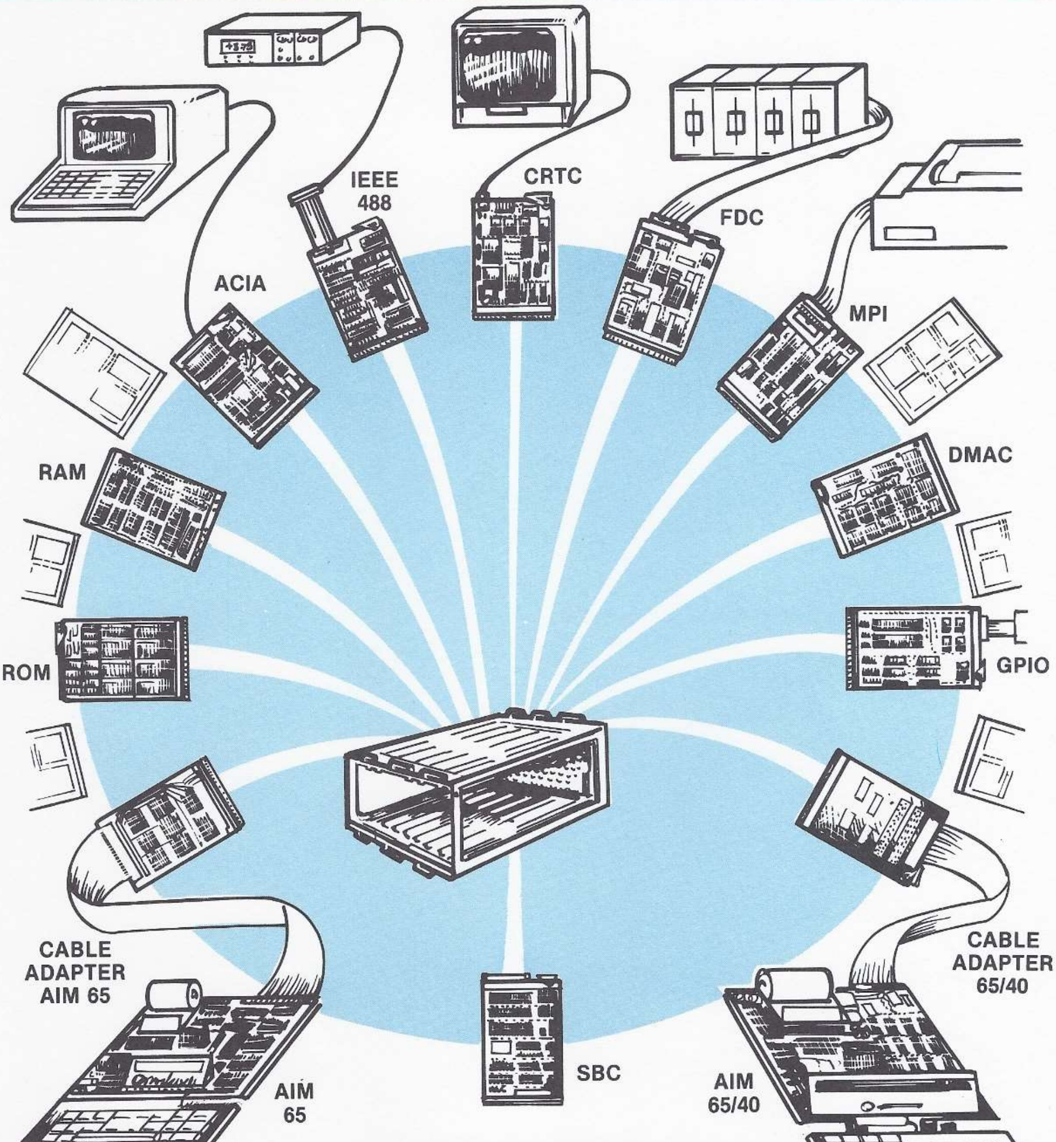
Rockwell International Modular Microcomputer Products



CONFIGURATION GUIDE

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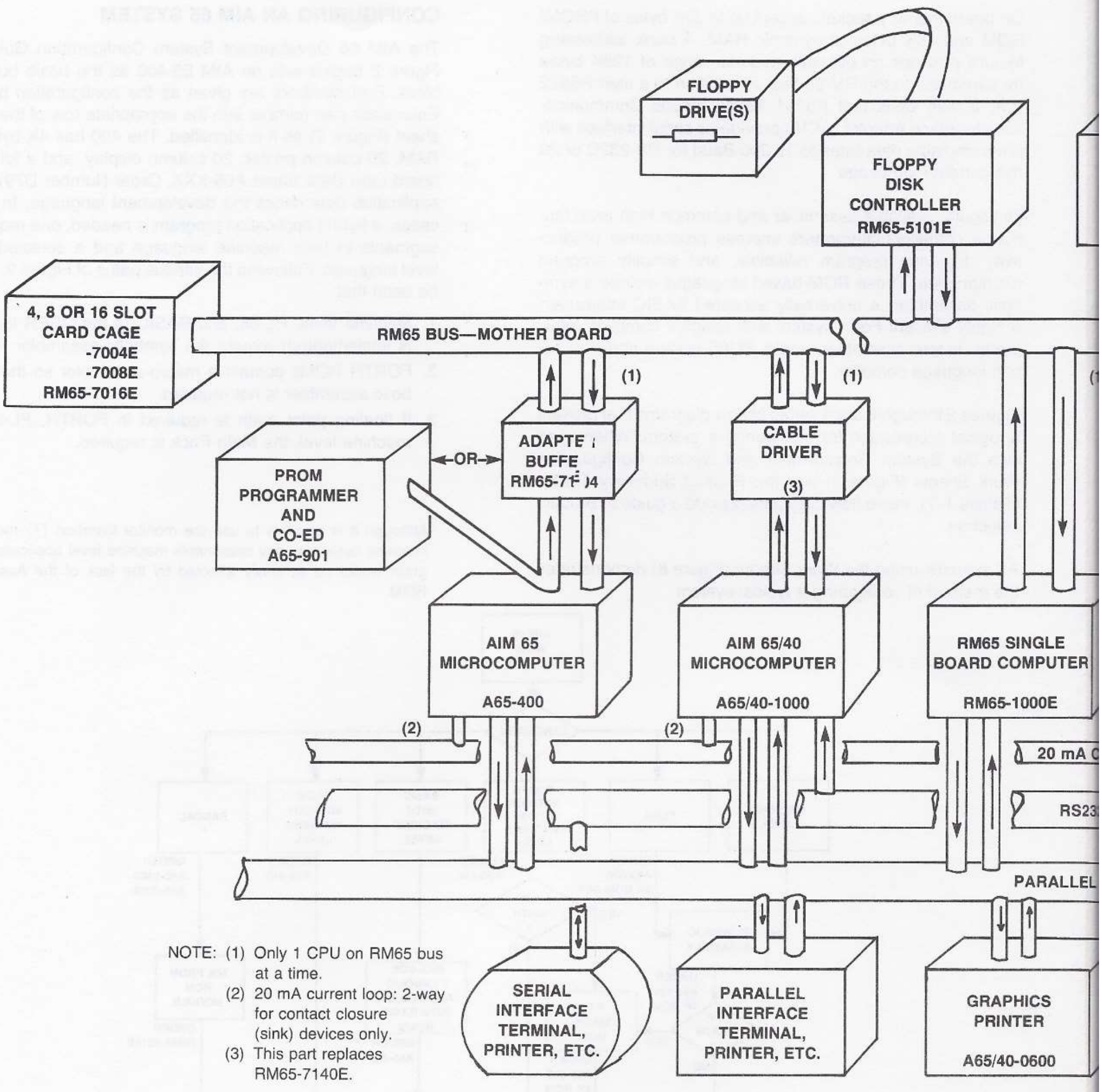


