

the digital group

po box 6528 denver, colorado 80206 (303) 777-7133

THE DIGITAL GROUP MINI-FLOPPY CABINET

298-132-A-11+2

ADDENDUM TO MINI-FLOPPY CABINET DOCUMENTATION

- 1) Before mounting the transformer and power supply in the cabinet, you need to connect the two red-white wires (110V AC input) to the transformer lugs.
- 2) The addition of jumpers and/or cut traces on the floppy controller board is only required on Revision C or earlier release boards.
- 3) To modify the standard floppy controller card to run mini-floppy drives, you need also to cut the trace labeled "MAX" and install a jumper from the lower pad to the pad labeled "MIN". The resistor changes indicated in the documentation also need to be made; parts have been provided to make all modifications. R10 is supplied either as a single resistor (16.4K) or as two resistors (8.2K) that need to be installed in series, standing up on the card.
- 4) In photo 2, the floppy cable plug is labeled pin 1 instead of the proper designation, pin 2. The cables are keyed so they cannot be installed incorrectly.
- 5) An audio cassette is provided with the drives and/or the floppy controller card to allow testing of the mini-floppy system. By reading in the tape with a standard audio cassette EROM, the user can test the drives with read, write or format operations.

Option 7 of the standard Digital Group operating system selects the mini floppy test program. The first program selection is the diskette formatting routine. You must format a mini-floppy diskette before reading or writing on the diskette.

The mini-floppy test programs specify the disk drive selected as well as the number of blocks, and the starting block for reading and writing.

To test reading and writing off the disk, select options 2 and 3. The storage buffer provided in the operating system starts at page 20 (octal). Blocks of 128 bytes are stored sequentially starting at page 20. Using the keyboard programmer option, octal or hex version, you can examine or fill blocks written or read off the disk. When writing on the diskette clear the buffer or some part of it and fill it with a particular test pattern. Select option 3-Write and specify the number of blocks to be written and the starting block on the diskette. After the write operation has finished, go

back and clear the buffer area (so that you can read the block back in). Then select option 2-Read, and after the read operation is finished, verify that the test pattern has been read correctly.

Option 4 of the mini-floppy test program is provided to allow jumping to the operating system to use the keyboard programmer or other options.

When ordering Digital Group software, you must specify that it is to run with mini-floppy drives. Software packages will be supplied with either standard disk drivers or with mini-floppy driver routines.

The Digital Group Mini-Floppy Cabinet

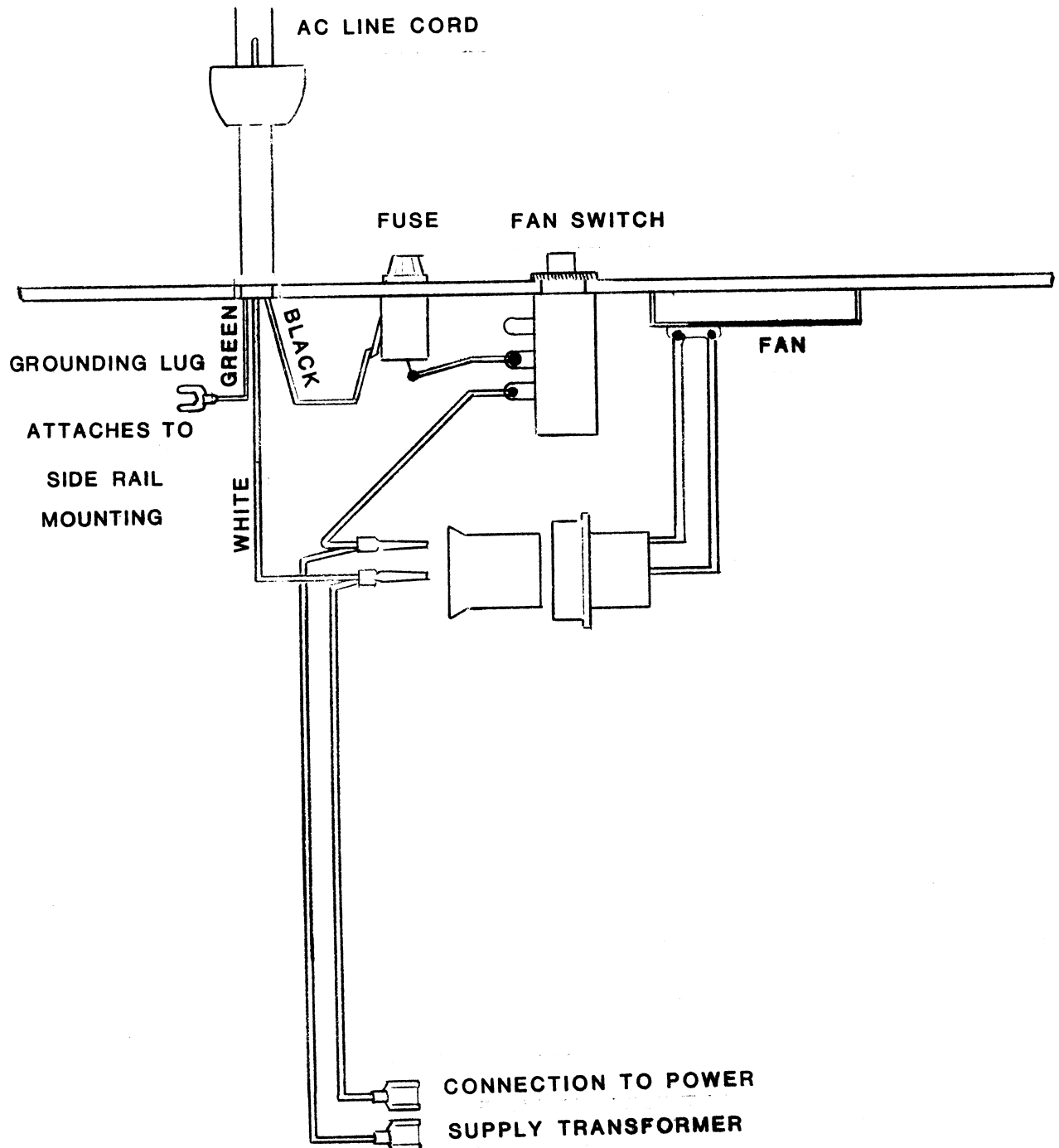
The Mini-Floppy Cabinet accommodates two mini-floppy drives, a power supply (+12V, +5V), and cabling for the connection between the cabinet and a Digital Group CPU cabinet. The cabinet provides a switched and fused line cord and a fan. The cabinet matches the other Digital Group components with tan painted aluminum and an anodized deep brown front panel.

