

1. FUNCTIONAL DESCRIPTION

10/13/83

HARDWARE DESCRIPTION

The main PC board is capable of programming any EPROM up to 256K (32K x 8). The main PCB in conjunction with the "Twin EPROM" board we can program the following eproms:

- * TMS2516 (2K x 8) 24 pin, 5 volt only
- * TMS2532 (4K x 8) 24 pin, 5 volt only
- * MCM68764 (8K x 8) 24 pin, 5 volt only

Each EPROM is programmed with the proper programming technique specified for that part. Hardware and software together provide for a "COLD" insertion (i.e., no power is applied to the EPROM). This feature is generated by the Twin EPROM board.

The EPROM Programmer responds at CRU base >1900 thru >19FF. Control signals are generated by two 14L4 PALs on the main EPROM PCB. The equations are as follows:

PAL #1 - U11

1. /MEMEN	11. /CRUCLK
2. A0	12. EPAGE
3. A1	13. DBIN
4. A2	14. /CRUST
5. A3	15. /BDRVR
6. A4	16. /ROMCS
7. A5	17. /DF00
8. A6	18. V1
9. A7	19. PCBEN
10. Power GND	20. Vcc

$$\text{CRUST} = \text{PCBEN} * \text{/MEMEN} * \text{CRUCLK} * \text{/A0} * \text{/A1} * \text{/A2} * \text{A3} * \text{A4} * \text{/A5} * \text{/A6} * \text{A7}$$

This signal indicates we are at >19xx CRU base.

$$\text{BDRVR} = \text{PCBEN} * \text{MEMEN} * \text{V1} * \text{EPAGE} * \text{/A0} * \text{A1} * \text{/A2}$$

This signal controls the data bus buffer to/from the EPROM card to the I/O bus.

ROMCS = PCBEN*MEMEN*V1*EPAGE*/A0*A1*/A2*/A3*DBIN

This signal is the chip select for the DSR ROM (not used).

DF00 = /A4+/A5+/A6+/A7

This signal is low when we are at >xFxx. It is not used on the current PCB.

PAL #2 - U12

1. /MEMEN	11. V1
2. A0	12. PCBEN
3. A1	13. EPAGE
4. A2	14. /PRGST
5. A3	15. /EPRBEN
6. A14	16. /EACMLD
7. A15/COUT	17. /EACLLD
8. /WE	18. Vcc/DF00
9. DBIN	19. Vcc
10. Power GND	20. Vcc

PRGST = PCBEN*MEMEN*V1*EPAGE*WE*/A0*A1*/A2*A3*DF00*/A14*/A15COUT

Write data. This signal turns on the program data bus to EPROM data bus buffer. Responds at >5xx0; if DF00 active responds at >5Fx0.

EPRBEN = PCBEN*MEMEN*V1*EPAGE*DBIN*/A0*A1*/A2*A3*DF00*/A14*/A15COUT

Read data. This signal turns on the EPROM data bus to the program data bus buffer. Responds at >5xx0; if DF00 active responds at >5Fx0.

EACMLD = PCBEN*MEMEN*V1*EPAGE*WE*/A0*A1*/A2*A3*DF00*A14*/A15COUT

This signal strobes the high two EPROM address bus counters. Responds at >5xx2; if DF00 active responds at >5Fx2.

EACLLD = PCBEN*MEMEN*V1*EPAGE*WE*/A0*A1*/A2*A3*DF00*A14*A15COUT

This signal strobes the low two EPROM address bus counters. Responds at >5xx3; if DF00 active responds at >5Fx3.

