

## General Installer User's Guide

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***TechNexion***

INNOVATORS OF TECHNOLOGY

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## 1. Overview

The generic installer can be operated in two modes, automatic or storage.

The first mode is “**automatic mode**”, which installs a pre-programmed image into the eMMC automatically when it boots from SD card. This mode is a deployment solution for mass production.

The other mode is “**storage mode**”, which allows the developer to program the eMMC under Windows or Linux computer via a USB-OTG cable, which is convenient in development stage. When the installer SD card boots the system, it will mount the eMMC as a mass storage device via USB-OTG cable. This way small changes can be deployed without having to reinstall the whole image.

See chapters 6 and 7 for details on how to select between the modes and how prepare an image to be installed in automatic mode.

## **2. Supported Hardware**

These are the systems covered in this guide:

### **System-on-Modules**

- EDM1-CF-IMX6
- EDM1-IMX6P
- EDM1-IMX6PLUS
- EDM1-CF-IMX6SX
- PICO-IMX6
- PICO-IMX6POP
- PICO-IMX6UL-EMMC
- PICO-IMX6UL-NAND
- PICO-IMX7D

### **Carrier Boards**

- EDM1-FAIRY
- EDM1-GOBLIN
- EDM2-ELF
- PICO-DWARF
- PICO-HOBBIT
- PICO-NYMPH
- PICO-PI

### **Fanless Computing**

- TEK3-IMX6
- TEK3-IMX6UL

### **Panel Computing**

- TEP-0500/TEP-0700 -IMX6UL
- TEP-0500/TEP-0700 -IMX7
- TEP-1010/TEP1560 -IMX6
- TC-07x0/TC-1000

### 3. Downloading the Installer Image

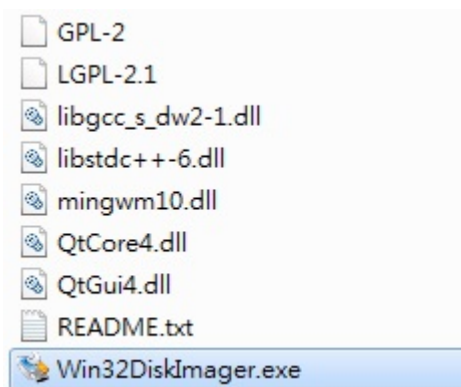
Please visit Technexion download page:

[ftp://ftp.technexion.net/development\\_resources/development\\_tools/installer/](ftp://ftp.technexion.net/development_resources/development_tools/installer/)

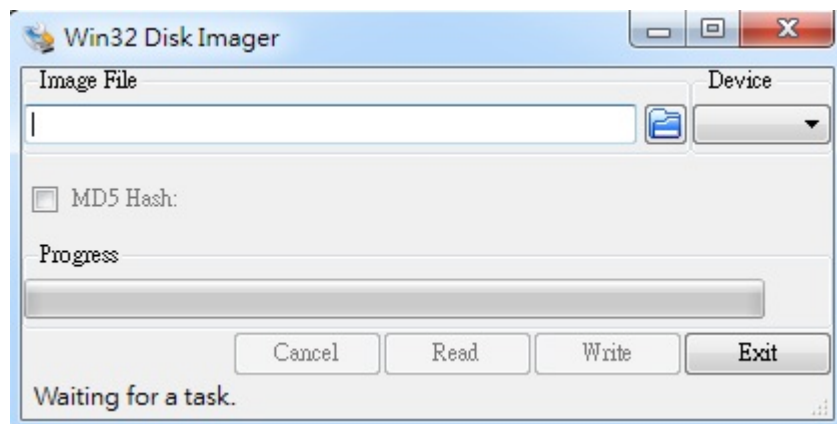
### 4. Flashing the Image into SD Card

**If your PC runs Windows OS:**

Please unzip the win32diskimager.zip:



Execute **Win32DiskImager.exe**.



Prepare a microSD card. Insert this microSD card into the card reader of PC.

Choose microSD you insert as “Device”.

Select the “**edml-cf-imx6** **edml-fairy\_generic-installer\_hdmi\_xxx.img**” as “Image File”.

Then, press “Write”. **Win32DiskImager** will flash yocto installer image into microSD card.

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### If your PC runs Ubuntu OS:

Prepare a microSD card. Insert this microSD card into the card reader of PC.

Use 'dd' command to flash yocto installer image into microSD card.

```
$ sudo dd if=edm1-cf-imx6_edm1-fairy_generic-installer_hdmi_xxx.img  
of=/dev/sd<partition> bs=1M && sync
```

Or

Use “imageWriter” tool.

