PT-B3R

User's Manual

2024

Peripheral Technology

Last Revised 7/17/24

PT- B3R

The PT- B3R is a replacement board for the SWTPC MP-B3. The PT-B3R is a copy of the SWTPC MP-B3 but adds a baud rate generator in the unused space between slot 0 and the edge of the board. The PT-B3R can either use the onboard baud rate generator or can pass baud rates generated by the processor board. The addition of the baud rate generator allows the PT-B3R to be used with extended addressing so it can support 1MB memory boards. This would allow the PT-B3R to be used with UNI-Flex or OS9 Level 2. This board uses 16 addresses per IO slots and is a bolt-in for any SWTPC system that has a MP-B3 or MP-MB motherboard. This board will not fit the original SWTPC 6800 cabinet.

If you are looking for a motherboard for an SWTPC 6800 cabinet, look at PT-B2R. It is the equivalent of the PT-B3R except it can be configured to place the IO at 8000 or E000 and is a bolt-in for the SWTPC 6800 cabinet.

The SWTPC assembly instructions are included in this manual. Except for the addition of the baud rate generator there are no changes to the SWTPC design. Included is an additional schematic for the baud rate generator and an updated parts list.

Jumpers

For most systems use the jumper selection below.

Place a jumper on 56K-64K and on "0" on the 8x2 header strip. This puts IO at E000.

Place a jumper on NORMAL.

Don't install jumpers on the 5x2 header strip. This will feed baud rates from the motherboard to the IO slots.

Place a jumper on "LOW".

Use of Processor Board Baud Rates

Remove IC10 and install 5 shunts on the 5x2 header strip. This will feed the baud rates generated by the processor board to the IO cards. When using this configuration you may not use more than 64K of memory in the system.

Onboard Baud Rate Generator

Baud Rates:

Low	High
1200	4800
4800	19200
300	1200
9600	38400
110	1800

Note: If the 57600/110 jumper is set to 57600, both low or high setting will produce 57600 baud on the 110 baud line.

The position of the baud rates on the SS30 slots:

1200
4800
300
9600
110 or 57600
RESET
Select

The Select line is the one toward the middle of the board.

The SS30 line with these baud rates is marked on the silkscreen of the motherboard. The marking assumes the LOW/HIGH is in the low setting.

Parts List - - MP-B3R Motherboard

Integrated Circuits

__ IC1 74LS121
__ IC2 74LS32
__ IC3 74LS244
__ IC4 7805
__ IC5 74LS138
__ IC6 74LS138
__ IC7 74LS00
__ IC8 74LS640
__ IC9 MC14411P
__ IC10 74LS04

