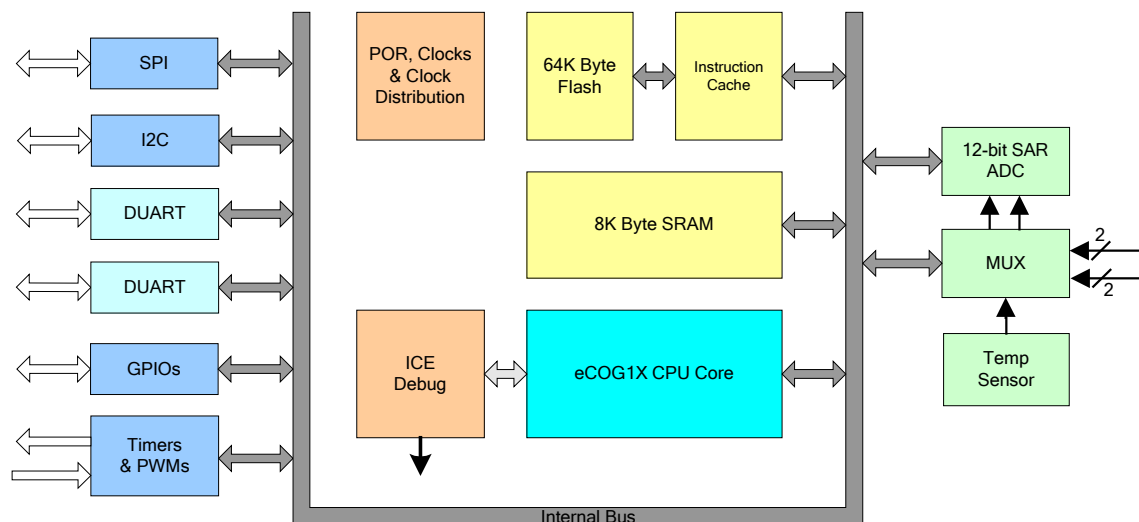


eCOG1XE01 Microcontroller Product Brief



The **eCOG1XE01** is a low-power single-chip microcontroller with 64Kbytes of flash memory and 8Kbytes of static RAM. It uses an internal Harvard architecture for high performance. It is available in a 68-pin QFN package. It is supported fully by Cyan's free, class-leading, integrated development environment, **CyanIDE**, which includes automatic peripheral configuration and an unrestricted ANSI C Compiler. A low cost development kit is available.

- ◆ 0 to 24MHz 1.8V core
- ◆ Powerful arithmetic operations
- ◆ Internal Harvard Architecture
- ◆ Built in Emulator (eICE)
- ◆ Low power operation
- ◆ 64Kbytes FLASH
- ◆ 8Kbytes SRAM
- ◆ Instruction cache
- ◆ Code security feature
- ◆ Fast Vectored Interrupts
- ◆ 2 x DUARTs
- ◆ SPI
- ◆ I²C
- ◆ Multi Purpose Timers
 - ◆ Clock timer
 - ◆ 2 x counter / timer
 - ◆ 2 x PWM timer
- ◆ Capture timer with 2 inputs
- ◆ Watchdog Timer
- ◆ Dual 12-bit 200ks/s SAR ADC
- ◆ 2x2 channel analogue multiplexer
- ◆ Temperature Sensor
- ◆ Power-On Reset
- ◆ 20 GPIO pins/peripheral I/O
- ◆ 3.3V supply, 1.8V core
- ◆ 24MHz clock from watch crystal
- ◆ Internal relaxation oscillator
- ◆ Operating temperature range: -40°C to +85°C



eCOG1XE01 Block Diagram

CPU Core

- 16-bit 24MHz CPU core.
- Internal Harvard architecture.
- 64Kbyte code address space.
- 64Kbyte data address space.
- Vectored interrupts.
- Full ICE debug support.

Flash Memory

- 64Kbytes.
- Organised into multiple sectors.
- Can be used for both code and data.
- Global and sector write protection.
- Simple programming via eICE, JTAG or in-system via CPU.

Instruction Cache

- Increases execution speed.
- Reduces power consumption.
- Provides a large number of address breakpoints by locking BRK commands in the cache.

