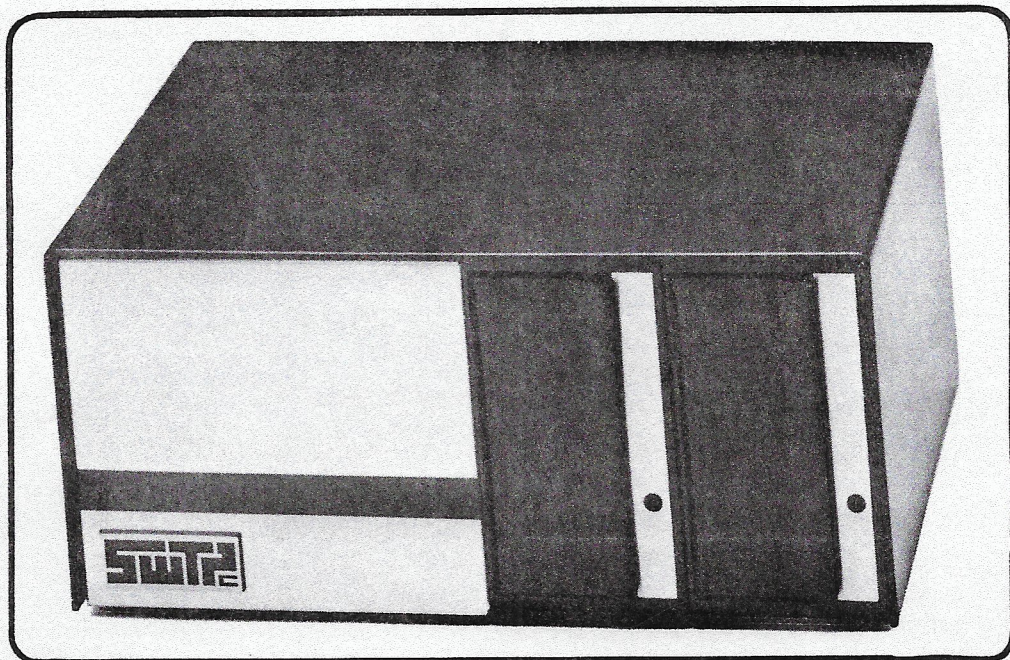




**MF-69
DISK UNIT**



**219 W. Rhapsody
San Antonio, Texas 78216**

Assembly Instructions MF-69 Minifloppy Disk Unit

The MF-69 Disk Unit is a dual mini-floppy disk designed for a SWTPC 6800 or 6809 Computer System.

The MF-69 consists of three major parts: the controller, the chassis and power supply and the drives themselves. The drives come pre-assembled and require only minor jumper programming. The power supply is assembled partially on a small printed circuit board and partially thru point to point chassis wiring. The controller is assembled entirely on a 5 3/4" x 4 3/4" circuit board that will plug into an I/O slot on the computer's motherboard. Connection between the controller and the drives is made via a 34-conductor flat ribbon cable.

This instruction set has been written for both the kit and assembled MF-69 disk unit. If you have received an assembled disk unit, skip to the "Computer Interconnection" section of this instruction set. Otherwise, proceed with these instructions.

When assembling the unit, work first on the controller board, then the power supply and finally the chassis assembly and the drive programming.

When the MF-69 disk unit is being assembled, work on only one part or board at a time. The MOS integrated circuits supplied with this kit are susceptible to static electricity damage and for this reason have been packed with their leads impressed onto a special conductive foam or possibly wrapped in a conductive foil. In either case, do not remove the protective material until told to do so later in the instructions.

Controller PC Board Assembly

NOTE: Since all of the holes on the PC board have been plated thru, it is only necessary to solder the components from the bottom side of the board. The plating provides the electrical connection from the "BOTTOM" to the "TOP" foil of each hole. Unless otherwise noted, it is important that none of the connections be soldered until all of the components of each group have been installed on the board. This makes it much easier to interchange components if a mistake is made during assembly. Be sure to use a low wattage iron (not a gun) with a small tip. Do not use acid core solder or any type of paste flux. We will not guarantee or repair any kit on which either product has been used. Use only the solder supplied with the kit or a 60/40 alloy resin core equivalent. Remember all of the connections are soldered on the bottom side of the board only. The plated-thru holes provide the electrical connection to the top foil.

- () Before installing any parts on the circuit board, check both sides of the board over carefully for incomplete etching and foil "bridges" or "breaks". It is unlikely that you will find

any, but should there be, especially on the "TOP" side of the board, it will be very hard to locate and correct after all of the components have been installed on the board.

- () Attach all of the resistors to the board. As with all other components unless noted, use the parts list and component layout drawing to locate each part and install from the "TOP" side of the board bending the leads along the "BOTTOM" side of the board and trimming so that 1/16" to 1/8" of wire remains. Solder.
- () Install all the capacitors on the board. Be sure to install the electrolytic and tantalum capacitors exactly as shown on the component layout drawing. Solder.
- () Starting from one end of the circuit board install each of the three, 10-pin Molex female edge connectors along the lower edge of the board. These connectors must be inserted from the "TOP" side of the board and must be pressed down firmly against the board. Make sure the body of the connector seats firmly against the board and that each pin extends completely into the holes on the circuit board. Not being careful here will cause the board to either wobble and/or be crooked when plugged onto the mother board. It is suggested that you solder only the two end pins of each of the three connectors until all have been installed at which time, if everything looks straight and rigid, you should solder the as yet unsoldered pins.
- () Insert the small nylon indexing plug into the lower edge connector pin indicated by the small triangular marking on the "BOTTOM" side of the circuit board. This prevents the board from being accidentally plugged on incorrectly.
- () The 34-pin ribbon cable connector should now be attached to the board. If you will be plugging the DC-3 disk controller board onto MP-B or MP-B2 motherboards, install the connector along the top edge of the board. If you will plugging the DC-3 board onto MP-B3 or MP-MB mother boards, install the connector along the right side of the board. Install the connector from the "TOP" side of the board and orient the connector such that the pins face the edge of the board. Solder.
- () Insert the four 3-pin programming strips into the positions indicated on the component layout drawing. The strips must be installed from the top side of the board with the short pinned side of the blocks soldered into the board. Solder. Programming blocks will be plugged onto these strips as outlined later in this instruction set.
- () The crystal should now be installed on the board. Bend the crystal's leads at a 90° angle approximately 1/8" from its body and mount from the top side of the board. After soldering, fasten the crystal to the board using a small piece of double sided tape.

