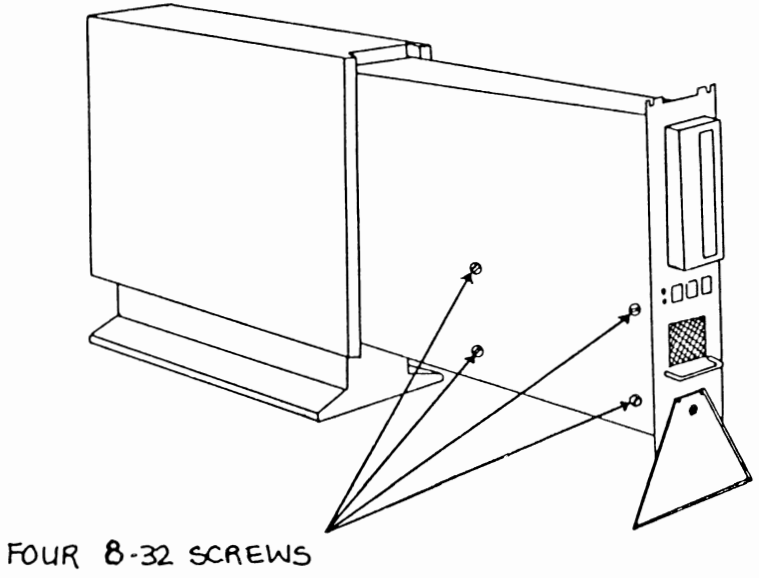




LEFT VIEW

To remove the disk drive, disconnect the 26- and 60-conductor ribbon cables from the disk controller board. Disconnect the other end of the 26- and 60-conductor ribbon cables from the disk drive itself. Pull off the ground lug from the back of the disk drive. Then pull the 8-pin Molex connector off the back of the disk drive. Viewing the computer from the left side, remove the four 8-32 trusshead screws that hold the disk drive in the case. The disk drive should now slide easily out of the case through the front panel. If the drive does not easily slide out, push inward on the mounting feet (where the truss screws attach the drive to the frame) while pulling the drive out.