Assembly Instructions

If you have an assembled mini-floppy cabinet you need only plug in the line cord and connect the 34-conductor cable to the CPU cabinet backplane. If you have any problems with the mini-floppies, refer to the documentation materials provided for schematic and parts placement diagrams, and to the drive manuals provided. For kits the following steps detail assembly of the cabinet, installation of the AC wiring harness and installation of the power supply and drives in the cabinet.

- Check the parts you have received with the parts list provided. An illustration of the cabinet assembly provides explanation as to how the various pieces are put together.
- Install the line cord, fan, fan switch, and fuseholder on the rear panel.
- Refer to Figure 1 showing the AC wiring harness. Secure the power cord in the rear panel using the strain relief provided. Be sure there are sufficient lead lengths on the line cord to make connection to the fuseholder and the side rail mounting screw. The mounting screw farthest from the rear panel is used for the line cord ground wire.
- Install the fuseholder with the fuseholder washer and nut provided. Orient the fuseholder so that the terminal on the side of the fuseholder is pointed down. Push the black wire of the power cord terminated by a spaded lug on this terminal.
- Install the fan switch with the bezel nut provided. Orient the terminals on the switch so they are facing the closest side rail (envisioning the exploded view cabinet illustration).
- Install the fan using four 4-40 x 1/2" screws and 4-40 nuts and orient the fan so the leads from the fan are towards the side rail.
- Provided with the AC wiring harness is a 3" black wire. Solder the wire between the remaining terminal on the fuse and the center terminal on the fan switch. This provides a 110V AC fused and switched source for the power supply, fan, and the two drives.
- Next, install the white wire from the power cord, terminated by a Amp pin in the 3-position Amp connector. The Amp connector provides a quick disconnect for the fan as well as wires for the power supply and fan switch. The two red-white wires, terminated by spade lugs, connect to the lower set of terminals on the mini-floppy power supply transformer. The two red-white wires need to be installed before the transformer is bolted down.
- Solder the end of the black wire from the 3-position amp connector to the outside terminal on the fan switch.
- Refer to Figure 1 and check the wiring inside the cabinet. The remaining connection, the GND lead of the line cord, is connected to the side rail mounting screw when the side rails are installed.
- Attach the two side rails (identical) to the rear panel using 8-32 x 3/8" screws. The end of the side rail with the shortest tab (see illustration) is oriented towards the front panel. Connect the GND wire to the outside side rail mounting screw.
- Similarly, attach the front panel to the two side rails using 8-32 x 3/8" screws. Orient the front panel so the two openings for the drives are shifted on the right side.
- Install the four rubber feet in the lower cover using 8-32 x 1/4" screws. Tapped holes are provided in the lower cover so nuts are not needed.
- Slide the front and rear panel assembly into the lower cover.
- Install the dress panel in front of the brushed metal front panel and using two 6-32 x 3/8" screws through the back panel, secure the front panel and side rail assembly.
- Using the hardware supplied with the mini-floppy power supply (four 8-32 x 3/4" screws, 1/4" or 3/8" spacers, 8-32 star washers and hex nuts) install the power supply with the transformer toward the front of the cabinet. The 8-32 hex nuts lock the screws in position. The 1/4" spacers put on top of the 8-32 screws provide additional clearance for the mini-floppy PC board. The power supply is secured by four additional 8-32 hex nuts, two are used also to secure the transformer. Before mounting the transformer, push the two wires on the lower set of transformer lugs.

FIGURE 1- MINI-FLOPPY CABINET AC WIRING



Installation of Termination Jumpers on the Mini-Floppy Drive

Before the drives are installed in the cabinet you need to install line termination jumpers on each drive. The jumpers required to operate in a Digital Group system are a drive select jumper and a head solenoid jumper. To use four mini-drives in a system you need to make a modification to the drive. Page 7 of the drive manual details the line termination jumpers that can be used. Figure 3 details the modification to the drive PC board and the jumpers that are used in a Digital Group system.

NOTE: Normal jumpering required is a head solenoid jumper and a single drive select jumper (1 thru 4). Remove the resistor pack (RP150 as shown on page 31 in the drive manual) on all but one drive operating in a system.

