

**Murata Wi-Fi/BT
Solution for i.MX**

Linux User Manual



Revision History

Revision	Date	Author	Change Description
1.0	Sept 7, 2015	S Kerr	Initial Release
2.0	Nov 7, 2015	S Kerr	Changes for L3.14.38_6UL GA BSP Release and support modified Murata Wi-Fi/BT EVK Definition.
3.0	March 1, 2016	S Kerr	Incorporated changes for NXP Linux 3.14.52 GA BSP Release. Added support for hostapd and Broadcom firmware package.
4.0	Feb 14, 2017	S Kerr	Renamed document to "Murata Wi-Fi/BT Solution for i.MX Linux User Manual". Incorporated changes for NXP Linux 4.1.15_2.0.0 GA BSP release. Modified NXP Linux 3.14.52_1.1.0 GA BSP release to build in bcmhdh WLAN driver, thereby matching 4.1.15_2.0.0 configuration. Added instructions for Murata source patch release which addresses errata/features on both releases. Added support for new i.MX 7Dual SDB, i.MX 6ULL EVK and Murata Type 1CK.
5.0	Dec 23, 2017	S Kerr J Kareem	Complete revision for integrating new Cypress " fmac " driver release. Added support for SDIO/UART 1.8V VIO signaling on i.MX6UL(L) and i.MX6SX platforms. Rollout of Murata customized Yocto build for i.MX BSP L4.9.11_1.0.0 release.
5.1	Jan 12, 2018	S Kerr J Kareem	Revise for "murata-wireless" Github and revised branches/releases. Add support for i.MX 7ULP EVK.
5.2	March 23, 2018	S Kerr J Kareem	Add support for new " fmac " release, codename " battr ". Support latest i.MX hardware: NXP i.MX8MQuad EVK. Provide quick/easy steps for generating Linux image with automated scripting. Update build steps with Code Aurora repository paths. Provide explanation of how " meta-murata-wireless " customized layer works. Add support for i.MX Yocto Linux 4.1.15 "krogoth" branch.
5.3	April 24, 2018	S Kerr	Updated hyperlink to " fmac battr " release on Cypress website.
5.4	June 19, 2019	S Kerr	Updates for Linux 4.9.88 and "manda" version of "fmac" driver.

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1 Introduction

Murata has partnered with Cypress Semiconductor Corporation to offer a complete Wi-Fi and Bluetooth connectivity environment for building world class Internet-connected products. The Murata Connectivity Modules enable developers to minimize the development time and effort for connectivity function implementation. This Linux User Manual provides details on building all necessary software for enabling Murata Wi-Fi/Bluetooth on reference NXP i.MX platforms. The latest release supports [NXP i.MX Linux 4.1.15, and 4.9.11 GA BSP's for i.MX6/7](#), [Linux L4.9.51 for i.MX 8MQuad Beta](#) and [Linux 4.9.88 for i.MX6/7/8](#). This manual details Murata's customized wireless Yocto layer which allows the user to easily build their desired i.MX image while pulling in the FMAC driver, configured/patched WPA supplicant & Hostapd, firmware files, NVRAM files, and Bluetooth patch files.

Note the current NXP i.MX Platforms supported include:

- [i.MX 8MQuad Evaluation Kit](#)
- [i.MX 7ULP Evaluation Kit¹](#)
- [i.MX 7Dual SABRE Development Board](#)
- [i.MX 6QuadPlus SABRE Development Board](#)
- [i.MX 6Quad/DualLite SABRE Development Board](#)
- [i.MX 6SoloX SABRE Development Board](#)
- [i.MX 6SoloLite Evaluation Kit](#)
- [i.MX 6UltraLite \(or i.MX 6UL\) Evaluation Kit](#)
- [i.MX 6ULL Evaluation Kit](#)

A high-level connection Diagram for the Murata Interconnect kit (i.MX6 platforms and i.MX7ULP EVK) is provided in **Figure 1**. All the Murata Wi-Fi/BT modules enabled by this release are shown². The Murata Wi-Fi/BT kit for i.MX6/7 enables this configuration by providing two custom-built Adapter boards. Please refer to the [Murata Quick Start Guide \(Linux\)](#) and [Murata Hardware User Manual](#) for more details.

No V1/V2 adapter kit is required for the [i.MX 7Dual SDB³](#). This platform has the Murata ZP module soldered down on the board. Both Wi-Fi and Bluetooth interfaces are supported on this platform. Unlike the 3.3V VIO InterConnect limitation on some i.MX6 platforms, there is no inherent "legacy" restriction on the i.MX7D platform which limits SDIO throughput. The Murata ZP module supports a very high throughput (SDIO 3.0 mode – UHS) over SDIO bus resulting in a much better performance. Please reference the NXP i.MX7 schematics for specifics: download package [here⁴](#).

¹ With difficult rework, the V1 adapter can be used to interconnect with the i.MX 7ULP EVK.

² Some of the modules shown are only available directly from Murata.

³ Although an external module can be connected to the i.MX7D SDB, Murata does not recommend this given extensive rework required.

⁴ For Wi-Fi/BT schematics on i.MX 7Dual SDB, refer to page 13 of "sch-28590_i.mx7d_saber_rev_2.pdf" document.

Figure 2 shows a simplified block diagram for the i.MX 7Dual SDB. **NOTE:** only the i.MX6UL(L), i.MX6SX and i.MX7ULP EVK's support 1.8V VIO signaling with specific modifications to the V1/V2 InterConnect adapter. For more details on Wi-Fi throughput dependency on SDIO bus speed and hardware modifications necessary for 1.8V VIO signaling, please refer to the [Murata Hardware User Manual](#).

Figure 1: Murata i.MX6/7 Interconnect Kit Interfaces

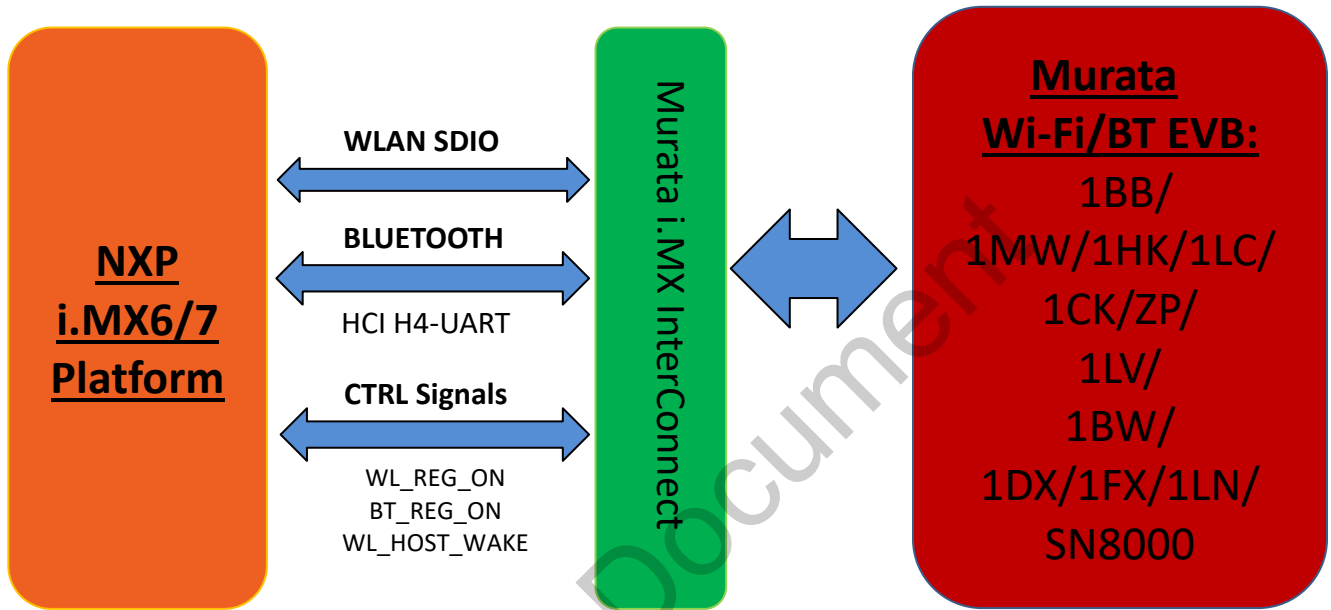


Figure 2: i.MX 7Dual SDB Block Diagram

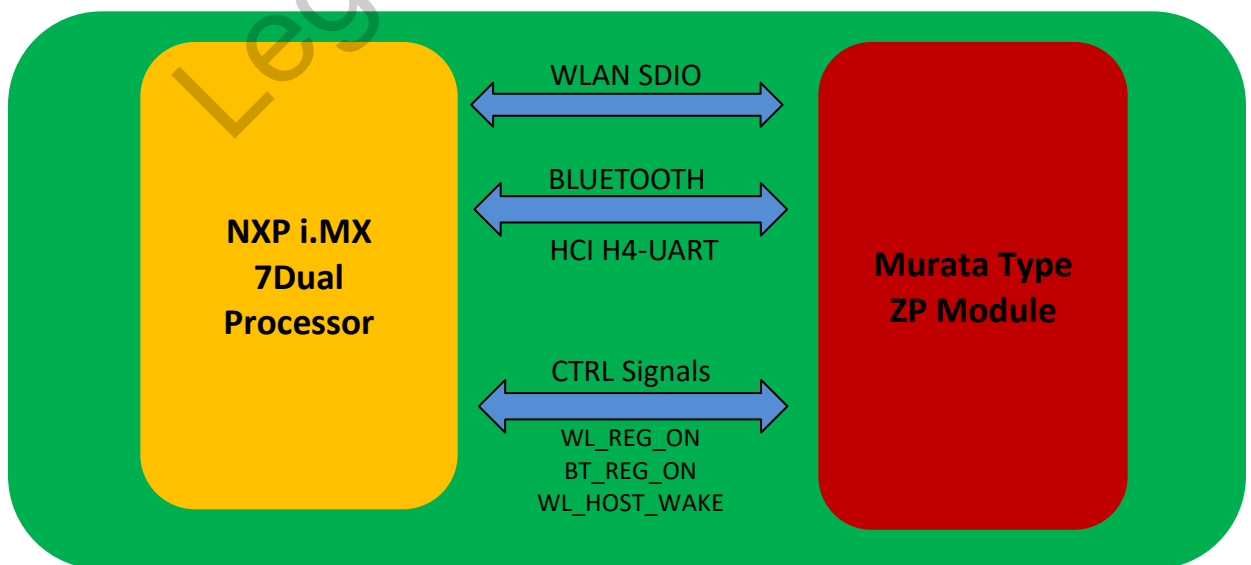
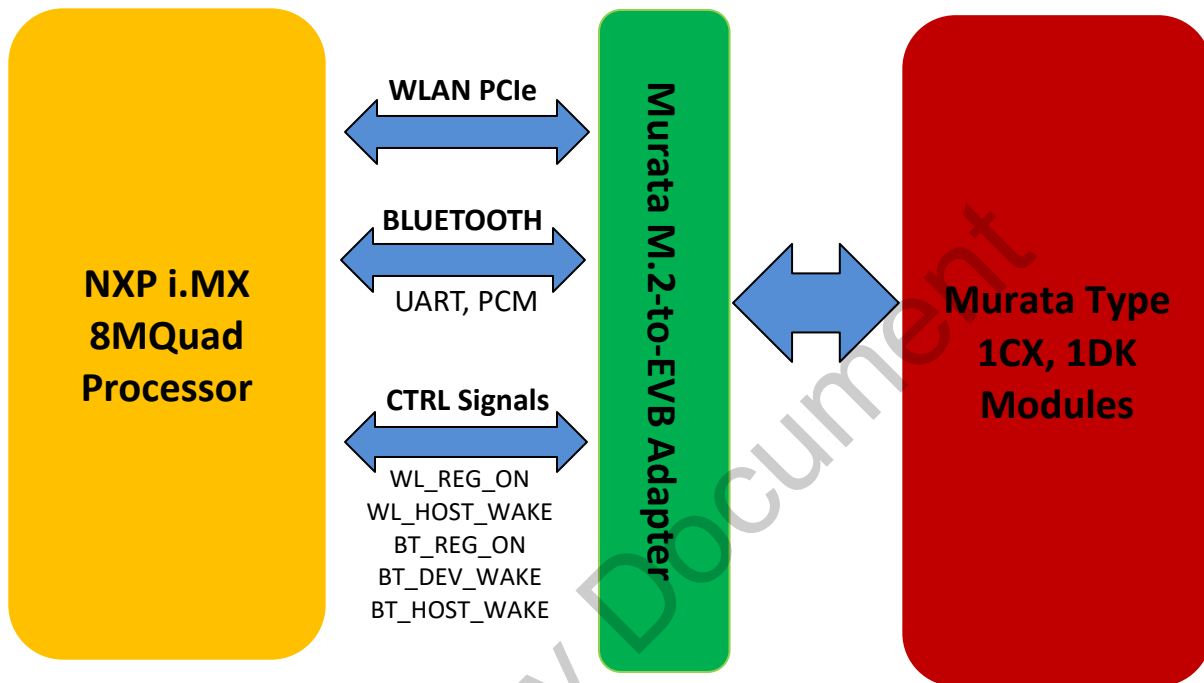


Figure 3 shows a simplified block diagram for the i.MX 8MQuad EVK Wi-Fi/BT interconnect. Currently both (CYW4356) modules supported are 2x2 802.11ac MIMO with PCIe interface. **NOTE:** some minor rework must be done to fully enable The M.2 Wi-Fi/BT option on the i.MX8MQuad EVK. However, the basic WLAN PCIe and Bluetooth UART interfaces are supported with no hardware modifications.

Figure 3: i.MX 8MQuad EVK Wi-Fi/BT Interconnect Block Diagram



1.1 Acronyms

Table 1: Acronyms used in Linux User Manual

Acronym	Meaning
API	Application Programming Interface
DTB	Device Tree Blob: Kernel reads in at boot time for configuration.
EVB	Evaluation Board (Murata module on custom PCB)
EVK	Evaluation Kit (includes EVB + Adapter)
FW	Firmware
GPIO	General Purpose Input/Output
PC	Personal Computer
PCIe	PCI Express
SW	Software
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus

1.2 References

1.2.1 Murata Hardware User Manual

Murata Wi-Fi/BT Solution for i.MX Hardware User Manual 1.0, “Murata Wi-Fi & BT Solution for i.MX Hardware User Manual 1.0.pdf”.

This manual provides HW specifics for the various i.MX platforms supported:

- Murata V1/V2 i.MX InterConnect Adapters.
- Signals required to interface Murata Wi-Fi/BT module solution.
- i.MX6UL(L), and i.MX6SX 1.8V VIO customizations.
- i.MX7D SDB Wi-Fi/BT interconnect to onboard Type ZP module.

The Murata Hardware User Manual is available here: <https://wireless.murata.com/imx>.

1.2.2 Murata Quick Start Guide (Linux)

Murata Wi-Fi/BT Solution for i.MX Quick Start Guide (Linux) 5.0, “Murata Wi-Fi & BT Solution for i.MX Quick Start Guide (Linux) 5.0.pdf”.

This Quick Start Guide details steps to get Murata Wi-Fi/BT solution up and running quickly on i.MX platforms.

The Murata Quick Start Guide is available here: <https://wireless.murata.com/imx>.

1.2.3 NXP Reference Documentation

Some of the key NXP reference documentation for Linux includes the following:

- Yocto Project User’s Guide: This document describes how to build an image for a NXP i.MX platform by using a Yocto Project build environment. It describes the NXP release layer and the NXP-specific usage.
- i.MX Linux User’s Guide: This document explains how to build and install the NXP Linux O/S BSP on the i.MX platform. It also covers special NXP features and how to use them.
- i.MX Linux Reference Manual: This document supports porting the i.MX Linux O/S BSP to customer-specific products. Intended audience should have a working knowledge of Linux O/S kernel internals, driver models and i.MX processors.
- i.MX Linux Release Notes: This document contains important information about the package contents, supported features, known issues, and limitations in the release.

Table 2 provides the following information on all releases supported:

- document filename
- document number
- document release revision
- date of release
- hyperlink to NXP document download

Table 2: NXP Reference Documentation Listing

Document Filename / Number	4.9.88_2.0.0	4.9.51 MQ Beta	4.9.11_1.0.0	4.1.15_2.0.0
i.MX_Yocto_Project_User's_Guide.pdf / IMXLXOCTOUG				
i.MX_Linux_User's_Guide.pdf / IMXLUG	Rev. L4.9.88_2.0.0-ga, 05/2018	Rev. L4.9.51_imx8mq-beta; 12/2017	Rev. L4.9.11_1.0.0-ga+mx8-alpha; 09/2017	Rev. L4.1.15_2.0.0-ga; 10/2016
i.MX_Linux_Reference_Manual.pdf / IMXLXRM				
i.MX_Linux_Release_Notes.pdf / IMXLXRN				

2 Murata's Customized i.MX Yocto Image Explained

2.1 Overview

The default [NXP i.MX Linux 4.1.15, and 4.9.11 GA BSP's for i.MX6/7, Linux L4.9.51 for i.MX 8MQuad Beta and Linux 4.9.88 for i.MX6/7/8](#) integrate the legacy Cypress WLAN **"bcmhdh"** driver and have limited Bluetooth support⁵. The new implementation of Cypress' WLAN driver is referred to as **"fmac"**. Please note that there is a distinct difference between the **"brcmfmac"** open source community drivers integrated into kernel.org Linux releases. The **"fmac"** driver (as customized by Murata) is an official open source release from Cypress that is tested and verified. The **"fmac"** release leverages the Linux Backports implementation to integrate the WLAN driver into the desired Linux kernel version.

Murata's customized Yocto layer **"meta-murata-wireless"** seamlessly disables the existing **"bcmhdh"** WLAN driver and pulls in the **"fmac"** (officially supported) driver implementation. More specifically it provides the following enhancements/customizations:

⁵ Default BlueZ stack and Bluetooth driver is operational with Murata modules but NXP default image does not include all the necessary or correct Bluetooth patches.

- Pull Cypress **“fmac”** driver and run backports tool during Yocto build to generate necessary driver modules.
- Additional/necessary patches to Cypress **“fmac”** driver for i.MX implementation.
- i.MX Linux kernel customizations to support **“fmac”** driver with OOB IRQ interrupts.
- Provide ultra-high speed (UHS) SDIO operation for WLAN interface to i.MX6UL(L), i.MX6SX, and i.MX7ULP platforms with 1.8V VIO configuration.
- WLAN production firmware files. For manufacturing test firmware (necessary for RF/regulatory testing), please contact Murata directly.
- Murata NVRAM files for correctly configuring WLAN RF.
- Example Bluetooth patchfiles.
- WL tool binary necessary for interoperability and RF testing.
- Hostapd (Version 2.6) configuration with specific patch release.
- Hostap-conf enablement.
- Hostap-utils enablement.
- WPA-suplicant (Version 2.6) configuration with specific patch release.
- Wi-Fi Direct (P2P) enablement.

There are four versions of **“fmac”** currently supported: **“v4.12 orga”**, **“v4.14 battra”**, **“v4.14 mothra”** and **“v4.14 manda”**. **“orga”**, **“battra”**, **“mothra”** and **“manda”** are the Cypress codenames denoting **“fmac”** release version. **“v4.12”** and **“v4.14”** are the latest kernel versions supported by either release (either **“fmac”** release can be backported to kernel version 3.0). To abbreviate references to specific versions of **“fmac”**, Murata uses *just* the Cypress codename – i.e. **“orga”** / **“battra”** / **“mothra”** / **“manda”**.

NOTE: It is strongly recommended to use the latest **“fmac”** release version: currently this is **“manda”**.

Murata’s customized Yocto layer supports the following NXP i.MX EVK’s as outlined in **Table 3**. **“MACHINE=target”** is a direct reference to Yocto build⁶. The **“target”** string is the keyword used to select hardware configuration for the build. With the newer EVK’s (i.MX 8MQuad and 7ULP) only certain kernel versions are supported.

Table 3: NXP i.MX EVK / Yocto (MACHINE) target / Kernel Version Matrix

i.MX EVK	MACHINE=target	Kernel Versions Supported	Notes
i.MX 8MQuad EVK	imx8mqevk	4.9.88, 4.9.51 Beta	EVB via M.2 interconnect.
i.MX 7ULP EVK	imx7ulpevk	4.9.88, 4.9.11	V1 Interconnect. Rework required.
i.MX 7Dual SDB	imx7dsabresd	4.9.88, 4.9.11, 4.1.15	Onboard ZP is supported.
i.MX 6QuadPlus SDB	imx6qpsabresd	4.9.88, 4.9.11, 4.1.15	V2 Interconnect.
i.MX 6Quad SDB	imx6qsabresd	4.9.88, 4.9.11, 4.1.15	V2 Interconnect.
i.MX 6DualLite SDB	imx6dlsabresd	4.9.88, 4.9.11, 4.1.15	V2 Interconnect.
i.MX 6SX SDB	imx6sxsabresd	4.9.88, 4.9.11, 4.1.15	V1 Interconnect.

⁶ Refer to Yocto Project User’s Guide for your kernel version. **Table 2** provides documentation package download links.

i.MX EVK	MACHINE=target	Kernel Versions Supported	Notes
i.MX 6SL EVK	imx6slevk	4.9.88, 4.9.11, 4.1.15	V1 Interconnect.
i.MX 6UL EVK (14x14, 9x9)	imx6ulevk	4.9.88, 4.9.11, 4.1.15	V2 Interconnect. Builds image for i.MX6ULL EVK as well.
i.MX 6ULL EVK (14x14)	imx6ull14x14evk	4.9.88, 4.9.11, 4.1.15	V2 Interconnect.
i.MX 6ULL EVK (9x9)	imx6ull9x9evk	4.9.88, 4.9.11, 4.1.15	V2 Interconnect.

2.2 Murata Github: Cornerstone of “fmac” Implementation

“The **cornerstone** is the first stone set in the construction of a masonry foundation, important since all other stones will be set in reference to this stone, thus determining the position of the entire structure.”

Murata Github is **the cornerstone** of the customized “fmac” i.MX Yocto implementation. Refer to **Table 4** for a complete listing of the Murata repositories used to build the i.MX Yocto image. For each repository, all available branch and release/tag names are included. All repositories are hosted at: <https://github.com/murata-wireless>. Depending on the repository, the branch naming convention vary as follows:

- “fmac” version (“**manda**” / “**mothra**” / “**battr**a” / “**orga**” / ^). It is **strongly recommended** to use “**manda**” (latest release).
- Linux kernel (equivalent to Yocto codename. i.e. “**rocko**”, “**morty**”, “**krogoth**”, “**jethro**”) and “fmac” versions.
- i.MX architecture (i.MX8 versus i.MX6/7), Linux kernel, and “fmac” versions.

