NinjaScan-Light User Manual

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Thank you for your purchase NinjaScan-Light.

Reference Site

- Google Code | NinjaScan project
- NinjaScan GUI software(zip file)
- Github | ninja-scan-light:
- Github | NinjaScan_GUI

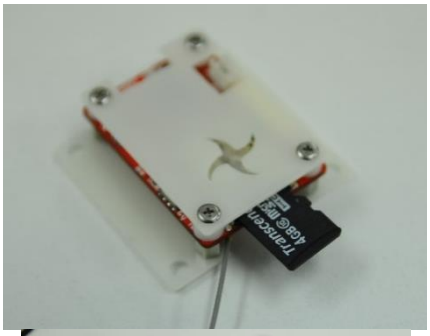
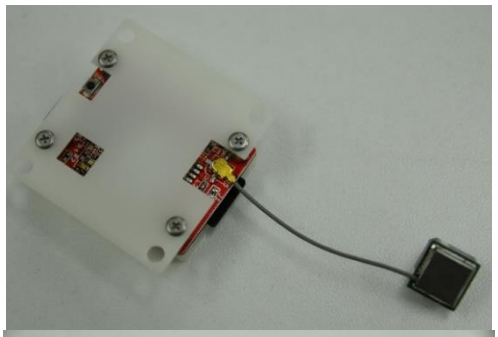
Included items

No.	item	No.	item
1	NinjaScan-Light	2	USB cable A-microB
3	GPS antenna (large)	4	GPS antenna (small)
5	External Connector (JST SH)	6	Power Connector (JST ZH)
7	JST BEC connector (for LiPo)	8	U.FL-SMA Connector (for GPS)
(9)	LiPo battery		

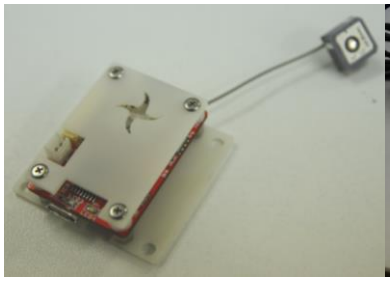
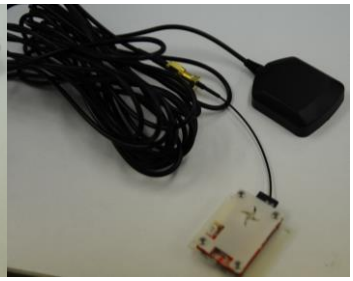
LiPo battery is NOT included in the case of overseas shipment from Japan.

How to logging

1. Insert the socket Micro SD card that is formatted on the FAT32(FAT16).
2. Connect a GPS antenna.
3. Connect USB powered mobile battery to NinjaScan-Light
4. （If you use LiPo battery, Connect LiPo battery to NinjaScan-Light. If you connect USB battery and LiPo together, LiPo battery is charged.）
5. Until the power is turn off, sensor log is saving.


Never use a LiPo battery that show any damage or disfigurement of any kind. Swelling is a sign of internal damage. Disposal of LiPo batteries requires special care. LiPo battery for NinjaScan is 1S (3.7V).

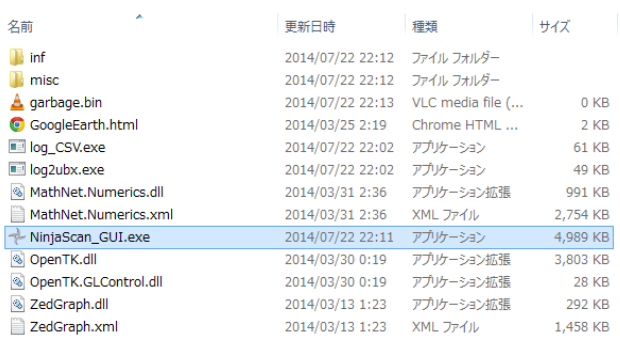
GPS antenna should be towards the sky. Position will not output if antenna doesn’t see the GPS satellites.

