MODEL EP-2A-88 EPROM PROGRAMMER

INSTRUCTIONS FOR USING THE EP-2A-88-1, EP-2A-88-2 AND EP-2A-88-3 EPROM PROGRAMMERS

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OPTIMAL TECHNOLOGY, INC.

~~BLUE MOON 127~~ RT. 1 BOX 138

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INTRODUCTION

The Model EP-2A-88 is an EPROM programmer which will copy from one to four EPROMs from a master EPROM. A selection of copy modules is available for adapting the programmer to various EPROMs.

WARRANTY

The Model EP-2A-88 is warranted for a period of 3 months from the date of purchase by the original purchaser. Optimal Technology may send a replacement circuit board or, replace the entire unit, or request that the entire programmer by returned for repair. Shipping charges are not covered under this warranty. The warranty is void if the progammer has been modified.

INITIAL CHECK-OUT

Observe the voltage rating marked on the rear of the case and plug the line cord into an appropriate electrical outlet.

CAUTION-Programmers are shipped with 100, 115, 220 and 240 voltage requirements; Use only the correct voltage rating which is marked on the rear of the case. Power requirements are 15 watts. The case of the programmer is connected to AC ground.

(1) Turn ON the power to the programmer and observe the audio prompt tone and that the LOAD indicator is illuminated. Select a COPY MODULE and insert in the socket labeled CM. . .NOTE THAT PIN 1 FOR ALL EPROMS AND FOR THE COPY MODULE IS LOCATED IN THE LOWER RIGHT CORNER OF THE SOCKET.

(2) Push the PROGRAM/LOAD key and observe that the PROG (Program) LED indicator comes ON. The programmer is in the program mode. Programming time for a 2716 EPROM is approximately 105 seconds. After the programming cycle is complete, the LOAD indicator will come ON as will the four LED indicators located directly above the empty EPROM sockets. Observe the audio tone (10 beeps at the end of programming). The above test indicates the programmer is probably in good working condtion.

CAUTION------IMPORTANT OPERATING PROCEDURE

1. Turn the power switch ON or OFF with all EPROMs removed from the sockets.

2. Change the EPROMs or the copy module only when the LOAD indicator is ON.(Power is removed from the programming sockets under this condition.)

3. PIN 1 of the copy module and PIN 1 of all EPROMs are always located at the lower right hand corner of each socket.

SELECTING A COPY MODULE

Select a copy module from the table below. All EPROMs operate from a single five volt power supply.

EPROM	EPROM SIZE	COPY MODULE	SOFTWARE
2758,TMS 2508	1K x 8	CM-70	88-1
2716,TMS 2516	2K x 8	CM-50	88-1,88-2,88-3
2532	4K x 8	CM-40	88-2
2732	4K x 8	CM-20	88-2
2732A	4K X 8	CM-20A	88-2
2764 (Note (1))	8K X 8	CM-643	88-3
2564 (Note (2))	8K X 8	CM-642	88-3

Notes:

(1) Requires socket expander SE-64-3 and 88-3 .

(2) Requires socket expander SE-64-2 and 88-3 .

TABLE 1 COPY MODULE SELECTION

The TMS EPROM part numbers are EPROMs manufactured by Texas Instruments. A number of other manufacturers have equivalent EPROMs including Intel,Fairchild, Hitachi, Fujitsu, and Mostek.

The software supplied with the EP-2A-88 is located in EPROM inside the programmer. The software will work with two or more Copy Modules as indicated in TABLE 1.

COPYING EPROMS--AN EXAMPLE

STEP 1. With the LOAD indicator ON, load the copy module, master eprom and fully erased EPROMs into their respective sockets.
COMMENT: From 1 to 4 EPROMs may be copied at any one time.
STEP 2. Press the PROGRAM/LOAD key.
COMMENT: Pressing this key initiates the programming cycle. Programming is complete when a tone of ten beeps occurs at the end of the program cycle. Programming time is approximately 50 seconds for each 1K of EPROM.

