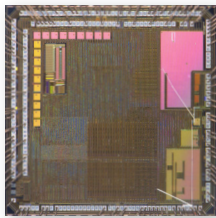


Intel® Quark™ microcontroller D1000

Flexible, ultra-low-power computing and performance, bringing low-cost integration to the next wave of intelligent connected devices

Internet of Things



Product Overview

Intel is proud to announce the Intel® Quark™ microcontroller D1000, a low-cost, extremely low-power, 32-bit microcontroller, ranking very high in computational performance. The Intel Quark microcontroller D1000 can provide flexible, low-power computing for a wide variety of vertical industry solutions—bringing low-cost integration and compatibility to the next wave of intelligent connected devices.

Integrated Security Features

The Intel Quark microcontroller D1000 extends rock-solid Intel security down to the device level to help protect your

data from the edge to the data center. Key security features include tamper resistance, optional JTAG lockout, CRC-16 and AES-128 routines in ROM, as well as reserved flash space for UID and/or keying materials.

Power-Efficient Intelligence at the Edge

The Intel Quark microcontroller D1000 has fine-grained power management features that enable your battery-powered and line-powered sensors to provide secure, intelligent processing at the edge for wired and wireless real-world applications.

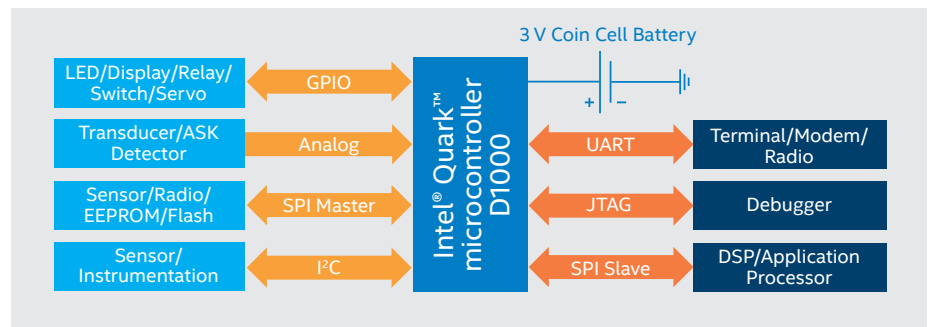


Figure 1. Example use case demonstrating the versatility of Intel® Quark™ microcontroller D1000 interfaces.

INTEL® QUARK™ MICROCONTROLLER D1000 FEATURES AT A GLANCE

FEATURE	SPECIFICATION
CPU	33 MHz 32-bit Harvard architecture tailored for MCUs
Flash	32 KB instruction + 4 KB data
Retention	≥10 years
Endurance	≥20,000 cycles
RAM	8 KB
ROM	8 KB
Wake-up from standby	<3 μs
General-use timers	3
Watchdog timer	Yes
Real-time clock	Yes
UARTs	2
SPI	2 (1 master with up to 4 devices, 1 slave)
I ² C	1 (master/slave)
Simultaneous serial I/O	All (5 channels)
ADC	19-channel SAR (12/10/8/6-bit @ 2.4/2.8/3.3/4.1 MSPs)
Comparators	19 wake-up comparators 6 high-speed 13 low-power
Security	Dedicated security pin, JTAG lockout
Package type	40-pin QFN, 6x6 mm
Power domains	5
Clock domains	8
Min/max crystals	0/2
Crystal oscillators	20–33 MHz (optional) 32 KHz (optional, for RTC)
Silicon oscillator	4/8/16/32 MHz ±2%
ADC clock generator	15.625 KHz to 33 MHz
CPU clock generator	125 KHz to 33 MHz
Input voltage	1.6–3.6 V
Flash write voltage	1.6–3.6 V
Max frequency voltage	1.6–3.6 V
Voltage regulator	1.35–1.8 V ±10%
Linear LDO	1.0–300 μA
Current buck	0.3–50 mA
Active current @3.3 V	0.5 mA @ 1 MHz 1.3 mA @ 4 MHz 7.7 mA @ 32 MHz
Standby current @3.3 V	2.1 μA w/o RTC 4.8 μA w/RTC
Retention current @3.3 V	1.6 μA w/o RTC 3.0 μA w/RTC

Notes

1. Power is measured at 25 °C on typical devices with a 3.3 V supply and static I/O.
2. Active power is measured while executing a 64-point FFT.
3. Power and latency figures assume silicon oscillator is used.
4. Standby and retention w/o RTC assume one low-power wake-up comparator is enabled.

