



LinkIt 7697 HDK v1.0 User's Guide

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Document Revision History

Revision	Date	Description
1.0	5 May 2017	Initial release

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1. Introduction

1.1. Overview

MediaTek LinkIt™ 7697 hardware development kit (HDK) is part of LinkIt development platform for RTOS and is based on a highly integrated MediaTek MT7697 SOC with an application processor, a low power 1x1 11n single-band Wi-Fi subsystem, a Bluetooth Low Energy subsystem and a Power Management Unit. The application processor subsystem contains ARM Cortex-M4 with floating point unit microprocessor.

The HDK supports peripherals, including UART, I2C, SPI, I2S, PWM, IrDA and auxiliary ADC. It also includes an embedded SRAM/ROM. The Wi-Fi subsystem contains 802.11b/g/n radio, baseband and MAC that are designed to meet both the low power and high throughput application requirements. It runs on a 32-bit RISC CPU that could fully offload the application processor. The Bluetooth Low Energy subsystem contains the Bluetooth radio, baseband and link controller and uses the same 32-bit RISC CPU for the Bluetooth protocols. The LinkIt 7697 HDK is shown in Figure 1.

The main features of this HDK are:

- Breadboard compatible form factor. Developers can use breadboards to connect peripherals with this HDK conveniently to build their applications.
- Auxiliary LED and buttons to reset the board and to program a user-defined functionality.
- An on-board USB-to-UART conversion chip to access logs and conveniently update the firmware.
- Serial Wire Debug (SWD) interface.
- [mt76x7-uploader tool](#), enables the HDK to switch between flash normal mode and recovery mode automatically without user intervention.
- Developers can program the board with the native LinkIt SDK using GCC, IAR embedded workbench, or Keil µVision IDE. Development with Arduino IDE is also supported.

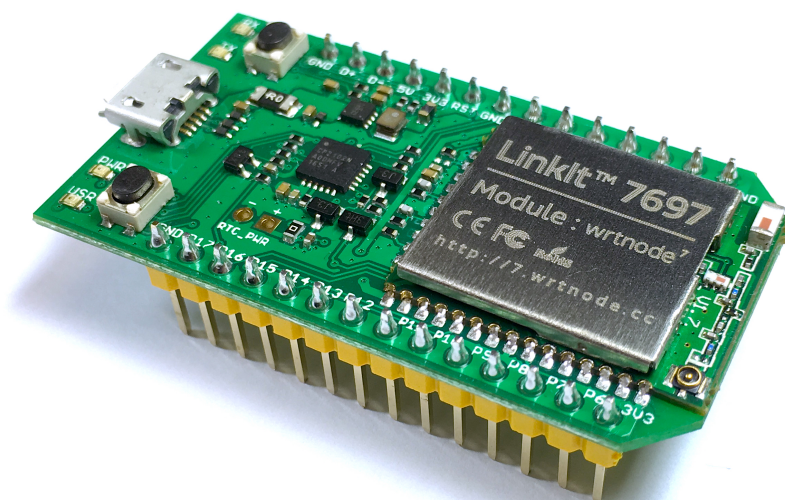


Figure 1. LinkIt 7697 HDK v1.0

2. Get Started with the HDK

This section covers the HDK configuration, driver installation and the update flow for the flash storage.

2.1. Board configuration

The interfaces and modules are shown in Figure 2.

