

SM-Z-207-41/42

DISK DRIVE SYSTEM

Service Manual





TABLE OF CONTENTS

INTRODUCTION	1-1	OPERATION	5-1
SPECIFICATIONS	2-1	Warnings	5-1
CONFIGURATION	3-1	Power Switch and Indicator	5-1
Disk Drive System	3-1	Disk Loading	5-1
Drive Select Jumpers	3-4	Write-Protect	5-2
Terminating Pack	3-4	Air Flow	5-2
True Ready/Standard Ready Jumper	3-4	Fan Filter	5-2
INSTALLATION AND FORMATTING	4-1	THEORY OF OPERATION	6-1
Short Flat Cable Installation	4-1	SERVICE INFORMATION	7-1
System Installation	4-2	Schematic Diagram	7-1 (foldout)
Long Flat Cable	4-3	REPLACEMENT PARTS LIST	8-1
Formatting	4-4	SEMICONDUCTOR IDENTIFICATION	9-1
		CIRCUIT BOARD X-RAY VIEW	10-1



INTRODUCTION

This Service Manual provides you with the information you need to configure and set up the Z-207-41 or the Z-207-42, 8" Floppy Disk Drive System to work with the Z-100 Computer.

The circuit description, schematic diagram, and service information will aid you in servicing the Z-207-41/42 Disk Drive System.

The 8" drives are mass storage devices that can store up to 1.262 megabytes of information on the two sides of an 8-inch disk when it is connected to a Z-100 Computer.

A transducer in each drive detects the presence or absence of a notch in the disk to ensure write protection. If the unit has a Shugart drive installed, a front panel locking lever securely locks each disk inside the drive. The lever maintains data integrity by not allowing the disk to be removed while the spindle is turning, or until two seconds after the drive is deselected. Mitsubishi drives have a push button release.

If either drive is defective, it must be replaced, as they are not serviceable.

NOTE: Early production models have Shugart drives which are installed with the circuit board on the top of the drive. Later production models have Mitsubishi drives which are installed with the circuit board on the bottom.

SPECIFICATIONS

DISK

Capacity	1,261,568 bytes per disk.
Recording Surfaces Per Disk	2.
Number of Tracks	77 each side.
Track density	48 tpi.

DATA TRANSFER RATE

Track-to-Track Move	3 ms.
Head Settle Time	20 ms.
Rotational Speed	360 rpm \pm 1.5%.
Average Access Time	90 ms.
Maximum Access Time	410 ms.
Average Latency	83 ms.

POWER REQUIREMENTS

Floppy System With Two Drives	1.2 amperes at 125 VAC.
Floppy Disk Drive	24 VDC \pm 1.2 VDC at 2.2 amperes max; average 1.3 amperes at \pm 1.2 VDC.
	5 VDC \pm .25 VDC at 1.0 amperes max; average .8 amperes.

POWER SUPPLY	24 VDC outputs, 1.3 ampere, 2.2 ampere max. +5 VDC outputs, 1 ampere.
-------------------------------	--

GENERAL

Dimensions	13 3/4" wide \times 20 1/2" deep \times 7 3/4" high.
Net Weight	42 lbs (Z-207-42). 34 lbs (Z-207-41).

Zenith Data Systems reserves the right to discontinue products and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.

CONFIGURATION

DISK DRIVE SYSTEM

The Z-207-41/42 Disk Drive System is sent from the factory properly configured to operate with Z-100 Series computers.

You may have one of two models of the Disk Drive System. Tables 3-1A and 3-1B, and Figures 3-1A and 3-1B cover these models. Look at your Disk Drive and refer to the appropriate table and figure where referenced in the following paragraphs.

If you wish to check or change the configuration of the drives, refer to Table 3-1A or 3-1B, and Figure 3-1A or 3-1B.

Depending on your Disk Drive System model, tables 3-1A and 3-1B show you how a typical 8" drive should be configured. The only exceptions are the drive-select jumpers (DS1, DS2, DS3, and DS4) and the terminating pack (U9, RM1, or UM1).

Figures 3-1A and 3-1B show you drive jumper locations.

Table 3-1A

Configuration table.
(Shugart drive).

DESIGNATOR	DESCRIPTION	CONFIGURATION	
		OPEN	SHORT
U9	Terminations for multiplexed inputs		X
SI	Internal write current switch		X
SE	External write current switch	X	
TR	True ready output		X
2S	Two sided status output		X
DC	Disk change option	X	
S1	Side select option using direction delect	X	
S2	Side select input		X
S3	Side select option using drive select	X	
1B, 2B, 3B, 4B	Side select option using drive select	X	
D	Alternate input-in use	X	
MS	Motor on form drive select		X
MO	Alternate input-motor on	X	
MD	Motor off delay		X
R	Ready output		X
RR	Radial ready		X
DS1	Drive select 1 input		X
DS2, 3, 4	Drive select 2, 3, 4 input	X	
PD	Stepper power down	X	
WP	Inhibit write when write protected		X
NP	Allow write when write protected	X	
TS	Data separation option select	X	
SR	Standard ready	X	
MT	Modified true ready		X

Table 3-1B
CONFIGURATION CHART
(Mitsubishi drive)

DESIGNATOR	LOCATION	DESCRIPTION	CONFIGURATION	
			OPEN	SHORT
TERMINATOR	E1	Input line terminator		X
JFG	A1	Frame ground and signal ground are shorted		X
JSG	A1	Frame ground and signal ground are opened	X	
DS1	D1	DRIVE SELECT 1 Input		X
DS2,DS3,DS4	D1	DRIVE SELECT 2,3,4 Input	X	
1B,2B,3B,4B	D1	SIDE SELECT Option using DRIVE SELECT	X	
SE	C1	External WRITE CURRENT SWITCH	X	
SI	C1	Internal WRITE CURRENT SWITCH		X
S	C1	"Keep Open"	X	
DC	C1	DISK CHANGE Option	X	
2S	C1	TWO-SIDED Status Output		X
IT	D1	IN USE Terminator		X
D	D1	Alternate Input — IN USE	X	
HI	D1	HEAD LOAD "OR" IN USE to the IN USE CIRCUIT	X	
C	D1	Alternate Input — HEAD LOAD	X	
I	D1	INDEX Output		X
R	D1	READY Output		X
S1	D1	SIDE SELECT Option using DIRECTION SELECT	X	
S2	D1	Standard SIDE SELECT Input		X
S3	D1	SIDE SELECT Option using DRIVE SELECT	X	
RS	D4	READY Standard		X
RM	D4	READY Modified	X	