- () Install all as yet uninstalled integrated circuits except for IC1, IC2, IC12 and IC13. As each one is installed, make sure it is down firmly against the board and solder only two of the leads to hold the IC in place while the other IC's are being inserted. Do not bend the leads on the back side of the board. Doing so makes it very difficult to remove the integrated circuits should replacement ever be necessary. The semicircle notch, dot or bar on the end of the package is used for orientation purposes and must match with the outlines shown on the component layout drawing for each of the IC's. After inserting all of the integrated circuits, go back and solder each of the as yet unsoldered pins.
- () Install integrated circuit IC13 and its heatsink on the circuit board. This component must be oriented so its metal face is facing the circuit board; it is secured to the circuit board with a #4 - 40 x 1/4" screw, lockwasher and nut. The three leads of the integrated circuit must be bent down into each of their respective holes. Orient the heatsink as shown in the component layout drawing. Solder.
- () If you will be using the DC-3 board with a MP-B or MP-B2 motherboard, ignore the rest of this step. Otherwise, attach the two angle brackets to the board from the "TOP" side using #6 - 32 x 1/4" screws, lockwashers and nuts. Orient the brackets so the corners of the brackets are flush with the edge of the board. Attach the metal cover plate to the angle bracket using #6 - 32 x 1/4" screws. Now snap a Tinnerman nut onto each of the two 3/16" diameter holes on the cover plate.

NOTE* MOS integrated circuits are susceptible to damage by static electricity. Although some degree of protection is provided internally within the integrated circuits, their cost demands the utmost in care. Before opening and/or installing any MOS integrated circuits, you should ground your body and all metallic tools coming into contact with the leads thru a 1M ohm 1/4 watt resistor (supplied with the kit). The ground must be an "earth" ground such as a water pipe, and not the circuit board ground. As for the connection to your body, attach a clip lead to your watch or metal ID bracelet. Make absolutely sure you have the 1 Meg ohm resistor connected between you and the "earth" ground, otherwise you will be creating a dangerous shock hazard. Avoid touching the leads of the integrated circuits any more than necessary when installing them, even if you are grounded. The tip of the soldering iron should be grounded as well (separately from your body ground) either with or without a 1 Meg ohm resistor. Most soldering irons having a three prong line cord plug already have a grounded tip. Static electricity should be an important consideration in cold, dry environments. It is less of a problem when it is warm and humid.

- () Install MOS integrated circuits IC1, IC2 and IC12 following the precautions given in the preceding section. As each is

installed, make sure it is down firmly against the board before soldering all of its leads. Do not bend the leads on the back side of the board. Doing so makes it very difficult to remove the integrated circuits should replacement ever be necessary. The "dot" or "notch" must match with that shown on the component layout drawing for each of the IC's.

- () Working from the "TOP" side of the circuit board, fill in all of the feed-thru's with molten solder. The feed-thru's are those unused holes on the board whose internal plating connects the "TOP" and "BOTTOM" circuit connections. Filling these feed-thru's with molten solder guarantees the integrity of the connections and increases the current handling capability.
- () Now that all of the components have been installed on the board, double check to make sure all have been installed correctly in their proper location.
- () Check very carefully to make sure that all connections have been soldered. It is very easy to miss some connections when soldering which can really cause some hard-to-find problems later during checkout. Also, look for solder "bridges" and "cold" solder joints which are another common problem.

Since the circuit board now contains MOS devices, it is susceptible to damage from severe static electrical sources. Avoid handling the board any more than necessary and when you must, avoid touching or allowing anything to come into contact with any of the conductors on the board.

- () Now that the controller has been finished, assemble the power supply using the P-30 MF instruction set.

Parts List -- DC-3 Minifloppy Disk Controller

Resistors

_____ R1 10K ohm 1/4 watt resistor	_____ R7 150 ohm 1/4 watt resistor
_____ R2 56K ohm " " "	_____ R8 10K ohm 1/4 watt resistor
_____ R3 75K ohm " " "	_____ R9 100K ohm " " "
_____ R4 150 " " " "	_____ R10 150Kohm " " "
_____ R5 150 " " " "	_____ R11 4.7M ohm " " "
_____ R6 150 " " " "	

Capacitors

_____ *C1 4.7 mfd tantalum electrolytic capacitor	_____ C9 0.1 mfd capacitor
_____ *C2 4.7 mfd tantalum electrolytic capacitor	_____ C10 0.01 mfd film capacitor
_____ C3 0.1 mfd capacitor	_____ *C11 1 mfd tantalum electrolytic capacitor
_____ C4 " " "	_____ C12 0.1 mfd capacitor
_____ C5 " " "	_____ C13 100 pfd capacitor
_____ C6 20 pfd capacitor	_____ *C14 1 mfd tantalum eletrolytic capacitor
_____ C7 0.1 mfd capacitor	_____ C15 0.1 mfd capacitor
_____ *C8 220 mfd @ 10 VDC electrolytic capacitor	_____ C16 0.01 mfd film capacitor

