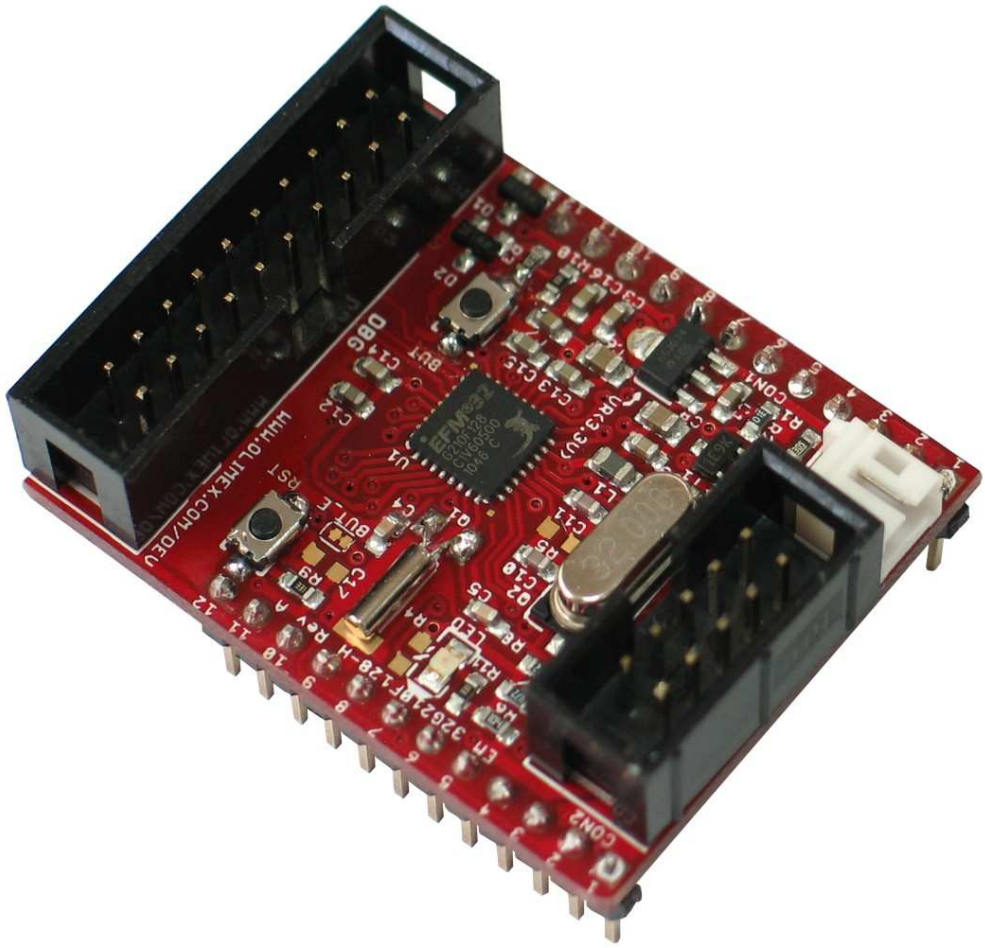

EM-32G210F128-H development board

Users Manual

Pb-free, Green All boards produced by Olimex are ROHS compliant

Revision Initial, September 2011

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INTRODUCTION:

EM-32G210F128-H is small header board with EFM32G210F128 Cortex M3 microcontroller from Energy Micro AS. With a unique combination of the powerful 32-bit ARM Cortex-M3, innovative low energy techniques, short wake-up time from energy saving modes, and a wide selection of peripherals, the EFM32G210F128 microcontroller is well suited for any battery operated application as well as other systems requiring high performance and low-energy consumption. On the board are available DBG connector for programming/debugging, UEXT connector for connecting some of our module boards to it, user button, status led and reset button.

BOARD FEATURES:

- MCU: EFM32G210F128
- Debug Interface
- UEXT
- Two extension connectors
- Status Led
- User button
- Reset button
- Battery connector
- FR-4, 1.5 mm, soldermask, component print
- Dimensions: 43.00 x 34.50mm (1.69 x 1.36")

ELECTROSTATIC WARNING:

The **EM-32G210F128-H** board is shipped in protective anti-static packaging. The board must not be subject to high electrostatic potentials. General practice for working with static sensitive devices should be applied when working with this board.

BOARD USE REQUIREMENTS:

Cables: The cable you will need depends on the programmer/debugger you use. If you use ARM-JTAG-EW, you will need USB A-B cable.

Hardware: Programmer/Debugger ARM-JTAG-EW or other compatible programming/debugging tool if you work with EW-ARM.