INTERPRETING THE RESULTS--NORMAL OPERATION

1. At the completion of the program cycle the LOAD indicator will come ON.
2. An illuminated LED above each EPROM indicates that the contents of the master eprom have been transferred to the particular EPROM. (Verification correct)
3. A flashing indicator above an EPROM indicates the EPROM was not erased during the previous programming cycle.
COMMENT: The programmer will not attempt to program an EPROM that is not fully erased.
4. When the LED indicator located above an EPROM is OFF, the EPROM was ERASED but did not program.

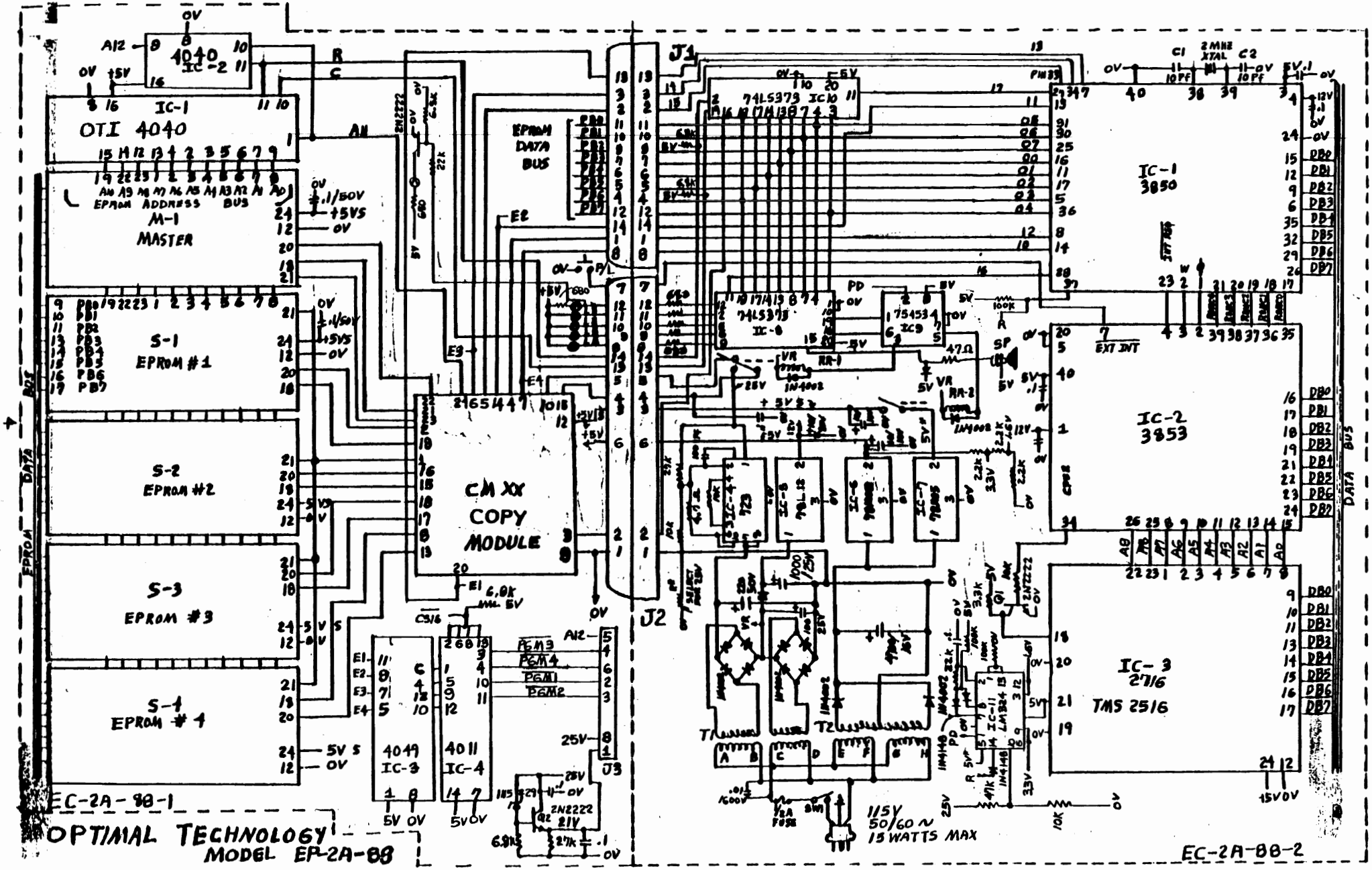
ADDITIONAL OPERATING MODES

1. Pressing the PROGRAM/LOAD key during the program cycle will return the programmer to the load cycle.(Not recommended.)
COMMENT: Since the program cycle has been interrupted, the EPROMs will need to be erased before resuming programming.
2. By leaving a master eprom out of its socket, EPROMs may be checked if they are fully ERASED. (i.e. Program HEX FF for all locations.)
3. The Model EP-2A-88 will make a number of checks to determine if any of the EPROMs are faulty. The results of these tests will keep the programmer from entering the program cycle. Thus after the PROGRAM/LOAD key is pressed, a problem will be indicated by an immediate tone prompt.
COMMENTS:(1) If the 25v, or 5v power supplies draw excessive current, the tone prompt will be activated immediatedly after pressing the PROGRAM/LOAD key.