FIG

CONFIGURATION GUIDE

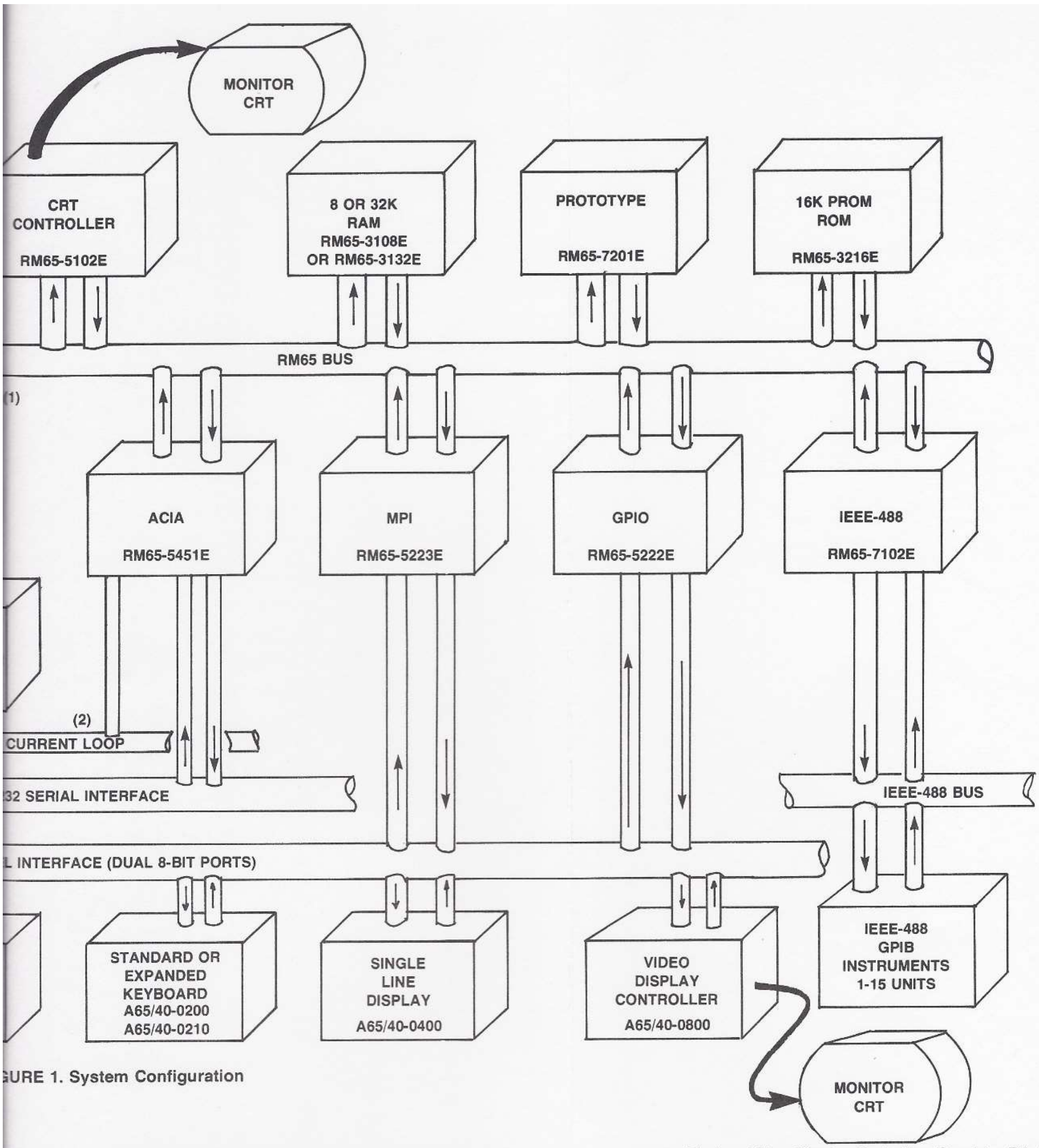
OVERVIEW

The system configuration guide shown in Figure 1 depicts the wide variety of intermix possible with Rockwell's modular Microcomputer Product Line.

The product line is designed for OEM and end-user microcomputer applications requiring state-of-the-art performance, compact size, modular design, and low cost. Software for these systems can be developed in R6500 Assembly Language, PL/65, BASIC and FORTH. Both BASIC and FORTH language interpreters are available as Run Time versions in 8K ROMs that can be incorporated into the user's final system.

The RM 65 modular microcomputer product line uses a motherboard interconnect concept and accepts any card in any slot. The 64-line RM 65 Bus offers memory addressing up to 128K bytes and high immunity to electrical noise. It includes growth provisions for user functions. A set of card cages allows a broad variety of packaging options. The RM 65 product line is also compatible with Rockwell's AIM 65 or AIM 65/40 Advanced Interactive Microcomputers for product development and desktop microcomputer applications.

The AIM 65 microcomputer is a complete, assembled microcomputer system featuring a 20-column thermal printer, a 20-



URE 1. System Configuration

character alphanumeric display, and a full-size terminal style keyboard. On-board memory sockets accept up to 20K bytes of PROM/ROM and 4K bytes of static RAM. A user R6522 Versatile Interface Adapter (VIA) dedicates 16 parallel I/O data lines and four handshaking control lines to application usage. The address, data, and control lines are accessible for off-board memory, peripheral, and I/O expansion. An 8K-byte ROM-resident debug monitor and text editor provides immediate interactive operation upon power turn-on.

