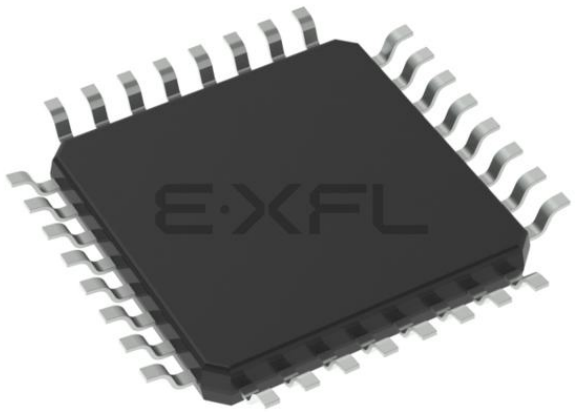

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Details	
Product Status	Active
Core Processor	ARM® Cortex®-M0+
Core Size	32-Bit Single-Core
Speed	48MHz
Connectivity	I²C, LINbus, SCI, SPI, UART/USART, USB
Peripherals	DMA, POR, PWM, WDT
Number of I/O	25
Program Memory Size	128KB (128K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	16K x 8
Voltage - Supply (Vcc/Vdd)	1.62V ~ 3.63V
Data Converters	A/D 10x12b; D/A 2x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	32-TQFP
Supplier Device Package	32-TQFP (7x7)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/atsaml21e17b-ant

15.13.11. CoreSight ROM Table Entry 1

Name: ENTRY1
Offset: 0x1004
Reset: 0xXXXXX00X
Property: PAC Write-Protection

Bit	31	30	29	28	27	26	25	24
	ADDOFF[19:12]							
Access	R	R	R	R	R	R	R	R
Reset	x	x	x	x	x	x	x	x

Bit	23	22	21	20	19	18	17	16
	ADDOFF[11:4]							
Access	R	R	R	R	R	R	R	R
Reset	x	x	x	x	x	x	x	x

Bit	15	14	13	12	11	10	9	8
	ADDOFF[3:0]							
Access	R	R	R	R				
Reset	x	x	x	x				

Bit	7	6	5	4	3	2	1	0
							FMT	EPRES
Access							R	R
Reset							1	x

Bits 31:12 – ADDOFF[19:0]: Address Offset
The base address of the component, relative to the base address of this ROM table.

Bit 1 – FMT: Format
Always read as '1', indicating a 32-bit ROM table.

Bit 0 – EPRES: Entry Present
This bit indicates whether an entry is present at this location in the ROM table.

This bit is set at power-up if the device is not protected indicating that the entry is not present.

This bit is cleared at power-up if the device is not protected indicating that the entry is present.

SYNCBUSY.ENABLE will be cleared by hardware when the operation is complete.

The Synchronisation Ready interrupt (if available) cannot be used to enable write-synchronization.

16.3.6. Software Reset Write-Synchronization

Setting the Software Reset bit in CTRLA (CTRLA.SWRST=1) will trigger write-synchronization and set SYNCBUSY.SWRST. When writing a '1' to the CTRLA.SWRST bit it will immediately read as '1'.

CTRL.SWRST and SYNCBUSY.SWRST will be cleared by hardware when the peripheral has been reset.

Writing a '0' to the CTRL.SWRST bit has no effect.

The Ready interrupt (if available) cannot be used for Software Reset write-synchronization.

16.3.7. Synchronization Delay

The synchronization will delay write and read accesses by a certain amount. This delay *D* is within the range of:

$5 \times P_{GCLK} + 2 \times P_{APB} < D < 6 \times P_{GCLK} + 3 \times P_{APB}$

Where P_{GCLK} is the period of the generic clock and P_{APB} is the period of the peripheral bus clock. A normal peripheral bus register access duration is $2 \times P_{APB}$.

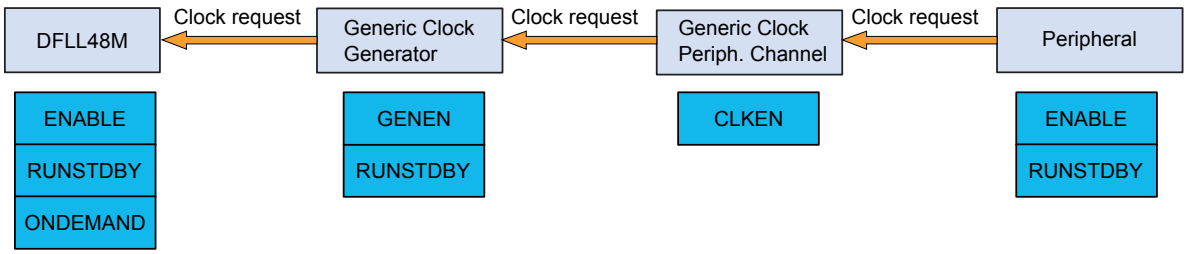
16.4. Enabling a Peripheral

In order to enable a peripheral that is clocked by a Generic Clock, the following parts of the system needs to be configured:

- A running Clock Source
- A clock from the Generic Clock Generator must be configured to use one of the running Clock Sources, and the Generator must be enabled.
- The Peripheral Channel that provides the Generic Clock signal to the peripheral must be configured to use a running Generic Clock Generator, and the Generic Clock must be enabled.
- The user interface of the peripheral needs to be unmasked in the PM. If this is not done the peripheral registers will read all 0's and any writing attempts to the peripheral will be discarded.

