MSP430-P2274 development board

Users Manual

Rev.A, Jully 2009
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INTRODUCTION

MSP430-P2274 header board provides easy way for developing and prototyping with the new MSP430F2274 ultralow-power, mixed signal microcontroller produced by Texas Instruments.

MSP430-P2274 has JTAG port for programming and debugging, UEXT, two status Leds, two user Buttons and most of the GPIOs are on prototype area where you can connect your additional circuits.

BOARD FEATURES

- CPU: MSP430F2274 mixed signal microcontroller

- JTAG connector

- JTAG Power_In and Power_Out jumpers

- 32768 Hz crystal oscillator

- Prototype area

- two Status Leds

- two User Buttons

- Power on Led

- PCB: FR-4, 1.5 mm (0,062"), solder mask, silkscreen component print

- Dimensions: 100x 80mm (3.93x 3.15")

ELECTROSTATIC WARNING

The MSP430-P2274 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, if you use MSP430-JTAG-TINY or MSP-JTAG-ISO, you will need A-B USB cable, if you use MSP430-JTAG-RF, you will need USB cable type A – female.

Hardware: Programmer/Debugger – one of our Programmers – MSP430-JTAG, MSP430-JTAG-TINY, MSP430-JTAG-ISO, or MSP430-JTAG-RF.

Software: MSP430 KickStart software.

PROCESSOR FEATURES

MSP430-P2274 board use ultralow-power mixed signal microcontroller with two built-in 16-bit timers, a universal serial communication interface, 10-bit A/D converter with integrated reference and data transfer controller (DTC), two general-purpose operational amplifiers, 32 GPIO with these features:

– 32KB + 256B Flash Memory

– 1KB RAM

– Low Supply Voltage Range: 1.8 V to 3.6 V

– Ultralow Power Consumption

  – Active Mode: 270 µA at 1 MHz, 2.2 V

  – Standby Mode: 0.7 µA

  – Off Mode (RAM Retention): 0.1 µA

– Ultrafast Wake-Up From Standby Mode in Less Than 1 µs

– 16-Bit RISC Architecture, 62.5-ns Instruction Cycle Time

– Basic Clock Module Configurations:

  – Internal Frequencies up to 16 MHz With Four Calibrated Frequencies to ±1%

  – Internal Very-Low-Power Low-Frequency Oscillator

  – 32-kHz Crystal

  – High-Frequency Crystal 16 MHz

  – Resonator

  – External Digital Clock Source

  – External Resistor

– 16-Bit Timer_A With Three Capture/Compare Registers

– 16-Bit Timer_B With Three Capture/Compare Registers

– Universal Serial Communication Interface

  – Enhanced UART Supporting Auto-Baudrate Detection (LIN)

  – IrDA Encoder and Decoder

  – Synchronous SPI

  – I²C™

– 10-Bit 200-ksps Analog-to-Digital (A/D) Converter With Internal Reference,Sample-and-Hold, Autoscan, and Data Transfer Controller

– Two Configurable Operational Amplifiers

– Brownout Detector

– Serial Onboard Programming, No External Programming Voltage Needed Programmable Code Protection by Security Fuse