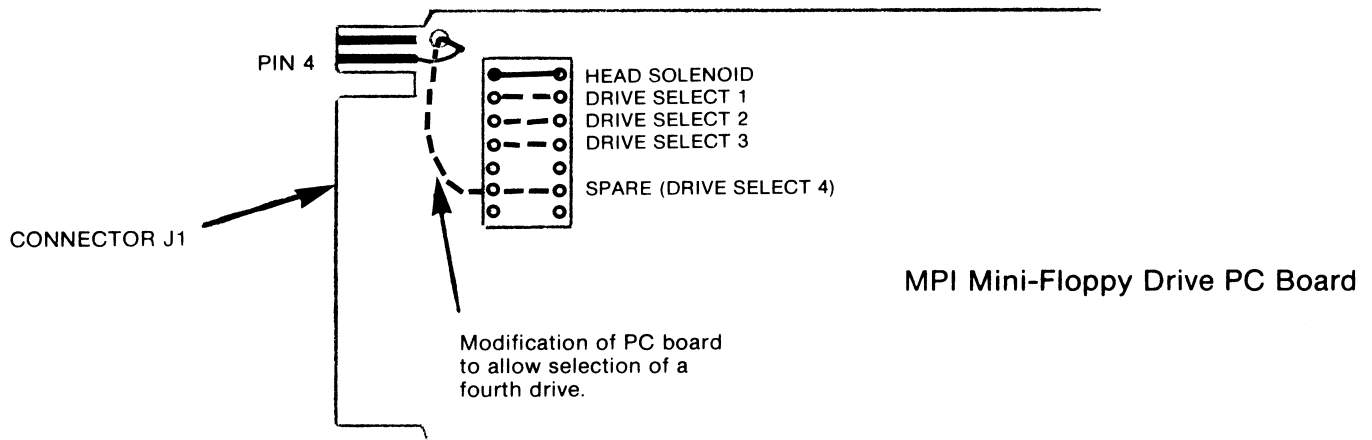


FIGURE 3 — MINI-FLOPPY DRIVE JUMPERING

On Bytemaster systems a jumper wire must also be connected between the floppy controller card, pin 25, and pin 4 of the floppy I/O connector (on the motherboard).

On standard mainframe systems a jumper wire must be installed on the CPU paddlecard connecting pin E (corresponding to the CPU backplane) to pin 4 of the 34 conductor header.

Dynamic Memories on Floppy-based Systems

The use of mini-floppies in a Digital Group system also requires modification to the CPU and floppy disk controller card. These modifications make the mini-floppies compatible with dynamic as well as static memory systems and also appropriately change the timing of signals on the standard floppy disk controller card to run mini-floppies.

On the Floppy Controller Card:

- Replace R10, an 8.2K ohm resistor, with a 16.4K ohm resistor (two 8.2K ohm resistors in series.)
- Replace R14, a 5.1K ohm resistor, with a 10K ohm resistor.

CPU Modificaitons for use with 32K Dynamic Memory Boards

The modification detailed in Figure 4 replaces the function of Reset with an NMI pulse. The NMI pulse effectively resets the CPU by having a vector jump address of 000 000, the Reset vector address. Without the modification, Refresh operations performed by the Z-80 microprocessor would be halted whenever the Reset button was used. If Refresh operations cease for more than 1 msec., memory contents could be lost.

