Nuvoton

8051 ICP Programmer

User Manual

Revision 5.31, 2011/04/08

Contents

Revision History

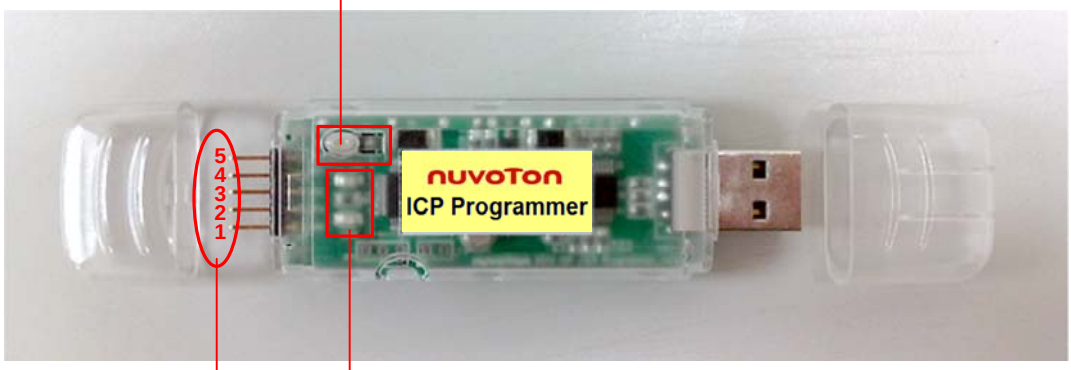
Revision	Description	Date
v3.00	The first formal released version.	2010/02/10
v4.00	(1) Add new parts: N79E234(R)/235(R) and N79E822A/823A/824A/825A. (2) Correct some GUI errors. (3) Update the document version to v4.00.	2010/04/01
v4.01	Update the document version to v4.01.	2010/04/30
v5.00	(1) Update the Hardware Connection. (Section 2.1) (2) Update the PC-site AP to v5.00. (The GUI display for "CONFIG Setting" becomes more user-friendly.)	2010/08/13
v5.02	Fix the HEX-to-BIN conversion error when the hex input file has a binary code size more than 64K. (The application program is updated to v5.02.)	2010/11/15
v5.05	(1) Support Tool Project (TPJ) file for management of GUI setting. (2) Release 'FS0' bit in CONFIG1 for W79E8213.	2011/01/18
v5.31	Fix some software bugs.	2011/04/08

1 Introduction

ICP is the acronym of **I**n-**C**ircuit **P**rogramming, which makes it possible that the user can update the MCU's program memory under the hardware control without removing the mounted MCU chip from the actual end product. The USB-stick-like tool "8051 ICP Programmer", as shown in the following picture, is used to perform the ICP function. It uses a serial interface with only five pins for programming, not like the universal programmer, which usually uses a parallel interface. In addition, since this tool can save the programming data downloaded from the host, it is able to perform the off-line operation. This feature is especially useful in the field without a host.

Note:
The difference between ICP (In-Circuit Programming) and ISP (In-System Programming) is that ICP is implemented by hardware control while ISP is implemented by software control of MCU itself. So, before updating the MCU chip, ISP needs a software code (the ISP-code) pre-programmed in MCU's LDROM to function as software control while ICP doesn't need any software code pre-programmed.

Picture of the "8051 ICP Programmer"



The ICP Interface

VPP: Programming voltage to the 8051 MCU. This voltage may be up to +11V for some MCU parts.

CLK: Serial clock to the 8051 MCU.

VCC: Power supply from the target system. In off-line operation, the Programmer is powered by the target system.

