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Open**ST**Linux

Quick Start Guide X-LINUX-GNSS1

STM32 MPU OpenSTLinux software expansion
package for GNSS-based applications

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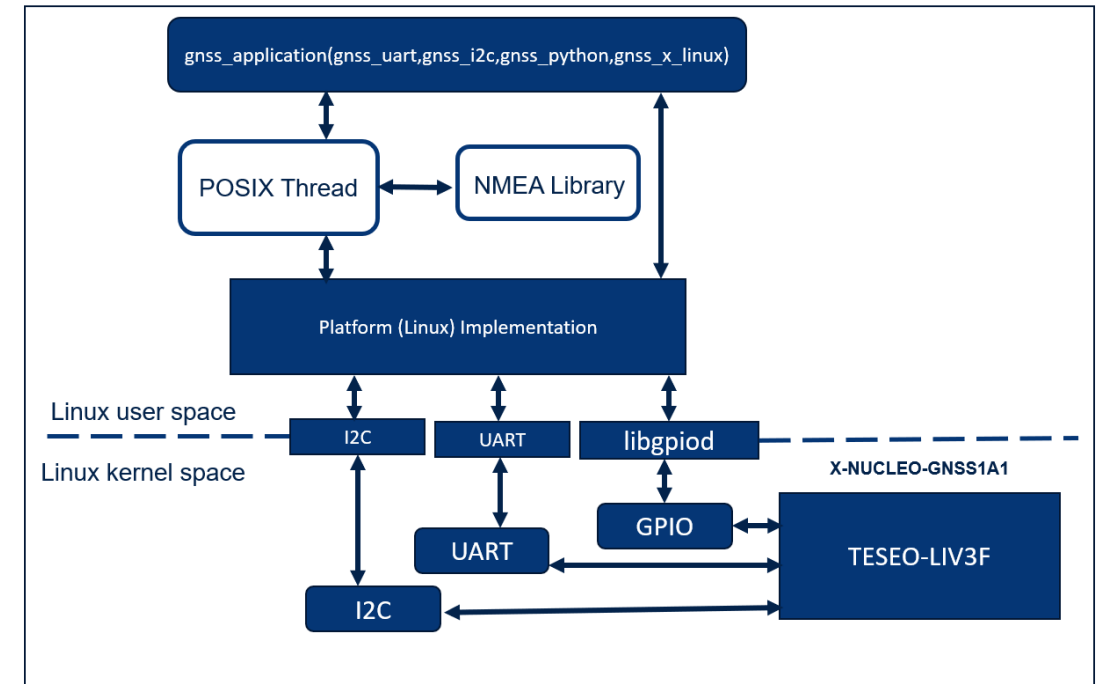
STM32 MPU OpenSTLinux Software Expansion Package : Overview

X-LINUX-GNSS1

Software Overview

Software Description

- X-LINUX-GNSS1 is a software expansion package developed to demonstrate GNSS (Global Navigation Satellite System) based applications on STM32MP157F-DK2 using X-NUCLEO-GNSS1A1 which is based on Teseo-LIV3F device
- Standalone applications to read the NMEA data over UART and I2C when X-NUCLEO-GNSS1A1 is connected to the Arduino Connector of STM32MP157F-DK2 board
- Demo application reads the continuous stream of GNSS data and send it to cloud – [ST Asset Tracking Dashboard](#)
- The package is easy to port across different Linux based platforms with compatible hardware interface.
- User-friendly License Terms



