STM32MP15 ecosystem release note - v1.0.0

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Stable: 02.04.2020 - 09:50 / Revision: 02.04.2020 - 09:49

Stable: 02.04.2020 - 09:39 / Revision: 02.04.2020 - 09:40

A quality version of this page, approved on *2 April 2020*, was based off this revision.

This article aims to describe the content of the release ***STM32MP15-Ecosystem-v1.0.0*** for *STM32MPU Embedded Software distribution* and its associated ecosystem.

Contents

1 Delivery purpose and scope

The purpose of this delivery is the **Mass Market release**, aka STM32MP1-V1.0.0, provided to STMicroelectronics customers.

The scope of this ecosystem delivery, dedicated to *STM32MP15* devices, is:

- The **STM32MPU Embedded Software distribution:**
  - The **OpenSTLinux** distribution running on the Arm® Cortex®-A7 processor(s)
  - The **STM32Cube MPU Package** running on the Arm® Cortex®-M4 processor
- The **associated tools:** : Referenced tools
  - STM32-CoPro-MPU Eclipse plugin
  - STM32CubeMX
  - STM32CubeProgrammer
  - Keygen
  - Signing tool
- The **documentation:**
  - This user guide (wiki format)
  - Documentation package : Reference_documents
- The **supported boards**: Boards
  - STM32MP15 Evaluation board
  - STM32MP15 Discovery kit

Aim of this release:

- To provide a full ecosystem for STM32MP15x devices.
- To work efficiently with STM32MP15 boards, using one of the Packages developed by STMicroelectronics for STM32 MPU devices (Starter Package, Developer Package, Distribution Package). See Which Package better suits your needs for more information on these Packages.

2 Intended audience

The targeted audience consists in STMicroelectronics customers.

3 Licensing

This software package is licensed under SOFTWARE LICENSE AGREEMENT, the "SLA". Customer may not use this package except in compliance with the software license agreement (SLA).

4 Main features / main highlights

4.1 Boards

Boards	PCBs list	Content	Availability	Distribution Package	Starter Package	Developper Package
EVAL Rev. C	MB1263 C (Daughter) + MB1262 C (Mother) + MB1230 C (Display) + MB1379A (Camera)	STM32MP1 STM32MP157AAA3 Rev.B PMIC STPMIC1APQR cut1.2 external oscillator	Jan' 19	Machine stm32mp1-boards-revc for all flashs Machine stm32mp1-eval-revc for SDCard	EVAL Rev.C Starter Package	EVAL Rev.C Developer Package
DISCO Rev. C	MB1272 C (Mother) + MB1407B (Display)	STM32MP1 STM32MP157CAC3 Rev.B PMIC STPMIC1APQR cut1.2 external oscillator	Jan' 19	Machine stm32mp1-boards-revc for all flashs Machine stm32mp1-disco-revc for SDCard	DISCO Rev. C Starter Package	DISCO Rev.C Developer Package

- Warning STLINK in EVAL and DISCO Rev.C boards integrates the latest firmware STLINK (V2J32M22) which requires upgraded USB PC drivers - new Windows USB driver

4.2 Embedded software

4.2.1 Cortex-A7 Linux software

- STM32MP15 microprocessor support with following components:
  - Kernel version LTS v4.19.9
  - TF-A version v2.0
  - U-Boot version v2018.11
  - OP-TEE version v3.3.0
  - openOCD version v0.10.0

- Build process
  - OpenEmbedded Thud (v2.6)
  - GCC version v8.2
- Applicative components
  - Weston version v5.0.0
  - GStreamer version v1.14.2
  - GCnano version v6.2.4

4.2.2 Boot configurations

- At boot, you can select two kernel configurations:
  - Configuration 1: All internal peripherals assigned to Cortex-A7 for Linux drivers, Cortex-M4 coprocessing firmware TTY executed by default
  - Configuration 2: Some internal peripherals assigned to Cortex-M4 to execute Cortex-M4 delivered examples on the board (EVAL or DISCO) see (How to run Cortex-M4 examples).
- Configuration 1 activated by default if you do not specify 2 in the console at boot.

4.2.3 Cortex-M4 Cube firmware

- The STM32Cube HAL, STM32 abstraction layer embedded software ensuring maximized portability across the STM32 portfolio. HAL APIs are available for all peripherals.
- Low-layer APIs (LL) offering a fast lightweight expert-oriented layer that is closer to the hardware than the HAL. LL APIs are available only for a set of peripherals.
- A consistent set of middleware components such as FreeRTOS, OpenAMP.
- All embedded software utilities, delivered with a full set of examples.

