

SECTION 10
EXPANDING AIM 65

AIM 65 provides for on-board and off-board expansion. On-board RAM, ROM, or PROM can be added by simply plugging the device into an appropriate vacant socket on the Master Module. Off-board expansion is also readily accomplished since all address, data, and control bus lines are brought out to the J3 Expansion Connector.

Commercially available motherboards allow the AIM 65 to be interfaced to a variety of standard busses, including the Rockwell R6500 bus, the Motorola M6800 bus, and the S-100 bus.

10.1 ON-BOARD RAM EXPANSION

On-board RAM may be expanded up to 4K (4096_{10} or $0FFF_{16}$) by plugging in R2114 static RAM devices or equivalent. The RAM socket pin assignments are shown in Figure 10-1. These devices must be added in pairs since each socket provides only four data bits, i.e., one half of the required 8-bit data width of a byte. The optional RAM pairs are:

<u>ADDRESS</u>	<u>SOCKETS</u>
0400-07FF	26, 27
0800-0BFF	211, 212
0C00-0FFF	217, 218

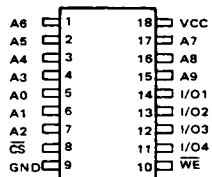


Figure 10-1. RAM Socket Pin Assignments

Install the RAM as follows:

1. Turn off AIM 65 power.
2. Align pin 1 of the RAM device with pin 1 of the socket.
3. Carefully insert the RAM device into the socket while applying pressure under the board to prevent board flexing until all pins are firmly seated.

CAUTION

Improper pin alignment may cause the pins to bend back during insertion and not make proper contact. If this happens, remove the device from the socket, very carefully straighten any bent pins, and reinsert the device back into the socket.

4. Turn on AIM 65 power.

5. Verify proper RAM installation and operation by entering the AIM 65 Text Editor and establishing the Text Buffer limits over the range of the added RAM. The Text Editor checks one address on each page for write and read operation. Improper RAM installation or operation will result in a <MEM ERROR.

10.2 ON-BOARD PROM/ROM EXPANSION

On-board PROM/ROM may be added up to 20K ($B000_{16} - FFFF_{16}$) by plugging in AIM 65 optional R2332 ROM, user provided R2332 ROM, or user provided compatible PROM devices. The PROM/ROM socket pin assignments are shown in Figure 10-2.

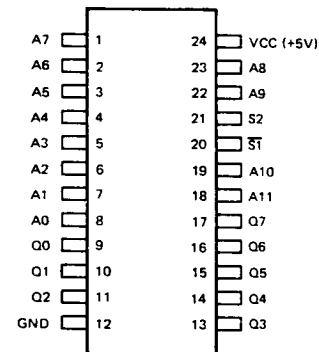


Figure 10-2. PROM/ROM Socket Pin Assignments

Install the PROM/ROM devices as follows:

1. Turn off AIM 65 power.

2. Align pin 1 of the PROM/ROM device with pin 1 of the socket.
3. Carefully insert the PROM/ROM device into the socket while applying pressure under the socket to prevent board flexing until all pins are firmly seated.

CAUTION

Improper pin alignment may cause the pins to bend back during insertion and not make proper contact. If this happens, remove the device from the socket, very carefully straighten any bent pins, and reinsert the device back into the socket.

4. Turn on AIM 65 power.
5. The program in the PROM/ROM devices can be tested by setting the program counter to the program starting address (using the * command) and executing the program using the G command, or by using a function key (F1, F2, or F3) after proper JMP instructions have been loaded (\$010C-\$010E, \$010F-\$0111, or \$0112-\$0114 respectively), or by using the AIM 65 option key linkage. The addresses in the spare PROM/ROM sockets called by the Monitor are:

<u>KEY</u>	<u>SOCKET</u>	<u>ADDRESS</u>
N	Z24	D000
5	Z26	B000
6	Z26	B003

10.3 OFF-BOARD EXPANSION

AIM 65 may be expanded off-board up to the 65K address limit of the R6502. The address, data, and control bus lines on the J3 Expansion Connector provide the interface signals. Expansion module or motherboards may be purchased that plug directly into J3. An expansion module may have components mounted directly on the board that perform desired functions or interface with other circuits. An expansion motherboard will have one or more card slots attached that allow standard interface expansion modules to be installed.

