AN12397

EdgeLock™ SE050 Quick start guide with i.MX6UltraLite

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Document information

Information	Content
Keywords	EdgeLock SE050, EdgeLock Plug & Trust middleware, i.MX6UltraLite
Abstract	This document explains how to get started with the OM-SE050ARD board and i.MX6UltraLite board. This guide provides detailed instructions for connecting the boards, installing the software, running the EdgeLock SE050 Plug & Trust project examples and executing the pySSSCLI tool.

Revision history

Revision history

Revision number	Date	Description
1.0	2019-06-08	First document release.
1.1	2019-06-20	Update board figures
1.2	2019-12-17	Corrected OM-SE050ARD J14 jumper setting.

1 Read this first

The hardware used in this document is the following:

1.1 Required hardware

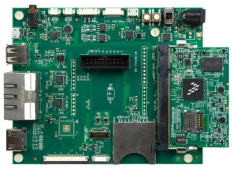
1. OM-SE050ARD development kit:

Table 1. OM-SE050ARD development kit details

Part number	12NC	Content	Picture
OM-SE050ARD	935383282598	EdgeLock SE050 development board	

2. i.MX6Ultralite board

Table 2. i.MX6Ultralite

Part number	12NC	Content	Picture
MCIMX6UL-EVKB	935328353598	i.MX6UltraLite evaluation kit	

2 Hardware setup

The hardware setup consists of two steps:

1. Mounting the boards, as described in Section 2.1
2. Configuring OM-SE050ARD jumpers, as described in Section 2.2

2.1 Mounting the boards

1. Connect the OM-SE050ARD board on top of the i.MX6UltraLite board using the Arduino connectors as shown in Figure 1

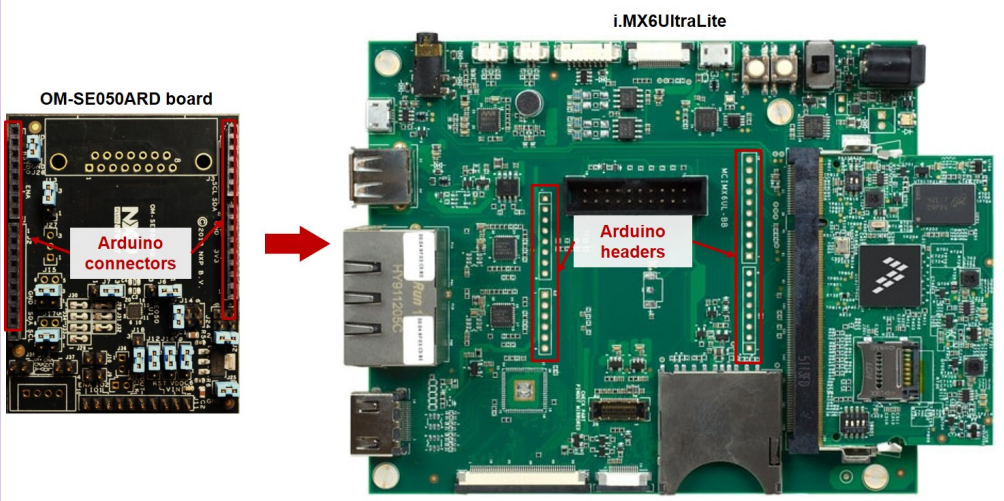


Figure 1. Arduino connectors of OM-SE050ARD and i.MX6UltraLite boards

Note: In case the i.MX6UltraLite board does not come with the Arduino headers assembled by default, they can be easily soldered in the dedicated mounting holes.

2.2 Jumper configuration

1. Make sure the jumper settings in your OM-SE050ARD board are configured as shown in Figure 2

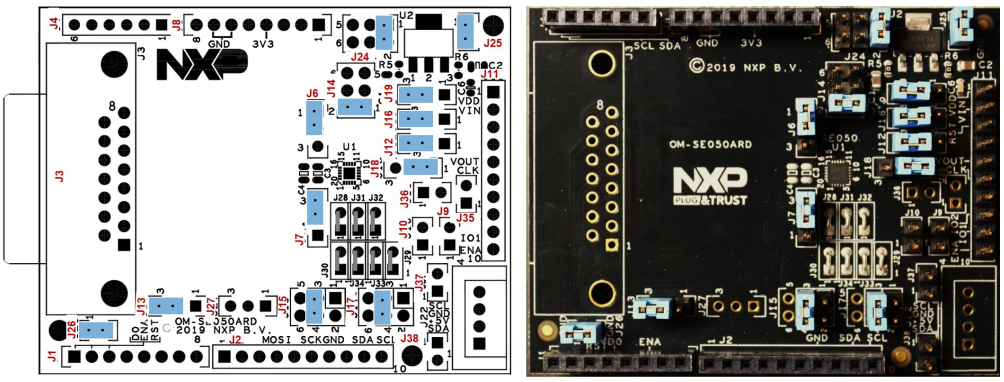


Figure 2. Jumper configuration for i.MX6UltraLite board

For more information about the OM-SE050ARD jumper settings, refer to AN12395 OM-SE050ARD hardware overview document.