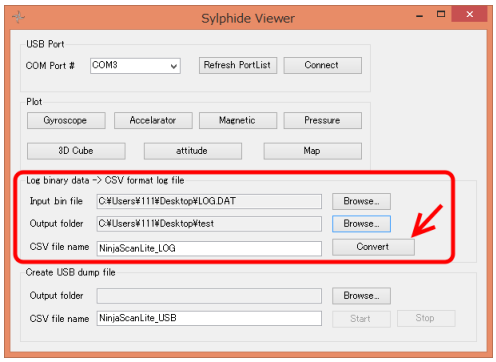
How to read log file (There are 3 ways of following)

- In Micro SD card, LOG.DAT file has been generated. You will read the SD card.
- While inserted SD card in NinjaScan-Light, connect to the PC from the Micro USB port. It is recognized as an external disk to the PC, LOG.DAT file can be read.
- (How to use as a sensor unit of computer) Connect PC to NinjaScan-Light with USB cable, not insert a Micro SD. It is recognized as a serial port by using the driver file. Sensor data that is defined in the USB Serial Dump Format is sent to the PC in real-time.

Log data save binary file for internal processing rapidly. The Data is divided the notion of a page to 32 bytes each in order to write the SD card in high speed. Therefore, you need to convert the data from binary to ASCII.

Convert from ASCII to binary of LOG.DAT





Download and unzip the NinjaScan GUI software, and execute NinjaScan_GUI.exe

Input bin file	LOG.DAT in which is saved the SD card
Output folder	Folder in which to store the output CSV file
CSV file name	The name of the output CSV file

Click the Convert button, the file will convert.

To be recognized as a serial port

Connect to the PC with a USB cable NinjaScan-Light, it is recognized as a serial port and a driver file “NinjaScanLight_CDC.inf” located in the “inf” folder in the NinjaScan GUI software.

名前	更新日時	種類	サイズ
inf	2014/07/22 22:12	ファイル フォルダー	
misc	2014/07/22 22:12	ファイル フォルダー	
garbage.bin	2014/07/22 22:13	VLC media file (...	0 KB
GoogleEarth.html	2014/03/25 2:19	Chrome HTML ...	2 KB
log_CSV.exe	2014/07/22 22:02	アプリケーション	61 KB
log2ubx.exe	2014/07/22 22:02	アプリケーション	49 KB
MathNet.Numerics.dll	2014/03/31 2:36	アプリケーション拡張	991 KB
MathNet.Numerics.xml	2014/03/31 2:36	XML ファイル	2,754 KB
NinjaScan_GUI.exe	2014/07/22 22:11	アプリケーション	4,989 KB
OpenTK.dll	2014/03/30 0:19	アプリケーション拡張	3,803 KB
OpenTK.GLControl.dll	2014/03/30 0:19	アプリケーション拡張	28 KB
ZedGraph.dll	2014/03/13 1:23	アプリケーション拡張	292 KB
ZedGraph.xml	2014/03/13 1:23	XML ファイル	1,458 KB

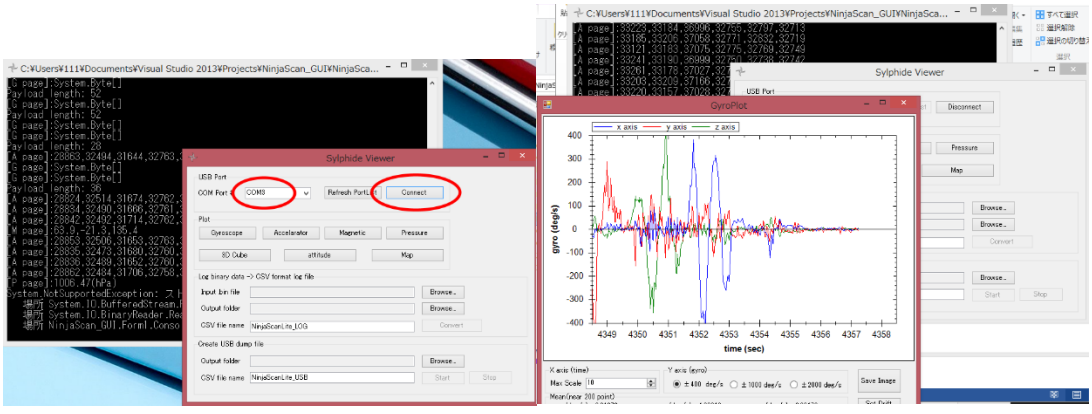
If you use Windows 8 (8.1)

http://blog.livedoor.jp/frbsd/archives/34124504.html

You must do the following 3 procedures.