The release names follow the branch-naming convention. When deciding on using a branch versus release/tag, the user will want to consider the following points:

- Release/tag is **strongly recommended** for end users who want a stable/tested version of the customized “fmac” release. Murata only “tags” a branch after having run through a testing cycle on the various i.MX/module configurations.
- If the user *just* needs to build a reference SD card image, then it is strongly recommended to use a release/tag.
- Branches are recommended for users who need the latest updates. Users can examine the latest git commits on Github for any given repository. The most up-to-date branch by default is “**master**”. Note that Murata does limited testing on updates (new git commits) to a given branch. If the user runs into any unexpected difficulty, please report the errata back to Murata by emailing wirelessFAQ@murata.com with “Github” in the subject line.
- The “**master**” branch in “**cyw-fmac**” repository corresponds to the latest “fmac” release – in this case “**battr**a”. If the user is checking for latest patches to “fmac” driver, then it is recommended to check “**drivers/net/wireless/broadcom/brcm80211**” folder in <https://github.com/murata-wireless/cyw-fmac>.

Table 4: Murata Github Repositories used in “fmac” build

Murata Github Repository Name	Branch Names	Current Release / Tag Names	Contents
“meta-murata-wireless”	<p>“master”</p> <p>“imx-rocko-manda”</p> <p>“imx-rocko-mothra”</p> <p>“imx8-morty-battra”</p> <p>“imx8-morty-orga”</p> <p>“imx-morty-manda”</p> <p>“imx-morty-mothra”</p> <p>“imx-morty-battra”</p> <p>“imx-morty-orga”</p> <p>“imx-krogoth-manda”</p> <p>“imx-krogoth-mothra”</p> <p>“imx-krogoth-battra”</p> <p>“imx-krogoth-orga”</p> <p>Github Listing</p>	<p>“imx-rocko-manda_r1.0”</p> <p>“imx-rocko-mothra_r1.0”</p> <p>“imx8-morty-battra_r1.0”</p> <p>“imx8-morty-orga_r1.1”</p> <p>“imx-morty-manda_r1.0”</p> <p>“imx-morty-mothra_r1.0”</p> <p>“imx-morty-battra_r1.0”</p> <p>“imx-morty-orga_r1.2”</p> <p>“imx-krogoth-manda_r1.0”</p> <p>“imx-krogoth-mothra_r1.0”</p> <p>“imx-krogoth-battra_r1.0”</p> <p>“imx-krogoth-orga_r1.1”</p> <p>Github Listing</p>	<p>“meta-murata-wireless” customized recipe layer. It drops into existing Yocto build environment. “master” branch only contains build script utilities – key starting point for user wanting to generate an image.</p>
“cyw-fmac”	<p>“master”</p> <p>“imx-rocko-manda”</p> <p>“imx-rocko-mothra”</p> <p>“imx8-morty-battra”</p> <p>“imx8-morty-orga”</p> <p>“imx-morty-manda”</p> <p>“imx-morty-mothra”</p> <p>“imx-morty-battra”</p> <p>“imx-morty-orga”</p> <p>“imx-krogoth-manda”</p> <p>“imx-krogoth-mothra”</p> <p>“imx-krogoth-battra”</p> <p>“imx-krogoth-orga”</p> <p>Github Listing</p>	<p>“imx-rocko-manda_r1.0”</p> <p>“imx-rocko-mothra_r1.0”</p> <p>“imx8-morty-battra_r1.0”</p> <p>“imx8-morty-orga_r1.0”</p> <p>“imx-morty-manda_r1.0”</p> <p>“imx-morty-mothra_r1.0”</p> <p>“imx-morty-battra_r1.0”</p> <p>“imx-morty-orga_r1.0”</p> <p>“imx-krogoth-manda_r1.0”</p> <p>“imx-krogoth-mothra_r1.0”</p> <p>“imx-krogoth-battra_r1.0”</p> <p>“imx-krogoth-orga_r1.0”</p> <p>Github Listing</p>	<p>“fmac” backports tarball extracted from official Cypress release with some modifications. Links to original Cypress releases provided below.</p> <p>“manda”:</p> <p>Private: https://community.cypress.com/docs/DOC-15932</p> <p>Public: https://community.cypress.com/docs/DOC-15932</p> <p>“battra”: “cypress-backports-v4.14-2018_0321.zip”</p> <p>“orga”: “cypress-fmac-v4.12-2018_0205.zip”</p> <p>NOTE: “master” branch includes latest fixes on most recent “fmac” release (i.e. “manda”).</p>
“cyw-fmac-fw”	<p>“master”</p> <p>“manda”</p> <p>“mothra”</p> <p>“battra”</p> <p>“orga”</p> <p>Github Listing</p>		<p>WLAN production firmware files (including any applicable “CLM blob” files) for following modules: SN8000, 1FX, 1DX/1LN, 1BW, 1LV, ZP/1CK, 1MW/1LC/1HK, 1BB, and 1CX/1DK.</p>
“cyw-fmac-nvram”	<p>“master”</p> <p>“manda”</p> <p>“mothra”</p> <p>“battra”</p> <p>“orga”</p> <p>Github Listing</p>		<p>WLAN NVRAM files (customized by Murata with Cypress guidance) for following modules: SN8000, 1FX, 1DX/1LN, 1BW, 1LV, ZP/1CK, 1MW/1LC/1HK, 1BB, and 1CX/1DK.</p>

Murata Github Repository Name	Branch Names	Current Release / Tag Names	Contents
"cyw-fmac-utils-imx32"	"master" "manda" "mothra" "battra" "orga" Github Listing		"wl" tool binary pre-compiled for i.MX 32-bit.
"cyw-fmac-utils-imx64"	"master" "manda" "mothra" "battra" "orga" Github Listing		"wl" tool binary pre-compiled for i.MX 64-bit.
"cyw-bt-patch"	"master" "rocko-manda" "rocko-mothra" "morty-manda" "morty-mothra" "morty-battra" "morty-orga" "krogoth-manda" "krogoth-mothra" "krogoth-battra" "krogoth-orga" Github Listing		Bluetooth patchfiles (*.hcd) which are used during Linux/BlueZ "hciattach" call to configure BT core. Bluetooth patchfiles for following modules: 1DX/1LN, 1BW, 1LV, ZP/1CK, 1MW/1LC/1HK, 1BB, and 1CX/1DK.

Legacy Document

Digging deeper into the Murata Github repositories:

- **“meta-murata-wireless”** repository is the **“driver’s seat”**. It determines which branches/releases of other branches are pulled into the Yocto build. This repository versions the Murata-customized Yocto layer which is copied into the Yocto **“sources”** sub-folder. In this Yocto build implementation, each i.MX/kernel/fmac implementation is independent. As such, there can be no single **“master”** branch that is the latest/greatest for all these unique branches. However, the **“master”** branch does contain a unique sub-folder **“cyw-script-utils”** with Linux scripts for assisting the user on automatically building a customized i.MX image.
- **“cyw-fmac”** contains the backport tool source used to backport the **“fmac”** driver and the actual WLAN **“fmac”** driver code: see sub-folder **“/drivers/net/wireless/broadcom/brcm80211/brcmfmac”**. The backport tool source is customized by Cypress to correct various issues/errata. Unlike the **“brcmfmac”** integrated into the Linux kernel GIT (<https://git.kernel.org/pub/scm/linux/kernel/git/torvalds/linux.git>), this release is configured/tested/released by the Cypress team. The integrated backport tool (refer to https://backports.wiki.kernel.org/index.php/Main_Page) allows the **“fmac”** driver to be “dropped into” any Linux kernel version from 3.0 to 4.12(**“orga”**)/4.14(**“battra”**)/4.14(**“mothra”**)/4.14(**“manda”**). The **“manda”** release is a bigger/better version of **“orga”** as it provides support for more recent kernel versions (version 4.14 compared to 4.12) and includes fixes/enhancements not in previous releases. The **“meta-murata-wireless”** layer uses this repository to dynamically backport the **“fmac”** driver to the various supported i.MX kernel versions. **NOTE:** the i.MX kernel does include **“drivers/net/wireless/broadcom/brcm80211/brcmfmac”** – please ignore this driver source code. It is very important that this **internal “brcmfmac”** driver is disabled to avoid any conflicts with the Cypress **“fmac”** implementation.
- Except **“master”** (and minor revisions to **“meta-murata-wireless”**), there is a one-to-one mapping of branches between the **“meta-murata-wireless”** and **“cyw-fmac”** repositories. i.e. **“imx-morty-battra”** branch of **“meta-murata-wireless”** backports/compiles the **“fmac”** source code from the same branch in **“cyw-fmac”**. **NOTE:** **“meta-murata-wireless”** does not compile the **“fmac”** source from **“master”** branch of **“cyw-fmac”** repository. This is because each **“meta-murata-wireless”** branch is dependent not just on the **“fmac”** version, but also the CPU selected (i.e. **“imx8”** or **“imx”**) and the Yocto version (i.e. **“krogoth”** or **“morty”**).
- The **“cyw-bt-patch”** repository uses branch names keying off the kernel (Yocto codename) and **“fmac”** versions. This is done to better manage kernel-specific issues - particularly regarding BlueZ stack implementation (default i.MX Yocto stack implementation).
- The remaining repositories (**“cyw-fmac-fw”**, **“cyw-fmac-nvram”**, **“cyw-fmac-utils-imx32”**, and **“cyw-fmac-utils-imx32”**) key off the Cypress **“fmac”** driver codename – in this case **“battra”** or **“orga”**. **“meta-murata-wireless”** only pulls from the Cypress codename branch; it does not pull from **“master”**. If the user needs the (not yet officially released) updates from a given **“master”** branch, they should download the files from Murata Github manually and install them on their Linux file system (or modify their own customized Yocto build).
- The **“cyw-fmac-nvram”** repository includes a **“murata-master”** sub-folder. This sub-folder contains additional NVRAM files (text format) to provide comprehensive support for all Murata modules. This is necessary due to how the WLAN driver (**“fmac”**) is implemented. When the

“**fmac**” driver loads, it looks for specific filename formats for both WLAN NVRAM and optional regulatory conformance file (CLM Blob) in the “**/lib/firmware/brcm**” folder:

- “**brcmfmac**” + <CYW chipset number> + <“-sdio” or “-pcie”> + “.txt”
- “**brcmfmac**” + <CYW chipset number> + <“-sdio” or “-pcie”> + “.clm_blob”

The “**murata-master**” sub-folder contains additional NVRAM files which are not the “Cypress Chipset Default” module. The default modules include: ZP(CYW4339), 1MW(CY43455), and 1CX(CYW4356). **NOTE:** the “**fmac**” driver requires that if the user needs to use a “non-default” Murata module, then the NVRAM file being copied into the “**/lib/firmware/brcm**” folder needs to have the module-identifying string removed. For more details refer to the [Quick Start Guide](#).

The “**cyw-bt-patch**” repository includes a “**murata-master**” sub-folder. This sub-folder contains additional Bluetooth patchfiles necessary to comprehensively support all Murata modules. This is necessary due to the BT Stack (BlueZ) implementation. To initialize the BT core, the BlueZ function “**hciattach**” is called and searches a Bluetooth patchfile with format: “**BCM**” + <CYW chipset number> + <CYW chipset version> + <Addl Chars> + “.hcd”

NOTE: “BCM” not “CYW” is first character string. The “**Addl Chars**” field provides flexibility, thereby allowing Murata to add the module name so Bluetooth patchfiles can be distinguished between different modules with same Cypress chipset. Unfortunately, this “free field” is not possible with the “**fmac**” driver implementation. For more details refer to the [Quick Start Guide](#).

2.3 “**fmac**” Backport Implementation

Many users may already be familiar with “**brcmfmac**” open source driver. This WLAN driver is an established part of the Linux kernel. If the user clones the Linux kernel repository at <https://git.kernel.org/pub/scm/linux/kernel/git/torvalds/linux.git>, the latest “**brcmfmac**” source code is at “**/drivers/net/wireless/broadcom/brcm80211/brcmfmac**”. Both Broadcom and Cypress contribute to this release, pushing their latest code updates and fixes. By comparison to the *true* open source “**brcmfmac**” driver, the key attributes to consider regarding the Cypress “**fmac**” release include:

- The driver release follows formal software development practices. It is configured, tested, and released every three (3) to four (4) months. Currently four releases are available: “**manda**”, “**mothra**”, “**battr**” and “**orga**”. It is recommended that the user updates to latest “**fmac**” driver version.
- Key components such as WLAN firmware binaries, along with WPA supplicant and Hostapd (including patches) are tested and released with the “**fmac**” driver.
- The “**fmac**” driver release is integrated with Linux backport tool. For more details on backport refer to https://backports.wiki.kernel.org/index.php/Main_Page. The key attraction here is that the *same* Cypress “**fmac**” source code release can be evaluated on different kernel versions. Also, the backport tool provides “automatic” porting – something which the “**meta-murata-wireless**” layer invokes dynamically during the Yocto i.MX image build.
- Lastly, Cypress and Murata **only support** the formal “**fmac**” driver release.

2.4 “*meta-murata-wireless*”: Pulling it All Together

2.4.1 What does “*meta-murata-wireless*” do exactly?

Quick recap on the essential ingredient in arriving at the correctly configured, “*fmac*”-enabled i.MX image. Murata’s customized Yocto layer “*meta-murata-wireless*” seamlessly disables the existing “*bcmdhd*” WLAN driver and pulls in the “*fmac*” driver implementation. More specifically it provides the following enhancements/customizations:

- Pull Cypress “*fmac*” driver and run backports tool during Yocto build to generate necessary driver modules.
- Additional/necessary patches to Cypress “*fmac*” driver for i.MX implementation.
- i.MX Linux kernel customizations to support “*fmac*” driver with OOB IRQ interrupts.
- Provide ultra-high speed (UHS) SDIO operation for WLAN interface to i.MX6UL(L), i.MX6SX, and i.MX7ULP platforms with 1.8V VIO configuration.
- WLAN production firmware files.
- Murata NVRAM files for correctly configuring WLAN RF.
- Example Bluetooth patchfiles.
- WL tool binary necessary for interoperability and RF testing.
- Hostapd (Version 2.6) configuration with specific patch release.
- Hostap-conf enablement.
- Hostap-utils enablement.
- WPA-supPLICANT (Version 2.6) configuration with specific patch release.
- Wi-Fi Direct (P2P) enablement.

For a Yocto primer, please refer to https://wiki.yoctoproject.org/wiki/Main_Page. For specifics on the i.MX Yocto implementation, refer to **Table 2: NXP Reference Documentation Listing** to obtain the i.MX Yocto Project User’s Guide.

2.4.2 The Contents of “*meta-murata-wireless*”

“*meta-murata-wireless*” is a Murata-customized Yocto layer. Each Yocto layer resides in the “*sources*” sub-folder. Murata’s implementation follows the Yocto “norm” with some minor exceptions due to required backport implementation. If you are planning on customizing or porting the Murata implementation, **please read** this section carefully. First off, refer to **Table 5** for a description of important folders/files in the “*meta-murata-wireless*” layer. Adding some more detail to the entries in **Table 5**:

- “*cyw-script-utils/latest*”: contains “*Host_Setup_for_Yocto.sh*” and “*Murata_Wireless_Yocto_Build.sh*” script files. Refer to **Section 4.2** for more details on how these script files accelerate the Linux image build process.
- “*add-murata-layer-script/add-murata-wireless.sh*”: this is the “hook”. When run, it will insert necessary code into the current i.MX Yocto build to pull in “*meta-murata-wireless*” layer. This script is run after i.MX Yocto build environment setup and i.MX target/graphics selection. It **should only be run once** for any given/unique build directory.

- **“conf/layer.conf”**: setting priorities for layers pulled into the Yocto build is **very important**. **“meta-murata-wireless”** is set to the highest priority (9) which guarantees that its packages will be compiled in if there is any conflict. As a specific example, there is “competition” between two WPA supplicant packages. One is included in **“meta-murata-wireless”** and the other is **“meta”** (i.MX default version). **“meta”** layer priority is 5, so the WPA supplicant package it pulls in will not be part of the image (version 2.5). Rather, the **“meta-murata-wireless”** WPA supplicant package (version 2.6) with associated/configured/tested patches is compiled into the i.MX image.
- **“freescale/imx6ulevk.conf”**: When compiling i.MX image for i.MX6UL(L) EVK, this file is critical. It pulls in the necessary DTB files to the image – otherwise the resulting SD card image would not have the correct Device Tree Blob (DTB) file to configure the kernel when the platform boots.
- **“recipes-connectivity/hostapd”**: this folder contains the recipe file that configures the Hostapd version (i.e. **“hostapd_2.6.bb”**). The **“hostapd”** sub-folder contains Hostapd patches, and necessary configuration files. **NOTE:** every release of **“fmac”** is configured for a specific Hostapd. As such, it is **extremely important** that the user does not deviate from this Hostapd configuration.
- **“recipes-connectivity/backporttool-native/backporttool-native_1.0.bb”**;
“recipes-kernel/backporttool-linux/backporttool-linux_1.0.bb”: These are the two key recipes that dynamically backport the **“fmac”** driver during the Yocto build. For more details, refer to **Section 2.4.3**.
- **“recipes-connectivity/murata-binaries/murata-binaries_1.0.bb”**: this recipe installs the following files:
 - WLAN firmware/regulatory files from <https://github.com/murata-wireless/cyw-fmac-fw> repository into **“/lib/firmware/brcm”** folder.
 - Bluetooth (**“*.hcd”**) patchfiles from <https://github.com/murata-wireless/cyw-bt-patch> into **“/etc/firmware”** folder.
 - WLAN NVRAM files from <https://github.com/murata-wireless/cyw-fmac-nvram> into **“/lib/firmware/brcm”** folder.
 - **“wl”** tool binary from <https://github.com/murata-wireless/cyw-fmac-utils-imx32> or <https://github.com/murata-wireless/cyw-fmac-utils-imx64> into **“/usr/sbin”** folder. **NOTE:** the **“wl”** tool binary differs for i.MX 32 and 64 bit architecture.
- **“recipes-connectivity/wpa-supPLICANT”**: this folder contains the recipe file that configures the WPA Supplicant version (i.e. **“wpa-supPLICANT_2.6.bb”**). The **“wpa-supPLICANT”** sub-folder contains WPA Supplicant patches, and necessary configuration files. **NOTE:** every release of **“fmac”** is configured for a specific WPA Supplicant. As such, it is **extremely important** that the user does not deviate from this WPA Supplicant configuration.
- **“recipes-kernel/firmware-imx/firmware-imx_6.0.bbappend”**: the default i.MX image includes WLAN firmware/NVRAM (**“/lib/firmware/bcm”**), and Bluetooth patchfiles (**“/etc/firmware”**) that need to be removed. This ensures that the user will use the properly configured files installed by the **“murata-binaries_1.0.bb”** recipe.

Table 5: Important folders/files in “meta-murata-wireless”

“meta-murata-wireless” folder/file	Notes
cyw-script-utils/latest/	Murata automated script files for host setup and i.MX Yocto build.
add-murata-layer-script/ add-murata-wireless.sh	Script file which modifies “ bblayer.conf ” and “ local.conf ”; thereby enabling the Murata-customized “ fmac ” implementation for current “ target ” build.
conf/layer.conf	Enable “ meta-murata-wireless ” bbappend files and set priority for “ meta-murata-wireless ” layer. NOTE: priority setting is important to avoid conflicts with multiple recipes in Yocto implementation such as WPA supplicant, Hostapd, etc.
freescale/imx6ulevk.conf	Ensures that all necessary i.MX6UL(L) Device Tree Blob (DTB) files are included in boot folder of generated i.MX image. Not applicable to non-i.MX6UL(L) platforms.
recipes-connectivity/ hostapd/	Configure and patch Hostapd.
recipes-connectivity/ backporttool-native/ backporttool-native_1.0.bb	Recipe file that uses native make (x86_64-linux) to produce local tools and generate .config file used in backport process.
recipes-connectivity/ murata-binaries/murata-binaries_1.0.bb	Installs WLAN firmware, Bluetooth patch, WLAN NVRAM, WLAN regulatory (CLM_blob), and “ wl ” binary files on root file system.
recipes-connectivity/ wpa-supPLICANT/	Configure and patch WPA supplicant.
recipes-kernel/ backporttool-linux/ backporttool-linux_1.0.bb	Recipe that generates WLAN driver files (including cross-compilation step) and copies them to root file system. From “ <u>/lib/modules/\${KERNEL_VERSION}/kernel/</u> ” folder: <ul style="list-style-type: none"> - “drivers/net/wireless/broadcom/brcm80211/brcmfmac/brcmfmac.ko” - “drivers/net/wireless/broadcom/brcm80211/brcmutil/brcmutil.ko” - “compat/compat.ko” - “net/wireless/cfg80211.ko”
recipes-kernel/ firmware-imx/ firmware-imx_6.0.bbappend	Appends to the default i.MX recipe “ meta-fsl-bsp-release/imx/meta-bsp/recipes-bsp/firmware-imx/firmware-imx_6.0.bb ”; taking the following actions: <ul style="list-style-type: none"> - delete “/lib/firmware/bcm” folder which contains legacy WLAN firmware and NVRAM files (used to support “bcmdhd”). - delete legacy Bluetooth patchfiles (“*.hcd” files) included in “/etc/firmware/”.
recipes-kernel/ linux-firmware/ linux-firmware_git.bbappend	Appends to the default i.MX recipe “ poky/meta/recipes-kernel/linux-firmware/linux-firmware_git.bb ” which pulls various firmware files and writes them to “ /etc/firmware ” folder. The bbappend file removes the “ /lib/firmware/brcm ” folder and all its contents. This is important so that only the specific configured contents (NVRAM, firmware, etc.) for the given “ fmac ” driver implementation is written to this folder.
recipes-kernel/ linux/ linux-imx_<Kernel Version>.bbappend	Appends to the default i.MX recipe “ meta-fsl-bsp-release/imx/meta-bsp/recipes-kernel/linux/linux-imx_<Kernel Version>.bb ”. This file patches the i.MX kernel and makes any necessary changes to the kernel configuration file (“ .config ”). Optional bbappend files are included in this folder for specific VIO or SDIO clock configurations. NOTE: currently i.MX6UL(L), i.MX6SX, and i.MX7ULP have customized bbappend files so user can configure VIO to 1.8V VIO or enable UHS (SDIO 3.0) mode.
recipes-kernel/ linux/ linux-imx-<Kernel Version>/	Kernel patch files. Some of the patches implement specific VIO configuration settings so that the kernel is specific for a given i.MX platform: i.MX6UL(L), i.MX6SX, and i.MX7ULP all connect to Murata Wi-Fi SDIO interface with different MMC slots.

