QUICK START GUIDE

VAB-630

Android EVK v1.0.3

1.00-08112017-110800

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Revision History

Version	Date	Remarks
1.00	08/11/2017	Initial release

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1. Introduction

This Quick Start Guide provides an overview on how to boot the Android EVK system image in the VAB-630 board and configure the supported hardware functions in the build.

The VAB-630 Android EVK v1.0.3 is developed based on Android 5.0.0 (Lollipop) and it enables the hardware features of the VAB-630 board.

1.1. EVK Package Contents

There are three folders in the package as listed below.

Firmware folder	Description
VAB-630_Android_EVK_v1.0.3.zip	Android EVK system image and installation script files
Document folder	**Description**
VAB-630_Android_EVK_v1.0.3_Quick_Start_Guide_v1.00_20170811.pdf	Quick start guide
Tools folder	**Description**
SmartETK_SDK_Sample.apk	Smart ETK demo program
BluetoothSPPTest.apk	Bluetooth SPP testing program
arm_201103_gcc4.5.2.tgz	Toolchain

VAB-630 Android BSP contents

1.1.1. Firmware Folder Contents

VAB-630_Android_EVK_v1.0.3.zip: The Android EVK system image and installation script files.

1.1.2. Document Folder Contents

VAB-630_Android_EVK_v1.0.3_Quick_Start_Guide_v1.00_20170811.pdf: This Quick Start Guide provides an overview on how to boot the Android EVK system image in the VAB-630 board and configure the supported hardware functions in the build.

1.1.3. Tools Folder Contents

SmartETK_SDK_Sample.apk: is the Smart ETK demo program.
BluetoothSPPTest.apk: is the Bluetooth SPP profile test program.
arm_201103_gcc4.5.2.tar.gz: is a toolchain, which is a set of software development tools for building images for the VAB-630 board.

1.2. Version Information and Supported Features

- U-Boot version: 1.1.4
- Kernel version: 3.4.5
- Evaluation image: Android Lollipop 5.0
- Development based on WM8980 Android_5.0_v0.2.0
- Supports SPI with eMMC boot
- Supports HDMI or LVDS display
- Supports HDMI audio output
- Supports ONation capacitive touch panel (through USB interface)
  - ONation 10.1" LVDS Panel VIA1001 OT101RBWDLT-00 (1280×800)
- Supports Debug UART connector
- Supports Line-out and Mic-in
- Supports Micro USB 2.0 OTG port
- Supports 10/100Mbps Ethernet
- Supports EMIO-5531 USB Wi-Fi & Bluetooth module
  - Supports Bluetooth A2DP and SPP profile
- Supports EMIO-2531 miniPCIe Wi-Fi & Bluetooth module
  - Supports Bluetooth A2DP and SPP profile
- Supports EMIO-2550 miniPCIe Mobile Broadband module
- Supports Smart ETK v1.0.3 GPIO, Watchdog timer, and UART

2. Image Installation

The VAB-630 only supports booting Android from the SPI ROM with eMMC. This section explains the setup requirements for booting from the SPI ROM with eMMC.

The installation script files, the precompiled U-boot and image are provided in the "Firmware" folder.

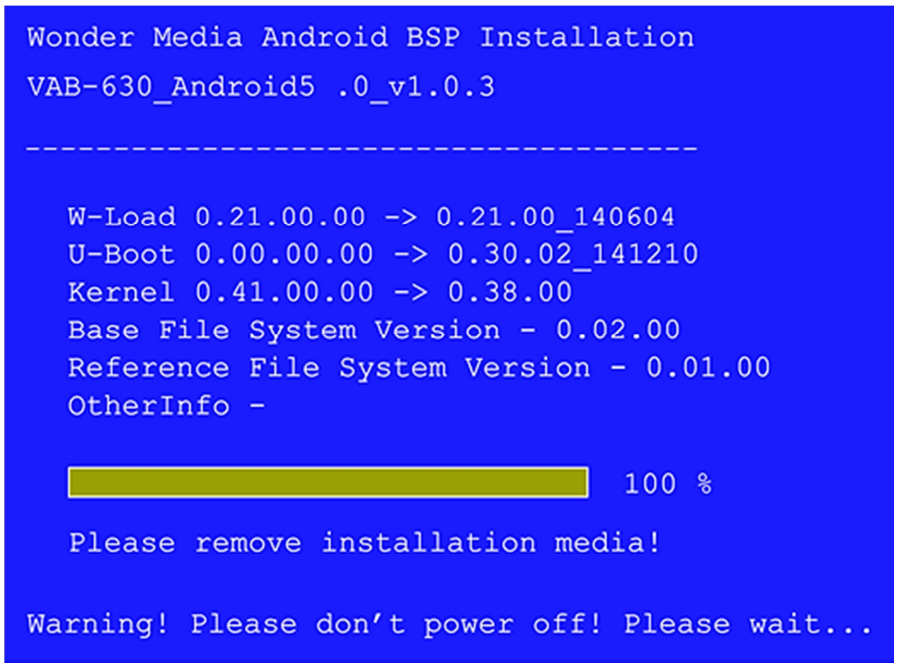
2.1. Requirements

- Host machine
- Micro SD card
- EVK package : VAB-630_Android_EVK_v1.0.3.zip

2.2. Booting from the SPI ROM with eMMC

The first step is to insert a Micro SD card into the host machine and create a FAT formatted partition. Next, extract the **VAB-630_Android_EVK_v1.0.3.zip** and copy the **bspinst** folder and **scriptcmd** file onto the Micro SD card.

Insert the prepared Micro SD card into the VAB-630, connect an HDMI display, and power on the device to initiate the update process.



Update process screen

***Note**:
Keep the power on during the installation process. After the installation process has completed, the system will automatically restart.

3. Hardware Functions

This section explains how to enable and test the hardware functions precompiled in the VAB-630 Android EVK including setting u-boot parameters, configuring displays settings as well as installing and applying the different functions included in the VIA Smart ETK sample program.

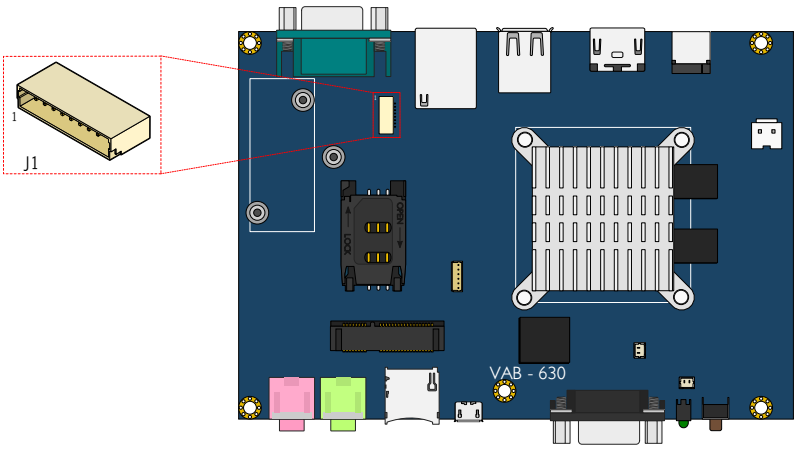
3.1. Setting Up U-Boot Parameters

VIA recommends that console board (P/N: 15GCU000000-20) and console cable (P/N: 99G33-192486) are used in order to configure the VAB-630 parameters.