Table 3-1B (Continued)
CONFIGURATION CHART
(Mitsubishi drive)

DESIGNATOR	LOCATION	DESCRIPTION	CONFIGURATION	
			OPEN	SHORT
RFa	F2	"Don't Remove"		X
RFb	F2	"Keep Open"	X	
MO	D1	MOTOR ON from HEAD LOAD	X	
MS	D1	MOTOR ON from DRIVE SELECT	X	
Z	D9	IN USE LED from DRIVE SELECT		X
NP	F9	Allow Write when WRITE PROTECTED	X	
WP	F9	Inhibit Write when WRITE PROTECTED		X
A	D4	Radial HEAD LOAD		X
B	D3	Radial HEAD LOAD		X
X	D4	Radial HEAD LOAD		X
RI	D1	Radial INDEX		X
RR	D1	Radial READY		X
RI	C2	Radial INDEX		X
RR	C3	Radial READY		X
Y	E8	IN USE from HEAD LOAD	X	
V	E8	Door Lock from HEAD LOAD		X
HLL	D10	HEAD LOAD Latch	X	
DL	D10	Door Lock Latch Option	X	
HUN	C5	HEAD UNLOAD Normal	X	
HUD	C5	HEAD UNLOAD Delay		X
HR	C4	HOLD READY Output	X	

Table 3-1B (Continued)
CONFIGURATION CHART
(Mitsubishi drive)

DESIGNATOR	LOCATION	DESCRIPTION	CONFIGURATION	
			OPEN	SHORT
HY	C4	Standard READY		X
M1	D1	Use J1 pin for MOTOR START	X	
M2	D1	USE J1 pin 18 for MOTOR START		X
PS	C2	HEAD LOAD Anded with Standard READY		X
PH	C2	HEAD LOAD Anded with HOLD READY	X	
E1	C4	"Keep Open"	X	
E2	C4	"Do not cut"		X
V1	E9	"Do not cut"		X
V2	E9	"Keep Open"	X	
V3	C5	"Do not cut"		X
V4	C5	"Keep Open"	X	
V5	E4	"Keep Open"	X	
V6	E4	"Do not cut"		X
V7	D3	"Keep Open"	X	
V8	D3	"Do not cut"		X

DRIVE SELECT JUMPERS

Only one of the four drive select positions (DS1, DS2, DS3, or DS4) should have a jumper plug on it. With Z-100 Systems, use only DS1 or DS2. For example, if the drive is to be designated drive 1 (or drive A), the jumper should be installed at DS1. If the drive is to be drive 2 (or drive B), the jumper should be installed at DS2, etc.

TERMINATING PACK

Only one terminator pack should be installed. If more than one drive is used, the terminator pack should be in the drive that is physically last on the flat cable.

To remove the terminator pack, refer to Figure 3-2A and Figure 3-2B and proceed as follows:

- Turn the drive over.
- If you have a Shugart drive remove the four screws (A) and the bottom plate.

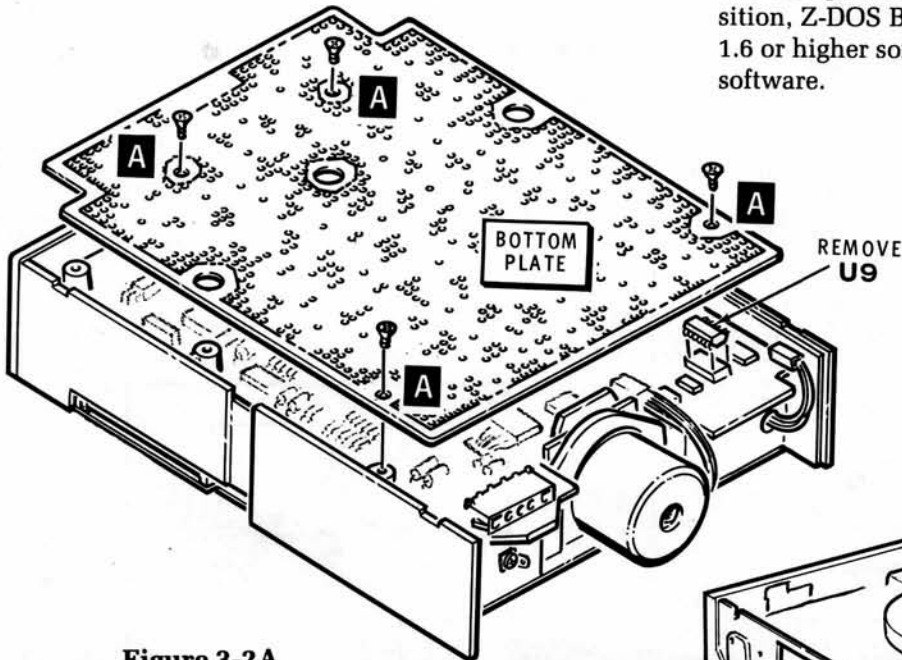


Figure 3-2A

Shugart Drive terminator pack removal.

- Remove the terminator pack from socket U9, RM1, or UM1 (depending on model).
- If you have a Mitsubishi drive, the terminator pack is at location E1. (The circuit board is numbered from 1 through 10 on each side and from A through F on the bottom. Refer to Figure 3-2B).
- Replace the bottom plate and screws (if necessary).

TRUE READY/STANDARD READY JUMPER

The Modified True Ready (MT) signal indicates to the disk controller that the drive is up to speed and ready for operation. This signal is active within 160 ms after the drive motor is first turned on and within 20 ms after the last seek operation.

The Standard Ready (SR) signal only indicates that a disk has been inserted and the drive door is closed. It does not indicate that a drive is available for operation.

If you use the Disk System with a Zenith Data System Computer and software, use the MT jumper position, Z-DOS BIOS version 1.10 and format version 1.6 or higher software, and/or CPM 2.2.101 or higher software.

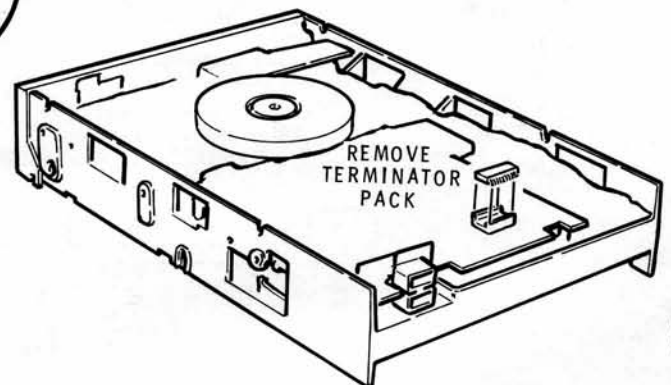


Figure 3-2B

Mitsubishi Drive terminator pack removal.