16.5. On Demand Clock Requests

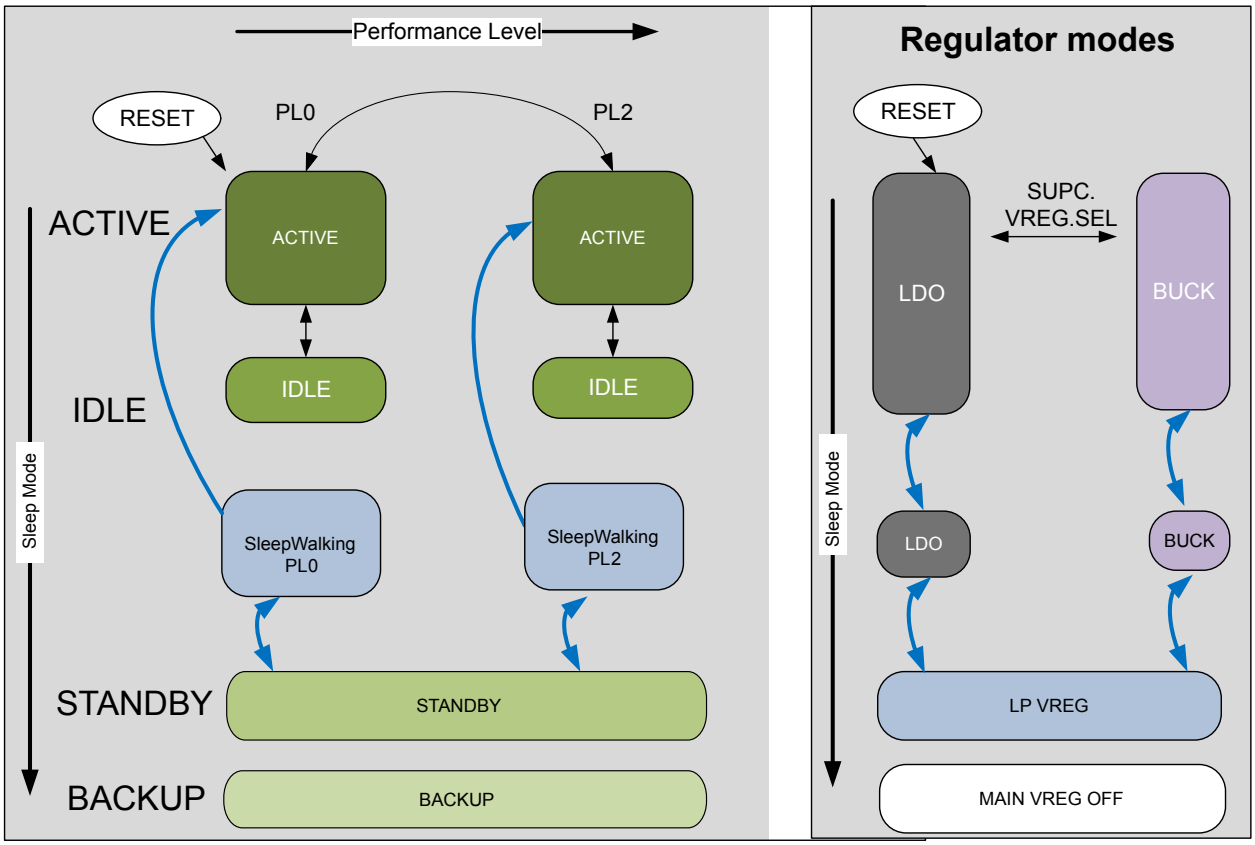
Figure 16-4. Clock Request Routing



All clock sources in the system can be run in an on-demand mode: the clock source is in a stopped state unless a peripheral is requesting the clock source. Clock requests propagate from the peripheral, via the GCLK, to the clock source. If one or more peripheral is using a clock source, the clock source will be started/kept running. As soon as the clock source is no longer needed and no peripheral has an active request, the clock source will be stopped until requested again.

The clock request can reach the clock source only if the peripheral, the generic clock and the clock from the Generic Clock Generator in-between are enabled. The time taken from a clock request being asserted

Figure 20-4. Operating Conditions and SleepWalking

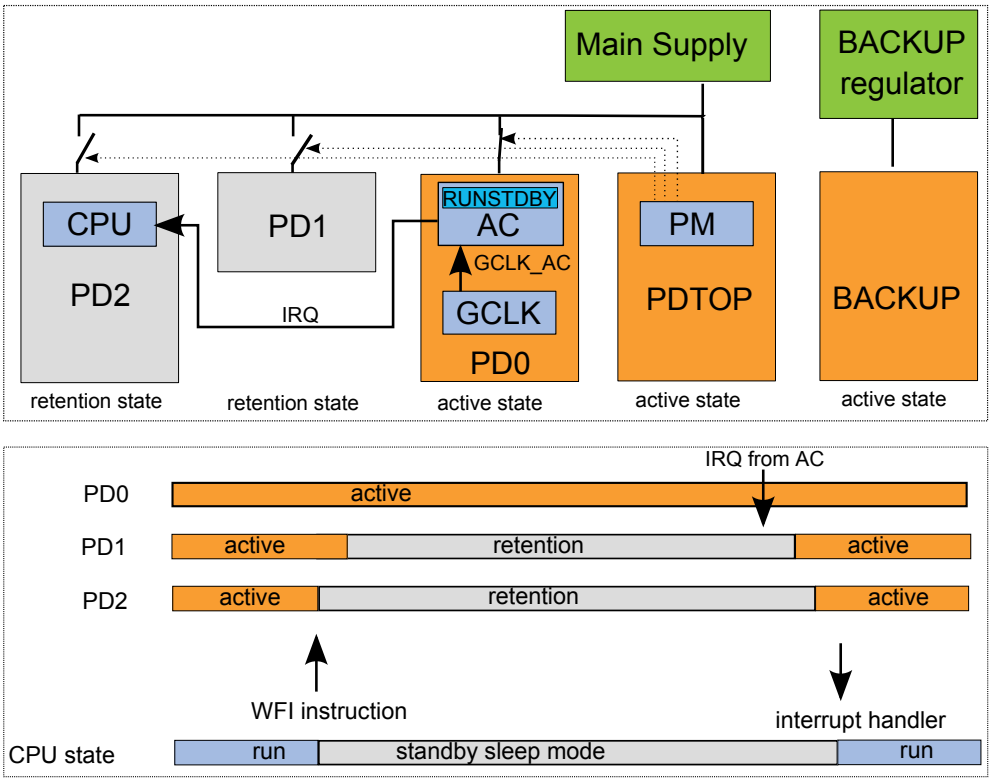


20.6.4.6. Wake-Up Time

As shown in the figure below, total wake-up time depends on:

- Latency due to Power Domain Gating:
  Usually, wake-up time is measured with the assumption that the power domains are already in active state. When using Power Domain Gating, changing a power domain from retention to active state will take a certain time, refer to Electrical Characteristics. If all power domains were already in active state in standby sleep mode, this latency is zero. If wake-up time is critical for the application, power domains can be forced to active state in standby sleep mode, refer to Power Domain Configuration and Linked Power Domains for details.
- Latency due to Performance Level and Regulator effect:
  Performance Level has to be taken into account for the global wake-up time. As example, if PL2 is selected and the device is in standby sleep mode, the voltage level supplied by the ULP voltage regulator is lower than the one used in active mode. When the device wakes up, it takes a certain amount of time for the main regulator to transition to the voltage level corresponding to PL2, causing additional wake-up time.
- Latency due to the CPU clock source wake-up time.
- Latency due to the NVM memory access.
- Latency due to Switchable Power Domain back-bias wake-up time:
  If back-bias is enabled, and the device wakes up from retention, it takes a certain amount of time for the regulator to settle.

