

MAIANA™ Firmware Update Procedure

Revision 1 - Nov 12, 2021

Summary

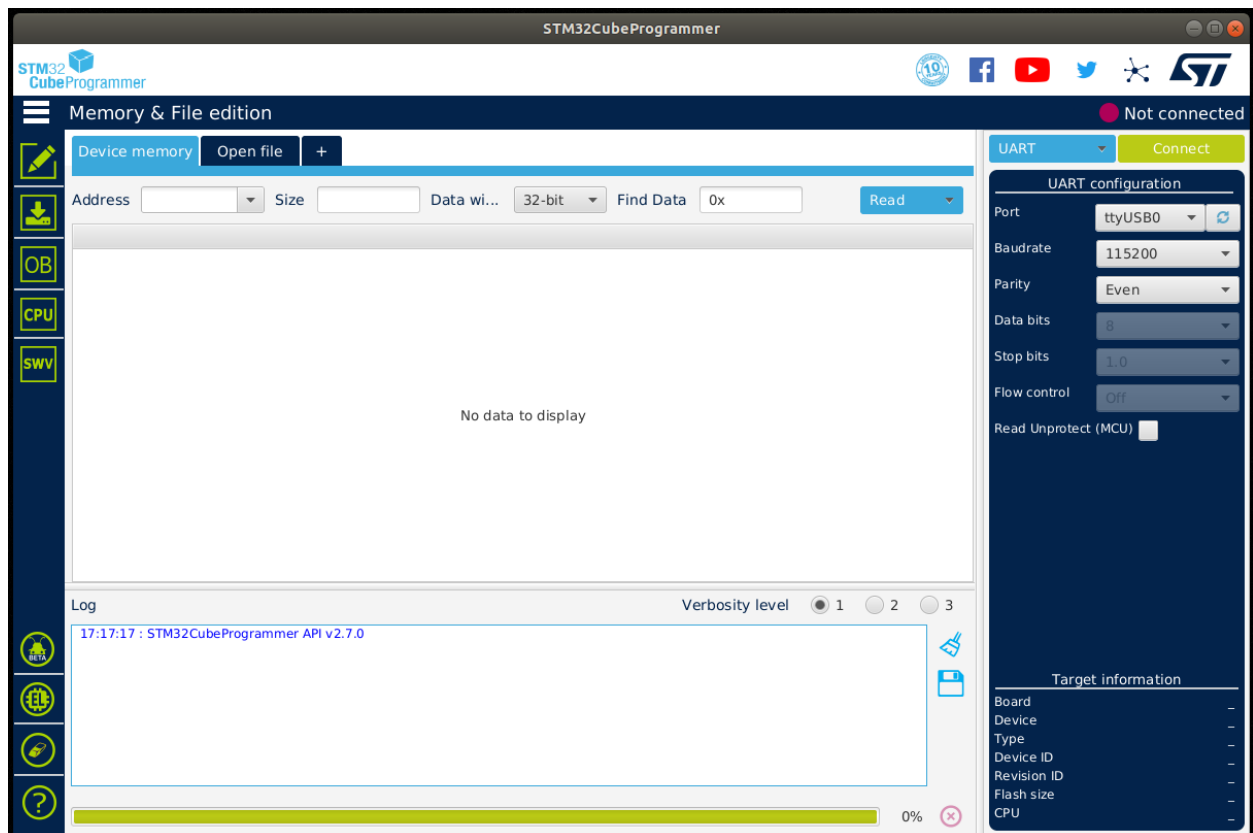
MAIANA has been designed to accept a firmware update over the same USB connector that normally transmits AIS NMEA messages to other devices. To carry out this procedure you will need a Windows, Mac or Linux computer, a serial terminal application, a software package from ST Micro (free download) and a binary firmware image.

Step 1: Get the programming software

Navigate to ST Micro's website and download the STM32CubeProgrammer software for your platform:

<https://www.st.com/en/development-tools/stm32cubeprog.html>

Install the package and launch it to make sure it runs. For this example, I have used the Linux version, but they all look very much the same. When you launch the programmer, it should look like this:



Step 2: Obtain the updated firmware binary

This is probably going to come directly from me, unless you have the ability to build the firmware from source using Eclipse CDT and the MCU package. The file will be named something like **maiana-stm32l422-11.0-legacy-v3.3.3.bin**. The name itself doesn't matter, but it indicates which particular board, processor and breakout version it's built for.

Step 3: Prepare the system

If you have any software on your PC that normally connects to the USB port of the MAIANA adapter, terminate it so the programming software can take over the port.

