

1. OVERVIEW

NT1062 EVK is an evaluation platform for performance and capabilities demonstration of NT1062: Two-Channel RF Front-End IC that covers GNSS (NavIC, GLONASS, GPS, Galileo, BeiDou, QZSS) signals at all frequency bands in various combinations: L1, L2, L3, L5, E1, E5a, E5b, E6, B1, B2, B3. External active antenna can be connected to SMA input that is common for two receiving channels. As an option two separate SMA inputs can be used for operating with external passive antennas.

NT1062 EVK is suitable the most for in-lab examining with measurement equipment like spectrum analyzer, oscilloscope, network analyzer and etc, but also it has connectors for wiring to external development platforms and can be used for prototyping of navigation receivers based on NT1062.

2. KEY FEATURES

- IO ports:
 - 50Ω SMA input connector for L1 band of GNSS signal reception (recommended for passive or low gain antennas)
 - 50Ω SMA input connector for L2, L3, L5 bands of GNSS signal reception (recommended for passive or low gain antennas)
 - 50Ω SMA input connector for L1 and L2, L3, L5 bands of GNSS signal reception (recommended for active antennas)
 - SMA input connector for external reference frequency
 - Each channel individual IF output ready to connect either as digital 2-bit CMOS or analog differential signal. Single-ended IF outputs are also available as assembly option
 - CMOS clock output
 - Embedded USB to SPI convertor for NT1062 registers configuration. External SPI controller can be also connected (special assembly option)
- On-board reference frequency source:
 - 16.368MHz TCXO
- Comprehensive software and documentation:
 - NT1062 datasheet
 - NT1062 EVK user manual
 - GUI for NT1062 registers access (Windows 7/8/8.1/10 and Linux Ubuntu 18.04 and upper compatible)
 - NT1062 configuration examples
 - Database of PCB reference design

3. PACKAGE CONTENT

- PCB_NT1062_EVK_v3 (demo board NT1062) with jumpers for board reconfiguration
- Power supply cable
- Link to online documentation