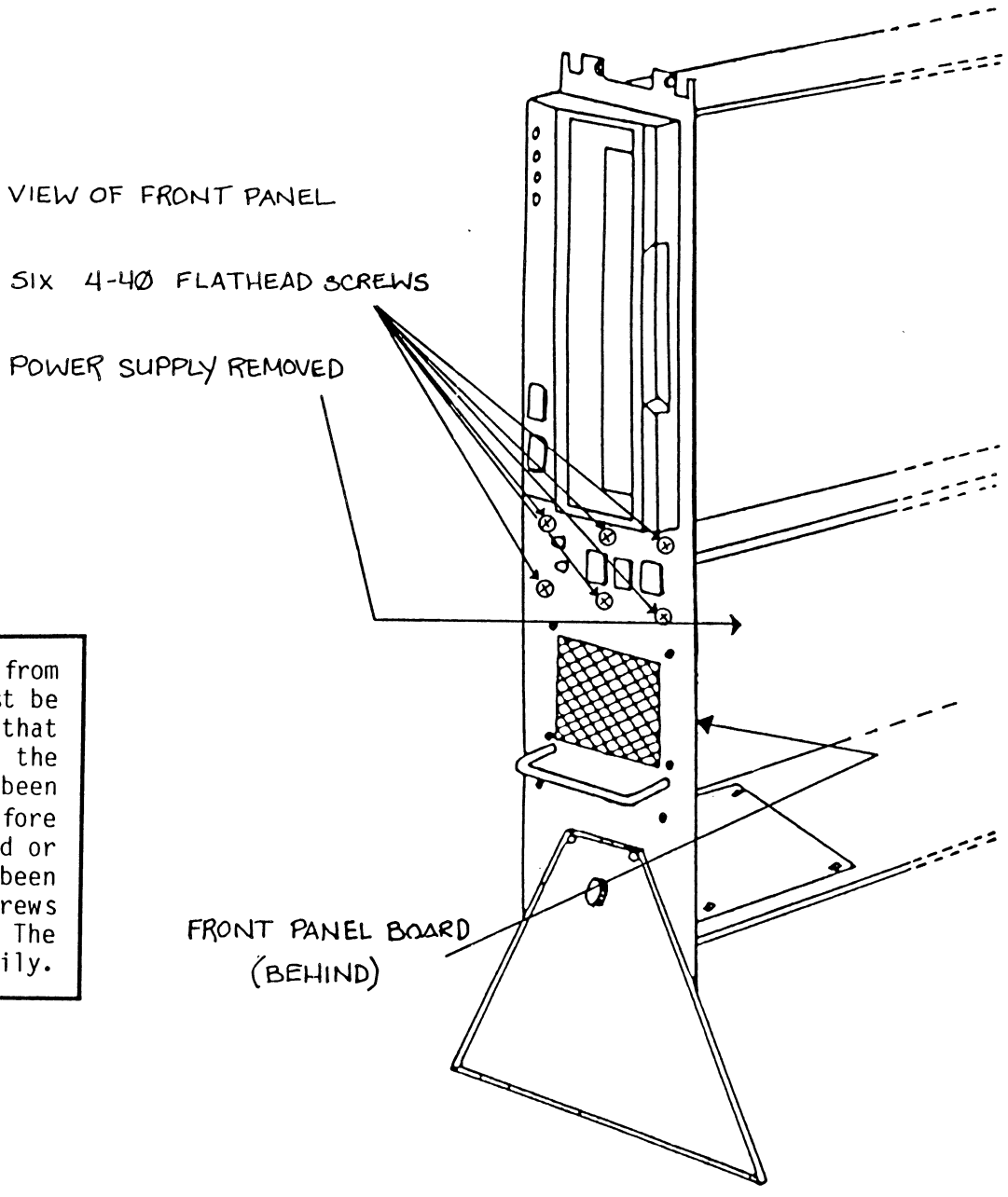




Removing Power Supply

To remove the power supply, first turn OFF the AC power supply switch, located at the back of the unit, and unplug the line cord from the wall receptacle. Loosen all of the screws on the two barrier strips at the right end of the power supply. Then remove all of the lugs. Go around to the left side of the computer and remove the four 8-32 screws on the left side of the sheet metal case that holds the power supply in place. Next, slide the power supply out and uncover the AC connections located on the left side of the power supply. Loosen the three screws on the barrier strip, and remove the lugs. It is very important to reconnect the lugs in the same place they were removed from.

