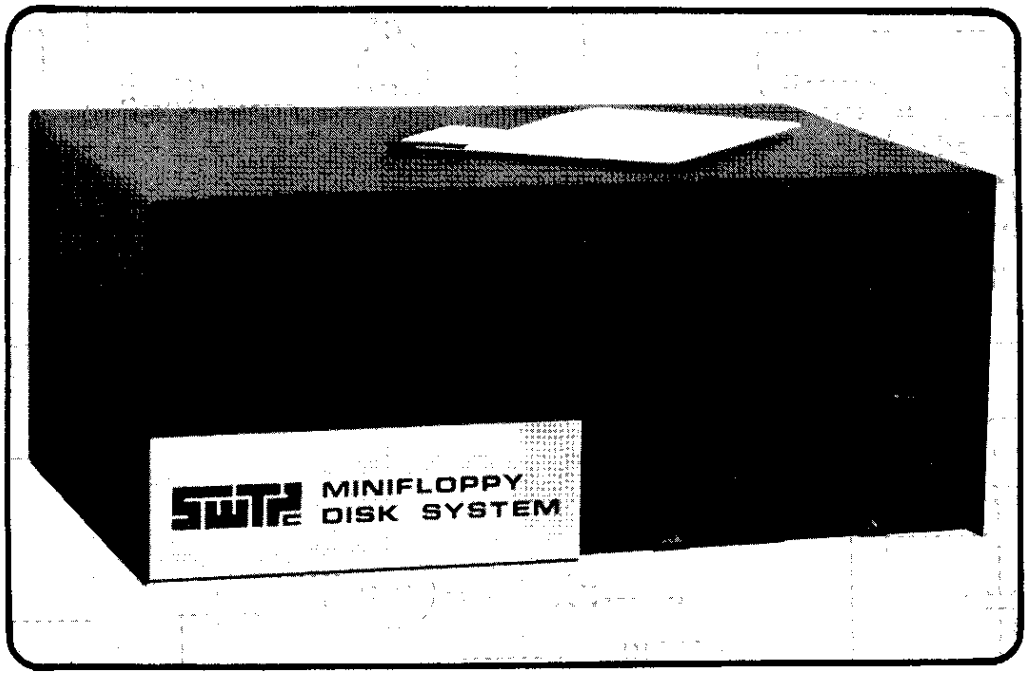
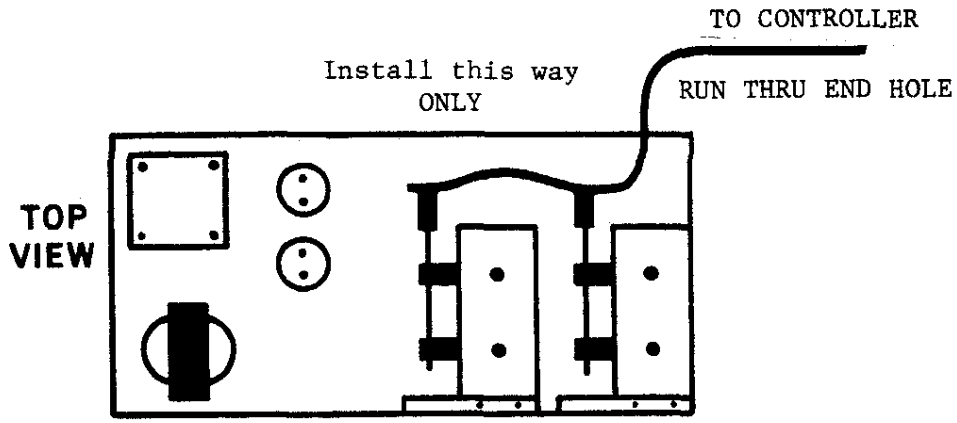


MF-68
DISK SYSTEM

219 W. Rhapsody, San Antonio, Texas 78216

MF-68 Disk Instructions Addendum

When connecting the ribbon cables to the drives the instructions state to connect the cables with pin 1 of the connectors toward the top of the disk unit. Some cables may have the two card edge connectors installed upside down or may have no numbers at all. If your cable has black connectors with a white painted dot on one end, the end with the dot is the pin 1 end. All cables should be installed as in the following pictorial. By running the cable through the end 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.



Assembly Instructions MF-68 Disk System

The MF-68 Disc System is a dual mini-floppy disc system designed for a SWTPC 6800 Computer System.

The MF-68 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 changes to be used. 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 5" circuit board that will plug into an I/O slot on the computers mother board. Connection between the controller and the drives is made via a 34 conductor ribbon cable.

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

When the MF-68 disc system 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 reason have been packed with their leads inpressed 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 of the capacitors on the board. Be sure to install the electrolytic and tantalum capacitors exactly as shown on the component layout drawing. Solder.

( ) Install the transistor and diodes on the board. The diodes must be turned so the banded end corresponds with that shown on the component layout drawing, and the transistor must be turned to match the outline on the component layout drawing as well. Solder.

( ) Starting from on 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 pins indicated by the small triangular on the "BOTTOM" side of the circuit board. This prevents the board from being accidently plugged on incorrectly.

( ) The 34 pin ribbon cable connector should now be attached to the board. Install the connector from the "TOP" side of the board and orient the connector such that the pins face the top edge of the board. Solder.

( ) The crystal should now be installed on the board. Bend the crystal's leads at a 90° angle approx. ½ inch from its body and mount from the top side of the board. After soldering fasten the crystal to the board using a short piece of stripped wire by passing the wire through the two holes next to the crystal.

( ) Install all integrated circuits, except IC1, 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 pack 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 purpose 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 as 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. The hole on the heatsink should be positioned to allow maximum contact area between the regulator and the heatsink. Solder.

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 1 M Ω ¼ 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 Ω 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 Ω 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 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" on the end of the package is used for orientation purposes and must match with that shown onthe 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 increase 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 damage from severe static electrical sources. One should 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-200 MF instruction set.

( ) Now that the power supply has been assembled you are ready to program and install the drives. The mini-floppy drives come pre-

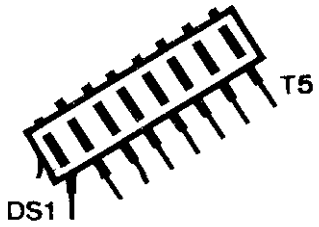
assembled and tested and require no circuit modifications to work in an MF-68 System. The drives do need to be programmed, however, to allow multiplexing of the drive select signals to selectively enable multiple drives. Carefully remove both drives from their boxes and turn the drives so that the edge connectors are nearest you and so that the belt and pulleys are on the bottom. Immediately above J2 on the bottom right hand edge of the board you will notice the wording

MINI		MINI
25060-1	or	25060-2

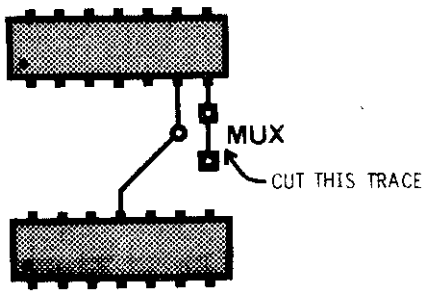
The number -1 or -2 denotes the circuit board revision number - follow the correct instructions below for the drives you have.

25060 -1 boards (Both drives must be -1)

( ) 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 screw driver and bend upward (straight out) the pins that go to terminals DS2, DS3, T1, T2, T3 T4 and T5. Do not break off these pins. Replace the jumper block in the socket. This jumper will select this drive for DRIVE #0, the lowest number and most dominant drive in the system. As a double check the only position that should have a connected jumper is DS1.

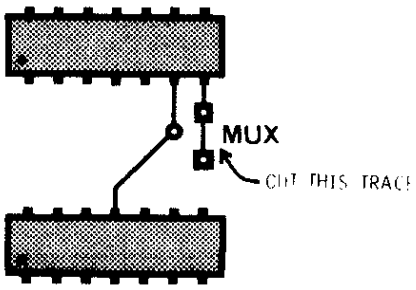


In the center of the board you will notice two small connected pads marked MUX. This small trace should be cut with a knife or razor blade.



This drive is now programmed as DRIVE Ø.

( ) On the other drive bend straight the pins going to DS1 and DS3 - all others should be left as they are to complete the jumpering of DS2, T1, T2, T3, T4 and T5. Re-install the jumper block. In the center of the board you will notice two small connected pads marked MUX. This small trace should be cut with a knife or razor blade.

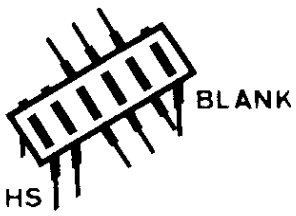


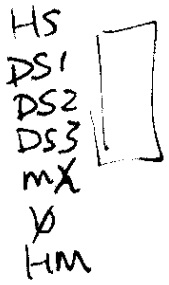
This drive is now programmed as DRIVE #1.

( ) Go on to the final assembly instructions.

25060 -2 boards (Both drives must be -2)

( ) 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 DS2, DS3, and MX. Do not break these pins off. Re-install the jumper block into the socket. As a double check the jumper block should have pins inserted only in terminals DS1, HS and the unlabled pin. There should be nothing plugged into the HM position.





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 Ø.

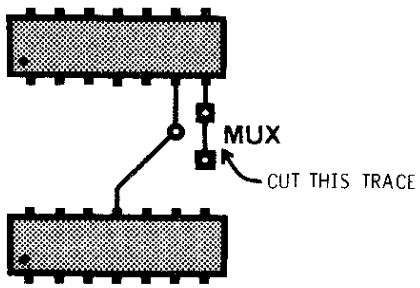
( ) On the other drive bend straight the pins going to DS1, DS3, and MX. Re-install the jumper so that HS, DS2 and the unlabled pin have jumper pins installed.

( ) Go on to the final assembly instructions.

Combination of one 25060-1 and one 25060-2 Board.

( ) If you have one -1 board and one -2 board a combination of the above instructions should be followed. First take the -2 unit and turn it so that the edge connectors are nearest you. At the bottom left corner of the board you will notice what looks like an IC made up of jumpers in a socket. Remove the jumper block with a screwdriver and bend upward (straight out) the pins that go to terminals DS2, DS3 and MX. Replace the jumper block in its socket. Directly above the 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. Slide a screwdriver under this array and remove it. It should not be re-installed. This drive is now programmed to be DRIVE $\emptyset$.

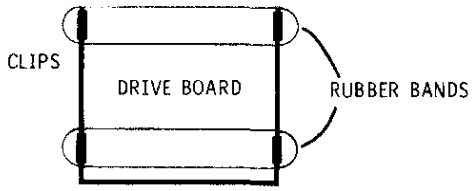
( ) Now take the -1 drive and bend up pins DS1 and DS3. Re-install the jumper block. You will notice in the middle of the board two small connector pads marked MUX. This trace should be cut with a knife or razor blade.



