

the digital group

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# MINI-FLOPPY DISK POWER SUPPLY

298-122-A-6+2

# Mini-Floppy Disk Power Supply

## General Description

The Floppy Disk Power Supply provides regulated and filtered DC supply voltages for the disk drives. One power supply is needed for every two drives in a system. The power supply provides +12V DC @ 2.5 amps (connection point OUT 1 on the parts placement and schematic diagrams) and two +5V DC sources @ .8 amp each (OUT 2 and OUT 3). A wire from OUT 3 (+5V) is connected to one drive in a system with a wire from OUT 2 (+5V) connected to a second drive. The +5V supplies are separate and should not be connected together or used to power more than one drive. As labeled on the parts placement diagram, wires from the four vertical pads on the left can be used for Drive #1 and wires from the four vertical pads on the right should be connected to a second drive, Drive #2, when drives are installed in the cabinet.

110V AC connections are made to the transformer primary lugs of T1. The line cord (hot wire) should be fused ( $\frac{1}{2}$  amp) and the power supply chassis grounded. The drive on the right is Drive 1; the drive on the left is Drive 2. The AC line cord, fuse, fan, heat sink, and switch are supplied with the floppy drive cabinet.

## Technical Description

### Circuit Operation [12V DC, output at OUT 1 (V1)]

The Floppy Drive Power Supply uses transformer T1 to create a 2 amp, 14V center-tapped AC source. 28V AC is applied to the full wave rectifier consisting of D1 - D2 with the output voltage filtered by C1, C2, and C9. The resulting DC voltage is fed through the series pass regulator of R1, Q1, D5, and Z1 with its output fused by F1. The voltage output at OUT 1 (V1) should be in the range of 12 to 12.5 volts. C4 and D3 provide "spike" suppression and filtering for a load assumed to be inductive.

### Circuit Operation [Two +5V DC outputs, .8 amp each at OUT 2 and OUT 3]

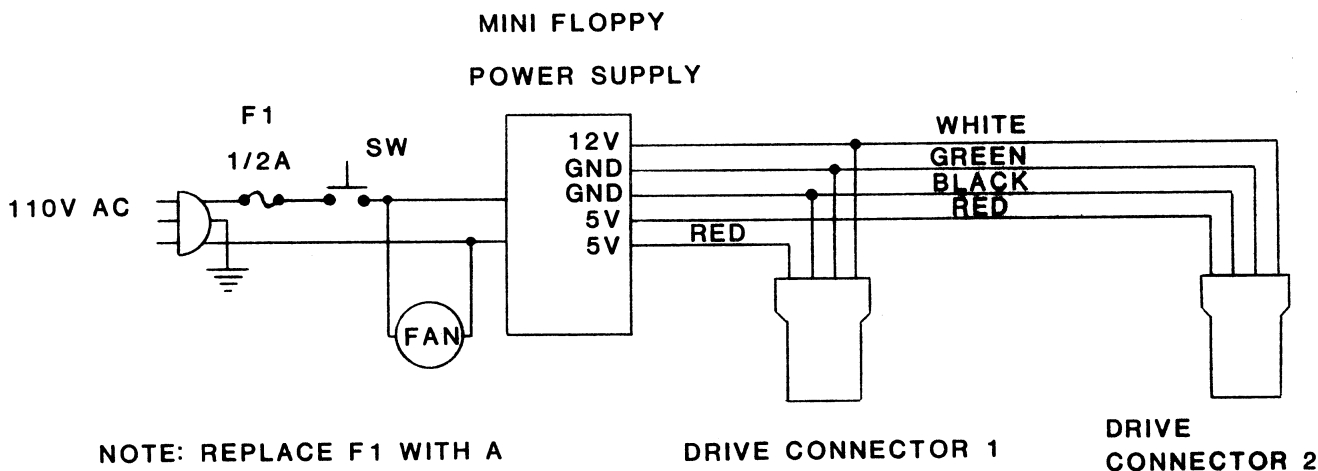
A 14V AC source is taken off one leg of the transformer T1 and single wave rectified via D4. Capacitor C3 filters the resulting DC voltage. Two identical 5V regulator circuits, one consisting of R2, Q2, C5, and C6, the other of R3, Q3, C7, and C8, take the voltage from C3 and output +5V DC. R2 and R3 drop the voltage from C3 and decrease heat dissipation of Q2 and Q3, respectively. C5 and C6 provide filtering and stabilize the regulated output of Q2. C7 and C8 filter and stabilize the output of Q3.

