

Users manual
for the
99/4 A

EPROMER

MECHATRONIC

MECHATRONIC EPROMER - 99

The Mechatronic Epromer - 99 is a programming device for the TI 99/4A, with very user-friendly software to program different types of Eproms.

You can program the: 2532, 2716 up to 16k-Byte Type 27128. Eproms can be programmed in a FAST-MODE, which will reduce the loading process time.

The Epromer is completely supported by software, and there are no bothersome flipping of switches; even the power will be selected by the menu. The necessary software can be loaded by:

Extended Basic

Editor/Assembler

Mini-Memory

32k-byte memory expansion and disk drive
system is needed to program your Eproms.

The following chapters describe the handling and the use of the Epromer and the associated software.

The menu-driven software supports the loading of the buffer-memory direct with the contents from ROM, GROM, ROM, or RAM. It is possible to load E/A-files direct from disk. A very interesting possibility is the use of a "G" card (Gram-Karte) and a GPL-assembler, a developing system for the Graphics Programming Language used in the TI 99/4A to develop your own modules.

1. HARDWARE

Mechatronic Epromer - 99
32K-Byte Expansion Memory
E/A, Extended Basic, or Mini-Memory
Disk-System

2. CONNECTION

The Epromer is plugged into the cartridge port of the TI 99/4A, with the Eprom-connector up.

On the Epromer you will find an Edgecard connector, which will hold the necessary module.

IMPORTANT:

The module edgeconnector is not polarized; the module has to be inserted so that the label faces you.

NOTE:

NEVER plug Epromer into the powered-up computer or remove it under power. It could result in damaging the computer or the Epromer. Always use the following steps:

- a. Turn off console
- b. Plug in Epromer
- c. Turn on console
- d. Connect power cable to Epromer (connector is keyed, small hump on connector has to be up)

After connecting the power supply to the Epromer a red LED lights up. If it does not light up, or other LED's are on, please disconnect power to the Epromer and wait 30 sec. and start from the beginning. The red LED will be on during the programming cycle, the green may blink but has no affect on the program.

To power down, use the following steps:

- a. Remove powercable from Epromer
- b. Turn off console

EPROM TYPES

The following Eproms can be burned in the NORMAL-MODE with a 50ms continuous pulse:

-2716
-2732
-27128
-2532
-2764

Other Eproms can be programmed in the INTELLIGENT-MODE or FAST-MODE:

-2764
-27128

All types have to have a programming voltage of 25V or 21V.

The functions of the FAST-MODE are as follows:


Program pulses are only 1ms long. To be sure that all data is burned in correctly; after each writepulse is a readpulse, and the contents of the Eprom will be checked with the original data from buffer-memory.

If an error occurs, the program is halted and a rewrite will occur. This can be repeated up to 15 times. After this a programming pulse of 4ms multiplied by the number of re-tries will be sent to the Eprom.

If after 15 times there is still an error, the procedure will be continued with a 50ms pulse and switched in the NORMAL-MODE. This modus equals the NEC standard Highspeed Programming Mode.

After completion of the programming cycle, it is advised always to check the data in the Eprom with the contents of the buffer-memory with VERIFY-FUNCTION.

4. INSERTING THE EPROM



The Eprom should be inserted after Epromer Commands are selected. The Eprom has to be aligned in front of the Epromer connector with the marking in the back, then lock Eprom in Place, and turn handle clockwise.

SOFTWARE V 1.0

3.1 LOADING OF THE SOFTWARE

Loading of the software with Extended Basic:

Insert the control disk in drive 1. As soon as you select Extended Basic the Epromer Program is automatically loaded, or you can load the program by RUN"DSK1.LOAD".

Editor/Assembler or Mini-Memory:

Select from the main menu the option "3.LOAD AND RUN" File-Name: DSK1.EPROMAS and the program starts.

3.2 First the title and the main menu appear on the screen. There are two selections:

EPROMER-COMMANDS:

This option contains all the instructions which are used after the loading of the buffer.

BUFFER-COMMANDS:

This option contains instructions for the software handling buffer, from which the Eprom is loaded.

The selections are controlled by the following FUNCTION-KEYS:

PROC'D	- RETURN TO THE SUBMENU
BACK	- RETURN TO MAIN MENU
ENTER	- HAS TO BE PRESSED AFTER EACH SELECTION
ARROW-KEY	- CORRECTIONS

The BUFFER-COMMANDS have to be called first, to load the Buffer which contains the data, which should be loaded into the Eprom, press function "BACK" and select from the main menu EPROM-COMMANDS.