The first step is to connect the host machine to the console board, then connect the console board to the VAB-630 through the Debug UART connector (J1). Use a serial port communication program such as PuTTY, GtkTerm, or Minicom, to configure the serial port setting and connect to the debug console. There you will be able to see the U-Boot boot log and adjust settings in the U-Boot console.

```
+-----------------------------------------------------------------------+
|  A    -         Serial Device                 : /dev/ttymxc0          |
|  B    -       Lockfile Location               : /var/lock             |
|  C    -         Callin Program                :                       |
|  D    -        Callout Program                :                       |
|  E    -          Bps/Par/Bits                 : 115200 8N1            |
|  F    -       Hardware Flow Control           : No                    |
|  G    -       Software Flow Control           : No                    |
+-----------------------------------------------------------------------+
```

Serial port setting of host machine



Debug UART connector (J1) diagram

Pin	Signal
1	UART0TXD
2	UART0RXD
3	SFCLK
4	GND
5	SFDO
6	SFDI
7	SFCS0-
8	VCC_SF

Debug UART connector (J1) pinout

Next, power on the VAB-630 to initiate the boot process. When prompted, press any key to stop the boot process and enter the U-Boot console as illustrated by the screenshot below.

```
WonderMedia Technologies, Inc.
W-Load Version : 0.21.00.00

Uncompressing U-Boot... done, booting U-Boot.


U-Boot 1.1.4 (Oct 13 2016 - 12:13:07)
WonderMedia Technologies, Inc.
U-Boot Version : 0.32.00.00
logo = 680 ms
Hit any key to stop autoboot:  0
WMT #
```

Debug console view of boot process

3.2. Configuring Display Parameters

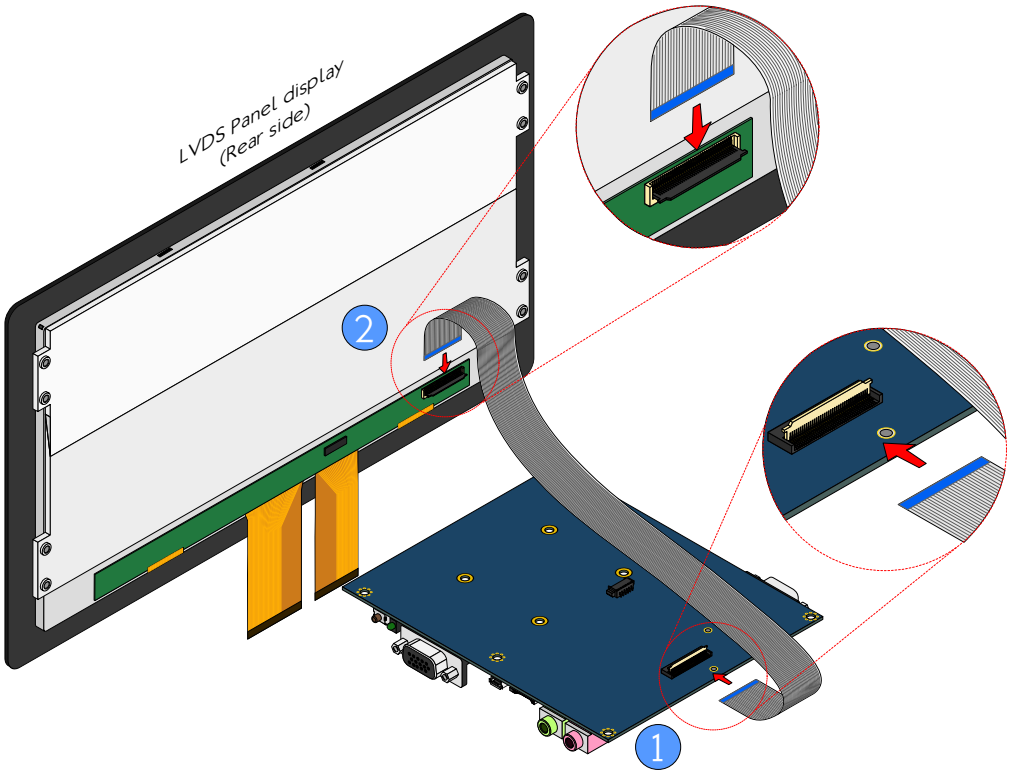
The VAB-630 Android BSP v1.0.3 supports the following display devices:

- ONation 10.1" LVDS Panel VIA1001 OT101RBWDLT-00 (1280×800)
- HDMI monitor (default)

The following sections below describe how to switch the settings from HDMI to LVDS, and vice versa.

3.2.1. Setting Up the LVDS Display Parameter

To set up the LVDS monitor, first connect the ONation LVDS panel to the VAB-630 board through the LVDS1 connector.



Connecting LVDS panel

Use the following command to change the U-Boot parameters for the ONation LVDS Panel

```
WMT # setenv wmt.display.fb0 0:[6:0:18:1280:800:60]
WMT # setenv wmt.display.ui.res 1280:800
WMT # saveenv
WMT # reset
```

From the output above we can see 1280:800 is the detected resolution set for the LVDS panel.

3.2.2. Setting Up the HDMI Display Parameter

To set up an HDMI monitor as the display output, use the following command below to change the U-boot parameters.

The system will automatically detect the EDID information and set the HDMI monitor default resolution. Configuring U-boot only affects the resolution for the U-boot logo.

```
WMT # setenv wmt.display.fb0 0:[4:6:1:1920:1080:60]
WMT # setenv wmt.display.ui.res 1920:1080
WMT # saveenv
WMT # reset
```

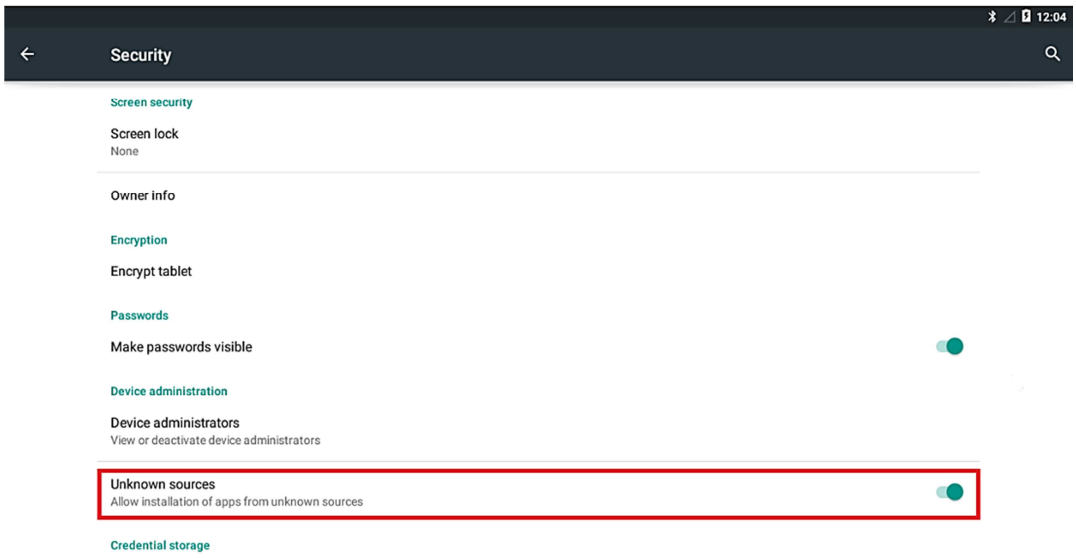
From the output above we can see 1920:1080 is the detected resolution of the HDMI monitor.

