Rockwell

RM65-2901E
RM 65 PROM PROGRAMMER MODULE

RM 65 MICROCOMPUTER MODULES

RM 65 Microcomputer Module products are designed for OEM and end user microcomputer applications requiring state-of-the-art performance, compact size, modular design and low cost. Software for RM 65 systems can be developed in R6500 Assembly Language, PL/65, BASIC, and FORTH. Both BASIC and FORTH are available in ROM and can be incorporated into the user's system.

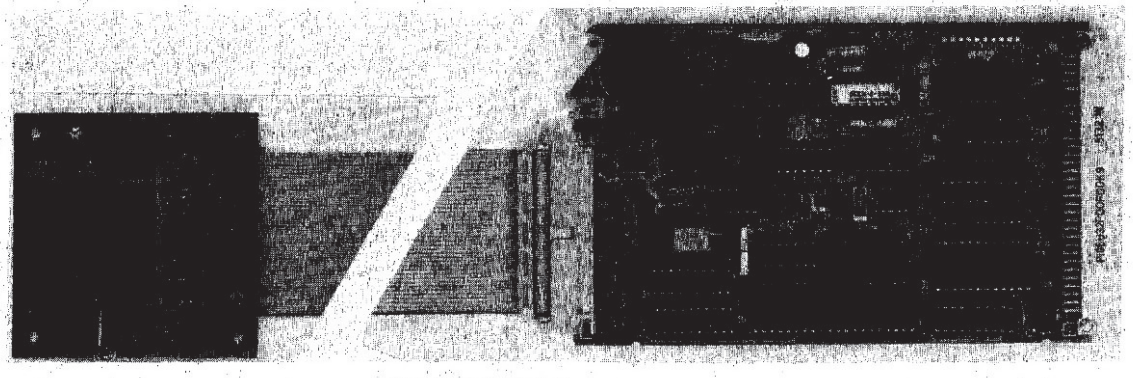
RM 65 Module products use a motherboard interconnect concept in which any card can be inserted in any slot. The 64-line RM 65 Bus offers memory addressing up to 128K bytes, provides high immunity to electrical noise and includes growth provisions for user functions. A selection of card cages allows packaging flexibility. RM 65 products may also be used with Rockwell AIM 65 and AIM 65/40 Microcomputers for product development and for a broad variety of portable or desktop microcomputer applications.

PRODUCT OVERVIEW

The RM 65 PROM Programmer module in conjunction with an AIM 65 or AIM 65/40 Microcomputer, programs industry standard 1K-, 2K-, 4K- and 8K-byte EPROMs (ultra-violet light erasable programmable read-only memories) and 2K-byte EEROMs (electrically erasable programmable read-only memories). The module consists of an RM 65 module and a PROM socket module connected together by a 24-inch ribbon cable. A 28-pin Zero Insertion Force (ZIF) socket mounted on the PROM socket module allows installation of a 28-pin or 24-pin PROM. The PROM socket module may be installed in various desk-top enclosure or front panel arrangements for development, end-user or OEM installation.

FEATURES

- RM 65 bus compatible
- Compact size RM 65 module—about 100 mm × 160 mm (4 in. × 6¼ in.)
- Separate PROM socket module with
  - —28-pin Zero Insertion Force (ZIF) socket
  - —Mounting holes for enclosure or panel installation
  - —Connecting 24-inch cable to RM 65 module
- Programs 1K-byte to 8K-byte UV EPROMs
  - —1K-byte: 2508, 2758
  - —2K-byte: 2516, 2716
  - —4K-byte: 2532, 2732, 2732A
  - —8K-byte: 2564, 2764, 68764
- Erases and programs 2K-byte EEROMs
  - —2K-byte: R5213/2816, 5213, 2816, 48016
- On-board 8K-byte ROM contains programming functions compatible with both
  - —AIM 65 Microcomputer Monitor
  - —AIM 65/40 Microcomputer I/O and Monitor
- Easy-to-use interactive commands
  - —PROM interface (check, program, read, verify)
  - —RAM preparation (fill and invert)
  - —Utility functions (command and PROM type menu, PROM type selection, toggle verify mode, etc.)
- Verify during or after programming
- +5V only operation (on-board DC/DC converter)
- Fully assembled and tested with one year warranty



RM65-2901E PROM Programmer Module

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ORDERING INFORMATION

Part No.	Description
RM65-2901E	PROM Programmer Module
Order No.	**Description**
820	PROM Programmer Module User's Manual*

Note:
*Included with RM65-2901E.