4. STRUCTURE

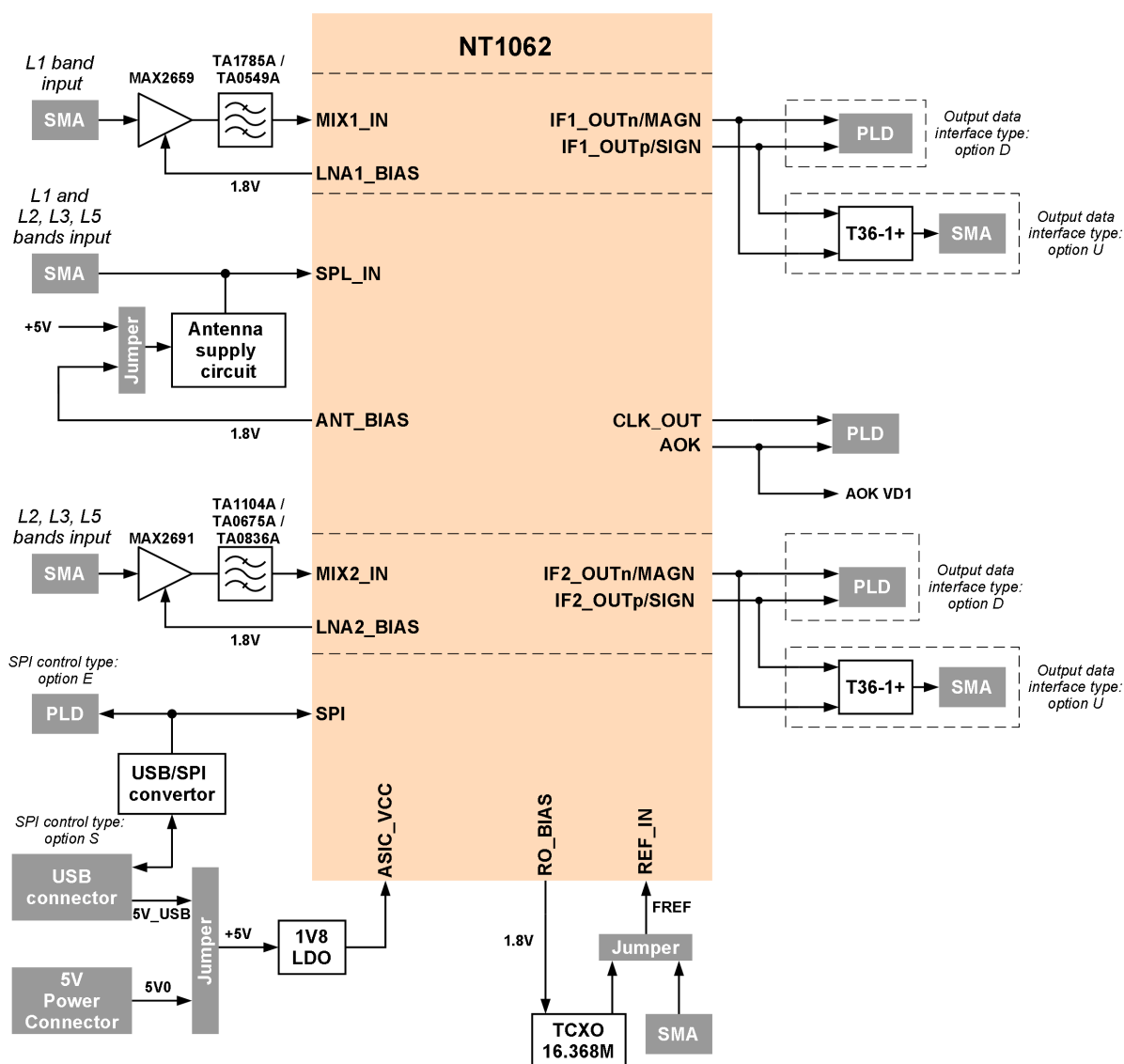


Figure 1: Block diagram

5. ORDERING INFORMATION

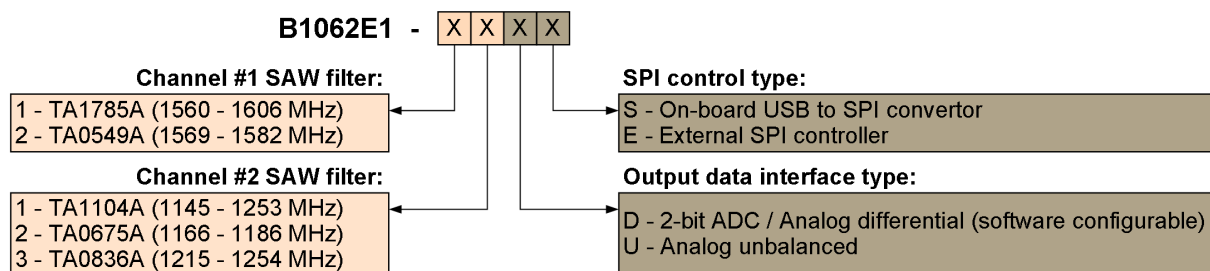


Figure 2: Ordering information

6. TECHNICAL DESCRIPTION

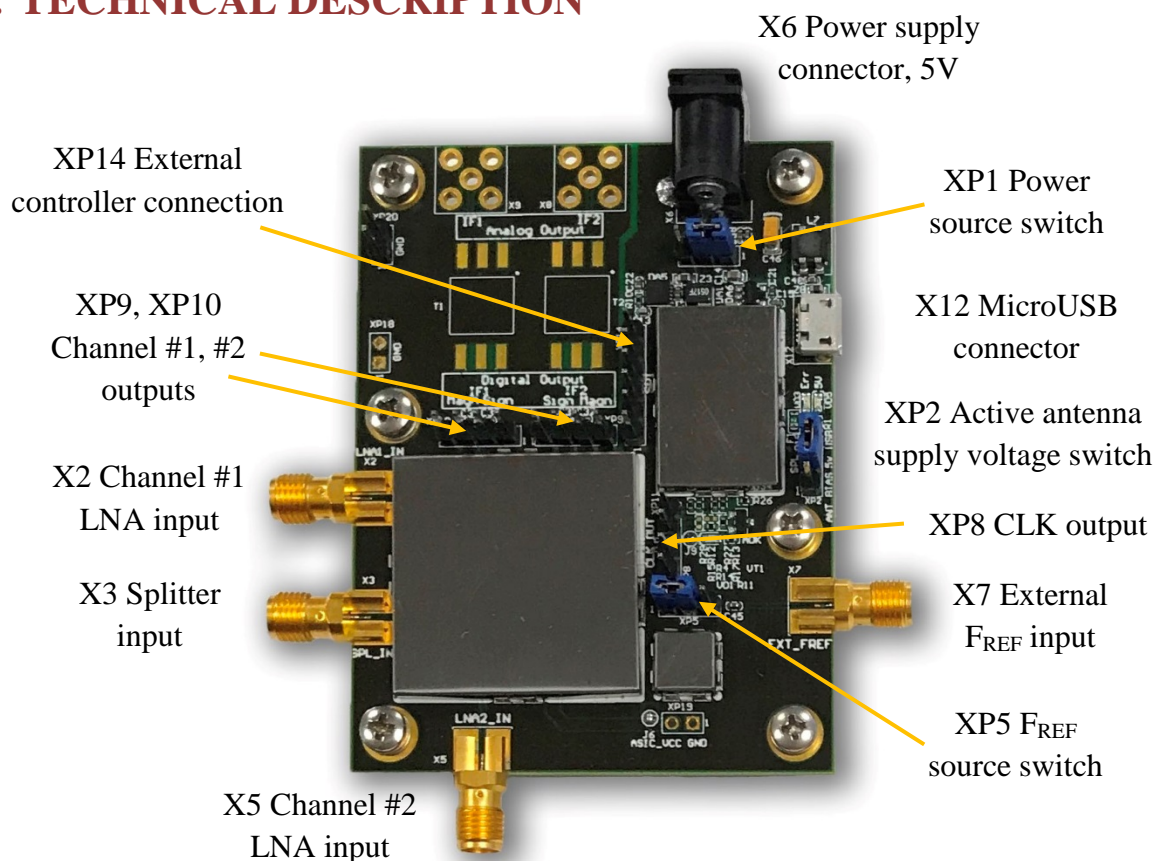


Figure 3: PCB_NT1062_EVK_v3 board

Table 6.1 PCB_NT1062_EVK_v3 ports description










Port number	Description	Notes
X2	Channel #1 LNA input (SMA)	Recommended for passive or low gain antennas
X3	Splitter input (SMA)	Recommended for active antenna
X5	Channel #2 LNA input (SMA)	Recommended for passive or low gain antennas
X6	External power supply connector (5.0V)	100–150mA current limit
X7	External reference frequency input (SMA)	
X8	Channel #2 IF unbalanced output	
X9	Channel #1 IF unbalanced output	
X12	MicroUSB connector for chip control and power supply	
XP1	Power sources switch: 2–1 position – Power supply from USB port X12 2–3 position – Power supply from port X6	2–3 position by default
XP2	Active antenna supply voltage switch: 2–1 position – 1.8V 2–3 position – 5V	2–3 position by default

