LinkIt Smart 7688

From Wiki 来自痴汉的爱

LinkIt[TM] Smart 7688 (a compact controller
board) is an open development board, based
on the OpenWrt Linux distribution and
MT7688 (datasheet

(http://www.seeedstudio.com/wiki/images/9/90/MT7688_datasheet.pdf)). The board is designed especially for the
prototyping of Rich Application IoT devices for Smart-Home[1]. The board offers sufficient memory and storage to
enable robust video processing. The platform also offers options to create device applications in Python, Node.js
and C programming languages.

[1]This board is only a part of MediaTek LinkIt[TM] Smart 7688 platform which includes other development boards.

Note: This page only guides you to get started with this development board. For a complete guide, please refer to
Resources (http://www.seeedstudio.com/wiki/LinkIt_Smart_7688#Resources) .

Get One Now

Contents

Features

- Single input single output (1T1R) Wi-Fi 802.11 b/g/n.
- Pin-out for GPIO, I^{2}C, I^{2}S, SPI, UART, PWM and Ethernet Port.
- 580 MHz MIPS CPU.
- 32MB Flash and 128MB DDR2 RAM.
- USB host.
- Micro SD slot.

Application ideas

- Rich application IoT Devices for Smart-Home
- Robotics

Specification

Category	Feature	Specification
MPU	Chipset	MT7688AN
	Core	MIPS24KEc
	Clock speed	580MHz
	Working voltage	3.3V
PCB Size	Dimensions	55.7 x 26 mm
Memory	Flash	32MB
	RAM	128MB DDR2
Power Source	USB Power	5V (USB micro-B)
	VCC	3.3V (Pin Breakout)
GPIO	Pin Count	22 (MT7688AN)
	Voltage	3.3V
PWM	Pin Count	4 (MT7688AN)
	Voltage	3.3V
	Max. Resolution	7 bits (customizable)
	Maximum Frequency@Resolution	100kHz@1-bit, 50kHz@2-bit, 25kHz@3-bit, 12.5kHz@4-bit, 6.25kHz@5-bit, 3.125kHz@6-bit, 1.5625kHz@7-bit (Standard mode)
		40MHz@1-bit, 20MHz@2-bit, 10MHz@3-bit, 5MHz@4-bit, 2.5MHz@5-bit, 1.25Mhz@6-bit, 625kHz@7-bit (Fast mode)
External Interrupts	Pin Count	22 (MT7688AN)
SPI	Set count	1 (MT7688AN)
	Pin numbers	P22, P23, P24 (Shared with on-board flash), P25
	Max. Speed	25 MHz
SPI Slave	Set count	1 (MT7688AN)
	Pin numbers	P28, P29, P30, P31
	Max. Speed	25 MHz
I^{2}S	Set count	1 (MT7688AN)
	Pin numbers	P10, P11, P12, P13
I^{2}C	Set count	1
	Pin numbers	P20, P21
	Speed	120K/400K
UART Lite	Set count	3 (MT7688AN)
	Pin numbers	P8, P9, P16, P17, P18, P19
	Max. Speed	0.5Mbps
USB Host	Set count	1 (MT7688AN)
	Pin numbers	P6, P7

	Speed	Micro-AB
ICommunication	Wi-Fi	1T1R 802.11 b/g/n (2.4G)
	Ethernet	1-port 10/100 FE PHY
	Pin numbers	P2, P3, P4, P5
User Storage	SD Card	Micro SD SDXC

