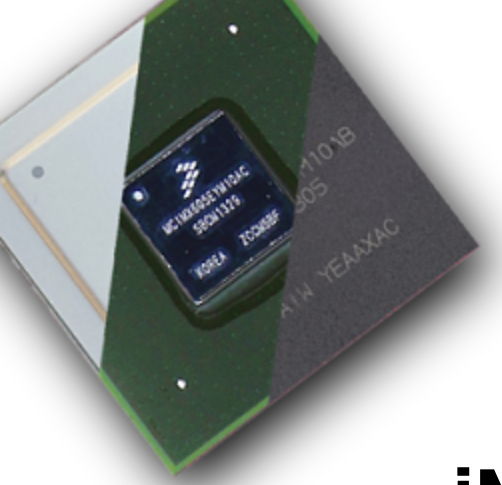
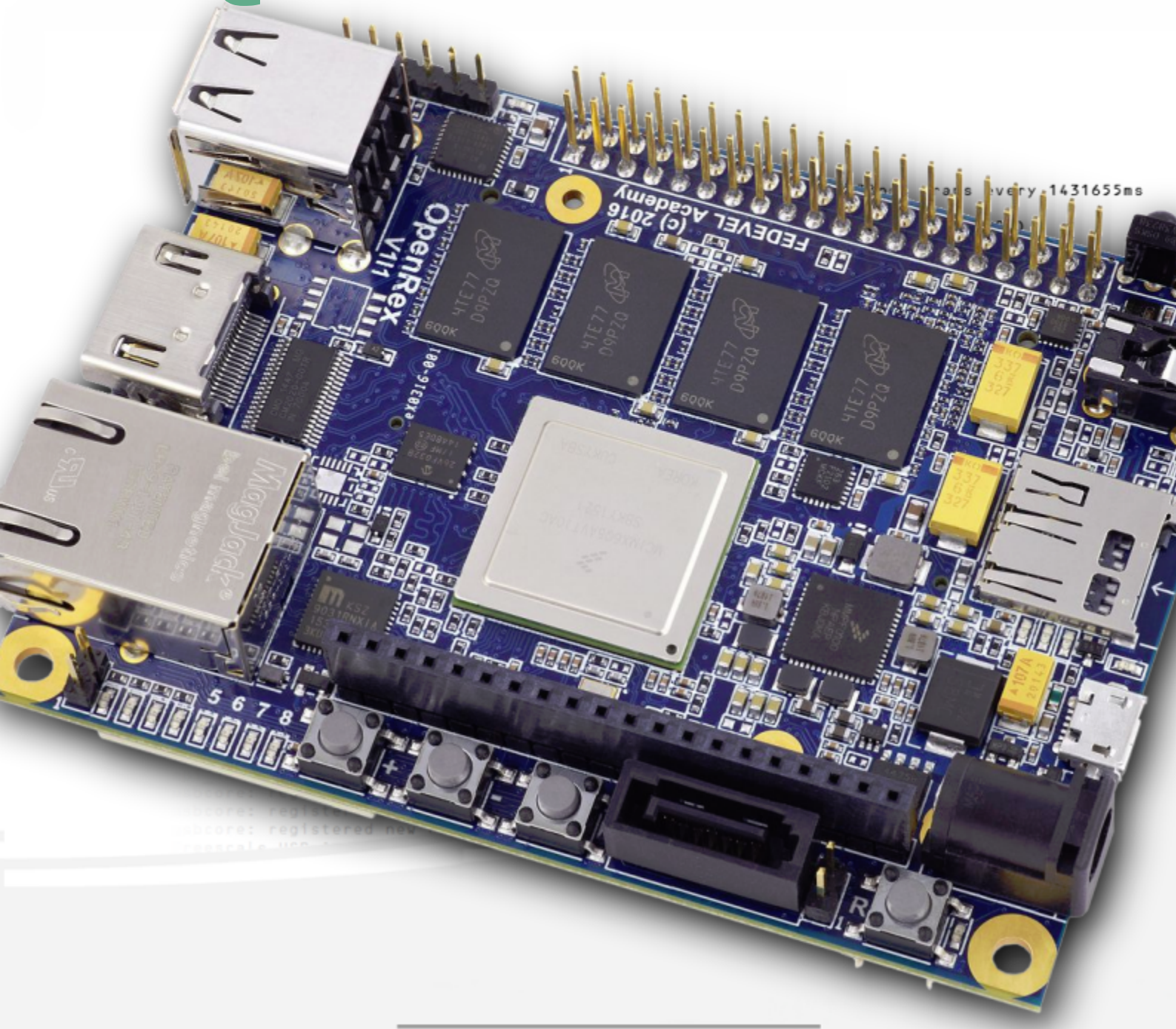


iMX6 OpenRex SBC

QUICK GUIDE



voipac

Last updated: June 26, 2017

About Voipac iMX6 OpenRex Single Board Computer (SBC)

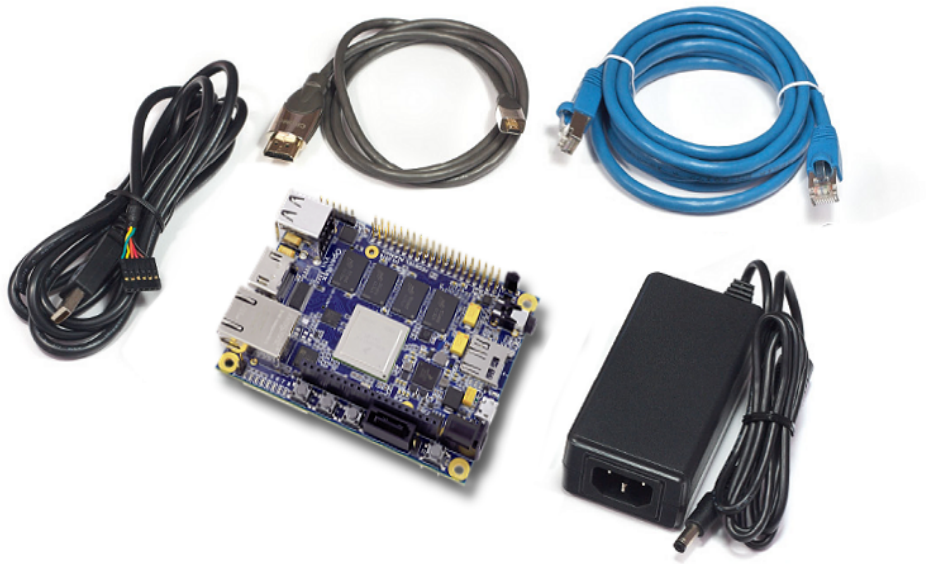
iMX6 OpenRex Single Board Computer (SBC) a **completely open source** SBC powered by NXP/Freescale i.MX6 ARM® Cortex® A9 multicore CPU. The board further features NXP LPC1345 ARM® Cortex® M3 microcontroller, multiple camera inputs, and a series of built-in sensors including compass & accelerometer, gyroscope, humidity sensor, and temperature sensor making it ideal choice for industrial as well as home automation applications.

It was designed also for playing, learning and hacking thus includes also Raspberry Pi & Arduino like GPIO headers.

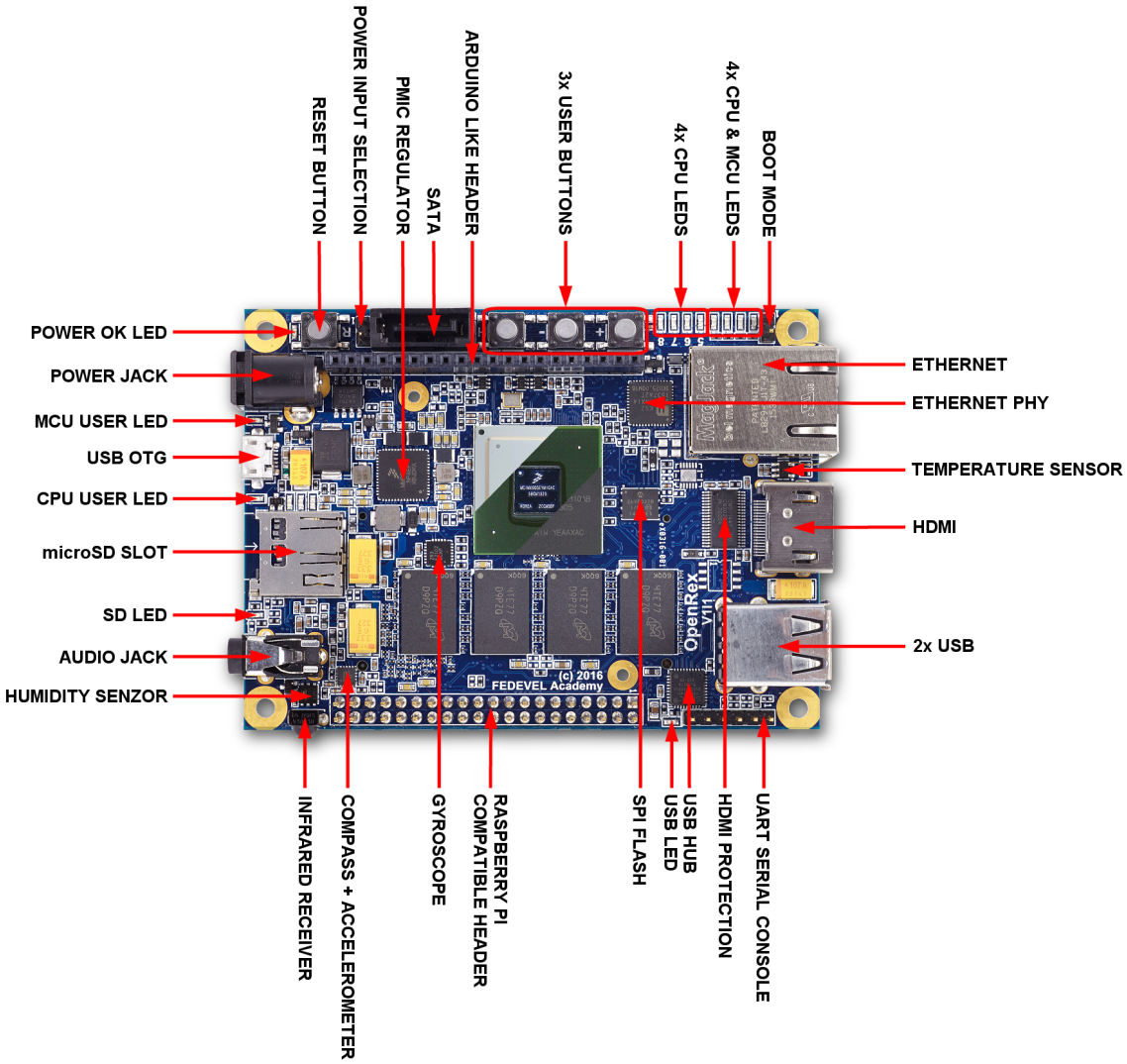
This Quick Guide shows, how to flash the board using MfgTool program, load Yocto Project Linux image on microSD card using USB writer. Programs run under Windows XP/7/8/10. More information available at: **imx6 openrex at wiki.voipac.com**.

