Megawin

8051 ISP via COM Port

User Manual

By Vincent Y. C. Yu

Contents

1 What is ISP

ISP is the acronym of **I**n-**S**ystem **P**rogramming, and makes it possible that the user can alter the application code under the software control without removing the mounted MCU chip from the actual end product.

To do ISP, the loader program (called “ISP code”) should be pre-programmed into the target MCU’s ISP-memory before mounting the MCU chip to the PCB. When powered on, the MCU boots from the ISP-memory and runs the loader program for checking if the user wants to do ISP. If the ISP is not requested, the MCU will re-boot from the AP-memory by triggering the software reset to run the user’s application code.

2 Chip Configuration for ISP

To use the ISP function, the user should configure the MCU chip by the following two steps:

Step1:
Use a universal Writer or Programmer to configure the *ISP-memory* with 1K bytes (or 1.5K bytes for MPC82L(E)54) and make *HWBS* or *HWBS2* option enabled.

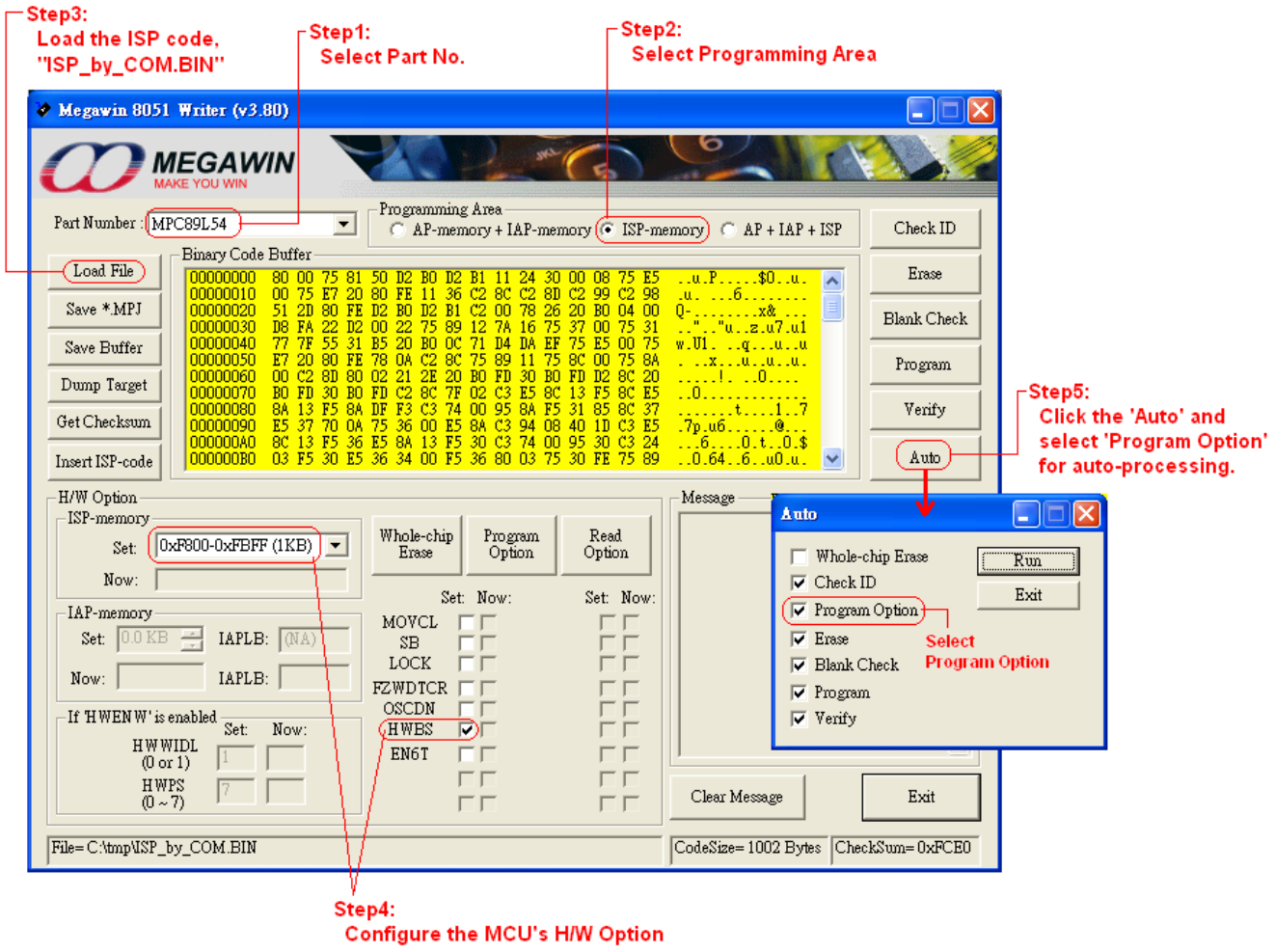
Step2:
Program the Megawin-provided standard ISP code, "*ISP_by_COM.BIN*" in the **[(2) Target ISP-code]** folder, into the configured ISP-memory.