Port number	Description		Notes
XP5	Reference frequency sources switch: 2–1 position – Onboard 16.368 MHz TCXO 2–3 position – External reference frequency from X7		2–1 position by default
XP8	pin #2	CMOS clock output	
	pin #1	Ground	
XP11	pin #2	NT1062 cumulative status (AOK)	
	pin #1	Ground	
XP9	pins #2-3	Channel #2 2-bit ADC digital output or analog differential output	
	pins #1, 4	Ground	
XP10	pins #2-3	Channel #1 2-bit ADC digital output or analog differential output	
	pins #1, 4	Ground	
XP14	Chip control from external controller ¹ :		Chip control from USB by default
	Pin #1	1.8V	
	Pin #2	CSN	
	Pin #3	SCLK	
	Pin #4	MOSI	
	Pin #5	MISO	
	Pin #6	Ground	
XP18, XP20	Ground		
VD1	NT1062 cumulative status indicator (red LED)		
VD3	Antenna short circuit indicator (red LED)		
VD5	Antenna power supply indicator (green LED)		

¹ Refer to section 4.4 of the document NT1062.1.2_LE_DS for NT1062 IC protocol description.

7. QUICK START

In order to start working with evaluation kit follow instructions:

- Make sure that all jumpers on the board are set in the correct positions according to selected options (see [Table 6.1](#) and [section 8](#)).
- Set 5V supply voltage on external power source. In order to prevent chip damage in case of incorrect connection or onboard elements short circuit it is also recommended to set current limitation 100–150mA. Connect power supply cable and USB cable to PCB_NT1062_EVK_v3. As an option PCB_NT1062_EVK_v3 can be supplied from its USB port.
- Install drivers according to [section 9](#).
- Default state of NT1062 is shutdown mode: both channels and clock output are disabled. Please refer to GUI to control NT1062:
 - Open GUI, go to “Service settings”,  click “Search” and make sure that STM32 controller and any COM port were found.
 - Read registers state by clicking  . Chip version is 1062.1.2.
 - Write one of configuration sets by clicking   and read registers state by clicking  .
 - IC settings may be changed according to application notes given in section 7 of NT1062 IC Datasheet.
 - If configuration sets are not used:
 - Select one of IC modes and click   to write selected mode to IC.
 - IC setting may be changed according to application notes given in section 7 of NT1062 IC Datasheet.

8. EVALUATION KIT RECONFIGURATION

Power supply source reconfiguration:

- Default configuration: PCB_NT1062_EVK_v3 is expected to be supplied from external power source (5.0V, 100–150mA limit) through the port X6 of PCB_NT1062_EVK_v3; jumper on XP1 of PCB_NT1062_EVK_v3 is set to 2–3 position.
- In order to supply PCB_NT1062_EVK_v3 from its USB port X12, set jumper on XP1 of PCB_NT1062_EVK_v3 to 1–2 position.

Chip reference frequency source reconfiguration:

- Default configuration: 16.368MHz TCXO on PCB_NT1062_EVK_v3 is used; jumper on XP5 of PCB_NT1062_EVK_v3 is set to 1–2 position.
- In order to use X7 SMA input of PCB_NT1062_EVK_v3 for external reference frequency connection, set jumper on XP5 of PCB_NT1062_EVK_v3 to 2–3 position and refer to NT1062 IC settings to disable TCXO supply ([Reg6 D\[5\]](#)).