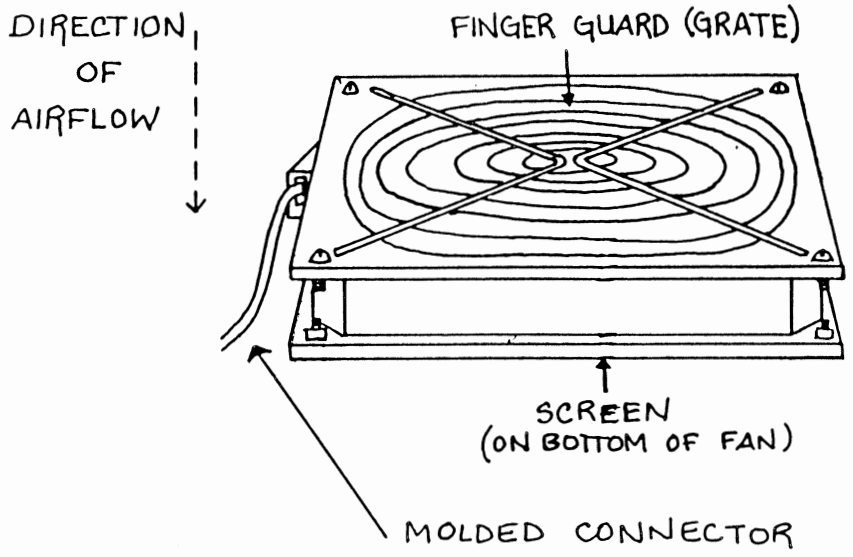
Removing Front Panel Board



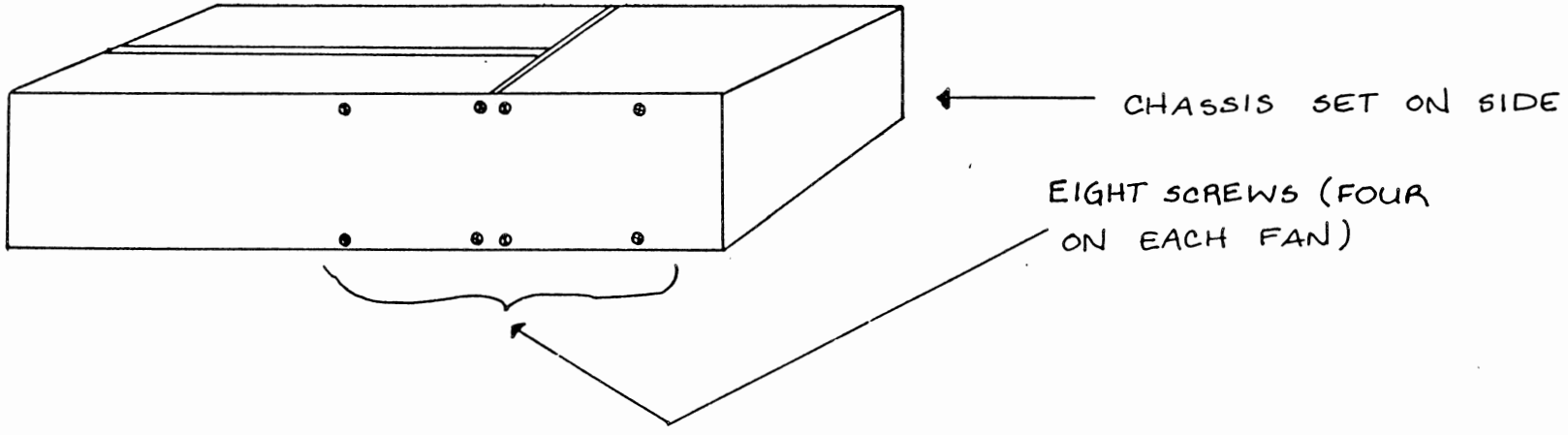
In order to remove the front panel board from the case, the power supply must first be removed. However, this does not require that the lugs be disconnected. Make sure that the AC power is OFF and the line cord has been unplugged from the wall receptacle before attempting to remove the front panel board or power supply. After power supply has been removed, unscrew the six 4-40 flathead screws that surround the front panel controls. The front panel board should now come out easily.

Removing Fans

To remove any of the fans from the case, first disconnect the molded connector that provides the AC power to the fans. Next, completely remove the chassis from the case and set it on its side in order to remove the four screws which hold each fan in place. When replacing fans, be sure to remove the finger guard (grate) and the screen (on the bottom of the fan) from the old fan and mount them on the new fan being installed.