Alternatively, a custom circuit may be designed to interface with J3 through an interface cable and connector.

Whatever the expansion method, the loading limitations of the R6502 address, data, and control lines should be followed. Refer to the R6500 Hardware Manual for the detailed R6502 electrical characteristics.

SECTION 11
TROUBLESHOOTING, WARRANTY, AND SERVICE

Your AIM 65 has been functionally tested at the factory before packing for shipment. Should your AIM 65 not operate correctly, consult the troubleshooting procedure in Table 11-1. If the problem cannot be corrected, return the AIM 65 to Rockwell with a description of the failure in accordance with the following service policies.

11.1 LIMITED 90-DAY WARRANTY

Rockwell International Corporation warrants the R6500 Advanced Interactive Microcomputer (AIM 65), and any approved accessories provided by Rockwell, against defects in materials and workmanship for a period of ninety (90) days from the date of delivery. In case of a defect, Rockwell International will, at its option, repair or replace the AIM 65 without charge.

For service under this warranty:

1. Pack the AIM 65 carefully in its original container, to avoid breakage in transit. The unit must be returned complete, with all components intact.
2. Mail it prepaid and insured to:

AIM 65 Customer Service Center
Rockwell International
6001 Threadgill Avenue
El Paso, Texas 79924
Phone 800/351-6018

3. With the AIM 65, enclose a copy of your invoice, sales slip, or other dated proof of purchase showing serial number of unit being returned.

EXCLUSIONS AND LIMITATIONS

This warranty does not extend to any damage or malfunction resulting from misuse, neglect, accident, or repairs or modifications made by other than authorized personnel at the above captioned service facility. This warranty (except as to title) is in lieu of all other warranties, expressed or implied, including merchantability or fitness for any particular purpose, arising by law, custom or conduct. The rights and remedies provided herein are exclusive and in lieu of any other rights or remedies. In no event shall Rockwell International be liable for consequential damages.

11.2 OUT-OF-WARRANTY SERVICE

If the warranty period has expired or the AIM 65 is returned without proof of purchase date or serial number documented, we will repair and return the AIM 65 to you C.O.D., at our prevailing service rates. To save C.O.D. handling and shipping charges, call the Customer Service Center in advance, toll-free 800/351-6018, for the amount of out-of-warranty repair charges, then forward your check payable to Rockwell International. Customers with established Rockwell accounts may enclose a company purchase order.

11.3 PRINTER PAPER

The AIM 65 Printer uses thermal/heat-sensitive paper. This paper is available from our Service Center, as Part Number TT 270, at a cost of 3 rolls for \$3.50, plus shipping costs. You may also use Olivetti Type No. 295933R35 or Sears Type 3974. DO NOT USE Texas Instruments Type TP-27225 paper!

11.4 PRINTER ADJUSTMENT

The printer has been adjusted at the factory, and no further adjustment should be required during normal operation. There are four adjustments on the printer that may be required, however, after extended printer operation.

11.4.1 Release Level Print Adjustment

With the head release lever in the PRINT position, wing "A" of the level should not touch the Thermal Head group. There must be visible clearance at "B" so that the Thermal Head group may rest on the platen (see Figure 11-1a).

11.4.2 Release Level Release Adjustment

When the head release lever is in the RELEASE position, the Thermal Head group must be held away from the platen. Minimum clearance is 0.8mm, as shown. To obtain both these conditions, form wings "A" as necessary (see Figure 11-1b).

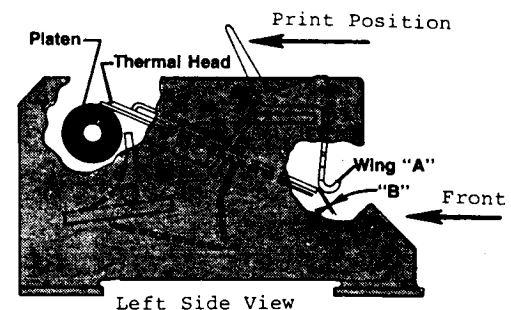
11.4.3 Motor Gear Mesh Adjustment

Motor gear mesh is adjusted by loosening the top and bottom motor mounting screws, and repositioning the motor as necessary. Mesh between the motor and the large transmission gear must be as deep as possible without binding. When this condition is obtained, tighten the motor mounting screws (see Figure 11-1c).