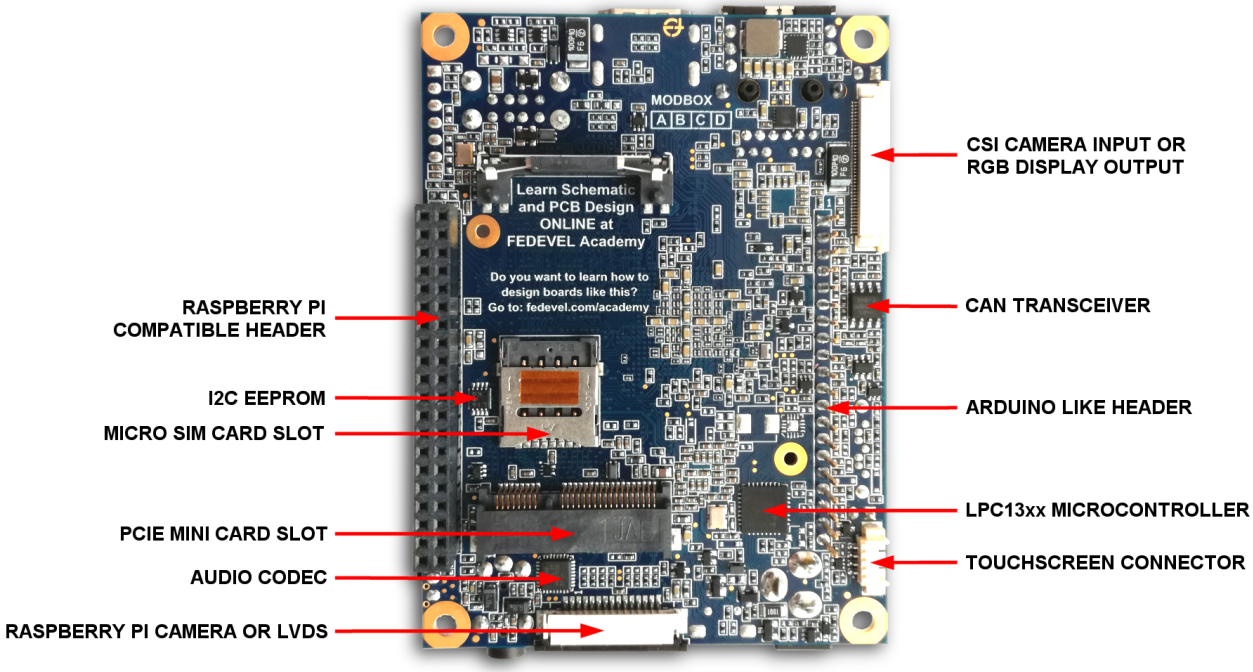
Packing List

COMPONENTS	QUANTITY
iMX6 OpenRex Single Board Computer	1
8GB microSDHC Class 4 memory card	1
Aluminum 35 x 35 x 10mm heatsink	1
TTL-232R-3V3 cable (Optional)	1
HDMI High Speed CAT.2 cable with Ethernet (Optional)	1
SFTP CAT.6 Patch Ethernet cable (Optional)	1
5V Power supply (Optional)	1
Quick Guide brochure	1
Yocto Project Linux OS preinstalled. **(Android 7.1 preinstalled upon request)**	



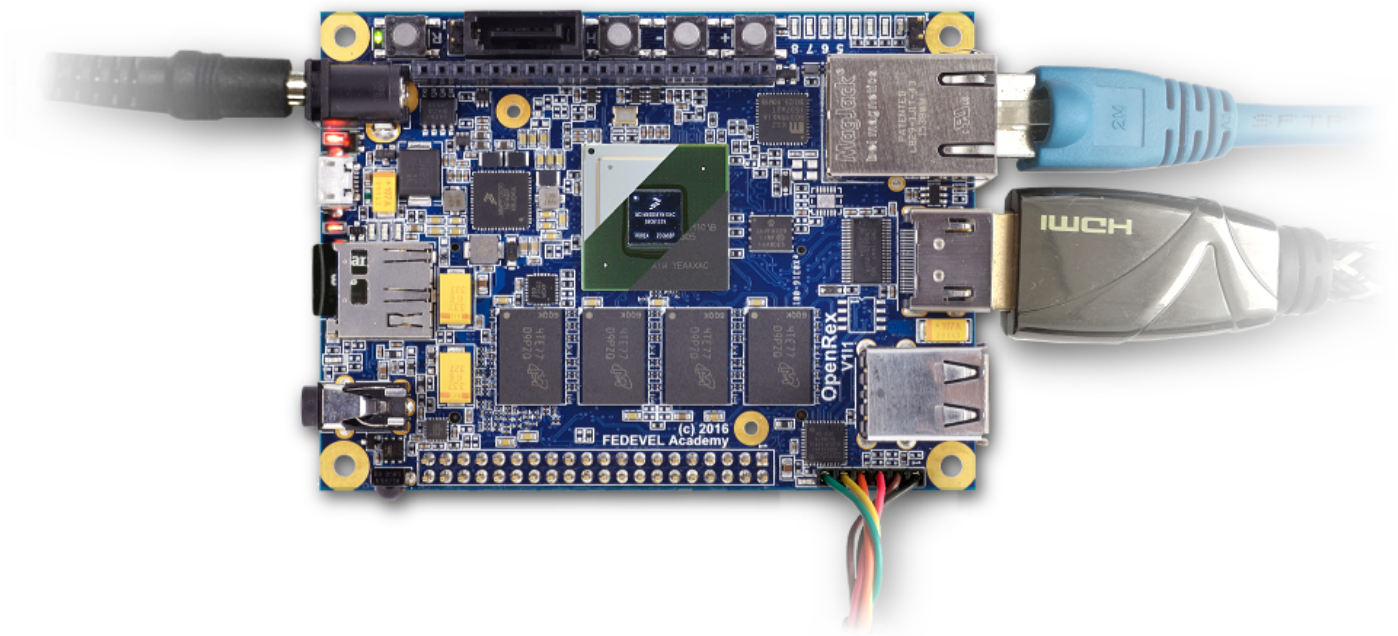
Connectors Locations



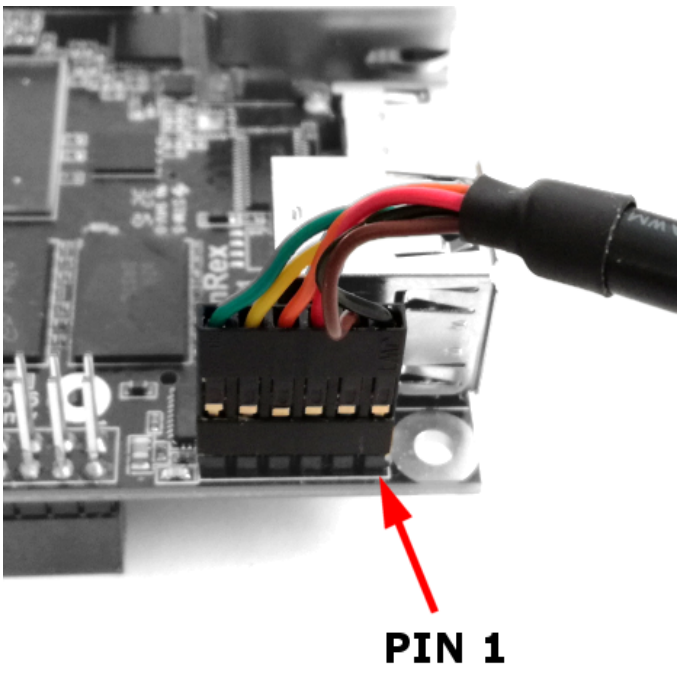


Connecting the components and cables

Prepare iMX6 OpenRex SBC and plug in (bootable) microSD card, TTL-232R-3V3 FTDI cable, Ethernet cable, HDMI cable and other devices or interfaces you need. Plug the power supply connector in.