INSTALLATION AND FORMATTING

SHORT FLAT CABLE INSTALLATION

The following steps provide you with instructions for installing the short flat cable (HE-134-1330) that was included with the Drive System.

- Disconnect the Computer's line cord from the AC outlet.
- Refer to Figure 4-1 and remove the cabinet top of the Computer.
- Lift the cabinet top straight up and set it aside.
- If the Computer has a short flat cable installed between the floppy disk controller card and the rear panel, remove the short cable. It will not be used. You must use the new cable, HE 134-1330, which is physically different.
- Remove any cards that are in the card cage to allow more room to work.

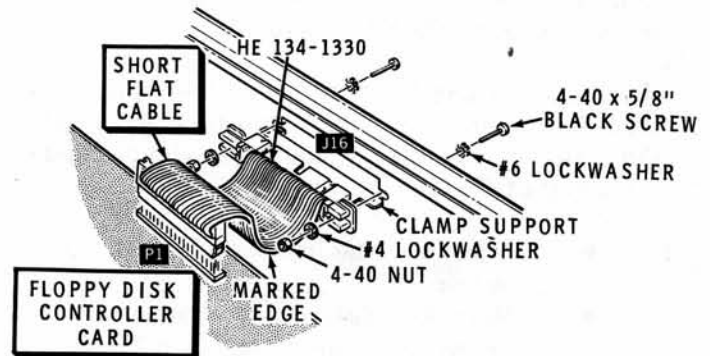


Figure 4-2

Short cable installation.

Refer to Figure 4-2 for the following steps.

- Insert the indicated end of the clamp support and the short flat cable into rear panel hole J16. Secure them in place with two 4-40 × 5/8" black screws, two #6 lockwashers, two #4 lockwashers, and two 4-40 nuts as shown. Be sure the marked edge of the cable is positioned as shown.
- Replace any cards you removed from the card cage.
- Plug the free end of the short flat cable onto connector P1 of the floppy disk controller card.
- Replace the cabinet top on the Computer.

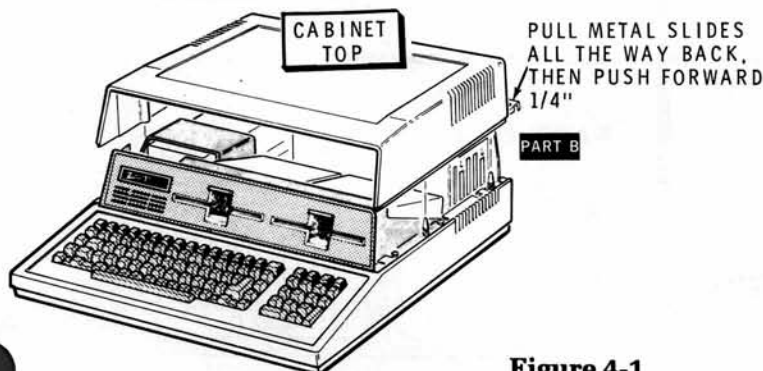
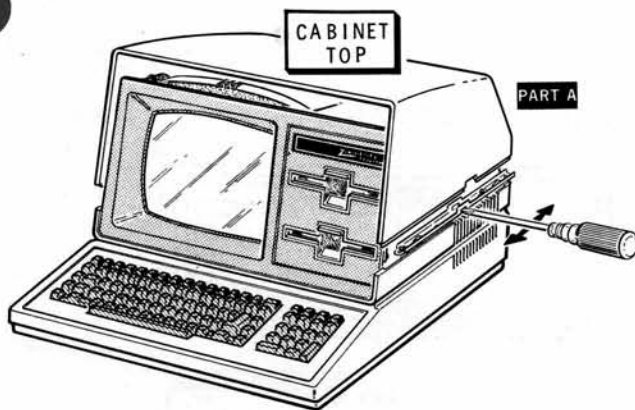


Figure 4-1

Top cover removal.

SYSTEM INSTALLATION

The Disk Drive can be located up to three feet away from the Computer. The Disk System comes from the factory set for 120 VAC operation.

If the Disk System is to operate on 240 VAC, or if there is low line voltage and you need to operate the System on 220 VAC or 100 VAC, refer to Figure 4-3, and the following steps.

- Disconnect the line cord from the Disk System.
- Slide the plastic cover over the power connector portion of the power block.
- Remove the fuse by pulling the lever. Then set the fuse aside.
- Pull out the small configuration board from the power block, and reposition it until the desired voltage value is visible.

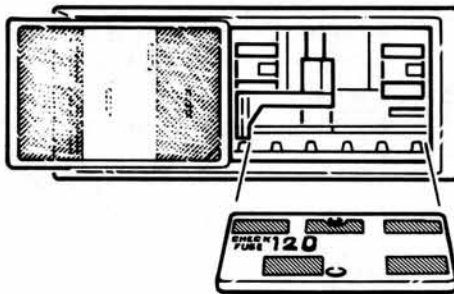
Use "240" for 220-245 volt operation.

Use "220" for 200-220 volt operation.

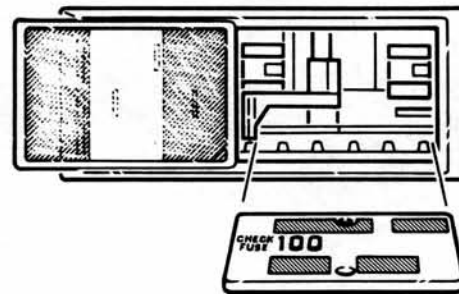
Use "120" for 115-125 volt operation.

Use "100" for 95-115 volt operation.

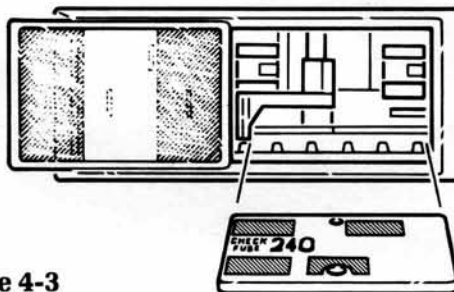
PART A 120 VAC



PART B 100 VAC



PART C 240 VAC



PART D 220 VAC

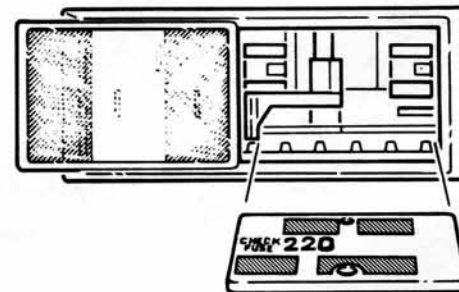


Figure 4-3

Power line options.