The AIM 65/40 microcomputer system integrates the AIM 65/40 modular components—Single Board Computer, 40-Character Display, Video Display Controller, Graphics Printer and Standard Keyboard—into a complete, self-contained system with an application-oriented 4K-byte I/O ROM and an operator-oriented ROM resident 8K-byte interactive Debug Monitor/Text Editor. The display and printer modules are mounted onto the SBC while the keyboard is detached—all peripherals are connected through removable 40-conductor ribbon cables. The Video Display Controller can replace the 40-Character Display for text or graphics applications. Any of these peripherals can easily be relocated to other positions to satisfy unique installation requirements.

4. BASIC does not require a Math Pack since the Interpreter contain the math functions.
5. If the application program is to be saved in ROM, a prom programmer co-ed module is required (see Data Sheet A65-901, Order Number 269).

At this point the elemental system is defined and each selected item should be entered on the work sheet (Figure 7). Further expansion requires the use of flow diagram shown in Figure 5, the RM 65 module product line configuration guide.

CONFIGURING AN AIM 65/40 SYSTEM

The AIM 65/40 Development System Configuration Guide in Figure 3 is based on the powerful AIM 65/40 modular microcomputer. The completed configured system is designed to have either 16 or 32 K bytes of RAM on-board. Enter the part numbers in the work sheet, Figure 7, as they are defined. The first selection is to determine the type of display. This also determines the keyboard style as the expanded keyboard is associated with a video monitor display and the standard keyboard with the single line display. The single line display provides a 40 character VF display on an intelligent, parallel port interface module (see Data Sheet A65/40-0400, Order Number D76). The video display controller (VDC) provides CRT monitor interface with text and full graphics capability through an intelligent, parallel port interfaced module (see Data Sheet A65/40-0800, Order Number D86).

The expanded keyboard has the same key set as the standard keyboard plus an industry standard key pad. While both units are compatible with either display, it is recommended that the expanded keyboard with its separate cursor controls be used with the VDC (see Data Sheet A65/40-0200, -0210, Order Number D74).

The next decision concerns the hard copy of the application development and program records. The AIM 65/40 graphics printer provides 40 columns of thermal dot matrix print on an intelligent, parallel port interface module. Full 280 X n dot graphics is achievable with this printer (see Data Sheet A65/40-0600, Order Number D75). As an alternative, a wide variety of parallel or serial printers that can be interfaced to the AIM 65/40 with relative ease are available.

The application determines the language. Real time control, for example, generally requires real time or machine level programming, while human interface and data calculation are best handled by a high level language. The final application

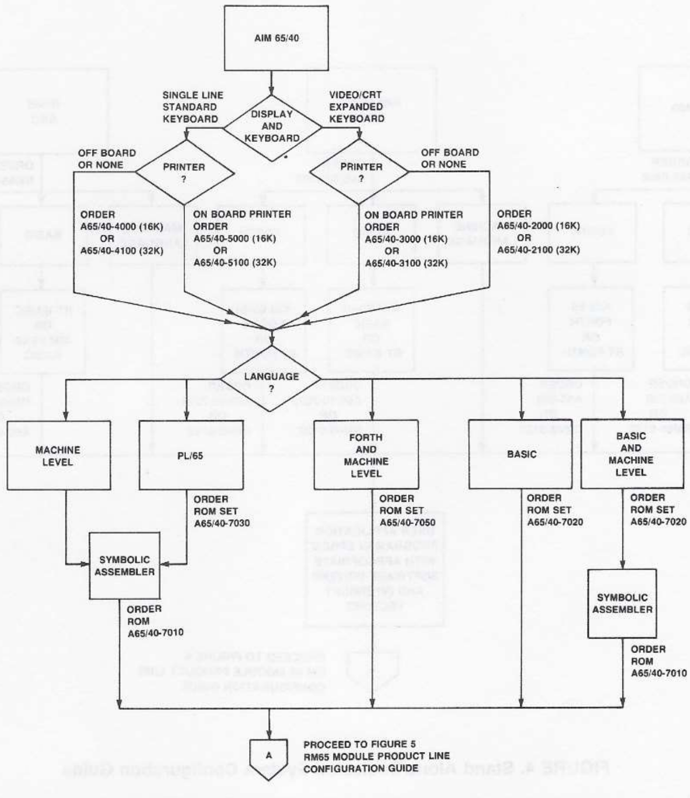


FIGURE 3. AIM 65/40 Development System Configuration Guide

software is most often a mix or hybrid of machine level and high level. From the flow diagram it can be seen that:

1. Machine level, PL-65, and BASIC with user functions require* the symbolic assembler.
2. FORTH supports machine level coding with an internal assembler.

At this point, the base system is defined and the selected part numbers should be entered into the work sheet. Figure 5 delineates the expansion requirements.

CONFIGURING THE FINAL SYSTEM

The Stand Alone/Dedicated System Configuration Guide in Figure 4 aids in determining the Host microcomputer in the final system. Once the application program has been developed, it may be advantageous to configure a stand-alone system, relieving the cost of the peripherals necessary for development. At this point, all systems parameters should be well-defined with regard to I/O, RAM, ROM, etc. The single board computer for the application is defined. Next, analyze the application language requirements. If a high level language is used, then the Run Time language ROM is appropriate. This ROM is an 8K ROM with all I/O vectored through RAM for user modification. The term Run Time means that, upon initial turn-on, the system comes up executing the application program. To incorporate these Run Time languages, you must include a machine level driver program. The power-on reset vectors in high memory (FFFC,D) point to the program. The general format for the driver is:

1. Initialize the routine and the high level language parameters
2. Set any variables required
3. Initialize any RAM I/O vectors to point to user handlers
4. Begin program execution by transfering to the language ROM.

Once defined, enter the selected SBC and ROM set in the work sheet, figure 7, and proceed to figure 5.

*Although the monitor insertion {I} mode will support machine level programming, any reasonable application program would be seriously handicapped without the Assembler ROM.