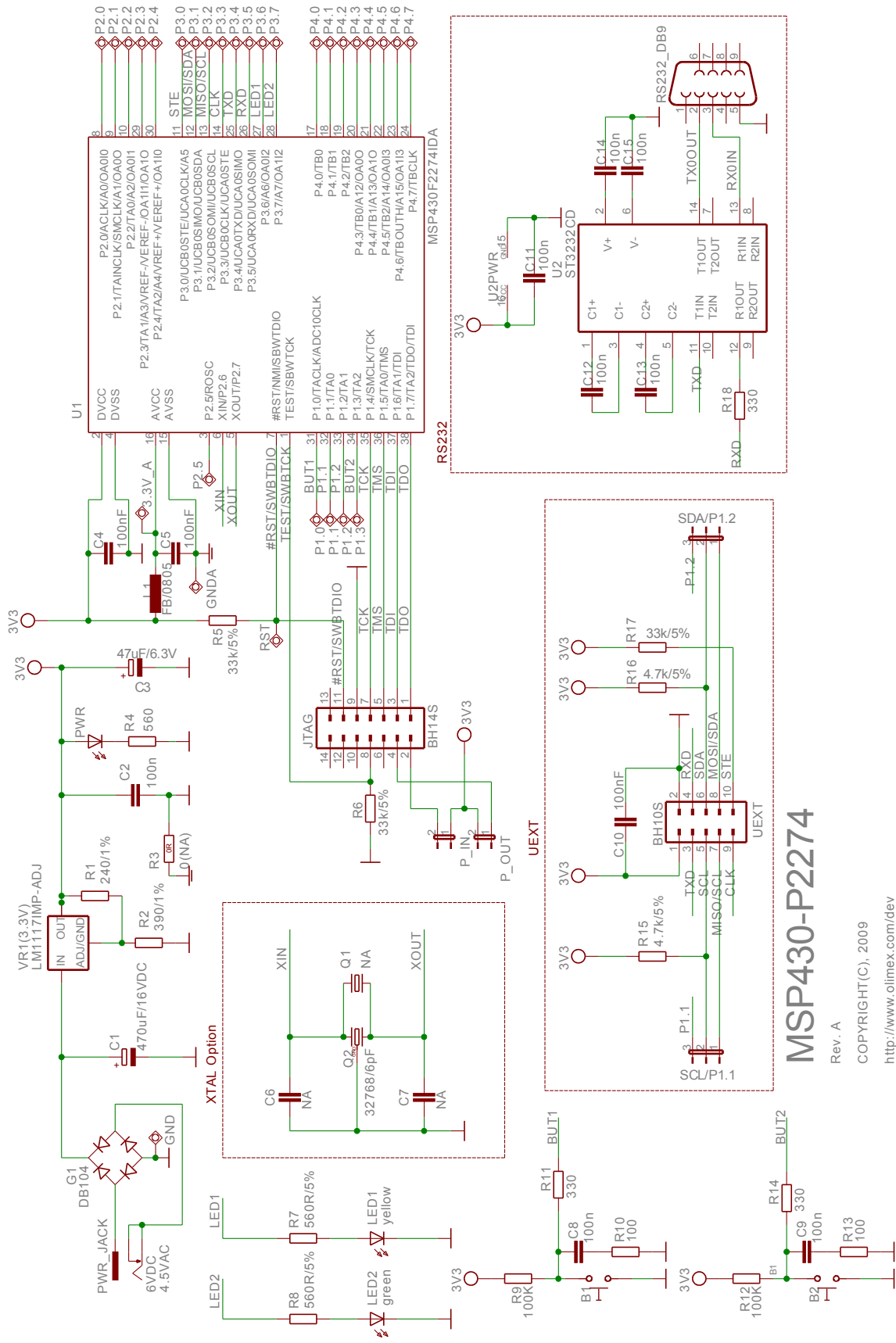– Bootstrap Loader

– On Chip Emulation Module

BLOCK DIAGRAM
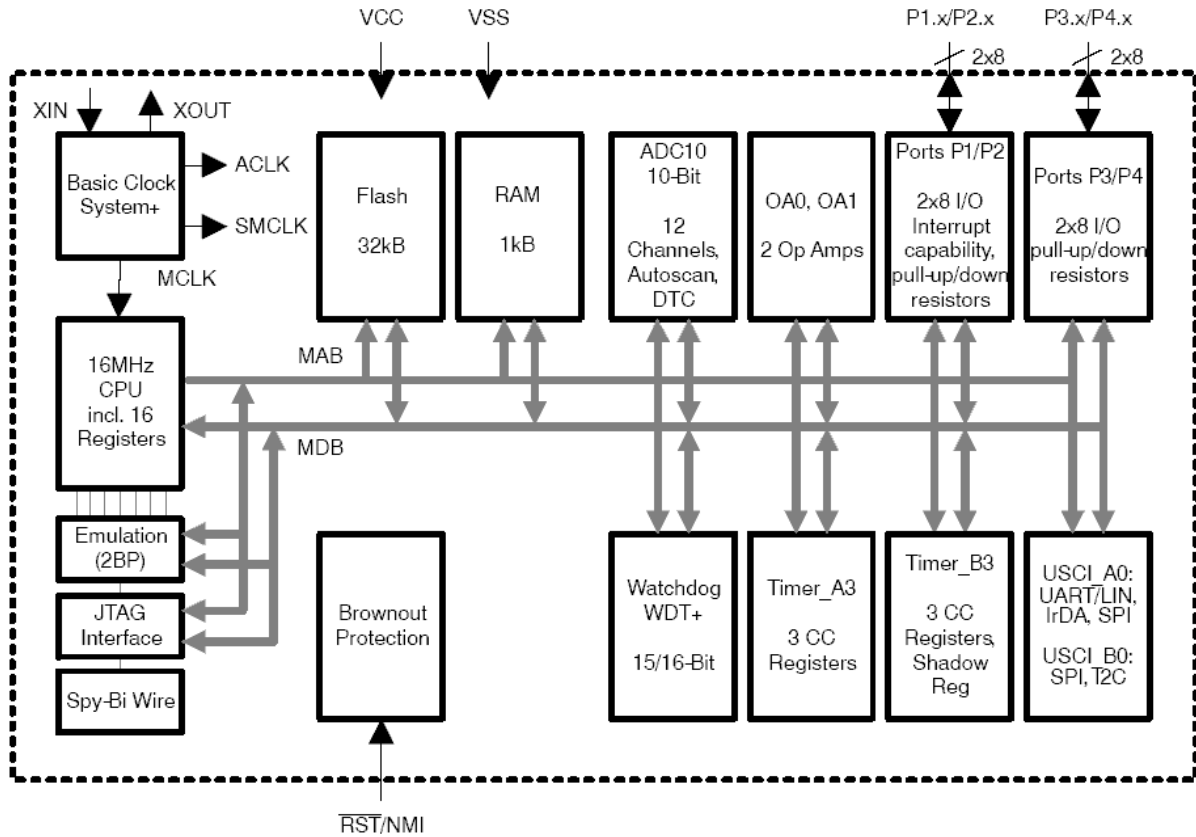
MEMORY ORGANIZATION

		MSP430F2274
Memory Main: interrupt vector Main: code memory	Size Flash Flash	32KB Flash 0FFFFh–0FFC0h 0FFFFh–08000h
Information memory	Size Flash	256 Byte 010FFh–01000h
Boot memory	Size ROM	1KB 0FFFh–0C00h
RAM	Size	1KB 05FFh–0200h
Peripherals	16-bit 8-bit 8-bit SFR	01FFh–0100h 0FFh–010h 0Fh–00h

