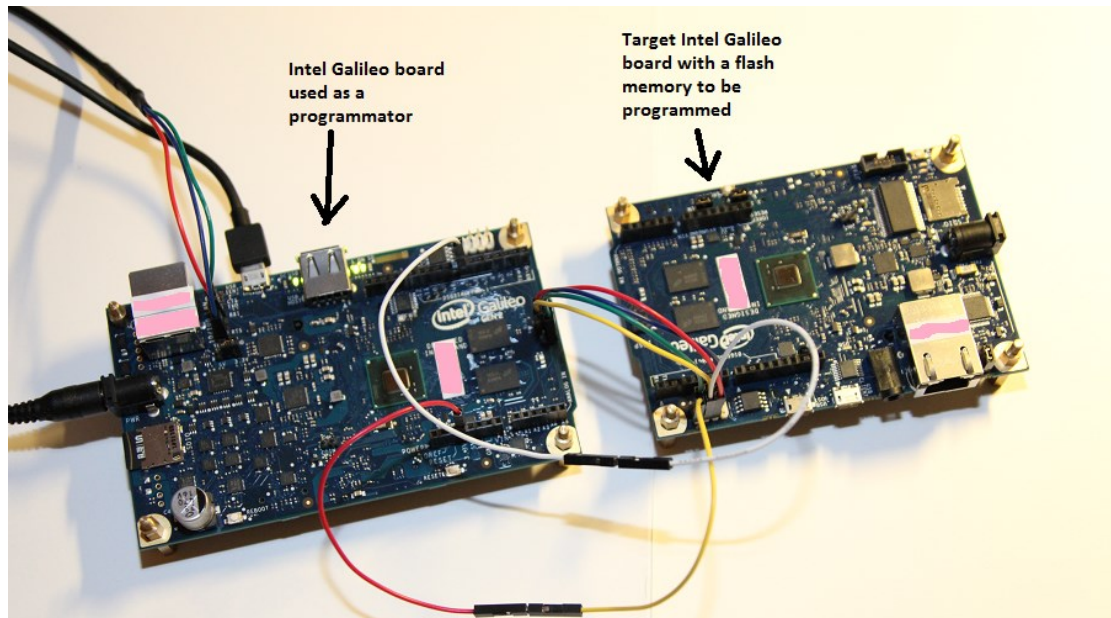


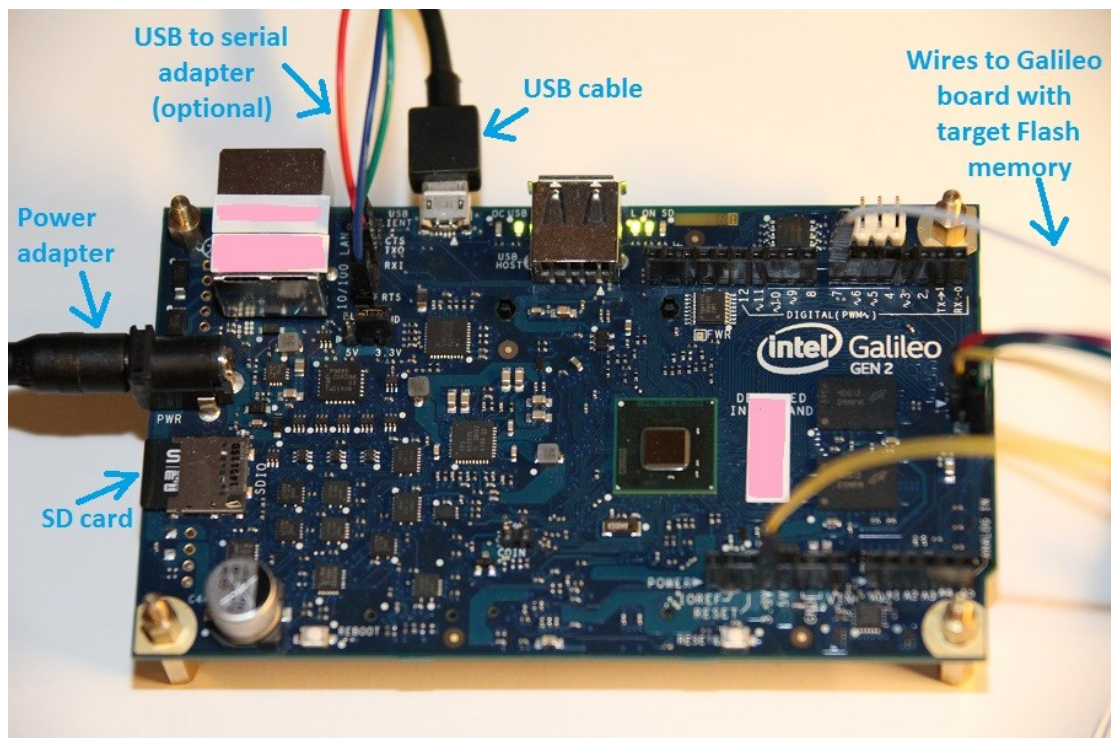
1. GaliProg... What is it? It is a tool (sketch) which allows to read/program/erase/verify SPI flash memory image on Intel® Galileo board. **NOTE: it was tested only a configuration when Galileo Gen 2 used as programmer and Galileo Gen 1 used as target board.**