Static RAM

- 8Kbytes.
- Can be used for both code and data.

DUARTs

- Two independent dual UART modules.
- Each DUART has two asynchronous double-buffered serial ports.
- 7 or 8 data bits.
- 1 or 2 stop bits.
- Even, odd or no parity.
- Programmable Baud rate generator.

I²C

- Two wire I²C compatible port.
- Address matching.
- Master and slave operation.
- Supports 7-bit and 10-bit addressing.
- 100kHz performance.

SPI

- Four wire SPI compatible port.
- Master and slave operation.
- Data transfer size of 1 to 16 bits.
- Master chip select output.
- Slave chip select input.
- Selectable clock polarity and phase.
- Support for multiple transfers with programmable delay times.

Timers

- 16-bit timer TMR.
- Two 16-bit timer/counters CNT1/2.
- Two 16-bit timers PWM1/2.
- 16-bit event capture timer CAP with two capture inputs.
- 16-bit watchdog timer WDOG.

General Purpose I/O (GPIO)

- 20 GPIO port pins/peripheral I/O.
- Individually configurable as inputs, outputs, or bidirectional.
- Outputs driven, open-drain, or tristate.
- 2mA and 4mA output current.

External Interrupts

- Interrupts available on all GPIO inputs.
- Level or edge sensitive interrupts.

Dual 12-bit ADCs

- Dual 12-bit successive approximation ADCs.
- 10 bit, 8 bit and 6 bit modes for faster conversion.
- 200ks/s at 12 bits resolution.
- 350ks/s at 10 bits resolution.
- 500ks/s at 8 bits resolution.
- 800ks/s at 6 bits resolution.
- Dual analogue input multiplexers with two input channels and automatic scanning.
- Single ended or differential inputs.
- Conversion trigger from software or internal hardware timer event.
- On-chip temperature sensor.

Clocks

- Two crystal oscillators.
- Internal programmable PLL multipliers.
- Low cost 32kHz watch crystal can generate 24MHz internal clock.
- Second 8MHz crystal oscillator generates 24MHz internal clock.
- Internal relaxation oscillator provides fast clock startup and 1MHz operation with no external components.
- Selection of clock source and PLL frequency under software control.

C Compiler Suite

- ANSI C Compiler.
- Validated to ANSI/ISO/FIPS-160.
- ANSI standard C library.
- Macro Assembler.
- Software Simulator and debugger.

eICE Debug Interface

- Real-time debug port.
- Accesses to memory anywhere in internal flash or SRAM.
- Run, Step, Stop commands to control program execution.
- Hardware address and data breakpoint registers.
- Flash programming.

JTAG

- Access for test and boundary scan.

Power Saving Features

- Highly flexible peripheral clock setup.
- Sleep mode with wake on interrupts.
- Fully static standby mode.

