



USB Programming Dongle (DR1128) Reference Manual

JN-RM-2056

Revision 1.1

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About this Manual

This manual provides a detailed reference for NXP's USB Dongle Programming (DR1128). The manual is part of the reference design JN-RD-6021.

The USB Programming Dongle provides an easy way of generating, from a USB interface, the relevant signals to program a Flash memory device on a customer application board based on an NXP JN51xx wireless microcontroller.

Organisation

This manual consists of 3 chapters, as follows:

- [Chapter 1](#) outlines the features and functions of the USB Programming Dongle.
- [Chapter 2](#) provides detailed feature information.
- [Chapter 3](#) describes how to program using the dongle.

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
PCB	Printed Circuit Board
USB	Universal Serial Bus

Related Documents

JN-DS-JN5148	JN5148 Data Sheet
JN-UG-3007	JN51xx Flash Programmer User Guide

1 Introduction

1.1 Overview

The USB Programming Dongle (DR1128) provides a simple solution for programming a Flash memory device on a JN51xx-based application board using the standard JN51xx Flash Programmer tool (described in the *JN51xx Flash Programmer User Guide (JN-UG-3007)*).

The JN51xx wireless microcontrollers have their application code held in an external serial memory device, typically a Flash device such as the M25P40. In order to facilitate the programming of this memory device, the microcontroller is put into a 'programming state' in which, under the control of a PC connected to UART0, it will receive application code and program it into the device. A standard JN51xx evaluation kit uses an FTDI USB cable connected to a 6-pin header which connects to UART0. Switches are also required on the reset and SPIMISO lines in order to place the microcontroller into its programming mode.

This USB Programming Dongle provides a similar programming mechanism. It replaces the FTDI cable and allows for connection to a physically smaller 6-pin connector, therefore allowing the easy development of application boards where space is critical. In addition to the smaller connector, the requirement for switches on the reset and SPIMISO line is removed, which saves further space.

A secondary use of this programming dongle is to allow UART communication during application development, such as to provide debug messages.

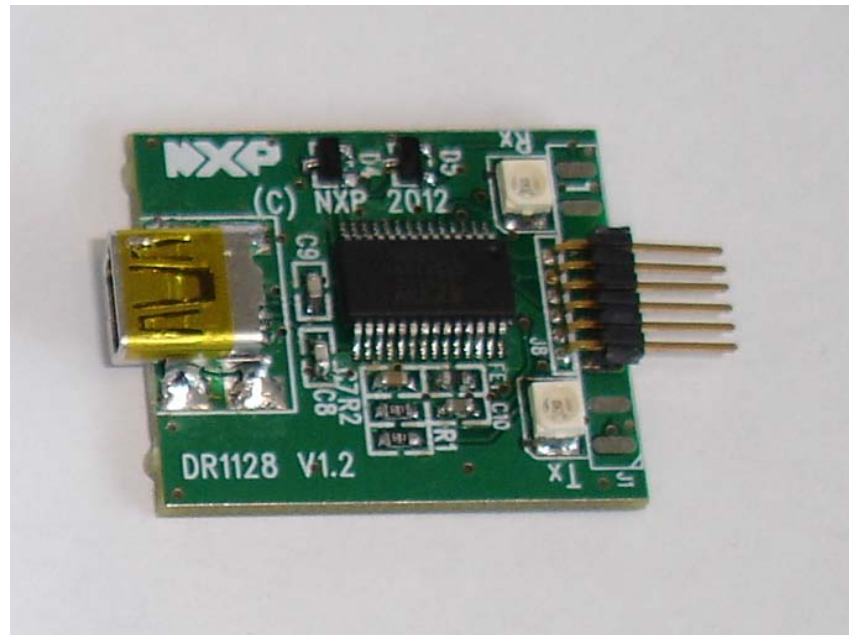


Figure 1: USB Programming Dongle

1.2 Features

The USB Programming Dongle provides the following features:

- USB connector
- USB interface driver
- Two LEDs
- Connector to support JN51xx UART interface

1.3 Reference Design

A reference design (JN-RD-6021) for the USB Programming Dongle board is available from www.nxp.com/jennic/support. This reference design comprises a ZIP file containing the following:

- This Reference Manual
- The schematic diagram for the dongle board
- The BOM (Bill of Materials) for the dongle board
- Gerbers
- PADS PCB design file