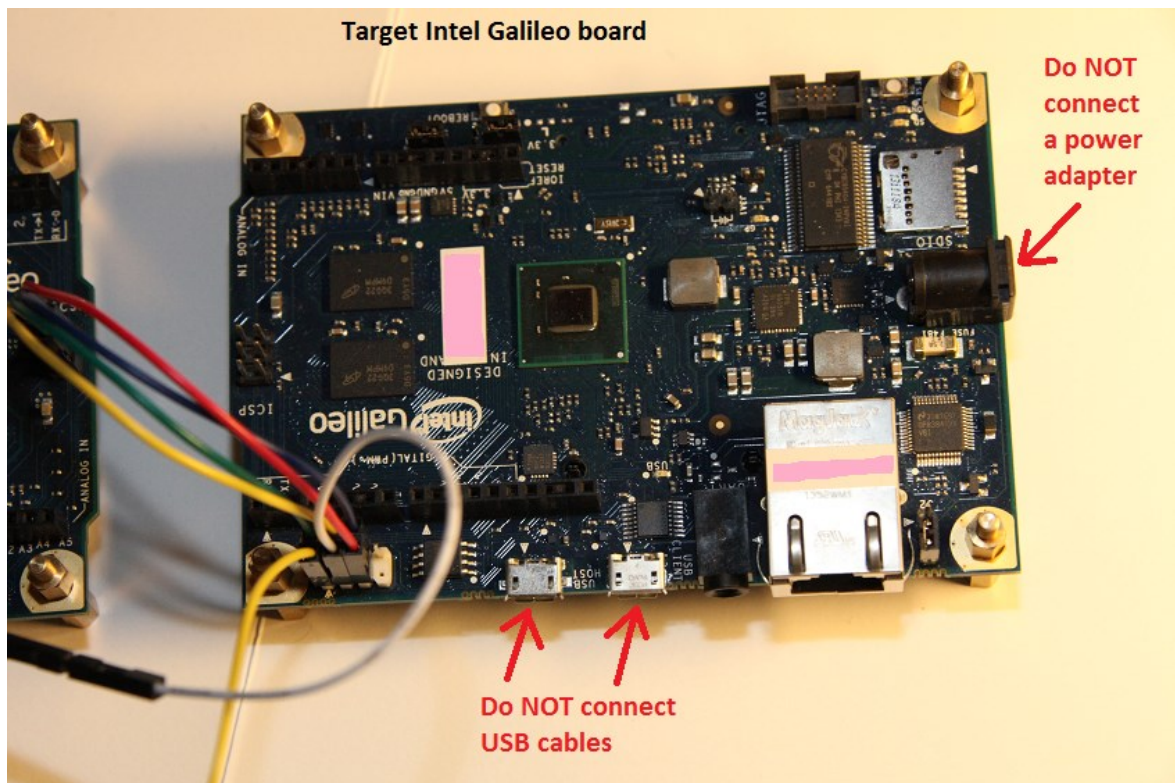
2. Required hardware

Need to have the following items to program SPI flash memory:

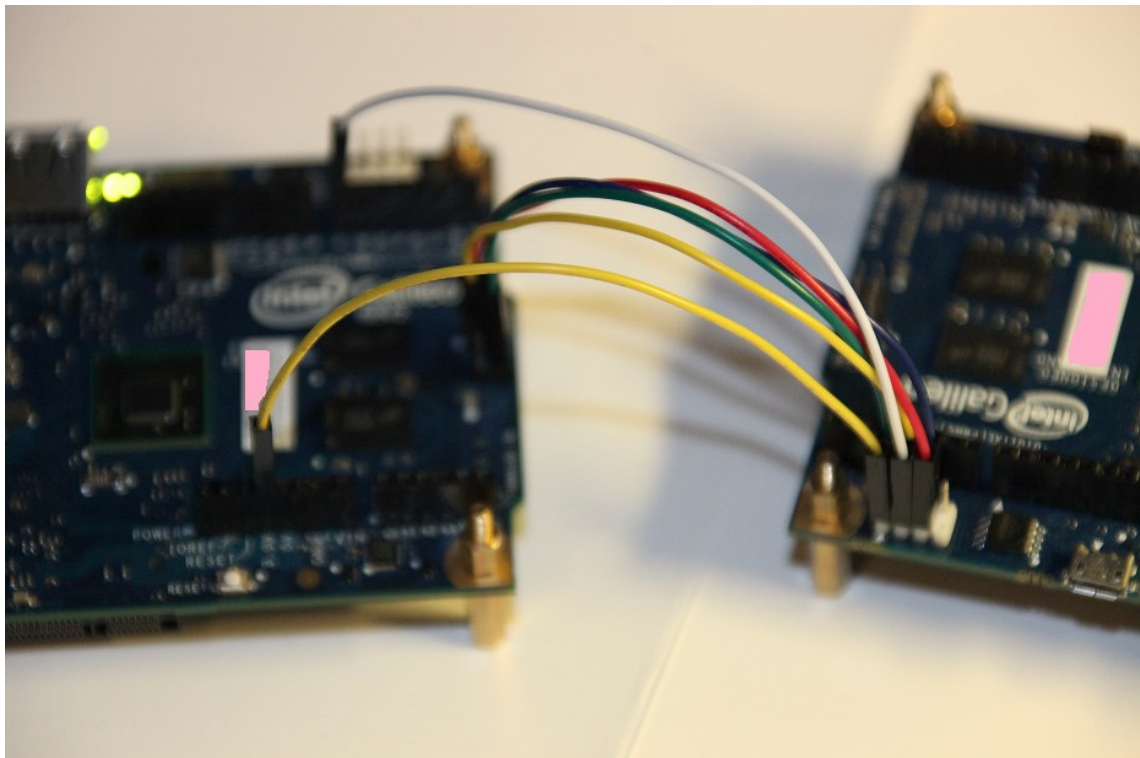
- a) Properly worked Intel Galileo board with USB cable, micro SD card and power adapter. It will be used as used as a programmer.



