MSP430-H449 development board

Users Manual

All boards produced by Olimex are ROHS compliant

INTRODUCTION:

MSP430-H449 is header board for the MSP430F449 mixed signal microcontroller produced by Texas Instruments.
MSP430-H449 has JTAG port for programming and debugging and most of the GPIOs are on extension headers where you can connect your additional circuits.

BOARD FEATURES:

- Microcontroller: **MSP430F449** with 60K Bytes Program Flash, 256 Bytes data Flash, 2K Bytes RAM

- JTAG connector

- JTAG Power_In and Power_Out jumpers

- 32 768 Hz oscillator crystal

- 8Mhz crystall oscillator (works only when power supply +3.6V)

- TEST pin pull-down

- RST/NMI pin pull-up

- power supply filtering capacitor

- extension headers for each uC pin

- PCB: FR-4, 1.5 mm (0,062"), green soldermask, white silkscreen component print

- Dimensions: 45x45 mm (1.8x1.8")

- space between the pin rows: 43.18 mm (1.7")

ELECTROSTATIC WARNING:

The MSP430-H449 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, MSP-JTAG-TINY-V2, or MSP-JTAG-ISO, you will need 1.8m A-B USB cable, if you use MSP430-JTAG-RF, you can connect it to the USB port of your computer, or via 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-H449 board use MSP430F449 mixed signal microcontroller with these features:

– Low Supply-Voltage Range, 1.8 V to 3.6 V

– Ultralow-Power Consumption:

    – Active Mode: 280 µA at 1 MHz, 2.2 V

    – Standby Mode: 1.1 µA

    – Off Mode (RAM Retention): 0.1 µA

– Five Power Saving Modes

– Wake-Up From Standby Mode in 6 µs

– 16-Bit RISC Architecture, 125-ns Instruction Cycle Time

– 12-Bit A/D Converter With Internal Reference, Sample-and-Hold and Autoscan Feature

– 16-Bit Timer With Seven Capture/Compare-With-Shadow Registers, Timer_B

– 16-Bit Timer With Three Capture/Compare Registers, Timer_A

– On-Chip Comparator

– Serial Communication Interface (USART), Select Asynchronous UART or Synchronous SPI by Software; Two USARTs (USART0, USART1)