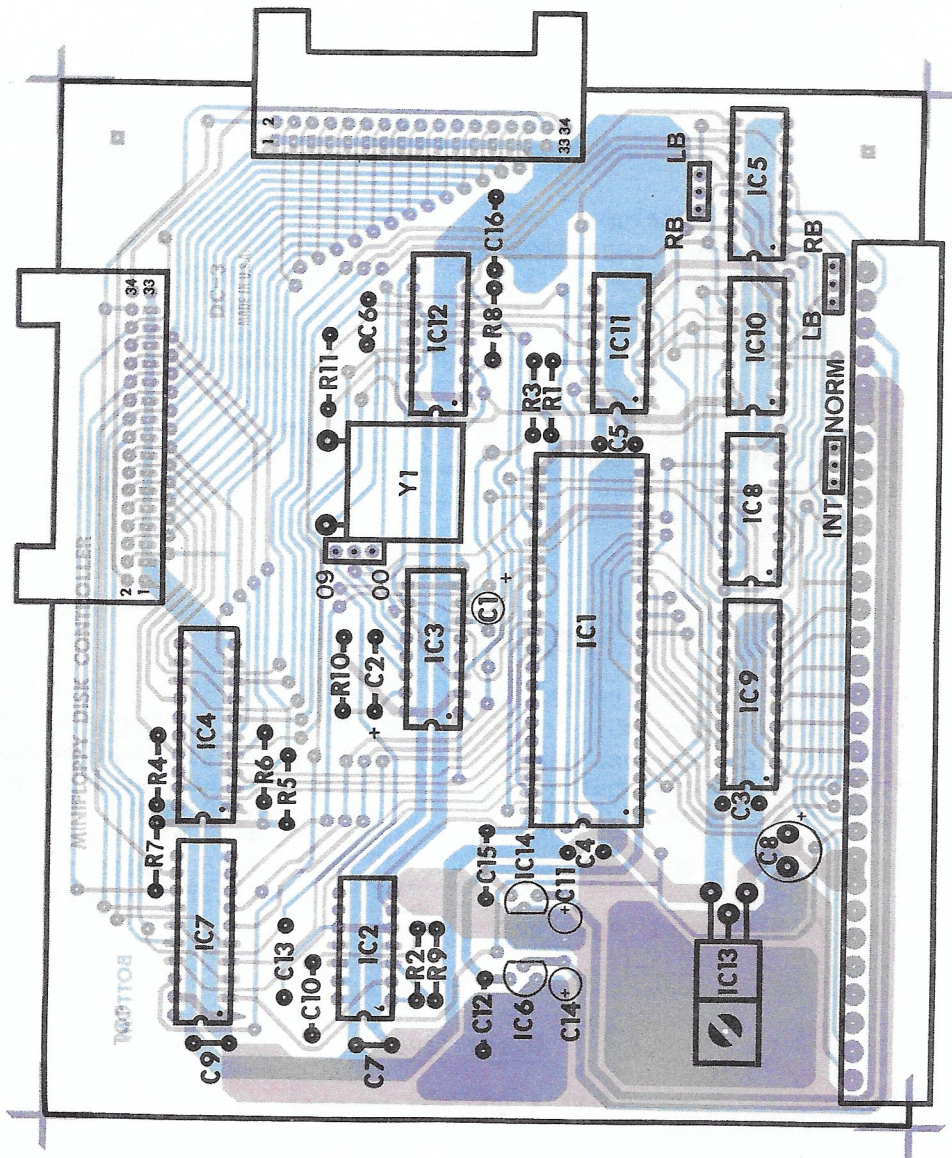
Integrated Circuits

_____ *IC1 1771 disk controller (MOS)	_____ *IC8 74LS175 quad D-flop
_____ *IC2 14541 timer (MOS)	_____ *IC9 74LS640 octal transceiver
_____ *IC3 74LS123 dual one shot	_____ *IC10 74LS32 quad OR gate
_____ *IC4 74LS244 octal buffer	_____ *IC11 74LS00 quad 2 input NAND gate
_____ *IC5 74LS139 dual 2 to 4 decoder	_____ *IC12 4049 hex inverter (MOS)
_____ *IC6 79L05 -5 VDC voltage regulator	_____ *IC13 7805 5-volt regulator
_____ *IC7 74LS240 octal inverter	_____ *IC14 78L12 12-volt regulator

Miscellaneous

_____ Y1 1.000 MHz crystal

* All components flagged with a * must be oriented as shown in the component layout drawing.



P-30 MF Power Supply

The P-30 Power Supply is a fixed voltage power supply designed to be used with several SWTPC kits. The P-30 MF version is supplied with those parts required to power the MF-69 Dual Floppy Disk Unit. The P-30 MF provides the following outputs:

+12 VDC $\pm 5\%$ @ 3.0 amps
+ 5 VDC $\pm 5\%$ @ 3.0 amps

The power supply consists of the 3 1/8" W x 3 3/8" L x 3 3/4" H power transformer, two large 2" diameter filter capacitors, circuit board and three regulator transistors. The design utilizes integrated regulators for adjustment free outputs and built-in overload protection. The power supply may be operated from 120 or 240 VAC, 50 to 60 Hz power systems.

PC Board Construction

- () Clean the copper foil side of the circuit board with a piece of Scotchbrite® (available at most hardware stores) to remove any oxidation.
- () Attach all of the resistors to the circuit board. Use the parts list and the component layout drawing to locate the proper position for each part. As with all components unless otherwise noted, mount each flush with the top of the board, bend the leads parallel to the board on the foil side and trim so that 1/16" to 1/8" of wire remains. Solder.
- () Attach all of the diodes to the circuit board. Be sure the banded end of each diode matches with the outline shown in the component layout drawing.
- () Using some #18 gauge bus wire, install jumpers in the two locations indicated with the number "J12". Solder. Make sure NO jumper is installed in the "J24" position. Use the component layout drawing for reference.
- () Attach the twelve-pin Wafercon® connector to the circuit board. Be sure to orient the connector as shown in the component layout drawing. Solder.
- () Complete the first half of steps 1 thru 18 of the wiring table. Cut each to make sure that all connections have been soldered and that there are not cold solder joints. Also make sure that all components have been installed correctly as called for in the instructions. Take note that there are some power supply components not used in the P-30 MF version of the kit. Install only those components listed in the parts list.

Scotchbrite® is a registered trademark of the 3M Corp.

Attaching the Connector to the Power Transformer

Even all of the power transformer secondary leaving them as long as possible and strip the ends of the wires so that only 1/8" protrudes beyond the insulation. Attach and solder the specified connector pins to each of the leads using the table below for reference. use the connector reference sheet contained within this instruction set if you have any problem distinguishing between the connector pins. Do NOT insert the connector pins into the connector shell until told to do so later in the instructions.

Transformer Secondary Wire	Connector Pin Gender	Connector Pin #
Yellow	female	1
green-white	female	2
green-yellow	male	3
green	female	4
blue-white	male	7
brown	female	9
blue	female	10
blue	female	11
brown	male	12

- () Take note that the back side of the male connector shell is numbered. Using the previous table, carefully insert each of the specified connector pins into the correct numerical position of the connector shell. Insert the pins from the back or numbered side of the connector and be careful not to make a mistake. The pins cannot be removed without destroying them once they have been pressed into place. This completes the transformer connector assembly.

Power Supply Onto Chassis Assembly

- () Attach the clamps for electrolytic capacitors C3 and C4 to the chassis using #6 - 32 x 1/4" screws, lockwashers and nuts. Orient the clamps as shown in the chassis pictorial. Leave the mounting screws loose until the capacitors and PC board have been installed as called for later in the instructions. Attach a ground lug under the C4 capacitor clamp screw shown in the chassis pictorial.
- () Attach lug strip LS-1 to the chassis using a #6 - 32 x 1/4" screw, lockwasher and nut. Orient the lug strip as shown in the chassis pictorial.
- () Attach fuseholder F1 to the chassis with a #6 - 32 x 3/8" screw, lockwasher and nut. Orient the fuseholder as shown in the chassis pictorial.
- () Using a pair of pliers, crimp the strain relief onto the line cord at a point about 8" from the end of the line cord and

insert the compressed strain relief and line cord assembly into the hole provided on the rear of the chassis from the outside of the chassis, then release.