- b) Galileo board with target Flash memory



- c) 2 male-female and 4 female-female wires to connect Galileo boards



- d) PC with installed Intel Arduino Software 1.5.3
- e) Micro SD card reader

3. Required software

- a) **Intel Arduino Software (IDE) 1.5.3 created for Intel Galileo board**
Link to download: <https://communities.intel.com/docs/DOC-22226>

- b) **SD-Card Linux Image**
Link to download: <https://communities.intel.com/docs/DOC-22226>

- c) **SPI flash image**

Select a way to get SPI flash image from described below:

Official way:

- 1) Flash Missing PDAT Release (.bin file)
Link to download: <https://communities.intel.com/docs/DOC-22226>
- 2) BSP Patches and Build Instructions
Link to download: <https://communities.intel.com/docs/DOC-22226>

Following the instruction above need to patch .bin file with a required platform configuration. Need to rename a resulting file 'Flash+PlatformData.bin' to 'galiprog_flash_write.bin'.

Clone way:

If you have a problem with generation of SPI flash image with your MAC address, it is possible to copy SPI flash image from one board (same Gen !) and copy it to another board. Need just to rename 'galiprog_flash_dump.bin' to 'galiprog_flash_write.bin'.

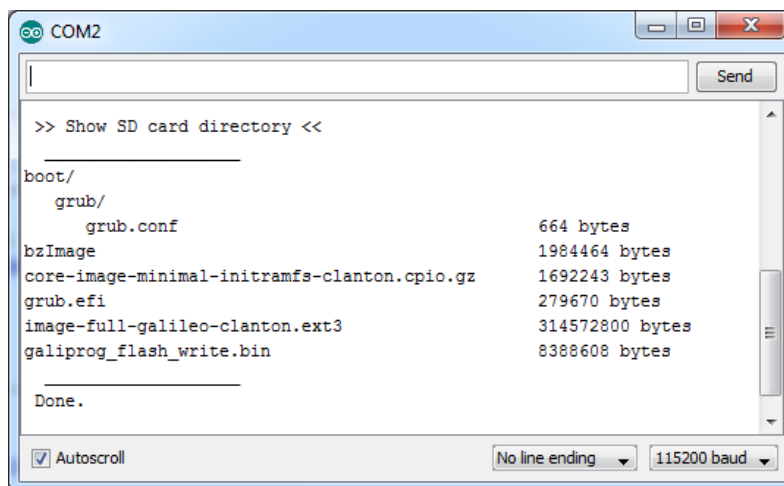
- d) **Galiprog (galiprog.ino)**
This is a flash programing tool.

Link to download: <https://github.com/xbolshe/galiprog>

4. Prepare a data on SD card

- a) **Format SD card**
- b) **Unpack SD-Card Linux Image to the root of SD card**
- c) **Copy 'Flash+PlatformData.bin' as 'galiprog_flash_write.bin', if you selected Official way.**

Here is a root directory on SD cards in case of 'Official way':



```
>> Show SD card directory <<
boot/
  grub/
    grub.conf          664 bytes
bzImage                1984464 bytes
core-image-minimal-initramfs-clanton.cpio.gz 1692243 bytes
grub.efi               279670 bytes
image-full-galileo-clanton.ext3 314572800 bytes
galiprog_flash_write.bin 8388608 bytes

Done.
```

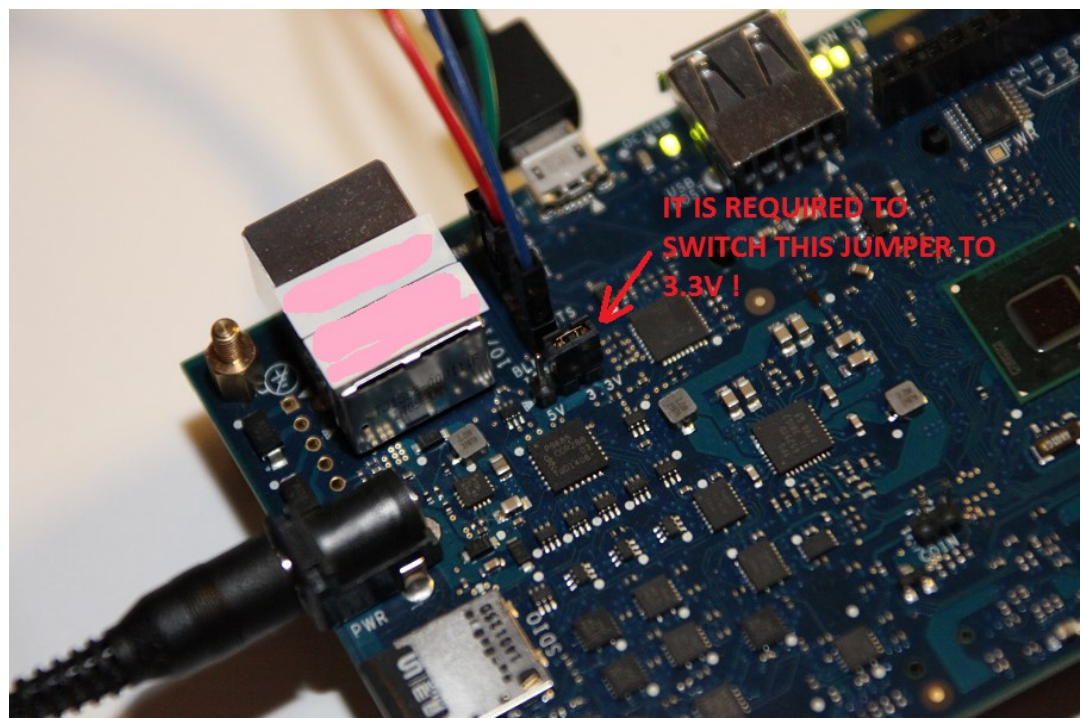
5. Connections between Galileo boards and hardware settings

a) Configure Galileo board which works as a programmer

A SPI flash memory works with 3.3V lines. So, it is required to switch Galileo board - programmer to 3.3V.