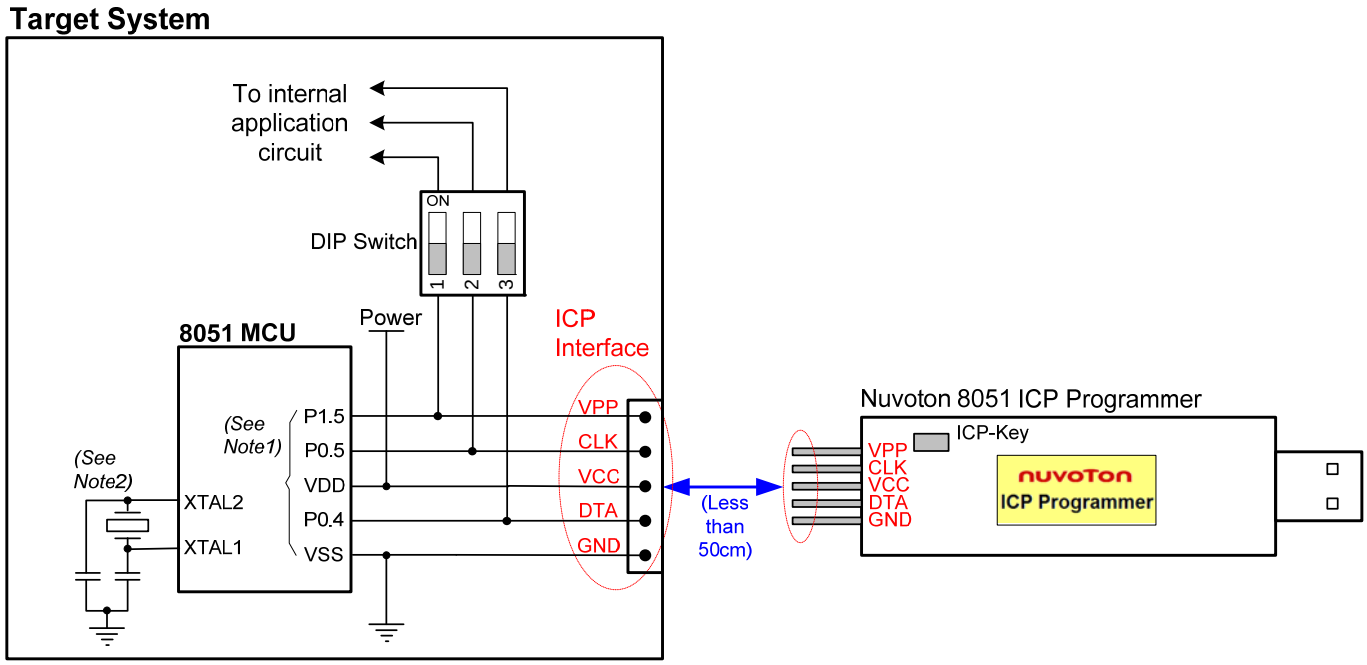
DTA: Serial data to/from the 8051 MCU.

GND: Ground.

2 Hardware

2.1 Hardware Connection

The following diagram shows the hardware connection. The DIP-switch is used to isolate the ICP interface from the application circuit during ICP programming. Before starting ICP programming, the user should switch the DIP-switch to OFF state. Note the DTA and CLK signals are always kept at TTL level while the VPP signal may rise up to +11V, so the isolation is especially necessary for the VPP signal to protect the application circuit from being damaged. After ICP programming is finished, disconnect the ICP Programmer and switch the DIP-switch to ON state for normal operation.



Note:

**1: Refer to Section 2.2, 'ICP Interface', for which pins are used.*

**2: XTAL is not necessary during ICP programming.*

2.2 ICP Interface

See the following table for the pins used as the ICP interface.

Part No.	Pins Used as the ICP Interface		
	DTA	CLK	VPP
W79E802A	P0.4	P0.5	P1.5
W79E803A	P0.4	P0.5	P1.5
W79E804A	P0.4	P0.5	P1.5
W79E822B	P0.4	P0.5	P1.5
W79E823B	P0.4	P0.5	P1.5
W79E824A	P0.4	P0.5	P1.5
W79E825A	P0.4	P0.5	P1.5
W79E832A	P0.4	P0.5	P1.5
W79E833A	P0.4	P0.5	P1.5
W79E834A	P0.4	P0.5	P1.5
W79E2051A	P1.6	P1.7	RST
W79E2051RA	P1.6	P1.7	RST
W79E4051A	P1.6	P1.7	RST
W79E4051RA	P1.6	P1.7	RST
W79E8213	P0.4	P0.5	P1.5
W79E8213R	P0.4	P0.5	P1.5
N79E342	P0.4	P0.5	P1.5
N79E342R	P0.4	P0.5	P1.5
N79E352	P1.6	P1.7	RST
N79E352R	P1.6	P1.7	RST
N79E875	P0.4	P0.5	P1.4
N79E875R	P0.4	P0.5	P1.4
N79E234	P0.4	P0.5	P1.4
N79E234R	P0.4	P0.5	P1.4
N79E235	P0.4	P0.5	P1.4
N79E235R	P0.4	P0.5	P1.4
N79E822A	P0.4	P0.5	P1.5
N79E823A	P0.4	P0.5	P1.5
N79E824A	P0.4	P0.5	P1.5
N79E825A	P0.4	P0.5	P1.5

3 Software

3.1 Install the Driver

This ICP Programmer has the USB-to-Serial bridge chip (PL-2303) built inside. When connected to host, it will appear as a *USB-to-Serial COM port* in the System\Hardware\Device Manager. Before starting to use this programmer, the user needs to install the driver in the host if the PL-2303 driver has never been installed in this host. The user can also find this driver in the folder [(1) Driver].