FUNCTIONAL DESCRIPTION

RM 65 Module

The Data Transceivers invert and transfer 8-bits of parallel data between the PROM Programmer module and the RM 65 data bus when enabled by the Chip Select Decoder. The read/write line from the RM 65 bus determines the direction of data flow. During a write operation, data is transferred from the bus to the module; during a read operation, data is transferred from the module to the RM 65 bus.

The Control Signal Buffers invert and transfer the phase 2, read/write, bank address and reset signals from the RM 65 bus to the module. The bus active signal is also driven to the RM 65 bus when data is being transferred between the RM 65 bus and the module.

Address Signal Buffers invert and transfer signals from 13 address lines from the RM 65 bus to the module.

The Chip Select Decoder, in conjunction with Base Address Select, Bank Select and Bank Select Enable switches and the ROM Range Select jumper decodes the address from the RM 65 bus and generates enable signals to other major on-board circuits. When the address matches the I/O Base Address switch positions, one of two Octal Latches, the on-board R6522 Versatile Interface Adapter (VIA), the Digital-to-Analog Converter (DAC) and/or the Data Bus Transfers are enabled. When the address matches the ROM Base Address switch positions and ROM Range Selection jumper position, the on-board program ROM is enabled along with the Data Bus Transceivers.

Bank Select and Bank Select Enable switches assign the module to one or two 65K-byte memory banks. The Bank Select Enable switch assigns the module to be active in common memory (both Bank 0 and 1) or in the bank selected by the Bank Select switch (either Bank 0 or 1).

There are eight Base Address switches; four switches assign the on-board ROM base address to a 4K-byte boundary and five assign the I/O base address to a page (256 bytes) within the ROM base address.

The ROM Range Select jumper indicates that no ROM, a 4K-byte ROM or an 8K-byte ROM, is installed on-board.

An 8K-byte ROM containing the PROM Programmer computer program instructions is installed on the module. One-half of the ROM contains programming functions, memory mapped at $7100-$7FFF, which operate in conjunction with the AIM 65 Monitor firmware. The other half of the ROM is memory mapped at $D100-$DFFF and contains programming functions compatible with the AIM 65/40 I/O and Monitor ROMs. A jumper selects which 4K-bytes (upper or lower), or if the entire 8K-bytes, of the ROM socket are to be addressed.

The R6522 VIA transfers 8-bit data between the RM 65 data bus and the PROM data lines and controls programming voltage levels. During PROM programming, the VIA transfers data from the Data Transceivers for writing into the PROM and during a PROM read, verify or check function, the VIA reads data from the PROM. During PROM programming, the VIA issues control signals to the Power Multiplexer, the Misplaced PROM Detector, and the Vpp Rise/Fall Time Controller.

The Programmable Voltage Regulator, consisting of the 8-bit DAC, a Vpp Rise/Fall Time Controller, a DC/DC Converter and an Analog Buffer, generates the Vpp programming voltage. The DAC outputs a voltage proportional to Vpp for the selected PROM type as controlled by 8-bit data received from the RM 65 data bus. The DAC output voltage is amplified to the full Vpp level, mixed with the rise or fall time control signal, clamped to minimum Vpp level, and output to the Analog Buffer. The +5 to +32V DC/DC Converter provides the high voltage used in the second stage of amplification. The Analog Buffer amplifies the Vpp current for use by the Power Multiplexer.