PROCESSOR FEATURES:

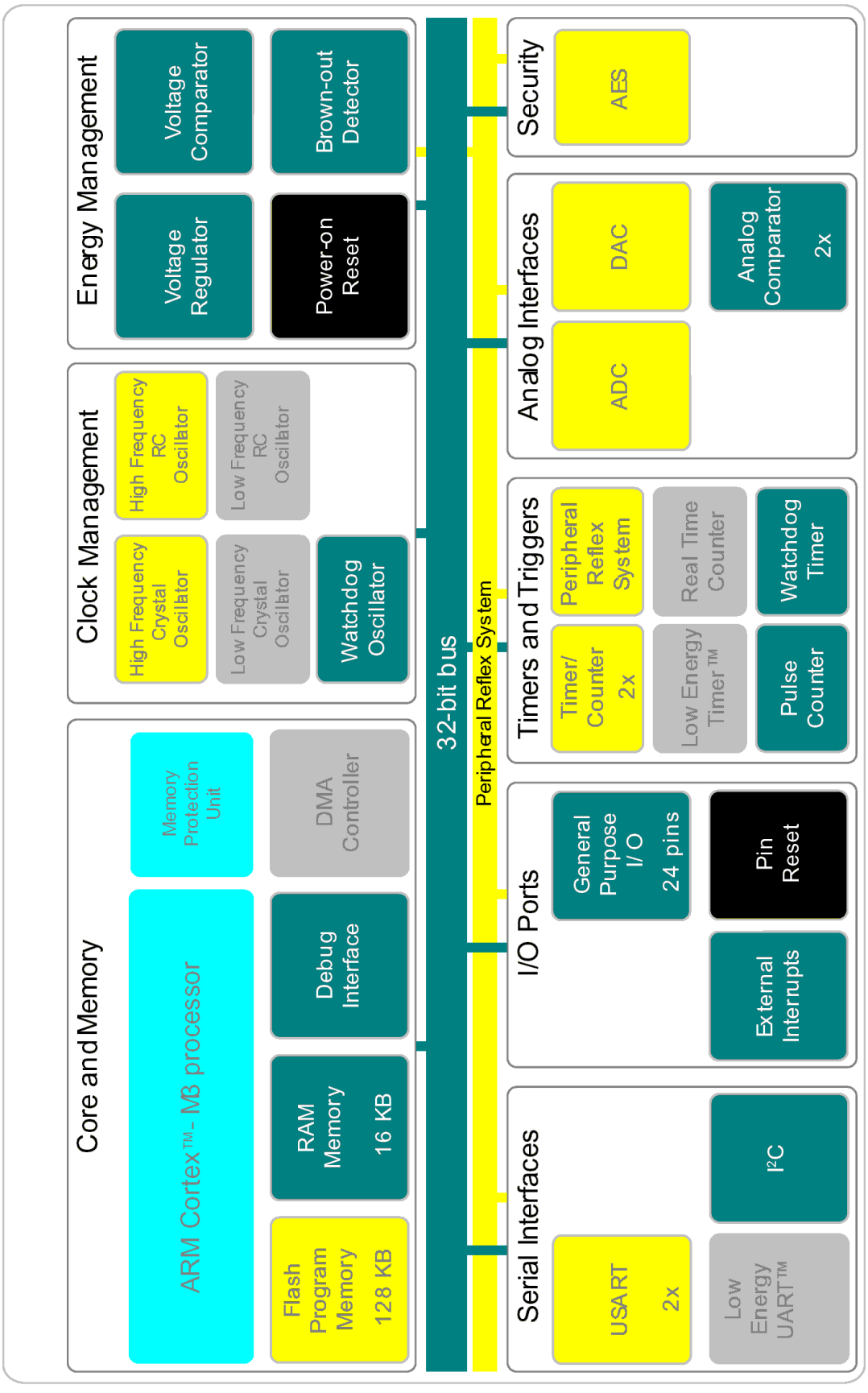
EM-32G210F128-H board use ARM 32-bit Cortex-M3 microcontroller **EFM32G210F128** from Energy Micro AS with these features:

- ARM Cortex-M3 CPU platform
  - High Performance 32-bit processor @ up to 32 MHz
  - Memory Protection Unit
  - Wake-up Interrupt Controller
- Flexible Energy Management System
  - 20 nA @ 3 V Shutoff Mode
  - 0.6 µA @ 3 V Stop Mode, including Power-on Reset, Brown-out Detector, RAM and CPU retention
  - 0.9 µA @ 3 V Deep Sleep Mode, including Real Time Clock with 32.768 kHz oscillator, Power-on Reset, Brown-out Detector, RAM and CPU retention
  - 45 µA/MHz @ 3 V Sleep Mode
  - 180 µA/MHz @ 3 V Run Mode, with code executed from flash
- 128 KB Flash
- 16 KB RAM
- 24 General Purpose I/O pins
  - Configurable Push-pull, Open-drain, pull-up/down, input filter, drive strength
  - Configurable peripheral I/O locations
  - 14 asynchronous external interrupts
- 8 Channel DMA Controller

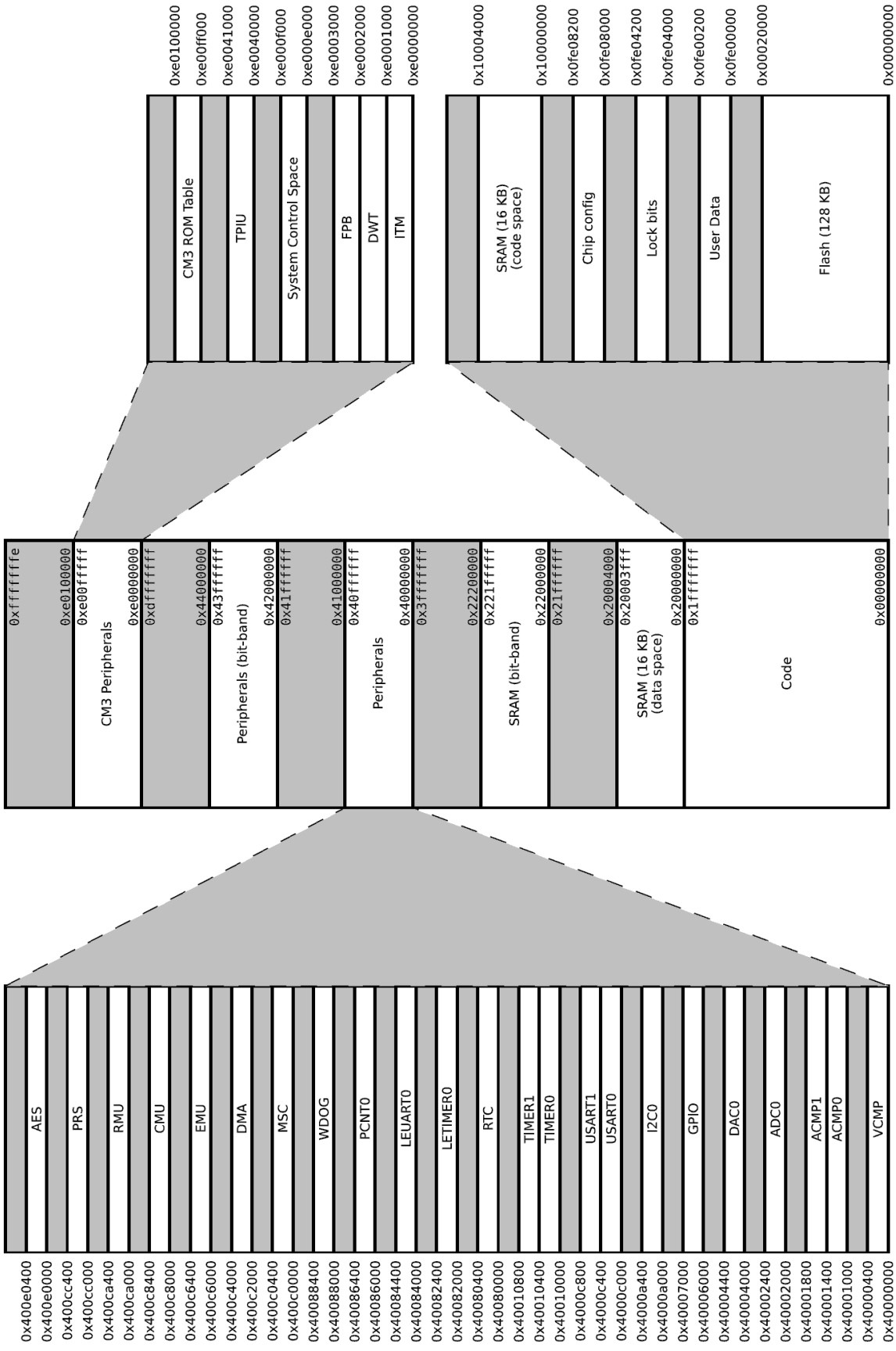
- 8 Channel Peripheral Reflex System for autonomous inter-peripheral signaling
- Hardware AES with 128/256-bit keys in 54/75 cycles
- Timers/Counters
  - 2× 16-bit Timer/Counter
    - 2×3 Compare/Capture/PWM channels
    - Dead-Time Insertion on TIMER0
  - 16-bit Low Energy Timer
  - 24-bit Real-Time Counter
  - 8-bit Pulse Counter
    - Asynchronous pulse counting/quadrature decoding
  - Watchdog Timer with dedicated RC oscillator @ 50 nA
- Communication interfaces
  - 2× Universal Synchronous/Asynchronous Receiver/Transmitter
    - UART/SPI/SmartCard (ISO 7816)/IrDA
    - Triple buffered full/half-duplex operation
    - 4-16 data bits
  - Low Energy UART
    - Autonomous operation with DMA in Deep Sleep Mode
  - I2C Interface with SMBus support
    - Address recognition in Stop Mode
- Ultra low power precision analog peripherals
  - 12-bit 1 Msamples/s Analog to Digital Converter
    - 4 single ended channels/2 differential channels
    - On-chip temperature sensor
    - Conversion tailgating for predictable latency
  - 12-bit 500 ksamples/s Digital to Analog Converter
  - 2× Analog Comparator
    - Programmable speed/current
    - Capacitive sensing with up to 5 inputs
  - Supply Voltage Comparator
- Ultra efficient Power-on Reset and Brown-Out Detector
- 2-pin Serial Wire Debug interface
  - 1-pin Serial Wire Viewer
- Pre-Programmed Serial Bootloader
- Temperature range -40 to 85 ^{o}C