- **“*recipes-kernel/linux-firmware/linux-firmware_git.bbappend*”**: removes **“*lib/firmware/brcm*”** folder and all its contents. This ensures that a clean install (with correct NVRAM, firmware, and regulatory files) is done by the **“*murata-binaries_1.0.bb*”** recipe.
- **“*recipes-kernel/linux/linux-imx_<Kernel Version>.bbappend*”**: As already described in the table, this file makes additional changes to the i.MX Linux kernel and **“.config”** file. The default recipe configures all i.MX VIO for 3.3V. However, there are additional recipe files provided to configure specific platforms for 1.8V VIO: i.MX6UL(L), i.MX6SX, and i.MX7ULP. Configuring VIO for 1.8V allows SDIO 3.0 (UHS) modes. Referring to **Table 6**, you will also see that some module EVK’s require 1.8V VIO (Type 1LV).
- **“*recipes-kernel/linux/linux-imx-<Kernel Version>”***: this folder contains all the patches applied to the i.MX kernel. The **“*linux-imx_<Kernel Version>.bbappend*”** recipe selects which patches to apply.

2.4.3 Dynamic “*fmac*” Backport Steps Explained

This section explains the most difficult implementation piece of **“*meta-murata-wireless*”** – especially for individuals new to Yocto. There are two phases involved in building the **“*fmac*”** driver. They are:

- **1st Phase:**
Generation of **“.config”** file using **“*backporttool-native_1.0.bb*”** recipe.
- **2nd Phase:**
Generation of **“.ko”** (Kernel Object – WLAN driver) files using **“*backporttool-linux_1.0.bb*”** recipe.

Each of the two phases is broken down to three steps: input, build and output; with specific details on each step. To provide more specifics, we use the **“*linux-morty-battra_r1.0*”** release as an example. Refer to **Table 4** for more branch and release information or browse the branches/releases directly on Murata Github: <https://github.com/murata-wireless/meta-murata-wireless>.

2.4.3.1 1st Phase: Generation of “.config” file using “*backporttool-native_1.0.bb*” recipe

Input:

Source file for building **“*fmac*”** driver is fetched from Murata Github location:
https://github.com/murata-wireless/cyw-fmac/blob/imx-morty-battra/imx-morty-battra_r1.0.tar.gz.

Yocto framework extracts the tar file and places the source files in the following location:

“*<fsl-bsp-release-dir>/<build-dir>/tmp/work/x86_64-linux/backporttool-native/1.0-r0/imx-morty-battra_r1.0*”.

Build:

Key instructions:

- i) the **DEPENDS = "linux-imx"** line (in "**backporttool-native_1.0.bb**" recipe) notifies Yocto build framework to first compile Linux kernel and then compile "**backporttool-native**" recipe.
- ii) Compilation of source code is performed using native make (x86_64-linux) to produce **".config"** file. The "**inherit native**" line (in "**backporttool-native_1.0.bb**") instructs the compiler to use native make instead of Yocto toolchain settings.

Steps for compilation:

Function "**do_compile()**" in "**backporttool-native**" performs the compilation.

- i) Copies source files to folder: "**backporttool-native-1.0**"
- ii) Following commands are used to generate **".config"** file:

```
oe_runmake KLIB="{STAGING_KERNEL_DIR}"  
KLIB_BUILD="{STAGING_KERNEL_BUILDDIR}" defconfig-brcmfmac
```

Key Parameters are explained as follows:

- "**oe-runmake**": make compilation tool
- "**KLIB**": points to kernel path
- "**KLIB_BUILD**": points to kernel build path
- "**defconfig-brcmfmac**": default configuration file for using brcmfmac (AKA "**fmac**")

Output:

Generated **".config"** file can be found in: "**<fsl-bsp-release-dir>/<build-dir>/tmp/work/x86_64-linux/backporttool-native/1.0-r0/backporttool-native-1.0**".

2.4.3.2 2nd Phase: Generation of **".ko"** (Kernel Object – WLAN Driver) files using "**backporttool-linux_1.0.bb**" recipe.

Input:

All output files from 1st phase are used as input for 2nd phase.

FROM: "**<fsl-bsp-release-dir>/<build-dir>/tmp/work/x86_64-linux/backporttool-native/1.0-r0/backporttool-native-1.0**"

TO: "**<fsl-bsp-release-dir>/<build-dir>/tmp/work/<machine-poky-linux-gnueabi>/backporttool-linux/1.0-r0/backporttool-linux-1.0**"

Build:

Key instructions:

The **DEPENDS += "backporttool-native"** line instructs Yocto to compile the "backporttool-native" recipe first and then *backporttool-linux*.

Steps for compilation:

The following commands are used to generate ".ko" files:

```
oe_runmake KLIB="${STAGING_KERNEL_DIR}"  
KLIB_BUILD="${STAGING_KERNEL_BUILDDIR}" modules
```

During this stage, target toolchain (Ex: "*imx6ulevk-poky-linux-gnueabi*") is used to build the backports tool and produce necessary ".ko" ("*compat*", "*cfg80211*", "*brcmutil*", "*brcmfmac*") driver files.

Output:

Generated ".ko" files are found in sub-folders of "*backporttool-linux-1.0*":

- "*compat.ko*": /compat/
- "*cfg80211.ko*": /net/wireless/
- "*brcmutil.ko*": /drivers/net/wireless/broadcom/brcm80211/brcmutil/
- "*brcmfmac.ko*": /drivers/net/wireless/broadcom/brcm80211/brcmfmac/

2.4.4 Staging Directories: Important Note!

Both recipes ("*backporttool-native_1.0.bb*" and "*backporttool-linux_1.0.bb*") use staged kernel directory paths. i.e. Both recipes need kernel source and kernel build output paths used by "*linux-imx*" recipe.

The reason for using staged kernel directory is because "*linux-imx*" recipe makes the kernel source code and libraries available for use by other recipes through Staging.

"*linux-imx*" recipe removes the temporary build outputs after backport recipes finishes building ".ko" WLAN driver files. Hence, it is recommended, that, **user doesn't build the "fmac" driver recipes standalone.**

If any changes are made to the kernel source, it is strongly recommended that the user always builds the kernel using the command, "**bitbake fsl-image-validation-imx**". This will, in turn, build "*fmac*" backports as well – **because** backports depends on "*linux-imx*" recipe.

3 i.MX HW/SW Configurations Supported with What Murata Modules?

Table 6 provides an overview i.MX Reference versus Murata module matrix. An additional column is included to provide a quick Cypress chipset lookup for the different Murata module names. For a given i.MX platform and Murata module, you can quickly look up the compatibility. Providing more details on the terminology used in the table:

- **“NC”** means not compatible. This is due to one or both of the following reasons:
 - VIO incompatible: module requires VIO voltage level that the i.MX HW cannot provide.
 - Bus (SDIO, PCIe, UART) interconnect not available.
- **“RW”** means rework required. Murata only recommends this configuration if the user is willing to spin additional cycles on customizing the interconnect. These configurations are currently not supported. Contact Murata directly with any questions.
- **“DRW”** means difficult rework required. This configuration is not recommended and not supported by Murata.
- **“Y”** or **GREEN** text means that the configuration **is** supported. The entries with green text provide the following information:
 - VIO supported with corresponding interrupt configuration. There are two VIO's (1.8V and 3.3V). When configuring some of the i.MX platforms (i.MX 6UL(L) and 6SoloX) for 1.8V VIO operation, there is a limitation on control signal voltage levels. More specifically the WL_REG_ON, BT_REG_ON, WL_HOST_WAKE pins are configured for 3.3V at i.MX processor end (even though rest of platform is running @1.8V). To ensure reliability the interrupt configuration is changed to SDIO in-band to avoid possible unreliability issues (i.e. WL_HOST_WAKE driven at 1.8V VIO with i.MX pin (GPIO) configured for 3.3V VIO).
 - To further explain the VIO/interrupt configuration. “Out” denotes out-of-band signaling: this is when WL_HOST_WAKE line is used and the i.MX requires a dedicated GPIO to monitor the interrupt. “In” denotes SDIO-in-band signaling. The i.MX SDIO host controller monitors for interrupt status on the SDIO_DATA_1 line.
 - Maximum SDIO clock frequency. Some modules only support SDIO 2.0, thereby limiting SDIO clock frequency to 50 MHz. When the i.MX platform only supports 3.3V VIO over SDIO bus, then that also limits SDIO bus frequency to 50 MHz. For i.MX/module configurations that both support SDIO 3.0 (UHS mode), then the SDIO clock can go up to 200 MHz (i.MX 6SoloX and 6UL). **NOTE:** The i.MX 6ULL platform has a maximum SDIO clock of 132 MHz.
- The i.MX 8MQuad (with Murata Type 1CX) supports WLAN PCIe interface with BT UART and PCM. A special Murata M.2 interconnect board is required for this combination. PCM is only enabled by minor rework on the i.MX 8MQuad platform.
NOTE: for more specifics on HW interconnect, please reference the [Hardware User Manual](#).

Table 6: NXP i.MX EVK / Murata Module Matrix

Murata Module	CYW Chipset	6UL(L)	6SL	6SX	6Q(P)/DL	7D	7ULP	8MQ
SN8000	43362	3.3V=Out 50 MHz	3.3V=Out 50 MHz	3.3V=Out 50 MHz	3.3V=Out 50 MHz	DRW	DRW	NC
1FX	43364	1.8V=In 3.3V=Out 50 MHz	3.3V=Out 50 MHz	1.8V=In 3.3V=Out 50 MHz	3.3V=Out 50 MHz	DRW	DRW	NC
1DX / 1LN	4343W	1.8V=In 3.3V=Out 50 MHz	3.3V=Out 50 MHz	1.8V=In 3.3V=Out 50 MHz	3.3V=Out 50 MHz	DRW	DRW	NC
1BW	43340	1.8V=In 3.3V=Out 50 MHz	3.3V=Out 50 MHz	1.8V=In 3.3V=Out 50 MHz	3.3V=Out 50 MHz	DRW	DRW	NC
ZP / 1CK	4339	1.8V=In 3.3V=Out 200 MHz	3.3V=Out 50 MHz	1.8V=In 3.3V=Out 200 MHz	3.3V=Out 50 MHz	ZP onboard	DRW	NC
1MW / 1LC	43455	1.8V=In 3.3V=Out 200 MHz	3.3V=Out 50 MHz	1.8V=In 3.3V=Out 200 MHz	3.3V=Out 50 MHz	DRW	DRW	NC
1HK	43455	1.8V=In 200 MHz	NC	1.8V=In 200 MHz	NC	DRW	DRW	NC
1LV	43012	1.8V=In 50 MHz	NC	1.8V=In 50 MHz	NC	DRW	DRW	NC
1BB	4354	1.8V=In 3.3V=Out 200 MHz	3.3V=Out 50 MHz	1.8V=In 3.3V=Out 200 MHz	3.3V=Out 50 MHz	DRW	DRW	NC
1CX / 1DK	4356	NC	NC	RW	RW	RW	NC	Y

Y = Supported NC = Not Compatible RW = Rework Req'd DRW = Difficult Rework Req'd

Additional information is provided for WLAN-SDIO configurations.

The VIO and Interrupt Configuration is listed as: <VIO>=<In | Out>

VIO is 1.8V or 3.3V with corresponding supported interrupt configuration.

"In" is SDIO-in-band interrupts; "Out" is Out-of-Band IRQ (Host GPIO Req'd)

MAX SDIO Clock frequency is listed:

For 3.3V VIO; MAX SDIO clock frequency is 50 MHz.

MAX frequency for dual 1.8/3.3V support only applies to 1.8V VIO (i.e. UHS).

4 Finally... Building i.MX Yocto Linux!

4.1 i.MX Yocto Build: Overview

If possible, Murata would gladly provide i.MX image binary with built-in “fmac” release. However, there are certain 3rd-party IP restrictions that prevent us from doing so (3rd-party drivers that are integrated into the baseline NXP i.MX image). Given this restriction, it is necessary for the end user to arrive at their own “SD card” image. We provide two paths to arrive at the necessary image:

- a) Follow manually documented steps. Intended for users with reasonable familiarity of Linux and Yocto: refer to **Section 4.3**. For users familiar with “meta-murata-wireless” implementation, all the steps from **Section 4.3** are repeated in a condensed version: **Section 4.4**.
- b) Execute Murata automated build script. This is intended to ease the “start up” phase. However, the user does need to install Ubuntu on a machine (PC or virtual environment). If selecting this (easier option) then please refer to **Section 4.2**.

4.2 i.MX Yocto Build: The Fast Track (In a Hurry or Linux Beginner?)

4.2.1 Install Ubuntu

First step is to install Ubuntu 12.04, 14.04 or 16.04 (Murata’s build is verified on Ubuntu 16.04 64-bit install) on the host - native PC or virtual environment like VMware. Host PC typically used has Ubuntu 16.04/14.04/12.04 installed with 50 GB free disk space (80 GB needed for i.MX8 build).

NOTE: Murata has verified these build steps using Ubuntu 16.04 (x64). For more information on the Ubuntu download, please refer to this link: <https://www.ubuntu.com/download/desktop>. The Ubuntu installation manual is provided [here](#).

4.2.2 Download Murata’s Script Files

With Ubuntu installed, we need to get the script files downloaded. There are a couple of quick options here:

- a) Using “web browser” option to download “meta-murata-wireless” zip file and extract:
 - Click on “clone or download” button at: <https://github.com/murata-wireless/meta-murata-wireless>.
 - Now select “Download ZIP” option.
 - Once the file is downloaded, extract it with “unzip” command or folder UI.
 - Now go to the “meta-murata-wireless-master/cyw-script-utils/latest” folder where the necessary README and script files are contained.

OR:

- b) Use “**wget**” command to pull specific files from Murata Github (**NOTE**: we need to set script files as executable afterwards with “**chmod a+x**” command because “wget” does not maintain the file permissions correctly):

```
wget --no-check-certificate --content-disposition https://github.com/murata-wireless/meta-murata-wireless/raw/master/cyw-script-utils/latest/README.txt
```

```
wget --no-check-certificate --content-disposition https://github.com/murata-wireless/meta-murata-wireless/raw/master/cyw-script-utils/latest/Host_Setup_for_Yocto.sh
```

```
wget --no-check-certificate --content-disposition https://github.com/murata-wireless/meta-murata-wireless/raw/master/cyw-script-utils/latest/Murata_Wireless_Yocto_Build.sh
```

```
chmod a+x *.sh
```

4.2.3 Configure Ubuntu for i.MX Yocto Build

Next step is configuring Ubuntu for Yocto build. Please run Murata’s host setup script (**should already be downloaded at this stage**): “[Host_Setup_for_Yocto.sh](#)”. To examine the plain ASCII text version, you can go to [this link](#) or just hit the “Raw” button. For more information (README file), just go to the main folder: <https://github.com/murata-wireless/meta-murata-wireless/tree/master/cyw-script-utils/latest>. The “latest” folder is used to maintain the most recent/up-to-date script.

Murata’s script installs necessary additional packages required for the Yocto build. For additional information, refer to [NXP Yocto Project User’s Guide \(part of NXP Reference Documents release\)](#). Murata’s script will prompt user for password – as supervisory access is needed to install various packages. GIT is also configured so it can be used later during the build process. For more information on first-time GIT setup, you can refer to this [link](#).

Running the script file is straightforward. Simply invoke at Ubuntu “terminal” prompt (folder location is not important):

```
./Host_Setup_for_Yocto.sh
```

The script goes through the following stages:

- 1) Verifying Host Environment
- 2) Verifying Host Script Version
- 3) Installing Essential Yocto host packages
- 4) GIT Configuration: verifying User name and email ID
- 5) Install toolchain for TI Sitara (Note: This step is for users who are using TI Sitara platforms).

For an example input/output sequence, refer to Appendix C.

4.2.4 Murata's i.MX Yocto Build Script

With Ubuntu installed and configured to build i.MX Yocto, please run the build script (**should already be downloaded at this stage**): "[Murata Wireless Yocto Build.sh](#)". For plain ASCII text version, you can go to [this link](#) or just hit the "Raw" button. For more information (README file), just go to the main folder: <https://github.com/murata-wireless/meta-murata-wireless/tree/master/cyw-script-utils/latest>. The "latest" folder is used to maintain the most recent/up-to-date script.

Prior to running Murata's build script, make sure you have completed the following:

- Installed 64-bit version of Ubuntu 16.04 (preferred), 14.04, or 12.04.
- Ran Murata's host setup script in **Section 4.2.3** to add necessary packages for Yocto build and configure GIT.
- Created a i.MX BSP folder **specific** to the desired i.MX Yocto Release. The i.MX Yocto distribution **cannot** build different versions of Yocto (Linux kernel) in the same folder. Currently the following Yocto releases are supported:
 - 4.9.88_2.0.0 GA
 - 4.9.51 8MQuad Beta
 - 4.9.11_1.0.0 GA
 - 4.1.15_2.0.0 GA
- Once the build script successfully completes, the i.MX BSP folder will contain:
 - Yocto "**sources**" and "**downloads**" folder.
 - "**meta-murata-wireless**" folder – is a sub-folder of "**sources**".
 - One or more i.MX build folders.

NOTE: when creating a i.MX BSP folder (**`$BSP_DIR`** or "**murata-imx-bsp**" used to reference this all-important folder later in this document), make sure that no parent folder contains a "**.repo**" folder.

Murata's build script performs the following tasks:

- Verifies host environment (i.e. Ubuntu 12.04/14.04/16.04).
- Check to make sure script being run is latest version.
- Prompts user to select release type:
 - "**Stable**" corresponds to "**meta-murata-wireless**" release/tag (rather than branch). Murata tests wireless functionality on i.MX platforms for each release/tag. This release type is recommended for baseline image builds or initial bring-up testing.
 - "**Developer**" corresponds to a branch which can be a "moving target". When performing the automated build, the script file pulls the latest branch contents – as opposed to a specific GIT commit on that branch. If the user wants the latest fixes, then this is the best option to go with. **NOTE:** Murata only runs "spot" tests before submitting fixes/enhancements to the branch.
- Select the "**fmac**" release. The script displays both the "**fmac**" codename and latest kernel version supported by that release. Currently four "**fmac**" releases are supported: "**manda**" (most recent and up-to-date regarding fixes and enhancements), "**mothra**", "**battra**" and "**orga**". Murata strongly recommends using "**battra**" release.

- Select the i.MX Yocto release. As already pointed out the current i.MX BSP folder (from which script is being executed) can only support **one** i.MX Yocto release. If you need to test/evaluate different Yocto/kernel versions, then **you have to** create additional folders.
- Select i.MX target: refer to **Table 8** for more details.
- If the i.MX target selected supports alternative VIO options (i.e. i.MX6UL(L), i.MX6SoloX, and i.MX7ULP all support 1.8V VIO signaling), then the script prompts the user for desired configuration. Regarding the “**non-UHS**” option, this forces the SDIO mode to not go “Ultra High Speed” or switch to SDIO 3.0 mode (even if the target supports it). Only use this if you want to slow down the SDIO clock for debugging purposes. **NOTE:** non-default VIO (i.e. 1.8V instead of 3.3V) requires hardware rework.
- Select the “DISTRO and image”. This configures the graphical driver and Yocto image. For more details reference the Yocto documentation. It is recommended to go with Murata defaults on this step – Murata has tested/validated with these images.
- Name desired build target folder name. If re-running the Murata build script, this folder name must be unique.
- Review final configuration and accept before moving forward.
- Accept the NXP/Freescale End User’s License Agreement (EULA). There is 3rd party IP included in the i.MX Yocto build. This step addresses the sub-licensing issue. During this step the user must review a fair bit of legal documentation (by repeatedly entering space bar) or if already familiar with the EULA language, enter ‘q’ to bypass displaying the complete agreement. The final step of this EULA step prompts the user to enter “y” to accept.
- Last and final step is to confirm that user want to kick off final build process (invoke “**bitbake <image>**” command).

Running the script file is straightforward. Simply invoke from your i.MX BSP folder (**\$BSP_DIR** or “**murata-imx-bsp**”):

```
./Murata_Wireless_Yocto_Build.sh
```

The script goes through the following stages:

- 1) Verifying Host Environment
- 2) Verifying Script Version
- 3) Select Release Type:
 - a) Stable: Murata tested/verified release tag. Stable is the recommended default.
 - b) Developer: Includes latest fixes on branch. May change at any time.
- 4) Select "fmac" version
- 5) Select i.MX Yocto Release
- 6) Select Target
 - 6.1) Select VIO Signaling
- 7) Select DISTRO & Image
- 8) Creation of Build directory
- 9) Verify your selection
- 10) Acceptance of End User License Agreement(EULA)
- 11) Starting Build Now. Note: depending on machine type, build may take 1-7 hours to complete.

For an example input/output sequence, refer to Appendix D.

4.3 i.MX Yocto Build: Manual Steps (Advanced Users)

The user should be very familiar with the [NXP Yocto Project User's Guide \(part of NXP Reference Documents release\)](#). We are only emphasizing some important steps in this section.

4.3.1 Host PC Preparation

First step is to install Ubuntu 12.04, 14.04 or 16.04 (Murata's build is verified on Ubuntu 16.04 64-bit install) on the host - native PC or virtual environment like VMware. Host PC typically used has Ubuntu 16.04/14.04/12.04 installed with 50 GB free disk space (80 GB needed for i.MX8 build / 100 GB needed for TI Sitara build).

NOTE: Murata has verified these build steps using Ubuntu 16.04 (x64).

Next step is configuring Ubuntu for Yocto build. Refer to [Yocto Project User's Guide \(Section 3 "Host Setup"\)](#). When following NXP's Yocto Project User's Guide, make sure that GIT is setup properly with the commands below:

```
git config --global user.name "Your Name"
git config --global user.email "Your Email"
git config --list
```

4.3.2 Yocto Project Setup

The NXP Yocto Project BSP Release directory contains a "sources" directory, which contains the recipes used to build, one or more build directories, and a set of scripts used to set up the environment. The recipes used to build the project come from both the community and NXP. The Yocto Project layers are downloaded to the sources directory. This sets up the recipes that are used to build the project. The following example shows how to download the NXP Yocto Project Community BSP recipe layers. Rather than use a specific folder name, we use the variable "**BSP_DIR**" name to represent the base directory for Yocto Build.

Create a build directory and setup "**BSP_DIR**":

```
cd ~
mkdir murata-imx-bsp
cd murata-imx-bsp
export BSP_DIR=`pwd`
```

➔ Now we are ready to download the Freescale Yocto Project Community BSP recipe layers.

