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What's new about this Enhanced Willem EPROM Programmer from PCB3B?

1. Added isolation circuit (between VPP and pin). So that to protect this programmer not be damaged by mis-configured VPP jumper.

2. Improved VPP configuration. For this Enhanced Willem EPROM Programmer, VPP can be configured by just press the VPP setting key. No jumper setting is needed. There are 4 LEDs to indicate the VPP currently been selected. (Normal 12V, 15V, 21V, 25V)

3. Improved Special Chip selection. The special chip selection key provides a simple way to select a chip type by pressing the Special Chip key. There are 7 LEDs to indicate the chip type been selected currently. (Normal, 2732, 2716, i28F, AT29, W27C)

4. Added a Safety Jumper and a Reset key to gave more protection when programming. Safety Jumper will disable all VPP and Special Chip changing to avoid misconfiguring accidentally. And Reset key provides a quicker way to reset VPP and Special Chip configuration to normal state.

5. Improved power supply. Added a USB port to make use of USB power. The USB cable is A-A type Male-to-Male connector. No AC adaptor is needed.

6. Added PLCC32, FWH/LPC and P28F002BC adapters on board.

7. The hardware is fully compatible with original Willem EPROM Programmer (PCB3B) and Windows software.

Hardware Installation & Configuration

1. Hardware Structure
2. **Installation Steps**

Turn off PC power supply

Connect one end of the cable to PC printer port

Connect the other end to 25 Pins port of the programmer

Connect A-A type (Male-Male) USB cable to the programmer and PC. This is for getting power from USB port. So, there is no AC adapter needed.

Then, the two programmer normal indicators light up, then the programmer power supply is normal, the hardware connection is ok.

**Note:** the LPT port of PC needs setting to ECP or ECP+EPP during BIOS setup.

3. **Software Operation**

The software interface:

4. **Hardware Check**

After start the program, click test hardware under Help menu, if the power supply or connection is wrong, appears the prompt, please check if the programmer connects well with
PC, or power supply is normal. If the connection and power supply is normal, then appears: "Hardware present"

**Jumper Configuration**

The blue portion is the socket of the target chips. They are DIP32, PLCC32, FWH/LPC, 25CXX, 24CXX, 93CXX, PIC16F84 and etc. Please note only one chip programming is allowed at the same time, otherwise the error will occur when programming or chip may be damaged.

On the middle top of the board, three push button switches. They are: Reset Switch, VPP Setting Switch and Special Chip Switch. In the above picture shows three black color buttons.

There is a Safety Jumper located on the top of the board.

**Special Chip Switch:** to configure the 2732, 2716, 2816, I28F001, AT29C256 special chips, when press this switch, the internal circuits automatically switch between those chips, the status is directly indicated by the LED.

**VPP Setting Switch:** to configure 27series chip programming voltage. when press this switch, the voltage cycles among 12V, 15V, 21V, 25V, and the voltage can be read from LED. Note, normally, the voltage is 12V, only certain the chip needs higher voltage, then it sets up to voltage above 12V. Hi-voltage may damage the chip if selected a wrong voltage.
Safety Jumper: to ensure the programmer at safe status: when this jumper is enabled (closed), the special model conversion and voltage cycle conversion are disable, the programmer is forced to work at the normal safe status to normal chip. After takeoff the jumper, the rest button return to normal situation.

After the chip programming, ensure to reset safety protection jumper to default position.

ICSP Socket: to connect the PIC MCU adaptor. When programming PIC MCU, the program prompts the connection method.

The J4, J3 jumper drawing: to 4M and 8M chips, when use it, the program prompts accordingly.

DIP Switch

When programming one chip, follow the program prompt to set DIP switch.

Important points

1. Since this programmer has build-in FWH/LPC, PLCC32, P28F002BC adaptors, it directly supports Intel810, 815, 845 main board N82802AB, SST49LF002, SST49LF004 and etc 3.3V chips

2. Safe protection normally at safe position, after programming of the special chip, please set back the jumper.

3. When programming a chip, please ensure the dial switch setting is the same as DIP switch displayed in the program, otherwise, and make sure the safety protection jumper is enabled (closed).
**Operation Steps:**

Before test, set the DIP switch, jumper setup is default.