If you don't have any serial terminal emulation software on your computer, then obtain one of the following (free downloads):

For Windows, use Terminate from here: https://www.compuphase.com/software_termite.htm

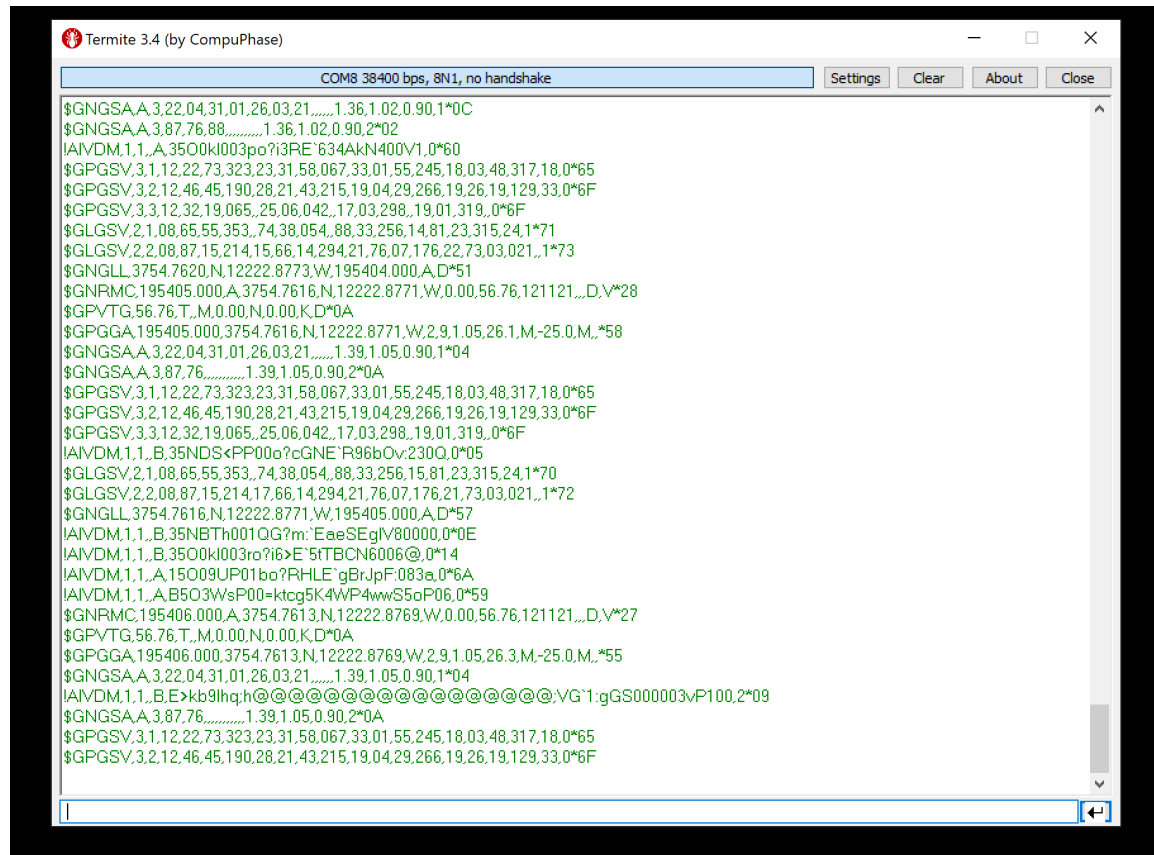
For Mac OS, use CoolTerm: <https://www.macupdate.com/app/mac/31352/coolterm>

For Linux, I recommend CuteCom: <http://cutecom.sourceforge.net/>

Configure your serial terminal so that it has "line input", which allows you to send a command to the other side of the connection by typing and pressing <Enter>. Look under Settings / Preferences of the above apps for that option.

Step 4: Enter firmware update mode

Connect the serial terminal application to the serial port at 38400 baud, 8 data bits, one stop bit, no parity, no flow control. Power up MAIANA and you should be seeing output like this:



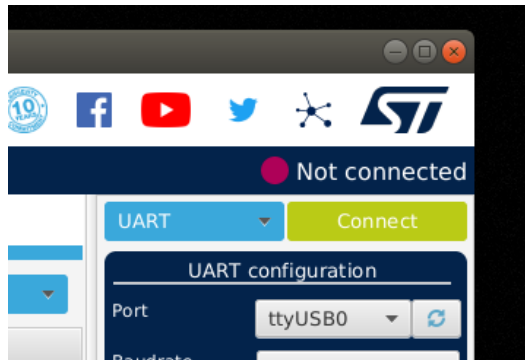
The screenshot shows a window titled "Termit 3.4 (by CompuPhase)". The status bar indicates "COM8 38400 bps, 8N1, no handshake". The window contains a list of hexadecimal data strings, likely representing a firmware update or boot sequence. The data is organized into groups, some starting with "\$GNGSA" and others with "\$GPGSV". The strings are separated by line breaks and some have trailing characters like "0C", "02", "60", "65", "6F", "71", "73", "51", "28", "0A", "58", "04", "0A", "05", "70", "72", "57", "0E", "14", "6A", "59", "27", "04", "09", "0A", "65", "6F".