In this example, we are targeting Linux 4.9.11_1.0.0 release. Execute the following repo commands:

```
repo init -u https://source.codeaurora.org/external/imx/fsl-arm-yocto-bsp.git -b imx-morty -m imx-4.9.11-1.0.0_ga.xml
repo sync
```

Once “*repo sync*” is completed, the source code is checked out into the directory “*\$BSP_DIR/sources*”. You can perform repo synchronization, with the command “*repo sync*”, periodically to update to the latest code. If errors occur during repo initialization, try deleting the “*.repo*” directory and running the repo initialization command again. In **Section 4.3.4**, we add the customized “*meta-murata-wireless*” to “*\$BSP_DIR/sources*”.

4.3.3 Image Build Configuration with i.MX Target Selection

For the i.MX Yocto Linux 4.9.11_1.0.0 GA release, refer to **Table 8** for the supported targets: i.MX reference interrupt configuration, DTB file, and Murata Adapter (V1/V2) are identified. For other Yocto/Kernel releases, refer to **Table 7** and **Table 9**. **Note:** the first harmonized i.MX BSP release that supports all i.MX 8/7/6 architectures is Linux 4.9.88_2.0.0 GA.

Table 7: i.MX8 Targets supported on Linux 4.9.88_2.0.0 GA & 4.9.51 Beta Releases

Target (MACHINE)	NXP i.MX DTB File	Adapter
Imx8mqevk	fsl-imx8mq-evk-pcie1-m2.dtb	M.2

Table 8: i.MX6/7 Targets supported on Linux 4.9.88_2.0.0 & 4.9.11_1.0.0 GA Releases

Target (MACHINE)	Interrupt Configuration	NXP i.MX DTB File	Adapter	1.8V VIO Option
imx7dsabresd	OOB IRQ	imx7d-sdb.dtb	Integrated ⁷	Yes (default)
imx6qpsabresd	OOB IRQ	imx6qp-sabresd-btwifi.dtb	V2	No
imx6qsabresd	OOB IRQ	imx6q-sabresd-btwifi.dtb	V2	No
imx6dlsabresd	OOB IRQ	imx6dl-sabresd-btwifi.dtb	V2	No
imx6xsabresd	OOB for 3.3V; SDIO in-band for 1.8V	imx6sx-sdb-btwifi.dtb	V1	Yes
imx6slevk	OOB IRQ	imx6sl-evk-btwifi.dtb	V1	No
imx6ulevk	OOB IRQ	imx6ul-14x14-evk-btwifi-oob.dtb imx6ul-9x9-evk-btwifi-oob.dtb	V2	Yes
imx6ulevk	SDIO in-band	imx6ul-14x14-evk-btwifi.dtb imx6ul-9x9-evk-btwifi.dtb	V2	Yes
imx6ull14x14evk	OOB IRQ	imx6ull-14x14-evk-btwifi-oob.dtb	V2	Yes
imx6ull14x14evk	SDIO in-band	imx6ull-14x14-evk-btwifi.dtb	V2	Yes
imx6ull9x9evk	OOB IRQ	imx6ull-9x9-evk-btwifi-oob.dtb	V2	Yes
imx6ull9x9evk	SDIO in-band	imx6ull-9x9-evk-btwifi.dtb	V2	Yes
Imx7ulpvk	OOB IRQ	Imx7ulp-evk.dtb	V1 ⁸	Yes

⁷ i.MX 7Dual SDB has Murata Module ZP soldered down onto platform.

⁸ Rework is required on i.MX7ULP EVK to add support for external Wi-Fi/BT via SD card connector.

Table 9: i.MX6/7 Targets supported on Linux 4.1.15_2.0.0 GA Release

Target (MACHINE)	Interrupt Configuration	NXP i.MX DTB File	Adapter	1.8V VIO Option
imx7dsabresd	OOB IRQ	imx7d-sdb.dtb	Integrated ⁹	Yes (default)
imx6qpsabresd	OOB IRQ	imx6qp-sabresd-btwifi.dtb	V2	No
imx6qsabresd	OOB IRQ	imx6q-sabresd-btwifi.dtb	V2	No
imx6dlsabresd	OOB IRQ	imx6dl-sabresd-btwifi.dtb	V2	No
imx6sxsabresd	OOB for 3.3V; SDIO in-band for 1.8V	imx6sx-sdb-btwifi.dtb	V1	Yes
imx6slevk	OOB IRQ	imx6sl-evk-btwifi.dtb	V1	No
imx6ulevk	OOB IRQ	imx6ul-14x14-evk-btwifi-oob.dtb imx6ul-9x9-evk-btwifi-oob.dtb	V2	Yes
imx6ulevk	SDIO in-band	imx6ul-14x14-evk-btwifi.dtb imx6ul-9x9-evk-btwifi.dtb	V2	Yes
imx6ull14x14evk	OOB IRQ	imx6ull-14x14-evk-btwifi-oob.dtb	V2	Yes
imx6ull14x14evk	SDIO in-band	imx6ull-14x14-evk-btwifi.dtb	V2	Yes
imx6ull9x9evk	OOB IRQ	imx6ull-9x9-evk-btwifi-oob.dtb	V2	Yes
imx6ull9x9evk	SDIO in-band	imx6ull-9x9-evk-btwifi.dtb	V2	Yes

To setup build directory for Linux 4.9.11_1.0.0, the following command syntax is used:

```
cd $BSP_DIR
DISTRO=<distro name> MACHINE=<machine name> source fsl-setup-release.sh -b <build dir>
```

One example is to build x11 graphical back end for i.MX 6UltraLite EVK:

```
cd $BSP_DIR
DISTRO=fsl-imx-x11 MACHINE=imx6ulevk source fsl-setup-release.sh -b build-imx6ulevk-x11
```

NOTE: When specifying the build directory (**-b <build dir>**), it is better to specify a unique folder name (in this example “**build-imx6ulevk-x11**”). Otherwise the next time you configure a Yocto build from the same folder (i.e. invoke “**fsl-setup-release.sh**” script from “**BSP_DIR**”, it will delete your previous build.

After invoking the “**fsl-release-setup.sh**” script, the EULA (End User License Agreement) will be presented to the user for agreement. Press “space” bar repeatedly (or “q” to skip reading entire EULA) until you reach the bottom of the agreement. Enter ‘y’ to accept the EULA agreement:

⁹ i.MX 7Dual SDB has Murata Module ZP soldered down onto platform.

```
2.3.          For NXP Licensed Software provided to you in source code
Do you accept the EULA you just read? (y/n) y
EULA has been accepted.
```

In this example, the final expected output is (after accepting license agreement):

```
Your build environment has been configured with:
MACHINE=imx6ulevk
SDKMACHINE=i686
DISTRO=fsl-imx-x11
EULA=
BSPDIR=
BUILD_DIR=.
meta-freescale directory found
<username>@ubuntu:~/murata-imx-bsp/build-imx6ulevk-x11$
```

To make code examples easier going forward, let's create a variable for the build directory:

```
$ export BUILD_DIR=`pwd` ← in this example “~/murata-imx-bsp/build-imx6ulevk-x11”
```

4.3.4 Fetch “meta-murata-wireless” from Github and copy into “Sources”

Clone “*meta-murata-wireless*” git and checkout “*imx-morty-battra_r1.0*” release (Linux 4.9.11):

```
cd $BSP_DIR/sources
git clone https://github.com/murata-wireless/meta-murata-wireless.git
cd meta-murata-wireless
git checkout imx-morty-battra_r1.0
```

“*meta-murata-wireless*” contains the following (refer to **Section 2.4.2** for more details):

- “*add-murata-layer-script*” folder
- “*conf*” folder
- “*freescale*” folder
- “*recipes-connectivity*” folder
- “*recipes-kernel*” folder
- files (*COPYING.MIT*, *README*, *README.md*)

4.3.5 Install Necessary “hooks” for “meta-murata-wireless”

To enable “*meta-murata-wireless*” into the selected i.MX target Yocto build, certain Yocto configuration files must be modified. Murata provides “*add-murata-wireless.sh*” script file:

```
cd $BSP_DIR
sh ./sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh build-imx6ulevk-x11
```

NOTE: “*build-imx6ulevk-x11*” is just the build folder name and not the directory.

If successful, the output will look like:

Welcome to Freescale Community BSP

The Yocto Project has extensive documentation about OE including a reference manual which can be found at:

<http://yoctoproject.org/documentation>

For more information about OpenEmbedded see their website:

<http://www.openembedded.org/>

You can now run 'bitbake <target>'

Common targets are:

- core-image-minimal
- meta-toolchain
- meta-toolchain-sdk
- adt-installer
- meta-ide-support

Your configuration files at build-imx6ulevk-x11 have not been touched. ← misleading statement¹⁰

BSPDIR=

BUILD_DIR=.

meta-freescale directory found

CORRECTION: Murata modified the following files ← Add'l Murata logging to clarify file modifications.

- bblayers.conf present in <BUILD_DIR>/conf
- local.conf present in <BUILD_DIR>/conf
- imx6ulevk.conf present in sources/meta-freescale/conf/machine

Murata-Wireless setup complete. Create an image with:

\$ bitbake fsl-image-validation-imx ← no errors logged and here is the bitbake command

¹⁰ “\$BSP_DIR/sources/meta-fsl-bsp-release/imx/tools/fsl-setup-release.sh” generates the “have not been touched” message. Subsequently the “add-murata-wireless.sh” script modifies the “bblayer.conf” and “local.conf”.

To double check on correct script execution, you can check the content of two files in “**\$BUILD_DIR/conf**” folder: “**bblayers.conf**” and “**local.conf**”. Verify last line in “**\$BUILD_DIR/conf/bblayers.conf**” is:

```
BBLAYERS += " ${BSPDIR}/sources/meta-murata-wireless "
```

Verify the last two lines in “**\$BUILD_DIR/conf/local.conf**” are:

```
INTERNAL_MIRROR = "http://localhost"  
CORE_IMAGE_EXTRA_INSTALL += " hostap-conf hostap-utils hostapd backporttool-linux murata-binaries"
```

4.3.6 Configure Either Default 3.3V or 1.8V VIO Signaling

If using default 3.3V VIO Signaling,¹¹ then skip to **Section 4.3.7**. For the i.MX 6SoloX, 6UL(L), and 7ULP platforms, the user has the option of configuring for 1.8V VIO operation. The i.MX7ULP default configuration is set to 1.8V. Reasons to configure for 1.8V VIO include:

- SDIO 3.0 UHS support: UHS (Ultra High Speed) modes are only supported by 1.8V VIO. UHS SDIO modes are necessary for optimizing the WLAN throughput for 802.11ac devices such as Type 1BB, 1MW, 1LC, 1HK, and ZP.
- Some **modules only support 1.8V** VIO operation: Type 1LV (CYW43012).
- Closer implementation to target hardware: typically, final hardware implementation will use 1.8V VIO signaling for both WLAN and Bluetooth interfaces.

The “**meta-murata-wireless**” layer provides a simple mechanism for end user to configure 1.8V VIO signaling for the i.MX 6SoloX, 6UL(L) or 7ULP platforms (VIO signaling changed on both WLAN SDIO and Bluetooth UART interfaces). Just copy the relevant “**bbappend**” file in “**\$BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux**” to choose one of the following configurations:

- 1) i.MX 6UL(L) EVK at 1.8V VIO signaling with UHS support:

```
cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux  
cp linux-imx_4.9.11.bbappend.6UL_6ULL@1.8V linux-imx_4.9.11.bbappend
```

- 2) i.MX 6UL(L) EVK at 1.8V VIO signaling with no UHS support (50 MHz max SDIO clock)¹²:

```
cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux  
cp linux-imx_4.9.11.bbappend.6UL_6ULL@1.8V_No_UHS linux-imx_4.9.11.bbappend
```

¹¹ Note that Type 1LV (CYW43012) requires 1.8V VIO configuration. It will not work with 3.3V VIO. As such for users interested in evaluating Type 1LV, only i.MX 6SoloX or i.MX6UL(L) platforms can be used.

¹² This option is a current workaround for SDIO bus stability issues on i.MX6UL EVK when running SDR104 mode (alternative workaround is to use default 3.3V VIO signaling which does not permit SDR104 mode). This is not required for i.MX6ULL EVK which has a slower Max SDIO bus speed (132 MHz versus 198 MHz for UL). Note that HW rework is required for this configuration. On i.MX6UL CPU board, R720 must be changed from 464 KOhm to 160 KOhm to hard-wire 1.8V VIO on SDIO interface. Refer to the Murata Hardware User Manual for more details on rework.

3) i.MX 6SoloX EVK at 1.8V VIO signaling with UHS support:

```
cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux
cp linux-imx_4.9.11.bbappend.6SX@1.8V linux-imx_4.9.11.bbappend
```

4) i.MX 7ULP EVK at 1.8V VIO signaling with UHS support:

```
cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux
cp linux-imx_4.9.11.bbappend.7ULP@1.8V linux-imx_4.9.11.bbappend
```

To revert to default 3.3V VIO signaling:

```
cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux
cp linux-imx_4.9.11.bbappend.default@3.3V linux-imx_4.9.11.bbappend
```

4.3.7 Build Murata-Customized Yocto Image for Specific i.MX Target

Now that the “*meta-murata-wireless*” layer is “hooked” into the i.MX BSP Yocto build, we can invoke “*bitbake*” to build the default (Murata-verified) “*fsl-image-validation-imx*” image:

```
cd $BUILD_DIR
bitbake fsl-image-validation-imx
```

Things to watch out for:

- If any necessary source file cannot be fetched, the build process terminates. In such a scenario, re-execute the command “*bitbake fsl-image-validation-imx*” again to see if the problem resolves itself. If the problem persists, report the error to whoever maintains the failing git repository.
- The “*bitbake*” step is expected to take at least **1-7 hours** to complete. This build process depends heavily on processor speed, RAM, hard drive access (i.e. SSD is optimal), and internet download speeds.
- Ensure that there is a minimum of 50 GB free disk space (80 GB needed for i.MX8 build).

4.4 i.MX Yocto Build: Manual Steps “Take 2” (Quick Recap)

This section is for users already familiar with the “*meta-murata-wireless*” implementation. It provides a condensed (i.e. repeat) version of **Section 4.3**. The following example sequence shows all the necessary steps to build the Murata customized i.MX image for the following configuration:

- i.MX6UL or i.MX6ULL EVK at 1.8V VIO (both WLAN and BT interfaces).
- SDIO 3.0 UHS support (MAX SDIO clock for SDR104 mode of 198 MHz (i.MX6UL) and 132 MHz (i.MX6ULL). Modules supporting SDR104 include 1BB, 1MW, 1HK, 1LC, 1CK, and ZP.
- Murata V2 adapter used to connect i.MX6UL(L) EVK with TP5 soldered, VIO jumper moved to 1.8V setting, and 32 KHz SLOW CLK (AKA LPO_IN) resistor circuit modified. See [Hardware User Manual](#) for more details.
- SDIO in-band (default) and OOB IRQ (WL_HOST_WAKE) both supported in DTB files. However due to i.MX hardware limitation, OOB IRQ is not guaranteed to work – testing has shown that it does “work”. To configure for OOB IRQ, choose the “*oob*” version of DTB file.
- WLAN interface is initialized during kernel boot. To bring up interface just invoke “*ifconfig wlan0 up*” or configure WPA supplicant, Hostapd, etc.
- Bluetooth UART is connected and is initialized by running “*hciattach*” command.
- Bluetooth PCM connection is not supported.

4.4.1 Initialize Linux i.MX Yocto Default Build Environment

```
cd ~
mkdir murata-imx-bsp
cd murata-imx-bsp
export BSP_DIR=`pwd`
repo init -u https://source.codeaurora.org/external/imx/fsl-arm-yocto-bsp.git -b imx-morty -m imx-4.9.11-1.0.0_ga.xml
repo sync
```

4.4.2 Configuring the i.MX Target

```
cd $BSP_DIR ← in this example “~/murata-imx-bsp”
DISTRO=fsl-imx-x11 MACHINE=imx6ulevk source fsl-setup-release.sh -b build-imx6ulevk-x11
```

This will bring the EULA (End User License Agreement). Press “space” bar repeatedly (or “q” to skip reading entire EULA) until you reach the bottom of the agreement. Enter ‘y’ to accept the EULA agreement:

```
2.3.          For NXP Licensed Software provided to you in source code
```

```
Do you accept the EULA you just read? (y/n) y
```

```
EULA has been accepted.
```

4.4.3 Add “meta-murata-wireless” Layer and Kick off the Build

```
export BUILD_DIR=`pwd` ← in this example “~/murata-imx-bsp/build-imx6ulevk-x11”
cd $BSP_DIR/sources
git clone https://github.com/murata-wireless/meta-murata-wireless.git
cd meta-murata-wireless
git checkout imx-morty-battra_r1.0
cd $BSP_DIR
sh ./sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh build-imx6ulevk-x11
```

NOTE: Special configuration step for i.MX 6UL(L) EVK at 1.8V VIO signaling with UHS support:

```
cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux
cp linux-imx_4.9.11.bbappend.6UL_6ULL@1.8V linux-imx_4.9.11.bbappend
cd $BUILD_DIR
bitbake fsl-image-validation-imx
```

Legacy Document

4.5 i.MX Yocto Build: Manual Steps “Take 2” for “4.9.123” with FMAC “Manda”

4.5.1 For i.MX8 platform

```
cd ~
mkdir murata-imx-bsp
cd murata-imx-bsp
export BSP_DIR=`pwd`
repo init -u https://source.codeaurora.org/external/imx/imx-manifest -b imx-linux-rocko -m imx-4.9.123-2.3.0-8mm_ga.xml
repo sync

cd $BSP_DIR
DISTRO=fsl-imx-wayland MACHINE=imx8mqevk source ./fsl-setup-release.sh -b build-imx8mqevk-wayland
export BUILD_DIR=`pwd`
cd $BSP_DIR/sources
git clone https://github.com/murata-wireless/meta-murata-wireless.git
cd meta-murata-wireless
git checkout imx-rocko-mini-manda

cd $BSP_DIR
chmod 777 sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh
sh ./sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh build-imx8mqevk-wayland

cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux
cp linux-imx_4.9.123.bbappend.8MQ linux-imx_4.9.123.bbappend
```

COMMENT: Renaming recipes files kernel-module-qca6174_2.0.bb and kernel-module-qca9377_2.0.bb, to kernel-module-qca6174_2.0.bbx and kernel-module-qca9377_2.0.bbx
This will disable qualcomm cld recipe files.

```
mv $BSP_DIR/sources/meta-fsl-bsp-release/imx/meta-bsp/recipes-kernel/kernel-modules/kernel-module-qca6174_2.0.bb $BSP_DIR/sources/meta-fsl-bsp-release/imx/meta-bsp/recipes-kernel/kernel-modules/kernel-module-qca6174_2.0.bbx
mv $BSP_DIR/sources/meta-fsl-bsp-release/imx/meta-bsp/recipes-kernel/kernel-modules/kernel-module-qca9377_2.0.bb $BSP_DIR/sources/meta-fsl-bsp-release/imx/meta-bsp/recipes-kernel/kernel-modules/kernel-module-qca9377_2.0.bbx
```

COMMENT: Copying necessary backport recipes and murata binaries recipes for i.MX8 platform

```
cp -f $BSP_DIR/sources/meta-murata-wireless/freescale/backporttool-linux_1.0.bb@imx8
$BSP_DIR/sources/meta-murata-wireless/recipes-kernel/backporttool-linux/backporttool-linux_1.0.bb
cp -f $BSP_DIR/sources/meta-murata-wireless/freescale/murata-binaries_1.0.bb@imx8
$BSP_DIR/sources/meta-murata-wireless/recipes-connectivity/murata-binaries/murata-binaries_1.0.bb
cd $BUILD_DIR
bitbake core-image-base
```

Known Issue: Sometimes, it is possible that, you may encounter following error, when you try to create an image with “core-image-base”. The error doesn’t occur with “fsl-image-validation-imx”.

```
ERROR: backporttool-linux-1.0-r0 do_make_scripts: Function failed: do_make_scripts (log file is located at /home/jkareem/testing/imx8mmevk-bsp/build-dir/tmp/work/imx8mmevk-poky-linux/backporttool-linux/1.0-r0/temp/log.do_make_scripts.20350)
ERROR: Logfile of failure stored in: /home/jkareem/testing/imx8mmevk-bsp/build-dir/tmp/work/imx8mmevk-poky-linux/backporttool-linux/1.0-r0/temp/log.do_make_scripts.20350
```

Solution:

The solution is to continue the build with following 2 statements from <BSP_DIR>.

```
cd $BSP_DIR
source sources/base/setup-environment <BUILD_DIR>
```

4.5.2 For i.MX6/7 platforms

```
cd ~
mkdir murata-imx-bsp
cd murata-imx-bsp
export BSP_DIR=`pwd`
repo init -u https://source.codeaurora.org/external/imx/imx-manifest -b imx-linux-rocko -m imx-4.9.123-2.3.0-8mm_ga.xml
repo sync

cd $BSP_DIR
DISTRO=fsl-imx-wayland MACHINE=imx6ulevk source ./fsl-setup-release.sh -b build-imx6ulevk-wayland
export BUILD_DIR=`pwd`
cd $BSP_DIR/sources
git clone https://github.com/murata-wireless/meta-murata-wireless.git
cd meta-murata-wireless
git checkout imx-rocko-mini-manda

cd $BSP_DIR
chmod 777 sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh
sh ./sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh build-imx6ulevk-wayland
```

NOTE: Special configuration step for i.MX 6UL(L) EVK at 1.8V VIO signaling with UHS support:

```
cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux
cp linux-imx_4.9.123.bbappend.6UL_6ULL@1.8V linux-imx_4.9.123.bbappend

cd $BUILD_DIR
bitbake core-image-base
```

4.6 i.MX Yocto Build: Manual Steps “Take 2” for “4.9.88” with FMAC “Manda”

4.6.1 For i.MX8 platform

```
cd ~
mkdir murata-imx-bsp
cd murata-imx-bsp
export BSP_DIR=`pwd`
repo init -u https://source.codeaurora.org/external/imx/imx-manifest -b imx-linux-rocko -m imx-4.9.88-2.0.0_ga.xml
repo sync

cd $BSP_DIR
DISTRO=fsl-imx-x11 MACHINE=imx8mqevk source ./fsl-setup-release.sh -b build-imx8mqevk-x11
export BUILD_DIR=`pwd`
cd $BSP_DIR/sources
git clone https://github.com/murata-wireless/meta-murata-wireless.git
cd meta-murata-wireless
git checkout imx-rocko-manda

cd $BSP_DIR
chmod 777 sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh
sh ./sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh build-imx8mqevk-wayland

cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux
cp linux-imx_4.9.88.bbappend.8MQ linux-imx_4.9.88.bbappend
```

