MCS1608 Programmer and serial Interface Instruction 29/01/2017

Changelog:

| V1.0 First Version	
V1.1 09-06-2016	Added EEPROM when flashing a device, removed (empty step 6)
V1.2 12-08-2016	Added changing OTAA and ABP Paremeters
V1.3 05-10-2016	Changed the programmer and COM cable
V1.31 10-10-2016	Added setting production data Ok
V1.32 11-10-2016	Added a more clear description for entering commands
V1.33 29-01-2017	Added the option to change the APPKEY in OTAA (ED1608 firmware V2.7 or higher required)

Safety warning:

⚠ Make sure the battery is NOT connected. The ED1608 is powered via the Serial Cable. Connecting the battery together with the programming cable can lead to dangerous heating of the battery and even explosion. ⚠

In the box you find the following items
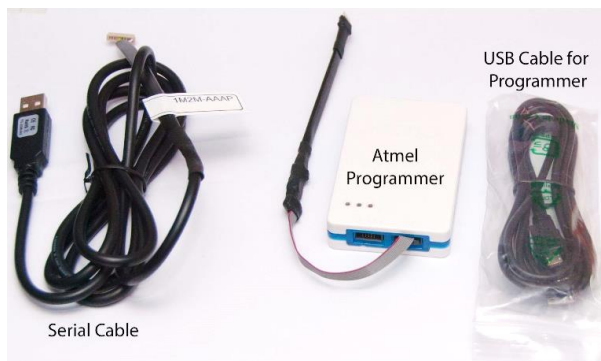
The box contains:
- 1 ATMEL Programmer
  - o Programmer Interface
  - o 1 micro USB Cable
- Serial interface cable (also sold separately)

The terminal software that is necessary for debugging can downloaded here:
www.1M2M.eu/downloads/Terminal.exe

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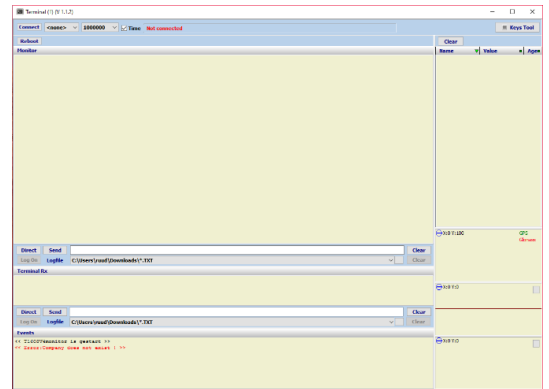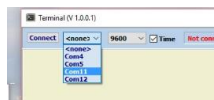## MCS1608 Programmer and serial Interface Instruction 29/01/2017

For Using the Terminal tool:

If you only need the terminal tool the Atmel programmer is not needed

Step 1: Connect the Serial interface cable to a USB port on your PC

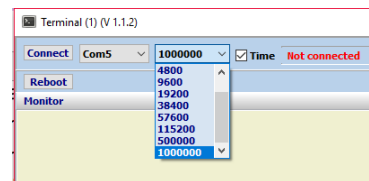*Step 2:* Run the terminal software, you get this screen:

Step 3: Select the correct COM port

Step 4: Select the speed of the COM port 115200, For V1.x firmware devices (until Aug 2016) and 1000000 for later devices

Step 5: Push connect button

Step 6: Connect the serial interface to the ED1608


⚠️ **Make sure the battery is NOT connected. The ED1608 is powered via the Serial Cable. Connecting the battery together with the programming cable can lead to dangerous heating of the battery and even explosion.** ⚠️