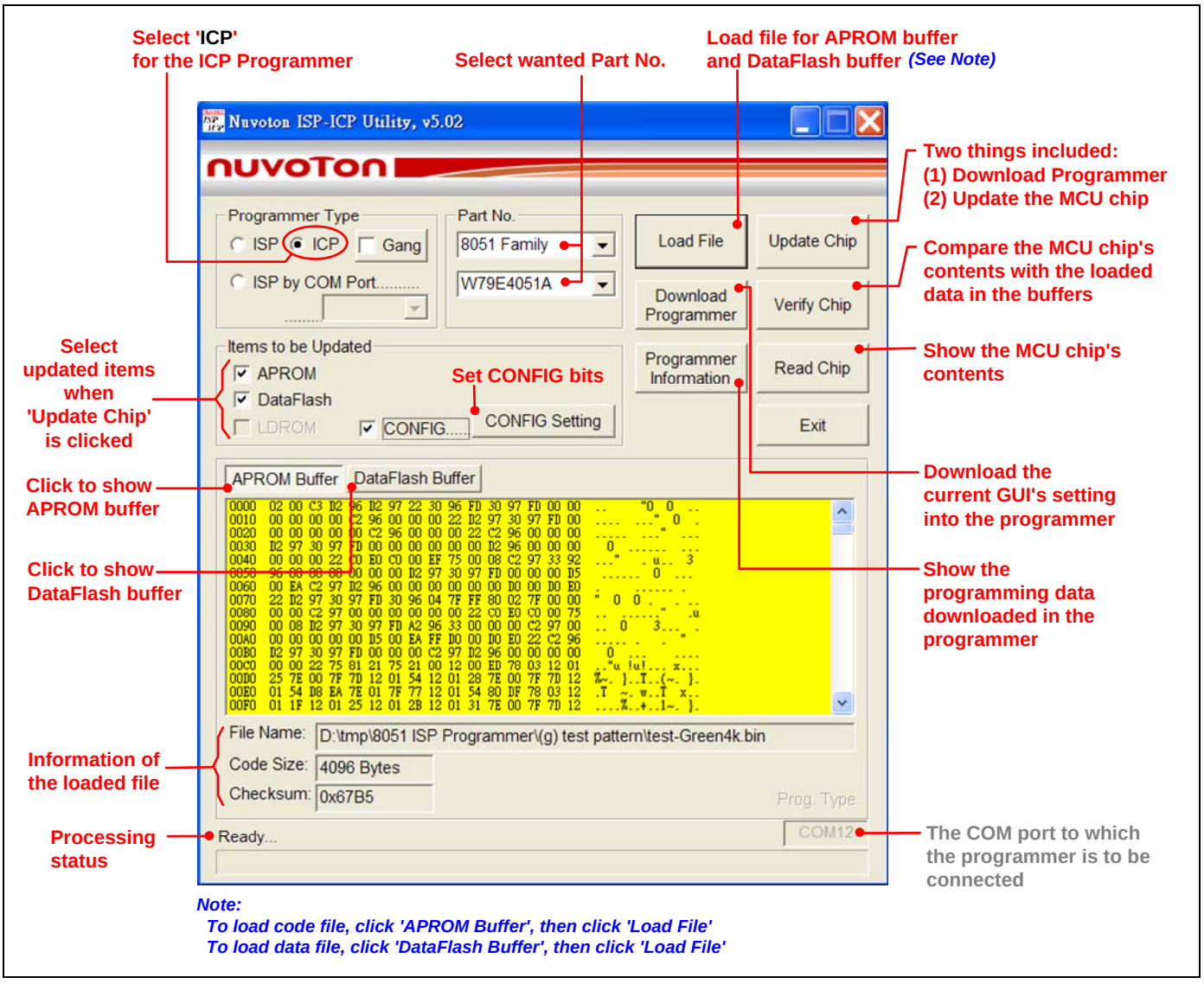
Note: Don't plug the ICP Programmer to the host before the driver is installed.

