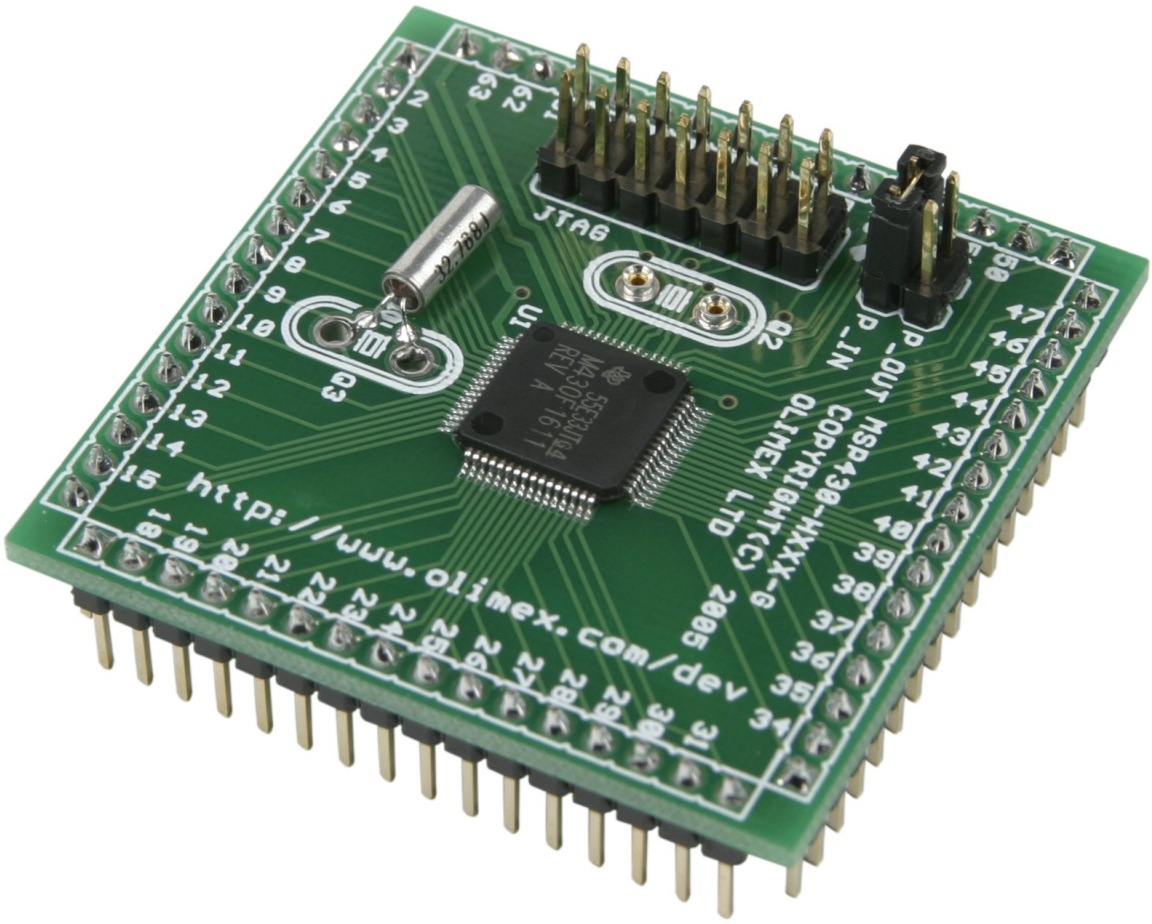


MSP430-H2618 development board

Users Manual

Pb-free, Green

All boards produced by Olimex are RoHS compliant

Rev. Initial, April 2009

INTRODUCTION:

MSP430-H2618 header board provides easy way for developing and prototyping with the new mixed signal MSP430F2618 microcontroller. It has JTAG interface and most of the GPIOs are on extension headers where you can connect your additional circuits.

BOARD FEATURES:

- MCU: MSP430F2618 with 116 KB + 256 B Flash Memory, 8 KB RAM
- JTAG connector
- 32 768 Hz oscillator crystal
- Optional high frequency crystal (socket)
- Extension headers for all microcontroller pins
- PCB: FR-4, 1.5 mm (0.062''), green soldermask, silkscreen component print
- Dimensions 46.99 x 46.99 mm (1.850 x 1.850")

ELECTROSTATIC WARNING:

The **MSP430-H2618** 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 MSP430-JTAG, you will need LPT cable. You will need 1.8 meter USB A-B cable to connect MSP430-JTAG-ISO or MSP430-JTAG-TINY to a USB host on your PC. If you use MSP430-JTAG-RF, you will not need a cable.