Resistors

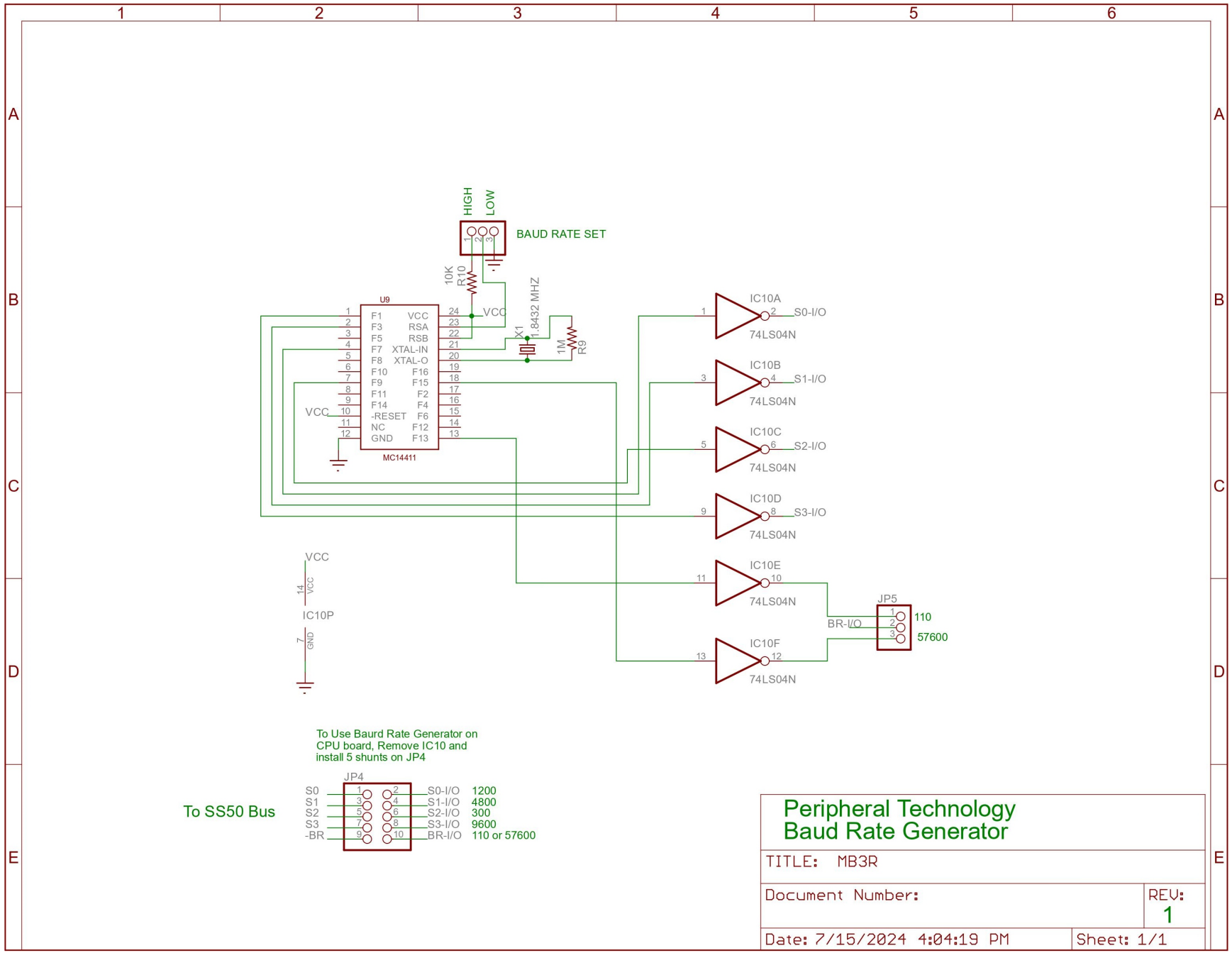
__ R1 4.7K 1/4W
__ R2 1K 1/4W
__ R3 4.7K 1/4W
__ R4 6.8K 1/4W
__ R5 6.8K 1/4W
__ R6 680 1/4W
__ R7 680 1/4W
__ R8 680 1/4W
__ R9 1M 1/4W
__ R10 10K 1/4W
__ TR1 680 10pin 9 Resistor
__ TR2 680 10pin 9 Resistor
__ TR3 680 10pin 9 Resistor
__ TR4 680 10pin 9 Resistor
__ TR5 680 10pin 9 Resistor
__ TR6 680 10pin 9 Resistor