NOTE: providing 5V may damage your Galileo board! Be careful with connecting boards and selecting a jumper setting.

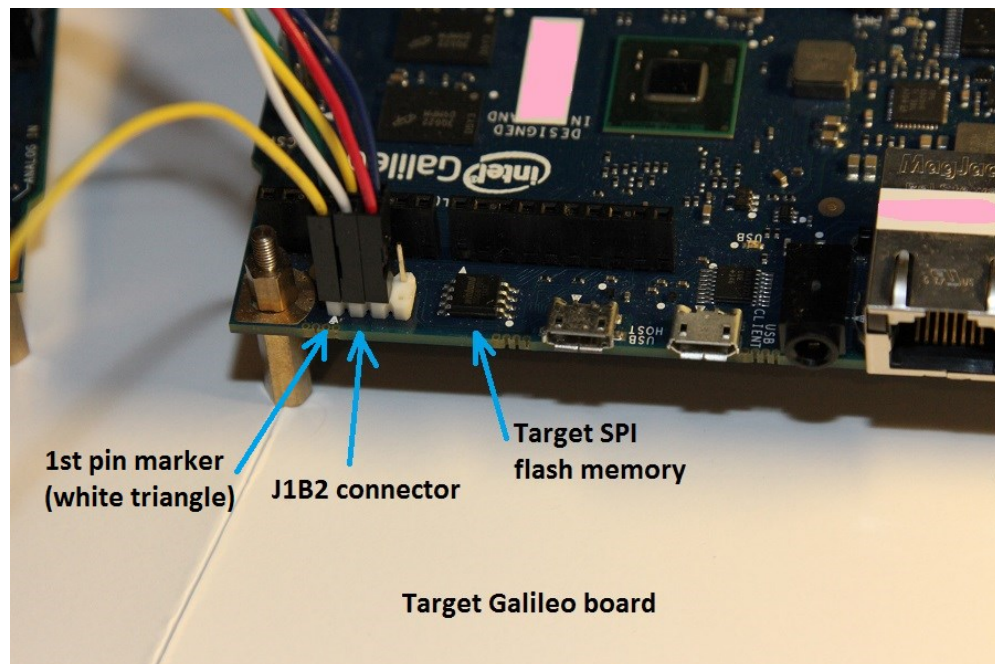
Need to switch a jumper shown on a picture below to 3.3V option.



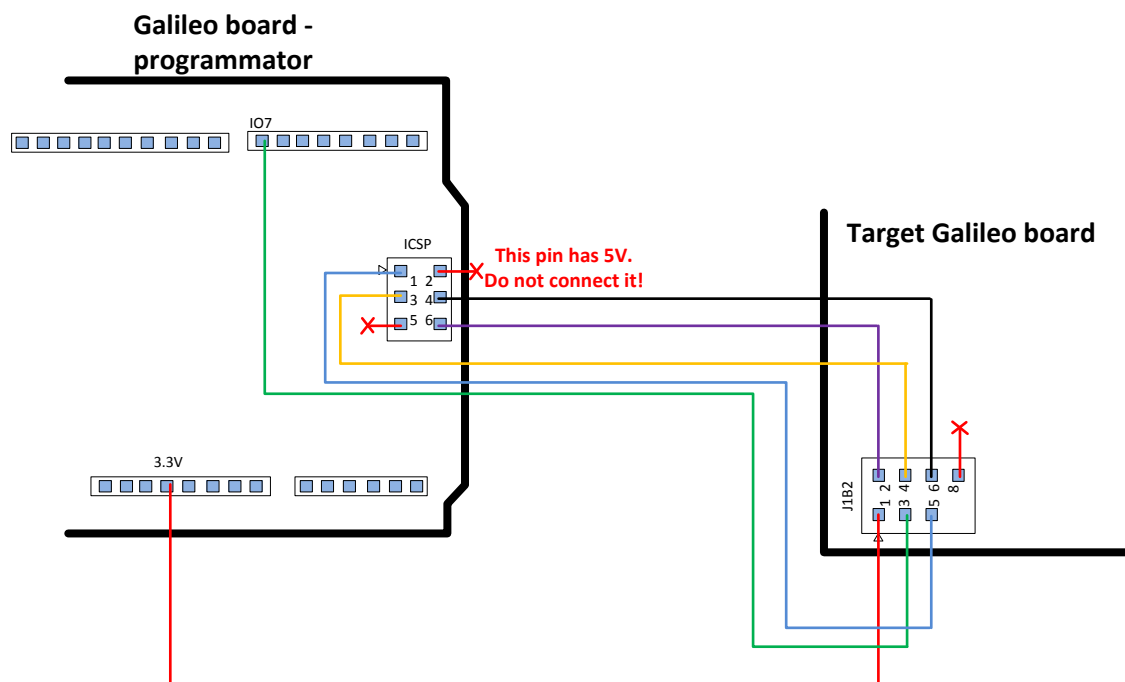
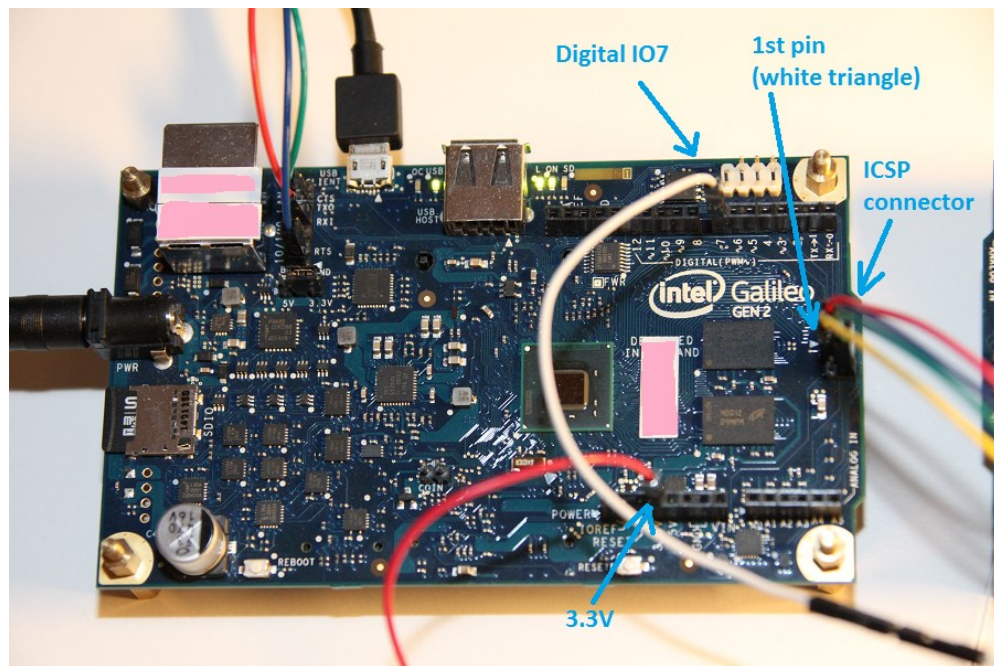
b) Wire connections