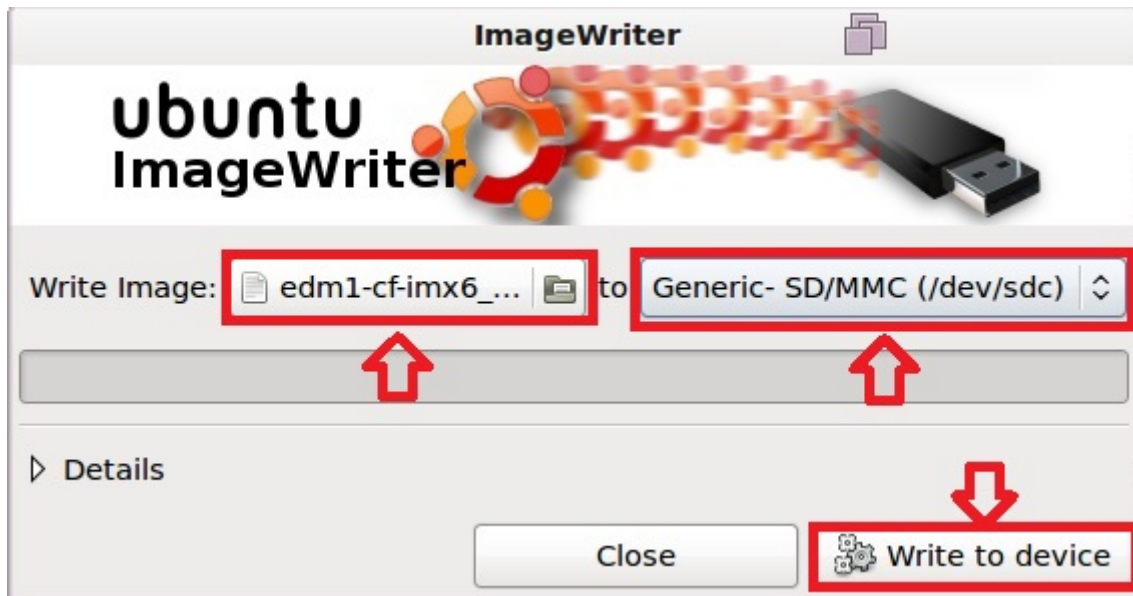
<https://apps.ubuntu.com/cat/applications/precise/usb-imagewriter/>

Install “imageWriter”:

```
sudo apt-get install usb-imagewriter
```

Execute “imageWriter”:

```
sudo imagewriter
```



Choose microSD you insert as “Device”.

Select the “edm1-cf-imx6\_edm1-fairy\_generic-installer\_hdmi\_xxx.img” as “Write Image”.

Then, press “Write to device”. **imagewriter** will flash Yocto installer image into microSD card.

## 5. Set up boot mode to run installer image on target board

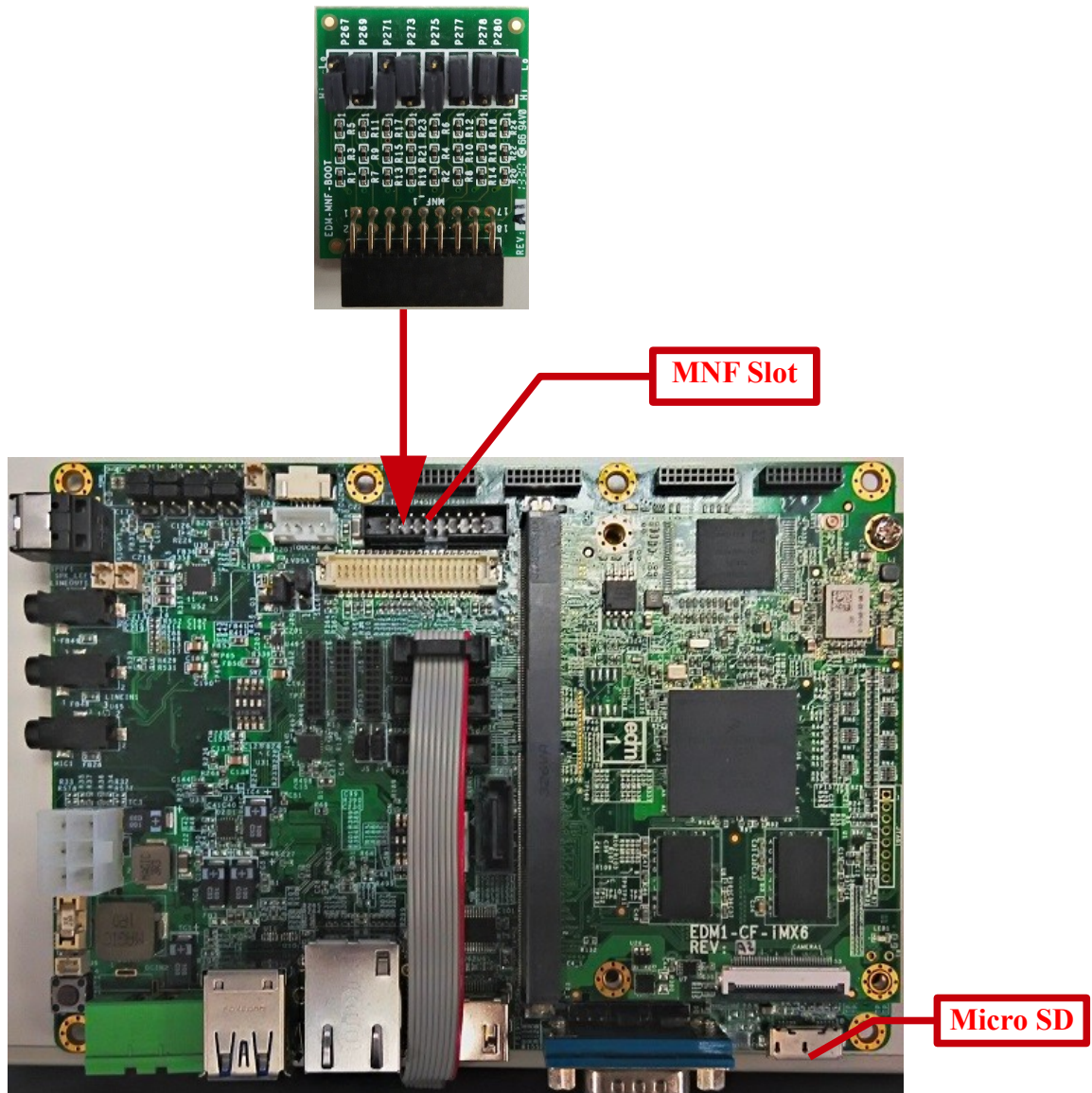
Switch the boot mode to boot from the baseboard SD card to run the installer.  
The installer image will install OS image into eMMC of CPU module.