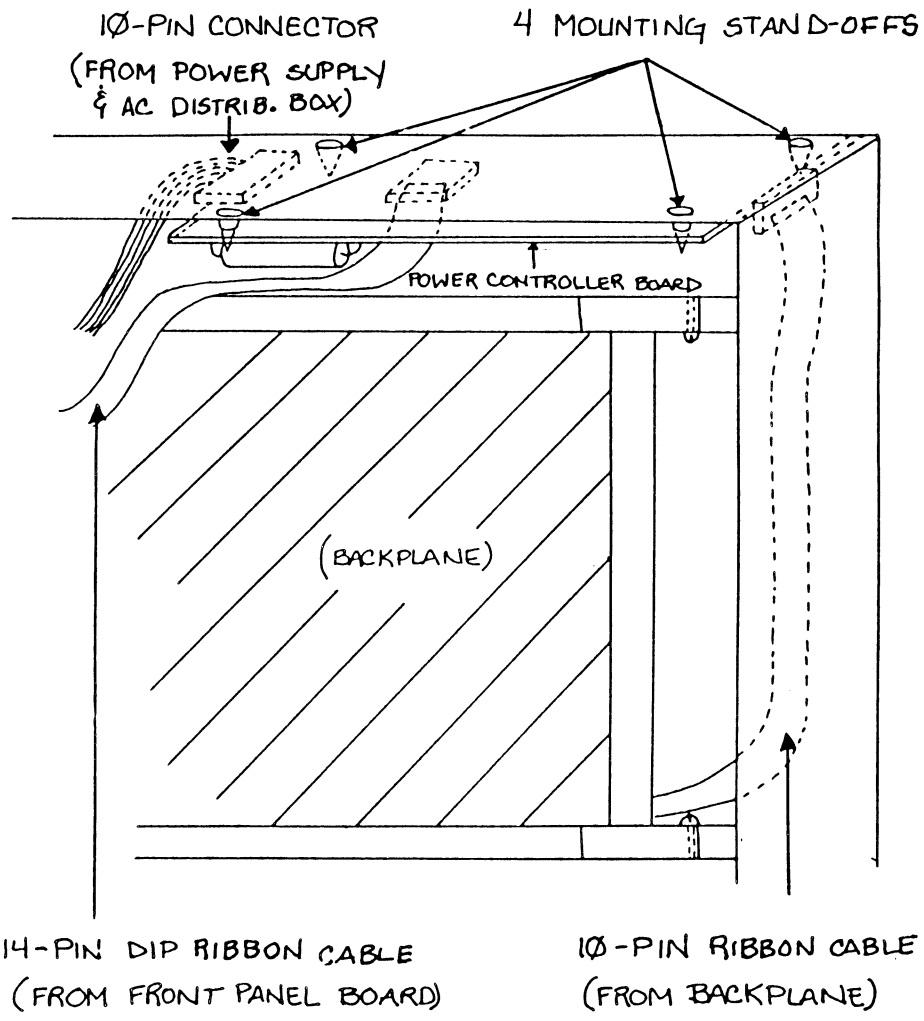


NOTE: WHEN INSTALLING FAN, MAKE SURE THAT THE FAN EXHAUSTS AIR THROUGH THE BOTTOM OF THE COMPUTER!



Removing Power Controller Board

There are three connectors that must be disconnected before removing the power controller board. These include: the 10-pin connector coming from the backplane, the 14-pin DIP connector coming from the front panel board, and the 10-pin connector coming from the power supply and AC distribution box. The power controller board itself is held in place by four printed circuit board mounting stand-offs. Each of these is released by pressing the locking tab on the stand-off towards the center of the stand-off, and then pulling the board away from the top panel. CAUTION: BEFORE REMOVING THE BOARD, TURN OFF THE AC POWER AND UNPLUG THE UNIT FROM THE WALL RECEPTACLE.



ERROR CODES...

Error Codes and Operator Actions

INTRODUCTION

This section explains how to interpret the four LEDs on the 40MB Disk Drive when an error condition is present. These LEDs are labeled Power, Load, Ready, and Write Protect. During normal function of the system, these LEDs monitor these four functions. When an error condition in the drive is encountered, though, these four lights indicate one of 71 different codes. Each of these codes represents a different error condition. To find which error condition is present, the user must do the following things:

1) Notice that an error condition is present

2) Decode the light sequence to a two-digit error code.

3) Look up the two digit code in an error code table

PRESENCE OF AN ERROR CONDITION

This section explains the LED status during normal conditions and error conditions.

NORMAL CONDITIONS

Following are the different states the LEDs can be in under normal operation:

12 - Deadman timer too short <> Tested after power on reset. Timer timed out in under 50 msec.

13 - Deadman timer too long <> Tested after power on reset. Timer failed to time out after 250 msec.

14 - Write current unsafe <> Write current was detected before loading or unloading the heads.