COMMENT: Renaming the recipes files kernel-module-qcacl_2.0.bb and kernel-module-qcacl-lea_1.0.bb, to kernel-module-qcacl_2.0.bbx and kernel-module-qcacl-lea_1.0.bbx. Basically, disabling qualcomm cld driver recipes.

```
mv $BSP_DIR/sources/meta-fsl-bsp-release/imx/meta-bsp/recipes-kernel/kernel-modules/kernel-module-qcacl_2.0.bb $BSP_DIR/sources/meta-fsl-bsp-release/imx/meta-bsp/recipes-kernel/kernel-modules/kernel-module-qcacl_2.0.bbx
mv $BSP_DIR/sources/meta-fsl-bsp-release/imx/meta-bsp/recipes-kernel/kernel-modules/kernel-module-qcacl-lea_1.0.bb $BSP_DIR/sources/meta-fsl-bsp-release/imx/meta-bsp/recipes-kernel/kernel-modules/kernel-module-qcacl-lea_1.0.bbx
```

COMMENT: Copying necessary backport recipes and Murata binaries recipes for i.MX8 platform

```
cp -f $BSP_DIR/sources/meta-murata-wireless/freescale/backporttool-linux_1.0.bb@imx8
$BSP_DIR/sources/meta-murata-wireless/recipes-kernel/backporttool-linux/backporttool-linux_1.0.bb
cp -f $BSP_DIR/sources/meta-murata-wireless/freescale/murata-binaries_1.0.bb@imx8
$BSP_DIR/sources/meta-murata-wireless/recipes-connectivity/murata-binaries/murata-binaries_1.0.bb

cd $BUILD_DIR
bitbake core-image-base
```

4.6.2 For i.MX6/7 platforms

```
cd ~
mkdir murata-imx-bsp
cd murata-imx-bsp
export BSP_DIR=`pwd`
repo init -u https://source.codeaurora.org/external/imx/imx-manifest -b imx-linux-rocko -m imx-4.9.88-2.0.0_ga.xml
repo sync

cd $BSP_DIR
DISTRO=fsl-imx-x11 MACHINE=imx6ulevk source ./fsl-setup-release.sh -b build-imx6ulevk-x11
export BUILD_DIR=`pwd`
cd $BSP_DIR/sources
git clone https://github.com/murata-wireless/meta-murata-wireless.git
cd meta-murata-wireless
git checkout imx-rocko-manda

cd $BSP_DIR
chmod 777 sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh
sh ./sources/meta-murata-wireless/add-murata-layer-script/add-murata-wireless.sh build-imx6ulevk-x11
```

NOTE: Special configuration step for i.MX 6UL(L) EVK at 1.8V VIO signaling with UHS support:

```
cd $BSP_DIR/sources/meta-murata-wireless/recipes-kernel/linux
cp linux-imx_4.9.88.bbappend.6UL_6ULL@1.8V linux-imx_4.9.88.bbappend

cd $BUILD_DIR
bitbake core-image-base
```

5 Flashing SD Card

Now that the SD card image is built, we can now flash the (micro) SD card used for booting the i.MX platform. Insert the (micro) SD card into host machine (PC). **It is imperative that the (micro) SD card comes up as “/dev/sdx” device.** If it does not, then you may require a USB to (micro) SD card adapter as shown in **Figure 4**. This Kingston device ([MobileLite G4](#)) provides direct plug-ins for microSD and SD cards. It supports USB 3.0 and UHS SD cards – allowing very fast transfer speeds. With the “right” (micro) SD Card Reader/Writer and UHS (micro) SD card, flashing a 1 GB i.MX image can be done in 10~20 seconds versus 1~2 minutes (or more).

Figure 4: USB to SD Card Reader/Writer Adapter



Once the (micro) SD card has been inserted into the PC, run the “**dmesg**” command to find which “/dev/sdx” device was just enumerated:

```
dmesg
```

The enumeration log of the *just* inserted (micro) SD card should look like:

```
[285317.464075] usbcore: registered new interface driver usb-storage
[285318.472525] scsi 6:0:0:0: Direct-Access   Generic- USB3.0 CRW  -0 1.00 PQ: 0 ANSI: 4
[285318.473143] sd 6:0:0:0: Attached scsi generic sg2 type 0
[285319.263194] sd 6:0:0:0: [sdc] 15597568 512-byte logical blocks: (7.98 GB/7.43 GiB)
[285319.264368] sd 6:0:0:0: [sdc] Write Protect is off
[285319.264379] sd 6:0:0:0: [sdc] Mode Sense: 2f 00 00 00
[285319.265413] sd 6:0:0:0: [sdc] Write cache: disabled, read cache: enabled, doesn't support DPO or FUA
[285319.274779] sdc: sdc1 sdc2
```

Referencing this example log, the correct device for the (micro) SD card is “/dev/sdc”.

NOTE: Before running next command, **make sure you have selected the correct device.** Otherwise you may unintentionally wipe/erase your hard drive! Substitute the correct (micro) SD device name for “/dev/sdx” in “**dd**” command line below.

Following the “*imx6ulevk*” target example, the command for flashing the (micro) SD is:

```
sudo dd if=$BUILD_DIR/tmp/deploy/images/imx6ulevk/fsl-image-validation-imx.sdcard of=/dev/sdx bs=1M && sync
```

- ⇒ **SD Card is now flashed with customized Murata wireless image which integrates “*fmac*” driver and other components listed in Section 2.1.**

5.1 WLAN Firmware, CLM Blob, and NVRAM Considerations

The following files are maintained in the “*/lib/firmware/brcm*” folder:

- WLAN firmware: firmware file downloaded to WLAN core. The naming format is: “*brcmfmac*+<CYW number>+<“-sdio” or “-pcie”>+”.bin”
- CLM Blob: regulatory conformance file. The naming format is: “*brcmfmac*+<CYW number>+<“-sdio” or “-pcie”>+”.clm_blob”¹³
- NVRAM file: configures module/chipset and sets RF parameters. The naming format is: “*brcmfmac*+<CYW number>+<“-sdio” or “-pcie”>+”.txt”

All the applicable WLAN firmware, CLM blob and NVRAM files are copied into the “*/lib/firmware/brcm*” folder as part of the Yocto build. The FMAC driver **will not work correctly unless** the correctly named files are present in the “*/lib/firmware/brcm*” folder.

5.1.1 Switching/Updating WLAN firmware version

The “*production*” version of WLAN firmware is used on default image. To switch over to manufacturing test firmware, the user needs to contact Murata or Cypress for the manufacturing test firmware files.

- Obtain manufacturing test firmware tarball.
- Mount flashed (micro) SD card on Linux host PC.
- “*cd*” to “*lib/firmware/brcm*” folder.
- Switch user to “*root*”.
- Backup existing “*.bin” and “*.clm_blob” files.
- Copy manufacturing test firmware files into “*lib/firmware/brcm*” folder.

5.1.2 Master Backup of Murata NVRAM files

Backup versions of the Murata NVRAM files are maintained in “*lib/firmware/brcm/murata-master*”. Note that **this folder also allows us to differentiate NVRAM files for modules using the same CYW chipset – “*lib/firmware/brcm*” can only contain one NVRAM file for a given CYW chipset module.** Note that there are multiple modules on the following CYW chipsets:

¹³ Not all modules/chipsets have “CLM blob” files. Check <https://github.com/murata-wireless/cyw-fmac-fw> branches.

- CYW43455: Type 1MW, 1LC, and 1HK.
- CYW4339: Type 1CK, and ZP.

To use/update any of the NVRAM files in the “*lib/firmware/brcm*” folder, the user must copy the version out of the “*murata-master*” sub-folder and remove the module string (i.e. “1LV”) out of the name before over-writing the existing NVRAM file in “*lib/firmware/brcm*”.

6 Specific WLAN Driver Configurations

The “*fmac*” driver has more features that require additional consideration. These features include:

- Handling Edge versus Level sensitive interrupts: particularly for Murata Type 1BW (CYW43340) and SN8000 (CYW43362). Neither of these modules works for OOB IRQ configuration without editing the DTS(I) file containing the “*fmac*” interrupt descriptor entry and changing from Level to Edge interrupts.
- UHS SDIO 3.0 is only supported at 1.8V VIO. Currently only the i.MX 6SoloX and i.MX 6UL(L), and i.MX 7ULP EVK platforms support this configuration (i.MX7D SABRE supports with onboard ZP module).
- Type 1LV (CYW43012) VIO must be set to 1.8V.

6.1 Handling Edge versus Level Sensitive Interrupts (OOB IRQ only)

This is only a necessary consideration if you are using either Type 1BW or SN8000. The DTS file includes an “*fmac*” interrupt descriptor that needs to be changed and then the DTB file rebuilt. If using SDIO in-band interrupts, you can skip this step.

- Locate the correct DTS(I) file in “*/arch/arm/boot/dts*” folder and open with editor.
- Locate the “*brcmf*” descriptor and then look for “*interrupts*” line. Change “*IRQ_TYPE_LEVEL_HIGH*” string to “*IRQ_TYPE_EDGE_RISING*”.
- Recompile DTB file for target and flash to (micro) SD card.

This example is pulled from “*/arch/arm/boot/dts/imx6ul-evk-btwifi-oob.dts*”:

```
/* Murata: add OOB IRQ definition for FMAC driver. */
&usdhc1 {
    brcmf: brcmf@1 {
        interrupt-parent = <&gpio2>;
        /* WL_HOST_WAKE = GPIO2_IO15 active high. Change to IRQ_TYPE_EDGE_RISING for 1BW and SN8000. */
        interrupts = <15 IRQ_TYPE_LEVEL_HIGH>; ← change “LEVEL_HIGH” to “EDGE_RISING”
        interrupt-names = "host-wake";
    };
};
```

6.2 UHS SDIO 3.0 Support

The default Murata Software and Hardware configurations set SDIO and UART VIO to 3.3V (exception of i.MX7D SABRE that has native 1.8V VIO for onboard ZP module). UHS SDIO 3.0 is only supported at 1.8V VIO. Currently only the i.MX 6SoloX, i.MX 6UL(L) EVK, and i.MX 7ULP EVK platforms support this configuration (i.MX7D SDB as already noted supports 1.8V VIO as well). Refer to **Section 4.3.6** for more details on software configuration. For hardware configuration, refer to the [Murata Hardware User Manual](#). As a quick reference, the 1.8V VIO hardware configuration is explained here.

i.MX 6UL(L) EVK:

- On V2 InterConnect Adapter, short TP5 (solder pads together) to provide 1.8V VIO at VIO_REG_OUT (TP10).
- On V2 InterConnect Adapter, move Jumper from 3.3V VIO (default) to 1.8V VIO setting.
- To modify SLOW CLK (LPO_IN) on V2 InterConnect Adapter, remove R2 resistor and replace R1 resistor with 0 Ohm value (original configuration is 15 Ohms).
- **NOTE:** no modifications required on i.MX 6UL(L) EVK.

i.MX 6SX SDB:

- On V1 InterConnect Adapter, short TP115 (solder pads together) to provide 1.8V VIO at VIO_REG_OUT (TP124).
- On V1 InterConnect Adapter, move Jumper from 3.3V VIO (default) to 1.8V VIO setting.
- To modify SLOW CLK (LPO_IN) on V1 InterConnect Adapter, remove R101 resistor and replace R100 resistor with 0 Ohm value (original configuration is 15 Ohms).
- **NOTE:** no modifications required on i.MX 6SX SDB.

i.MX 7ULP EVK:

- On V1 InterConnect Adapter, short TP115 (solder pads together) to provide 1.8V VIO at VIO_REG_OUT (TP124).
- On V1 InterConnect Adapter, move Jumper from 3.3V VIO (default) to 1.8V VIO setting.
- To modify SLOW CLK (LPO_IN) on V1 InterConnect Adapter, remove R101 resistor and replace R100 resistor with 0 Ohm value (original configuration is 15 Ohms).
- **NOTE:** Extensive modifications required on i.MX7ULP EVK. Please refer to Murata Hardware User Manual.

With 1.8V hardware customization there is a shortcoming/limitation with the control signaling. WL_HOST_WAKE is only driven by WLAN module/chipset at 1.8V VIO; whereas the i.MX GPIO is fixed at 3.3V VIO rail (i.MX 7ULP is exception here with all 1.8V VIO signaling). Informal testing has shown this configuration to work – however it cannot be guaranteed. As such for 100% reliability, it is recommended to run SDIO in-band interrupts only.

6.3 Type 1LV (CYW43012) 1.8V VIO Configuration

Type 1LV (CYW43012) can only operate at 1.8V VIO. As such the Murata customized i.MX Yocto image must be configured per **Section 4.3.6**. No special consideration for “non-UHS” must be given (even on i.MX6UL EVK) since the Type 1LV is currently configured for a maximum SDIO bus speed of 50 MHz.

7 Bluetooth Patchfile Considerations

The Murata customized build configures example Bluetooth patchfiles (“*.hcd”) in the “/etc/firmware” folder. Like WLAN, the file naming convention is very important. The default Bluetooth stack implementation is BlueZ. When the “hciattach” command is invoked, the BT core is interrogated for the Chip ID. That Chip ID is then used to select the correct Bluetooth patchfile to download.

All Cypress customized Bluetooth patchfiles start with a “**CYW**” string which is changed by “**meta-murata-wireless**” to “**BCM**” (during file system build) for the “hciattach” call to work correctly. You can see a listing of the Bluetooth patchfiles at <https://github.com/murata-wireless/cyw-bt-patch>. Here is an example (Bluetooth bring-up/scan) sequence if you are using Type 1MW:

⇒ First boot the platform and login as “root”.

```
cd /etc/firmware
mv CYW4345C0.1MW.hcd BCM4345C0.1MW.hcd
hciattach /dev/ttymx1 bcm43xx 3000000 flow -t 20 ← “/dev/ttymx1” is correct UART for i.MX6UL(L) EVK
hciconfig hci0 up
hcitool scan
```

NOTE: After kernel boot, no toggling of BT_REG_ON is necessary given the “modem” construct in the i.MX DTS file. i.e. The kernel boot sequence should guarantee correct toggling of BT_REG_ON during power on, so that the Bluetooth core is in the correct state.

8 Using “fmac” driver and “wl” tool

This section is intended to provide the user with a quick “how to” when using “**fmac**” driver for the first time.

8.1 How-To on “fmac” driver

Here is a quick overview on expected output when platform is correctly configured for Murata-Cypress WLAN solution. First off, let’s go through a checklist:

- Murata-customized image correctly built and (micro) SD card flashed. Even without testing WLAN/BT, make sure your finished image allows the i.MX platform to boot correctly (use default i.MX “**dtb**” file).
- Correct WLAN firmware, CLM blob (if applicable), and WLAN NVRAM files in “/lib/firmware/brcm” folder.
- i.MX hardware correctly setup: i.e. for 1.8V VIO signaling image, make sure the V1/V2 adapter is correctly configured.
- Select the correct “**dtb**” file by interrupting bootloader sequence. Refer to **Table 7**, **Table 8**, or **Table 9** for selecting the right “**dtb**” (Device Tree Blob) file.

The “**fmac**” driver consists of loadable modules. If the “**dtb**” file enables WLAN interface and the Murata WLAN hardware is connected, then the “**fmac**” driver should automatically load during kernel boot. Look for the following key logging messages:

```
brcmfmac: brcmf_c_preinit_dcmds: Firmware version = wl0: Nov 13 2017 17:54:11 version 6.37.39.87 (r677401 CY)
brcmfmac: brcmf_c_preinit_dcmds: CLM version = API: 10.0 Data: 6.8.1 Compiler: 1.15.3 ClmImport: 1.15.3 Inc Data: 9.10.84 Inc Compiler: 1.26.11 Inc ClmImport: 1.36.3
```

After the kernel boots, the “**wlan0**” interface can be initialized by one of the following methods.

- “**ifconfig**” command:

```
ifconfig wlan0 up
```

- WPA supplicant . First bring up WPA supplicant and then invoke “**wpa_cli**”:

```
wpa_supplicant -i wlan0 -D nl80211 -c /etc/wpa_supplicant.conf -B
wpa_cli -i wlan0
```

Currently Murata has tested the following on “**fmac**” driver:

- “**ifconfig**”
- “**wl**”
- “**iw**”
- “**wpa_cli**”
- WPA supplicant
- HostApd

8.2 Tool for RF Testing (both mfgtest and regulatory)

The Murata-customized image incorporates the “**wl**” tool binary and necessary “**libnl**” libraries it depends on. “**wl**” tool is located in “/usr/sbin”. For the “**wl**” tool to work correctly the “**wlan0**” interface must be up. So, if following typical boot sequence....

```
ifconfig wlan0 up
wl revinfo ← example “wl” command
```

9 Building Linux Kernel with FMAC Standalone

The following steps show how to build “**fmac**” driver standalone. Linux kernel version 4.14.52 with “**manda**” version of “**fmac**” driver is used as an example.

1) Download Linux stable kernel (v4.14.52) source using following command.

```
wget https://git.kernel.org/pub/scm/linux/kernel/git/stable/linux.git/snapshot/linux-4.14.52.tar.gz
tar zxvf linux-stable-4.14.52.tar.gz
```

2) Fetch Cypress patch files (cypress-patch-v4.14.52-2018_0928.tar.gz) for FMAC from the following public link (<https://community.cypress.com/docs/DOC-15932>).

3) Copy the file (cypress-patch-v4.14.52-2018_0928.tar.gz) to the folder "linux-4.14.52".

4) Untar the file, cypress-patch-v4.14.52-2018_0928.tar.gz. Patch files will be placed in the folder, "cypress-patch".

5) In Linux root folder, apply cypress patches with below bash commands

```
cd linux-4.14.52
for i in cypress-patch/*.patch; do patch -p1 < $i; done
```

6) Source the necessary toolchain for arm 32bit/64bit.

```
source /opt/fsl-imx-x11/4.9.88-2.0.0/environment-setup-cortexa7hf-neon-poky-linux-gnueabi
```

7) Use the default defconfig (imx_v6_v7_defconfig) to create .config file.

```
make imx_v6_v7_defconfig
```

8) Set kernel .config and enable below options, then compile kernel image

```
CONFIG_BRCMUTIL=y
CONFIG_BRCMFMAC=y
CONFIG_BRCMFMAC_SDIO=y
CONFIG_BRCMFMAC_PROTO_BCDC=y
CONFIG_BRCMFMAC_PCIE=y
CONFIG_BRCMFMAC_PROTO_MSGBUF=y
```

9) Build the new kernel image using the command.

```
make -j8 zImage modules dtbs
```

10) Create modules using the following command.

```
make modules_install INSTALL_MOD_PATH=/home/<user-name>/tempModules
```

11) Copy kernel to the boot folder. Copy the contents from "tempModules/lib/Modules" to rootfs (/lib/modules/).

12) Boot the system with the new kernel and modules

10 Applying Cypress Patches to Hostapd and WPA Supplicant

This section describes the building of “hostapd” and “wpa_supplicant” packages for “manda” release.

- 1) get a clone of the repository and update the branch to tag hostap_2_6.

```
git clone git://w1.fi/hostap.git
cd hostap
git checkout hostap_2_6
```

- 2) Fetch Cypress patch files (*cypress-hostap_2_6-2018_0928.tar.gz*) for Integrated (Hostapd + wpa_supplicant) from the following public link (<https://community.cypress.com/docs/DOC-15932>)

- 3) Apply all the patches

```
git am <path-to-cypress-path>/cypress-hostap_2_6/*.patch
```

---sample output---

```
Applying: hostapd: Avoid key reinstallation in FT handshake
Applying: Prevent reinstallation of an already in-use group key
Applying: Extend protection of GTK/IGTK reinstallation of WNM-Sleep Mode cases
Applying: Prevent installation of an all-zero TK
Applying: Fix PTK rekeying to generate a new ANonce
Applying: TDLS: Reject TPK-TK reconfiguration
Applying: WNM: Ignore WNM-Sleep Mode Response without pending request
Applying: FT: Do not allow multiple Reassociation Response frames
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: driver_nl80211: support passing PSK on connect
Applying: driver_nl80211: check 4-way handshake offload support
Applying: nl80211: Add API to set the PMK to the driver
Applying: driver: Add port authorized event
Applying: nl80211: Handle port authorized event
Applying: wpa_supplicant: Handle port authorized event
Applying: wpa_supplicant: Notify Neighbor Report for driver-triggered request
Applying: driver_nl80211: Fix 802.1X auth failure when offloading 4-way handshake
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: Sync with mac80211-next.git include/uapi/linux/nl80211.h
Applying: SAE: Allow SAE password to be configured separately (STA)
```

Applying: Fix sae_password documentation in wpa_supplicant to refer correct field
Applying: Add more debug prints for wpa_sm_set_pmk() calls
Applying: SAE: Fix default PMK configuration for PMKSA caching case
Applying: nl80211: Use RSN_AUTH_KEY_MGMT_* instead of WLAN_AKM_SUITE_*
Applying: non-upstream: Sync with Linux kernel nl80211.h for SAE offload support
Applying: nl80211: Check SAE authentication offload support
Applying: SAE: Pass SAE password on connect for SAE authentication offload support
Applying: WPA: Ignore unauthenticated encrypted EAPOL-Key data

4) Source appropriate toolchain. Example shown below.

```
source /opt/fsl-imx-x11/4.9.11-1.0.0/environment-setup-cortexa7hf-neon-poky-linux-gnueabi
```

5) Build hostapd with the attached config file (config_hostapd)

```
cp <path-to-config-hostapd>/config_hostapd hostapd/.config  
cd hostapd  
make clean  
make
```

--sample output--

```
LD hostapd  
CC hostapd_cli.c  
CC ../src/common/wpa_ctrl.c  
CC ../src/common/cli.c  
CC ../src/utils/edit_simple.c  
LD hostapd_cli
```

6) Build wpa_supplicant with the attached config file (config_supplicant)

```
cd ../wpa_supplicant  
cp ../config_supplicant .config  
make clean  
make
```

-----sample output--

```
LD wpa_supplicant  
CC wpa_cli.c  
CC ../src/common/wpa_ctrl.c  
CC ../src/common/cli.c  
CC ../src/utils/edit_simple.c  
LD wpa_cli  
CC wpa_passphrase.c  
LD wpa_passphrase
```