X-LINUX-GNSS1

Hardware Overview

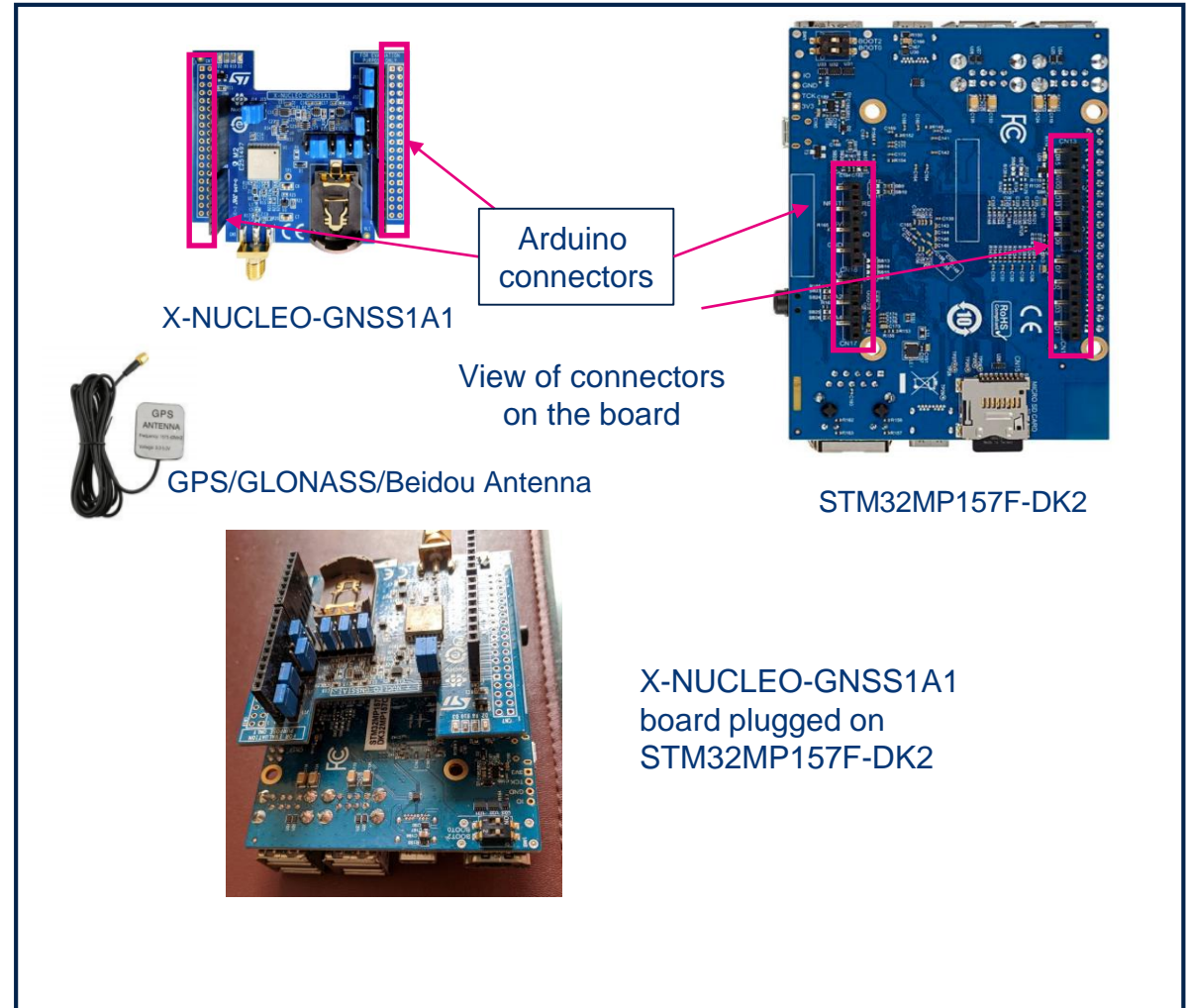
Hardware Description

- The X-NUCLEO-GNSS1A1 expansion board is based on the Teseo-LIV3F tiny GNSS module. It represents an affordable, easy-to-use, global navigation satellite system (GNSS) module, embedding a Teseo III single die standalone positioning receiver IC
- STM32MP157F-DK2 Discovery kit leverages the capabilities of STM32MP1 series microprocessors to allow users easily develop applications using STM32 MPU OpenSTLinux distribution software

Key Products on board

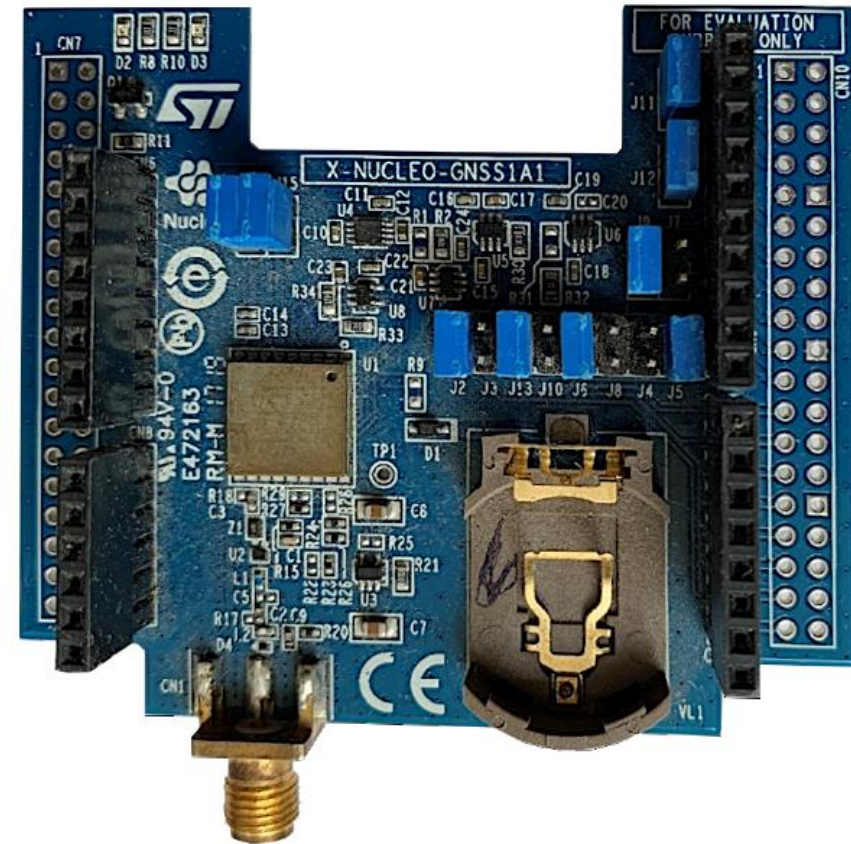
STM32MP157F
Microprocessor Unit

Teseo-LIV3F
Tiny GNSS Module



Jumper Settings

Signal	Arduino	Nucleo 64	Jumper	Configuration
I2C-SCL	D15	PB8	J11	Open
I2C-SDA	D14	PB9	J12	Open
Wakeup	D13	PA5	J9	Closed
Wakeup	D4	PB5	J7	Open
Reset	D9	PC7	J10	Open
Reset	D7	PA8	J13	Closed
PPS	D6	PB10	J6	Closed
PPS	D2	PA10	J8	Open
UART-RX	D8	PA9	J3	Closed
UART-TX	D2	PA10	J4	Closed
UART-RX	D1	PA2	J2	Open
UART-TX	D0	PA3	J5	Open



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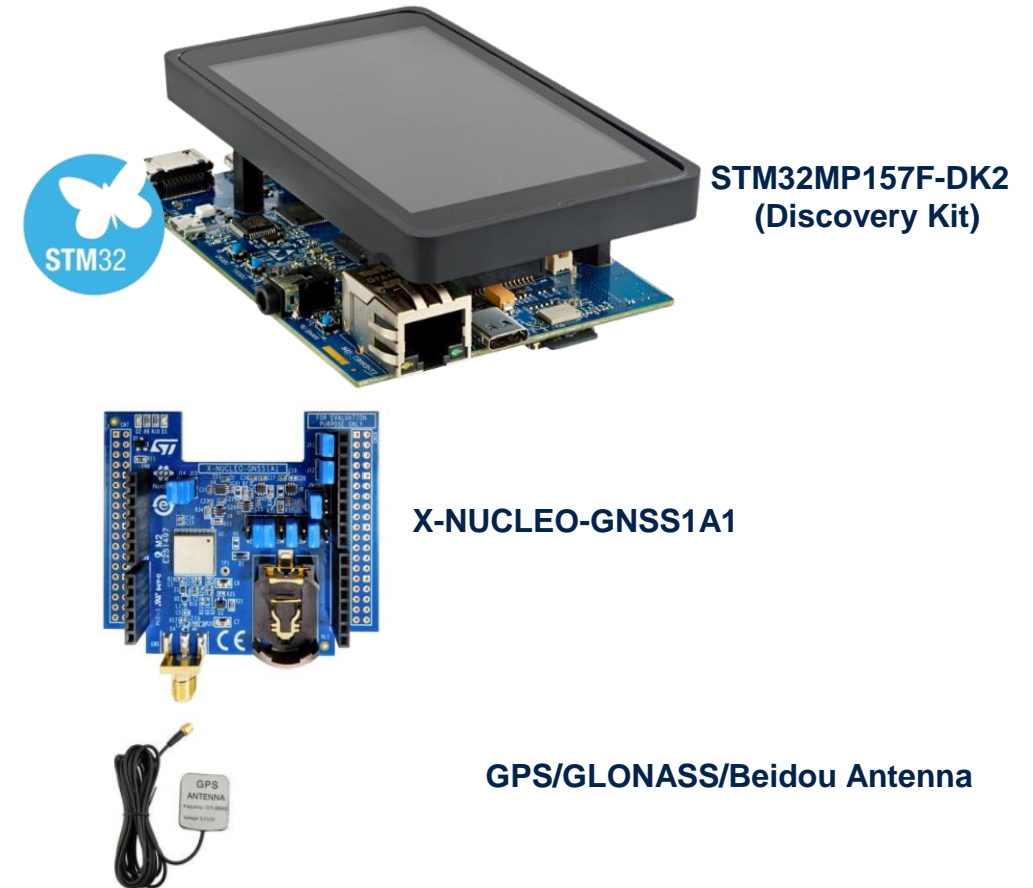
STM32 MPU OpenSTLinux Software Expansion Package : Overview