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Termit 3.4 (by CompuPhase)
COM8 38400 bps, 8N1, no handshake
$GNGSA,3.22,04,31,01,26,03,21,1.36,1.02,0.90,1*0C
$GNGSA,3.87,76,88,1.36,1.02,0.90,2*02
IAIVDM,1.1,A,3500K003po?i3RE'634AkN400V1,0*60
$GPGSV,3.1,12,22,73,323,23,31,58,067,33,01,55,245,18,03,48,317,18,0*65
$GPGSV,3.2,12,46,45,190,28,21,43,215,19,04,29,266,19,26,19,129,33,0*6F
$GPGSV,3.3,12,32,19,065,25,06,042,17,03,298,19,01,319,0*6F
$GLGSV,2,1,08,65,55,353,74,38,054,88,33,256,14,81,23,315,24,1*71
$GLGSV,2,2,08,87,15,214,15,66,14,294,21,76,07,176,22,73,03,021,1*73
$GNGLL,3754,7620,N,12222.8773,W,195404.000,A,D*51
$GNRMC,195405.000,A,3754.7616,N,12222.8771,W,0.00,56.76,121121,,,D,V*28
$GPVTG,56.76,T,M,0.00,N,0.00,K,D*0A
$GPGGA,195405.000,3754.7616,N,12222.8771,W,2.9,1.05,26.1,M,-25.0,M,*58
$GNGSA,3.22,04,31,01,26,03,21,1.39,1.05,0.90,1*04
$GNGSA,3.87,76,1.39,1.05,0.90,2*0A
$GPGSV,3.1,12,22,73,323,23,31,58,067,33,01,55,245,18,03,48,317,18,0*65
$GPGSV,3.2,12,46,45,190,28,21,43,215,19,04,29,266,19,26,19,129,33,0*6F