Figure 20-6. AC SleepWalking with Static PD Gating



- Exiting standby mode: When conditions are met, the AC peripheral generates an interrupt to wake up the device. Successively, the PM peripheral sets PD1 and PD2 to active state. Once PD2 is in active state, the CPU is able to operate normally and execute the AC interrupt handler accordingly.
- Wake-up time:
  - The required time to set PD1 and PD2 to active state has to be considered for the global wake-up time, refer to Wake-Up Time for details.
  - In this case, the VDDCORE voltage is still supplied by the main voltage regulator, refer to Regulator Automatic Low Power Mode for details. Thus, global wake-up time is not affected by the regulator.

TC0 SleepWalking with Static PD Gating

TC0 peripheral is used in counter operation mode. An interrupt is generated to wake-up the device based on the TC0 peripheral configuration. To make the TC0 peripheral continue to run in standby sleep mode, the RUNSTDBY bit is written to '1'.

- Entering standby mode: As shown in Figure 20-7, PD1 (where the TC0 is located) and PD0 (where the peripheral clock generator is located) remain active, whereas PD2 is set to retention state by the Power Manager peripheral. Refer to Power Domain Controller for details.
- Exiting standby mode: When conditions are met, the TC0 peripheral generates an interrupt to wake-up the device. The PM peripheral sets PD2 to active state. Once PD2 is in active state, the is able to operate normally and execute the TC0 interrupt handler accordingly.
- Wake-up time:
  - The required time to set PD2 to active state has to be considered for the global wake-up time, refer to Wake-Up Time for details.

Value	Description
0	The output is not enabled.
1	The output is enabled and driven by the SUPC.

24.8.2. Configuration

Name: CONFIG
Offset: 0x01
Reset: Loaded from NVM User Row at startup
Property: PAC Write-Protection, Enable-Protected

Bit	7	6	5	4	3	2	1	0
	WINDOW[3:0]				PER[3:0]			
Access	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
Reset	-	-	-	-	-	-	-	-

Bits 7:4 – WINDOW[3:0]: Window Mode Time-Out Period
In Window mode, these bits determine the watchdog closed window period as a number of cycles of the 1.024kHz CLK_WDT_OSC clock.

These bits are loaded from NVM User Row at startup.

Value	Name	Description
0x0	CYC8	8 clock cycles
0x1	CYC16	16 clock cycles
0x2	CYC32	32 clock cycles
0x3	CYC64	64 clock cycles
0x4	CYC128	128 clock cycles
0x5	CYC256	256 clock cycles
0x6	CYC512	512 clock cycles
0x7	CYC1024	1024 clock cycles
0x8	CYC2048	2048 clock cycles
0x9	CYC4096	4096 clock cycles
0xA	CYC8192	8192 clock cycles
0xB	CYC16384	16384 clock cycles
0xC - 0xF	-	Reserved

Bits 3:0 – PER[3:0]: Time-Out Period
These bits determine the watchdog time-out period as a number of 1.024kHz CLK_WDTOSC clock cycles. In Window mode operation, these bits define the open window period.

These bits are loaded from NVM User Row at startup.

Value	Name	Description
0x0	CYC8	8 clock cycles
0x1	CYC16	16 clock cycles
0x2	CYC32	32 clock cycles

26.6.6. Events

The DMAC can generate the following output events:

- Channel (CH): Generated when a block transfer for a given channel has been completed, or when a beat transfer within a block transfer for a given channel has been completed. Refer to Event Output Selection for details.

Setting the Channel Control B Event Output Enable bit (CHCTRLB.EVOE=1) enables the corresponding output event configured in the Event Output Selection bit group in the Block Transfer Control register (BTCTRL.EVOSEL). Clearing CHCTRLB.EVOE=0 disables the corresponding output event.

The DMAC can take the following actions on an input event:

- Transfer and Periodic Transfer Trigger (TRIG): normal transfer or periodic transfers on peripherals are enabled
- Conditional Transfer Trigger (CTRIG): conditional transfers on peripherals are enabled
- Conditional Block Transfer Trigger (CBLOCK): conditional block transfers on peripherals are enabled
- Channel Suspend Operation (SUSPEND): suspend a channel operation
- Channel Resume Operation (RESUME): resume a suspended channel operation
- Skip Next Block Suspend Action (SSKIP): skip the next block suspend transfer condition

Setting the Channel Control B Event Input Enable bit (CHCTRLB.EVIE=1) enables the corresponding action on input event. clearing this bit disables the corresponding action on input event. Note that several actions can be enabled for incoming events. If several events are connected to the peripheral, any enabled action will be taken for any of the incoming events. For further details on event input actions, refer to Event Input Actions.

Related Links

EVSYS – Event System on page 544

26.6.7. Sleep Mode Operation

Each DMA channel can be configured to operate in any sleep mode. To be able to run in standby, the RUNSTDBY bit in Channel Control A register (CHCTRLA.RUNSTDBY) must be written to '1'. The DMAC can wake up the device using interrupts from any sleep mode or perform actions through the Event System.

Note: In standby sleep mode, the DMAC can access the LP SRAM only when the power domain PD1 is not in retention and PM.STDBYCFG.BBIASLP=0x0. The DMAC can access the SRAM in standby sleep mode only when the power domain PD2 is not in retention and PM.STDBYCFG.BBIASHS=0x0.

26.6.8. Synchronization

Not applicable.