The two regulated outputs of +5V will provide a current of up to .8 amp each. The output of *each* circuit, OUT 2 and OUT 3, should *not* be connected together under any circumstances.

## Power Supply Hook-up

The power supply is designed to provide three outputs with a common ground; +12V DC, 2.5 amp output at OUT 1, +5V DC at OUT 2 and OUT 3. The +12V DC source will range from 12 to 12.5 volts depending on its load. It is fused to prevent short circuit problems. The two outputs should not be tied together. A typical application and hook-up is shown below.

### FIGURE 1 MINI FLOPPY POWER SUPPLY HOOKUP

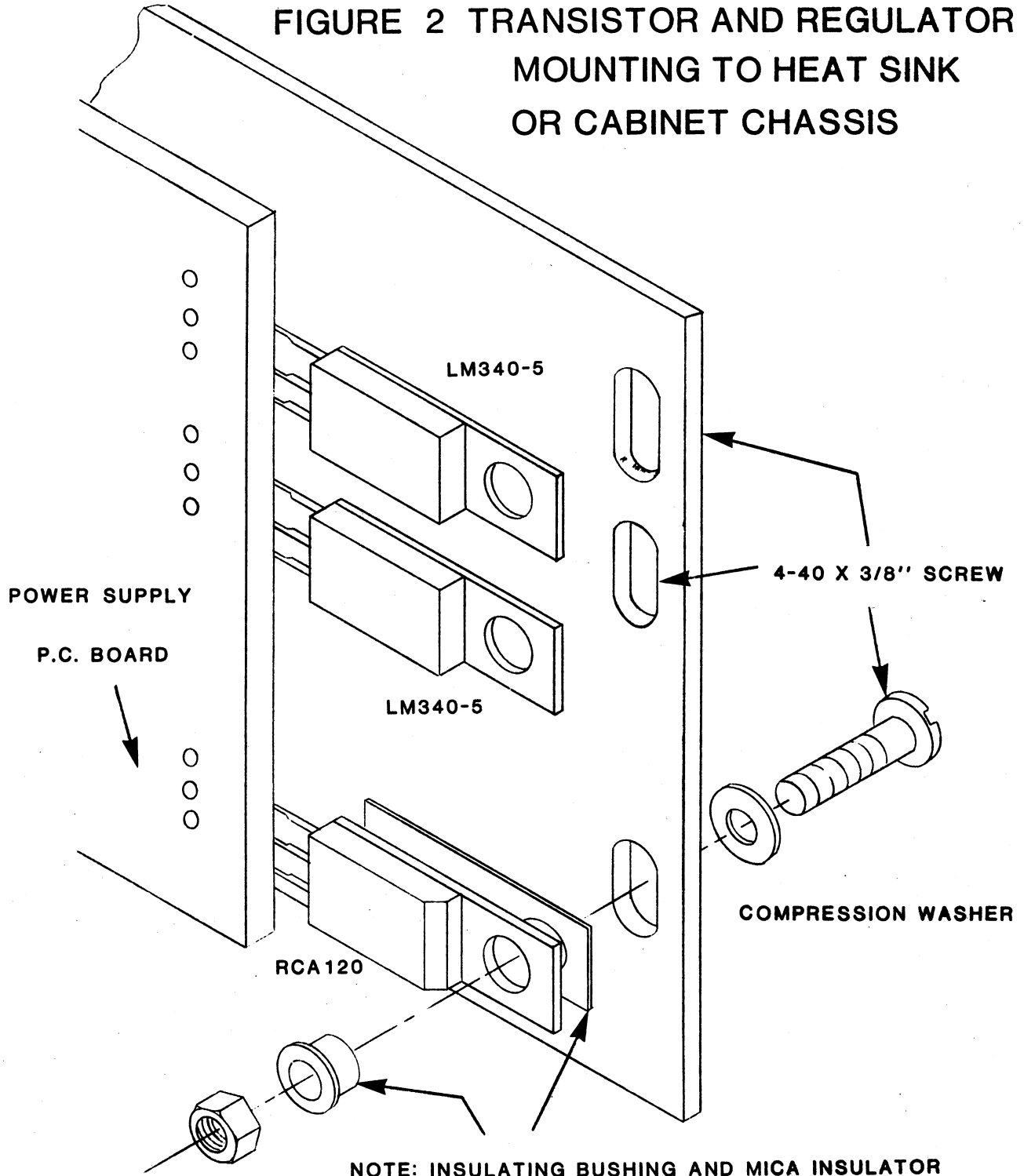


#### Assembly Instruction for the Mini-Floppy Disc Power Supply

You will be inserting components from the blank side of the board and soldering the leads to the trace side of the board.