Setup & Demo Example

Hardware Pre-requisites

Hardware requirements

- 1x STM32MP157F-DK2 board (Discovery Kit)
- 1x X-NUCLEO-GNSS1A1 (expansion board for Teseo-LIV3F)
- 1x GPS/GLONASS/Beidou Antenna
- 1x Linux - Laptop/PC (Ubuntu 16.04 LTS or higher)
- 1x USB Type A to micro-USB cable
- 1x USB PD compliant 5V, 3A power supply
- 1x USB Type A to USB Type-C cable
- 1x micro SD card (minimum 4GB)

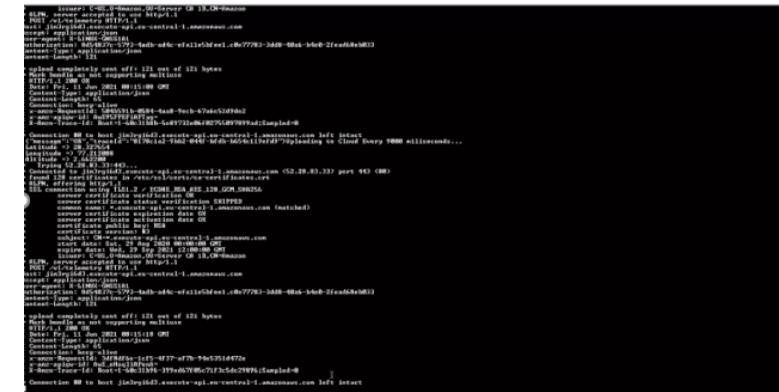
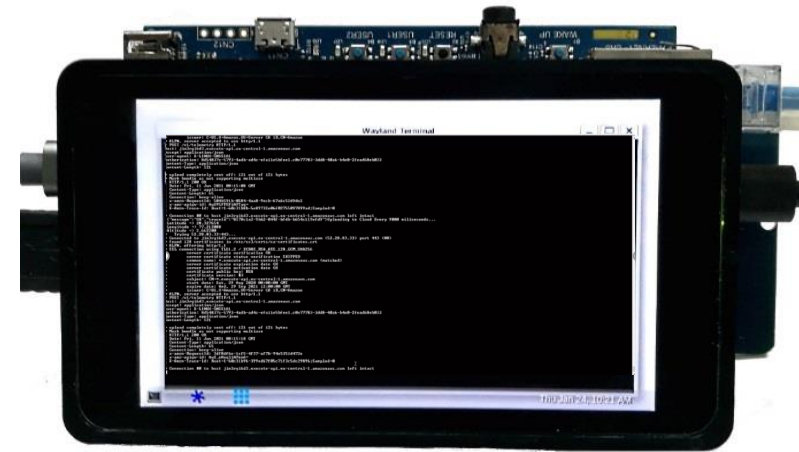


Setup & Demo Example

Software Pre-requisites

Software requirements

- Boot the Discovery Kit with Starter Package. Please refer to instructions at wiki page [Getting Started with STM32MP157F-DK2 board](#)
- Download the X-LINUX-GNSS1 package from www.st.com and extract it to find the pre-built images
- Follow instructions on wiki page to copy the pre-built files and device tree blob at correct locations (or build using Developer Package and source code of application), restart the Discovery Kit and run the Demo application.
- Remote terminal applications such as Tera-Term(On Windows) or Minicom(Linux) to transfer applications and device tree



Setup (1/4)

Installation Steps

- Boot the STM32MP1-DK2 board with Starter Package. Please refer to instructions at wiki page [Getting Started with STM32MP157F-DK2 board](#)
- Download pre-built images <https://www.st.com/en/embedded-software/x-linux-gnss1.html>
- Transfer the below files to respective locations on board using Tera-Term(Windows) or using scp (Linux) –