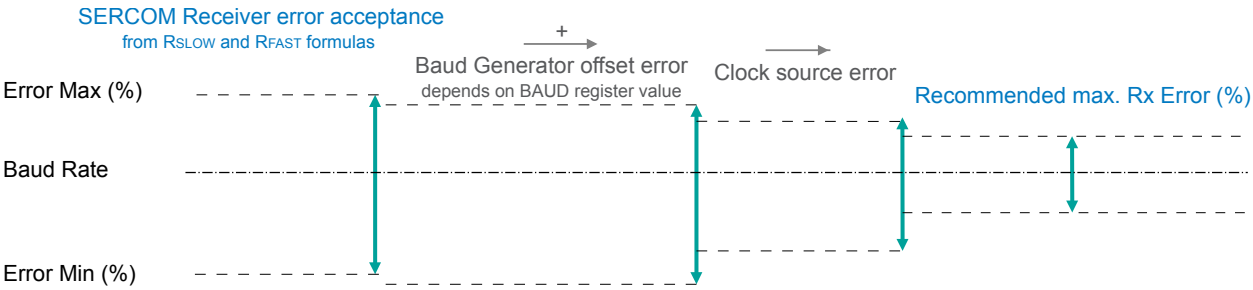
The following equations calculate the ratio of the incoming data rate and internal receiver baud rate:

$$R_{SLOW} = \frac{(D+1)S}{S-1+D\cdot S+S_F} \quad , \quad R_{FAST} = \frac{(D+2)S}{(D+1)S+S_M}$$

- R_{SLOW} is the ratio of the slowest incoming data rate that can be accepted in relation to the receiver baud rate
- R_{FAST} is the ratio of the fastest incoming data rate that can be accepted in relation to the receiver baud rate
- D is the sum of character size and parity size (D = 5 to 10 bits)
- S is the number of samples per bit (S = 16, 8 or 3)
- S_F is the first sample number used for majority voting (S_F = 7, 3, or 2) when CTRLA.SAMPA=0.
- S_M is the middle sample number used for majority voting (S_M = 8, 4, or 2) when CTRLA.SAMPA=0.

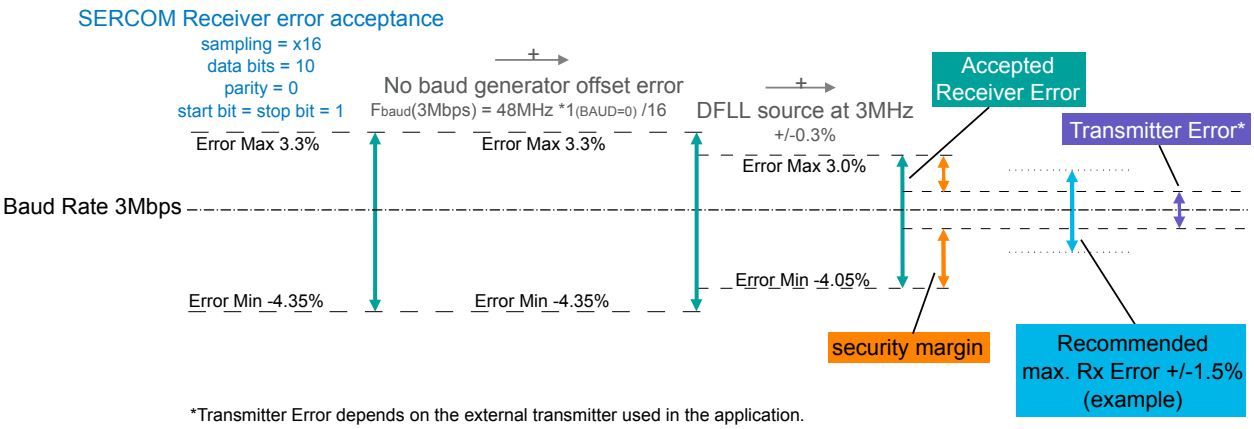
The recommended maximum Rx Error assumes that the receiver and transmitter equally divide the maximum total error. Its connection to the SERCOM Receiver error acceptance is depicted in this figure:

Figure 32-5. USART Rx Error Calculation



The recommendation values in the table above accommodate errors of the clock source and the baud generator. The following figure gives an example for a baud rate of 3Mbps:

Figure 32-6. USART Rx Error Calculation Example



*Transmitter Error depends on the external transmitter used in the application.
It is advised that it is within the Recommended max. Rx Error (+/-1.5% in this example).
Larger Transmitter Errors are acceptable but must lie within the Accepted Receiver Error.

Related Links

Clock Generation – Baud-Rate Generator on page 572
Asynchronous Arithmetic Mode BAUD Value Selection on page 573

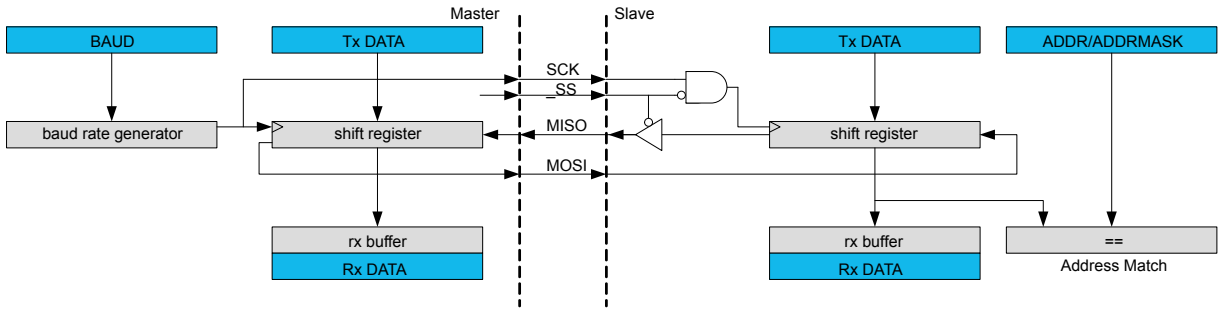
32.6.3. Additional Features

32.6.3.1. Parity

Even or odd parity can be selected for error checking by writing 0x1 to the Frame Format bit field in the Control A register (CTRLA.FORM).