3.3. Smart ETK

The VAB-630 Android EVK includes the VIA Smart ETK program which supports Watchdog timer, GPIO and UART functions. Please follow the procedures below to experiment with the Smart ETK functions on the VAB-630 board.

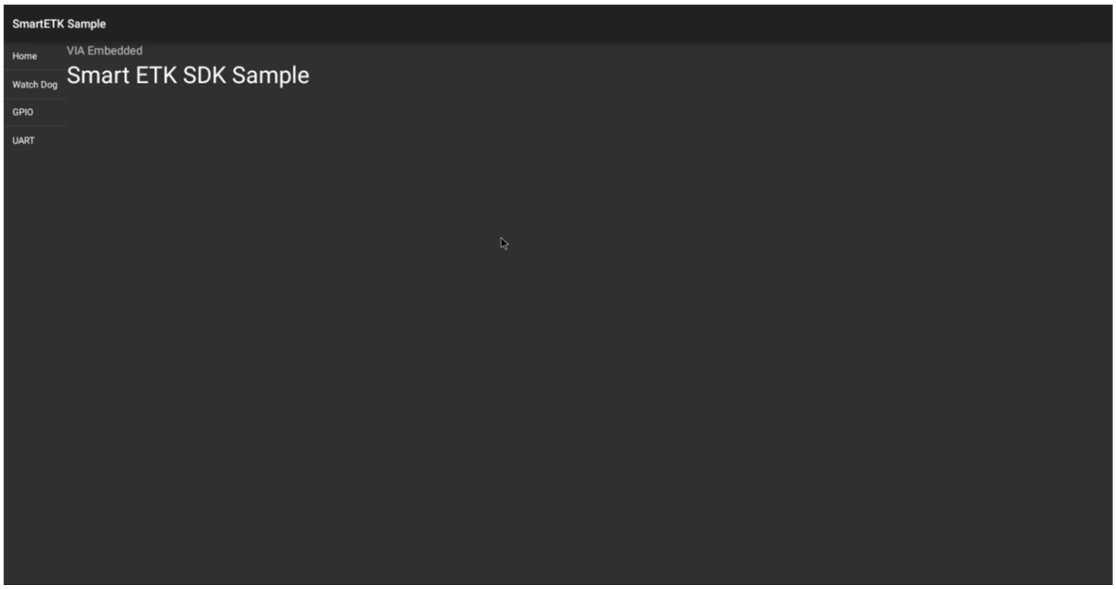
3.3.1. Installing Smart ETK

The first step is to copy the **SmartETK_SDK_Sample.apk** onto a mass storage device such as a USB thumb drive. Next, from the Settings screen, click Security, and then enable "Unknown sources" as shown in the diagram below.



Finally, insert the USB thumb drive into the VAB-630 and double click on the **SmartETK_SDK_Sample.apk** file to install.

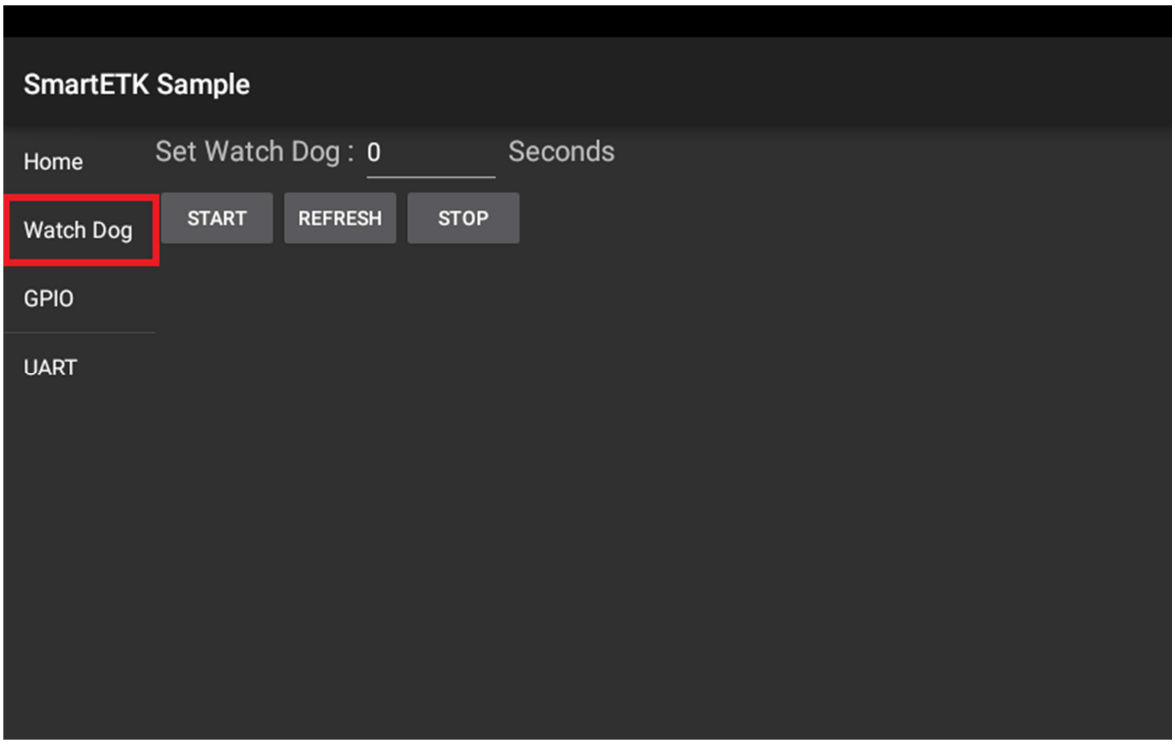
When the installation process has completed, run the **SmartETK_SDK_Sample.apk** and start to test the different functions with it.



Smart ETK SDK sample screen

3.3.2. Testing Watchdog Timer Function

The Watchdog timer includes Start, Refresh and Stop functions.



Smart ETK Watchdog Timer interface

First, please open the Smart ETK sample program then select Watch Dog.

To test the Watchdog function, the first step is to enter the time value (0~1400 seconds) in the Set Watch Dog setting.

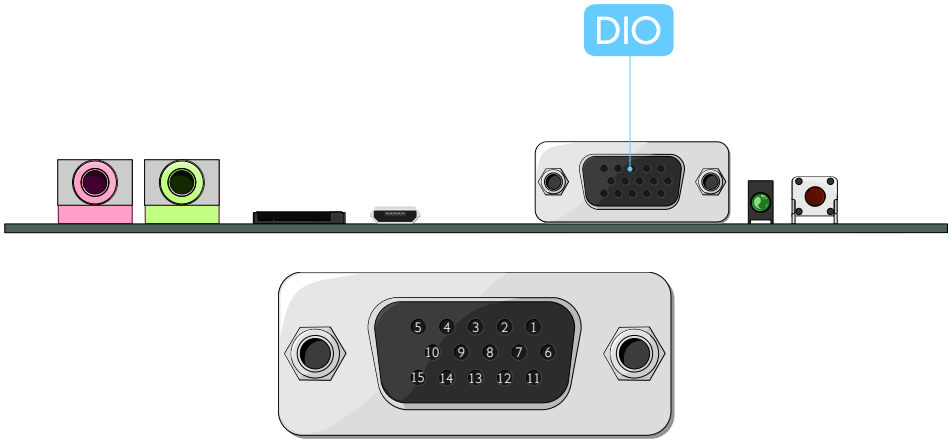
Click on the START button to start the watchdog timer function.