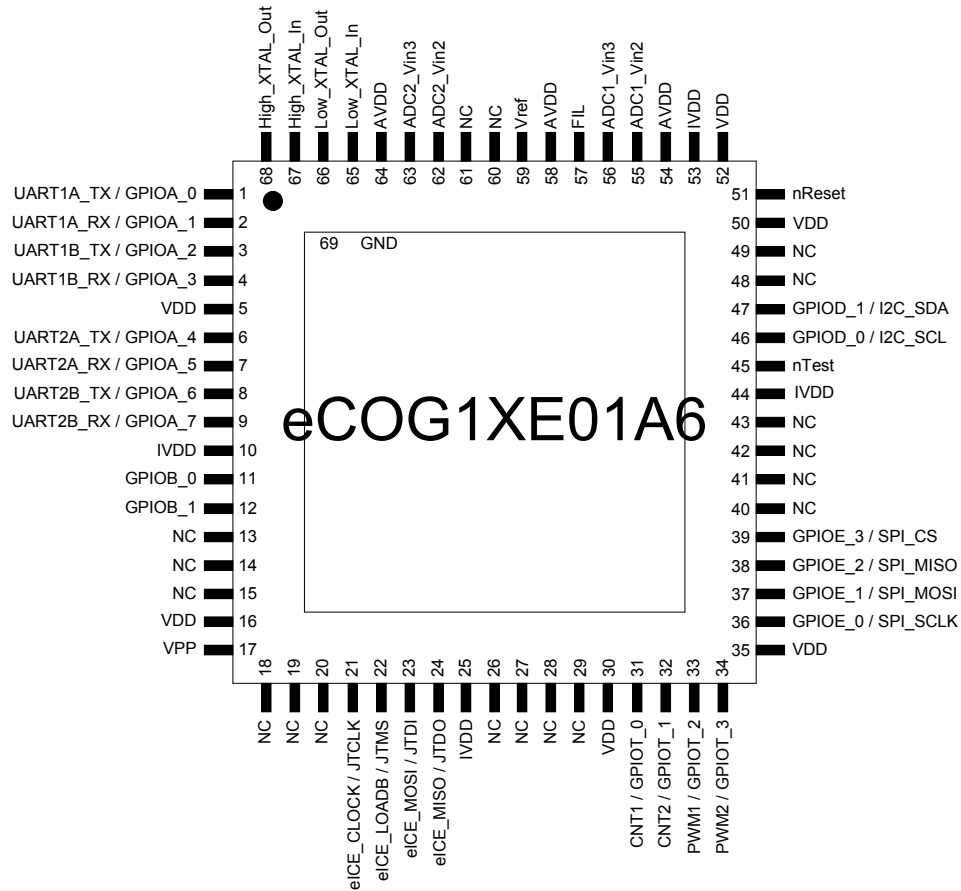
Power Supplies

- 1.8V core supply.
- 3.3V I/O supply.
- On-chip power-on reset circuit.

- Industrial operating temperature range: -40°C to +85°C

eCOG1XE01A6

Pin Diagram: 68 pin QFN – A package (top view).

**Pin List**

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	UART1A_TX / GPIOA_0	18	NC	35	VDD	52	VDD
2	UART1A_RX / GPIOA_1	19	NC	36	SPI_SCLK / GPIOE_0	53	IVDD
3	UART1B_TX / GPIOA_2	20	NC	37	SPI_MOSI / GPIOE_1	54	AVDD
4	UART1B_RX / GPIOA_3	21	eICE_CLK / JTCLK	38	SPI_MISO / GPIOE_2	55	ADC1_Vin2
5	VDD	22	eICE_LOADB / JTMS	39	SPI_CS / GPIOE_3	56	ADC1_Vin3
6	UART2A_TX / GPIOA_4	23	eICE_MOSI / JTDI	40	NC	57	FIL
7	UART2A_RX / GPIOA_5	24	eICE_MISO / JTDO	41	NC	58	AVDD
8	UART2B_TX / GPIOA_6	25	IVDD	42	NC	59	VREF
9	UART2B_RX / GPIOA_7	26	NC	43	NC	60	NC
10	IVDD	27	NC	44	IVDD	61	NC
11	GPIOB_0	28	NC	45	nTEST	62	ADC2_Vin2
12	GPIOB_1	29	NC	46	I2C_SCL / GPIOD_0	63	ADC2_Vin3
13	NC	30	VDD	47	I2C_SDA / GPIOD_1	64	AVDD
14	NC	31	CNT1 / GPIOT_0	48	NC	65	Low_XTAL_In
15	NC	32	CNT2 / GPIOT_1	49	NC	66	Low_XTAL_Out
16	VDD	33	PWM1 / GPIOT_2	50	VDD	67	High_XTAL_In
17	VPP	34	PWM2 / GPIOT_3	51	nReset	68	High_XTAL_Out
						69	GND ¹

1. The 68QFN package has a large central body contact which forms the GND pad. This is listed as pin 69.
2. Pins labelled NC may be connected internally and should be left open-circuit.

Notes

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I²C and the I2C interface are patented by Philips Semiconductor in certain territories. Philips may demand a royalty or licence fee from designs using the I2C interface.

Declaration of RoHS Compliance

Cyan Technology Ltd hereby declares that the eCOG1XE01 is in full compliance with the European Directive 2002/95/EC, The Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS).

This declaration is made based on data provided by our material suppliers, and independent analysis of all homogenous materials used in the manufacture of the product.

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