nRF52840 Product Specification

NORDIC®
SEMICONDUCTOR

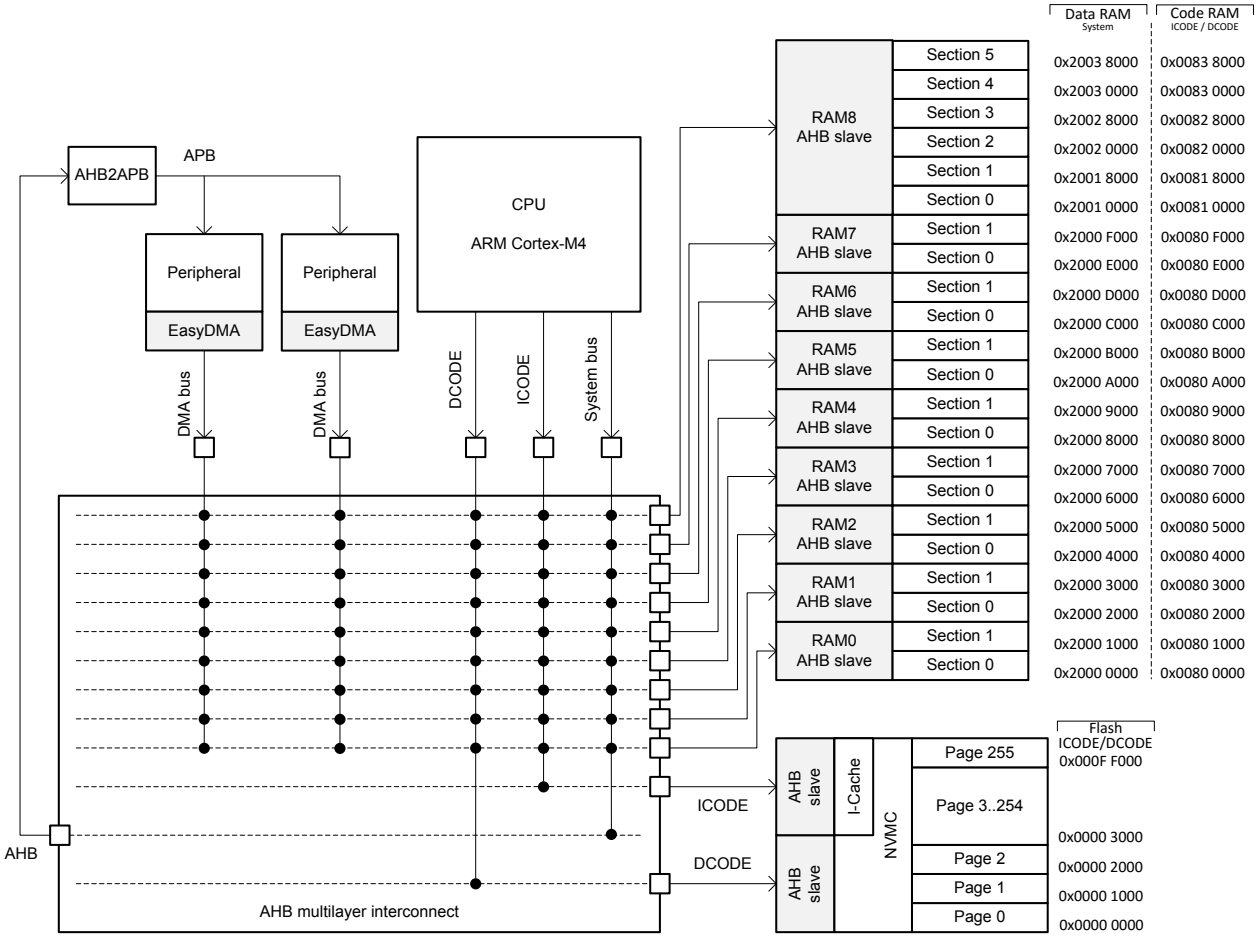
Contents

1. Memory

The nRF52840 contains 1024 kB of flash memory and 256 kB of RAM that can be used for code and data storage.

The CPU and peripherals with EasyDMA can access memory via the AHB multilayer interconnect. In additon, peripherals are accessed by the CPU via the AHB multilayer interconnect, as shown in the following figure.

Figure 1. Memory layout



See AHB multilayer and EasyDMA for more information about the AHB multilayer interconnect and EasyDMA.

The same physical RAM is mapped to both the Data RAM region and the Code RAM region. It is up to the application to partition the RAM within these regions so that one does not corrupt the other.

RAM - Random access memory

The RAM interface is divided into nine RAM AHB slaves.

RAM AHB slaves 0 to 7 are connected to two 4 kB RAM sections each, while RAM AHB slave 8 is connected to six 32 kB sections, as shown in Memory layout.

Each RAM section has separate power control for System ON and System OFF mode operation, which is configured via RAM register (see the POWER — Power supply).