The user may utilize the “Megawin 8051 Writer” or the “Hi-Lo ALL-11 Universal Programmer” for the MCU chip configuration.

2.1 Using the “Megawin 8051 Writer” for Chip Configuration

Please follow the steps (also shown in the following picture):

Step1: Select the Part No.
Step2: Select the Programming Area: *ISP-memory*.
Step3: Load the ISP code, *“ISP_by_COM.BIN*”, to the Writer’s buffer.
Step4: Configure the MCU’s H/W Option: 1KB (or 1.5KB for MPC82L(E)54) for ISP-memory and enable HWBS or HWBS2.
Step5: Click “Auto” and select “Program Option”, then click “Run” for auto programming.



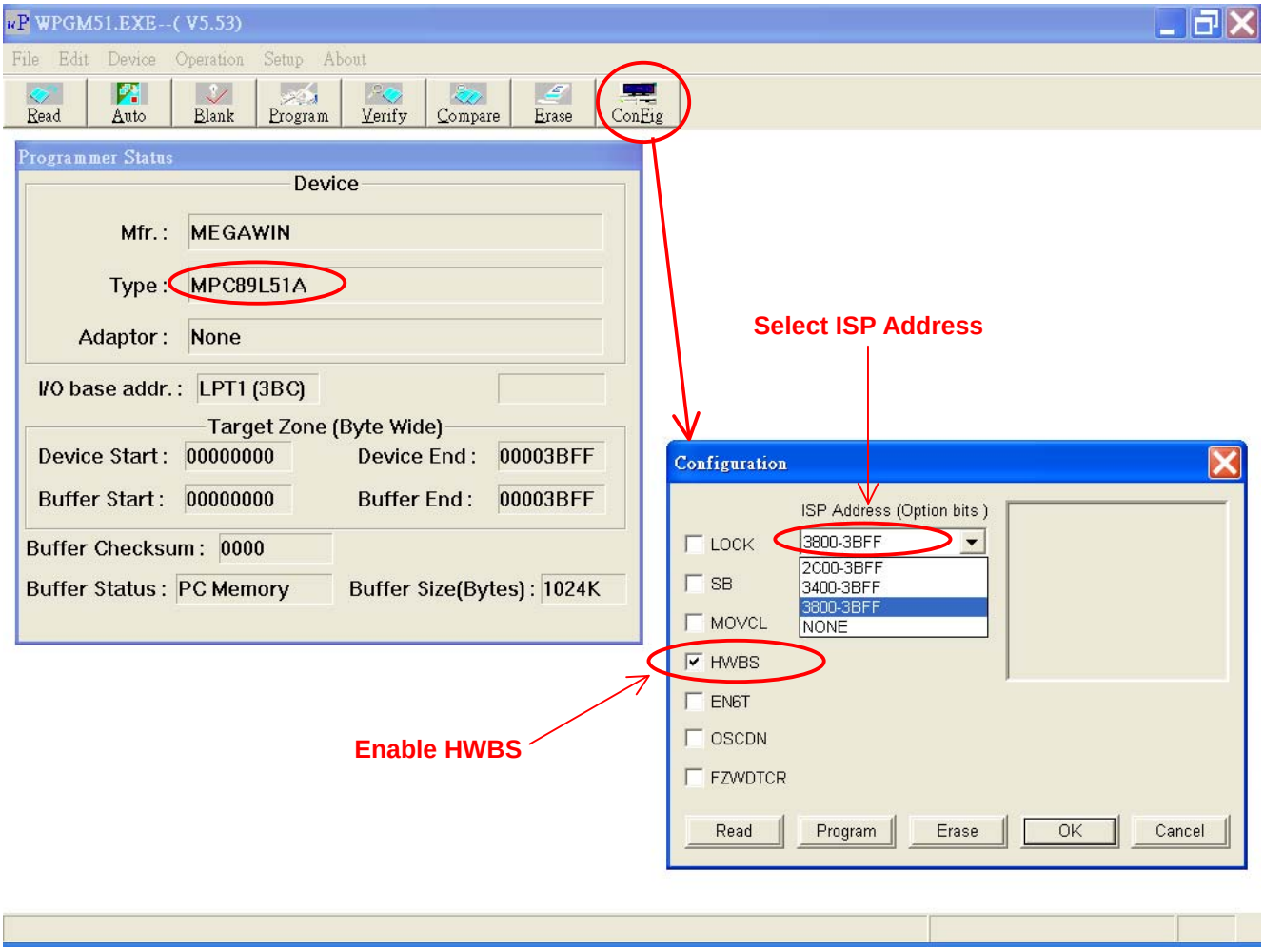
2.2 Using the "Hi-Lo ALL-11 Programmer" for Chip Configuration