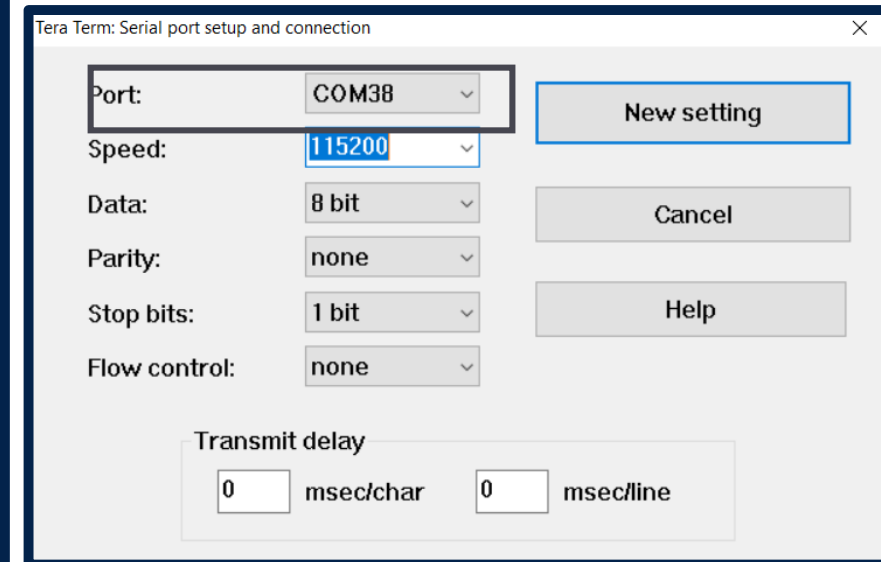
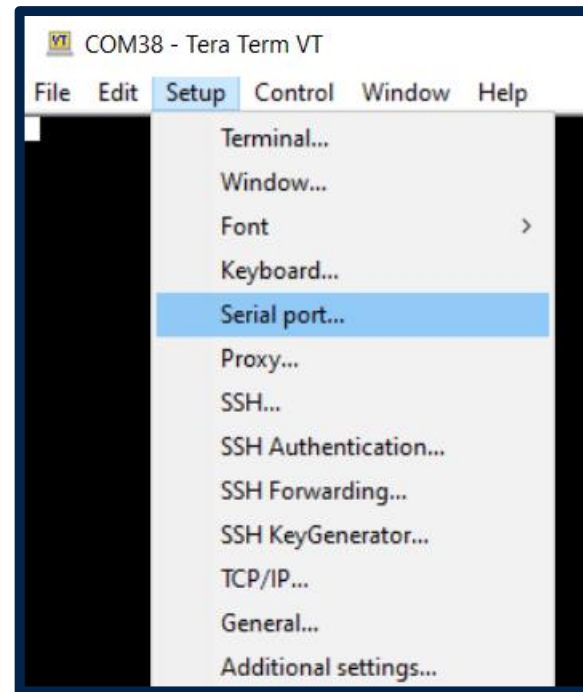
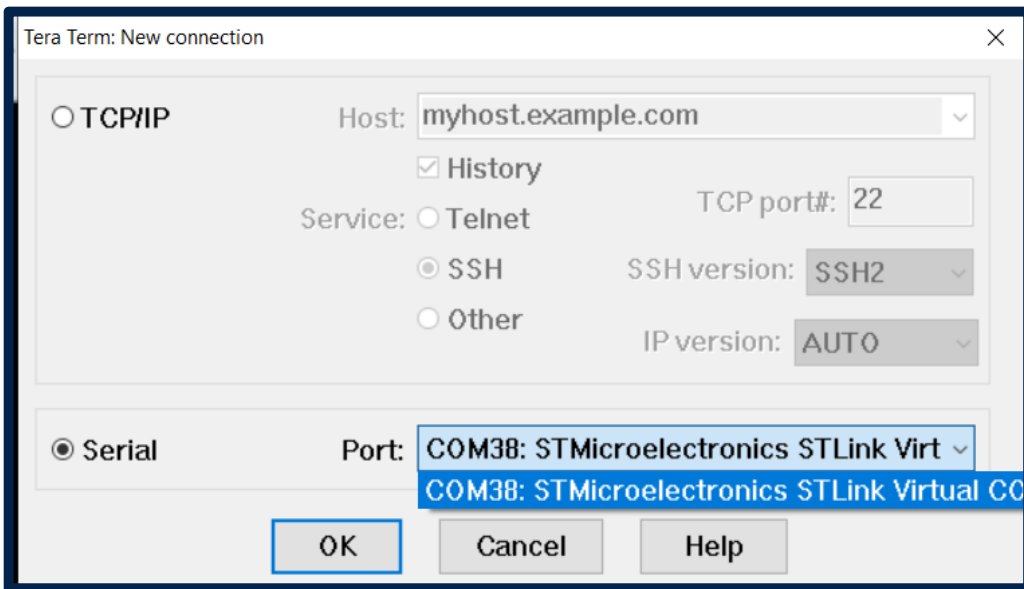
Downloaded File	Location in DK2 Board
X-LINUX-GNSS1_V1.0.0\STM32MP157C-DK2_Device_Tree\Binaries\stm32mp157f-dk2.dtb	/boot/
X-LINUX-GNSS1_V1.0.0\Application\Binaries\gnss_app	/

Setup (2/4)

Installation Steps

- For Windows PC* : Connect to Discovery Kit and open Tera Term

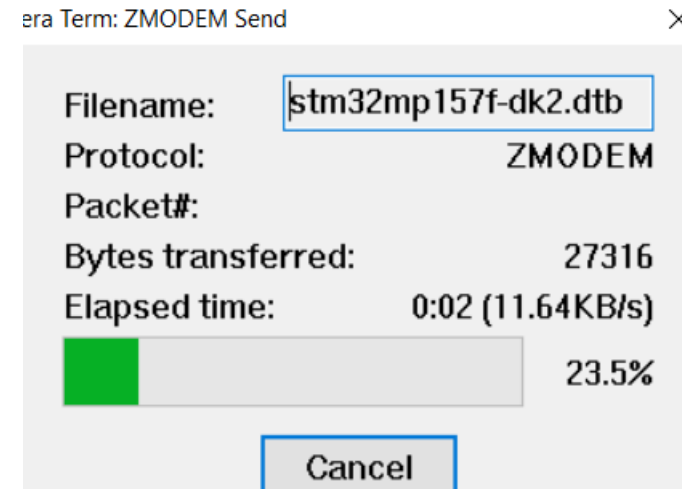
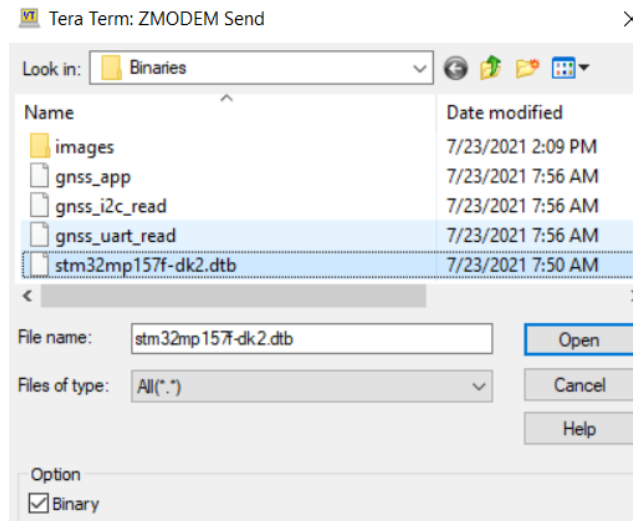
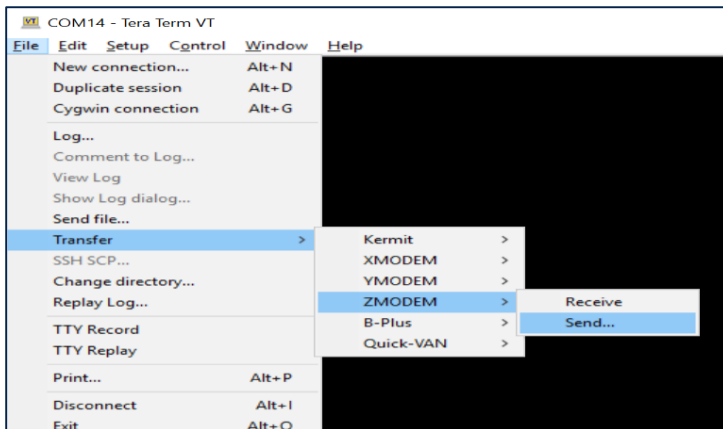
COM Port will come automatically as “COMXX:STMicroelectronics STLink Virtual Com Port” , where XX is the Port number. Here it is 38 but may vary from PC to PC. Do the Serial Port Settings (baud Rate : 115200, Data, Stop bits and Flow Control) as shown below



Setup (3/4)