Flash - Non-volatile memory

The CPU can read from flash memory an unlimited number of times, but is restricted in how it writes to flash and the number of writes and erases it can perform.

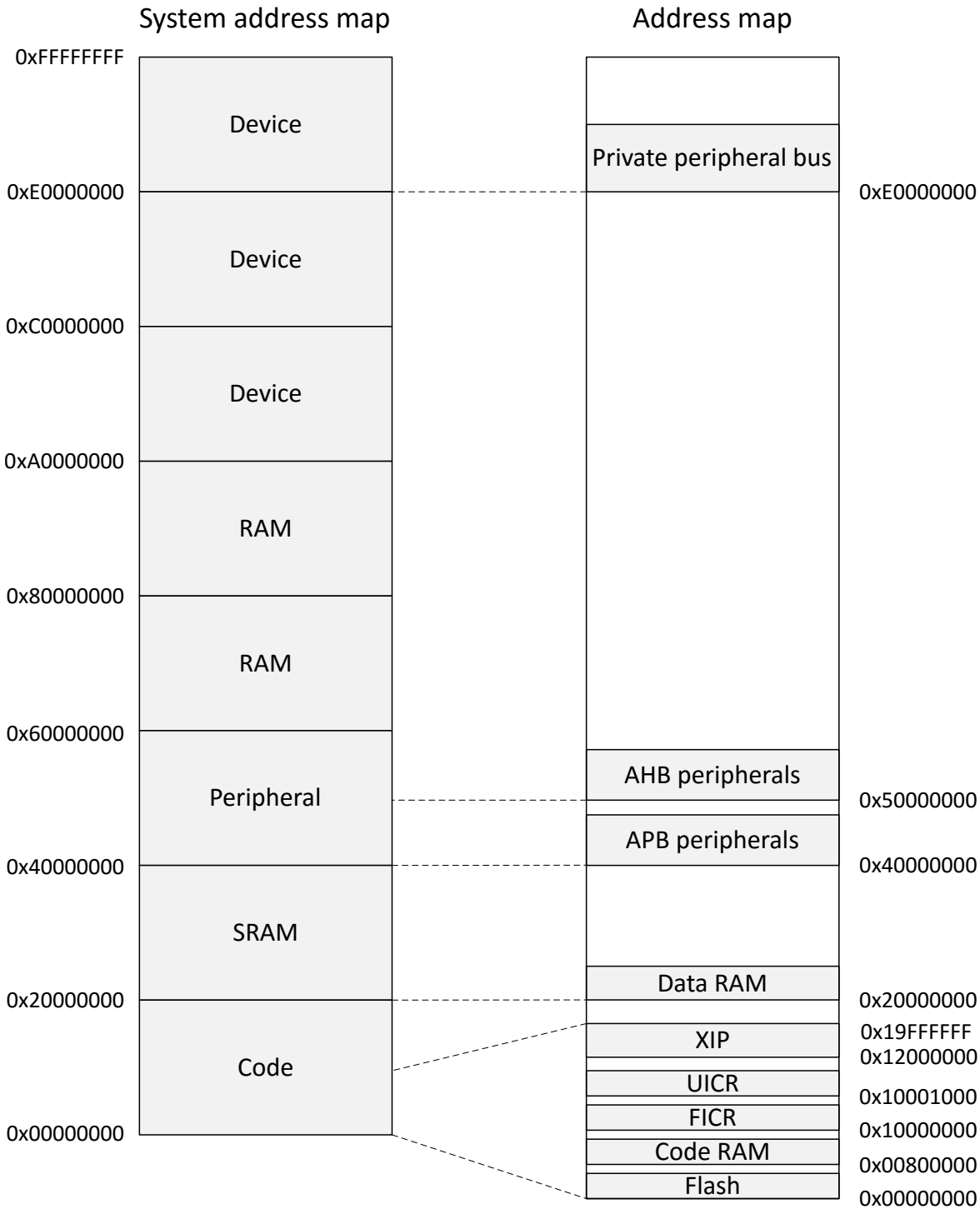
Writing to flash memory is managed by the non-volatile memory controller (NVMC), see NVMC — Non-volatile memory controller.

Flash memory is divided into 256 pages of 4 kB each that can be accessed by the CPU via the ICODE and DCODE buses as shown in Memory layout.

Memory map

The complete memory map for the nRF52840 is shown in the following figure. As described in Memory, Code RAM and Data RAM are the same physical RAM.