Nº	Galileo board - programmator	Signal role	Galileo board - target
1	3.3V	VCC	J1B2 – pin 1
2	Digital IO7	Slave selection	J1B2 – pin 3
3	ICSP – pin 4	MOSI	J1B2 – pin 6
4	ICSP – pin 1	MISO	J1B2 – pin 5
5	ICSP – pin 3	SCK	J1B2 – pin 4
6	ICSP – pin 6	Ground	J1B2 – pin 2

A location of J1B2 connector is shown on a picture below:

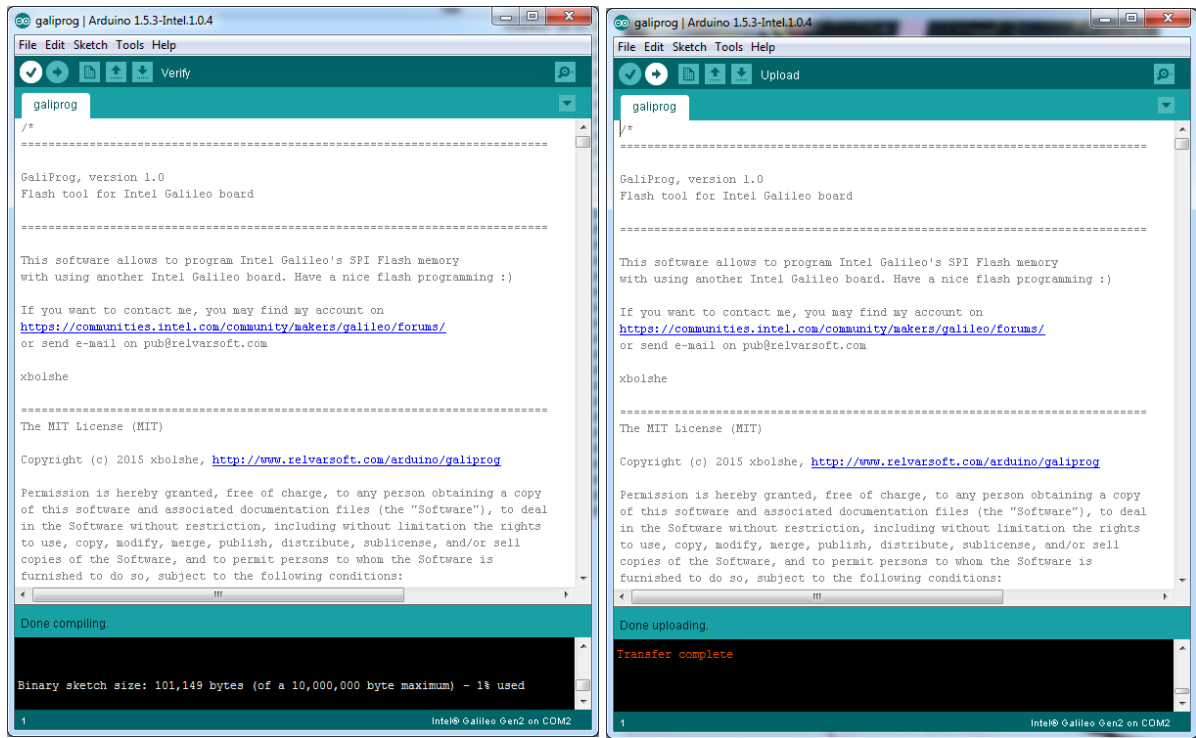


A location of ICSP connector is shown on a picture below:



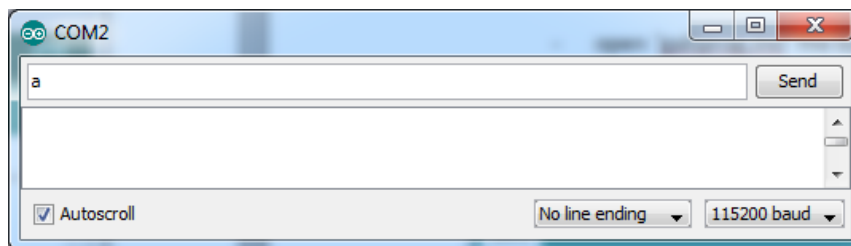
6. Compiling Galiprog sketch

- open 'galiprog.ino' file by Intel Arduino Software (IDE) 1.5.3
- compile it with using 'Verify' button
- upload it to Galileo Board with using 'Upload' button

