MF - 68
DISK SYSTEM

219 W. Rhapsody, San Antonio, Texas 78216
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 computer's 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 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 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 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 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 #6-40 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 MΩ ½ 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 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 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 25060-1 or MINI 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 unlabeled 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 unlabeled 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 Ø.

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 1 1/2 inch 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 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.

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 C. 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 \( 0100 \) and again type G. If, after several tries, 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 doubt 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 \( 0 \) 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 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 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

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>4.7K Ω</td>
<td>1/4 watt resistor</td>
</tr>
<tr>
<td>R2</td>
<td>1M Ω</td>
<td></td>
</tr>
<tr>
<td>R3</td>
<td>750K Ω</td>
<td></td>
</tr>
<tr>
<td>R4</td>
<td>150 Ω</td>
<td></td>
</tr>
<tr>
<td>R5</td>
<td>150 Ω</td>
<td></td>
</tr>
<tr>
<td>R6</td>
<td>150 Ω</td>
<td></td>
</tr>
<tr>
<td>R7</td>
<td>150 Ω</td>
<td></td>
</tr>
<tr>
<td>R8</td>
<td>4.7K Ω</td>
<td></td>
</tr>
<tr>
<td>R9</td>
<td>4.7K Ω</td>
<td></td>
</tr>
<tr>
<td>R10</td>
<td>680 Ω</td>
<td></td>
</tr>
<tr>
<td>R11</td>
<td>100 Ω</td>
<td></td>
</tr>
<tr>
<td>R12</td>
<td>4.7M Ω</td>
<td></td>
</tr>
<tr>
<td>R13</td>
<td>1K Ω</td>
<td></td>
</tr>
</tbody>
</table>

Capacitors

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>0.01 µF</td>
<td>disc capacitor</td>
</tr>
<tr>
<td>C2</td>
<td>0.01 µF</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>0.01 µF</td>
<td></td>
</tr>
<tr>
<td>C4</td>
<td>0.1 µF</td>
<td></td>
</tr>
<tr>
<td>C5</td>
<td>0.1 µF</td>
<td></td>
</tr>
<tr>
<td>C6</td>
<td>20 pF</td>
<td></td>
</tr>
<tr>
<td>C7</td>
<td>0.1 µF</td>
<td></td>
</tr>
<tr>
<td>C8</td>
<td>100 µF @ 16 volt electrolytic capacitor</td>
<td></td>
</tr>
<tr>
<td>C9</td>
<td>0.1 µF</td>
<td>disc capacitor</td>
</tr>
<tr>
<td>C10</td>
<td>22 µF @ 6.3v tantalum capacitor</td>
<td></td>
</tr>
<tr>
<td>C11</td>
<td>0.1 µF</td>
<td>disc capacitor</td>
</tr>
<tr>
<td>C12</td>
<td>0.1 µF</td>
<td></td>
</tr>
</tbody>
</table>

Semiconductors

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>1N4733</td>
<td>5.1 V zener diode</td>
</tr>
<tr>
<td>D2</td>
<td>1N4742</td>
<td>12 V zener diode</td>
</tr>
<tr>
<td>Q1</td>
<td>SS 1122</td>
<td>silicon transistor</td>
</tr>
</tbody>
</table>
**Integrated Circuits**

