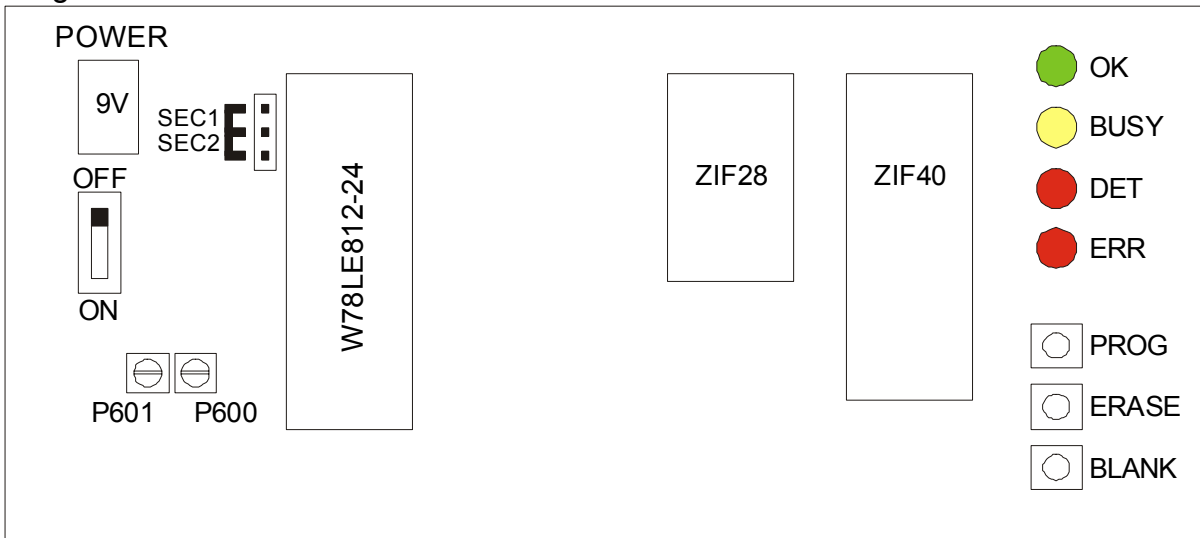


"WinProg-1" Programmer

User guide

1. Introduction

The WinProg-1 Programmer is applicable to program 8-bit microcontrollers, type Winbond, series W78 ... and W77... (**except ISP type units**). The WinProg-1, when used together with any EPROM memory programmer, enables to copy programs from EPROM memory (27C512), placed in ZIF28 socket, to flash ROM memory of microcontroller installed in ZIF40 socket. The WinProg-1 makes it possible to provide automatic protection of programmed microcontroller selectable with SEC1 and SEC2 jumpers. Since the type of microcontroller is automatically recognized, just three push-buttons are left to operate the Programmer.



View of WinProg-1 Programmer board with main components shown.

The following main components are located on Programmer board:

- **LED "OK"** indicator – it goes on to inform that the last operation was successful. When lit, you may replace components in both ZIF sockets.
- **LED "BUSY"** – current operation in progress. When lit, you must not replace components in both ZIF sockets (!!!)
- **LED "DET"** – if lit, it indicates error in reading identifier of microcontroller located in ZIF40 socket.

This may be due to: (I) an attempt was made to program a unit which is not serviced by Programmer, (II) malfunction of the microcontroller being programmed; or (III) ZIF40 socket is empty.

If lit, you may replace components in both ZIF sockets.

- **LED "ERR"** – it goes on to inform that the last operation was erroneous. Possible reasons: (I) error in identifying microcontroller; (II) programming failure (verification error); (III) clearing failure (verification error); or test failure for microcontroller flash memory is blank ("BLANK CHECK") – the unit was not cleared (includes data). If lit, you may replace components in both ZIF sockets.
- Push-button "**PROG**" – when depressed and then released, it starts programming the microcontroller located in ZIF40 socket.
- Push-button "**ERASE**" - when depressed and then released, it starts erasing function for microcontroller located in ZIF socket.
- Push-button "**BLANK**" – when depressed and then released, it starts test for microcontroller flash ROM memory, located in ZIF40 socket, is cleared (blank).

- Socket **ZIF40** – it receives microcontroller to be programmed or erased.
- Socket **ZIF28** – it receives EPROM memory (27C512) with source code for microcontroller to be programmed.
- Jack **"POWER"** – power supply for Programmer. Polarity: "plus in the centre". A non-regulated power supply unit shall be used providing voltage of 9 V and min. load current of 300 mA.
- Switch **"ON-OFF"** - to switch on/off the Programmer. Each time the Programmer is turned on, all LED indicators go temporarily on to check for they are not blown off.
- Potentiometer **"P600"** – it is used to adjust the programming voltage (refer to **"Service mode"**).
- Potentiometer **"P601"** – is used to adjust the erasing voltage (refer to **"Service mode"**).
- Jumper **"SEC1"** – when pinched, it sets the mode of automatic actuating all bits protecting flash ROM memory of microcontroller under programming (refer to **"Program protection"**).
- Jumper **"SEC2"** – it sets the mode of copying states of protecting bits from EPROM memory to flash ROM memory of microcontroller under programming (refer to **"Program protection"**).