### 5.1 Platforms based on i.MX6Solo/DualLite/Dual/Quad/QuadPlus/SoloX

#### 5.1.1 EDM1-CF-IMX6 with FAIRY/GOBLIN/ELF

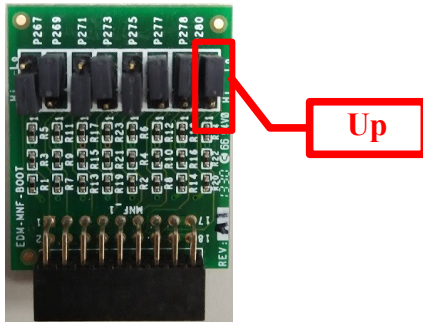
Plug “EDM-MNF-BOOT PCB” into MNF slot on EDM1-Fairy baseboard.  
It will cause EDM1-Fairy boot from external microSD card instead of eMMC.  
Then, insert MicroSD card with yocto installer image inside into EDM1-Fairy baseboard.

##### EDM-MNF-BOOT PCB

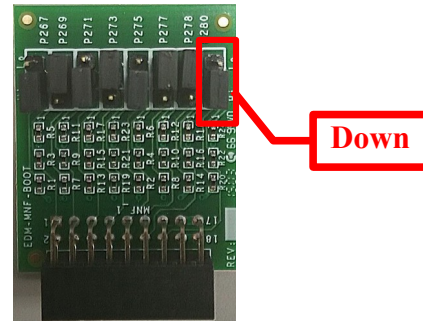


**Note:** The rightmost jumper of EDM-MNF-BOOT PCB is different on EDM1-CF-IMX6 and EDM1-CF-IMX6SX.

For EDM1-CF-IMX6



For EDM1-CF-IMX6SX



### 5.1.2 TC-07x0/TC-1000

There is an on-board eMMC inside the TC-07x0.

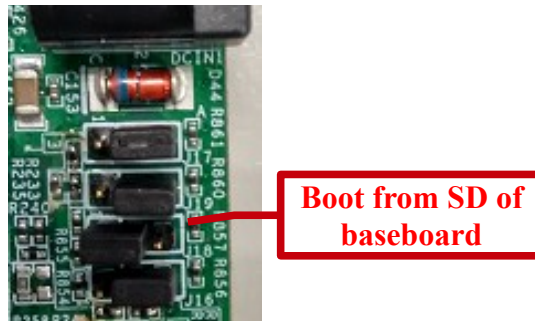
Insert the SD card into the TC-07x0. Hold down “S1” and power on the unit (or do a warm reboot by pressing the "RST" button).



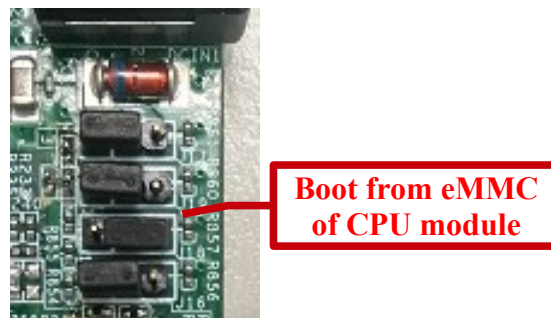


### 5.1.3 PICO-IMX6\_DWARF

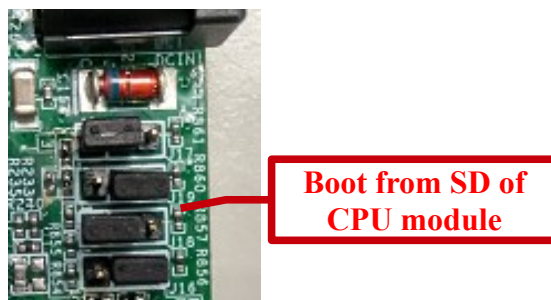
Install jumpers as below, and board will boot from SD card of baseboard:



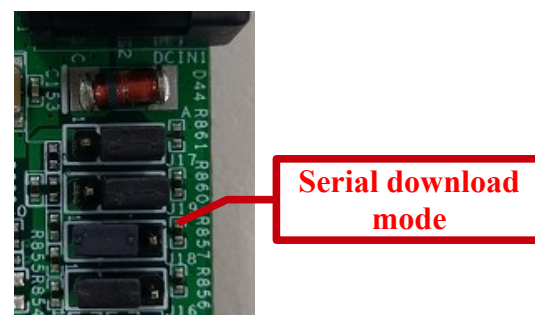
Install jumpers as below, and board will boot from eMMC card of CPU module:



Install jumpers as below, and board will boot from SD card of CPU module:

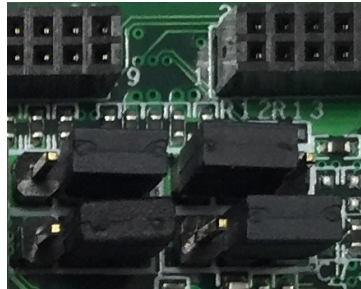


Install jumpers as below, and board will boot from serial boot loader:



### 5.1.4 PICO-IMX6\_HOBBIT

Install jumpers as below, and board will boot from SD card of baseboard:



**Boot from SD of  
baseboard**

Install jumpers as below, and board will boot from eMMC card of CPU module:



**Boot from eMMC  
of CPU module**

Install jumpers as below, and board will boot from SD card of CPU module:



**Boot from SD of  
CPU module**

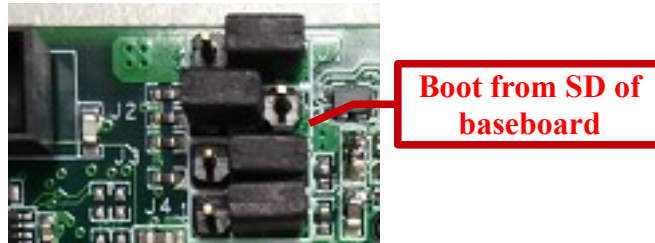
Install jumpers as below, and board will boot from serial boot loader:



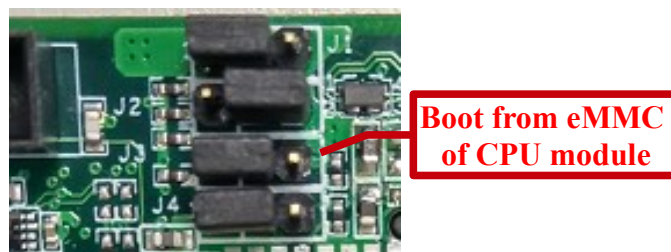
**Serial download  
mode**

### 5.1.5 PICO-IMX6\_NYMPH

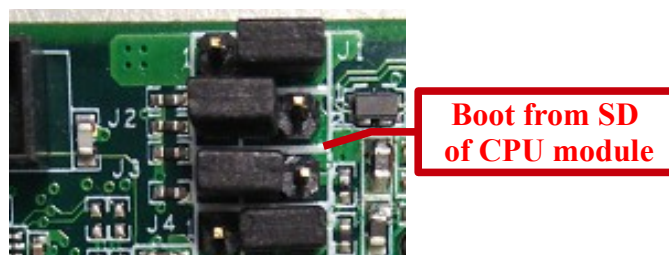
Install jumpers as below, and board will boot from SD card of baseboard:



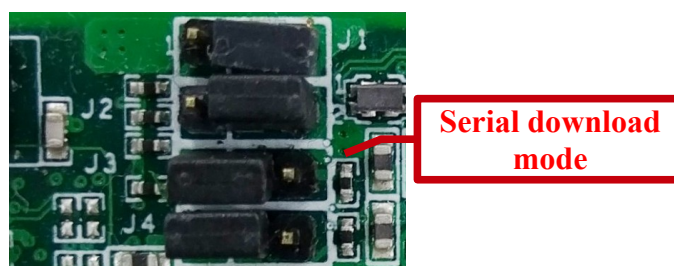
Install jumpers as below, and board will boot from eMMC card of CPU module:



Install jumpers as below, and board will boot from SD card of CPU module:

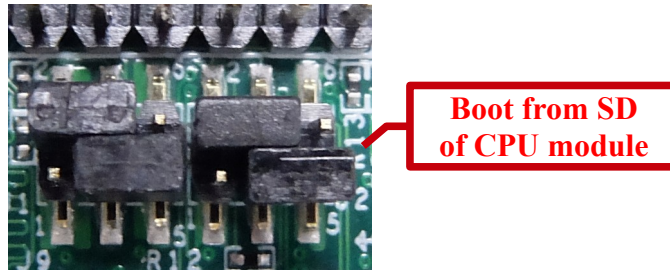


Install jumpers as below, and board will boot from serial boot loader:

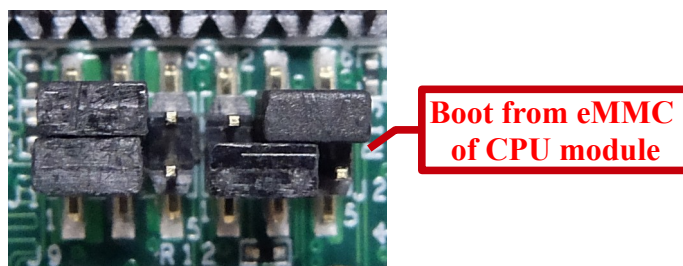


### 5.1.6 PICO-IMX6\_PI

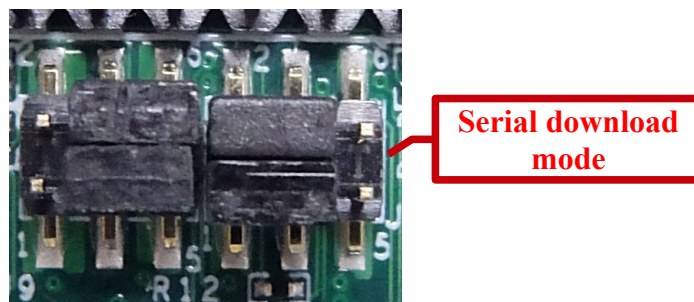
Install jumpers as below, and board will boot from SD card of CPU module:



Install jumpers as below, and board will boot from eMMC of CPU module:



Install jumpers as below, and board will boot from serial boot loader:



### 5.1.7 TEK3-IMX6/TEK3-IMX6UL/TEP-0500/TEP-0700/TEP-1010/TEP1560

Insert the SD card into the device. Hold down “S1” and press “RST” button.

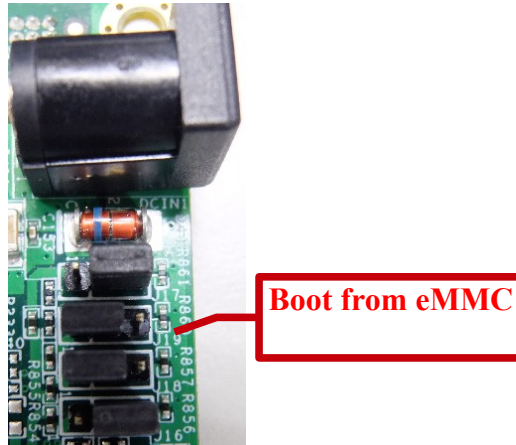
(PS. Hold down “S1” button will switch the boot mode to boot from SD card. Then press “RST”, the board will reboot from SD card.)



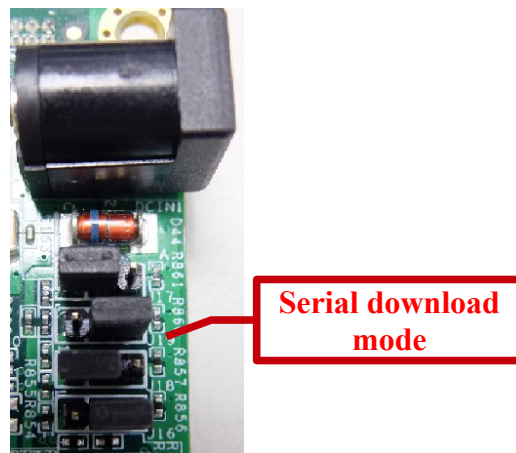
## 5.2 Platforms based on i.MX6UL

### 5.2.1 PICO-IMX6UL-EMMC\_DWARF

Install jumpers as below, and board will boot from SD card of baseboard:

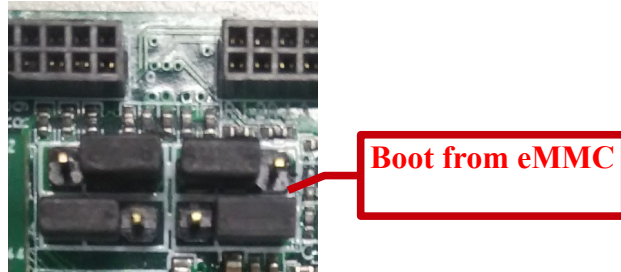


Install jumpers as below, and board will boot from NAND of CPU module:

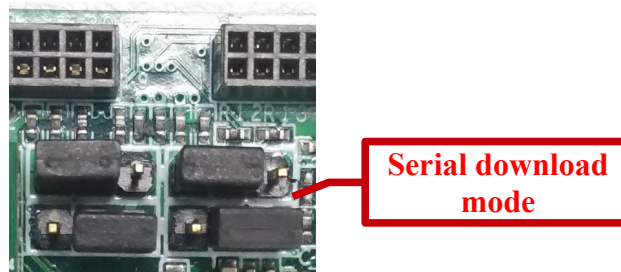


## 5.2.2 PICO-IMX6UL-EMMC\_HOBBIT

Install jumpers as below, and board will boot from eMMC of CPU module:



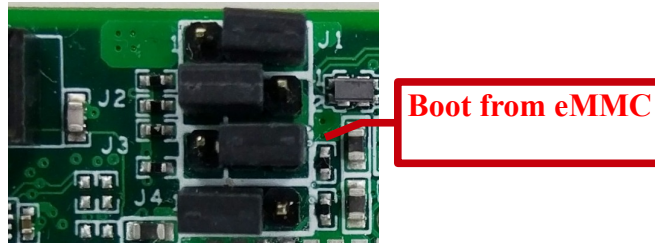
Install jumpers as below, and board will boot from serial boot loader:



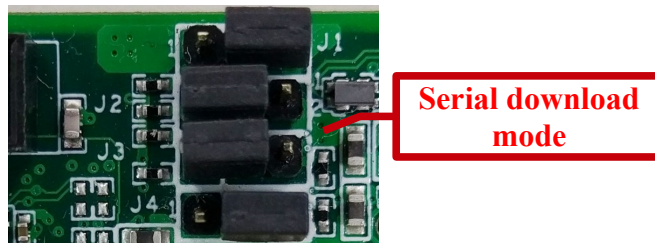


### 5.2.3 PICO-IMX6UL-EMMC\_NYMPH

Install jumpers as below, and board will boot from eMMC of CPU module:



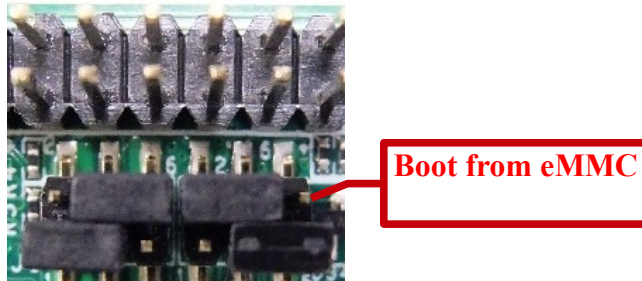
Install jumpers as below, and board will boot from serial boot loader:



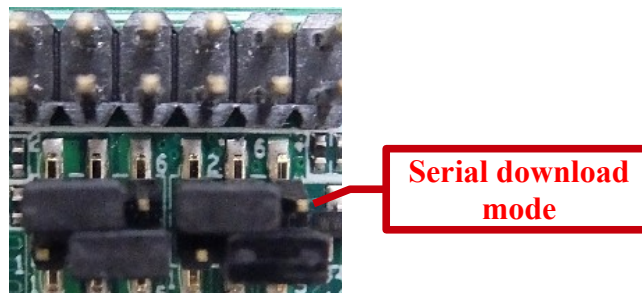


## 5.2.4 PICO-IMX6UL-EMMC\_PI

Install jumpers as below, and board will boot from eMMC of CPU module:

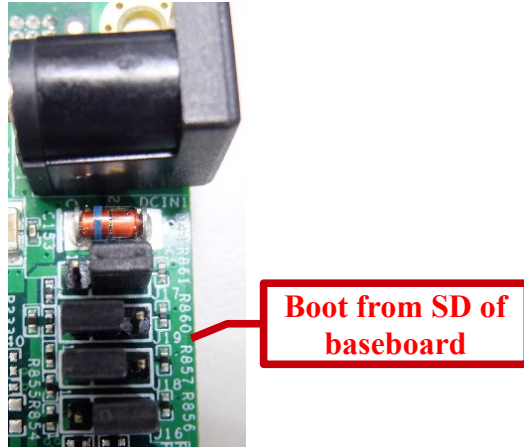


Install jumpers as below, and board will boot from serial boot loader:

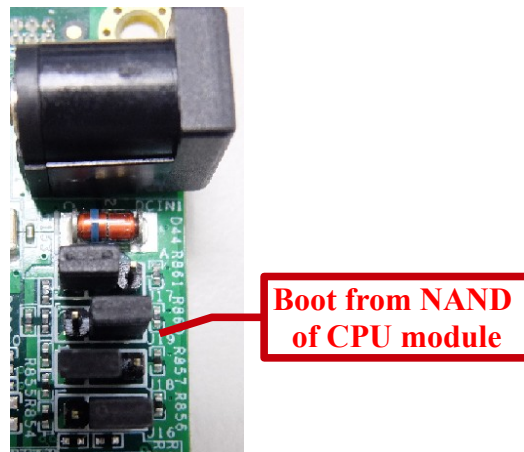


## 5.2.5 PICO-IMX6UL-NAND\_DWARF

Install jumpers as below, and board will boot from SD card of baseboard:

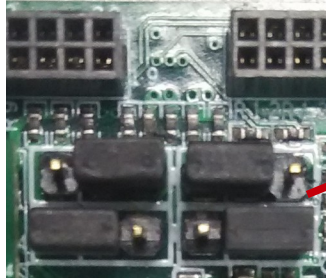


Install jumpers as below, and board will boot from NAND of CPU module:



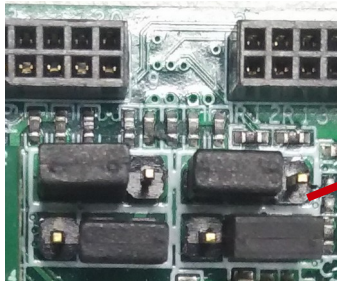
## 5.2.6 PICO-IMX6UL-NAND\_HOBBIT

Install jumpers as below, and board will boot from SD card of baseboard:



**Boot from SD of  
baseboard**

Install jumpers as below, and board will boot from NAND of CPU module:

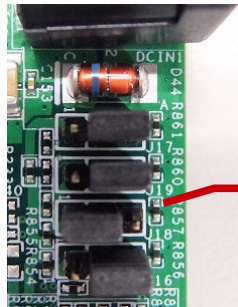


**Boot from NAND  
of CPU module**

## 5.3 Platforms based on i.MX7

### 5.3.1 PICO-IMX7D\_DWARF

Install jumpers as below, and board will boot from SD card of baseboard:



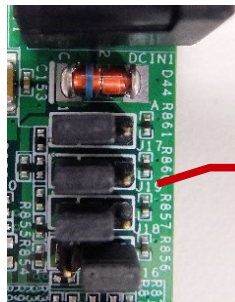
**Boot from SD of  
baseboard**

Install jumpers as below, and board will boot from eMMC card of CPU module:



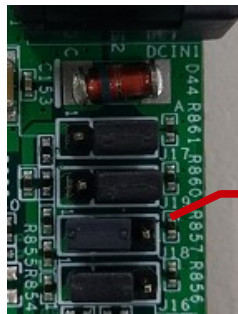
**Boot from eMMC  
of CPU module**

Install jumpers as below, and board will boot from SD card of CPU module:



**Boot from SD of  
CPU module**

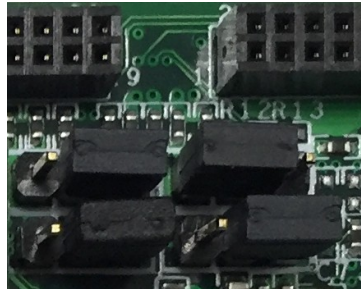
Install jumpers as below, and board will boot from serial boot loader:  
(Please remove SD card in the SD card slot of the baseboard before booting.)