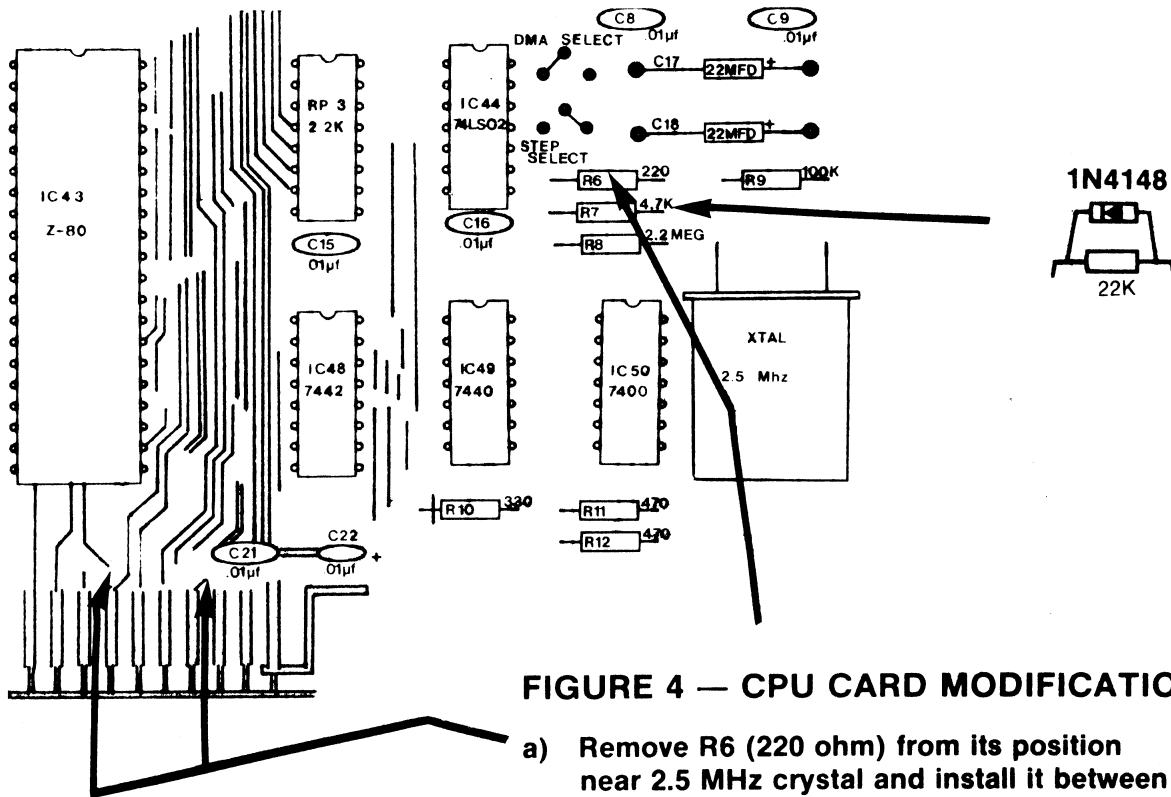


FIGURE 4 — CPU CARD MODIFICATION

- a) Remove R6 (220 ohm) from its position near 2.5 MHz crystal and install it between feed-thru holes connected to CPU pins 47 and AZ.
- b) Remove R7, 4.7 ohm resistor, and install the resistor-diode combination shown above.

The Digital Group floppy disk controller board was originally designed so that whenever data from the floppy was immediately available, CPU was put into a Wait state. This Wait may be as long as 200 ms, and when the Z-80 is in a Wait state, no Refresh occurs. The detailed modification below with the NMI, and floppy controller card changes, alters the system timing so that excessive WAIT states do not occur.

Additional Parts Requirements for Floppy/Dynamics Modifications:

- 2 1N4148 or 1N914
- 1 7400
- 3 feet of #30 insulated wire

Refer to Figure 5.

- Place the floppy controller board pin side up, connectors facing you.
- Cut the trace going to IC1 pin 8 as shown in Figure 5.
- Connect a short jumper from IC1 pin 8 to IC1 pin 12 and IC1 pin 13.
- Connect a short jumper from IC1 pin 11 to the trace originally going to IC1 pin 8.
- Connect a short jumper from IC1 pin 2 to IC1 pin 6.
- Connect a long jumper from IC31 pin 1 to IC1 pin 5.
- Connect another long jumper from IC21 pin 4 to IC1 pin 1.
- Connect another long jumper from IC1 pin 3 and IC1 pin 4 to pin C of the dual 36-pin connector.

Refer to Figure 6.

- Place the floppy controller board component side up, connector facing you.
- Remove IC1 (7408). Replace with a 7400 IC.
- Remove R17 (47 ohm).
- Remove R16 (22K). Save this resistor for later.

Refer to Figure 7.

- Place the Digital Group motherboard pin side up.
- Connect a long jumper from pin C of the dual 36-pin connector of the floppy controller card to pin 17 of the dual 36-pin connector of the port 0 to 3 I/O card. The I/O board and the floppy controller board may not be in the pictured locations but the relative pin locations will be the same.

Refer to Figure 4 (shown previously).

- Place the Z-80 CPU board component side up, connector facing you.
- Place a 1N4148 diode around the 22K resistor previously removed.
- Insert and solder the 22K and 1N4148 at R7 as shown in Figure 4.

Refer to Figure 6.

- Place the floppy controller board component side up, connector facing you.
- Place a 1N4148 diode around the 4.7K resistor previously removed.
- Insert and solder the 4.7K and 1N4148 at R16 as shown in Figure 6.
- Verify that the Reset/NMI modification (previously detailed) has been done.