- The release the Secure Boot in the configuration of UEFI firmware.
- The transition to test mode to disable the digital signature of the USB device.
- “Disable Force Driver Signing” from the startup configuration.

As a sensor unit (GUI software)



Select the serial port of the NinjaScan-Light, and then click the Connect button.

When the connection is completed successfully, the data has displayed to a black screen. And it will be graphed when pressed the Gyroscope button and so on.

As a sensor unit (Command prompt)

In cmd.exe, move current directory to the file where log_CSV.exe located in the NinjaScan GUI folder. And you should change COMn to proper number, i.e. COM3

```
log_CSV.exe COMn --direct_sylphide=on --page=A
```

If you change Capital A to another page name in “--page=A”, it is outputted the page contents.

Contents of the log

A page	GPS time(msec), Accelerator(g), Gyroscope(deg/sec), temp(℃)
G page	GPS log data
M page	GPS time(msec), magnetism(uT)
P page	GPS time(msec), pressure(Pa), temp(℃)

You may load .ubx file to u-center that u-blox has developed

http://www.u-blox.com/ja/evaluation-tools-a-software/u-center/u-center.html

Meaning of LEDs

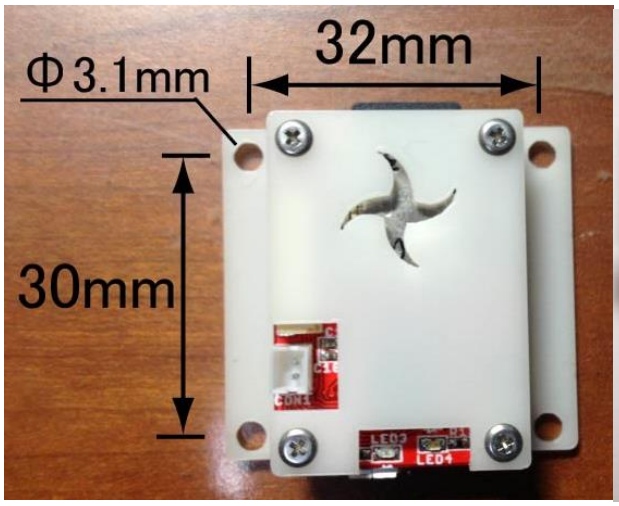
LED1 (red) : ON when power supply by LiPo

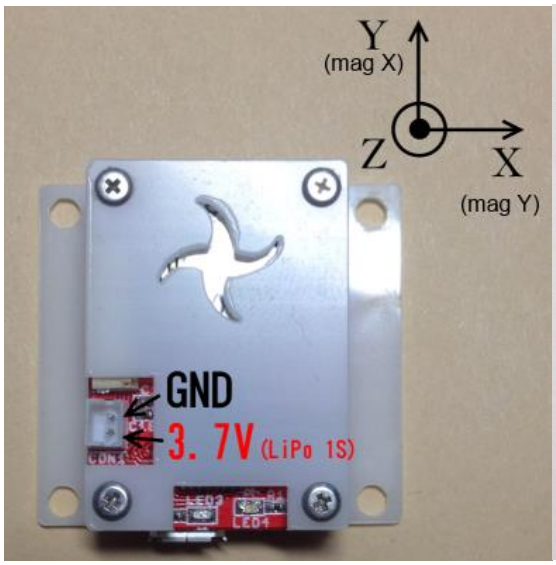
LED2 (orange) : ON when LiPo is charged by USB power supply