The Power Multiplexer selects the proper voltage level to output to the PROM during a programming or read operation as controlled by signals from the VIA and Octal Latch A. The output voltage is selected from TTL high, TTL low, Vcc and the Vpp output from the Analog Buffer. The correct voltage is selected by VIA output control lines.

The Misplaced PROM Detector determines if a 24-pin PROM has been offset by one or two pin positions when installed in the 28-pin ZIF socket on the PROM module. The detected state is input to the VIA and sampled by the programming firmware to prevent application of programming voltage to a misplaced PROM.

The two Octal Latches, A and B, transfer addresses from the Address Buffers to the PROM during PROM access operations. The levels of three programming voltages output by the Power Multiplexer to the PROM are also controlled by Octal Latch A.

PROM Socket Module and Interface Cable

A 28-pin Zero Insertion Force (ZIF) socket is mounted on a 3-inch × 3-inch PROM socket module and connected to the RM 65 module by a 24-inch ribbon cable. The socket module has mounting holes and may be installed in any orientation. The 28-pin ZIF socket allows installation of 24-pin PROMs as well as 28-pin PROMs.

PROM PROGRAM COMMANDS

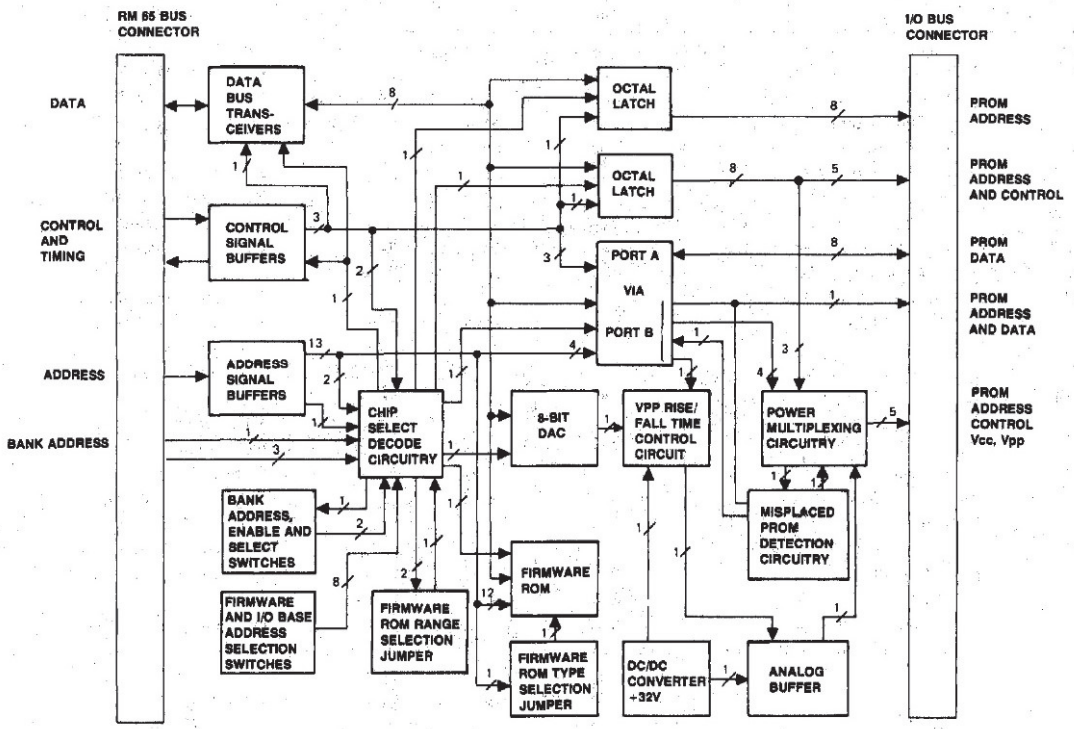
Computer program routines to operate the PROM Programmer module are provided in an 8K-byte ROM installed on the RM 65 module. One of the two versions of the resident firmware is jumper selectable upon installation to operate with either the AIM 65 or the AIM 65/40 I/O and Monitor firmware. Easy-to-use interactive commands perform PROM interface functions (check, program, read and verify), RAM preparation functions (fill and invert) and utility functions (e.g., command and PROM type menus, toggle verification mode, and change PROM type). Many Monitor commands are directly linked to the PROM Programmer command level for ease of operation.