Hardware Overview
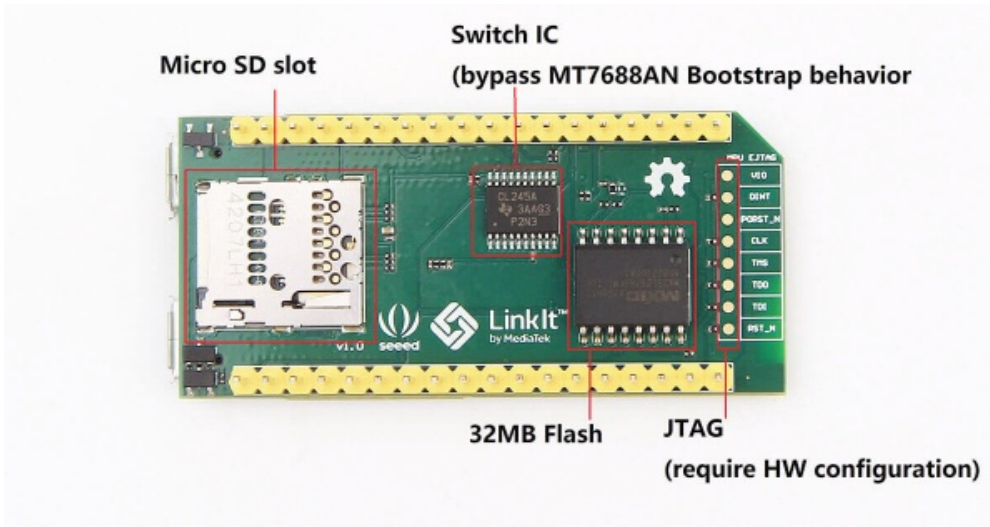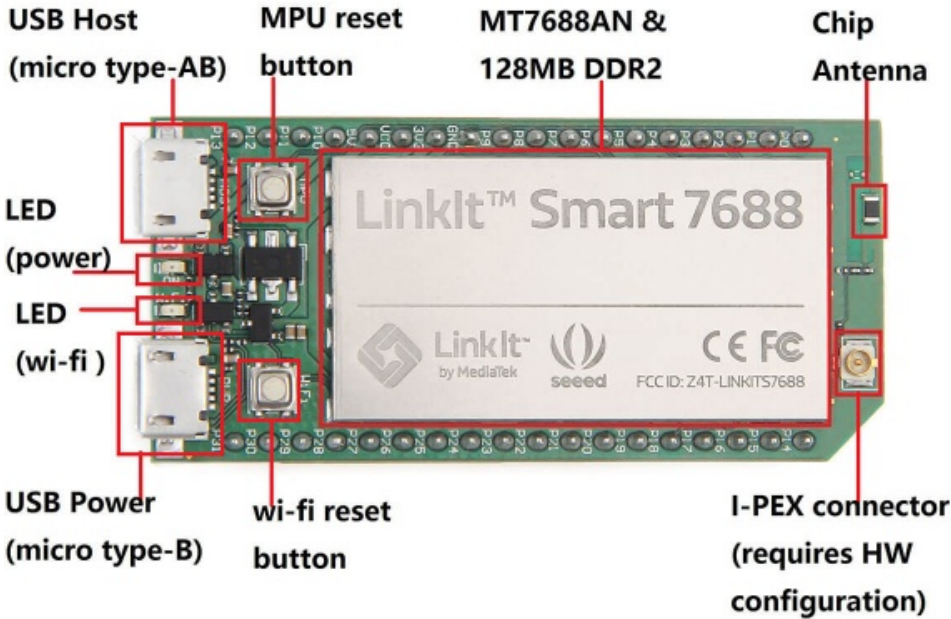
Parts list

Parts name	Quantity
LinkIt^{TM} Smart 7688	1PC
Manual	1PC

Getting Started

Connect to the embedded operating system

Note: There are two ways described in the manual. Here, we only show the advanced way (using a USB to Serial adapter) which seems a little harder. But, you will benefit a lot from it in the long run.

Materials required

- LinkIt Smart 7688 × 1
- USB cable (type A to micro type-B) × 2
- USB to Serial adapter× 1
- Jumper wires × 3

On Windows

1. Install PuTTY. PuTTY provides a system console environment using Secure Socket Shell (SSH) to access the development board's operating system.
2. Install Bonjour (https://support.apple.com/kb/DL999?viewlocale=en_US&locale=en_US) Print Service (For Windows 7, Windows 8, Windows 10)
3. Install driver. If you are using a USB cable based on FTDI chip, please download and install its driver from here (http://www.ftdichip.com/Drivers/VCP.htm) . If you are having problems with the latest driver, try installing an older version (http://www.ftdichip.com/Support/Documents/InstallGuides.htm) .
4. Next, connect the Serial to USB cable to LinkIt Smart 7688's pins as following table shows:

| Pin on USB adapter	Corresponding Pin to be connected on LinkIt Smart 7688
Pin RX	Pin 8
Pin TX	Pin 9
Pin GND	Pin GND
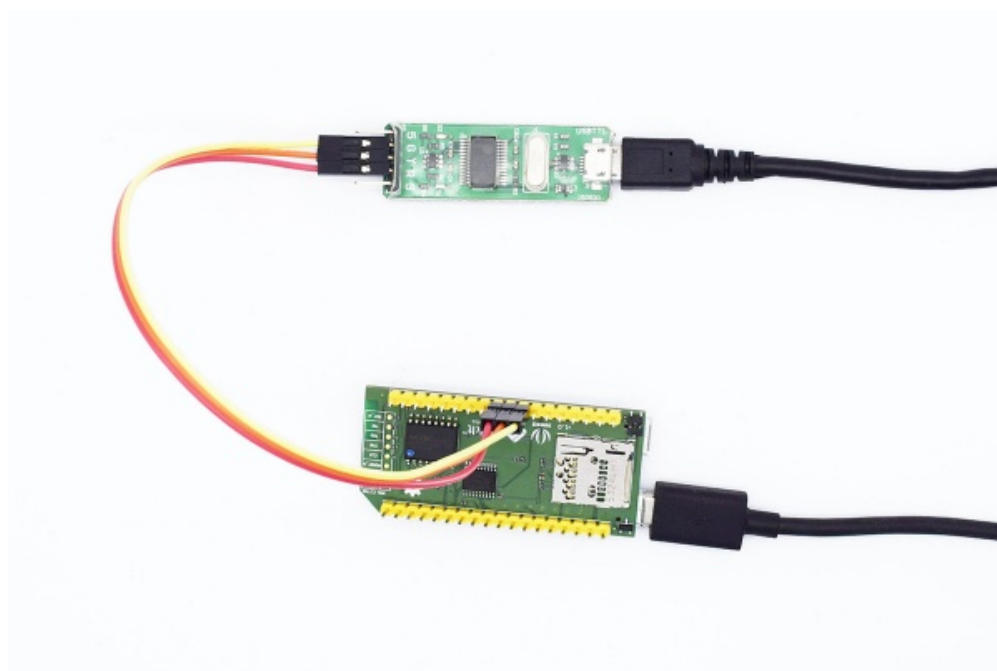
5. After connecting the Serial to USB cable, open the device manager and notice the COM port number as