Figure 2. Memory map


System address map
Address map
0xFFFFFFFF
Device
0xE0000000
Device
0xC0000000
Device
0xA0000000
RAM
0x80000000
RAM
0x60000000
Peripheral
0x40000000
SRAM
0x20000000
Code
0x00000000
Private peripheral bus
0xE0000000
AHB peripherals
0x50000000
APB peripherals
0x40000000
Data RAM
0x20000000
XIP
0x19FFFFFF
0x12000000
UICR
0x10001000
FICR
0x10000000
Code RAM
0x00800000
Flash
0x00000000

Instantiation

ID	Base address	Instance	Description
0	0x40000000	APPROTECT	APPROTECT control
0	0x40000000	CLOCK	Clock control
0	0x40000000	POWER	Power control
0	0x50000000	GPIO	General purpose input and output This instance is deprecated.
0	0x50000000	P0	General purpose input and output, port 0
0	0x50000300	P1	General purpose input and output, port 1
1	0x40001000	RADIO	2.4 GHz radio
2	0x40002000	UART0	Universal asynchronous receiver/transmitter This instance is deprecated.
2	0x40002000	UARTE0	Universal asynchronous receiver/transmitter with EasyDMA, unit 0
3	0x40003000	SPI0	SPI master 0 This instance is deprecated.
3	0x40003000	SPIM0	SPI master 0

ID	Base address	Instance	Description
3	0x40003000	SPIS0	SPI slave 0
3	0x40003000	TWI0	Two-wire interface master 0 This instance is deprecated.
3	0x40003000	TWIM0	Two-wire interface master 0
3	0x40003000	TWIS0	Two-wire interface slave 0
4	0x40004000	SPI1	SPI master 1 This instance is deprecated.
4	0x40004000	SPIM1	SPI master 1
4	0x40004000	SPIS1	SPI slave 1
4	0x40004000	TWI1	Two-wire interface master 1 This instance is deprecated.
4	0x40004000	TWIM1	Two-wire interface master 1
4	0x40004000	TWIS1	Two-wire interface slave 1
5	0x40005000	NFCT	Near field communication tag
6	0x40006000	GPIOTE	GPIO tasks and events

ID	Base address	Instance	Description
7	0x40007000	SAADC	Analog to digital converter
8	0x40008000	TIMER0	Timer 0
9	0x40009000	TIMER1	Timer 1
10	0x4000A000	TIMER2	Timer 2
11	0x4000B000	RTC0	Real-time counter 0
12	0x4000C000	TEMP	Temperature sensor
13	0x4000D000	RNG	Random number generator
14	0x4000E000	ECB	AES electronic code book (ECB) mode block encryption
15	0x4000F000	AAR	Accelerated address resolver
15	0x4000F000	CCM	AES counter with CBC-MAC (CCM) mode block encryption
16	0x40010000	WDT	Watchdog timer
17	0x40011000	RTC1	Real-time counter 1
18	0x40012000	QDEC	Quadrature decoder
19	0x40013000	COMP	General purpose comparator

ID	Base address	Instance	Description
19	0x40013000	LPCOMP	Low power comparator
20	0x40014000	EGU0	Event generator unit 0
20	0x40014000	SWI0	Software interrupt 0
21	0x40015000	EGU1	Event generator unit 1
21	0x40015000	SWI1	Software interrupt 1
22	0x40016000	EGU2	Event generator unit 2
22	0x40016000	SWI2	Software interrupt 2
23	0x40017000	EGU3	Event generator unit 3
23	0x40017000	SWI3	Software interrupt 3
24	0x40018000	EGU4	Event generator unit 4
24	0x40018000	SWI4	Software interrupt 4
25	0x40019000	EGU5	Event generator unit 5
25	0x40019000	SWI5	Software interrupt 5
26	0x4001A000	TIMER3	Timer 3

ID	Base address	Instance	Description
27	0x4001B000	TIMER4	Timer 4
28	0x4001C000	PWM0	Pulse width modulation unit 0
29	0x4001D000	PDM	Pulse Density modulation (digital microphone) interface
30	0x4001E000	ACL	Access control lists
30	0x4001E000	NVMC	Non-volatile memory controller
31	0x4001F000	PPI	Programmable peripheral interconnect
32	0x40020000	MWU	Memory watch unit
33	0x40021000	PWM1	Pulse width modulation unit 1
34	0x40022000	PWM2	Pulse width modulation unit 2
35	0x40023000	SPI2	SPI master 2 This instance is deprecated.
35	0x40023000	SPIM2	SPI master 2
35	0x40023000	SPIS2	SPI slave 2
36	0x40024000	RTC2	Real-time counter 2

ID	Base address	Instance	Description
37	0x40025000	I2S	Inter-IC sound interface
38	0x40026000	FPU	FPU interrupt
39	0x40027000	USBD	Universal serial bus device
40	0x40028000	UARTE1	Universal asynchronous receiver/transmitter with EasyDMA, unit 1
41	0x40029000	QSPI	External memory interface
42	0x5002A000	CC_HOST_RGF	Host platform interface
42	0x5002A000	CRYPTOCELL	CRYPTOCELL control interface
45	0x4002D000	PWM3	Pulse width modulation unit 3
47	0x4002F000	SPIM3	SPI master 3
N/A	0x10000000	FICR	Factory information configuration
N/A	0x10001000	UICR	User information configuration

Table 1. Instantiation table