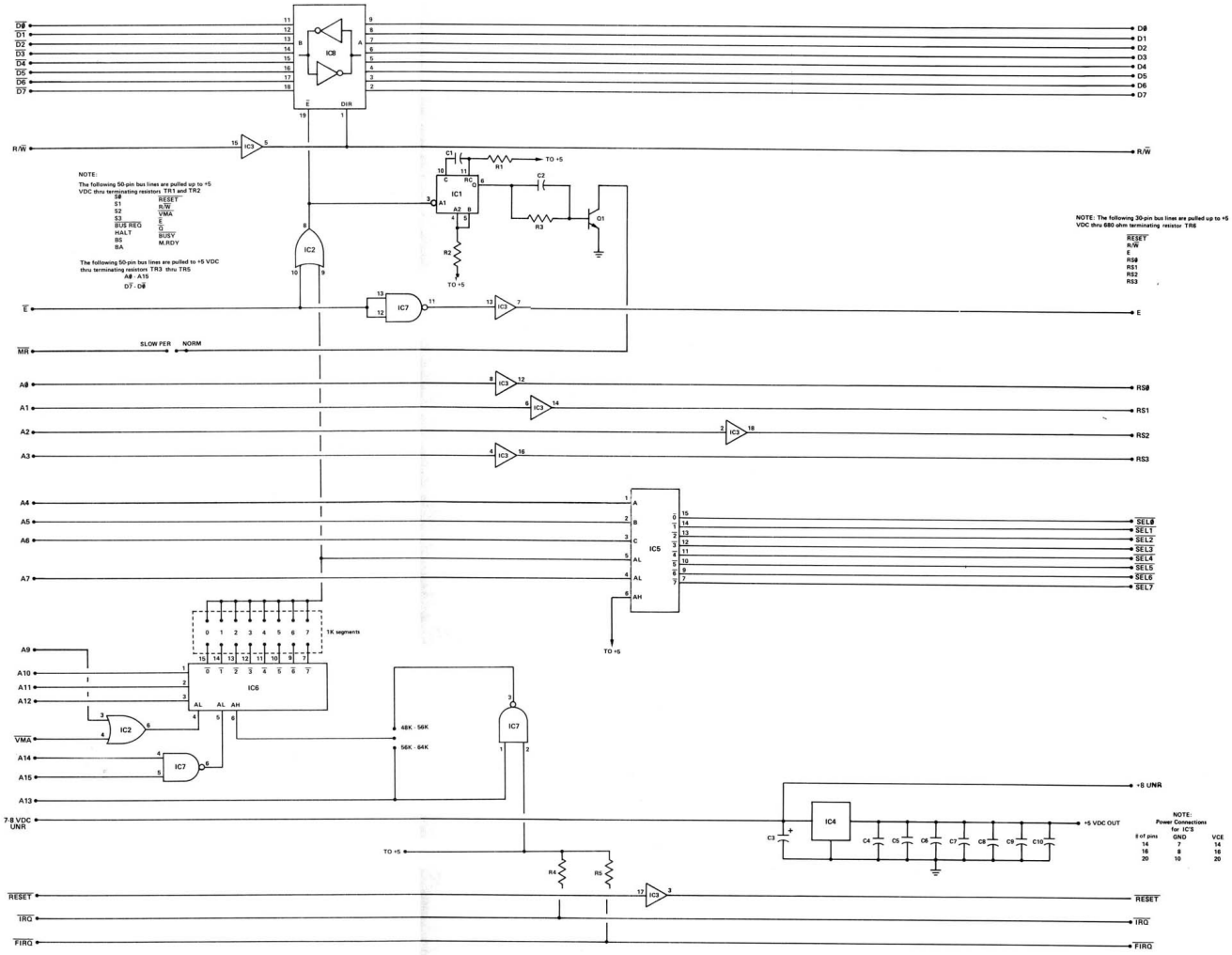
Capacitors

__ C1 220pF
__ C2 20pF
__ C3 100uF 16V
__ C4 0.1uF
__ C5 0.1uF
__ C6 0.1uF
__ C7 0.1uF
__ C8 0.1uF
__ C9 0.1uF
__ C10 0.1uF
__ C11 0.1uF