SCHEMATIC

MSP430-P2274

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BOARD LAYOUT
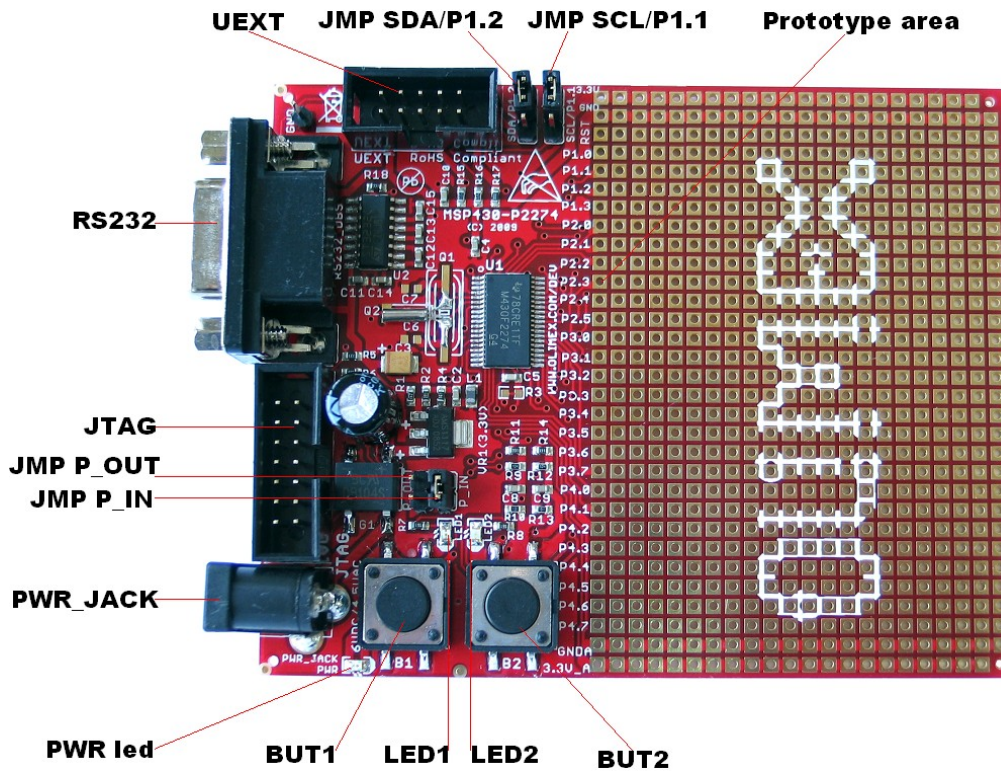
POWER SUPPLY CIRCUIT

MSP430-P2274 is power supplied from PWR_JACK with 6 V DC, or 4.5 V AC. The board power consumption is about 15 mA.

RESET CIRCUIT

MSP430-P2274 reset circuit includes JTAG connector pin 11, Prototype area – outlet 3 and MSP430F2274 pin 7 (#RST/SWBTDIO).

CLOCK CIRCUIT

Quartz crystal 32768MHz is connected to **MSP430F2274** pin 5 (XOUT/P2.7) and pin 6 (XIN/P2.6).

JUMPER DESCRIPTION

Power In jumper:

P_IN jumper connects power supply from JTAG connector. You have to ensure that your circuit doesn't draw more than few milliampers current or the power supply may decrease due to the JTAG port current limitations. P_IN is useful and must be used mostly to program the microcontroller.

Power Out jumper:

P_OUT jumper connects power from MSP430-5438STK to JTAG connector. When this jumper cap is placed, the power supply of JTAG connector will follow the power supply of the board. This is useful when your board works at lower than +3,3V power supply.

Note:

P_IN and **P_OUT** jumper caps should not be placed at the same time.

SDA/P1.2

Give user choice to select UEXT SDA connection between P1.2 or MOSI/SDA. <u>Default state is P1.2.</u>

SCL/P1.1

Give user choice to select UEXT SCL connection between P1.1 or MISO/SCL. <u>Default state is P1.1.</u>

<u>INPUT/OUTPUT</u>

Status LED1 (yellow) with name **LED1** connected to MSP430F2274 pin 27 (P3.6/A6/OA0I2).

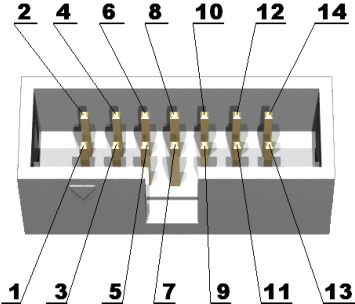**Status LED2 (green)** with name **LED2** connected to MSP430F2274 pin 28 (P3.7/A7/OA1I2).

Power-on LED (red) with name **PWR** – this led shows that +3.3V is applied to the board.