(1) EPROMER-COMMANDS

Select Eprom type

Select the number key associated with the Eprom type (e.g., Nr 3 = 2764 then ENTER). The Eprom must be inserted directly after this command is entered.

COMMAND/FUNCTIONS:

Select the desired function through the correct number key and more information will be required.

- a. PROGRAM = Program Eprom with buffer data
- b. READ = Read Eprom in buffer
- c. VERIFY = Read Eprom and compare with buffer
- d. BLANKCH = TEST EMPTY Eprom

Selection of program power:

This is asked by the command program, depending on the type of Eprom 21V or 25V (see Eprom Data Sheet). Select appropriate number and ENTER.

Address:

The addresses are given in HEX, they are relative to >0000, which is the beginning of the Eprom or buffer. It is IMPORTANT that the address START RAM is exactly the same as the address in the buffer. From this address, the selected function is started, also programming, read or verify. Address END RAM is the last address in the buffer which is written to +1 (e.g., END RAM = >2000 hex >1FFF) END ADDRESS >FFAM. From the hex address EPROMSTART is the Eprom data from the START RAM Address and END RAM Address programmed or read.

When all addresses are entered, the computer will check each address for its possibilities. If you press ENTER without entering a number, the Eprom is automatically programmed from the beginning of the buffer. On entering EPROMSTART the selected function is committed.

For the Eproms 2764 and 27128 a so called FAST-MODE is available (see data sheet of Eprom). Entering EPROMSTART address, you will be prompted with FAST-MODE Y/N and after this the program starts. During the programming, the address currently in the Eprom will be displayed in the lower line on the menu. Programming can be stopped with the FCIN BACK, but has to be restarted for completion. By verifying the Eprom with the buffer contents, possible errors are displayed. By pressing the SPACE-BAR you can interrupt the procedure, and by releasing the bar the verifying continues. To be sure that all the data are correct you should always use the verify function to check the Eprom.

(2) BUFFER-COMMANDS

To select a function press the appropriate Nr. key and ENTER

1 LOAD BUFFER FROM RAM

Loading buffer contents from selected RAM. THE END address is the absolute RAM address + 1 (FFAM). With the command ENTER the process is started and continued until you see the COMMAND-COMPLETED on your screen. To stay in the submenu for further function press "PROC'D". To the main menu press function "BACK". IMPORTANT: The ram-buffer of Epromer starts at address >A000 to >DFFF.

2 LOAD BUFFER FROM GROM

Has the same function as above, but it loads the buffer from GROM/GRAM.

3 LOAD BUFFER FROM VDP

Same function as 1 except the buffer is loaded from VDP-RAM.

4 CLEAR BUFFER

With this command the buffer is cleared (buffer is loaded with >FF). It is advised to select this command before loading the buffer. Before this command goes into action, you will be asked for confirmation.

5 LOADING ASSEMBLER-FILES

This section is devoted to load TAGGED-OBJECT-CODE as they are assembled by the TI 99/4A Assembler. You will be asked for the "FILE-NAME" (e.g., "DKS1.TEST") and the function is performed. Please NOTE: Only Object Codes in absolute addressing can be loaded (AORG) nor can REF/DEF statements be used. The absolute addressing of data is loaded relative to the beginning of the buffer (e.g., the first address in the TAGGED-OBJECT-CODE is the start address >0000 in the buffer interpreter).

6 SAVE/LOAD Program Files

This function gives you the opportunity to SAVE or LOAD file in PROGRAM-IMAGE-FORMAT from or to disk. First you have to enter the relative address of the buffer (e.g., >0000). If you want to work from the beginning of the buffer the menu gives you the choice to SAVE or LOAD, SAVE Y/N.