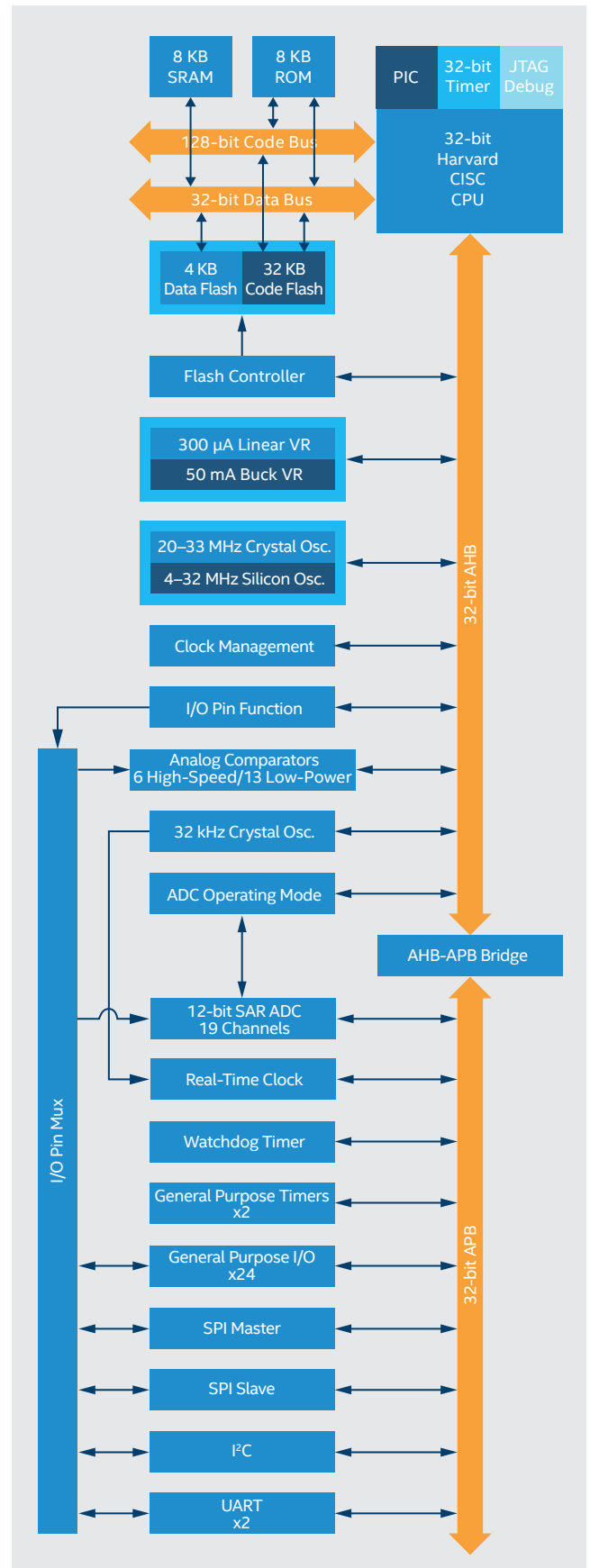


Figure 2. Intel® Quark™ microcontroller D1000 block diagram

Faster Time to Market

The Intel Quark microcontroller D1000 simplifies design and reduces bill of materials (BOM) costs by minimizing external components required on the platform. Integrated analog, digital, and serial interfaces make it easier to connect to a wide range of sensors, actuators, and communications devices.

The Intel Quark microcontroller D1000 provides tremendous flexibility by requiring a single DC power source within an operating range of 1.6 to 3.6 volts and supporting the serial interfaces typically seen on sensors, wireless modules, flash devices, and

EEPROMs. Additionally, all 24 of its bidirectional I/O pins can be used as general purpose I/O (GPIO). With programmable drive strength and integrated pull-ups, they can be connected directly to LEDs, relays, H-bridges, or switches.

Moreover, with a 19-channel 12-bit 2.4 MSps SAR ADC, six high-speed comparators, and 13 low-power wake-up comparators, its mixed signal capabilities are unsurpassed in its class.

The Intel Quark microcontroller D1000 comes in a 6x6 mm 40-pin QFN and is qualified over an industrial temperature range (-40 °C to +85 °C).

Broad Software Support

Development tools and sample applications provide access to internal registers, while integrated debugging capabilities expedite development and characterization of application performance. The Intel® System Studio for Microcontrollers plugs into the Eclipse* environment, the Intel® Integrated Development Environment (Intel® IDE) is custom- and purpose-built, and command-line utilities provide additional flexibility for developers.

MICROCONTROLLER SPECIFICATIONS

Cores/threads	1/1
Speed	32 MHz (33 MHz with external crystal)
ROM	8 KB
Program flash	32 KB
Data flash	4 KB
SRAM	8 KB
GPIOs	24
ADCs/precision	19-port ADC/2.4 MSps @ 12 bits
Serial Interfaces	SPI master, SPI slave, 2x UART, I ² C
Package dimensions/type	6x6 mm/QFN-40
Operating temperature	-40 °C to +85 °C
Supply voltage	1.62 V to 3.63 V

SPEC CODE	ORDERING CODE	STEPPING	PACKAGE	FORMAT
SLKMJ	DMNIAD01SLVBT	B1	QFN-40	T&R



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