$GPGSV,3.3,12,32,19,065,25,06,042,17,03,298,19,01,319,0*6F
IAIVDM,1.1,B,35NDS<PP00o?cGNE'R96bOv,230Q,0*05
$GLGSV,2,1,08,65,55,353,74,38,054,88,33,256,15,81,23,315,24,1*70
$GLGSV,2,2,08,87,15,214,17,66,14,294,21,76,07,176,21,73,03,021,1*72
$GNGLL,3754.7616,N,12222.8771,W,195405.000,A,D*57
IAIVDM,1.1,B,35NBTh001QG?m:EaeSEglV80000,0*0E
IAIVDM,1.1,B,3500K003ro?i6>E'5(TBCN6006@,0*14
IAIVDM,1.1,A,15009UP01bo?RHLE'gBrJpF:083a,0*6A
IAIVDM,1.1,A,B503WSP00=ktcg5K4WP4wwwS5oP06,0*59
$GNRMC,195406.000,A,3754.7613,N,12222.8769,W,0.00,56.76,121121,,,D,V*27
$GPVTG,56.76,T,M,0.00,N,0.00,K,D*0A
$GPGGA,195406.000,3754.7613,N,12222.8769,W,2.9,1.05,26.3,M,-25.0,M,*55
$GNGSA,3.22,04,31,01,26,03,21,1.39,1.05,0.90,1*04
IAIVDM,1.1,B,E>kb9lhq:h@@@@@@@@@@@@@:VG`1:GS000003vP100,2*09
$GNGSA,3.87,76,1.39,1.05,0.90,2*0A
$GPGSV,3.1,12,22,73,323,23,31,58,067,33,01,55,245,18,03,48,317,18,0*65
$GPGSV,3.2,12,46,45,190,28,21,43,215,19,04,29,266,19,26,19,129,33,0*6F
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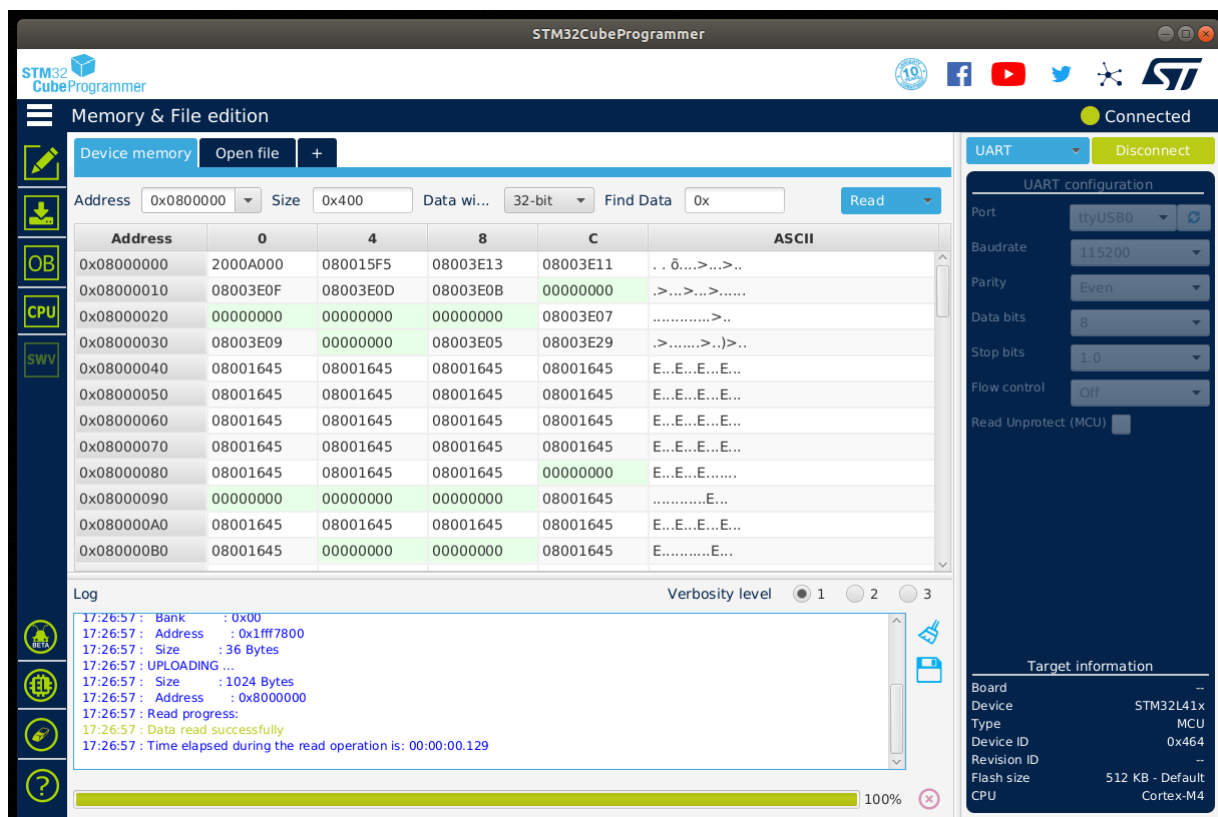
[illegible]