IMPORTANT! Be careful when connecting TTL-232R FTDI cable to the board. Check if the cable conductor 1 (black wire) is connected to Pin 1 (Header connector J3 – TTL-232R FTDI) on the board.



To boot from microSD Card, make sure that BOOT_MODE jumper is not present.

The First Steps

Voipac iMX6 OpenRex SBC is supplied with bootloader and Yocto Project Linux distribution preinstalled on microSD card by default. The SBC can be controlled over:

Controlling iMX6 OpenRex SBC over serial line

Recommended HW:

a) PC with USB port
b) Voipac iMX6 OpenRex SBC
c) TTL-232R-3V3 (FTDI) cable

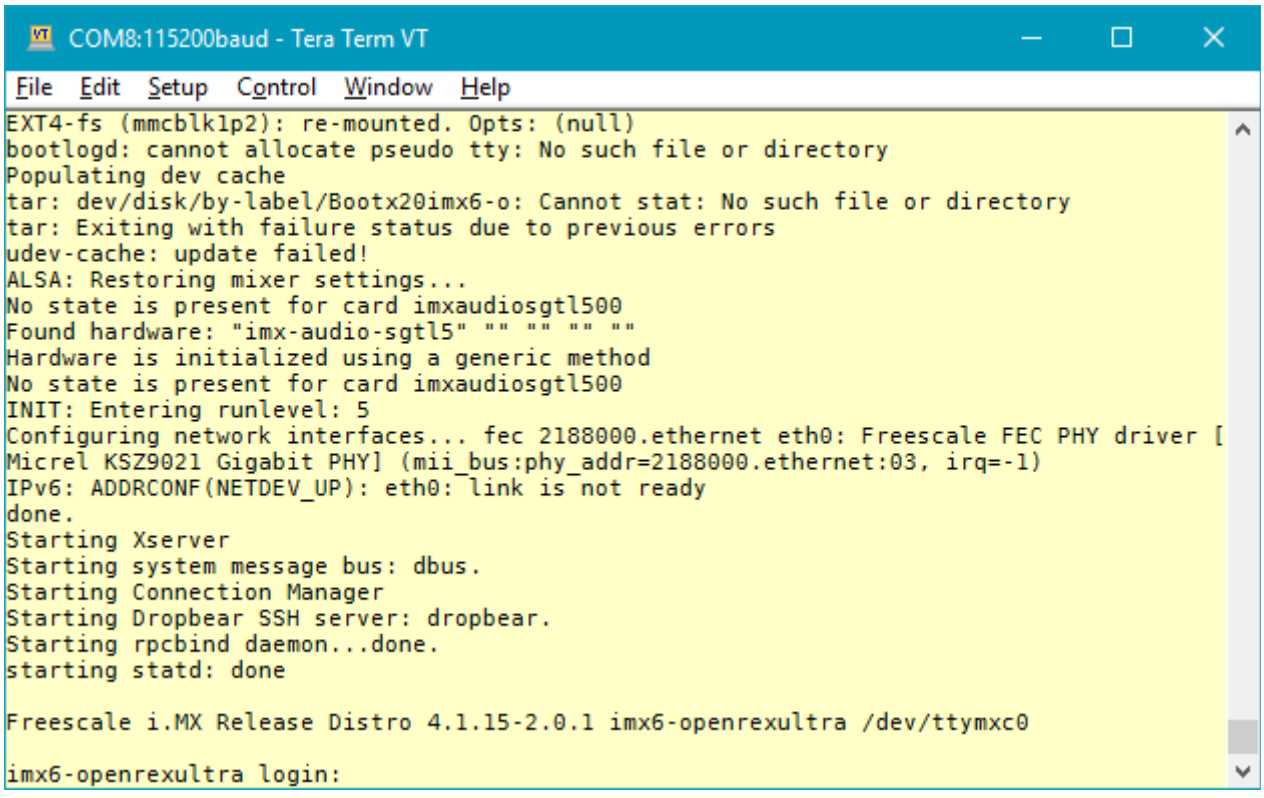
Recommended SW:

Serial line terminal (PUTTY, Minicom, Ckermit, Hyperterminal, TeraTerm, ...)

Default serial port settings:

Speed (baud):	**115200**
Data bits:	**8**
Stop bits:	**1**
Parity:	**None**
Flow control:	**None**

Controlling iMX6 OpenRex SBC using TeraTerm



Using external monitor and USB keyboard

Recommended HW:

a) External monitor with HDMI connector (HDMI to VGA adapter is required for VGA monitor)
b) Voipac iMX6 OpenRex SBC
c) HDMI High Speed cable
d) USB keyboard and USB mouse

Controlling the SBC using external monitor and USB keyboard

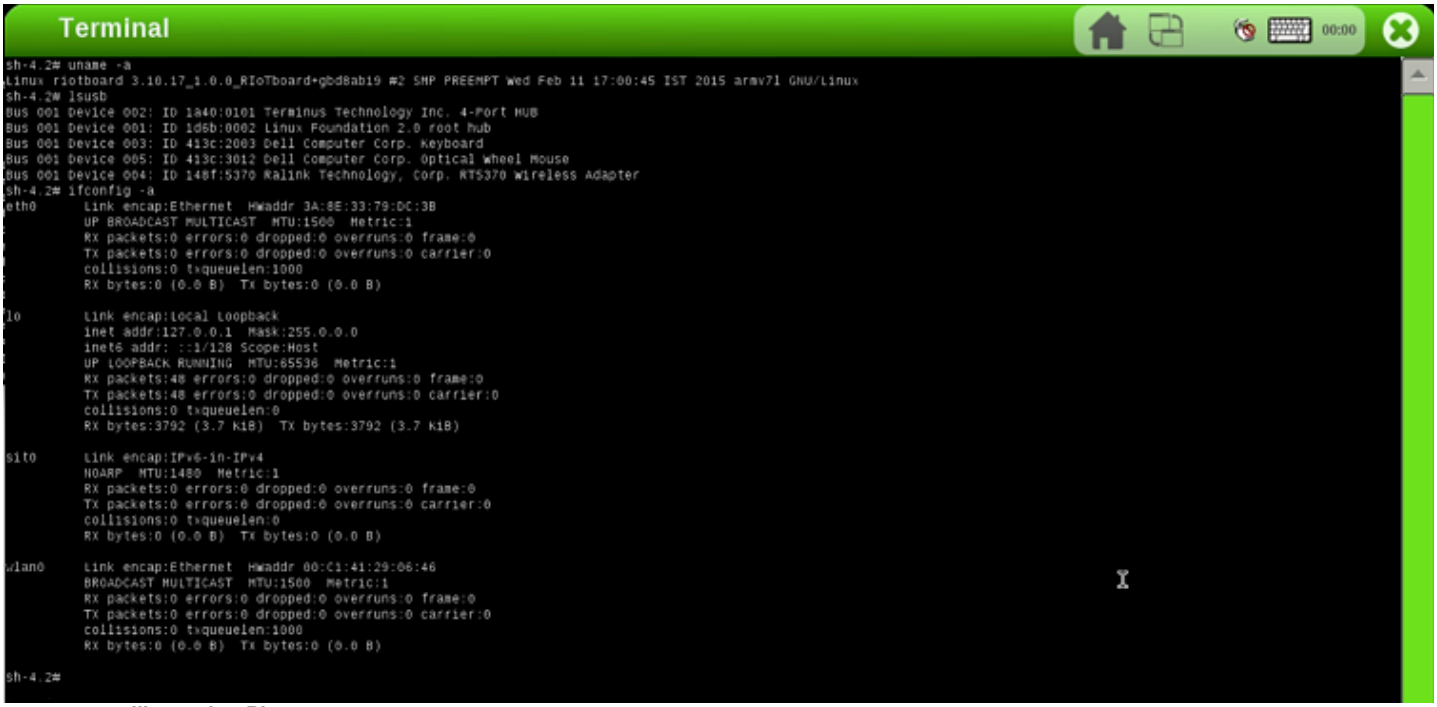


Illustration Photo

Controlling iMX6 OpenRex SBC over Ethernet (telnet, ssh, ftp, sftp)