– Single power supply 1.8 to 3.8 V

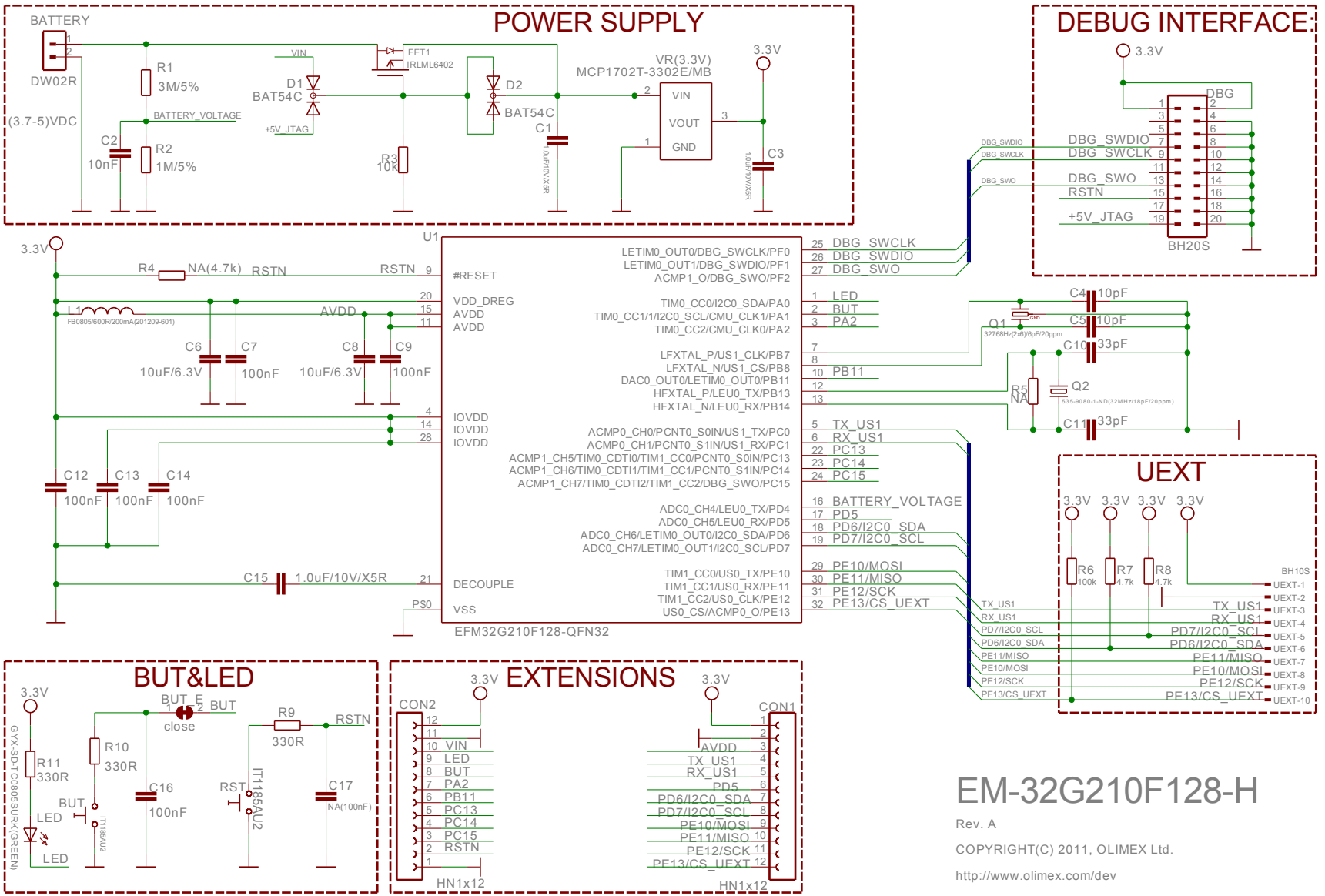
BLOCK DIAGRAM:



MEMORY MAP:


0xe0100000
0xe00ff000
0xe0041000
0xe0040000
0xe000f000
0xe000e000
0xe0003000
0xe0002000
0xe0001000
0xe0000000
CM3 ROM Table
TPIU
System Control Space
FPB
DWT
ITM
0x10004000
0x10000000
0x0fe08200
0x0fe08000
0x0fe04200
0x0fe04000
0x0fe00200
0x0fe00000
0x00020000
0x00000000
SRAM (16 KB) (code space)
Chip config
Lock bits
User Data
Flash (128 KB)
0xffffffff
0xe0100000
0xe00fffff
0xe0000000
0xdfffffff
0x44000000
0x43ffffff
0x42000000
0x41ffffff
0x41000000
0x40ffffff
0x40000000
0x3fffffff
0x22200000
0x221fffff
0x22000000
0x21ffffff
0x20004000
0x20003fff
0x20000000
0x1fffffff
0x00000000
CM3 Peripherals
Peripherals (bit-band)
Peripherals
SRAM (bit-band)
SRAM (16 KB) (data space)
Code
0x400e0400
0x400e0000
0x400cc400
0x400cc000
0x400ca400
0x400ca000
0x400c8400
0x400c8000
0x400c6400
0x400c6000
0x400c4000
0x400c2000
0x400c0400
0x400c0000
0x40088400
0x40088000
0x40086400
0x40086000
0x40084400
0x40084000
0x40082400
0x40082000
0x40080400
0x40080000
0x40010800
0x40010400
0x40010000
0x4000c800
0x4000c400
0x4000c000
0x4000a400
0x4000a000
0x40007000
0x40006000
0x40004400
0x40004000
0x40002400
0x40002000
0x40001800
0x40001400
0x40001000
0x40000400
0x40000000
AES
PRS
RMU
CMU
EMU
DMA
MSC
WDOG
PCNT0
LEUART0
LETIMER0
RTC
TIMER1
TIMER0
USART1
USART0
I2C0
GPIO
DAC0
ADC0
ACMP1
ACMP0
VCMP

SCHEMATIC:



EM-32G210F128-H

Rev. A

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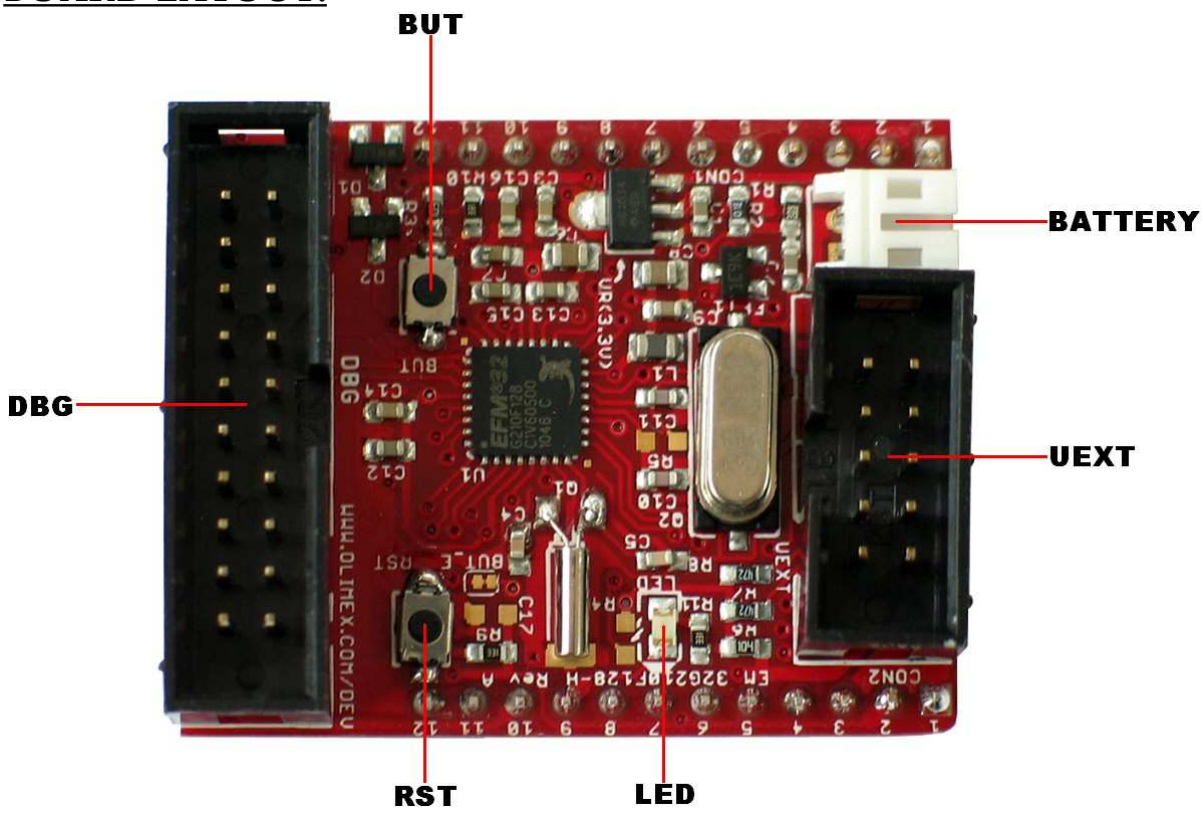
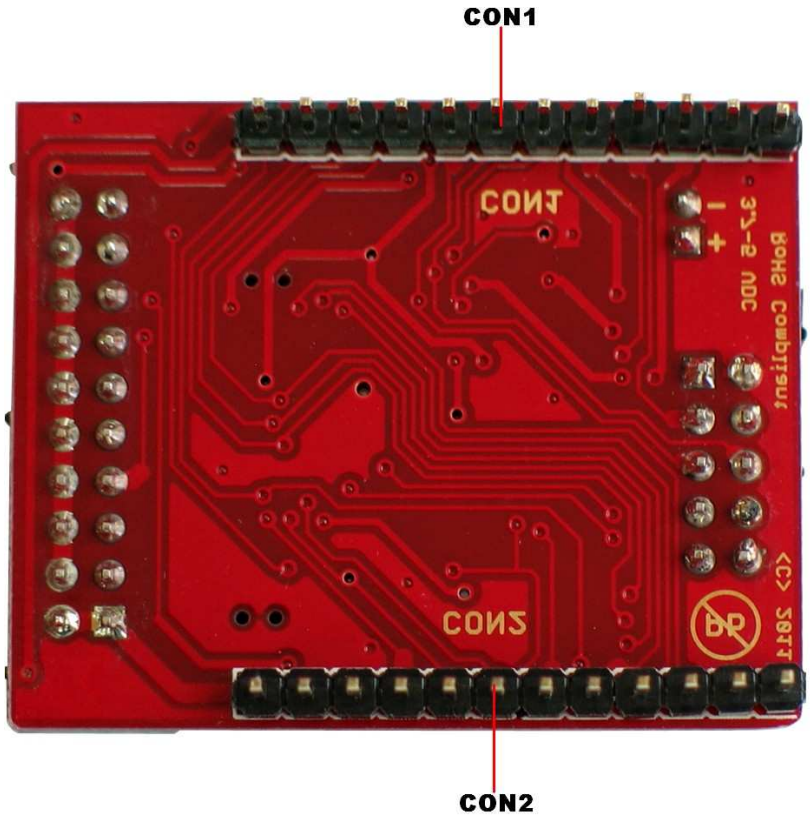
BOARD LAYOUT:





POWER SUPPLY CIRCUIT:

EM-32G210F128-H is typically power supplied by Li-ion battery but battery connector allows 3.7-5 VDC.

The board can also be power supplied from extension CON2 pin 10 (VIN – 3.8-6VDC) and pin 11 (GND) and from DBG connector(pin19 – 3.8-6VDC).

The programmed board power consumption is about 7 mA with all peripherals enabled.

RESET CIRCUIT:

EM-32G210F128-H reset circuit includes R9 (330Ω), CON2 - pin 2, DBG connector pin 15, EFM32G210F128 pin 9 (#RESET) and RESET button.