**Serial download  
mode**

### 5.3.2 PICO-IMX7D\_HOBBIT

Install jumpers as below, and board will boot from SD card of baseboard:



**Boot from SD of  
baseboard**

Install jumpers as below, and board will boot from eMMC card of CPU module:



**Boot from eMMC  
of CPU module**

Install jumpers as below, and board will boot from SD card of CPU module:



**Boot from SD of  
CPU module**

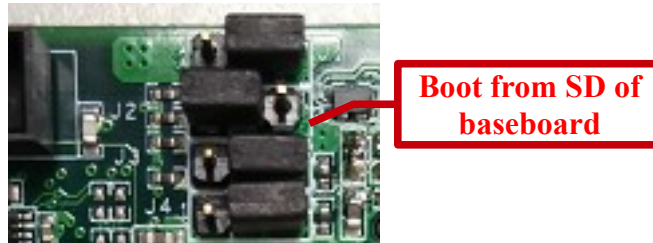
Install jumpers as below, and board will boot from serial boot loader:  
(Please remove SD card in the SD card slot of the baseboard before booting.)



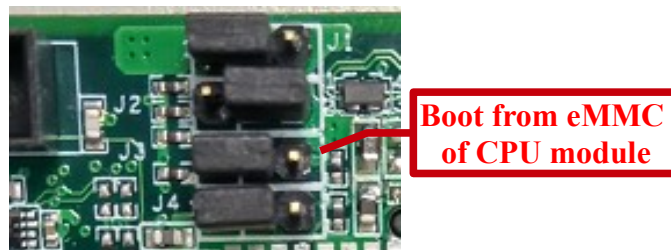
**Serial download  
mode**

### 5.3.3 PICO-IMX7D\_NYMPH

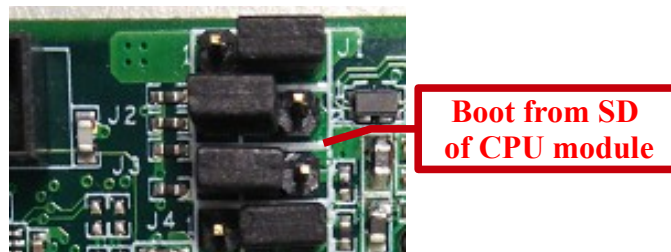
Install jumpers as below, and board will boot from SD card of baseboard:



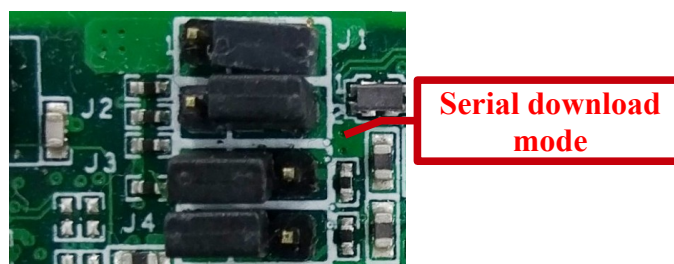
Install jumpers as below, and board will boot from eMMC card of CPU module:



Install jumpers as below, and board will boot from SD card of CPU module:

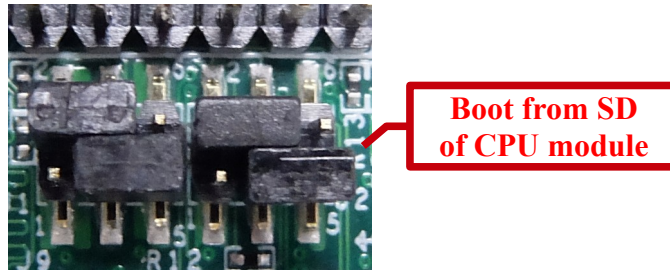


Install jumpers as below, and board will boot from serial boot loader:  
(Please remove SD card in the SD card slot of the baseboard before booting.)

