MaaXBoard Mini

Linux Yocto Lite

Software Development Guide

V1.2

Copyright Statement:

◆ The MaaXBoard Mini single board computer and its related intellectual property are owned by Avnet Manufacturing Services.

◆ Avnet Manufacturing Services has the copyright of this document and reserves all rights. Any part of the document should not be modified, distributed or duplicated in any approach and form with the written permission issued by Avnet Manufacturing Services.

Disclaimer:

◆ Avnet Manufacturing Services does not take warranty of any kind, either expressed or implied, as to the program source code, software and documents provided along with the products, and including, but not limited to, warranties of fitness for a particular purpose; The entire risk as to the quality or performance of the program is with the user of products.

Regulatory Compliance:

◆ MaaXBoard Mini single board computer has passed the CE, FCC & SRRC certification.

Revision History

Version	Note	Author	Release Date
V1.0	Initial version	Paul/Sandy	20200904
V1.1	Updated Yocto 3.0	Nick	20210322
V1.2	Updated Zeus branch for meta-maaxboard	Nick	20211014

Catalog

Chapter 1   Build Environment Setup

1.1 Setup Build Environment

To setup the build environment need:

◆ Hardware: At least 40GB of disk space and 2GB of RAM

◆ Software: Ubuntu 64bit OS, 18.04 LTS version or later LTS version (Ubuntu Desktop or Ubuntu Server version). You could also run the Ubuntu 64 bit OS on virtual machine.

The following packages are required for the development environment. The required packages can be installed using the bash script below:

```
$ sudo apt-get update
$ sudo apt-get install -y gawk wget git-core diffstat unzip texinfo gcc-multilib build-essential chrpath socat libsdl1.2-dev xterm sed cvs subversion coreutils texi2html docbook-utils python-pysqlite2 help2man make gcc g++ desktop-file-utils libgl1-mesa-dev libglu1-mesa-dev mercurial autoconf automake groff curl lzop asciidoc u-boot-tools cpio sudo locales
```

Install repo

```
$ curl https://storage.googleapis.com/git-repo-downloads/repo > ./repo
$ chmod a+x repo
$ sudo mv repo /usr/bin/
```

Chapter 2   Fetch Source Code

2.1 Download meta layers from NXP

```
$ mkdir imx-yocto-bsp
$ cd imx-yocto-bsp
$ repo init -u https://source.codeaurora.org/external/imx/imx-manifest -b imx-linux-zeus -m
imx-5.4.24-2.1.0.xml
$ repo sync
```

2.2 Download MaaXBoard Mini Source Code

To download the source code of MaaXBoard, download the repository form GitHub or get the source code package from FAE.

Clone from Github:

```
$ cd imx-yocto-bsp/sources
$ git clone https://github.com/Avnet/meta-maaxboard.git -b zeus
```

Or extract the code package:

```
$ tar -jxvf meta-maaxboard*.tar.bz2 -C imx-yocto-bsp/sources
```

2.3 Install patch

NXP do some hook / patch according different machine / distro when init a new build. We need do this first.

```
$ cd imx-yocto-bsp
$ mkdir imx8mmevk
$ DISTRO=fsl-imx-wayland MACHINE=imx8mmevk source fsl-setup-release.sh -b imx8mmevk
$ rm -rf imx8mmevk
```

Chapter 3   Build

3.1 Build Configure

Create the build directory and the default build conf

```
$cd imx-yocto-bsp
$ mkdir -p maaxboard-mini/build
$ source sources/poky/oe-init-build-env maaxboard-mini/build
```

This operation will generate 2 conf file under path: maaxboard-mini/build/conf if there is no conf file exist.

◆   local.conf

◆   bblayers.conf

Users could modify the conf files according to your setting, there are two reference file under path:

imx-yocto-bsp/sources/meta-maaxboard/conf

◆   local.conf.sample

◆   bblayers.conf.sample

To build MaaXBoard Mini, you should change the Machine(in local.conf) to:

```
MACHINE ??= 'maaxboard-mini-ddr4-2g-sdcard'
```

3.2 Build

```
$ cd imx-yocto-bsp
$ source sources/poky/oe-init-build-env maaxboard-mini/build
$ bitbake lite-image
```

The build output locate under path:
imx-yocto-bsp/maaxboard-mini/build/tmp/deploy/images/maaxboard-mini-ddr4-2g-sdcard/.

Below is an example of build output.

