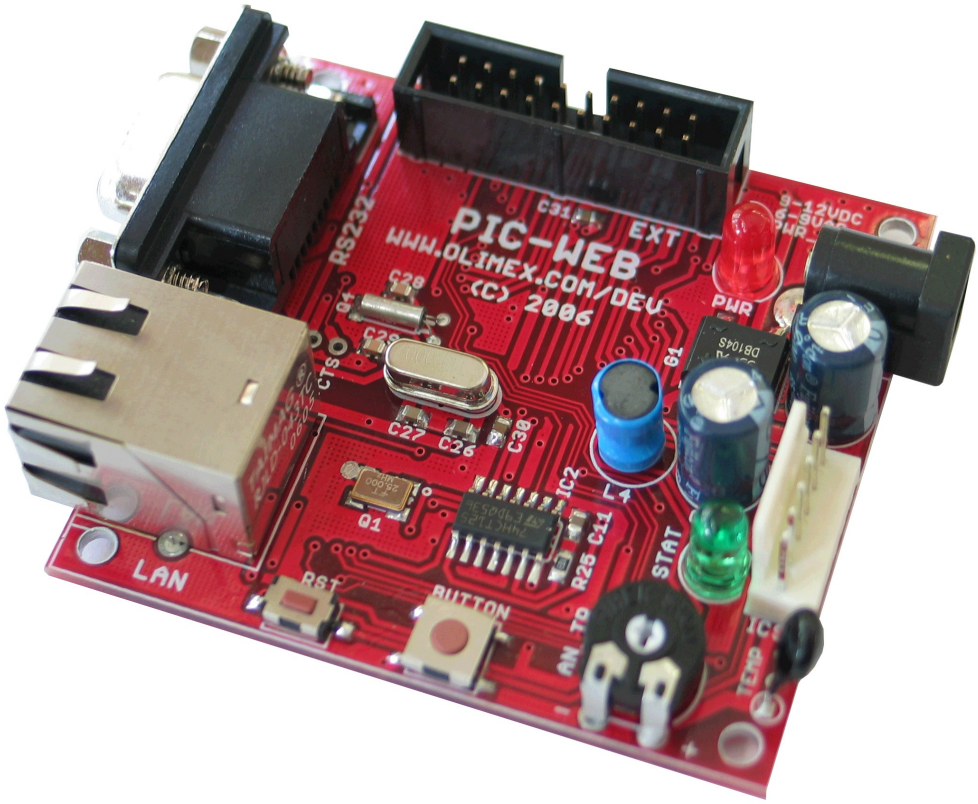


PIC-WEB development board

Users Manual

Rev.A, July 2008

INTRODUCTION:

PIC-WEB is compact board with 65x60 mm size which is supported by Microchip's open source TCP-IP stack AN833. The board is designed with PIC18F452 microcontroller and ENC28J60 Ethernet controller and supports: SLIP, ARP, IP, ICMP, TCP, UDP, HTTP, DHCP, FTP. The Microchip stack is written on modular and flexible basis and you can enable or disable modules. The stack also supports dynamic web pages which give you the possibility to control all PIC resources remotely via FTP, HTTP, UDP, TCP etc. With this board you can implement web and ftp server, send e-mails and almost everything what a big server can do. The on board 1Mbit serial flash is available for data storage

BOARD FEATURES:

- PIC18F452 microcontroller, ENC28J60 Ethernet controller
- 1Mbit on board serial flash for web pages storage
- ICSP/ICD connector for programming with PIC-MCP, PIC-MCP-USB and programming and debugging with PIC-ICD2 and PIC-ICD2-POCKET.
- Reset button
- User event button
- Analogue trimmer potentiometer
- Thermistor for temperature monitoring
- RS232 driver and connector
- Complete web server and TCP-IP stack support as per Microchip's open source TCP-IP stack
- Power plug-in jack for +5VDC power supply
- Voltage regulator +3.3V and filtering capacitors
- Status LED
- Extension header to connect to other boards
- Dimensions 60x65 mm (2.36x2.55")

ELECTROSTATIC WARNING:

The PIC-WEB 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: Depends on the used programming/debugging tool. It could be 1.8 meter USB A-B cable to connect PIC-MCP-USB, PIC-ICD2 or PIC-ICD2-POCKET to USB host on PC or RS232 cable in case of PIC-MCP or other programming/debugging tools. You will need a serial cable if not for programming, than for configuring the board. You will also need a LAN cable.

Hardware: Programmer/Debugger – most of Olimex programmers are applicable, for example **PIC-MCP, PIC-MCP-USB, PIC-ICD2**, **PIC-ICD2-POCKET** or other compatible programming/debugging tool.

Software: PIC-WEB is tested with **MPLAB IDE v.7.62 + MPLAB C18** C compiler. It is possible that the stack might not function properly if used with later versions of MPLAB IDE.
You will also need a terminal program configured at 19 200 bps, 8N1 and no flow control.

