



m13design

M13-RZA2M-EK

**RZA2M (Cortex-A9)
m13_rza2m_ek_bsp_demo**

Application Note Guide

Updated on the: 06 Aug. 21

Board name:
MPU:
Version

M13-RZA2M-EK
R7S921053VCBG
1.0.0

TABLE OF CONTENT

1	Introduction.....	3
1.1	Project brief description	3
2	Required Resources.....	4
2.1	Development tools and software	4
2.2	Hardware	4
2.3	Related Documents	4
3	Download and Installation	5
3.1	e ² studio	5
3.2	Project demo.....	5
3.3	Serial Terminal configuration.....	5
4	Importing the demo project.....	6
4.1	Launch e ² studio	6
4.2	File/Import.....	6
4.3	Existing Project.....	7
4.4	Project location	8
4.5	Project Explorer View	9
5	Build and Debug	10
5.1	Debug configuration select	10
5.2	Build before debug session	11
5.3	Launch the debug session.....	12
6	Manipulating the demo	13
6.1	The capacitive touchscreen.....	14
6.2	The Accelerometer	16
5.4	Trace level configuration	17
7	Contact and Support	18
7.1	General contact	18
7.2	Support contact.....	18
8	Revision history.....	19

1 INTRODUCTION

This application guide describes how to install the needed development tools/software, download the needed project, load it into the software environment and debug it with the M13-RZA2M-EK evaluation kit. The demo project **m13_rza2m_ek_bsp_demo** let you discover a few features of the board.

1.1 PROJECT BRIEF DESCRIPTION

All the board's features used in the project are listed in [Table 1](#).

Table 1. M13-RZA2M-EK Feature used

32Mbyte external SDRAM	✓
16Kbit I ² C EEPROM (Initialisation only)	✓
4.3-inch 480x272 TFT LCD with capacitive touch panel	✓
USB Interface	✗
LAN Interface	✗
SD/MMC Host Interface	✗
OctaRAM (Initialisation only)	✓
I2S Audio codec	✗
3-Axis accelerometer	✓
On-board JLINK-OB debugger with VCOM	✓
8bit camera	✗
Mikrobus	✗
PMOD	✗
Mono-turn 10KΩ Potentiometer	✗
User led	✓
User switch and 1 x Reset switch	✓

2 REQUIRED RESOURCES

2.1 DEVELOPMENT TOOLS AND SOFTWARE

- IDE: e2studio 2021-04 (21.4.0) or greater
- Tool Chain: GNU ARM Embedded Toolchain 9.3.1.20200408
- Serial Terminal (Free Serial Port Terminal, PuTTY)

2.2 HARDWARE

- M13design M13-RZA2M-EK Evaluation Kit
<https://www.m13design.fr/products/M13-RZA2M-EK.html>
- USB cable: Micro-B male to USB-A male (Not included in the kit)

2.3 RELATED DOCUMENTS

- Renesas RZA2M Group User's Manual
<https://www.renesas.com/us/en/document/mah/rza2m-group-users-manual-hardware?language=en&r=1054511>
- M13-RZA2M-EK schematic
https://www.m13design.fr/download/pdf/M13design_M13-RZA2M-EK_Schematic.pdf
- M13-RZA2M-EK User manual
https://www.m13design.fr/download/pdf/M13design_M13-RZA2M-EK_User_Manual.pdf

3 DOWNLOAD AND INSTALLATION

3.1 E²STUDIO

The latest e2studio IDE is downloadable here <https://www.renesas.com/us/en/software-tool/e-studio>

Make sure to have Renesas account or create one before downloading

Refer to the “Getting Started Guide for e2studio for RA” section 2 for a complete installation guide.

3.2 PROJECT DEMO

You can find the **rza2m_ek_bsp_demo** project for the M13-RZA2M-EK board to download here: https://www.m13design.fr/download/software/m13_rza2m_ek_bsp_demo.zip

3.3 SERIAL TERMINAL CONFIGURATION

Make sure to launch your Serial Terminal program with the following configuration:

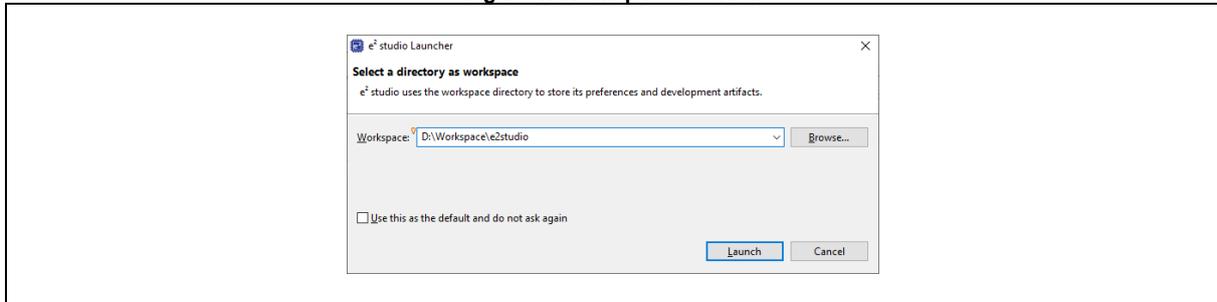
- Baud Rate: 115200
- Data Bits: 8
- Parity: None
- Stop Bits: 1
- Flow Control: None
- COM Port: As detected in your Windows™ Device Manager

4 IMPORTING THE DEMO PROJECT

4.1 LAUNCH E²STUDIO

Assuming you have e²studio installed, launch the software and enter a workspace location as shown in [Figure 1](#) below than click “**launch**” and wait until the environment is fully loaded.