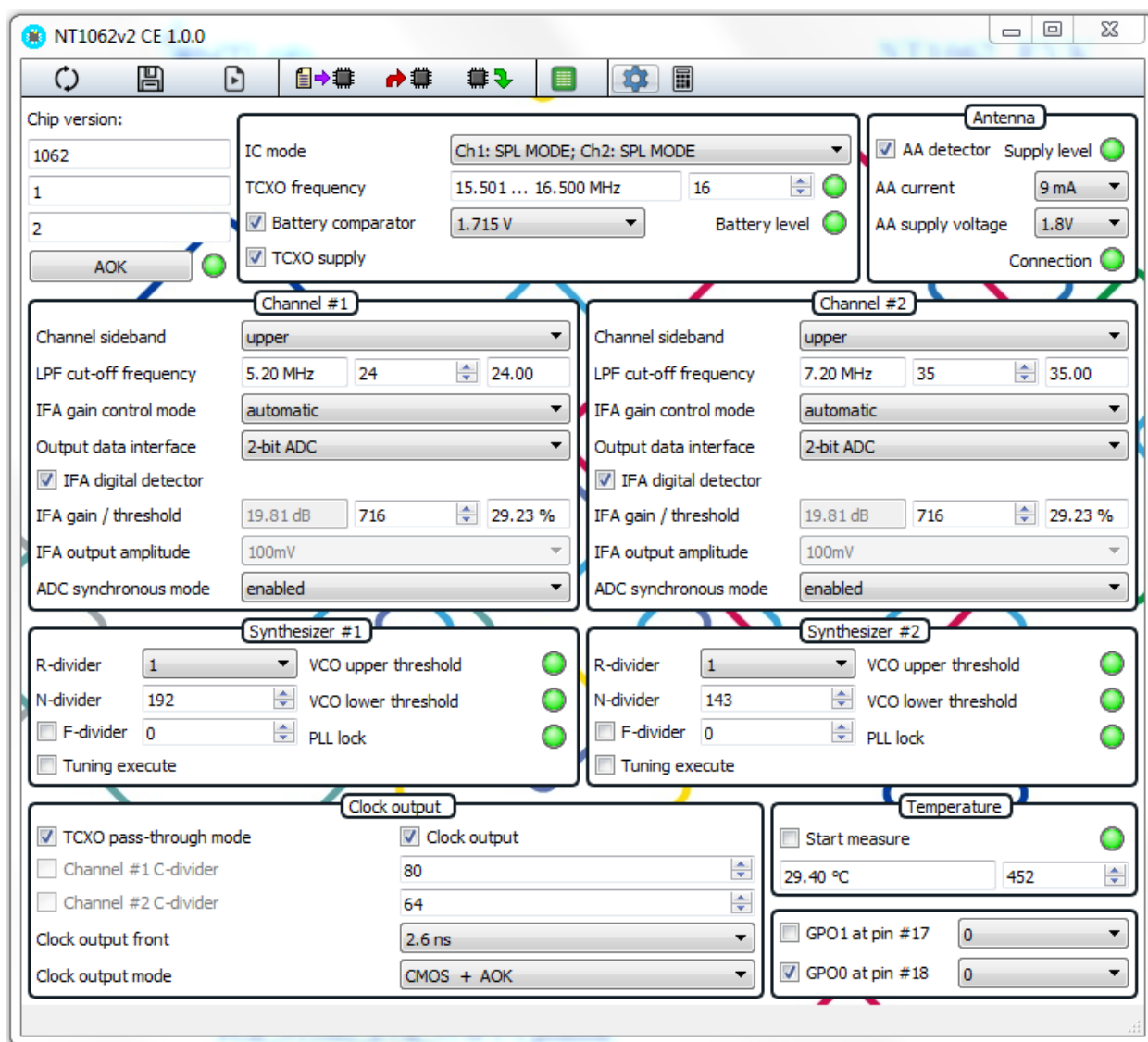
Reconfiguration of supply voltage source for active antenna connected to X3 port of PCB_NT1062_EVK_v3:

- Default configuration: active antenna is expected to be supplied with 5V, jumper on XP2 of PCB_NT1062_EVK_v3 is set to 2–3 position.
- In order to supply active antenna with 1.8V set jumper on XP2 of PCB_NT1062_EVK_v3 to 1–2 position.





9. USB ADAPTER DRIVER INSTALLATION

OS MS Windows 7 and 8 require drivers installation. Open “en.stsw-stm32102” folder, select version suitable for your OS and follow instructions from “readme” file to install STM drivers. OS MS Windows 10 doesn’t require drivers installation.

