

INSTRUCTIONS FOR MODEL 953A EPROM PROGRAMMER

1. Make sure your serial interface is configured as follows:
 - 300 BAUD (or 1200 BAUD on certain models)
 - 1 Stop bit
 - No parity
 - 8 Data bits
2. The 953A does not use or need any handshaking lines, so enable any handshake lines which your computer requires. (Jumper pins 4, 5, 6 and 20 on connector to defeat handshaking.)

Signals required by the 953A are as follows:

Data into programmer:	Pin 3 on DB25P
Data out of programmer:	Pin 2 on DB25P
Signal ground:	Pin 7 on DB25P

3. Subsequent to applying AC power, the 953A will wait for a character to be sent to it. This first character should be an X. The programmer will respond by signing on (See X Command). This initial X is used to determine the BAUD rate (1200/300 Option). The BAUD rate will remain in effect until AC power is removed.

NOW YOU ARE READY.

A functional description of the commands at your disposal follows:

S COMMAND

Type S - You will get a menu of EPROM types.
Select one.
Notice that the prompter indicates the type of EPROM being used. The default type on powerup is 2716.

NOTICE: The effective addressing range of the programmer is determined by the currently selected EPROM type. Any bits in an address sent to the programmer which are greater than the address capability of the EPROM type selected are ignored.

EXAMPLE: Assume 2716s are currently selected. Then P100=P900=P1100=P4100 etc.

@ COMMAND (only on 953A-R1 and later releases)

Type @ - The programmer will respond with the current programming algorithm in effect and ask if you wish to change it. Repond with Y or N.

Two programming algorithms are available for your use:

The single 50 MS pulse is the accepted industry standard for 2758, 2716, 2532, and 2732. This is the default algorithm when power is applied to your programmer.

The other algorithm utilizes a series of 2 MS program pulses. After each pulse, the cell is checked to see if it holds the desired data. Once the cell verifies correct, five more 2M3 pulses are applied. This algorithm is automatically used with the MCM68764, regardless of the algorithm you have selected, as is required bby the Motorola programming specification.

Motorola in particular recognizes this algorithm for use with their 2716s and 2532s. It will program an EPROM in about one half the time of the single 50Ms pulse algorithm, if you have 1200 BAUD option. BayTech is not advocating this algorithm for use on parts for which it is not recommended by the manufacturer.

I COMMAND (only on 953A-R1 and later releases)

Type I - The programmer will respond with the prompter again. This command may be useful in automating control of the programmer if the controlling program wants to check what type of EPROM the programmer is set up for.

L COMMAND - List EPROM contents

The L Command dumps the contents of the EPROM in a formatted form.

EXAMPLE:

```
2716>L0,2F<CR>
```

```
0000 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0010 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0020 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

```
2716>
```

NOTE: You may terminate the listing by sending a dollar sign (\$).

R COMMAND - Read EPROM contents

The Read Command dumps the contents of the EPROM in a continuous string of ASCII HEX characters.

EXAMPLE:

```
2716>R0,2F<CR>
```

```
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFF
```

```
2716>
```

NOTE: You may terminate this command by sending a dollar sign (\$).

D COMMAND - Dump EPROM contents

The dump command causes the contents of the EPROM between specified addresses to be output in eight bit bytes. If speed is a consideration, you might wish to implement this command.

P COMMAND - Program EPROM command

Start programming at specified address.

EXAMPLE:

```
2716>P100<CR>
```

Notice the programmer responds with a dash indicating that it is ready to receive ASCII HEX characters. While programming, it is allowable to send spaces and carriage returns between bytes. The programmer will ignore them. Remember that a byte is two HEX characters -- sending spaces or returns in the middle of a byte will result in a *DT ERR @ NNN.

The program command is terminated by sending a dollar sign (\$).

EXAMPLE:

```
-00 12 45 A3 C3 00 00 123456 FF FB 2222 C2 C31000 CD1234 3A25 44$
```

```
2716>L100, 105<CR>
```

```
0100 00 12 45 A3 C3 00
```

```
2716>
```

V COMMAND - Verify erasure command

The programmer will inspect the bytes between the addresses specified. Any byte which is not OFFH, will be output along with its address.

EXAMPLE: Suppose the 2716 in the programmer is erased; then

```
2716>VO,7FF<CR>
```

```
2716>
```

Notice there is no output. On the other hand, if the EPROM had some unerased cells, the output might look like this:

```
2716>VO,7FF<CR>
```

```
0120 7F  
0125 7F  
0560 7F  
07FF DF
```

```
2716>
```

This EPROM is not completely erased. You may terminate the verify command with a dollar sign (\$) at any time. The need to do so will be obvious at the appropriate time.

X COMMAND - Causes programmer to sign-on

The RXX field in the following example is indicative of any options which you may have. It indicates which operating system is in your programmer.

EXAMPLE:

```
2716>X
```

```
Bay Technical Associates, Inc.  
Model 953A (-RXX) EPROM Programmer.  
Copyright 1980 (1981)
```