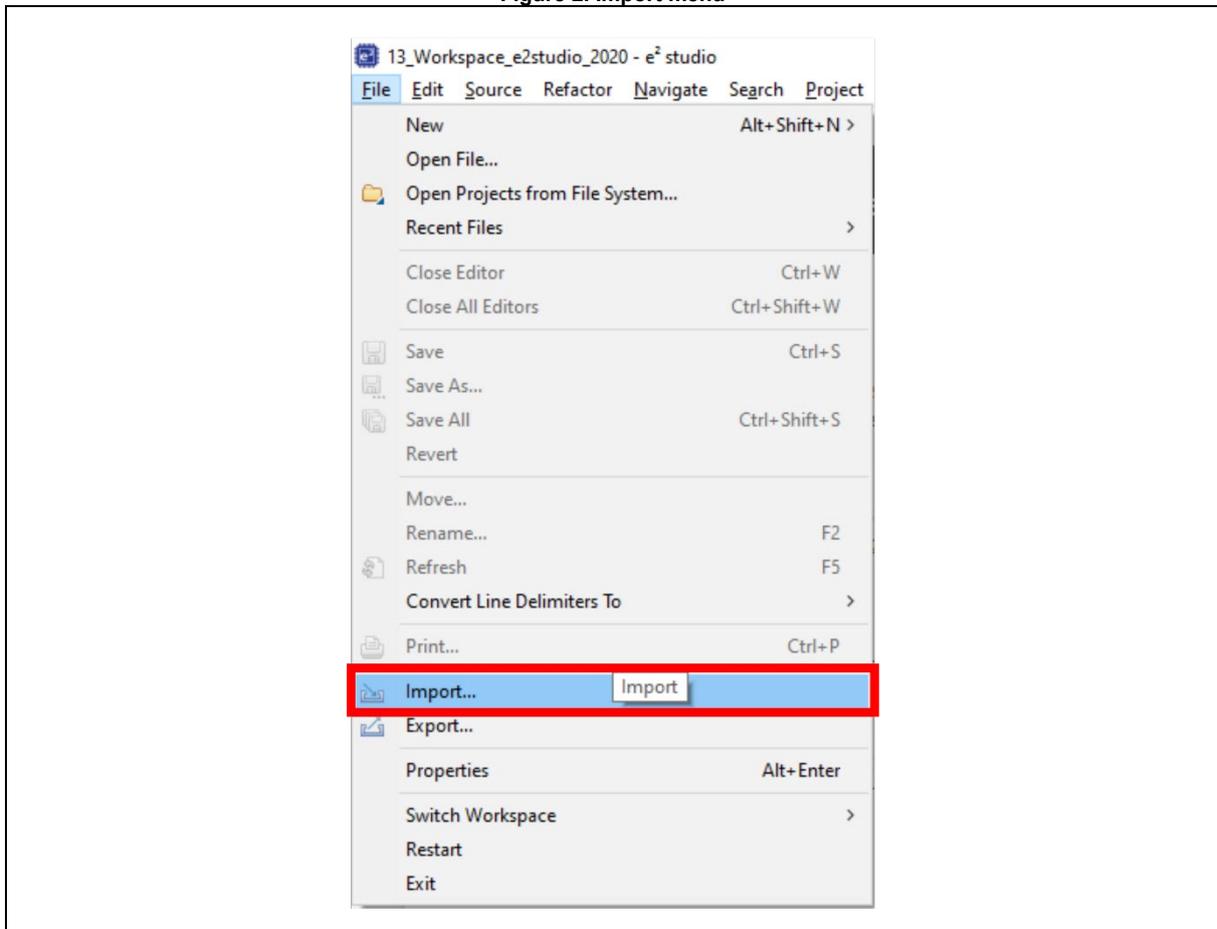
Figure 1. Workspace location



4.2 FILE/IMPORT

To import the previously downloaded project, in the top menu, click on “**File**” and choose the “**import**” option in the dropdown menu as shown in the [Figure 2](#) below.

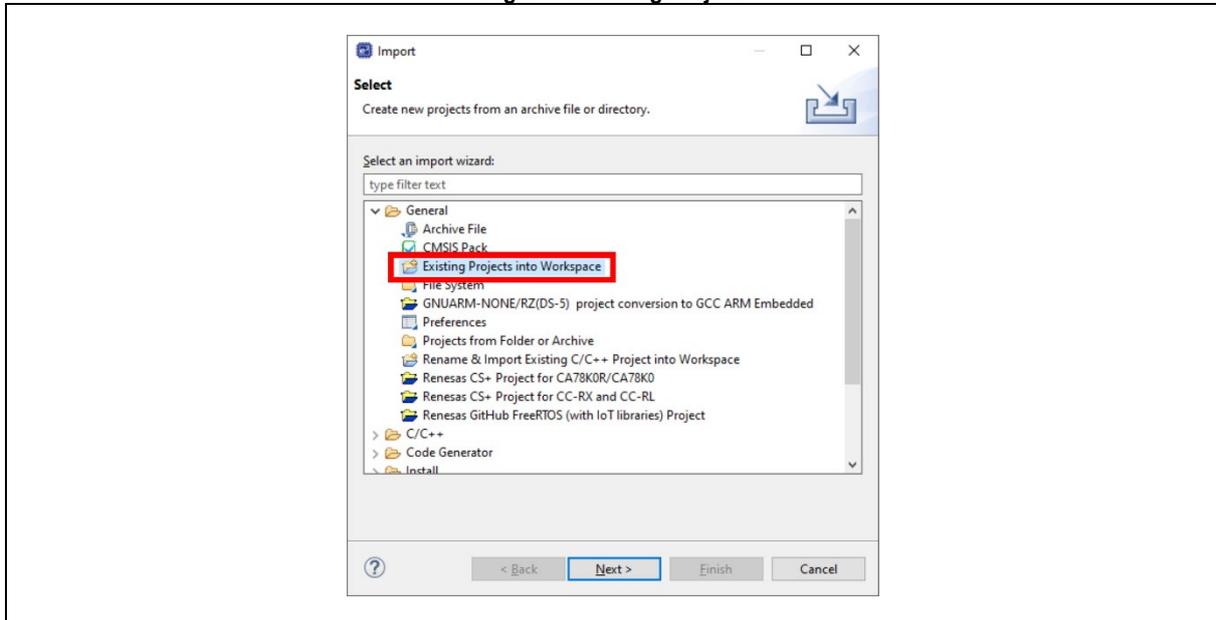
Figure 2. Import menu



4.3 EXISTING PROJECT

From the “**Import**” popup box, select in the “**General**” file section the option “**Existing Projects into Workspace**” and click “**Next**”