Connect Serial interface and power supply

Needed to connect the Terminal Software

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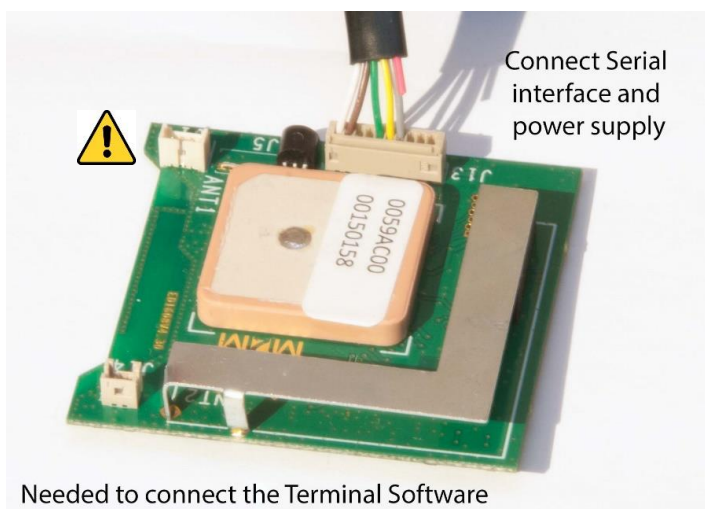
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You will now get the following screen
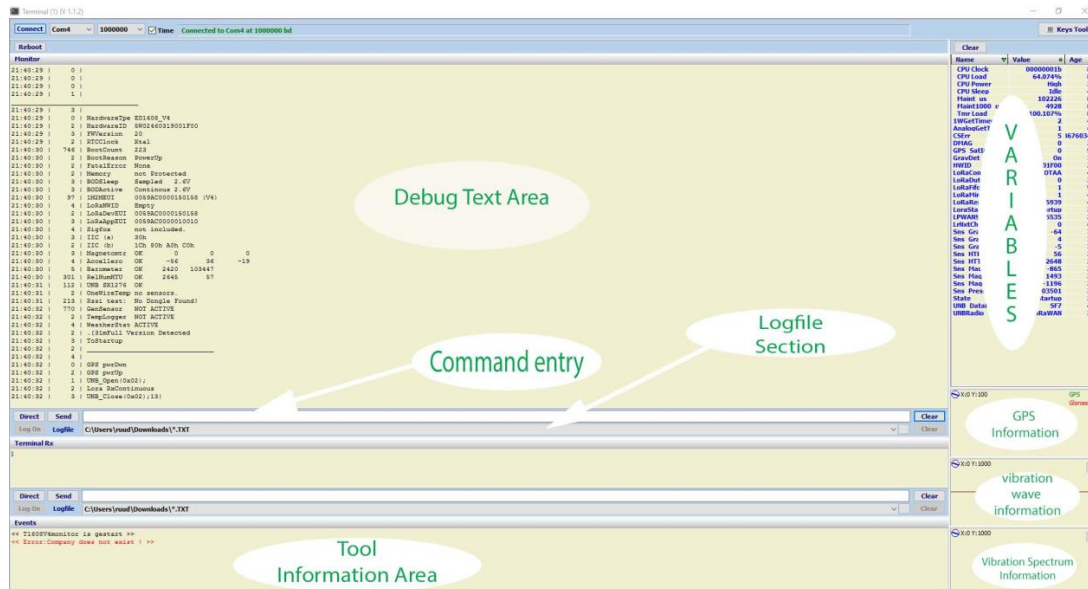
- **Debug Text Area**, contains debug texts from the firmware
- **Variables** contains the actual values of some important variables in the firmware, there are three columns:
    - Name: the name of the variable
    - Value: the value of the variable
    - Age: the time passed since the last update of the variable

    The area can be enabled, via the enable button, and cleared via the Clear button

- **Tool Information** Area, contains tool status information
- **Command entry**, here simple text commands can be sent to the ED1608 in the same format as in downlink commands
- **LogFile Selection**, here a logfile can be selected (create an empty text file first) and logging can be enabled. Logfiles can be helpful for debugging.
- **GPS Information,** when GPS is enabled GPS signals are shown, blue for GPS signals and red for GLONAS signals
- **Vibration Information,** when vibration scan is performed a spectrum analysis is shown here. The scaling of the vibration information can be adapted automatically by pressing the squares in the upper right corners of the area.

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Setup the keys tool:

The keys tool is part of the Terminal and must be properly setup before flashing firmware. **It is not necessary to setup the keys tool if you only want to observe the ED1608 behavior or want to enter commands.**

The keys tool connects to the 1M2M database where keys, network addresses and other information of the ED1608 is stored. The information must be downloaded from the server every time a unit is flashed.

Step 1: In the Terminal, press the button "Keys Tool" in the upper right corner. A popup window shows;

Step 2: Enter the credentials you received from 1M2M (Company, User and Password) and press update> If everything is ok the fields in the screens are filled and you will get the following error message. Your license needs to be activated. Please contact 1M2M to activate your license.:
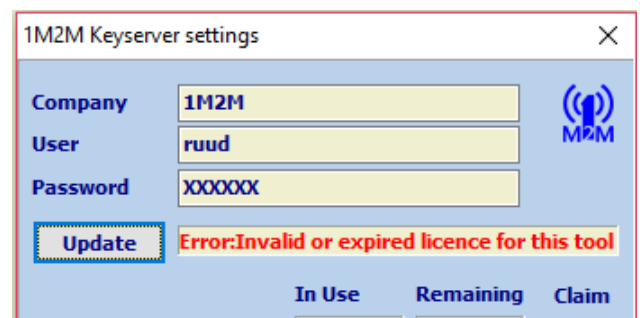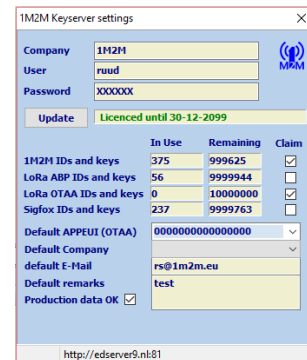