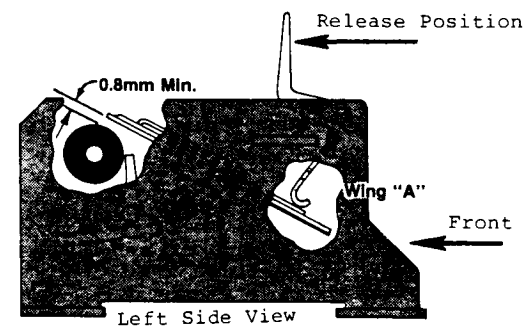
11.4.4 Vertical Dot Alignment Adjustment

To adjust vertical dot alignments, print a series of eights and ones: 81818181...

Loosen the strobe cap mounting nut slightly. Rotate the strobe cap until all vertical dots are in line. Tighten the strobe cap mounting nut (see Figure 11-1d).



A. Release Level Print Adjustment



B. Release Level Release Adjustment

Figure 11-1. AIM 65 Printer Adjustments

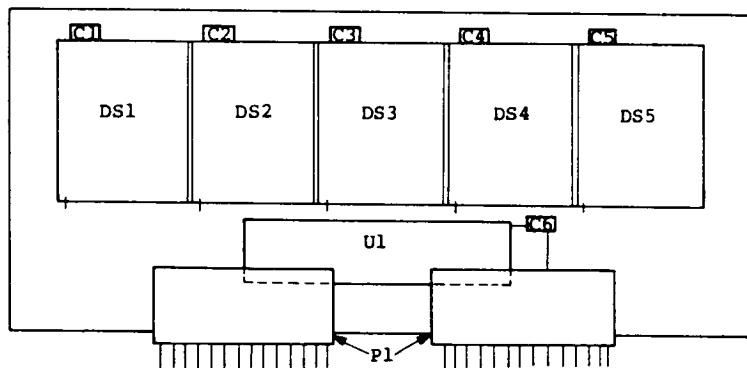


Figure 11-3. AIM 65 Display Module Layout

Table 11-1. Troubleshooting Procedure

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. No display	1a. +5V absent or low	1a. Ensure +5±0.5V on TB1-3
	1b. Monitor or user program hung up or lost	1b. Press RESET
	1c. Display module pin(s) disconnected from J5	1c. Ensure all display module pins are securely inserted into J5
	1d. R6502 CPU incorrectly installed	1d. Ensure R6502 correctly installed in Z9
	1e. R3222 and R3223 ROMs incorrectly installed	1e. Ensure ROMs are correctly installed in Z22 and Z23, respectively.
	1f. RAM Page 0 and 1 not installed	1f. Ensure R2114 RAMs are installed incorrectly in Z2 and Z3

Table 11-1. Troubleshooting Procedure (Cont.)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
2. No response to keyboard entry	2a. KB/TTY switch not in proper position for selected AIM 65 or TTY keyboard.	2a. Select KB or TTY on KB/TTY switch to match desired keyboard. Press RESET.
	2b. Monitor or User program hung-up or lost.	2b. Press RESET.
	2c. AIM 65 Keyboard Module disconnected from Master Module.	2c. Ensure Keyboard Module to Master Module interconnect cable is securely connected to both modules.
	2d. Stuck key on keyboard.	2d. Release stuck key(s).
3. Printer not printing.	3a. Printer control turned off.	3a. Type CTRL & PRINT after "<" prompt displayed simultaneously until <ON is displayed.