10. RUNNING AND USING NT1062 CONTROL TOOL



The program allows you to perform the following operations:

-  **IC** → **GUI** Reads current state of all IC registers and displays them in the GUI.
-  **GUI** → **IC** Writes displayed register states from GUI to IC. Only changes from the latest IC reading are written. If IC was never read after program start, all registers are written.
-  **File** → **IC** Writes registers states containing in the file directly to IC. Writing is sequential; if file contains several values of the same register, register will be overwritten several times with those values.
-  **File** → **GUI** Reads registers states containing in the file and displays them in the GUI. If file contains several values of the same register, only the last value is displayed.



GUI → File Writes displayed register states from GUI to a file:

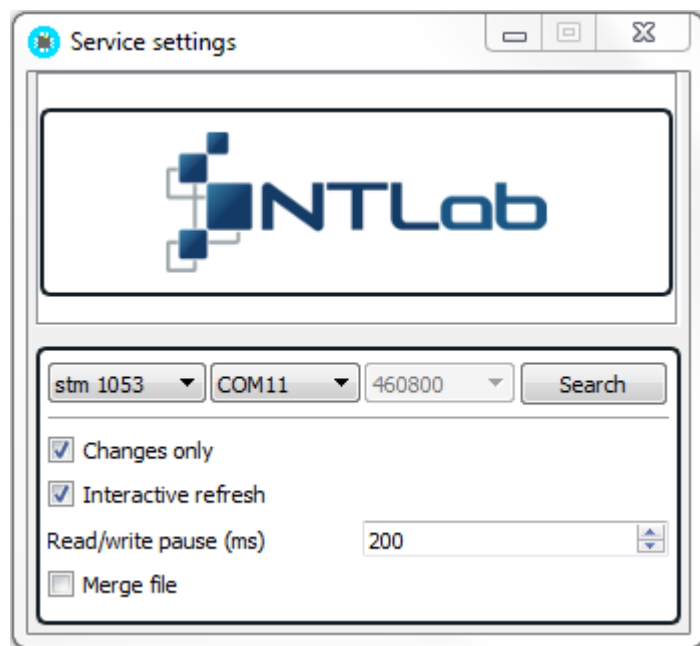
- To save full configuration file open **Service settings** and disable **Changes only** option (enabled by default). Full register map will be written to a file. After that **Changes only** option must be **enabled**.
- If **Merge with previous** option is **enabled** (Service settings):
 - New file: copies last opened file (file path is shown in the program header), adds changes that user made in GUI to the end of a new file.
 - Existing file: adds changes from the latest opened file (file path is shown in the program header) that user made in GUI to the end of existing file.
- If **Merge with previous** option is **disabled** (Service settings, disabled by default):
 - Writes full register map. Overwrites an existing file.



Load default.hex Restores default register states to GUI.

Service settings also include the following options:

- **Interactive refresh** of registers states at the display after writing.
- Setting of **pause** between **read/write** operations (value in ms).