<table>
<thead>
<tr>
<th>IC</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC1</td>
<td>1771</td>
<td>Disk controller (MOS)</td>
</tr>
<tr>
<td>IC2</td>
<td>555</td>
<td>timer</td>
</tr>
<tr>
<td>IC3</td>
<td>555</td>
<td>timer</td>
</tr>
<tr>
<td>IC4</td>
<td>7407</td>
<td>open collector hex buffer</td>
</tr>
<tr>
<td>IC5</td>
<td>74LS139</td>
<td>Dual 2 to 4 decoder</td>
</tr>
<tr>
<td>IC6</td>
<td>DM8097/74367</td>
<td>hex bus driver</td>
</tr>
<tr>
<td>IC7</td>
<td>7406</td>
<td>open collector hex inverter</td>
</tr>
<tr>
<td>IC8</td>
<td>74175</td>
<td>Quad D flip-flop</td>
</tr>
<tr>
<td>IC9</td>
<td>DM8835</td>
<td>Quad bi-directional transceiver</td>
</tr>
<tr>
<td>IC10</td>
<td>DM8835</td>
<td>&quot;</td>
</tr>
<tr>
<td>IC11</td>
<td>74LS00</td>
<td>Quad 2 input NAND gate</td>
</tr>
<tr>
<td>IC12</td>
<td>4049</td>
<td>(MOS) Hex inverter</td>
</tr>
<tr>
<td>IC13</td>
<td>7805</td>
<td>5 volt regulator</td>
</tr>
</tbody>
</table>

**Misc.**

| Y1   | 1 MHz | 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.

<table>
<thead>
<tr>
<th>CIRCUIT</th>
<th>Labor Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller board and cable</td>
<td>$16.00</td>
</tr>
<tr>
<td>Power supply</td>
<td>$10.00</td>
</tr>
<tr>
<td>Disk drives</td>
<td>Depends on individual drive</td>
</tr>
</tbody>
</table>

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
LIMITED WARRANTY

GIMIX Inc. ("GIMIX") warrants its products against defects in material and workmanship for a period of Ninety Days from the date of shipment. The obligation of GIMIX is limited to the repair or replacement of any product, free of all charges, which proves defective during this period. This warranty does not cover damage due to accidents, negligence, abuse, or tampering.

GIMIX MAKES NO OTHER WARRANTIES OR GUARANTEES, EXPRESS, STATUTORY, OR IMPLIED, OF ANY KIND WHATSOEVER WITH RESPECT TO ANY PRODUCT PURCHASED, AND ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS HEREBY DISCLAIMED BY GIMIX AND EXCLUDED FROM ANY AGREEMENT MADE BY GIMIX.

GIMIX will not be responsible for any damage of any kind not covered by the exclusive remedies set forth in this limited warranty. GIMIX will not be responsible for any special, indirect, or consequential damage caused by its products.

GIMIX products are not for consumer use. GIMIX expressly disclaims all warranties on any of its products which may be included in any product normally used for personal or family purposes.

Contact GIMIX by mail at 1337 West 37th Place Chicago, IL 60609; or phone at (312) 927-5510; if your product is defective to arrange for its repair or replacement under this warranty.
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 5½" drives in 6800 systems
* Controls any mix of 5½" 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 is 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 documentatio) 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 motherboards.

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 capable 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 preferred 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 bootstrap 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.

5½" or 8" drive option (S 1)

The GIMIX 5/8 DISK CONTROLLER allows the use of both 5½" 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 5½" 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 5½" 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 5½" 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 5½" 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.

FLEX™ is a registered trademark of TECHNICAL SYSTEMS CONSULTANTS
### GIMIX 5/8 DISK CONTROLLER

#### QUICK REFERENCE CONFIGURATION CHART

<table>
<thead>
<tr>
<th>CONFIGURATION</th>
<th>ADDRESSING</th>
<th>READY</th>
<th>DRIVE SEL</th>
<th>5or8</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>(74LS138 at U-19 or 20)</td>
<td>(JA-3)</td>
<td>(JA-4)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>GIMIX FLEX™ 6809</strong></th>
<th>U-19</th>
<th>Fig.2</th>
<th>Fig.6</th>
<th>*</th>
<th>Fig.8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GIMIX 6800</strong></td>
<td>U-20</td>
<td>Fig.3</td>
<td>Fig.5</td>
<td>off</td>
<td>#</td>
</tr>
<tr>
<td><strong>SWTP DC-1</strong></td>
<td>U-20</td>
<td>Fig.3</td>
<td>Fig.5</td>
<td>*</td>
<td>#</td>
</tr>
<tr>
<td><strong>SWTP DC-2</strong></td>
<td>U-20</td>
<td>Fig.3</td>
<td>Fig.5</td>
<td>*</td>
<td>#</td>
</tr>
<tr>
<td><strong>SWTP DC-3</strong></td>
<td>------</td>
<td>see note #1 below ------</td>
<td></td>
<td>*</td>
<td>#</td>
</tr>
</tbody>
</table>