**Address Pin Test:** click the one of the push button in the Address Out group, use multimeter detect output signal in the ZIF32 socket. Or directly input the address data, the range is: 0-7FFFFH A0-PIN 12, A1-PIN 11, A2-PIN 12, A3-PIN 9, A4-PIN 8, A5-PIN 7, A6-PIN 6, A7-PIN 5, A8-PIN 27, A9-PIN 26,A10-PIN 23, A11-PIN 25, A12-PIN 4, A13-PIN 28, A14-PIN 29, A15-PIN 3, A16-PIN 2, A17-PIN 30.

**Data Pin Test:** click one of the push button in Data Out group, use multimeter confirm the data from ZIF socket. Alternatively, input the test data, the range is: 0-FFH; D0-PIN 13, D1-PIN 14, D2-PIN 15, D3-PIN 17, D4-PIN 18, D5-PIN 19, D6-PIN 20, D7-PIN 21.

**VPP (programming voltage) Test:** Turn on the programming voltage by click on pin 1 (1-Vpp) check box, measure the voltage between PIN 16 and PIN 1. It should show the Vpp voltage your set. (12V, 15V, 21V, 25V. Note: there may be 5% tolerance of voltage reading).

**Clear All:** Clear the whole control signal, address and data output. Then you measure should be all 0V.
The software interface:

Tool bar:

- ![Icon](image1.png)
  - Read data file to buffer, it can be: Intel HEX (*.hex); Binary (*.bin); Motorola S Record (*.s); ALL Eprom File (*.bin, *.hex, *.s)
- ![Icon](image2.png)
  - Save data to a file from buffer
- ![Icon](image3.png)
  - Clear buffer of programmer software
- ![Icon](image4.png)
  - Read data from chip to programmer buffer
Blank verify. Verify the chip if it is blank

Display chip's factory ID

Programming/Test. Program the chip or test the SRAM.

Erase. Erase content of chip.

Programming bit control. For MCS51, AVR

File : Open, Save, Exit.

Edit: Edit buffer

Device: Selection of target device/chip.

Action: The operations for the target device/chip.

Help: Help information.

Main area in software: From left to right there are four sections

1, chip selection and parameter

2, hardware jumper and setting indication picture.

3, MCU chip's parameter setting, such as lock bit.

4, programming parameter setting and fine adjustment. Normally a default value can be used.

Tab page selection:

The bottom of main program screen is series tab window button.

Click "Buffer" button, display buffer content. The first column of data is data address, last column is the data ASCII code, the middle is data hex value. If internal EEPROM exists in PIC MCU, the EEPROM data content displays automatically.
Status bar: Displays programmer's current status: the chip write in is not correct, wrong programming position, programmer problem and so on.

**BIOS/Flash Setting & Programming**

Programming the BIOS on Willem enhanced programmer is easy, as long as we selected right chip type and right jumper. Here is an example for programming on a N82802AB of Intel845 mother board (3.3V):

Note: when programming N82802AB chip, a 12V programming voltage is needed. So, to prevent chip damaged by hi-voltage, please enable the Safety Protection Jumper.

1. select chip type and software setting

![Image of Willem Enhanced Programmer interface]

Now you can see following setting:
DIP position: OFF,ON,ON,OFF,ON,OFF,ON,OFF,ON

Chip's parameter is showed below the Chip Select Button. Normally, those parameters are no need to adjusted, using default value.
Size&checksum: shows chip's capacity and data buffer's checksum.
Shift&pattem adress: shows chip's address line to be used and highest address bit.
tWP/WC: shows programming pulse width and delay time.

2. check chip's position

After DIP set, check the chip's position. For BIOS chip, it should be placed in the 32 pins ZIF socket. For N82802AB chip, the program prompt user need a FWH/LPC adaptor. We only need put chip in the build-in on board adaptor when using our Willem enhanced programmer.

Please make sure the pin one position on the FWH/LPC adaptor.
Note:

1. Displayed chip's parameter is no need to be ajusted.
2. DIP is different when programming different chip
3. For EPROM chip, we need resetting the DIP, special chip and special voltage follow the prompt of software.

3. read from chip

After selected the chip, we can click on the "Read" button. All data will be put into the buffer. When reading the chip, the yellow LED will be light up, indicates that the voltage is been applied on the chip.