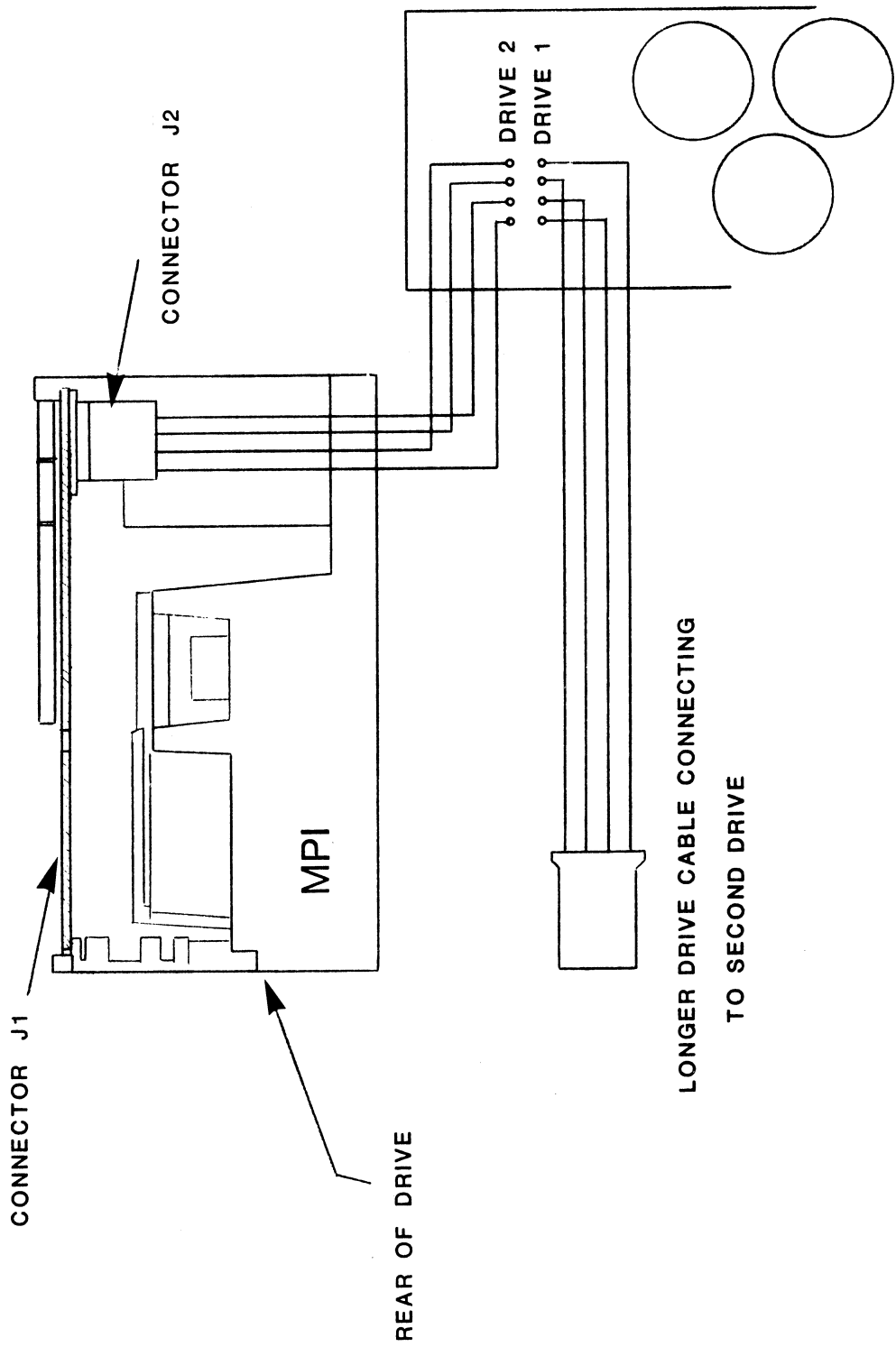
- As you look at the blank side of the board, orient the board to match the parts placement diagram.
- Install C1, C2, and C3, 2900 mfd electrolytic capacitors, with six 10-32 x 3/8" screws and spacers. Note carefully the polarity of each capacitor and install according to the polarity labeling on the circuit side of the PC board.
- Install and solder the six 1 mfd 35V tantalum capacitors so that polarity labeling on the capacitor matches that of the PC board.
- Install and solder the 1.5K ohm 1 watt resistor, R1, as shown on the parts placement diagram.
- Install and solder the two 10 ohm 12 watt resistors, R2 and R3.  
**Note:** the resistors must be mounted approximately 1/4" off the board to allow proper heat dissipation.
- Install and solder the three MR501 diodes, D1, D2, and D3, so that the cathode striped end is oriented toward the right as shown on the parts placement diagram. Install the MR501 diode, D4, in a diagonal position so that the cathode striped end is oriented toward the bottom.
- Install and solder the two fuse clips so that the open ends face each other.
- Install and solder the diode combination, D5 and Z1, consisting of the 1N4001 and 1N4743 diode. Install the diodes as shown on the parts placement diagram.
- Install and solder the two regulators and one transistor, Q1, Q2, and Q3, as shown below. Be sure that the lead lengths allow proper heat sinking to the mini-floppy cabinet. When not mounted in a mini-floppy cabinet, attach a heat sink to the two regulators and transistor approximately 3" x 4" x 3/16" in size.
- A heat sink compound should be used under all three devices. Each regulator or transistor is secured using 4-40 x 3/8" screws, compression washers, and two hex nuts.  
**Note:** The case of Q1 (RCA 120) must be insulated from the heat sink using the nylon bushing and mica insulator provided.