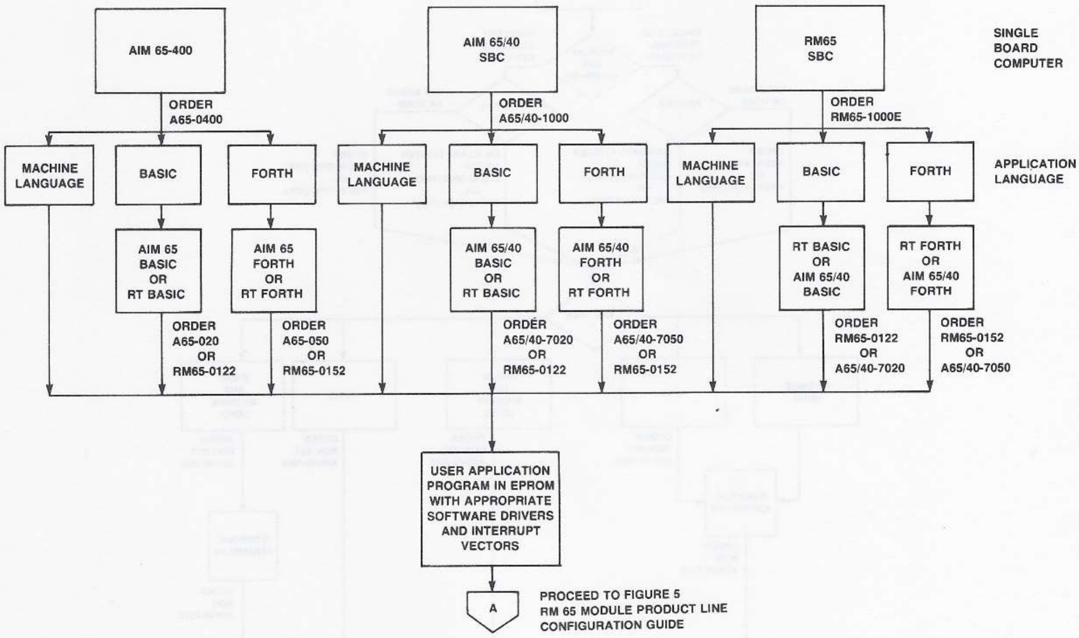


FIGURE 4. Stand Alone/Dedicated System Configuration Guide

CONFIGURING AN RM 65 SYSTEM

The RM 65 Module Product Line Configuration Guide in Figure 5 supplies the information necessary to expand either of the basic development systems (AIM 65 or AIM 65/40 based) or the dedicated/stand-alone system. The expansion modules, as selected, should be entered in the Worksheet, figure 7. This facilitates easy selection of the card cage size necessary to integrate the RM 65 expansion modules and the controlling system. Summaries of the various modules relating to power, memory requirements, etc., are shown in tables 1 through 7. The first decision is whether to expand onboard[1] RAM with either 8K or 32K RAM (see Data Sheet RM65-3216E or -3132E, Order Number RM02 or RM11). Permanent memory is analyzed next (see Data Sheet RM65-3216E, Order Number RM02), followed by the temporary mass memory media. Disk or tape are the options with tape *not* compatible with the RM 65-1000 SBC.

Disk expansion requires resident firmware. Depending on the SBC option, the AIM 65 DOS V1.0, AIM 65/40 DOS V1.0, or the primitives are available. The DOS ROMs as well as the non-DOS ROM will provide the primitives for the RM 65 SBC. The DOS routines do, however, require the appropriate SBC and monitor ROMs for proper DOS operation. The Disk configuration can be one to four of 5¼″ or 8″ floppies, single- or double-sided and single or double densities (see Data Sheet RM65-5101E, Order Number RM15). Parallel I/O, when required beyond the dedicated user port on the SBC, can be expanded with either the MPI or GPIO card. The interface to the AIM 65/40 peripherals (display, printer, keyboard) is identical to the connectors on the MPI. This allows a RM 65-1000 based system easy access to these modules (see Data Sheet RM65-5222E or -5223E, Order Number RM12 or RM24). Serial RS232C or 20 milliamps current loop interfacing can be realized with the asynchronous communication interface controller (ACIA) module.[2] Two separate RS232C type channels are available (see Data Sheet RM65-5451E, Order Number RM08). Instrumentation monitoring and control over the IEEE-488 standard bus are available through the IEEE-488 Interface Adapter module. The module comes with an interface cable to mate with the GPIB as well as ROM resident firmware to assist the user in interfacing with the GPIA (see Data Sheet RM65-7102, Order Number RM13).

The RM 65 module expansion set is now defined and the data necessary to proceed to figure 6 should be entered on the worksheet.

NOTES:

1. On board refers to the SBC (AIM 65, AIM 65/40, RM 65 SBC) capability.
2. 20 mA communication between two AIM's or an AIM 65 (or 65/40) and the ACIA module require an isolation circuit since all 20 mA send and receive circuits are current sources.

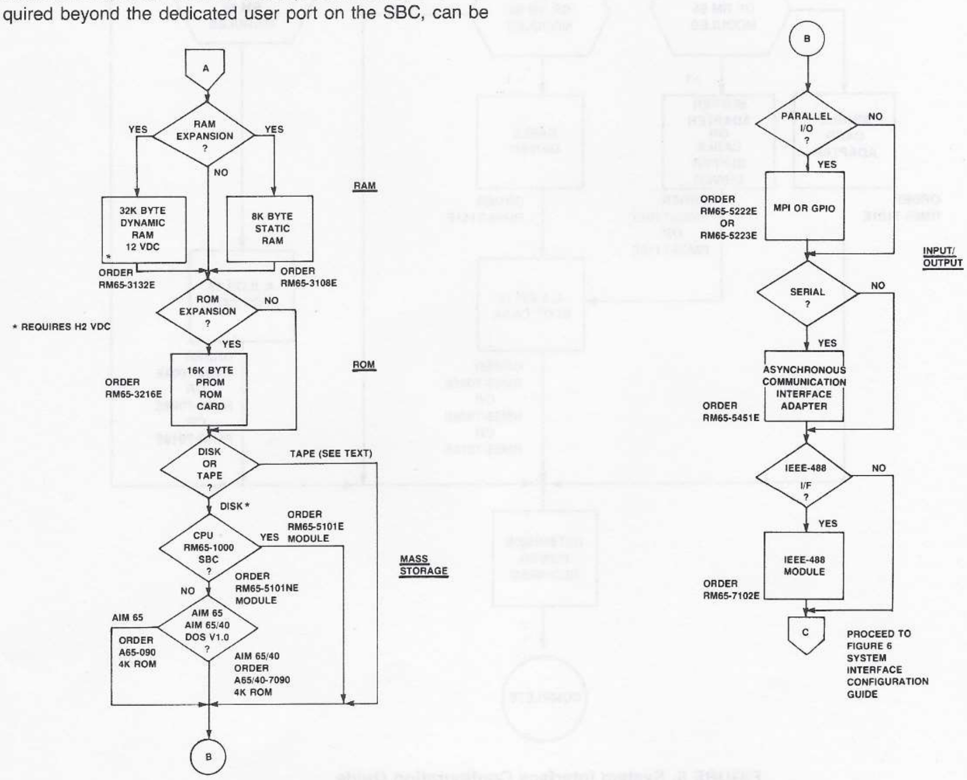


FIGURE 5. RM 65 Module Product Line Configuration Guide

INTEGRATING THE SYSTEM CONFIGURATIONS

The System Interface Configuration Guide in Figure 6 provides the decision paths needed to interface the expansion modules with the development or dedicated system. After analyzing the application and identifying which expansion modules are required, the CPU-to-module interface must be defined. The RM65-1000 SBC inserts directly into the card cage. The AIM 65 can interface to one expansion module with the single card adapter or to a card cage with the adapter buffer cable. The buffer board occupies one slot in the cage, reducing the total capacity by one. The AIM 65/40 interfaces to the card cage in the same manner. A single card, however, can be connected directly to the AIM 65/40 SBC's expansion connector. Enter the selection into the work sheet, figure 7, indicating cage size in the left column.