- Reinsert the board.
- Install the proper size fuse.
 - Use 1.5 ampere for 100-120 volt operation, (HE 421-25).
 - Use .75 ampere for 200-220 volt operation, (HE 421-29).
- Reposition the plastic cover and reattach the line cord.

The plug on the line cord is standard for 115 VAC outlets. For 240 VAC operation in the U.S.A., replace the line cord in a manner such that your power connection conforms with section 210-21 (b) of the National Electric Code, which reads in part:

"Receptacles connected to circuits having different voltages, frequencies, or types of current (AC or DC) on the same premises shall be of such design that attachment plugs used on such circuits are not interchangeable."

When you install a new plug, make sure it is connected according to your local electrical code. Units with three-wire line cords must always have the green wire connected to chassis ground.

LONG FLAT CABLE

The following steps provide you with instructions for installing the long flat cable (HE 134-1308). Refer to Figure 4-4.

- Use caution in handling the cable. The pins may bend, causing an inoperative condition.
- If it has not already been done, remove the screws, washers and top bar from the connector clamp.
- Notice the missing pin in the Disk Drive System's rear panel connector. Both connectors on the long flat cable have one hole
- plugged. Choose the cable end that will plug into the rear panel connector so that the marked edge is as shown, and be sure the cable comes from the bottom of the connector as shown. Then plug the cable into the connector.
- Replace the top bar of the cable clamp and secure it snugly in place with the two screws and washers you just removed.
- In a similar manner, connect the free end of the cable to the rear of the Computer. Connect it to the free end of the short cable that you previously installed.
- Connect the line cord coming from the rear of the Disk System to an AC outlet.

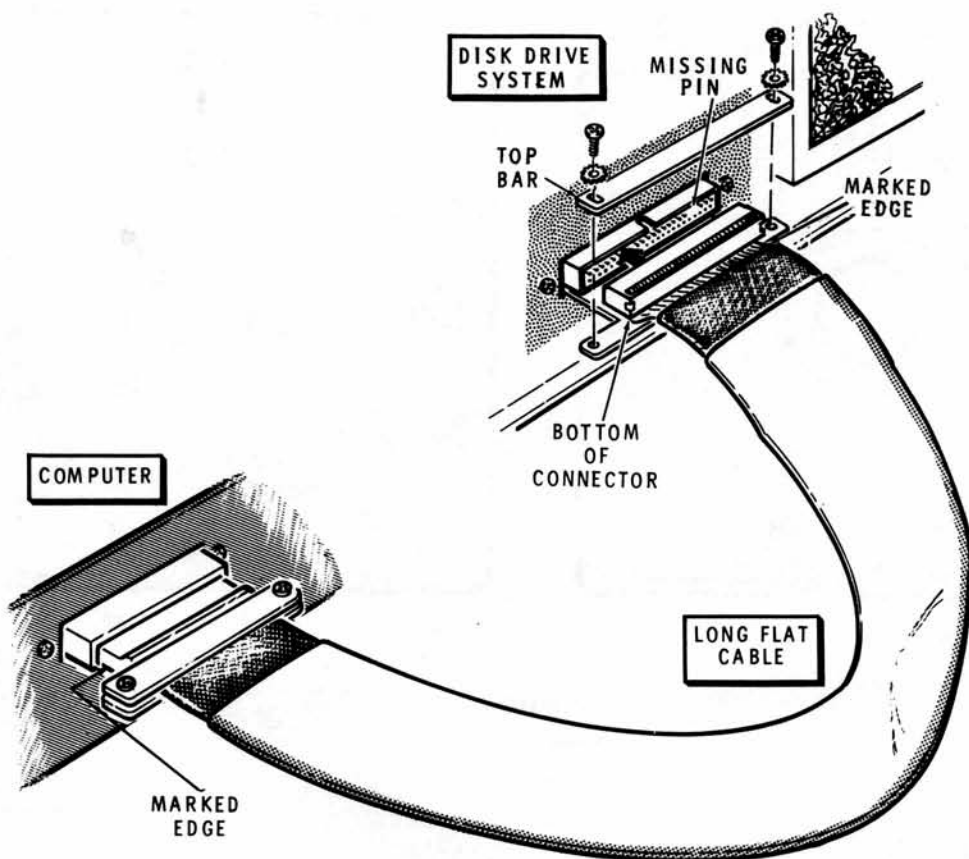


Figure 4-4

Long flat cable installation.

FORMATTING

The following information provides you with the procedure to format a disk.

- Locate a blank 8" double-sided disk and either 5 1/4" Z-DOS Distribution Disk I or CP/M-85 Distribution Disk I.
- Refer to Figure 4-5, and place the write-enable tape over the write protect notch of the 8" disk.

- Boot up the Z-DOS or CP/M-85 Distribution Disk I. Then type **FORMAT** and press **RETURN**. Follow the program instructions.
- Insert the blank 8" disk into drive C (the 8" drive configured as DS1, the top drive of a two Drive System) and close the door.