2. Programming

The WinProg-1 is applicable in programming the following types of units:

Unit type	Size of flash ROM	Protecting bits			Address of protection byte	
W78E51B	\$0000H - \$0FFFH		B2	B1	B0	\$FFFFH
W78LE51B	\$0000H - \$0FFFH		B2	B1	B0	\$FFFFH
W78E52B	\$0000H - \$1FFFH		B2	B1	B0	\$FFFFH
W78LE52B	\$0000H - \$1FFFH		B2	B1	B0	\$FFFFH
W78IE52	\$0000H - \$1FFFH		B2	B1	B0	\$FFFFH
W78E54B	\$0000H - \$3FFFH		B2	B1	B0	\$FFFFH
W78LE54	\$0000H - \$3FFFH		B2	B1	B0	\$FFFFH
W78IE54	\$0000H - \$3FFFH		B2	B1	B0	\$FFFFH
W78E58	\$0000H - \$7FFFH			B1	B0	\$FFFFH
W77E58	\$0000H - \$7FFFH		B2	B1	B0	\$FFFFH
W77LE58	\$0000H - \$7FFFH		B2	B1	B0	\$FFFFH
W77E468	\$0000H - \$7FFFH		B2	B1	B0	\$FFFFH
W77IE58	\$0000H - \$7FFFH		B2	B1	B0	\$FFFFH

Programming process is actuated with push-button **"PROG"**. During programming, a data area corresponding to the size of available memory in microcontroller being programmed (refer to the Table above) is copied from EPROM memory to flash memory of the microcontroller. Each byte is verified after being programmed. Programming procedure would not start if:

- there is no microcontroller placed in ZIF40 socket,
- unit identifier has not be read,
- microcontroller memory already includes programmed data other than FFH.

Programming will be successful if all programmed locations are successfully verified (compared with EPROM memory).

3. Erasing

Microcontroller memory is erased with push-button "**ERASE**". The flash memory of microcontroller is erased by setting all bits of the memory to "1". The Programmer verifies for all available memory locations of microcontroller in question are properly erased during this procedure.

The flash memory of microcontroller would not be erased if:

- there is no microcontroller in ZIF socket,
- unit identifier has not be read,
- the microcontroller memory has been already erased and includes no data.

Erasing will be successful if all erased locations are successfully verified (compared with FFH value).

4. Verification ("**BLANK CHECK**")

The push-button "**BLANK**" is used to verify for all flash ROM memory of microcontroller is clear. Then, all locations of the memory area in microcontroller tested are compared with the \$FFH value.

The test fails if:

- there is no microcontroller in ZIF socket,
- unit identifier has not be read,
- microcontroller flash memory tested is not cleared (contains programmed data other than FFH).

5. Program protection

There are three options protecting program entered into microcontroller depending on how are set the jumpers "**SEC1**" and "**SEC2**".

Option No.1:

Automatic protection after programming is completed (the jumper "**SEC1**" is depressed). The Programmer automatically sets turns on bits protecting the flash memory of microcontroller (bits B1, B2 and B3 are cleared for all microcontrollers) and clears bytes "**SEED0**" and "**SEED1**" for microcontrollers of series W77... This protection is made immediately after the microcontroller is programmed.

Option No.2:

This is the user's setting mode (jumper "**SEC2**" depressed). The Programmer copies the settings of protection and control bits from EPROM memory to flash memory of the microcontroller. User's data should be placed in EPROM memory locations with addresses consistent with those of relevant bytes in the flash memory of the microcontroller.

Example:

When programming the W77E58 microcontroller, we want to write A7H values into bytes "SEED0" and "SEED1" and to set the bits "Lock bit" and "MOVC inhibit bit". At the end of user's program (assembler) we should add the following:

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cseg at 0FF3FH          : address of byte SEED1
                        DB  0A7H          : data to be programmed
cseg at 0FF7FH          : address of byte SEED0
                        DB  0A7H          : data to be programmed
cseg at 0FFFFH         : address of protecting byte
                        DB  0FCH          : cleared bits: B0 ("LOCK") and B1
                                                : ("MOVC")
                                                : remaining bits to state "1"