11 Building Hostapd through Yocto

- 1) After you have created a SD card image through the script or by any of the methods (take 1/2/3). Enter the following command from the build directory. Example shown below.

```
<build-dir>$ bitbake -c devshell hostapd
```

```
jameel@ubuntu:~/project/task63-manda/testing/b-imx6ulevk-3-3v$ bitbake -c devshell hostapd
WARNING: Host distribution "Ubuntu-16.04" has not been validated with this version of the build system; you may possibly experience unexpected failures. It is recommended that you use a tested distribution.
Loading cache: 100% |#####| Time: 0:00:01
Loaded 3054 entries from dependency cache.
NOTE: Resolving any missing task queue dependencies

Build Configuration:
BB_VERSION      = "1.32.0"
BUILD_SYS       = "x86_64-linux"
NATIVELSBSTRING = "Ubuntu-16.04"
TARGET_SYS     = "arm-poky-linux-gnueabi"
MACHINE        = "imx6ulevk"
DISTRO         = "fsl-imx-x11"
DISTRO_VERSION = "4.9.11-1.0.0"
TUNE_FEATURES  = "arm armv7ve vfp neon          callconvention-hard          cortexa7"
TARGET_FPU     = "hard"
meta
meta-poky      = "HEAD:78890ea22750804e3e9113e76f7ca3d7234c8342"
meta-oe
meta-multimedia = "HEAD:fe5c83312de11e80b85680ef237f8acb04b4b26e"
meta-freescale = "HEAD:a398b50b7fc084a9e68cc3000c218d5028522a25"
meta-freescale-3rdparty = "HEAD:68314612e236cab1da82d72a0da62635a3523f84"
meta-freescale-distro = "HEAD:cd5c7a2539f40004f74126e9fd08254fd9a6390"
meta-bsp
meta-sdk       = "HEAD:daba3340ecd8b358e0c6c415baeee0fcae95c525"
meta-browser   = "HEAD:10f6e3778d823ee1be106c126216c6f941088fbf"
meta-gnome
meta-networking
meta-python
meta-fileystems = "HEAD:fe5c83312de11e80b85680ef237f8acb04b4b26e"
meta-qt5       = "HEAD:ff073f04109900fc07bf81e2f1df63c626caf342"
meta-murata-wireless = "imx-morty-manda:4fd68c47a1be094d83c82f8e82602fff194fe1d4"

Initialising tasks: 100% |#####| Time: 0:00:00
NOTE: Executing SetScene Tasks
NOTE: Executing RunQueue Tasks
Currently 1 running tasks (88 of 88) 98% |#####|
0: hostapd-2.6-r0 do_devshell - 24s (pid 37012)
```

Note: This will open another new shell window as shown below.

```
root@ubuntu:~/project/task63-manda/testing/b-imx6ulevk-3-3v/tmp/work/cortexa7hf-neon-poky-linux-gnueabi/hostapd/2.6-r0/hostapd-2.6
root@ubuntu:~/project/task63-manda/testing/b-imx6ulevk-3-3v/tmp/work/cortexa7hf-neon-poky-linux-gnueabi/hostapd/2.6-r0/hostapd-2.6#
```

- 2) User can build “hostapd” using the new shell.

```
cd hostapd
make clean
make
```

12 Building WPA Supplicant through Yocto

- 1) After you have created a SD card image through the script or by any of the methods (take 1/2/3). Enter the following command from the build directory. Example shown below.

```
<build-dir>$ bitbake -c devshell wpa-supPLICANT
```

```
jameel@ubuntu:~/project/task63-manda/testing/b-imx6ulevk-3-3v$ bitbake -c devshell wpa-supPLICANT
WARNING: Host distribution "Ubuntu-16.04" has not been validated with this version of the build system; you may possibly experience unexpected failures. It is recommended that you use a tested distribution.
Loading cache: 100% |#####| Time: 0:00:01
Loaded 3054 entries from dependency cache.
NOTE: Resolving any missing task queue dependencies

Build Configuration:
BB_VERSION      = "1.32.0"
BUILD_SYS      = "x86_64-linux"
NATIVELSBSTRING = "Ubuntu-16.04"
TARGET_SYS     = "arm-poky-linux-gnueabi"
MACHINE        = "imx6ulevk"
DISTRO         = "fsl-imx-x11"
DISTRO_VERSION = "4.9.11-1.0.0"
TUNE_FEATURES  = "arm armv7ve vfp neon          callconvention-hard          cortexa7"
TARGET_FPU     = "hard"
meta
meta-poky      = "HEAD:78890ea22750804e3e9113e76f7ca3d7234c8342"
meta-oe
meta-multimedia = "HEAD:fe5c83312de11e80b85680ef237f8acb04b4b26e"
meta-freescale = "HEAD:a398b50b7fc084a9e68cc3000c218d5028522a25"
meta-freescale-3rdparty = "HEAD:68314612e236cab1da82d72a0da62635a3523f84"
meta-freescale-distro = "HEAD:cd5c7a2539f40004f74126e9fd08254fd9a6390"
meta-bsp
meta-sdk       = "HEAD:daba3340ecd8b358e0c6c415baeee0fcae95c525"
meta-browser   = "HEAD:10f6e3778d823ee1be106c126216c6f941088fbf"
meta-gnome
meta-networking
meta-python
meta-filesystems = "HEAD:fe5c83312de11e80b85680ef237f8acb04b4b26e"
meta-qt5       = "HEAD:ff073f04109900fc07bf81e2f1df63c626caf342"
meta-murata-wireless = "imx-morty-manda:4fd68c47a1be094d83c82f8e82602fff194fe1d4"

Initialising tasks: 100% |#####| Time: 0:00:01
NOTE: Executing SetScene Tasks
NOTE: Executing RunQueue Tasks
Currently 1 running tasks (88 of 88) 98% |#####|
0: wpa-supPLICANT-2.6-r0 do_devshell - 13s (pid 37976)
```

Note: This will open another new shell window as shown below.

```
root@ubuntu: ~/project/task63-manda/testing/b-imx6ulevk-3-3v/tmp/work/cortexa7hf-neon-poky-linux-gnueabi/wpa-supPLICANT/2.6-r0/wpa_supPLICANT-2.6
root@ubuntu:~/project/task63-manda/testing/b-imx6ulevk-3-3v/tmp/work/cortexa7hf-neon-poky-linux-gnueabi/wpa-supPLICANT/2.6-r0/wpa_supPLICANT-2.6#
```

- 2) User can build “wpa_supPLICANT” using the new shell.

```
cd wpa_supPLICANT
make clean
make
```

13 Technical Support Resources

Table 10 lists all the support resources available for the NXP/Cypress/Murata i.MX Wi-Fi/BT solution. There is a dedicated Murata website (no login required) in addition to a dedicated imxfaq@murata.com email alias. All website/email addresses are hyperlinked in the “Support Site” column below.

Table 10: List of Support Resources

Support Site	Notes
Murata i.MX Landing Page	No login credentials required: http://wireless.murata.com/imx . This is an excellent starting point to understand all hardware/software configurations supported. All supporting Murata i.MX Wireless documentation is provided here. Links to other Murata wireless pages which provide specifics on various module solutions.
NXP i.MX Community Forum	Go to: https://community.nxp.com/community/imx . Login credentials required. Numerous forum postings on interfacing Murata wireless solutions on NXP i.MX platforms. NXP and Murata teams support this forum.
Cypress Linux Support Forum	Go to: https://community.cypress.com/community/linux . Login credentials required. Includes support forum, chipset datasheets, application notes, etc. Cypress and Murata Teams support this forum.
Murata i.MX FAQ Email	i.MX FAQ email: imxfaq@murata.com . Supported by Murata Team. Typically used to support issues accessing support sites, this email address can also be used to escalate issues not answered on any of the support forums.

Appendix A: Useful “git” commands

Git is a free and open source distributed version control system. It is important for the user to have a reasonable understanding of Git, because Murata’s “*fmac*” implementation relies heavily on Github (<https://github.com/>): a remote Git repository. Some people may be new to using “*git*” commands or to remote Git repositories such as Github. Here is a [good primer](#) on using “*git*”. For more details, refer to the main Git page: <https://git-scm.com/>. Commonly used “*git*” commands are shown in **Table 11**.

Table 11: Useful “git” commands

“git” command	Description
<code>git config --list</code>	List Git identity: user name and email address.
<code>git config --global --unset-all user.name</code>	Remove Git user name setting.
<code>git config --global --unset-all user.email</code>	Remove Git user email address setting.
<code>git config --global user.name “<User Name>”</code>	Configure Git user name. Is done as part of first-time Git setup. Example: <i>git config --global user.name “Fred Jones”</i>
<code>git config --global user.email “<User Email>”</code>	Configure Git user email address. Is done as part of first-time Git setup. Example: <i>git config --global user.email “fj@gmail.com”</i>
<code>git clone <remote_URL></code>	Creates a local working copy of an existing remote repository.
<code>git branch -a</code>	Lists all available branches of current local repository.
<code>git tag</code>	Lists all the available release tags.
<code>git checkout <branch_name></code>	Check out a specific branch or release/tag in local repository.
<code>git status</code>	Lists the current branch (which is checked out) in local repository.
<code>git reset --hard</code>	Reset current Git repository content to default branch settings. NOTE: there are two “-” characters before “hard” switch.
<code>git log</code>	Shows the chronological commit history for local repository.

Providing more details on certain “*git*” commands:

- “***git config***” commands: Git needs to be configured prior to using it. At a minimum the username and email address must be configured. For more details refer to: <https://git-scm.com/book/en/v2/Getting-Started-First-Time-Git-Setup>.

- “**git clone**”: this command is one of the key steps in building the customized Murata i.MX Yocto image. After configuring the baseline i.MX Yocto environment, the user must install the “**meta-murata-wireless**” layer in the Yocto “**sources**” folder by invoking “**git clone** <https://github.com/murata-wireless/meta-murata-wireless.git>”.
- “**git branch -a**”: this command is useful to see which branches are currently available. Once you have the correct spelling of a given branch, then you can invoke the “**git checkout**” command to pull your desired release.
- “**git tag**”: for users who want to use formal configured/tested release. This command will list all the current release tags. Typically run only in “**meta-murata-wireless**” and “**cyw-fmac**” repositories.
- “**git checkout**”: this command checks out a given branch or release tag. It can only be run after a git repository is created. In the Murata-customized build flow, we are invoking “**git checkout**” after “**git clone**” which creates a local copy of the “**meta-murata-wireless**” repository. “**git clone/checkout**” are also useful to pull specific versions of NVRAM, firmware, or patchfiles. “**git checkout**” can be used to easily switch branches in any given repository.
- “**git status**”: this confirms which branch/release you are on. It also indicates if there have been any changes to the files: both tracked (files checked out as part of the current branch) and untracked (new files that you may have added).
- “**git reset --hard**”: note the double “-“ character entry before “**hard**” switch. This command resets the content of the current Git repository to the default for current “<branch_name>”. This is a useful command if you implemented certain changes that you want to back out. You can also invoke “**git reset <filename>**” to reset (restore) just that one file.

Appendix B: Useful “bitbake” commands

Quoting from the [BitBake User Manual](#):

“Fundamentally, BitBake is a generic task execution engine that allows shell and Python tasks to be run efficiently and in parallel while working within complex inter-task dependency constraints. One of BitBake's main users, OpenEmbedded¹⁴, takes this core and builds embedded Linux software stacks using a task-oriented approach.”

Or to be more succinct, BitBake is **the** “Swiss Army Knife” when using Yocto or OpenEmbedded. **Table 12** provides a list of essential “**bitbake**” commands.

Table 12: Useful “bitbake” commands

Yocto commands	Description
<code>bitbake -c devshell virtual/kernel</code>	To access kernel source
<code>bitbake <recipe> -c devshell</code>	Open a new shell where necessary system values already defined for recipe
<code>bitbake-layers show-layers</code>	To see the layers and their priorities.
<code>bitbake -e <recipe> grep ^PV</code>	To check which version actually got selected for the recipe.
<code>bitbake -c fetch <recipe></code>	To fetch source code. Source code can be found in downloads folder.
<code>bitbake -b <recipe.bb> -c compile -D</code>	To force compilation of the selected recipe.
<code>bitbake -b <recipe.bb></code>	To perform build on the selected recipe.
<code>bitbake -b <recipe.bb> -c clean</code>	To perform clean on the selected recipe.
<code>bitbake fsl-image-validation-imx</code>	To create SD card image.
<code>bitbake virtual/kernel -c menuconfig</code>	Interactive kernel configuration
<code>bitbake <image > -g -u depexp</code>	Show the package dependency for <i>image</i> .

NOTE: “**bitbake**” commands must be invoked from the Yocto build directory.

¹⁴ OpenEmbedded and Yocto are similar embedded Linux distributions. “meta-murata-wireless” can be easily leveraged in OpenEmbedded as well.

Appendix C: Example of running Host Setup for Yocto Script

```
$/Host_Setup_for_Yocto.sh
```

```
Murata: setup script to check Ubuntu installation and install  
additional host packages necessary for Yocto build
```

```
=====
```

1) Verifying Host Environment

```
-----
```

```
Murata: Verified Linux Distribution: Ubuntu
```

```
Murata: Verified Ubuntu Release: 16.04
```

2) Verifying Host Script Version

```
-----
```

```
Fetching latest script from Murata Github.
```

```
Cloning "https://github.com/murata-wireless/meta-murata-wireless.git"
```

```
Creating "meta-murata-wireless" subfolder.
```

```
Latest: 03222018
```

```
Current: 03222018.....PASS
```

3) Installing Essential Yocto host packages

```
-----
```

```
Murata: Installing Essential Yocto Project host packages.
```

```
sudoers-priviledged user will be prompted for password...
```

```
[sudo] password for skerr:
```

```
Reading package lists... Done
```

```
Building dependency tree
```

```
Reading state information... Done
```

```
build-essential is already the newest version (12.1ubuntu2).
```

```
diffstat is already the newest version (1.61-1).
```

```
gawk is already the newest version (1:4.1.3+dfsg-0.1).
```

```
gcc-multilib is already the newest version (4:5.3.1-1ubuntu1).
```

```
libstdc++1.2-dev is already the newest version (1.2.15+dfsg1-3).
```

```
unzip is already the newest version (6.0-20ubuntu1).
```

```
chrpath is already the newest version (0.16-1).
```

```
socat is already the newest version (1.7.3.1-1).
```

texinfo is already the newest version (6.1.0.dfsg.1-5).
git-core is already the newest version (1:2.7.4-0ubuntu1.3).
wget is already the newest version (1.17.1-1ubuntu1.3).
0 upgraded, 0 newly installed, 0 to remove and 258 not upgraded.
Murata: Installing i.MX layers host packages...
Reading package lists... Done
Building dependency tree
Reading state information... Done
autoconf is already the newest version (2.69-9).
automake is already the newest version (1:1.15-4ubuntu1).
g++ is already the newest version (4:5.3.1-1ubuntu1).
gcc is already the newest version (4:5.3.1-1ubuntu1).
libglu1-mesa-dev is already the newest version (9.0.0-2.1).
libsdl1.2-dev is already the newest version (1.2.15+dfsg1-3).
make is already the newest version (4.1-6).
sed is already the newest version (4.2.2-7).
xterm is already the newest version (322-1ubuntu1).
asciidoc is already the newest version (8.6.9-3).
docbook-utils is already the newest version (0.6.14-3ubuntu1).
groff is already the newest version (1.22.3-7).
help2man is already the newest version (1.47.3).
lzop is already the newest version (1.03-3.2).
mercurial is already the newest version (3.7.3-1ubuntu1).
python-pysqlite2 is already the newest version (2.7.0-1).
repo is already the newest version (1.12.32-2).
texi2html is already the newest version (1.82+dfsg1-5).
coreutils is already the newest version (8.25-2ubuntu3~16.04).
curl is already the newest version (7.47.0-1ubuntu2.7).
cvs is already the newest version (2:1.12.13+real-15ubuntu0.1).
desktop-file-utils is already the newest version (0.22-1ubuntu5.1).
libgl1-mesa-dev is already the newest version (17.2.8-0ubuntu0~16.04.1).
subversion is already the newest version (1.9.3-2ubuntu1.1).
0 upgraded, 0 newly installed, 0 to remove and 258 not upgraded.
Murata: Installing i.MX layers host packages for a Ubuntu 16.04 or 14.04 host setup only...
Reading package lists... Done
Building dependency tree
Reading state information... Done

u-boot-tools is already the newest version (2016.01+dfsg1-2ubuntu3).

0 upgraded, 0 newly installed, 0 to remove and 258 not upgraded.

Murata: Ubuntu Linux host environment verified, necessary host packages installed...

4) GIT Configuration:

Scott Kerr

skerr@murata.com

user.name : Scott Kerr

user.email: skerr@murata.com

Do you want to proceed with user name and email ID? Y/n: Y

Murata: please verify git username and email address prior to running Yocto build.

Currently configured as...

color.ui=auto

user.name=Scott Kerr

user.email=skerr@murata.com

Murata: If git username/email OK, then ready to build "meta-murata-wireless" customized i.MX Linux image!

Legacy Document

Appendix D: Example of running Murata Wireless Build

MURATA Custom i.MX Linux build using Yocto

=====

1) Verifying Host Environment

Murata: Verified Linux Distribution: Ubuntu

Murata: Verified Ubuntu Release: 16.04

2) Verifying Script Version

Fetching latest script from Murata Github.

Cloning "https://github.com/murata-wireless/meta-murata-wireless.git"

Creating "meta-murata-wireless" subfolder.

Latest: 03222018

Current: 03222018.....PASS

3) Select Release Type

a) Stable: Murata tested/verified release tag. Stable is the recommended default.

b) Developer: Includes latest fixes on branch. May change at any time.

Select Stable ('n'=Developer)? Y/n: Y

Stable release selected

4) Select "fmac" version

| Entry | "fmac" version |

|-----|-----|

| 1. | "orga" (v4.12) - Previous release |

| 2. | "battr" (v4.14) - Latest and Highly recommended |

Select which entry? 2

Selected : "battra" (v4.14)

5) Select i.MX Yocto Release

```
-----  
-----  
|Entry| i.MX Yocto | Yocto | i.MX | "meta-murata-wireless" |  
| | Release | branch | Supported | Release Tag |  
|----|-----|-----|-----|-----|  
| 1 | 4.9.51 8MQ Beta | morty | 8 | imx8-morty-battra_r1.0 |  
| 2 | 4.9.11_1.0.0 GA | morty | 6,7 | imx-morty-battra_r1.0 |  
| 3 | 4.1.15_2.0.0 GA | krogoth | 6,7 (No 7ULP) | imx-krogoth-battra_r1.0 |  
-----
```

Select which entry? 2

Selected: 4.9.11_1.0.0 GA

6) Select Target

```
-----  
-----  
| Entry | Target Name | i.MX Platform |  
|----|-----|-----|  
| 1 | imx7dsabresd | i.MX 7Dual SDB |  
| 2 | imx6qpsabresd | i.MX 6QuadPlus SDB |  
| 3 | imx6qsabresd | i.MX 6Quad SDB |  
| 4 | imx6dlsabresd | i.MX 6DualLite SDB |  
| 5 | imx6sxsabresd | i.MX 6SX SDB |  
| 6 | imx6slevk | i.MX 6SL EVK |  
| 7 | imx6ulevk | i.MX 6UL EVK |  
| 8 | imx6ull14x14evk | i.MX 6ULL EVK(14x14) |  
| 9 | imx6ull9x9evk | i.MX 6ULL EVK(9x9) |  
| 10 | imx7ulpevk | i.MX 7ULP EVK |  
-----
```

Select your entry: 7

Selected target: imx6ulevk

6.1) Select VIO Signaling

```
-----
| Entry | Options |
|-----|-----|
| 1. | 1.8V VIO signaling with UHS support |
| 2. | 1.8V VIO signaling without UHS support |
| 3. | 3.3V VIO signaling (No HW mods needed) |
-----
```

Refer to Murata Quickstart Guide for more details:

- Murata Wi-Fi BT Solution for i.MX Quick Start Guide (Linux) 5.x.pdf

Select your entry: 3

Selected 3.3V VIO signaling (No HW mods needed).

7) Select DISTRO & Image

Murata default DISTRO & Image pre-selected are:

DISTRO: fsl-imx-x11

Image: fsl-image-validation-imx

Proceed with this configuration? Y/n: Y

Proceeding with Murata defaults.

8) Creation of Build directory

Ex: <build-imx6ulevk-x11> for imx6ulevk with x11 backend

Ex: <build-xwayland-imx8mq> for imx8mqevk with xwayland backend

NOTE: The directory will be created in your <fsl-yocto-bsp-release> folder.

Enter build directory name: build-imx6ul-3.3V-x11

9) Verify your selection

i.MX Yocto Release : 4.9.11_1.0.0 GA
 Yocto branch : morty
 fmac version : "battra" (v4.14)
 Target : imx6ulevk
 meta-murata-wireless Release Tag: imx-morty-battra_r1.0
 VIO Signaling : 3.3V VIO signaling (No HW mods needed)
 DISTRO : fsl-imx-x11
 Image : fsl-image-validation-imx
 Build Directory : build-imx6ul-3.3V-x11

Please verify your selection

Do you accept selected configurations ? Y/n: Y

10) Acceptance of End User License Agreement(EULA)

* Thank you for entering necessary configuration! *

* Please be patient to complete the last phase of the build script process. *

* Final steps of the build script require user to review and accept *

* NXP/Freescale Software License Agreement. *

* *

* NOTE: It may take several minutes to display EULA Agreement. *

* *

* User is prompted to enter space bar to fully display EULA Agreement OR 'q' *

* to quit reading entire EULA. *

* *

* Please enter space bar (repeatedly) OR 'q' until you see the final EULA *

* acceptance prompt as shown below: *

* *

* Do you accept the EULA you just read? (y/n) *

* *

* Please make sure to enter 'y', so build script continues. *

* Once EULA has been successfully accepted following line is displayed: *

```

*
* EULA has been accepted.
*
*
* Once EULA is accepted, final step (last User Prompt) is to kick off Yocto
* build.
*
*****

```

Do you want to continue? Y/n: Y

Get https://gerrit.googlesource.com/git-repo/clone.bundle

Get https://gerrit.googlesource.com/git-repo

Get https://source.codeaurora.org/external/imx/fsl-arm-yocto-bsp.git

% Total	% Received	% Xferd	Average Speed	Time	Time	Time	Current
			Dload	Upload	Total	Spent	Left
			Speed	Speed	Spent	Left	Speed
100	161	100	161	0	0	603	0
0	0	0	0	0	0	0	0

curl: (22) The requested URL returned error: 404 Not Found

Server does not provide clone.bundle; ignoring.

remote: Counting objects: 867, done.

remote: Total 867 (delta 0), reused 0 (delta 0)

Receiving objects: 100% (867/867), 151.10 KiB | 0 bytes/s, done.