3 Software setup

The software setup consists of:

1. Preparing a micro-SD card with the pre-compiled Linux image for i.MX6UltraLite board, as described in Section 3.1.
2. Installing the *USB to UART Bridge VCOM driver* in your laptop, as described in Section 3.2.
3. Installing TeraTerm terminal application, as described in Section 3.3.
4. Booting the i.MX6UltraLite board, as described in Section 3.4.

3.1 Micro-SD card preparation

To prepare the micro-sd card with the pre-compiled Linux image that includes the EdgeLock SE050 Plug & Trust middleware, you need to:

1. Download from www.nxp.com/se050 the EdgeLock SE050 Plug & Trust middleware SD Card Image. This image contains the EdgeLock SE050 Plug & Trust middleware pre-installed on a bootable IMX6UL-EVK SD Card Image.
2. Download and install Win32 Disk Imager software. Win32 Disk Imager is a Windows open source program to format SD card images. Instead of Win 32 Disk Imager, you could also use any other software for this operation.
3. Plug your micro-SD card in your laptop.
4. Open Win 32 Disk Imager, (1) select from your file system the pre-compiled Linux image you downloaded from the website and (2) click the ***Write*** button as shown in Figure 3.

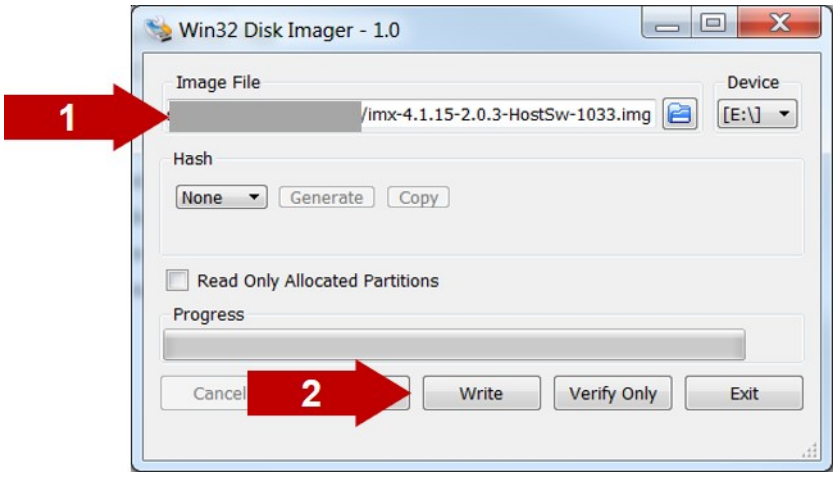


Figure 3. Micro-SD card preparation with Win32 Disk Imager software

3.2 Drivers

To install the i.MX6UltraLite drivers, follow these steps:

1. Plug the power supply and connect the USB cable to your laptop as shown in Figure 4.

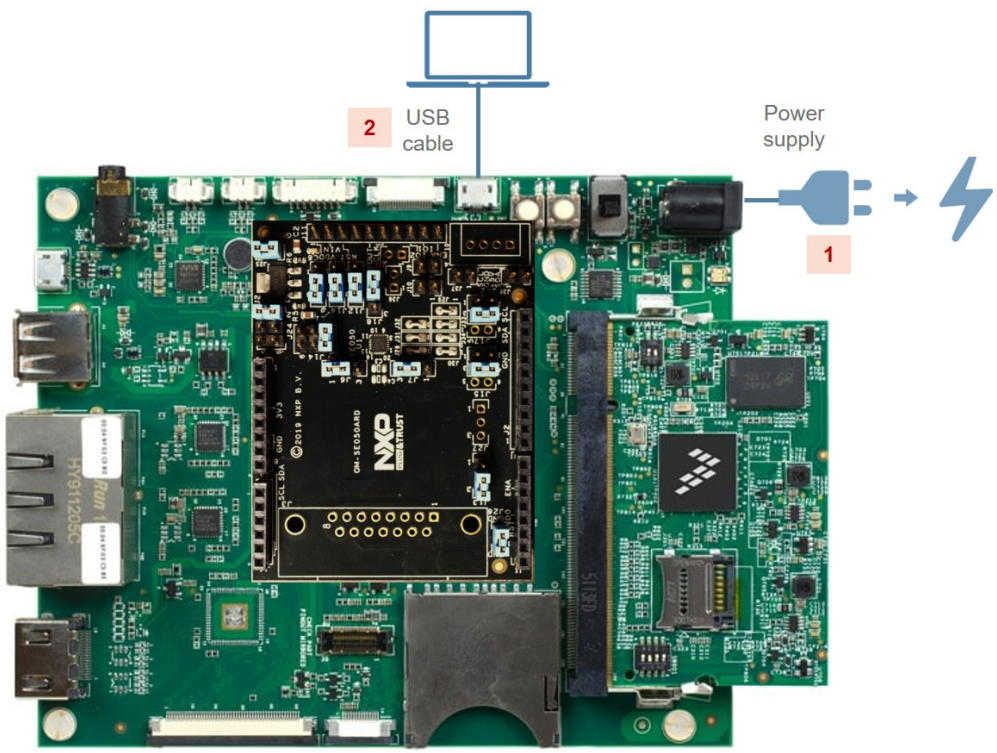


Figure 4. Plug the power supply and connect the USB cable to your laptop

2. Download the USB to UART Bridge VCOM driver for your processor (either 32 or 64 bits). Install the driver by following the setup wizard until it is finished.
3. Unplug and plug your board.
4. Go to your Device Manager, and check that your board is recognized and assigned to a port number (COMxx). Write down the assigned port number (COMxx) as it is needed in the next steps. Your Device Manager should look like Figure 5

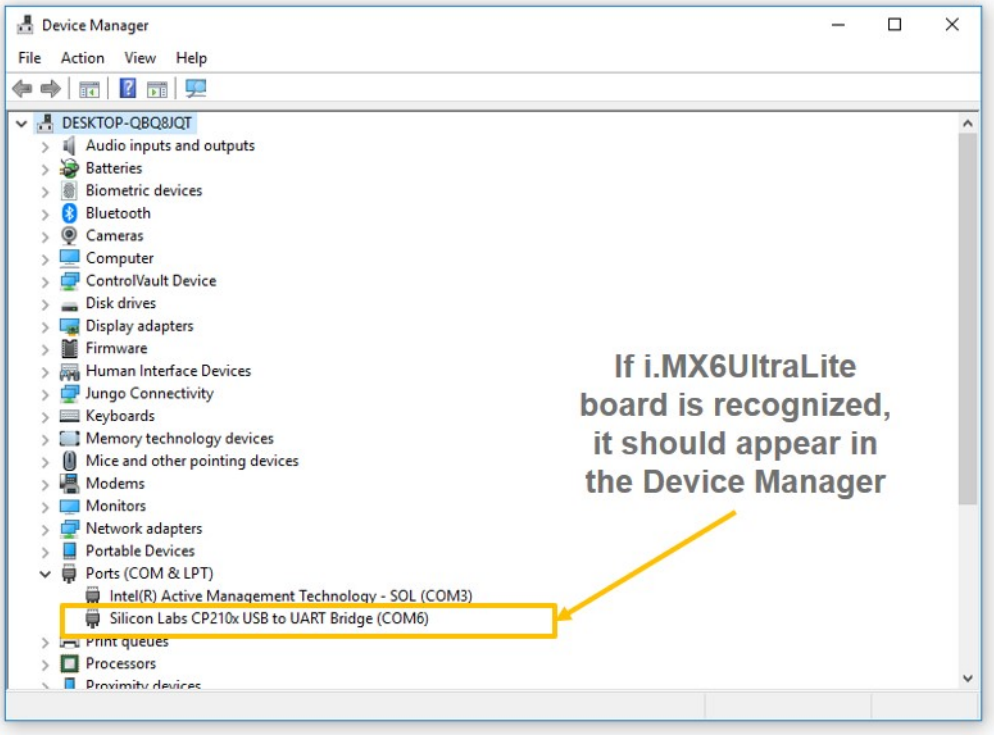


Figure 5. Check i.MX6UltraLite board is recoginized in Device Manager

3.3 Terminal setup

We need to install a terminal application, for instance TeraTerm, to communicate and view the serial output of the i.MX6UltraLite board from our laptop. To setup TeraTerm application:

1. Download TeraTerm and run the installer.
2. Launch TeraTerm, click ***Serial*** option and select from the drop down list the COM port number assigned to your i.MX6UltraLite board as shown in Figure 6. If the serial option is not enabled for you, your i.MX6UltraLite board might not be recognized. In that case, please repeat the driver installation described in Section 3.2.