This drive is now programmed as DRIVE 1.

FINAL ASSEMBLY

( ) Some drives have the printed circuit board held in place with four metal spring clips. If yours is of this type use two rubber bands for each drive to help the retaining clips hold the board in place.



( ) Now that both drives have been programmed you are ready to install them in the chassis. DRIVE Ø 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 mount 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 next to the first. Again orient the drive so that the jumper block is toward the top. Use two 6-32 C 1/4 screws to secure the drive.

( ) Insert the 1½ inch hole bushings in the rear of the chassis. Install the bushings from the outside of the chassis.

( ) Run the ribbon cable thru the 1½ inch hole bushing nearest the edge of the chassis so that both edge type connectors are inside the chassis.

( ) Install the 2 Tinnerman nuts to 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.

( ) The front panel piece should now be installed on the chassis using 6-32 x 3/8 screws, lockwashers and nuts.

( ) This completes the assembly of the disk system. Before the cover is installed or power is applied you should re-check all assembly steps.

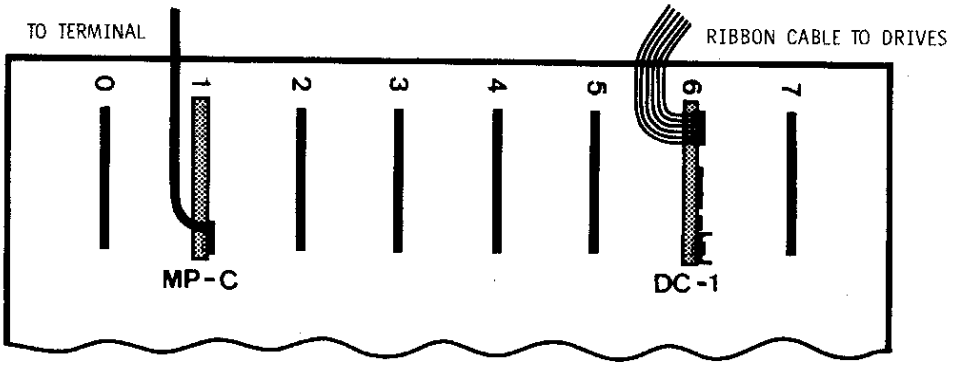
Computer Interconnection

( ) In order for the MF-68 to work properly with an SWTPC 6800 computer one minor modification needs to be made to the mother board. Power down the computer and carefully remove the mother board. With a short length of wire connect the two end pins of I/O socket #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 cut. Re-install the mother board when finished.

( ) The disk controller board should now be plugged onto I/O slot 6 on the computer's mother board.

( ) 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 runs toward the back of the board.



SWTPC 6800 Computer System Mother Board

( ) This completes the interconnection of the MF-68 and the computer system. The disk system is now ready for checkout.

Checkout and Use

At least 16K of memory must be installed in the computer.

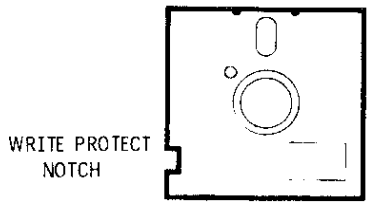
( ) After connecting the disk to the computer you are ready to use the MF-68. If at any time the disk fails to operate as described, power down the system and re-check all assembly.

( ) Power up the MF-68 unit. Nothing should happen at this point.

( ) Power up the computer system. At this time the drive's heads will be stepped to the TRACK Ø position (if not already there) and the DRIVE Ø head load LED should come on.

( ) Load the small boot program into memory.

( ) 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 Ø so that the write protect notch is at the bottom. Be sure to close the door on the drive.

( ) Set the computer's program counter to 0100 and type G. Both drives

should start up and the operating system contained on the diskette should be loaded into memory. If everything is operational the computer should respond with SWTPC READY. At this point you are in the disk operating system. If the system does not boot up correctly reset the program counter to Ø1ØØ and again type G. If, after several trys, the computer fails to respond with ready then the system is not operating properly. If this is the case refer to the In Case of Problems section.

Using the Disk System

The MF-68 Minifloppy Disk System 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 system (16K minimum) must be operational for the disk to operate properly. If any doublt exists run the ROBIT, MEMCON and CDAT 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 on. Leaving the notch open will allow write privileges.

The LED's on 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 un-load, and after approximately 20-30 seconds, the motors will turn off. During this off state it is normal for the DRIVE Ø LED to be activated.

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 is 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 diskette to heat or sunlight.

7. Do not touch or attempt to clean the disk surface. Abrasions may cause loss of stored data.

The MF-68 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. A parallel printer interface will work correctly on slot 5 with DOS.

Parts List - DC-1 Disk Controller

Resistors

____	R1	4.7K	Ω	¼	watt	resistor
____	R2	1M	Ω	"	"	"
____	R3	750K	Ω	"	"	"
____	R4	150	Ω	"	"	"
____	R5	150	Ω	"	"	"
____	R6	150	Ω	"	"	"
____	R7	150	Ω	"	"	"
____	R8	4.7K	Ω	"	"	"
____	R9	4.7K	Ω	"	"	"
____	R10	680	Ω	"	"	"
____	R11	100	Ω	"	"	"
____	R12	4.7M	Ω	"	"	"
____	R13	1K	Ω	"	"	"

Capacitors

____	C1	0.01	µF	disc	capacitor
____	C2	0.01	µF	"	"
____	C3	0.01	µF	"	"
____	C4	0.1	µF	"	"
____	C5	0.1	µF	"	"
____	C6	20	pF	"	"
____	C7	0.1	µF	"	"
____	*C8	100	µF @ 16 volt electrolytic capacitor		
____	C9	0.1	µF	disc	capacitor
____	*C10	22	µF @ 6.3v	tantalum capacitor	
____	C11	0.1	µF	disc	capacitor
____	C12	0.1	µF	"	"

Semiconductors

____	*D1	1N4733 5.1 v zener diode
____	*D2	1N4742 12 v zener diode
____	*Q1	SS 1122 silicon transistor

Integrated Circuits

____	*IC1	1771	Disk controller (MOS)
____	*IC2	555	timer
____	*IC3	555	timer
____	*IC4	7407	open collector hex buffer
____	*IC5	74LS139	Dual 2 to 4 decoder
____	*IC6	DM8097/74367	hex bus driver
____	*IC7	7406	open collector hex inverter
____	*IC8	74175	Quad D flip-flop
____	*IC9	DM8835	Quad bi-directional transceiver
____	*IC10	DM8835	" " " "
____	*IC11	74LS00	Quad 2 input NAND gate
____	*IC12	4049	(MOS) Hex inverter
____	*IC13	7805	5 volt regulator

Misc.

____	Y1	1MHz	Crystal

IN CASE OF PROBLEMS

If your MF-68 fails to operate properly we suggest that you first go back and double check all parts. Be sure that they are turned 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.

If you suspect that the "Shugart" SA-400 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.

REPAIR SERVICE

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 FDOS.

*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.

CIRCUIT	Labor Charge
Controller board and cable	$16.00
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.

ADDITIONAL DISKETTES

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

SHIPPING INSTRUCTIONS

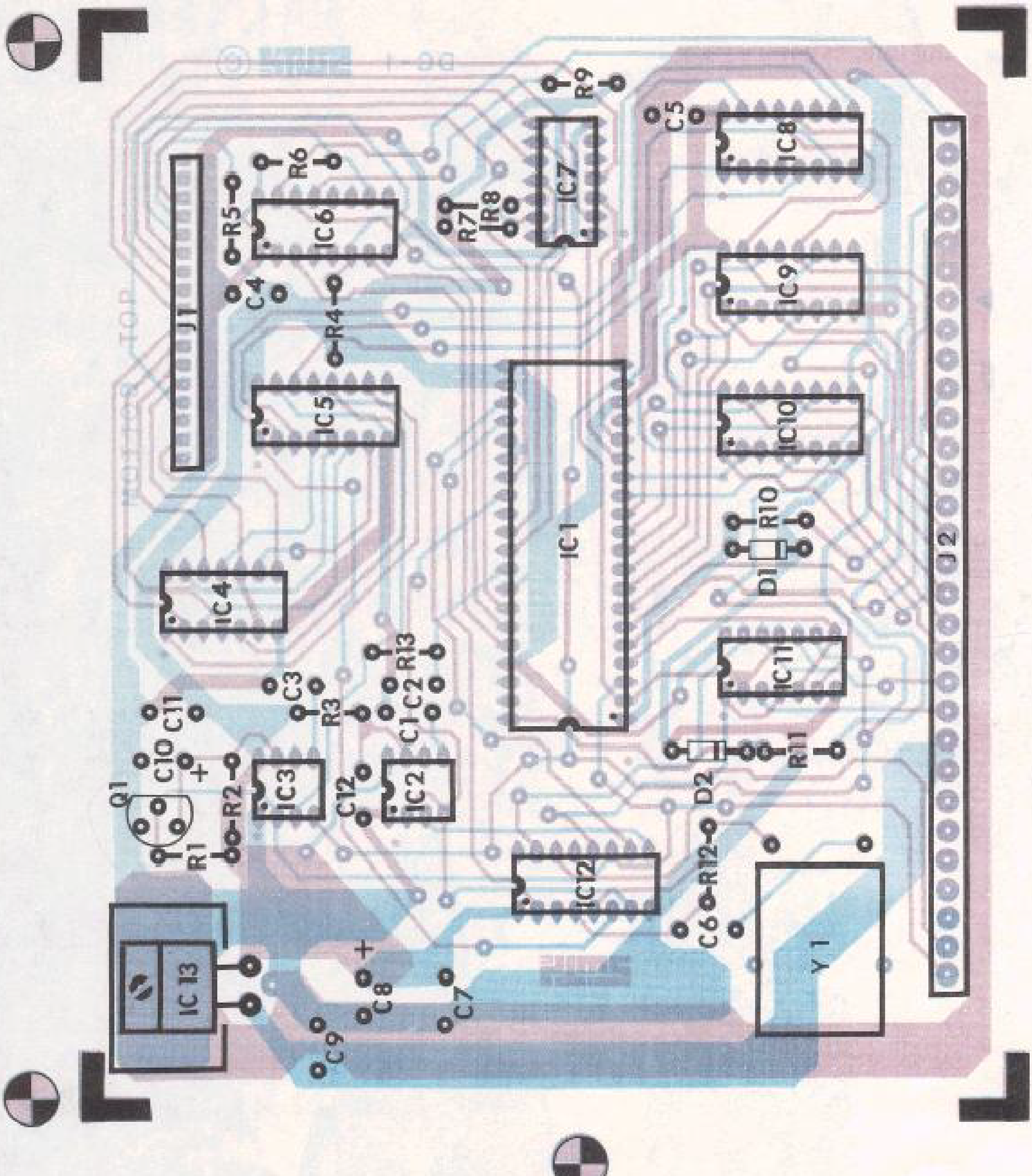
- Pack in a large carton with at least 3 inches of padding on all sides. Do not attempt to return the kit in the original box. We will not service a kit if there is any postal damage until the claim is settled.