**FIGURE 2 TRANSISTOR AND REGULATOR  
MOUNTING TO HEAT SINK  
OR CABINET CHASSIS**



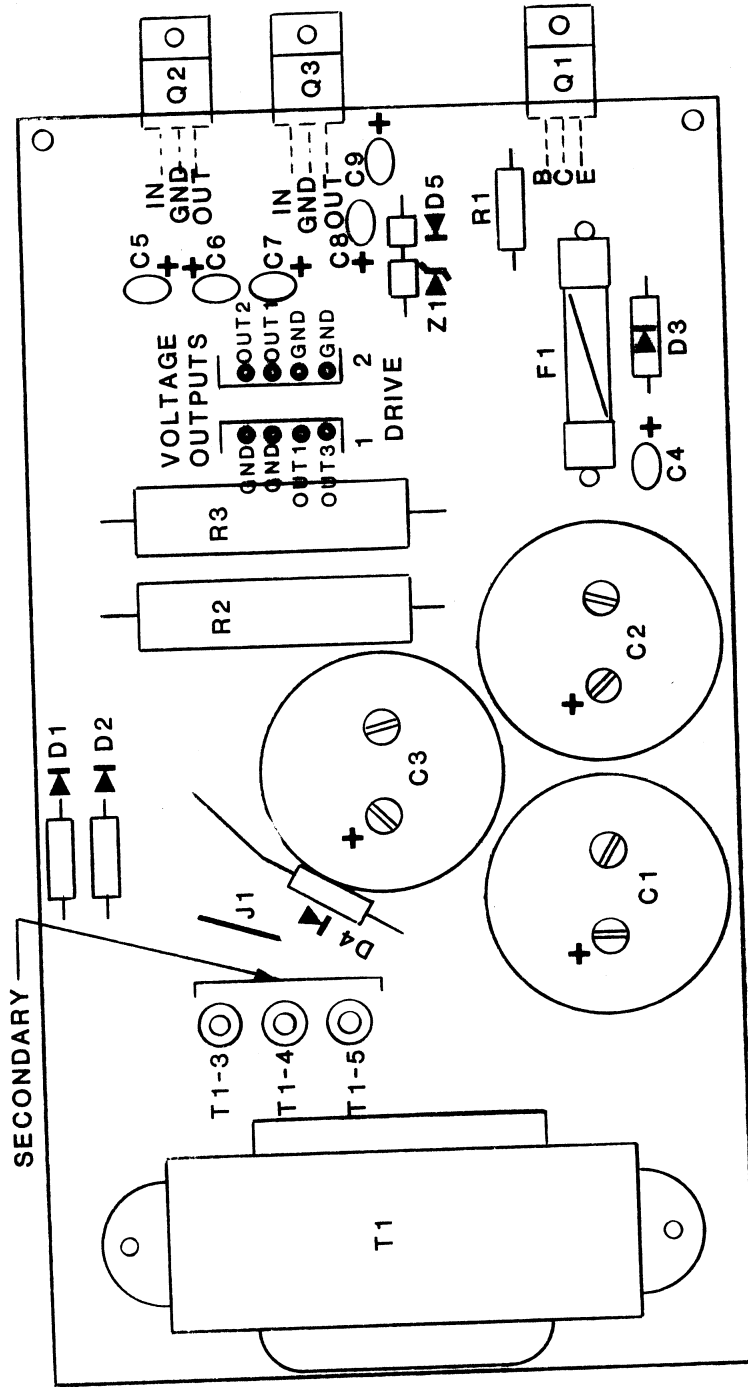
- Temporarily bolt the transformer, T1, to the PC board using two 8-32 x  $\frac{5}{8}$ " screws and hex nuts. 110V AC connection is made to the bottom set of lugs. The three lugs on top are the transformer secondary windings. The center position of the transformer is the centertap which is connected to GND.
- From the 24" length provided, cut three 2 $\frac{1}{2}$ " lengths to connect between the transformer secondary windings and the diode bridge on the PC board.
- Strip, tin, and use the lengths to connect points T1-3, T1-4, and T1-5 to the transformer secondary. (Do not cross the wires.)
- Install and solder a jumper approximately  $\frac{1}{2}$ " in length as indicated on the parts placement diagram. This jumper, labeled J1, connects the centertap of the transformer to GND.
- Two drive power cables are provided to supply +12V and +5V to each drive. The shorter of the two cables is used for the left drive. The second cable is used for the drive farthest from the supply.
- Connect the wires of each cable as follows:
  - Right Drive Cable:**
    - Red wire to OUT 3 (+5V)
    - White wire to OUT 1 (+12V)
    - Black wire to GND
    - Green wire to GND
  - Left Drive Cable:**
    - Red wire to OUT 2 (+5V)
    - White wire to OUT 1 (+12V)
    - Black wire to GND
    - Green wire to GND
- When not using the Digital Group mini-floppy cabinet, care must be taken to adequately heat sink the two regulators and the pass transistor. It is preferred that the regulator and pass transistor are mounted to whatever cabinet you are using. If this is not possible, a heat sink of aluminum measuring approximately 3" x 4" x  $\frac{3}{16}$ " should be used. Heat sink compound should be used under all three devices. Care should be taken to insure that Q1 (RCA 120) is insulated from the heat sink. Figure 2 shows the proper mounting of a heat sink to the power supply. Typical power connections for two mini-floppy drives are shown in Figure 3.
- Before plugging the drive connectors in the drives, plug in the power supply and test the voltages out of each connector. After checking to see that the proper voltages are on the connector, plug the drive connectors in the rear of each drive as shown in Figure 3. Be sure to mount the power supply using the 8-32 x  $\frac{3}{8}$ " spacers and four 8-32 x  $\frac{5}{8}$ " screws. This will prevent shorting traces on the circuit side of the card.
- If this power supply is to be mounted in the Digital Group mini-floppy cabinet, continue with the cabinet assembly where final power supply mounting and wiring is completed.