Once the system is defined the remaining sections of the Work Sheet can be filled in and the power requirements calculated.

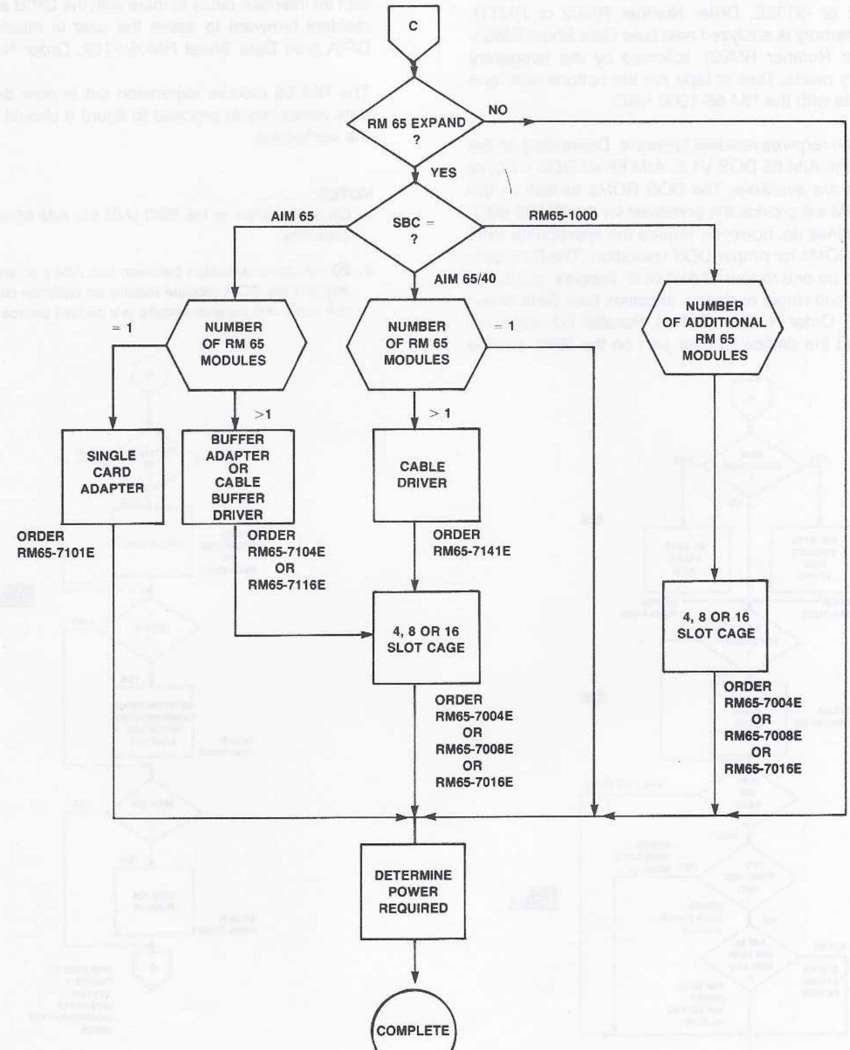


FIGURE 6. System Interface Configuration Guide

USING THE WORK SHEET

Figure 7 is the configuration work sheet. This work sheet is filled out as the application hardware/software is defined. The method of system definition can be divided into these four major steps:

THE STEPS

1. Define the system
   Identify the overall system with regard to what will be done and what external hardware exists or is required.
2. Identify all I/O
   Identify the input-output requirements to interface to the items defined in Step 1.
3. Identify data handling
   The calculations required to take the input data and condition it to become the output data define not only the type of data I/O, but also give a good indication of the software requirements, that is, do we need to hand data real time or do we need to buffer it until the data stream stops, etc.
4. Identify human interface
   The majority of applications still require human interface to start, monitor, or stop action. This interface can consist of lights, audible tones, CRT, push buttons, etc.

EXAMPLE

The following examples are used with the example work sheet in figure 8A and 8B.

STEP 1. SYSTEM DEFINITION

1. Monitor 8 switches or contact closures
2. Monitor 6 different voltages (0–10V)
3. Control 3 stepper motors
4. 3 of voltage inputs relate to stepper motor position
5. 6 of the switches are limit sensors
6. 2 lights

STEP 2. INPUT/OUTPUT DEFINITION

1. 8-switch or contact closure ...... 8-parallel input lines, one per closure
2. 6 voltage through IEEE-488 Bus . 1-IEEE-488 interface
3. 3 stepper motors, 2 lines each .. 6-parallel output lines
4. 2 lights .... 2-parallel output lines

STEP 3. DATA HANDLING/CONDITIONING

Steps to calibrate steppers:

1. Slew steppers to Stop 1
2. Gather Stop 1 voltages
3. Slew steppers to Stop 2
4. Gather Stop 2 voltages
5. Build Data Table, each stepper based on:
   a. Voltage Stop 2-Stop 1 (V2–V1)
   b. Slew angle
   c. Calculate 250 intervals for 250 degrees of movement, 90 intervals for 90 degrees

(This is for a slewing arm that moves 250° from stop 1 to stop 2 and has a linearly variable position indicator. It will produce a position related voltage $0_p = (V_0 - V_1) * V_r$)

where 0_p = position
V_0 = Voltage at the position
V_r = (V2-V1)/250

STEP 4. HUMAN INTERFACE

1. Contact closure to start initializing sequence
2. Contact closure to start work sequence
3. Contact closure for emergency stop
4. Contact closure for stop
5. Error light
6. Run light

Taking the example program defined above, the following sequence demonstrates the use of this guide with the work sheet (figure 7).

SYSTEMS REQUIREMENT WORK SHEET

(Refer to Figure 8A System Requirements Work Sheet Example)

1. Ⓐ based on Step 2: 8 parallel input lines
   6 parallel output lines
   IEEE-488
   2 parallel output lines

2. Ⓑ The application program will be in EPROM. Estimate 4K based on steps 3 & 4 — 4K bytes

3. Ⓒ Data tables from step 3 require RAM.
   Estimate:

   a. Program variables: 256 bytes

   b. Data Tables:
      250 data points each
      2 bytes/data point
      3 tables =
      1500 bytes — 1500 bytes

   c. Language and monitor overhead (RAM) 1000 bytes — 1000 bytes

   Total Ram = 3756 bytes

4. Ⓓ Save development program on cassette tape

We'll be doing real time control (stepper motors) and data calculations, so we'll use a combination of machine code and BASIC.

The system requirements of figure 8A provide the guidelines for using the flow diagrams in figures 2 through 6. The following sequence configures a development system based on an AIM 65 Microcomputer. Refer to figure 8A, the System Requirements Work Sheet Example, for the size requirement. As the individual pieces of the system are determined (from Figures 2 through 6), they are entered into the System Configuration Work Sheet, as shown in Figure 8B.