Step 1. Configure the H/W option: Enable HWBS and select ISP Address

(1) For MPC89L(E)51/52/53: select **0x3800-0x3BFF** (1K bytes for Megawin-provided ISP code)
(2) For MPC89L(E)54/58/515: select **0xF800-0xFBFF** (1K bytes for Megawin-provided ISP code)
(3) For MPC82L(E)52: select **0x1C00-0x1FFF** (1K bytes for Megawin-provided ISP code)
(4) For MPC82L(E)54: select **0x3800-0x3DFF** (1.5K bytes for Megawin-provided ISP code)
(5) For MPC82G516: select **0xFC00-0xFFFF** (1K bytes for Megawin-provided ISP code)

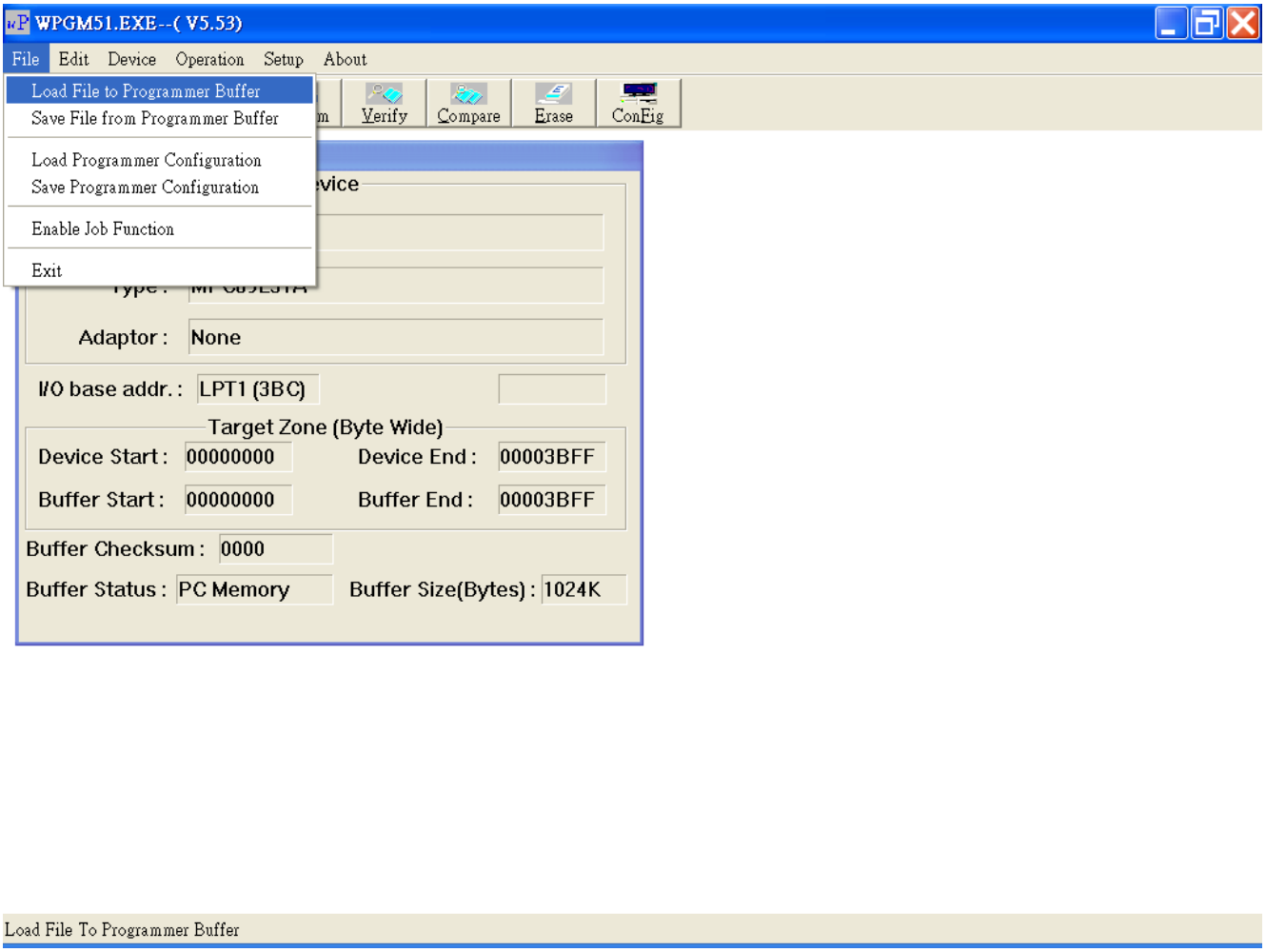
See the following example:

For MPC89L(E)51/52/53:



Step 2. Load the "ISP code" to the programmer's buffer

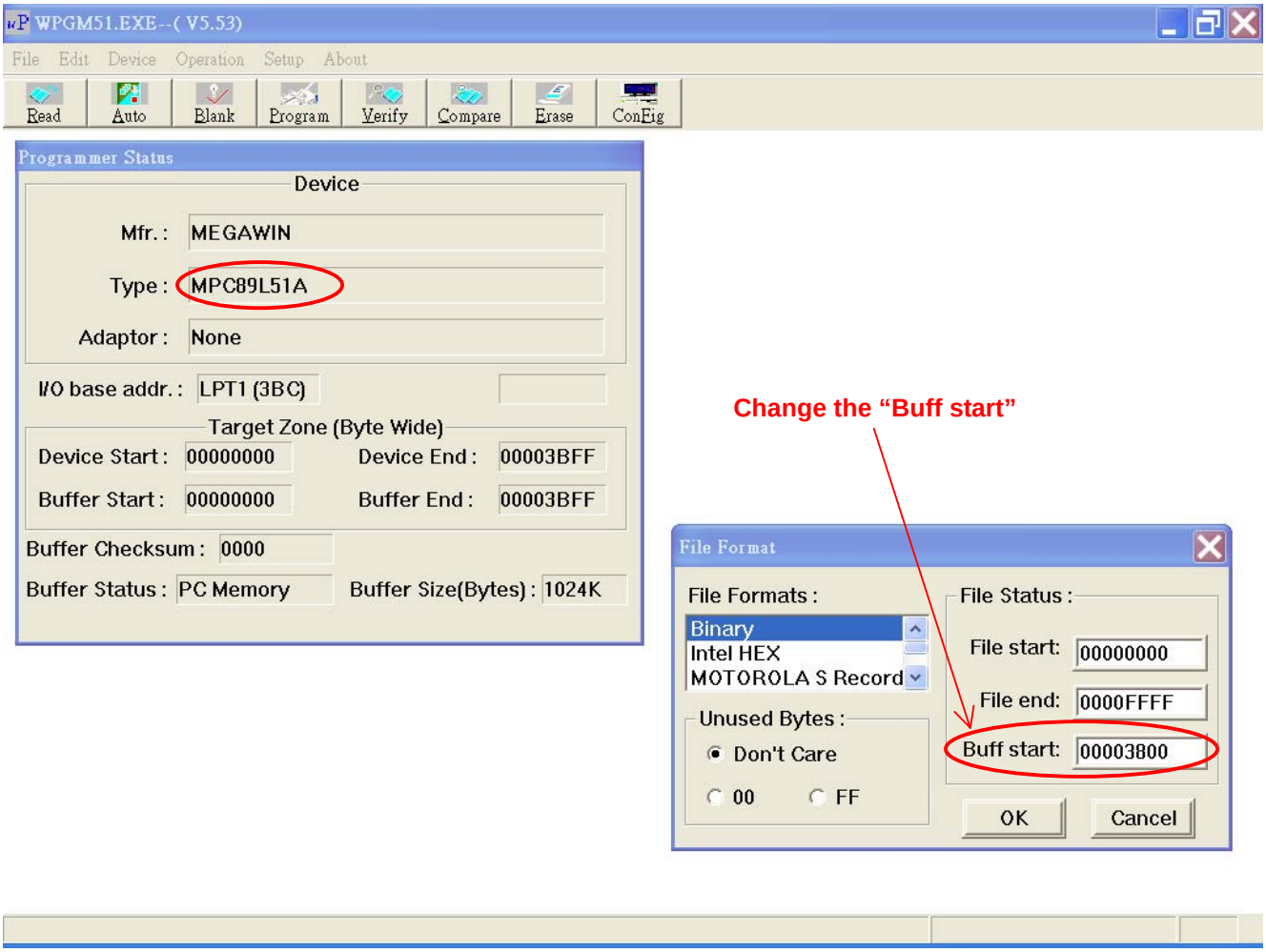
As the following figure, select "Load File to Programmer Buffer" to load the ISP code "*ISP_by_COM.BIN*" into the Programmer Buffer.