Resolving deltas: 100% (391/391), done.

From https://source.codeaurora.org/external/imx/fsl-arm-yocto-bsp

- * [new branch] imx-4.1-krogoth -> origin/imx-4.1-krogoth
- * [new branch] imx-4.1.15-1.0.0_ga -> origin/imx-4.1.15-1.0.0_ga
- * [new branch] imx-morty -> origin/imx-morty
- * [new branch] nxp/imx-3.10.17-1.0.0_ga -> origin/nxp/imx-3.10.17-1.0.0_ga
- * [new branch] nxp/imx-3.10.17-1.0.1_ga -> origin/nxp/imx-3.10.17-1.0.1_ga
- * [new branch] nxp/imx-3.10.17-1.0.2_ga -> origin/nxp/imx-3.10.17-1.0.2_ga
- * [new branch] nxp/imx-3.10.17-1.0.3_patch -> origin/nxp/imx-3.10.17-1.0.3_patch
- * [new branch] nxp/imx-3.10.53-1.1.0_ga -> origin/nxp/imx-3.10.53-1.1.0_ga
- * [new branch] nxp/imx-3.10.53-1.1.1_patch -> origin/nxp/imx-3.10.53-1.1.1_patch
- * [new branch] nxp/imx-3.10.53-1.1.2_patch -> origin/nxp/imx-3.10.53-1.1.2_patch
- * [new branch] nxp/imx-3.14.28-1.0.0_ga -> origin/nxp/imx-3.14.28-1.0.0_ga
- * [new branch] nxp/imx-3.14.28-1.0.1_patch -> origin/nxp/imx-3.14.28-1.0.1_patch
- * [new branch] nxp/imx-3.14.28-7D_alpha -> origin/nxp/imx-3.14.28-7D_alpha
- * [new branch] nxp/imx-3.14.38-6QP_beta -> origin/nxp/imx-3.14.38-6QP_beta
- * [new branch] nxp/imx-3.14.38-6QP_ga -> origin/nxp/imx-3.14.38-6QP_ga

```
* [new branch] nxp/imx-3.14.38-6UL7D_beta -> origin/nxp/imx-3.14.38-6UL7D_beta
* [new branch] nxp/imx-3.14.38-6UL_ga -> origin/nxp/imx-3.14.38-6UL_ga
* [new branch] nxp/imx-3.14.38-6UL_patch -> origin/nxp/imx-3.14.38-6UL_patch
* [new branch] nxp/imx-3.14.52-1.1.0_ga -> origin/nxp/imx-3.14.52-1.1.0_ga
* [new branch] nxp/imx-4.1-krogoth -> origin/nxp/imx-4.1-krogoth
* [new branch] nxp/imx-4.1.15-1.0.0_agl-demo -> origin/nxp/imx-4.1.15-1.0.0_agl-demo
* [new branch] nxp/imx-4.1.15-1.0.0_ga -> origin/nxp/imx-4.1.15-1.0.0_ga
* [new branch] nxp/imx-4.1.15-1.0.0_genivi-demo -> origin/nxp/imx-4.1.15-1.0.0_genivi-demo
* [new branch] nxp/imx-4.1.15-1.0.0_iotg-demo -> origin/nxp/imx-4.1.15-1.0.0_iotg-demo
* [new branch] nxp/imx-4.1.15-1.0.0_xbmc-demo -> origin/nxp/imx-4.1.15-1.0.0_xbmc-demo
* [new branch] nxp/imx-morty -> origin/nxp/imx-morty
* [new branch] nxp/scm-imx-3.14.52-1.1.0_ga -> origin/nxp/scm-imx-3.14.52-1.1.0_ga
* [new branch] nxp/scm-imx-3.14.52-1.1.1_ga -> origin/nxp/scm-imx-3.14.52-1.1.1_ga
```

Your identity is: Scott Kerr <skerr@murata.com>

If you want to change this, please re-run 'repo init' with --config-name

repo has been initialized in /home/skerr/Downloads/test

Fetching project fsl-community-bsp-base

Fetching project poky

remote: Counting objects: 263, done.

remote: Total 263 (delta 0), reused 0 (delta 0), pack-reused 263

Receiving objects: 100% (263/263), 55.99 KiB | 0 bytes/s, done.

Resolving deltas: 100% (143/143), done.

From git://github.com/Freescale/fsl-community-bsp-base

```
* [new branch] daisy -> freescale/daisy
* [new branch] danny -> freescale/danny
* [new branch] denzil -> freescale/denzil
* [new branch] dizzy -> freescale/dizzy
* [new branch] dora -> freescale/dora
* [new branch] dylan -> freescale/dylan
* [new branch] fido -> freescale/fido
* [new branch] jethro -> freescale/jethro
* [new branch] krogoth -> freescale/krogoth
* [new branch] master -> freescale/master
* [new branch] master-next -> freescale/master-next
* [new branch] morty -> freescale/morty
```

```
* [new branch] pyro -> freescale/pyro
* [new branch] rocko -> freescale/rocko
* [new tag] 1.2 -> 1.2
* [new tag] 1.2-rc1 -> 1.2-rc1
* [new tag] 1.3 -> 1.3
* [new tag] 1.4 -> 1.4
* [new tag] 1.5 -> 1.5
* [new tag] 1.6 -> 1.6
* [new tag] 1.7 -> 1.7
* [new tag] 1.8 -> 1.8
* [new tag] 2.0 -> 2.0
* [new tag] 2.1 -> 2.1
* [new tag] 2.2 -> 2.2
```

Fetching project meta-freescale

remote: Counting objects: 24965, done.

remote: Compressing objects: 100% (8326/8326), done.

remote: Counting objects: 398359, done. | 1.63 MiB/s

remote: Compressing objects: 100% (94827/94827), done.

remote: Total 24965 (delta 13455), reused 24860 (delta 13350)

Receiving objects: 100% (24965/24965), 40.80 MiB | 472.00 KiB/s, done.

Resolving deltas: 100% (13455/13455), done.

From git://git.yoctoproject.org/meta-freescale

```
* [new branch] master -> yocto/master
* [new branch] master-next -> yocto/master-next
* [new branch] morty -> yocto/morty
* [new branch] pyro -> yocto/pyro
* [new branch] rocko -> yocto/rocko
* [new tag] 2.1 -> 2.1
* [new tag] 2.2 -> 2.2
```

Fetching projects: 22% (2/9) Fetching project meta-freescale-3rdparty

remote: Counting objects: 4463, done. 9 MiB | 1.39 MiB/s

remote: Total 4463 (delta 0), reused 0 (delta 0), pack-reused 4463

Receiving objects: 100% (4463/4463), 2.30 MiB | 3.29 MiB/s, done.

Resolving deltas: 100% (2544/2544), done.40.12 MiB | 1.25 MiB/s

From git://github.com/Freescale/meta-freescale-3rdparty

```
* [new branch] daisy -> freescale/daisy
* [new branch] danny -> freescale/danny
```

* [new branch] denzil -> freescale/denzil
* [new branch] dizzy -> freescale/dizzy
* [new branch] dora -> freescale/dora
* [new branch] dylan -> freescale/dylan
* [new branch] fido -> freescale/fido
* [new branch] jethro -> freescale/jethro
* [new branch] krogoth -> freescale/krogoth
* [new branch] master -> freescale/master
* [new branch] master-next -> freescale/master-next
* [new branch] morty -> freescale/morty
* [new branch] pyro -> freescale/pyro
* [new branch] rocko -> freescale/rocko
* [new tag] 1.2 -> 1.2
* [new tag] 1.2-rc1 -> 1.2-rc1
* [new tag] 1.3 -> 1.3
* [new tag] 1.4 -> 1.4
* [new tag] 1.5 -> 1.5
* [new tag] 1.6 -> 1.6
* [new tag] 1.7 -> 1.7
* [new tag] 1.8 -> 1.8
* [new tag] 2.0 -> 2.0
* [new tag] 2.1 -> 2.1
* [new tag] 2.2 -> 2.2

Fetching projects: 33% (3/9) Fetching project meta-qt5
remote: Counting objects: 8789, done. 2 MiB | 1.25 MiB/s
remote: Compressing objects: 100% (7/7), done.
remote: Total 8789 (delta 0), reused 1 (delta 0), pack-reused 8782
Receiving objects: 100% (8789/8789), 2.44 MiB | 2.33 MiB/s, done.
Resolving deltas: 100% (5626/5626), done.

From git://github.com/meta-qt5/meta-qt5

* [new branch] daisy -> QT5/daisy
* [new branch] dizzy -> QT5/dizzy
* [new branch] dora -> QT5/dora
* [new branch] dora-next -> QT5/dora-next
* [new branch] dylan -> QT5/dylan
* [new branch] fido -> QT5/fido
* [new branch] fido-next -> QT5/fido-next

* [new branch] jansa/daisy -> QT5/jansa/daisy
* [new branch] jansa/dizzy -> QT5/jansa/dizzy
* [new branch] jansa/fido -> QT5/jansa/fido
* [new branch] jansa/jethro -> QT5/jansa/jethro
* [new branch] jansa/krogoth -> QT5/jansa/krogoth
* [new branch] jansa/master -> QT5/jansa/master
* [new branch] jansa/morty -> QT5/jansa/morty
* [new branch] jansa/pyro -> QT5/jansa/pyro
* [new branch] jansa/rocko -> QT5/jansa/rocko
* [new branch] jethro -> QT5/jethro
* [new branch] jethro-next -> QT5/jethro-next
* [new branch] krogoth -> QT5/krogoth
* [new branch] krogoth-next -> QT5/krogoth-next
* [new branch] master -> QT5/master
* [new branch] master-next -> QT5/master-next
* [new branch] morty -> QT5/morty
* [new branch] morty-next -> QT5/morty-next
* [new branch] otavio/master -> QT5/otavio/master
* [new branch] pyro -> QT5/pyro
* [new branch] pyro-next -> QT5/pyro-next
* [new branch] rocko -> QT5/rocko
* [new branch] rocko-next -> QT5/rocko-next
* [new tag] 5.2.1+origin/release -> 5.2.1+origin/release
* [new tag] jansa/test-2013-10-08 -> jansa/test-2013-10-08
* [new tag] master-next-2014-02-19 -> master-next-2014-02-19
Fetching projects: 44% (4/9) Fetching project meta-openembedded
remote: Counting objects: 89284, done. 1 MiB | 975.00 KiB/s
remote: Compressing objects: 100% (30668/30668), done.
remote: Total 89284 (delta 55092), reused 87988 (delta 53996)
Receiving objects: 100% (89284/89284), 28.41 MiB | 3.70 MiB/s, done.
Resolving deltas: 100% (55092/55092), done..93 MiB | 849.00 KiB/s
From git://git.openembedded.org/meta-openembeddedB | 780.00 KiB/s
* [new branch] daisy -> oe/daisy
* [new branch] daisy-next -> oe/daisy-next
* [new branch] danny -> oe/danny
* [new branch] danny-next -> oe/danny-next
* [new branch] denzil -> oe/denzil

* [new branch] denzil-next -> oe/denzil-next
* [new branch] dizzy -> oe/dizzy
* [new branch] dizzy-next -> oe/dizzy-next
* [new branch] dora -> oe/dora
* [new branch] dora-next -> oe/dora-next
* [new branch] dylan -> oe/dylan
* [new branch] dylan-next -> oe/dylan-next
* [new branch] fido -> oe/fido
* [new branch] fido-next -> oe/fido-next
* [new branch] jansa/dizzy -> oe/jansa/dizzy
* [new branch] jansa/fido -> oe/jansa/fido
* [new branch] jansa/master -> oe/jansa/master
* [new branch] jethro -> oe/jethro
* [new branch] jethro-next -> oe/jethro-next
* [new branch] krogoth -> oe/krogoth
* [new branch] krogoth-next -> oe/krogoth-next
* [new branch] master -> oe/master
* [new branch] master-next -> oe/master-next
* [new branch] morty -> oe/morty
* [new branch] morty-next -> oe/morty-next
* [new branch] pyro -> oe/pyro
* [new branch] pyro-next -> oe/pyro-next
* [new branch] rocko -> oe/rocko
* [new branch] rocko-next -> oe/rocko-next
* [new branch] staggng/master-next -> oe/staggng/master-next

Fetching projects: 55% (5/9) Fetching project meta-browser

remote: Counting objects: 3981, done.

remote: Compressing objects: 100% (34/34), done.

remote: Total 3981 (delta 12), reused 27 (delta 6), pack-reused 3941

Receiving objects: 100% (3981/3981), 1001.52 KiB | 0 bytes/s, done.

Resolving deltas: 100% (2563/2563), done.

From git://github.com/OSSystems/meta-browser

* [new branch] danny -> OSSystems/danny
* [new branch] dora -> OSSystems/dora
* [new branch] dylan -> OSSystems/dylan
* [new branch] jansa/master -> OSSystems/jansa/master
* [new branch] jethro -> OSSystems/jethro

```
* [new branch] krogoth -> OSSystems/krogoth
* [new branch] master -> OSSystems/master
* [new branch] morty -> OSSystems/morty
```

Fetching projects: 66% (6/9) Fetching project meta-fsl-bsp-release

```
% Total % Received % Xferd Average Speed Time Time Time Current
      Dload Upload Total Spent Left Speed
100 161 100 161 0 0 1029 0 --:--:-- --:--:-- --:--:-- 1032
0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0
```

curl: (22) The requested URL returned error: 404 Not Found

Server does not provide clone.bundle; ignoring.

remote: Counting objects: 113648, done.

remote: Compressing objects: 100% (637/637), done.

remote: Total 113648 (delta 1951), reused 3107 (delta 1951)

Receiving objects: 100% (113648/113648), 11.27 MiB | 9.05 MiB/s, done.

Resolving deltas: 100% (70096/70096), done..06 MiB | 688.00 KiB/s

From https://source.codeaurora.org/external/imx/meta-fsl-bsp-release

```
* [new branch] imx-morty -> CAF/imx-morty
* [new branch] jethro_4.1.15-1.0.0_ga -> CAF/jethro_4.1.15-1.0.0_ga
* [new branch] jethro_4.1.15-1.1.0_usb-pll-patch -> CAF/jethro_4.1.15-1.1.0_usb-pll-patch
* [new branch] jethro_4.1.15-1.2.1 -> CAF/jethro_4.1.15-1.2.1
* [new branch] krogoth_4.1.y -> CAF/krogoth_4.1.y
* [new branch] morty-4.9.51-8mq_beta -> CAF/morty-4.9.51-8mq_beta
* [new branch] morty-4.9.51-8mq_ga -> CAF/morty-4.9.51-8mq_ga
* [new branch] morty-4.9.51-8qm_beta2 -> CAF/morty-4.9.51-8qm_beta2
* [new branch] morty-4.9.51-8qxp_alpha -> CAF/morty-4.9.51-8qxp_alpha
* [new branch] morty-4.9.51-mx8_beta -> CAF/morty-4.9.51-mx8_beta
* [new branch] nxp/daisy_3.10.53-1.1.0_GA -> CAF/nxp/daisy_3.10.53-1.1.0_GA
* [new branch] nxp/daisy_3.10.53-1.1.1_patch -> CAF/nxp/daisy_3.10.53-1.1.1_patch
* [new branch] nxp/daisy_3.10.53-1.1.2_patch -> CAF/nxp/daisy_3.10.53-1.1.2_patch
* [new branch] nxp/dizzy_3.14.28-1.0.0_GA -> CAF/nxp/dizzy_3.14.28-1.0.0_GA
* [new branch] nxp/dizzy_3.14.28-1.0.1_patch -> CAF/nxp/dizzy_3.14.28-1.0.1_patch
* [new branch] nxp/dora_3.10.17-1.0.0_GA -> CAF/nxp/dora_3.10.17-1.0.0_GA
* [new branch] nxp/dora_3.10.17-1.0.1 -> CAF/nxp/dora_3.10.17-1.0.1
* [new branch] nxp/dora_3.10.17-1.0.2 -> CAF/nxp/dora_3.10.17-1.0.2
* [new branch] nxp/dora_3.10.17-1.0.3 -> CAF/nxp/dora_3.10.17-1.0.3
* [new branch] nxp/fido_3.14.28_7D_alpha -> CAF/nxp/fido_3.14.28_7D_alpha
* [new branch] nxp/fido_3.14.38_6QP_beta -> CAF/nxp/fido_3.14.38_6QP_beta
```

* [new branch] nxp/fido_3.14.38_6QP_ga -> CAF/nxp/fido_3.14.38_6QP_ga
* [new branch] nxp/fido_3.14.38_6UL7D_beta -> CAF/nxp/fido_3.14.38_6UL7D_beta
* [new branch] nxp/fido_3.14.38_6UL_ga -> CAF/nxp/fido_3.14.38_6UL_ga
* [new branch] nxp/fido_3.14.38_6UL_patch -> CAF/nxp/fido_3.14.38_6UL_patch
* [new branch] nxp/fido_3.14.52_1.1.0_ga -> CAF/nxp/fido_3.14.52_1.1.0_ga
* [new branch] nxp/imx-morty -> CAF/nxp/imx-morty
* [new branch] nxp/jethro_4.1.15-1.0.0_ga -> CAF/nxp/jethro_4.1.15-1.0.0_ga
* [new branch] nxp/jethro_4.1.15-1.1.0_usb-pll-patch -> CAF/nxp/jethro_4.1.15-1.1.0_usb-pll-patch
* [new branch] nxp/krogoth_4.1.15-2.0.0_patch -> CAF/nxp/krogoth_4.1.15-2.0.0_patch
* [new branch] nxp/krogoth_4.1.15-2.0.1 -> CAF/nxp/krogoth_4.1.15-2.0.1
* [new branch] nxp/krogoth_4.1.30_7ULP_alpha -> CAF/nxp/krogoth_4.1.30_7ULP_alpha
* [new branch] nxp/krogoth_4.1.y -> CAF/nxp/krogoth_4.1.y
* [new branch] nxp/master -> CAF/nxp/master
* [new tag] imx_3.14.52_1.1.0_ga -> imx_3.14.52_1.1.0_ga
* [new tag] imx_3.14.52_1.1.1 -> imx_3.14.52_1.1.1
* [new tag] imx_4.1.15.2.0.3_patch -> imx_4.1.15.2.0.3_patch
* [new tag] imx_4.1.15_1.0.0_ga -> imx_4.1.15_1.0.0_ga
* [new tag] imx_4.1.15_1.1.0_ga -> imx_4.1.15_1.1.0_ga
* [new tag] imx_4.1.15_1.1.1 -> imx_4.1.15_1.1.1
* [new tag] imx_4.1.15_1.2.0_ga -> imx_4.1.15_1.2.0_ga
* [new tag] imx_4.1.15_2.0.1 -> imx_4.1.15_2.0.1
* [new tag] imx_4.1.15_2.0.2 -> imx_4.1.15_2.0.2
* [new tag] imx_4.1.33_7ulp_beta -> imx_4.1.33_7ulp_beta
* [new tag] rel_imx_3.14.28_1.0.0_ga -> rel_imx_3.14.28_1.0.0_ga
* [new tag] rel_imx_4.1.15_2.1.0_ga -> rel_imx_4.1.15_2.1.0_ga
* [new tag] rel_imx_4.9.51_8qm_beta1 -> rel_imx_4.9.51_8qm_beta1
* [new tag] rel_imx_4.9.51_8qm_beta2 -> rel_imx_4.9.51_8qm_beta2

Fetching projects: 77% (7/9) Fetching project meta-freescale-distro

remote: Counting objects: 1435, done.

remote: Compressing objects: 100% (40/40), done.

remote: Total 1435 (delta 27), reused 39 (delta 18), pack-reused 1376

Receiving objects: 100% (1435/1435), 320.53 KiB | 0 bytes/s, done.

Resolving deltas: 100% (799/799), done., 52.82 MiB | 711.00 KiB/s

From git://github.com/Freescale/meta-freescale-distro

* [new branch] daisy -> freescale/daisy
* [new branch] danny -> freescale/danny
* [new branch] denzil -> freescale/denzil

* [new branch] dizzy -> freescale/dizzy
* [new branch] dora -> freescale/dora
* [new branch] dylan -> freescale/dylan
* [new branch] fido -> freescale/fido
* [new branch] jethro -> freescale/jethro
* [new branch] krogoth -> freescale/krogoth
* [new branch] master -> freescale/master
* [new branch] master-next -> freescale/master-next
* [new branch] morty -> freescale/morty
* [new branch] pyro -> freescale/pyro
* [new branch] rocko -> freescale/rocko
* [new tag] 1.2 -> 1.2
* [new tag] 1.2-rc1 -> 1.2-rc1
* [new tag] 1.3 -> 1.3
* [new tag] 1.4 -> 1.4
* [new tag] 1.5 -> 1.5
* [new tag] 1.6 -> 1.6
* [new tag] 1.7 -> 1.7
* [new tag] 1.8 -> 1.8
* [new tag] 2.0 -> 2.0
* [new tag] 2.1 -> 2.1
* [new tag] 2.2 -> 2.2

remote: Total 398359 (delta 297029), reused 398029 (delta 296700) 3.61 MiB | 723.00 KiB/s

Receiving objects: 100% (398359/398359), 144.35 MiB | 1.95 MiB/s, done.

Resolving deltas: 100% (297029/297029), done.