- () Now insert electrolytic capacitors C3 and C4 into their clamps. Use the parts list and chassis pictorial to determine position and orientation. Install them exactly as shown in the pictorial. These capacitors are polarized so the + terminal must be positioned as shown in the drawing. Loosely secure the capacitors with #6 - 32 x 1/2" screws, lockwashers and nuts.
- () Orient the power transformer so the nine-wire secondary side is nearer the left side of the chassis and secure with four #8 - 32 x 3/8" screws, flatwashers and nuts.
- () Remove the precoated insulators from their packages and place over the pins on the bottom of regulator transistors Q3, Q4 and Q5.
- () Install transistors Q3, Q4 and Q5 onto the chassis in the appropriate set of holes from the outside of the chassis. Be sure you have put the right transistor in the right set of holes. Secure each transistor with #6 - 32 x 3/8" screws, insulated shoulder washers, ground lugs and nuts. NOTE: The case of each power transistor is electrically a transistor junction and hence must be electrically isolated from all other electrical junctions including the chassis. The mounting screws are electrically connected to each transistor case and you must be sure the screws do not contact the chassis as they pass through. Keep in mind also that the wire leads of each power transistor must be centered in the large holes through which they pass. The mounting screws must be tightened evenly and with enough pressure to slightly compress the transistor insulators. Orient the ground lugs as shown in the chassis pictorial. The entire bottom of the transistor case must be in solid contact with the insulator for good heat transfer.
- () Carefully set a #10 internal star lockwasher on top of each of the four large capacitor terminal lugs. Now carefully place the power supply circuit board on top of the capacitors oriented as shown in the chassis pictorial. Insert #10 - 32 1/4" screws thru the board, lockwashers and into the capacitor lugs. Be sure the screws are straight and tighten so they are snug but be careful not to overtighten. The capacitor lugs are made of aluminum and will strip out easily.
- () Tighten all of the capacitor clamp mounting screws.
- () For American standard 120 VAC line operation, complete steps 19 thru 22 of the wiring table. For European standard 240 VAC operation, complete steps 19A thru 22A of the wiring table.

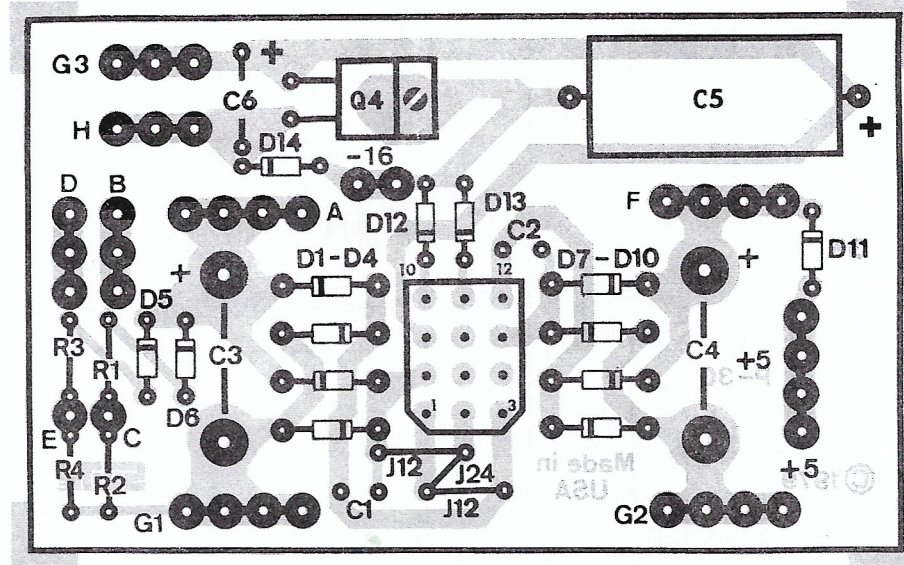
- () Now go back and complete the second half of wiring steps 1 thru 9. When attaching the wires to the regulator transistors Q3, Q4 and Q5, slip a 1" piece of heat shrinkable tubing over each of the wires to be attached first. Solder the wire directly to the transistor pin, slip the heat shrinkable tubing over the exposed connection and shrink the tubing with the heat from your soldering iron.
- () Complete wiring steps 10 thru 18 and 23 thru 25 of the wiring table. Wiring steps 10 thru 17 require that the female connector pins be snapped into the specified connector shell. Be very careful not to interchange the wires and follow the precautions given for the transformer connector.
- () Go back and double check all wiring steps and solder connections for correctness and completion. Even a simple mistake can cause costly damage to your power supply.
- () Plug the twelve-pin male connector attached to the power transformer's secondary leads onto the twelve-pin receptacle on the power supply printed circuit board. Be sure to orient the connector correctly. It will fit only one way.
- () Install fuse F1 into the fuseholder.
- () Without having anything plugged onto power connectors J0 or J1 and after making sure these connectors are not inadvertently touching anything they shouldn't be, plug the line cord into a wall outlet and turn the power switch ON.
- () Using the proper return line on the power connectors as a ground reference, measure the following voltages on the two power connectors listed below. If you find that any of the voltages do not measure as specified, immediately remove power and recheck all wiring and solder connections.

Connectors J0 and J1

<u>Pin #</u>	<u>Voltage</u>	<u>Tolerance</u>
1	+12 VDC	±5%
2(+12 gnd ref.)	0 VDC	±5%
3(+5 gnd ref.)	0 VDC	±5%
4	+5 VDC	±5%

- () If everything checks out as called for then remove power, unplug the unit and continue with the main disk assembly instructions for final assembly and checkout. Once you are convinced that the power supply is working as it should be, use the wire ties supplied with the kit to bundle the wires where necessary.

P-30 MF Power Supply



Parts List P-30 MF Power Supply

Resistors

_____ R1 243 ohm 1% resistor
 _____ R2 2030 ohm 1% resistor
 _____ R3 243 ohm 1% resistor
 _____ R4 2030 ohm 1% resistor
 _____ D5* 1N4003 diode

Capacitors

_____ C1 0.1 mfd capacitor
 _____ C2 0.1 mfd capacitor
 _____ C3 20,000 mfd @ 25 VDC
 _____ C4* 29,000 mfd @ 25 VDC
 _____ C5 not used
 _____ C6 not used

Diodes

_____ D1* 1N5402 high current diode
 _____ D2* " " " "
 _____ D3* " " " "
 _____ D4* " " " "
 _____ D6* 1N4003 diode
 _____ D7* 1N5402 high current diode
 _____ D8* " " " "
 _____ D9* " " " "
 _____ D10* " " " "
 _____ D11* 1N4003 diode
 _____ D12 not used
 _____ D13 not used
 _____ D14 not used