(2) If any of the EPROMs will not tri-state, the tone prompt will be activated and the programmer will not enter the program cycle.
4. If the PROGRAM/LOAD key will not return the programmer to the LOAD mode, turn off the power to the programmer and unload the EPROMs.
5.If all EPROMs are not erased, a verification is done and the program cycle is skipped.

MAINTENANCE AND REPAIR

Calibration of the 25v power supply should be performed to maintain the voltage between 25.0 and 25.3 volts.(Select resistor R1 in the 723 regulator circuit.) If the programmer is in warranty, contact Optimal Technology. If the warranty period has expired, repair will be performed at a reasonable charge.

The most common problems are propagated by faulty EPROMs. Circuits which can be damaged include: (See schematic for EP-2A-88) the address counter (IC-1), 25 volt regulator (IC-4), 5 volt regulator (IC-7) and I/O ports of the 3850 (IC-1). If it is necessary to disassemble the programmer, follow the steps below.


OTI 4040
IC-1
M-1
MASTER
EPROM ADDRESS BUS
S-1
EPROM #1
S-2
EPROM #2
S-3
EPROM #3
S-4
EPROM #4
EPROM DATA BUS
CM XX
COPY
MODULE
4049
IC-3
4011
IC-4
PGM3
PGM4
PGM1
PGM2
J1
J2
J3
74LS373
IC-8
IC-9
IC-10
IC-11
IC-1
3850
IC-2
3853
IC-3
2716
TMS 2516
EXT INT
DATA BUS
115V
50/60 ~
15 WATTS MAX
EC-2A-88-1
EC-2A-88-2
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MODEL EP-2A-88

(1) Unplug the AC power to the programmer.

(2) Remove the four screws which hold the top panel to the lower case. (Located on the two sides of the programmer.)