3.2 Install the Application Program

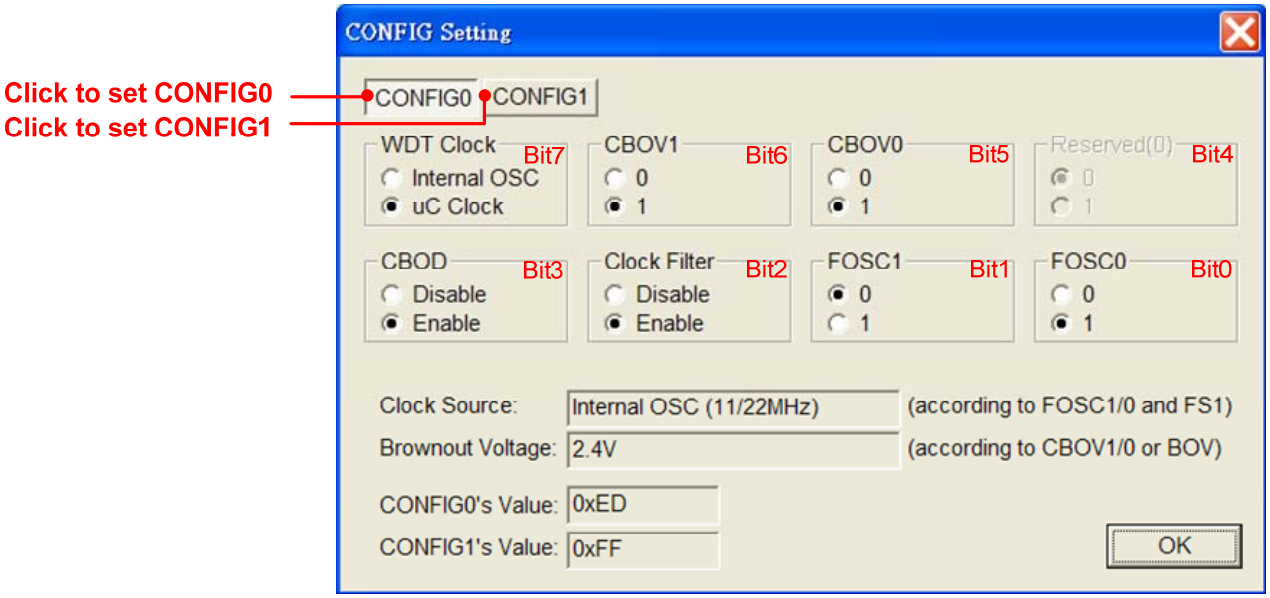
The application program setup file is contained in the folder [(2) PC-site AP]. Using the default installation setting, you will find the item *"Nuvoton Tools \ Nuvoton ISP-ICP Utility, v?.??"* appearing in the Windows START-menu after the application program is successfully installed.

*Note: **ISP-ICP** means this application program is designed for both the **ISP Programmer** and the **ICP Programmer**.*

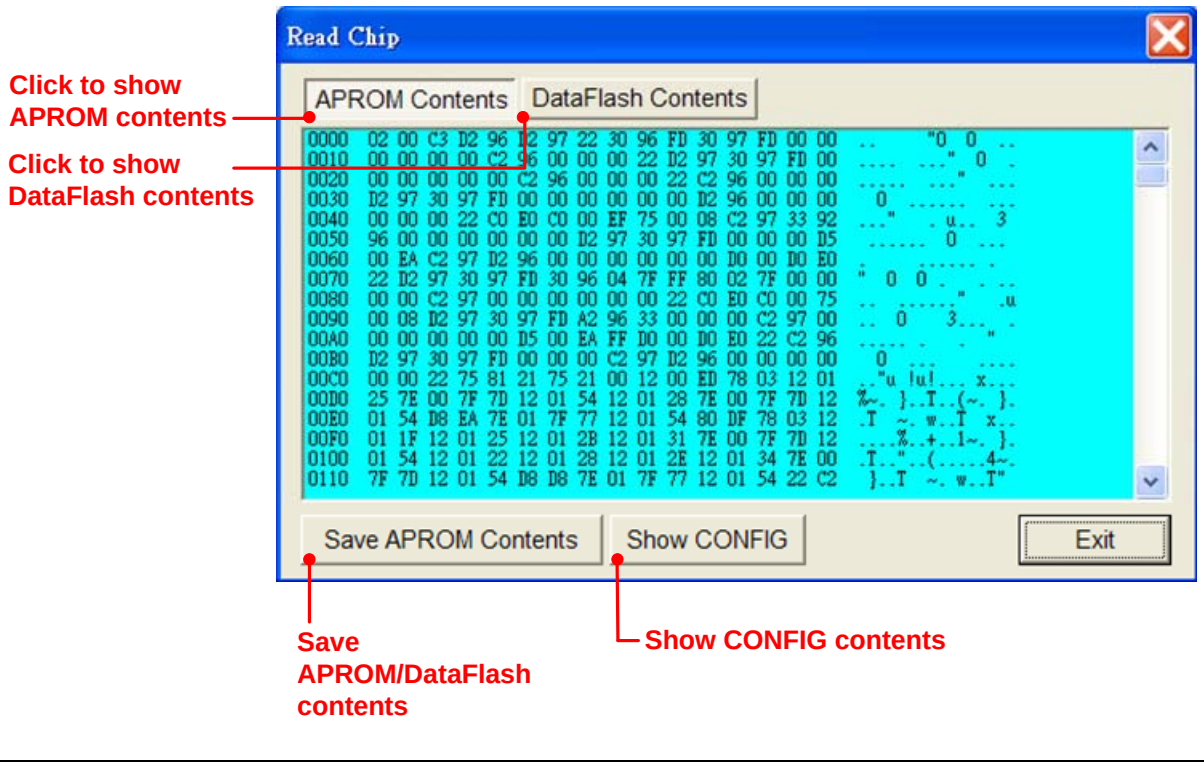
3.2.1 Main GUI for the Application Program



