

Heathkit[®] Manual

for the

MULTIPOINT SERIAL I/O CARD Model H8-4

ASSEMBLY

595-2080

**HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022**

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Step-By-Step Assembly	5	Warranty	Inside front cover
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INTRODUCTION

The Heath Model H8-4 Multiport Serial I/O Card is a 4-channel asynchronous serial interface for use with the Heath H8 Computer System. Each channel is fully programmable (including baud rate) and has its own input and output ports. Any channel is functionally independent of the other three channels. All four

channels interface with RS-232C, plus channel 0 has a 20 mA current loop option.

The modern, digital design assures excellent accuracy and reliability to give you many years of trouble-free operation.

PARTS LIST

Each circuit part in an electronic kit has its own component number (R2, C4, etc.). Use these numbers when you want to identify the same part in the various sections of the Manual. These numbers, which are especially useful if a part has to be replaced, appear:

- In the Parts List.
- At the beginning of each step where a component is installed.
- In some illustrations.
- In the Schematic.
- In the sections at the rear of the Manual.

A separate "Illustration Booklet" contains numbered illustrations (Pictorials, Details, etc.) that are too large for the Assembly Manual. The Step-by-Step Assembly instructions will direct you to the proper illustration in the Booklet. After you complete the assembly

of your kit, place the illustration Booklet with the Assembly Manual and save it for future reference.

Check each part against the following list and the Parts Pictorial (Illustration Booklet, Page 1). Any part that is packed in an individual envelope with the part number on it should be placed back in the envelope after you identify it until it is called for in a step. Do not discard any packing materials until all parts are accounted for.

To order a replacement part, always include the PART NUMBER. Use the Parts Order Form furnished with this kit or at the rear of this Manual. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover. Your Warranty is inside the front cover. For prices, refer to the separate "Heath Parts Price List."



KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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RESISTORS

NOTE: The following resistors are 1/4-watt and have a tolerance of 5% (gold fourth band) unless they are marked otherwise.

A1	6-271-12	1	270 Ω (red-violet-brown)	R3
A1	6-511	4	510 Ω, 1/2-watt (green-brown-brown)	R1, R2, R8, R9
A1	6-102-12	4	1000 Ω (brown-black-red)	R141, R142, R143, R144
A1	6-152-12	1	1500 Ω (brown-green-red)	R101
A1	6-222-12	2	2200 Ω (red-red-red)	R5, R6
A1	6-104-12	2	100 kΩ (brown-black-yellow)	R4, R7
A1	6-105-12	1	1 MΩ (brown-black-green)	R102

CAPACITORS

B1	21-147	2	47 pF ceramic	C105, C106
B1	21-143	8	.05 μF ceramic	C103, C104, C113, C114, C123, C124, C133, C134
B1	21-95	13	.1 μF ceramic	C101, C102, C111, C112, C121, C122, C131, C132, C141, C142, C143, C144, C145
B2	25-221	6	2.2 μF tantalum	C1, C2, C3, C4, C5, C6

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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DIODES—TRANSISTORS—INTEGRATED CIRCUITS (IC's)

C1	56-56	1	1N4149 diode	D2
C1	57-65	2	1N4002 diode	D1, D3

NOTE: Transistors and integrated circuits are marked for identification in one of the following ways:

1. Part number,
2. Type number. (On integrated circuits, this refers only to the numbers and letters. Disregard any other numbers or letters.)
3. Part number and type number.
4. Part number with a type number other than the one shown.

CAUTION: The integrated circuits packed in conductive foam can be damaged by static voltage. Since these parts represent a considerable portion of the cost of the kit, do not remove them from their packages until you are instructed to do so.

C2	417-865	1	MPSA55 transistor	Q1
C2	417-897	1	N-channel Fet (selected)	Q2
C3	442-54	1	7805 5-volt regulator	U3
C3	442-663	1	78M12 +12-volt regulator	U1
C3	442-664	1	79M12 -12-volt regulator	U2
C4	443-808	2	4N26 integrated circuit	U4, U5
C5	443-54	1	7403 integrated circuit	U148
C5	443-755	1	74LS04 integrated circuit	U145
C5	443-730	1	74LS74 integrated circuit	U144
C5	443-779	4	74LS02 integrated circuit	U102, U112, U122, U132
C5	443-794	4	75188 integrated circuit	U103, U113, U123, U133
C5	443-795	4	75189 integrated circuit	U104, U114, U124, U134
C5	443-798	1	74LS20 integrated circuit	U147
C5	443-884	3	74LS242 integrated circuit	U146, U151, U152
C6	443-807	2	74LS42 integrated circuit	U142, U143
C7	443-885	1	74LS245 integrated circuit	U141
C8	443-874	4	8250 integrated circuit	U101, U111, U121, U131



KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.	KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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WIRE—CABLE

340-8	3"	Bare wire
344-111	3"	Orange wire
344-120	3"	Black wire
344-121	3"	White wire
347-36	12"	15-wire round cable
134-1022	1	15-wire flat cable (with ends)

CONNECTORS—SOCKETS

D1	432-1080	1	3-hole connector shell
D2	432-1010	6	15-hole connector shell
D3	432-947	2	Circuit board socket
D4	432-1038	13	Jumper plugs
D5	432-866	100	Spring connector
D6	432-969	9	5-pin plug
D7	432-1039	16	15-pin plug
D8	434-315	2	6-pin IC socket
D9	434-298	19	14-pin IC socket
D10	434-299	2	16-pin IC socket
D11	434-311	1	20-pin IC socket
D12	434-253	4	40-pin IC socket

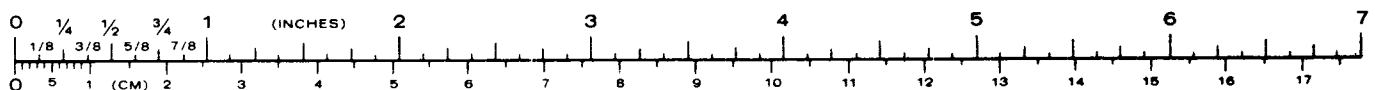
HARDWARE

E1	250-56	5	6-32 × 1/4" screw
E2	250-89	2	6-32 × 3/8" screw
E3	252-3	5	6-32 nut
E4	254-1	5	#6 lockwasher
E5	255-1	2	#6 spacer

MISCELLANEOUS

	85-2133-1	1	Circuit board	
F1	60-604	3	DPDT switch	SW1, SW2, SW3
F2	266-966	1	Connector key	
F3	204-2308	1	Bracket	
	73-151	1	Double-sided tape (1-3/4")	
F4	404-608	1	1.8432 MHz crystal	Y101
	490-185	1	Solder braid	
F5	352-13	1	Silicone grease	
	391-34	1	Blue and white label	
	597-260	1	Parts Order Form	
		1	Assembly Manual (See Page 1 for part number.)	
		1	Operation Manual	

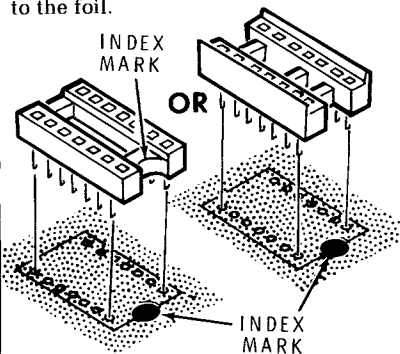
Solder



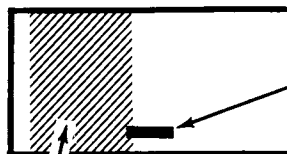
STEP-BY-STEP ASSEMBLY

START

NOTE: 6-pin, 14-pin, 16-pin, 20-pin, and 40-pin IC sockets are used in this kit. Be very careful when you install the sockets, as it is possible to place a 14-pin socket in a 16-pin socket location by mistake. Make sure all pins are straight and insert the socket pins into the circuit board holes. The index mark on the circuit board must still be visible after it is installed. Solder the pins to the foil.



IDENTIFICATION
DRAWING



PART
NUMBER

The steps performed in this Pictorial are in this area of the circuit board.

() 14-pin IC socket at U112.

() 14-pin IC socket at U113.

() 14-pin IC socket at U114.

() 14-pin IC socket at U102.

() 14-pin IC socket at U103.

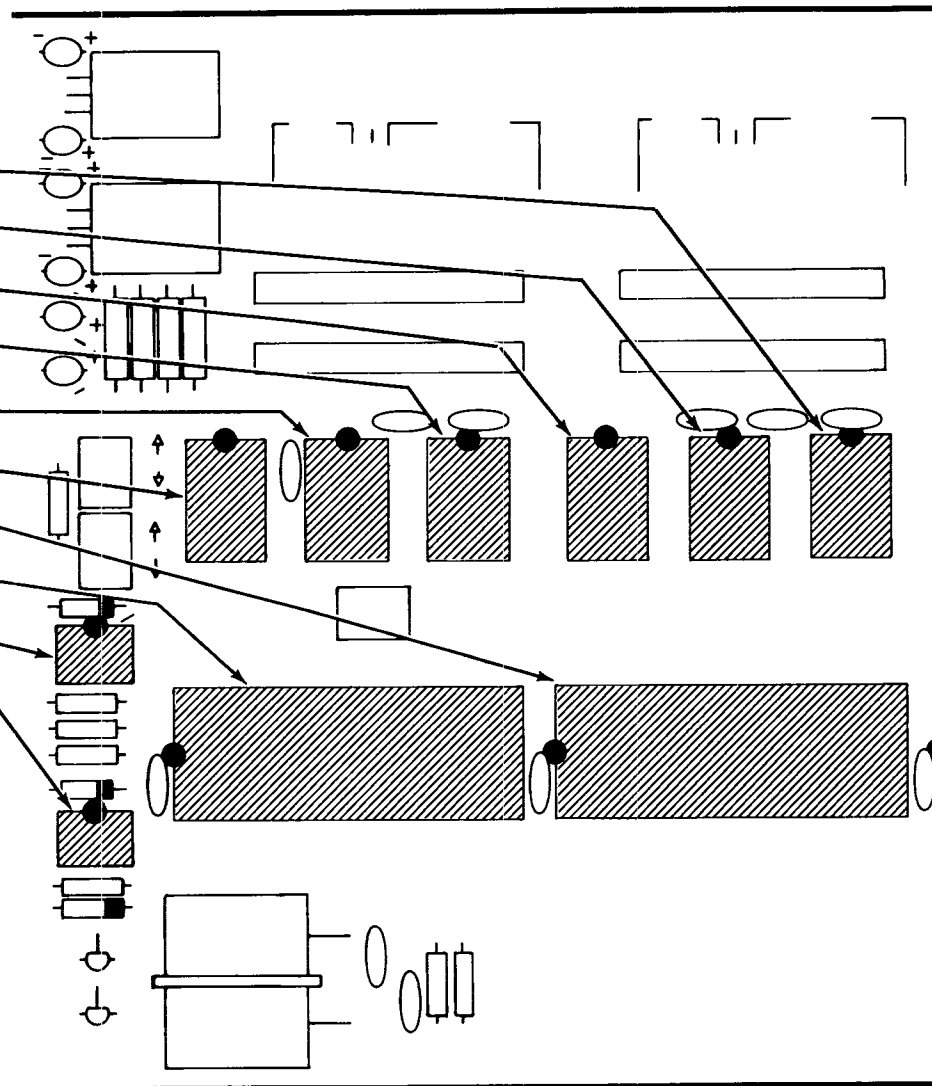
() 14-pin IC socket at U104.

() 40-pin IC socket at U111.

() 40-pin IC socket at U101.

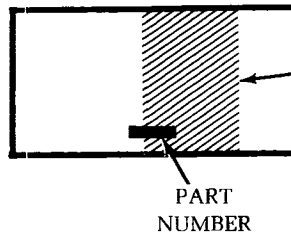
() 6-pin IC socket at U4.

() 6-pin IC socket at U5.



PICTORIAL 1-1

IDENTIFICATION
DRAWING



The steps performed in this Pictorial are in this area of the circuit board.

START ↘

NOTE: Reposition the circuit board as shown in the identification drawing at the top of this page. The drawing indicates the area of the circuit board that you will be working in.

NOTE: Solder the pins of each IC socket to the foil as you install it.

() 14-pin IC socket at U132.

() 14-pin IC socket at U133.

() 14-pin IC socket at U134.

() 14-pin IC socket at U122.

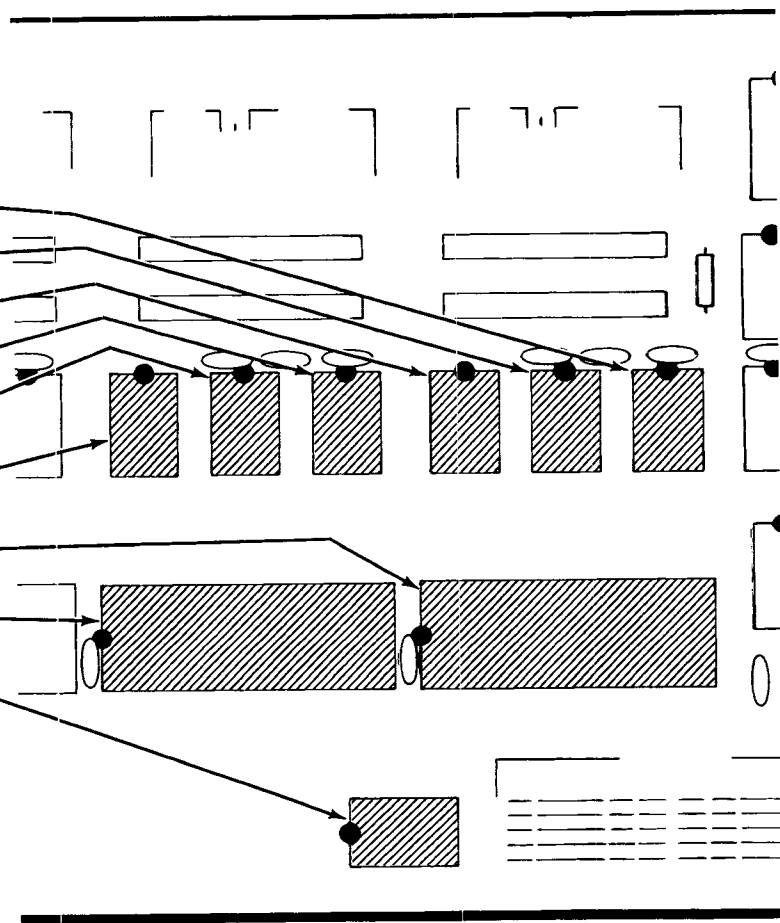
() 14-pin IC socket at U123.

() 14-pin IC socket at U124.

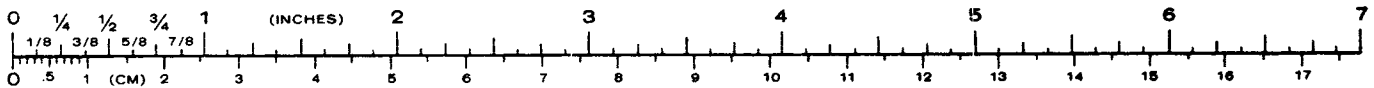
() 40-pin IC socket at U131.

() 40-pin IC socket at U121.

() 14-pin IC socket at U148.

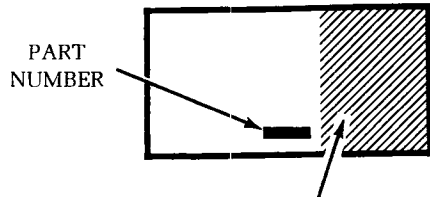


PICTORIAL 1-2





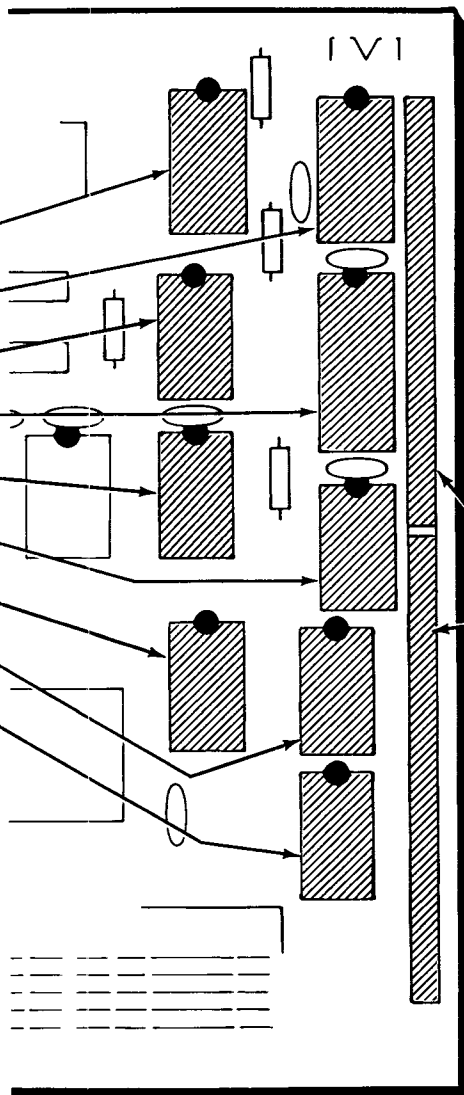
IDENTIFICATION
DRAWING



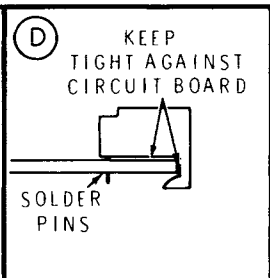
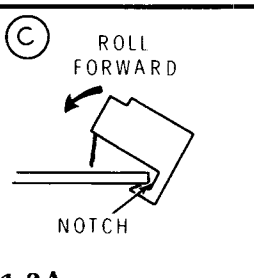
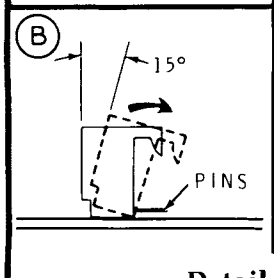
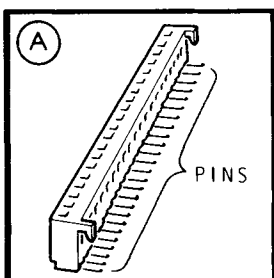
The steps performed in this Pictorial are in this area of the circuit board.

START →

- () 16-pin IC socket at U143.
- () 16-pin IC socket at U142.
- () 14-pin IC socket at U144.
- () 20-pin IC socket at U141.
- () 14-pin IC socket at U145.
- () 14-pin IC socket at U146.
- () 14-pin IC socket at U147.
- () 14-pin IC socket at U152.
- () 14-pin IC socket at U151.



PICTORIAL 1-3



Detail 1-3A

CONTINUE →

NOTE: Use the following procedure when you install a circuit board socket:

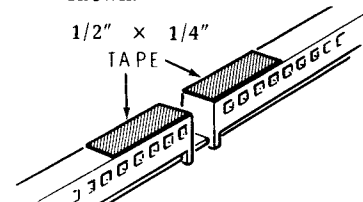
1. Refer to Detail 1-3A, Part A, and position the socket on a hard flat surface with the pins along the surface as shown.
2. Refer to Part B of the Detail, roll the socket forward, and bend the pins up approximately 15°.
3. Refer to Part C and position the connector with its notches against the edge of the circuit board and the pins over the circuit board holes.
4. Refer to Part D, roll the connectors forward, and insert the pins into the circuit board holes. Make sure the socket is tight against the circuit board; then solder two pins at each end of the socket to the foil. Check the socket to make sure it is still tight against the circuit board. Then solder the remaining pins to the foil.

() Circuit board socket.

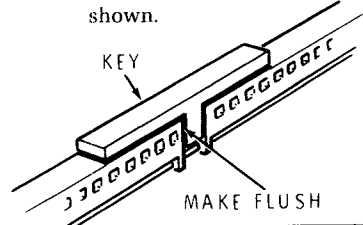
() Circuit board socket.

() Install the connector key as follows:

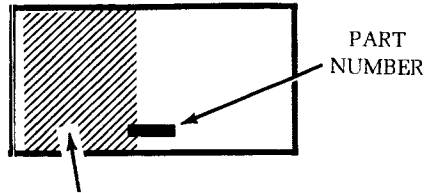
- Cut two 1/2" × 1/4" lengths of tape, remove the protective covering from one side of each length, and apply the tape to the connectors at the locations shown.



- Remove the other protective covering from the lengths of tape and press the connector key down onto the tape. Be sure the key is flush with the edge of the connector as shown.



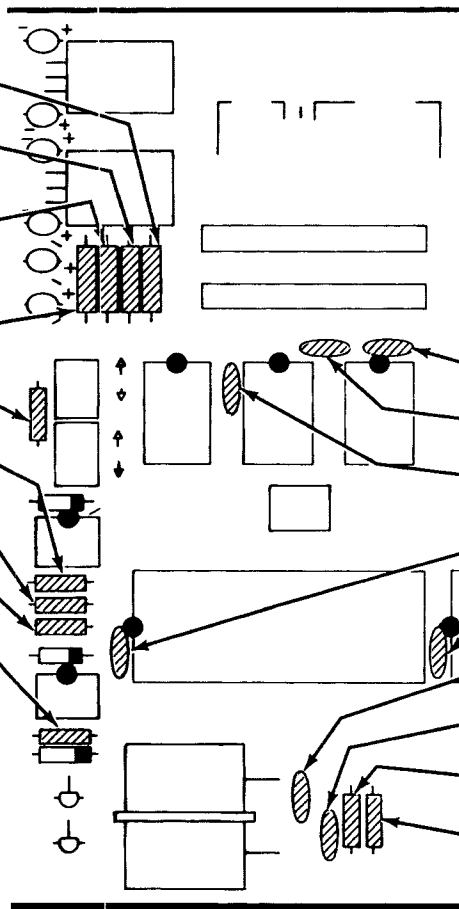
IDENTIFICATION
DRAWING



The steps performed in this Pictorial are in this area of the circuit board.

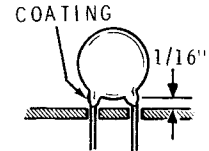
START ↘

- () R9: 510 Ω, 1/2-watt (green-brown-brown).
- () R8: 510 Ω, 1/2-watt (green-brown-brown).
- () R2: 510 Ω, 1/2-watt (green-brown-brown).
- () R1: 510 Ω, 1/2-watt (green-brown-brown).
- () R3: 270 Ω (red-violet-brown).
- () R4: 100 kΩ (brown-black-yellow).
- () R3: 2200 Ω (red-red-red).
- () R6: 2200 Ω (red-red-red).
- () R7: 100 kΩ (brown-black-yellow).
- () Solder the leads to the foil and cut off the excess lead lengths.



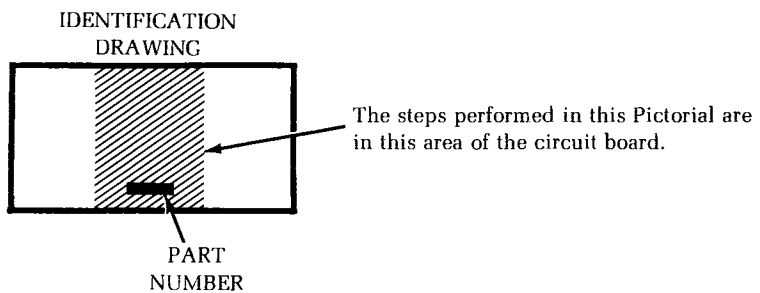
CONTINUE ↙

NOTE: A coating on ceramic capacitor leads can extend through the circuit board and make soldering difficult. Therefore, always space ceramic capacitors 1/16" above the circuit board.



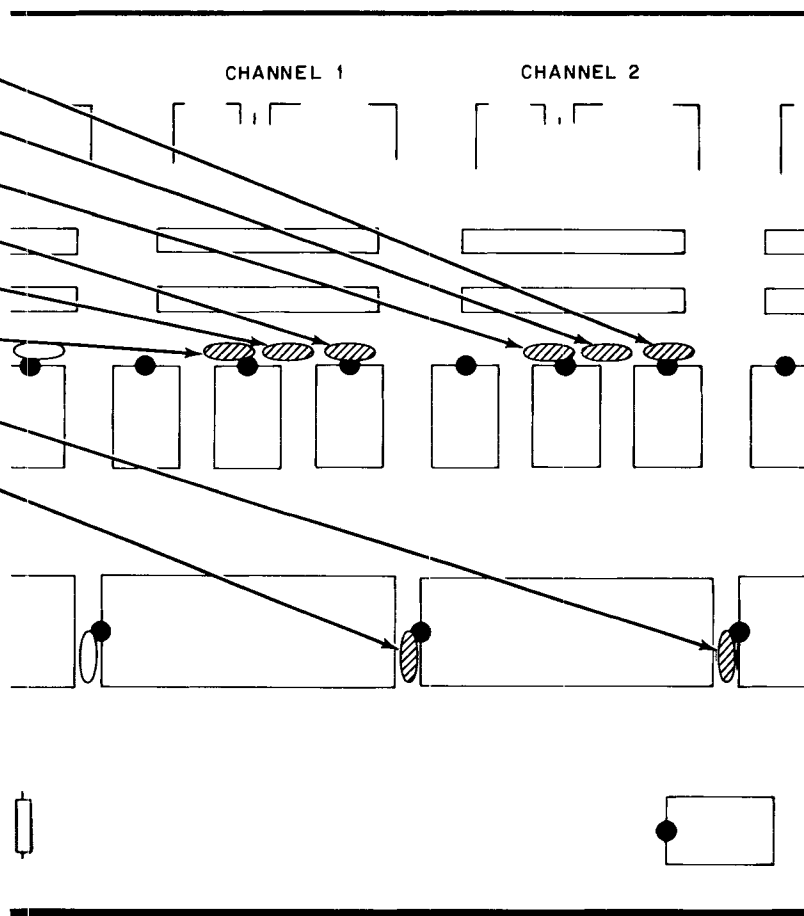
- () C102: .1 μF ceramic.
- () C103: .05 μF ceramic.
- () C104: .05 μF ceramic.
- () C101: .1 μF ceramic.
- () C111: .1 μF ceramic.
- () C106: 47 pF ceramic. The board may be marked 10 at this location.
- () C105: 47 pF ceramic.
- () R102: 1 MΩ (brown-black-green).
- () R101: 1500 Ω (brown-green-red).
- () Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 1-4



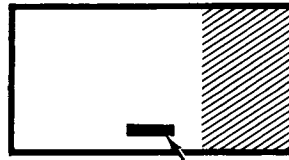
START ▼

- () C122: .1 μ F ceramic.
- () C123: .05 μ F ceramic.
- () C124: .05 μ F ceramic.
- () C112: .1 μ F ceramic.
- () C113: .05 μ F ceramic.
- () C114: .05 μ F ceramic.
- () C131: .1 μ F ceramic.
- () C121: .1 μ F ceramic.
- () Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 1-5

IDENTIFICATION
DRAWING

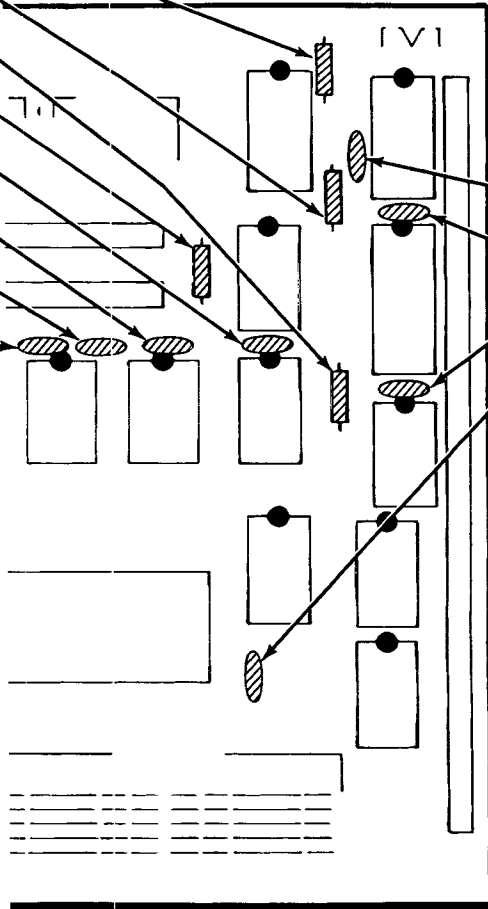


The steps performed in this Pictorial are in this area of the circuit board.

PART
NUMBER

START →

- R141: 1000 Ω (brown-black-red).
- R142: 1000 Ω (brown-black-red).
- R144: 1000 Ω (brown-black-red).
- R143: 1000 Ω (brown-black-red).
- C141: .1 μF ceramic.
- C132: .1 μF ceramic.
- C133: .05 μF ceramic.
- C134: .05 μF ceramic.
- Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE ↘

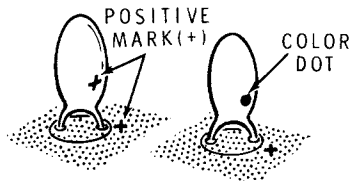
- C142: .1 μF ceramic.
- C143: .1 μF ceramic.
- C144: .1 μF ceramic.
- C145: .1 μF ceramic.
- Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 1-6



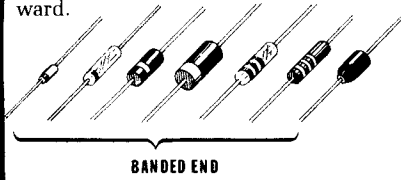
START ↘

NOTE: When you install tantalum capacitors, be sure to position the plus (+) or color dot marked lead in the plus marked hole in the circuit board.



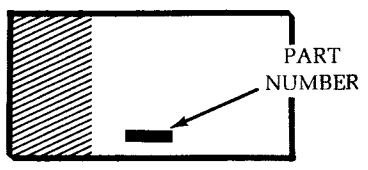
- () C1: 2.2 μ F tantalum.
- () C3: 2.2 μ F tantalum.
- () C2: 2.2 μ F tantalum.
- () C4: 2.2 μ F tantalum.
- () C5: 2.2 μ F tantalum.
- () C6: 2.2 μ F tantalum.
- () Solder the leads to the foil and cut off the excess lead lengths.

NOTE: When you install a diode, position its banded end as shown in the Pictorial. A circuit will not operate properly if the diode is installed backward.

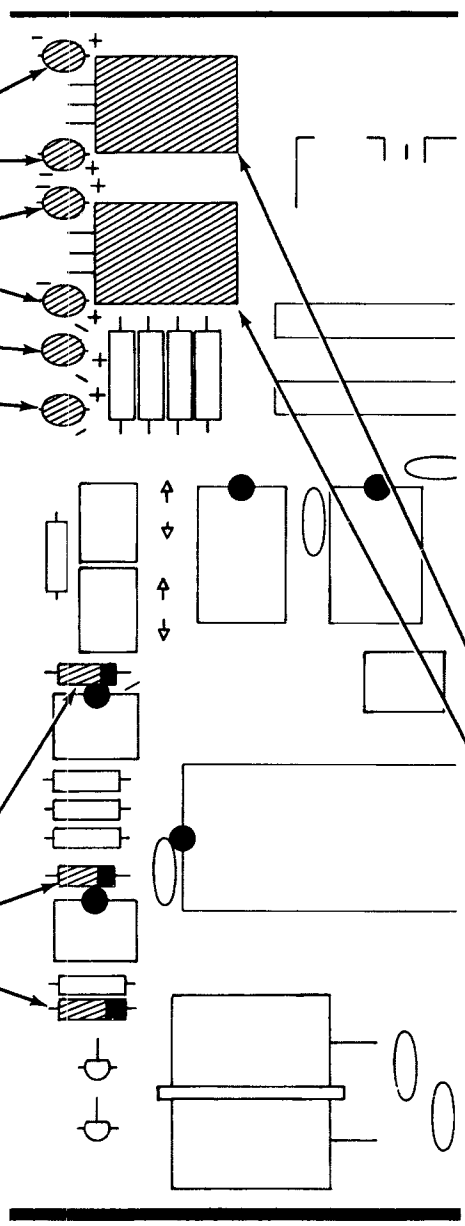


- () D1: 1N4002 diode (#57-65).
- () D2: 1N4149 diode (#56-56).
- () D3: 1N4002 diode (#57-65).
- () Solder the leads to the foil and cut off the excess lead lengths.

IDENTIFICATION DRAWING



The steps performed in this Pictorial are in this area of the circuit board.

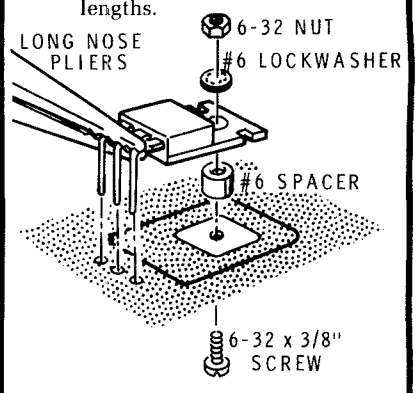


CONTINUE ↘

Install the next two transistors as follows:

NOTE: To avoid possible damage to the transistors, DO NOT bend or spread the wide portion of the transistor leads.

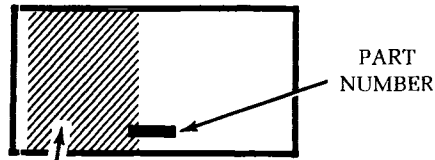
1. Grasp the wide portion of the transistor leads with long-nose pliers and bend the narrow portion of the leads with your fingers.
2. Insert the transistor leads into their respective circuit board holes.
3. Mount the transistor to the circuit board with a 6-32 \times 3/8" screw, a #6 spacer, a #6 lockwasher, and a 6-32 nut. Do not let the transistor twist when you tighten the hardware.
4. Solder the transistor leads to the foil and cut off the excess lead lengths.



- () U1: 78M12 integrated circuit (#442-663).
- () U2: 79M12 integrated circuit (#442-664).
- () Examine the six tantalum capacitors and make sure the plus (+) marked leads are toward the center of the circuit board.

PICTORIAL 1-7

IDENTIFICATION
DRAWING

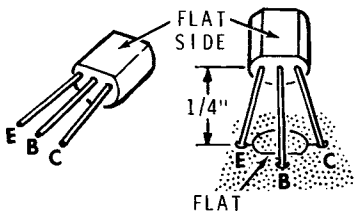


The steps performed in this Pictorial are in this area of the circuit board.

START →

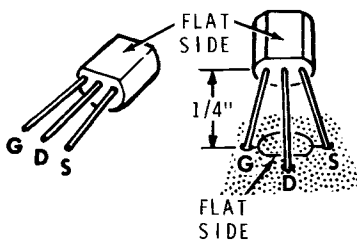
() Q1: Install an MPSA55 transistor (#417-865) at Q1 as follows:

1. Line up the flat on the transistor with the outline of the flat on the circuit board.
2. Insert the leads into their correct E, C, and B holes.
3. Then solder the leads to the foil and cut off the excess lead lengths.



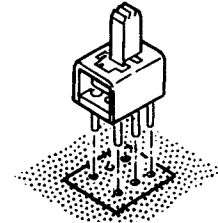
() Q2: Install an N-channel FET (selected) (#417-897) at Q2 as follows:

1. Line up the flat on the transistor with the outline of the flat on the circuit board.
2. Insert the leads into their correct G, D, and S holes.
3. Then solder the leads to the foil and cut off the excess lead lengths.

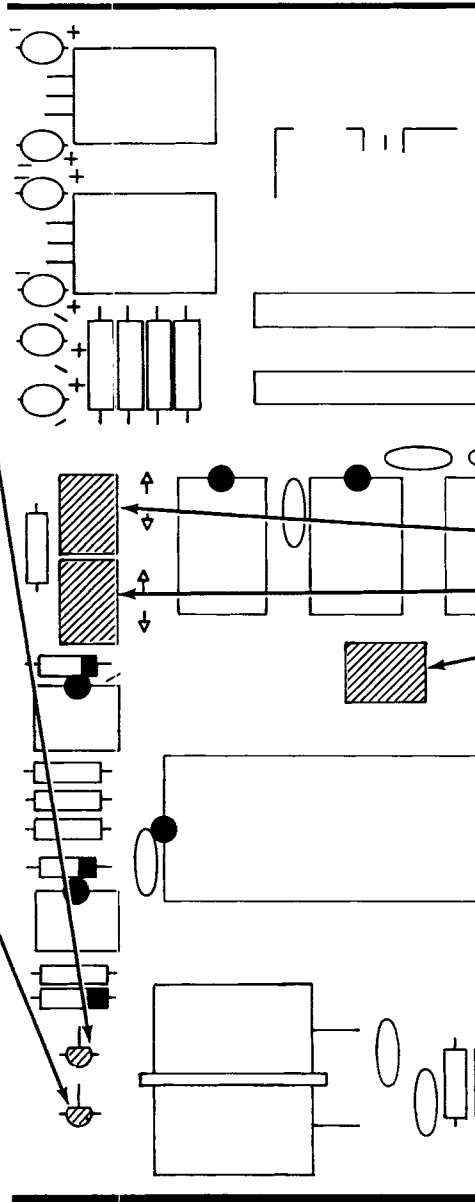


CONTINUE ↘

Install DPDT switches (#60-604) in the following steps. Push each switch down against the circuit board. Then solder the lugs to the foil.



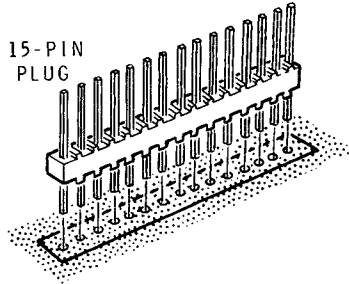
- () SW2.
- () SW3.
- () SW1.



PICTORIAL 1-8

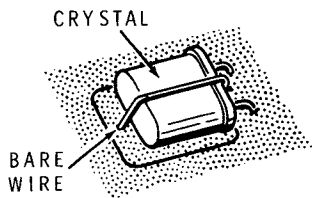
START →

- () Install four 15-pin plugs at the indicated locations. Install the short pins through the circuit board and solder them to the foil.

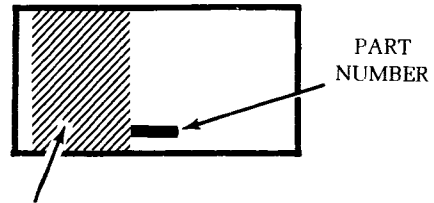


- () Install four 15-pin plugs at the indicated locations.

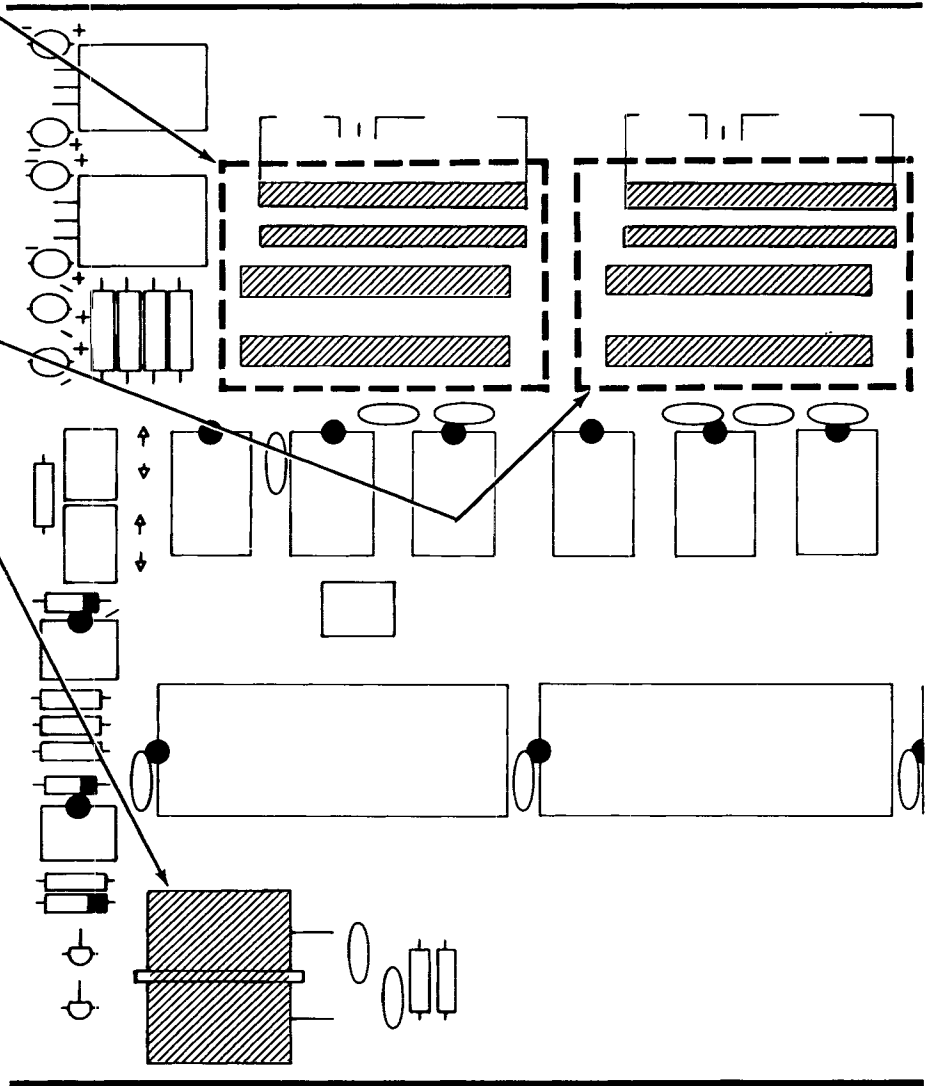
- () Y101: 1.8432 MHz crystal. Insert the crystal leads into the holes and position the crystal over the outline on the circuit board. Install a bare wire over the crystal to hold it in place. Then solder the bare wire ends and the crystal leads to the foil.



IDENTIFICATION DRAWING

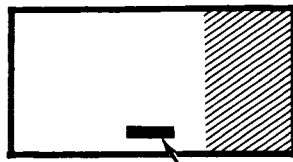


The steps performed in this Pictorial are in this area of the circuit board.



PICTORIAL 1-9

IDENTIFICATION
DRAWING

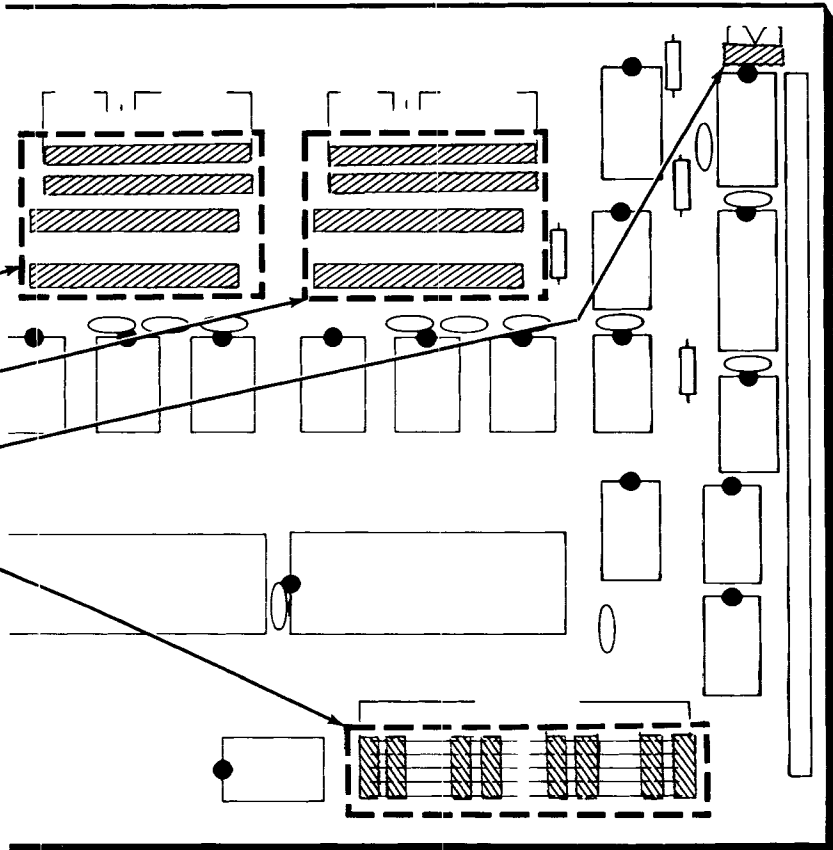


The steps performed in this Pictorial are in this area of the circuit board.

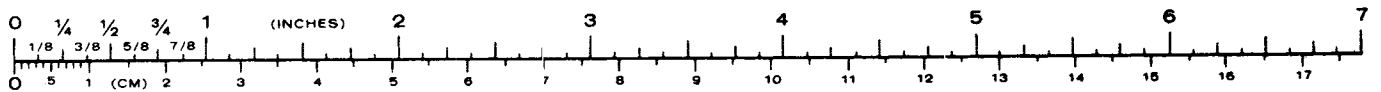
START ↓

NOTE: Solder the pins of each plug to the foil as it is installed in the following steps.

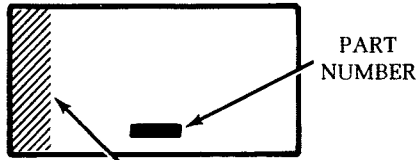
- () Install four 15-pin plugs at the indicated locations.
- () Install four 15-pin plugs at the indicated locations.
- () Install a 5-pin plug.
- () Install eight 5-pin plugs at the indicated locations.



PICTORIAL 1-10



IDENTIFICATION DRAWING



The steps performed in this Pictorial are in this area of the circuit board.

START ↘

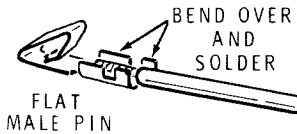
() Mount the bracket on the circuit board with two 6-32 × 1/4" screws, two #6 lockwashers, and two 6-32 nuts. Position it as shown.

() Refer to inset drawing #1 and open the silicone grease pod. Apply a liberal amount of grease to the bare metal side of the 7805 integrated circuit (#442-54).

() U3: Mount the 7805 integrated circuit (#442-54) to the bracket with a 6-32 × 1/4" screw, #6 lockwasher, and a 6-32 nut. Face the bare metal side against the bracket. Position the leads as shown. The IC may be supplied in either of two case styles. (See inset drawing #2).

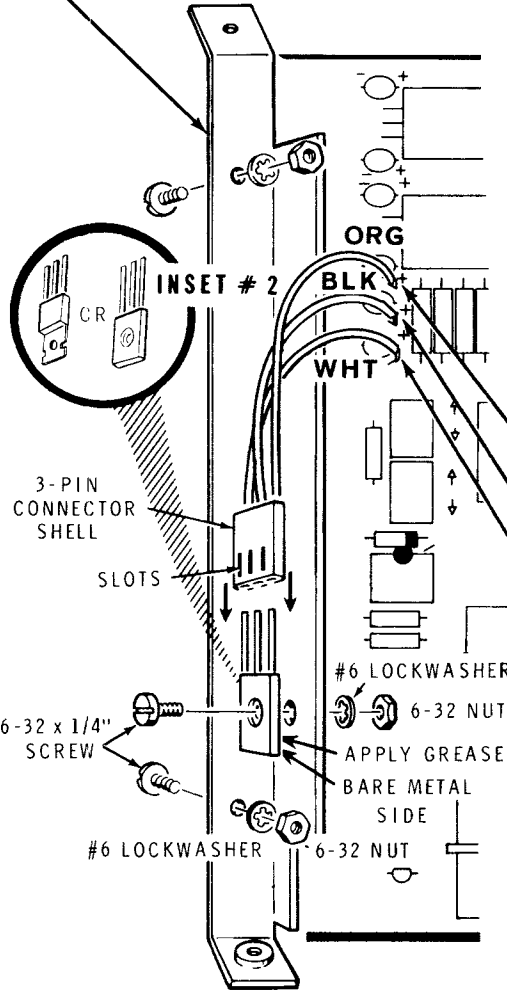
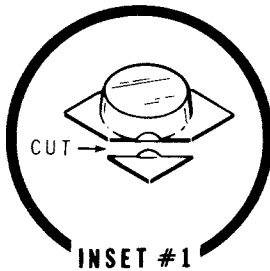
() Cut the orange, white, and black wires to 3". Remove 1/8" of insulation from one end of each wire and 1/4" of insulation from the other end.

() Install a spring connector on the 1/8" end of the prepared 3" white stranded wire.



() Install a spring connector on the 1/8" end of the 3" orange and the 3" black stranded wires.

() Refer to Detail 1-11A and prepare the 3-hole connector shell.



PICTORIAL 1-11

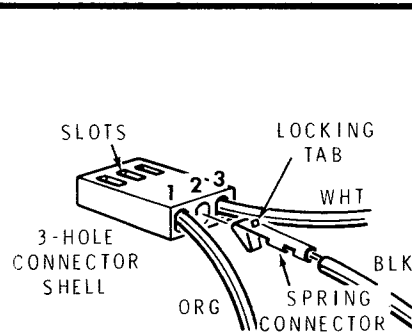
CONTINUE ↘

Connect the three wires coming from the 3-hole connector shell to the circuit board as follows:

- () Orange wire to hole +8V.
- () Black wire to hole GND.
- () White wire to hole +5V.

() Solder the wires to the circuit board foil and cut off the excess wire lengths.

() Push the 3-hole connector shell onto the integrated circuit leads as shown. Face the slots on the connector shell away from the bracket.



Detail 1-11A

1. Position the 3-hole connector shell so its slots are up as shown.
2. Position the spring connector on the black wire so its locking tab is up as shown.
3. Push the spring connector into connector hole #2 until the pin locks in place.
4. In a like manner, install the spring connector on the white wire into connector hole #3 and the orange connector into hole #1.



CIRCUIT BOARD CHECKS

Refer to Pictorial 2-1 (Illustration Booklet, Page 2) for the following steps.

- () Make sure the POWER switch (on the rear panel of your Computer) is in the OFF position.
- () Unplug the Computer's line cord.
- () If not already done, remove the two screws that hold the top cover on the Computer. Then remove the cover.
- () Remove the tie bracket from the Computer, if it is not already done.
- () Position the Multiport Serial I/O circuit board inside the chassis assembly as shown. Then carefully push the two connectors at S101 on the edge of the circuit board onto one of the unused plugs on the mother circuit board.
- () Plug the line cord into the proper AC outlet.

NOTE: If you do not obtain the proper results in the following steps, push the POWER switch to OFF and refer to the "Possible Cause" column of the chart that follows each check.

- () Push the POWER switch to ON. The PWR LED and the RUN LED on the front panel should light.

PROBLEM	POSSIBLE CAUSE
PWR LED and RUN LED do not light.	A. Solder bridge on the Multiport Serial I/O circuit board. B. C1, C2 of C5.

NOTE: The following checks require a VTVM or VOM. If you do not have one available, remove the Multiport Serial I/O circuit board from the Computer and carefully inspect the circuit board for solder bridges. Then proceed to "Integrated Circuit Installation."

- () Connect the common lead of your meter to the chassis.
- () Set your meter to measure +5 volts DC.
- () Touch the probe of your VTVM to the indicated foil at TP1 (+5V, white wire). The meter should indicate between +4.75 and +5.25 volts.



PROBLEM	POSSIBLE CAUSE
TP1 does not indicate between +4.75 and + 5.25 volts.	A. Solder bridge on the Multiport Serial I/O circuit board. B. Wiring error on the circuit board at U3. C. C6.

Set your meter to measure +15 volts DC.

Touch the probe of your VTVM to the indicated lug of U1 (TP2). The meter should indicate between +11.75 and +12.25 volts.

PROBLEM	POSSIBLE CAUSE
TP2 does not indicate between +11.75 and +12.25 volts.	A. Solder bridge on the Multiport Serial I/O circuit board. B. C3.

Set your meter to measure -15 volts DC.

Touch the probe of your VTVM to the indicated lug of U2 (TP3). The meter should indicate between -11.75 and -12.25 volts.

PROBLEM	POSSIBLE CAUSE
TP3 does not indicate between -11.75 and -12.25 volts.	A. Solder bridge on the Multiport Serial I/O circuit board. B. C4.

Push the POWER switch to OFF and unplug the line cord.

Disconnect the VTVM from the chassis and Multiport Serial I/O circuit board.

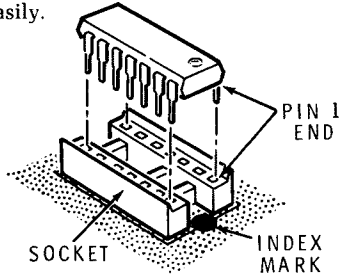
Remove the Multiport Serial I/O circuit board from the Computer.

INTEGRATED CIRCUIT INSTALLATION

START

In the following steps, install IC's (integrated circuits) in the designated sockets. Be careful to match the pin 1 end of each IC to the index mark on the circuit board. See Detail 3-1A on this page.

Before you apply downward pressure to an IC, make sure each IC pin is centered in its proper socket hole. Handle IC's with care, as their pins bend very easily.



() U112: 74LS02 IC (#443-779).

() U113: 75188 IC (#443-794).

() U114: 75189 IC (#443-795).

() U102: 74LS02 IC (#443-779).

() U103: 75188 IC (#443-794).

() U104: 75189 IC (#443-795).

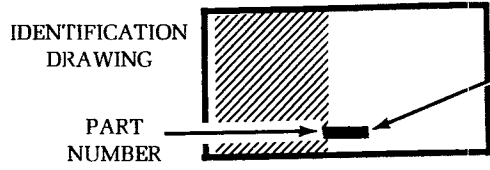
Some of the following IC's are easily damaged by static electricity. Once you remove an IC (that is supplied in protective foam) from its foam, DO NOT lay it down until it is installed in the socket. Also, place your free hand on the circuit board before you touch the IC to its socket. This will equalize the static electricity between the circuit board and the IC.

() U4: 4N26 IC (#443-808).

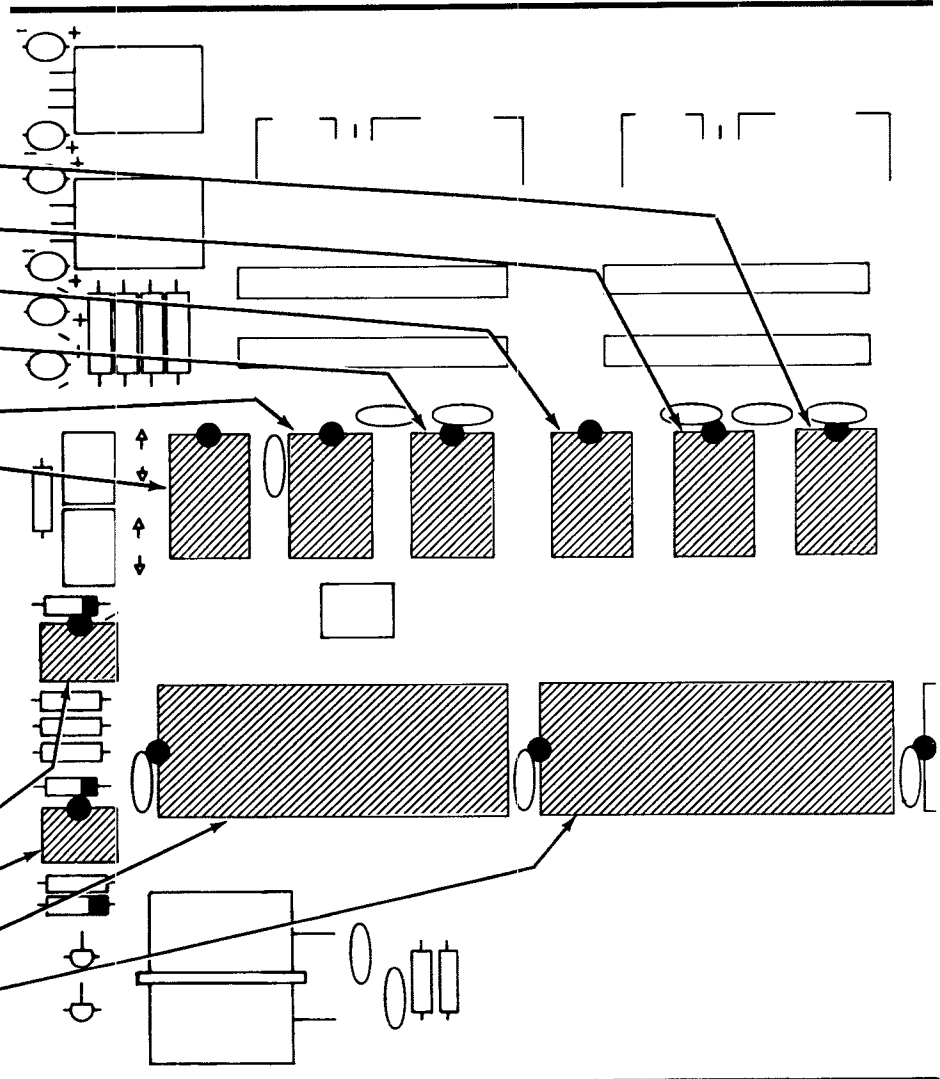
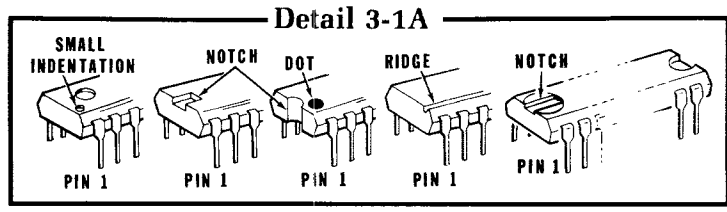
() U5: 4N26 IC (#443-808).

() U101: 8250 IC (#443-874).

() U111: 8250 IC (#443-874).



The steps performed in this Pictorial are in this area of the circuit board.



PICTORIAL 3-1



IDENTIFICATION
DRAWING

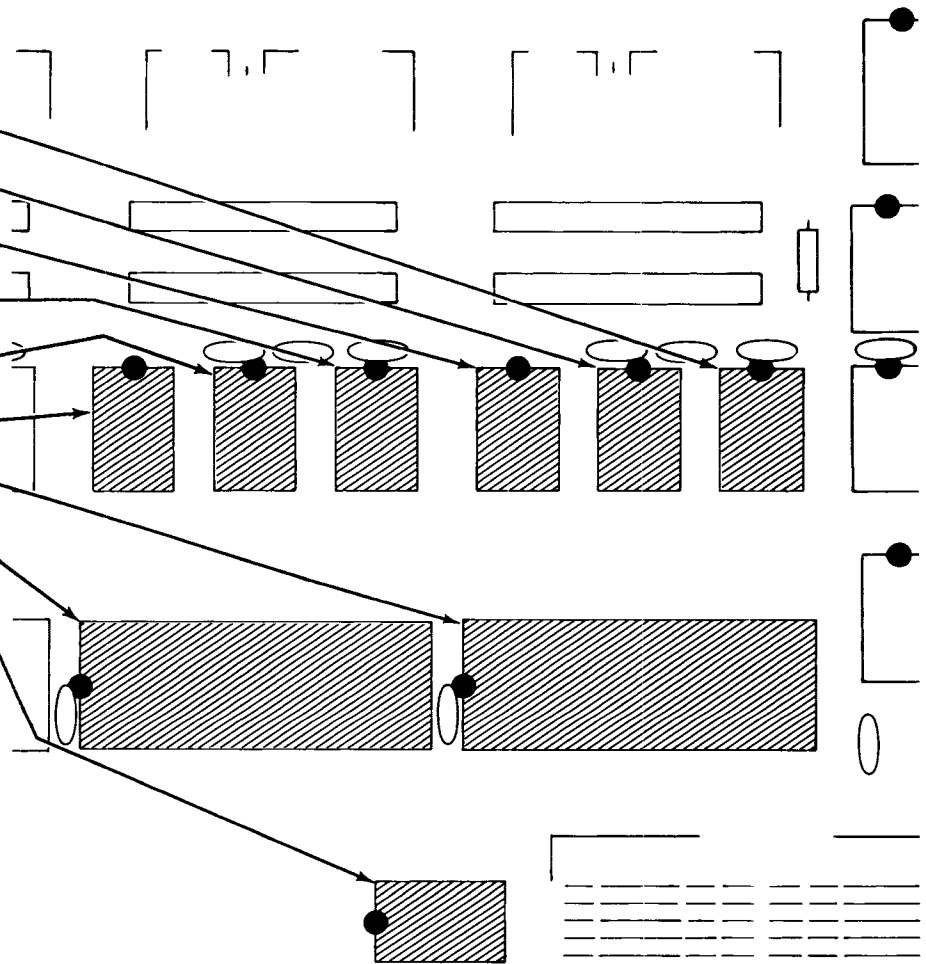


The steps performed in this Pictorial are in this area of the circuit board.

PART
NUMBER

START →

- () U132: 74LS02 IC (#443-779).
- () U133: 75188 IC (#443-794).
- () U134: 75189 IC (#443-795).
- () U122: 74LS02 IC (#443-779).
- () U123: 75188 IC (#443-794).
- () U124: 75189 IC (#443-795).
- () U131: 8250 IC (#443-874).
- () U121: 8250 IC (#443-874).
- () U148: 7403 IC (#443-54).



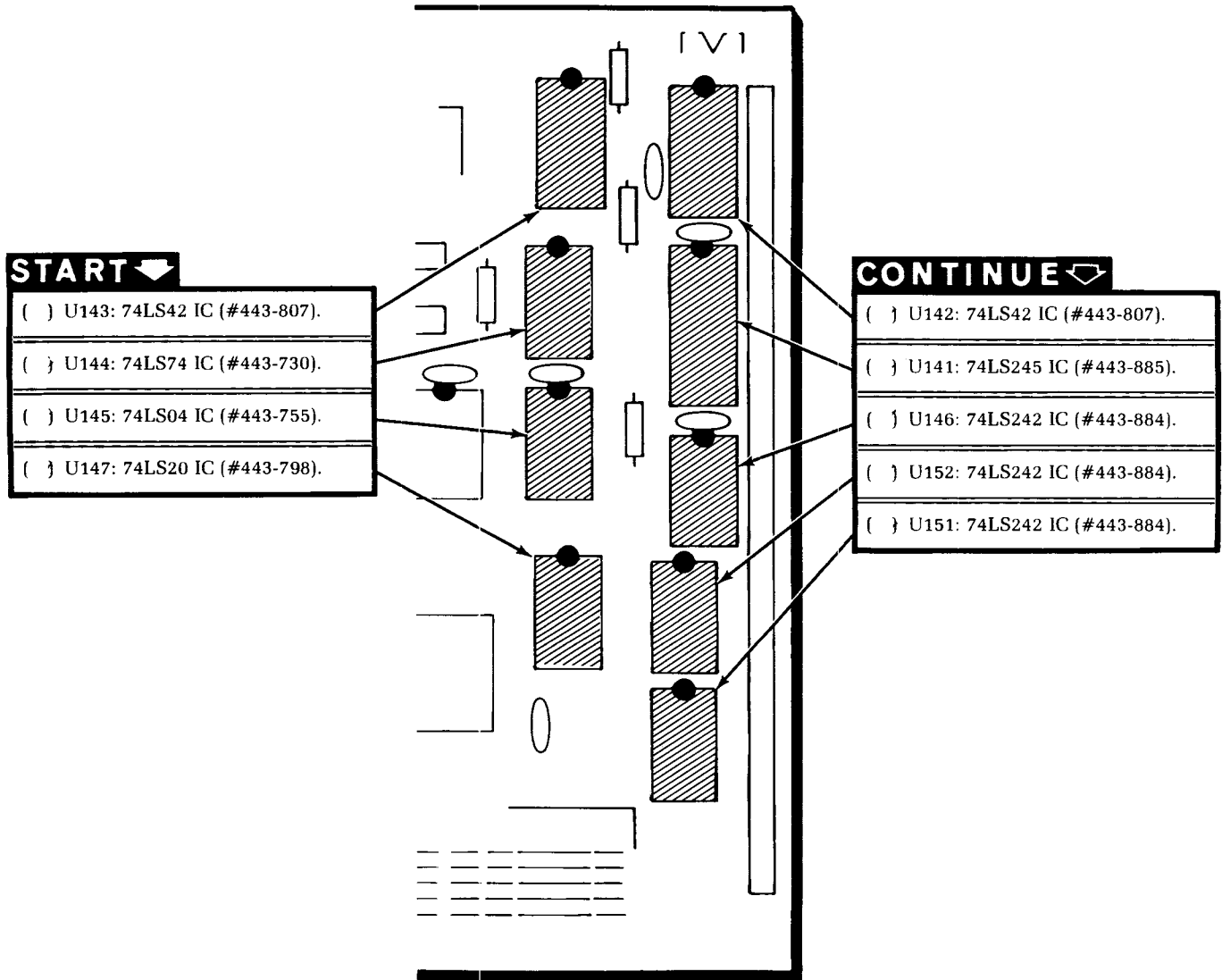
PICTORIAL 3-2

IDENTIFICATION
DRAWING



PART
NUMBER

The steps performed in this Pictorial are
in this area of the circuit board.



START ↓

- () U143: 74LS42 IC (#443-807).
- () U144: 74LS74 IC (#443-730).
- () U145: 74LS04 IC (#443-755).
- () U147: 74LS20 IC (#443-798).

CONTINUE ↓

- () U142: 74LS42 IC (#443-807).
- () U141: 74LS245 IC (#443-885).
- () U146: 74LS242 IC (#443-884).
- () U152: 74LS242 IC (#443-884).
- () U151: 74LS242 IC (#443-884).

PICTORIAL 3-3

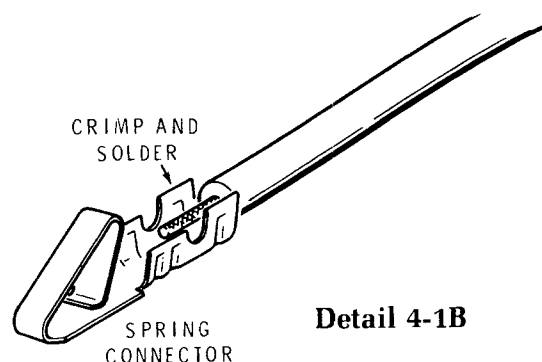
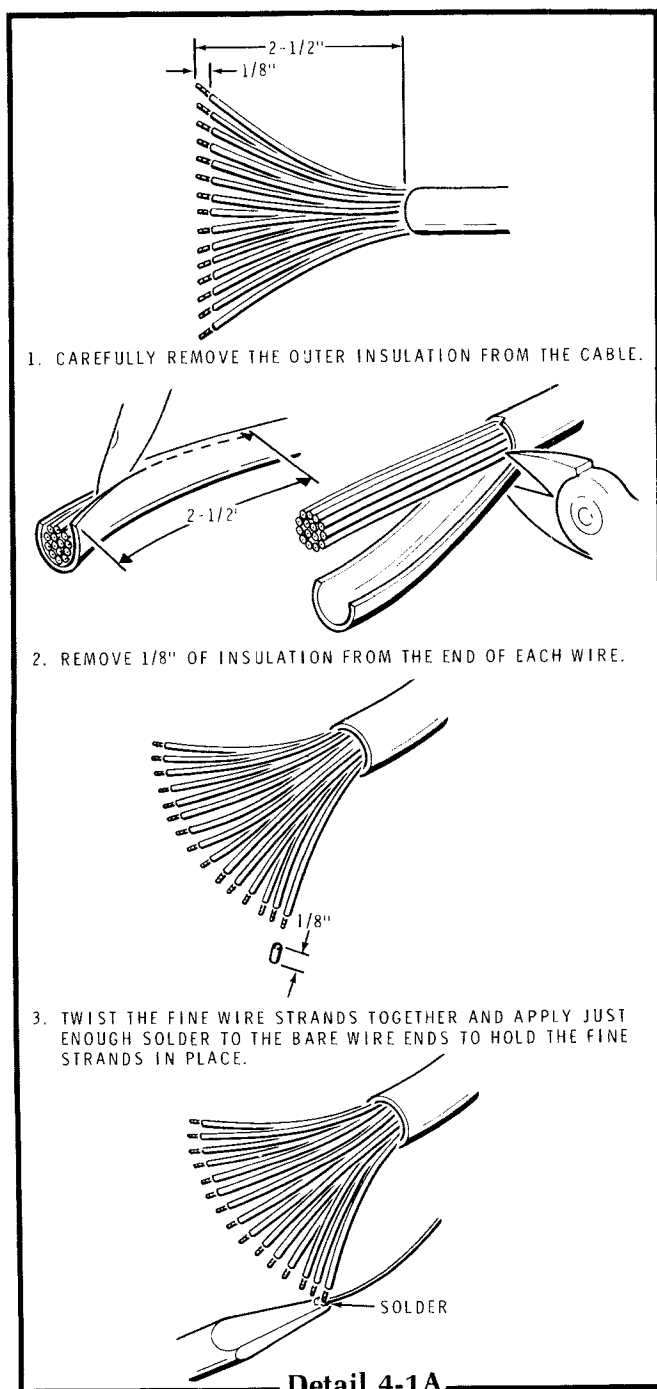




TEST CABLE ASSEMBLY

Refer to Pictorial 4-1 (Illustration Booklet, Page 2) for the following steps.

- () Refer to Detail 4-1A and prepare **both** ends of the 15-wire round cable.

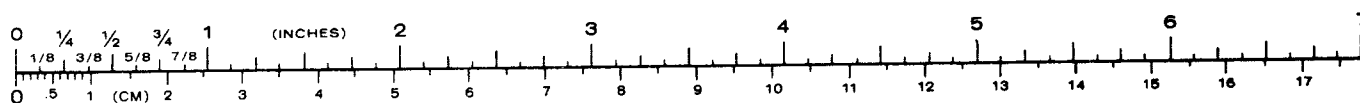


- () Refer to Detail 4-1B and install a spring connector on each wire at **both** ends of the 15-wire round cable.

NOTE: When you perform the following steps, be sure to position the connector shell and spring connector as shown before you insert the connector into the shell. Push in on the wire until the connector snaps into place.

Insert the spring connectors at one end of the cable into a 15-hole connector shell as explained below. Then insert the spring connectors at the other end of the cable into another 15-hole connector shell. Two sets of checkoff spaces are provided for this purpose.

- () () Black wire to hole 1.
- () () White wire to hole 2.
- () () Red wire to hole 3.
- () () Green wire to hole 4.
- () () Orange wire to hole 5.
- () () Blue wire to hole 6.
- () () Black-white wire to hole 7.
- () () Black-red wire to hole 8.
- () () Black-green wire to hole 9.
- () () Black-orange wire to hole 10.





- Black-blue wire to hole 11.
- White-black wire to hole 12.
- White-red wire to hole 13.
- White-green wire to hole 14.
- White-blue wire to hole 15.

You will have four extra 15-hole connector shells and 67 spring connectors left over. Use these to make your own interface cables if the 16-conductor flat cable will not interface to your peripherals. The input and outputs of the Multiport Serial I/O are explained in the Operation Manual.

This completes the assembly of the Multiport Serial I/O. The 15-wire round cable, the 15-wire flat cable, and the 13 jumper plugs will be used later.

NOTE: The blue and white label shows the Model Number and Production Series Number of your kit. Refer to these numbers in any communications with the Heath Company about your kit. This assures you that you will receive the most complete and up-to-date information in return.

- Carefully peel the backing paper from the blue and white label. Then press the label onto the lower left corner of your H8 computer. Do not cover any other labels that may be present.

INITIAL TESTS

Refer to Pictorial 5-1 for the following steps.

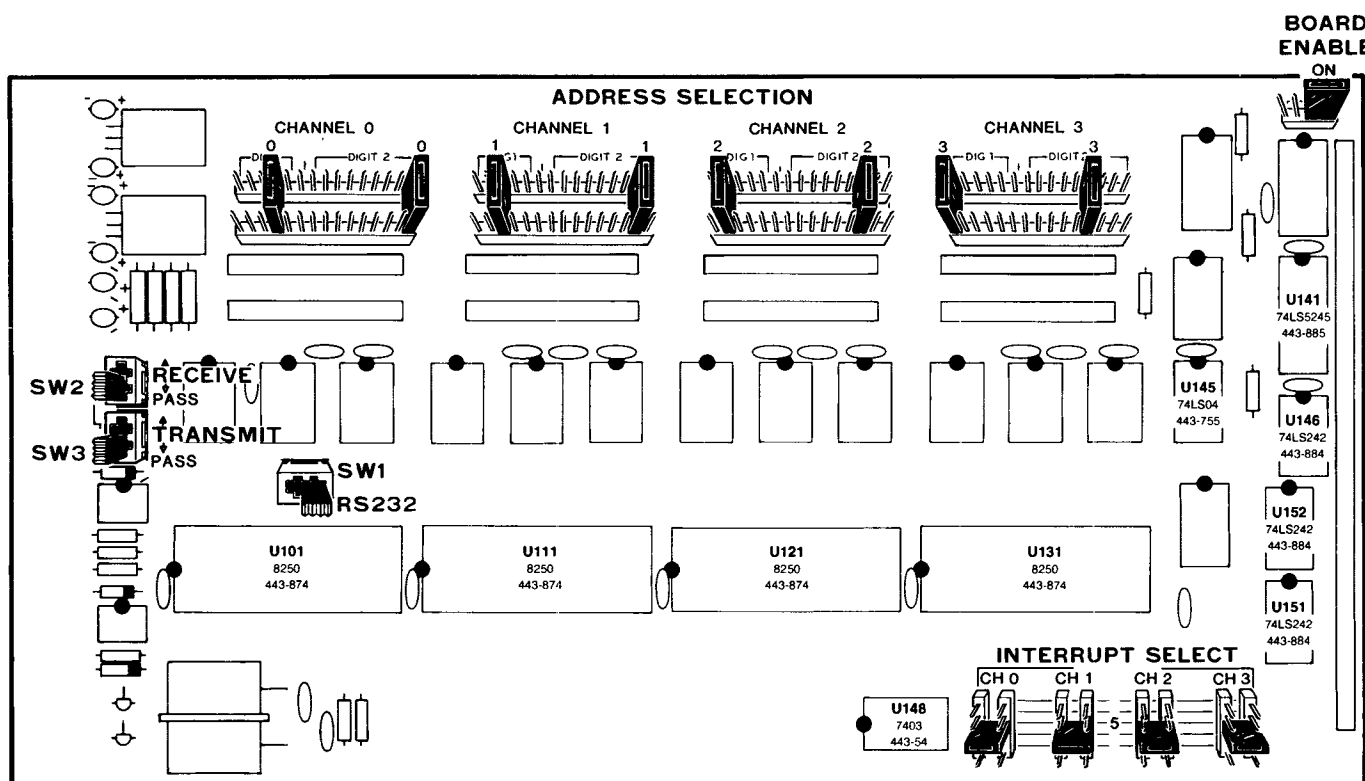
Set the programming jumpers as follows:

- Channel 0 to 00.
- Channel 1 to 11.
- Channel 2 to 22.
- Channel 3 to 33.
- BOARD ON/OFF to ON.
- All four INTERRUPTS to 5.

Set the three switches as follows:

- RCV ACT/PASS to PASS.

- XMT ACT/PASS to PASS.
- 20 mA /RS232 to RS232.
- Make sure your Computer is turned off.
- Plug the Multiport Serial I/O Card onto a selected plug in your Computer.
- Turn the Computer power switch on. The horn should sound (single beep) and the displays should operate in the usual manner. If so, proceed to the "Functional Test" in the "Operation Manual." If not, turn the power off and perform the following steps. After each step, repeat the above "power on" procedure. Continue until the Computer initializes in the proper manner.



PICTORIAL 5-1

Remove	Possible Cause of Problem
1. INTERRUPT jumpers.	U101, U111, U121, U131, U148.
2. U151 and U152.	U151, U152.
3. U146.	U146.
4. U141.	U141.
5. U145.	U145.

If you still cannot get the Computer to initialize, a solder bridge probably exists between one of the edge connector foils and a foil coming from one of the integrated circuits listed above. After a problem has been located and corrected, replace the integrated circuits and INTERRUPT jumpers and repeat the preceding tests.