4.3 STM32CubeProgrammer, Signing tool, Key gen

- Flashload SDCard, eMMC, NAND, NOR images through USB and UART for EV1, DK1, DK2 boards
- Private and public keys generation
- Images signature with hash public key
- Flashlayout file format change
- STM32MP1 fuses management (with console interface only)
- PMIC NVM management (with console interface only)

4.4 STM32CubeMX

STM32CubeMX release note

4.5 SW4STM32 IDE

STM32-CoPro-MPU plug-in integrated in SW4STM32 IDE covers the Arm Cortex-M4 development and debug with:

- SW4STM32 plug-in to support Cortex-M4 STM32CubeMP1 in Production mode and Engineering mode
- Cortex-M4 Firmware compilation, Load, Debug
- PC Linux with Ethernet (recommended) or serial link
- PC Windows with Ethernet or Ethernet over USB link
- Cortex-M4 Firmware installation directory configurable

This plug-in is delivered with SW4STM32 from version 2.8.0 SW4STM32 release note
Note: To use delivered Cortex-M4 examples per ST board, the user needs to enable Cortex-M4 examples device tree configuration using U-Boot

4.6 Miscellaneous

- Detailed features are available in the release notes of the different items constituting this delivery.
- See sections STM32MPU Embedded Software distribution detailed release notes , Referenced tools release notes and Reference documents

5 Recommendations of use

5.1 Safe

- Develop board based on STM32MP1
- Flashload and boot from all flashes SDCard, eMMC, NAND ONFI, NOR
- Application can activate Low power modes (STOP and STANBY)
- Develop Linux application, libraries, kernel modules based on OpenSTLinux delivery
- Develop Cube application with coprocessing link based on Cube delivery
- Prototype some applications based on ST boards
- Stress available features

5.2 Not recommended

6 Main restriction list

6.1 Boards

- None

6.2 Embedded software

- Some modes proposed in CubeMX for Cortex-A7 non secure context not supported in Cortex-A7 secure context. See details in STM32MP15_OpenSTLinux_release_note_-_v1.0.0#Main_restrictions_list

6.3 STM32CubeProgrammer, signing tool, key generator

- None

6.4 STM32CubeMX

STM32CubeMX release note

6.5 SW4STM32 IDE

- None

6.6 Miscelleanous

- Exhaustive restriction lists are available in the release notes of each delivery.
- See sections STM32MPU Embedded Software distribution detailed release notes and Referenced tools release notes .
- Implemented SW workarounds information in STM32MP15-Ecosystem-v1.0.0 release based on workarounds proposed in STM32MP15xx device errata. See STM32MP15_ecosystem_errata_sheet

7 Minor release updates

STMicroelectronics regularly delivers corrections through github® components which are u-boot, optee-os, tf-a, Linux kernel. You can decide to incorporate them into your developer package (please refer to STM32MP1 Developer Package) or Distribution package.
For updating Distribution package please proceed as follow:

1. Switch to github® mode your Distribution package
2. Use the command **devtool modify <recipe name>** to have direct access to source code git used by build process
3. In source code just extracted, use git command as **git checkout -b WORK <github® TAG>** to points on new revision of component

More rarely and independently, STMicroelectronics also delivers fixes on layers through github®. These changes can be integrated (via git commands) into your local STM32MP1 Distribution Package environment. Please find below the github® links of the quoted layers :

- meta-st-stm32mp
- meta-st-openstlinux
- meta-st-stm32mp-addons

7.1 v1.0.1

OpenSTLinux updates v1.0.1
STM32CubeMP1 updates v1.0.1

7.2 v1.0.2

OpenSTLinux updates v1.0.2

7.3 v1.0.3

OpenSTLinux updates v1.0.3

7.4 v1.0.4

OpenSTLinux updates v1.0.4

7.5 v1.0.5

OpenSTLinux updates v1.0.5

8 Reference documents

All the resources for the STM32MP1 Series are in the Resources area of the STM32MP1 Series web page.

The resources below are referenced in some of the articles in this user guide for the STM32MP1 Series.

Information

The different **STM32MP15** microprocessor **part numbers** available (with their corresponding internal peripherals, security options and packages) are described in the **STM32MP15 microprocessor part numbers**.

Reference	Name	Link	Version
Application notes			
AN5031	**Getting started with STM32MP15 Series hardware development**	AN5031.pdf	v1.0
AN5109	**STM32MP1 Series using low-power modes**	AN5109.pdf	v1.0
AN5253	**Migration of microcontroller applications from STM32F4x9 lines to STM32MP15x lines microprocessor**	AN5253.pdf	v1.0
AN5122	**STM32MP1 Series DDR memory routing guidelines**	AN5122.pdf	v1.0
AN5168	**STM32MP1 series DDR configuration**	AN5168.pdf	v1.0
Datasheets[1]			
DS12505	**STM32MP157Cxx datasheet** (secure)	DS12505.pdf	v1.0
DS12504	**STM32MP157Axx datasheet** (basic)	DS12504.pdf	v1.0
DS12503	**STM32MP153Cxx datasheet** (secure)	DS12503.pdf	v1.0
DS12502	**STM32MP153Axx datasheet** (basic)	DS12502.pdf	v1.0
DS12501	**STM32MP151Cxx datasheet** (secure)	DS12501.pdf	v1.0
DS12500	**STM32MP151Axx datasheet** (basic)	DS12500.pdf	v1.0
Errata sheets			