Click on the REFRESH button to refresh the countdown time value back to the beginning.

Click on the STOP button to stop the watchdog timer function.

3.3.3. Testing GPIO Function

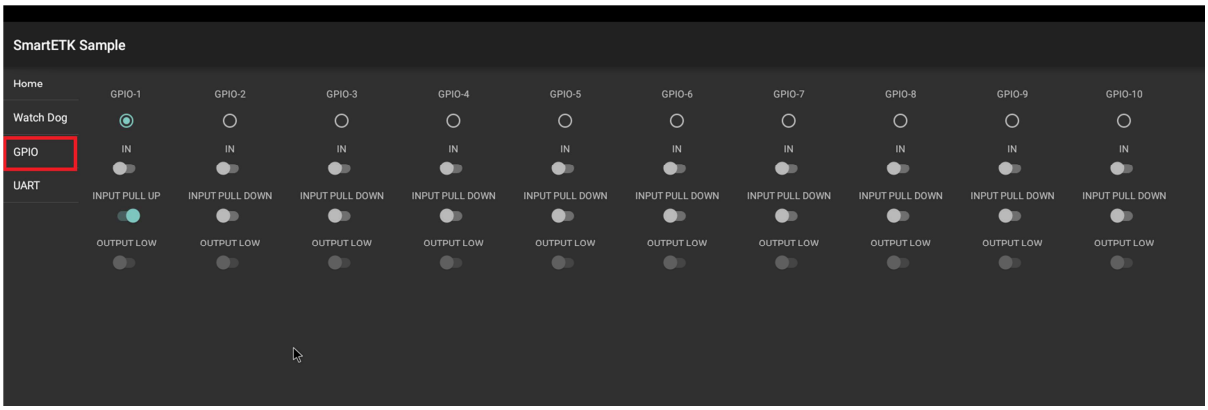
The DIO port on the VAB-630 board consists of 15 pins. Pins 1~7 and 10~12 are the active pins. The following section explains setting up these pins for input/output communication.



DIO port diagram

Pin	Signal	Smart ETK
1	GPIO-1	GPIO1
2	GPIO-2	GPIO2
3	GPIO-3	GPIO3
4	GPIO-5	GPIO4
5	GPIO-6	GPIO5
6	GPIO-7	GPIO6
7	GPIO-8	GPIO7
8	GND	GND
9	NC	NC
10	GPIO-12	GPIO8
11	GPIO-13	GPIO9
12	GPIO-14	GPIO10
13	VO_33	VO_33
14	VO_33	VO_33
15	GND	GND

DIO port default pinout with Smart ETK pinout



Smart ETK GPIO interface

First, please open the Smart ETK sample program, then from the left side select GPIO. In the demo program, pins 1~10 have been set as programmable GPIO pins.

The toggles under each pin can be used to set the desired configuration.
IN/OUT: Sets whether the pin is defined as input (IN) or output (OUT).

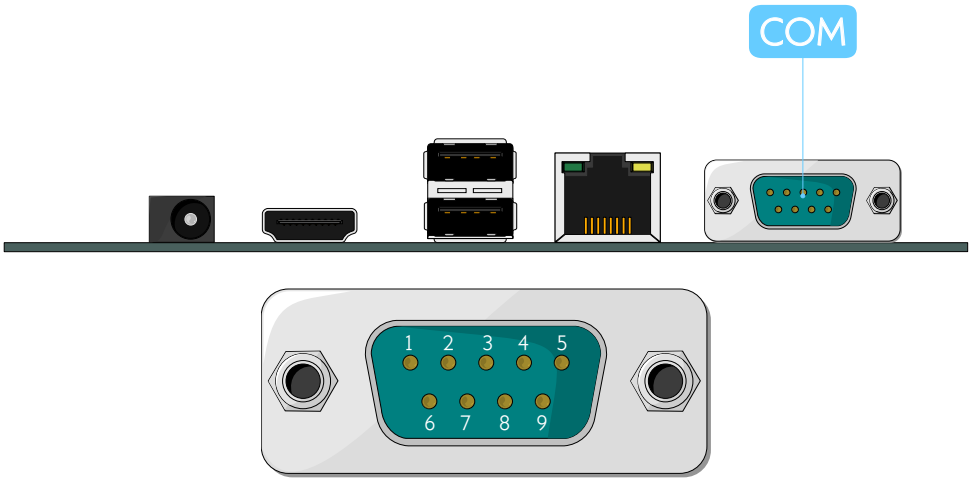
If you set the GPIO pin as an input (IN), you can then set whether the input voltage is high or low with the INPUT PULL UP/DOWN toggle.
INPUT PULL UP: the input voltage is high.
INPUT PULL DOWN: the input voltage is low.

If you set the GPIO pin as an output (OUT), you can then set whether the output voltage is high or low with the OUTPUT LOW/HIGH toggle.
OUTPUT LOW: the output voltage is low.
OUTPUT HIGH: the output voltage is high.

3.3.4. Testing UART Function

The VIA Smart ETK UART function supports TX/RX communication with other devices. The COM port of the VAB-630 board supports RS-232 mode.

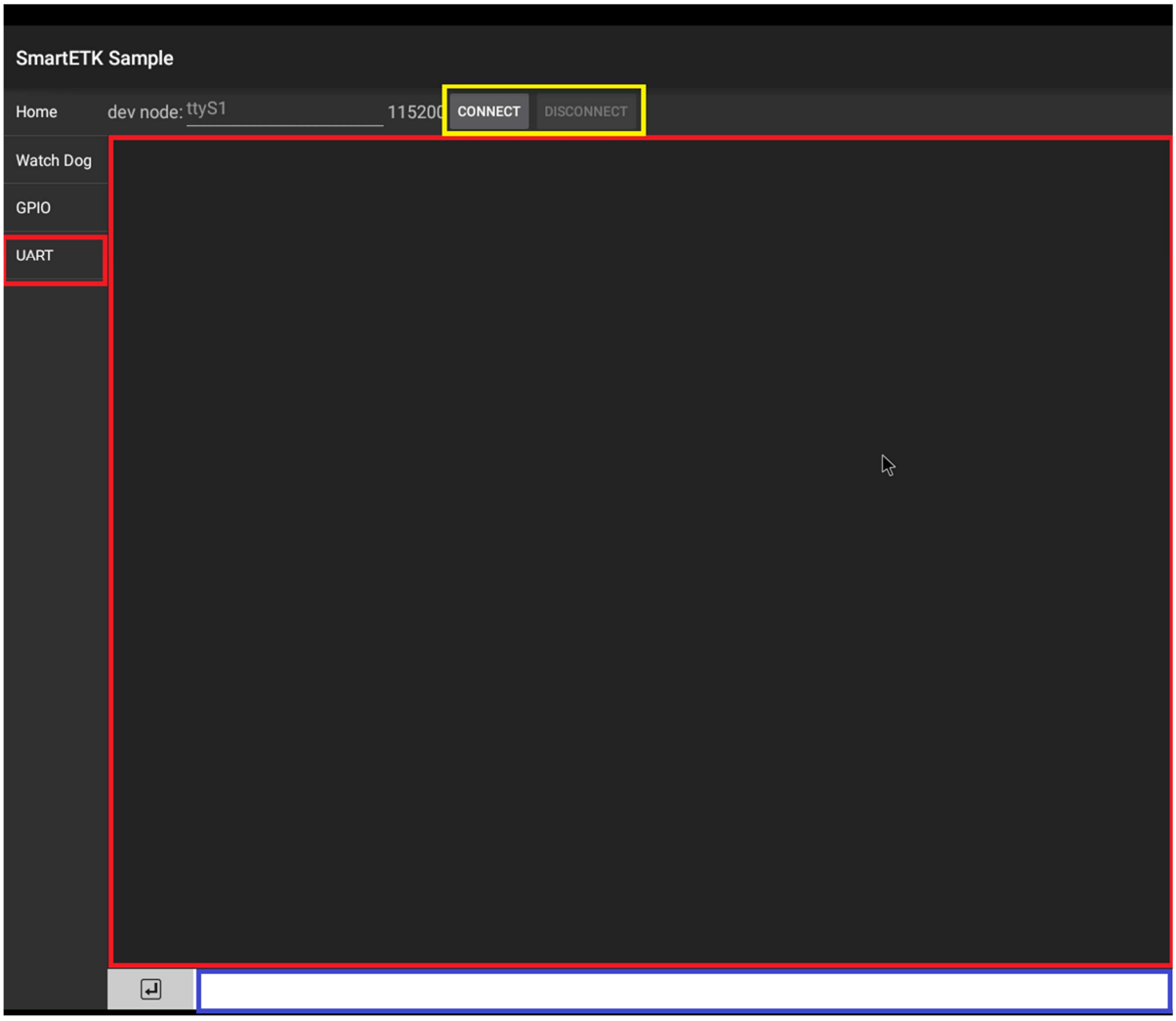
The first step is to connect the host machine to the COM port on the VAB-630 using an RS-232 cable. Next on the host machine start a serial communication program such as Putty, GtkTerm or Minicom with the same serial port setting using the appropriate serial device.