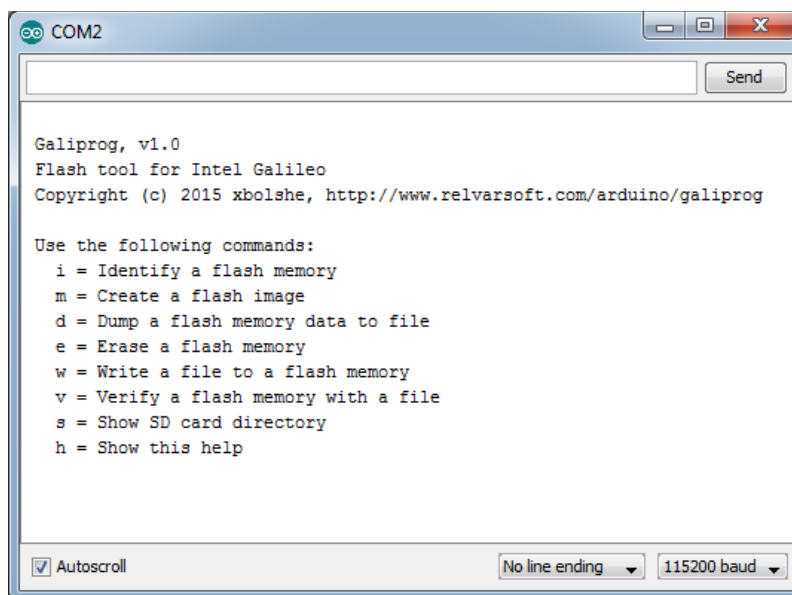


7. Galiprogram commands

- when galiprogram is uploaded to Galileo board, select Tools -> Serial Monitor
- type any character and push 'Send' button



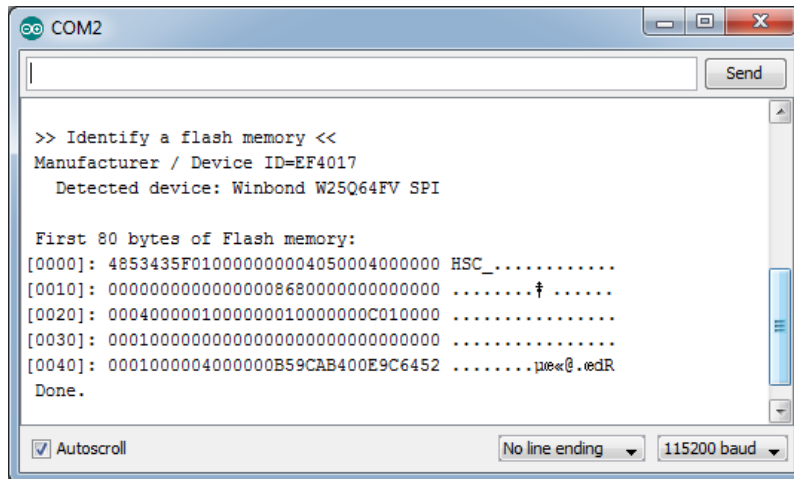
- a command list will be shown



To select menu item type a letter and push 'Send' button.

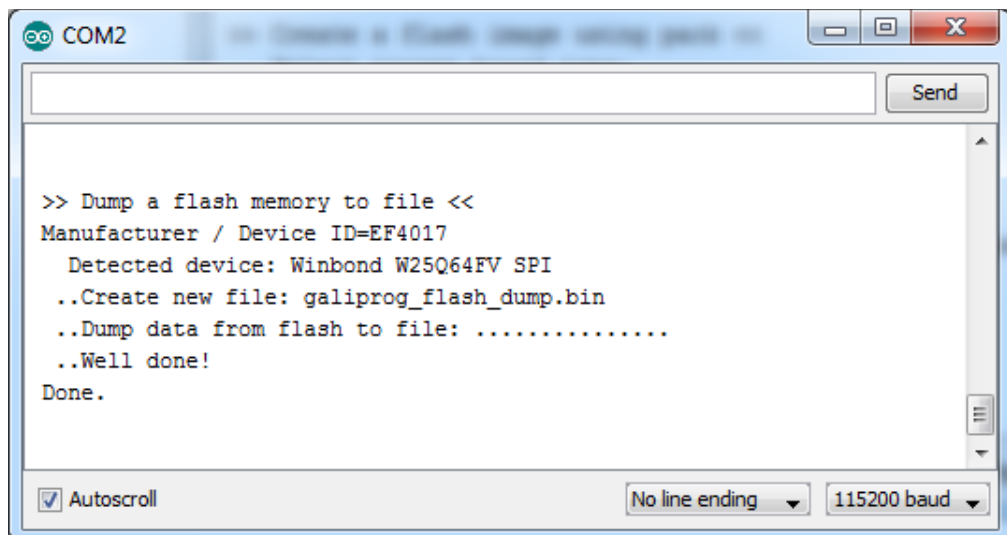
1. Identify a flash memory

This menu item allows to check that a connection with a target Galileo board is correct. It is recommended to use it before operations.