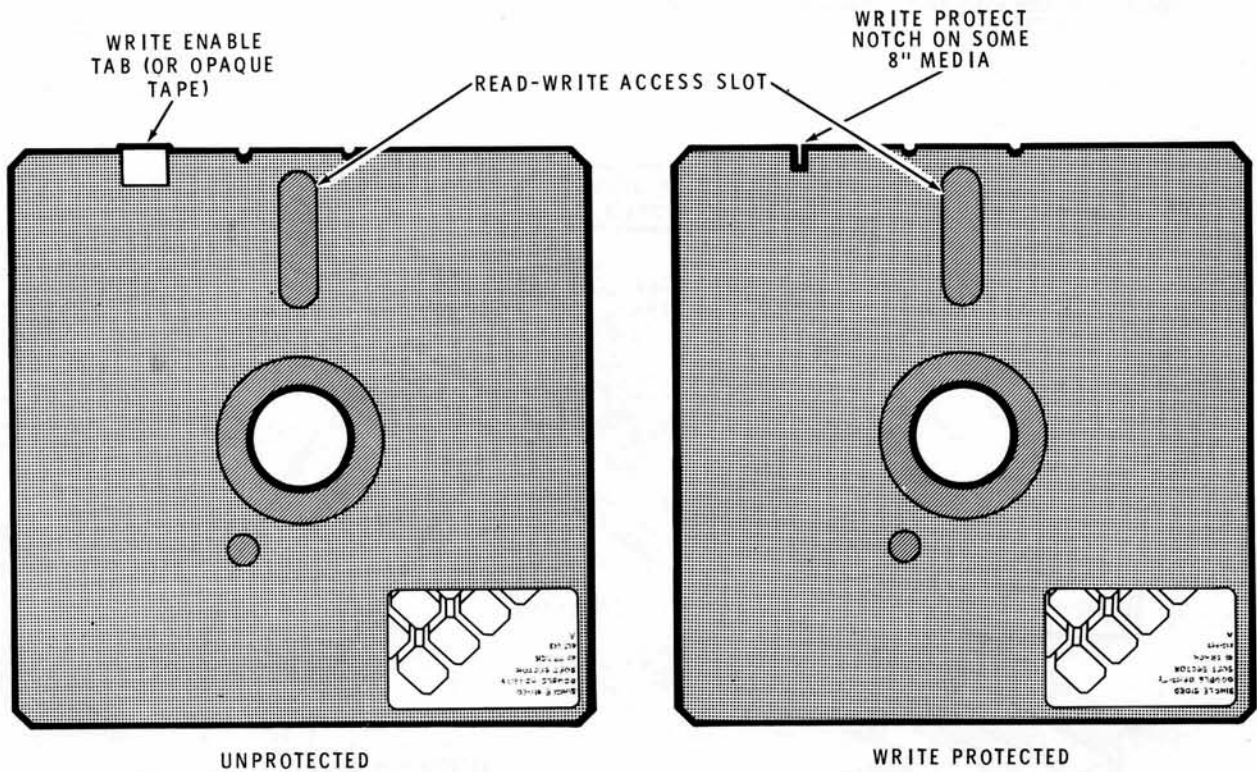


Figure 4-5
Write protection.
8" disk.

OPERATION

WARNINGS

If you have a Shugart drive:

1. Be sure to remove the cardboard inserts before using the Drive System.
2. Do not force the drive door open while it is accessed. This can damage the Drive.
3. Do not close the Drive door unless a disk or cardboard insert is in the Drive.

POWER SWITCH and INDICATOR

When the line cord is plugged into an AC outlet, the Power Switch applies power to the Drive System. The power indicator glows brightly to indicate that the System is on.

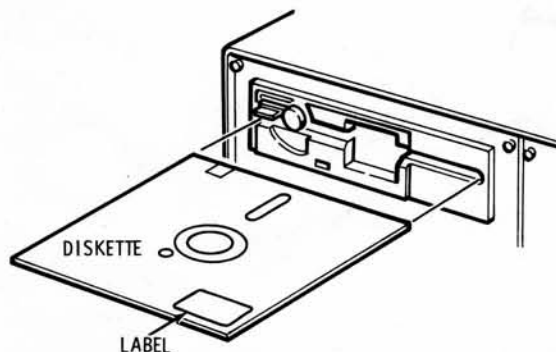


Figure 5-1A

Disk installation in Shugart Drive.

DISK LOADING

If you have a Shugart drive, refer to Figure 5-1. Raise the door lever and insert the disk with the label up as shown. Push the disk all the way into the drive. It will latch into place. Then lower the door lever.

The door lever is locked closed when the drive is being accessed and for approximately two seconds after the drive is deselected. Never attempt to force the door lever up when it is locked, or the Drive can be damaged.

To remove the disk, raise the door lever and the disk will spring part way out of the Drive. Always remove the disks before you turn off the Drive System.

If you have a Mitsubishi drive, refer to Figure 5-1B and insert the disk as shown. To release the disk, press in as indicated.

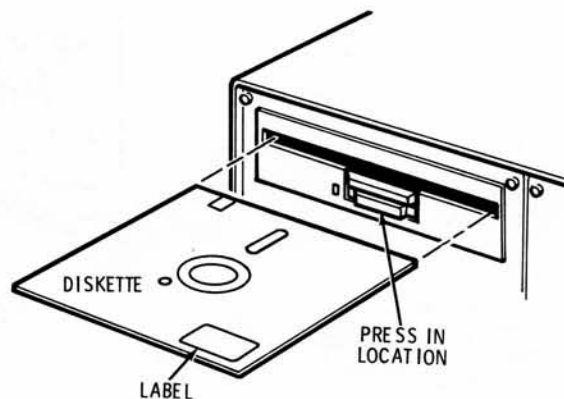


Figure 5-1B

Diskette Installation in Mitsubishi Drive.

WRITE-PROTECT

To write-protect a disk so it cannot be written on, remove the tab or opaque tape from the write-protect notch. Refer to Figure 4-5.

AIR FLOW

Never block the air vents or fan opening, or in any way obstruct the flow of air in the Drive System. This could cause overheating and possible damage to the System.

FAN FILTER

The fan filter should be cleaned every 60 days. In industrial environments, it should be cleaned more often. To clean the filter, proceed as follows:

- Refer to Figure 5-2.
- Gently pull the filter out of its rear panel area.
- Wash the filter in warm water and a mild detergent.
- Squeeze the filter as dry as possible.
- Allow the filter to dry for several minutes.
- Replace the filter.

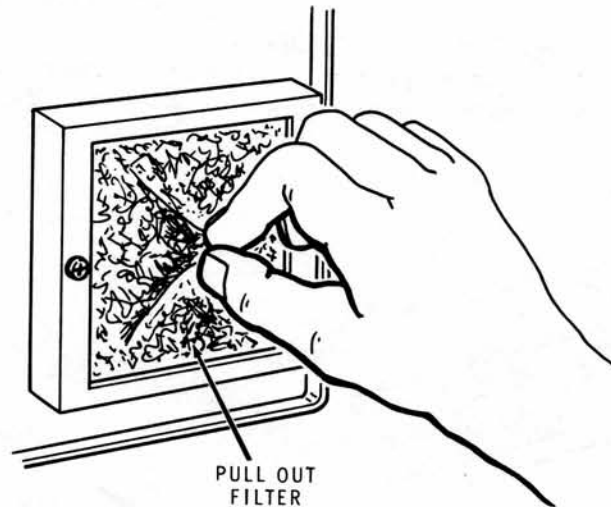


Figure 5-2
Removing filter.