COM port diagram

Pin	Signal
1	NC
2	IC_RXD1
3	IC_RXD1
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

COM port pinout



Smart ETK UART interface

First, please open the Smart ETK sample program, then from the left side select UART.

To begin, click the **CONNECT** button to enable the COM port, and then a communication between the host machine and VAB-630 will start.

When the host machine transfers data to the VAB-630, the data will be displayed inside the red frame.

To send data from host machine to VAB-630, you need to type the data inside the white frame and click the Enter button.

Click on the **DISCONNECT** button to disable this function.

4. Accessories

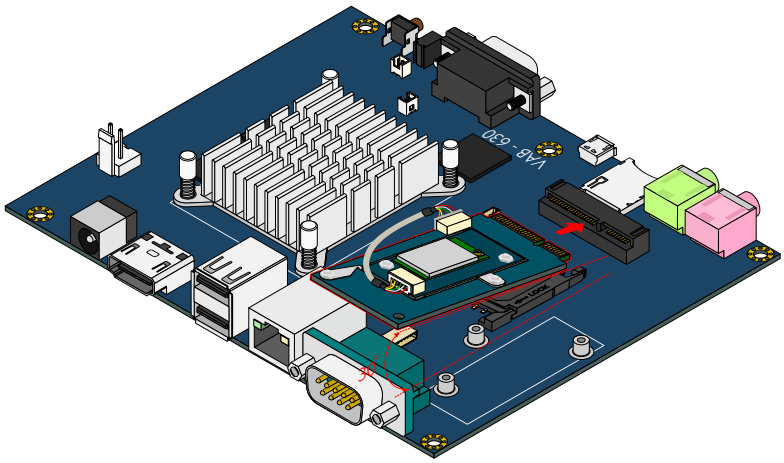
This section explains how to install and configure the various EMIO wireless modules available for the VAB-630 board.

4.1. Configuring the EMIO-2531 miniPCIe / EMIO-5531 USB Wi-Fi & Bluetooth Module

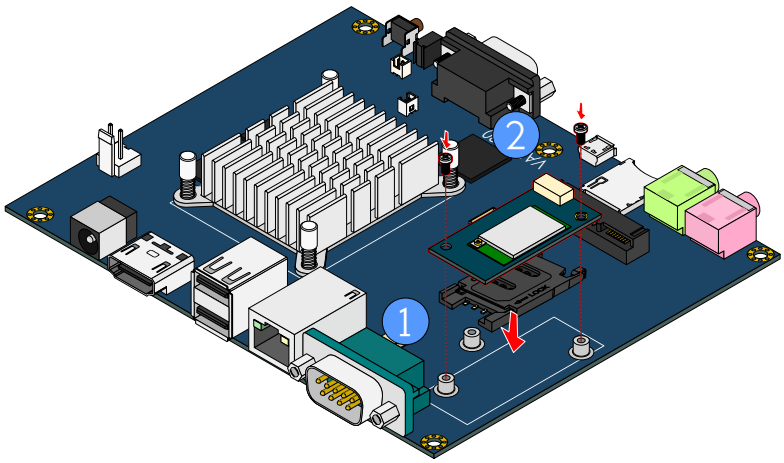
The EMIO-2531 miniPCIe Wi-Fi & Bluetooth module and EMIO-5531 USB Wi-Fi & Bluetooth module support Wi-Fi and Bluetooth functions.

4.1.1. Connecting to the Internet

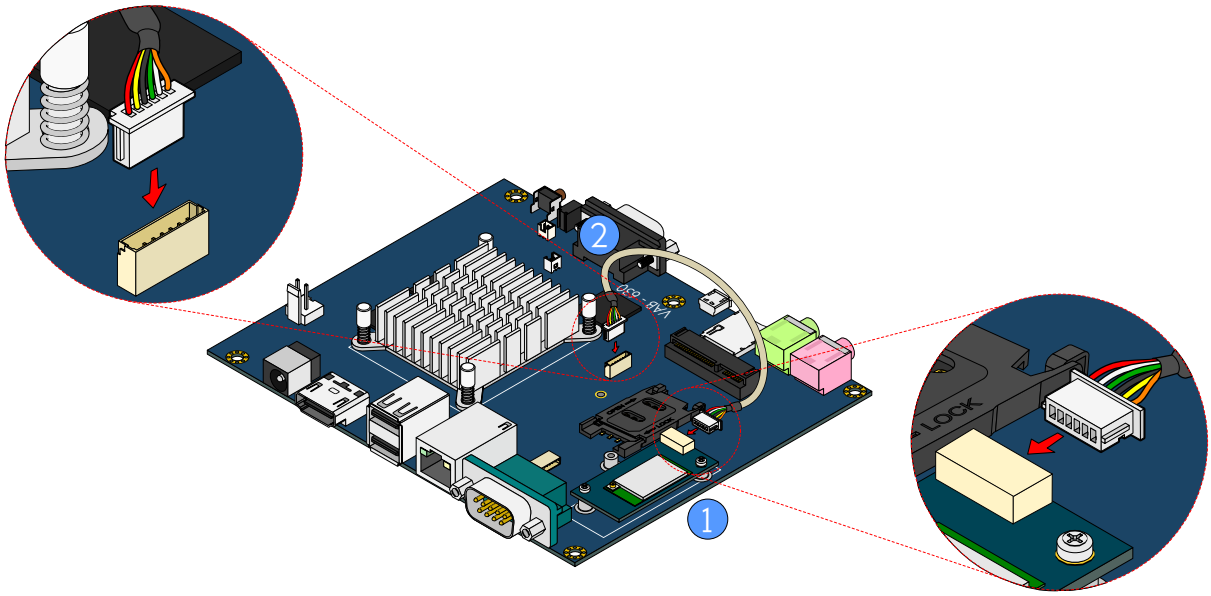
The first step is to insert the EMIO-2531 module into the miniPCIe slot or connect the EMIO-5531 module to the onboard USB pin header (JUSB1) using the USB cable (P/N: 99G3-190042). After installing either module, connect the provided antenna to the module. Next, make sure to unplug any LAN cables or other Wi-Fi/3G modules you have installed. Finally, power on the VAB-630.