EXTERNAL CONNECTOR PIN DEFINITION

.100" PIN TO PIN SPACING

PIN #	MEMEMONIC	FUNCTION
1	GND	Logic ground
2	EA14	Address bit 14 (MSB)
3	GND	Logic ground
4	ECS*	Eprom chip select
5	PSDN*	Power supply on
6	VPP	High/low voltage supply
7	TYSEL*	Eprom type select
8	EA12	Address bit 12
9	PSHI	Vpp at high level
10	EA10	Address bit 10
11	EA08	Address bit 8
12	EA09	Address bit 9
13	EA06	Address bit 6
14	EA07	Address bit 7
15	EA04	Address bit 4
16	EA05	Address bit 5
17	VCC	+5 Volts
18	VCC	+5 Volts
19	VCC	+5 Volts
20	VCC	+5 Volts
21	EA02	Address bit 2
22	EA03	Address bit 3
23	EA00	Address bit 0 (LSB)
24	EA01	Address bit 1
25	ED6	Data bit 6
26	ED5	Data bit 5
27	ED0	Data bit 0 (MSB)
28	ED7	Data bit 7 (LSB)
29	ED4	Data bit 4
30	ED1	Data bit 1
31	ED2	Data bit 2
32	ED3	Data bit 3
33	EA11	Address bit 11
34	GND	Logic ground
35	EA13	Address bit 13
36	GND	Logic ground

SOFTWARE DESCRIPTION

There are eight different functions provided by the software. Each function is described in detail in the following paragraphs. All the functions provided are menu driven and the function keys respond as expected. Required peripherals are the Memory Expansion Unit, Editor Assembler Command Module, at least

one disk drive and controller card, and RS232 unit if printouts are desired.

Upon entry into the program, an initial EPROM type is requested. If no EPROM type is entered, timeout will occur and the default EPROM selected is a TMS2532.

MAIN MENU. The main menu is as follows:

* Eprom Programmer Ver 2.0 *

PRESS

1. TO CHANGE EPROM TYPE
2. CHANGE PROGRAMMING TYPE
3. CHECK/VERIFY EPROM
4. LOAD OBJECT FILE
5. PROGRAM EPROM
6. READ EPROM
7. WRITE MEMORY TO FILE
8. DISPLAY/CHANGE MEMORY

EPROM: TMS 2532 ALL BYTES

Upon entry to this menu the computer is expecting a number from one to eight. If "BACK" or "REDO" is pressed the program is aborted, and the standard color bar screen is displayed. If any other function is pressed it is ignored at this time.

Throughout this software the following conventions are used:

- * "BACK" aborts current activity restarts current activity
- * "PROCD" continues, assuming the default value shown.
- * "CLEAR" stops current output or restarts current activity
- * "BACK" aborts current activity and restarts current activity

- * "REDO" aborts current activity and returns to main menu. From main menu this exits the program.
- * "<SPACE>" continues, assuming default value was entered.
- * "<CENTER>" continues, with value entered or default value if no entry was made.

CHANGE EPROM TYPE. The menu displayed for this option is as follows: PRESS

1. FOR TMS 2516
2. FOR TMS 2532
3. FOR TMS 2564
4. FOR MCM 68764
5. FOR INTEL 27128
6. FOR INTEL 27256

The computer is now waiting for a number between one and six. The EPROM selected is the displayed at the bottom of the main menu screen.

CHANGE PROGRAMMING TYPE. The menu displayed for this option is as follows: PRESS

1. FOR ALL BYTES
2. FOR EVEN BYTES
3. FOR ODD BYTES

The computer is now waiting for a number between one and three. The programming type selected is displayed at the bottom of the screen. This option allows for programming EPROMs in an UPPER and LOWER bank fashion, or in an alternate byte type format (ALL BYTES).

CHECK/VERIFY EPROM. The menu displayed for this option is as follows: PRESS

1. TO VERIFY EPROM EMPTY
2. VERIFY EPROM

3. CHECK IF PROGRAMMABLE

The computer is now waiting for a number between one and three. The option selected then goes to a sub menu for actual parameters.

The first option, verify EPROM empty, is used to check the EPROM in entirety or in part, to verify that the data is 0FF. The second option, verify EPROM, is used to check the eeprom against data in memory. Any part of the EPROM may be checked against any part of memory.

The third option, check if programmable, is used when the EPROM to burn is not empty, but may still be programmed if all the bits required are at a logic one. If the EPROM is still programmable, the computers returns with the response "no errors".