```
2716>
```

NOTE: On versions which are 300/1200 BAUD, an X must be the first character sent to the programmer after it is plugged in (to the AC outlet). The BAUD rate is automatically selected and remains in effect as the programmer is on.

DIAGNOSTICS

Following is a list of 953A error codes.

It is important to note that all errors start with an asterisk (*).

After an error is output, the programmer will always return to the command mode.

*SN ERR - Command syntax error

*SEL SW ERR - Selector switch error

Any attempt to read or program an EPROM with the selector switch in the wrong position will result in a selector switch error.

Put the switch in position <A> for 2716, 2516, 2758, 2508, 2532

Put the switch in position for 2732, MCM68764

*DT ERR @ NNNN - Data error

This error is output when the programmer is in the program mode and receives a non ASCII HEX character when it requires a valid ASCII HEX character.

*NE ERR @ NNNN - Needs erasing error

This error is output when the programmer is in the program mode and ready to program a cell. The programmer examines the cell to be programmed within the EPROM and compares it bit by bit to the byte it wishes to program. If it is not possible to program the cell because a bit is 0 and the same bit in the byte to be programmed is a 1, this error will then be output since it would be impossible to program.

*WP ERR @ NNNN - WONT program error

This error is output when the cell will not program. This error is a good indication of a bad EPROM, since it checks the cell prior to trying to program it.

*ST ERR @ NNNN - Stack error

This error will only occur if the programmer's FIFO overflows. This is not possible when running at 300 BAUD. It is possible if you have the version which also operates at 1200 BAUD, if the programmer data output stream is never allowed to catch up with the data input stream. The 953A input FIFO is 16 bytes in length. If it overflows, the programmer will output a stack error, clear the FIFO, and return to the command mode.

Notice that the PGMR software allows the programmer to catch up after each HEX record is sent.

INTERFACING NOTES

1. The model 953A will echo a line feed, OAH, after each carriage return; ODH.
2. Any error which occurs will put the programmer back into the command mode.
3. All errors begin with an asterisk (*).
4. An error causes the programmers input FIFO to be cleared.
5. The programmer only understands upper case command characters. Lower case will result in syntax errors.
6. The number preceding the > prompter indicates the number of KBITS for the EPROM.

4 for 64K (not all versions can program the MCM68764)
2 for 32K
6 for 16K
8 for 8K

This is useful for automating control of the programmer.

7. The end of the prompter,>, indicates the programmer is ready to accept the command.
8. The effective addressing capability of the programmer is determined by the EPROM type currently selected. Thus, if 2716s are currently selected, the programmer can address 000 to 7FF or 11 bits. Address 800 is equivalent to 000. Address 1400 is equivalent to 400.

SPECIAL PROCEDURE FOR USING THE 953A WITH THE INTEL 2732A EPROM

General:

Intel's new 2732A must be programmed with a VPP not to exceed 21 volts. Some other manufacturers of the 2732A guarantee their parts to program with a VPP of 25 volts also.

The model 953A program voltage is factory set to 25 volts, as this is the voltage used by the EPROMS it was designed to program. The programming algorithm is the same for the 2732A as the 2732. The following procedure may be used to reduce the VPP level to 21 volts, thus allowing the user to program the Intel 2732A.

Procedure:

1. Remove the four corner screws securing the front panel to the box.
2. Remove the front panel. You will see the thumbwheel potentiometer on the p.c. board.
3. With the selector switch in the <A> position and 2716 the selected type, put the programmer in the program mode.
4. With a voltmeter, measure the voltage between pins 12 and 21 on the programming socket. It should be 25 volts. Slowly adjust the thumbwheel potentiometer until a reading of 21 volts is observed.
5. Take the programmer out of the program mode by sending it a dollar sign (\$). Put the programmer back in its box, select type 2732, and put the selector in position . You are now ready for Intel 2732A.
6. Repeat the above procedure to put the program voltage back to 25 volts before trying to use the programmer with other EPROM types.

INSTRUCTIONS FOR PATCHING PGMR ROUTINE
FOR USE WITH 1200/300 BAUD VERSIONS OF THE 953A

When operating at 1200 BAUD the PGMR routine must not be allowed to get too far ahead of the programmer.

Add the subroutine <SENBYTE:> to your PGMR source code as shown below. Change the two call SENDEM instructions in <STRP1:> to call SENBYTE. Then reassemble and reload PGMR.

```
;Model 953A programmer CPM HEX file interface program
;Program name - PGMR
;Revision 0 ---- 11/15/81
;Revision 1 ---- 01/05/81
                Add SENBYTE route to allow using program at 1200 BPS
```

*****FIND THIS SECTION OF YOUR SOURCE CODE

```
STRP1: Call GNB                ;Get data byte
        Call SENBYTE           ;Changed from SENDEM
        Call GNB                ;Get rest of data byte
        Call SENBYTE           ;Changed from SENDEM
        LDA BCOUNTER
        DCR A
        JZ ENREC
        STA BCOUNTER
        JMP STRP1              ;Loop for more data
```

*****ADD THIS SUBROUTINE

```
SENBYTE:CALL SENDEM ;Send the byte
CALL PINPUT ;Wait for a response
CALL ECHO ;Echo the char
CPI /*/ ;Check for errors
JZ ERHAND
RET
```

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