PROM Programmer commands are invoked from a command enty level mode similar to the AIM 65 and 65/40 Debug Monitor operation. Initial entry and re-entry functions from the Debug Monitor provide operator initialization flexibility. The commands listed below can then be selected by single keystrokes. Subprompts displayed upon command selection request entry of information pertinent to the specific function. Once initiated, each function operates automatically until successful completion or upon termination due to a detected error.

PROM PROGRAMMER FUNCTIONS

Command	Function
C	Check PROM
P	Program PROM
R	Read PROM
V	Verify PROM
S	Check Memory
A	Alter Memory
I	Invert Memory
?	Display Menu
E	Erase EEROM
N	Change PROM Type
T	Toggle Verify Mode
X	Exit
L	Load with Offset
D	Dump with Offset

The RM 65 Floppy Disk Controller (FDC) Module and DOS 1.0 functions may also be used in conjunction with the PROM Programmer to simplify file handling during PROM programming or read operations.



PROM Programmer Module Block Diagram

PROM Socket Pin Assignment

Connector J1 (P2) Pin No.	28-pin PROM Socket Pin Number	Signal Symbol	Signal Name	Connector J1 (P2) Pin No.	28-pin PROM Socket Pin Number	Signal Symbol	Signal Name
3, 5, 10, 15, 24, 26, 28, 30, 32, 35, 37, 39	14	GND	Ground	16	11	Q0	Data Bit 0
				17	12	Q1	Data Bit 1
				18	13	Q2	Data Bit 2
1, 40	28	VCC	PROM Supply Voltage	19	15	Q3	Data Bit 3
2	1	VPP	Programming Voltage	20	16	Q4	Data Bit 4
4	2	A12	Address Bit 12	21	17	Q5	Data Bit 5
6	3	A7	Address Bit 7	22	18	Q6	Data Bit 6
7	4	A6	Address Bit 6	23	19	Q7	Data Bit 7
8	5	A5	Address Bit 5	25	20	$\overline{CE}$	Chip Enable
9	6	A4	Address Bit 4	27	21	A10	Address Bit 10
11	7	A3	Address Bit 3	29	22	$\overline{OE}$	Output Enable
12	8	A2	Address Bit 2	31	23	A11	Address Bit 11
13	9	A1	Address Bit 1	33	24	A9	Address Bit 9
14	10	A0	Address Bit 0	34	25	A8	Address Bit 8
				36	26	A13	Address Bit 13
				38	27	$\overline{PGM}$	Program