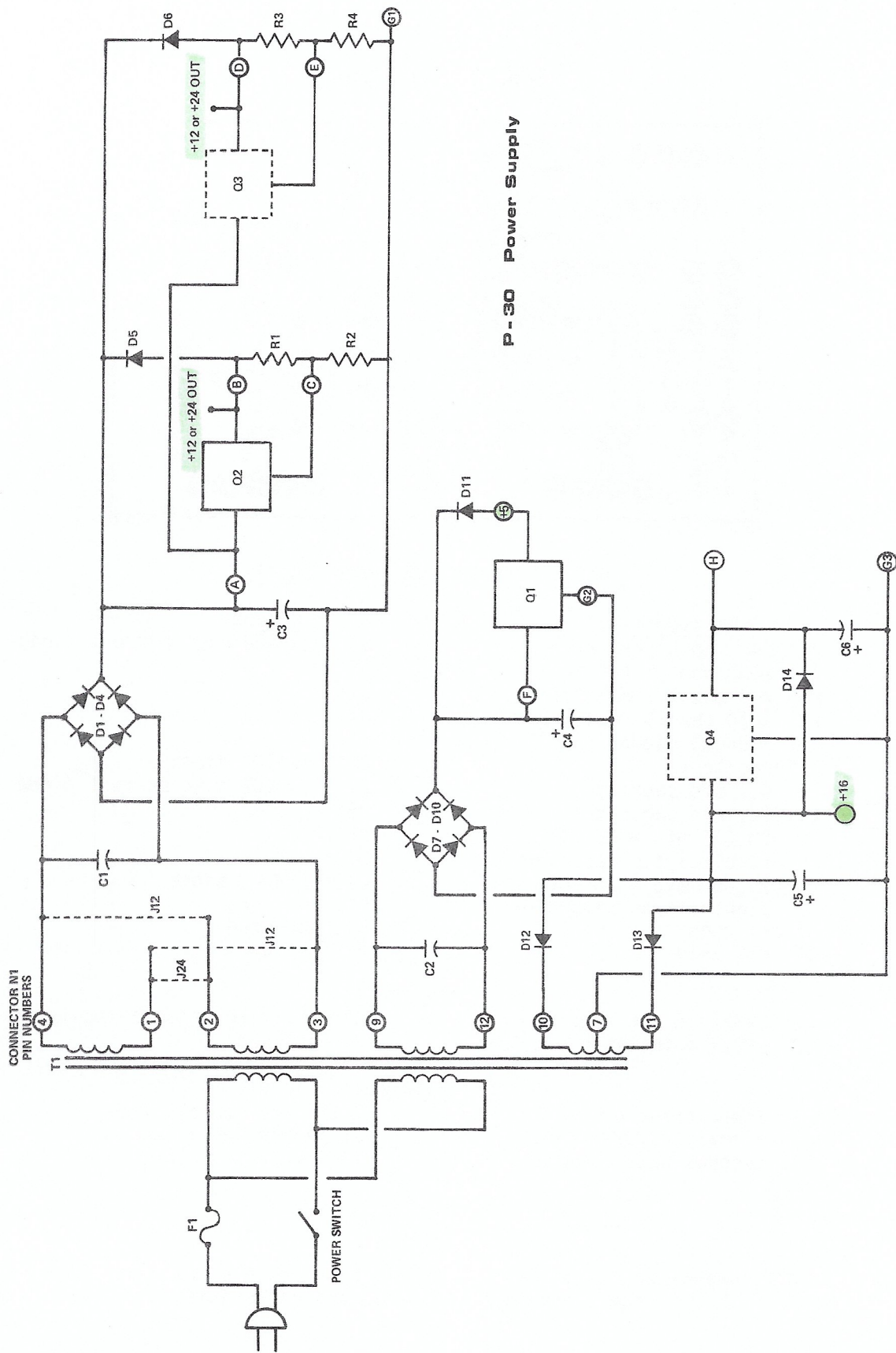
Regulators

_____ Q1* LM323 +5 VDC regulator
 _____ Q2* LM317 adjustable regulator
 _____ Q3* LM317 adjustable regulator
 _____ Q4 not used

Miscellaneous

_____ T1* Power transformer 50-60 Hz
 _____ Primary: 120/240 VAC
 _____ Secondaries: 12 VAC @ 1.5 amp
 _____ 12 VAC @ 1.5 amp
 _____ 7 VAC @ 3 amp
 _____ 24 VAC @ 200 ma
 _____ 2 1/2 amp slo-blo fuse
 _____ J1 jumper installed
 _____ J2 jumper installed

All components flagged with a (*) must be oriented as shown in the component layout drawing and pictorials.

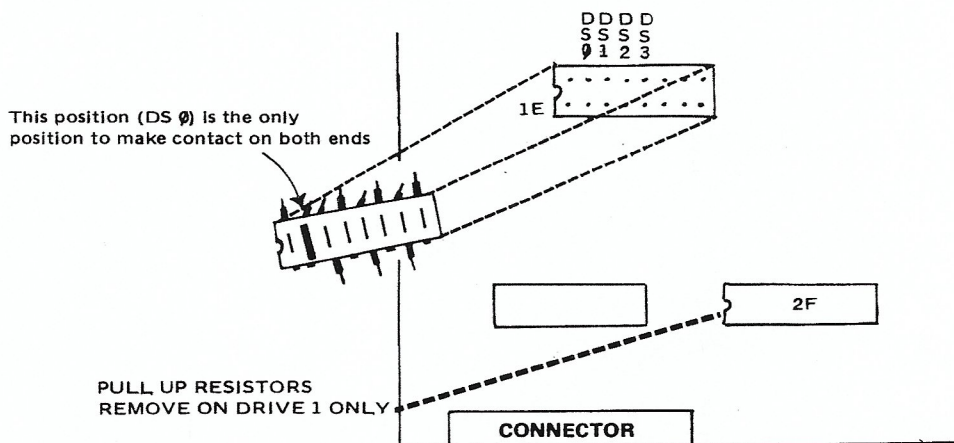


(This is in my System)

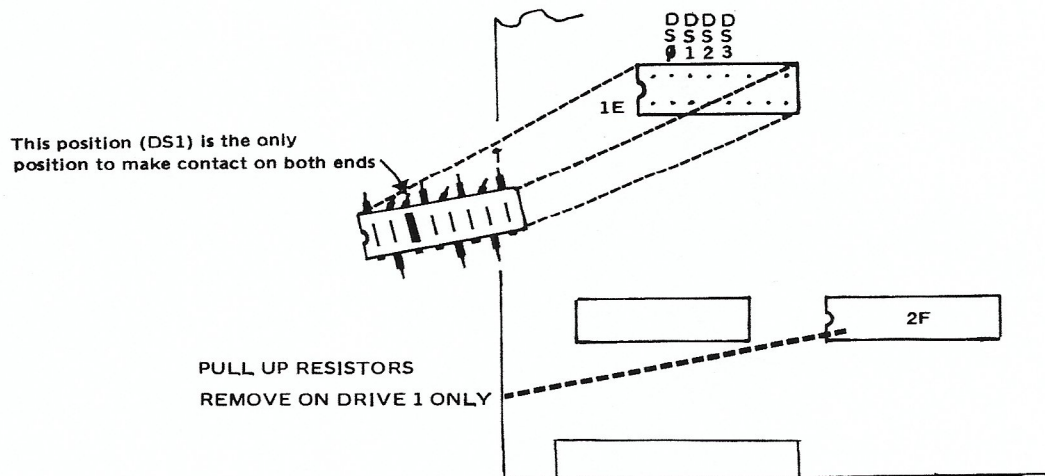
Programming Tandon Disk Drives

Carefully remove both drives from their boxes and turn the drives so that the edge connectors are nearest you and so that the belt and pulleys are on the bottom.