1. An AIM 65 has been selected for this example, so begin with figure 1.
2. The decision for language is a combination machine back and BASIC language. The path coming from the BASIC and machine level decision indicates P/N A65-420. Entering this at ① on the worksheet.
3. The application program will be EPROM resident, indicating P/N A65-901. Enter ② on the work sheet.

Moving to figure 5 the RM 65 Expansion is defined.

4. The system requirements work sheet indicates 3K bytes of RAM. This is best fit by the 8K RAM card P/N RM65-3108E which is entered at ③ on the worksheet.
5. ROM requirements are 4K bytes. For demonstration purposes assume an off-board requirement. Enter P/N RM 65-3216E at ④.
6. Tape will be used for this example, thus eliminating any disk requirements.
7. The parallel I/O requirement is 16 parallel lines (8 in, 8 out). The product summary (Tables 1-7) tells us that either the GPIO or the MPI will satisfy our need. We have no mixed ports (i.e. N out and M in where N + M = 8 lines). Enter P/N RM 65-5222E at ⑤.
8. No serial I/O so bypass this section.
9. Instrumentation control and monitoring are required. Enter P/N RM 65-7102E at ⑥.

The RM 65 expansion modules have been defined. The selection process continues with the RM 65 Expansion Interface Configuration Guide, figure 6.

10. Referring to the first two decisions in figure 6, RM 65 Expansion is required and the SBC is the AIM 65.
11. The total number of RM 65 modules is five as indicated in figure 8B.
12. From the summary tables it can be seen that the adapter buffer card and cable drive differ only by cable length. In figure 8B enter P/N RM65-7104E at ⑦.
13. We can see from the worksheet that a 4-slot card cage is too small as there are five occupied slots; therefore, add an 8-slot card cage at ⑧ in figure 8B.
14. From the summary tables (Tables 1-7), fill in the power requirements.
15. Add up the RM 65 and AIM 65 power. Since the PROM program is not used with the RM 65 attached, don't add in its power. A 5V at 4A supply will suffice.

The defined system is now configured.

SYSTEM REQUIREMENTS WORK SHEET	MEMORY (BYTES)		INPUT/OUTPUT SERIAL LINES			INPUT/OUTPUT PARALLEL LINES		PERIPHERALS STORAGE		PERIPHERALS DISPLAY		
	RAM	ROM	20MA	RS 232	IEEE 488	IN	OUT	TAPE	DISK	VIDEO	SINGLE LINE	PRINTER

FIGURE 7A. SYSTEM REQUIREMENTS WORK SHEET

HARDWARE CAGES					MEMORY (BYTES)		INPUT/OUTPUT LINES SERIAL			PARALLEL		PERIPHERALS STORAGE		DISPLAY			POWER AVG. CURRENT (mA)				
4	8	16	SLOT	PART NUMBER	RAM	(E) ROM	20MA	RS 232	IEEE 488	IN	OUT	TAPE	DISK	VIDEO	LINE	PRINTER	+5V	+12V	+24V	+V	−V
			1																		
			2																		
			3																		
			4																		
			5																		
			6																		
			7																		
			8																		
			9																		
			10																		
			11																		
			12																		
			13																		
			14																		
			15																		
			16																		
MICRO COMPUTER																					
TOTALS																					
ADDITIONAL SUPPORT ITEMS																					

FIGURE 7B. SYSTEM CONFIGURATION WORK SHEET

SYSTEM REQUIREMENTS WORK SHEET	MEMORY (BYTES)		INPUT/OUTPUT SERIAL LINES			PARALLEL LINES		PERIPHERALS STORAGE		DISPLAY		
	RAM	ROM	20MA	RS 232	IEEE 488	IN	OUT	TAPE	DISK	VIDEO	SINGLE LINE	PRINTER
	Ⓒ	Ⓑ			Ⓐ	Ⓐ	Ⓐ	Ⓓ				
	3K	4K			✓	8	8	✓				

FIGURE 8A. SYSTEM REQUIREMENTS WORK SHEET EXAMPLE

	HARDWARE CAGES					MEMORY (BYTES)		INPUT/OUTPUT LINES SERIAL			PARALLEL		PERIPHERALS STORAGE		DISPLAY			POWER AVG. CURRENT (mA)				
	4	8	16	SLOT	PART NUMBER	RAM	(E) ROM	20MA	RS 232	IEEE 488	IN	OUT	TAPE	DISK	VIDEO	LINE	PRINTER	+5V	+12V	+24V	+V	−V
③				1	RM 65 3108E	8K												1A				
④				2	RM 65 3216E		16K											850				
⑤				3	RM 65 5222E						8	8						870				
⑥				4	RM 65 7102E					✓								650				
⑦				5	RM 65 7104E																	
⑧				6	RM 65 7008																	
				7																		
				8																		
				9																		
				10																		
				11																		
				12																		
				13																		
				14																		
				15																		
				16																		
①	MICRO COMPUTER				A65 420								✓					2A		500		
	TOTALS																	5.37A		500		
②	ADDITIONAL SUPPORT ITEMS				A65 901													500				

FIGURE 8B. SYSTEM CONFIGURATION WORK SHEET EXAMPLE

TABLE 1. FIRMWARE

PART NUMBER	DESCRIPTION	MEDIA ROM	MEDIA DISK	MEMORY BYTES ROM	MEMORY BYTES RAM	HARDWARE A65	HARDWARE A65/40	HARDWARE RM 65	HARDWARE FDC		POWER AVG. CURRENT (mA) +5V	+12V	+24V	+V	−V
A65-010	AIM 65 ASSEMBLER	√		4K		√									
A65-020	AIM 65 BASIC	√		8K		√									
A65-030	AIM 65 PL/65	√		8K		√									
A65-040	AIM 65 MATH PACK	√		4K		√		√							
A65-050	AIM 65 FORTH	√		8K		√									
A65-060	AIM 65 INSTANT PASCAL	√		20K		√ (1)		√							
A65-090	AIM 65 DOS VER 1.0	√		4K		√			√						
A65/40-7000	AIM 65/40 MONITOR	√		4K			√								
A65/40-7010	AIM 65/40 ASSEMBLER	√		4K			√								
A65/40-7020	AIM 65/40 BASIC	√		8K			√								
A65/40-7030	AIM 65/40 PL/65	√		8K			√								
A65/40-7050	AIM 65/40 FORTH	√		8K			√								
A65/40-7090	AIM 65/40 DOS VER 1.0	√		4K			√		√						
A65/40-7040	AIM 65/40 MATH PACK	√		4K			√								
RM65-0122	RM 65 BASIC R/T INTERP.	√		8K				√							
RM65-0152	RM 65 FORTH R/T INTERP.	√		8K				√							