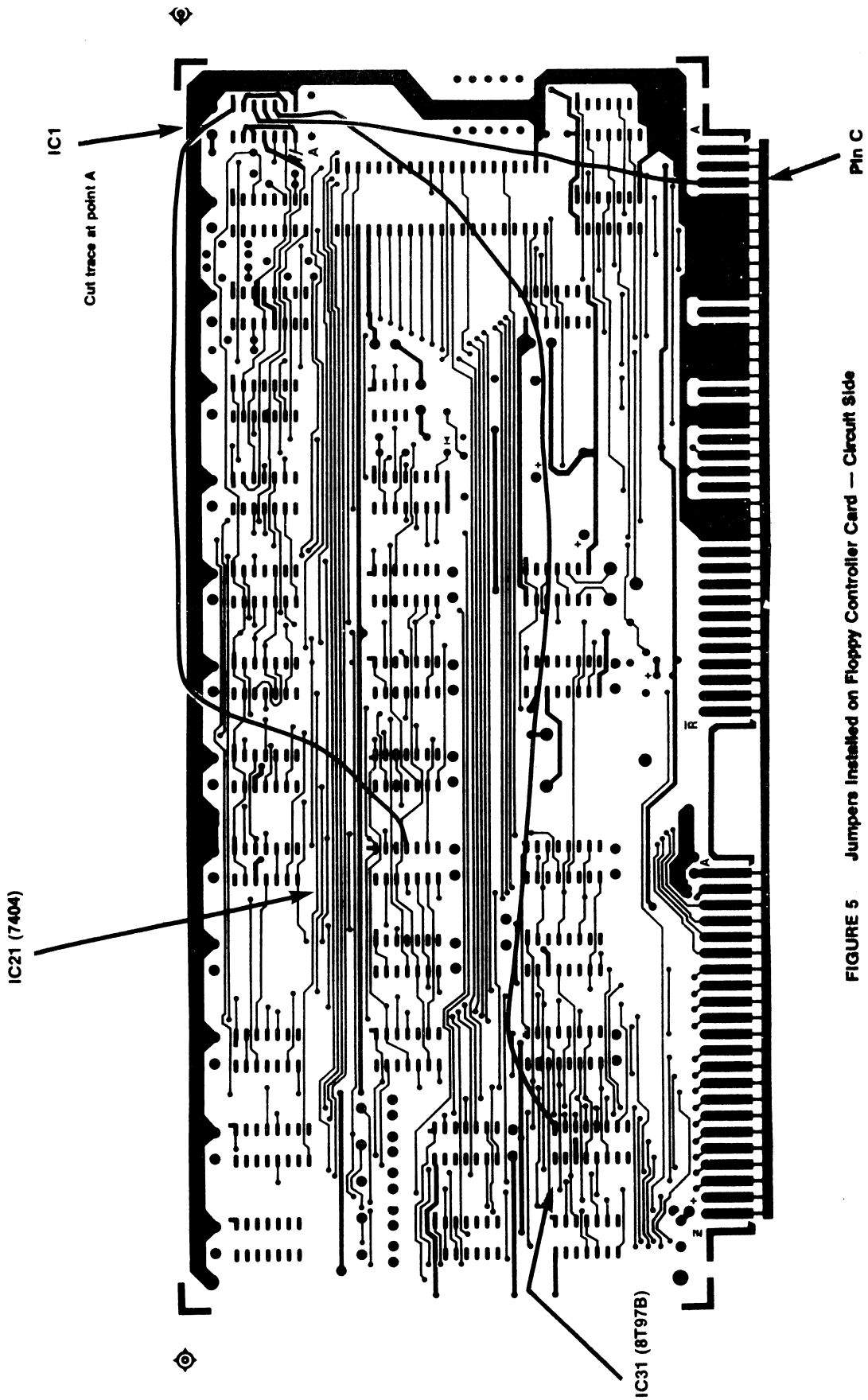


FIGURE 5 Jumpers Installed on Floppy Controller Card — Circuit Side

IC Change: IC1, 7408 to a 7400 IC