END
    
```

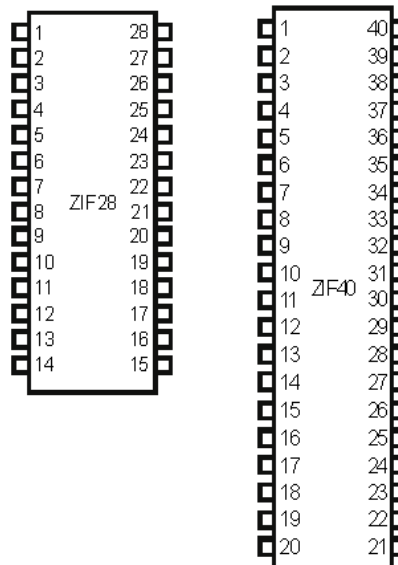
Option No.3:

Without any protection. If no jumper is depressed, Programmer makes no protections for the flash memory of microcontroller being programmed.

6. Service mode

The Service Mode is used to verify the levels of all signals appearing on ZIF sockets. To enter into this mode, turn on the Programmer while both "PROG" and "BLANK" push-buttons are kept depressed. Available are two service steps being toggled by "BLANK" push-button.

ZIF sockets with pin identification



Step No.1:

It is indicated by blinking "ERR" LED . It is applied to adjust the programming voltage (pin 31, ZIF40) and to control remaining voltages at ZIF sockets. Programming voltage may be independently adjusted with **P600** potentiometer. The table below summarizes the voltages for all pins of ZIF sockets.

ZIF28 (service step No.1)							
Pin No.	Voltage [V]	Pin No.	Voltage [V]	Pin No.	Voltage [V]	Pin No.	Voltage [V]
1	min.2.4 V	8	min.2.4 V	15	min.2.4 V	22	min.2.4 V
2	min.2.4 V	9	min.2.4 V	16	min.2.4 V	23	min.2.4 V
3	min.2.4 V	10	min.2.4 V	17	min.2.4 V	24	min.2.4 V
4	min.2.4 V	11	min.2.4 V	18	min.2.4 V	25	min.2.4 V
5	min.2.4 V	12	min.2.4 V	19	min.2.4 V	26	min.2.4 V
6	min.2.4 V	13	min.2.4 V	20	min.2.4 V	27	min.2.4 V
7	min.2.4 V	14	GND	21	min.2.4 V	28	5V ± 5%

ZIF40 (service step No.1)							
Pin No.	Voltage [V]	Pin No.	Voltage [V]	Pin No.	Voltage [V]	Pin No.	Voltage [V]
1	min.2.4 V	11	max.0.8 V	21	min.2.4 V	31	12.5V ± 0.25V
2	min.2.4 V	12	max.0.8 V	22	min.2.4 V	32	min.2.4 V
3	min.2.4 V	13	min.2.4 V	23	min.2.4 V	33	min.2.4 V
4	min.2.4 V	14	x	24	min.2.4 V	34	min.2.4 V
5	min.2.4 V	15	x	25	min.2.4 V	35	min.2.4 V
6	min.2.4 V	16	min.2.4 V	26	min.2.4 V	36	min.2.4 V
7	min.2.4 V	17	min.2.4 V	27	min.2.4 V	37	min.2.4 V
8	min.2.4 V	18	x	28	min.2.4 V	38	min.2.4 V
9	min.2.4 V	19	max.0.8 V	29	min.2.4 V	39	min.2.4 V
10	min.2.4 V	20	GND	30	max.0.8 V	40	5V ± 5%

Step No.2:

It is indicated by blinking "DET" LED . It is applied to adjust the erasing voltage (pin 31, ZIF40) and to control remaining voltages at ZIF sockets. Erasing voltage may be independently adjusted with **P601** potentiometer. The table below summarizes the voltages for all pins of ZIF sockets.

ZIF40 (service step No.2)							
Pin No.	Voltage [V]	Pin No.	Voltage [V]	Pin No.	Voltage [V]	Pin No.	Voltage [V]
1	max.0.8 V	11	max.0.8 V	21	max.0.8 V	31	14.5V ± 0.25V
2	max.0.8 V	12	max.0.8 V	22	max.0.8 V	32	max.0.8 V
3	max.0.8 V	13	max.0.8 V	23	max.0.8 V	33	max.0.8 V
4	max.0.8 V	14	x	24	max.0.8 V	34	max.0.8 V
5	max.0.8 V	15	x	25	max.0.8 V	35	max.0.8 V
6	max.0.8 V	16	max.0.8 V	26	max.0.8 V	36	max.0.8 V
7	max.0.8 V	17	max.0.8 V	27	max.0.8 V	37	max.0.8 V
8	max.0.8 V	18	x	28	max.0.8 V	38	max.0.8 V
9	min.2.4 V	19	max.0.8 V	29	min.2.4 V	39	max.0.8 V
10	max.0.8 V	20	GND	30	max.0.8 V	40	5V ± 5%

ZIF28 (service step No.2)							
Pin No.	Voltage [V]	Pin No.	Voltage [V]	Pin No.	Voltage [V]	Pin No.	Voltage [V]
1	max.0.8 V	8	max.0.8 V	15	max.0.8 V	22	max.0.8 V
2	max.0.8 V	9	max.0.8 V	16	max.0.8 V	23	max.0.8 V
3	max.0.8 V	10	max.0.8 V	17	max.0.8 V	24	max.0.8 V
4	max.0.8 V	11	max.0.8 V	18	max.0.8 V	25	max.0.8 V
5	max.0.8 V	12	max.0.8 V	19	max.0.8 V	26	max.0.8 V
6	max.0.8 V	13	max.0.8 V	20	max.0.8 V	27	max.0.8 V
7	max.0.8 V	14	GND	21	max.0.8 V	28	5V ± 5%