Recommended HW:

a) PC with Ethernet
b) Voipac iMX6 OpenRex SBC
c) Ethernet cable

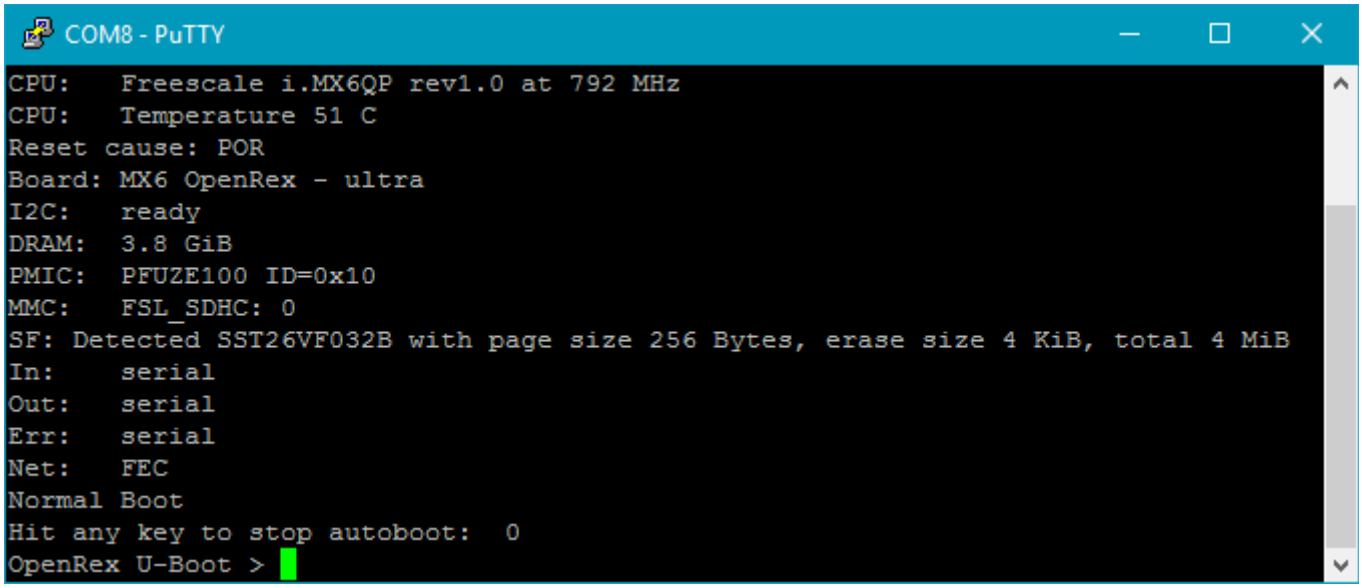
Recommended SW:

- Telnet client (Telnet, PUTTY, …)
- SSH client (SSH,PUTTY, …)
- FTP client (FTP, Filezilla, BareFTP, …)
- SFTP client (Filezilla, PUTTY, WinSCP, …)

IMPORTANT!
iMX6 OpenRex SBC is shipped with empty password.
Login is: `root`
The default IP address is dynamic and setup by your dhcp server upon boot.

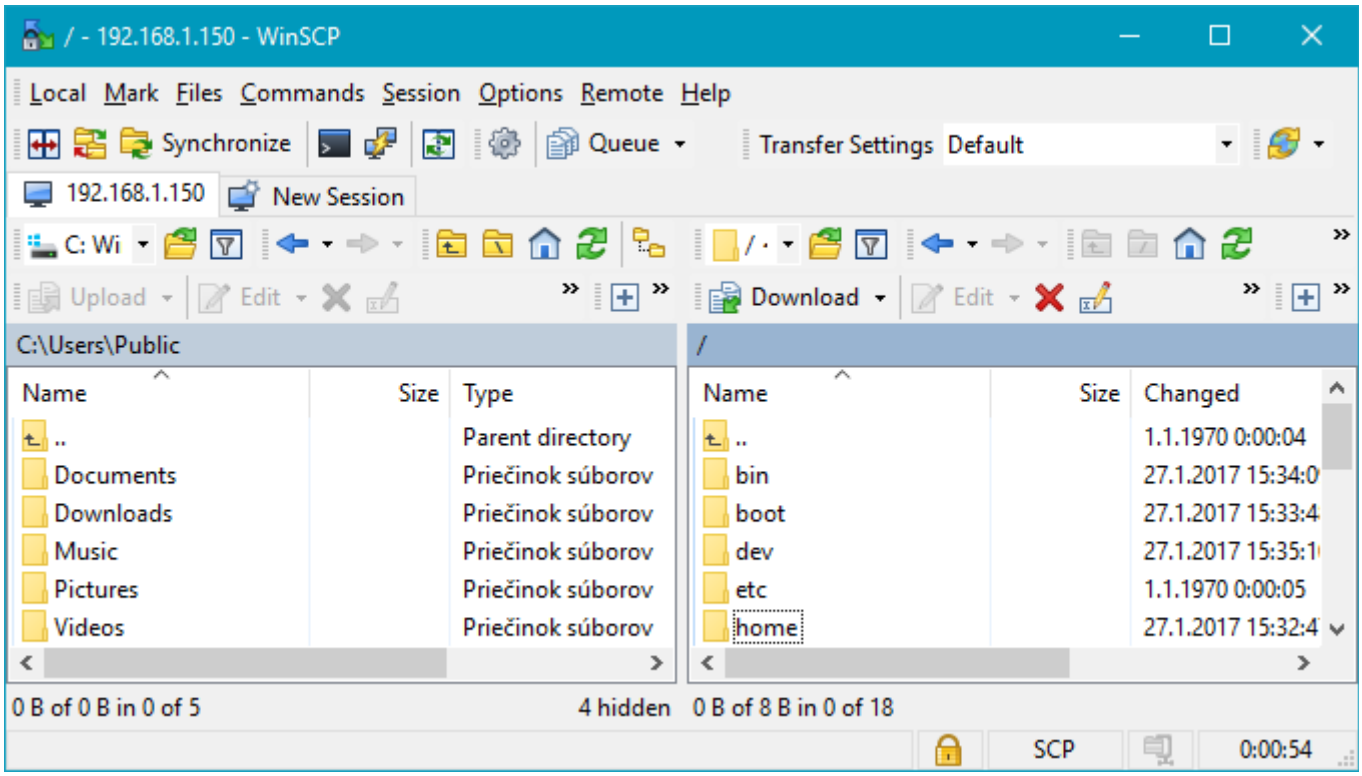
SSH, SFTP require root password to be set up. (“passwd” command)
FTP, SFTP are recommended only for data transfers. (binary mode is recommended)

Controlling iMX6 OpenRex SBC using PUTTY connected to Serial Line.



Controlling iMX6 OpenRex SBC using PUTTY SSH client.

Controlling iMX6 OpenRex SBC using WinSCP.



MfgTool for booting by USB OTG

MfgTool

U-boot is a bootloader responsible for hardware initialization, loading and booting linux kernel. It is also used for module flashing. Following example is for iMX6 OpenRex SBC in Ultra configuration.

Recommended HW:

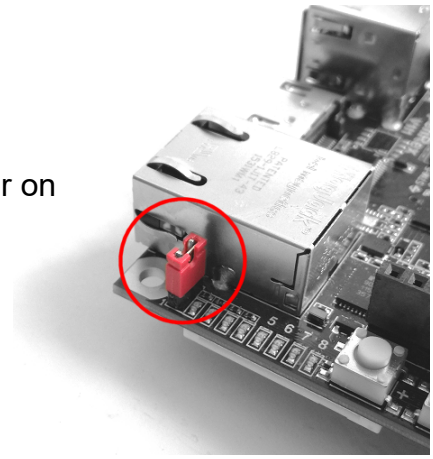
a) PC with USB port
b) Voipac iMX6 OpenRex SBC
c) USB to Micro-USB cable

Recommended SW:

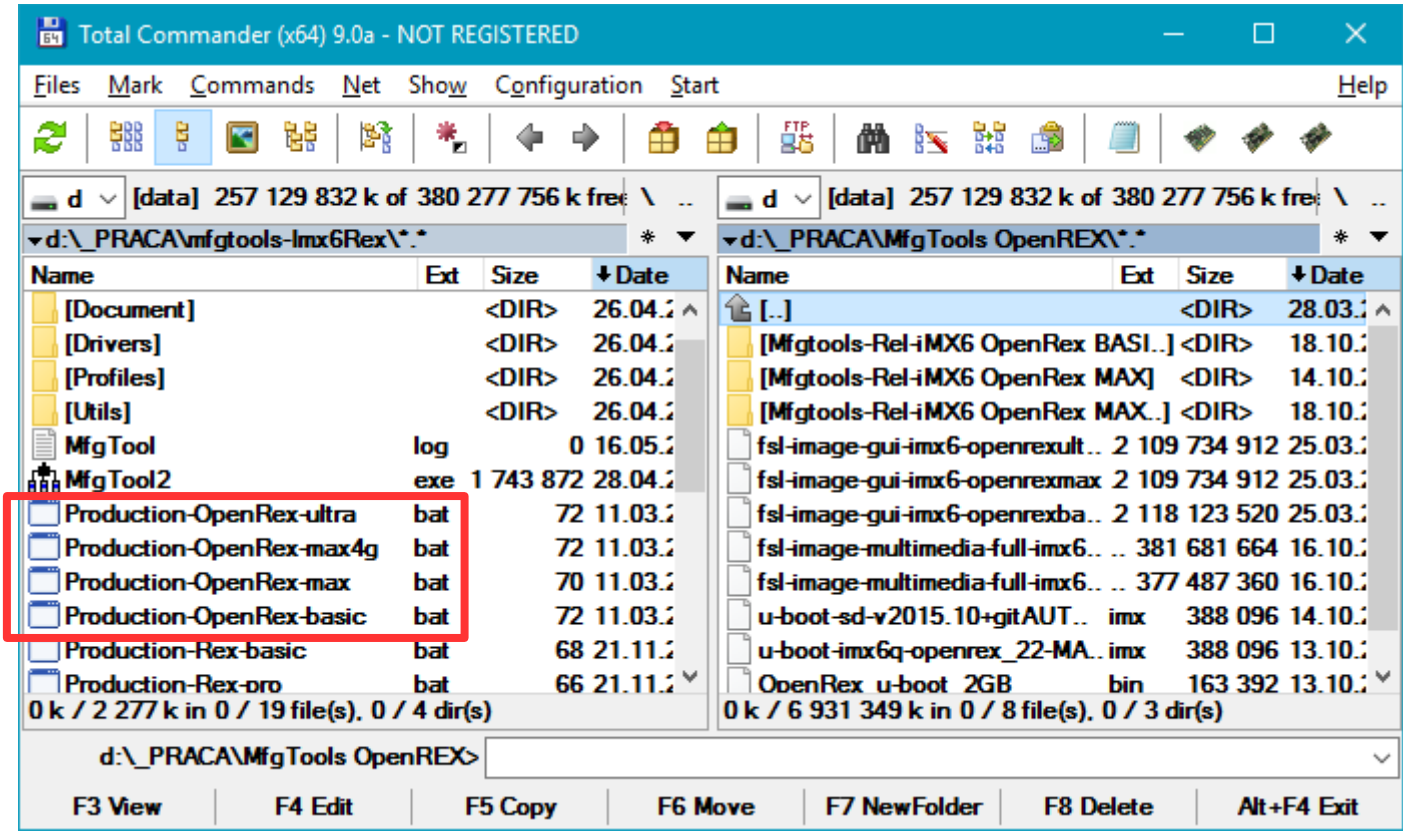
- MfgTool
- Serial line terminal

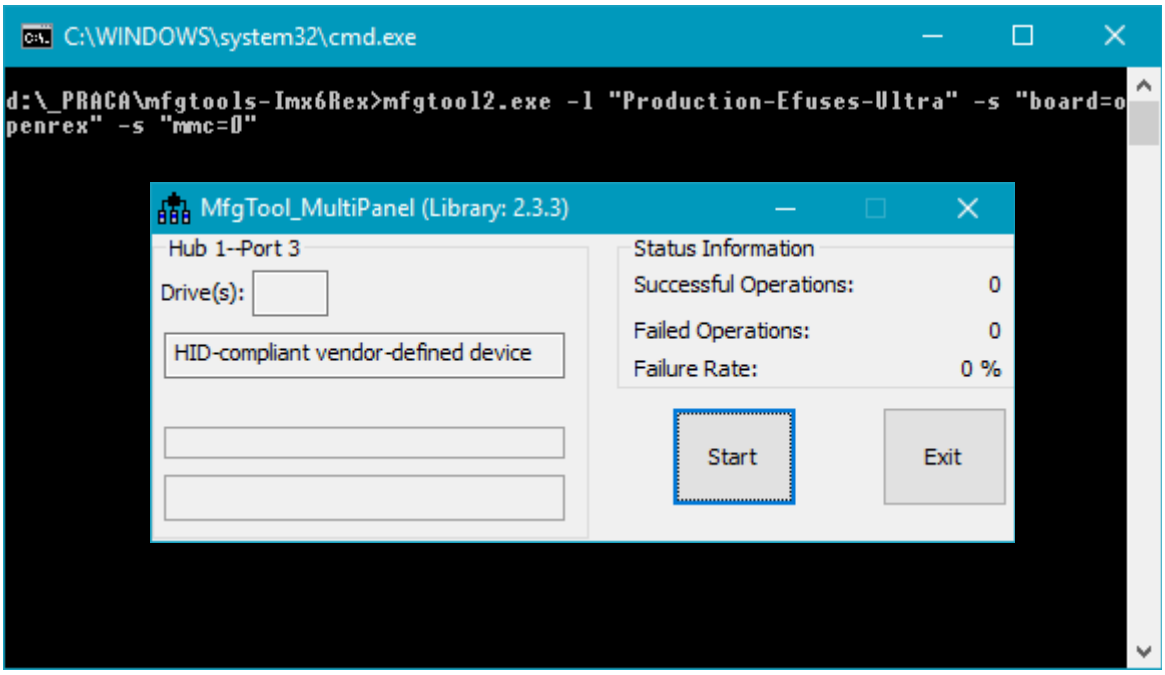
1 STEP Connect USB cable to USB port on your computer and OpenRex SBC USB OTG port.