Step 5: Update the firmware

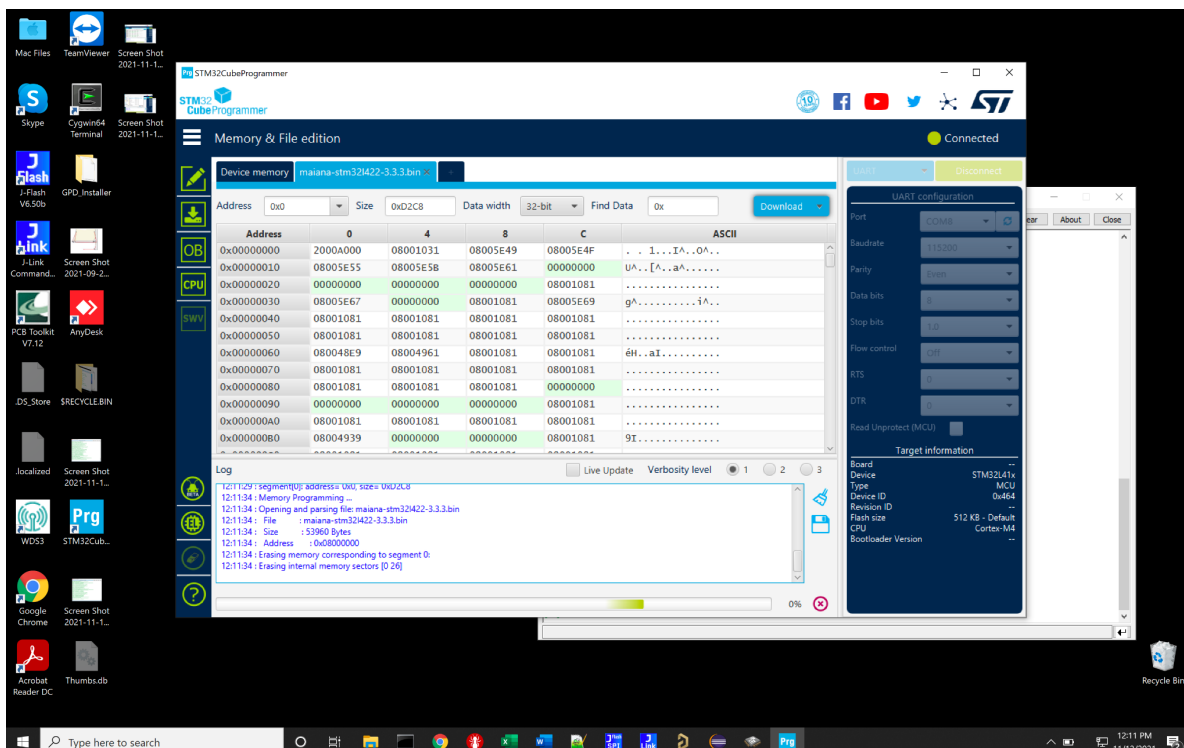
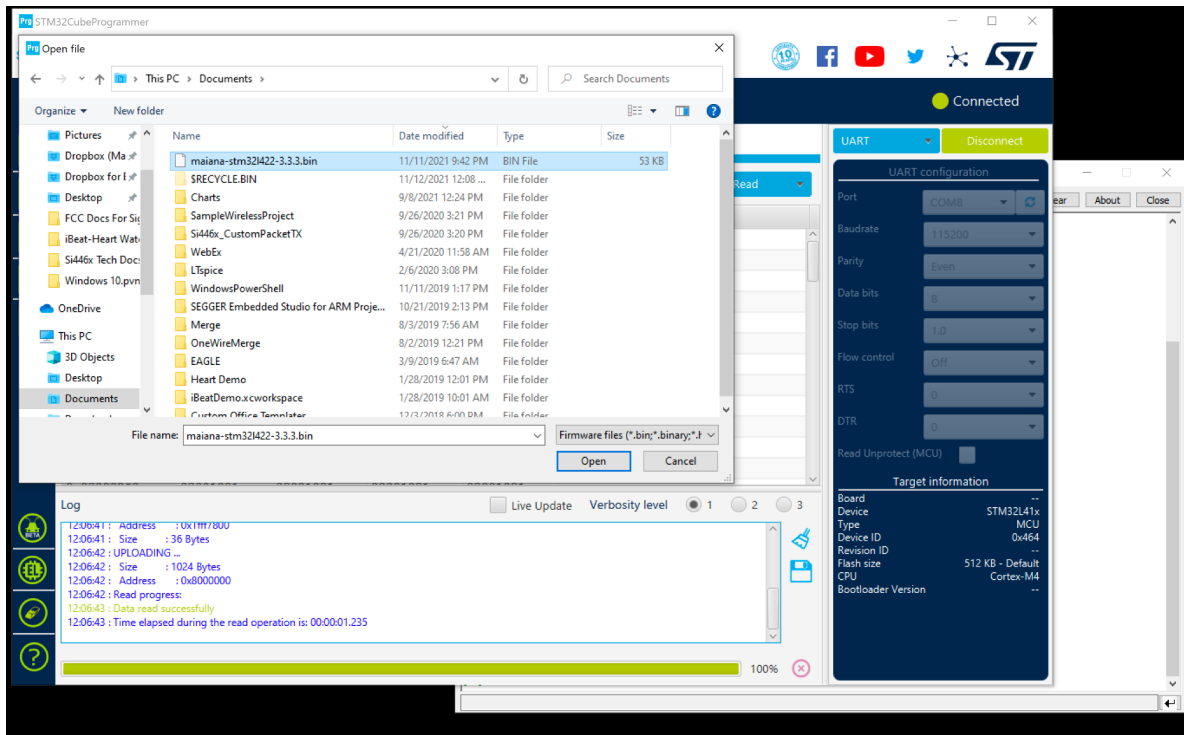
Switch to the STM32CubeProgrammer window. On the top right, use the drop down to select “UART” as the programming interface, then make sure that the correct COM port is selected. Leave the baud rate at 115200, and press “Connect”:



If everything worked, the programmer should be able to connect and show something like this:



Now, click on the “Open File” tab to select the new firmware binary file and then click on the Download button to start the update. The process should take about 20 seconds:



You can now close (or disconnect) the STM32Cube programmer and power-cycle MAIANA. The firmware update is complete.

If you run into trouble, email maiana.kits@gmail.com