RM 65 Bus Pin Assignments

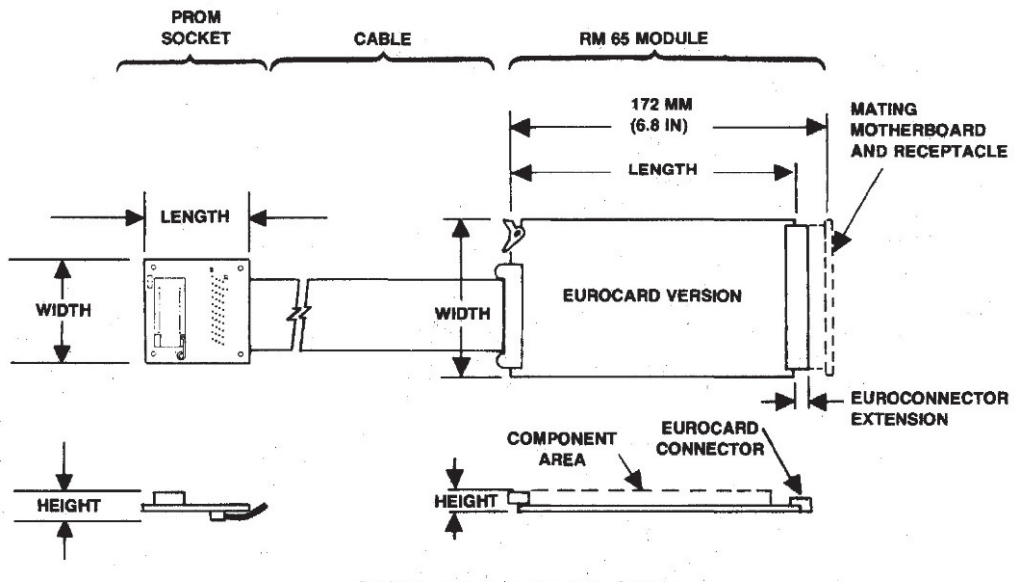
Bottom (Solder Side)			Top (Component Side)		
Signal Mnemonic	Signal Name	Pin	Pin	Signal Mnemonic	Signal Name
GND	Ground	1a	1c	+5V	+5 Vdc
BADR/	Buffered Bank Address	2a	2c	BA15/	Buffered Address Bit 15
GND	Ground	3a	3c	BA14/	Buffered Address Bit 14
BA13/	Buffered Address Bit 13	4a	4c	BA12/	Buffered Address Bit 12
BA11/	Buffered Address Bit 11	5a	5c	GND	Ground
BA10/	Buffered Address Bit 10	6a	6c	BA9/	Buffered Address Bit 9
BA8/	Buffered Address Bit 8	7a	7c	BA7/	Buffered Address Bit 7
GND	Ground	8a	8c	BA6/	Buffered Address Bit 6
BA5/	Buffered Address Bit 5	9a	9c	BA4/	Buffered Address Bit 4
BA3/	Buffered Address Bit 3	10a	10c	GND	Ground
BA2/	Buffered Address Bit 2	11a	11c	BA1/	Buffered Address Bit 1
BA0/	Buffered Address Bit 0	12a	12c	Bø1	*Buffered Phase 1 Clock
GND	Ground	13a	13c	BSYNC	*Buffered Sync
BSO	*Buffered Set Overflow	14a	14c	BDRQ1/	*Buffered DMA Request 1
BRDY	*Buffered Ready	15a	15c	GND	Ground
	*User Spare 1	16a	16c	−12V/−V	*−12 Vdc/−V
+12V/+V	*+12 Vdc	17a	17c		*User Spare 2
GND	Ground	18a	18c	BFLT/	*Buffered Bus Float
BDMT/	*Buffered DMA Terminate	19a	19c	Bø0	*Buffered External Phase 0 Clock
	*User Spare 3	20a	20c	GND	Ground
BR/$\overline{W}$/	Buffered Read/Write "Not"	21a	21c	BDRQ2/	*Buffered DMA Request 2
	*System Spare	22a	22c	BR/$\overline{W}$	*Buffered Read/Write
GND	Ground	23a	23c	BACT/	Buffered Bus Active
BIRQ/	*Buffered Interrupt Request	24a	24c	BNMI/	*Buffered Non-Maskable Interrupt
Bø2/	Buffered Phase 2 "Not" Clock	25a	25c	GND	Ground
Bø2	*Buffered Phase 2 Clock	26a	26c	BRES/	Buffered Reset
BD7/	Buffered Data Bit 7	27a	27c	BD6/	Buffered Data Bit 6
GND	Ground	28a	28c	BD5/	Buffered Data Bit 5
BD4/	Buffered Data Bit 4	29a	29c	BD3/	Buffered Data Bit 3
BD2/	Buffered Data Bit 2	30a	30c	GND	Ground
BD1/	Buffered Data Bit 1	31a	31c	BD0/	Buffered Data Bit 0
+5V	+5 Vdc	32a	32c	GND	Ground