Hardware: Programmer/Debugger – one of the Olimex MSP430-JTAG tools: **MSP430-JTAG, MSP430-JTAG-ISO, MSP430-JTAG-TINY, MSP430-JTAG-RF**.

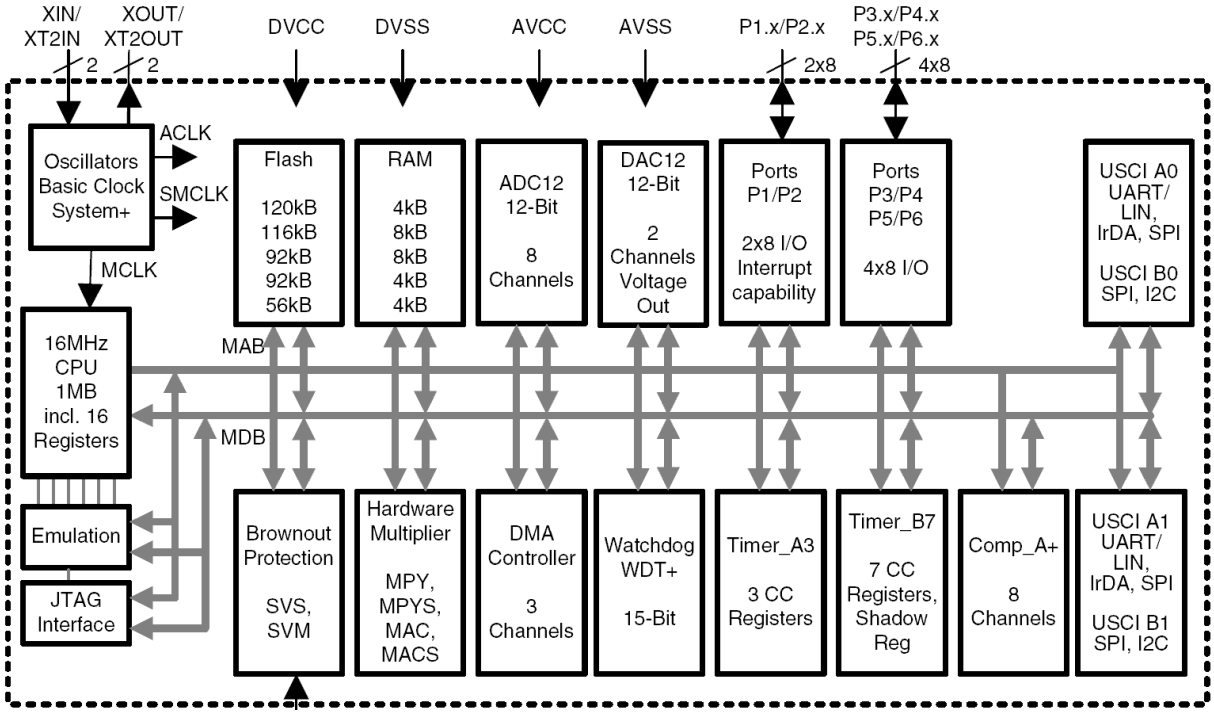
Software: **Olimex MSP430 programmer** – free stand-alone software which allows you to program MSP430 devices without any third party software; **MSP430 Kick Start** C compiler and debugger (free for assembly, limited for C); **MSPGCC** – free compiler and debugger. You will also need **drivers** for the JTAG programmer that you use (to be found on the corresponding web pages on our web site).