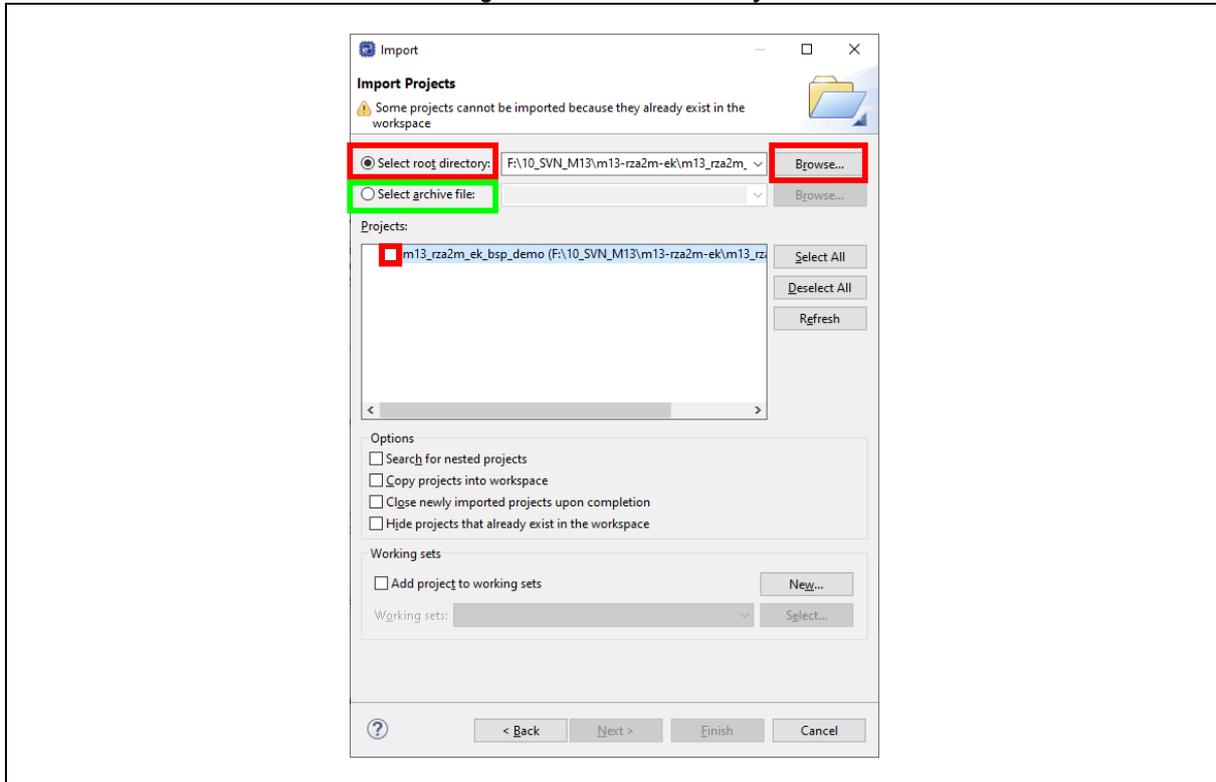
Figure 3. Existing Project



4.4 PROJECT LOCATION

In the next box, select your project location by clicking on the **“Browse”** button on the right side as shown in [Figure 4](#). If preferred, you can import an archived project instead by checking the **“Select Archive file”** mark. In both cases, make sure the project is checked in the **“Project”** area. Any other options can be left unmarked and click the **“Finish”** button down below.

