DELA ELEKTRONIK GMBH

General information

With the DELA-EPROMMER you have acquired a programming device that is unequalled in its price class and its performance. Due to the high programming speed and the special features, this device is suitable for beginners as well as for professionals.

A little about EPROMs

What are EPROMs? EPROMs are read-only memories that can retain their contents for long periods of time without an external power supply. An EPROM is "burned" by applying a certain voltage.
This means that immediately after the programming voltage is applied, a discharge process begins within the EPROM, but we will not go into this further here, since it would go beyond the scope of this manual.

Well, as mentioned before, EPROMs are read-only memories. If you have ever opened your computer, you will have noticed three 24-pin ICs underneath the cassette port. In principle, these are also EPROMs, but they are called PROMs because they cannot be erased. EPROMs, on the other hand, can be erased. For this purpose, there is a small window in the middle of the EPROM. If this window is irradiated with ultraviolet light, the EPROM loses its content after a few minutes. When the EPROM is erased, a resetting process is initiated.

You can imagine the programming as follows: After a voltage is applied, the process mentioned above takes effect. Let us assume that an EPROM has many small boxes, each with a door. When the EPROM is empty, this box is filled with a specific charge. If the programming voltage is now applied, the doors open and the charge can come out. If the voltage is interrupted, the doors close again immediately. If the small window is now illuminated with UV light, the doors open again and the boxes are filled with a charge. So, you should imagine the process of burning and deleting in a similar way.

With a PROM, the data can go in, but cannot come out again because of the absence of the erase window. This is why it is called PROM (Programmable Read Only Memory).

EPROMs are very sensitive to electrostatic electricity. Therefore, make sure that they are not electrostatically charged. In electrostatically discharges, 10,000 volts could easily jump to the EPROM. This is not a problem for you, but it is a disaster for the EPROM. 10,000 volts sounds high, but an electrostatic charge does not have a lot of energy. You will notice nothing more than a slight twitch at the point where the charge is released. You have probably noticed this before when you have walked on a plastic carpet and then touched something made of metal.

EPROM types

This EPROMMER is intended for programming EPROM types 2716 to 27156. You can also burn CMOS types such as 27CXXX. EEPROMs can be burned and electronically erased with this programmer.

Type	VPP	Bytes (hex)	Bytes (dec)	Size KB	Blocks
2716	25V	0800	2048	2 KB	8 (Diskette 9)
2732	25V	1000	4096	4 KB	16 (Diskette 17)
2732A	21V	1000	4096	4 KB	16 (Diskette 17)
2764	21V	2000	8192	8 KB	32 (Diskette 33)
2764A	12V	2000	8192	8 KB	32 (Diskette 33)
27128	21V	4000	16384	16 KB	64 (Diskette 65)
27256	21/12V	8000	32768	32 KB	128 (Diskette 129)

Programming voltages

In most cases, you will find a designation (e.g. 2764-25) behind the type designation on an EPROM. This designation does NOT refer to the programming voltage, it refers to the access time. So never confuse the programming voltage with this designation.

In the example above, the value -25 means an access time of 250 nanoseconds. This means that the EPROM can provide the stored data in a four-thousandth of a second. Here you know exactly the meaning of this information.

With the programming voltages, on the other hand, the situation is somewhat different. Basically, it is impossible to say how high the programming voltage must be for the individual EPROM types (2764, 27128).

In case there is another designation on the EPROM, for example "PGM 12.5", the programming voltage is clear, namely 12.5 volts. However, if there is nothing of this kind on the EPROM, it is no safe assumption that the programming voltage is the default voltage, because more and more manufacturers are starting to market EPROMs as 12volt types.

Most manufacturers use an "A" after the type designation for 12.5 volts (e.g. 2764 A). If you do not have any documentation or data sheets (you can get them from the manufacturer) about EPROMs, try to burn the EPROM with 12.5 volts first. If an error message appears, then try a second time. Before you do this, check the EPROM to see if it is really empty (see the software manual for more information).

If it still cannot be programmed, it can be assumed that it is a 21volt type. Set the PGM (PGM or VPP = programming voltage) to 21 volts and repeat the procedure. If necessary, ask the seller for the necessary information about the EPROM.

Installing the EPROM burner

Warning! Before installing the EPROM burner, the computer and the floppy must be switched off.

Connect the EPROM burner to the user port of the computer with the ICs facing up. The user port is located on the far right outside when you look at the computer from the back. Make sure that the toggle lever of the EPROM socket is pointing vertically to the top.
Now turn on your computer and the floppy disk drive again. Put the control software in the drive and load the first program that is on diskette.