33.3. Block Diagram

Figure 33-1. Full-Duplex SPI Master Slave Interconnection



33.4. Signal Description

Table 33-1. SERCOM SPI Signals

Signal Name	Type	Description
PAD[3:0]	Digital I/O	General SERCOM pins

One signal can be mapped to one of several pins.

Related Links

I/O Multiplexing and Considerations on page 30

33.5. Product Dependencies

In order to use this peripheral, other parts of the system must be configured correctly, as described below.

33.5.1. I/O Lines

In order to use the SERCOM's I/O lines, the I/O pins must be configured using the IO Pin Controller (PORT).

When the SERCOM is configured for SPI operation, the SERCOM controls the direction and value of the I/O pins according to the table below. Both PORT control bits PINCFGn.PULLEN and PINCFGn.DRVSTR are still effective. If the receiver is disabled, the data input pin can be used for other purposes. In master mode, the slave select line ($\overline{SS}$) is hardware controlled when the Master Slave Select Enable bit in the Control B register (CTRLB.MSSEN) is '1'.

Table 33-2. SPI Pin Configuration

Pin	Master SPI	Slave SPI
MOSI	Output	Input
MISO	Input	Output
SCK	Output	Input
$\overline{SS}$	Output (CTRLB.MSSEN=1)	Input

The combined configuration of PORT, the Data In Pinout and the Data Out Pinout bit groups in the Control A register (CTRLA.DIPO and CTRLA.DOPO) define the physical position of the SPI signals in the table above.

Related Links

PORT: IO Pin Controller on page 512

33.5.2. Power Management

This peripheral can continue to operate in any sleep mode where its source clock is running. The interrupts can wake up the device from sleep modes.

Related Links

PM – Power Manager on page 192

33.5.3. Clocks

The SERCOM bus clock (CLK_SERCOMx_APB) is enabled by default, and can be enabled and disabled in the Main Clock.

A generic clock (GCLK_SERCOMx_CORE) is required to clock the SPI. This clock must be configured and enabled in the Generic Clock Controller before using the SPI.

This generic clock is asynchronous to the bus clock (CLK_SERCOMx_APB). Therefore, writes to certain registers will require synchronization to the clock domains.

Related Links

GCLK - Generic Clock Controller on page 133

Peripheral Clock Masking on page 157

Synchronization on page 626

33.5.4. DMA

The DMA request lines are connected to the DMA Controller (DMAC). In order to use DMA requests with this peripheral the DMAC must be configured first. Refer to *DMAC – Direct Memory Access Controller* for details.

Related Links

DMAC – Direct Memory Access Controller on page 406

33.5.5. Interrupts

The interrupt request line is connected to the Interrupt Controller. In order to use interrupt requests of this peripheral, the Interrupt Controller (NVIC) must be configured first. Refer to *Nested Vector Interrupt Controller* for details.

Related Links

Nested Vector Interrupt Controller on page 52

33.5.6. Events

Not applicable.

33.5.7. Debug Operation

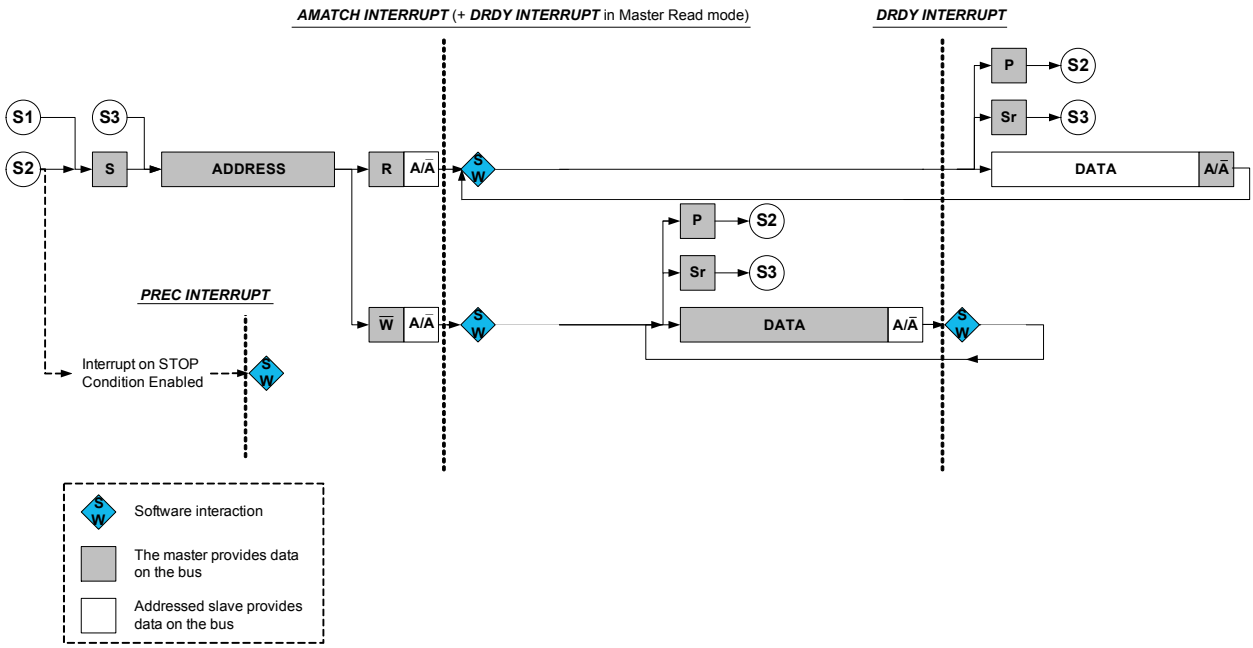
When the CPU is halted in debug mode, this peripheral will continue normal operation. If the peripheral is configured to require periodical service by the CPU through interrupts or similar, improper operation or data loss may result during debugging. This peripheral can be forced to halt operation during debugging - refer to the Debug Control (DBGCTRL) register for details.

33.5.8. Register Access Protection

Registers with write-access can be write-protected optionally by the peripheral access controller (PAC).

PAC Write-Protection is not available for the following registers:

Figure 34-10. I²C Slave Behavioral Diagram (SCLSM=1)



Receiving Address Packets (SCLSM=0)

When CTRLA.SCLSM=0, the I2C slave stretches the SCL line according to Figure 34-9. When the I²C slave is properly configured, it will wait for a start condition.