Installation Steps

- The following steps needs to be executed on Tera Term :
- To transfer a file(dtb and gnss_app) from host PC to Discovery Kit, click on File menu on top left corner of the Tera Term window and go to File>>Transfer>>ZMODEM>>Send.
- Then select desired file for sending to the '/' (root) location of Discovery Kit.
- Transfer dtb file

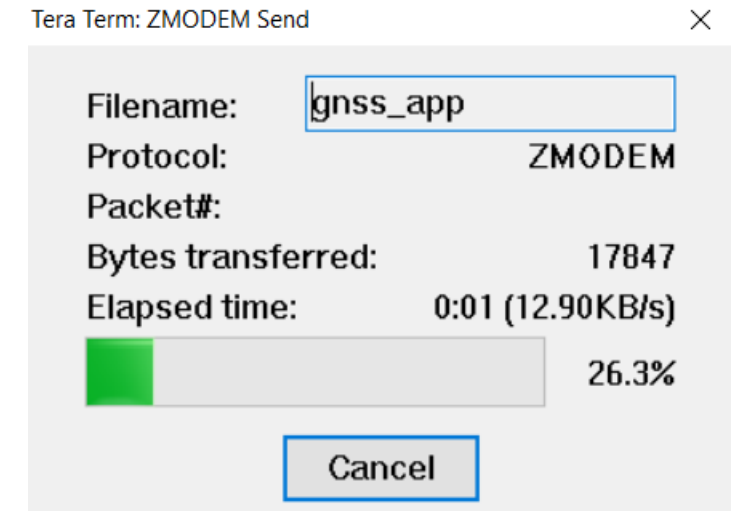
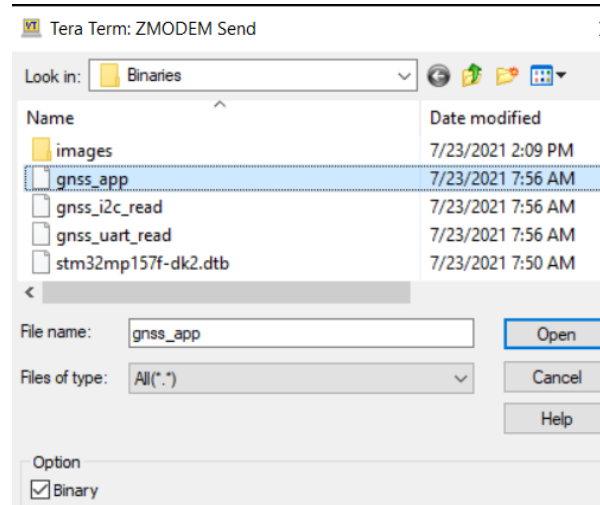
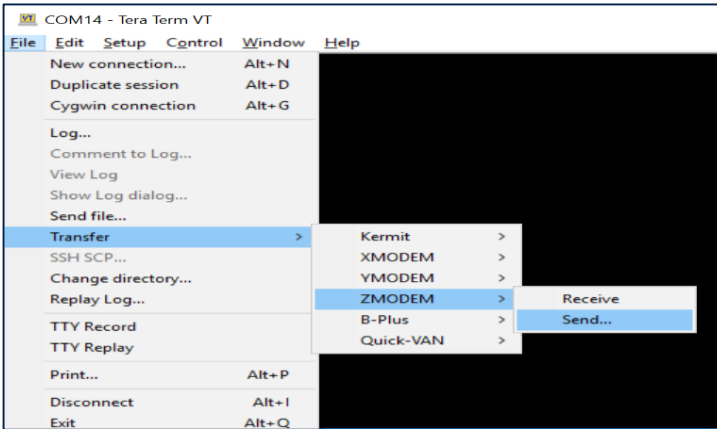


- Once transferred move it to /boot using below command
- `#mv stm32mp157f-dk2.dtb /boot`

Setup (4/4)

Installation Steps

- Transfer gnss_app



- Change the permissions of the file using below command
- `#chmod a+x gnss_app`
- Once done execute the below commands

```
Board $> /sbin/depmod -a
Board $> sync
Board $> reboot
```

Running the Demo

- Once rebooted run the app using the below command and enter 11 to get the GNSS data

COM38 - Tera Term VT
File Edit Setup Control Window Help

```
root@stm32mp1:~# ./gnss_app
Ieseo_Consumer_Task_Init...
Console_Parse_Task_Init.....
Select a command:
1 - getpos
2 - lastpos
3 - wakestatus
4 - help
5 - debug
6 - track
7 - lasttrack
9 - getgnsmg
10 - getpggst
11 - getgprmc
12 - getgsmsg
13 - getgsmsg
19 - ext-help
20 - Upload to Cloud
21 - Stop Upload to Cloud

Save configuration (y/n)?
> █
```

```
>Select a command:
1 - getpos
2 - lastpos
3 - wakestatus
4 - help
5 - debug
6 - track
7 - lasttrack
9 - getgnsmg
10 - getpggst
11 - getgprmc
12 - getgsmsg
13 - getgsmsg
19 - ext-help
20 - Upload to Cloud
21 - Stop Upload to Cloud

Save configuration (y/n)?
> 11
getgprmc =11
```

```
UTC:
Status:
Latitude:
Longitude:
Speed over ground (knots):
Trackgood:
Date (ddmmyy):
Magnetic Variation:
Magnetic Var. Direction:
```

```
[ 09:32:35 ]
[ 0 ]
[ 28' 32'' N ]
[ 77' 21'' E ]
[ 0.0 ]
[ 0.0 ]
[ 300721 ]
[ 0.0 ]
[ - ]
```

```
>Select a command:
1 - getpos
2 - lastpos
3 - wakestatus
4 - help
5 - debug
6 - track
7 - lasttrack
9 - getgnsmg
10 - getpggst
11 - getgprmc
12 - getgsmsg
13 - getgsmsg
19 - ext-help
20 - Upload to Cloud
21 - Stop Upload to Cloud

Save configuration (y/n)?
> █
```

- Similarly other apps can be transferred (gnss_uart_read,gnss_i2c_read) and executed

Documents & Related Resources

- All documents are available on the www.st.com
 - User Manual
 - Data Brief
 - Quick Start Guide
 - Source code
 - Wiki page on <https://wiki.st.com/stm32mpu>