* 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 interrupts 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)

FLEX™ is a registered trademark of TECHNICAL SYSTEMS CONSULTANTS
GIMIX 6809 RELOCATABLE DISK BOOT

FOR GIMIX PROGRAMMED I/O AND SWTPC
DC-1, DC-2 & DC-3 CONTROLLERS

Michael H. Katz

Copyright (C) 1980 by
GIMIX, Inc.
1337 West 37th Place
Chicago, Illinois 60609
(312) 927-5510

All rights reserved

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 PSTRING 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 OF 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 O,S
DECREMENT COUNTER

F01E 26 F6
BNE BOOTA
LOOP TILL THREE STEPS DONE
PROGRAMMED I/O DISK BOOT

5-12-81 GIMIX, INC PAGE 2

F020 32 61 LEAS 1,S ADJUST STACK
   LDA #$0B HOME AT 40ms PER STEPPING PULSE, LOAD HEAD
   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
   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
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 [ERROR] LEAX ERMESG,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 CMPA #Y IS IT A 'Y'?
F06B 81 59 CMPA #N IS IT AN 'N'?
F06D 27 91 BEQ [BOOT] YES: TRY AGAIN
F06F 81 4E CMPA #N RE-PROMPT IF NOT 'Y' OR 'N'
F071 26 EA BNE ERROR1 YES: GO BACK TO MONITOR THROUGH
F073 6E 9F FFFE JMP [$FFFFE] HARDWARE RESET VECTOR

* PRINT DRIVES NOT READY
PROGRAMMED I/O DISK BOOT

F077 30 8D 002B NOTRDY LEAX NRDMY,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 CKRDY 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
* 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 NRDMY FCC /NOT READY/
F0AF 04 FCB $04
END BOOT

0 ERROR(S) DETECTED
### SYMBOL TABLE:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOOT</td>
<td>F000</td>
</tr>
<tr>
<td>BOOT1</td>
<td>F029</td>
</tr>
<tr>
<td>BOOTA</td>
<td>F016</td>
</tr>
<tr>
<td>CHKRDY</td>
<td>F081</td>
</tr>
<tr>
<td>CHKRDY1</td>
<td>F083</td>
</tr>
<tr>
<td>COMREG</td>
<td>E018</td>
</tr>
<tr>
<td>DATREG</td>
<td>E01B</td>
</tr>
<tr>
<td>DELAY</td>
<td>F089</td>
</tr>
<tr>
<td>DELAY1</td>
<td>F088</td>
</tr>
<tr>
<td>DRVREG</td>
<td>E014</td>
</tr>
<tr>
<td>ERRMSG</td>
<td>F08F</td>
</tr>
<tr>
<td>ERROR</td>
<td>F05B</td>
</tr>
<tr>
<td>ERROR1</td>
<td>F05D</td>
</tr>
<tr>
<td>INCHE</td>
<td>F066</td>
</tr>
<tr>
<td>NOTRDY</td>
<td>F077</td>
</tr>
<tr>
<td>NRDYMS</td>
<td>F0A6</td>
</tr>
<tr>
<td>PORT</td>
<td>E014</td>
</tr>
<tr>
<td>PSTRNG</td>
<td>F810</td>
</tr>
<tr>
<td>READ</td>
<td>F042</td>
</tr>
<tr>
<td>READ1</td>
<td>F055</td>
</tr>
<tr>
<td>SECREG</td>
<td>E01A</td>
</tr>
</tbody>
</table>
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 INEE EQU $E1AC INPUT W/ECHO
E07E PDATA1 EQU $E07E PRINT STRING