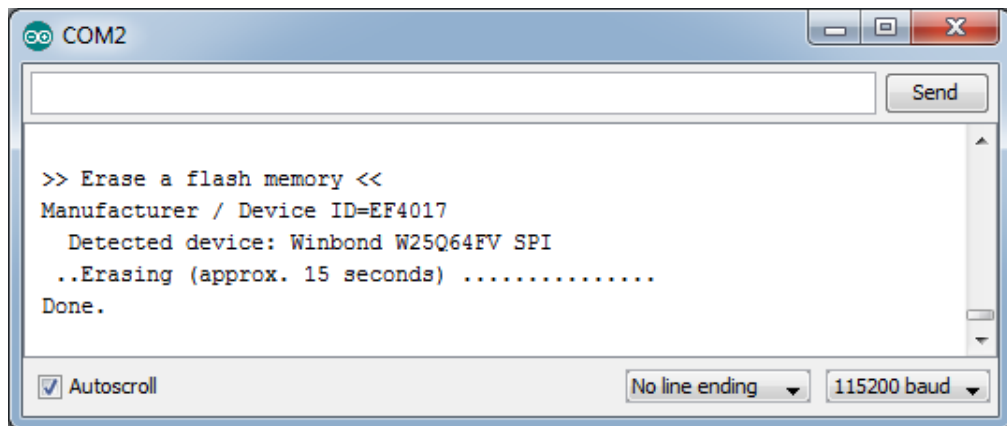
2. Dump a flash memory data to file

This menu item allows to read all data (8 Megabytes) from SPI flash memory to a file with name 'galiprogram_flash_dump.bin' (located in the root of SD card).



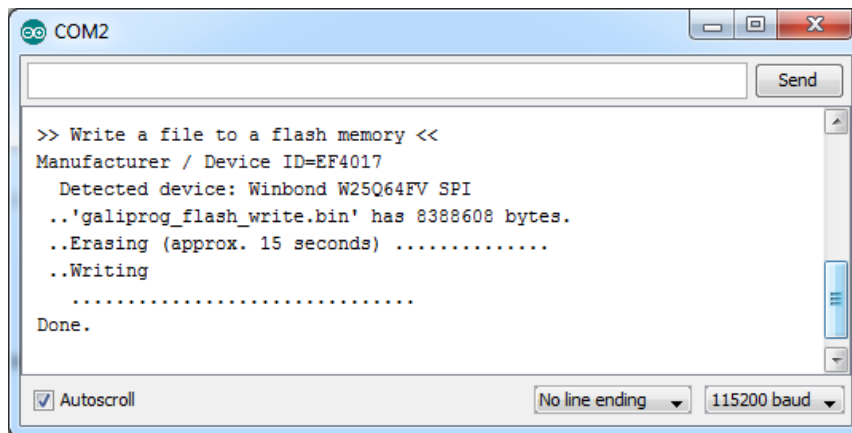
3. Erase a flash memory

This menu item erases all SPI flash memory (fill it by 0xFF).



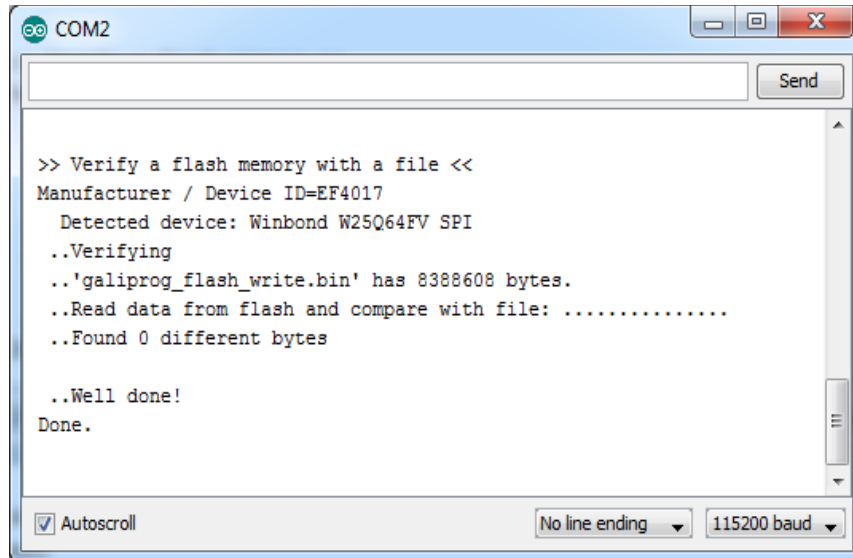
4. Write a file to a flash memory

This menu item erases all SPI flash memory (fill it by 0xFF) and writes a data from a file with name 'galiproq_flash_write.bin' to a flash memory.

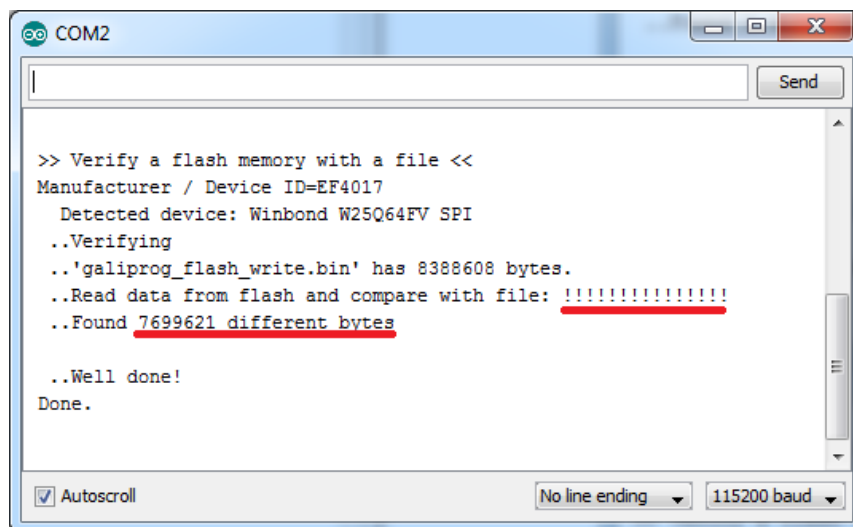


5. Verify a flash memory with a file

This menu item reads all SPI flash memory and compares with a data from a file with name 'galiprogram_flash_write.bin'.