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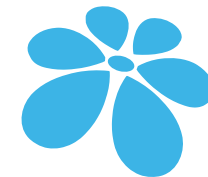
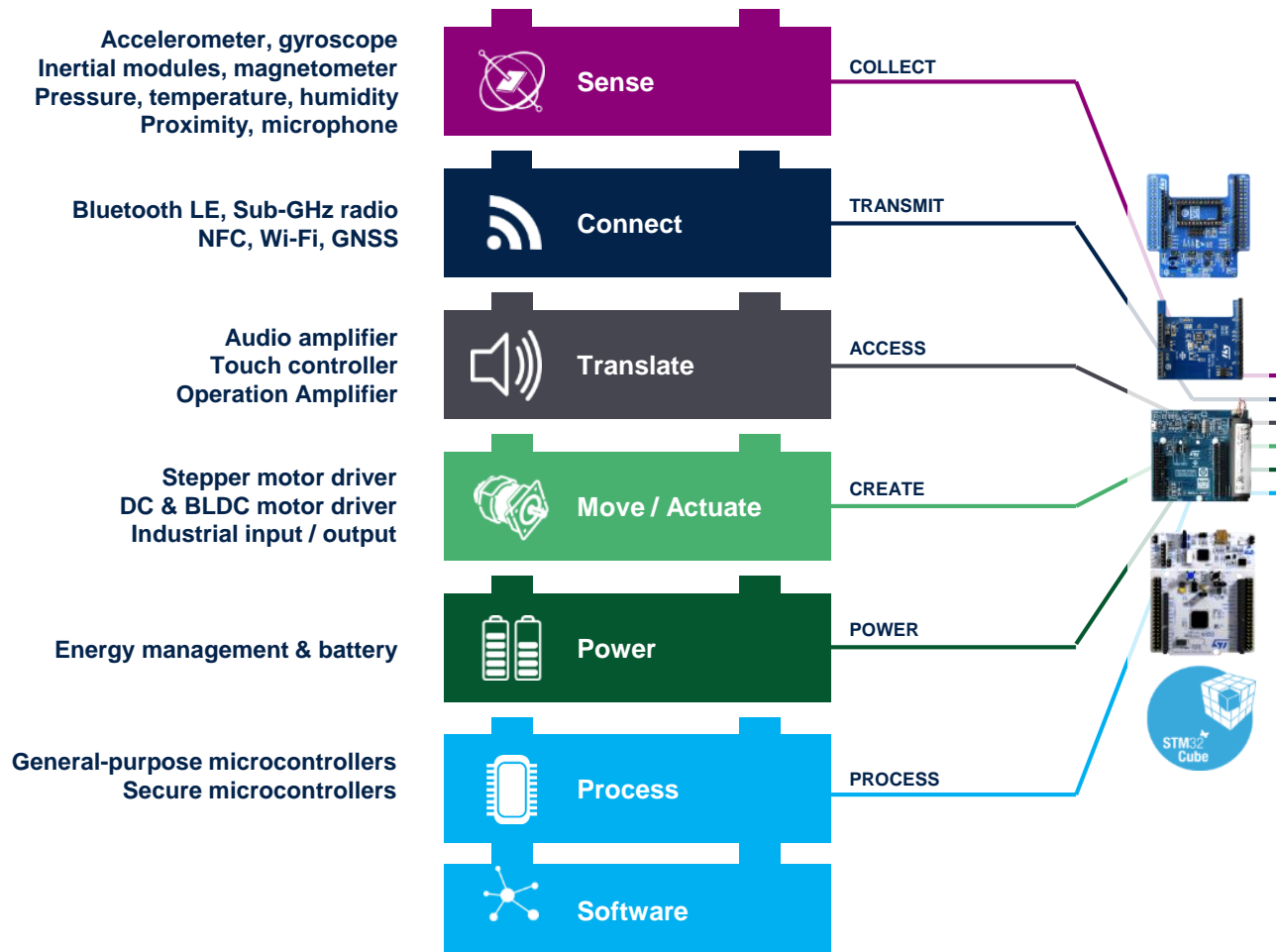
STM32 MPU OpenSTLinux Software Expansion Package : Overview