- 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 Corp.
  Repair Department - Digital Group
  219 W. Rhapsody
  San Antonio, Texas 78216



74367

74LS139

7407

555 555

4049

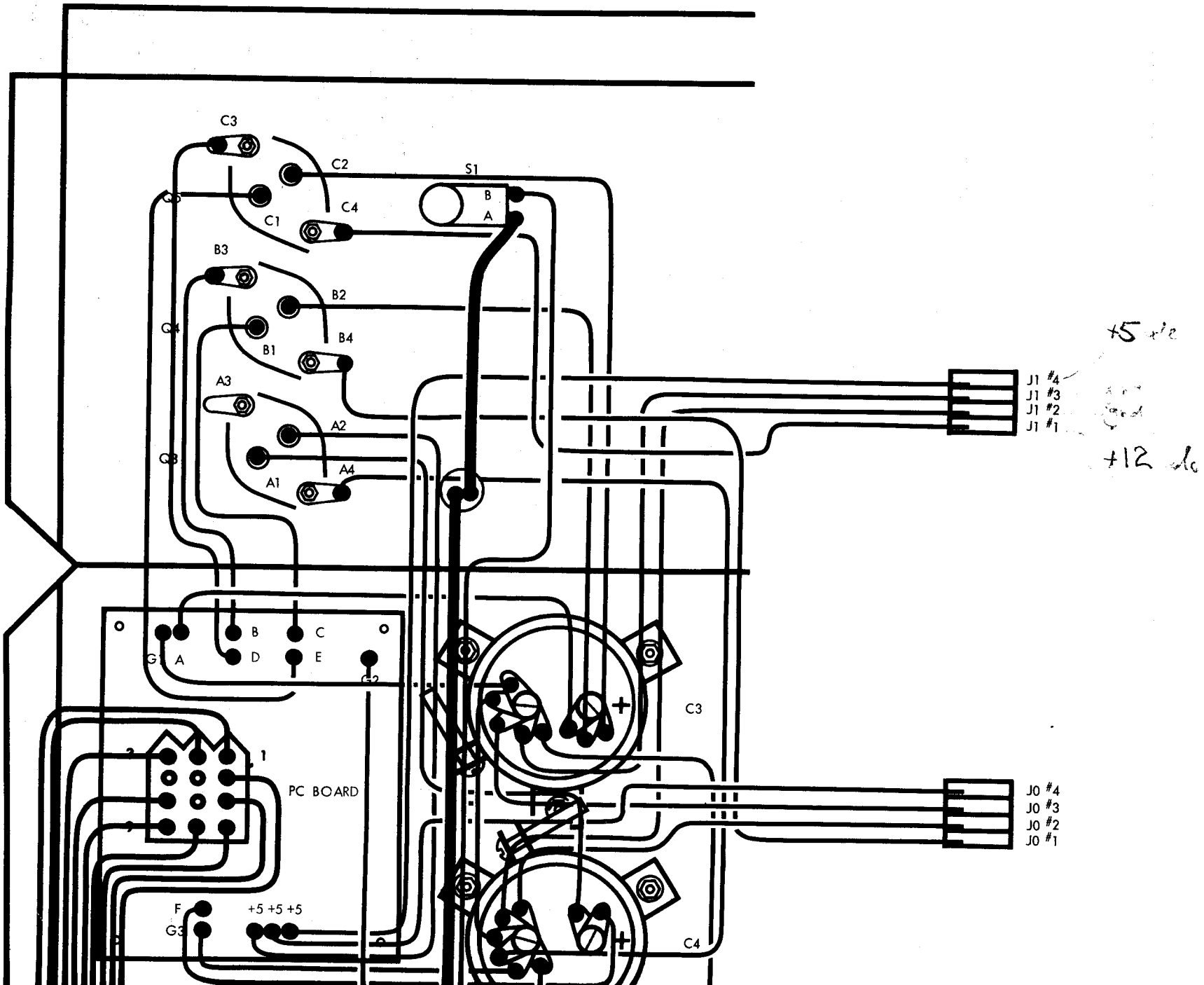
7406

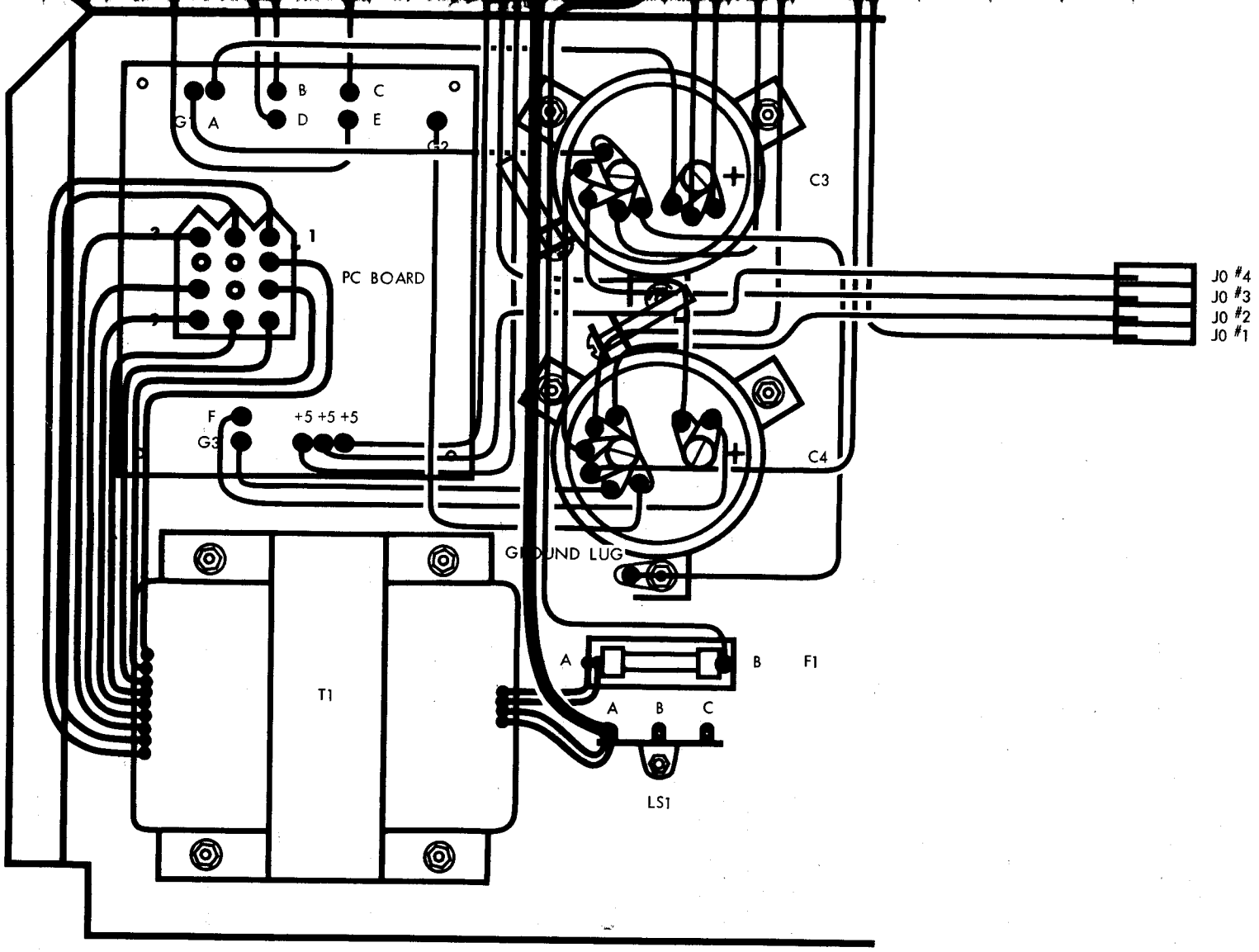
74175

8835

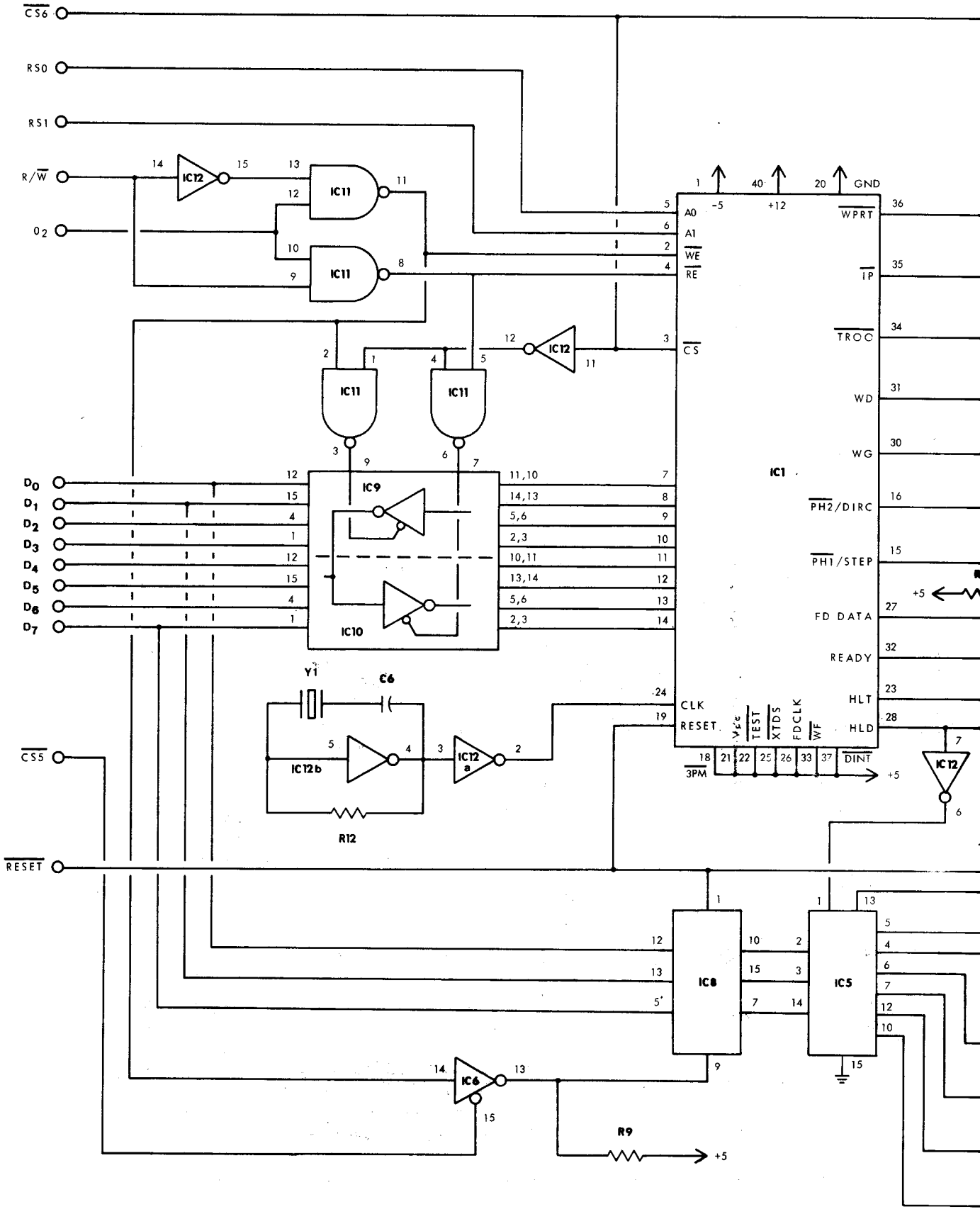
8835

74LS00

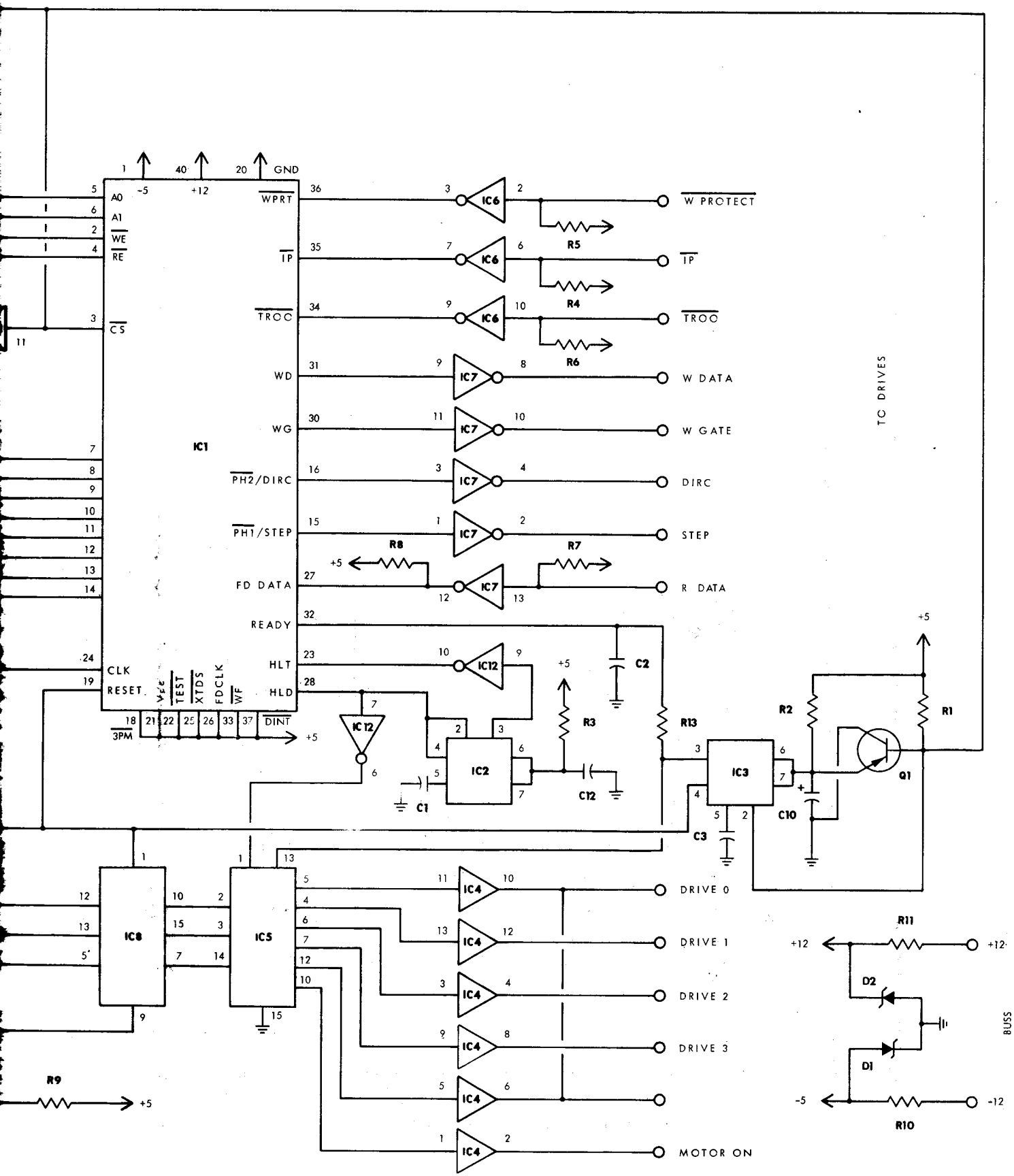

C3
C2
S1
C1
C4
B
A
B3
B2
B1
B4
A3
A2
A1
A4
J1 #4
J1 #3
J1 #2
J1 #1
+5 v
+12 v
G
A
B
D
C
E
G2
C3
PC BOARD
J0 #4
J0 #3
J0 #2
J0 #1
F
G3
+5 +5 +5
C4



MF-68 MINIFLOPPY DISK SYSTEM
WIRING PICTORIAL



Schematic - DC-1 Minifloppy Disk Controller



Schematic - DC-1 Minifloppy Disk Controller

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GIMIX 5/8 DISK CONTROLLER

The GIMIX 5/8 DISK CONTROLLER is a versatile floppy disk interface for use with both 6800 and 6809 systems on the SS-50 or SS-50C bus. The board physically occupies one slot of the 30 pin I/O bus.

FEATURES

* Hardware and software compatible with existing controllers (SWTP DC-1, DC-2, and DC-3)
* Controls up to four 5¼" drives in 6800 systems
* Controls any mix of 5¼" and 8" drives, up to four drives total in 6809 systems
* Provides for double headed drives
* Synchronous data separator for data reliability
* Designed to meet the data hold-time requirements for the 1771 floppy disk controller I.C.
* Gold Bus and Drive Cable Connectors

HARDWARE CONFIGURATION

The GIMIX 5/8 DISK CONTROLLER has several options which must be configured for proper operation in various applications.

Addressing Options

The board can be configured for use in systems with either 4 or 16 decoded addresses per I/O slot. To configure the board for 4 addresses per slot (6800 systems and certain 6809 systems) a 74LS138 should be installed at socket U-20 (see the component layout drawing) and socket U-19 should be empty. To configure the board for 16 addresses per I/O slot the 74LS138 should be installed at U-19 and U-20 should be empty. GIMIX 6809 systems use 16 addresses per slot and 6800 systems use 4.

If the board is being used to replace a SWTP DC-1, or DC-2, it should be configured for 4 addresses per slot. When the board is used to replace a SWTP DC-3 this option is equivalent to the RB/LB option of the DC-3. The 74LS138 should be installed at U-20 for RB systems (SWTP systems with the reset button on the right side of the cabinet) or at U-19 for LB systems (button on the left).

When the board is configured for 4 decoded addresses per I/O slot it in usually installed in I/O slot #6, this is the normal configuration for 6800 systems and 6809 systems with converted SWTP motherboards. Since the controller actually requires 5 addresses the I/O select line from I/O slot #5 must be connected to the UD-3 line of the I/O bus.