1. 4K ON BOARD, 16K OFF BOARD

TABLE 2. SINGLE BOARD COMPUTERS

PART NUMBER	DESCRIPTION	MEMORY BYTES RAM	MEMORY BYTES ROM	I/O LINES SERIAL	I/O LINES PARALLEL	16 BIT COUNT/ TIMER	EXPAND ?	ADDRESS RANGE	POWER AVG. CURRENT (mA) +5V	+12V	+24V	+V	−V
A65-100	AIM 65 WITH 1K RAM & 8K MONITOR	1K	20K	1	16	2	Y	0-65K	2.0A REG.		500 (2500 PK)		
A65/40-1000	AIM 65/40 WITH 16K RAM & 4K I/O ROM	48K	32K	2	48	6	Y	0-65K ON 61K OFF BOARD	4.9A				
RM65-1000E	RM 65 SINGLE BOARD COMPUTER	2K	16K		16	2	Y	131K	750				

TABLE 3. DEVELOPMENT SYSTEMS

PART NUMBER	DESCRIPTION	MEMORY BYTES RAM	MEMORY BYTES ROM	I/O LINES SERIAL	I/O LINES PARALLEL	16 BIT COUNT/ TIMER	EXPAND ?	ADDRESS RANGE	POWER AVG. CURRENT (mA) +5V	+12V	+24V	+V	−V
A65-400	AIM 65 W 4K RAM, 8K MONITOR, PRINTER, DISPLAY, KEYBOARD	4K	20K	1	16	2	Y (1)						
A65/40-5000	AIM 65/40 W 16K RAM, GRAPHICS PRINTER, SINGLE LINE DISPLAY, KEY-BOARD, 4K MONI-TOR & 4K I/O ROM	16K	28K	2	16	2	Y (1)						
A65/40-5100	SAME AS 5000 W 32K RAM	32K	28K	2	16	2	Y (2)						

1. OFF BOARD
2. ON OR OFF BOARD

TABLE 4. INPUT/OUTPUT

PART NUMBER	DESCRIPTION	SERIAL 20MA	SERIAL RS 232	SERIAL IEEE 488	PARALLEL LINES IN	PARALLEL LINES OUT	16 BIT COUNT/ TIMER	CONNECTORS	POWER AVG. CURRENT (mA) +5V	+12V	+24V	+V	−V
RM65-5222(E)	GENERAL PURPOSE I/O & TIMER (GPIO)				32*2	32*2	4	4-20 PIN MASS TERM	870				
RM65-5223(E)	MULTIFUNCTION PERIPHERAL INTER-FACE (MPI)				32*1	32*1	4	2-40 PIN MASS TERM	650				
RM65-5451(E)	ASYNCHRONOUS COMMUNICATION INTERFACE ADAPTER (ACIA)	1*3	2					1-4 PIN 2-26 PIN MASS TERM	700				
RM65-5451N(E)	SAME W/O DC CONVERTOR	1*3	2					SAA	500	120			−12V AT 120
RM65-7102(E)	IEEE-488 BUS INTERFACE			1				IEEE-488 I/P CONNECTOR ON 8' CABLE	650				

1. EACH LINE SELECTABLE FOR IN OR OUT 32 TOTAL LINES
2. EACH BYTE (8 LINES) SELECTABLE FOR IN OR OUT (A BYTES)
3. IN PARALLEL WITH ONE ACIA CHANNEL

TABLE 5. PERIPHERAL MODULES

PART NUMBER	DESCRIPTION	FIRMWARE	CONNECTOR	INTERFACE TO SBC MPI	AIM 65	AIM 65/40	GPIO	POWER AVG. CURRENT (mA) +5V	+12V	+24V	+V	−V
A65/40-0200	AIM 65/40 STAN-DARD KEYBOARD	CONTAINED IN AIM 65/40 I/O ROM	40 PIN MASS	*✓		✓	*✓					
A65/40-0210	AIM 65/40 EX-TENDED KEYBOARD	SAA	SAA	*✓		✓	*✓					
A65/40-0400	SINGLE LINE DISPLAY	INTELLIGENT PARALLEL PORT (8 BIT) INTERFACE	SAA	*✓		✓	*✓	800				
A65/40-0600	GRAPHICS PRINTER	SAA	SAA				*✓	300		2500 6300 PK		
A65/40-0800	VIDEO CONTROLLER	SAA	SAA				*✓					
RM65-5101(E)	FLOPPY DISK CONTROLLER	I/P DE-PENDENT	50 PIN MASS TERM		✓	✓		600	60			
RM65-5101N(E)	SAME AS ABOVE W/O ROM	USER JUS-TIFIED SAA	SAA		✓	✓		600	60			
RM65-5102(E)	CRT CONTROLLER	4K FIRMWARE 2K CONNECTOR 8MM	MINI-COAX 6 PIN		✓	✓		940				

*SOFTWARE DRIVER REQUIRED.

TABLE 6. MEMORY

PART NUMBER	DESCRIPTION	MEMORY BYTES RAM	ROM	TYPE	POWER AVG. CURRENT (mA) +5V	+12V	+24V	+V	−V
RM65-3108(E)	.8K STATIC RAM	8K		2114 RAM	1.03 A				
RM65-3108N(E)	8K STATIC RAM W/O RAM				*				
RM65-3132(E)	32K DYNAMIC RAM	32K			1.4A	170			
RM65-3132N(E)	32K DYNAMIC RAM W/O RAM				*				
RM65-3216(E)	16K PROM/ROM		16K	2716 2732 2532 68764	850				
RM65-5101(E)	FLOPPY DISK CTRL (SEE PERIPHERAL MODULES)		4K	5½ or 8" SINGLE OR DOUBLE (SIDED DENSITY)	600	60			

*CONFIGURATION DEPENDENT WITHOUT ROMS

TABLE 7. SUPPORT HARDWARE

PART NUMBER	DESCRIPTION	FIRMWARE	I/F REQUIREMENT	POWER AVG. CURRENT (mA)				
				+5V	+12V	+24V	+V	−V
A65-901	PROM PROGRAMMER & CO-ED	ON BOARD	AIM 65 EXPANSION 24 PIN ZIF (NOT COMPATIBLE WITH RM65 & A65/40 LINE)	500				
RM65-7004(E)	4 SLOT CARD CAGE	—	ACCEPTS RM65 MODULES (≤4)					
RM65-7008(E)	8 SLOT CARD CAGE	—	SAME EXCEPT (≤8)					
RM65-7016(E)	16 SLOT CARD CAGE	—	SAME EXCEPT (≤16)					
RM65-7101(E)	SINGLE CARD ADAPTER	—	I/F ONE RM 65 MODULE TO AIM 65					
RM65-7104(E)	ADAPTER BUFFER CARD	—	I/F ONE CARD CAGE (4, 8 OR 16) TO AIM 65 1½ FOOT CABLE					
RM65-7116(E)	CABLE DRIVER ADAPTER CARD	—	I/F ONE CARD CAGE (4, 8 OR 16) TO AIM 65 6 FOOT CABLE					
A65/40-7141(E)	CABLE DRIVER ADAPTER CARD	—	I/F ONE CARD CAGE (4, 8 OR 16) TO AIM 65/40 2 METER CABLE					