STM32 MPU OpenSTLinux Software Expansion Package: all that you need

The building blocks

Your need

Our answer

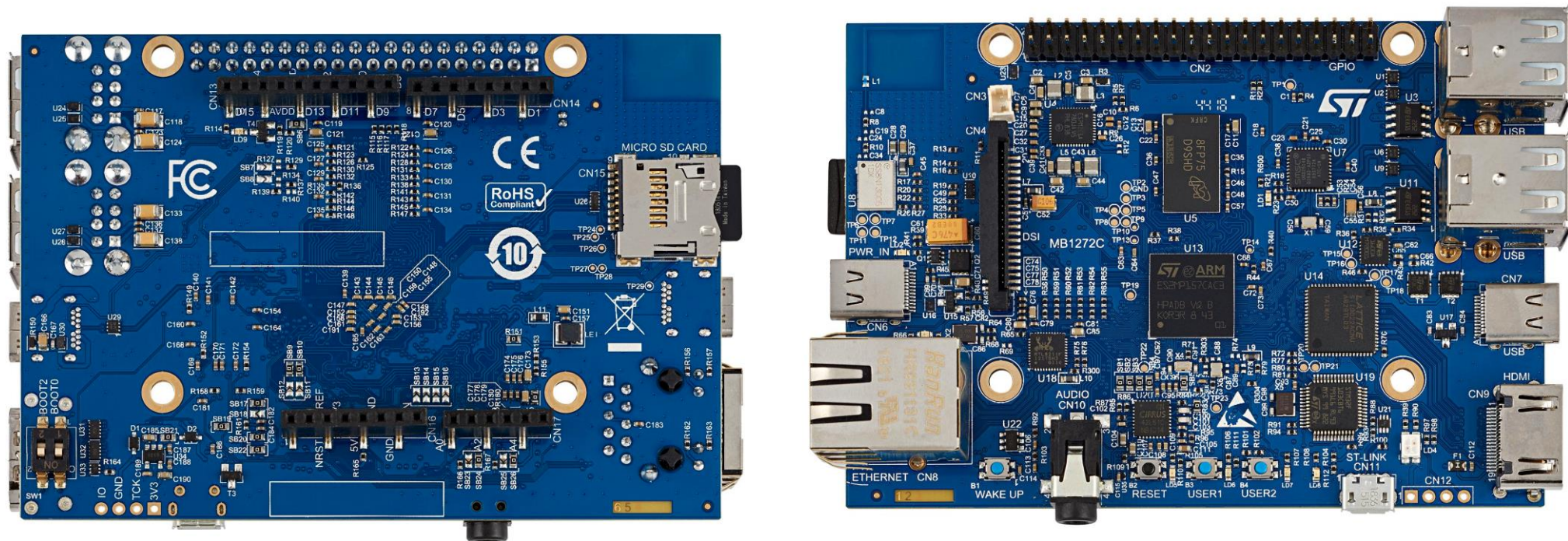


STM32 Open
Development
Environment



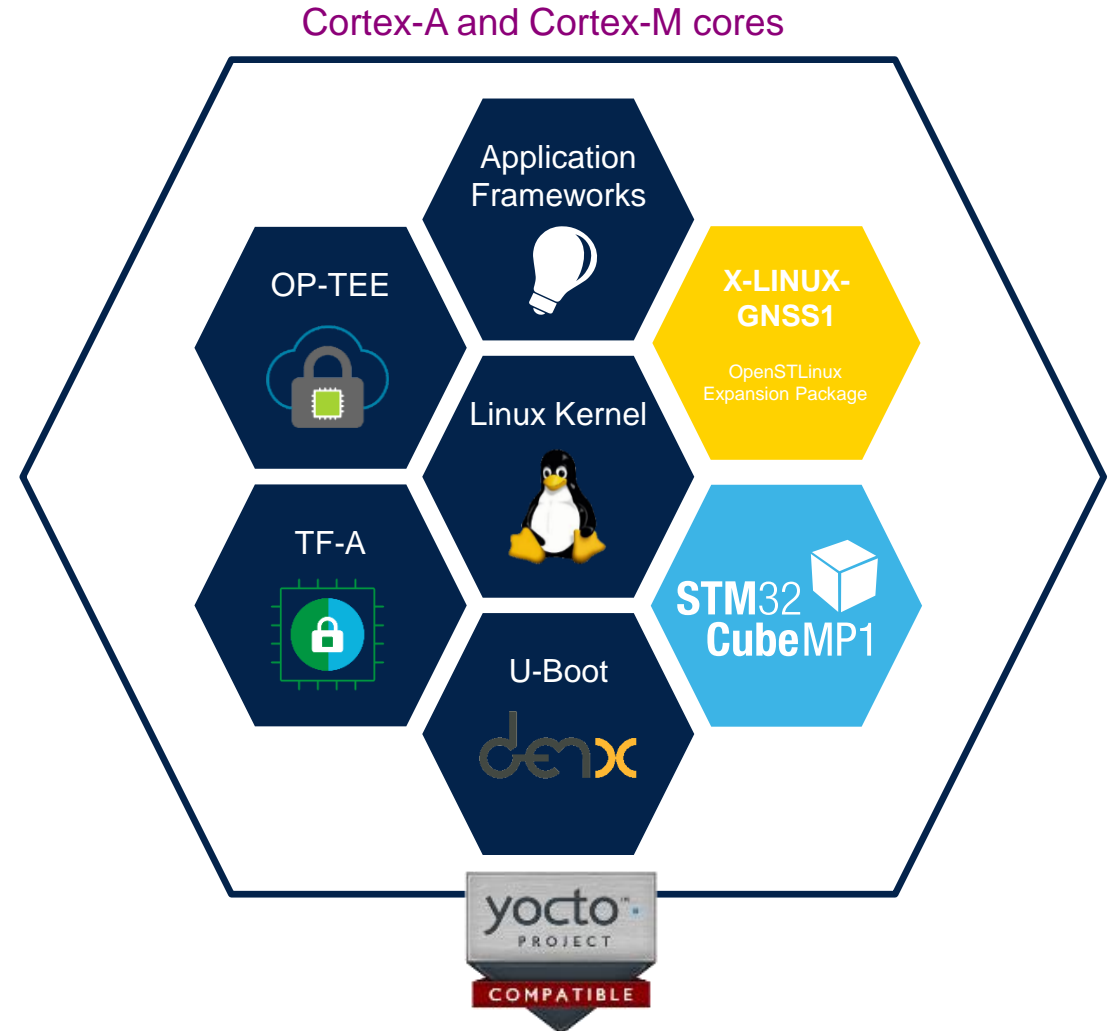
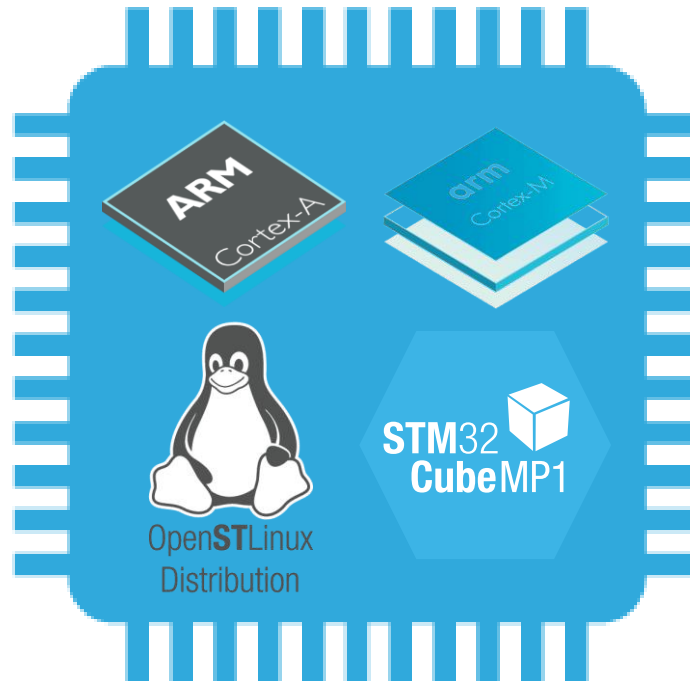
X-LINUX Software Expansion Package

- X-LINUX Software Expansion package is developed on A7 core of STM32MP1 for stand alone applications and applications using X-NUCLEO boards or Raspberry Pi HAT boards
- X-NUCLEO expansion board can be plugged on Arduino connector or Raspberry Pi HAT board can be plugged on the 40-pin connector available on the STM32MP157F-DK2 board