PROCESSOR FEATURES:

MSP430-H2618 board uses MCU **MSP430F2618** from Texas Instruments with these features:

- Low Supply Voltage Range, 1.8 V to 3.6 V
- Ultra-Low Power Consumption:
    - Active Mode: 365 µA at 1 MHz, 2.2 V
    - Standby Mode: 0.5 µA
    - Off Mode (RAM Retention): 0.1 µA
- Wake-Up From Standby Mode in Less Than 1µs
- 16-Bit RISC Architecture, 62.5-ns Instruction Cycle Time
- Three-Channel Internal DMA
- 12-Bit Analog-to-Digital (A/D) Converter With Internal Reference, Sample-and-Hold, and Autoscan Feature
- Dual 12-Bit Digital-to-Analog (D/A) Converters With Synchronization
- 16-Bit Timer_A With Three Capture/Compare Registers
- 16-Bit Timer_B With Seven Capture/Compare-With-Shadow Registers
- On-Chip Comparator
- Four Universal Serial Communication Interfaces (USCIs)
    - USCI_A0 and USCI_A1
        - Enhanced UART Supporting Auto-Baudrate Detection
        - IrDA Encoder and Decoder
        - Synchronous SPI
    - USCI_B0 and USCI_B1
        - I^2C
        - Synchronous SPI
- Supply Voltage Supervisor/Monitor With Programmable Level Detection
- Brownout Detector
- Bootstrap Loader
- Serial Onboard Programming, No External Programming Voltage Needed Programmable Code Protection by Security Fuse
- 116KB+256B Flash Memory, 8KB RAM

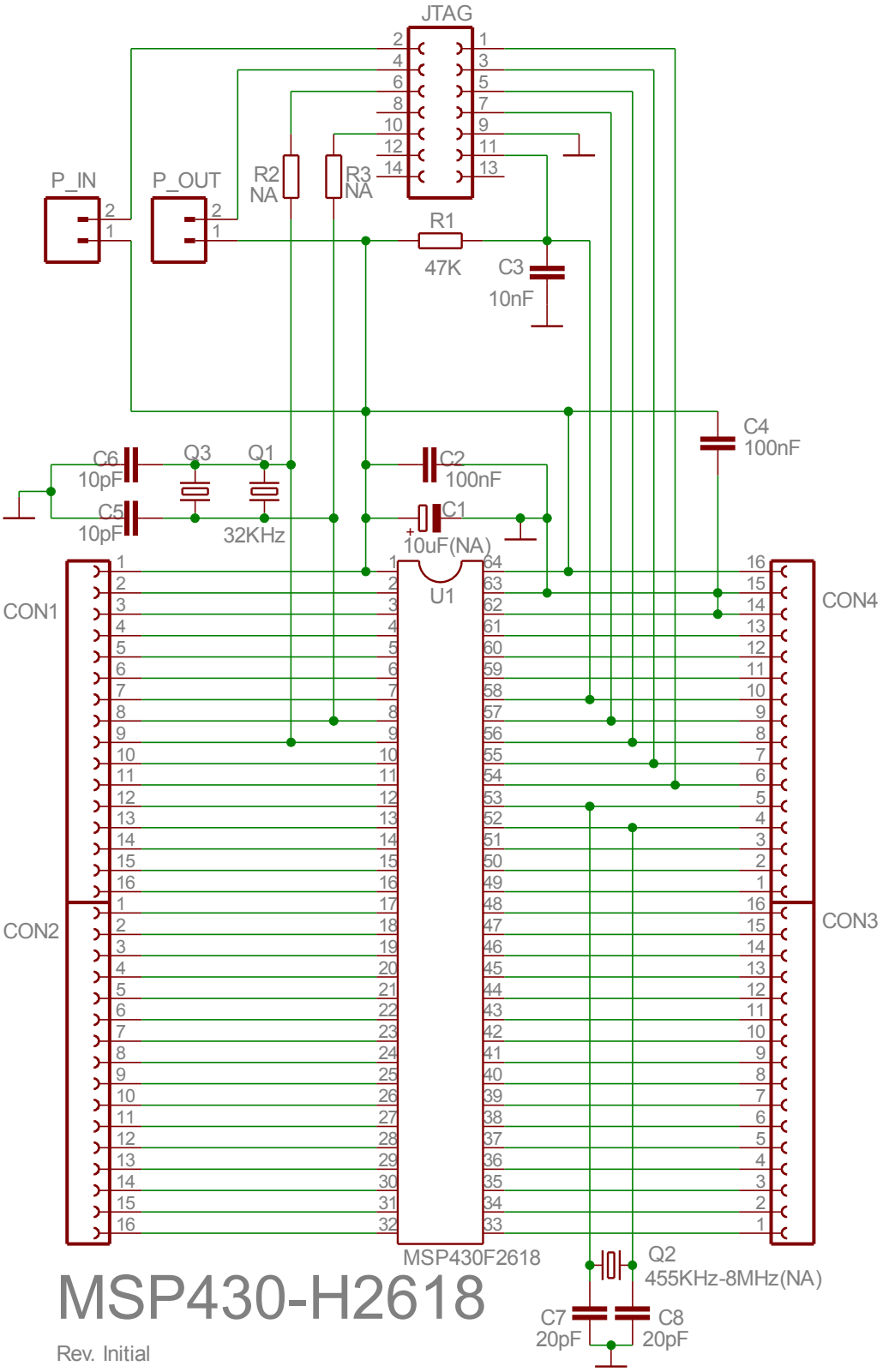
BLOCK DIAGRAM:



MEMORY MAP:

		MSP430F2618
Memory Main: interrupt vector Main: code memory	Size Flash Flash	116KB 0x0FFFF - 0x0FFC0 0x1FFFF - 0x03100
RAM (total) Extended Mirrored	Size Size Size	8kB 0x030FF - 0x01100 6kB 0x030FF - 0x01900 2kB 0x018FF - 0x01100
Information memory	Size Flash	256 Byte 0x010FF - 0x01000
Boot memory	Size ROM	1KB 0x00FFF - 0x00C00
RAM (mirrored at 0x18FF to 0x01100)	Size	2KB 0x009FF - 0x00200
Peripherals	16-bit 8-bit 8-bit SFR	0x001FF - 0x00100 0x000FF - 0x00010 0x0000F - 0x00000

SCHEMATIC:


JTAG
P_IN
P_OUT
R2
NA
R3
NA
R1
47K
C3
10nF
C4
100nF
C6
10pF
C5
10pF
Q3
Q1
32KHz
C2
100nF
C1
10uF(NA)
U1
CON1
CON2
CON3
CON4
MSP430F2618
Q2
455KHz-8MHz(NA)
C7
20pF
C8
20pF
MSP430-H2618
Rev. Initial
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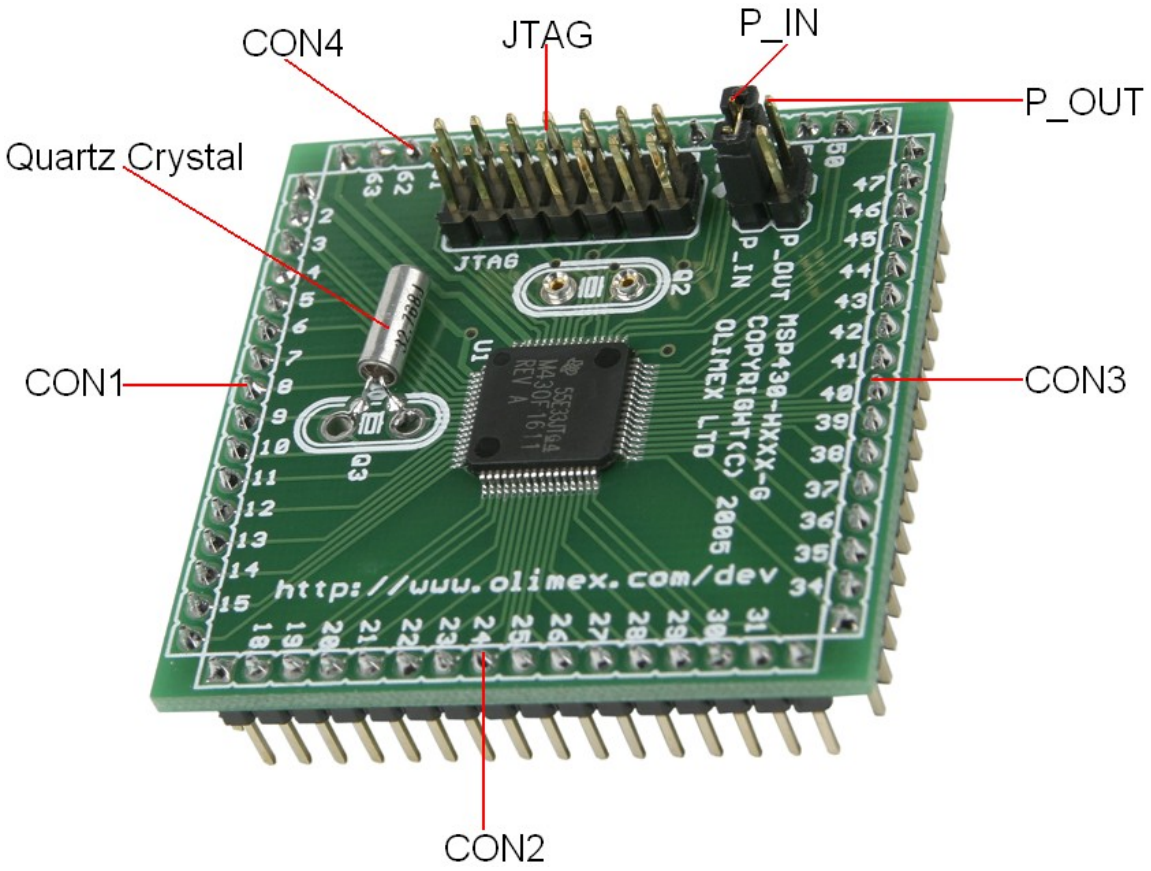
BOARD LAYOUT:



POWER SUPPLY CIRCUIT:

MSP430-H2618 is typically power supplied from the JTAG interface (P_IN closed). If not, you could power supply the board if you apply up to +3.6VDC at CON1 pin 1 (MSP430F2618.pin 1) and GND at CON4 pin 14 or pin 15 (MSP430F2618.pin 62 or 63).

The board power consumption is less than 10 mA.

RESET CIRCUIT:

MSP430-H2618 reset circuit is realized with a pull-up resistor R1 (47k) and capacitor C3(10n). You could also reset the MCU with an active low level at the JTAG pin 11 or at CON4 pin 10 (MSP430F2618.pin 58).

CLOCK CIRCUIT:

Quartz crystal 32 768 Hz is connected to **MSP430F2618** pin 8 (XIN) and pin 9 (XOUT/TCLK).

There is an option for a high speed crystal oscillator to be connected to the **MSP430F2618** pin 52 (XT2OUT) and pin 53 (XT2IN).

JUMPER DESCRIPTION:

P_IN

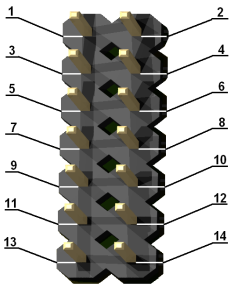
When this jumper is closed, the board is power supplied by the standard JTAG pin 2. This is only possible when the consumption of the board is not very high which is typically the case with MSP430 microcontrollers. If this jumper is open the board should be power supplied by another external source. This jumper and P_OUT should always be reversely open/closed, i.e. if P_IN is closed, P_OUT should be open and vice versa.
Default state is closed.

P_OUT

When this jumper is closed, the board is power supplied not by the JTAG but from external source. Then the JTAG has to synchronize with the working voltages which is done through this line. This is especially important when debugging with JTAG. This jumper and P_IN should always be reversely open/closed, i.e. if P_OUT is closed, P_IN should be open and vice versa.
Default state is open.

EXTERNAL CONNECTORS DESCRIPTION:

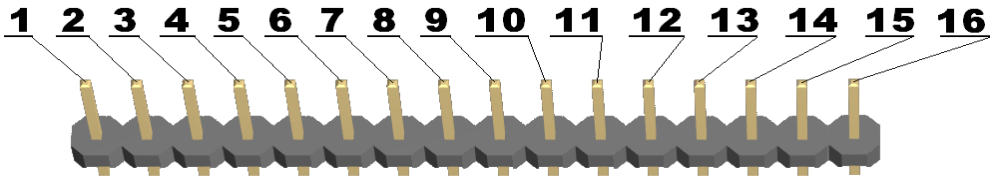
JTAG:



Pin #	Signal Name	Pin#	Signal Name
1	TDO	2	P_IN
3	TDI	4	P_OUT
5	TMS	6	NC
7	TCK	8	NC
9	GND	10	NC
11	RST	12	NC
13	NC	14	NC