On GIMIX 6800/6809 motherboards this connection can be made by setting a DIP-switch on the motherboard to the ON (CLOSED) position. (see the motherboard documentation) On other motherboards this connection is made by soldering a jumper wire between pins 1 and 30 of I/O slot #5. If the GIMIX 5/8 controller is being used to replace a SWTP DC-1,2,or 3 controller , that is installed in slot #6, this connection should already be made, as it is also required by the SWTP controllers.

When the board is configured for 16 decoded addresses per I/O slot it is usually installed at I/O slot #1. This is the standard location for use with the GMXBUG09 system monitor and GIMIX 6809 FLEX™ as well as SWTP 6809 systems with SWTP 6809 motherboards. When installed in this configuration the disk DIP-switch on GIMIX 6800/6809 motherboards should be OFF (OPEN) , no jumper is required on other mother boards.

The proper slot and address configuration for other disk operating systems should be determined from the documentation supplied with the software.

Ready Option Jumper (JA-3)

This option allows the controller to generate a pseudo-ready signal for drives that do not have a ready output. This allows the software to check for "drive ready" and can be used to prevent the system from locking up if a disk operation is attempted on a drive that has no disk or has its door open. This option should only be enabled if the disk operating system is capabable of using this feature. **GIMIX 6809 FLEX™ for the 5/8 controller uses this feature and it should be enabled if GIMIX FLEX™ is being used and the drive select with motor-on option is selected.**(see the drive select option section) This feature can also be enabled when using SWTP 6809 FLEX™ versions 2.6 and above if the drive select with motor-on option is also selected. This option is equivalent to the 00/09 option on the SWTP DC-3 controller. The ready option should be disabled when the controller is used in 6800 systems.

Drive Select Option Jumper (JA-4)

This option enables the drive select outputs of the controller either when the motor-on line is active (drive motors on) or only when the head load output of the 1771 is active. In the drive select with motor on position (Fig. 6 of the jumper configuration drawing) the drive select outputs are active whenever the motors are on. This configuration is prefered when double headed drives are used, as it limits the number of times the heads are loaded. In the drive select with head load position (Fig. 5 of the jumper configuration drawing) the drive select outputs are only active when the head load output of the 1771 floppy disk controller I.C. is active. This configuration should be selected when the controller is used with single headed drives.

When using the GIMIX 5/8 DISK CONTROLLER with GIMIX 6809 FLEX™ either drive select with head load or drive select with motor-on may be selected. If the drive select with head load option is selected the Ready Option (JA-3) must be disabled.