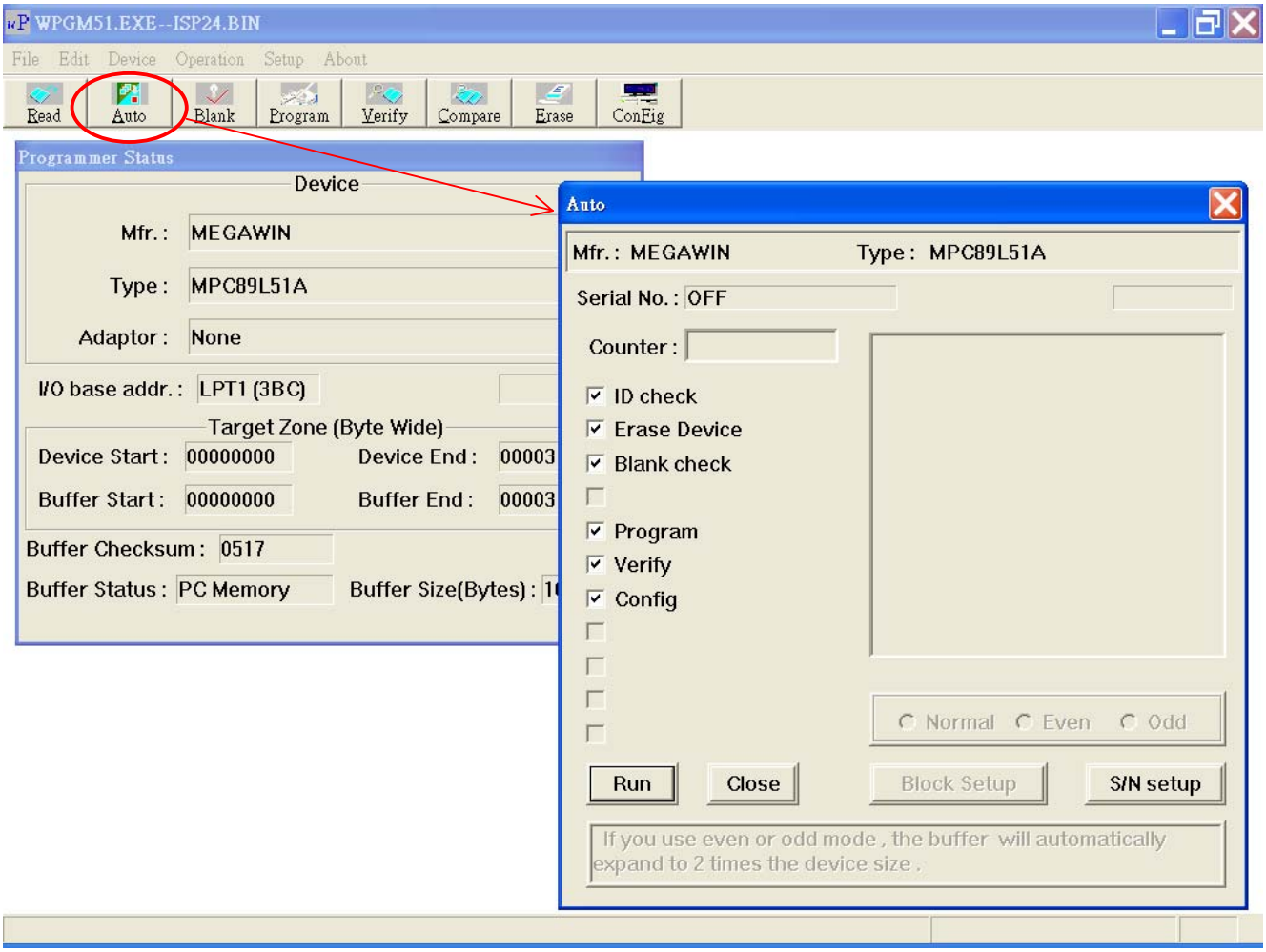
Step 3. Change the "Buff start" to the MCU's ISP start address

(1) For MPC89L(E)51/52/53: change to **0x3800**
(2) For MPC89L(E)54/58/515: change to **0xF800**
(3) For MPC82L(E)52: change to **0x1C00**
(4) For MPC82L(E)54: change to **0x3800**
(5) For MPC82G516: change to **0xFC00**

Note: Hi-Lo will support MPC82G516 in the future.



Step 4. Click the “Auto” button to program the ISP code and H/W option into the MCU chip