THEORY OF OPERATION

Refer to the schematic diagram (foldout from page 7-1) as you read the following paragraphs.

The Disk System is designed to operate with two 8" floppy disk drives. Each drive requires both +5 VDC and +24 VDC, which is supplied by the power supply.

Transformer T1 converts line voltage to the two proper AC voltages. These AC voltages are then rectified, filtered, and regulated to produce the proper DC voltages. The AC voltage at circuit board holes A, E, and F is full-wave rectified by the diodes in D3 and filtered by capacitor C101. Capacitors C1, C2, and C3 are bypass capacitors and C7, C8, C11, and C12 ensure the stability of voltage regulators U1

and U2. Resistor divider networks R1-R2 and R3-R4 set the bias of these regulators so their outputs will be 24 volts.

The +5 VDC supply functions in a similar manner, except that the voltage regulators are designed to have a fixed output of +5 VDC. Therefore, resistor biasing is not required.

A portion of the +5 VDC coming from regulator U4 is applied through current-limiting resistor R5 to the power indicator LED, D4.

The line filter attenuates line transients and reduces AC line noise. This provides a more reliable operation of the Disk System.

SERVICE INFORMATION

The following chart list some problems or conditions that might occur. The "Possible Cause" column list the components associated with the problem. This will help you relate a problem to the Schematic Diagram or to the "Theory of Operation."

Refer to the "Circuit Board X-Ray View" for the physical location of parts on the circuit board.

CONDITION	POSSIBLE CAUSE
Nothing happens at turn on.	<ul style="list-style-type: none"> Not plugged in. Fuse F1 blown. Line cord not attached.
Fuse blows.	<ul style="list-style-type: none"> Diodes D1, D2, or D3. C101, C15, C7, or C8. U1, U2, U3, or U4. Power module board not installed properly.
No output from 5 volt supplies, or voltage(s) too high or too low.	<ul style="list-style-type: none"> U3 or U4. D1 or D2. C15. Power module circuit board.
No output from 24 volt supplies, or voltage(s) too high or too low.	<ul style="list-style-type: none"> U1 or U2. D3. C101. R1, R2, R3, or R4. Power module circuit board.
Cannot write to or format a disk.	<ul style="list-style-type: none"> Write protect notch not covered. Disk not installed, or not installed properly. Long flat cable not connected. Cables inside Drive System not connected properly. Drive not programmed properly.
Cannot format single-sided disks. Double-sided disks format OK. Preformatted single-sided disks function properly.	<ul style="list-style-type: none"> Probable cause is a very early version of CP/M-85. Contact Software Technical Consultation (616-982-3860) to obtain an update.
Erratic read/write operation.	<ul style="list-style-type: none"> Terminator pack; both installed or none at all. There should be only one. Check cables for bent pins.

NOTES:

- ALL RESISTOR VALUES ARE IN OHMS (k=1,000, M=1,000,000) ALL RESISTORS ARE 1/4-WATT, 5% UNLESS OTHERWISE SPECIFIED.
- ALL CAPACITOR VALUES ARE IN μ F (MICROFARADS), UNLESS OTHERWISE SPECIFIED.
- REFER TO THE CIRCUIT BOARD X-RAY VIEW FOR THE PHYSICAL LOCATION OF PARTS.

LEGEND:

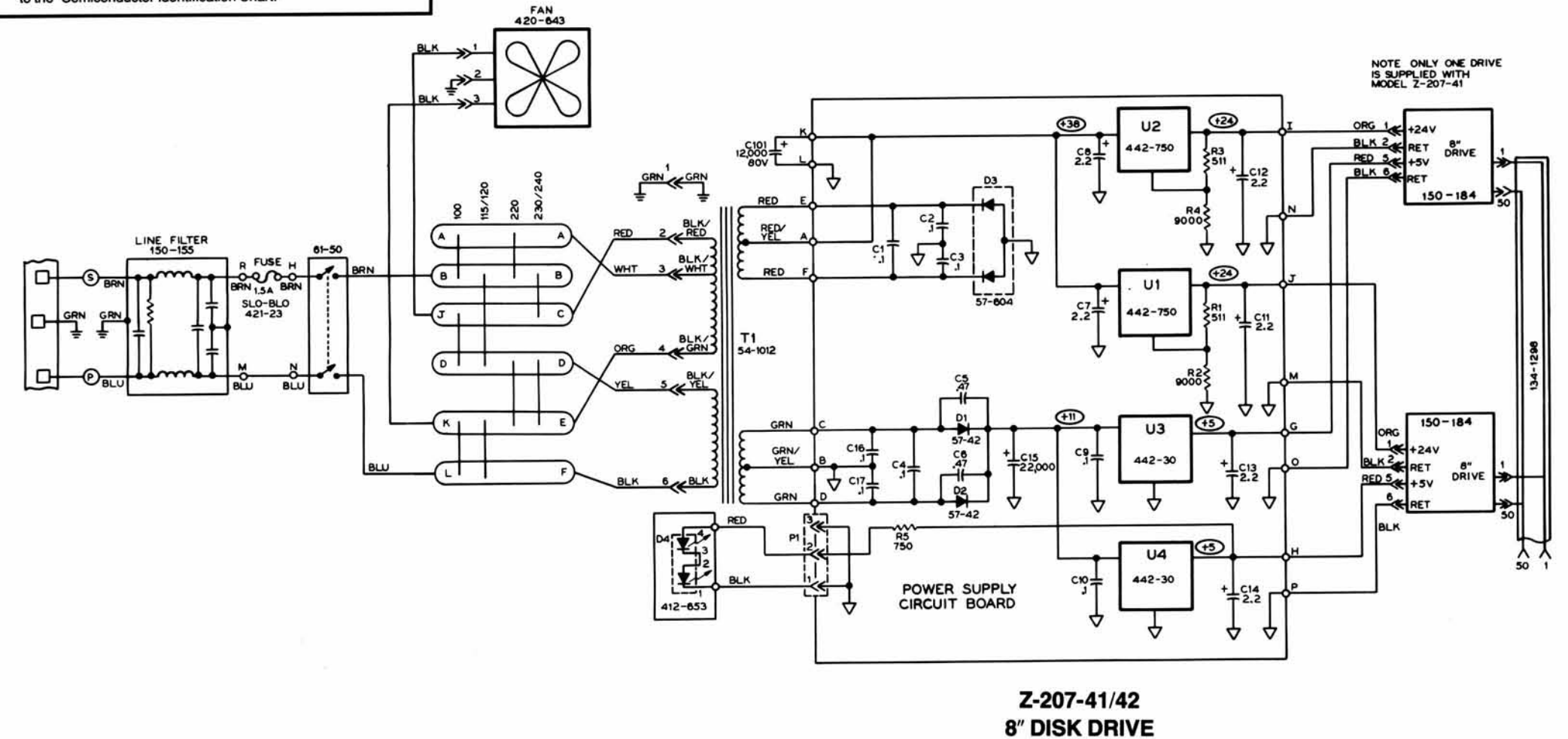
- CHASSIS GROUND
- CIRCUIT BOARD GROUND
- DIRECTION
- SIGNAL FROM S-100 BUS
- SIGNAL TO S-100 BUS
- MECHANICAL CONNECTION
- MALE CONNECTION
- FEMALE CONNECTION
- NO CONNECTION
- CONNECTION
- CALIBRATION OR A TEST POINT
- THIS SYMBOL INDICATES WHERE A WIRE CONNECTS TO A CIRCUIT BOARD.
- THIS SYMBOL INDICATES A DC VOLTAGE TAKEN BETWEEN THE POINT INDICATED AND CIRCUIT BOARD GROUND.