When the GIMIX 5/8 DISK CONTROLLER is used as a replacement for the SWTP DC-1,2,or 3 controllers either position can be used, however if the drive select with head load option is chosen and the SWTP bootstrap loaders are being used, it is necessary to wait 10 to 12 seconds after a system reset before attempting to boot the disk system. This is only necessary when using the SWTP bootstap loaders and the wait is not required when using GIMIX bootstrap loaders. When the drive select with head load option is selected, for use with SWTP FLEX™, the ready option (JA-3) must be disabled. NOTE: This option has no equivalent on the SWTP controllers. The SWTP DC-1 and DC-2 controllers are fixed in the drive select with head load configuration. The SWTP DC-3 controller is fixed in the drive select with motor-on configuration.

5¼" or 8" drive option (S 1)

The GIMIX 5/8 DISK CONTROLLER allows the use of both 5¼" and 8" disk drives on the same controller in 6809 systems. A total of 4 drives can be connected to one controller in any combination of 5¼" and 8". DIP-switch S1 must be set to indicate which type drive is connected to each of the 4 possible drive positions, Drive 0,1,2,and 3. DIP-switch S1 position 1 (S1-1) corresponds to drive 0, S1-2 to Drive 1, etc. To configure the controller for a 5¼" drive in a particular position the corresponding DIP-switch section should be OFF (OPEN). For 8" drives the corresponding section of S1 should be ON (CLOSED) For example if 4 drives are to be connected to the controller with two 5¼" drives as drives 0 and 1 and two 8" drives as drives 2 and 3 DIP-switch S1-1 and S1-2 would be OFF(OPEN)

NOTE: Separate 34 and 50 pin connectors for 5¼" and 8" drives respectively are provided at the top of the board. The drives themselves must be programmed (see the manufacturers documentation for information on how to program the drives you have) to respond at the proper drive position.

The use of 8" drives with the GIMIX 5/8 DISK CONTROLLER requires that the disk operating system support 8" disks. The GIMIX 6809 FLEX™ operating system fully supports the use of 8" drives with this controller.

Some versions of the GIMIX 5/8 DISK controller do not support the use of 8" drives.

Motor On Delay option (JA-1 and JA-2)

The controller includes a motor-on delay circuit to allow the drive motors to come up to speed before disk operations are attempted. This option is factory jumpered for **delay enabled**. If the controller is to be used exclusively with drives that do not have motor control, i.e. the drive motors run at all times, then this option may be disabled by changing the soldered jumpers at JA-1 and JA-2 (see the jumper configuration drawing) to the no motor-on delay position (Fig. 12). Changing to no delay will speed up disk operations on these systems.

Interrupt Option Jumper (JA-5)

This jumper allows the interrupt outputs of the 1771 to be connected to the interrupt lines on the 30 pin I/O bus. Unless required by the operating system being used the interrupt jumpers should be in the no interrupts enabled position (Fig. 8 of the jumper configuration drawing). The GIMIX 6809 FLEX™ operating system as well as other vendors versions of FLEX™ do not require interrupts and they should be disabled. Consult the software vendors documentation for the interrupt requirements of other disk operating systems.

CPU Clock Speed

In 6800 systems the allowable maximum CPU clock speed for proper operation of the disk controller is 1Mhz. This restriction is due to the bus timing requirements of the 1771 floppy controller I.C. Proper operation of the board is not guaranteed at CPU speeds above 1 Mhz. on 6800 systems.

Operation at CPU clock speeds greater than 1 Mhz. is possible in 6809 systems if the motherboard has provisions for generating a slow I/O signal. GIMIX 6800/6809 motherboards have these provisions and in order to use the board at speeds above 1 Mhz. the slow I/O circuit on the mother board must be enabled. (see the GIMIX 6800/6809 MOTHERBOARD documentation)

Proper operation at CPU speeds above 1Mhz. also requires that the disk operating system be capable of running at the higher speed. The GIMIX 6809 FLEX™ is capable of running at CPU speeds up to 2 Mhz.

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GIMIX 5/8 DISK CONTROLLER

QUICK REFERENCE CONFIGURATION CHART

CONIGURATION	ADDRESSSING (74LS138 at U-19 or 20)	READY (JA-3)	DRIVE SEL (JA-4)	5or8 (S1)	INT (JA-5)
GIMIX FLEX™ 6809	U-19	Fig.2	Fig.6	*	Fig.8
GIMIX 6800	U-20	Fig.3	Fig.5	all off	#
SWTP DC-1	U-20	Fig.3	Fig.5	*	#
SWTP DC-2	U-20	Fig.3	Fig.5	*	#
SWTP DC-3	------ see note #1 below ------			*	#

* Depends on drives being used (SWTP DC-1,2,and 3 do not support 8" drives, 8" drives cannot be used on 6800 systems)

\# Depends on operating system (Fig. 8 no interrrupts for most operating systems including FLEX™)

1 Configuration for the SWTP DC-3 depends on how the DC-3 would be configured for a particular system, see the complete GIMIX 5/8 DISK CONTROLLER manual.

This chart is intended as a quick reference and does not cover all the possible configurations. See complete manual for more information on other possible configurations.

Addressing is done by installing the 74LS138 at either U-19 or U-20, the other socket should be empty. This sets the board for 16 or 4 addresses per slot respectively. At 16 addresses the board is normally installed in I/O slot #1. At 4 addresses the board is normally installed at I/O slot #6.
When installed in slot #6 at 4 addresses the disk switch on GIMIX 6800/6809 motherboards must be on, other motherboards require a jumper (see the complete manual for jumper details)

JUMPER AREA JA-3

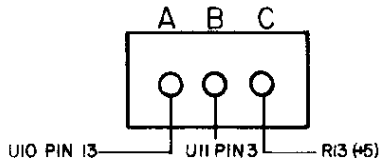

FIGURE 1: READY OPTION GENERATOR

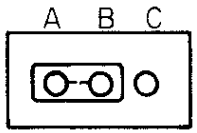

FIGURE 2: READY GENERATOR ENABLED

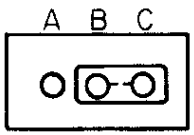

FIGURE 3: READY GENERATOR DISABLED

JUMPER AREA JA-6

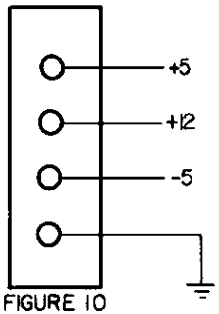

FIGURE 10
VOLTAGE TEST JACK

JUMPER AREA JA-4

FIGURE 4: DRIVE SELECT OPTIONS

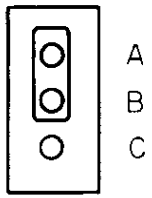

FIGURE 5: DRIVE SELECT WITH HEAD LOAD

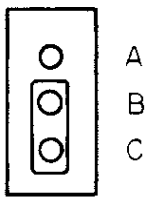

FIGURE 6: DRIVE SELECT WITH MOTOR ON

JUMPER AREAS JA-1 & JA-2
SOLDER PADS

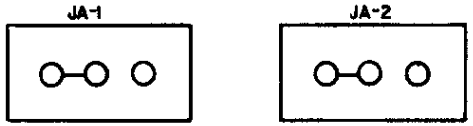

FIGURE 11:
MOTOR ON DELAY (FACTORY JUMPERED)