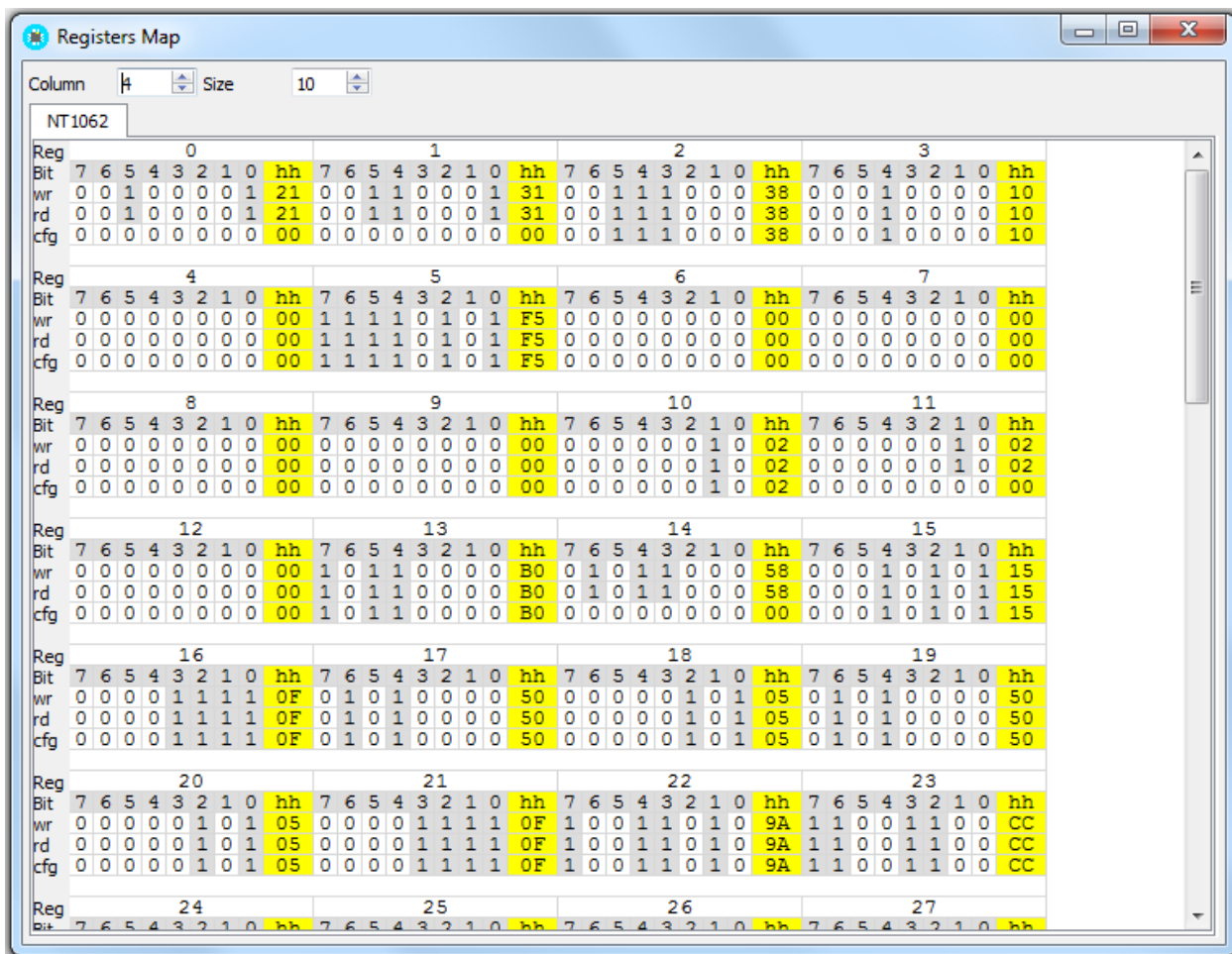
While using GUI under Linux Ubuntu, make sure that User has permission to access the device:

```
$ cat /dev/ttyACM0
cat: /dev/ttyACM0: Permission denied
```

If NT1062 EVK board is connected to PC and GUI can't read registers map, use command given below to permit access:

```
$ sudo chmod a+rw /dev/ttyACM0
```


RegMap shows current states of the registers.



Reg	0								1								2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
wr	0	0	1	0	0	0	0	1	21	0	0	1	1	0	0	0	31	0	0	1	1	0	0	0	38	0	0	0	1	0	0	0
rd	0	0	1	0	0	0	0	1	21	0	0	1	1	0	0	0	31	0	0	1	1	0	0	0	38	0	0	0	1	0	0	0
cfg	0	0	0	0	0	0	0	0	00	0	0	0	0	0	0	0	00	0	0	1	1	0	0	0	38	0	0	0	1	0	0	0

Please refer to section 7 of the datasheet for IC application notes.

11. REVISION HISTORY

Changes to be tracked.