NUVOTON ISP PYQT Code in Linux

Example Code Introduction for 32-bit NuMicro® Family

Information

Application	The sample code implements python with pyqt for Nuvoton ISP protocol with USB interface on Linux platform, and provides the setup step and using process.
ISP FW Version	Nano100B_Series_BSP_CMSIS_v3.02.002
Hardware	NT-Nano100K

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1 Function Description

1.1 Introduction

The ISP (In System Programing) is a technology that enables target chip to be directly updated by the system. The target chip runs the boot/loader code of LDROM through the peripheral interface such as USB/UART/SPI/I²C/RS-485/CAN... to update the internal APROM, Data Flash and User Configuration Word.

This sample code implements the ISP sample program with USB as the interface on the Linux platform, and provides the usage process and steps.

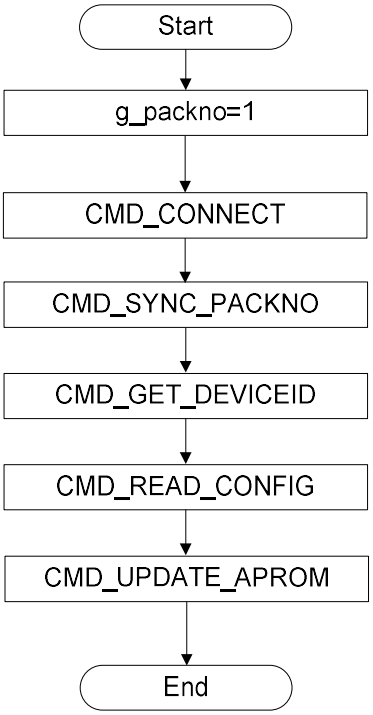
1.2 ISP Protocol

ISP packet is 64 byte fixed regardless of packet type. The ISP supported commands are listed as below.

Command	Command Code	ACK	Command Description
CMD_UPDATE_APROM	0x000000A0	Yes	Within the range 0~MAX_APROM_SIZE, program APROM from address user specified.
CMD_READ_CONFIG	0x000000A2	Yes	Get Config0 and Config1
CMD_SYNC_PACKNO	0x000000A4	Yes	Synchronize packet number with NuMicro™ MCU microcontrollers before a valid command send.
CMD_GET_FWVER	0x000000A6	Yes	Get version information of ISP firmware.
CMD_GET_DEVICEID	0x000000B1	Yes	Get chip product ID.
CMD_RUN_APROM	0x000000AB	No	Instruct ISP to boot from APROM.
CMD_RUN_LDROM	0x000000AC	No	Instruct ISP to boot from LDROM.
CMD_RESET	0x000000AD	No	Instruct ISP to reboot.
CMD_WRITE_CHECKSUM	0x000000C9	Yes	Instruct ISP to write application length and checksum in APROM to the last 8 bytes of APROM.
CMD_GET_FLASHMODE	0x000000CA	Yes	Get boot selection.

2 Commands flow

This flow is for command only. If user needs to update APROM, the following commands need to issue



3 Software and Hardware Environment

- **Software Environment**
  - BSP version
    - Nano100B_Series_BSP_CMSIS_v3.02.002
    - ISP source code path:
      - Nano100B_Series_BSP_CMSIS_v3.02.002\SampleCode\ISP\ISP_HID
  - IDE version
    - Keil uVersion 5.26
  - Config bit must setting boot in LDROM
- **Hardware Environment**
  - Circuit components
    - NT-Nano100K
      - The DetectPin (PB15) must keep low state for ISP upgrade.

4 Directory Information

NUVOTON ISP PYQT	Source file of example code

5 How to Execute Example Code

Please install libusb according to the following instructions in the Linux environment.

sudo apt-get updated

```
jc@jc-VirtualBox:~/sharefolder/Debug$ sudo apt-get update
[sudo] password for jc:
Hit:1 http://tw.archive.ubuntu.com/ubuntu xenial InRelease
Get:2 http://tw.archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:3 http://tw.archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Get:4 http://security.ubuntu.com/ubuntu xenial-security InRelease [107 kB]
Get:5 http://tw.archive.ubuntu.com/ubuntu xenial-updates/main amd64 DEP-11 Metadata [318 kB]
Get:6 http://tw.archive.ubuntu.com/ubuntu xenial-updates/main DEP-11 64x64 Icons [228 kB]
Get:7 http://tw.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 DEP-11 Metadata [246 kB]
Get:8 http://tw.archive.ubuntu.com/ubuntu xenial-updates/universe DEP-11 64x64 Icons [331 kB]
Get:9 http://tw.archive.ubuntu.com/ubuntu xenial-updates/multiverse amd64 DEP-11 Metadata [5956 B]
Get:10 http://tw.archive.ubuntu.com/ubuntu xenial-updates/multiverse DEP-11 64x64 Icons [14.3 kB]
Get:11 http://tw.archive.ubuntu.com/ubuntu xenial-backports/main amd64 DEP-11 Metadata [3324 B]
Get:12 http://tw.archive.ubuntu.com/ubuntu xenial-backports/universe amd64 DEP-11 Metadata [5100 B]
```