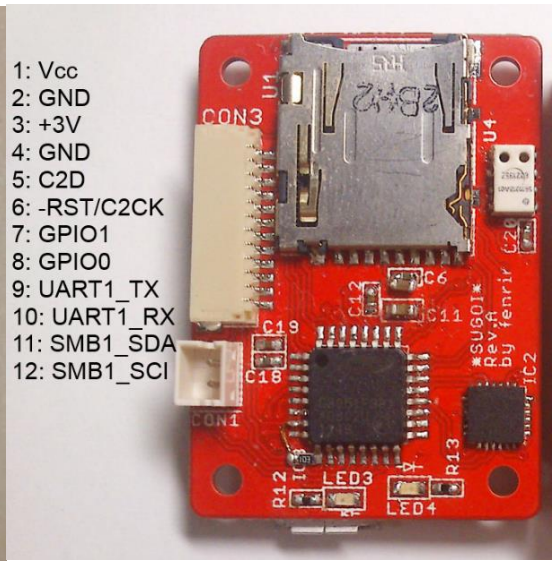
LED3 (green) : When the data is written to the SD card, the 3 flashes every 2 seconds.

LED4 (blue) : Flashing every 10seconds by the number of satellite acquisition of GPS.

Axial direction, mounting position and pin arrangement







Hardware specification

1) Silicon Laboratories C8051F381 MCU providing USB connectability

2) u-blox NEO-6 series GPS receiver

3) 6 DOF inertial sensor, Invensense MPU-6000

4) 3-axis magnetic sensor, Freescale MAG3110

5) Pressure and temperature sensor, Measurement specialties MS5611

6) Power management including Li-Ion battery charger, Linear Technology LTC3550

7) MicroSD supporting SDHC/FAT32

Telemetrize

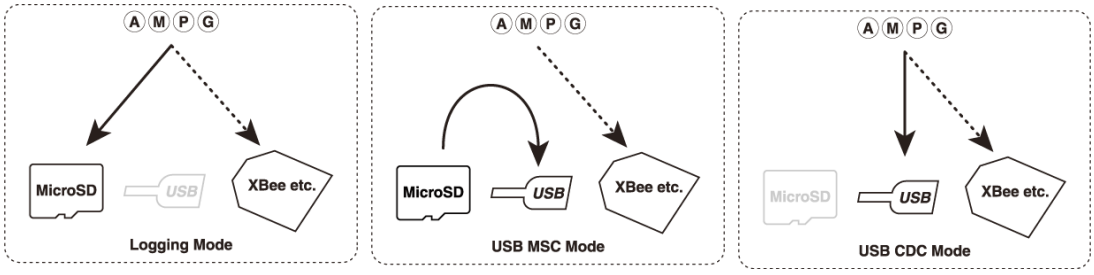
For example in the case of XBee, you may connect as follows. In another case of another radio module, you may connect the UART pins of the logger to the pins of the input and output of the radio module.

NinjaScan-Light CON3	Radio module
3 pin　+3V	1　pin　VDD
4　pin　GND	10 pin　GND
9　pin　UART1_TX	3　pin　DIN
10 pin　UART1_RX	2 pin　DOUT