- () At the bottom left corner of the board you will notice what looks like an IC made up of jumpers in a socket. On one of the drives remove the jumper block with a screwdriver and bend straight (upward) the pins shown below. Do not break these pins off. Re-install the jumper block as shown. This drive is now programmed as DRIVE 0.



- () On the other drive, bend straight out the pins of its jumper block as shown below. Re-install it as shown.



- () Located on this drive below and to the right of the jumper block you will notice what appears to be an IC in a socket. This is an array of pull-up resistors and should be removed. This drive is now programmed as DRIVE 1.
- () Proceed to the final assembly instructions.

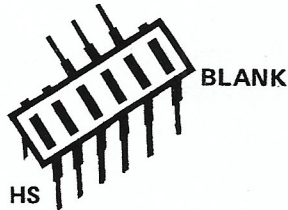
Drive Programming

Now that the power supply has been assembled and tested, you are ready to program and install the drives. The MF-69 disk kit may be supplied with either Shugart, Wangco, Siemens or Qume brand drives. Programming is identical for the Shugart, Siemens or Wangco drives.

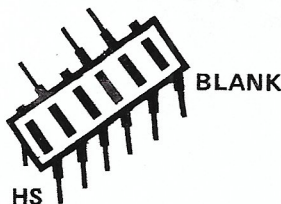
Programming Shugart, Siemens or Wangco Drives

Carefully remove both drives from their boxes and turn the drives so that the edge connectors are nearest you and so that the belt and pulleys are on the bottom.

- () At the bottom left corner of the board you will notice what looks like an IC made up jumpers in a socket. One of the drives remove the jumper block with a screwdriver and bend upward (straight) the pins that go to terminals DS2, DS3 and MX. Do not break these pins off. Reinstall the jumper block into the socket. As a double check the jumper block should have pins inserted only in terminals DS1, HS and the unlabeled pin. There should be nothing plugged into the HM position. This drive is now programmed as DRIVE 0.



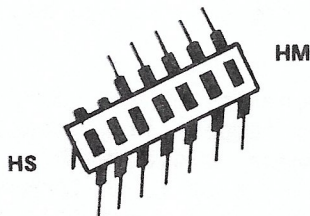
- () On the other drive, bend straight out the pins going to DS1, DS3 and MX. Re-install the jumper so that HS, DS2 and the unlabeled pin have jumper pins installed.
- () Directly above this jumper block you will notice what appears to be a 14-pin IC in a socket. This is not an IC but is an array of pull-up resistors. Carefully remove this array from its socket using small screwdriver. This array should not be reinstalled. This drive is now programmed as DRIVE 1.



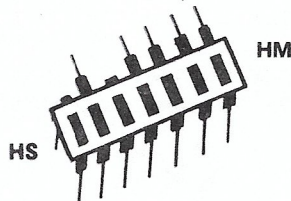
- () Proceed to the final assembly instructions.

Programming Qume Drives

- () At the bottom left corner of the board you will notice what looks like an IC made up of jumpers in a socket. On one of the drives remove the jumper block with a screwdriver and bend upward (straight) the pins that go to terminals DS1, DS2, MX, DS3 and HM. Do not break these pins off. Reinstall the jumper block into the socket. As a double check, the jumper block should have pins inserted only in terminals DS0 and HS. This drive is now programmed as DRIVE 0.



- () On the other drive, bend straight out the pins going to DS0, DS2, MX, DS3 and HM. Re-install the jumper so that HS and DS1 pins have jumper pins installed.
- () Directly above this jumper block you will notice what appears to be a 14-pin IC in a socket. This is not an IC but is an array of pull-up resistors. Carefully remove this array from its socket using a small screwdriver. This array should not be reinstalled. This drive is now programmed as DRIVE 1.

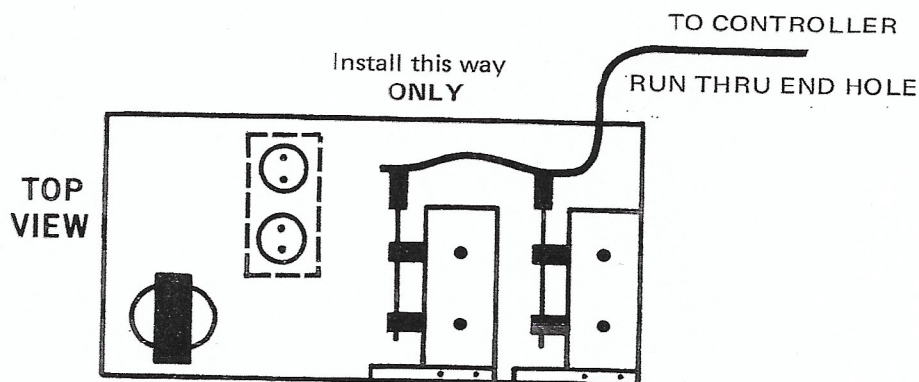


- () Proceed to the final assembly instructions.

Final Assembly

- () Now that both drives have been programmed you are ready to install them in the chassis. DRIVE 0 should be installed first nearest the power supply. The drive should be installed so that the jumper block is toward the TOP of the chassis. Connect the power supply connector to J2 of the drive and attach the drive from the bottom of the chassis using two 6 - 32 x 1/4" screws.
- () Connect the other power supply connector to J2 of DRIVE 1 and install this drive to the right of the first. Again, orient the drive so that the jumper block is toward the top. Use two 6 - 32 x 1/4" screws to secure the drive.
- () Insert the 1 1/2" hole bushings in the rear of the chassis. Install the bushings from the outside of the chassis.
- () Run the ribbon cable thru the 1 1/2" hole bushing nearest the right edge of the chassis so that both edge type connectors are inside the chassis.
- () Install the 2 Tinnerman nuts over holes in the side of the chassis for cover mounting.
- () Connect the two edge connectors on the ribbon cable to the drives. The connectors must be installed so that pin #1 is toward the top of the chassis.

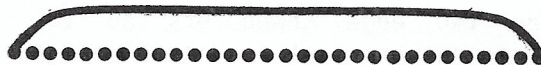
All cables should be installed as in the following pictorial. By running the cable through the hole in the rear of the chassis the only natural way for the connectors to fit will be the right way, as shown. Be very careful to install the cable correctly - incorrect installation can cause damage to the controller and the drives.



