1. INTRODUCTION

This manual describes the function and operating procedures of the Altair™ 88-MBL Multi-Boot Loader PROM. The 88-MBL PROM is a preprogrammed 1702A PROM that is used in conjunction with an 88-PMC PROM Memory Card. It facilitates the loading of all paper tape and cassette versions of MITS Altair 8800 system software, eliminating the need to toggle in a bootstrap loader.

2. INSTALLATION OF THE MBL PROM

The MBL PROM must be addressed at 177000_8. It is inserted into slot G of an 88-PMC PROM Memory Card that is addressed at 174000_8.

3. SUPPORTED DEVICES AND PORT ADDRESSES

Table 3-1 lists the devices that are supported by the MBL PROM and the port addresses to which they must be assigned.

Table 3-1. Supported Devices

Device	Port Addresses (Octal)
2SIO	20, 21
SIO (A, B, and C) (REV 1)	Ø, 1
ACR	6, 7
4PIO	40, 41, 42, 43
88-PIO	4, 5
High Speed Paper Tape Reader	44, 45, 46, 47

4. SENSE SWITCH SETTINGS

The MBL PROM reads the sense switches (A8 through A15) to determine the load device type and the terminal device type. Sense switches A8 through A11 are encoded to indicate the load device type, and switches A12 through A15 are encoded to indicate the terminal device. The codes are shown in Table 4-1.

Table 4-1. Sense Switch Settings

Device Type	Octal Code	Terminal SS Up	Load Device SS Up
2SIO (2 stop bits)	Ø	none	none
2SIO (1 stop bit)	1	A12	A8
SIOA, B, C (REV 1)	2	A13	A9
ACR	3	A12, A13	A8, A9
4PIO	4	A14	A10
88-PIO	5	A12, A14	A8, A10
High Speed Reader	6	A13, A14	A9, A10
Terminal at non-standard address	16	A13, A14, A15	Not Supported

NOTE

The MBL PROM does not support non-standard load devices or terminals.

5. OPERATING PROCEDURES

Steps a) through c) of the operating procedures are common to loading from any device.

a) If a non-standard terminal device will be used with the software to be loaded, the necessary information should be deposited into memory at this time. (See the appropriate software manual.)

b) Examine location 177000_8.

c) Set the sense switches according to the codes described in Section 4 to indicate the load device type and terminal device type.

Steps d) through f) are device-dependent. Refer to the device being used (below) for continuing the operating procedures, steps d) through f).

1) Loading from paper tape through 2SIO; 4PIO; SIOA, B, C or 88-PIO
2) Loading from Audio Cassette
3) Loading from paper tape through the High Speed Reader

1) Loading from paper tape through 2SIO; 4PIO; SIOA, B, C or 88-PIO

d) Position the tape so that the non-zero leader is over the read head. (This leader is 256_8 for 3.2 BASIC and 3.0 Package II, and 302_8 for 4.0 BASIC.)

e) Activate the RUN switch on the 8800.

f) Wait 5 seconds, or until the address lights change, then start the paper tape reader.

2) Loading from Audio Cassette

d) Rewind the tape.

e) Start the tape.

f) When the tone changes from a steady "beep" to a "warble," activate the RUN switch on the 8800. (The sound can be monitored by using an earplug connected to the tape recorder.)

3) Loading from paper tape through the High Speed Reader

d) Position the tape so that the non-zero leader is over the read head. (This leader is 256_8 for 3.2 BASIC and 3.0 Package II, and 302_8 for 4.0 BASIC.)

NOTE
The next two steps should be performed in rapid succession.

e) Activate the RUN switch on the High Speed Reader.

f) Activate the RUN switch on the 8800. The tape will stop momentarily, and after a few seconds it will begin to read in.

At this point, if 3.2 BASIC or 3.0 Package II is being loaded, it is necessary to set the sense switches according to the conventions supported by these versions. (4.0 BASIC and all future releases of MITS system software will support the same sense switch codes supported by the MBL PROM.)

6. ERROR INDICATIONS

The Interrupt Enable light remains off if loading is proceeding properly. If an error occurs, the Interrupt Enable light comes on and the ASCII code for the error is stored at location Ø. This error code is then sent continuously to all standard terminal devices.

The error codes are:

C - Checksum error ------- the computed checksum and the checksum on the tape are not the same

I - Invalid load device -- sense switches A8 through A11 do not indicate a standard load device

M - Memory error --------- a bad memory location or ROM has been encountered; the address of the "bad" location is stored in memory locations 1 and 2

O - Overlay error -------- an attempt was made to load into the memory page on which the MBL's stack and input routine reside (this is always the last page of existing memory)