After the program has been loaded, launch it with RUN. The control software allocates the range $AOOO to $CFFF. After the start, the range from $0801 to $9FFF (this is where you have loaded the control software) is available again. If the software or the computer crashes for some reason, you can restart the program with **SYS 49152**. This will open a monitor, which we will explain in a moment. Simply type "**x**" and you will return to the control software.

- CAUTION: Never place an EPROM in the EPROMMER before you have started the software.

The control software

Before you choose any item in the main menu, you should insert an EPROM into the ZIP socket and push the toggle lever. The EPROM must be inserted into the ZIP socket with the notch to the left, i.e. in the direction of the lever.

Function 1: The empty test

With the empty test you can check whether a new or deleted EPROM for programming is actually completely empty. If this is not the case, erase it again with an EPROM erase lamp. You will find out what this is below.

This test gives no information about the programmability of the EPROMs to be tested, only about their contents. If EPROMs that are detected as completely empty cannot be burnt, run the empty test again without the EPROM. If an error message still appears, there is probably a fault with the EPROM burner or your computer.

However, if you are not sure, check the burner with a friend. If the result is the same and you have not committed any operating error, you should send the burner to us for inspection as soon as possible and under any circumstances not try to repair it yourself in the event of a fault.

Function 2: Read EPROM

With this function you can read the contents of an EPROM. This means that its contents are read into the computer's memory. This is useful if you also want to burn EPROM programs from a friend, but no longer have the software. This way you can simply read out the EPROM and save it to diskette.

After you have selected this function and have inserted the EPROM to be read into the ZIF socket, you will be requested to enter the start address in the memory. This is the address from which the control software should store the contents of the EPROM. It is important that

you do not choose an address that is too high, otherwise the EPROM contents can easily overwrite the control software. It is recommended that you always enter $1000 as the starting address. This is 4096 in decimal.

After reading the EPROM, you will be prompted if the contents should be saved to diskette. If you have answered YES, you must enter a program name for the EPROM contents. The disk drive will then begin to save the information.

Storing the EPROM on floppy disk is useful if you do not want to burn the data onto a new EPROM immediately, but would like to use it later.

Function 3: Program EPROM

This function lets you program an EPROM. You have already learned what this is above. You will be prompted for the type of EPROM.
Select the type of EPROM you have inserted for programming (designation is on the EPROM itself, 2764, 27128 ...).

A screen then will appear on what you have to enter the parameters for the programming of the EPROM. At the bottom of the screen you will see three possible voltages which you can select with any key (except the RETURN key) (make sure you select the correct voltage). The number shown in reverse is the desired programming voltage.

After pressing the RETURN key, the set voltage is applied.

A menu then appears in which you must set the programming mode.

There you have various options again:

0 – Normal mode

This signifies that the inserted EPROM will be burnt with 50ms/byte. However, this is only necessary for old EPROMs and EPROM types 2716 and 2732. This burning time has an advantage; it ensures long-term data security (up to 10 or more years). The disadvantage is that programming takes a very long time.

1 – Fast Mode

In this mode, an EPROM is burned with a maximum of 15ms/byte.
Furthermore, this mode offers a special feature, whereby an EPROM is programmed mutually. This means that each byte is burned and immediately read out again for checking. If the content does not match, the EPROM switches to normal mode for this particular byte.
If the content of the EPROM still does not match the content of the memory, an error message is displayed and the programming process is aborted.
This also applies to the normal mode. If the contents do match, the byte is burnt again with the same burning time. As you can easily see, this way of burning is certainly more efficient than the normal mode. Because all programming modes perform a VERIFY (check the contents against the memory), you can be sure that the EPROM actually contains what you want to burn.

2 – Individual programming

This allows you to program a single byte in the EPROM. The corresponding entries are requested by the program.

3 - Erasing EEPROMs

Use this function to delete EEPROMs electronically. All memory cells of the EEPROM are reset to $FF (=255).

The programming

After you have selected the programming mode, you will be asked for the starting address of the program to be burned in the memory. If you do not know this, you can load the program with the load function to $1000 in menu 2 (all addresses are in hexadecimal).
Then enter $1000 as the start address.