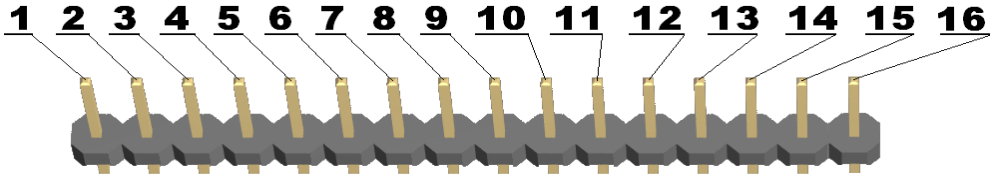
TDI Input **Test Data In**. This is the serial data input for the shift register.
TDO Output **Test Data Out**. This is the serial data output for the shift register. Data is shifted out of the device on the negative edge of the TCK signal.
TMS Input **Test Mode Select**. The TMS pin selects the next state in the TAP state machine.
TCK Input **Test Clock**. This allows shifting of the data in, on the TMS and TDI pins. It is a positive edge triggered clock with the TMS and TCK signals that define the internal state of the device.
P_IN Input **Power In.** Normally, if there isn't external power source, this signal power supplies the board.
P_OUT Output **Power Out**. When there is external power supply, this is the voltage synchronization signal for the JTAG interface.

CON1:



Pin #	Signal Name	Pin#	Signal Name
1 (1)	DV_{CC1}	2 (2)	P6.3/A3
3 (3)	P6.4/A4	4 (4)	P6.5/A5/DAC1
5 (5)	P6.6/A6/DAC0	6 (6)	P6.7/A7/DAC1/SVSIN
7 (7)	V_{REF+}	8 (8)	XIN
9 (9)	XOUT	10 (10)	Ve_{REF+}/DAC0
11 (11)	V_{REF-}/Ve_{REF-}	12 (12)	P1.0/TACLK/CAOUT
13 (13)	P1.1/TA0	14 (14)	P1.2/TA1
15 (15)	P1.3/TA2	16 (16)	P1.4/SMCLK

CON2:

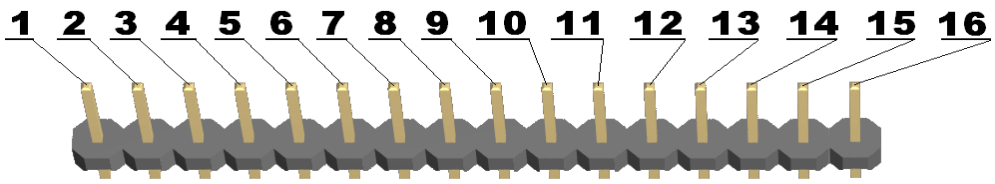


Pin #	Signal Name	Pin#	Signal Name
1 (17)	P1.5/TA0	2 (18)	P1.6/TA1
3 (19)	P1.7/TA2	4 (20)	P2.0/ACLK/CA2
5 (21)	P2.1/TAINCLK/CA3	6 (22)	P2.2/CAOUT/TA0/CA4
7 (23)	P2.3/CA0/TA1	8 (24)	P2.4/CA1/TA2
9 (25)	P2.5/Rosc/CA5	10 (26)	P2.6/ADC12CLK/CA6
11 (27)	P2.7/TA0/CA7	12 (28)	P3.0/UCB0STE
13 (29)	P3.1/UCB0SIMO/UCB0SD	14 (30)	P3.2/UCB0SOMI/UCB0SC

	A		L
15 (31)	P3.3/UCB0CLK/UCA0STE	16 (32)	P3.4/UCA0TXD

UCB0CLK I/O Universal Serial Communication Interface (USCI) B0 clock input/output.
UCB0SOMI I/O USCI B0 slave out/master in in SPI mode.
UCB0SIMO I/O USCI B0 slave in/master out in SPI mode.
UCB0STE I/O USCI B0 slave transmit enable.
UCA0TXD Output USCIA transmit data output in UART mode.
UCB0SDA I/O SDA I^2C data in I^2C mode.
USB0SCL I/O SCL I^2C clock in I^2C mode.