2 STEP Short BOOT_MODE jumper JP2 on OpenRex SBC and Power on the board.

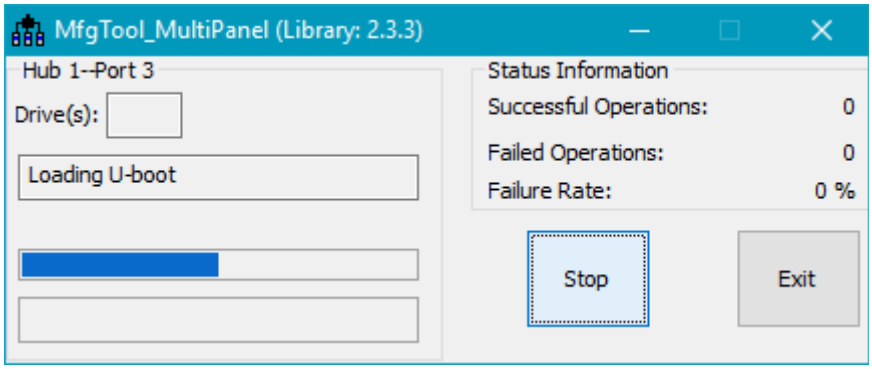


3 STEP Execute Manufacturing toolkit at host PC. Open an appropriate BAT file.

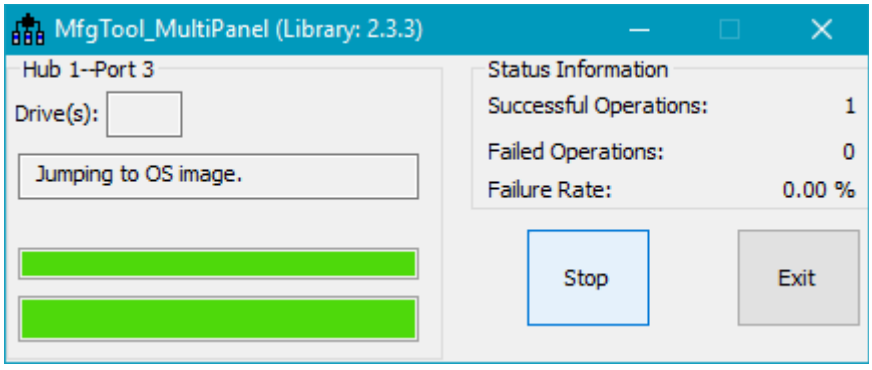


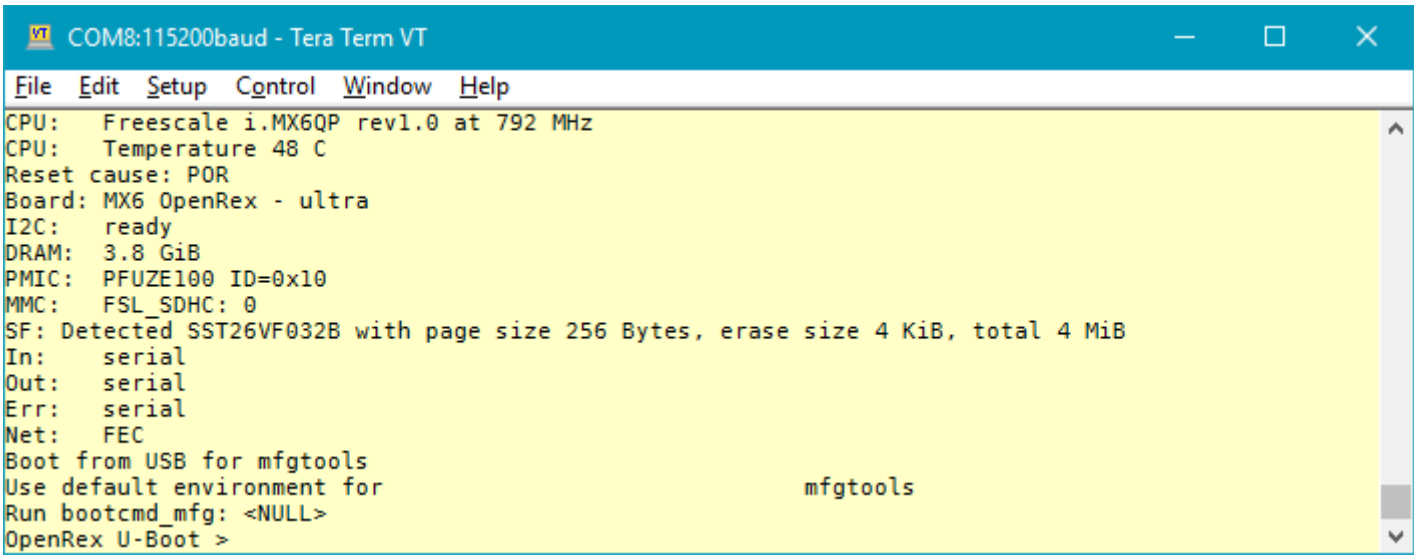


4 STEP Press Start button (iMX6 OpenRex SBC will boot firmware loaded over USB OTG).



5 STEP Wait until firmware (u-boot) is booted (serial terminal).





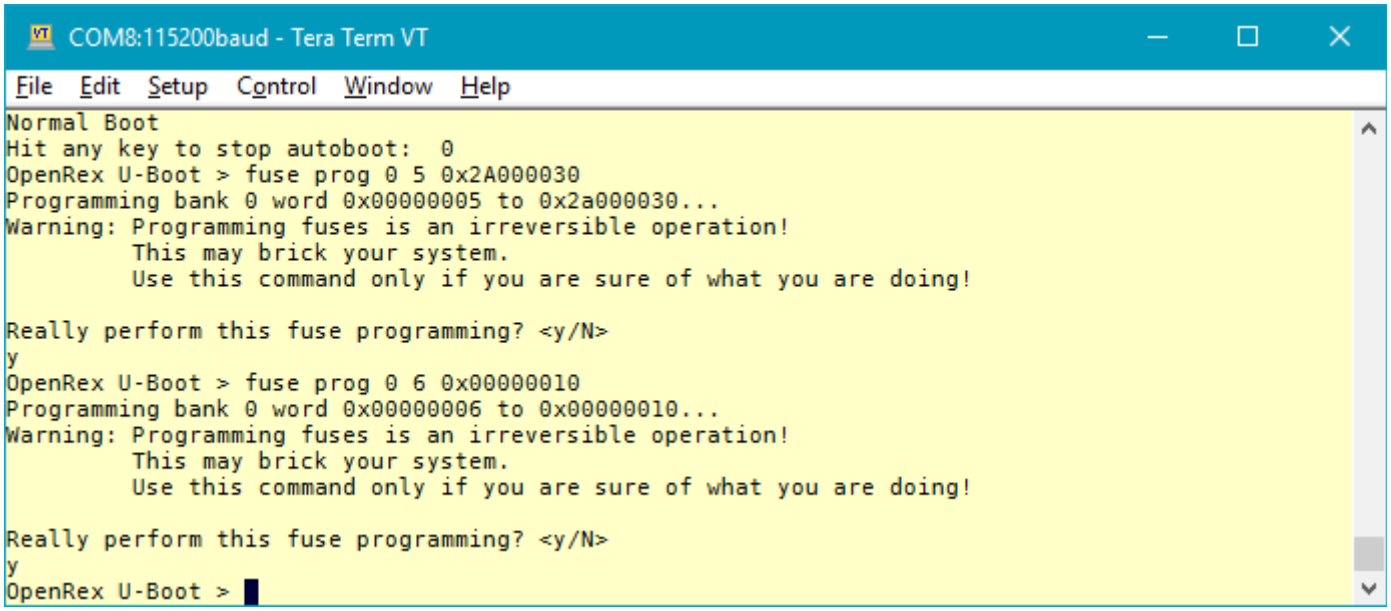
6 STEP Burn efuses over serial terminal. **Only for "VIRGIN" OpenRex SBC !**

Efuses Boot From SPI:

```
fuse prog 0 5 0x2A000030
fuse prog 0 6 0x00000010
```

MAC Address (For example 00:0D:15:00:D1:75)**:**

```
fuse prog 4 3 0x000d
fuse prog 4 2 0x1500d175
```



This operation is not reversible and should be executed carefully. The iMX6 OpenRex SBC must be replaced in the case of error.

BE AWARE THAT E-FUSES PROGRAMING IS A NON REVERSAL PROCESS ! WARRANTY CLAIM CAUSED BY IMPROPER E-FUSES PROGRAMMING WILL NOT BE ACCEPTED !

7 STEP Power off iMX6 OpenRex SBC.

8 STEP Remove BOOT_MODE jumper.

SPI Bootloader

How to flash SPI bootloader (u-boot-imx6-openrex.imx)*

This part of QuickGuide shows how to flash u-boot and configure the module to run, in addition to the SD card, from iMX6 OpenRex SBC SPI flash. Updating of existing modules with burned efuses possible.

Recommended HW:

a) PC with USB port
b) Voipac iMX6 OpenRex SBC
c) USB to Micro-USB cable

Recommended SW:

- MfgTool (only for “VIRGIN” modules)
- Serial line terminal
- Appropriate files

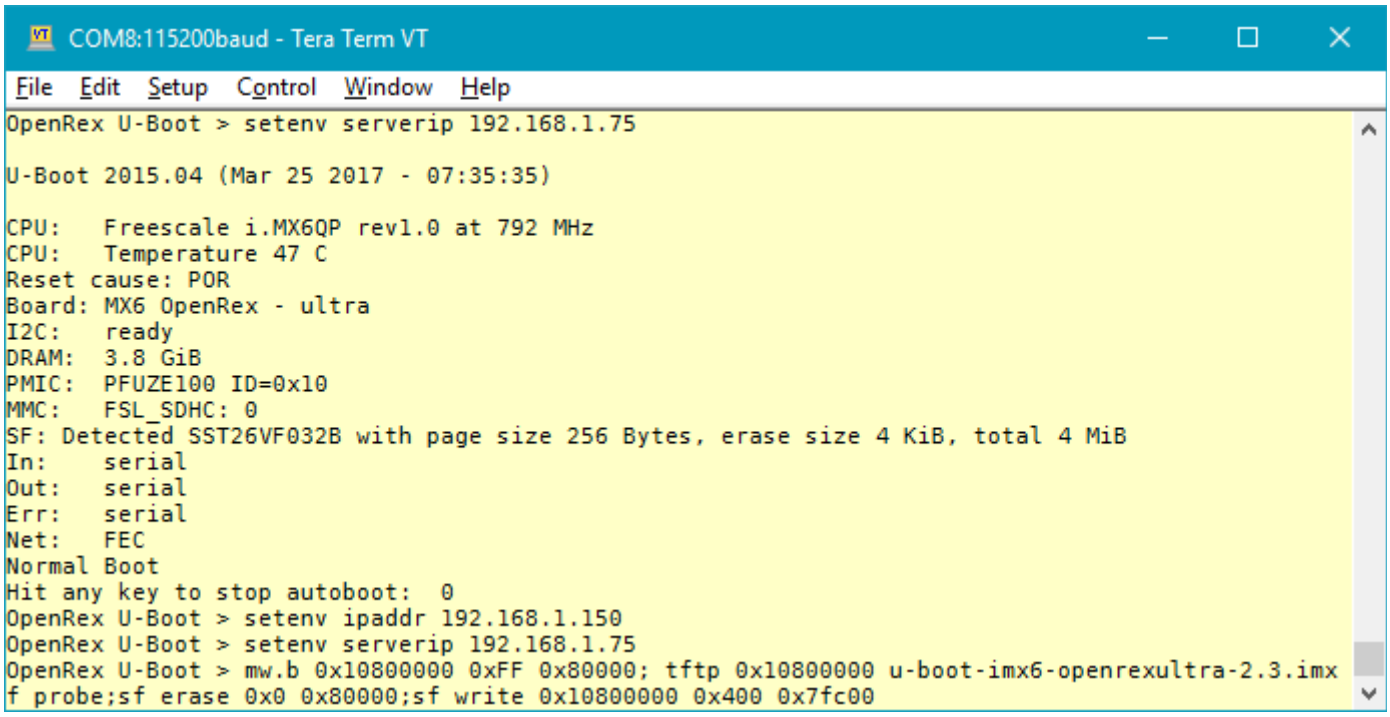
*** Select appropriate file for specified configuration:**

– iMX6 OpenRex SBC Ultra:	u-boot-imx6-openrexultra.imx
– iMX6 OpenRex SBC Max:	u-boot-imx6-openrexmax.imx
– iMX6 OpenRex SBC Basic:	u-boot-imx6-openrexbasic.imx

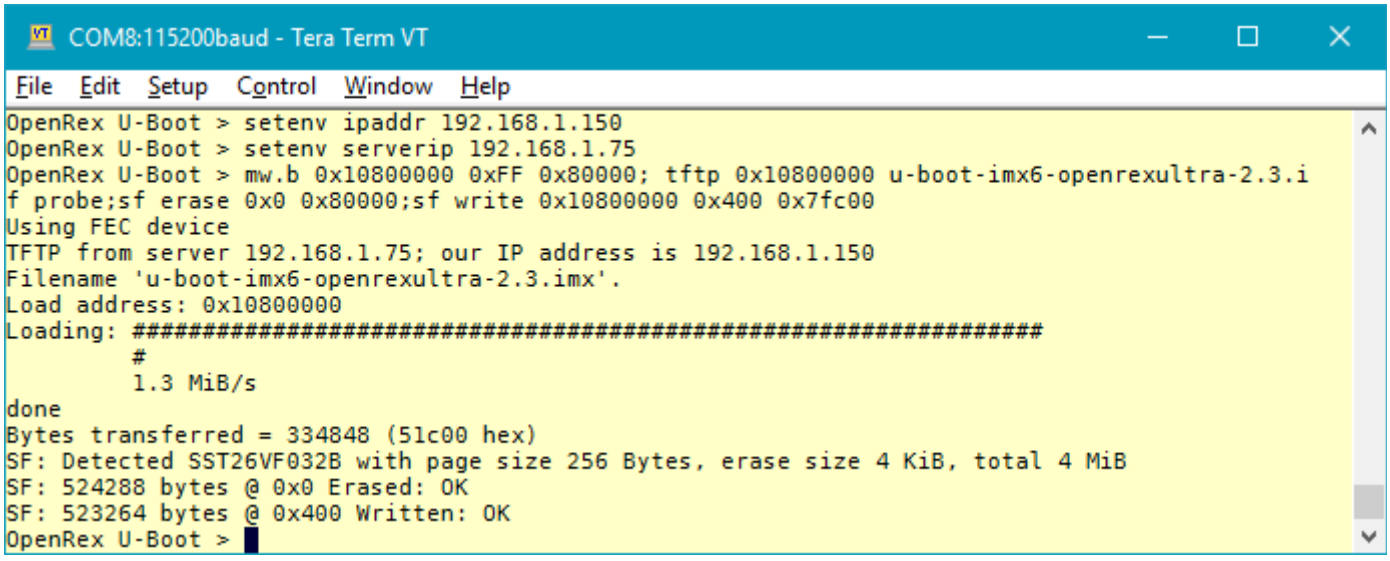
1 STEP Open MfgTool appropriate .bat file to load bootloader over USB OTG port. Use this step only for “VIRGIN” SBC as described in the above MfgTool Chapter of this document.