Table 11-1. Troubleshooting Procedure (Cont.)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
4. Printer not printing one or more columns	3b. Printer Release lever is in Release position.	3b. Move Printer Release Lever to Print position.
	3c. +24 absent or low.	3c. Ensure +24 \pm 1.5V on TB1-6.
	3d. Printer cable loose.	3d. Ensure printer cable contacts are securely inserted into J2
	3e. Printer cable pins misaligned in J2.	3e. Ensure printer cable contacts are properly aligned in J2
	3f. Z32 R6522 failed.	3f. Replace Z32 with Z1 R6522 to isolate failed R6522
	4a. See 3d.	4a. See 3d.
4b. See 3e.	4b. See 3e.	
4c. See 3f.	4c. See 3f.	

Table 11-1. Troubleshooting Procedure (Cont.)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
5. Printer printing too light or too dark	5a. Potentiometer VR2 out of adjustment.	5a. Adjust VR2 counterclockwise to darken printout, or clockwise to lighten printout
6. Printer printing too fast or too slow.	6a. Potentiometer VR3 out of adjustment.	6a. Adjust VR3 clockwise for slower operation, or counterclockwise for faster
7. Printer Vertical dots are misaligned	7a. Printer speed is too fast.	7a. Adjust VR3 clockwise for slower operation
	7b. Print vertical dots are out of adjustment.	7b. See Printer Vertical Dot adjustment (Section 11.4.4).
8. Printer is not printing evenly or consistently.	8a. Loose +24V power or GND connection.	8a. Ensure proper connections on power supply and TBl.
	8b. Foreign material between printer elements and paper.	8b. Release Printer Paper Release bar and ensure nothing is between the print element and the paper.

Table 11-1. Troubleshooting Procedure (Cont.)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
	8c. Printer Thermal Head is not resting on the platen when the Printer Release lever is in the Print position.	8c. See Printer Release level adjustment. (Section 11.4.2)
9. Printer motor runs slow or is stopped when energized.	9a. Motor gear mesh is too tight.	9a. See Printer Gear Mesh adjustment. (Section 11.4.3)
10. Printer motor runs but Thermal Head does not move.	10a. Motor gear mesh is too loose.	10a. See Printer Gear Mesh adjustment. (Section 11.4.3)
	10b. Printer Release lever is in Release position.	10b. Move lever to Print position.
11. Incorrect Assembler operation.	11a. Incorrect R3224 ROM installation.	11a. Ensure R3224 ROM is correctly installed in Z24.

Table 11-1. Troubleshooting Procedure (Cont.)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
12. Incorrect BASIC operation.	12a. Incorrect R3225 and R3226 ROM installation.	12a. Ensure R3225 and R3226 ROMs are correctly installed in Z25 and Z26, respectively.
13. Audio Tape Recorder Motor does not operate.	13a. Inoperative Recorder.	13a. Disconnect all AIM 65 lines from recorder and verify proper recorder operation.
	13b. Incorrect recorder control line installation.	13b. Verify recorder line installation per Section 9.1
	13c. Incomplete recorder control line connection.	13c. Remove control line from recorder. Put recorder in Play Mode and verify tape movement. With at least one audio line (IN or OUT) attached and proper tape control line ON, connect tape control line to recorder and verify continued

Table 11-1. Troubleshooting Procedure (Cont.)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
		recorder motor operation. Wiggle tape control line plug in recorder REM jack to ensure proper plug connection.
	13d. Wrong tape control line pair used.	13d. Try the other tape control line pair.
14. Audio Tape does not read properly.	14a. Inoperative Recorder	14a. See 13a.
	14b. Incorrect recorder installation.	14b. Verify recorder interface connection and checkout per Section 9.1
	14c. Low recorder volume adjustment on play.	14c. Adjust recorder volume to maximum.
	14d. Incompatible tape format parameter values.	14d. Ensure input device (T or K) equals the recorded output device (T or K).

Table 11-1. Troubleshooting Procedure(Cont.)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
	<p>14e. Incompatible tape speed.</p> <p>14f. Gap size is too short for Editor update or Assembler input.</p>	<p>14e. Ensure TSPEED (\$A408) value equals recorded tape speed, i.e., \$C7 (default), \$5B or \$5A.</p> <p>14f. Ensure GAP (\$A409) equals \$80 on recorded tape.</p> <p style="text-align: center;"><u>NOTE</u></p> <p style="text-align: center;">Default value is \$08.</p>