PARTS ORDERING INFORMATION:

If you order a part from Zenith Data Systems, use the (HE) prefix. Example:
HE 443-730

If you order a part from Heath Company, DO NOT use the (HE) prefix. Example:
443-730

For semiconductor type numbers (Example: 74LS153), refer to the "Semiconductor Identification Chart."



Z-207-41/42
8" DISK DRIVE

REPLACEMENT PARTS LIST

Power Supply Circuit Board

(Assembled HE 181-4114)

CIRCUIT COMPONENT NUMBER	ZDS PART NUMBER	DESCRIPTION
--------------------------------	-----------------------	-------------

ZDS PART NUMBER	DESCRIPTION
-----------------------	-------------

RESISTORS

R1	HE 6-5110-12	511Ω
R2	HE 6-9001-12	9000Ω
R3	HE 6-5110-12	511Ω
R4	HE 6-9001-12	9000Ω
R5	HE 6-751-12	750Ω

CAPACITORS

C1-C4	HE 29-72	.1 μF
C5-C6	HE 27-194	.47 μF
C7-C8	HE 25-930	2.2 μF, electrolytic
C9-C10	HE 29-72	.1 μF
C11-C14	HE 25-930	2.2 μF, electrolytic
C15	HE 25-943	22,000 μF, electrolytic
C101	HE 25-849	12,000 μF, electrolytic

SEMICONDUCTORS

See "Semiconductor Identification."

CABINET PARTS

HE 90-1301	Cabinet shell - top
HE 90-1302	Cabinet shell - bottom
HE 203-2143	Front panel
HE 203-2144	Rear panel
HE 203-2145	Front control panel
HE 203-2146	Main front panel
HE 204-2677	Panel brace
HE 204-2678	Cabinet support bracket
HE 391-663	Nameplate

MISCELLANEOUS

HE 61-50	Switch.
HE 134-1298	Cable - connects drives to rear panel of Drive System.
HE 134-1308	Cable - long flat, connects drive to Computer.
HE 134-1330	Cable - short flat, connects controller board to rear panel of the Computer.
HE 150-150	Power block card.
HE 150-154	Disk Drive (Shugart; discontinued).
HE 150-155	Line filter.
HE 150-184	Disk Drive (Mitsubishi)
HE 181-4114	Power supply board.
HE 181-4350	Power ON indicator switch.
HE 420-638	Fan.
HE 421-25	Fuse - 1.5 amp. slow-blow (for 120VAC operation).
HE 421-29	Fuse - .75 amp. slow-blow (for 240VAC operation).
HE 470-10	Fan filter.

HARDWARE

HE 250-1314	8-32 × 3/8" hex screw
HE 250-1319	4-40 × 5/8" phillips screw
HE 250-1325	6-32 × 1/4" phillips screw
HE 250-1411	4-40 × 1/4" phillips screw
HE 250-1420	6-32 × 3/8" phillips screw
HE 250-1425	6-32 × 1/2" phillips screw
HE 205-1426	6-32 × 3/4" phillips screw
HE 250-1483	6-32 × 3/8" phillips screw
HE 252-2	4-40 × 1/4" nut
HE 252-3	6-32 × 1/4" nut
HE 253-21	#6 washer
HE 254-1	#6 internal washer
HE 254-2	#8 internal washer
HE 254-6	#6 external washer
HE 254-9	#4 internal washer
HE 259-1	#6 solder lug

SEMICONDUCTOR IDENTIFICATION

This section is divided into two parts: "Component Number Index" and "Part Number Index."

The Component Number Index provides a cross reference between semiconductor component numbers and their respective ZDS Part Numbers. The component numbers are listed in numerical order.

The Part Number Index provides a cross reference to the manufacturing part number and the ZDS Part Numbers, Description, and Lead Configuration for each semiconductor part number. The part numbers in the second section are also listed in numerical order.

COMPONENT NUMBER INDEX

Diodes

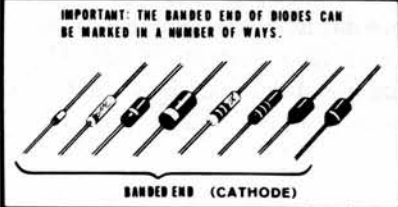
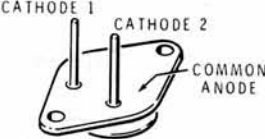
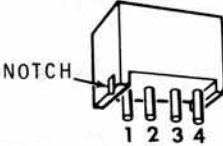
D1, D2	HE 57-42
D3	HE 57-604
D4	HE 412-653

Integrated Circuits

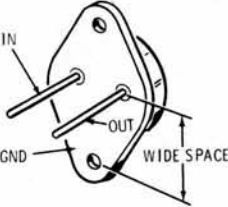
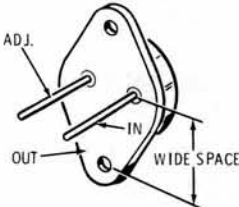
U1, U2	HE 442-750
U3, U4	HE 442-30