User button with name **BUT1** connected to MSP430F2274 pin 31 (P1.0/TACLK/ADC10CLK).

User button with name **BUT2** connected to MSP430F2274 pin 34 (P1.3/TA2).
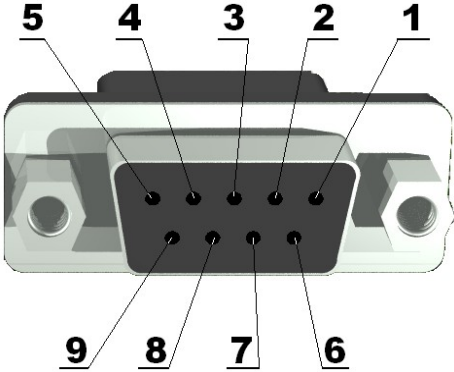
CONNECTOR DESCRIPTIONS

JTAG

Pin #	Signal Name	Pin #	Signal Name
1	TDO	2	VCC_IN
3	TDI	4	VCC_OUT
5	TMS	6	NC
7	TCK	8	TEST/SWBTCK
9	GND	10	NC
11	#RST/SWBTDIO	12	NC
13	NC	14	NC

RS232

Pin #	Signal Name
1	NC
2	TX0OUT
3	RX0IN
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

PWR_JACK

Pin #	Signal Name
1	Power Input
2	GND
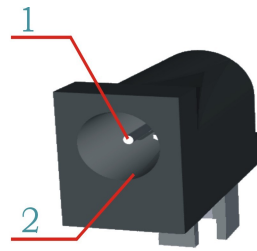
UEXT

Pin #	Signal Name
1	3.3V
2	GND
3	TXD
4	RXD
5	SCL
6	SDA
7	MISO/SCL
8	MOSI/SDA
9	CLK
10	STE
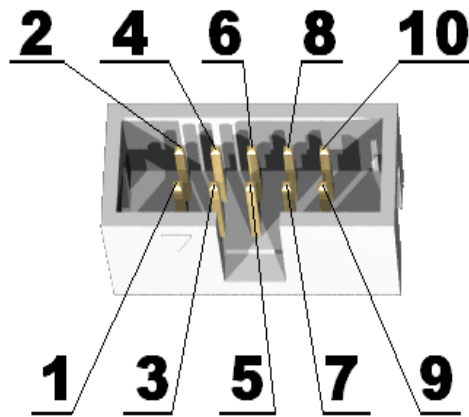
PROTOTYPE AREA

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	GND
3	#RST/SWBTDIO	4	BUT1
5	P1.1	6	P1.2
7	BUT2	8	P2.0
9	P2.1	10	P2.2
11	P2.3	12	P2.4
13	P2.5	14	STE
15	MOSI/SDA	16	MISO/SCL
17	CLK	18	TXD
19	RXD	20	LED1
21	LED2	22	P4.0
23	P4.1	24	P4.2
25	P4.3	26	P4.4
27	P4.5	28	P4.6
29	P4.7	30	AVSS
31	AVCC		

```
3.3V    1
GND     2
RST     3
P1.0    4
P1.1    5
P1.2    6
P1.3    7
P2.0    8
P2.1    9
P2.2    10
P2.3    11
P2.4    12
P2.5    13
P3.0    14
P3.1    15
P3.2    16
P3.3    17
P3.4    18
P3.5    19
P3.6    20
P3.7    21
P4.0    22
P4.1    23
P4.2    24
P4.3    25
P4.4    26
P4.5    27
P4.6    28
P4.7    29
GNDA    30
3.3V_A  31
```

MECHANICAL DIMENSIONS

AVAILABLE DEMO SOFTWARE

- MSP430-P2274_Blinking_Leds
- MSP430-P2274_Buttons & Leds
- MSP430-P2274_UART

ORDER CODE

MSP430-P2274 – assembled and tested

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.A   - create   Jully 2009