When a start condition is detected, the successive address packet will be received and checked by the address match logic. If the received address is not a match, the packet will be rejected, and the I²C slave will wait for a new start condition. If the received address is a match, the Address Match bit in the Interrupt Flag register (INTFLAG.AMATCH) will be set.

SCL will be stretched until the I²C slave clears INTFLAG.AMATCH. As the I²C slave holds the clock by forcing SCL low, the software has unlimited time to respond.

The direction of a transaction is determined by reading the Read / Write Direction bit in the Status register (STATUS.DIR). This bit will be updated only when a valid address packet is received.

If the Transmit Collision bit in the Status register (STATUS.COLL) is set, this indicates that the last packet addressed to the I²C slave had a packet collision. A collision causes the SDA and SCL lines to be released without any notification to software. Therefore, the next AMATCH interrupt is the first indication of the previous packet's collision. Collisions are intended to follow the SMBus Address Resolution Protocol (ARP).

After the address packet has been received from the I²C master, one of two cases will arise based on transfer direction.

Case 1: Address packet accepted – Read flag set

The STATUS.DIR bit is '1', indicating an I²C master read operation. The SCL line is forced low, stretching the bus clock. If an ACK is sent, I²C slave hardware will set the Data Ready bit in the Interrupt Flag register (INTFLAG.DRDY), indicating data are needed for transmit. If a NACK is sent, the I²C slave will wait for a new start condition and address match.

Typically, software will immediately acknowledge the address packet by sending an ACK/NACK bit. The I²C slave Command bit field in the Control B register (CTRLB.CMD) can be written to '0x3' for both read

36.6.4. DMA, Interrupts, and Events

Table 36-6. Module Requests for TCC

Condition	Interrupt request	Event output	Event input	DMA request	DMA request is cleared
Overflow / Underflow	Yes	Yes		Yes(1)	On DMA acknowledge
Channel Compare Match or Capture	Yes	Yes	Yes(2)	Yes(3)	For circular buffering: on DMA acknowledge For capture channel: when CCx register is read
Retrigger	Yes	Yes			
Count	Yes	Yes			
Capture Overflow Error	Yes				
Debug Fault State	Yes				
Recoverable Faults	Yes				
Non-Recoverable Faults	Yes				
TCCx Event 0 input			Yes(4)		
TCCx Event 1 input			Yes(5)		

Notes:

1. DMA request set on overflow, underflow or re-trigger conditions.
2. Can perform capture or generate recoverable fault on an event input.
3. In capture or circular modes.
4. On event input, either action can be executed:
   - re-trigger counter
   - control counter direction
   - stop the counter
   - decrement the counter
   - perform period and pulse width capture
   - generate non-recoverable fault
5. On event input, either action can be executed:
   - re-trigger counter
   - increment or decrement counter depending on direction
   - start the counter
   - increment or decrement counter based on direction
   - increment counter regardless of direction
   - generate non-recoverable fault

36.6.4.1. DMA Operation

The TCC can generate the following DMA requests:

38.8.11. Hash Key x (GCM mode only)

Name: HASHKEYx
Offset: 0x5C + n*0x04 [n=0..3]
Reset: 0x00000000
Property: PAC Write-protection

Bit	31	30	29	28	27	26	25	24
	HASHKEY[31:24]							
Access	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
Reset	0	0	0	0	0	0	0	0

Bit	23	22	21	20	19	18	17	16
	HASHKEY[23:16]							
Access	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
Reset	0	0	0	0	0	0	0	0

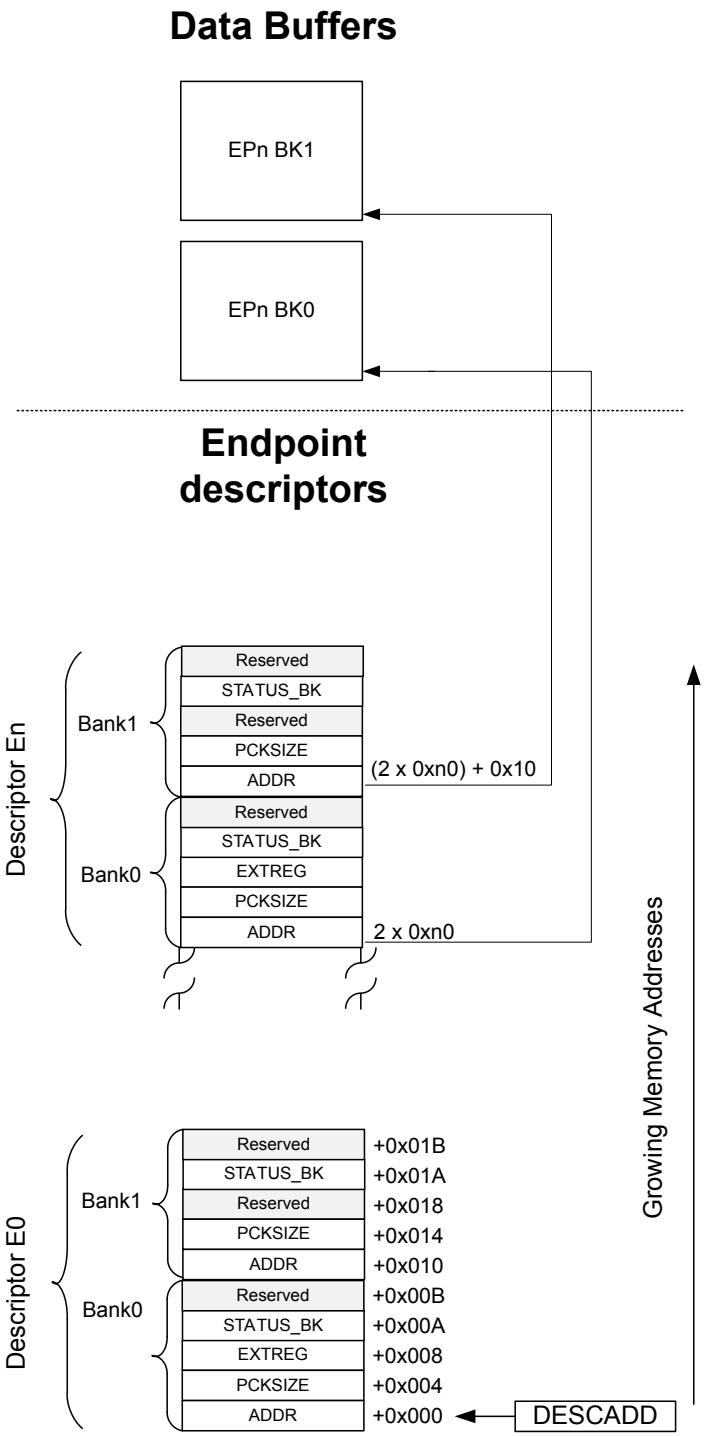
Bit	15	14	13	12	11	10	9	8
	HASHKEY[15:8]							
Access	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
Reset	0	0	0	0	0	0	0	0