◆   Entire system image:

lite-image-maaxboard-mini-ddr4-2g-sdcard-20210304015911.rootfs.sdcard.bz2

◆   U-boot image: imx-boot-maaxboard-mini-ddr4-2g-sdcard-sd.bin-flash_ddr4_evk

◆   Kernel:

- Image

- maaxboard-mini-mipi.dtb

- maaxboard-mini-device.dtb

◆ File system: lite-image-maaxboard-mini-ddr4-2g-sdcard-20210304015911.rootfs.tar.bz2

Chapter 4 Burn the Image

The default version of MaaXBoard Mini support SD Card. Avnet Manufacturing Services also provide eMMC version for users to customize. To burn the system image to the eMMC, refer to MaaXBoard UUU Burning Guide.

4.1 Burn Entire System Image

Extract the bz2 and burn it:

Note: lite-image-maaxboard-mini-ddr4-2g-sdcard-20210304015911.rootfs.sdcard is an example of system image, the value **sdb** should be replaced by the actual node of SD Card under Linux system.

```
$ bunzip2 lite-image-maaxboard-mini-ddr4-2g-sdcard-*.rootfs.sdcard.bz2
$ sudo dd if=lite-image-maaxboard-mini-ddr4-2g-sdcard-20210304015911.rootfs.sdcard
of=/dev/sdb bs=256M conv=fsync
```

4.2 Burn Part of Image

4.2.1 Burn U-boot Image

```
$ sudo dd if= imx-boot-maaxboard-mini-ddr4-2g-sdcard-sd.bin-flash_ddr4_evk of=/dev/sdb bs=1k
seek=33 conv=fsync
```

4.2.2 Burn Kernel Image

Copy the Image and dtb files to the first partition of SD Card.

4.2.3 Burn File System

Burn the img file of file system to the second partition of SD Card use dd command, for example:

```
$ sudo mount /dev/sdb2 /mnt/
$ sudo tar xjfv lite-image-maaxboard-mini-ddr4-2g-sdcard-20210304015911.rootfs.tar.bz2 –C /mnt
$ sync
$ sudo umount /mnt
```

4.3 Burn eMMC

Use the system image and u-boot image
imx-boot-maaxboard-mini-ddr4-2g-sdcard-sd.bin-flash_ddr4_evk to burn eMMC board, for detailed

operation, refer to MaaXBoard UUU Burning Guide.

Chapter 5   User Defined Module

5.1 Configuration

Default Configuration:

- Distor: 'fsl-imx-wayland-lite'
  - meta-maaxboard/conf/distro/fsl-imx-wayland-lite.conf
- Image: "lite-image"
  - meta-maaxboard/images/lite-image.bb
- Machine:
  - MaaXBoard Mini: maaxboard-mini-ddr4-2g-sdcard

Customization

Users could add more packages in the image recipe: meta-maaxboard/images/lite-image.bb

Distro features: meta-maaxboard/conf/distro/fsl-imx-wayland-lite.conf

Machine features: meta-maaxboard/conf/machine/maaxboard-mini-ddr4-2g-sdcard.conf

5.2 Setup a Debian Repository

Here we want to show you how to setup a Debian Repository. In this way, you could use **apt-get install** to install packages that you built in Yocto.

5.2.1 Build Packages

Build the software package in Yocto Compile Environment, take nano for example.

```
$ cd imx-yocto-bsp
$ source sources/poky/oe-init-build-env maaxboard-mini/build
$ bitbake nano
```

5.2.2 Generate Packages index files

After build the packages, you should generate the package index files for apt-get to search.

Add a script called dpkg-scan.sh under deb folder:

```
$ cd imx-yocto-bsp/maaxboard-mini/build/tmp/deploy/deb
$ nano dpkg-scan.sh
```

Add following info:

```
#!/bin/bash
ls -d */   | sed 's/\///' | cat | while IFS=' ' read -r item
do
echo "[$item] - Scan Packages and generate Packages.gz"
dpkg-scanpackages ${item} | gzip > ${item}/Packages.gz
done
```

Then execute following command:

```
$ sudo chmod +x ./dpkg-scan.sh
```

Exec ./dpkg-scan.sh everytime you build a new package:

```
./dpkg-scan.sh
```

5.2.3 Host Setup

Install a web server on the host machine that you build the Yocto images:

```
$ sudo apt install nginx
$ sudo nano /etc/nginx/sites-available/deb
```

Add following info:

```
server {
    listen 80 default_server;
    server_name yocto_deb_packages;
    root ~/imx-yocto-bsp/maaxboard-mini/build/tmp/deploy/deb/;

    location / {
        autoindex on;
    }
}
```

Enable website

```
$ sudo rm /etc/nginx/sites-enabled/default
$ sudo ln -s /etc/nginx/sites-available/deb /etc/nginx/sites-enabled/deb
```