- () The front panel should now be attached to the chassis using 6 - 32 x 3/8" screws, lockwashers and nuts.
- () This completes the assembly of the disk unit. Before the cover is installed or power is applied you should recheck all assembly steps.

Computer Interconnection

- () In order for the MF-69 to work properly with an SWTPC 6800 or 6809 computer with an MP-B or MP-B2 (not MP-B3 or MP-MB) motherboard, one minor modification needs to be made to the motherboard. Power down the computer and carefully remove the motherboard. With a short length of wire connect together each of the two end pins of 30-pin I/O connector row #5. This will connect the #5 chip select line to UD3. When connecting the wire, route it around the PC support on the bottom of the board to prevent it from being pinched. Re-install the motherboard when finished. This modification should not be done on MP-B3 or MP-MB motherboards.

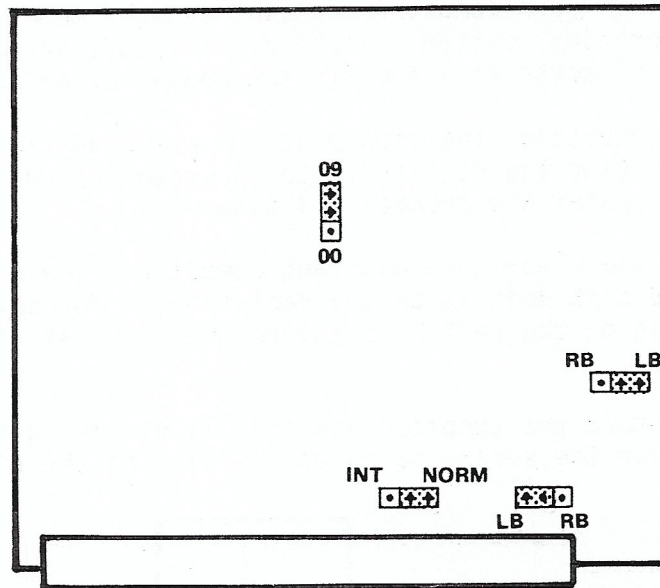


Jumper Programming the DC-3 Controller Board

There are four jumper blocks on the DC-3 controller board that must be properly programmed before the board is installed in the computer system. Programming is achieved by plugging the small plastic shorting blocks onto the specified set of programming pins.

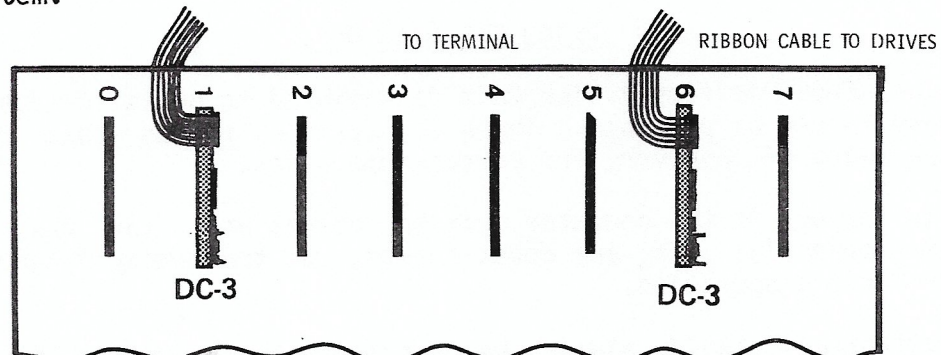
- () There are two jumper locations on the board marked RB/LB. If your computer cabinet has the RESET button located on the left side of the chassis, install both jumpers in the LB (left button) position. If your computer cabinet has the RESET button located on the right side of the chassis, install both jumpers in the RB (right button) position.
- () If you will be using the MF-69 disk unit with a 6800 (not 6809) processor board or a 6809 running FLEX 2.5 or earlier, install the 00/09 jumper in the 00 position. If you are running a 6809 with 6809 FLX 2.6 or above, you may install the jumper in the 09 position. The 09 position gives the software the ability to check for "drive ready" but may only be used with the newer versions of FLEX that use the features in the new DC-3 controller board.

- () Unless otherwise noted, install the INT/NORM jumper in the NORM position. Interrupts are not presently used with this board.



DC-3 Programming Header Locations

- () The disk controller board should now be plugged onto I/O slot 6 on computers with MP-B or MP-B2 motherboards and I/O slot 1 on computers with MP-B3 and MP-MB motherboards. Be sure the male connector pins on your motherboard are not so long as to contact components on the DC-3 board. A plastic bushing on some 6800 mainframes may have to be removed to allow insertion. The lower rear edge of the DC-3 board may also have to be notched slightly to allow the board to seat properly.
- () Connect the ribbon cable to the connector on the controller board. If the connector supplied on the cable does not have an indexing pin, install the connector so that the cable extends toward the back of the board. The pin 1 side should be nearer the front edge of the board when installed in the computer system.

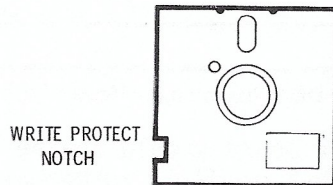


SWTPC 6809 Computer System Mother Board

- () This completes the interconnection of the MF-69 and the computer. The disk unit is now ready for checkout.

Checkout and Use

- () Be sure that your computer contains enough memory to run the disk operating system supplied. The software manual supplied with the diskette will specify the amount of memory required.
- () After connecting the disk unit you are ready to use the MF-69. If at any time the disk fails to operate as described, power down the system and recheck all assembly.
- () Power up the MF-69 disk unit and computer. The power switch for the MF-69 disk unit is on the back panel. The switch is ON when the paddle on the switch is toward the right as viewed from the front.
- () Write protect the supplied diskette by placing a small piece of tape around the square notch on the side of the diskette.



- () Install the diskette into DRIVE 0 (left drive) so that the write protect notch is at the bottom. Be sure to close the door on the drive.
- () Type in the minifloppy disk boot character on your terminal. Check your computer's monitor documentation for the correct character. If the disk unit does not respond recheck each step of this instruction set then refer to the IN CASE OF PROBLEMS section of this manual.

Using the Disk Unit

The MF-69 Minifloppy Disk Unit is designed to be as straightforward and easy to use as possible. There are certain things that the user must be aware of, however, for correct operation.

All memory in the computer must be operational for the disk to operate properly. If any doubt exists, run the memory diagnostics to verify correct operation.

Diskettes should always be inserted with the WRITE PROTECT notch nearest the LED'S on the drive and with the label outward. Having this notch closed with a piece of tape will prevent the disk from being written upon. Leaving the notch open will allow write privileges.