3.2.2 GUI for 'CONFIG Setting'

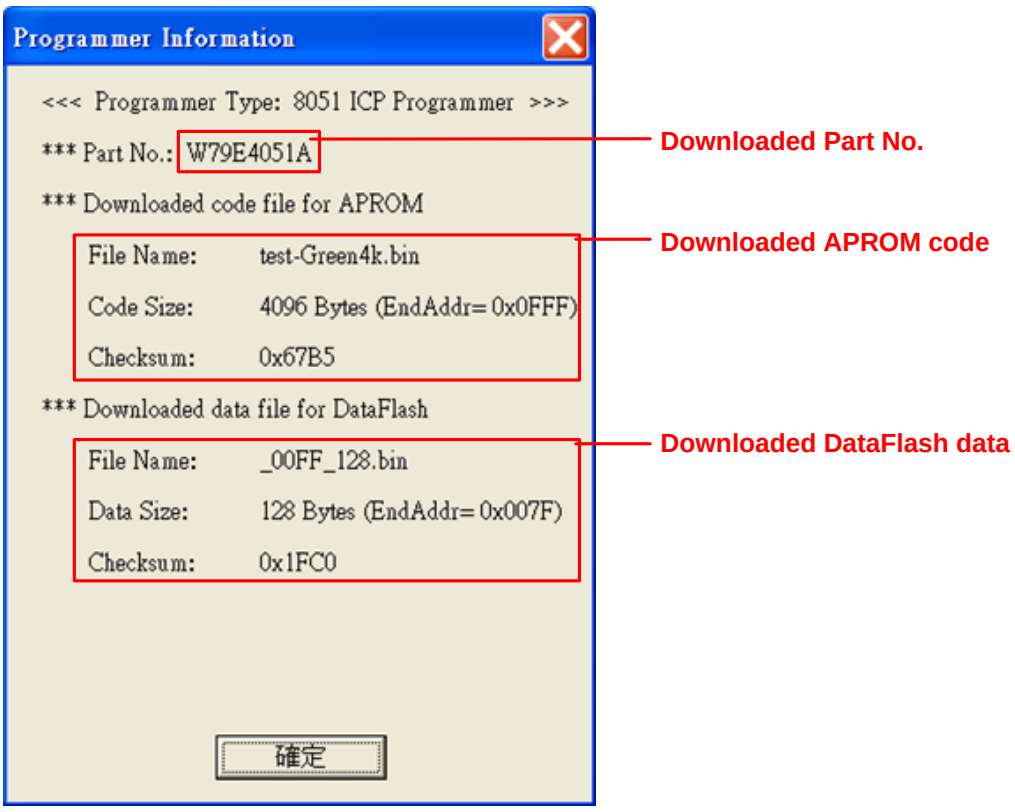


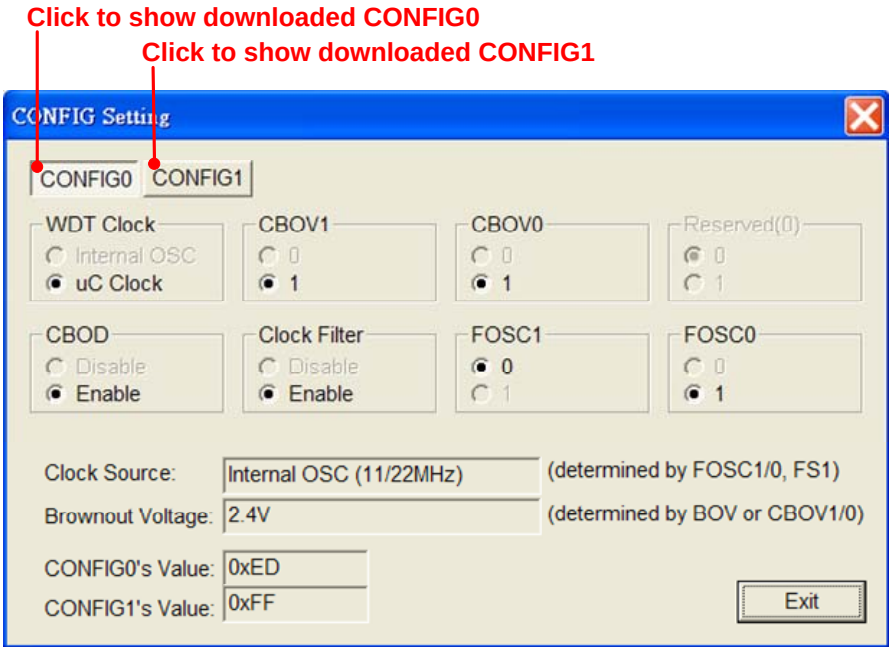
3.2.3 GUI for 'Read Chip'