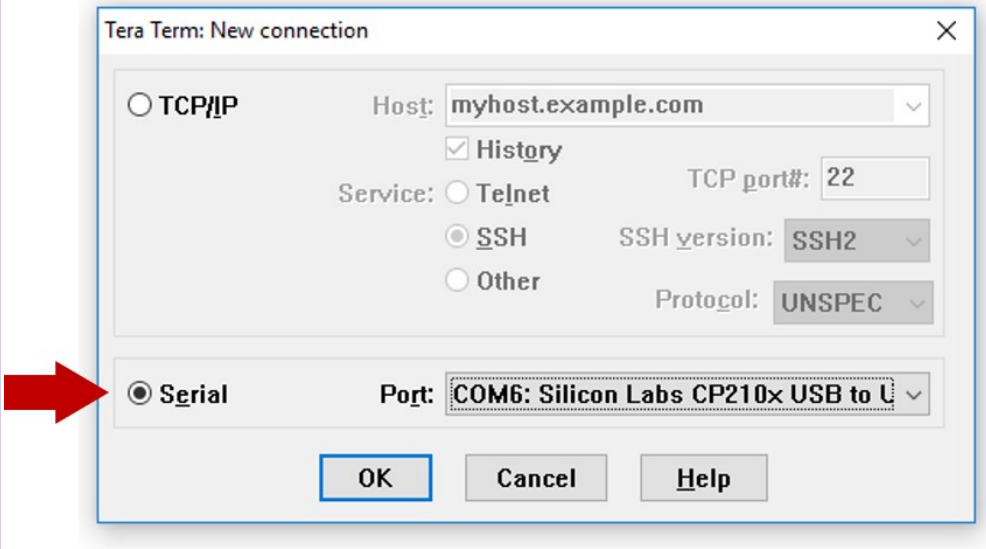


Figure 6. Open a TeraTerm serial connection

3. Go to Setup > Serial Port and configure the terminal to *115200 baud rate*, *8 data bits, no parity* and *1 stop bit* and click **OK** as shown in Figure 7

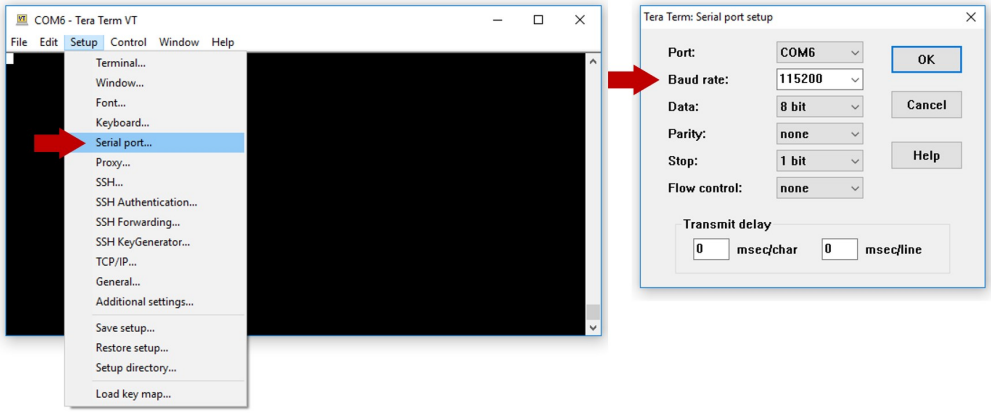


Figure 7. Configure TeraTerm serial port connection

3.4 Booting the i.MX6UltraLite

To boot the i.MX6UltraLite, please do the following:

1. Insert the micro-SD card with the pre-compiled Linux image into the card slot as shown in Figure 8

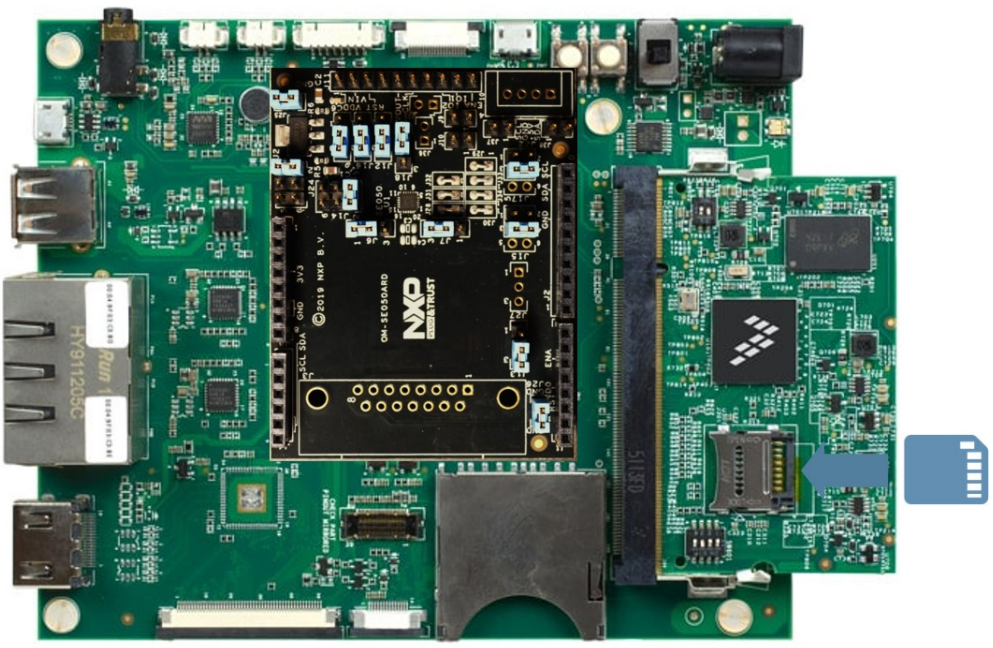


Figure 8. Insert the Micro-SD card

2. Configure the board switches as follows
   - SW601 (Boot Device Select Switch): OFF, ON, OFF, OFF (from 4-1 bit)
   - SW602 (Boot Mode Select Switch): ON, OFF (from 1-2 bit)
3. Make sure the i.MX6UltraLite switches are set as shown in Figure 9

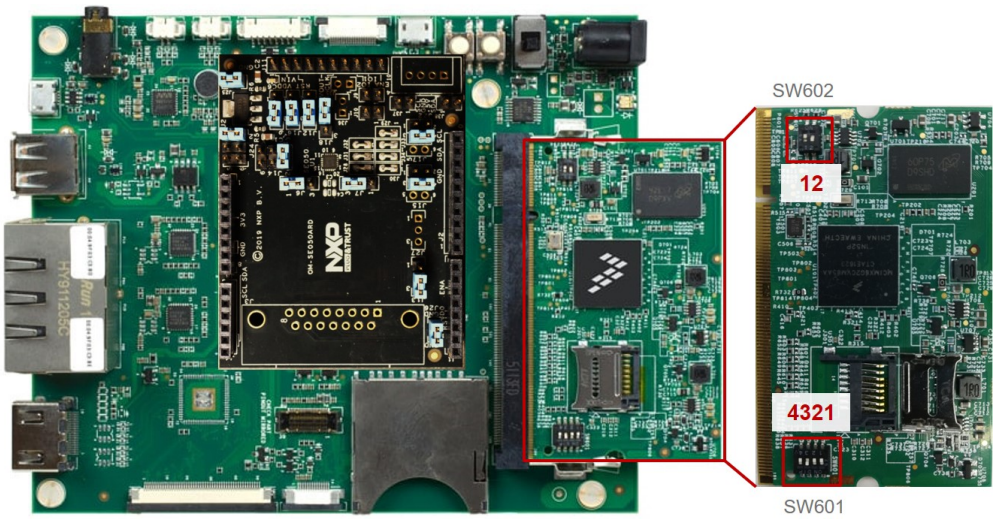


Figure 9. Configure i.MX6UltraLite board switches

4. Make sure your board is connected to the power supply and to your laptop using a USB cable and TeraTerm serial port configured (see Section 3.3).
5. Turn on the power supply switch to boot up the board. The power supply button is shown in Figure 10.

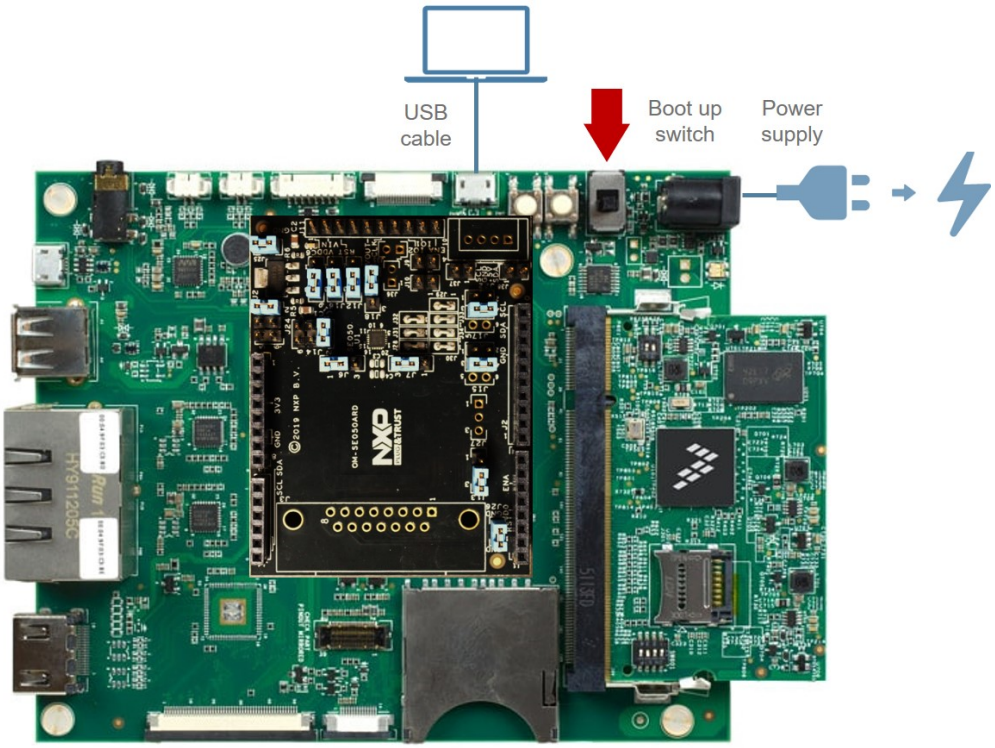


Figure 10. Turn on the board

6. During the boot process, the operating system status information will be prompted on the TeraTerm as shown in Figure 11. When the process is complete, the user can login with the following credentials
   - Account name: root
   - Password: not required