– Brownout Detector

– Supply Voltage Supervisor/Monitor With Programmable Level Detection

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

– Integrated LCD Driver for Up to 160 Segments
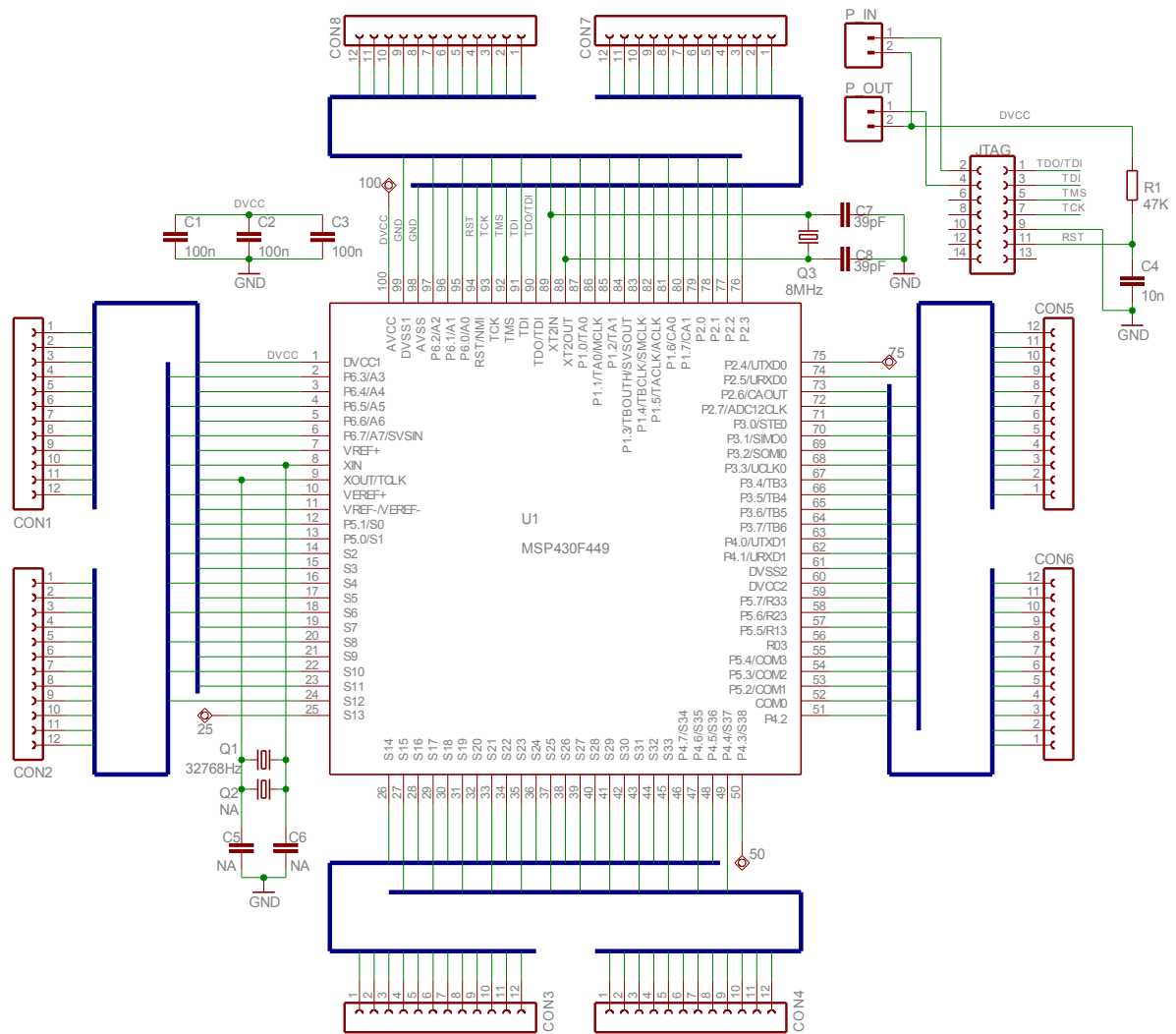
– 60KB+256B Flash Memory