4. Programming

After insert the chip, click on "Open file" to open your data file. Then click on "Programm Chip" button. Note, some of chip need erase before write. When programming, the yellow LED will be on. If the chip needs a Vpp programming voltage, the red LED will be on.
5. **copy a chip:**

1) Select the chip type and then put in the original chip.

2) "read" the data into buffer.

3) Put in the target chip and then click "Programm Chip".

**Note:** the chip may be damaged if wrong chip type selected or chip in a wrong direction in socket.

The following parameter is for advanced user only.

- **R/C delay time:** programming pulse delay. If your computer is too fast, you may need increase the delay.
- **Skip Write 0xFF:** Enable this setting will skip the 0xFF when programming.
- **Fast Programming:** For a fast programming mode if it is enabled.
- **Printer Port:** LPT1 (0X378), printer port selected.
- **Offset:** setting programming start offset address.
- **Check Type:** You can select the way to check either 32 bit CRC or 16 bit addition.

**Note:**

1. Some of chip need to be erased in order to programming. Such as SST39SF020.
2. Always put the chip in the programmer at the last step. Because the programmer is in a unstable state then windows is starting.
3. Do not interrupt the programming procedure. Press the "Stop" button if needed.
**EPROM Chip Programming**

The operation to EPROM chip is similar to general BIOS chip. The main difference is: the programmer jumper needs relevant ground setup. As an example: write a 27C16 (programming voltage is 12.5V):

1. **Select the chip and configuration**

Press chip selection button to select the right chip model, the program displays the DIP switch adjustment figure. Follow the figure to set up the DIP switch, includes the jumper next to DIP switch.

![DIP Switch Setup Example](image)

The DIP switch setup is: toward to upper side is on, toward to bottom side is off. As to above figure, the DIP switch is: ON, ON, OFF, OFF, OFF, ON, OFF, ON, ON, OFF, OFF, OFF.

1. **Fix the chip position**

After DIP switch set-up, insert the chip to 32 PIN ZIF socket, meanwhile, special chip and special voltage setup button shows the relevant chip parameters.

For the chips have capacity less than 1M, PIN fewer than 32 PIN, the chip installation is shown the right figure, align with the bottom of ZIF socket:

![Chip Installation Example](image)

The follows operation is read in data file, programming. When programming, the red indicator lights up. This shows the programmer has correct voltage Vpp.

![Programming Chip Example](image)

Note: if wrongly select the chip model or wrongly the chip, the EPROM chip may be damaged.
EEPROM Chip Programming

Some EPROM chip, like W27C512 or W27C512, they are 27series, but no erasing window on the top. Then, they have to be erased electronically. When programming this type, besides the DIP setup and insertion of IC to 32 PIN ZIP socket, the special chip and special voltage button have to be adjusted accordingly.

1. WinBond EEPROM

The programmer supports: W27E512, W27E010, W27C010, W27C020, W27C040

Operation steps:

1) Setup the 12 bit DIP, select the chip model W27CXX

2) Take out the jumper protection line, the programming voltage auto to 15V, special model jumper auto to W27C position --press the special chip button to W27C position (last bit, the LED 7 light up position)

3) Insert W27CXX to 32PIN ZIP socket, click the software upper right corner erase button, the program indicator lamp flashes and progress bar is not moving, then directly press reset button, the chip starts to erase.

4) Check write in, everything is normal.

2. SST EEPROM

This programmer supports: 27SF256, 512, 010, 020, 040; 37VF512, 010, 020, 040.

Operation steps (Vpp keeps as 12V):

1) Setup the 12 bit DIP, select the chip model W27CXX

2) Take out the jumper protection line, the programming voltage auto to 15V, special model jumper auto to W27C position --press the special chip button to W27C position (last bit, the LED 7 light up position)

3) Insert W27CXX to 32PIN ZIP socket, click the software upper right corner erase button, the program indicator lamp flashes and progress bar is not moving, then directly press reset button, the chip starts to erase.

4) Check write in, everything is normal.

3. MX26C4000 EEPROM

Operation steps (VPP keeps as 12V):

1) Setup the 12 bit DIP, select the chip model W27CXX
2) Take out the jumper protection line, the programming voltage auto to 15V, special model jumper auto to W27C position --press the special chip button to W27C position (last bit, the LED 7 light up position)

3) Insert W27CXX to 32PIN ZIP socket, click the software upper right corner erase button, the program indicator lamp flashes and progress bar is not moving, then directly press reset button, the chip starts to erase.

4) Check write in, everything is normal

**ATMEL Chip Programming**

Select the target MCU chip, the program prompts the relevant adapter. Meanwhile, display the options to select the lock bit:

```
MCS-51 Lock Bit

- No Lock Bit
- Lock Bit 1 (MOVc)
- Lock Bit 1+2 (Verify)
- Lock Bit 1+2+3 (EXEC)

Auto write Lockbit
```

**MCS-51 encryption setup, lock bit functions:**

- **No LockBit**: no
- **LockBit1**: forbidden MOVC instruction and programming again.
- **LockBit1+2**: include the above functions and forbidden test (forbidden readout FLASH)
- **LockBit1+2+3**: include the above functions and forbidden external program memory
After selecting the relevant PIC chip type, the program prompts the needed socket:

Meanwhile, in the chip setup area, display the relevant setup to select PIC MCU configuration parameters:

**Oscillator types:**
- **LP:** low power consumption
- **XT:** crystal/ceramic
- **HS:** high speed crystal/ceramic
- **RC:** resistance
- **IntRC:** internal 4Mhz resistant
- **ExtRC:** external resistant
- **ExtClock:** external clock (24Mhz)
- **E4:** external clock with PLL (6Mhz)
- **H4:** crystal/ceramic with PLL (6Mhz)
- **IntRC RB4:** internal resistant
- **IntRC CLKOUT:** internal resistant, RB4 output clock
- **ExtRC RB4:** external resistant
- **ExtRC CLKOUT:** external resistant, RB4 output clock
- **IntRC I/O:** internal resistant
- **intRC CLKOUT:** internal resistant, output clock
- **ER I/O:** external resistance
- **ER CLKOUT:** external resistance, output clock

**Code protect:** encrypt PIC MCU program, prevent read out

**Watch Dog:** turn on/off watch dog

**Power-up Time:** upper power delay selection
AVR Chip Programming

As to AVR chip, choose the target chip, the program prompts the correct adapter socket. Meanwhile, at the chip configuration area, display the right setup list in order to choose PIC MCU configuration parameters.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CKSEL0...2:</td>
<td>Reset delay selection</td>
</tr>
<tr>
<td>BODEN:</td>
<td>BOD(power off test) permission</td>
</tr>
<tr>
<td>BODENLEVEL:</td>
<td>BOD strike voltage selection</td>
</tr>
<tr>
<td>FSTART:</td>
<td>upper start time selection</td>
</tr>
<tr>
<td>RCEN:</td>
<td>internal RC oscillation permission</td>
</tr>
<tr>
<td>SPIEN:</td>
<td>SPI serial programming permission</td>
</tr>
</tbody>
</table>

ATMEL89 Adapter & 51-AVR+ adaptor

By using this adapter, it is able to program MCS-51 series MCU. The MCU includes ATMEL & INTEL. It supports:

89 series MCU:
AT89C1051, AT89C2051, AT89C4051, AT89C51, AT89LV51, AT89C52, AT89LV52, AT89C55, AT89LV55, AT89S8252, AT89LS8252, AT89S523, AT89LS53, AT87F51, AT87F52, i87C51, i87C51FA, i87C51FB, i87C51FC, i87C52, i87C54, i87C58 (*), AT89C51RC (32KB), AT89C55WD

90 series AVR 8-bit RISC: AT90S1200, AT90S2313
51-AVR+ adaptor

This adaptor is an enhanced version of ATMEL89 adaptor. Beside it support all chips of ATMEL89 adaptor, it also included AVR chips: 90S2333, 90S4433, 90S4414, 90S8515, 90S4434, 90S8535

ATMEL PLCC44 Adapter

This adaptor is able to program MCS-51 series PLCC MCU, such as 89C51PLCC44. Please note, it is used with ATMEL89 Adaptor.