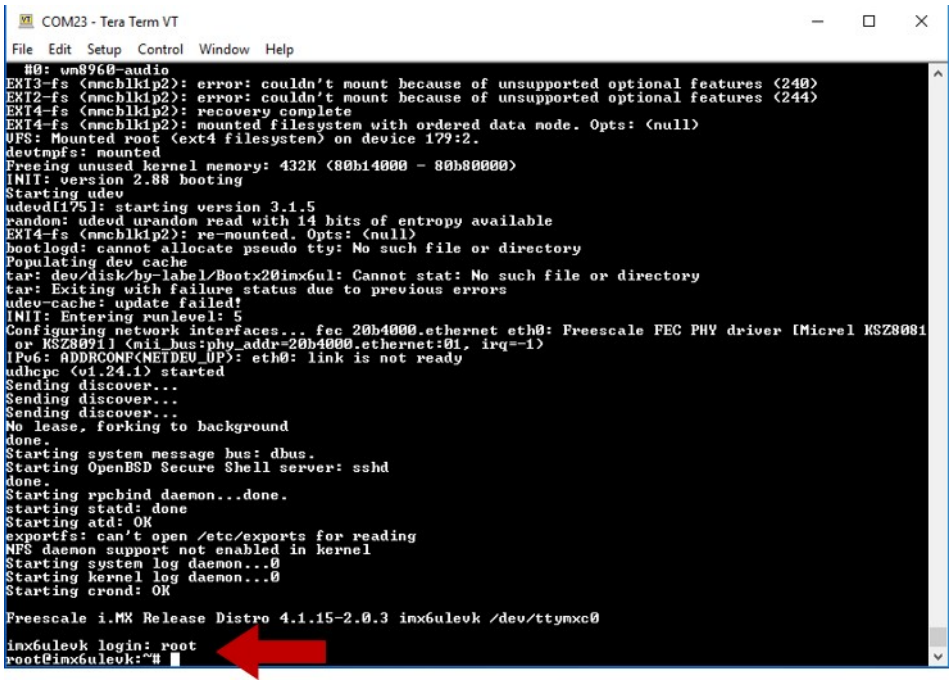


Figure 11. Sign in in the OS

4 Run EdgeLock SE050 Plug & Trust middlewaretest examples

The EdgeLock SE050 Plug & Trust middleware comes with several test examples used to verify atomic EdgeLock SE050 security IC features. This section explains how to run the EdgeLock SE050 Plug & Trust middleware test example called `se05x_minimal`.

1. Go to se050_mw_vXX.XX.XX_build/imx_native_se050_t1oi2c/bin directory as shown in Figure 12, where vXX.XX.XX corresponds to the EdgeLock SE050 Plug & Trust middleware version number. At the moment of writing, the latest version was v02.09.00_20190605_115623
   Send > `cd se050_mw_vvXX.XX.XX_build/imx_native_se050_t1oi2c/bin`.

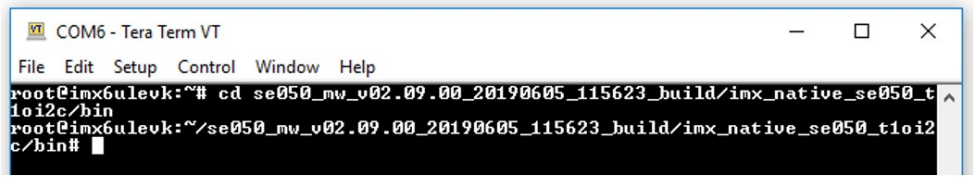


Figure 12. Go to the EdgeLock SE050 Plug & Trust middleware test example directory

2. Execute the `se05x_minimal` test example. This test example outputs the memory left in EdgeLock SE050 security IC.
   Send > `./se05x_minimal`.
   The TeraTerm logs should indicate the available memory in EdgeLock SE050 security IC as can be seen in Figure 13 (in this case, 592).

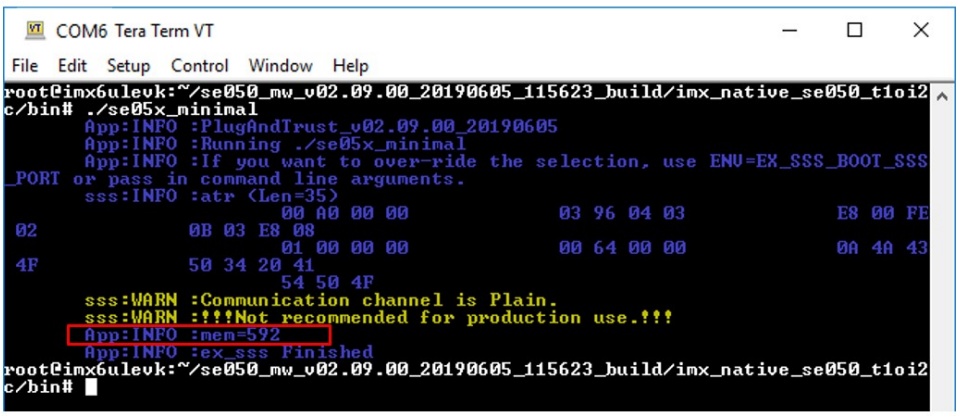


Figure 13. Run `se05x_minimal` test example

The execution of the `se05x_minimal` project is shown as an example. The steps detailed in this section can be replicated to run any other test example included as part of the EdgeLock SE050 Plug & Trust middleware. To get the list of test examples:

1. Send the `ls` command as shown in Figure 14

Send > `ls -l`

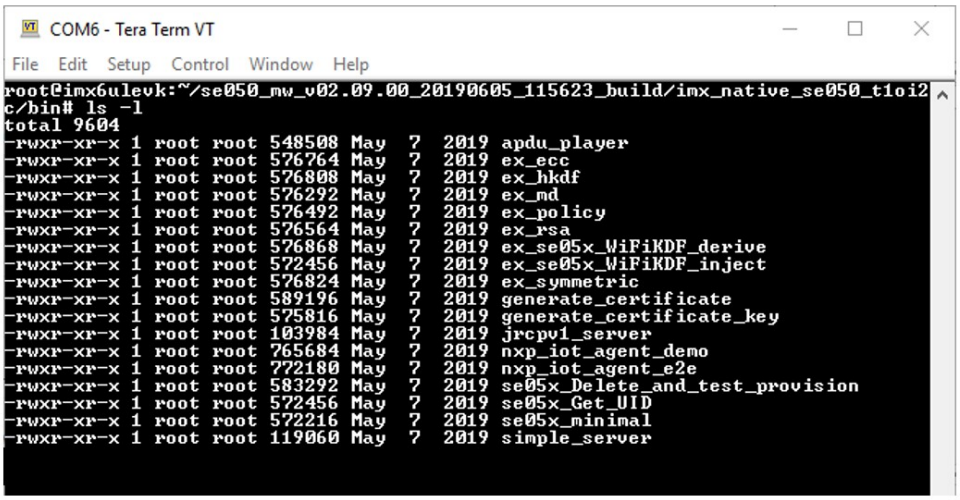


Figure 14. List EdgeLock SE050 Plug & Trust middleware test examples

5 Using SE050 ssscli tool

In Section 2 and Section 3 we have prepared the hardware setup and the software setup respectively. To validate that the whole process was done correctly and that your setup is fully operational, we are going to run the `ssscli` tool. To start the `ssscli` tool, send the commands shown in Figure 15:

1. Open the connection:
   Send: >`ssscli connect se050 t1oi2c none`
2. Send the reset command:
   Send: >`ssscli se05x reset`

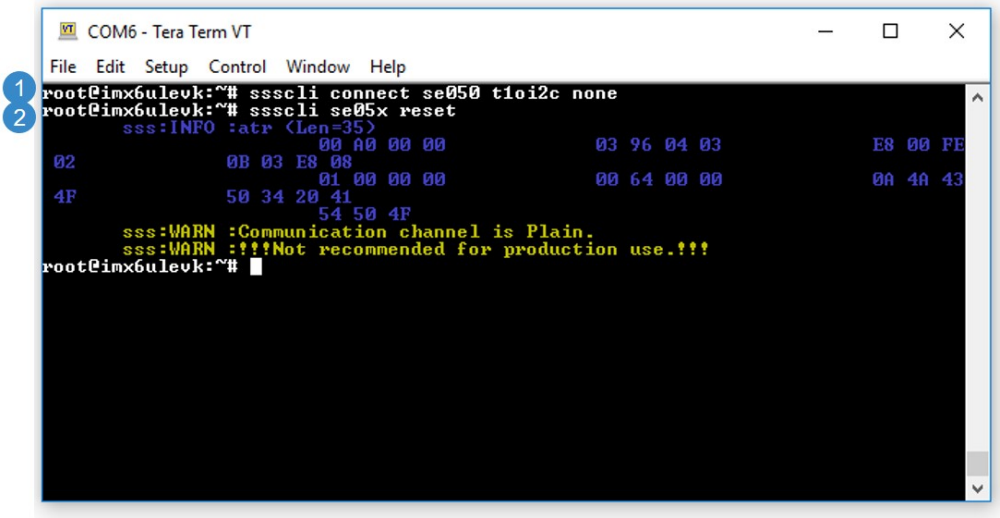


Figure 15. Start the ssscli tool

Note: *If you see the following message: WARNING:sss.connect:Session already open, close current session first message as shown in Figure 16, it means that you have a session open. To close it, send: (1) >* `ssscli disconnect` *and then send once again (2) >*`ssscli connect se050 vcom <COM_NUMBER>` *and later (3) >*`ssscli se05x reset`*.*