By default, it is sent the data to the radio module at a frequency as follows

A page	5 Hz
P page, M page	1 Hz
G page	1 Hz

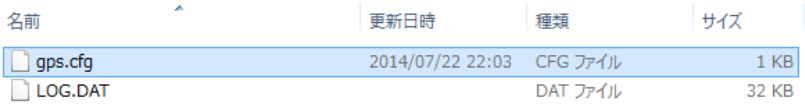
Mode of operation



How to get RAW data by GPS module

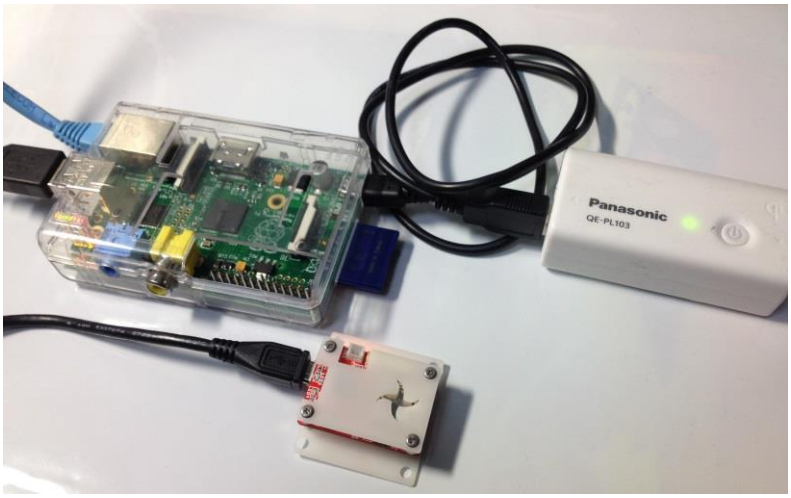
You can get RAW data (RXM-RAW). RAW data is pseudorange, Doppler measurements and carrier phase. You can use DGPS or RTK GPS when you use GPS carrier phase.

In the NinjaScan GUI software [misc folder] → [for_neo6m_rename_to_gps.cfg] rename to [gps.cfg]. RAW data will output when you copy the [gps.cfg] to the SD card to be inserted into NinjaScan-Light



When you data analysis RAW data (RXM-RAW), RTKLIB is useful.

Use with Raspberry Pi



Refer to (Japanese language blog)

ina111's blog: ちょっとすごいロガーを便利に使う（４）Raspberry Pi に接続

Now you can build a telemetry by using 3G dongle or wireless LAN dongle. It enables real-time data processing and collaboration with other sensors besides.

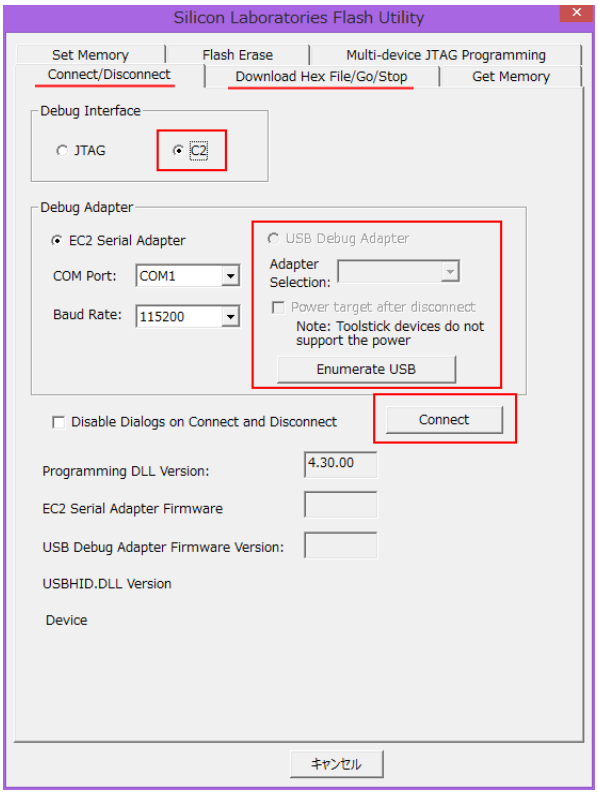
How to generate the firmware binary file from source file

To build the firmware, install sdcc (testing with ver 3.3.0 #8604), and just "make" at "firmware" directory of the downloaded code