CONCLUSION

The hardware and software design is the result of 2,984 years of combined experience in designing EPROM Programmers. Jim Tolson, Chuck McCarthy, and Mike Bunyard hope you enjoy using it, and solicit any feedback in improving this system. MLB

SECTION 1

FUNCTIONAL DESCRIPTION

10/13/83

1.1 HARDWARE DESCRIPTION

The main PC board is capable of programming any eprom up to 256K (32K x 8). The main PC in conjunction with the "twin eprom" board we can program the following eproms:

- * TMS 2516 (2K x 8) 24 pin, 5 volt only
- * TMS 2532 (4K x 8) 24 pin, 5 volt only
- * MCM 68764 (8K x 8) 24 pin, 5 volt only

Each eprom is programmed with the proper programming technique specified for that part. Hardware and Software together provide for a "COLD" insertion (i.e., no power is applied to the EPROM). This feature is generated by the twin eprom board.

1.2 SOFTWARE USAGE

On the disk which comes with the programmer, you will find several programs. they are:

File name	File type	Description
EPROM	program	} these are one
EPRON	program	} eprom program
OLD_EPROM	display/fix 80	this is the old version
SETUP	program	eprom card parameter setup
LABLE	extended basic	eprom lable maker

1.3 EPROM PROGRAM

The program which will be most used is the program EPROM/EPRON. This program was developed by T.I. Holland, and is a program file. It requires the Editor/ Assembler command module.

disk controller & drive, and memory expansion. To run, select editor/assembler and go to OPTION 5, "run program file". Enter the file name "DSK1.EPROM". Both eprom and epron are then loaded and linked automatically.

The function of software is pretty much self explanatory, but a few notes are in order:

- * This program "creates" its own area for the eprom. i.e., if you want the eprom to be at address >4000, the program will "create" a buffer area the size of the eprom at address >4000.
- * Use the function-9 ("BACK") to "go back" to start the current function. This is predominately used to repeat a function (e.g., load files) after it has ititially begin completed.
- * Use the function-8 ("REDO") to terminate the current function and return to the main menu.
- * Use the function-4 ("CLEAR") to terminate (interrupt) the current function. This is useful durring burn operations, since when interrupted the program checks the eprom for completion.
- * for option #4, load program files, all programs MUST be AORGd, and cannot have REFS or DEFS (the program does not resolve them). If you need to REF, instead equate the ref in your program and re-assemble. A list of refs is included in the E/A manual and the MINI-MEMORY manual. note that the refs are different for the two.

1.4 OLD_EPROM PROGRAM

This is the old version (blue screen) of the eprom programmer. It requires E/A or MINI-MEMORY command modules. To run, select option 3 from E/A, "load and run". The file name is "DSK1.OLD_EPROM" (note the underline in the name). After the file is loaded, hit <ENTER>. The program name is "EPROM".

This program is handy in that it burns 64K bit eproms faster than the other program. Also, it allows for two eproms to be burned into one (e.g., two 32K bit eproms into a 64K bit eprom).

OLD_EPROM ->D000
DISASSM 7E300

1.5 SETUP

Most people will probably never have to use this program. It is used to checkout the eprom card for proper operation. It checks 8 function of the eprom card. It too is pretty much self explanatory. To run, select option 5 "run program file", and enter the file name "DSK1.SETUP". One note is on the data read function. This option display current data read from the eprom. So as you ground each of the data lines on the eprom, the display should change (e.g., from >FF to >7F, >EF, >FB, etc...).

1.6 LABEL PROGRAM

This program is an Extended-Basic program used to print labels for covering the eprom window. to run type RUN "DSK1.LABEL" from extended basic. it uses the default printer RS232 to print on (line 120 selects this). This program prints four labels in a row, 3 lines per label.