PART NUMBER INDEX

Diodes

ZDS PART NUMBER	MAY BE REPLACED WITH	LEAD CONFIGURATION (Top View)
HE 57-42	3A1	 <p>IMPORTANT: THE BANNED END OF DIODES CAN BE MARKED IN A NUMBER OF WAYS.</p> <p>BANDER END (CATHODE)</p>
HE 57-604	SR711A	 <p>CATHODE 1 CATHODE 2 COMMON ANODE</p>
HE 412-653	HLMP-2300	 <p>NOTCH 1 2 3 4</p>

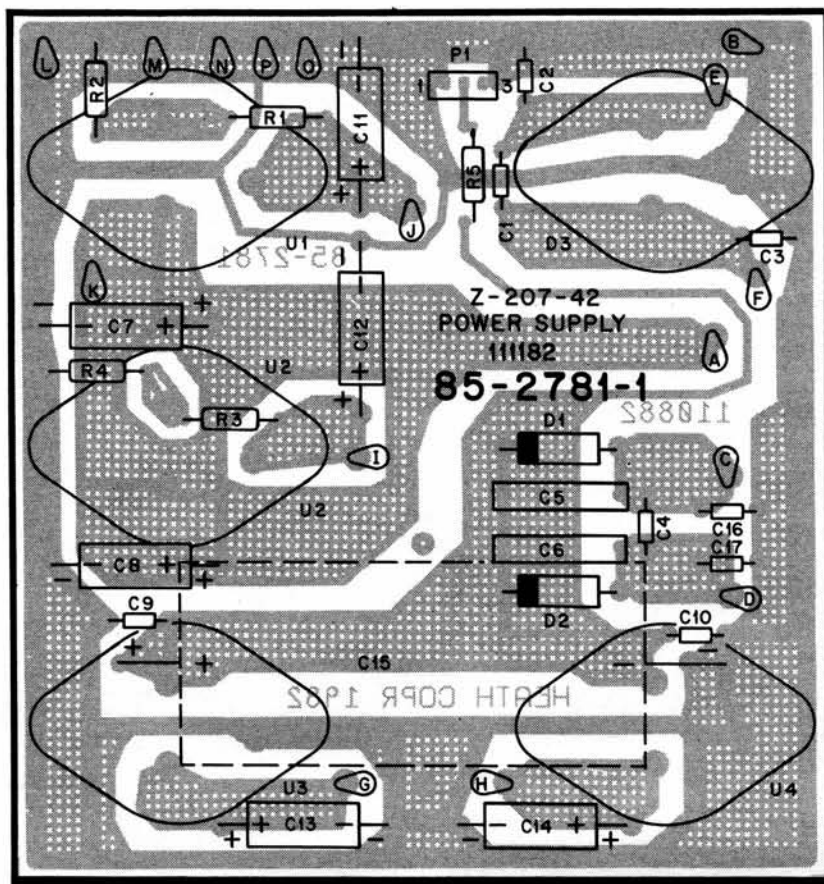
Integrated Circuits

ZDS PART NUMBER	MAY BE REPLACED WITH	LEAD CONFIGURATION (Top View)
<p>442-703</p> <p>HE 442-750</p>	LM 350	 <p>IN OUT GND WIDE SPACE</p>
HE 442-30	UA 309K	 <p>ADJ. IN OUT WIDE SPACE</p>

CIRCUIT BOARD X-RAY VIEW

NOTE: To find the PART NUMBER of a component for the purpose of ordering a replacement part:

- A. Find the circuit component number (C11, R4, etc.) on the x-ray view.
- B. Refer to the "Replacement Parts List" for that circuit board. Then locate this same number in the "Circuit Component Number" column.
- C. Adjacent to this circuit component number, you will find the ZDS PART NUMBER.



POWER SUPPLY BOARD (HE 181-4114)

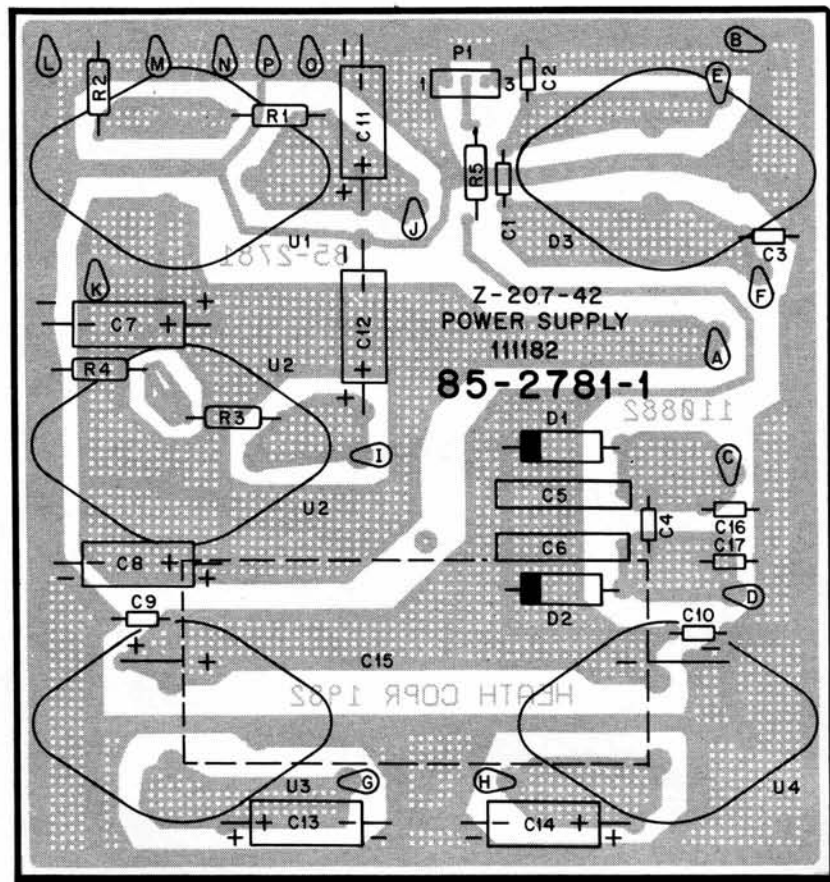
(Shown from component side)



CIRCUIT BOARD X-RAY VIEW

NOTE: To find the PART NUMBER of a component for the purpose of ordering a replacement part:

- A. Find the circuit component number (C11, R4, etc.) on the x-ray view.
- B. Refer to the "Replacement Parts List" for that circuit board. Then locate this same number in the "Circuit Component Number" column.
- C. Adjacent to this circuit component number, you will find the ZDS PART NUMBER.



POWER SUPPLY BOARD (HE 181-4114)

(Shown from component side)