FIGURE 3 DRIVE CONNECTIONS FROM MINI FLOPPY POWER SUPPLY



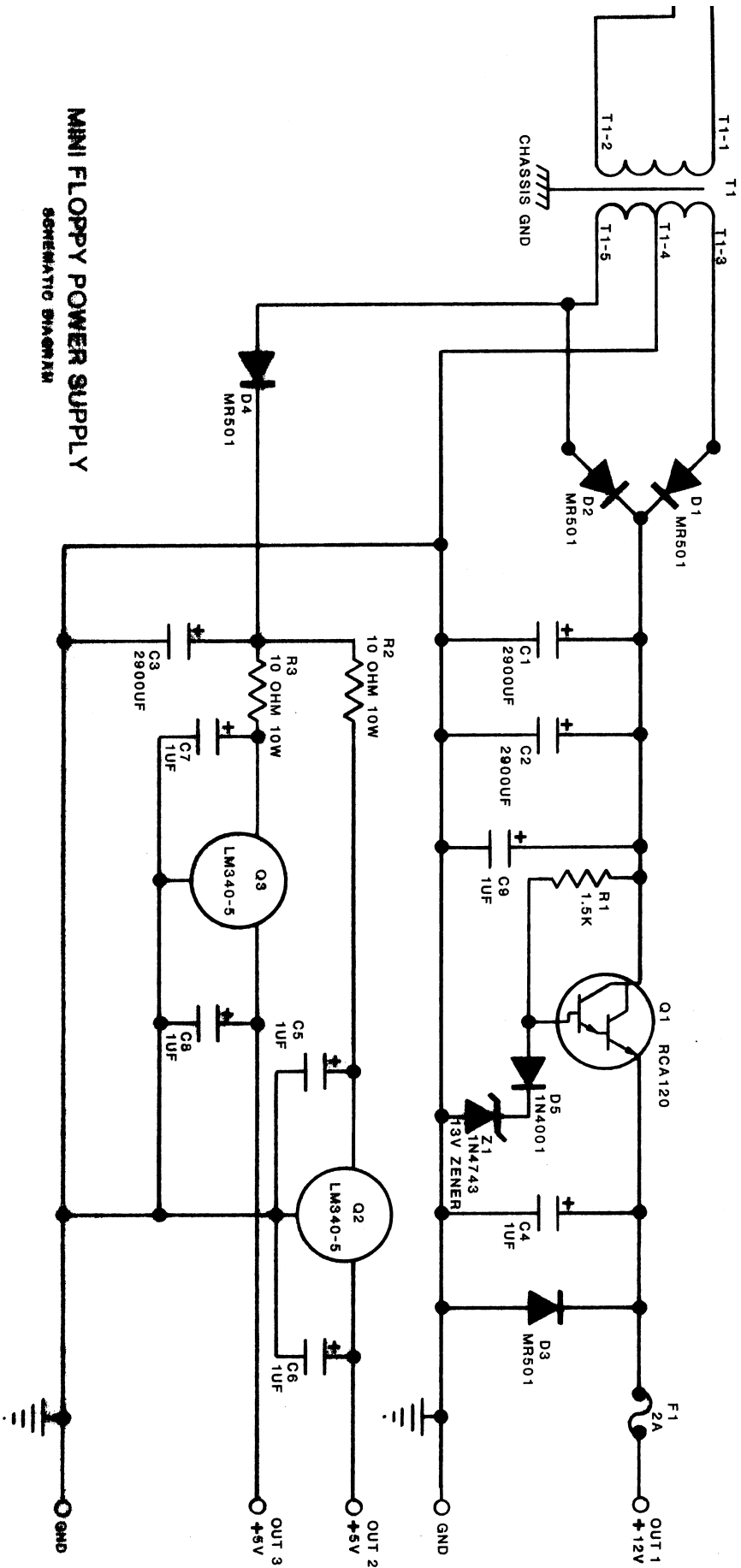
## Mini-Floppy Power Supply Parts List

	Label	Description	Qty	Digital Group Part #
<input type="checkbox"/>		Printed circuit board	1	090-036
<input type="checkbox"/>	T1	28V AC centertapped transformer	1	855-004
<input type="checkbox"/>	C1 - C3	2900 mfd, 50V electrolytic capacitor	3	012-010
<input type="checkbox"/>	C4 - C9	1 mfd, 35V tantalum capacitor	6	010-001
<input type="checkbox"/>	D1 - D4	MR501 diode	4	040-014
<input type="checkbox"/>	Z1	1N4743, 13V zener diode	1	040-012
<input type="checkbox"/>	D5	1N4001 diode	1	040-003
<input type="checkbox"/>	R1	1.5K ohm, 1 watt resistor	1	003-006
<input type="checkbox"/>	R2, R3	10 ohm, 12 watt resistor	2	007-001
<input type="checkbox"/>	Q1	RCA 120, Darlington transistor	1	026-001
<input type="checkbox"/>	Q2, Q3	LM 340-5, 5V regulator	2	070-003
<input type="checkbox"/>	F1	Fuse clip	2	190-010
<input type="checkbox"/>	F1	2 amp slo-blo fuse	1	123-008