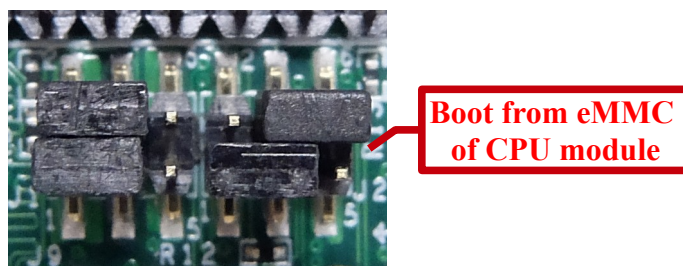


### 5.3.4 PICO-IMX7D\_PI

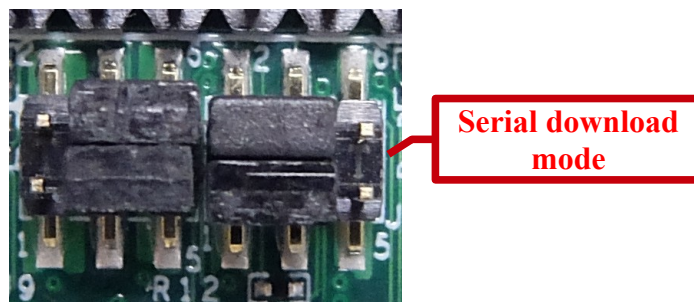
Install jumpers as below, and board will boot from SD card of CPU module:



Install jumpers as below, and board will boot from eMMC of CPU module:



Install jumpers as below, and board will boot from serial boot loader:





## 6. Using Generic Installer in Storage Mode



By default there is no pre-programmed image to install in the installer. When run, the installer enters storage mode.

Attach a USB OTG cable to the development kit and attach the other end to a USB host port on a Windows computer. A mass storage device will appear.

Use “**Win32DiskImager**” or “dd” command (see **Section 4**. Flashing the Image into SD Card, but this time the device is eMMC, instead of SD card) to burn image to the mass storage device, will install the image into eMMC.

Once the installation completes. **Switch boot mode to “boot from eMMC”**, and remove the SD card. Then, reboot your board.

### **Note:**

For EDM1-FAIRY/EDM1-GOBLIN/EDM2-ELF, it needs to remove the “EDM-MNF-BOOT PCB” to switch boot mode to “boot from eMMC”.

For PICO-DWARF/PICO-HOBBIT/PICO-NYMPH/PICO-PI, it needs to adjust the boot jumpers to switch boot mode to “boot from eMMC”.



## 7. Using Generic Installer in Automatic Mode

This section describes the technicalities of preparing an installer SD card. The SD card created will install an image for every boot, without any user interaction.

### 7.1 Installer SD card overview

The generic installer SD card has two partitions. The very first one, is a FAT partition containing boot files, and more importantly the image to be installed. The second partition is the installer itself, and users should not have to touch the second partition.

The quickest way to make a custom installer (each step is explained in more detail further down this document) is:

1. Prepare an image file to be installed
2. Compress it with xz

```
$ xz -9 image
```

3. Place it in image/image.xz on the FAT partition.

This way, the installer will install the image.xz into eMMC.

PS. The file name of “image.xz” will affect the display image and style of progress bar on display in installation process.

If the file name is “image.xz” as “android.xz”, it will show android logo. (Same as naming as ubuntu .xz or yocto.xz)

#### **Example:**

You build a target image from Yocto and you’d like to flash this image into eMMC.

Step 1: Compress this image in xz format

```
$ xz -9 fsl-image-xxx.rootfs.sdcard
```

Step 2: Rename it as yocto.xz

```
$ mv fsl-image-xxx.rootfs.sdcard.xz yocto.xz
```

Step 3: Put yocto.xz into “images” directory of first partition of installer SD card

```
$ sudo mkdir /mnt/temp  
$ sudo mount /dev/mmcblkXp1 /mnt/temp  
$ sudo cp yocto.xz /mnt/temp/image/  
$ sudo umount /mnt/temp
```

Step 4: Set boot mode as “boot from module/baseboard SD card”, then reboot.

## 7.2 Preparing an image file from existing system

The image file is expected to be a compressed block device image. One way to prepare a such image is to first manually prepare one unit where the software works as intended.

Then use the 'dd' command to take a block-by-block copy of the eMMC content to an SD card. In its simplest form:

```
$ dd if=/dev/mmcblk1 of=/mnt/sdcard/image
```

In practice there are a few things that can be done more efficiently than a crude copy.

First, the command above copies the whole eMMC to a file on the SD card. You might not use it all. When partitioning your eMMC, leaving some part of the eMMC unpartitioned would decrease the install time. The smaller the eMMC image, the faster it installs.

Second, when copying the eMMC content to a file, only copy the actually used (partitioned) area. One way to do that is

```
bl=`echo pq | fdisk -u /dev/mmcblk1 | grep /dev/ | tail -1 | awk '{print $3}'`  
$ dd if=/dev/mmcblk1 of=/mnt/sdcard/image bs=$bl count=512
```

The last step is to compress the image file.

On a desktop computer running linux, it can be done by:

```
$ xz -9 image
```

This will take some time, depending on the size of image and speed of your computer.



## 7.3 Customizing the installation process

To be written at a later point.

## 7.4 Tips and tricks

The maximum size of the compressed image is about 1GB. There are some tricks to reduce the size of the compressed image.

The most useful one is to fill the unused space in image with zeroes (by default the empty space contains remnants of whatever files has been stored there).

Before creating the image file, fill the device with a large, but empty file:

```
# dd if=/dev/zero of=/media/sdcard/file bs=1M
# umount /media/sdcard
# mount /dev/sdcard /media/sdcard
# rm -f /media/sdcard/file
```

The unmount/mount step is needed to ensure that the file is written out to the file system, and not just staying in the fs cache.

Then proceed with 'dd' ing the eMMC to an image file. The empty space will then xz-compress very well.