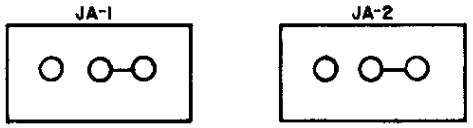

FIGURE 12:
NO MOTOR ON DELAY

JUMPER AREA JA-5

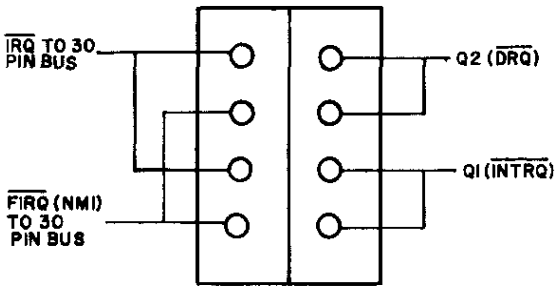

FIGURE 7: INTERRUPT OPTION JUMPERS

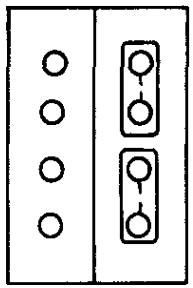

FIGURE 8: NO INTERRUPTS ENABLED

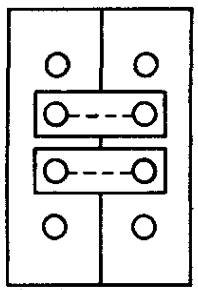

FIGURE 9: DRQ GENERATES FIRQ (NMI)
INTRQ GENERATES IRQ

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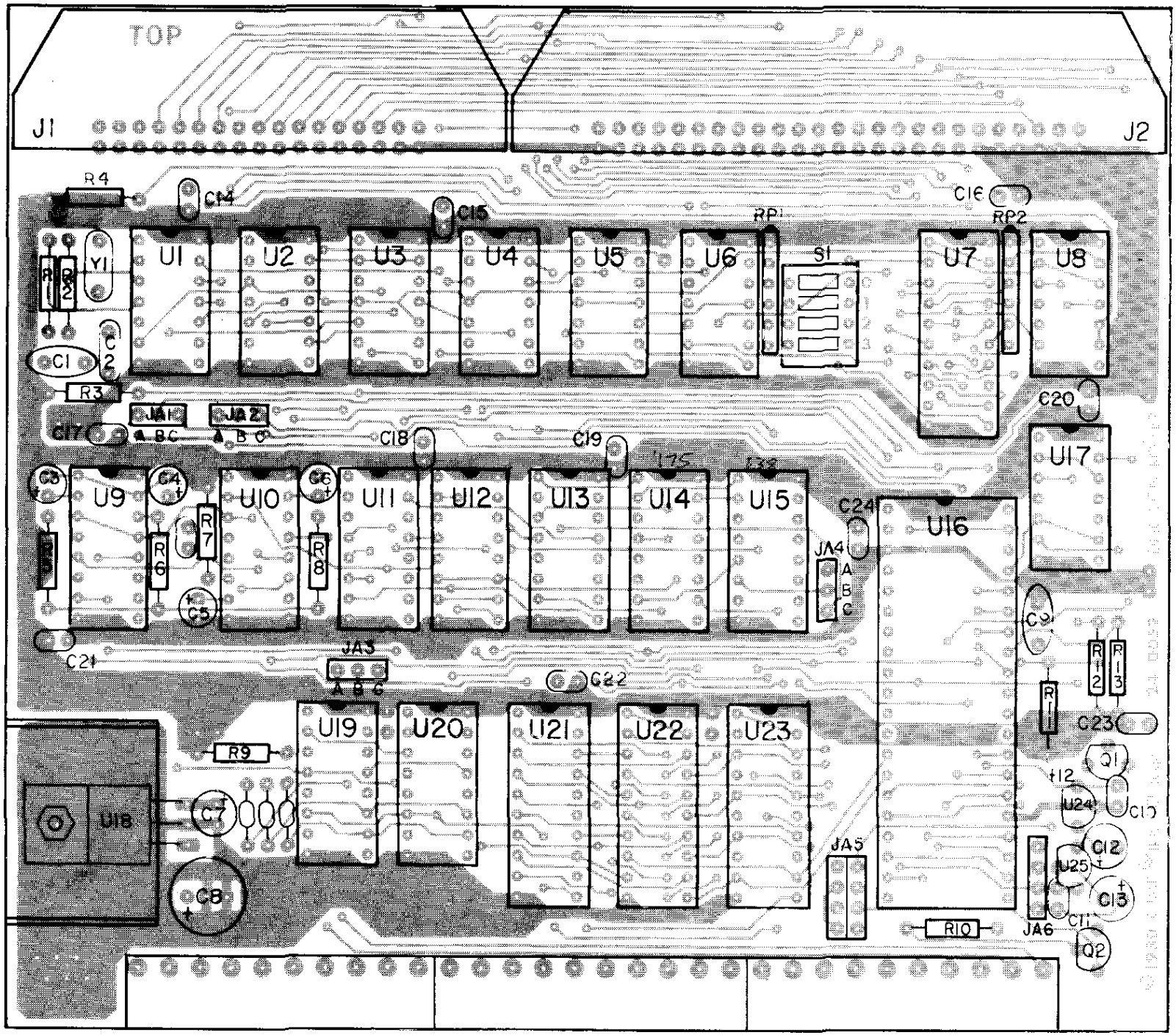
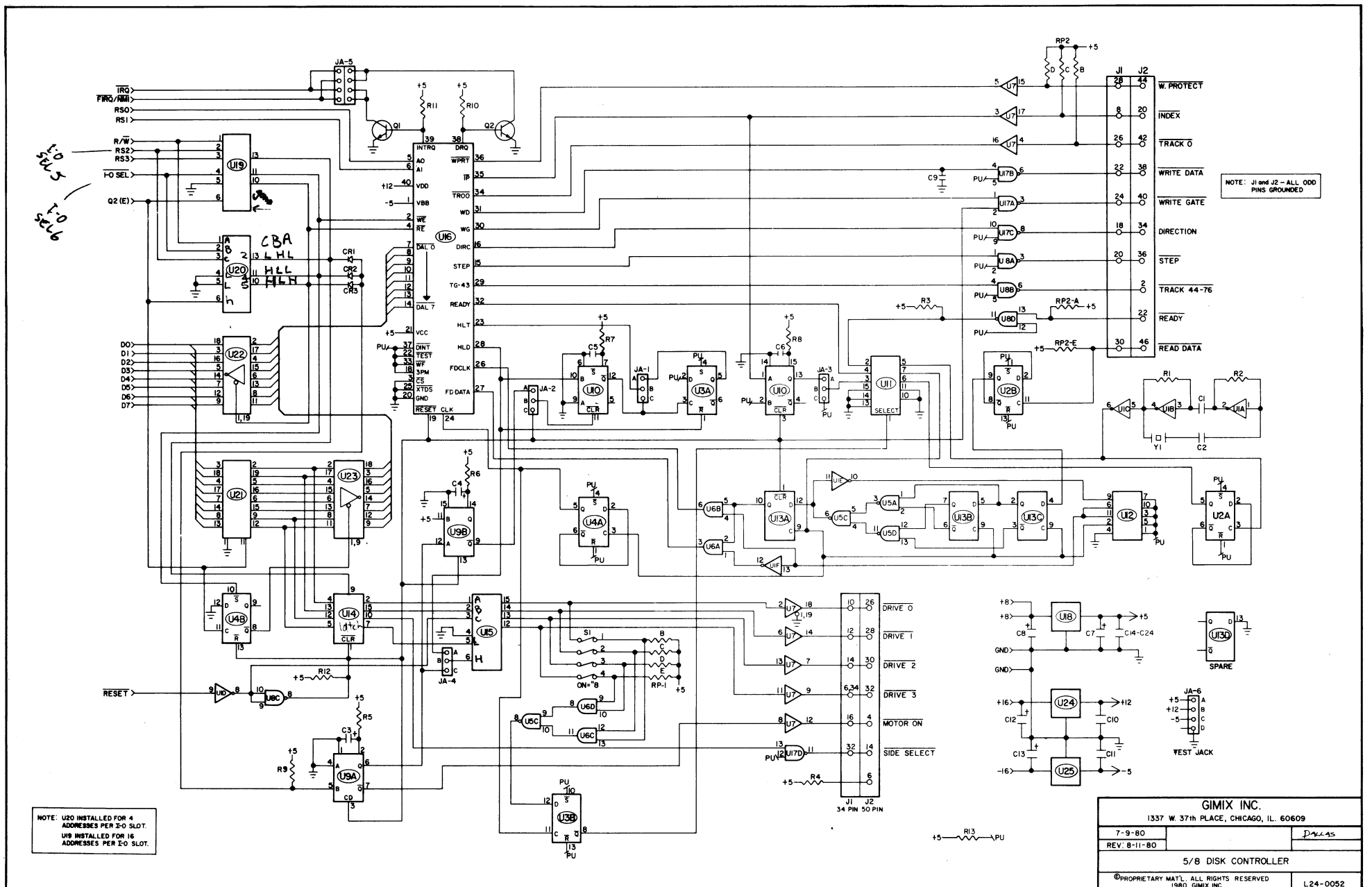
12-15-80		
5/8 DISK CONTROLLER		
JUMPER OPTIONS		C24-0052



COMPONENT LAYOUT


GIMIX INC.
1337 W. 37th PLACE, CHICAGO, IL. 60609
7-9-80
REV: 8-11-80
Douglas
5/8 DISK CONTROLLER
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L24-0052
NOTE: U20 INSTALLED FOR 4 ADDRESSES PER I-O SLOT.
U19 INSTALLED FOR 16 ADDRESSES PER I-O SLOT.
NOTE: J1 and J2 - ALL ODD PINS GROUNDED
W. PROTECT
INDEX
TRACK 0
WRITE DATA
WRITE GATE
DIRECTION
STEP
TRACK 44-76
READY
READ DATA
DRIVE 0
DRIVE 1
DRIVE 2
DRIVE 3
MOTOR ON
SIDE SELECT
34 PIN 50 PIN
SPARE
TEST JACK
I-O SLOT 5
I-O SLOT 6
CBA
HLL
HLH

```
                ********************************************
                *                                          *
                *     GIMIX 6809 RELOCATABLE DISK BOOT     *
                *    ----------------------------------    *
                *    FOR GIMIX PROGRAMMED I/O AND SWTPC    *
                *      DC-1, DC-2 & DC-3 CONTROLLERS       *
                *    ----------------------------------    *
                *              Michael H. Katz             *
                *                                          *
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                *             Chicago, Illinois  60609     *
                *             (312) 927-5510               *
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                *                                          *
                ********************************************
                *
                *  EQUATES FOR DISK BOARD
                *
           E014 PORT    EQU  ' $E014     BASE ADDRESS OF CONTROLLER (PORT 5)
                *                        PORT ONE AT SIXTEEN BYTES
                *                        PER I/O SLOT
           E014 DRVREG  EQU    PORT      CONTROLLER DRIVE SELECT REGISTER
           E018 COMREG  EQU    PORT+4    FDC COMMAND/STATUS REGISTER
           E01A SECREG  EQU    PORT+6    FDC SECTOR REGISTER
           E01B DATREG  EQU    PORT+7    FDC DATA REGISTER
                *
                *  GMXBUG-09 ENTRY POINTS
                *
           F806 INCHE   EQU    $F806     INPUT W/ECHO
           F810 PSTRNG  EQU    $F810     PRINT STRING
                *
F000                    ORG    $F000
                *
                *  START OF DISK BOOT
                *
F000 10CE DFFF  BOOT    LDS    #$DFFF    MOVE STACK
F004 34   08            PSHS   DP        PRESERVE DP-REGISTER
F006 86   E0            LDA    #$E0      PAGE OF I/O
F008 1F   8B            TFR    A,DP      SET UP DP-REGISTER
F00A 0F   14            CLR    <DRVREG   START MOTOR AND SELECT DRIVE ZERO
F00C 86   D0            LDA    #$D0      CODE FOR CLEAR INTERRUPT
F00E 97   18            STA    <COMREG   GIVE IT TO FDC
F010 8D   6F            BSR    CHKRDY    WAIT FOR READY
F012 86   03            LDA    #$3       STEP OUT THREE (3) STEPS
F014 34   02            PSHS   A         PUT ON STACK
F016 86   5B    BOOTA   LDA    #$5B      STEP IN
F018 97   18            STA    <COMREG   GIVE TO CONTROLLER
F01A 8D   65            BSR    CHKRDY    WAIT FOR READY
F01C 6A   E4            DEC    0,S       DECREMENT COUNTER
F01E 26   F6            BNE    BOOTA     LOOP TILL THREE STEPS DONE
```

```
F020 32 61          LEAS  1,S        ADJUST STACK
F022 86 0B          LDA   #$0B       HOME AT 40ms PER STEPPING PULSE,
                    *                LOAD HEAD
F024 97 18          STA   <COMREG    GIVE TO FDC
                    *
                    *  DELAY TILL MOTORS UP TO SPEED.
                    *  DELAY IS 1,999,949 CYCLES LONG.
                    *
F026 8E 4009        LDX   #$4009     NUMBER OF TIMES THROUGH LOOP
F029 8D 5E  BOOT1   BSR   DELAY      DELAY FOR 114 CYCLES
F02B 30 1F          LEAX  -1,X       DECREMENT COUNTER
F02D 26 FA          BNE   BOOT1      LOOP TILL COUNTER DONE
F02F 8D 50          BSR   CHKRDY     WAIT FOR READY
F031 C5 40          BITB  #$40       READY?
F033 26 42          BNE   NOTRDY     IF NOT THEN ERROR ------>
F035 86 01          LDA   #$01       SET FOR SECTOR ONE
F037 97 1A          STA   <SECREG    TELL THE FDC
F039 C6 8C          LDB   #$8C       READ SINGLE RECORD, IBM FORMAT,
                    *                HLD, HLT AND 10 ms DELAY
F03B 8E C000        LDX   #$C000     ADDRESS TO LOAD FROM DISK
F03E D7 18          STB   <COMREG    GIVE COMMAND TO FDC
F040 8D 47          BSR   DELAY      GIVE IT TIME TO SETTLE
F042 D6 18  READ    LDB   <COMREG    GET STATUS
F044 C5 02          BITB  #$02       DATA REQUEST?
F046 26 0D          BNE   READ1      YES:  READ DATA
F048 C5 01          BITB  #$01       ARE WE BUSY?
F04A 26 F6          BNE   READ       YES:  WAIT FOR DRQ OR DONE FLAG
F04C C5 9C          BITB  #$9C       ANY ERRORS?
F04E 26 0B          BNE   ERROR      YES:  PRINT ERROR MESSAGE ------>
F050 35 08          PULS  DP         RESTORE DP REGISTER
F052 7E C000        JMP   $C000      NO:  FINISHED, JUMP TO NEXT BOOT ---> to next boot
F055 96 1B  READ1   LDA   <DATREG    READ BYTE FROM FDC
F057 A7 80          STA   0,X+       STORE IN MEMORY AND BUMP POINTER
F059 20 E7          BRA   READ       AND RE-ENTER READ LOOP
                    *
                    *  ERROR ROUTINE
                    *  CHECKS FOR DRIVES NOT READY
                    *  AND TELLS THE USER IF THAT IS
                    *  THE CASE.
                    *
F05B 2B 1A  ERROR   BMI   NOTRDY     IF NOT READY THEN PRINT MSG.
F05D 30 8D 002E ERROR1 LEAX ERRMSG,PCR POINT TO ERROR MESSAGE
F061 AD 9F F810     JSR   [PSTRNG]   PRINT IT
F065 AD 9F F806     JSR   [INCHE]    WAIT FOR CHARACTER
F069 35 08          PULS  DP         RESTORE DP-REGISTER
F06B 81 59          CMPA  #'Y        IS IT A 'Y'?
F06D 27 91          BEQ   BOOT       YES:  TRY AGAIN
F06F 81 4E          CMPA  #'N        IS IT AN 'N'?
F071 26 EA          BNE   ERROR1     RE-PROMPT IF NOT 'Y' OR 'N'
F073 6E 9F FFFE     JMP   [$FFFE]    YES:  GO BACK TO MONITOR THROUGH
                    *                HARDWARE RESET VECTOR
                    *
                    *  PRINT DRIVES NOT READY
                    *
```

```
F077 30   8D 002B  NOTRDY  LEAX   NRDYMS,PCR POINT TO MESSAGE
F07B AD   9F F810          JSR    [PSTRNG]  PRINT IT
F07F 20   DC               BRA    ERROR1    PRINT ERROR MESSAGE AND GOTO RE-TRY
                    *
                    *  THIS ROUTINE WAITS FOR THE
                    *  FDC TO FINISH EXECUTING
                    *  THE CURRENT COMMAND.
                    *
F081 8D   06       CHKRDY  BSR    DELAY     DELAY FOR 114 CYCLES
F083 D6   18       CKRDY1  LDB    <COMREG   GET STATUS FROM 1771
F085 57                    ASRB             BUSY?
F086 25   FB              BCS    CKRDY1    YES:  WAIT TILL DONE
F088 39                    RTS
                    *
                    *  THIS DELAYS FOR EXACTLY 114
                    *  MACHINE CYCLES INCLUDING THE
                    *  THE BSR AND RTS.  THE NUMBER
                    *  OF CYCLES FOR EACH INSTRUCTION
                    *  IS IN PARENTHESIS.
                    *
                    *  THE BSR TAKE SEVEN (7) CYCLES
                    *
F089 C6   14       DELAY   LDB    #20       NUMBER 5 CYCLE LOOPS (2)
F08B 5A            DELAY1  DECB             DECRIMENT COUNTER (2)
F08C 26   FD               BNE    DELAY1    LOOP TILL DONE (3)
F08E 39                    RTS              RETURN TO CALLING PROGRAM (5)
                    *
                    *  ERROR MESSAGES
                    *
F08F 45 52 52 4F   ERRMSG  FCC    /ERROR IN BOOT, RE-TRY?/
F0A5 04                    FCB    $04
F0A6 4E 4F 54 20   NRDYMS  FCC    /NOT READY/
F0AF 04                    FCB    $04
                           END    BOOT

0 ERROR(S) DETECTED
```