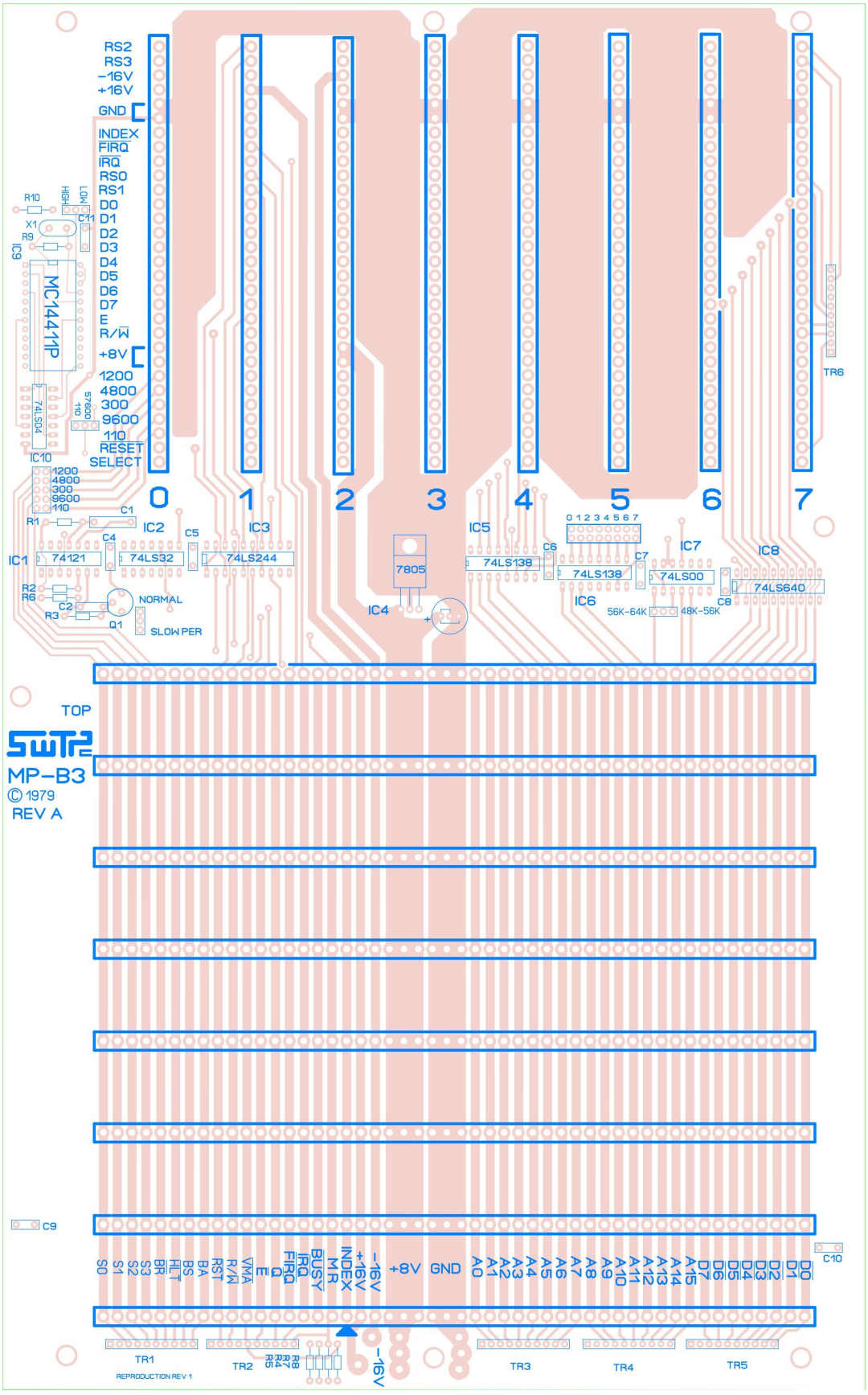
Miscellaneous

__ Q1 2N5210
__ X1 1.8432 MHZ Crystal
__ 5x2 Header
__ 8x2 Header
__ 4 3x1 Header
__ 5 Shunts
__ Medium Heat Sink
__ #4 screw, nut and washer
__ 64 Molex type connector - AMP TE Connectivity 1-640384-0


HIGH
LOW
BAUD RATE SET
10K
R10
VCC
X1
1.8432 MHZ
1M
R9
U9
F1
F3
F5
F7 XTAL-IN
F8 XTAL-O
F10
F9
F11
F14
-RESET
NC
GND
VCC
F16
F15
F2
F4
F6
F12
F13
MC14411
IC10A
S0-I/O
74LS04N
IC10B
S1-I/O
74LS04N
IC10C
S2-I/O
74LS04N
IC10D
S3-I/O
74LS04N
IC10E
74LS04N
IC10F
74LS04N
JP5
BR-I/O
110
57600
VCC
IC10P
To Use Baurd Rate Generator on
CPU board, Remove IC10 and
install 5 shunts on JP4
JP4
S0
S1
S2
S3
-BR
S0-I/O 1200
S1-I/O 4800
S2-I/O 300
S3-I/O 9600
BR-I/O 110 or 57600
To SS50 Bus
Peripheral Technology
Baud Rate Generator
TITLE: MB3R
Document Number:
REV: 1
Date: 7/15/2024 4:04:19 PM
Sheet: 1/1



Schematic MP-B3 Motherboard


RS2
RS3
-16V
+16V
GND
INDEX
FIRQ
IRQ
RS0
RS1
D0
D1
D2
D3
D4
D5
D6
D7
E
R/W
+8V
1200
4800
300
9600
110
RESET
SELECT
0
1
2
3
4
5
6
7
TR6
R10
HIGH
LOW
C11
X1
R9
IC9
MC14411P
74LS04
57600
110
IC10
1200
4800
300
9600
110
R1
C1
IC2
C4
C5
IC3
IC1
74121
74LS32
74LS244
R2
R6
C2
R3
Q1
NORMAL
SLOW PER
7805
IC4
IC5
74LS138
C6
0 1 2 3 4 5 6 7
74LS138
IC6
C7
74LS00
IC7
IC8
74LS640
C8
56K-64K
48K-56K
TOP
SWTPC
MP-B3
© 1979
REV A
C9
C10
S0
S1
S2
S3
BR
HLT
BS
BA
RST
R/W
VMA
E
Q
FIRQ
IRQ
BUSY
MR
INDEX
+16V
-16V
+8V
GND
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
D7
D6
D5
D4
D3
D2
D1
D0
TR1
TR2
TR3
TR4
TR5
-16V
REPRODUCTION REV 1

SWTPC Instructions from 1979

Assembly Instructions MP-B3 Motherboard

Introduction

The MP-B3 motherboard is a 9.1" x 15.1" double sided plated thru hole board onto which all of the various computer processor and interface boards are plugged. The motherboard also provides the line buffering and address decoding for up to eight interface boards. Although one of the eight must be the MP-S2 console interface (serial), the other seven may be any combination of serial (MP-S2) and parallel (MP-L2) interfaces the user may choose to have.