<input type="checkbox"/>		Drive power cable (left), 4 conductor	1	560-056
<input type="checkbox"/>		Drive power cable (right), 4 conductor	1	560-057
<input type="checkbox"/>		Mica insulator (Q1)	1	131-000
<input type="checkbox"/>		Nylon bushing (Q1)	1	131-002
<input type="checkbox"/>		Compression washer (Q1, Q2, Q3)	3	131-001
<input type="checkbox"/>		8-32 x 5/8" round head screw	4	228-021
<input type="checkbox"/>		8-32 star washer	4	228-462
<input type="checkbox"/>		8-32 hex nut	8	228-251
<input type="checkbox"/>		8-32 x 3/8" spacer	4	228-659
<input type="checkbox"/>		4-40 x 3/8" round head screw	3	220-009
<input type="checkbox"/>		4-40 hex nut	3	228-252
<input type="checkbox"/>		24" length of #18 black wire	1	110-020
<input type="checkbox"/>		Silicon grease capsule	1	230-023
<input type="checkbox"/>		Mini-floppy supply — Kit	1	570-004
<input type="checkbox"/>		Mini-floppy supply — Assembled	1	855-003



MINI FLOPPY POWER SUPPLY  
PARTS PLACEMENT DIAGRAM





NOTE: REPLACE F1 WITH A 2 AMP  
SLOW-BLOW FUSE ONLY

**MINI FLOPPY POWER SUPPLY**  
SCHEMATIC DIAGRAM