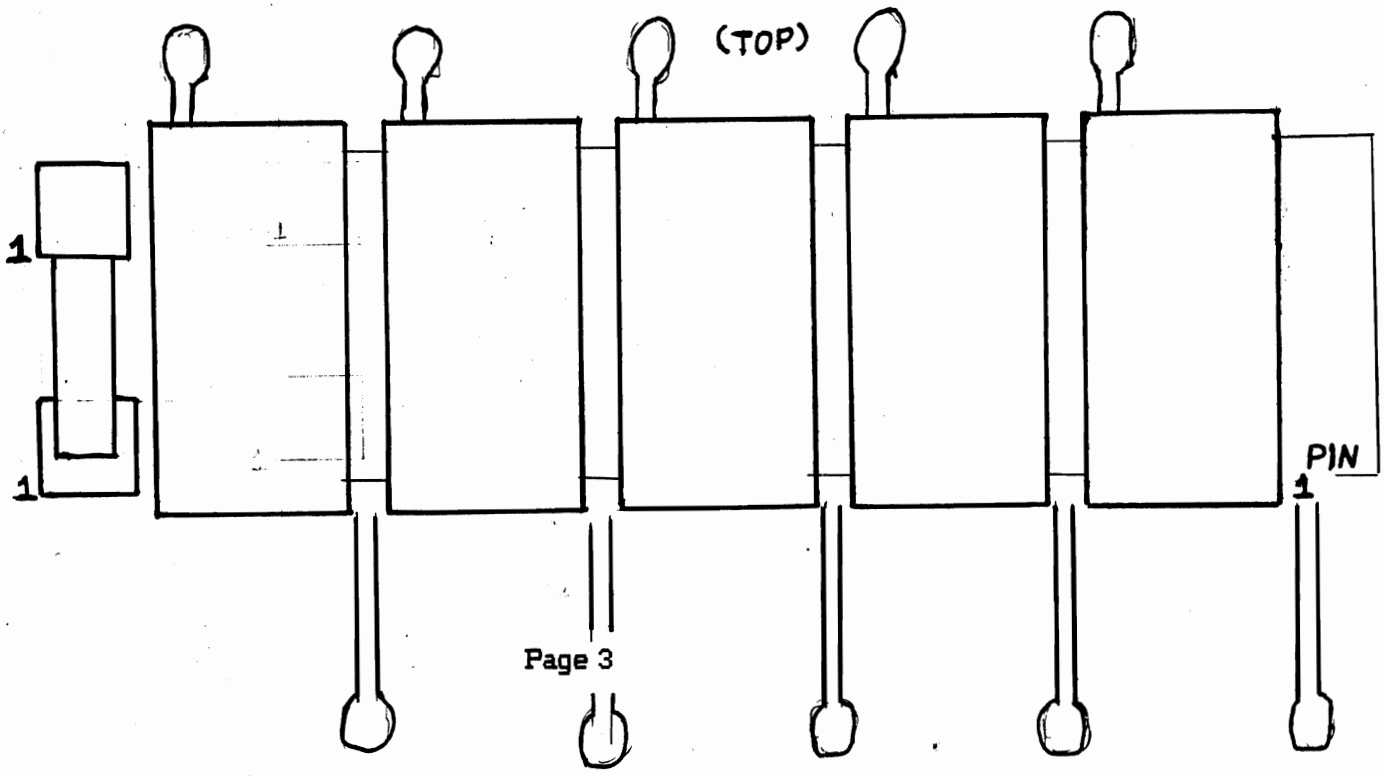
(3) Gently, lift up the top panel and unplug the two 14 pin ribbon cables.

(4) The upper and lower circuit boards are held to the case with screws attached to the PC board standoffs.

PROGRAMMING 2764 AND 2564 EPROMS

It is necessary to add the socket expanders SE-64-3 and SE-64-2 respectively for the programming of the 2764 ,and 2564 EPROMs.If you purchased the EP-2A-88-3 and the socket expander at the same time ,the programmer will already have the long handles on the Textool sockets shipped with programmer.Purchasing the socket expanders at a later date will require the user to install the long handles by removing the two screws on each of the five sockets. The installation of the socket expander is shown in the sketch below.The five long handles will need to be closed to secure the socket expander.The 8 pin ribbon cable goes directly to the 8 pin socket with no twist in the cable.

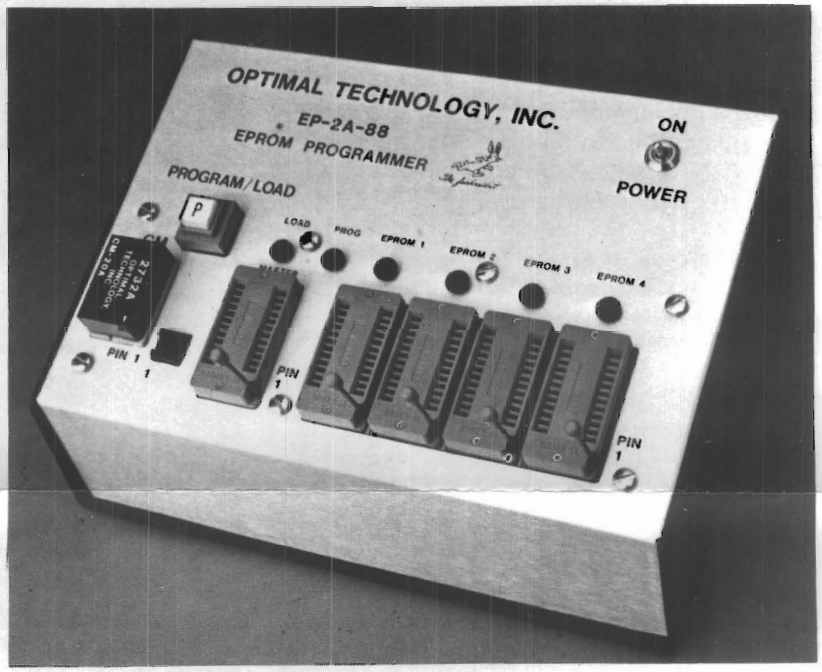
SOCKET EXPANDER INSTALLATION



Model EP-2A-88-4 EPROM Programmer

Features:

- ••• Follows Manufacturer's recommendations for programming
- Copies from one to four EPROMs
- Fast verify mode
- Programming time for (4) 27128 100 seconds
- Copy modules available for 2716, 2732, 2732A, 2532, 2764, 2564, and 27128
- SINGLE Push Button Control
- Audio tone to prompt user when finished
- Only programs fully erased EPROMs
- Power removed during loading of EPROMs
- Checks if EPROMs are erased, programs and verifies



The model **EP-2A-88-4** will copy from one to four EPROMs from a master EPROM. A LED indicator located above each EPROM indicates that the EPROM has been programmed correctly. A flashing LED at the end of programming indicates that the EPROM was not erased, a continuous glow indicates correct programming; and if LED is off, the EPROM was erased but did not program. Typical programming times for 2764 and 27128 (Intel, Fujitsu, SEEQ, and Hitachi) are 50 and 100 seconds; and 80 seconds for the TI 2564. Programming times for all 2K and 4K devices are 100 and 200 second respectively.

The EP-2A-88-41 has the same features as the **EP-2A-88-4** except that it programs the 2764A, and 27128A EPROMs. Note that the EP-2A-88 can be configured to program the 2764, 27128 or 2764A, 27128A EPROMs but not **both.**

Part Number	Description	Effective 10/1/85 Price
EP-2A-88-4	Programmer (Programs 2764, 27128)	$295
EP-2A-88-41	Programmer (Programs 2764A, 27128A)	$295
	Non-Standard Voltage Option (220v, 240v, or 110v)	15.00
CM-50	Copy Module for 2716, TMS 2516	23.00
CM-50C	Copy Module for 27C16	25.00
CM-20	Copy Module for 2732	23.00
CM-40	Copy Module for 2532	25.00
CM-20A	Copy Module for 2732A, R87C32	33.00
CM-20C	Copy Module for 27C32	25.00
CM-642	Copy Module for 2564 (Requires SE-64-2)	23.00
CM-643	Copy Module for 2764, Fujitsu 27C64 (Requires SE-64-3)	23.00
CM-645	Copy Module for 27128 (Requires SE-64-3)	23.00
CM-647	Copy Module for 2764A (Requires SE-64-3)	23.00
CM-649	Copy Module for 27128A (Requires SE-64-3)	23.00
SE-64-2	Socket Expander for 2564	93.00
SE-64-3	Socket Expander for 2764, 27128, 2764A, 27128A	93.00

All prices FOB Earlysville, Virginia. Shipping weight is 5 lbs. Size: 9 inches wide, 4 inches high, and 6 inches deep. Warranty is for three months. Virginia residents add 4% sales tax.

Optimal Technology, Inc.

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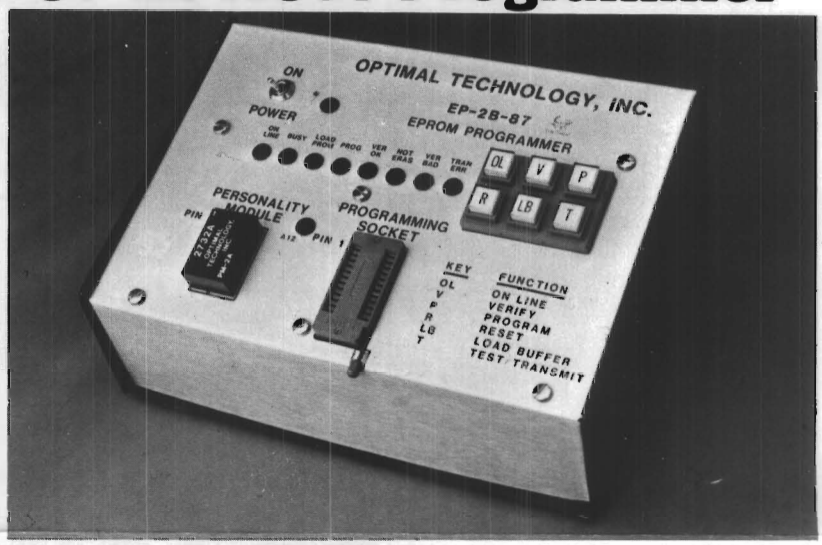
Model EP-2B-87 EPROM Programmer