3.2.4 GUI for 'Programmer Information'

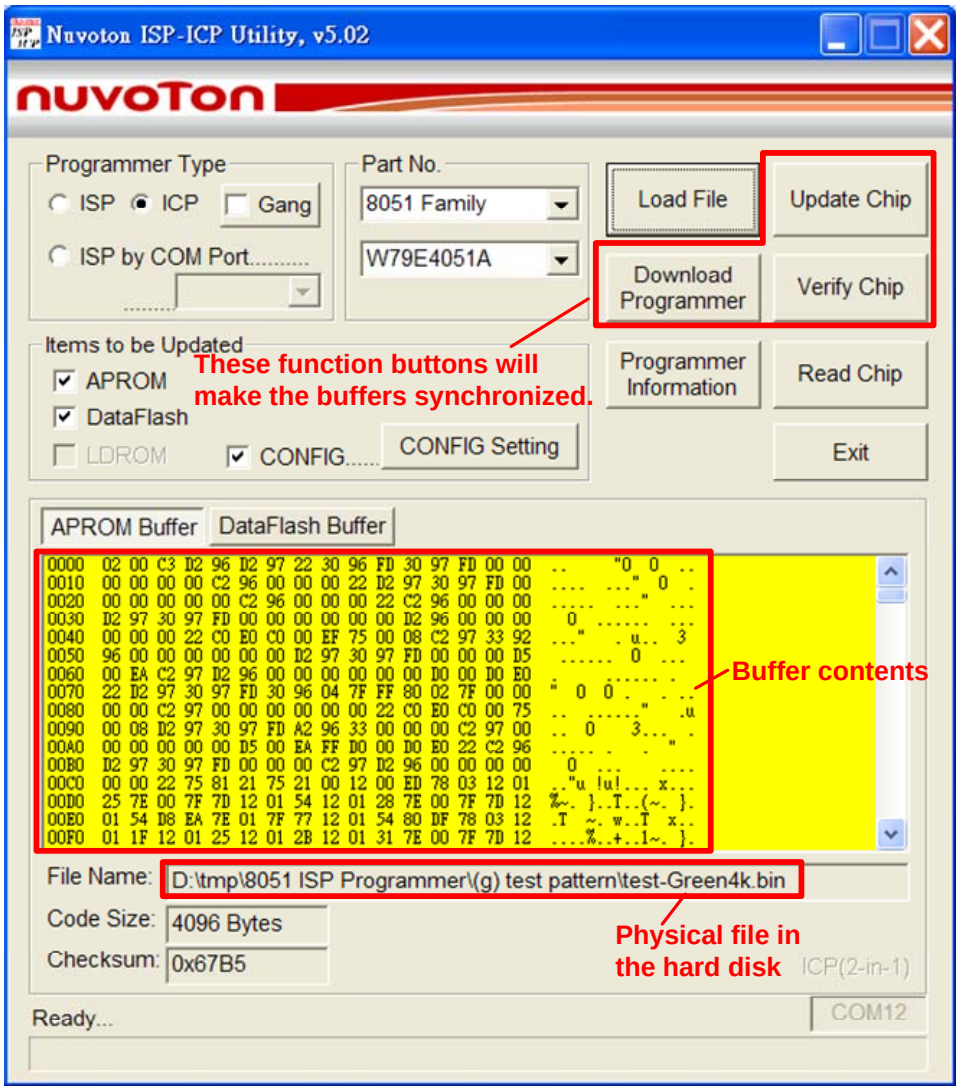
To check the programming data downloaded in the Programmer, click the 'Programmer Information' button when the Programmer is connected to PC. Note the 'CONFIG Setting' dialog box appears only when the CONFIG bits are to be updated.