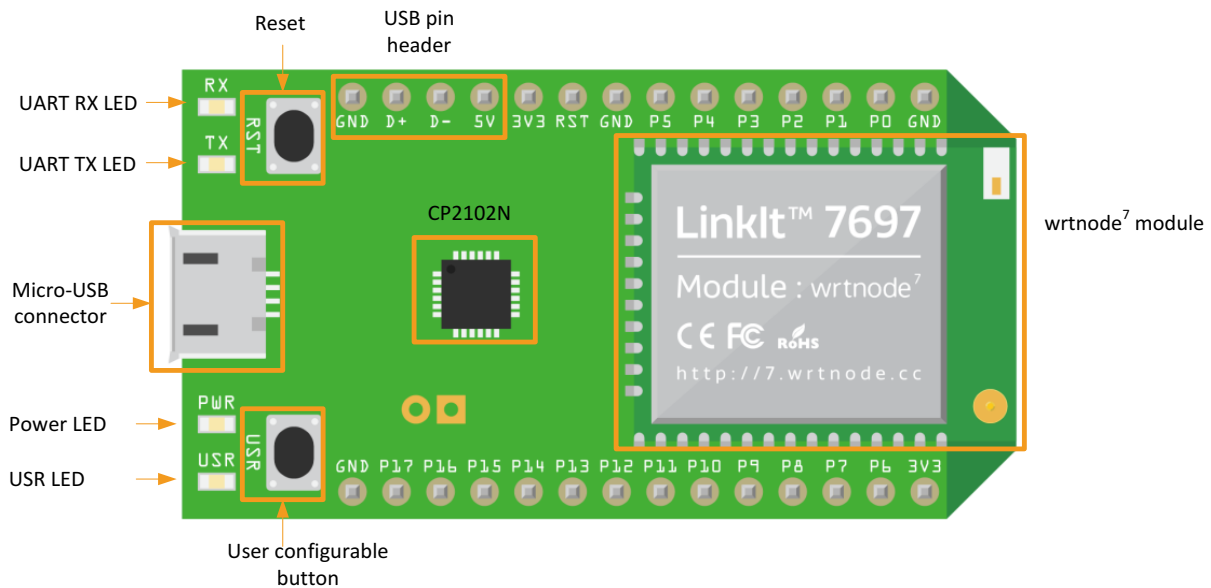


Figure 2. Front view of the HDK (created in Fritzing)

- **wrtnode⁷ Wi-Fi and Bluetooth LE module:** It equips the MT7697 Wi-Fi / BLE SOC and is ready to use with an on-board antenna and an I-PEX connector. Moreover, a 4MB flash is also included in this module.
- **CP2102N:** A USB-to-UART bridge chipset made by [Silicon Labs](#). It's used during flash update process with the [mt76x7-uploader tool](#) and to switch between the flash normal mode and the flash recovery mode, automatically.
- **Micro-USB connector:** Serves as a 5V power source to the HDK. Connect the HDK to a computer that has the CP2102N driver installed, to get UART messages (from UART0 on MT7697) using a terminal program.
- **RX / TX LEDs:** LEDs used to indicate the transmission states of the UART port (UART0).
- **PWR LED:** This LED will light on while connecting to a power source.
- **USR LED:** An LED used for user-defined behavior. It's controlled by P7 pin (GPIO36).
- **RST button:** Resets the chipset and is connected to the RST pin. While it's pressed, it will be linked to the GND.
- **USR button:** A button used for user-defined behavior. It's connected to P6 pin (GPIO37). When it's pressed, it will be linked to the 3V3 source.
- **USB pin header:** It provides the same functionality as the micro-USB connector but in the form of pin headers.
- **MT7697 bootstrap pins:** All MT7697 bootstrap pins except **GPIO37** (used for Flash Access Mode control) are hidden from this HDK and not accessible through breakout headers. The Flash Access Mode has to two

configurations; normal mode and recovery mode. To set the HDK to Flash Recovery mode, use the **USR** button to pull up GPIO37. For more details, see section 2.3, "Updating the flash". Note, that since GPIO37 is in the breakout header, if there is an external component connected to P6 (where GPIO37 is), the voltage level of that component might affect the boot-up sequence. Ensure P6 is clear or pulled low when the system powers on.

- If there is no 5V power source, this HDK can also work with 3.3V by simply connecting the 3V3 pin to a 3.3V power source.

2.2. Installing the driver for Windows

LinkIt 7697 HDK connects to your computer through the COM port interface. The COM port interface is provided by the on-board CP2102N USB-to-UART bridge chipset, which then connects to the UART0 port of the MT7697 chipset. The UART0 port can be used to program the flash memory attached to the MT7697 chipset. It can also be used as a communication channel for your application through terminal emulator program of your choice.

The block diagram for the communication is shown in

Figure 3:

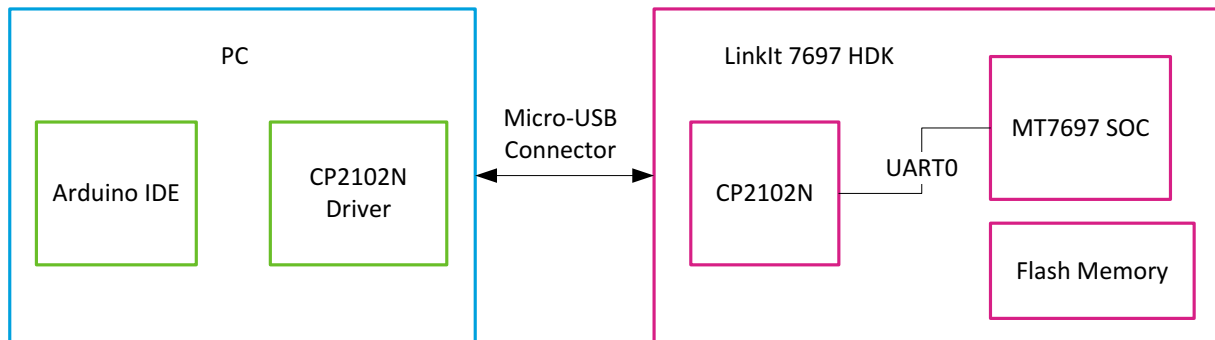


Figure 3. Communication between PC and the HDK

Since the board relies on CP2102N to provide the COM port functionality, you'll need to install a driver so that your computer can recognize it. And because the board uses the default USB VID and PID of the CP2102N, it's required to install [the official CP2102N driver](#) from the vendor's website.

After choosing the **Download VCP** option according to your operating system version and finishing the driver installation, use a micro-USB cable to connect the board to your computer. The onboard PWR LED should light up. Follow the steps below to confirm the driver is properly installed:

- Open **Device Manager** from the control panel.
- In the **Ports (COM & LPT)** section, an item named **Silicon Labs CP210x USB to UART Bridge (COMnnn)** should appear. The port number can be different on each computer. This is the COM port you'll be using to program and interact with the LinkIt 7697 HDK (see Figure 4).

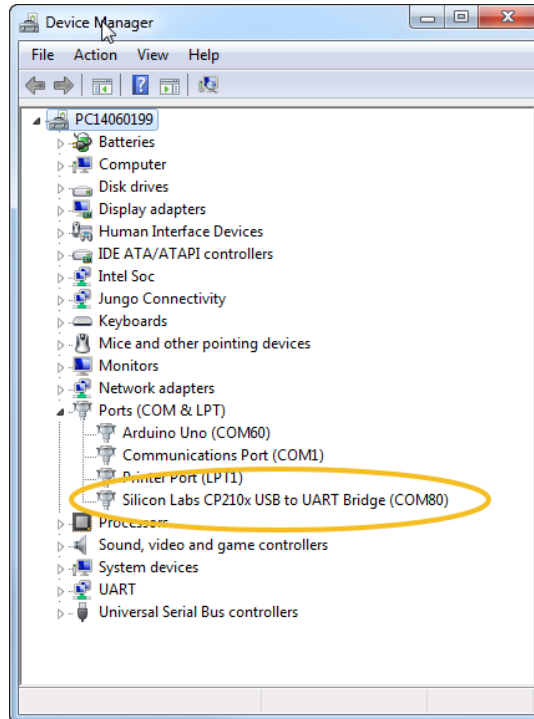


Figure 4. The COM port allocation for LinkIt 7697 HDK

2.3. Updating the flash

There are two tools provided for programming the flash storage:

- 1) The Flash tool inside the LinkIt SDK. It's a Windows execution program providing the functionality to program and format the flash storage, see section 2.2.4.1, "Using the Flash Tool" of the LinkIt for RTOS development platform get started guide, for more details about using the Flash tool.
- 2) The [mt76x7-uploader](#) on MediaTek Labs' GitHub page. It's a Python script providing cross-platform implementation for the flash storage. For its usage guide, refer to the readme [on the project page](#).

Select the tool based on your development requirements (see Table 1).

Table 1. Comparison between Flash tool and mt76x7-uploader

	Supported OS	Recovery mode switching	Flash contents read-back	Format the flash storage	Where to get
Flash Tool	Windows	Manual	Supported	Supported	LinkIt SDK package
mt76x7-uploader	Windows, Linux, macOS	Automatic	N/A	N/A	MediaTek Labs' GitHub page

One thing to be noted is that when using the Flash tool, switch the board into the Flash Recovery mode for the tool to operate properly.

To switch the board into the Flash recovery mode:

- 1) Connect the board to a power source.
- 2) Press and hold the **USR** button.

- 3) Click (press and release) the **RST** button.
- 4) Wait for 1 second and then release the **USR** button.

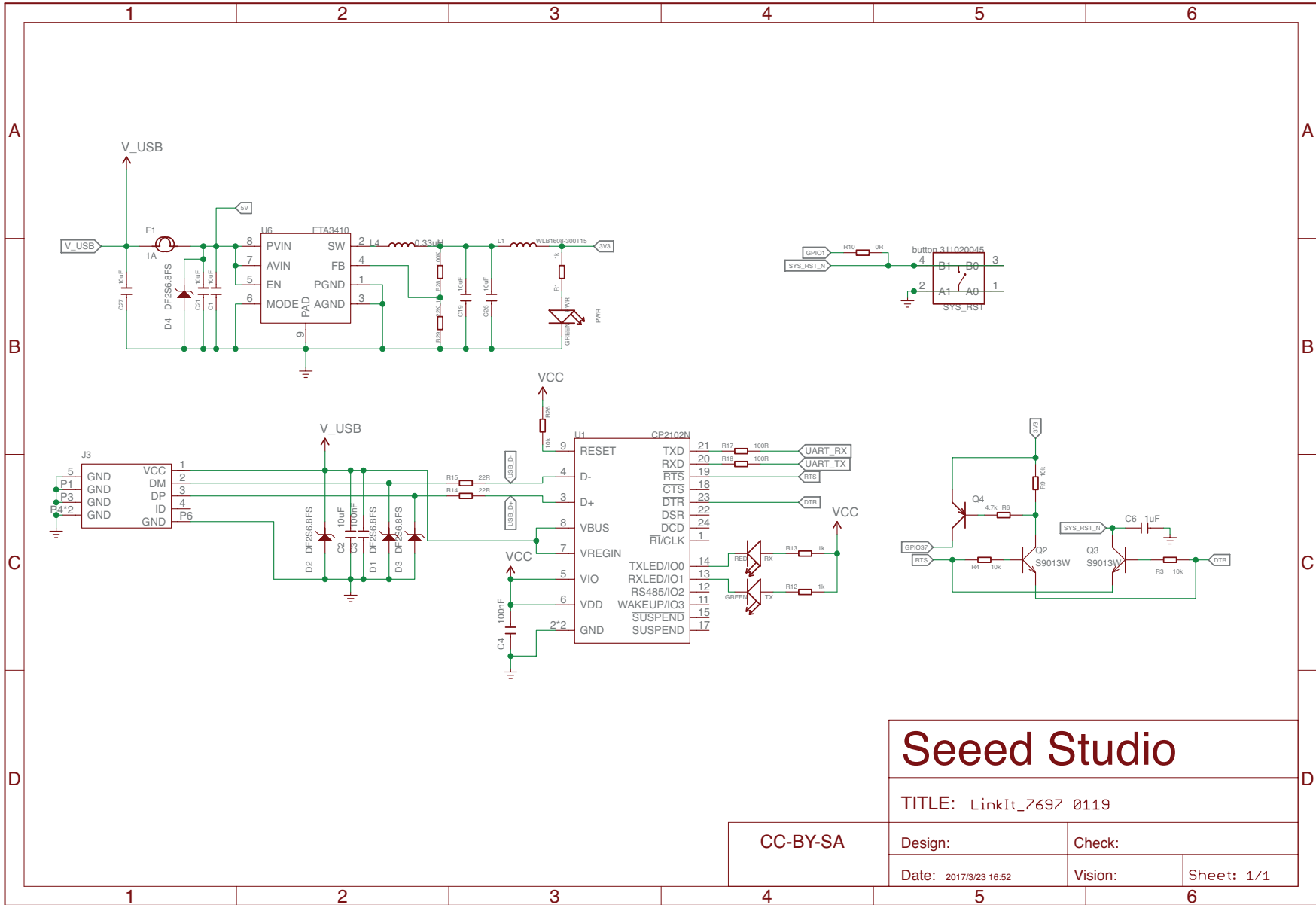
After step 4, the board will go into the **Flash Recovery mode** and you can then use the Flash tool or the QA tool with it.

If you choose the **mt76x7-uploader** to update the flash, the tool itself will handle the flash mode switch automatically without user intervention.

3. Hardware Features

This section lists the LinkIt 7697 HDK features. For more detailed specification of MT7697, please refer to the MT7697 datasheet.

- 192MHz ARM Cortex-M4 CPU with FPU support.
- 352KB RAM.
- 4MB Flash storage.
- 802.11 b/g/n 2.4GHz Wi-Fi.
- Bluetooth Low Energy support.
- On-board chip antenna.
- I-PEX connector provided.
- CP2102N USB-to-UART convertor.
- Passed FCC / CE certifications.
- Support two operational power voltages: 5V and 3.3V.
- Pin headers for 5V / 3.3V / GND / Reset / GPIO (**18**) / PWM (**18**) / UART (**2 sets**) / IR (**1 set**) / EINT (**4**) / I2S (**1 set**) / I2C (**1 set**) / SPI (**1 set**) / ADC (**4**) and USB UART (**1 set**).
- Two buttons are provided. The **RST** button (connected to the **RST** pin) and the **USR** button (connected to the **P6/GPIO37**).
- Four LEDs are provided. One is for the power indicator and one is for the user-defined behavior (controlled by **P7/GPIO36**). The other two are used for indicating the TX / RX status of **UART0**.
- Breadboard compatible form factor for the pin pitch (2.54mm).

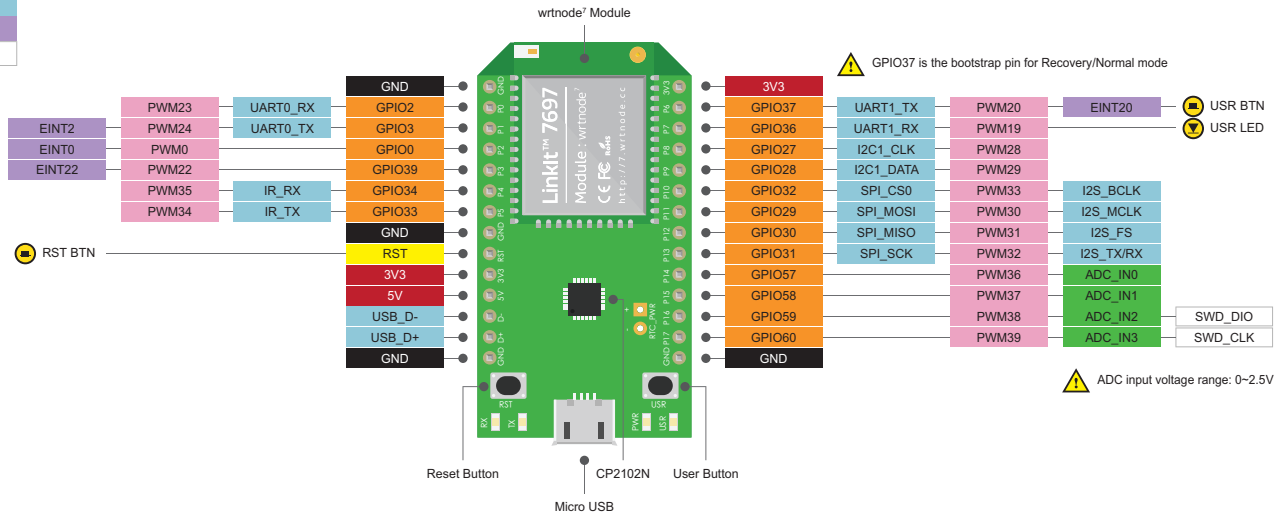


5. Pin-Out Diagram

LinkIt™ 7697



GND
POWER
CONTROL
DIGITAL
ANALOG
PWM
SERIAL
INTERRUPT
DEBUG



Module	wrtnode™ by WRTnode
MCU	ARM Cortex-M4 with FPU 192Mhz
RAM	352 KB
Flash	4 MB
Wi-Fi	802.11 b/g/n (2.4G)
Bluetooth	4.2 LE