Figure 4. Select root directory

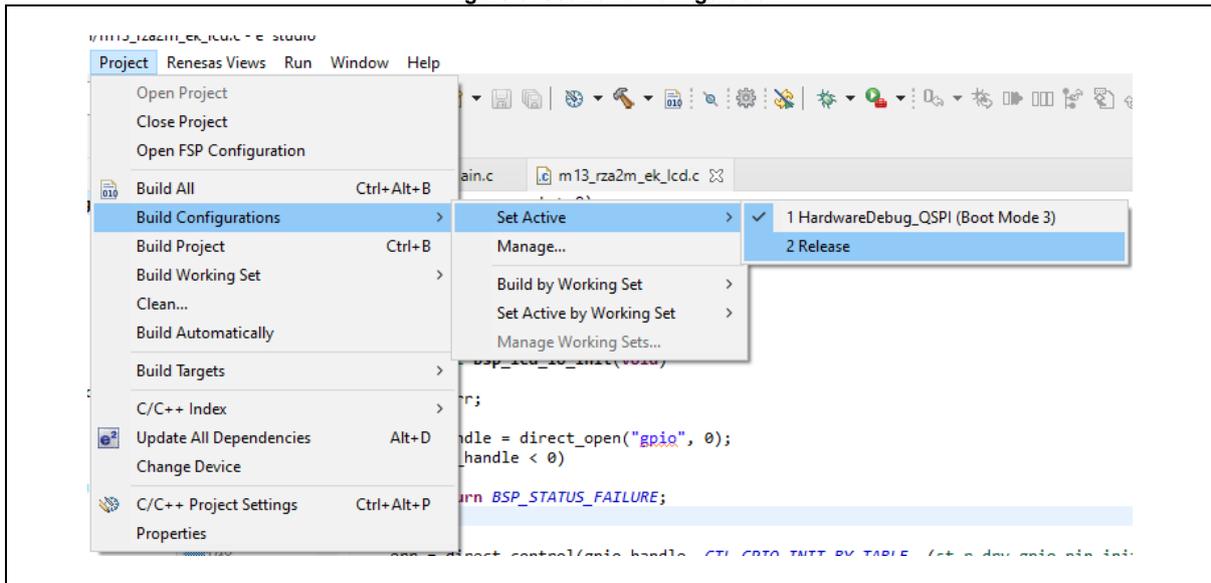


5 BUILD AND DEBUG

5.1 DEBUG CONFIGURATION SELECT

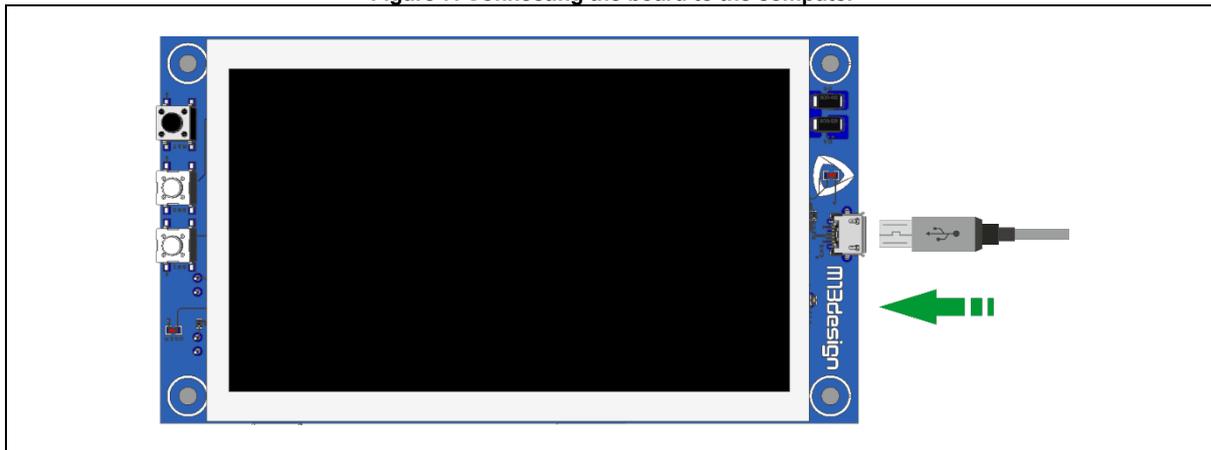
The demo project comes with a “Debug” and a “Release” build configuration. By default, the project is set in the “Debug” build configuration. To switch between the “Debug” and the “Release” configurations, navigate through the menu “**Project>Build Configurations>Set Active<Select_Build>**” as shown in [Figure 6](#) below.

Figure 6. Set Build Configuration



Before launching the debug session, make sure the M13-RZA2M-EK board is connected to your computer via the USB connector CN5 as shown in [Figure 7](#).

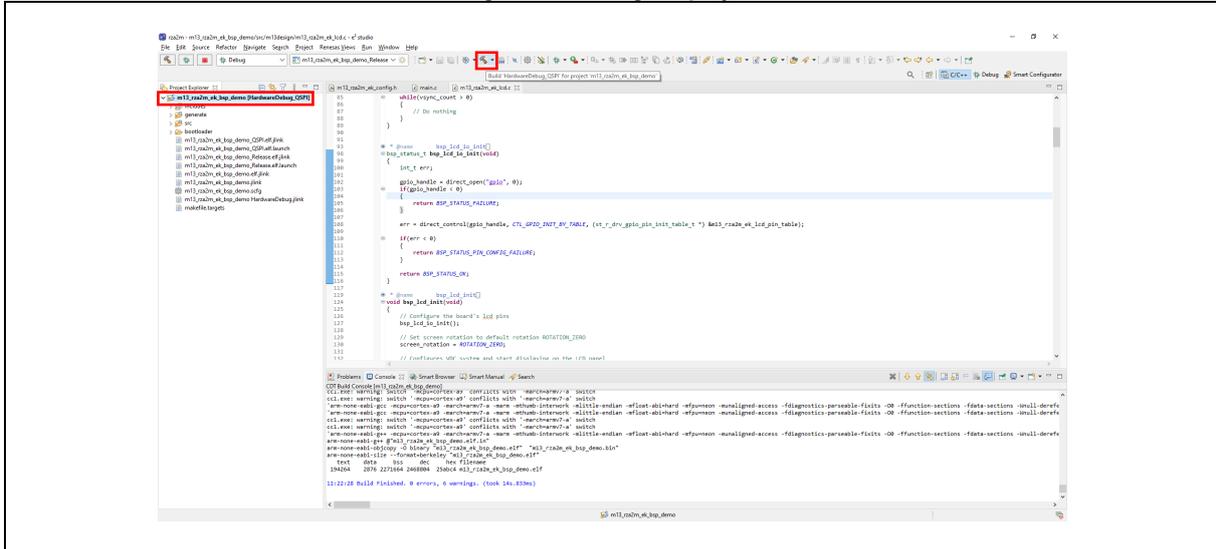
Figure 7. Connecting the board to the computer



5.2 BUILD BEFORE DEBUG SESSION

After selecting the debug configuration, proceed to build the project. If you have more than one projects imported, make sure the desired project folder to be built is selected before building the project. As highlighted in [Figure 8](#), after selected the project, click on the build icon to proceed into the debug session.