Inserting the EMIO-2531 module

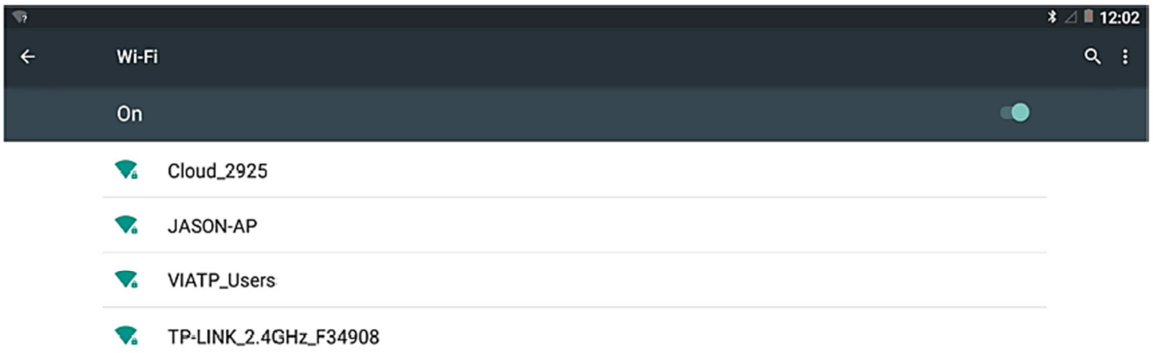


Inserting the EMIO-5531 module



Connecting the USB Wi-Fi & Bluetooth cable

To enable Wi-Fi, go to Settings -> Wi-Fi-> On.



A list of available Wi-Fi connection will appear on the screen. Select the appropriate device to complete the Wi-Fi connection.

When the connection is created, connect to the internet through your web browser.

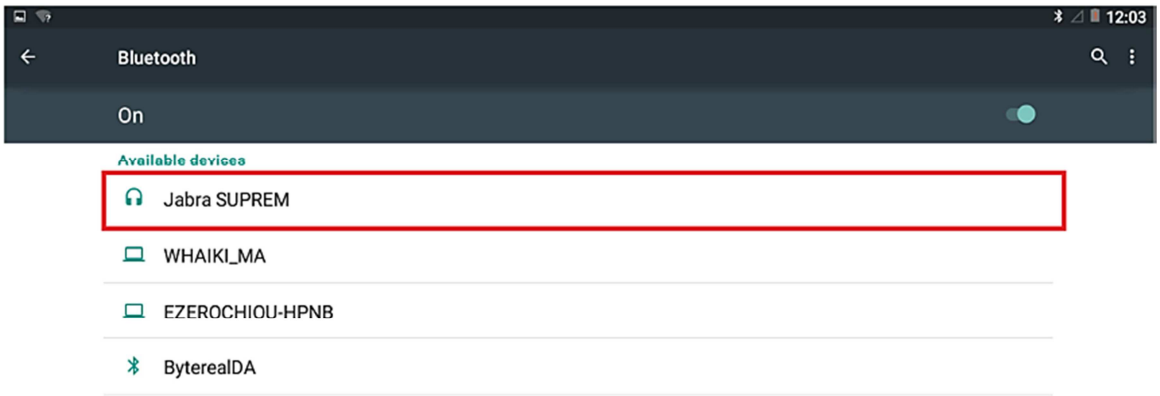
4.1.2. Enabling Bluetooth

The following sections show how to enable the Bluetooth Advanced Audio Distribution Profile (A2DP) to allow audio playback through a connected Bluetooth device as well as how to configure the Bluetooth Serial Port Profile (SPP).

4.1.2.1. Setting Up Bluetooth A2DP Profile

First, put the accessory you want to use into discovery mode. The exact way to do this depends on the accessory. If you have a headset, you may need to hold a button down on the headset for several seconds until a light starts flashing. It will only stay discoverable for a few minutes.

If you are not sure how to put your accessory into discovery mode, please refer to its manual, check the manufacturer's website, or perform a web search for instructions. To enable the Bluetooth A2DP function, go to Settings -> Bluetooth and set the switch to On to enable the Bluetooth function.



A list of local devices will appear on the screen, select the appropriate device to complete the Bluetooth paring.

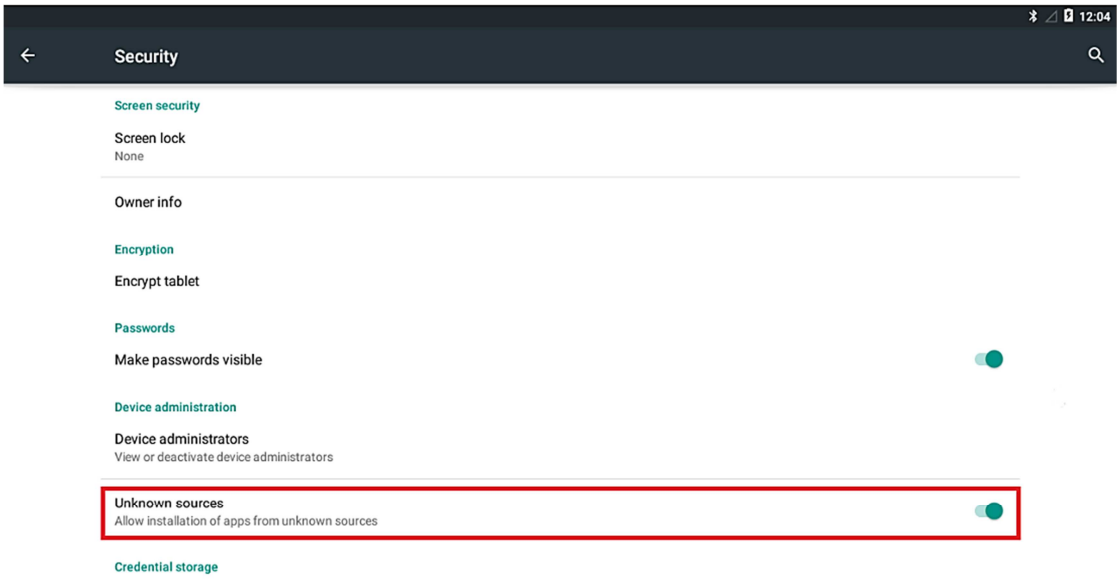
4.1.2.2. Setting Up Bluetooth SPP Profile

The VAB-630 implements the Bluetooth Serial Port Profile allowing serial port communication between two Android devices.