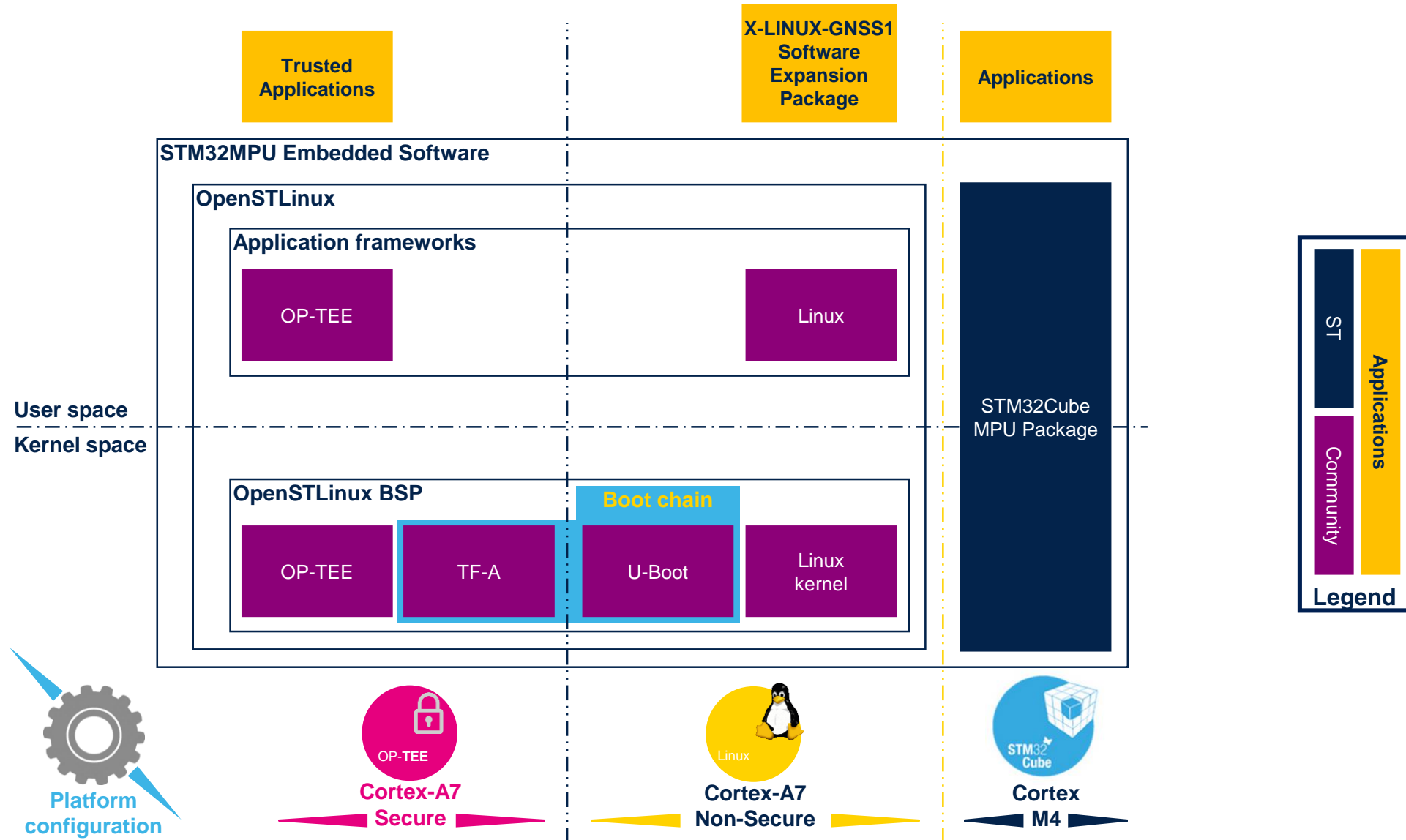


STM32MPU Embedded Software

- More complex
- Multiple piece of software to deliver
- STM32CubeMP1 is part of it



STM32MPU Embedded Software



Software packages presentation

- **Starter Package**

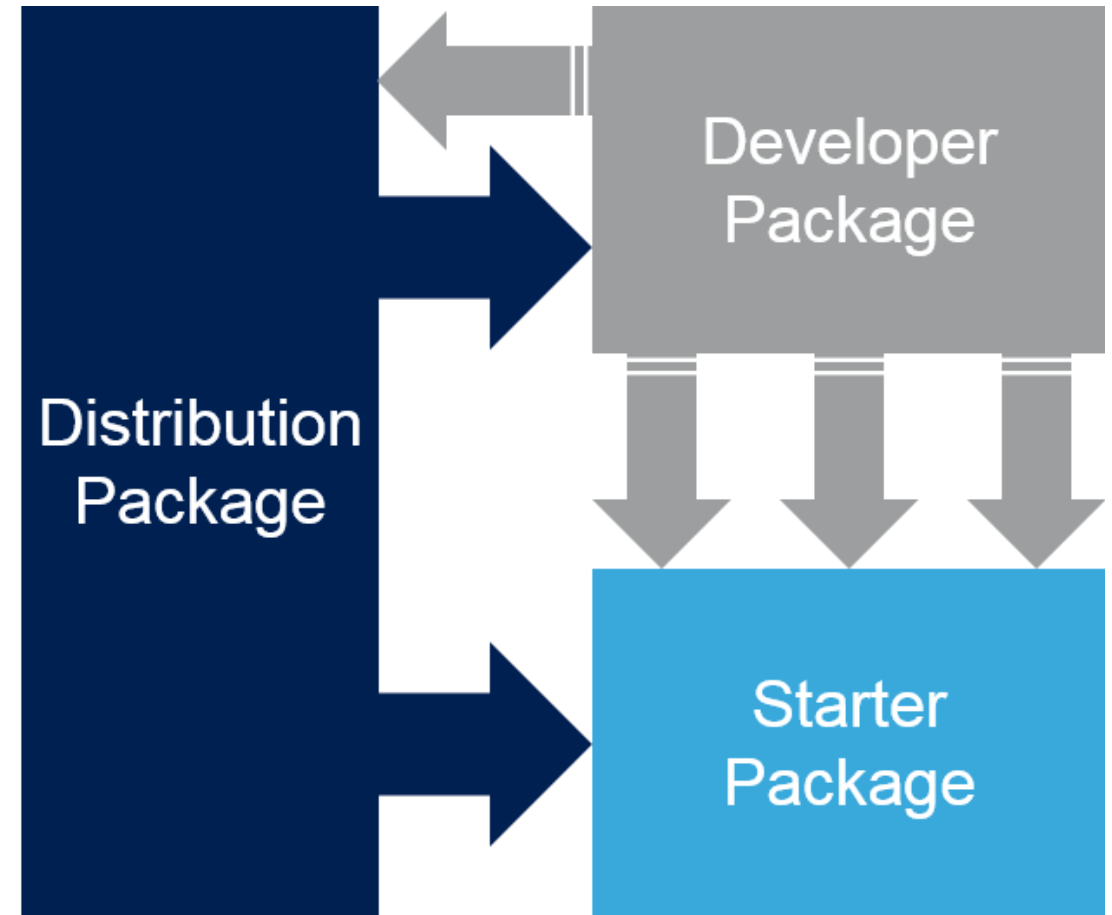
- Used to quickly and easily start with any STM32MP microprocessor device. The Starter package is generated from the Distribution Package.

- **Developer Package**

- Used to add your own developments on top of the STM32MPU Embedded Software distribution, or to replace the Starter package pre-built binaries. The Developer Package is generated from the Distribution Package.

- **Distribution Package**

- Used to create your own Linux® distribution, your own Starter package and your own Developer Package.



More info:

<https://wiki.st.com/stm32mpu>

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