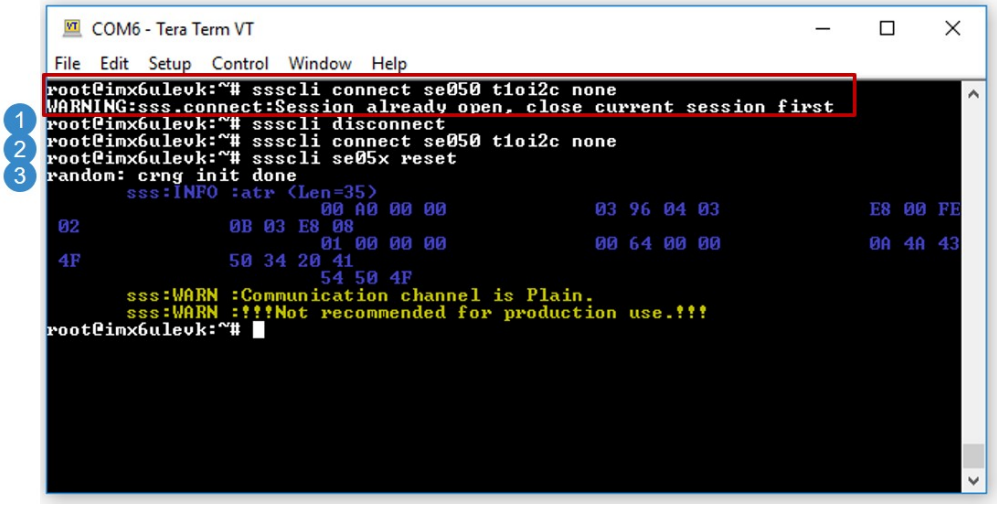


Figure 16. Close an already openned session

3. The SE050 ssscli tool supports several operations. To check which commands support the SE050 ssscli tool:
(Figure 17) Send: > `ssscli`

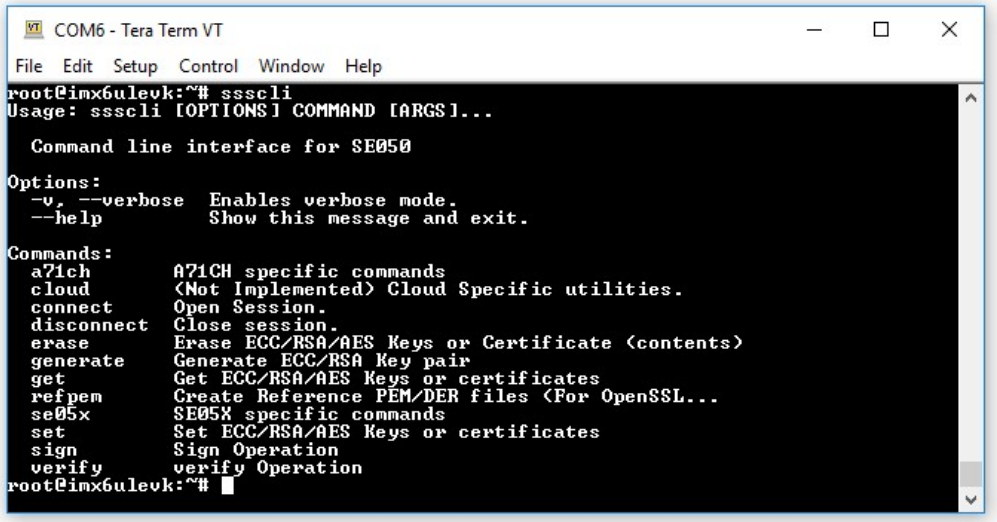


Figure 17. ssscli info

4. Once you are done using the ssscli tool, close the session with SE050 security IC:
(Figure 18) Send: > `ssscli disconnect`

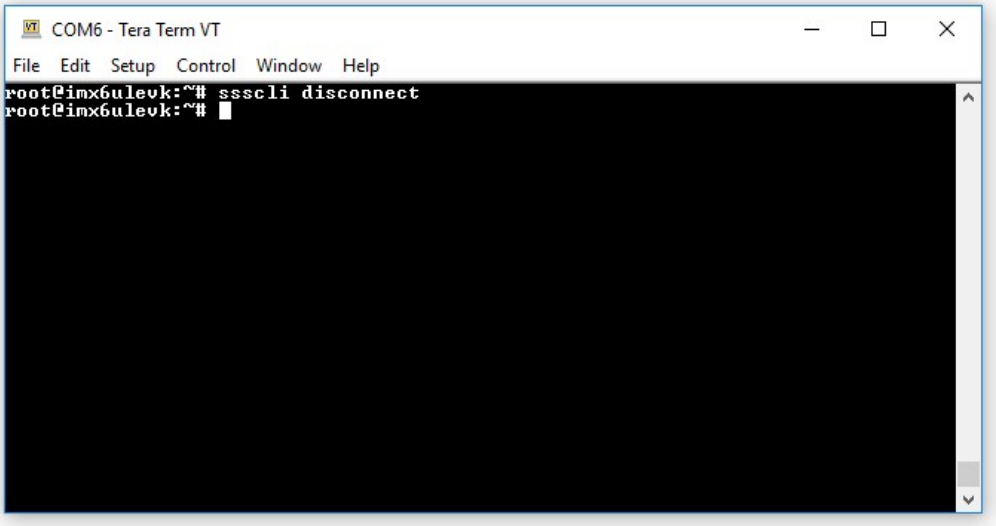


Figure 18. ssscli disconnect

If you have reached this point, the `ssscli` tool is working as expected in your machine.

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