Bit	7	6	5	4	3	2	1	0
	HASHKEY[7:0]							
Access	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
Reset	0	0	0	0	0	0	0	0

Bits 31:0 – HASHKEY[31:0]: Hash Key Value
The four 32-bit `HASHKEYx` registers contain the 128-bit Hash Key value computed from the AES KEY. The Hash Key value can also be programmed offering single GF128 multiplication possibilities.

39.8.4. Device Registers - Endpoint RAM

39.8.4.1. Endpoint Descriptor Structure



Value	Description
0x6	512 Byte(1)
0x7	1023 Byte(1)

(1) for Isochronous endpoints only.

Bits 27:14 – MULTI_PACKET_SIZE[13:0]: Multiple Packet Size
These bits define the 14-bit value that is used for multi-packet transfers.

For IN endpoints, MULTI_PACKET_SIZE holds the total number of bytes sent. MULTI_PACKET_SIZE should be written to zero when setting up a new transfer.

For OUT endpoints, MULTI_PACKET_SIZE holds the total data size for the complete transfer. This value must be a multiple of the maximum packet size.

Bits 13:0 – BYTE_COUNT[13:0]: Byte Count
These bits define the 14-bit value that is used for the byte count.

For IN endpoints, BYTE_COUNT holds the number of bytes to be sent in the next IN transaction.

For OUT endpoint or SETUP endpoints, BYTE_COUNT holds the number of bytes received upon the last OUT or SETUP transaction.

39.8.6.4. Pipe Status Set Register n

Name: PSTATUSSET
Offset: 0x105 + (n x 0x20)
Reset: 0x0000
Property: PAC Write-Protection

Bit	7	6	5	4	3	2	1	0
	BK1RDY	BK0RDY		PFREEZE		CURBK		DTGL
Access	R/W	R/W		R/W		R/W		R/W
Reset	0	0		0		0		0

Bit 7 – BK1RDY: Bank 1 Ready Set
Writing a zero to this bit has no effect.

Writing a one to this bit will set the bit PSTATUS.BK1RDY.

Bit 6 – BK0RDY: Bank 0 Ready Set
Writing a zero to this bit has no effect.

Writing a one to this bit will set the bit PSTATUS.BK0RDY.

Bit 4 – PFREEZE: Pipe Freeze Set
Writing a zero to this bit has no effect.

Writing a one to this bit will set PSTATUS.PFREEZE bit.

Bit 2 – CURBK: Current Bank Set
Writing a zero to this bit has no effect.

Writing a one to this bit will set PSTATUS.CURBK bit.

Bit 0 – DTGL: Data Toggle Set
Writing a zero to this bit has no effect.

Writing a one to this bit will set PSTATUS.DTGL bit.

SIZE[2:0]	Description
0x5	256 Byte(1)
0x6	512 Byte(1)
0x7	1024 Byte in HS mode(1) 1023 Byte in FS mode(1)

1. For Isochronous pipe only.

Bits 27:14 – MULTI_PACKET_SIZE[13:0]: Multi Packet IN or OUT size
These bits define the 14-bit value that is used for multi-packet transfers.

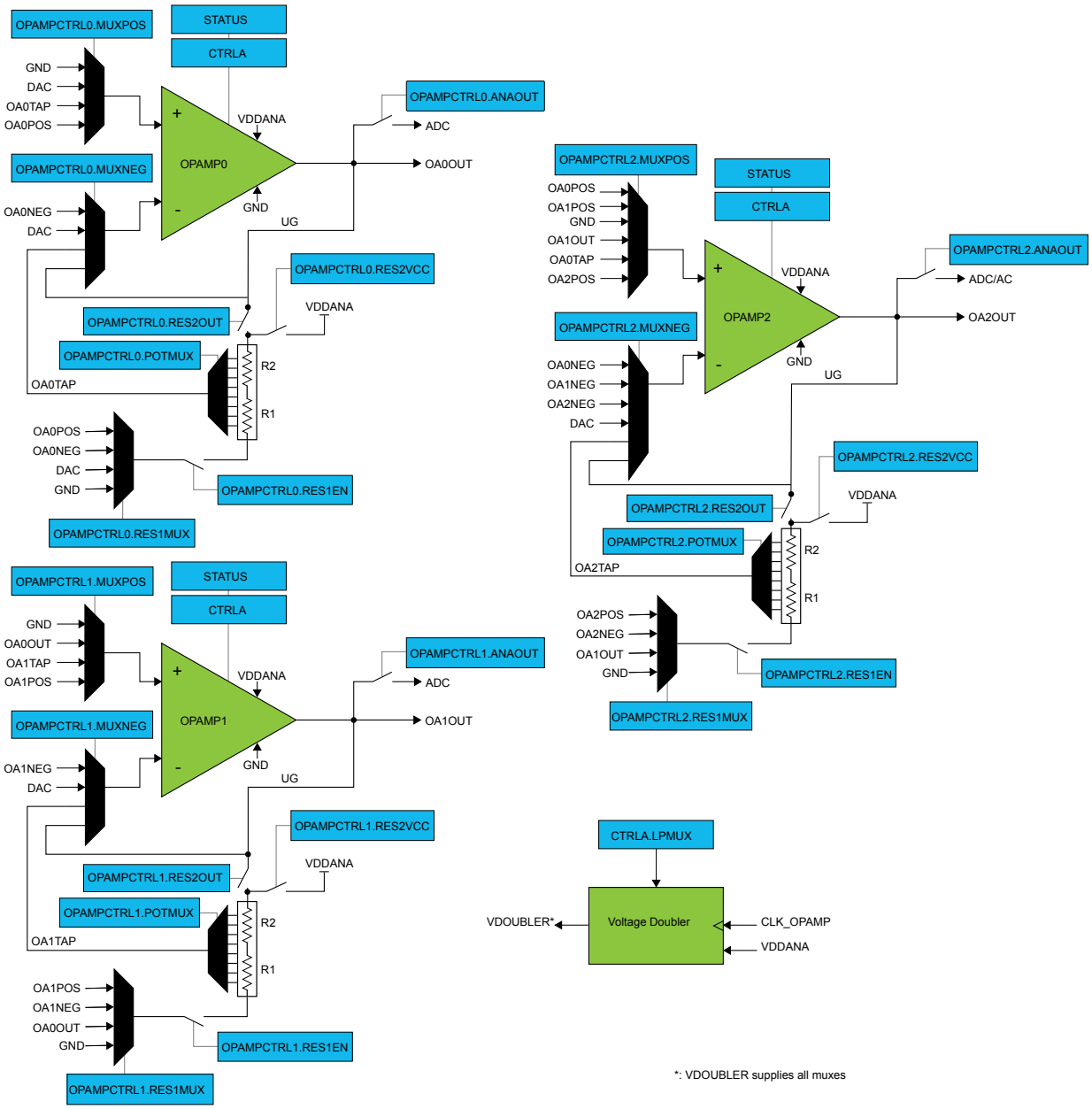
For IN pipes, MULTI_PACKET_SIZE holds the total number of bytes sent. MULTI_PACKET_SIZE should be written to zero when setting up a new transfer.