sudo apt-get install libusb-dev

```
jc@jc-VirtualBox:~/sharefolder/Debug$ sudo apt-get install libusb-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
libusb-dev is already the newest version (2:0.1.12-28).
0 upgraded, 0 newly installed, 0 to remove and 198 not upgraded.
```

sudo apt-get install libudev-dev

```
jc@jc-VirtualBox:~/sharefolder/Debug$ sudo apt-get install libudev-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
libudev-dev is already the newest version (229-4ubuntu21.2).
0 upgraded, 0 newly installed, 0 to remove and 198 not upgraded.
```

sudo apt-get -y install python3-pip

```
jc@jc-VirtualBox:~/sharefolder/Debug$ sudo apt-get -y install python3-pip
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libexpat1-dev libpython3-dev libpython3.5-dev python-pip-whl python3-dev python3
  python3-wheel python3.5-dev
Suggested packages:
  python-setuptools-doc
The following NEW packages will be installed:
  libexpat1-dev libpython3-dev libpython3.5-dev python-pip-whl python3-dev python3
  python3-setuptools python3-wheel python3.5-dev
0 upgraded, 9 newly installed, 0 to remove and 198 not upgraded.
Need to get 39.2 MB of archives.
```

pip3 install pyusb

```
jc@jc-VirtualBox:~/sharefolder/Debug$ pip3 install pyusb
Collecting pyusb
  Downloading https://files.pythonhosted.org/packages/5f/34/2095e821c01225377dda4e
e43d3888fa91dd6/pyusb-1.0.2.tar.gz (54kB)
    100% |                                | 61kB 64kB/s
Building wheels for collected packages: pyusb
  Running setup.py bdist_wheel for pyusb ... done
  Stored in directory: /home/jc/.cache/pip/wheels/1f/a9/7e/d189b5030ee3a56f9b72c28
08a5
Successfully built pyusb
Installing collected packages: pyusb
Successfully installed pyusb
```

pip3 install pyqt5

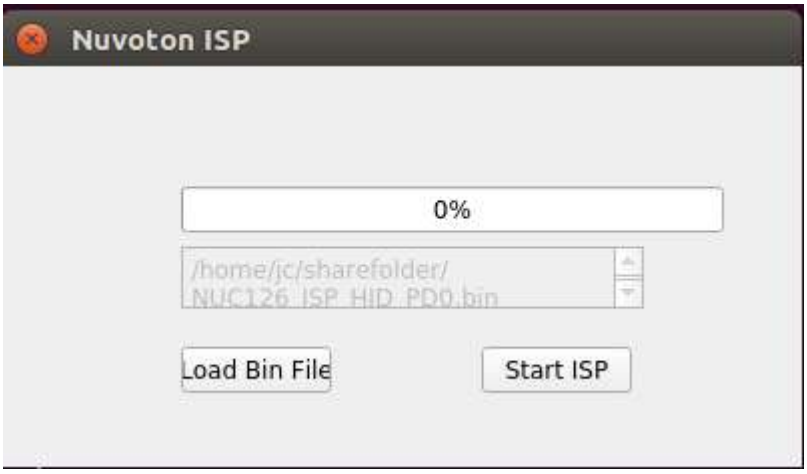
```
jc@jc-VirtualBox:~/sharefolder/Debug$ pip3 install pyqt5
Collecting pyqt5
  Downloading https://files.pythonhosted.org/packages/e4/15/4e2e49f64884edbab6f833
1f2883e645d4d8f/PyQt5-5.10.1-5.10.1-cp35.cp36.cp37.cp38-abi3-manylinux1_x86_64.whl
    100% |                                | 107.8MB 13kB/s
Collecting sip<4.20,>=4.19.4 (from pyqt5)
  Downloading https://files.pythonhosted.org/packages/6b/46/2869369c8ec634ec9dc714
328efccfa0c855e/sip-4.19.8-cp35-cp35m-manylinux1_x86_64.whl (66kB)
    100% |                                | 71kB 87kB/s
Installing collected packages: sip, pyqt5
Successfully installed pyqt5-5.10.1 sip-4.19.8
```

Please burn target chip ISP code(Nano100B_Series_BSP_CMSIS_v3.02.002\SampleCode\ISP\ISP_HID) in LDROM, the chip must set boot in LDROM rom and GPB15 is keep low.
If chip boots in LDROM, the USB will detect the USB VID:0x0416, PID:0x3F00.

Execution “sudo python3 pyisp.py”

```
jc@jc-VirtualBox:~/sharefolder$ sudo python3 pyisp.py
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'
```

Select Load bin file and start ISP burn code for target chip APROM.



6 Revision History

Date	Revision	Description
Jun. 28, 2019	1.00	1. Initially issued.

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