Reference	Name	Link	Version
Application notes			
ES0438	**STM32MP15xx device errata**	ES0438.pdf	v1.0
Reference manuals[1]			
RM0436	**STM32MP157xxx reference manual** (STM32MP157xxx advanced Arm®-based 32-bit MPUs)	RM0436.pdf	v2.0
RM0442	**STM32MP153xxx reference manual** (STM32MP153xxx advanced Arm®-based 32-bit MPUs)	RM0442.pdf	v2.0
RM0441	**STM32MP151xxx reference manual** (STM32MP151xxx advanced Arm®-based 32-bit MPUs)	RM0441.pdf	v2.0
Boards schematics			
MB1262 schematics	**STM32MP157C-EV1 motherboard schematics** (Evaluation board)	MB1262C-01.pdf	vC-0.1
MB1263 schematics	**STM32MP157C-EV1 daughterboard schematics** (Evaluation board)	MB1263C-01.pdf	vC-0.1
MB1230 schematics	**DSI 720p LCD display daughterboard schematics** (Evaluation board)	MB1230B-02.pdf	vB-0.2
MB1379 schematics	**Camera daughterboard schematics** (Evaluation board)	MB1379A-01.pdf	vA-0.1
MB1272 schematics	**STM32MP157x-DKx motherboard schematics** (Discovery kit)	MB1272C-01.pdf	vC-0.1
MB1407 schematics	**STM32MP157x-DKx daughterboard schematics** (Discovery kit)	MB1407C-01.pdf	vB-0.1
Boards user manuals			
UM2535	**STM32MP157x-EV1 evaluation board user manual**	UM2535.pdf	V1.0
UM2534	**STM32MP157x-DKx discovery board user manual**	UM2534.pdf	V1.0

9 How to get the software and start with this release?

The list of embedded software packages available for downloaded depends on the Package to be used.

More information can be found on **STM32MPU Embedded Software** distribution and the supported **Packages**, at:

- Which Package better suits your needs
- STM32MPU Embedded Software distribution

The table below provides the available board part numbers and the source of information in order to:

- Get started with one of the three available Packages (Starter, Developer or Distribution Packages)
- Get started with the board
- Find the associated embedded software distributions
- **Download** source code
- **Build** an embedded software

Board part number	Jump to
STM32MP157C-EV1 Evaluation board	STM32MP15 Evaluation boards - getting started, including software download
STM32MP157X-DKX Discovery kit	STM32MP15 Discovery kits - getting started, including software download

10 STM32MPU Embedded Software distribution detailed release notes

The table below lists the software packages available in the STM32MPU Embedded Software distribution, and provides the corresponding release notes.
The release notes provide more information and details about the features and content of each package.
The release notes does not explain how to get software. For that, refer chapter How to get the software and start with this release

Firmware	Release note	Version
OpenSTLinux Distribution	STM32MP15 OpenSTLinux release note - v1.0.0	openstlinux-4.19-thud-mp1-19-02-20
STM32Cube MPU Package	STM32CubeMP1 Package release note - v1.0.0	STM32CubeMP1-V1.0.0

11 Referenced tools release notes

The table below lists the available tools, and provides links to the respective release notes.

Each release note provides information on how to install and use the corresponding tool.

The set of tools to be downloaded depends on the Package to be used (double check Which Package better suits your needs article to find more information on each Package).

Tools	Release notes	Host PC		Which Package may need the tool ?		
Linux version	Windows version	Starter Package	Developer Package	Distribution Package		
STM32Cube Programmer	STM32Cube Programmer release note	2.0.0	2.0.0			
STM32-CoPro-MPU plug-in for SW4STM32 IDE	STM32-CoPro-MPU plugin release note	1.0.0	1.0.0			
STM32Cube MX	STM32Cube MX release note	from 5.1	from 5.1			
Keygen	KeyGen release note	1.0.0	1.0.0			
Signing tool	Signing tool release note	1.0.0	1.0.0			

12 Change log

See detailed release notes for more information STM32MPU Embedded Software distribution detailed release notes and Referenced tools release notes .

13 References

- 1.01.1 The part numbers are specified in STM32MP15 microprocessor part numbers

also known as

Microprocessor Unit

Evaluation board

Power Management Integrated Circuit

Discovery kit

Trusted Firmware for Arm Cortex-A

Das U-Boot -- the Universal Boot Loader (see U-Boot_overview)

Open Portable Trusted Execution Environment

TeleTYpewriter

Hardware Abstraction Layer

Low layer of STM32Cube

former spelling for e•MMC ('e' in italic)

Universal Asynchronous Receiver/Transmitter

Non Volatile Memory, like a flash memory

(Software)Integrated development/design/debugging environment

Open NAND Flash interface (The ONFI working group, acronym for Open NAND Flash Interface, was founded in 2005. The group’s mission consists in creating a common industry standard for NAND Flash interfaces, to simplify integration of NAND Flash memory into consumer electronics (CE) devices and computing platforms. ST is one of the co-founder companies together with Hynix, Intel, Micron, Phison and Sony.)

Doubledata rate (memory domain)

Display Serial Interface (MIPI® Alliance standard)