When the SWTPC 6809 computer is being assembled, work on only one board at a time. Each of the computer's boards and their associated parts must not be intermixed to avoid confusion during assembly.

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 one, 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. Be sure to orient all of the terminating resistor packages so the dot or "1" on the end of the package matches with the dot on the circuit 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. Then solder.

( ) Install all of the capacitors on the board. Be sure to orient the electrolytic capacitor properly. Then solder.

( ) Install each of the 64, 10-pin Molex male connectors, oriented so the shorter pinned side fits into the holes provided on the mother board. The 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 circuit board and that each pin extends completely into the holes on the circuit board. Not being careful here will cause the plug-on boards to be crooked. It is suggested that you solder only the two end pins of each of the 64 connectors until all have been installed at which time, if everything looks straight and rigid, you should solder the as yet unsoldered pins.

( ) Using a pair of wire cutters, cut off the "INDEX" pin on each of the eight main board (50-pin) and eight interface board (30-pin) male connector strips. Each row is pointed out by the word "INDEX" or "IND" printed right on the "TOP" side of the mother board. Be very careful when doing this. Do not cut off anything other than the "INDEX" pins. You cannot afford to make a mistake here. These "INDEX" locations prevent the various plug-on boards from being plugged on incorrectly later during assembly.

( ) Install each of the integrated circuits excluding IC4. As each one is installed make sure it is down firmly against the board and solder only two of the leads to hold the IC in place while the other IC's are being inserted. Be very careful to install each in its correct position. 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 or dot on the end of the package is used for orientation purposes and must match with the outlines shown on the component layout drawing for each of the IC's.
After inserting all of the integrated circuits go back and solder each of the as yet unsoldered pins.

( ) Cut off the center lead on integrated circuit IC4. Now install integrated circuit IC4 on the circuit board. This component must be oriented so its metal face is facing the circuit board with the small metal heat sink sandwiched between the two. The heat sink and IC are secured to the circuit board with a #4-40 x 3/8" screw, lock washer and nut. The two leads of the integrated circuit must be bent down into each of their respective holes and the heat sink must be oriented as shown in the component layout drawing. Solder.

( ) Install transistor Q1 on the circuit board. Orient the transistor as shown in the component layout drawing. Solder.

( ) Install the 16-pin header in the set of holes just above IC6 on the component layout drawing. Also install the two three-pin headers. The headers should be installed so the shorter pinned side goes into the board from the TOP side. Solder.

( ) Working from the "TOP" side of the circuit board, fill in all of the feed-thru's with molten solder. The feed-thru's are those unused holes on the board whose internal plating connects the "TOP" and "BOTTOM" circuit connections. Filling these feed-thru's with molten solder guarantees the integrity of the connections and increases the current handling capability. Do not fill in the holes on the edge of the board that are to be used for wiring connections.

( ) 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.

This completes the assembly phase for the MP-B3 board. Program the jumper blocks as outlined in the section below. Checkout instructions for the board are provided with the System Checkout Instructions supplied with this kit. The System Checkout Instructions are used after having assembled the
MP-09 Processor Board, MP-B3 Mother Board, MP-S2 Serial Interface, and MP-P2 Power Supply.

Programming the Jumper Blocks

Programmable jumper blocks allow the interface boards to be decoded in the lower 512 bytes of any 1K segment in memory from 48K thru 64K. The 48K/56K jumper determines into which of the two 8K segments is to be decoded. The 0-7 jumper determines which 1K segment above the 48/56K base is to be decoded. For proper operation with the SBUG-E monitor ROM on the MP-09 processor board, program the jumper blocks for 56K - 64K and 0. This will locate the decoding at E000 or 56K. Unless otherwise noted in the instructions, program the SLOW PER./NORM jumper for NORM. Refer to the Documentation Notebook for detailed programming information.

How It Works

Attached to the 50-line system information bus are the interface decode and driver circuits. A considerable cost savings is made by providing the address decoding and information bus buffering for all of the interfaces right on the motherboard instead of providing it on each of the interface boards individually. Since each parallel interface integrated circuit requires four address locations and each serial two, sixteen addresses are provided for each of the interface positions. The signals carried on the interface information bus are almost identical to those on the system bus. RSO, RS1, RS2 and RS3 are register select lines which are identical to address lines A0, A1, A2 and A3 respectively.