For OUT pipes, MULTI_PACKET_SIZE holds the total data size for the complete transfer. This value must be a multiple of the maximum packet size.

Bits 13:8 – BYTE_COUNT[5:0]: Byte Count
These bits define the 14-bit value that contains number of bytes sent in the last OUT or SETUP transaction for an OUT pipe, or of the number of bytes to be received in the next IN transaction for an input pipe.

41.3. Block Diagram

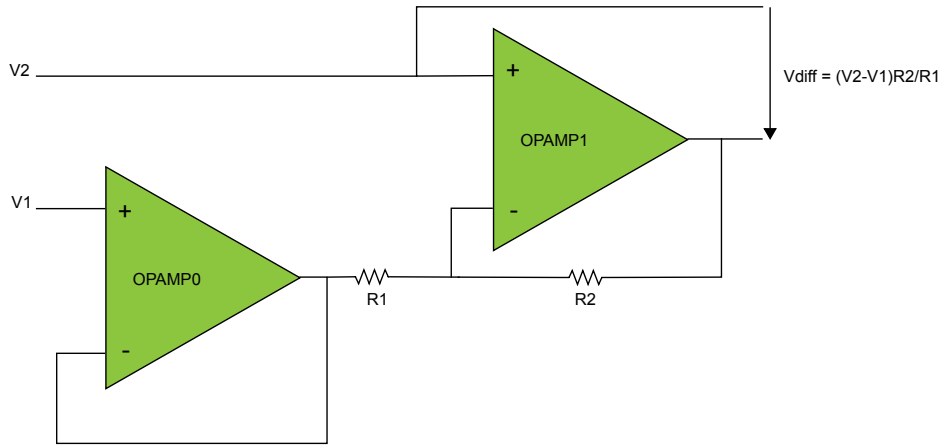
Figure 41-1. OPAMP Block Diagram



41.4. Signal Description

Signal	Description	Type
OA0POS	OPAMP0 positive input	Analog input
OA0NEG	OPAMP0 negative input	Analog input
OA1POS	OPAMP1 positive input	Analog input

Figure 41-7. OPAMP0 OPAMP1 Differential Amplifier



41.6.10.7. Instrumentation Amplifier

In this mode, OPAMP0 and OPAMP1 are configured as voltage followers. The OPAMPCTRLx register can be configured as follows:

Table 41-9. Instrumentation Amplifier Configuration

	MUXPOS	MUXNEG	RES1MUX	POTMUX	RES2VCC	RES2OUT	RES1EN	ANAOUT
OPAMP0	000	010	11	010	0	1	1	0
OPAMP1	000	010	11	000	0	0	0	0
OPAMP2	110	001	10	010	0	1	1	0

The resistor ladders associated with OPAMP0 and OPAMP2 must be configured as follows in order to select the appropriate gain:

Table 41-10. Instrumentation Amplifier Gain Selection

OPAMPCTRL0.POTMUX	OPAMPCTRL2.POTMUX	GAIN
0x7	Reserved	Reserved
0x6	0x0	1/7
0x5	Reserved	Reserved
0x4	0x1	1/3
0x3	Reserved	Reserved
0x2	0x2	1
0x1	0x4	3
0x0	0x6	7

Note: Either the DAC or GND must be the reference, selected by the OPAMPCTRL0.RES1MUX bits. Refer to OPAMPCTRL0, OPAMPCTRL1 and OPAMPCTRL2 for details.

Abbreviation	Description
INT	Interrupt
MBIST	Memory built-in self-test
MEM-AP	Memory Access Port
MTB	Micro Trace Buffer
NMI	Non-maskable interrupt
NVIC	Nested Vector Interrupt Controller
NVM	Non-Volatile Memory
NVMCTRL	Non-Volatile Memory Controller
OPAMP	Operation Amplifier
OSC	Oscillator
PAC	Peripheral Access Controller
PC	Program Counter
PER	Period
PM	Power Manager
POR	Power-on reset
PORT	I/O Pin Controller
PTC	Peripheral Touch Controller
PWM	Pulse Width Modulation
RAM	Random-Access Memory
REF	Reference
RTC	Real-Time Counter
RX	Receiver/Receive
SERCOM	Serial Communication Interface
SMBus™	System Management Bus
SP	Stack Pointer
SPI	Serial Peripheral Interface
SRAM	Static Random-Access Memory
SUPC	Supply Controller
SWD	Serial Wire Debug
TC	Timer/Counter
TCC	Timer/Counter for Control Applications
TRNG	True Random Number Generator
TX	Transmitter/Transmit