From git://git.yoctoproject.org/poky

* [new branch] 1.1_M1 -> yocto/1.1_M1
* [new branch] 1.1_M2 -> yocto/1.1_M2
* [new branch] 1.1_M3 -> yocto/1.1_M3
* [new branch] 1.1_M4 -> yocto/1.1_M4
* [new branch] 1.2_M1 -> yocto/1.2_M1
* [new branch] 1.2_M2 -> yocto/1.2_M2
* [new branch] 1.2_M3 -> yocto/1.2_M3
* [new branch] 1.2_M4 -> yocto/1.2_M4
* [new branch] 1.3_M1 -> yocto/1.3_M1
* [new branch] 1.3_M2 -> yocto/1.3_M2
* [new branch] 1.3_M3 -> yocto/1.3_M3

* [new branch] 1.3_M4 -> yocto/1.3_M4
* [new branch] 1.3_M5 -> yocto/1.3_M5
* [new branch] 1.3_beta -> yocto/1.3_beta
* [new branch] 1.4_M1 -> yocto/1.4_M1
* [new branch] 1.4_M3 -> yocto/1.4_M3
* [new branch] 1.4_M4 -> yocto/1.4_M4
* [new branch] 1.4_M5 -> yocto/1.4_M5
* [new branch] 1.6_M5 -> yocto/1.6_M5
* [new branch] bernard -> yocto/bernard
* [new branch] blinky -> yocto/blinky
* [new branch] clyde -> yocto/clyde
* [new branch] daisy -> yocto/daisy
* [new branch] danny -> yocto/danny
* [new branch] danny-next -> yocto/danny-next
* [new branch] denzil -> yocto/denzil
* [new branch] dizzy -> yocto/dizzy
* [new branch] dora -> yocto/dora
* [new branch] dora-toaster -> yocto/dora-toaster
* [new branch] dylan -> yocto/dylan
* [new branch] edison -> yocto/edison
* [new branch] elroy -> yocto/elroy
* [new branch] fido -> yocto/fido
* [new branch] green -> yocto/green
* [new branch] jethro -> yocto/jethro
* [new branch] krogoth -> yocto/krogoth
* [new branch] krogoth-next -> yocto/krogoth-next
* [new branch] laverne -> yocto/laverne
* [new branch] master -> yocto/master
* [new branch] master-next -> yocto/master-next
* [new branch] master-next2 -> yocto/master-next2
* [new branch] morty -> yocto/morty
* [new branch] morty-next -> yocto/morty-next
* [new branch] pinky -> yocto/pinky
* [new branch] purple -> yocto/purple
* [new branch] pyro -> yocto/pyro
* [new branch] pyro-next -> yocto/pyro-next
* [new branch] rocko -> yocto/rocko

* [new branch] rocko-next -> yocto/rocko-next

* [new tag] 1.1_M1.final -> 1.1_M1.final

* [new tag] 1.1_M1.rc1 -> 1.1_M1.rc1

* [new tag] 1.1_M1.rc2 -> 1.1_M1.rc2

* [new tag] 1.1_M2.final -> 1.1_M2.final

* [new tag] 1.1_M2.rc1 -> 1.1_M2.rc1

* [new tag] 1.1_M2.rc2 -> 1.1_M2.rc2

* [new tag] 1.1_M2.rc3 -> 1.1_M2.rc3

* [new tag] 1.1_M3.final -> 1.1_M3.final

* [new tag] 1.1_M3.rc2 -> 1.1_M3.rc2

* [new tag] 1.1_M3.rc3 -> 1.1_M3.rc3

* [new tag] 1.1_M4.rc2+ -> 1.1_M4.rc2+

* [new tag] 1.1_M4.rc3 -> 1.1_M4.rc3

* [new tag] 1.1_M4.rc4 -> 1.1_M4.rc4

* [new tag] 1.2_M1.final -> 1.2_M1.final

* [new tag] 1.2_M1.rc1 -> 1.2_M1.rc1

* [new tag] 1.2_M1.rc2 -> 1.2_M1.rc2

* [new tag] 1.2_M2.final -> 1.2_M2.final

* [new tag] 1.2_M2.rc1 -> 1.2_M2.rc1

* [new tag] 1.2_M3.final -> 1.2_M3.final

* [new tag] 1.2_M3.rc1 -> 1.2_M3.rc1

* [new tag] 1.2_M4.rc1 -> 1.2_M4.rc1

* [new tag] 1.2_M4.rc2 -> 1.2_M4.rc2

* [new tag] 1.2_M4.rc3 -> 1.2_M4.rc3

* [new tag] 1.2_M4.rc3.1 -> 1.2_M4.rc3.1

* [new tag] 1.2_M4.rc3.2 -> 1.2_M4.rc3.2

* [new tag] 1.2_M4.rc4 -> 1.2_M4.rc4

* [new tag] 1.2_M4.rc4.0 -> 1.2_M4.rc4.0

* [new tag] 1.3 -> 1.3

* [new tag] 1.3.1 -> 1.3.1

* [new tag] 1.3.2 -> 1.3.2

* [new tag] 1.3.2.final -> 1.3.2.final

* [new tag] 1.3_M1.final -> 1.3_M1.final

* [new tag] 1.3_M1.rc1 -> 1.3_M1.rc1

* [new tag] 1.3_M2.final -> 1.3_M2.final

* [new tag] 1.3_M2.rc1 -> 1.3_M2.rc1

* [new tag] 1.3_M3.final -> 1.3_M3.final

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* [new tag] 1.3_M3.rc2 -> 1.3_M3.rc2
* [new tag] 1.3_M4.final -> 1.3_M4.final
* [new tag] 1.3_M4.rc1 -> 1.3_M4.rc1
* [new tag] 1.3_M5.rc1 -> 1.3_M5.rc1
* [new tag] 1.3_M5.rc2 -> 1.3_M5.rc2
* [new tag] 1.3_M5.rc3 -> 1.3_M5.rc3
* [new tag] 1.3_M5.rc4 -> 1.3_M5.rc4
* [new tag] 1.4.1.rc1 -> 1.4.1.rc1
* [new tag] 1.4_M1.final -> 1.4_M1.final
* [new tag] 1.4_M1.rc1 -> 1.4_M1.rc1
* [new tag] 1.4_M3.final -> 1.4_M3.final
* [new tag] 1.4_M3.rc1 -> 1.4_M3.rc1
* [new tag] 1.4_M3.rc2 -> 1.4_M3.rc2
* [new tag] 1.4_M4.final -> 1.4_M4.final
* [new tag] 1.4_M4.rc1 -> 1.4_M4.rc1
* [new tag] 1.4_M5.final -> 1.4_M5.final
* [new tag] 1.4_M5.rc1 -> 1.4_M5.rc1
* [new tag] 1.4_M5.rc2 -> 1.4_M5.rc2
* [new tag] 1.4_M5.rc3 -> 1.4_M5.rc3
* [new tag] 1.4_M6.rc1 -> 1.4_M6.rc1
* [new tag] 1.5_M1.final -> 1.5_M1.final
* [new tag] 1.5_M1.rc1 -> 1.5_M1.rc1
* [new tag] 1.5_M2.rc1 -> 1.5_M2.rc1
* [new tag] 1.5_M3 -> 1.5_M3
* [new tag] 1.5_M3.final -> 1.5_M3.final
* [new tag] 1.5_M3.rc1 -> 1.5_M3.rc1
* [new tag] 1.5_M4 -> 1.5_M4
* [new tag] 1.5_M4.final -> 1.5_M4.final
* [new tag] 1.5_M4.rc1 -> 1.5_M4.rc1
* [new tag] 1.5_M4.rc2 -> 1.5_M4.rc2
* [new tag] 1.5_M4.rc3 -> 1.5_M4.rc3
* [new tag] 1.5_M5.rc1 -> 1.5_M5.rc1
* [new tag] 1.5_M5.rc2 -> 1.5_M5.rc2
* [new tag] 1.5_M5.rc3 -> 1.5_M5.rc3
* [new tag] 1.5_M5.rc4 -> 1.5_M5.rc4
* [new tag] 1.5_M5.rc5 -> 1.5_M5.rc5
* [new tag] 1.5_M5.rc6 -> 1.5_M5.rc6

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* [new tag] 1.5_M5.rc7 -> 1.5_M5.rc7
* [new tag] 1.5_M5.rc8 -> 1.5_M5.rc8
* [new tag] 1.6_M1 -> 1.6_M1
* [new tag] 1.6_M1.final -> 1.6_M1.final
* [new tag] 1.6_M1.rc1 -> 1.6_M1.rc1
* [new tag] 1.6_M2 -> 1.6_M2
* [new tag] 1.6_M3 -> 1.6_M3
* [new tag] 1.6_M3.final -> 1.6_M3.final
* [new tag] 1.6_M4 -> 1.6_M4
* [new tag] 1.7_M1 -> 1.7_M1
* [new tag] 1.7_M2 -> 1.7_M2
* [new tag] 1.7_M3 -> 1.7_M3
* [new tag] 1.8_M1 -> 1.8_M1
* [new tag] 1.8_M2 -> 1.8_M2
* [new tag] 1.8_M3 -> 1.8_M3
* [new tag] 1.9_M2 -> 1.9_M2
* [new tag] 2.1_M1 -> 2.1_M1
* [new tag] 2.2_M1 -> 2.2_M1
* [new tag] 2.2_M2 -> 2.2_M2
* [new tag] 2.2_M3 -> 2.2_M3
* [new tag] 2.3_M1 -> 2.3_M1
* [new tag] 2.3_M2 -> 2.3_M2
* [new tag] 2.3_M3 -> 2.3_M3
* [new tag] 2.4_M1 -> 2.4_M1
* [new tag] 2.4_M2 -> 2.4_M2
* [new tag] 2.4_M3 -> 2.4_M3
* [new tag] 2.5_M1 -> 2.5_M1
* [new tag] 2.5_M2 -> 2.5_M2
* [new tag] bernard-1.0rc1 -> bernard-1.0rc1
* [new tag] bernard-5.0 -> bernard-5.0
* [new tag] bernard-5.0-alpha -> bernard-5.0-alpha
* [new tag] bernard-5.0.1 -> bernard-5.0.1
* [new tag] bernard-5.0.2 -> bernard-5.0.2
* [new tag] bernard-5.0.2+docs -> bernard-5.0.2+docs
* [new tag] bernard-5.0rc1 -> bernard-5.0rc1
* [new tag] bernard-5.0rc2 -> bernard-5.0rc2
* [new tag] blinky-3.0 -> blinky-3.0

* [new tag] clyde-2.0 -> clyde-2.0
* [new tag] daisy-11.0.0 -> daisy-11.0.0
* [new tag] daisy-11.0.1 -> daisy-11.0.1
* [new tag] daisy-11.0.2 -> daisy-11.0.2
* [new tag] daisy-11.0.3 -> daisy-11.0.3
* [new tag] danny-8.0 -> danny-8.0
* [new tag] danny-8.0.1 -> danny-8.0.1
* [new tag] danny-8.0.2 -> danny-8.0.2
* [new tag] denzil-7.0 -> denzil-7.0
* [new tag] denzil-7.0.0 -> denzil-7.0.0
* [new tag] denzil-7.0.1 -> denzil-7.0.1
* [new tag] denzil-7.0.1_rc2 -> denzil-7.0.1_rc2
* [new tag] denzil-7.0.2 -> denzil-7.0.2
* [new tag] dizzy-12.0.0 -> dizzy-12.0.0
* [new tag] dizzy-12.0.1 -> dizzy-12.0.1
* [new tag] dizzy-12.0.2 -> dizzy-12.0.2
* [new tag] dizzy-12.0.3 -> dizzy-12.0.3
* [new tag] dora-10.0.0 -> dora-10.0.0
* [new tag] dora-10.0.0.final -> dora-10.0.0.final
* [new tag] dora-10.0.1 -> dora-10.0.1
* [new tag] dora-10.0.1.final -> dora-10.0.1.final
* [new tag] dora-10.0.2 -> dora-10.0.2
* [new tag] dora-10.0.3 -> dora-10.0.3
* [new tag] dora-10.0.4 -> dora-10.0.4
* [new tag] dylan-9.0.0 -> dylan-9.0.0
* [new tag] dylan-9.0.1 -> dylan-9.0.1
* [new tag] dylan-9.0.1.rc1 -> dylan-9.0.1.rc1
* [new tag] dylan-9.0.2 -> dylan-9.0.2
* [new tag] dylan-9.0.2.rc1 -> dylan-9.0.2.rc1
* [new tag] dylan-9.0.3 -> dylan-9.0.3
* [new tag] dylan-9.0.4 -> dylan-9.0.4
* [new tag] edison-6.0 -> edison-6.0
* [new tag] edison-6.0.1 -> edison-6.0.1
* [new tag] edison-6.0.1.final -> edison-6.0.1.final
* [new tag] edison-6.0.1.release -> edison-6.0.1.release
* [new tag] edison-6.0.2 -> edison-6.0.2
* [new tag] edison-6.0.2_rc1 -> edison-6.0.2_rc1

- * [new tag] fido-13.0.0 -> fido-13.0.0
- * [new tag] fido-13.0.1 -> fido-13.0.1
- * [new tag] fido-13.0.2 -> fido-13.0.2
- * [new tag] green-3.3 -> green-3.3
- * [new tag] green-3.3.1 -> green-3.3.1
- * [new tag] inky-1.0 -> inky-1.0
- * [new tag] jethro-14.0.0 -> jethro-14.0.0
- * [new tag] jethro-14.0.1 -> jethro-14.0.1
- * [new tag] jethro-14.0.2 -> jethro-14.0.2
- * [new tag] jethro-14.0.3 -> jethro-14.0.3
- * [new tag] krogoth-15.0.0 -> krogoth-15.0.0
- * [new tag] krogoth-15.0.1 -> krogoth-15.0.1
- * [new tag] krogoth-15.0.2 -> krogoth-15.0.2
- * [new tag] krogoth-15.0.3 -> krogoth-15.0.3
- * [new tag] laverne-4.0 -> laverne-4.0
- * [new tag] laverne-4.0.1 -> laverne-4.0.1
- * [new tag] morty-16.0.0 -> morty-16.0.0
- * [new tag] morty-16.0.1 -> morty-16.0.1
- * [new tag] morty-16.0.2 -> morty-16.0.2
- * [new tag] morty-16.0.3 -> morty-16.0.3
- * [new tag] pinky-3.1 -> pinky-3.1
- * [new tag] pinky-3.1.1 -> pinky-3.1.1
- * [new tag] pinky-3.1.2 -> pinky-3.1.2
- * [new tag] poky-10.0.0.final -> poky-10.0.0.final
- * [new tag] purple-3.2 -> purple-3.2
- * [new tag] purple-3.2.1 -> purple-3.2.1
- * [new tag] pyro-17.0.0 -> pyro-17.0.0
- * [new tag] pyro-17.0.1 -> pyro-17.0.1
- * [new tag] pyro-17.0.2 -> pyro-17.0.2
- * [new tag] pyro-17.0.3 -> pyro-17.0.3
- * [new tag] rocko-18.0.0 -> rocko-18.0.0
- * [new tag] rocko-18.0.1 -> rocko-18.0.1
- * [new tag] rocko-18.0.2 -> rocko-18.0.2
- * [new tag] toaster-dora-10.0.0 -> toaster-dora-10.0.0
- * [new tag] uninative-1.0 -> uninative-1.0
- * [new tag] uninative-1.3 -> uninative-1.3
- * [new tag] uninative-1.4 -> uninative-1.4

- * [new tag] uninative-1.5 -> uninative-1.5
- * [new tag] uninative-1.6 -> uninative-1.6
- * [new tag] uninative-1.7 -> uninative-1.7
- * [new tag] uninative-1.8 -> uninative-1.8
- * [new tag] yocot-1.4.2 -> yocot-1.4.2
- * [new tag] yocto-1.4.1 -> yocto-1.4.1
- * [new tag] yocto-1.4.2 -> yocto-1.4.2
- * [new tag] yocto-1.4.2.rc1 -> yocto-1.4.2.rc1
- * [new tag] yocto-1.4.3 -> yocto-1.4.3
- * [new tag] yocto-1.4.4 -> yocto-1.4.4
- * [new tag] yocto-1.5 -> yocto-1.5
- * [new tag] yocto-1.5.1 -> yocto-1.5.1
- * [new tag] yocto-1.5.1.final -> yocto-1.5.1.final
- * [new tag] yocto-1.5.2 -> yocto-1.5.2
- * [new tag] yocto-1.5.3 -> yocto-1.5.3
- * [new tag] yocto-1.5.4 -> yocto-1.5.4
- * [new tag] yocto-1.5.final -> yocto-1.5.final
- * [new tag] yocto-1.5_M5.rc2 -> yocto-1.5_M5.rc2
- * [new tag] yocto-1.6 -> yocto-1.6
- * [new tag] yocto-1.6.1 -> yocto-1.6.1
- * [new tag] yocto-1.6.2 -> yocto-1.6.2
- * [new tag] yocto-1.6.3 -> yocto-1.6.3
- * [new tag] yocto-1.7 -> yocto-1.7
- * [new tag] yocto-1.7.1 -> yocto-1.7.1
- * [new tag] yocto-1.7.2 -> yocto-1.7.2
- * [new tag] yocto-1.7.3 -> yocto-1.7.3
- * [new tag] yocto-1.8 -> yocto-1.8
- * [new tag] yocto-1.8.1 -> yocto-1.8.1
- * [new tag] yocto-1.8.2 -> yocto-1.8.2
- * [new tag] yocto-1.9_M1 -> yocto-1.9_M1
- * [new tag] yocto-2.0 -> yocto-2.0
- * [new tag] yocto-2.0.1 -> yocto-2.0.1
- * [new tag] yocto-2.0.2 -> yocto-2.0.2
- * [new tag] yocto-2.0.3 -> yocto-2.0.3
- * [new tag] yocto-2.1 -> yocto-2.1
- * [new tag] yocto-2.1.1 -> yocto-2.1.1
- * [new tag] yocto-2.1.2 -> yocto-2.1.2

- * [new tag] yocto-2.1.3 -> yocto-2.1.3
- * [new tag] yocto-2.2 -> yocto-2.2
- * [new tag] yocto-2.2.1 -> yocto-2.2.1
- * [new tag] yocto-2.2.2 -> yocto-2.2.2
- * [new tag] yocto-2.2.3 -> yocto-2.2.3
- * [new tag] yocto-2.3 -> yocto-2.3
- * [new tag] yocto-2.3.1 -> yocto-2.3.1
- * [new tag] yocto-2.3.2 -> yocto-2.3.2
- * [new tag] yocto-2.3.3 -> yocto-2.3.3
- * [new tag] yocto-2.4 -> yocto-2.4
- * [new tag] yocto-2.4.1 -> yocto-2.4.1
- * [new tag] yocto-2.4.2 -> yocto-2.4.2
- * [new tag] yocto_1.5_M5.rc8 -> yocto_1.5_M5.rc8

Fetching projects: 100% (9/9), done.

Build directory is build-imx6ul-3.3V-x11

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LA_OPT_BASE_LICENSE v18 February 2017

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EULA has been accepted.

Welcome to Freescale Community BSP

The Yocto Project has extensive documentation about OE including a reference manual which can be found at:

<http://yoctoproject.org/documentation>

For more information about OpenEmbedded see their website:

<http://www.openembedded.org/>

You can now run 'bitbake <target>'

Common targets are:

core-image-minimal

meta-toolchain

meta-toolchain-sdk

adt-installer

meta-ide-support

Your build environment has been configured with:

MACHINE=imx6ulevk

SDKMACHINE=i686

DISTRO=fsl-imx-x11

EULA=

BSPDIR=

BUILD_DIR=.

meta-freescale directory found

Cloning into 'meta-murata-wireless'...

remote: Counting objects: 331, done.

remote: Total 331 (delta 0), reused 0 (delta 0), pack-reused 331
Receiving objects: 100% (331/331), 174.84 KiB | 0 bytes/s, done.
Resolving deltas: 100% (140/140), done.
Checking connectivity... done.
Note: checking out 'imx-morty-battra_r1.0'.

You are in 'detached HEAD' state. You can look around, make experimental changes and commit them, and you can discard any commits you make in this state without impacting any branches by performing another checkout.

If you want to create a new branch to retain commits you create, you may do so (now or later) by using `-b` with the checkout command again. Example:

```
git checkout -b <new-branch-name>
```

HEAD is now at 40e31c8... Updated imx-morty-battra for cyw-script-utils
setting to default machine

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<http://www.openembedded.org/>

You can now run 'bitbake <target>'

Common targets are:

- core-image-minimal
- meta-toolchain
- meta-toolchain-sdk
- adt-installer
- meta-ide-support

Your configuration files at build-imx6ul-3.3V-x11 have not been touched.

BSPDIR=

BUILD_DIR=.

meta-freescale directory found

CORRECTION: Murata modified the following files

- bblayers.conf present in <BUILD_DIR>/conf
- local.conf present in <BUILD_DIR>/conf
- imx6ulevk.conf present in sources/meta-freescale/conf/machine

Murata-Wireless setup complete. Create an image with:

```
$ bitbake fsl-image-validation-imx
```

11) Starting Build Now.

NOTE: depending on machine type, build may take 1-7 hours to complete.

'Y' to continue, 'n' aborts build.

Do you want to start the build ? Y/n: Y

NOTE: Your conf/bblayers.conf has been automatically updated.

NOTE: Your conf/bblayers.conf has been automatically updated.

WARNING: Host distribution "Ubuntu-16.04" has not been validated with this version of the build system; you may possibly experience unexpected failures. It is recommended that you use a tested distribution.

```
Parsing recipes: 100%
|#####|
#####| Time: 0:00:59
```

Parsing of 2326 .bb files complete (0 cached, 2326 parsed). 3054 targets, 277 skipped, 2 masked, 0 errors.

NOTE: Resolving any missing task queue dependencies

Build Configuration:

BB_VERSION = "1.32.0"

BUILD_SYS = "x86_64-linux"

NATIVELSBSTRING = "Ubuntu-16.04"

TARGET_SYS = "arm-poky-linux-gnueabi"

MACHINE = "imx6ulevk"

DISTRO = "fsl-imx-x11"

DISTRO_VERSION = "4.9.11-1.0.0"

TUNE_FEATURES = "arm armv7ve vfp neon callconvention-hard cortexa7"

TARGET_FPU = "hard"

meta

meta-poky = "HEAD:78890ea22750804e3e9113e76f7ca3d7234c8342"

meta-oe

meta-multimedia = "HEAD:fe5c83312de11e80b85680ef237f8acb04b4b26e"

meta-freescale = "HEAD:a398b50b7fc084a9e68cc3000c218d5028522a25"

meta-freescale-3rdparty = "HEAD:68314612e236cab1da82d72a0da62635a3523f84"

meta-freescale-distro = "HEAD:cd5c7a2539f40004f74126e9fdf08254fd9a6390"

meta-bsp

meta-sdk = "HEAD:daba3340ecd8b358e0c6c415baeee0fcae95c525"

meta-browser = "HEAD:10f6e3778d823ee1be106c126216c6f941088fbf"

meta-gnome

meta-networking

meta-python

meta-fileystems = "HEAD:fe5c83312de11e80b85680ef237f8acb04b4b26e"

meta-qt5 = "HEAD:ff073f04109900fc07bf81e2f1df63c626caf342"

meta-murata-wireless = "HEAD:40e31c8c5c4c81c2ee0af07eaf35053c9078e738"

```

Initialising tasks: 100%
|#####|
#####
##### | Time: 0:00:18

```

NOTE: Executing SetScene Tasks

NOTE: Executing RunQueue Tasks

WARNING: libmpc-native-1.0.3-r0 do_fetch: Failed to fetch URL <http://www.multiprecision.org/mpc/download/mpc-1.0.3.tar.gz>, attempting MIRRORS if available