shown below. This number may vary on different computers.
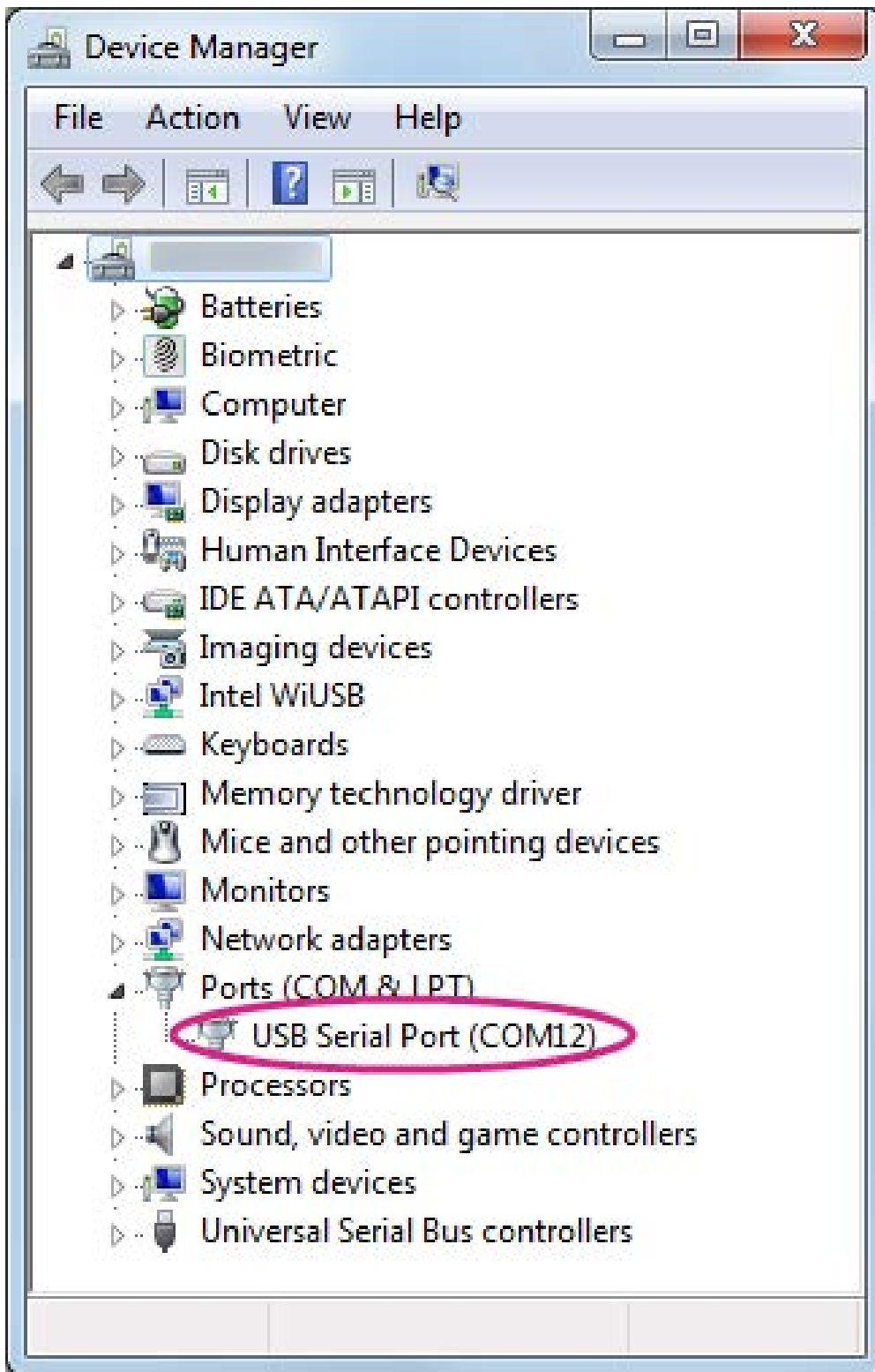
6. Launch the PuTTY terminal and enter the COM port number of the USB device found in the device manager, click on the Serial radio button, type 57600 in Speed box and click Open, as shown below.
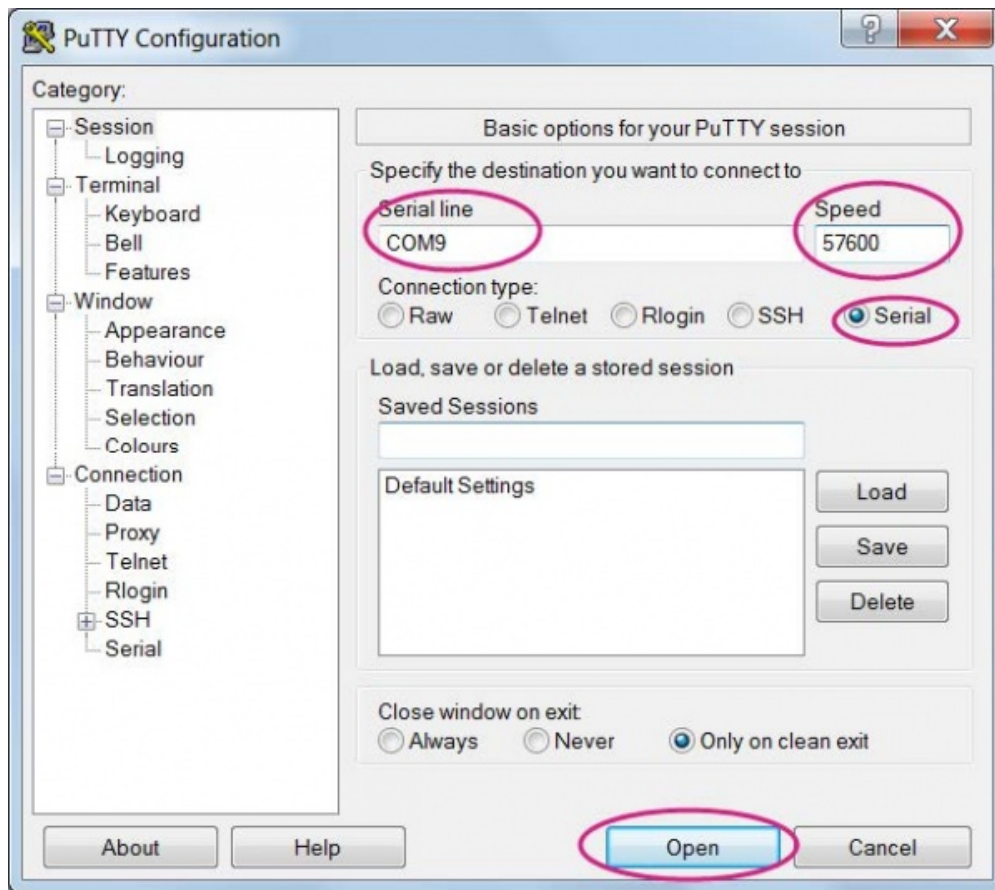
7. Now you will see printing text as those in a Linux console.