CLOCK CIRCUIT:

Quartz crystal **Q1** 32.768 kHz is connected to EFM32G210F128 pin 7 (LFXTAL_P/US1_CLK/PB7) and pin 8 (LFXTAL_N/US1_CS/PB8).

Quartz crystal **Q2** 32MHz is connected to EFM32G210F128 pin 12 (HFXTAL_P/LEU0_TX/PB13) and pin 13 (HFXTAL_N/LEU0_RX/PB14).

JUMPER DESCRIPTION:

BUT_E

This jumper enables the user button – BUT.
Default state is closed.

INPUT/OUTPUT:

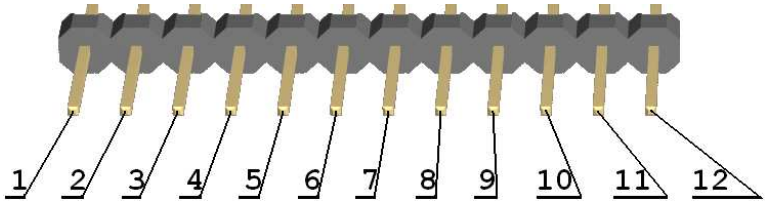
Status led (green), with name **LED**, connected to EFM32G210F128 pin 1 (TIM0_CC0/I2C0_SDA/PA0).

User button with name **BUT** connected, via BUT_E, to **EFM32G210F128** pin 2 (TIM0_CC1/1/I2C0_SCL/CMU_CLK1/PA1).

User button with name **RST** connected to **EFM32G210F128** pin 9 (#RESET).

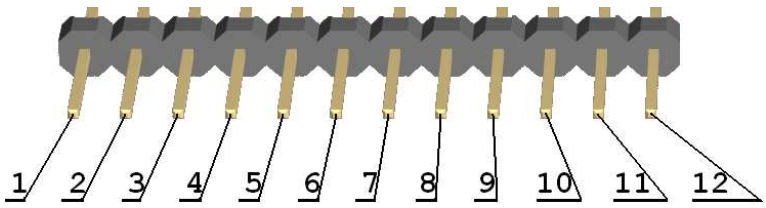
EXTERNAL CONNECTORS DESCRIPTION:

CON1:



Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	GND
3	AVDD	4	TX_US1
5	RX_US1	6	PD5
7	PD6/I2C0_SDA	8	PD7/I2C0_SCL
9	PE10/MOSI	10	PE11/MISO
11	PE12/SCK	12	PE13/CS_UEXT

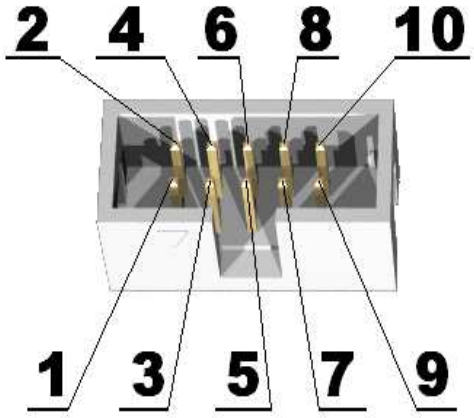
CON2:



Pin #	Signal Name	Pin #	Signal Name
1	GND	2	RSTN
3	PC15	4	PC14
5	PC13	6	PB11
7	PA2	8	BUT
9	LED	10	VIN
11	GND	12	VCC

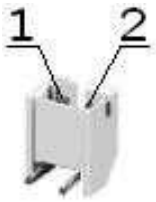
UEXT:

Pin #	Signal Name
1	VCC
2	GND
3	TX_US1
4	RX_US1
5	PD7/I2C0_SCL
6	PD6/I2C0_SDA
7	PE11/MISO
8	PE10/MOSI
9	PE12/SCK
10	PE13/CS_UEXT

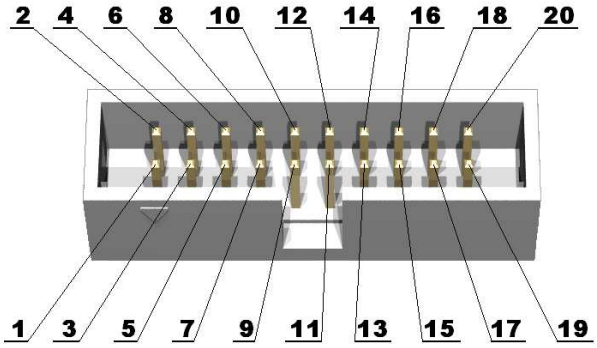


BATTERY:

Pin #	Signal Name
1	to VCC
2	GND

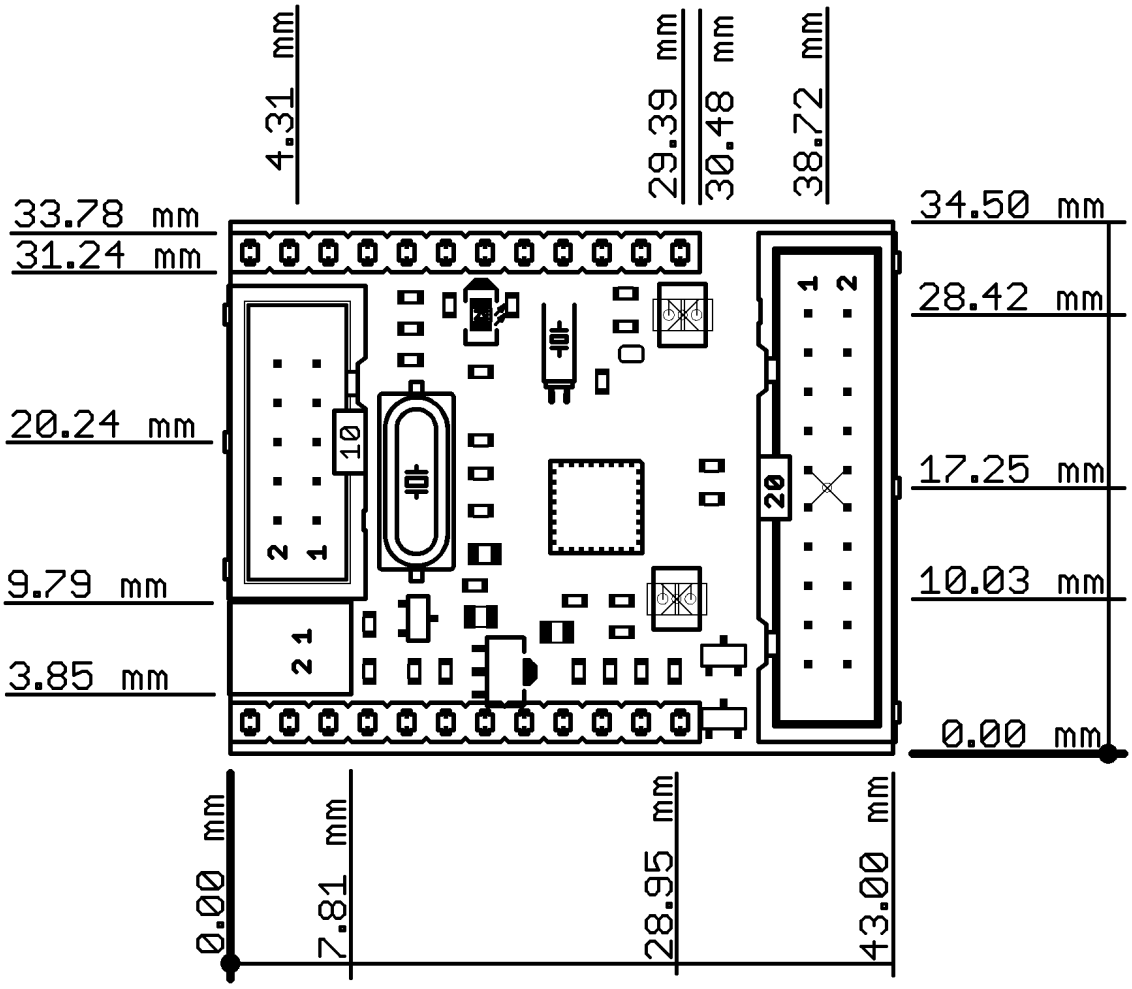


DBG:



Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	VCC
3	Not connected	4	GND
5	Not connected	6	GND
7	DBG_SWDIO	8	GND
9	DBG_SWCLK	10	GND
11	Not connected	12	GND
13	DBG_SWO	14	GND
15	RSTN	16	GND
17	Not connected	18	GND
19	+5V_JTAG	20	GND

MECHANICAL DIMENSIONS:



AVAILABLE DEMO SOFTWARE:

- Blinking led

ORDER CODE:

EM-32G210F128-H - assembled and tested board

How to order?

You can order to us directly or by any of our distributors.
Check our web www.olimex.com/dev for more info.

Revision history:

Board's revision:

Rev. A, July 2011

Manual's revision:

Rev. Initial, September 2011

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