The LED indicators on the front of the drives are head load lights and are activated only when the head for a particular drive is loaded on a diskette. They are not power indicators.

The disk controller has been designed to load the head and turn on the drive motors only when necessary. When the computer requests data from the disk, the motors will activate and the correct head will load. After the information has been retrieved the head will unload, and after approximately one minute the motors will turn off.

Just like cassette tapes, diskettes are made of magnetic materials and can be erased by stray magnetic fields. Also, it is an excellent idea to back-up all important disks on a spare diskette. The following precautions should be followed concerning diskettes.

1. Return the diskette to its storage envelope whenever it is removed from a drive.
2. Keep diskettes away from magnetic fields and from ferromagnetic materials which might become magnetized. Strong magnetic fields can distort recorded data on the disk.
3. Replace storage envelopes when they become worn, cracked or distorted. Envelopes are designed to protect the disk.
4. Do not write on the plastic jacket with a lead pencil or ball point pen. Use a felt tip pen.
5. Heat and contamination from a carelessly dropped ash can damage the disk.
6. Do not expose diskettes to heat or sunlight.
7. Do not touch or attempt to clean the disk surface. Abrasions may cause loss of stored data.

With MP-B and MP-B2 motherboards the MF-69 uses the ENABLE line from I/O position 5 as a control line. Care should be exercised when using I/O slot 5 for other devices.

IMPORTANT: Do not power the computer or MF-69 disk units on or off while diskettes are installed in the drives with the doors closed. Doing so may destroy any or all data stored on the diskette(s).

IN CASE OF PROBLEMS

If your MF-69 fails to operate properly we suggest that you first go back and double check all parts. Be sure that they are oriented as shown on the drawings and that they are the correct part number. The majority of problems turn out to be incorrect assembly. Using the printed pattern as a guide look over the board for solder bridges. Accidental solder bridges are the second most common problem in kits that are returned for repair. Be sure that all jumpers called for are in place and that all connections have been soldered.

Factory Exchange Service Plan for Assembled Units Only

Southwest Technical Products Corp. provides an exchange program for factory assembled products and product subassemblies which require service. The plan is designed to provide a way of returning systems to operational status as quickly as possible.

All equipment is registered in the plan for a period of six months after installation. After this time an exchange charge is made, if the equipment has not been placed under service contract.

Any article to be returned to the factory must be properly packed and marked with a return address. This should include the name and telephone number of the person requesting the repair. The nature of the problem should also be described as fully as possible.

The serial number of the system from which any subassembly was removed must be supplied with the returned subassembly.

Ship all articles to be returned to the factory prepaid by UPS or insured parcel post. We cannot pick up repairs sent by bus. No COD shipments can be accepted. Articles will be returned prepaid. Upon receipt of a repairable, defective article and payment covering the cost of the article exchange, Southwest Technical Products Corp. will ship a new or equivalent-to-new performance exchange article.

Exchange articles will be placed under a six-month exchange plan at no additional cost, just as new equipment.

EXCHANGE CHARGES -- MF-69

Controller board and cable.....\$20.00
Power supply..... 10.00
Disk drive.....depends on individual drive

Ship to: Southwest Technical Products Corporation
Repair Dept. - Digital Group
219 W. Rhapsody
San Antonio, Texas 78216

Repair Service for Kits

If you have a problem that you cannot solve, the kit may be returned for factory service. Please return the entire* kit (Chassis, case, PC boards, cable, drives, etc). Be sure to include the supplied diskette containing the software.

If you suspect that the drive unit itself is not working properly, remove the drive and return it to us for testing. Do not attempt to adjust or repair the drive unit. Special equipment and tools are required and considerable damage can be done by attempting to work on these units without proper training.

*Remove the power transformer. This reduces postal costs and damage. Selected individual boards may be returned but in most cases it is best to send the entire unit. Do not remove the boards from the drives themselves and send them in. Repairs are performed for a flat labor charge per board plus parts and postage.

<u>CIRCUIT</u>	<u>LABOR CHARGE</u>
Controller board and cable.....	\$20.00
Power supply.....	\$10.00
Disk drives..	Depends on individual drive

If we find that the board, drive or complete unit is functional as received and does not require service, the Checkout Charge is \$10.00.

A confirmation sheet will be sent upon receipt of the kit. Please do not ask for an estimate or a detailed report on exactly what was done in repairing your unit as we cannot provide this service.

It is not necessary to enclose any funds with the kit, you will be billed for authorized repairs.

Shipping Instructions

Pack in a large carton with at least 3 inches of padding on all sides. Do not attempt to return the kit in the original box. We will not service a kit if there is any postal damage until the claim is settled. Include all relevant correspondence and a brief description of the difficulty.

Ship prepaid by UPS or insured Parcel Post. We cannot pick up repairs sent by bus.

Ship to: Southwest Technical Products Corporation
Repair Department-Digital Group
219 W. Rhapsody
San Antonio, Texas 78216

Additional Diskettes

Additional blank diskettes are available at \$5.50 ea. Part #FD-M.

WIRE			FROM			TO		
STEP	LENGTH	GAUGE	PART	TERMINAL	SOLDER	PART	TERMINAL	SOLDER
MF-69 Wiring Table								
1	11	#18	PC board	G2	yes	Q3	A4	yes
2	11¼	#18	PC board	F	yes	Q3	A1	yes
3	11¼	#18	PC board	+5	yes	Q3	A2	yes
4	11½	#18	PC board	B	yes	Q4	B4	yes
5	13¼	#18	PC board	C	yes	Q4	B1	yes
6	13	#18	PC board	A	yes	Q4	B2	yes
7	13	#18	PC board	D	yes	Q5	C4	yes
8	15½	#18	PC board	E	yes	Q5	C1	yes
9	14¼	#18	PC board	A	yes	Q5	C2	yes
10	14	#18	PC board	B	yes	female pin	J0 #1	yes
11	12	#18	PC board	G1	yes	female pin	J0 #2	yes
12	12	#18	PC board	G2	yes	female pin	J0 #3	yes
13	13	#18	PC board	+5	yes	female pin	J0 #4	yes
14	17	#18	PC board	D	yes	female pin	J1 #1	yes
15	15¼	#18	PC board	G1	yes	female pin	J1 #2	yes
16	15	#18	PC board	G2	yes	female pin	J1 #3	yes
17	16¼	#18	PC board	+5	yes	female pin	J1 #4	yes
18	5	#18	PC board	G1	yes	chassis	gnd. lug	yes
120 VAC OPERATION								
19	3	—	T1	Black	—	LS1	A	no
20	3	—	T1	White	—	LS1	A	no
21	3	—	T1	Blk—Red	—	F1	A	no
22	3	—	T1	Blk—Wht	—	F1	A	yes

[illegible]