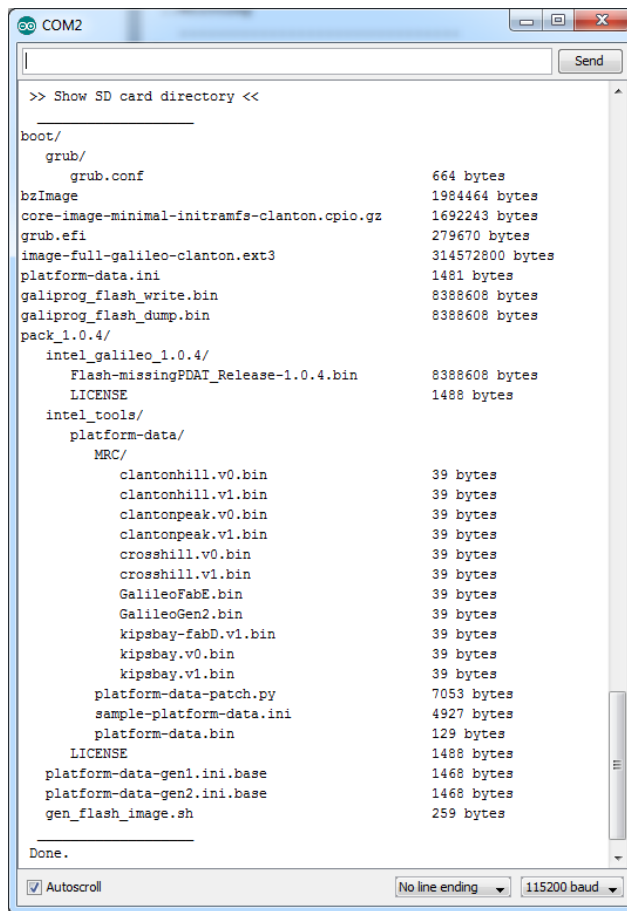


In case of a difference between the file and flash memory the following information will be shown:



6. Show SD card directory

This menu item prints a current list of files on SD card.



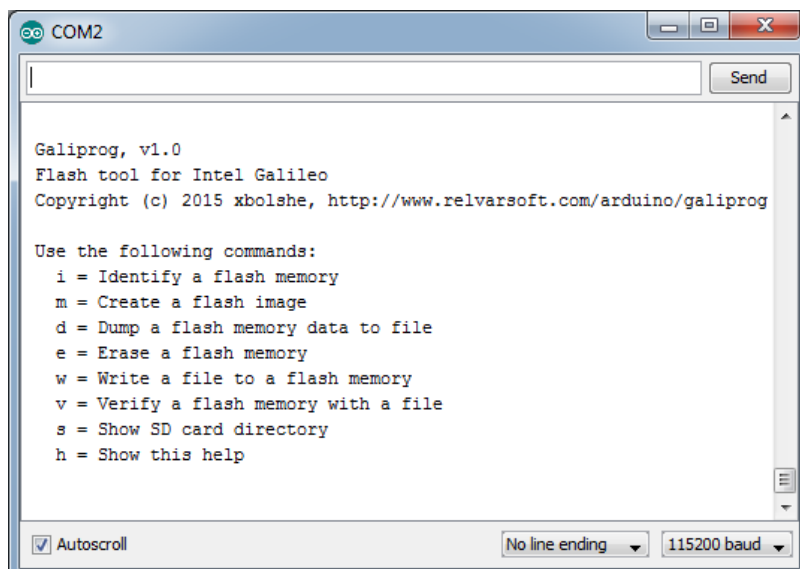
```
>> Show SD card directory <<

boot/
  grub/
    grub.conf                                664 bytes
  bzImage                                   1984464 bytes
  core-image-minimal-initramfs-clanton.cpio.gz 1692243 bytes
  grub.efi                                 279670 bytes
  image-full-galileo-clanton.ext3          314572800 bytes
  platform-data.ini                        1481 bytes
  galiprog_flash_write.bin                 8388608 bytes
  galiprog_flash_dump.bin                  8388608 bytes
  pack_1.0.4/
    intel_galileo_1.0.4/
      Flash-missingPDAT_Release-1.0.4.bin    8388608 bytes
      LICENSE                                1488 bytes
    intel_tools/
      platform-data/
        MRC/
          clantonhill.v0.bin                  39 bytes
          clantonhill.v1.bin                  39 bytes
          clantonpeak.v0.bin                  39 bytes
          clantonpeak.v1.bin                  39 bytes
          crosshill.v0.bin                    39 bytes
          crosshill.v1.bin                    39 bytes
          GalileoFabE.bin                     39 bytes
          GalileoGen2.bin                     39 bytes
          kipsbay-fabD.v1.bin                  39 bytes
          kipsbay.v0.bin                      39 bytes
          kipsbay.v1.bin                      39 bytes
          platform-data-patch.py              7053 bytes
          sample-platform-data.ini            4927 bytes
          platform-data.bin                   129 bytes
          LICENSE                             1488 bytes
          platform-data-gen1.ini.base          1468 bytes
          platform-data-gen2.ini.base          1468 bytes
          gen_flash_image.sh                  259 bytes
        Done.

Autoscroll No line ending 115200 baud
```

7. Show this help

This menu item shows help screen like shown below:



```
Galiprog, v1.0
Flash tool for Intel Galileo
Copyright (c) 2015 xboishe, http://www.relvarsoft.com/arduino/galiprog

Use the following commands:
  i = Identify a flash memory
  m = Create a flash image
  d = Dump a flash memory data to file
  e = Erase a flash memory
  w = Write a file to a flash memory
  v = Verify a flash memory with a file
  s = Show SD card directory
  h = Show this help

Autoscroll No line ending 115200 baud
```

8. Questions

1) What I need to execute to restore broken image in SPI flash memory?

Answer:

- Identify a flash memory
- Dump a flash memory data to file (optional)
- Write a file to a flash memory
- Verify a flash memory with a file

2) More questions or comments? Write me e-mail.