On Mac

1. Install the driver if needed. Check the cable manufacturer's website for driver requirements on Mac and installation instructions.
2. Plug-in the cable and connect the cable to LinkIt Smart 7688.
3. Open a **Terminal** session.
4. Type **ls /dev/cu*** in the Terminal. You should see a list of devices. Look for something like cu.usbserial-XXXXXXXX where XXXXXXXX is usually a random identifier. This is the serial device used to access the system console. For example:

```
$ls /dev/cu*
/dev/cu.Bluetooth-Incoming-Port
/dev/cu.Bluetooth-Modem
/dev/cu.pablop-WirelessiAP
/dev/cu.usbserial-A6YMCQBR
```

5. Use the **screen** utility to connect to the serial port and set the baudrate to **57600**. This is because the baudrate of the system console is 57600 by default. For example:

```
$screen /dev/cu.usbserial-XXXXXXXX 57600
```

6. Now you should be connected to the system console. Press **Enter** key in the Terminal to bring up the prompt. You will notice that the prompt has become a different regular application, it is the LinkIt Smart 7688 prompt and it looks like the following:

```
root@myLinkIt:/#
```

7. You are ready to make changes to the LinkIt Smart 7688 system through this console.

On Linux

1. Install the driver if needed. Check the cable manufacturer's website for driver requirements on Linux and installation instructions.
2. Plug-in the cable and connect the cable to LinkIt Smart 7688.
3. Open a Terminal session.
4. Type **ls /dev/ttyUSB*** in the Terminal. You should see a list of devices. Look for something like cu.usbserial-XXXXXXXX where XXXXXXXX is usually a random identifier. This is the serial device used to access the system console. For example:

```
$ls /dev/ttyUSB*
/dev/ttyUSB0
```

5. Use the **screen** utility to connect to the serial port and set the baudrate to **57600**. This is because the baudrate of the system console is 57600 by default. For example:

```
$sudo screen /dev/ttyUSB0 57600
```

6. Now you should be connected to the system console. Press ENTER in the Terminal to bring up the prompt. You'll notice that the prompt has become different from your OS X Terminal application, it is the LinkIt Smart 7688 prompt and it looks like the following:

```
root@myLinkIt:/#
```

7. You are ready to make changes to the LinkIt Smart 7688 system through this console.

Running the Blink example

Materials required

- LinkIt Smart 7688 × 1
- USB cable (type A to micro type-B) × 1
- USB to Serial adapter × 1
- Jumper wires × 3

Get Blink to work

1. Power up your board with a micro-USB cable (only connect the USB Power interface, not the USB Host interface).

2. Launch PuTTy and connect to the system with USB to Serial adapter as shown in the previous (http://www.seeedstudio.com/wiki/LinkIt_Smart_7688#Connect_to_the_embedded_operating_system) section.

3. Type **python /IoT/examples/blink-gpio44.py** and press **Enter** to run the Blink example.

4. Notice that the Wi-Fi LED blinks steadily.

5. In the system console, type CTRL + C, this will terminate the example.

Connect to the Internet (Switch to Station mode)

There are two Wi-Fi modes, i.e. AP mode and Station mode. Refer this (https://answers.yahoo.com/question/index?qid=20061207225409AANCN17) for the differences between them.

1. Power up the board with a micro-USB cable.

2. Open the Wi-Fi connection utility on your computer and connect to the access point named LinkIt_Smart_7688_XXXXXX. **XXXXXX** is a kind of hardware identifier which varies from board to board.