Step 3: When activation is done everything is OK you will get the following screen:

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*Step3:*When your license is activated, select the Keys you need for you device (SigFox and/or (LoRa ABP or LoRa OTAA) and before flashing the firmware set the mark at "Production Data OK"
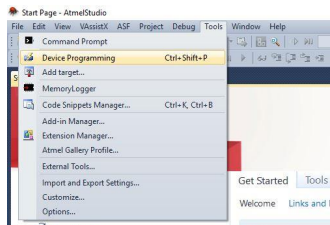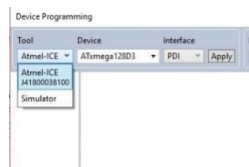

For Flashing Firmware:

Step 1: Install Atmel Studio Version 6 or 7 are both OK

Step 2: Open Atmel Studio

Step 3: From the menu select <Tools><Device Programming> ctrl+shift+P
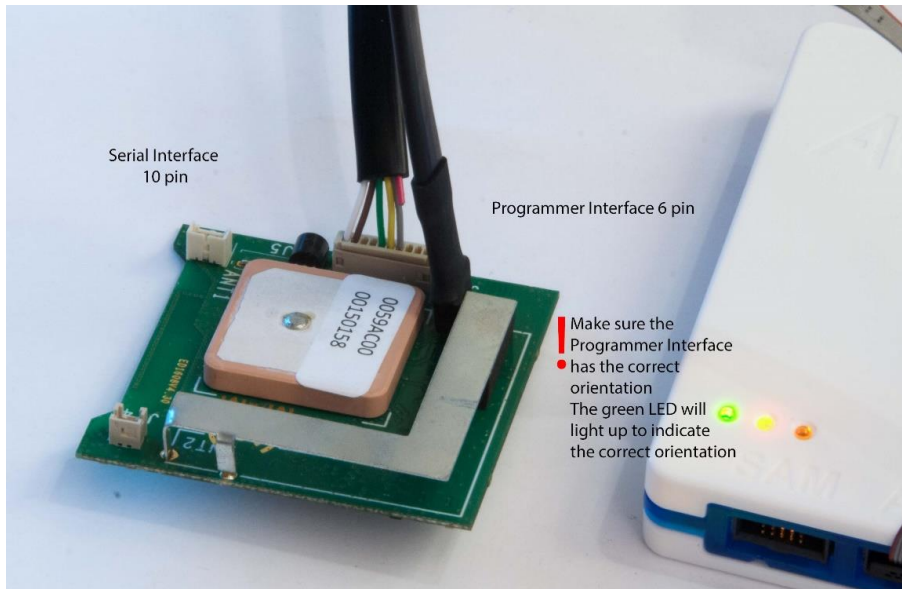

*Step 4:* In tool field, select Atmel-ICE, For device search for ATxmega128D3, and Interface PDI. Press Apply

Step 5: Connect the programmer to the ED1608, make sure the Serial interface is also connected

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Step 6: Go to the TAB Production file and select a production file (this file will be provided by 1M2M)
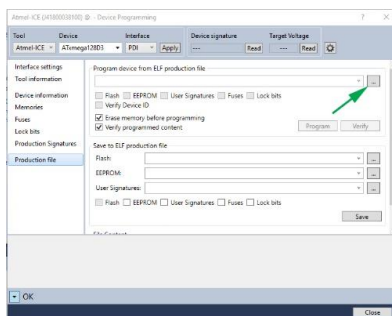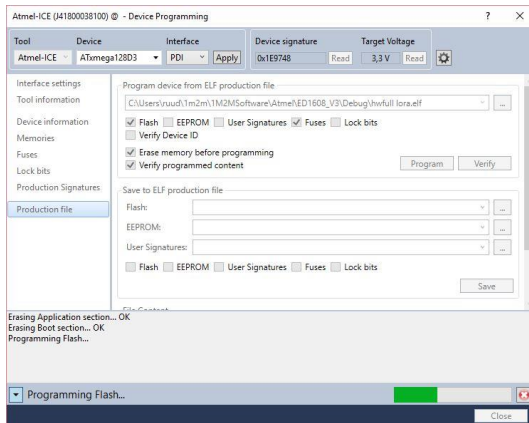

Step 7: Make sure the all the boxes Flash and EEPROM and Fuses are selected and that erase memory before programming and verify programmed content are ticked

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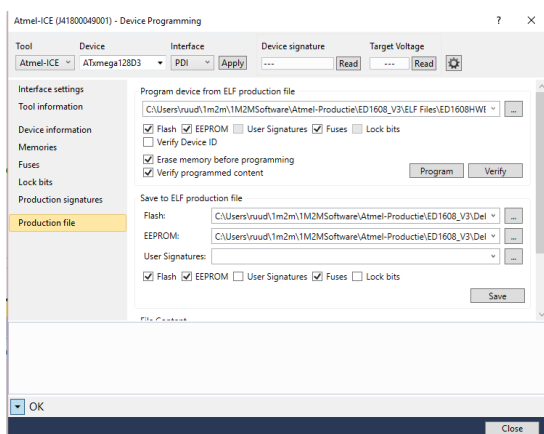
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Step 8: Press the Program button in Atmel Studio, the ED1608 will be flashed and perform a reboot.