Note:
*Not used on this module

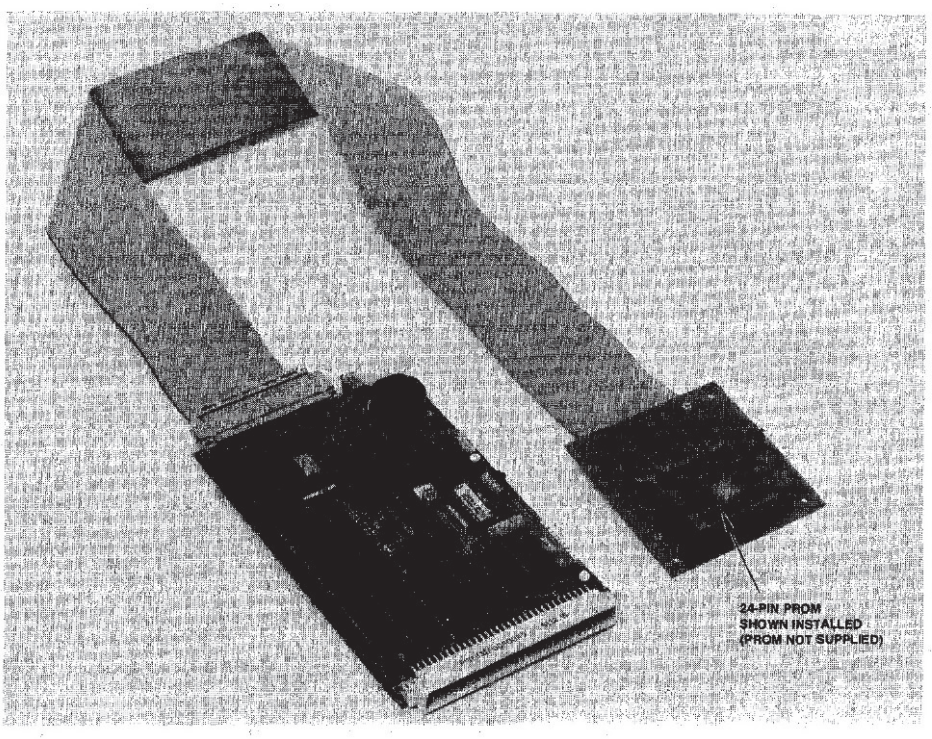
SPECIFICATIONS

Characteristics	Values
Dimensions	
PROM Programmer Module	
Width	100 mm (3.94 in.)
Length	167 mm (6.58 in.)
Height[1]	14 mm (0.56 in.)
Weight[3]	184 g (6.5 oz.)
PROM Socket Module	
Length	76 mm (3.0 in.)
Height[2]	35 mm (1.38 in.)
Weight (with cable)[3]	99 g (3.5 oz.)
PROM Programmer Cable	
Length	610 mm (24 in.)
Environment	
Operating Temperature	0° to 70°C
Storage Temperature	−40°C to 85°C
Relative Humidity	0% to 85% (without condensation)
Power Requirements	+5V ±5% at 1.1 A typical 2.0 A maximum (average) 2.9 A maximum (peak)
Connectors/Sockets	
RM 65 Bus Connector (P1)	64-pin plug per DIN 41612 (Rows a and b with c not installed)
Socket Module Cable Connector (J1)	40-pin plug (0.100 in. centers) per DIN 41612, mates with 3417-7040 (3M) or equivalent
PROM Socket	28-pin, 213R27-010 or equivalent

Notes:
1. Height value includes the maximum values for component height above the board surface (0.4 in.), printed circuit board thickness (0.062 in.), and pin extension through the bottom of the module (0.1 in.).
2. Height value includes height of Zero Insertion Force Socket lever and cable connector plug thickness.
3. Total weight of PROM Programmer Module (including PROM Programmer Cable with attached PROM Socket Module) 284 g (10 oz.).



PROM Programmer Module Outline



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