   ↑TOP
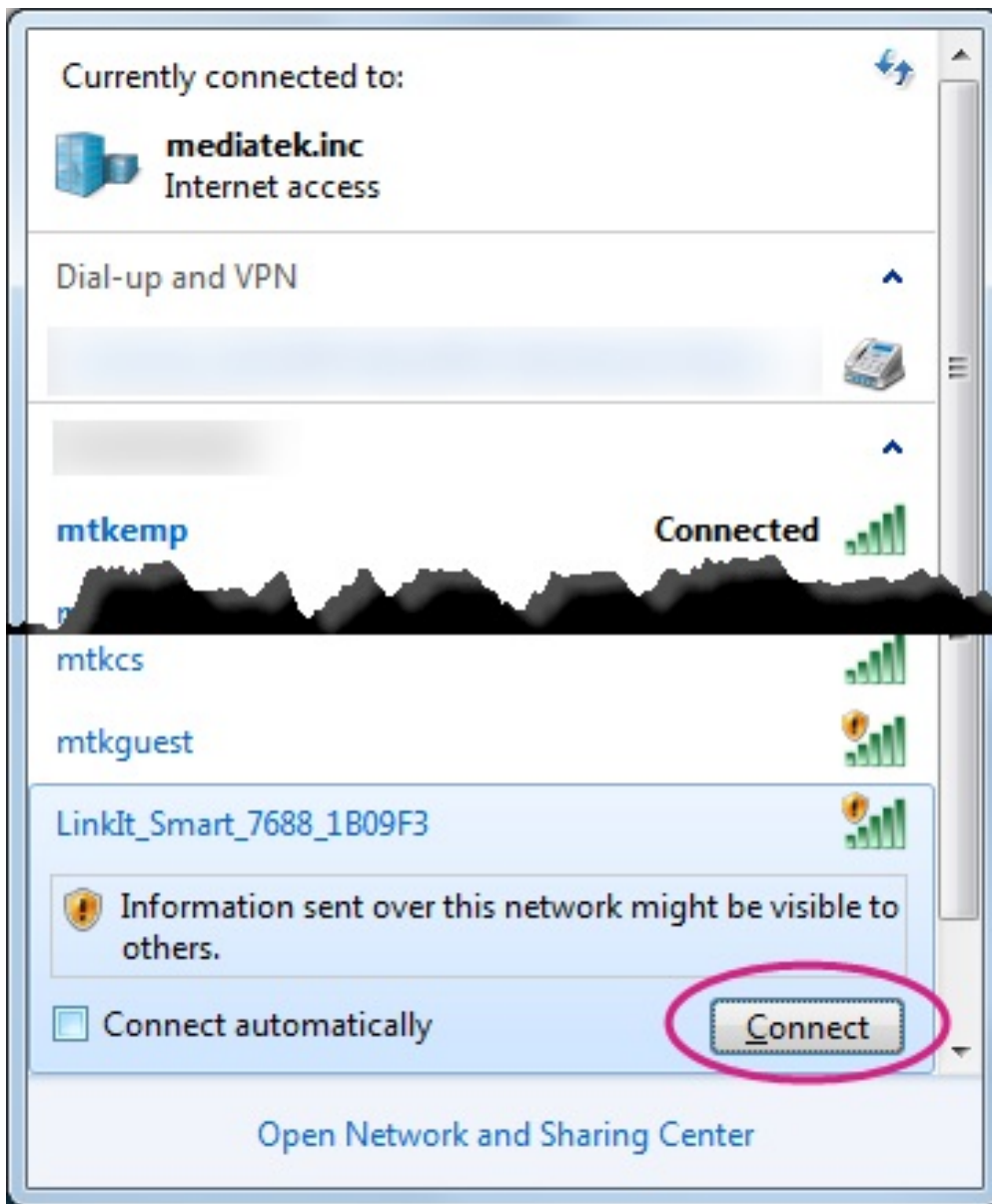
3. Open a browser with URL **mylinkit.local/** or **192.168.100.1**, set the password for root and sign in. Click **Network** on the upper right.

Welcome to MediaTek LinkIt Smart 7688   For advanced network configuration, go to OpenWrt.

System information   **Network**

Platform information

Device name

mylinkit

Current IP address

192.168.100.1

Account information

Account

root(default)

Password *

● ● ● ● ● ● ● ●

CONFIGURE

4. Select the **Station mode** and click **Refresh** or downward arrow on the right to find the AP to connect to. After you have selected the AP, enter password if required. Click Configure & Restart to finish as shown below. Then wait for around 30 seconds to switch mode.

MEDIATEK   English ▾   Sign out

Welcome to MediaTek LinkIt Smart 7688   For advanced network configuration, go to OpenWrt.

System information   **Network**

Network setting

○ AP mode   ◉ Station mode

Detected Wi-Fi network *

mtkemp (83 %)   ▾

REFRESH

Password

SHOW PASSWORD

CANCEL   CONFIGURE & RESTART

5. Launch PuTTy and connect to the system with USB to Serial adapter as shown in the previous section.
6. Type **ifconfig** and find the IP address of **inet addr** as shown below:

```
root@mylinkit:/# ifconfig
apcli0    Link encap:Ethernet  HWaddr 9E:65:F9:0B:09:CE
          inet addr:192.168.16.249  Bcast:192.168.17.255  Mask:255.255.254.0
          inet6 addr: fe80::9c65:f9ff:fe0b:9ce/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:2 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

br-lan    Link encap:Ethernet  HWaddr 9C:65:F9:1B:09:6A
          inet addr:192.168.100.1  Bcast:192.168.100.255  Mask:255.255.255.0
          inet6 addr: fd85:5e0f:898e::1/60 Scope:Global
          inet6 addr: fe80::9e65:f9ff:fe1b:96a/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:111 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:17922 (17.5 KiB)

eth0      Link encap:Ethernet  HWaddr 9C:65:F9:1B:09:6A
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:125 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:21020 (20.5 KiB)
          Interrupt:5
```

Note: It will still enter the Station mode after rebooting the system. Press wi-fi button at least 5 seconds to switch back to AP mode. **Note:** It will be needed to reboot the embedded OS by using **reboot** command.

7. Type the IP in a new Tab of browser and you can login to Web user interface to configure the system.

8. Now both the host computer and LinkIt Smart 7688 are connected to internet. Type **ping www.mediatek.com** in console and you will get:

```
root@myLinkIt:/# ping www.mediatek.com
PING www.mediatek.com (175.98.146.37): 56 data bytes
64 bytes from 175.98.146.37: seq=0 ttl=245 time=39.076 ms
64 bytes from 175.98.146.37: seq=1 ttl=245 time=38.717 ms
64 bytes from 175.98.146.37: seq=2 ttl=245 time=39.250 ms
64 bytes from 175.98.146.37: seq=3 ttl=245 time=118.304 ms
64 bytes from 175.98.146.37: seq=4 ttl=245 time=118.949 ms
```

9. Now you can use internet to configure your system on development board.

Demo: A Hello world example

Note: To avoid running out of memory during native application development, you should set up the native application development environment in a more powerful host environment that enables you to cross-compile the executable format of the LinkIt Smart 7688 target instead. The following table shows an overview of the LinkIt Smart 7688 programming languages and their related development environment on host computer.

Programming language	Tools and libraries	Applications	Host platforms supported
C/C++	Cross compilation toolchain	System programming	OS X Linux
Python	Python runtime on LinkIt Smart 7688	Prototyping Network Arduino bridge library	OS X Linux Windows
Node.js	Node.js runtime on LinkIt Smart 7688	Prototyping Network	OS X Linux Windows

A Hello world example in Python

1. Use FileZilla and refer to this tutorial (https://wiki.filezilla-project.org/FileZilla_Client_Tutorial_(en)) to know

how to connect with server or another host computer, the server IP (replace **host name**) address is the **inet addr** found in Switch to Station mode section (http://www.seeedstudio.com/wiki/LinkIt_Smart_7688#Connect_to_the_Internet_.28Switch_to_Station_mode.29) , the username is **root** and password is the password you set in that section.

2. Open a text editor, copy and paste the below example code and save it as **helloworld.py**.

```
print "Hello World!"
```

3. Copy the file **helloworld.py** into system on target development environment (LinkIt Smart 7688) with FileZilla, place it under the folder **root.**

4. Launch PuTTY and connect to system with USB to Serial adapter.

5. Set working directory to **/root** and enter **python helloworld.py** to execute.

6. Now you can see **Hello World!** printed in console.

Resources

- Hardware Schematic files (http://www.seeedstudio.com/wiki/images/6/6e/Hardware_Schematics.zip)
- Manual (http://www.seeedstudio.com/wiki/images/1/17/Manual.zip)
- OpenWrt (http://wiki.openwrt.org/doc/howto/user.beginner)
- Firmware_upgrade_Instruction (http://www.seeedstudio.com/wiki/File:LinkIt_Smart_7688_Firmware_upgrade.zip)

Retrieved from "http://www.seeedstudio.com/wiki/index.php?title=LinkIt_Smart_7688&oldid=110972"

- This page was last modified on 23 December 2015, at 07:11.
- This page has been accessed 2,353 times.