



JN5148 High-Power USB Dongle (DR1131) Reference Manual

JN-RM-2064
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About this Manual

This manual provides a detailed reference for NXP's JN5148 High-Power USB Dongle (DR1131). The manual is part of the reference design JN-RD-6034.

Organisation

This manual consists of 4 chapters, as follows:

- [Chapter 1](#) outlines the features and functions of the USB dongle
 - [Chapter 2](#) provides detailed feature information
 - [Chapter 3](#) describes programming the LPC1343 device on the dongle
 - [Chapter 4](#) describes programming the JN5148 device on the dongle
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Conventions

Files, folders, functions and parameter types are represented in **bold** type.

Function parameters are represented in *italics* type.

Code fragments are represented in the Courier typeface.

Acronyms and Abbreviations

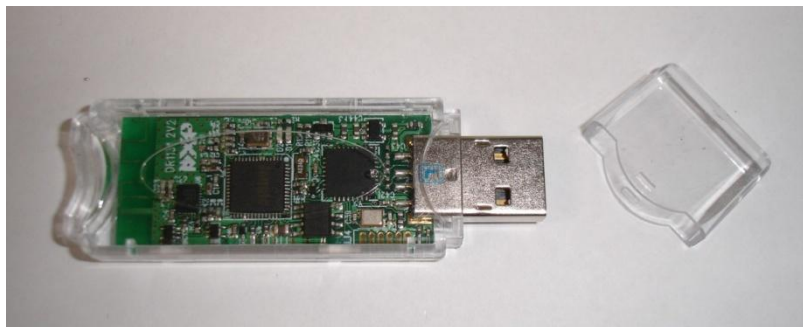
BOM	Bill Of Materials
DIO	Digital Input/Output
LNA	Low-Noise Amplifier
PCB	Printed Circuit Board
SDK	Software Developer's Kit
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus

Related Documents

JN-DS-JN5148 JN5148 Data Sheet

1 Introduction

This manual provides a detailed reference for the JN5148 High-Power USB Dongle, of type DR1131, supplied with JenNet-IP EK040 evaluation kit. The dongle provides a platform for hardware development environment for wireless microcontroller applications with a USB interface.



1.1 Features

The dongle has the following features:

- JN5148-J01 device (mounted directly on the board)
- Integrated PCB antenna
- High-power capability
- NXP LPC1343 USB interface and connector (interface chip is connected to UART0 of the JN5148-J01 device)
- Two LEDs (one red and one green)

This dongle is a high-power device with a radio transmission capability similar to the high-power modules provided in the JenNet-IP EK040 evaluation kit.

1.2 Reference Design

A reference design (JN-RD-6034) for the JN5148 High-Power USB Dongle is available from www.nxp.com/jennic/support. The reference design comprises a ZIP file containing the following files:

- This Reference Manual
- The schematic diagram for the board
- The BOM (Bill Of Materials) for the board
- Gerbers for the board

2 Hardware Overview

2.1 Dongle Layout

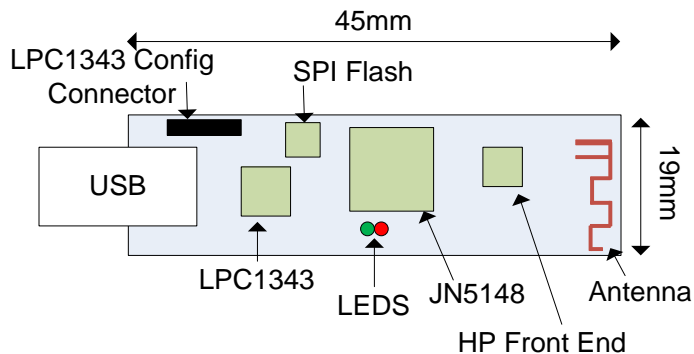
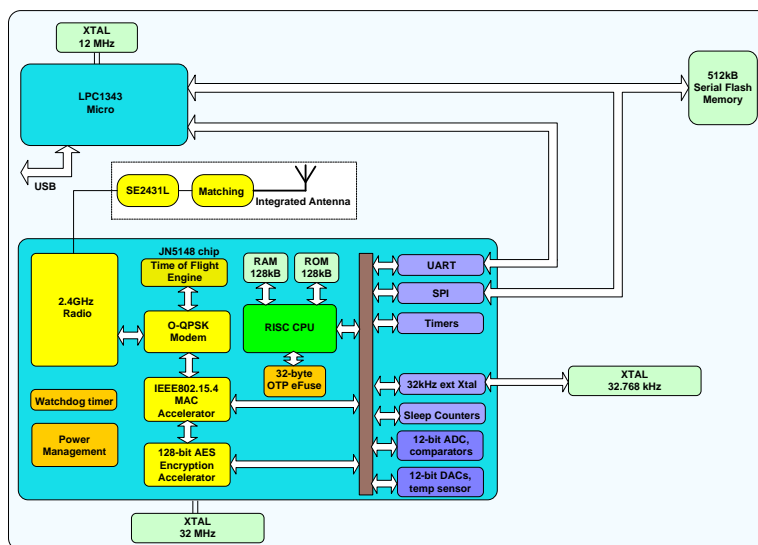


Figure 1: DR1131 Board Layout

2.2 Dongle Block Diagram



2.3 LPC1343 Device

The LPC1343 device is connected to the USB connector and acts as an interface between the PC and the JN5148 device. The LPC1343 will enumerate on the PC as two devices:

1. A mass storage device used to program the Flash device for the JN5148
2. A virtual COM port connected directly to UART0 on the JN5148

2.4 JN5148 Device

The JN5148 circuit is based around the standard JN5148 reference design.

2.5 High-Power Front-End

The front-end is a Skyworks SE2431L. This means that the dongle can achieve 22dBm output power and Rx sensitivity of -100dBm. The output of the front-end is connected to a printed antenna.

2.6 LNA Bypass

If the dongle is used in the presence of very strong signals, such as Wi-Fi, then there will be a performance improvement by switching off the Low-Noise Amplifier (LNA) in the front-end to stop the input stage of the JN5148 device from being overloaded with other signals. The LNA can be bypassed using DIO1 - driving DIO1 low will bypass the LNA.

2.7 LEDs

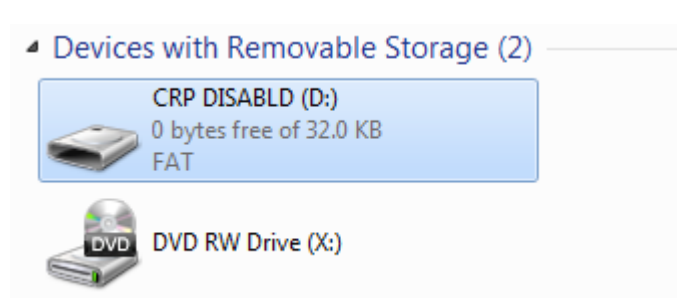
The two LEDs are connected back-to-back between DIOs 16 and 17.

3 Programming the LPC1343 Device

The LPC1343 device is supplied pre-programmed on all USB dongles. **You should never need to reprogram the firmware in the LPC1343 device when developing applications for the JN5148 device.**

If you are producing new USB dongles or are developing new ways to communicate with the JN5148 device (i.e. new HID classes) then the mechanism for reprogramming the LPC1343 is as follows.

1. Insert the USB dongle into the PC with pins 2 and 6 of J4 connected together.
2. Wait up to 30 seconds. The dongle will now appear in Windows Explorer as a mass storage device with the title 'CRP DISABLD':



3. Rename your new binary **FIRMWARE.BIN**.
4. 'Drag and drop' or 'copy and paste' the new binary file onto the USB dongle.
5. Remove the USB dongle from the PC and re-insert it, this time with J4 pins 2 and 6 not connected together.

Two pre-compiled binaries are available in the JN-RD-6034 reference design. These are:

- **LPC1343_Firmware_0x10.bin**: This binary should be used for devices that store their MAC address at address 0x10, such as the JN5148-J01 and JN5142-J01.
- **LPC1343_Firmware_0x30.bin**: This binary should be used for devices that store their MAC address at address 0x30, such as the JN5148-001.

4 Programming the JN5148 Device

4.1 Re-programming USB Dongles

You can easily re-programme a dongle with another binary file through a USB port of your PC and the LPC1343 device on the dongle. The replacement binary file must be a specially prepared file called **FIRMWARE.BIN**. When this file is copied onto the mass storage device, the LPC1343 device holds the JN5148 device in reset and then programs the SPI Flash device directly, releasing the reset once programming is complete. The LPC1343 device will also check the MAC address in the SPI Flash device and preserve it though re-programming operations if a new MAC address has not been specified in the new **FIRMWARE.BIN** file.

4.2 Preparing the Binary File

Before a custom application binary file can be programmed into the USB dongle, a utility called **jn514x_firmware.exe** must be run on the file to strip out a 4-byte header. This utility is provided in the *JenNet-IP SDK (JN-SW-4051)* and is located as follows:

C:/Jennic/Tools/NXP_USBDongle/jn514x_firmware.exe

The utility can be run from a bash shell using the following command:

```
/cygdrive/c/Jennic/Tools/NXP_USBDongle/jn514x_firmware.exe
```

with the following options:

- f is used to specify the name of the input file
- m is used to specify the IEEE/MAC address of the target device (: separated)
- c is used to specify the target chip type (in this case, should be JN5148J01)

Therefore, the required usage is:

```
.../jn514x_firmware.exe -f <app path/name> -m <MacAddress>  
-c JN5148J01
```

4.3 Programming the Dongle

This re-programming of the dongle uses a simple 'drag and drop' method within Windows Explorer, as follows:

1. Plug the USB dongle into a free USB port of your PC (if an 'Installing driver' message is displayed, refer to Section 4.4 below).
2. Open Windows Explorer - the dongle should appear as 'Jennic_USB'.
3. If the dongle currently contains any files, delete them.
4. Within Windows Explorer, navigate to the new **FIRMWARE.BIN** file on your PC, then 'drag and drop' or 'copy and paste' the new binary file onto the USB dongle.

4.4 Installing Device Driver for USB Dongle

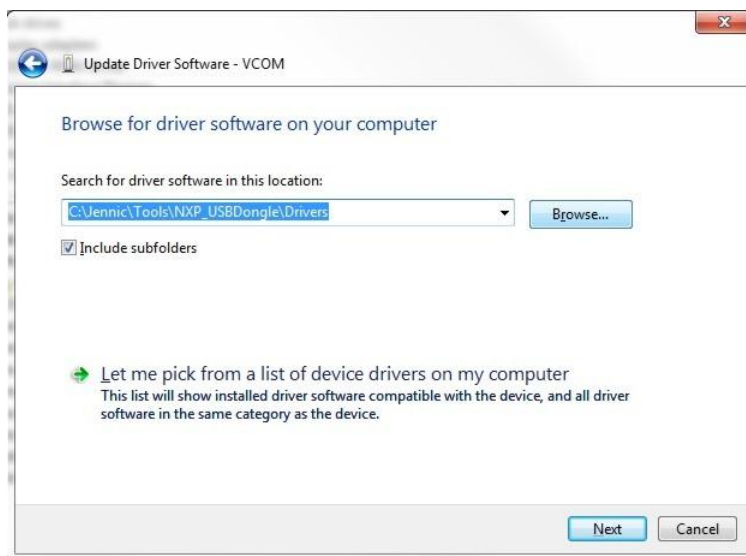
1. The first time you plug the dongle into a USB port of your PC, an 'Installing driver' message appears in the bottom-right corner of the screen. The system will install most of the software required, but will leave the following box:



2. Close the box and go to **Start > Control Panel > System > Device Manager**. In the Device Manager, you will notice that the VCOM port is accompanied by an exclamation mark:

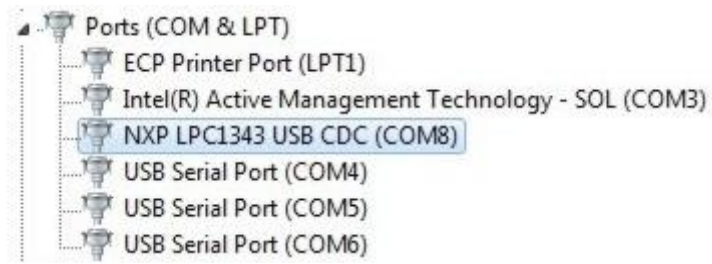


3. Right-click on the VCOM port and from the context menu select 'Update driver software..' and then select the manual installation method (bottom option).
4. Use the Update Driver Software browser to navigate down to the folder **C:\JennicTools\NXP_USBDongle\Drivers** and then click **Next**.



The system will now install the software driver.

5. You can check that the device driver has installed correctly as if it has, the device NXP LPC1343 will appear in the Ports (COM & LPT) section and will appear as a USB mass storage device in the USB Controllers section.



Your dongle is now ready to use.

5 Compliance Statements & Documentation

5.1 FCC Statements and Documentation

This section contains the Federal Communication Commission (FCC) statements and documents.

5.1.1 High-Power Module Usage Limitation

The high-power module variants are classified as 'mobile' devices pursuant with FCC §2.1091 and must not be used at a distance of less than 20 cm (8") from any person.

5.1.2 Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

5.1.3 WARNING!

FCC Radiation Exposure Statement:

This portable equipment with its integrated antenna complies with FCC's RF radiation exposure limits set forth for an uncontrolled environment. To maintain compliance follow the instructions below;

Avoid direct contact to the antenna, or keep it to a minimum while using this equipment.

Please observe the usage limitation notice in this user guide.

5.1.4 USB Dongle usage recommendation

It is strongly recommended for best performance and minimum RF exposure that the Dongle is used with the supplied USB extension cable.

Revision History

Version	Date	Description
1.0	25-July-2012	First release

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