After doing so, the end address in the memory is requested. If you want to program an entire EPROM, just press the RETURN key. Otherwise, enter the end address of the program. If you do not know it, you can find it out by using the memory locations $AE (Low Byte) and $AF (High Byte). For example, if $AE contains the value $OA and $AF contains the value $50, we get the address $500A. From this value, we must subtract 1.

After that you will be asked for the start address in the EPROM. This address is not associated with the addresses of the memory. If an EPROM is to be burned from the beginning ($0000), just press the RETURN key.
After answering the following questions, the process of programming the EPROM will begin.

A long bar made of points appears on the screen. During programming, the bar fills up more and more with round little circles. Each point of the bar represents a block (256 bytes). If programming is not possible, the error message mentioned above appears.

Function 4: Repeat programming

This function makes it more convenient for you to program several identical EPROMs or to reprogram them. For example, if you have just programmed an EPROM and want to program another one, you do not need to re-enter all the data such as start address, end address, etc., all you have to do is select this function. The given values will be fully preserved. However, this only works if you want to burn the identical program onto another EPROM.

Function 5: Compare EPROM - memory

You can compare a burned EPROM with the memory contents with this function. For example, if you have burned an EPROM and it does not run as it should. Then just load the burnt program from diskette and insert the EPROM into the ZIF socket and select this menu item.

Function 6: Go to Menu II

This gives you the option of going to a second menu. But first remove the EPROM from the ZIF socket!

L - Loading Programs

With this function you can load a program that you want to burn into the EPROM into the computer's memory. You can choose between the original address and the address $1000. If you do not know the original address, always select "AFTER $1000".

B – Basic

With this function you exit the control software and return to BASIC.

R - Return to Menu 1

Press this key to return to Menu 1.

M – Monitor

Selecting this function opens a monitor.
A monitor is designed for manipulating, testing and programming machine language programs. You can also print the results of your screen. To do this, exit the control software and enter the following:

OPEN 1,4: CMD 1: SYS 49152 (RETURN)

All output that normally takes place on the screen is now redirected to the printer. If the command "x" is typed in, the monitor always returns to the control program.

The following are the monitor commands:

Command	Function	Syntax
.$	Convert HEX in DEC	
.=	Convert DEC in HEX	
.L	Load	L"NAME",08 Loads program according to original address
.S	Save	S "NAME",08,A-Adr.,E-Adr.+1 Saves program
.F	Filling	F 1000 2000 FF - Fills memory from 1000 to 2000 with the value #FF.
.M	Memory display	M 2000 or M 2000 2 100 - displays the range in hexadecimal and decimal respectively
.D	Disassemble	D 1000 or D 1000 1100 - Disassembles the range from $1000
.T	Transfer	T 1000 2000 4000 Moves the range from 1000 to 2000 after 4000
.G	Go	G 1000 - Starts a program from address 1000
.H	Hunt	H 2000 3000 45 46 47 - Searches the range from 2000 to 3000 using the byte sequence 45 46 47
.N	New locate	N 4000 5000 3000 1000 2000 - After moving a memory area to another, this function recalculates the absolute jump addresses so that the program is then ready to run.

The module generator

The module generator is a tool that allows you to prepare several programs in a way that all of them can be burned into an EPROM, as long as the total capacity of the programs does not exceed the capacity of the EPROM. The module generator also generates a list of the programs in the EPROM. This gives you a tool which allows you to easily and quickly burn several programs into an EPROM.

When you press the G key from menu 2 of the control software, you will enter the module generator. There, please press key 1 first. Another menu appears with the possibility to view the operating instructions. For this reason, written instructions for the module generator are not necessary here.

The EPROM Erasing Lamp

There are various erase lamps or erase sets available to help you erase the EPROMs that you have hopefully burnt correctly, whereby these sets are equivalent to a kit.

An erasing lamp basically consists of a special UV lamp with usually 6W power and a choke coil. As already mentioned, the ultraviolet radiation triggers a process that gradually erases the EPROM. An erasing lamp or erasing set is an essential accessory for any user of a computer, because it often happens that a program on a module does not run as it should. These erasing lamps and erasing sets are also available in our shop.

We hope that you are very satisfied with your newly purchased DELA EPROM burner and would be pleased to welcome you as a regular customer in our company.

DELA-ELEKTRONIK GmbH

Attention! New address and telephone number.

5000 Cologne 1 Maastrichter Street 23 ☎ 0221-517081

Business opening hours: Mo-Fr 10.00 Sa 10.00-14.00

Manual Translated and Assembled by Tincho's Place - Argentina.
Youtube: @tinchosplace2406