15 - Power unsafe test failed <> At power on reset the power unsafe circuits failed to detect an unsafe condition forced by the microprocessor.

17 - Internal CPU RAM error <> At spin up the internal CPU RAM failed a checker board or address test.

18 - External RAM error <> At spin up the external RAM failed a checker board or address test.

19 - Internal CPU timer error <> At spin up the internal CPU timers failed their test.

1A - External timer error <> At spin up the external timers failed their test.

1B - CPU not in mode 2 <> At power on reset the CPU was not in the correct mode.

1D - ROM 1 (K13) checksum error <> The ROM failed a 1's complement checksum test at power on reset or spin up.

1E - ROM 2 (K14) checksum error <> The ROM failed a 1's complement checksum test at power on reset or spin up.

21 - Hall switch 1 unstable during calibration <> The transitions for the Hall switch were not stable enough for calibration to occur.

Error Codes and Operator Actions

(continued)

- In normal operation of the drive with the system running, two of the four LEDs are on, the Power and the Ready.

- Whenever the power is on and the Write Protect switch is also on, the Write Protect LED will always be on.

- When the Start/Stop switch is turned to Stop, the Power LED is the only one on until the disk is spun up or down, at which time the Load light also comes on.

- When power is off, all LEDs are off

ERROR CONDITION

When an error condition occurs, the LEDs start blinking on and off in a sequence that repeats itself after three blinks. The first blink in the sequence is always all four lights blinking on then off. The next two blinks represent the error code.

READING THE LED

To recognize the code that is being blinked, you read the lights from top to bottom if the system is in a tower enclosure, or, more generally, in the direction from the Power LED to the Write Protect LED. Each blink represents a hexadecimal

22 - Cannot find sync (head crash) <> The drive could not sync up the servo sequencer to the servo data usually due to the absence of gap, sync pulses, or servo data altogether.

23 - Servo field error during calibration <> Thirty-five (35) consecutive servo fields could not be read during calibration. In normal operating mode this error will not flash. Instead, a 22 or 5E error will occur if the recovery routine fails.

25 - No index detect during calibration <> Could not detect index for calibration to continue.

26 - Write gate fault 2 (operator error - write protect mode) <> Write gate was activated when the drive had the selected volume write protected. Either the switch for write protection was active or a condition in the drive existed which required write protection (i.e. offset active, fault present).

27 - Write gate fault 1 <> Write gate was activated when one or more of the following existed: previous servo field was unreadable, read gate was active, drive was off track, or either a seek or head change command was pending.

29 - Hardware fault (head chip) <> A MARS unsafe signal was received from the head chip or the servo write inhibit signal was not active when a servo field was present. Commonly an incorrectly connected SMD B cable can cause a MARS unsafe signal if the head chip does not see write data when write selected.

2A - Actuator command set with no valid command received (open cable detect) <> The microprocessor detected an actuator command set but when it statused all actuator command lines, none were active.

2B - No offset direction but offset command set <> The microprocessor found the offset start line active but neither the forward or reverse offset lines were active.

Error Codes and Operator Actions

(continued)

number. To convert the light sequence to a hexadecimal code you must know how to convert binary numbers to hexadecimal numbers.

CONVERTING BINARY TO HEXADECIMAL

A single digit hexadecimal number goes from 0 to F: 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F. Each of these numbers is represented by a four bit binary number as follows:

HEX	BINARY
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
A	1010
B	1011
C	1100
D	1101
E	1110
F	1111

2C - Have fault detected but no fault exists <> The fault line indicating that a 26, 27, or 29 error was present was active but the respective fault signal lines were not.

31 - Will not spin up or no Hall 1 (Spin switch) transitions <> Microprocessor was not sensing any transitions from the Hall 1 switch, which usually means the drive was not spinning up.

32 - Spinning wrong direction <> The phasing between the Hall 1 and Hall 2 switches indicated the drive was spinning in the wrong direction.

33 - Spin up too slow <> The spin motor was not up to the correct speed in the allotted number of revolutions.