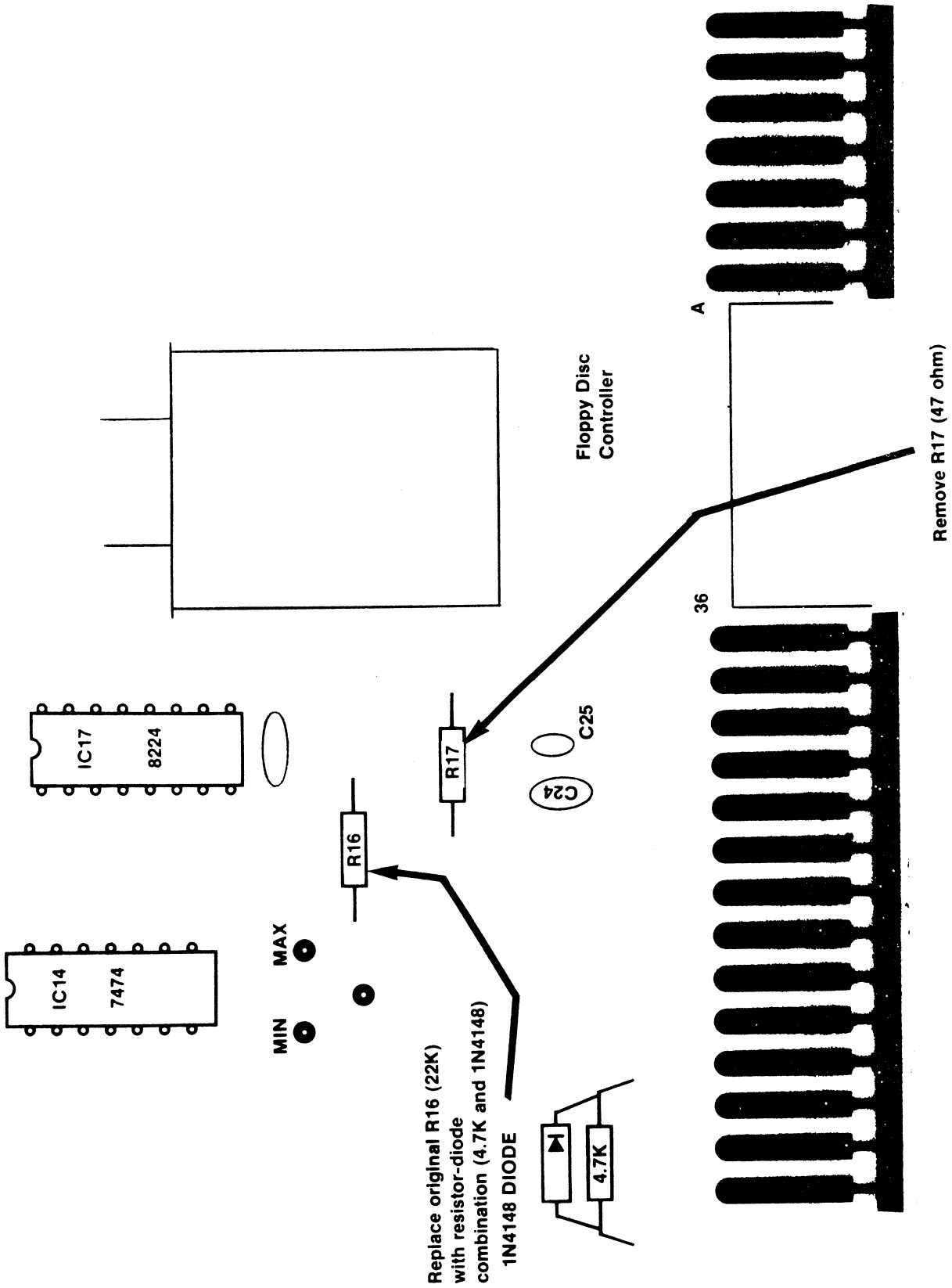
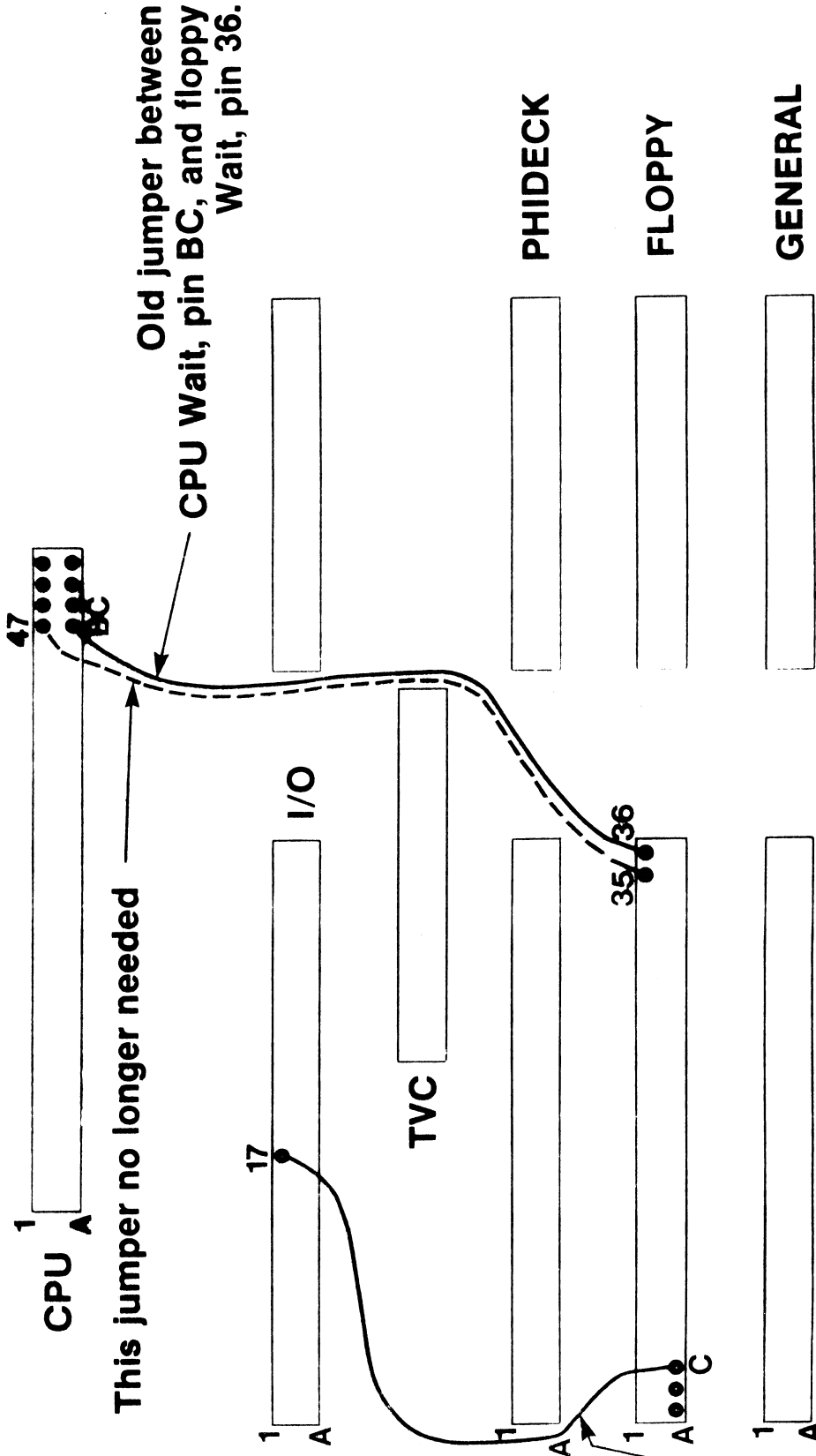


FIGURE 6 — FLOPPY CONTROLLER CARD MODIFICATION (Component Side)