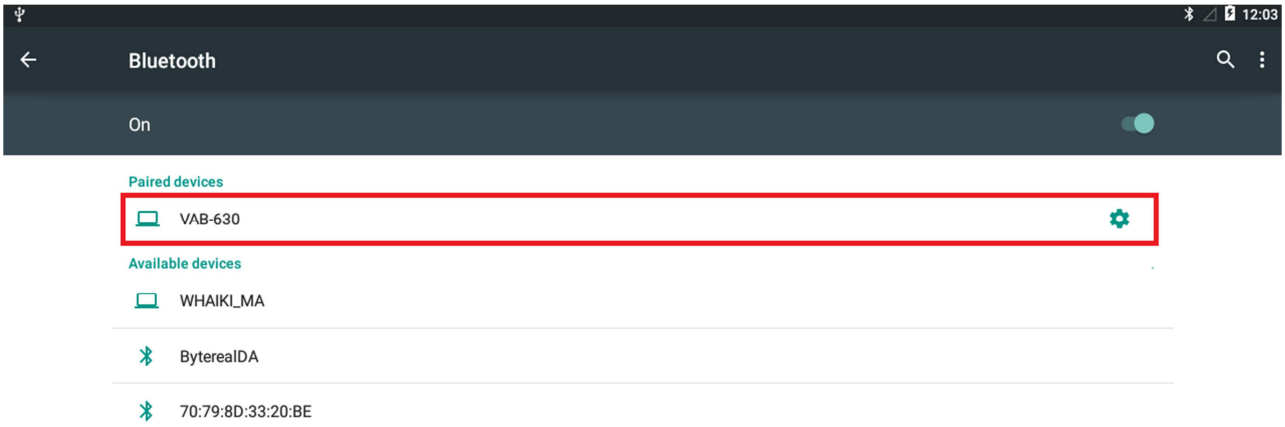
Included in the VAB-630 Tools folder is the BluetoothSPPTest.apk which is a simple communication application which utilizes the Bluetooth SPP Profile to transmit and receive data between two paired Android devices.

The following example will demonstrate how to use the BluetoothSPPTest.apk to communicate over the Bluetooth SPP Profile between two VAB-630 boards.

First, the **BluetoothSPPTest.apk** must be installed onto each VAB-630 board. From the Settings screen, click Security -> and then switch on the "Unknown sources" and allow the installation of non-Market apps. Next, copy the **BluetoothSPPTest.apk** onto a mass storage device, such as USB thumb drive, and install the **BluetoothSPPTest.apk** onto both VAB-630 boards.



After the installation process has completed, go to Settings -> Bluetooth -> On to enable the Bluetooth function on both VAB-630 systems. A list of local devices will then appear on each screen. From both screens, select the VAB-630 system from the list to complete the pairing process as seen in the figure below.

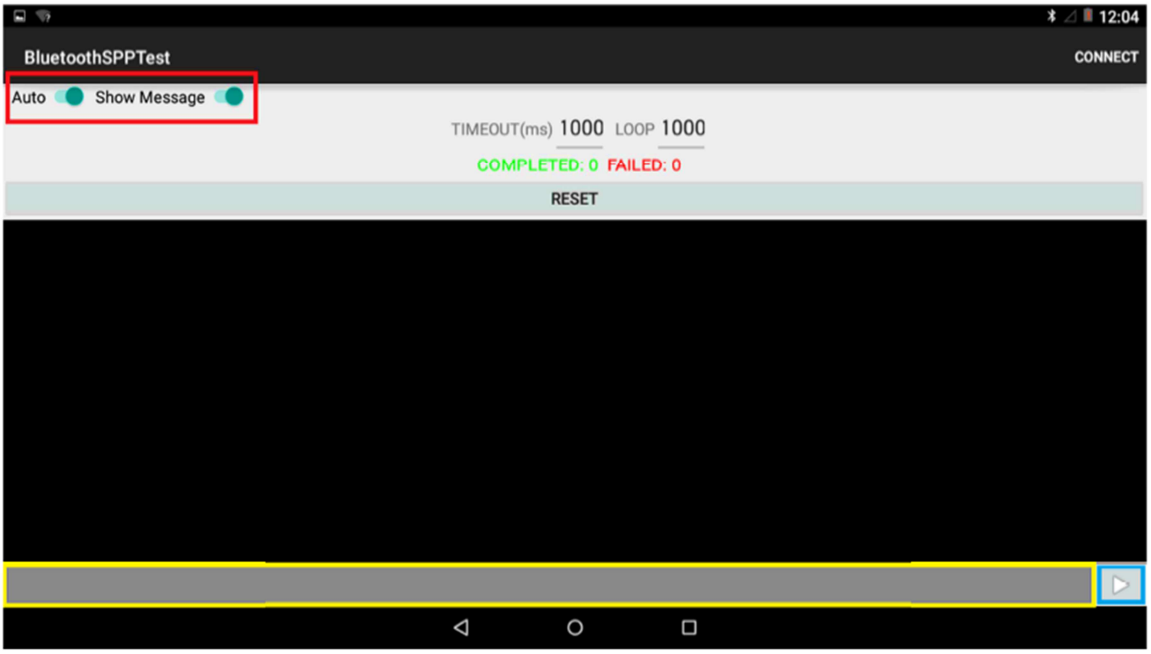


After the devices have paired, open the **BluetoothSPPTest.apk** on both VAB-630 systems and configure the settings as follows in both apps.

"Auto" – enabled

"Show Message" – enabled

Select **CONNECT** from either VAB-630 boards to create the connection between the two. Both VAB-630 boards can communicate over the Bluetooth SPP Protocol.



BluetoothSPPTest interface

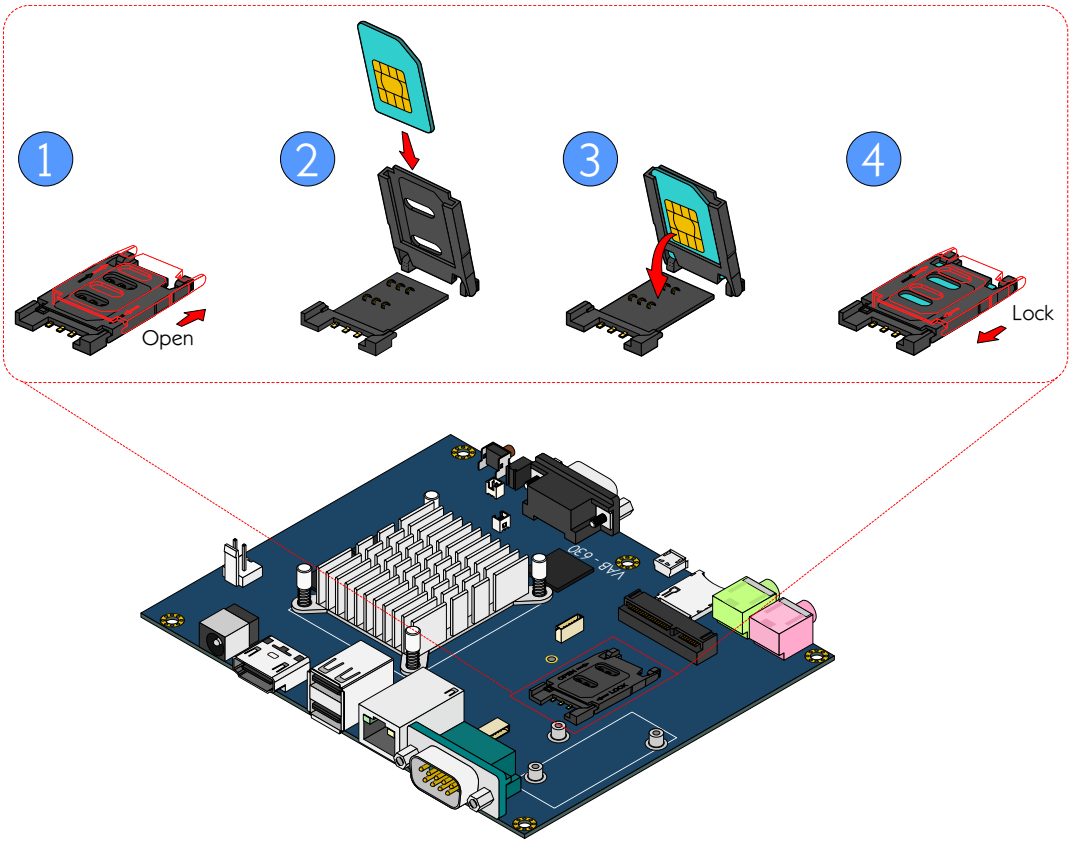
Type the data inside the yellow frame and click the blue frame to send the data through either VAB-630 boards, this data will be shown on the other VAB-630 board.