34 - No transitions from Hall 2 (Spin switch) <> During spin up no transitions were seen from the Hall 2 switch.

36* - Trying to spin up when not stopped <> Hall 1 switch transitions were sensed before power was applied to the spin motor.

3B - Spin down too slow <> The spin motor did not spin down to a stop within the allotted number of revolutions.

3C* - Not spinning for Hall spin test <> No Hall 1 switch transitions were detected during the Hall spin test.

3D - Spinning too slow (Hall switch) <> Using the Hall 1 switch the spin motor was determined to be spinning too slow.

3E - Spinning too fast (Hall switch) <> Using the Hall 1 switch the spin motor was determined to be spinning too fast.

Error Codes and Operator Actions

(continued)

To convert a binary number to hexadecimal, follow these steps:

- Divide the binary number into groups of four starting from the right.

- As an example, consider this number: 11100010. You should divide this number as follows: 1110,0010.

- For each group of four binary digits, assign the appropriate hexadecimal digit.

- For example, the above number in hexadecimal is E2, E for the 1110 and 2 for the 0010.

CONVERSION OF THE LED'S TO A BINARY CODE

The four LEDs represent a four digit binary code which can be converted to a hexadecimal code. An LED that is ON represents a 1 and an LED that is OFF represents a 0. Read in the direction of Power LED toward Write Protect LED, the Power LED representing the most significant digit. The first flash is always a 1111, or all ON. The second flash is the beginning of the code. Consider the following example:

Example: An error condition is encountered after drive Power switch is turned off to spin down the disk.

- All four LEDs blink on then off.

41 - Heads not unloaded (sequencer) <> The carriage retract switch was open when the drive spun down and stopped. This error may follow a 7A error after a power on reset. IMPORTANT! The cartridge must not be removed from the drive at this time or severe damage will result. The heads must be unloaded off the disks before normal operation can occur. See Special Maintenance Routines.

42 - Heads not unloaded (for unlocking cartridge door) <> The carriage retract switch was open when the microprocessor was to unlock the cartridge door.

43 - Heads did not load <> After proper actuator current was detected for head loading, the carriage retract switch was still closed.

44* - Not spinning for loading heads <> No transitions were detected from the Hall 1 switch when trying to load the heads. Possible operator error in maintenance mode.

45 - Heads did not unload, emergency retract initiated <> After proper actuator current was detected for heads unloading, the carriage retract switch was still open. An emergency retract was initiated to unload the heads. If the switch is still open, full power was applied to the actuator as a last resort, to get the heads off the disk.

47* - Heads not unloaded (for spin up) <> The carriage retract switch was open when trying to energize the spin motor. This is usually an operator error in maintenance mode.

48**- Cannot find sync on head 0 (exerciser) <> Drive could not sync up the servo sequencer to the servo data because of the absence of servo pulses or servo data altogether on head 0. The exerciser has attempted to isolate the problem to heads and not electronics. At least one head is operating correctly and head 0 was the first bad head found.

Error Codes and Operator Actions

(continued)

- Ready and Write Protect LEDs blink on then off.

- Power, Ready, and Write Protect LEDs blink on then off.

- All four LEDs blink on then off.

This sequence continues to repeat itself.

The first blink of all four indicates there is an error. The second blink represents a 0011, or a 3 in hexadecimal. The third blink represents a 1011, or a B in hexadecimal. Thus the hexadecimal error code is a 3B. The accompanying table indicates that a 3B code indicates a Spin Down Too Slow error condition.

49**- Cannot find sync on head 1 (exerciser) <> Drive could not sync up the servo sequencer to the servo data because of the absence of servo pulses or servo data altogether on head 1. The exerciser has attempted to isolate the problem to heads and not electronics. At least one head is operating correctly and head 1 was the first bad head found.

4A**- Cannot find sync on head 2 (exerciser) <> Drive could not sync up the servo sequencer to the servo data because of the absence of servo pulses or servo data altogether on head 2. The exerciser has attempted to isolate the problem to heads and not electronics. At least one head is operating correctly and head 2 was the first bad head found.