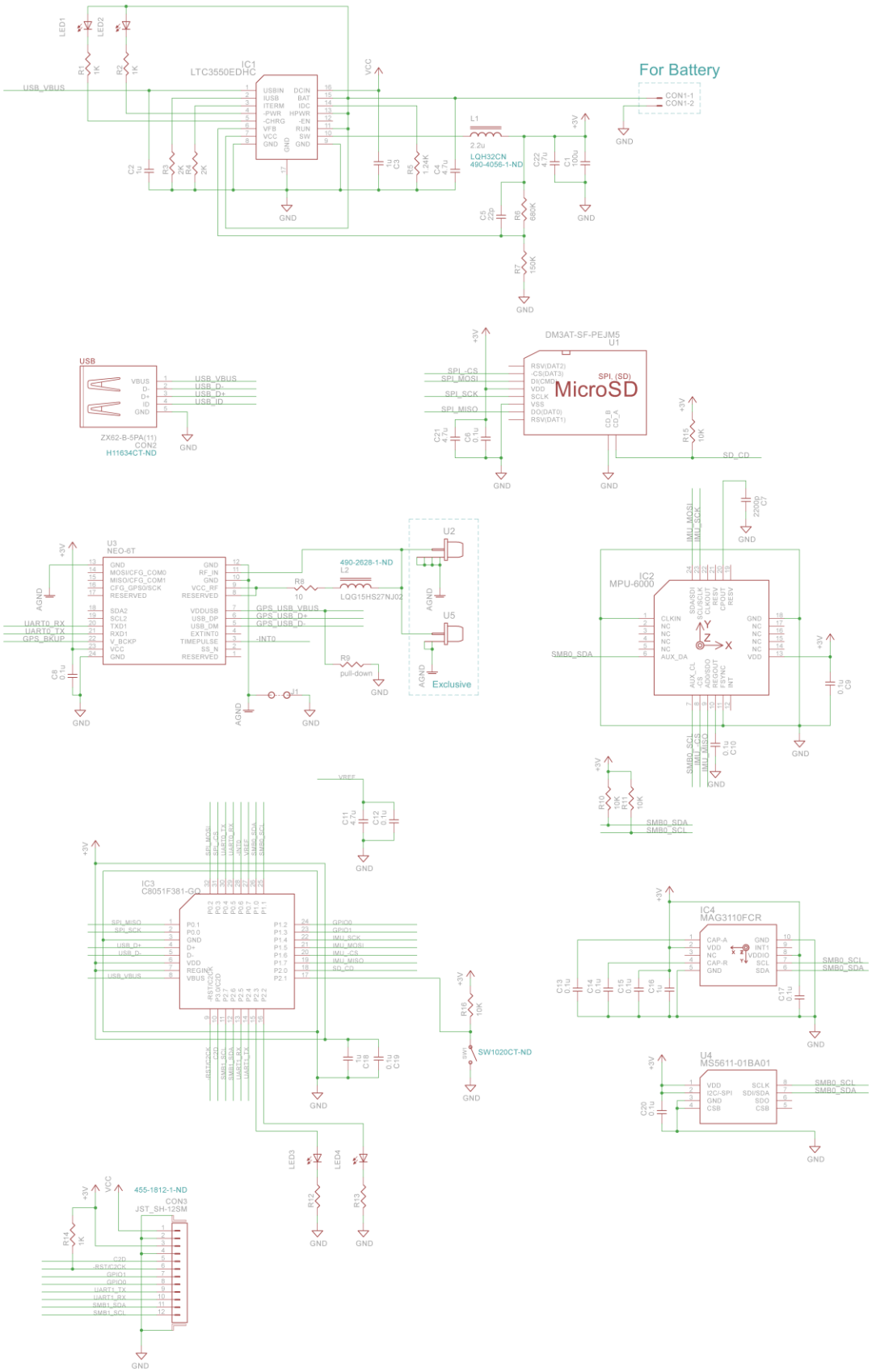
How to write firmware to hardware

Connect a NinjaScan-Light board and a PC via USB debug adapter (UDA) or compatible one. The minimum required programming connections are summarized in the following table. Then, use Flash Programming Utilities. Note: the board may not be recognized by a PC when an UDA is connected via USB hubs. UDA is recommended to connect a PC directly.

Signal	UDA side	NinjaScan－Light
C2D	4 pin	CON3　5 pin
C2CK	7 pin	CON3　6 pin
GND	3 pin	CON3　4 pin



Schematic



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https://code.google.com/p/ninja-scan-light/

PC GUI software: LGPL v2.1

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