– 2KB RAM

BLOCK DIAGRAM:
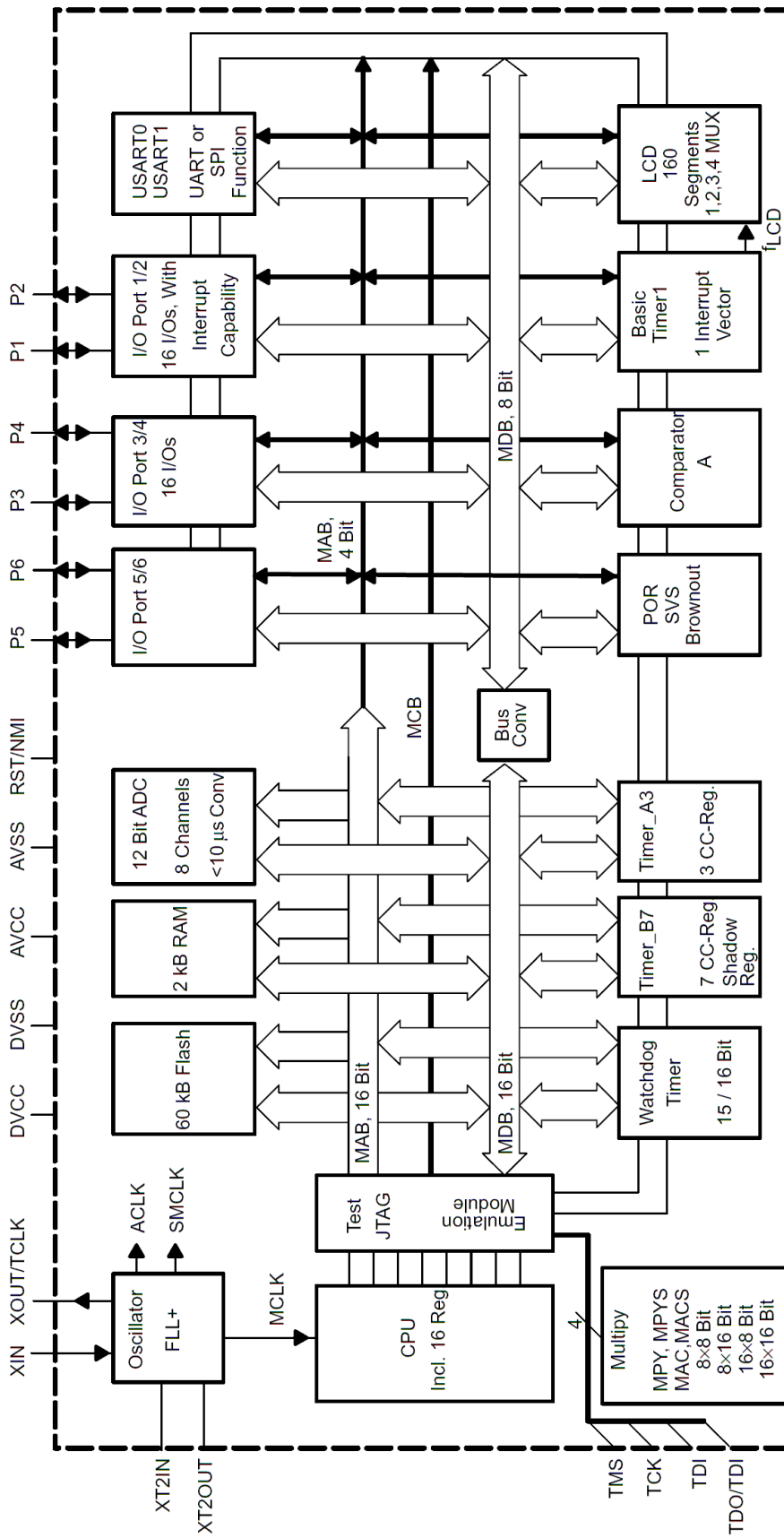
MEMORY ORGANIZATION:

Memory	Size	60KB
Main: interrupt vector	Flash	0FFFFh – 0FFE0h
Main: code memory	Flash	0FFFFh – 01100h
Information memory	Size	256 Byte
	Flash	010FFh – 01000h
Boot memory	Size	1KB
	ROM	0FFFh – 0C00h
RAM	Size	2KB
		09FFh – 0200h
Peripherals	16-bit	01FFh – 0100h
	8-bit	0FFh – 010h
	8-bit SFR	0Fh – 00h

SCHEMATIC:

MSP430-H449

Rev. Initial

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BOARD LAYOUT:
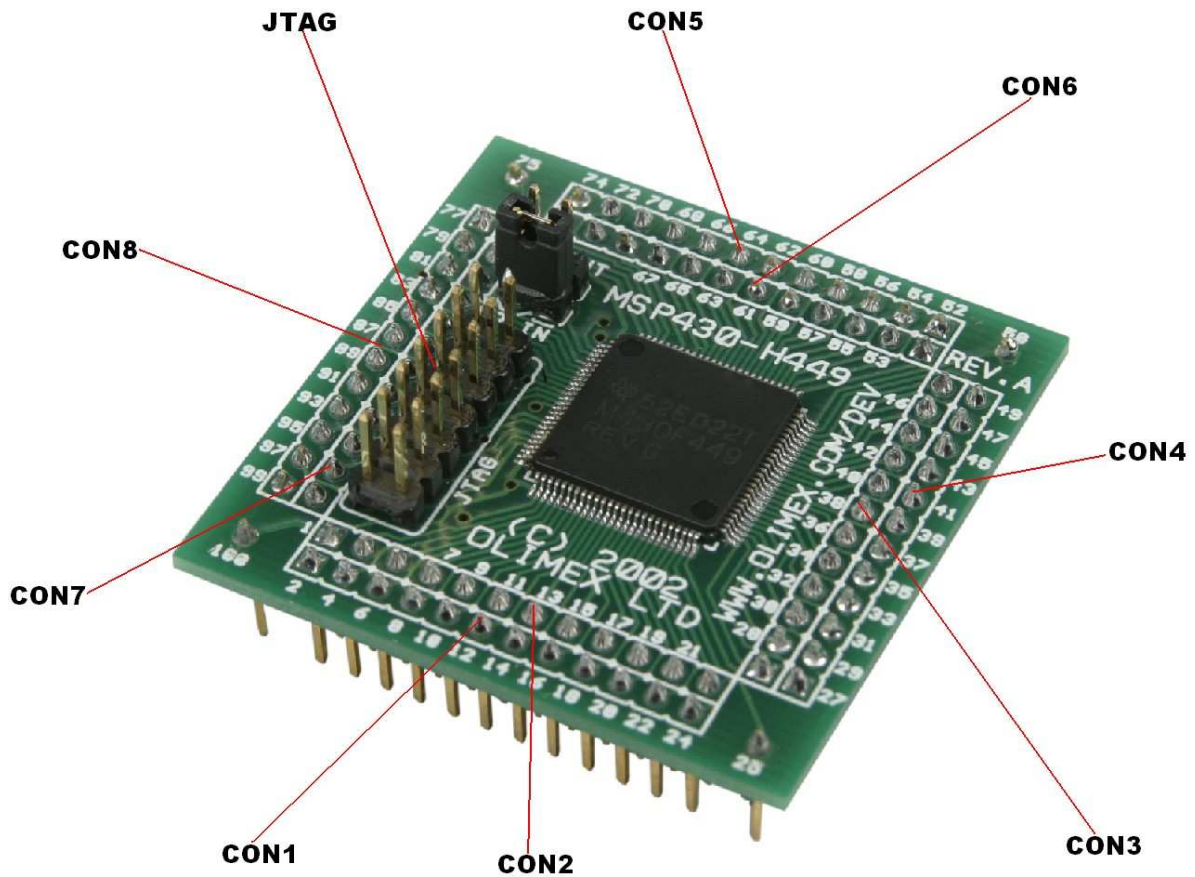
POWER SUPPLY CIRCUIT:

MSP430-H449 can take power from two sources:

– JTAG, when P_IN jumper is closed.

– EXT connectors, when P_OUT jumper is closed.

RESET CIRCUIT:

MSP430-H449 reset circuit includes R1 (47kΩ), C4 (10nF), JTAG connector pin 11, CON7 pin 10 and MSP430F449 pin 94.

CLOCK CIRCUIT:

Quartz crystal 32768 MHz is connected to **MSP430F449** pin 8 (XIN) and pin 9 (XOUT/TCLK).

Quartz crystal 8 MHz is connected to **MSP430F449** pin 88 (XT2OUT) and pin 89 (XT2IN).

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 milliamperes 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. <u>Default state is closed.</u>

Power Out jumper:

P_OUT jumper connects power from MSP430-H449 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, or consume more than few mA current. <u>Default state is opened.</u>

Note:

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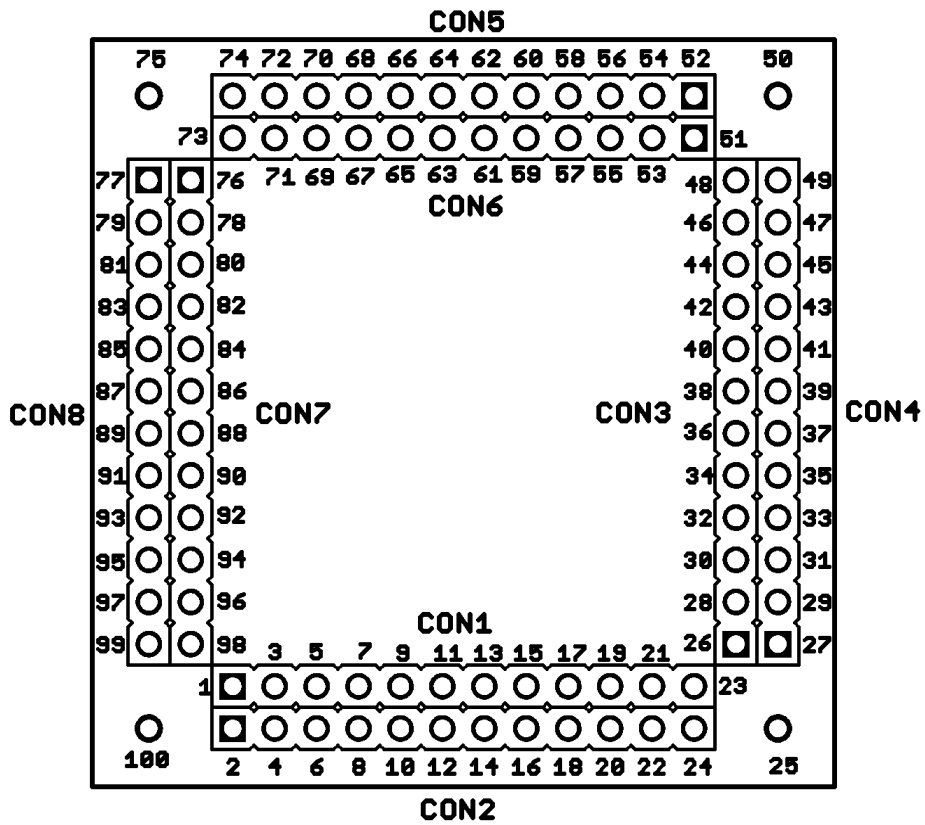
CONNECTOR DESCRIPTIONS:

JTAG:
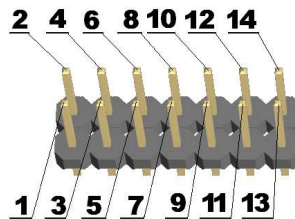
Pin #	Signal Name	Pin #	Signal Name
1	TDO/TDI	2	Via jmp V_IN to DVCC
3	TDI	4	Via jmp V_OUT to DVCC
5	TMS	6	Not Connected
7	TCK	8	Not Connected
9	GND	10	Not Connected
11	RST	12	Not Connected
13	Not Connected	14	Not Connected

Extension connectors:

CON	Pin #	Signal Name	CON	Pin #	Signal Name
CON1	1	DVCC	CON2	2	P6.3
	3	P6.4		4	P6.5
	5	P6.6		6	P6.7
	7	VREF+		8	XIN
	9	XOUT		10	VEREF+
	11	VREF-		12	P5.1
	13	P5.0		14	S2
	15	S3		16	S4
	17	S5		18	S6
	19	S7		20	S8
	21	S9		22	S10
	23	S11		24	S12
	25	S13		26	S14
	27	S15		28	S16
	29	S17		30	S18
	31	S19		32	S20

	33	S21		34	S22
	35	S23		36	S24
	37	S25	CON3	38	S26
CON4	39	S27		40	S28
	41	S29		42	S30
	43	S31		44	S32
	45	S33		46	P4.7
	47	P4.6		48	P4.5
	49	P4.4		50	P4.3
	51	P4.2		52	COM0
	53	P5.2		54	P5.3
	55	P5.4		56	R03
	57	P5.5		58	P5.6
	59	P5.7		60	DVCC
	61	GND		62	P4.1
CON6	63	P4.0	CON5	64	P3.7
	65	P3.6		66	P3.5
	67	P3.4		68	P3.3
	69	P3.2		70	P3.1
	71	P3.0		72	P2.7
	73	P2.6		74	P2.5
	75	P2.4		76	P2.3
	77	P2.2		78	P2.1
	79	P2.0		80	P1.7
	81	P1.6		82	P1.5
	83	P1.4		84	P1.3
	85	P1.2		86	P1.1
CON8	87	P1.0	CON7	88	XT2OUT
	89	XT2IN		90	TDO/TDI
	91	TDI		92	TMS
	93	TCK		94	RST
	95	P6.0		96	P6.1
	97	P6.2		98	GND
	99	GND		100	DVCC