FIGURE 7 — MO' HERBOARD MODIFICATION TO RUN DYNAMIC MEMORY

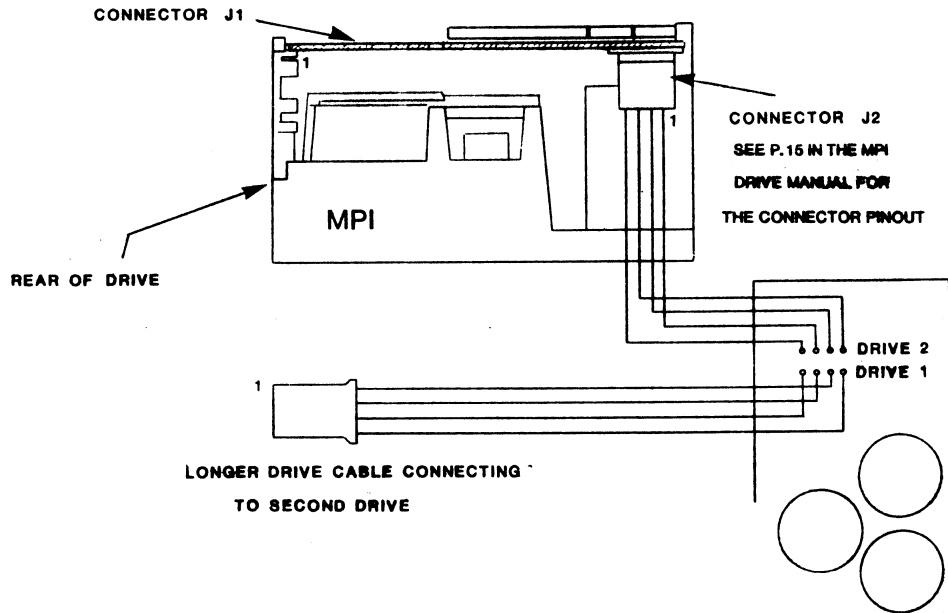


Install jumper between floppy pin C and input port 1 — bit 7, pin 17.

- Using the eight 6-32 x 1" screws and eight .625" spacers mount the two drives in the cabinet. The screws come up through the bottom of the cabinet and into the four threaded holes on the bottom of each drive. The spacers inserted between the lower cover and the bottom of the drive serve to raise the back end of each drive. When properly installed the drives are flush against the dress panel and are horizontal with the lower cover.

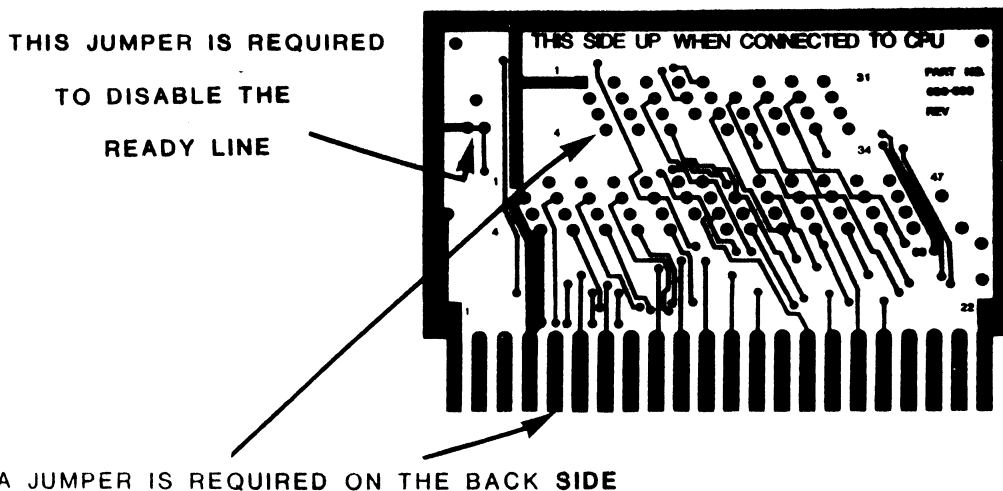
Connect the power cable to the rear of each drive as shown in Figure 8.

FIGURE 8 DRIVE CONNECTIONS FROM MINI FLOPPY POWER SUPPLY



- Install the 34-conductor cable in the cabinet matching pin 1 of each cable plug end to the pin 1 end of connector J1 on each drive. Connect the paddlecard end of the cable to the CPU backplane slot designated for the mini-floppy. The backplane of the CPU is wired identically for mini-floppies as for standard floppy drives with the exception of the READY line, pin 15. Because mini-floppy drives do not send a READY signal back to the CPU, a jumper on the paddle card disables this line and ties it to GND.

FIGURE 9- JUMPER ADDITION TO MINI-FLOPPY PADDLECARD



OF THE PADDLECARD CONNECTING PIN 4 TO PIN E

- After installing the jumper, plug the paddlecard into the CPU backplane and, using a disk operating system diskette, run the drives through reading and writing tests. Each time the drive is selected the front panel LED will light, the head will load the diskette, and the drive and stepper motor will operate.

Mini-Floppy Cabinet Parts List

	Label	Description	Qty	Digital Group Part #
<input type="checkbox"/>		Top cover	1	190-003
<input type="checkbox"/>		Bottom cover	1	216-001
<input type="checkbox"/>		Anodized side rail	2	216-002
<input type="checkbox"/>		Rear panel	1	216-003
<input type="checkbox"/>		Front panel	1	216-004
<input type="checkbox"/>		Dress panel (2 drive)	1	219-011
<input type="checkbox"/>		Dress panel (1 drive)	1	219-010
<input type="checkbox"/>		Fan, 4"	1	190-003
<input type="checkbox"/>		AC wiring harness	1	112-005
<input type="checkbox"/>		Fuse - ½ amp slo-blo	1	123-006
<input type="checkbox"/>		Fuseholder	1	190-006
<input type="checkbox"/>		Fuseholder washer	1	228-456
<input type="checkbox"/>		Fuseholder nut	1	228-255
<input type="checkbox"/>		Fan switch	1	100-002
<input type="checkbox"/>		Rubber feet	4	221-000
<input type="checkbox"/>		Power cord strain relief	1	230-000
<input type="checkbox"/>		Spacer — .25 diameter, .625" height	8	228-660
<input type="checkbox"/>		6-32 x 1" screw	8	228-000
<input type="checkbox"/>		6-32 x ¾" knurled knob	2	228-016
<input type="checkbox"/>		6-32 x ¾" screw	2	228-001
<input type="checkbox"/>		8-32 x ¼" screw	4	228-002
<input type="checkbox"/>		8-32 x ¾" screw	8	228-003
<input type="checkbox"/>		4-40 x ½" screw	4	228-006
<input type="checkbox"/>		4-40 hex nut	4	228-252