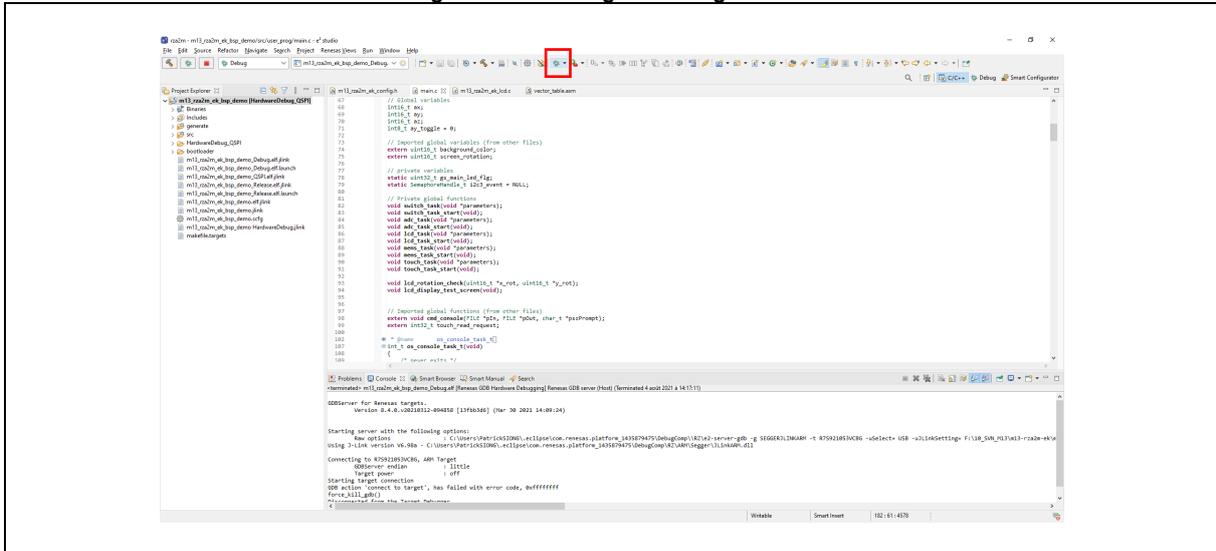
Figure 8. Building the project



5.3 LAUNCH THE DEBUG SESSION

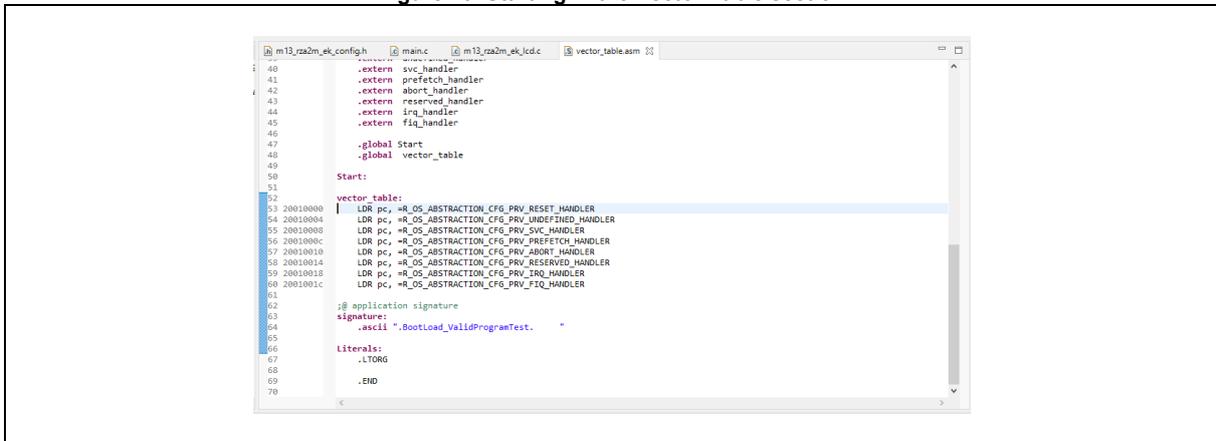
Click on the Debug icon to launch the debug session as shown in Figure 9 below

Figure 9. Launching the Debug session



The session starts in the vector table as shown in Figure 10 below. “Resume” the session (F8 shortcut) will bring you in the main() function. From here on, you can either Step into (F5), Step over (F6) or just launch the session (F8).

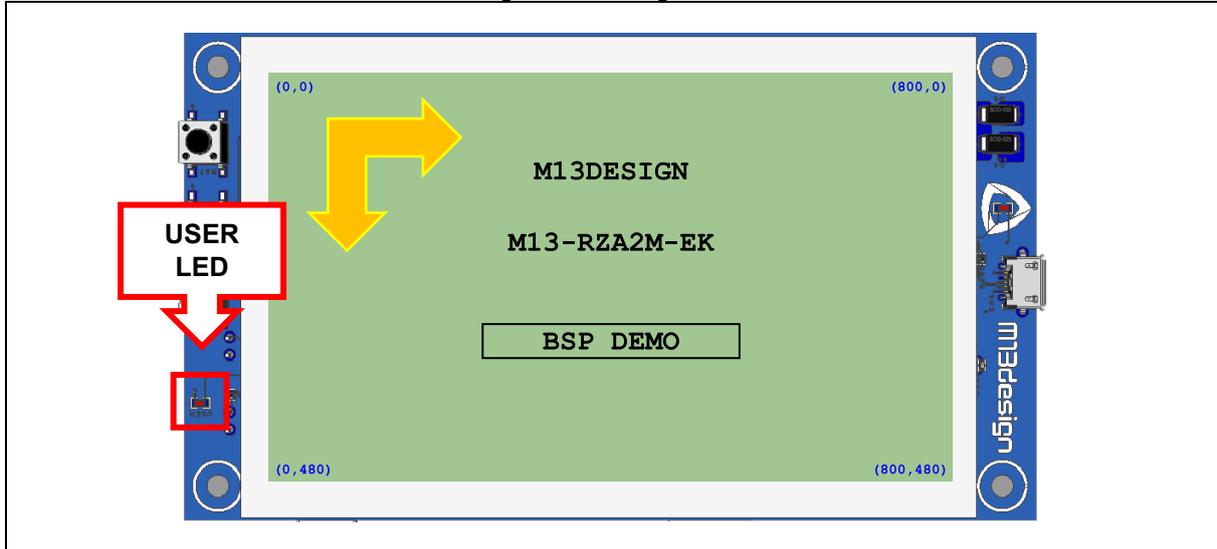
Figure 10. Starting in the Vector Table section



6 MANIPULATING THE DEMO

Figure 11 below shows you the starting screen of the demo project which should be displayed on the board's LCD screen.