2 Hardware Details

2.1 Board Layout

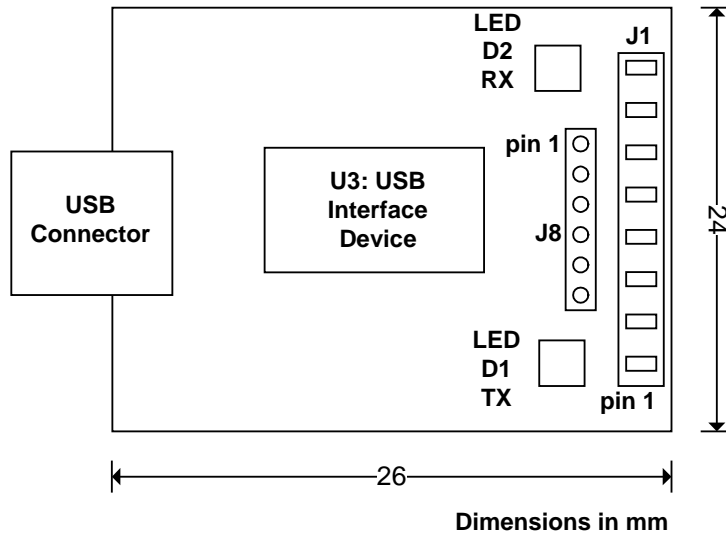


Figure 2: DR1128 USB Programming Dongle Layout

2.2 USB Connection

The USB connector is a standard USB Type mini-B connector. This allows connection to the power and serial data connections from the USB host.

2.3 USB Interface Device

The USB interface device is an FTDI FD232RL device. It is used to interface between the data connections of the USB port and the standard UART connections for UART0 of the JN51xx device.

For details of installing the royalty-free FTDI device driver, refer to the *JN51xx Flash Programmer User Guide (JN-UG-3007)*.

Once the device driver is installed, the USB Programming Dongle will appear as an additional COM port on the Windows PC.

2.4 Power Supply

The power for the USB Programming Dongle is sourced from the 5V connection on the USB connector. The USB interface device generates a 3.3V supply which is available on the Primary connector, J8 (see Section 2.6).

2.5 LEDs

Two LEDs are provided that are controlled by the CB0 and CB1 pins of U3 (the FTDI232RL device). When a pin is driven low then the corresponding LED is switched on. These LEDs can be controlled via a control register within U3, which is accessible via the USB interface. The LEDs are expected to be used for signalling transmit and receive activity, as indicated on the silkscreen.

LED	Expected function	U3 Connection
D1	TX from USB	CB0
D2	RX into USB	CB1

Table 1: LED Connections

2.6 Primary Connector for Programming Interface

The connector J8 supports the programming interface for the remote hardware (i.e. the JN51xx board that is to be programmed) and employs 3.3V signals.

Pin	Name	Use
1	DIO6 (input)	Receive UART data, to connect to UART0 TXD output from remote JN51xx, i.e. DIO6.
2	DIO7 (output)	Transmit UART data, to connect to UART0 RXD input of the JN51xx, i.e. DIO7.
3	MISO (output)	Control line to connect to SPIMISO of the JN51xx – used in conjunction with RESETN to put remote JN51xx into programming mode. It is only possible to cause this pin to go low, due to diode D5.
4	3V30	3.3V supply output from programming interface. This is capable of providing up to 40mA.
5	RESETN (output)	Control line to connect to RESETN of the JN51xx - used in conjunction with MISO to put remote JN51xx into programming mode. Also used to reset the JN51xx after a programming cycle. It is only possible to cause this pin to go low, due to the diode D4.
6	GND	Ground

Table 2: Pinout of J8 Connector

The connector takes the physical form of 6 plated vias at a 1.27-mm pitch. Pin 1 is identified by the square pad in the Reference Design material. Ideally, the target application board will have a 6-pin header specifically designed for this programming interface.

2.7 Extended Connector

The connector J1 is an alternative connector to J8. It has the same signals as J8 with the addition of DIO4 and DIO5, which can form the RTS and CTS UART connections associated with DIO6 and DIO7. This connector employs 3.3V signals, except the VCC signal is 5V (while it is 3.3V on the J8 connector). The connector takes the physical form of 8 pads at a 2.54-mm pitch.

Pin	Name	Use
1	RESETN (output)	Control line to connect to RESETN of the JN51xx - used in conjunction with MISO to put remote JN51xx into programming mode. Also used to reset the JN51xx after a programming cycle. It is only possible to cause this pin to go low, due to the diode D4.
2	GND	Ground
3	DIO5 (input)	CTS UART signal – to connect to remote UART0 RTS output, i.e. DIO5 of JN51xx.
4	VCCUSB	5V from the USB connector.
5	DIO7 (output)	Transmit UART data, to connect to UART0 RXD input of the JN51xx, i.e. DIO7.
6	DIO6 (input)	Receive UART data, to connect to UART0 TXD output from remote JN51xx, i.e. DIO6.
7	DIO4 (output)	RTS UART signal – to connect to remote UART0 CTS input, i.e. DIO4 of JN51xx.
8	MISO (output)	Control line to connect to SPIMISO of the JN51xx – used in conjunction with RESETN to put remote JN51xx into programming mode. It is only possible to cause this pin to go low, due to diode D5.

Table 3: Pinout of J8 Connector

2.8 Configuring the FTDI Device

The FTDI device needs to be programmed in order for this Reference Design to function as required. The FT_Prog tool provided on the FTDI web site (www.ftdichip.com) should be used to program the device - the required configuration is shown in Figure 3. It is necessary to first select the chip type, FT232R, in the Chip_Details page.

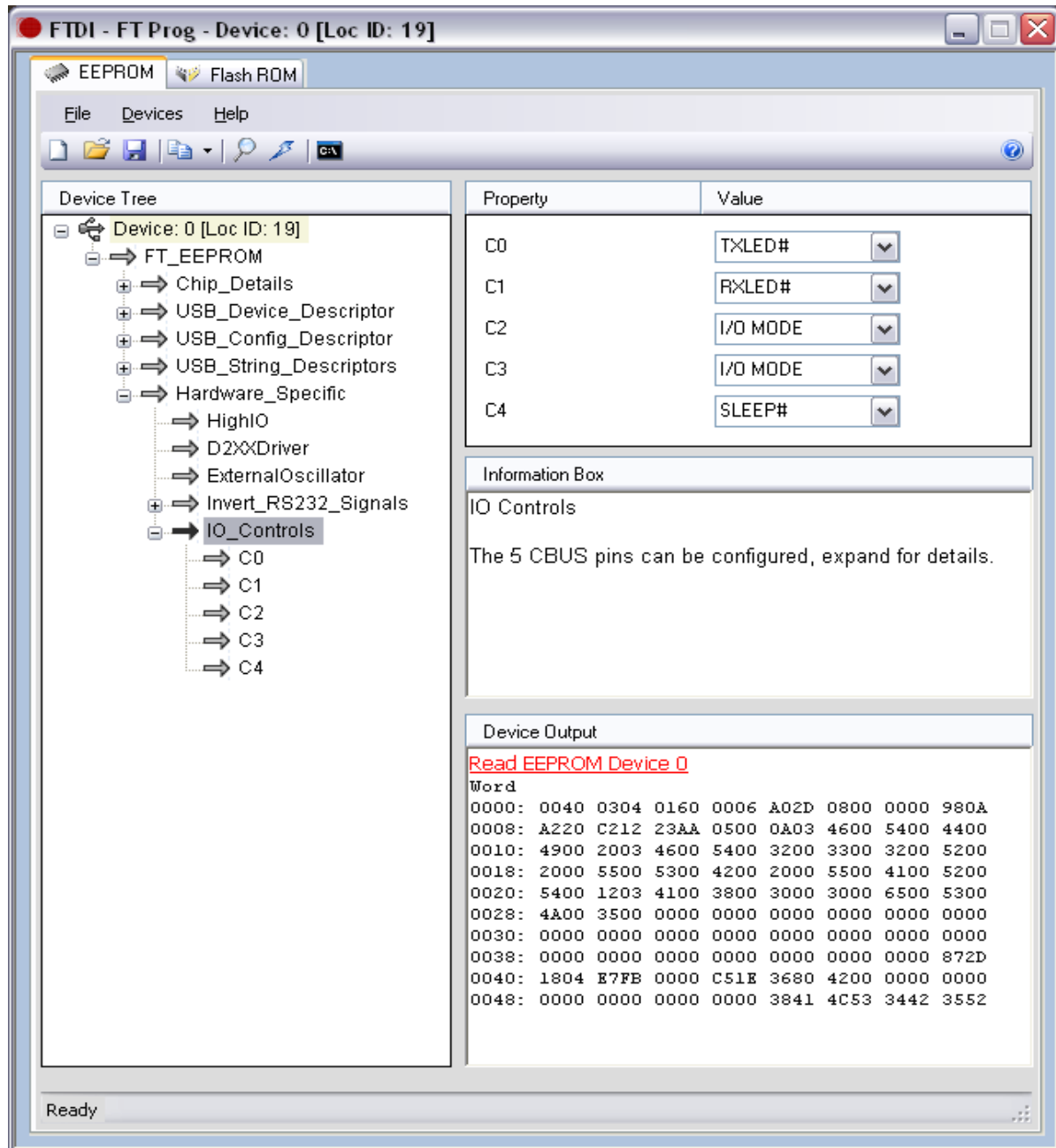


Figure 3: Configuration Settings for FTDI device

3 Programming

In order to use the USB Programming Dongle to program the Flash memory device on a remote JN51xx -based application board, it is necessary to connect pins 1, 2, 3, 5 and 6 of the dongle board's J8 connector to the application board. Pin 4 can also be connected, if it is required to power the application board.

The JN51xx Flash programmer can then be used to program the Flash device – see the *JN51xx Flash Programmer User Guide (JN-UG-3007)*.

Ensure that the Flash Programmer has “Automatic Program and Reset”. This will allow the programming utility to place the JN51xx into its programming mode by manipulating MISO and RESETN on J8. It will then download the program to the Flash device and then reset the JN51xx, causing the application to be loaded and executed.

Revision History

Version	Date	Description
1.0	24-Mar-2010	First release
1.1	25-July-2012	USB A connector updated to USB Mini-b connector

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