Features:

- ••• Follows manufacturer's recommendations for programming
- Stand alone duplicator
- Audio Tone to prompt user
- RS-232 (or 20 MA loop) interface, dip switch selectable
- 1200 or 9600 baud rate, dip switch selectable
- Power is removed from EPROM socket when loading EPROMs
- LED indicators indicate sequence and result of various operations
- CRT entry mode
- 17 Serial Interface Commands



- Programs 2708, 2716, 2732, TMS 2708, TMS 2716, 2532, 2732A, 2764, 2564, 27128, and MCM68764, 27C64, 27256, 27C256, 2764A, 27128A, Intel 27512 and 27513
- Reads popular ROMs, PROMs and programs, erases and verifies 2864A, 2816A EEPROMs

The Model **EP-2B-87 EPROM Programmer** has an RS-232 compatible interface and includes an 8K byte buffer. Seventeen RS-232 commands allow another computer to download, upload or remotely control the Programmer. INTEL, TEKTRONIX or MOTOROLA formats are supported. The buffer may be edited directly from a dumb terminal and EPROMs can be copied off-line without a computer. A keypad located on the Programmer allows the user to program, verify, copy and check if EPROMs are erased. Power requirements are 115v, 50/60 Hertz at 15 watts.

The disk driver software available under MS-DOS and CP/M handles large files, prompting the user to change EPROMs, and includes a split byte program. The MS-DOS program converts the Microsoft assembler format to a HEX format. Programs under MS-DOS convert .COM, and .EXE files to Intel format.

Programming time for Intel, Hitachi, AMD, and Fujitsu 2764, 27C64, 27128, and 27256 EPROMs is 40 seconds for 8K bytes using PM-13 or PM-14. For both N-MOS and C-MOS EPROMs, the PM-13 programs at 12.5 volts the PM-14 programs at 21 volts.

Effective 10/1/85

Part Number	Description	Price
EP-2B-87-00	Programmer with 8K buffer* (For 1K thru 16K devices), standard	$535.00
EP-2B-87-01	Programmer with 8K buffer* (Required for 27256, 27512, 27513)	535.00
	Non-Standard voltage (220v, 240v, or 100v)	15.00

Personality Modules/Software

Part No.	Programs	Price	Part No.	Programs	Price
PM-1	2708	18.00		CP/M or MS-DOS software driver	30.00
PM-2C	2732, 27C32	34.00	PM-5E	2816A (EEPROM)	*33.00
PM-2A	2732A, R87C32	34.00	PM-8	MCM68764, MCM68766	36.00
PM-3	TMS 2716	26.00	PM-9	2764, 27128, 27C64 (Slow)	36.00
PM-4	2532	34.00	PM-10	2564	36.00
PM-5C	2716, 2516, 27C16	18.00	PM-11	8751 (Microcomputer)	36.00
SA-32-1	8751 Socket Adapt	55.00	PM-12	38E70 (Microcomputer)	36.00
PM-13	2764A, 27128A, 27256 (12.5 V)	36.00	SA-16-1	38E70 Socket Adapt	55.00
SA-64-2	2564. Requires PM-10	39.00	PM-14	2764, 27C64, 27128, 27256 (21 V)	36.00
SA-64-5	Socket Adapt 2764, 27128 (Used with EP-2B-87-00)	39.00	SA-64-11	Socket Adapt 2764 thru 27256 (Used with EP-2B-87-01)	40.00
PM-15	Intel 27512, 27513	36.00	SA-64-13	27512, 27513 Socket Adapt	43.00

* *NOTE: Intel Hex format is one of the standard interface formats. If Motorola or Tektronix formats are desired, they must be specified at the time of ordering.*

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