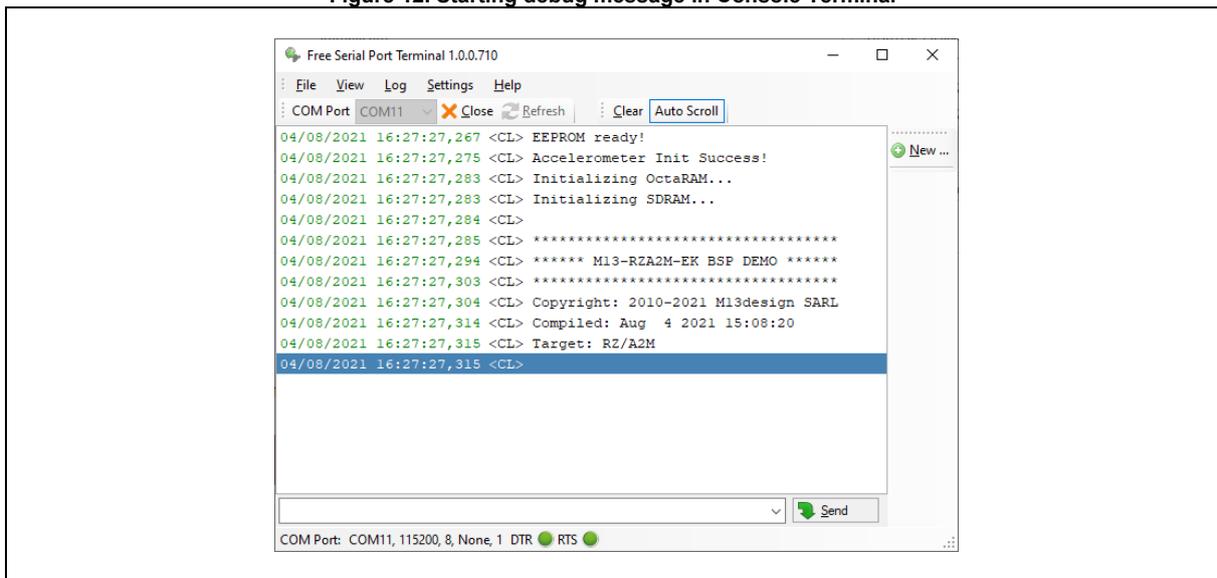
Figure 11. Starting screen



The User Led should be blinking all the time, proving that the demo is up and running. Also, at each corner of the screen, you should have the displayed coordinates of each corner. Note that the coordinates progression is shown above with the orange arrows with its origin (0,0) located in the top left corner.

The debug console should display the below starting messages as show in Figure 12.

Figure 12. Starting debug message in Console Terminal



6.1 THE CAPACITIVE TOUCHSCREEN

You can play with the touchscreen as shown in [Figure 13](#). By touching the screen with one finger, you will have a feedback on the screen right under your finger as a yellow square. By moving the finger around on the screen, the yellow square should be following your finger.

Figure 13. One finger visual feedback display

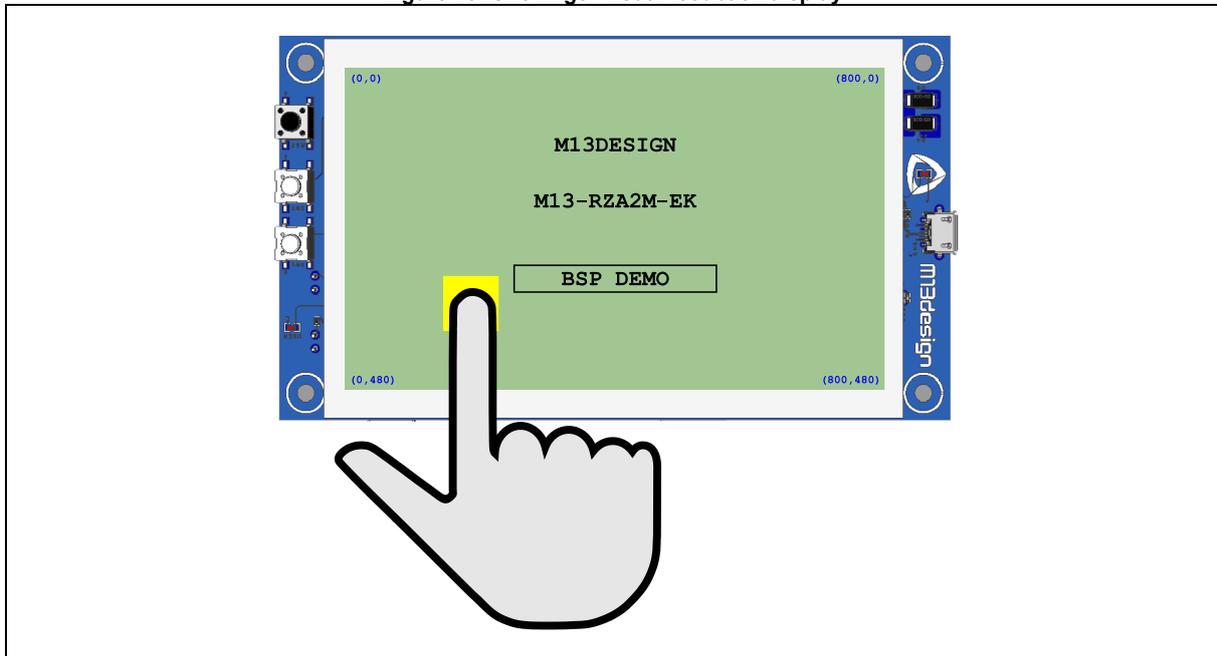
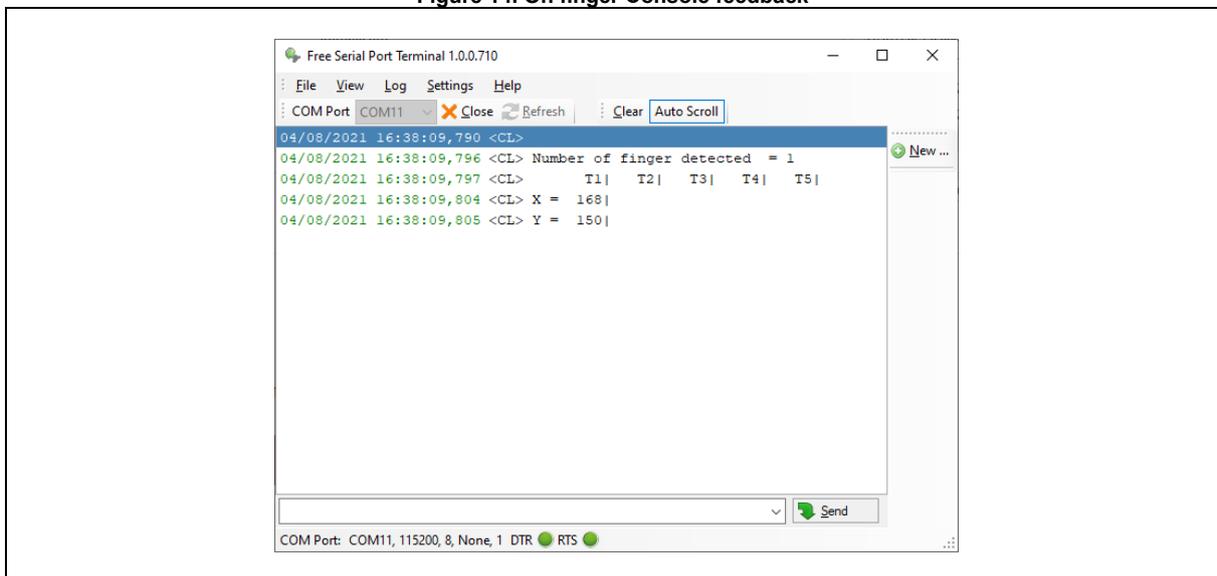