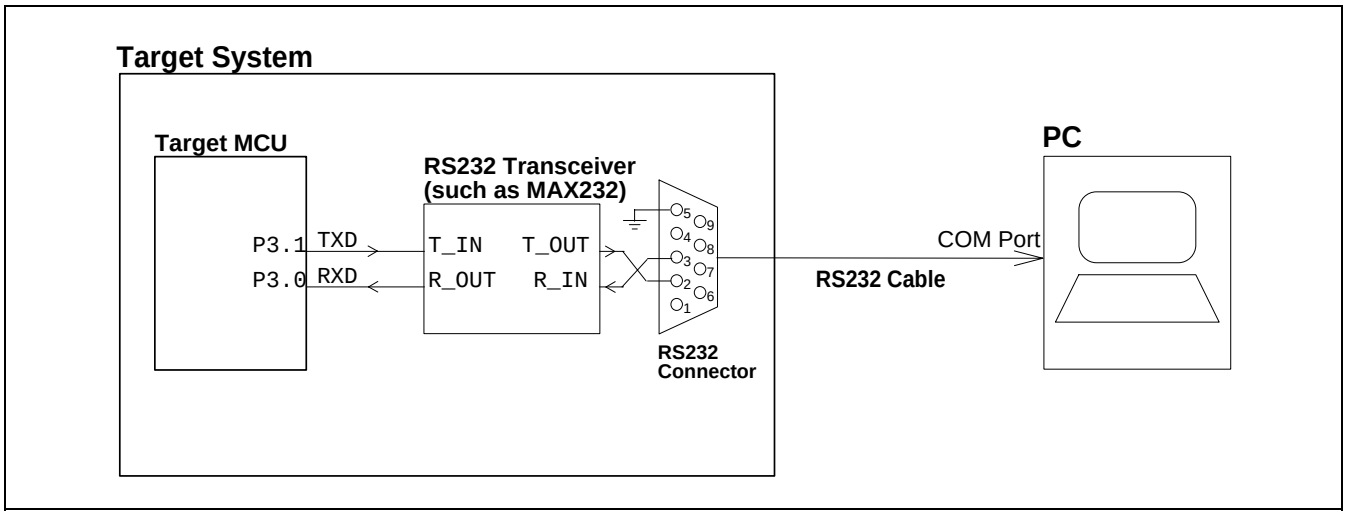


3 How to Do ISP via COM Port

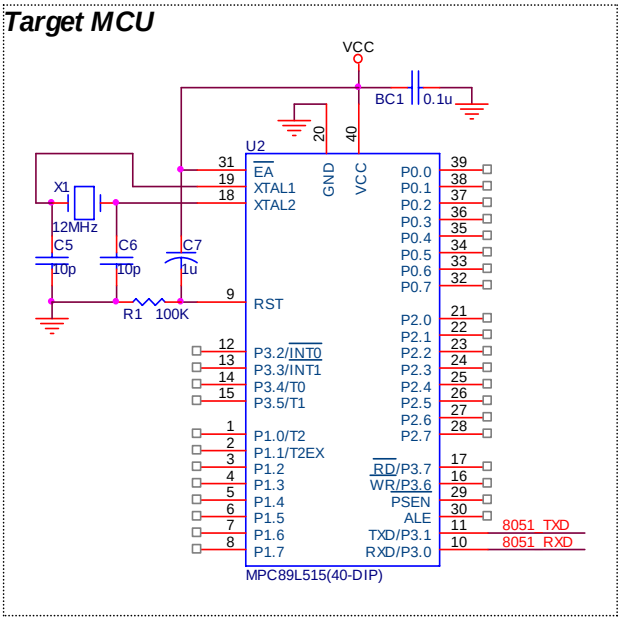
3-1 System Diagram & Circuit

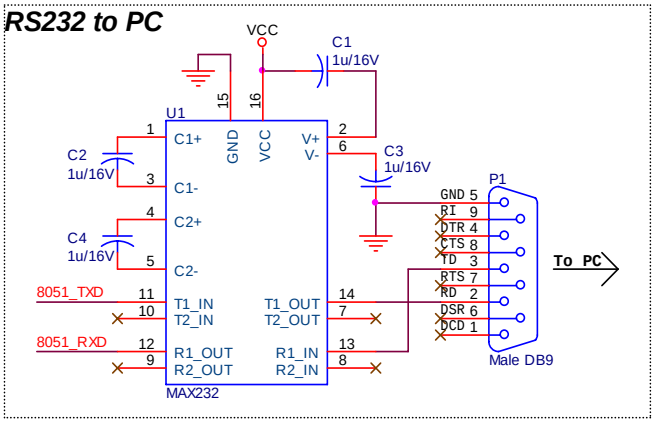
To connect the target system to the COM port of a host PC, there needs an RS232 signal level converter, i.e., an RS232 transceiver (such as the MAX232 chip). The following block diagram shows the connection between the target system and the PC. Where, the P3.0 & P3.1 of the target MCU function as the UART receive & transmit, respectively; And, a MAX232 chip and a 9-pin RS232 connector are used for communication with the PC's COM port.

Block Diagram



Circuitry





Note:
(1) The VCC power can be 3.3V (for L-series) or 5.0V (for E-series).
(2) There is no restriction on the XTAL's frequency.