Start nginx

```
$ sudo systemctl restart nginx
```

5.2.4 Install the Package on MaaXBoard Mini

In this example, the host machine IP is 192.168.2.58, we will install package: **nano.**

1. Add Sources List

```
$ sudo nano /etc/apt/sources.list
```

Add following info:

```
deb http://192.168.2.58/ aarch64/
deb http://192.168.2.58/ aarch64-mx8mm/
deb http://192.168.2.58/ maaxboard_mini_ddr4_2g_sdcard/
deb http://192.168.2.58/ all/
```

2. Update source and install package

```
$ sudo rm -rf /var/lib/apt/lists/*
$ sudo apt-get update
$ sudo apt-get install nano
```

Chapter 6　Appendix

6.1 Hardware

For the detail hardware introduction, please refer to MaaXBoard Mini Hardware user manual.

6.2 Software

MaaXBoard Mini support Linux Yocto system and Android system, for the detail software introduction, please refer to related user manual.

- ◈ **Linux**
    - ◆ MaaXBoard Mini Linux Software Release Note
    - ◆ MaaXBoard Mini Linux Software User Manual
    - ◆ MaaXBoard Mini Linux Software Development Guide
- ◈ **Android**
    - ◆ MaaXBoard Mini Android Software Release Note
    - ◆ MaaXBoard Mini Android Software User Manual
    - ◆ MaaXBoard Mini Android Software Development Guide

6.3 USB Burning

MaaXBoard Mini support burn image through USB port, refer to "MaaXBoard Mini UUU Burning Guide".

Chapter 7   Technical Support and Warranty

7.1 Technical Support

Avnet Manufacturing Services provides its product with one-year free technical support including:

◆ Providing software and hardware resources related to the embedded products of Avnet Manufacturing Services;

◆ Helping customers properly compile and run the source code provided by Avnet Manufacturing Services;

◆ Providing technical support service if the embedded hardware products do not function properly under the circumstances that customers operate according to the instructions in the documents provided by Avnet Manufacturing Services;

◆ Helping customers troubleshoot the products.

◆ The following conditions will not be covered by our technical support service. We will take appropriate measures accordingly:

  ◆ Customers encounter issues related to software or hardware during their development process;

  ◆ Customers encounter issues caused by any unauthorized alter to the embedded operating system;

  ◆ Customers encounter issues related to their own applications;

  ◆ Customers encounter issues caused by any unauthorized alter to the source code provided by Avnet Manufacturing Services.

7.2 Warranty Conditions

◆ 12-month free warranty on the PCB under normal conditions of use since the sales of the product;

◆ The following conditions are not covered by free services; Avnet Manufacturing Services will charge accordingly:

  ◆ Customers fail to provide valid purchase vouchers or the product identification tag is damaged, unreadable, altered or inconsistent with the products;

  ◆ Not according to the user's manual operation causes damage to the product;

  ◆ Products are damaged in appearance or function caused by natural disasters (flood, fire, earthquake, lightning strike or typhoon) or natural aging of components or other force majeure;

  ◆ Products are damaged in appearance or function caused by power failure, external forces, water, animals or foreign materials;

  ◆ Products malfunction caused by disassembly or alter of components by customers or, products disassembled or repaired by persons or organizations unauthorized by Avnet Manufacturing

Services, or altered in factory specifications, or configured or expanded with the components that are not provided or recognized by Avnet Manufacturing Services and the resulted damage in appearance or function;

- Product failures caused by the software or system installed by customers or inappropriate settings of software or computer viruses;
- Products purchased from unauthorized sales;
- Warranty (including verbal and written) that is not made by Avnet Manufacturing Services and not included in the scope of our warranty should be fulfilled by the party who committed. Avnet Manufacturing Services has no any responsibility.

- Within the period of warranty, the freight for sending products from customers to Avnet Manufacturing Services should be paid by customers; the freight from Avnet Manufacturing Services to customers should be paid by us. The freight in any direction occurs after warranty period should be paid by customers;

- Please contact technical support if there is any repair request.

- **Avnet Manufacturing Services will not take any responsibility on the products sent back without the permission of the company.**

Chapter 8   Contact Information

◆ Tel: +86-755-33190846/33190847/33190848

◆ E-mail:

♦ Technical support: support@embest-tech.com

♦ Sales contact: chinasales@embest-tech.com

◆ Fax: +86-755-25616057

◆ Website: http://www.embest-tech.com/

◆ Address: Tower B 4/F, Shanshui Building, Nanshan Yungu Innovation Industry Park, Liuxian

Ave.No.4093,Nanshan District, Shenzhen, Guangdong, China