1.7 Detailed hardware Info

The eprom programmer responds at CRU base >1900 thru >19FF. Control signals are generated by two 14L4 PALs on the main eprom pcb. The equations are as follows:

PAL #1 - U11

1. /MEMEN	11. /CRUCLK
2. A0	12. EPAGE
3. A1	13. DBIN
4. A2	14. /CRUST
5. A3	15. /BDRVR
6. A4	16. /ROMCS
7. A5	17. /OFOO
8. A6	18. V1
9. A7	19. PCBEN
10. Power GND	20. Vcc

$$\text{CRUST} = \text{PCBEN} * \text{/MEMEN} * \text{CRUCLK} * \text{/A0} * \text{/A1} * \text{/A2} * \text{A3} * \text{A4} * \text{/A5} * \text{/A6} * \text{A7}$$

This signal indicates we are at >19xx CRU base.

$$\text{BDRVR} = \text{PCBEN} * \text{MEMEN} * \text{V1} * \text{EPAGE} * \text{/A0} * \text{A1} * \text{/A2}$$

This signal controls the data bus buffer to/from the eprom card to the I/O bus.

$$\text{ROMCS} = \text{PCBEN} * \text{MEMEN} * \text{V1} * \text{EPAGE} * \text{/A0} * \text{A1} * \text{/A2} * \text{A3} * \text{DBIN}$$

This signal is the chip select for the DSR rom (not used).

$$\text{OFOO} = \text{/A4} + \text{/A5} + \text{/A6} + \text{/A7}$$

This signal is low when we are at >xFxx. It is not used on the current pcb.

EXTERNAL CONNECTOR PIN DEFINITION
 .100" PIN TO PIN SPACING

SKIP1 PIN #	MMEMONIC	FUNCTION
1	GND	Logic ground
2	EA14	Address bit 14 (MSB)
3	GND	Logic ground
4	ECS*	Eprom chip select
5	PSDN*	Power supply on
6	VPP	High/low voltage supply
7	TYSEL*	Eprom type select
8	EA12	Address bit 12
9	PSHI	Vpp at high level
10	EA10	Address bit 10
11	EA08	Address bit 8
12	EA09	Address bit 9
13	EA06	Address bit 6
14	EA07	Address bit 7
15	EA04	Address bit 4
16	EA05	Address bit 5
17	VCC	+5 Volts
18	VCC	+5 Volts
19	VCC	+5 Volts
20	VCC	+5 Volts
21	EA02	Address bit 2
22	EA03	Address bit 3
23	EA00	Address bit 0 (LSB)
24	EA01	Address bit 1
25	ED6	Data bit 6
26	ED5	Data bit 5
27	ED0	Data bit 0 (MSB)
28	ED7	Data bit 7 (LSB)
29	ED4	Data bit 4
30	ED1	Data bit 1
31	ED2	Data bit 2
32	ED3	Data bit 3
33	EA11	Address bit 11
34	GND	Logic ground
35	EA13	Address bit 13
36	GND	Logic ground

EXTERNAL CONNECTOR PIN DEFINITION
 .100" PIN TO PIN SPACING

SKIP1 PIN #	MMEMONIC	FUNCTION
1	GND	Logic ground
2	EA14	Address bit 14 (MSB)
3	GND	Logic ground
4	ECS*	Eprom chip select
5	PSON*	Power supply on
6	VPP	High/low voltage supply
7	TYSEL*	Eprom type select
8	EA12	Address bit 12
9	PSHI	Vpp at high level
10	EA10	Address bit 10
11	EA08	Address bit 8
12	EA09	Address bit 9
13	EA06	Address bit 6
14	EA07	Address bit 7
15	EA04	Address bit 4
16	EA05	Address bit 5
17	VCC	+5 Volts
18	VCC	+5 Volts
19	VCC	+5 Volts
20	VCC	+5 Volts
21	EA02	Address bit 2
22	EA03	Address bit 3
23	EA00	Address bit 0 (LSB)
24	EA01	Address bit 1
25	ED6	Data bit 6
26	ED5	Data bit 5
27	ED0	Data bit 0 (MSB)
28	ED7	Data bit 7 (LSB)
29	ED4	Data bit 4
30	ED1	Data bit 1
31	ED2	Data bit 2
32	ED3	Data bit 3
33	EA11	Address bit 11
34	GND	Logic ground
35	EA13	Address bit 13
36	GND	Logic ground