Figure 14. On finger Console feedback



You will also have an information feedback in the console as shown in [Figure 14](#). The displayed information should indicate the following:

- The number of fingers detected
- The X and Y coordinates location of the finger (T1) on the screen

The capacitive touchscreen is configured to detect up to five fingers. As shown in [Figure 15](#) and [Figure 16](#), doing so, you will have a visual feedback on the screen and a feedback in the console.

Figure 15. Five finger visual feedback display

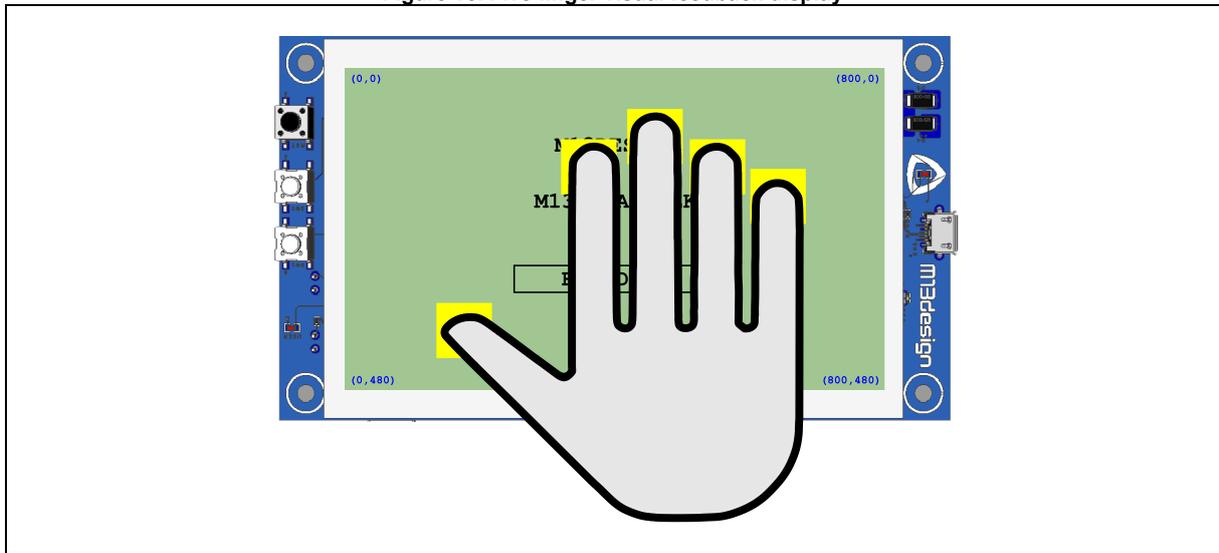
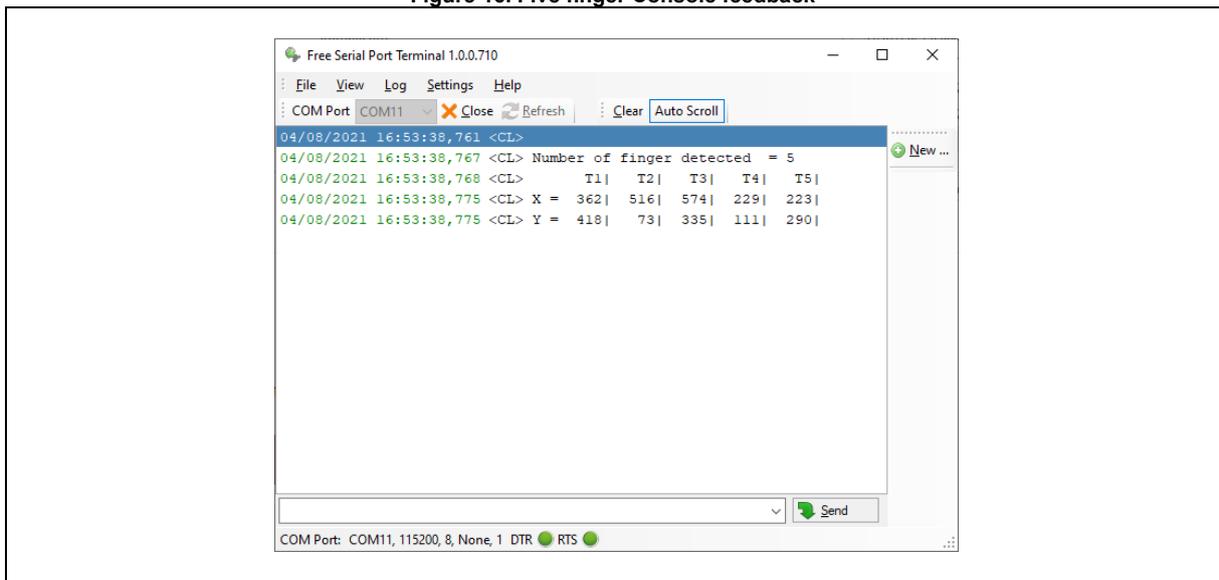