TABLE 8A. CROSS PRODUCT MATRIX

	CROSS PRODUCT MATRIX / PART NUMBER	A65-	A65/40-	RM65-	ASSEMBLER	PL/65	BASIC	FORTH	MATH PACK	PASCAL	DOS V1.0	AIM 65	AIM 65/40	RM-65 SBC	8K RAM	32K DRAM	16K PROM/ROM	FDC	GPI
SOFTWARE	ASSEMBLER	010	7010	—	\			1		1		8	8	1					
SOFTWARE	PL/65	030	7030			\	1	1		1		8	8	1					
SOFTWARE	BASIC	020	7020			1	\	1		1		8	8	1					
SOFTWARE	FORTH	050	7050		1	1	1	\		1		8	8	1					
SOFTWARE	MATH PACK	040					1		\	1		3	8						
SOFTWARE	PASCAL	060	—		1	1	1	1	1	\		3	1	1			2		
SOFTWARE	DOS V1.0	090	7090								\	8	8	7				2	
	R.T. FORTH				1	1	1	1		1	9	7	7						
	R.T. BASIC				1	1	1	1	1	1	9	7	7						
SBC	AIM 65	100										\	1	1					
SBC	AIM 65/40		1000							1			\						
SBC	RM65 SBC			1000E	7	7	7	7	7	7	7	1	1	\					
MEMORY	8K STATIC RAM			3108E											\				
MEMORY	32K DRAM			3132E												\			
MEMORY	16K PROM/ROM			3216E													\		
MEMORY	FLOPPY DISK CTRL			5101E														\	

PRODUCT COMPATIBILITY MATRIX

This section of the configuration guide (tables 8A and 8B) is a cross product matrix. The numeric legend in the right margin provides information for product mix relating to software requirements, compatibility, on board compatibility, and base CPU.

An example of the use of these tables would proceed as follows:

Example: Develop a program with Instant Pascal.

1. Follow the horizontal row marked Pascal
   a. DOS V1.0 is compatible
   b. The only CPU compatible is AIM 65
   c. All RM65 boards are compatible
   d. Pascal generally requires RAM expansion. Either RAM board is compatible
   e. A power supply will be required
   f. Either a card cage and buffer adapter or a single card adapter is required. Since expansion RAM is probably desired the cage/buffer card should be selected.
   g. Select FDC for disk storage
   h. Select DOS V1.0 to handle disk interface

GPIO	MPI	ACIA	IEEE-488	CRTC	VDC	SLD	GRPH PRINT	KEYBOARD				POWER SUPPLY	ENCLOSURE	CAGE 4, 8, 16	SINGLE CARD ADPT	BUFFER/DRIVER	PROM PGMR	PROTOTYPE	EXTENDER
												2		2	*	2	1		
												2		2	*		1		
												2		2			1		
												2		2			1		
												2							
												2					1		
												2	1	2	1		1		
												2		2			1		
												2/0		2			1		
												2		2			1		
												2		2			1		

LEGEND

[ ] COMPATIBLE (MAY REQUIRE EXPANSION BUT NO CONFLICT EXISTS)

[0] SPECIAL POWER

[1] NOT COMPATIBLE OR NOT REQUIRED

[2] REQUIRED

MINIMUM REQUIREMENT TO SUPPORT:

[3] AIM 65

[4] AIM 65 + 1-RM65

[5] AIM 65 + >1 RM65

[6] RM65 APPLIC.

(Cont. Next Figure)

*AN ALTERNATE TO THE CARD CAGE AND/OR BUFFER/CABLE DRIVER FOR SINGLE RM65 INTERFACE TO AIM 65

2. So far the minimum system would be:
   a. AIM 65
   b. 8 or 32K RAM board
   c. FDC + DOS V1.0
   d. 16K Prom ROM
   e. Buffer cable adapter
   f. Power supply
   g. 4, 8 or 16 slot card cage

3. For a compatibility check, each item can be cross-checked by following its row across. For example:
   a. 8 or 32K RAM requires the power supply and precludes the prom programmer
   b. FDC + DOS V1.0: the DOS has an AIM 65 related part number. The FDC compatibility is same as the 8 or 32K RAM cards.

TABLE 8B. CROSS PRODUCT MATRIX

	CROSS PRODUCT MATRIX / PART NUMBER	A65-	A65/40-	RM65-	ASSEMBLER	PL/65	BASIC	FORTH	MATH PACK	PASCAL	DOS V1.0	AIM 65	AIM 65/40	RM-65 SBC	8K RAM	32K DRAM	16K PROM/ROM	FDC
I/O	GPIO			5222E														
	MPI			5223E														
	ACIA			5451E														
	IEEE-488			7102E														
PERIPHERALS	CRTC			5102E														
	VDC			0800														
	Single Line Display		0400															
	Graphics Printer		0600															
	Keyboard Standard		0200															
	Keyboard Expanded		0210															
MISC.	Power Supply & Enclosure	006											1	1				
	Enclosure	002											1	1				
	Card Cage 4, 8, 16			7004E 7008E 7016E														
	Single Card Adapt.			7101E									1	1				
	Buffer/Driver		RM65- 7144E	7104E 7116E									8	1				
	Prom PGMR	901									1		1	1	1	1	1	1
	Prototype			7201E														
	Extender			7211B														

*4-Slot Only

GPIO	MPI	ACIA	IEEE-488	CRTC	VDC	SLD	GRPH PRINT	KEYBOARD				POWER SUPPLY	ENCLOSURE	CAGE 4, 8, 16	SINGLE CARD ADPT	BUFFER/DRIVER	PROM PGMR	PROTOTYPE	EXTENDER
					7	7	7	7				2					1		
					11	11	11	11				2					1		
												2					1		
												2					1		
												2					1		
	11																1		
	11																1		
	11																1		
	11																1		
													1*				1		
																	1		
																	1		
1	1	1	1	1	1	1	1	1	1			2		1	1	1		1	1
																	1		
																	1		

LEGEND (Cont.)

- 7 — COMPATIBLE WITH SPECIAL CONDITIONS (HARDWARE/ SOFTWARE)
- 8 — COMPATIBLE, OBSERVE PROPER PART NUMBER
- 9 — USER SOFTWARE REQUIRED
- 10 — ON BOARD CAPABILITY
- 11 — DIRECT HARDWARE INTERFACE