

SECTION IV

ASSEMBLY

and

TEST

Sol PERSONALITY MODULE



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4.1 PARTS AND COMPONENTS

Check all parts and components against the "Parts List", Table 4-1. If you have difficulty in identifying any parts by sight, refer to Figure 3-1 on Page III-5 in Section III of this manual.

Table 4-1. PM5204 Personality Module Parts List.

| | | | |
|---|---|---|----------------------------------|
| 1 | PM5204 PC Board | 2 | 1 ufd Capacitor, Tantalum Dipped |
| 2 | 5204 or 5204Q EPROM (U1 & U2) | | |
| 1 | 74LS155 (U5) | 1 | 16-pin DIP Socket |
| 9 | 10K ohm, $\frac{1}{4}$ watt, 5% Film Resistor | 2 | 24-pin DIP Socket |
| 1 | .047 ufd Capacitor, Disc Ceramic | 1 | Handle Bracket (Sol-1045) |
| | <u>MM 5204C</u> | 2 | 2-56xl/8 Binder Head Screw |

4.2 ASSEMBLY TIPS

For the most part the assembly tips given in Paragraph 3.2 of Section III (Page III-1) apply to assembling the personality module.

4.3 ASSEMBLY PRECAUTIONS

For the most part the assembly precautions given in Paragraph 3.3 in Section III (Page III-6) apply to assembling the personality module.

4.4 REQUIRED TOOLS, EQUIPMENT AND MATERIALS

The following tools, equipment and materials are recommended for assembling the personality module:

1. Needle nose pliers
2. Diagonal cutters
3. Screwdriver
4. Controlled heat soldering iron, 25 watt
5. 60-40 rosin-core solder (supplied)
6. Small amount of #24 solid wire

4.5 ORIENTATION

Resistor location R7 will be located in the lower righthand corner of the board when the edge connector is positioned at the

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left end of the board. In this position the component (front) side of the board is facing up. Subsequent position references related to the personality module circuit board assume this orientation.

4.6 ASSEMBLY-TEST

4.6.1 Circuit Board Check

- (✓) Visually check circuit board for broken traces, shorts (solder bridges) between traces and similar defects.
- (✓) Check circuit board to insure that the +5-volt bus, +12-volt bus and -12-volt bus are not shorted to each other or to ground. Using an ohmmeter, make the following measurements (refer to personality module assembly drawing in Section IX):
 - (✓) +5-volt Bus Test. Measure between edge connector pin B14 (back side, second pin from bottom) and pin B1 (back side, top pin). There should be no continuity.
 - (✓) -12-volt Bus Test. Measure between edge connector pin B2 (back side, second pin from top) and pin B1 (back side, top pin). There should be no continuity.
 - (✓) +12-volt Bus Test. Measure between edge connector pin B15 (back side, bottom pin) and pin B1 (back side, top pin). There should be no continuity.
 - (✓) 5/12/(-12) Volt Bus Test. Measure between edge connector pin B14 (back side, second pin from bottom) and pin B15 (back side, bottom pin), between pin B15 and pin B2 (back side, second pin from top), and between pins B14 and B2. There should be no continuity in any of these three measurements.

If visual inspection reveals any defect, or you measure continuity in any of the preceding tests, return the board to Processor Technology for replacement. If the board is not defective, proceed to next paragraph.

4.6.2 Assembly-Test Procedure

Refer to personality module assembly drawing in Section IX.

CAUTION

THE MEMORY IC's USED ON THE PERSONALITY MODULE ARE MOS DEVICES. THEY CAN BE
(CAUTION continued on Page IV-3)

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DAMAGED BY STATIC ELECTRICITY DISCHARGE. HANDLE THESE IC's SO THAT NO DISCHARGE FLOWS THROUGH THE IC. AVOID UNNECESSARY HANDLING AND WEAR COTTON, RATHER THAN SYNTHETIC, CLOTHING WHEN HANDLING MOS IC's. (STATIC CHARGE PROBLEMS ARE MUCH WORSE IN LOW HUMIDITY CONDITIONS.)

- (✓) Step 1. Install DIP sockets. Install each socket in the indicated location with its end notch oriented as shown on the circuit board and assembly drawing. Take care not to create solder bridges between the pins and/or traces.

INSTALLATION TIP

Insert socket pins into mounting pads of appropriate location. On back (solder) side of board, bend pins at opposite corners of socket (e.g. pins 1 and 9 on a 16-pin socket) outward until they are at a 45° angle to the board surface. This secures the socket until it is soldered. Repeat this procedure with each socket until all are secured to the board. Then solder the pins on all sockets.

| <u>LOCATION</u> | <u>TYPE SOCKET</u> |
|-----------------|--------------------|
| (✓) U1 | 24 pin |
| (✓) U2 | 24 pin |
| () U3* | None |
| () U4* | None |
| (✓) U5 | 16 pin |

*Spare locations, not used.

- (✓) Step 2. Install the following resistors in the indicated locations. Install these resistors vertical to the board as shown in Figure 4-1, solder and trim.

| <u>LOCATION</u> | <u>VALUE (ohms)</u> | <u>COLOR CODE</u> |
|-----------------|---------------------|--------------------|
| (✓) R1 | 10K | brown-black-orange |
| (✓) R2 | 10K | " " " |
| (✓) R3 | 10K | " " " |
| (✓) R4 | 10K | " " " |

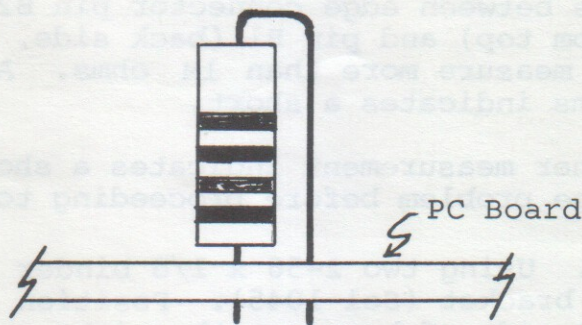


Figure 4-1. R1 through R4 installation.

- (✓) Step 3. Install the following resistors in the indicated locations. Install these resistors in the normal position, parallel with the board. Bend leads to fit distance between mounting holes, insert leads, pull down snug to board, solder and trim.

| <u>LOCATION</u> | <u>VALUE (ohms)</u> | <u>COLOR CODE</u> |
|-----------------|---------------------|--------------------|
| (✓) R5 | 10K | brown-black-orange |
| (✓) R6 | 10K | " " " |
| (✓) R7 | 10K | " " " |
| (✓) R8 | 10K | " " " |
| (✓) R9 | 10K | " " " |

- (✓) Step 4. Install the following capacitors in the indicated locations. Take care to observe the proper value, type and orientation for each installation. Insert leads, bend outward on solder (back) side of board, solder and trim. (Refer to footnote at end of this step before installing C3.)

| <u>LOCATION</u> | <u>VALUE (ufd)</u> | <u>TYPE</u> | <u>ORIENTATION</u> |
|-----------------|--------------------|--------------|--------------------|
| (✓) C1 | 1 | Tant Dip | "+" lead bottom |
| (✓) C2 | 1 | Tant Dip | "+" lead bottom |
| (✓) C3* | .047 | Disc Ceramic | None |

*Insert leads through mounting holes, remove capacitor and clear holes of any wax. Reinsert and install.

- (✓) Step 5. Check for +5-volt bus to ground and -12-volt bus to ground shorts. Using an ohmmeter, make the following measurements:

- (✓) Measure between edge connector pin B14 (back side, second pin from bottom) and pin B1 (back side, top pin). You should measure more than 1M ohms. A reading less than 10K ohms indicates a short.

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- (↓) Measure between edge connector pin B2 (back side, second pin from top) and pin B1 (back side, top pin). You should measure more than 1M ohms. A reading less than 10K ohms indicates a short.
- (↓) If either measurement indicates a short, find and correct the problem before proceeding to Step 6.
- (↓) Step 6. Using two 2-56 x 1/8 binder head screws, install handle bracket (Sol-1045). Position bracket on front (component) side of board at the right end as shown in Figure 4-2. Align bracket holes with mounting holes in board, insert screws from back (solder) side of board and drive into bracket. No nuts are needed since the bracket holes are tapped.

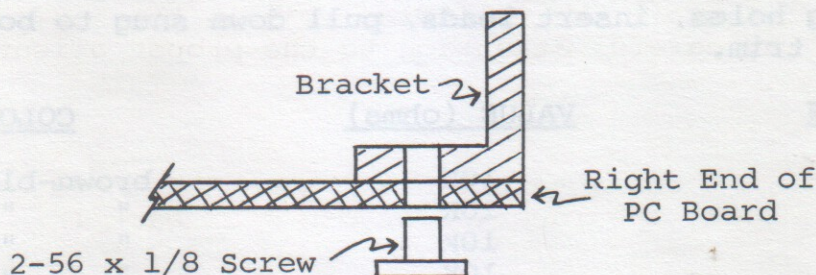


Figure 4-2. Handle bracket (Sol-1045) installation.

- (✓) Step 7. If 5204A EPROM's are supplied with your kit, go on to Step 8. If 5204Q EPROM's are supplied, install jumpers (#24 bare wire may be used) in the four J1 locations. These are located just below U3, to the left of R5, to the right of R1 and to the right of R2.
- () Step 8. Stop assembly at this point and proceed with Sol-PC assembly and test up through Step 48. (See Section III.) Then go on to Step 9 of this procedure.
- (✓) Step 9. Plug personality module into J5 on Sol-PC, apply power to Sol-PC and make the following voltage measurements on the personality module:

| <u>MEASUREMENT POINT</u> | <u>VOLTAGE</u> |
|--------------------------|-------------------|
| Pin 1 of U1 Socket | +5 V dc $\pm 5\%$ |
| Pin 4 of U1 Socket | +5 V dc $\pm 5\%$ |
| Pin 12 of U1 Socket | +5 V dc $\pm 5\%$ |
| Pin 1 of U2 Socket | +5 V dc $\pm 5\%$ |

(Step 9 continued on Page IV-6.)

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| <u>MEASUREMENT POINT</u> | <u>VOLTAGE</u> |
|--------------------------|--------------------|
| Pin 4 of U2 Socket | +5 V dc $\pm 5\%$ |
| Pin 12 of U2 Socket | +5 V dc $\pm 5\%$ |
| Pin 23 of U1 Socket | -12 V dc $\pm 5\%$ |
| Pin 23 of U2 Socket | -12 V dc $\pm 5\%$ |
| Pin 2 of U1 Socket | Ground |
| Pin 2 of U2 Socket | Ground |

- (✓) If any voltages are incorrect, locate and correct the cause before proceeding to Step 10.
- (✓) If the voltages are correct, turn power off, disconnect power cable, unplug personality module and go on to Step 10.
- (✓) Step 10. Install the following IC's in the indicated locations. Pay careful attention to the proper orientation.

NOTE

Dots on the assembly drawing and PC board indicate the location of pin 1 of each IC.

| <u>IC NO.</u> | <u>TYPE</u> |
|---------------|----------------|
| (✓) U1* | 5204A or 5204Q |
| (✓) U2* | 5204A or 5204Q |
| (✓) U3 | None |
| (✓) U4 | None |
| (✓) U5 | 74LS155 |

*MOS device. See CAUTION on Pages IV-2,3.

- (✓) Step 11. Plug personality module into J5 on Sol-PC and connect Sol-PC video output cable to video monitor. (Refer to CAUTION on Page III-22 in Section III.)
- (✓) Set S1 switches as follows:
 - No. 1 through 4: OFF
 - No. 5: ON
 - No. 6: OFF
- (✓) Turn monitor on and apply power to Sol-PC.
- (✓) You should see a white display on the monitor with a blinking rectangular cursor in the upper left corner of the screen.

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- (✓) If you do not see a blinking cursor, locate and correct the problem before proceeding.
- (✓) If a blinking cursor is present, the Enter and DUMP commands should operate as described in Section IX of this manual.
- (✓) If the Enter and DUMP commands do not operate correctly, locate and correct the problem before proceeding.
- (✓) If the personality module is operating correctly, turn monitor and power off, disconnect power cable and video output cable and go on to Step 50 in Section III. (The personality module can be left plugged in.)

NOTE

Note on the Assembly Drawing and PC board indicate the location of pin 1 of each IC.

| IC NO. | TYPE |
|--------|----------------|
| U1* | 5204A or 5204B |
| U2* | 5204A or 5204B |
| U3 | None |
| U4 | None |
| U5 | 74LS158 |

*MS device. See CAUTION on pages IV-5, 6.

Step 11. Plug personality module into J5 on SO1-PG and connect SO1-PG video output cable to video monitor. (Refer to CAUTION on page III-23 in Section III.)

Set S1 switches as follows:

No. 1 through 4: ON

No. 5: ON

No. 6: OFF

Turn monitor on and apply power to SO1-PG.

You should see a white display on the monitor with a blinking rectangular cursor in the upper left corner of the screen.

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4.1 PARTS AND COMPONENTS

When ordering your Sol, you selected one of the three types of Personality Modules: CONSOL, SOLOS, or SOLED. The outer carton for your kit is stamped with the Personality Module type. All three use the same PC board, marked 5204, and differ only in the number of EPROM's and their programming. An alternative PC board marked 6834 and designed for type 6834 EPROM's is also available, but not supplied with this kit. Schematic diagram X-5 and assembly drawing X-21 refer to this alternative board. Check all parts against Table 4-1 below. If you have difficulty identifying any parts, refer to Figure 3-1 on page III-5.

Table 4-1. PM5204 Personality Module Parts List.

| | | | |
|--------|----------------------------------|---|-------------------------------------|
| 1 | PM5204 PC Board | 2 | 1-ufd Capacitor, Tantalum Dipped |
| 2 or 4 | 5204A or 5204Q EPROM | 4 | 24-pin DIP Socket |
| 1 | 74LS155 | 1 | 16-pin DIP Socket |
| 9 | 10K ohm, 1/4 watt, 5% Resistor | 1 | Handle Bracket (Sol-1045) |
| 1 | .047-ufd Capacitor, Disc Ceramic | 2 | 2-56X1/8 Binder Head Screw |

4.2 ASSEMBLY TIPS

For the most part the assembly tips given in Paragraph 3.2 of Section III (Page III-1) apply to assembling the personality module.

4.3 ASSEMBLY PRECAUTIONS

For the most part the assembly precautions given in Paragraph 3.3 in Section III (Page III-6) apply to assembling the personality module.

4.4 REQUIRED TOOLS, EQUIPMENT AND MATERIALS

The following tools, equipment and materials are recommended for assembling the personality module:

1. Needle nose pliers
2. Diagonal cutters
3. Screwdriver
4. Controlled heat soldering iron, 25 watt
5. 60-40 rosin-core solder (supplied)
6. Small amount of #24 solid wire

4.5 ORIENTATION

Resistor location R7 will be located in the lower righthand corner of the board when the edge connector is positioned at the

✓

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left end of the board. In this position the component (front) side of the board is facing up. Subsequent position references related to the personality module circuit board assume this orientation.

4.6 ASSEMBLY-TEST

4.6.1 Circuit Board Check

- () Visually check circuit board for broken traces, shorts (solder bridges) between traces and similar defects.
- () Check circuit board to insure that the +5-volt bus, +12-volt bus and -12-volt bus are not shorted to each other or to ground. Using an ohmmeter, make the following measurements (refer to personality module assembly drawing in Section X):
 - () +5 volt Bus Test. On U1, measure between pin 24, (ground) and pins 1, then 12 (+5 volts). There should be no continuity.
 - () -12 volt Bus Test. Also on U1, measure between pin 24 (ground) and pin 23 (-12 volts). There should be no continuity.
 - () +12 volt Bus Test. Also on U1, measure between pin 24 (ground) and the bottom edge connector pin on the component side of the board (nearest the "+" side of C1).
 - () Inter-bus Test. On U1, measure between pins 1 and 23, then between the edge connector pin in the previous test and pins 23, then 1. There should be no continuity in any of these measurements.

If visual inspection reveals any defect, or you measure continuity in any of the preceding tests, return the board to Processor Technology for replacement. If the board is not defective, proceed to next paragraph.

4.6.2 Assembly-Test Procedure

Refer to personality module assembly drawing X-4.

CAUTION

THE MEMORY IC's USED ON THE PERSONALITY MODULE ARE MOS DEVICES. THEY CAN BE
(CAUTION continued on Page IV-3)

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DAMAGED BY STATIC ELECTRICITY DISCHARGE. HANDLE THESE IC's SO THAT NO DISCHARGE FLOWS THROUGH THE IC. AVOID UNNECESSARY HANDLING AND WEAR COTTON, RATHER THAN SYNTHETIC, CLOTHING WHEN HANDLING MOS IC's. (STATIC CHARGE PROBLEMS ARE MUCH WORSE IN LOW HUMIDITY CONDITIONS.)

- () Step 1. Install DIP sockets. Install each socket in the indicated location with its end notch oriented as shown on the circuit board and assembly drawing. Take care not to create solder bridges between the pins and/or traces.

INSTALLATION TIP

Insert socket pins into mounting pads of appropriate location. On back (solder) side of board, bend pins at opposite corners of socket (e.g. pins 1 and 9 on a 16-pin socket) outward until they are at a 45° angle to the board surface. This secures the socket until it is soldered. Repeat this procedure with each socket until all are secured to the board. Then solder the pins on all sockets.

| <u>LOCATION</u> | <u>TYPE SOCKET</u> |
|-----------------|--------------------|
| () U1 | 24 pin |
| () U2 | 24 pin |
| () U3 | 24 pin |
| () U4 | 24 pin |
| () U5 | 16 pin |

- () Step 2. Install the following resistors in the indicated locations. Install these resistors vertical to the board as shown in Figure 4-1, solder and trim.

| <u>LOCATION</u> | <u>VALUE (ohms)</u> | <u>COLOR CODE</u> |
|-----------------|---------------------|--------------------|
| () R1 | 10K | brown-black-orange |
| () R2 | 10K | " " " |
| () R3 | 10K | " " " |
| () R4 | 10K | " " " |

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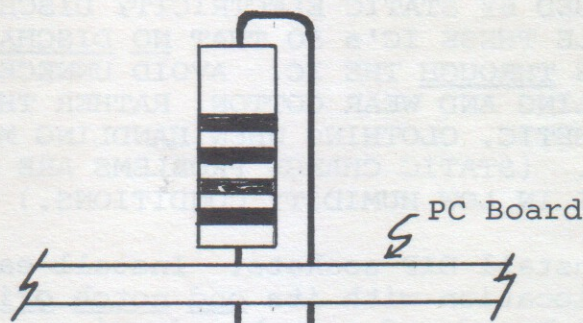


Figure 4-1. R1 through R4 installation.

- () Step 3. Install the following resistors in the indicated locations. Install these resistors in the normal position, parallel with the board. Bend leads to fit distance between mounting holes, insert leads, pull down snug to board, solder and trim.

| <u>LOCATION</u> | <u>VALUE (ohms)</u> | <u>COLOR CODE</u> |
|-----------------|---------------------|--------------------|
| () R5 | 10K | brown-black-orange |
| () R6 | 10K | " " " |
| () R7 | 10K | " " " |
| () R8 | 10K | " " " |
| () R9 | 10K | " " " |

- () Step 4. Install the following capacitors in the indicated locations. Take care to observe the proper value, type and orientation for each installation. Insert leads, bend outward on solder (back) side of board, solder and trim. (Refer to footnote at end of this step before installing C3.)

| <u>LOCATION</u> | <u>VALUE (ufd)</u> | <u>TYPE</u> | <u>ORIENTATION</u> |
|-----------------|--------------------|--------------|--------------------|
| () C1 | 1 | Tant Dip | "+" lead bottom |
| () C2 | 1 | Tant Dip | "+" lead bottom |
| () C3* | .047 | Disc Ceramic | None |

*Insert leads through mounting holes, remove capacitor and clear holes of any wax. Reinsert and install.

- () Step 5. Check for +5-volt bus to ground and -12-volt bus to ground shorts. Using an ohmmeter, make the following measurements:

- () Measure between edge connector pin B14 (back side, second pin from bottom) and pin B1 (back side, top pin). You should measure more than 1M ohms. A reading less than 10K ohms indicates a short.

- () Measure between edge connector pin B2 (back side, second pin from top) and pin B1 (back side, top pin). You should measure more than 1M ohms. A reading less than 10K ohms indicates a short.
- () If either measurement indicates a short, find and correct the problem before proceeding to Step 6.
- () Step 6. Using two 2-56 x 1/8 binder head screws, install handle bracket (Sol-1045). Position bracket on front (component) side of board at the right end as shown in Figure 4-2. Align bracket holes with mounting holes in board, insert screws from back (solder) side of board and drive into bracket. No nuts are needed since the bracket holes are tapped.

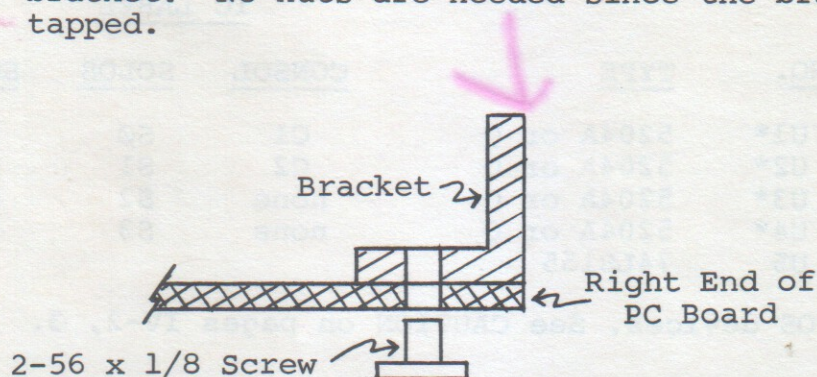


Figure 4-2. Handle bracket (Sol-1045) installation.

- () Step 7. If 5204A EPROM's are supplied with your kit, go on to Step 8. If 5204Q EPROM's are supplied, install jumpers (#24 bare wire may be used) in the four J1 locations. These are located just below U3, to the left of R5, to the right of R1 and to the right of R2.
- () Step 8. Stop assembly at this point and proceed with Sol-PC assembly and test up through Step 48. (See Section III.) Then go on to Step 9 of this procedure.
- () Step 9. Plug personality module into J5 on Sol-PC, apply power to Sol-PC and make the following voltage measurements on the personality module:

MEASUREMENT POINT

VOLTAGE

| | |
|-----------------------|-------------------|
| Pin 1 of U1, 2, 3, 4 | +5 V dc \pm 5% |
| Pin 4 of U1, 2, 3, 4 | +5 V dc \pm 5% |
| Pin 12 of U1, 2, 3, 4 | +5 V dc \pm 5% |
| Pin 23 of U1, 2, 3, 4 | -12 V dc \pm 5% |
| Pin 2 of U1, 2, 3, 4 | Ground |
| Pin 24 of U1, 2, 3, 4 | Ground |

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- () If any voltages are incorrect, locate and correct the cause before proceeding to Step 10.
- () If the voltages are correct, turn power off, disconnect power cable, unplug personality module and go on to Step 10.
- () Step 10. Install IC's in the sockets numbered U1 through U5. Make sure the dot or notch indicating pin 1 on the IC package is in the correct position as indicated on the PC board component legend and the assembly drawing X-4. Sockets U3 and U4 are to be left empty for CONSOL modules.

| IC NO. | TYPE | IC LABEL | | | |
|---------|------------|----------|-------|-------|--|
| | | CONSOL | SOLOS | SOLED | |
| () U1* | 5204A or Q | C1 | SØ | EØ | |
| () U2* | 5204A or Q | C2 | S1 | E1 | |
| () U3* | 5204A or Q | none | S2 | E2 | |
| () U4* | 5204A or Q | none | S3 | E3 | |
| () U5 | 74LS155 | | | | |

* MOS devices. See CAUTION on pages IV-2, 3.

- () Step 11. Plug personality module into J5 on Sol-PC and connect Sol-PC video output cable to video monitor. (Refer to CAUTION on Page III-22 in Section III.)

- () Set S1 switches as follows:

No. 1 through 4: OFF

No. 5: ON

No. 6: OFF

- () Turn monitor on and apply power to Sol-PC.

- () If you have a CONSOL module, you should see a white display on the monitor with a blinking rectangular cursor in the upper left corner of the screen. A SOLOS module will have the cursor preceded by a prompt character: >|

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- () If you do not see a blinking cursor, locate and correct the problem before proceeding.
- () If a blinking cursor is present, the ENTER and DUMP commands should operate as described in Section IX of this manual.
- () If the ENTER and DUMP commands do not operate correctly, locate and correct the problem before proceeding.
- () If the personality module is operating correctly, turn monitor and power off, disconnect power cable and video output cable and go on to Step 50 in Section III. (The personality module can be left plugged in.)

ASSEMBLY PROCEDURE CHANGE NOTICE

Reference Paragraph 4.6.2, Step 6 on Page IV-5 in Section IV of the Sol-PC Single Board Terminal ComputerTM Assembly and Test Instructions.

The PM5204 Personality Module Kit you have received with your Sol-PC Kit includes 2 each 2-56 x 3/16 binder head screws, 2 each #2 inside tooth lockwashers and 2 each 2-56 x 3/16 (max) hex nuts. These are used to attach the handle bracket (Sol-1045) to the PM5204 circuit board.

With your kit, use the following procedure to attach the handle bracket in place of Step 6 in Paragraph 4.6.2, Section IV: (Figure 4-2 on Page IV-5 in Section IV may still be used for reference concerning the position of the bracket.)

Position handle bracket (Sol-1045) on front (component) side of the board at the right end as shown in Figure 4-2. Align bracket holes with mounting holes in board, insert screws from back (solder) side of board, place lockwasher on each screw, start nuts and tighten.

CC #1