3.3 Auto Synchronization of APROM/DataFlash Buffer

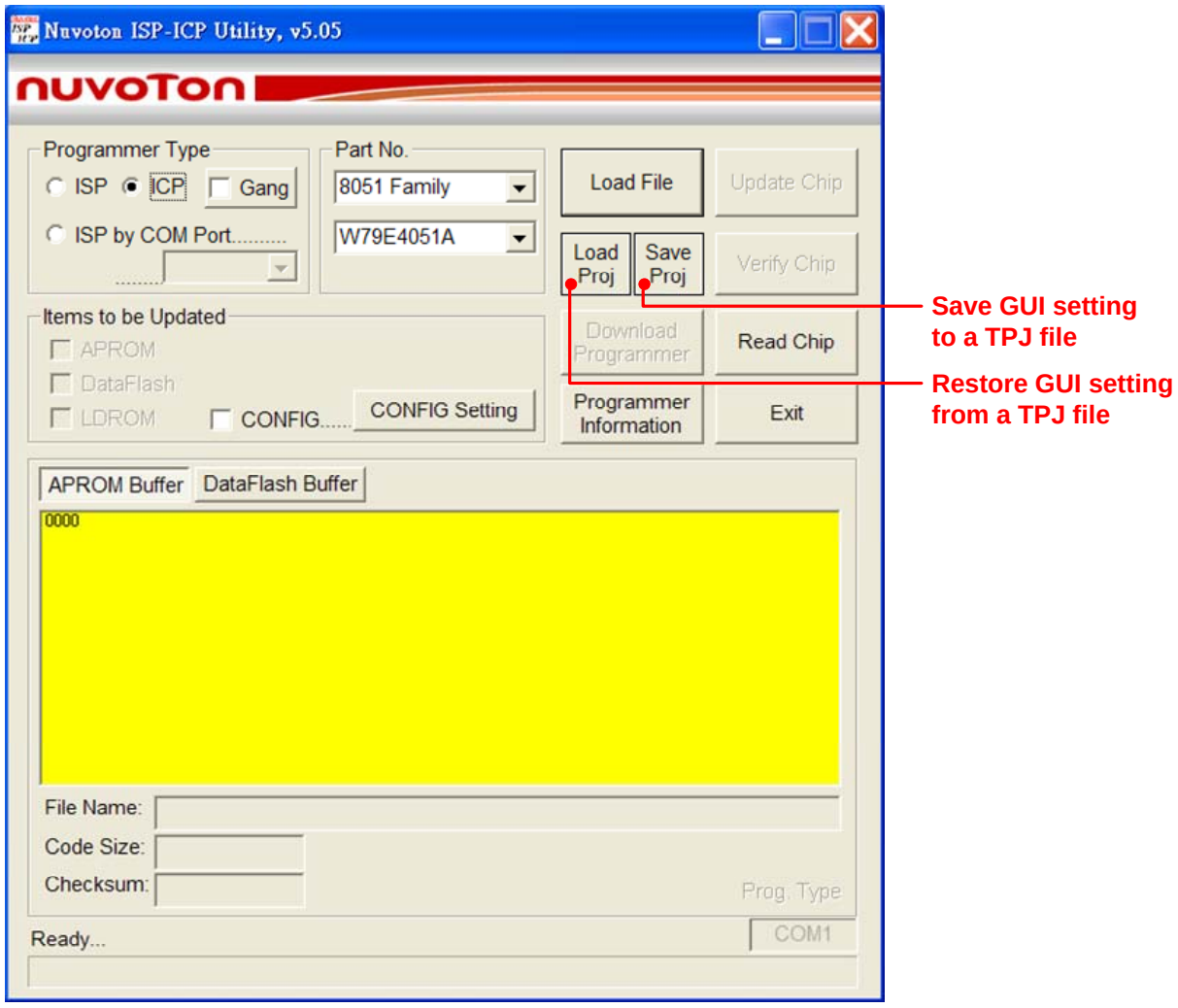
The buffer contents will be automatically synchronized with the physical file in the hard disk when the function button 'Download Programmer', 'Update Chip' or 'Verify Chip' is clicked, as shown below. So, the user needn't manually reload the files for APROM buffer and DataFlash buffer when the physical files are updated externally.



3.4 Tool Project File (TPJ)

The user may save all the GUI setting to the Tool Project (TPJ) file, and retrieve the GUI setting by loading the TPJ file previously saved. It is much helpful to the user to manage a variety of the programming data by a project style.