4.2. Configuring the EMIO-2550 miniPCIe Mobile Broadband Module

The EMIO-2550 miniPCIe Mobile Broadband module supports 3G function.

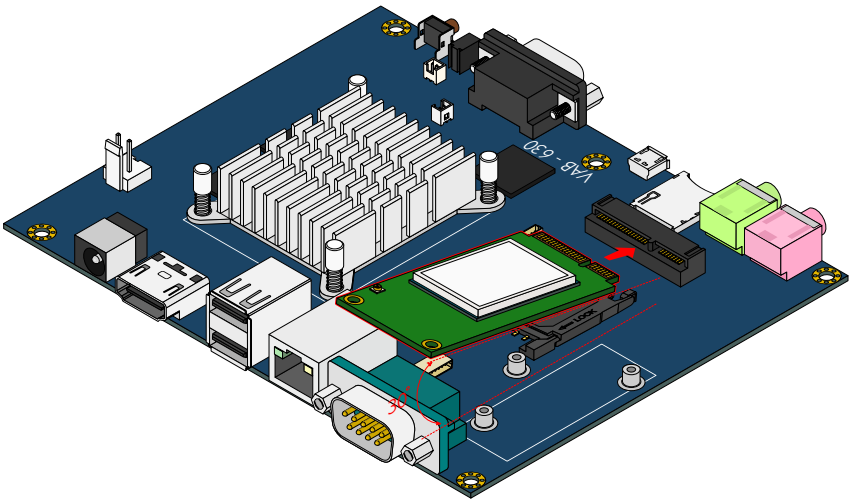
4.2.1. Connecting to the Internet

The first step is to insert an active SIM card into the SIM card slot on the VAB-630 board, then insert the EMIO-2550 module into the miniPCIe slot. After installing the module connect the provided antenna to the module. Next, make sure to unplug any LAN cables or USB Wi-Fi dongles you have installed. Finally, power on the VAB-630 board.



Inserting the SIM card

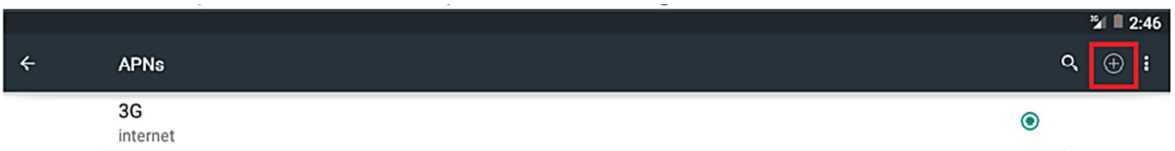
Next, insert the EMIO-2550 module into the miniPCIe slot. Finally, power on the VAB-630.



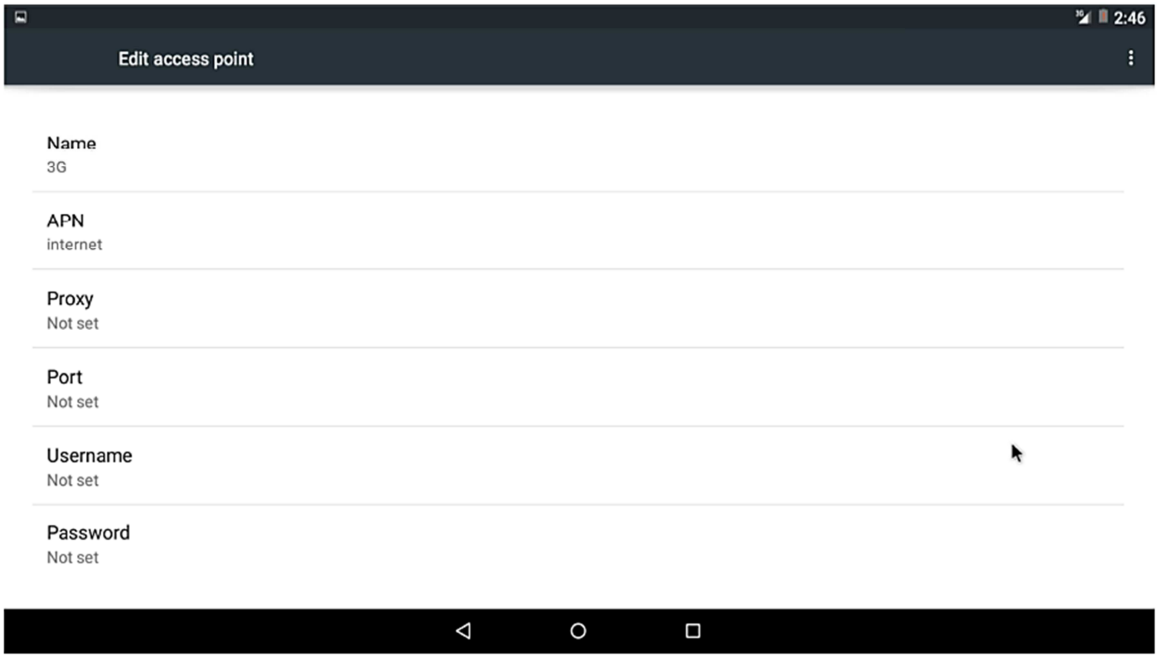
Inserting the EMIO-2550 module

4.2.2. Enabling 3G

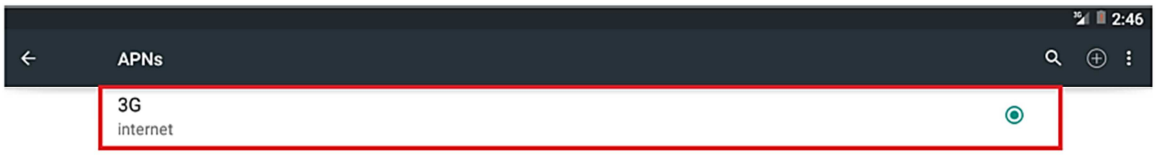
To enable 3G, go to Settings->Wireless & networks-> More -> Cellular network ->Access Point Names. Next, click the plus button to add your APNs setting.



Fill in the required fields to register your APN settings. If you are unsure of which fields and values are required, please check with your Mobile Broadband provider.



When the APN setting is complete, click your APNs to enable the 3G network. Next, open the browser to connect to the Internet.



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