SYMBOL TABLE:

BOOT	F000	BOOT1	F029	BOOTA	F016	CHKRDY	F081	CKRDY1	F083
COMREG	E018	DATREG	E01B	DELAY	F089	DELAY1	F08B	DRVREG	E014
ERRMSG	F08F	ERROR	F05B	ERROR1	F05D	INCHE	F806	NOTRDY	F077
NRDYMS	F0A6	PORT	E014	PSTRNG	F810	READ	F042	READ1	F055
SECREG	E01A								

```
                ********************************************
                *                                          *
                *           GIMIX 6800 DISK BOOT           *
                *     ----------------------------------   *
                *       FOR SWTPC DC-1, DC-2, DC-3 AND     *
                *           GIMIX 5/8 CONTROLLERS          *
                *     ----------------------------------   *
                *              Michael H. Katz             *
                *                                          *
                *           Copyright (C) 1980 by          *
                *             GIMIX, Inc.                  *
                *             1337 West 37th Place         *
                *             Chicago, Illinois  60619     *
                *             (312) 927-5510               *
                *                                          *
                *           All rights reserved            *
                *                                          *
                ********************************************
                *
                *     EQUATES FOR DISK BOARD
                *
          8014  PORT    EQU   $8014     BASE ADDRESS OF CONTROLLER (PORT 5)
          8014  DRVREG  EQU   PORT      CONTROLLER DRIVE SELECT REGISTER
          8018  COMREG  EQU   PORT+4    1771 COMMAND/STATUS REGISTER
          801A  SECREG  EQU   PORT+6    1771 SECTOR REGISTER
          801B  DATREG  EQU   PORT+7    1771 DATA REGISTER
                *
                *  GMXBUG 3.0 ENTRY POINTS
                *
          E1AC  INEEE   EQU   $E1AC     INPUT W/ECHO
          E07E  PDATA1  EQU   $E07E     PRINT STRING
                *
                *  START OF DISK BOOT
                *
                        ORG   $EC00
EC00                    CLRA            DRIVE ZERO
EC00 4F       BOOT      STAA  DRVREG    SET DRIVE REGISTER
EC01 B7 8014            LDAA  #$D0      CODE FOR FORCE IMMEDIATE INTERRUPT
EC04 86 D0              STAA  COMREG    GIVE IT TO 1771
EC06 B7 8018            BSR   CHKRDY    WAIT FOR READY
EC09 8D 62              LDAA  COMREG    START MOTOR
EC0B B6 8018            LDAA  #$0B      HOME AT 40ms PER STEP & LOAD HEAD
EC0E 86 0B              STAA  COMREG    GIVE TO 1771
EC10 B7 8018            BSR   DELAY     WAIT FOR CHIP TO ACCEPT COMMAND
EC13 8D 60              BSR   CHKRDY    WAIT FOR READY
EC15 8D 56              CLR   SECREG    TELL THE 1771 THAT WE WANT SECTOR 0
EC17 7F 801A            BSR   DELAY     GIVE IT TIME TO ACCEPT INFO
EC1A 8D 59              LDAB  #$8C      READ SINGLE SEC.,10ms DELAY, IBM FORMAT
EC1C C6 8C              *               AND HEAD LOAD
                        STAB  COMREG    GIVE TO 1771
EC1E F7 8018            BSR   DELAY     GIVE IT TIME TO SETTLE
EC21 8D 52              LDX   #$2400    ADDRESS TO LOAD FROM DISK
EC23 8E 2400            BITB  #$02      DATA REQUEST?
EC26 C5 02    READ
```

```
[illegible]8 27   07              BEQ    READ1     NO:  TEST FOR END
EC2A B6   801B                    LDAA   DATREG    YES:  READ DATA
EC2D A7   84                      STAA   0,X       STORE IT IN MEMORY
EC2F 30   01                      INX              BUMP POINTER
EC31 F6   8018      READ1         LDAB   COMREG    GET STATUS
EC34 C5   01                      BITB   #$01      ARE WE BUSY?
EC36 26   EE                      BNE    READ      YES:  WAIT FOR NEXT DRQ OR DONE FLAG
EC38 C5   1C                      BITB   #$1C      ANY ERRORS?
EC3A 26   03                      BNE    ERROR     YES:  PRINT ERROR MESSAGE
EC3C 7E   2400                    JMP    $2400     FINISHED, JUMP TO NEXT BOOT
EC3F 8E   EC53      ERROR         LDX    #ERRMSG   POINT TO MESSAGE RELATIVE
EC42 BD   E07E                    JSR    PDATA1    PRINT IT
EC45 BD   E1AC                    JSR    INEEE     WAIT FOR CHARACTER
EC48 81   59                      CMPA   #°Y       IS IT A °Y°?
EC4A 27   B4                      BEQ    BOOT      YES:  TRY AGAIN
EC4C 81   4E                      CMPA   #°N       IS IT AN °N°?
EC4E 26   EF                      BNE    ERROR     RE-PROMPT IF NOT °Y° OR °N°
EC50 7E   E0E3                    JMP    $E0E3     YES:  GO BACK TO GMXBUG-09
EC53 0D 0A          ERRMSG        FCB    $0D,$0A   CR/LF
EC55 45 52 52 4F                  FCC    /ERROR IN BOOT, RE-TRY? /
EC59 52 20 49 4E
EC5D 20 42 4F 4F
EC61 54 2C 20 52
EC65 45 2D 54 52
EC69 59 3F 20
[illegible]C 04                   FCB    $04
[illegible]6D F6    8018      CHKRDY    LDAB   COMREG    GET STATUS FROM 1771
EC70 C5   01                      BITB   #$01      BUSY?
EC72 26   F9                      BNE    CHKRDY    YES:  WAIT TILL DONE
EC74 39                           RTS
EC75 8D   00        DELAY         BSR    DELAY1
EC77 39             DELAY1        RTS
                                  END    BOOT
```

ERROR(S) DETECTED

YMBOL TABLE:

```
OOT    EC00   CHKRDY EC6D   COMREG 8018   DATREG 801B   DELAY  EC75
ELAY1  EC77   DRVREG 8014   ERRMSG EC53   ERROR  EC3F   INEEE  E1AC
DATA1  E07E   PORT   8014   READ   EC26   READ1  EC31   SECREG 801A
```