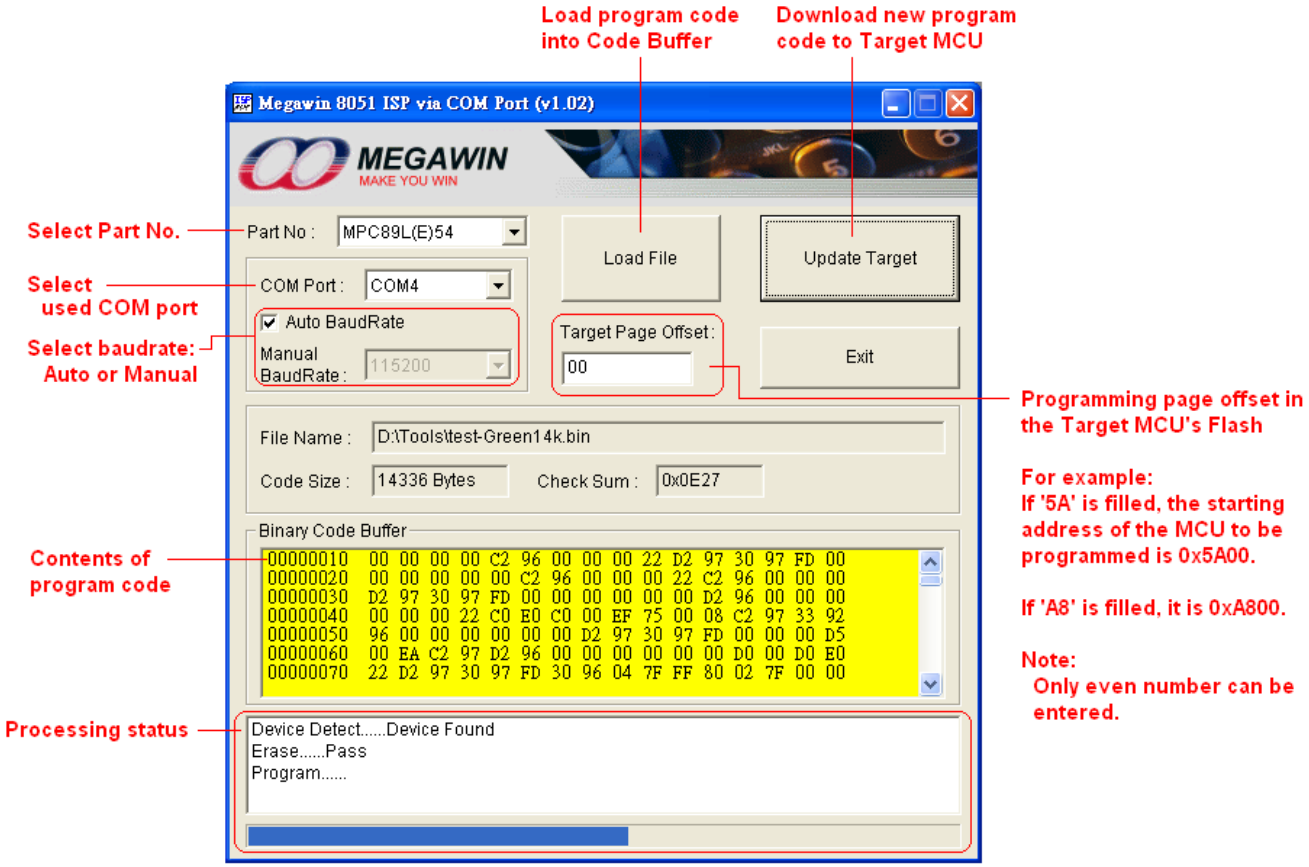
3-2 Install the PC-site AP

Run ***"Setup.exe"*** (in the **[(1) PC-site AP]** folder) to install the application program on PC-site. Using its default installing setting, you will find the item ***"Megawin Utilities \ Megawin 8051 ISP via COM Port (v…)"*** appearing in the Windows' START-menu.

*(Note: the **v?.??** means the current version and may be upgraded in the future.)*

Introduction to the GUI of the AP

GUI means "Graphic User Interface" of the Application Program running in the Windows.



3-3 Operating Steps

First, turn off the target system and run the installed AP on PC-site. Then, follow the steps listed below:

Step1: Select **Part No.**

Step2: Click "**Load File**" to load the new program code

Step3: Fill the "**Target Page Offset**" if need

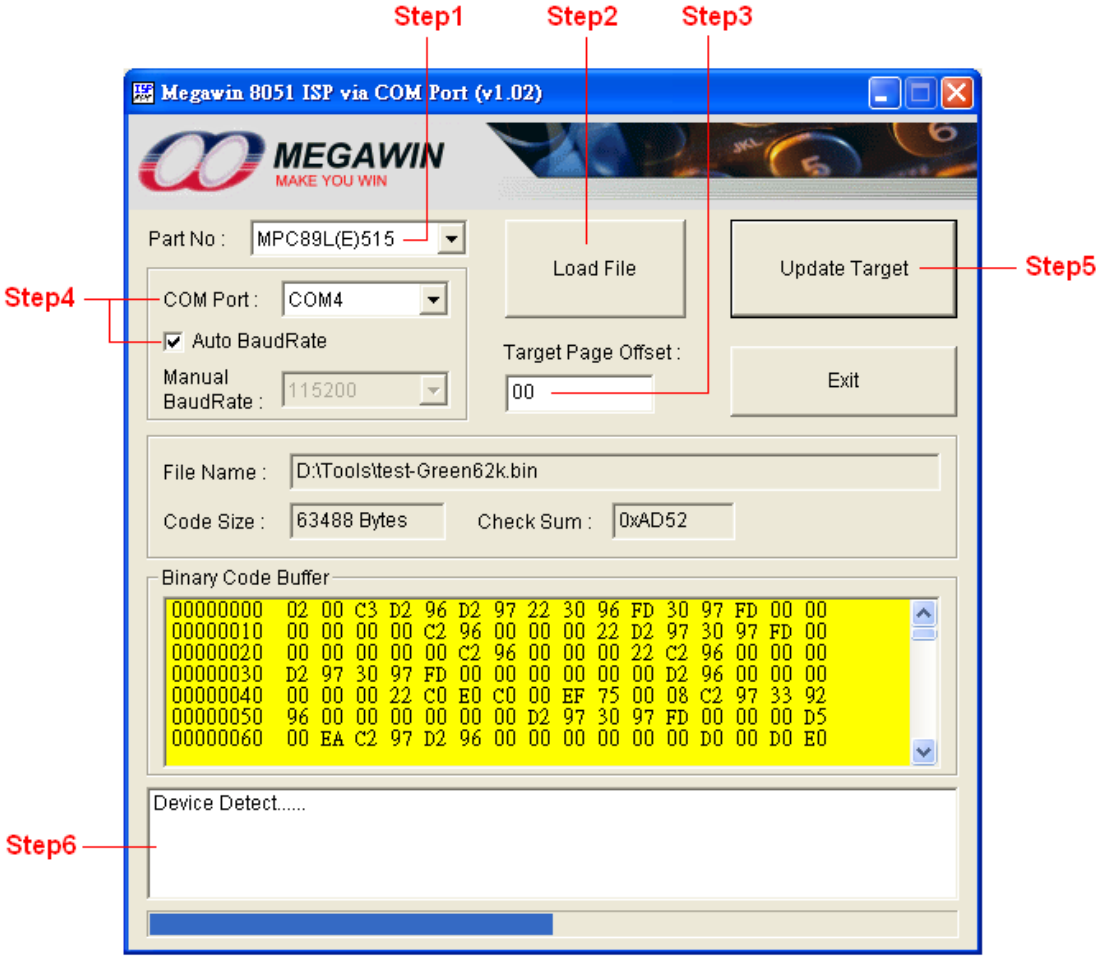
Step4: Select the **COM Port** to which the target system is connected, and select **Auto/Manual BaudRate**

Step5: Click "**Update Target**", and then turn on the target system within 10 seconds when the message 'Device Detect…' is shown in the processing status window. ➔ **Very important !**

Step6: Wait the processing result.

Step7: Go to Step5 for trying again if any errors happen.

See notes in the next page.



Notes:

For Step2:

When load file, both ".HEX" and ".BIN" are acceptable, and the code size is based on its binary format.

For **MPC89L(E)51/52/53**, the maximum code size is 15K-1K=**14K** bytes, which includes IAP data.

For **MPC89L(E)54/58/515**, the maximum code size is 63K-1K=**62K** bytes, which includes IAP data.

For **MPC82L(E)52**, the maximum code size is 8K-1K=**7K** bytes, which includes IAP data.

For **MPC82L(E)54**, the maximum code size is 15.5K-1.5K=**14K** bytes, which includes IAP data.

For **MPC82G516**, the maximum code size is 64K-1K=**63K** bytes, which includes IAP data.

Where, "minus 1K" (or 1.5K for MPC82L(E)54) means subtracting the space of ISP-memory.

For Step3:

The "Target Page Offset" means the starting address of the Flash memory to be programmed. For example, if the offset is filled with '5A', then the new program code will be programmed into the Flash memory starting from 0x5A00. In fact, the offset value is the high-byte Flash page address. Because each page has 512 bytes, this offset value should be an even number.

For Step4:

If a "USB-to-RS232" cable is used, its COM port number can be checked by the following steps:

1) Open the **My Computer** folder.
2) Open the **Control Panel** folder.
3) Open the **System**.
4) Click on the **Hardware** tab at the top of the dialog box, then click on the **Device Manager**.
5) Click on the plus sign in front of the **Ports (COM & LPT)** to check the device listing for the cable's COM number.

The user can select either Auto BaudRate or Manual BaudRate. Sometimes the ISP processing may fail when Auto Baudrate is used. At this time, please select Manual BaudRate and choose a lower baudrate for successful ISP processing.

For Step5:

Anyway, before clicking "**Update Target**", the user should keep the target system in powered-off state.

4 About USB-to-RS232 Cables

So many modern *Note Book* computers have no COM port built-in. Therefore, the user may use the "USB-to-RS232" (or "USB-to-Serial") adapter to substitute the real COM Port. However, not all the cables can work well for our ISP application. ***It is strongly recommended that user use the cable with Prolific chip (PL-2303) or FTDI chip built in.***

Revision History

Revision	Description	Date
v1.00	The first released version.	2007/04/24
v1.01	Fix the PC-site AP bug: Hex to Binary conversion error.	2007/08/06
v1.02	In the target MCU, only the pages occupied by the new program code are erased.	2008/01/22