START OF DISK BOOT

ORG $EC00

BOOT CLR

STAA DRVREG

LDAA #$D0

STAA COMREG

BSR CHKRDY

LDAA COMREG

STAA COMREG

LDAA #$0B

STAA COMREG

BSR DELAY

BSR CHRDY

CLR SECREG

BSR DELAY

LDAB #$8C

STAB COMREG

BSR DELAY

LDX #$2400

READ BITB #$02

DATA REQUEST?
ERROR(S) DETECTED

YMBOL TABLE:

OOT  EC00  CHKRDY  EC6D  COMREG  8018  DATREG  801B  DELAY  EC75
ELAY1 EC77  DRVREG  8014  ERRMSG  EC53  ERROR  EC3F  INEEE  EC1AC
DATA1 E07E  PORT  8014  READ  EC26  READ1  EC31  SECREG  801A
Deck Controller (61MIX) 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 prepared generator enabled
all others the same.
(this will not work 6800 version -)
RS232 CLOCK SELECTION SWITCH

SWITCH 1 2 3 4 (SW1)

0 0 0 1 TRANSMIT & RECEIVE CLOCKS ARE BOTH SUPPLIED BY THE ON BOARD BAUD GEN. THIS CLOCK IS ALSO SUPPLIED TO THE SS-30 BAUD LINES. (VIA JU2)

0 0 1 0 THE TRANSMIT CLOCK IS SUPPLIED BY THE ON BOARD BAUD GEN AND IS ALSO SUPPLIED TO THE SS-30 BAUD LINES. THE RECEIVE CLOCK IS SUPPLIED BY THE REMOTE RS232 DEVICE.

0 1 0 1 THE TRANSMIT & RECEIVE CLOCKS ARE SUPPLIED BY THE ON BOARD BAUD GEN.

0 1 1 0 THE TRANSMIT CLOCK IS SUPPLIED BY THE ON BOARD BAUD GEN AND THE RECEIVE CLOCK IS SUPPLIED BY THE EXTERNAL RS232 DEVICE.

1 0 0 1 THE TRANSMIT & RECEIVE CLOCKS ARE SUPPLIED BY THE SS-30 LINES.

1 0 1 0 THE TRANSMIT CLOCK IS SUPPLIED BY THE SS-30 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 150 BAUD LINE) THIS BAUD LINE MUST BE CONNECTED TO MRDY ON THE SS-50 BUS. THE ON BOARD BAUD GEN CLOCK OUTPUT MAY BE JUMPERED TO A SS-30 BAUD LINE VIA "C" ON JU2.

JU3- THIS JUMPER CONNECTS THE -12 VOLT SUPPLY TO THE WD1000 IF NEEDED. IF YOU ARE USING THE WD1001, 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 WD100X CONTROLLER. IF YOU WISH TO SUPPLY -12V TO THE WD1000, 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 200MA 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 ALS373 LATCH.
- U1 74LS245
- U2 8T97 OR 74LS367
- 6821
- 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 5.0668 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

DI00X CONNECTOR- (ADDRESS XXX8-F) J3- THIS CONNECTOR IS CONFIGURED
OR THE WD1000 OR WD1001 CONTROLLER. SEE THE SOFTWARE & SCHEMATIC
OR DESCRIPTION OF THIS CONNECTOR. NOTE THAT THE -12 VOLT SUPPLY
CAN BE SUPPLIED TO THE CONTROLLER IF THE CONNECTION AT JU3 IS MADE.
LSO NOTE THAT THE WD100X REQUIRE MEMORSTRETCHING & IS NON-STANDARD
THE SS-30 BUSS. THE MOTHER BOARD SHOULD HAVE A JUMPER INSTALLED
ETWEEN MRDY & ONE OF THE SS-30 UNUSED BAUD LINES (WE SUGGEST THE 150
AUD LINE). JU2 OF THE INTERFACE BOARD MAY BE CONFIGURED SO THAT
EMORY STRETCH IS CONNECTED TO THE UNUSED BAUD LINE.