Dec 30/82

Disk Controller (GIMIX) Options

works 6800 system

JA1 - soldered A-B
JA2 - soldered A-B

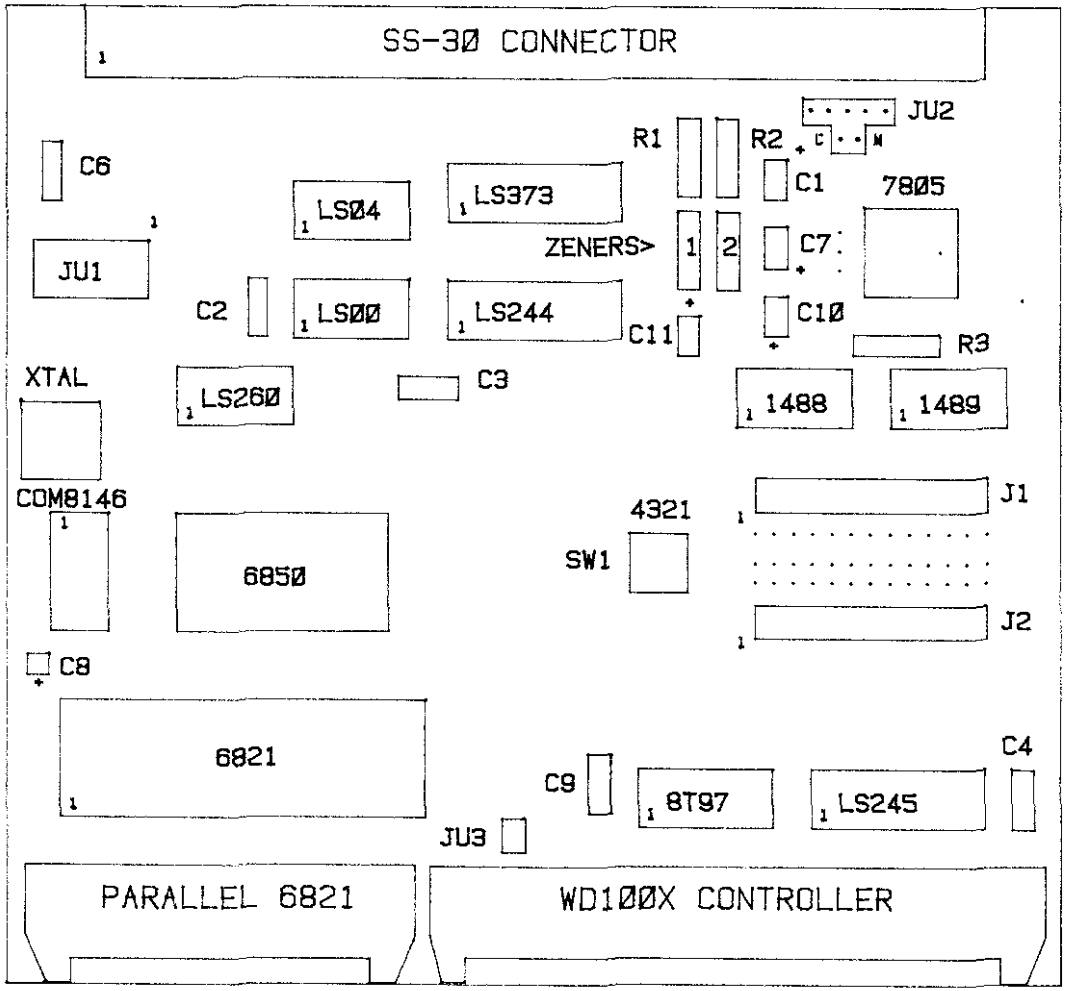
JA3 - jumpered B-C - ready generator disabled
JA4 - jumpered B-C - drive select with motor on
JA5 - no interrupts enabled
JA6 - no connection - voltage test jack

6809 -

try JA3 - jumpered A-B ready generator enabled.
all others the same.
(this will not work 6800 version -

ZEFF ADVANCED PRODUCTS

WINCHESTER I/O, SERIAL & PARALLEL INTERFACE WSP-30



RS232 CLOCK SELECTION SWITCH

SWITCH 1 2 3 4 (SW1)

Ø Ø Ø 1 TRANSMIT & RECEIVE CLOCKS ARE BOTH SUPPLIED BY THE ON BOARD BAUD GEN. THIS CLOCK IS ALSO SUPPLIED TO THE SS-3Ø BAUD LINES. (VIA JU2)

Ø Ø 1 Ø THE TRANSMIT CLOCK IS SUPLLIED BY THE ON BOARD BAUD GEN AND IS ALSO SUPPLIED TO THE SS-3Ø BAUD LINES. THE RECEIVE CLOCK IS SUPLLIED BY THE REMOTE RS232 DEVICE.

Ø 1 Ø 1 THE TRANSMIT & RECEIVE CLOCKS ARE SUPLLIED BY THE ON BOARD BAUD GEN.

Ø 1 1 Ø THE TRANSMIT CLOCK IS SUPLLIED BY THE ON BOARD BAUD GEN AND THE RECEIVE CLOCK IS SUPPLIED BY THE EXTERNAL RS232 DEVICE.

1 Ø Ø 1 THE TRANSMIT & RECEIVE CLOCKS ARE SUPPLIED BY THE SS-3Ø LINES.

1 Ø 1 Ø THE TRANSMIT CLOCK IS SUPPLIED BY THE SS-3Ø BAUD LINES & THE RECEIVE CLOCK IS SUPPLIED BY THE REMOTE RS232 DEVICE.

JUMPER & CONNECTORS CONFIGURATION

JU1- INTERRUPT SELECTOR JUMPERS- SEE SCHEMATIC FOR DETAILS.

JU2- MEMORY STRETCH (DESIGNATED BY "M" ON JU2) JUMPER TO AN UNUSED BAUD LINE. (SUCH AS THE 15Ø BAUD LINE) THIS BAUD LINE MUST BE CONNECTED TO MRDY ON THE SS-5Ø BUS. THE ON BOARD BAUD GEN CLOCK OUTPUT MAY BE JUMPERED TO A SS-3Ø BAUD LINE VIA "C" ON JU2.

JU3- THIS JUMPER CONNECTS THE -12 VOLT SUPPLY TO THE WD1ØØØ IF NEEDED. IF YOU ARE USING THE WD1ØØ1, DO NOT MAKE THIS CONNECTION.

J2- RS232 OUTPUT. CONNECT A RIBBON TO AN I.D.C. (INSULATION DISPLACEMENT CONNECTOR) WITH THE OTHER END TO A 25 PIN D CONNECTOR. JUMPER J2 (SEE SCHEMATIC) PER YOUR RS232 REQUIREMENTS.

J3- WINCHESTER INTERFACE CONNECTOR. CONNECT TO YOUR WD1ØØX CONTROLLER. IF YOU WISH TO SUPPLY -12V TO THE WD1ØØØ, JUMPER JU3.

J4- 6821 I/O. SEE SCHEMATIC FOR PIN-OUT. +5 VOLTS IS SUPPLIED ON PINS 2,3 & GROUND IS SUPPLIED BY PINS 1,2,25 & 26. DO NOT EXCEED 2ØØMA ON THE +5 VOLT SUPPLY.

NOTE THAT ALTHOUGH THE COM8146 BAUD RATE GENERATOR DOES NOT NORMALLY MEET 2 MHZ TIMING REQUIREMENTS, PROPER 2 MHZ TIMING IS OBTAINED BY A 74LS373 LATCH.

PARTS LIST- WINCHESTER I/O, SERIAL & PARALLEL INTERFACE

U1 74LS245
U2 8T97 OR 74LS367
U3 6821
U4 6850
U5 COM8146 BAUD GEN
U6 74LS260
U7 74LS00
U8 74LS04
U10 74LS373
U11 74LS240
VR1 7805T +5 REG

R1-R2 100 OHM
R3 1.8K
C1-C3 .1 UFD
C4-C8 10 UFD/35V
C9-C10 .1 UFD
XTAL 5.0688 MHZ
SW1 4 POSITION DIP
J2 26 PIN HEADER
Z1-2 12V,.5 WATT ZENER
J3 50 PIN HEADER
J4 26 PIN HEADER

NOTE:
IF YOUR BUSS USES REGULATED +/- 12V
DO NOT INSTALL ZENERS 1 & 2.

COM8146 BAUD GEN- (ADDRESS XXX0 OR XXX1)
THE BAUD RATE FOR THE 6850 CAN BE
OBTAINED FROM THE ON BOARD BAUD
RATE GENERATOR OR FROM THE BUSS.
THIS BOARD MAY ALSO SUPPLY THE
BAUD RATE TO THE BUSS- SEE THE
SW1 SETTING CHART.

6850 ACIA- (ADDRESS XXX2-3)
JUMPER J2 PER YOUR I/O REQUIREMENTS.
(SEE SCHEMATIC)

6821 PIA- (ADDRESS XXX4-7) THE I/O FROM THIS DEVICE IS AVAILABLE ON THE 26 PIN HEADER J4. THIS CONNECTOR ALSO SUPPLIES +5 (PINS 3 & 4) AND GROUND (PINS 1,2,25 & 26) SEE THE SCHEMATIC FOR PINOUT.

THE ADDRESS FOR THE PIA IS CONFIGURED SUCH THAT 16-BIT I/O IS POSSIBLE:

ADDRESS	REGISTER
XXX4	PIA/DDRA
XXX5	PIB/DDRB
XXX6	CRA
XXX7	CRB

NOTE THAT A "STD" OR "STX" INSTRUCTION WILL WRITE TO PA & PB.

WD100X CONNECTOR- (ADDRESS XXX8-F) J3- THIS CONNECTOR IS CONFIGURED FOR THE WD1000 OR WD1001 CONTROLLER. SEE THE SOFTWARE & SCHEMATIC FOR DESCRIPTION OF THIS CONNECTOR. NOTE THAT THE -12 VOLT SUPPLY CAN BE SUPPLIED TO THE CONTROLLER IF THE CONNECTION AT JU3 IS MADE. ALSO NOTE THAT THE WD100X REQUIRES MEMORY STRETCHING & IS NON-STANDARD ON THE SS-30 BUSS. THE MOTHER BOARD SHOULD HAVE A JUMPER INSTALLED BETWEEN MRDY & ONE OF THE SS-30 UNUSED BAUD LINES (WE SUGGEST THE 150 BAUD LINE). JU2 OF THE INTERFACE BOARD MAY BE CONFIGURED SO THAT MEMORY STRETCH IS CONNECTED TO THE UNUSED BAUD LINE.