Entering commands:

The button "Direct" should not be selected in the command entry line.

Commands are entered as 3 byte values for example "010E01" is used to enable the tracker in the firmware. Type the characters 010E01 in the command line and press send when the device is ready to receive the command.

In many firmware versions the terminal is switched off after the device has booted. On devices with firmware version 2.0 and onward the terminal will stay on after entering the command 1F in the device:

Type "011F01"(without the quotes in the command entry line) press send as soon as the device is booting and !before the terminal is switched off. The terminal will stay on if the command is accepted.

! In most full versions the terminal will stay on anyway.

! Commands can only be entered when the device is not in sleep mode (see variables area for the variable CPUSleep) In deep sleep mode the device is not able to receive commands

! The best timing for entering command (press the send button) is for LoRa devices, during a LoRa Transmission

! The best timing (press the send button) for SigFox devices is between sending the Alive message and waiting for the downlink message

Creating LogFiles:

Select an existing (empty) file by pressing the button at the end of the LogFile selection line. Once selected press the "log on" button at the left side of the LogFile Selection line. From now on all texts in the debug area will also be logged in the selected log file.

For Changing APPEUI and APPKEY (LoRa Only):

There are two (or three) ways of changing the APPEUI.

Changing APPEUI via the terminal

Step 1: Connect the ED1608 to the terminal via the serial interface

Step 2: In the terminal go with the mouse to the **Command entry** area, and make sure the button "Direct" is not selected.

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Step 3: type "APPEUI=1122334455667788APPKEY=00112233445566778899AABBCCDDEEFF" *) and press Send

The ED1608 will respond with the message "`APPEUI Set:8877665544332211`" *) and `APPKEY Set: 00112233445566778899AABBCCDDEEFF` and when the unit goes to idle it will reboot.

This command also enable the use of OTAA and disables APB!

*) the APPKEY part is optional if this part is not entered the APPKEY will remain unchanged

*) the APPEUI is displayed in reverse order, however the APPEUI is correctly set in the unit

*) In firmware V2.6 and lower a factory reset command will erase the APPEUI and go back to the original setting
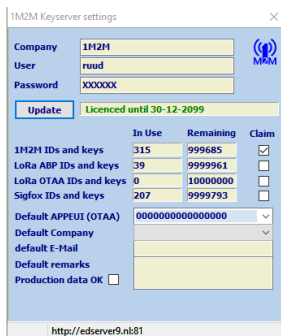
Changing APPEUI during firmware flashing

Step 1: With a text editor open the file <Terminal>\<TerminalData>\AppEUI.txt
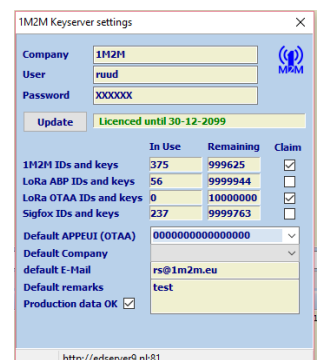
Step 2: Enter the required APPEUI as a line in this TXT file

Step 3: Save the file

Step 4: Go to the Keys Tool screen in the Terminal

Select the field Default APPEUI (OTAA) and select the APPEUI you just entered (you might need to close and re-open the Terminal software)

Step 5: Flash the firmware with the LoRa OTAA IDs and keys enabled. The unit will now have the APPEUI as a factory default APPEUI

For Changing ABP Parameters (LoRa Only):

Changing ABP Parameters via the terminal:

Step 1: Connect the ED1608 to the terminal via the serial interface

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Step 2: In the terminal go with the mouse to the **Command entry** area, and make sure the button "Direct" is not selected.

Step 3: type
"DEVADDR=00112233NWSKEY=00112233445566778899AABBCCDDEEFFAPPSKEY=00112233445566778899AABBCCDDEEFF" and press Send
The ED1608 will respond with the message
```
DevAddr Set:33221100 *)
NwkSKey Set:00112233445566778899AABBCCDDEEFF
AppSKey Set:00112233445566778899AABBCCDDEEFF
```

and when the unit goes to idle it will reboot.

This command also enable the use of ABP and disables OTAA!

*) the DevAddr is displayed in reverse order, however the DevAddr is correctly set in the unit

*) In firmware V2.6 and lower a factory reset command will erase the ABP Parameters and go back to the original setting

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