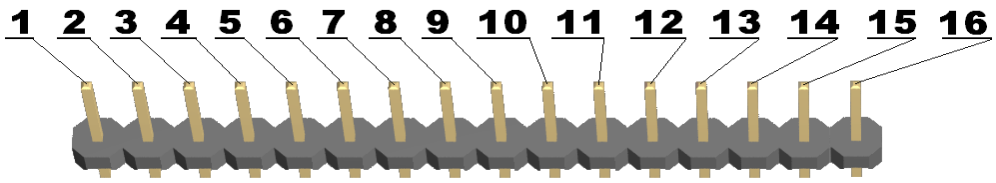
CON3:



Pin #	Signal Name	Pin#	Signal Name
1 (33)	P3.5/UCA0RXD	2 (34)	P3.6/UCA1TXD
3 (35)	P3.7/UCA1RXD	4 (36)	P4.0/TB0
5 (37)	P4.1/TB1	6 (38)	P4.2/TB2
7 (39)	P4.3/TB3	8 (40)	P4.4/TB4
9 (41)	P4.5/TB5	10 (42)	P4.6/TB6
11 (43)	P4.7/TBCLK	12 (44)	P5.0/UCB1STE
13 (45)	P5.1/UCB1SIMO	14 (46)	P5.2/UCB1SOMI
15 (47)	P5.3/UCB1CLK	16 (48)	P5.4/MCLK

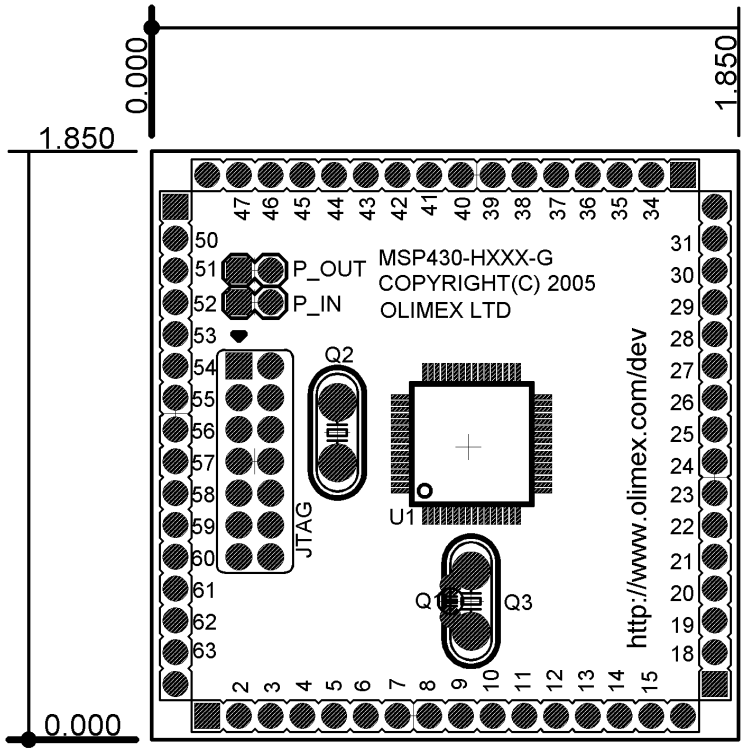
UCA0RXD Input USCI A0 receive data input in UART mode, slave data out.
UCB1CLK I/O USCI B1 clock input/output.
UCB1SOMI I/O USCI B1 slave out/master in in SPImode.
UCB1SIMO I/O USCI B1slave in/master out in SPI mode.
UCB1STE I/O USCI B1 slave transmit enable.
UCA1TXD Output USCI A1 transmit data output in UART mode.
UCA1RXD Input USCI A1 receive data input in UART mode.

CON4:



Pin #	Signal Name	Pin#	Signal Name
1 (49)	P5.5/SMCLK	2 (50)	P5.6/ACLK
3 (51)	P5.7/TBOUTH/SVSOUT	4 (52)	XT2OUT
5 (53)	XT2IN	6 (54)	TDO/TDI
7 (55)	TDI/TCLK	8 (56)	TMS
9 (57)	TCK	10 (58)	#RST/NMI
11 (59)	P6.0/A0	12 (60)	P6.1/A1
13 (61)	P6.2/A2	14 (62)	AV_{SS}
15 (63)	DV_{SS1}	16 (64)	AV_{CC}

MECHANICAL DIMENSIONS:



- All measures are in inches.

AVAILABLE DEMO SOFTWARE:

- MSP430-H2618_Blinking_Led

You could find MSP430-H2618 demo software at www.olimex.com/dev.

ORDER CODE:

MSP430-H2618 – assembled and tested (no kit, no soldering required).

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:

REV. Initial - created April 2009