MECHANICAL DIMENSIONS:
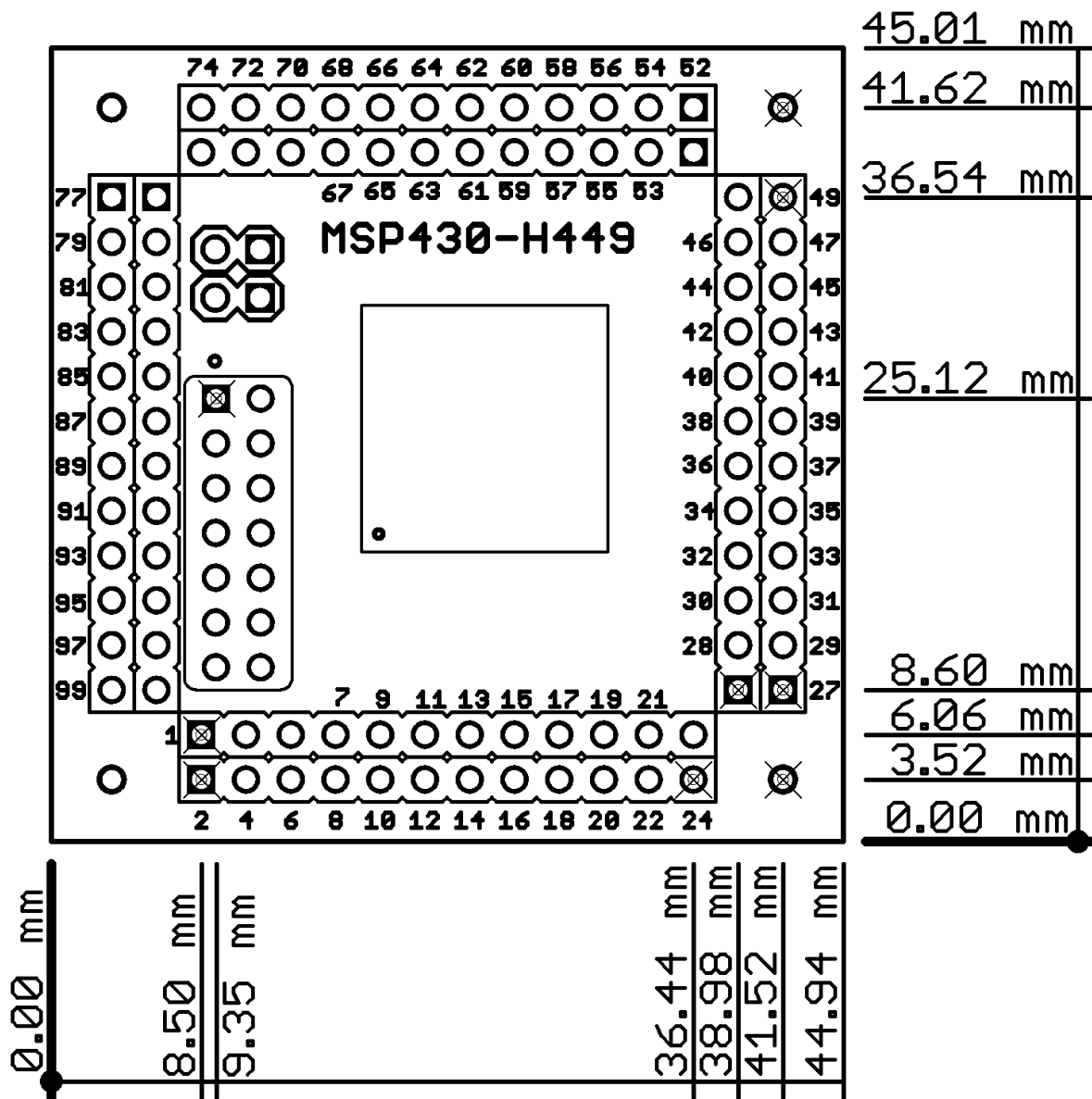
AVAILABLE DEMO SOFTWARE:

- Not available

ORDER CODE:

MSP430-H449 – 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:

Board's revision: Rev. Initial - January 2006

Manual's revision: Rev. Initial – June 2011

Disclaimer: