nRF Connect SDK - latest

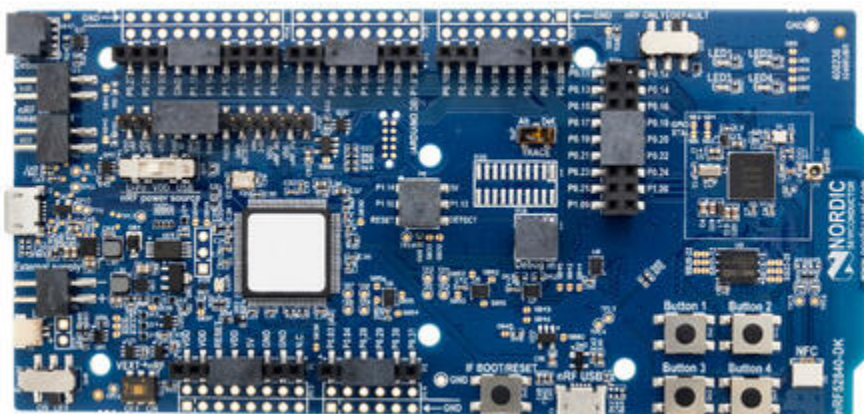NORDIC
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Contents

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1. nRF52840 DK

Overview

The nRF52840 Development Kit (PCA10056) hardware provides support for the Nordic Semiconductor nRF52840 ARM Cortex-M4F CPU and the following devices:

- ADC
- CLOCK
- FLASH
- GPIO
- I2C
- MPU
- NVIC
- PWM
- RADIO (Bluetooth Low Energy and 802.15.4)
- RTC
- Segger RTT (RTT Console)
- SPI
- UART
- USB
- WDT

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nRF52840 DK (Credit: Nordic Semiconductor)◈

More information about the board can be found at the nRF52840 DK website [6] [2]. nRF52840 Product Specification [7] [3] contains the processor's information and the datasheet.

Hardware

nRF52840 DK has two external oscillators. The frequency of the slow clock is 32.768 kHz. The frequency of the main clock is 32 MHz.

Supported Features

The `nrf52840dk/nrf52840` board configuration supports the following hardware features:

Interface	Controller	Driver/Component
ADC	on-chip	adc
CLOCK	on-chip	clock_control
FLASH	on-chip	flash
GPIO	on-chip	gpio
I2C(M)	on-chip	i2c
MPU	on-chip	arch/arm
NVIC	on-chip	arch/arm
PWM	on-chip	pwm
RADIO	on-chip	Bluetooth, ieee802154
RTC	on-chip	system clock

Interface	Controller	Driver/Component
RTT	Segger	console
SPI(M/S)	on-chip	spi
UART	on-chip	serial
USB	on-chip	usb
WDT	on-chip	watchdog

Other hardware features have not been enabled yet for this board. See nRF52840 DK website [6] [2] and nRF52840 DK Hardware guide [8] [4] for a complete list of nRF52840 Development Kit board hardware features.

Connections and IOs

LED

- LED1 (green) = P0.13

- LED2 (green) = P0.14

- LED3 (green) = P0.15

- LED4 (green) = P0.16

Push buttons

- BUTTON1 = SW1 = P0.11

- BUTTON2 = SW2 = P0.12

- BUTTON3 = SW3 = P0.24

- BUTTON4 = SW4 = P0.25

- BOOT = SW5 = boot/reset

Programming and Debugging

Applications for the `nrf52840dk/nrf52840` board configuration can be built, flashed, and debugged in the usual way. See Building an Application and Run an Application for more details on building and running.

Flashing

Follow the instructions in the Nordic nRF5x Segger J-Link page to install and configure all the necessary software. Further information can be found in Flashing. Then build and flash applications as usual (see Building an Application and Run an Application for more details).

Here is an example for the Hello World application.

First, run your favorite terminal program to listen for output.

```
$ minicom -D <tty_device> -b 115200
```

Replace `<tty_device>` with the port where the board nRF52840 DK can be found. For example, under Linux, `/dev/ttyACM0`.

Then build and flash the application in the usual way.

```
# From the root of the zephyr repository
west build -b nrf52840dk/nrf52840 samples/hello_world
west flash
```

Debugging

Refer to the Nordic nRF5x Segger J-Link page to learn about debugging Nordic boards with a Segger IC.

Testing the LEDs and buttons in the nRF52840 DK

There are 2 samples that allow you to test that the buttons (switches) and LEDs on the board are working properly with Zephyr:

```
samples/basic/blinky
samples/basic/button
```

You can build and flash the examples to make sure Zephyr is running correctly on your board. The button and LED definitions can be found in boards/nordic/nrf52840dk/nrf52840dk_nrf52840.dts.

Changing UART1 pins

The following approach can be used when an application needs to use another set of pins for UART1:

1. Add devicetree overlay file to the main directory of your application:

```
&pinctrl {
   uart1_default_alt: uart1_default_alt {
      group1 {
         psels = <NRF_PSEL(UART_TX, 0, 14)>,
                 <NRF_PSEL(UART_RX, 0, 16)>;
      };
   };
   /* required if CONFIG_PM_DEVICE=y */
   uart1_sleep_alt: uart1_sleep_alt {
      group1 {
         psels = <NRF_PSEL(UART_TX, 0, 14)>,
                 <NRF_PSEL(UART_RX, 0, 16)>;
         low-power-enable;
      };
   };
};


&uart1 {
  pinctrl-0 = <&uart1_default_alt>;
  /* if sleep state is not used, use /delete-property/ pinctrl-1; and
   * skip the "sleep" entry.
   */
  pinctrl-1 = <&uart1_sleep_alt>;
  pinctrl-names = "default", "sleep";
};
```

In the overlay file above, pin P0.16 is used for RX and P0.14 is used for TX

See Set devicetree overlays for further details.

Selecting the pins

Pins can be configured in the board pinctrl file. To see the available mappings, open the nRF52840 Product Specification [7] [3], chapter 7 'Hardware and Layout'. In the table 7.1.1 'aQFN73 ball assignments' select the pins marked 'General purpose I/O'. Note that pins marked as 'low frequency I/O only' can only be used in under-10KHz applications. They are not suitable for 115200 speed of UART.

nRF52811 emulation on nRF52840 DK

Overview

The `nrf52840dk/nrf52811` board variant is a modified version of the nRF52840 DK that enforces the limitations imposed by the nRF52811 IC, which is a variant of the original nRF52840. Since Nordic does not offer a development kit for the nRF52811 you can use this board to develop for this IC while using the nRF52840 Development Kit (PCA10056).

See nRF52840 DK for more information about the development board and nRF52811 website [5] [1] for the official reference on the IC itself.

References

[1]

https://www.nordicsemi.com/Products/Low-power-short-range-wireless/nRF52811

[2] (1,2)

https://www.nordicsemi.com/Software-and-Tools/Development-Kits/nRF52840-DK

[3] (1,2)

https://docs.nordicsemi.com/bundle/ps_nrf52840/page/keyfeatures_html5.html

[4]

https://docs.nordicsemi.com/bundle/ug_nrf52840_dk/page/UG/dk/intro.html

References

[5]

https://www.nordicsemi.com/Products/Low-power-short-range-wireless/nRF52811

[6] (1,2)

https://www.nordicsemi.com/Software-and-Tools/Development-Kits/nRF52840-DK

[7] (1,2)

https://docs.nordicsemi.com/bundle/ps_nrf52840/page/keyfeatures_html5.html

[8]

https://docs.nordicsemi.com/bundle/ug_nrf52840_dk/page/UG/dk/intro.html

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