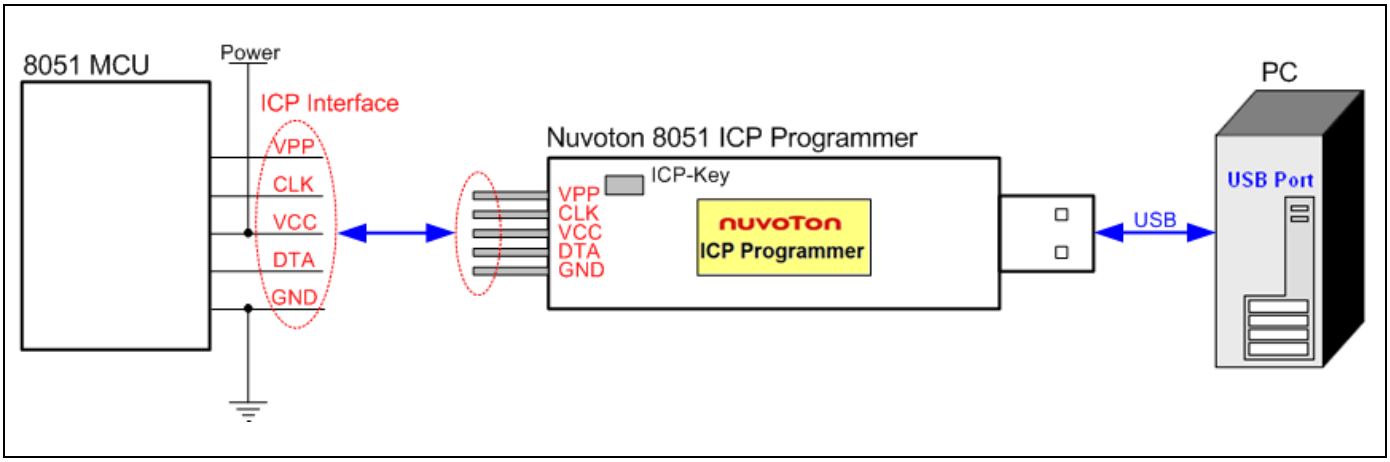
*Note: This feature is supported from revision **v5.05**.*



4 Operation Modes

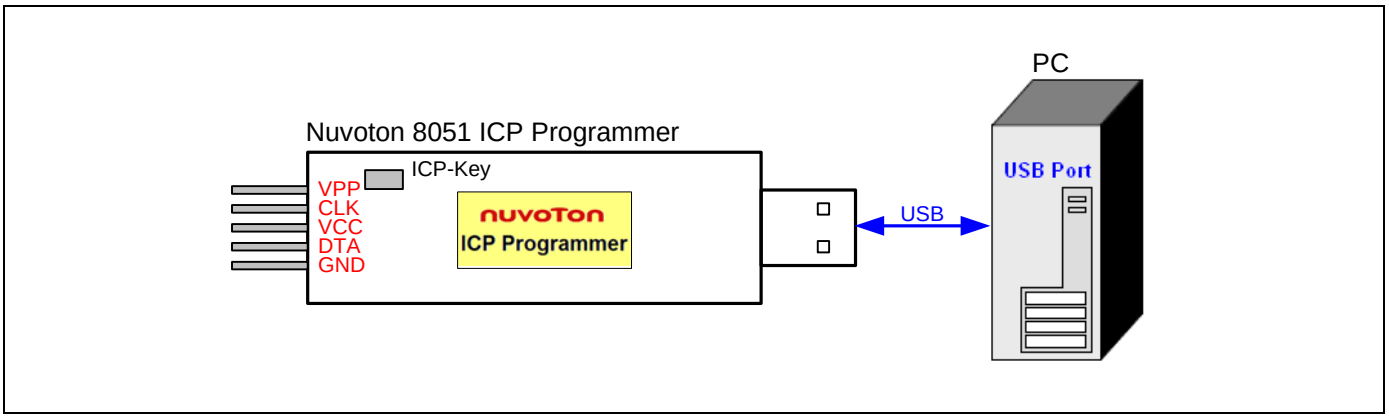
4.1 On-line Mode

The system diagram for **On-line Mode** is shown below. In this mode, both the host and 8051 MCU are connected. The user may directly update the 8051 MCU or download the programming data into the ICP Programmer for using in the Off-line Mode. After updating the 8051 MCU, the user may disconnect the ICP Programmer and send a reset signal to the 8051 MCU to make it re-start to run the new application code.



4.2 Download Programmer Mode

The system diagram for **Download Programmer Mode** is shown below. In this mode, only the host is connected. The user may download the programming data into the ICP Programmer for using in the Off-line Mode.



4.3 Off-line Mode

The system diagram for **Off-line Mode** is shown below. In this mode, only the 8051 MCU is connected. This mode is especially useful in the field without the host. After the ICP Programmer has been downloaded, it can perform the off-line operation. Press the ICP-Key to trigger an ICP operation to update the 8051 MCU. After updating the 8051 MCU, the user may disconnect the ICP Programmer and send a reset signal to the 8051 MCU to make it re-start to run the new application code.