4B**- Cannot find sync on head 3 (exerciser) <> Drive could not sync up the servo sequencer to the servo data because of the absence of servo pulses or servo data altogether on head 3. The exerciser has attempted to isolate the problem to heads and not electronics. At least one head is operating correctly and head 3 was the first bad head found.

4C* - Heads not unloaded (for spin down) <> The carriage retract switch was not closed at the beginning of the spin down routine. This is usually an operator error in maintenance mode.

4D* - Heads not unloaded (for loading heads) <> The carriage retract switch was not closed at the beginning of the load heads routine. This is usually an operator error in maintenance mode.

4E - Heads not loaded (during calibration) <> The carriage retract switch closed during calibration.

51 - No end conversion A to D converter <> The end conversion was not received from the A to D converter during the A to D test at spin up.

52 - A to D out of tolerance <> The offset in the A to D conversion was too large during the A to D test at spin up.

Error Codes and Operator Actions

(continued)

53 - D to A out of tolerance <> The offset in the D to A conversion was too large during the D to A test at spin up.

54 - Off track-position <> The D to A value of position voltage indicates that the selected head was off track when it should have been on.

55 - Off track-address <> The selected head was determined to be off the correct track when the track addresses in 50 consecutive servo fields did not indicate the correct track.

56 - No actuator current detected during load <> After switching power to the actuator for heads loading, no actuator current was sensed.

57 - No actuator current detected during unload <> After switching power to the actuator for heads unloading, no actuator current was sensed.

5A - Seek retry error during first seek of calibration <> The drive failed after 20 retries to complete the first seek of calibration.

5B - D to A --to-- A to D disagree <> The ending digital value disagreed with the original value during the D to A --to-- A to D test in which all 256 (one byte) values are tried.

5E - Seek retry - too many <> Drive failed to complete seek after 20 retries.

61 - Software interrupt <> Unused interrupt that should never occur.

62 - Power unsafe <> One or more of the following voltages was too low for proper operation of the drive to continue: -5.2V, -12V, or +24V.

63 - Input capture interrupt <> Unused interrupt that should never occur.

Error Codes and Operator Actions

(continued)

64 - Output compare interrupt <> Unused interrupt that should never occur.

65 - Timer overflow interrupt <> Unused interrupt that should never occur.

66 - RS-232 terminal interrupt <> Unused interrupt that should never occur.

67 - Deadman timer (NMI) interrupt <> The deadman timer timed out and a master reset was performed. This can occur if the microprocessor or some other device on the address bus was malfunctioning.

68 - Door switch still closed when solenoid energized <> After energizing the door solenoid, the door switch did not indicate that the door was unlocked.

69 - Door switch opened during normal operation <> The door switch indicated that the door became unlocked when it should still have been locked.

6A - Not enough cylinders in inner guard band <> During calibration not enough cylinders (tracks) were available in the inner guard band.

6B - Not enough cylinders in outer guard band <> During calibration not enough cylinders (tracks) were available in the outer guard band.

72 - Cartridge not in place <> The cartridge in place switch was not closed when the drive tried to spin up.

73 - Door not closed properly - will not lock <> The cartridge door lock switch did not close when the solenoid was deenergized. After the door is closed properly the error will clear automatically.

74 - Cylinder request over range <> The cylinder address received for the next seek was greater than 643 (decimal).

Error Codes and Operator Actions

(continued)

77 - Both forward and reverse offset received at same time <> The actuator command register indicates that both forward and reverse offsets were active.

7A - Heads not unloaded (during deadman - power unsafe test) <> The carriage retract switch was not closed at power on reset when the deadman timer test was performed. This error is usually flashed only once before the 41 error is flashed. See error 41 description for more details.

7D**- Exerciser test routine pass complete <> No error condition exists, used for status only.

7E**- Special spin-up - unload successful <> No error condition exists, used for status only.

* These errors will usually only be seen in maintenance mode but their occurrance is possible in SMD mode.

** Special maintenance routines.

NOTES