2 STEP Stop autoboot in your serial line terminal. Type or paste commands separately to download appropriate bootloader file from TFTP server where the bootloader file is located. Following example is for iMX6 OpenRex SBC in Ultra configuration.

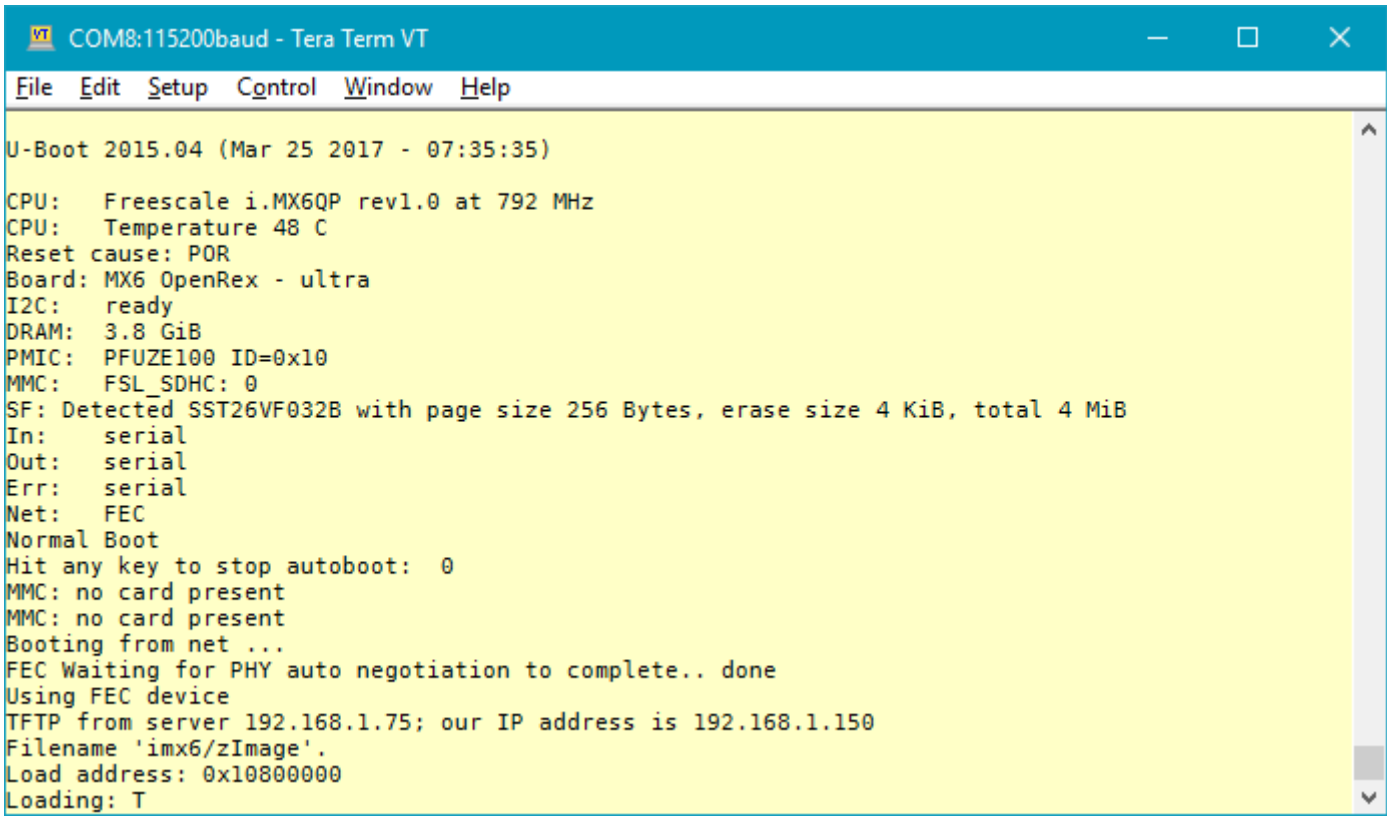
```
setenv ipaddr 192.168.1.150
setenv serverip 192.168.1.75
mw.b 0x10800000 0xFF 0x80000
tftp 0x10800000 u-boot-imx6-openrexultra-2.3.imx; sf probe;sf erase 0x0 0x80000
sf write 0x10800000 0x400 0x7fc00
```

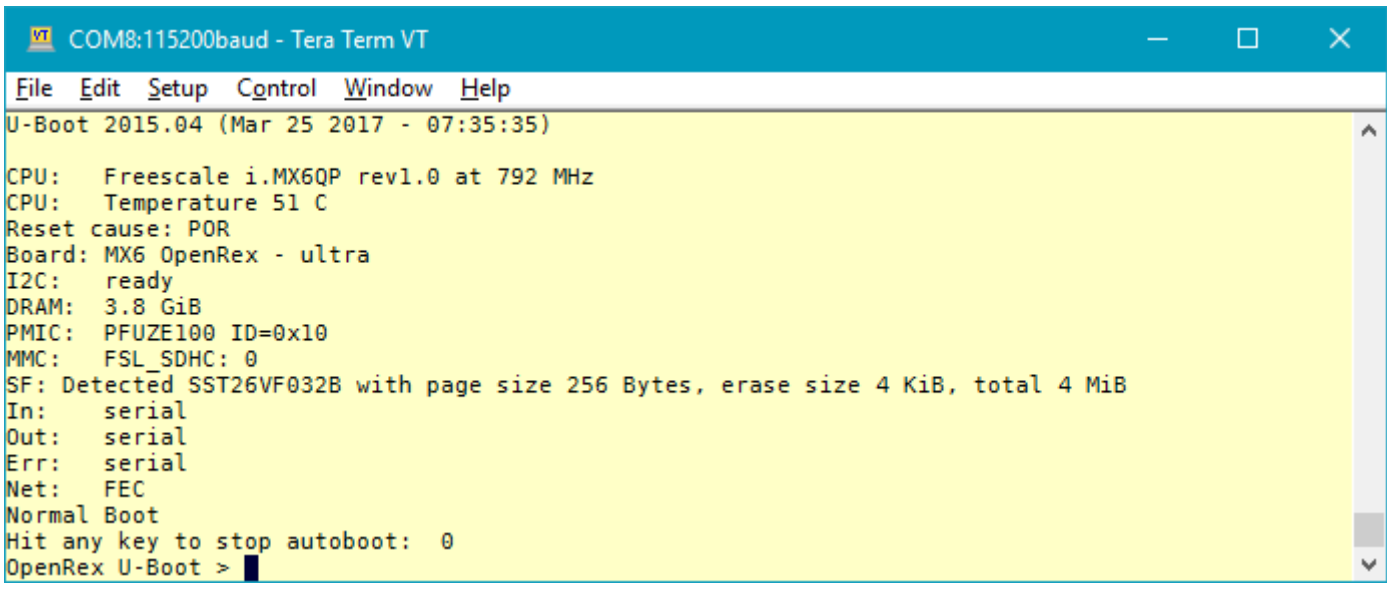


The bootloader is written to iMX6 OpenRex SBC SPI Flash after automatic download from the TFTP Server.



3 STEP Reset the board. iMX6 OpenRex SBC will start booting from SPI Flash. The bootloader will defaultly start to download Image from TFTP Server. To change bootloader environment, stop autobooting.





Creating Bootable microSD card

USB Writer

Following example is for iMX6 OpenRex SBC in Ultra configuration.

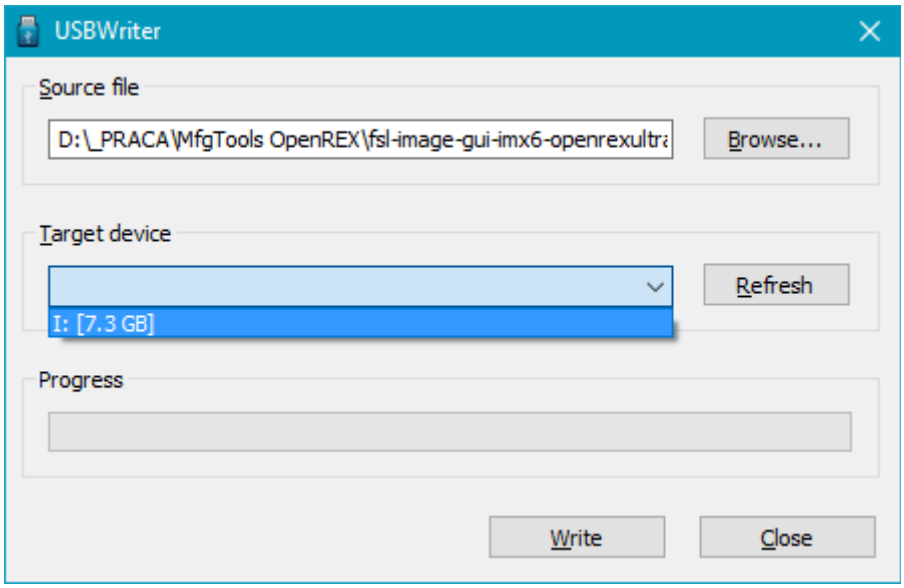
Recommended HW:

a) PC with microSD port
b) microSD card

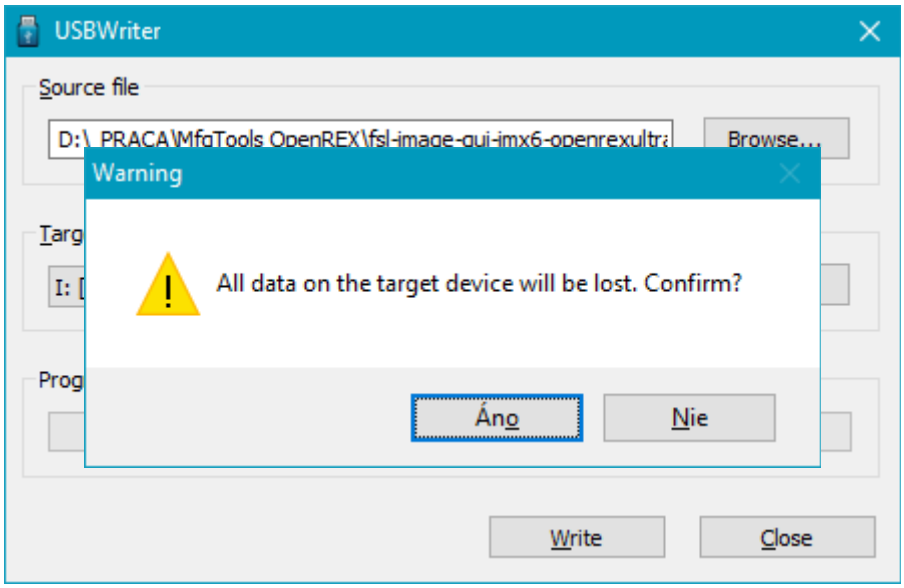
Recommended SW:

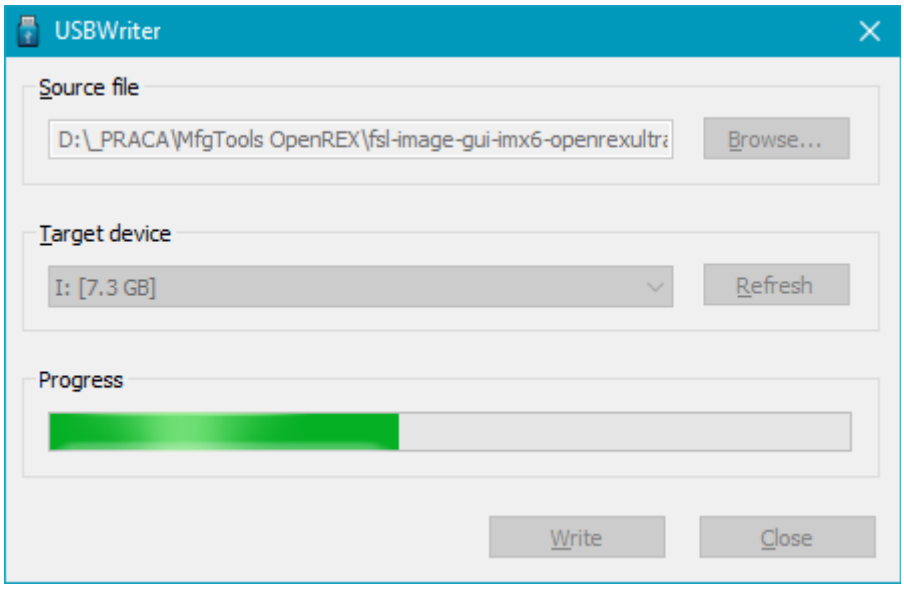
- USBWriter
- Appropriate Image files

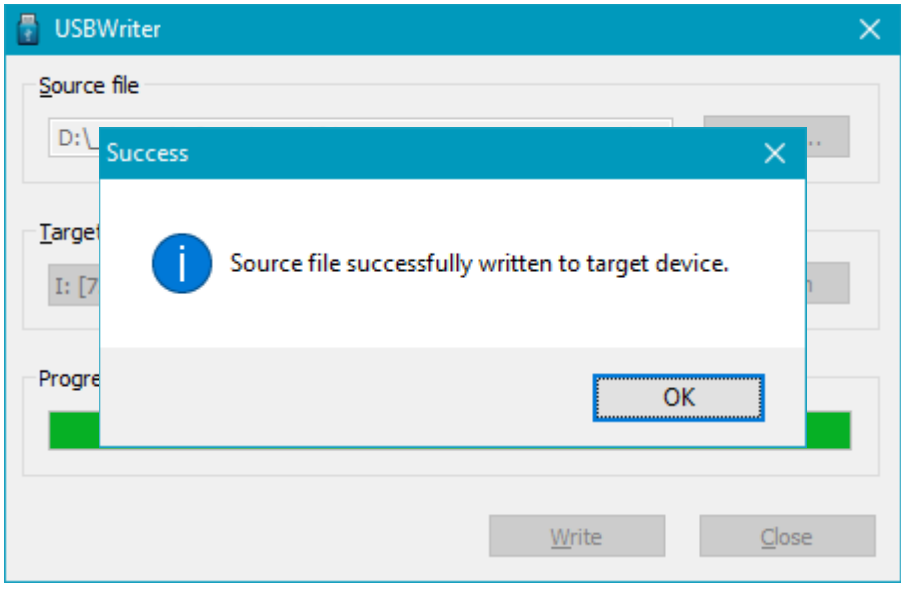
1 STEP Open USBWriter. Browse source file (appropriate fsl-image). Select target device.



2 STEP Click on Write button and confirm a procedure.







Bootable microSD Card is now created and prepared for use.

Notes

Important and Usefull Information

Products` Life Cycle Phase

Voipac products are divided into 4 phases:

- **INTRODUCTION PHASE**, **approximately the first 6-12 months.**
  The last software issues are still being resolved.
  Product in this stage is the most suitable for new designs.

- **ACTIVE PHASE**, **the first 1-3 years following the product introduction.**
  Product software packages are stable, additional functions, OS and GUI are being released.
  Product in this stage is suitable for new designs.

- **MATURITY PHASE**, **approximately the first 4-6 years after the introduction.**
  Products are shipped in volumes, additional functions additions declines.
  Product in this stage is no longer recommended for new designs.

- **EOL PHASE**, **approximately 7-10 years after the introduction.**
  Used components availability decreases, although product may still be purchased under specific circumstances.
  The Last Time Buy notification is send to all product users app. 6 months prior to product discontinuation.
  Components stocking service for discontinued products and manufacturing of further production batches is available.

To find out the specific product life cycle phase, visit its product page and check the title color.

CE compliance of Voipac products

The CE label is a mandatory conformity mark for complex electronic devices placed on the market in the European Economic Area and each product sold within the EU needs a CE Certificate of Conformance that ensures that the product conforms to the essential requirements of the applicable EC directives.

However, if such complex electronic devices are produced for further processing by the industry, skilled development teams or system integrators, they do not need to observe the above mentioned CE requirements and consequently do not need any identification either. This applies to the Voipac Computers On Module (COM) and Single Board Computers (SBC), because these are not used as stand-alone devices by the general public.

To make sure that Voipac COMs and SBCs can be used in CE marked devices, they are designed to obey the EC directives and the standard configuration COMs and SBCs manufactured by Voipac are tested for Electromagnetic Interference and operating temperature ranges.

TECHNICAL SUPPORT

HW & SW support: support@voipac.com
Warranty claims: warranty.claim@voipac.com

All of the relevant communication between the customer and Voipac should be executed via e-mails preferably.
Response time is up to 48 hours, except state holidays and weekends.
Voipac working hours are: 8:00 - 17:00, Monday - Friday.

Before contacting support, please read the following for the basic information about how to work with your SBC:
www.voipac.com/#Downloads
http://www.voipac.com/downloads/imx/iMX6_OpenRex/
http://wiki.voipac.com/xwiki/bin/view/imx6+openrex/
http://www.imx6rex.com

We provide paid support for your new designs when it comes to the special drivers for the peripherals not included in the Voipac standard COMs and SBCs, design of your own base boards, prototyping, or even new products development.
Please contact: support@voipac.com for more info.

Warranty:

VOIPAC TECHNOLOGIES s.r.o. Does Not Bear Responsibility for the Following:

- Failure of a product resulting from misuse, accident, modification, unsuitable operating environment, or improper maintenance by user
- Unless otherwise agreed in written, a product does not include technical support and the customer may be able to purchase technical support under separate agreement
- Any technical or other support provided under warranty by VOIPAC TECHNOLOGIES s.r.o. such as assistance, set-up and installation is provided WITHOUT WARRANTY OF ANY KIND.

Disclaimer:

VOIPAC TECHNOLOGIES s.r.o. reserves the right to make changes, without notice, to any product, including circuits and/or software described or contained in this datasheet. VOIPAC TECHNOLOGIES s.r.o. assumes no responsibility or liability for the use of the described product(s), conveys no license or title under any patent, copyright, or mask work rights to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

Trademark Acknowledgment:

Brand and product names are trademarks or registered trademarks of their respective owners.

VOIPAC TECHNOLOGIES s.r.o., M.R. Stefanika 6670/19, 911 01 Trencin, Slovak Republic