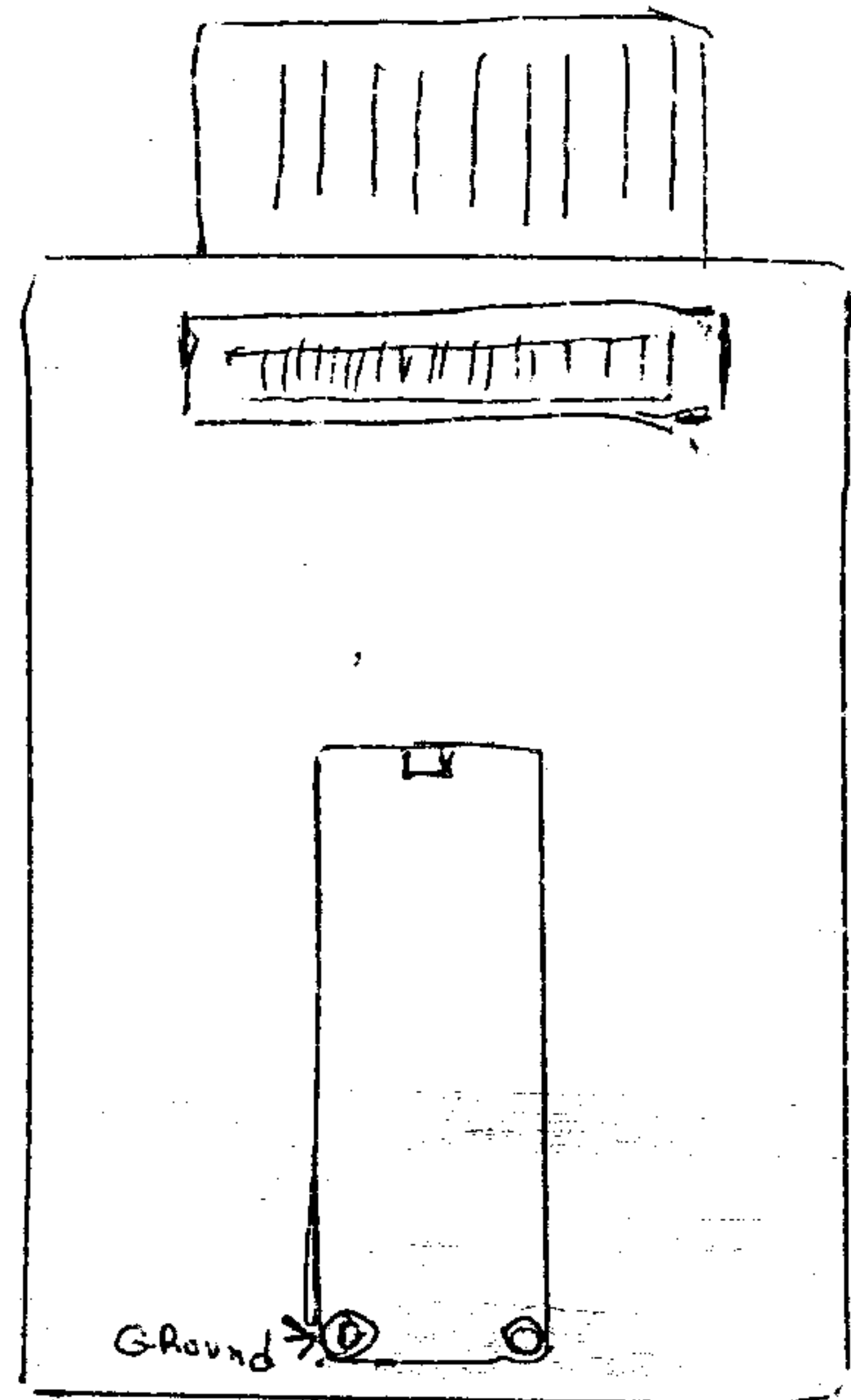
ENTER Y and the buffer is SAVED on Disk. ENTER N and data is loaded IN PROGRAM FORMAT into the buffer. Before starting you

have to enter a FILE-NAME. NOTE: With the command SAVE, almost 8k-bytes from the start address of the buffer are written to the disk. To SAVE the complete buffer you have to do this in two steps. Step No. 1: START >0000; Step No. 2: START >2000 (e.g., "DSK1.TEST1: and "DKS1.TEST2")

7 CHANGE BUFFER

With this command you can go directly into the buffer. By entering a starting address at the prompt START the contents of the memory address are displayed and next to it is the Cursor. Now you can change the value over Keyboard in HEX (4 digits). If you enter nothing and press the following function keys the memory stays unchanged. If you enter a number and press a function key, the value of the address will be changed.

Increasing or lowering of the addresses number is performed by the function key "PROC'D" or "BACK". Press ENTER and the command is performed. After COMMAND COMPLETED is displayed, you can select the submenu BUFFER-COMMANDS by pressing "PROC'D". For the main menu press "BACK".



↑
Power

Always place chip in all the way toward you ↓ with ~~with~~ Dot Away from you ↑.