NOTE: BE SURE TO LEAVE ADEQUATE LEAD LENGTH
ON THE TWO REGULATORS & TRANSISTOR Q1
TO MOUNT TO THE CABINET LOWER COVER

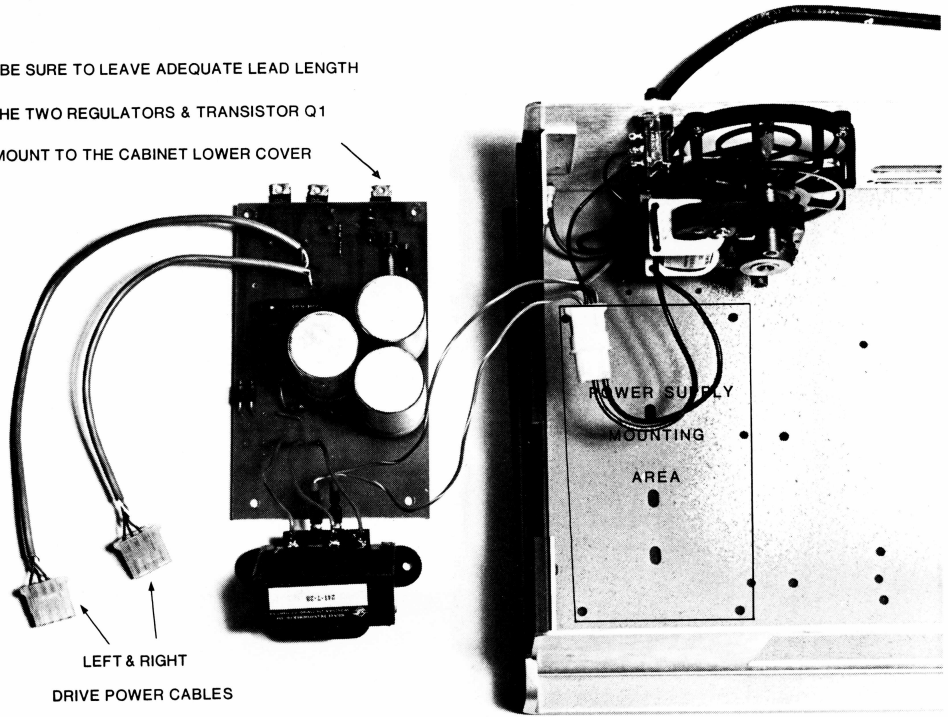


PHOTO 1 - MINI-FLOPPY AC WIRING & POWER SUPPLY MOUNTING

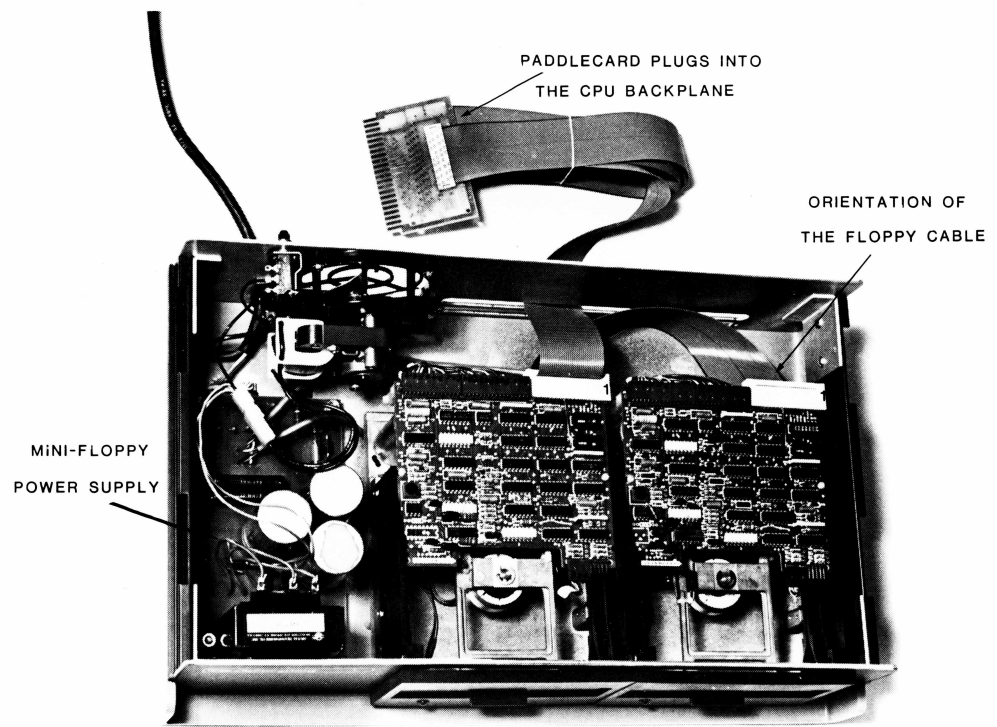


PHOTO 2 - COMPLETED MINI FLOPPY CABINET

MINI FLOPPY - CABINET ASSEMBLY