Willem Programmer Supported Device List

<table>
<thead>
<tr>
<th>Memory/MCU</th>
<th>Model #</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 bit EPROM(DIP40) (1-4Mbit)</td>
<td>27C1024 (27C210), 27C2048 (27C2002), 27C4096 (27C4002) Eprom 16bit DIP40 adaptor is needed</td>
</tr>
<tr>
<td>16 bit EPROM(DIP42) (4-32Mbit)</td>
<td>M27C400(DIP40), 27C800, 27C160, 27C322 Eprom 16bit DIP42 adaptor is needed</td>
</tr>
<tr>
<td>2.Erasable EPROM</td>
<td>W27E512, W27E010, W27C010, W27C020, W27C040 SST27SF256, SST27SF512, SST27SF010, SST27SF020 MX26C4000 Vcc = 3.3-3.6V SST37VF512, SST37VF010, SST37VF020, SST37VF040</td>
</tr>
<tr>
<td>AT49F001, AT49F002, AT49F008A</td>
<td>Am29F512, Am29F010, Am29F020, Am29F040, HY29F080</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>with TSOP48 Adapter:</td>
<td>Am29F400, Am29F800, 29F160, 29F320 (read/write byte mode)</td>
</tr>
<tr>
<td>with TSOP48 Adapter (Vpp12V):</td>
<td>i28F200, i28F400, i28F800, i28F160 (TSOP48)</td>
</tr>
<tr>
<td>with TSOP48LV Adapter:</td>
<td>29LV200, 29LV400, 29LV800, 29LV160, 29LV320 (read/write byte mode)</td>
</tr>
<tr>
<td>with Firmware Hub/LPC (PLCC32) adapter:</td>
<td>Firmware Hub:</td>
</tr>
<tr>
<td>5. Serial (I2C) EEPROM</td>
<td>24C02, 24C04, 24C08, 24C16, 85C72, 85C82, 85C92</td>
</tr>
<tr>
<td>6. Microwire EEPROM</td>
<td>8 mode: 93C06, 93C46, 93LC46, 93C56, 93C57, 93C66, 93C76, 93C86, 93C13, 93C14</td>
</tr>
<tr>
<td>with PIC embedded MCU adapter:</td>
<td>16F870, 16F871, 16F872, 16F873, 16F874, 16F874, 16F876, 16F877, 16F873A, 16F874A, 16F876A, 16F877A</td>
</tr>
<tr>
<td>8. SPI EEPROM</td>
<td>16F871, 16F874, 16F877, 16F870, 16F872, 16F873, 16F876</td>
</tr>
<tr>
<td></td>
<td>6116, 6264, 62256, 62512, 628128</td>
</tr>
<tr>
<td>10. Atmel MCU with Atmel AT89 adapter</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>89 series:</strong></td>
<td></td>
</tr>
<tr>
<td>Atmel: AT89C51, 52, 55, AT89LV51, 52, 55, AT89S8252 (8K+2K), AT89S53, AT89LS8252, AT89LS53, AT89C1051, AT89C2051, AT89C4051 (20pin), AT89C51RC (32KB), AT89C55WD (6.2V), SST89C54/58, SI89C52</td>
<td></td>
</tr>
<tr>
<td>Intel: i87C51, i87C51FA, i87C51FB, I8xC51, I8xC52, I8xC54, I8xC58</td>
<td></td>
</tr>
<tr>
<td><strong>90 series:</strong></td>
<td></td>
</tr>
<tr>
<td>AT90S1200, AT90S2313</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. Atmel MCU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>with AVR DIP40 adapter:</strong></td>
</tr>
<tr>
<td>AT90S8515, AT90S4414, AT90S4434, AT90S8535</td>
</tr>
</tbody>
</table>

| **with AVR DIP28 adapter:** |
| AT90S2333, AT90S4433         |

<table>
<thead>
<tr>
<th>with Atmel AT89 PLCC44 adapter:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P8048AH, P8049AH, P8050AH, P8042AH (Vea = 12V), P8041, P8042</td>
</tr>
<tr>
<td>OTP (read/verify/Program)</td>
</tr>
<tr>
<td>P8748, P8749H, P8742H (Vea = 18V)</td>
</tr>
<tr>
<td>EPROM (read/verify/Program)</td>
</tr>
<tr>
<td>D8748, D8749, D8742, D8741, D8742 (Vea = 18V)</td>
</tr>
</tbody>
</table>

This multi-function programmer enhanced version has build-in FWH/LPC, PLCC32, P28F002BC adaptor, no need to buy additional adaptor, it directly supports Intel 810, 815, 845 main board, N82802AB, SST49LF002, SST49LF004 and 3.3V MCU...