Figure 16. Five finger Console feedback



6.2 THE ACCELEROMETER

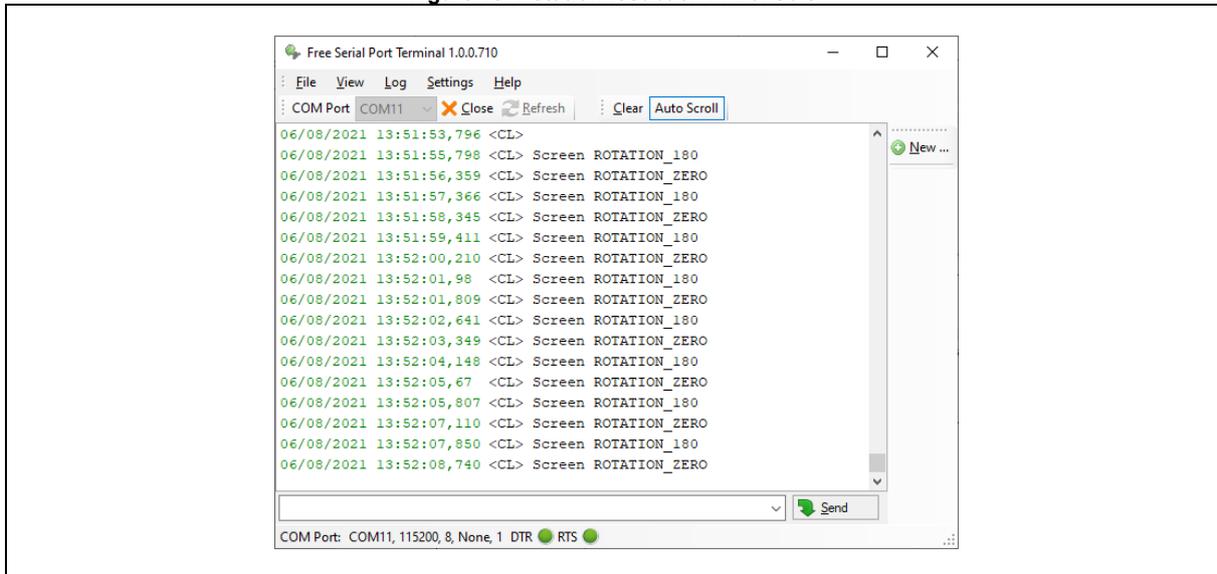
With the help of the on-board accelerometer, the application allows the screen to always face up will the board is held in landscape view. The starting default view (**ROTATION_ZERO**) is shown in [Figure 17](#) below. This view is also the default view when the board is lying flat on a desk on a horizontal surface. Please note that there is no “Portrait” display available.

Figure 17. Starting default view: Rotation ZERO



When the board is rotated 180° (still in landscape view), the screen will rotate its display information to match the user’s view. In order to this, the application checks the changes in the accelerometer’s Y axis and rotates the display if a threshold is reached. In addition, you will also have access to the rotation value through the console as shown below in [Figure 18](#). Note that the board will recognize two rotation position, **ROTATION_ZERO** or **ROTATION_180**.

Figure 18. Rotation feedback in Console



Please note that the touch coordinates will also be rotated 180° to match the screen display will in **ROTATION_180**.

5.4 TRACE LEVEL CONFIGURATION

The debug messages through the JLink Virtual COM port can be configured, turned off or on in the **m13_rza2m_ek_config.h** file. This file can be found in the folder located in **<Project_install>/src/m13design/**

Table 2. Trace level details

Trace level	PRINTF_INFO (...) / PRINTF_ARRAY (...)	PRINTF_DEBUG (...) / PRINTF_ARRAY_DEBUG (...)
BSP_TRACE_LEVEL_OFF	OFF	OFF
BSP_TRACE_LEVEL_INFO	ON	OFF
BSP_TRACE_LEVEL_DEBUG	ON	ON

As shown in [Table 2](#), each level will activate/deactivate the **printf** macros for debug purposes throughout M13design bsp files.

As shown in the code below, “Trace levels” can be redefined/reconfigured for each predefined available features in the **m13_rza2m_ek_config.h** file. As the board BSP will progress, more configuration will become available (More Trace levels, more board feature will be traceable etc...)

```
#define BSP_CONFIG_TRACE_LEVEL_ACC      BSP_TRACE_LEVEL_INFO // Trace level for Accelerometer
#define BSP_CONFIG_TRACE_LEVEL_TOUCH   BSP_TRACE_LEVEL_INFO // Trace level for Touch screen
#define BSP_CONFIG_TRACE_LEVEL_SDRAM   BSP_TRACE_LEVEL_INFO // Trace level for SDRAM
#define BSP_CONFIG_TRACE_LEVEL_SDRAM_T BSP_TRACE_LEVEL_OFF  // Trace level for SDRAM Test routine
#define BSP_CONFIG_TRACE_LEVEL_OCTARAM BSP_TRACE_LEVEL_INFO // Trace level for OctaRAM
#define BSP_CONFIG_TRACE_LEVEL_OCTARAM_T BSP_TRACE_LEVEL_OFF // Trace level for OctaRAM Test routine
#define BSP_CONFIG_TRACE_LEVEL_EEPROM  BSP_TRACE_LEVEL_DEBUG // Trace level for EEPROM
```

7 CONTACT AND SUPPORT

7.1 GENERAL CONTACT

For any general inquiries, fill-in our online contact form here: <https://www.m13design.fr/contact/>

Or send us a request by email at: sales@m13design.fr

7.2 SUPPORT CONTACT

For any technical support request, contact us via email at: support@m13design.fr

8 REVISION HISTORY

Table 3. Revision Table

Revision	Date	Revision content
V1.0	6 th of July 2021	Initial release.

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