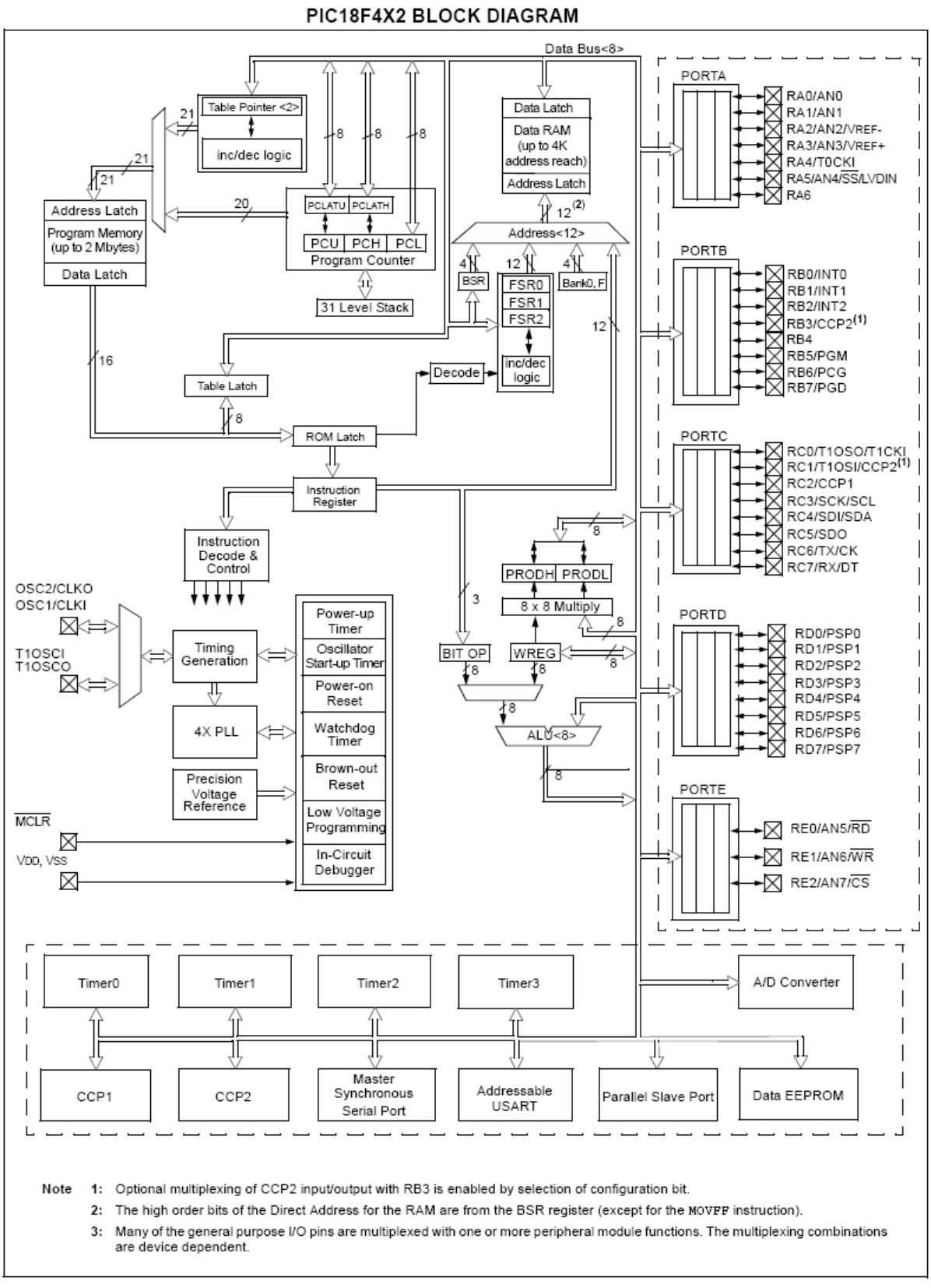
PROCESSOR FEATURES:

PIC-WEB board uses microcontroller **PIC18F452** from Microchip with these features:

- C compiler optimized architecture/instruction set
  - Source code compatible with the PIC16C, PIC17C and PIC18C instruction sets
- 32 Kbytes FLASH, 1536 bytes RAM and 256 bytes EEPROM on board
- Up to 10 MIPs operation:
  - DC - 40 MHz osc./clock input
  - 4 MHz - 10 MHz osc./clock input with PLL active
- 16-bit wide instructions, 8-bit wide data path
- Priority levels for interrupts
- 8 x 8 Single Cycle Hardware Multiplier
- High current sink/source 25 mA/25 mA
- Three external interrupt pins
- Timer0 module: 8-bit/16-bit timer/counter with 8-bit programmable prescaler
- Timer1 module: 16-bit timer/counter
- Timer2 module: 8-bit timer/counter with 8-bit period register (time-base for PWM)
- Timer3 module: 16-bit timer/counter
- Secondary oscillator clock option - Timer1/Timer3
- Two Capture/Compare/PWM (CCP) modules. CCP pins that can be configured as:
  - Capture input: capture is 16-bit, max. resolution 6.25 ns (TCY/16)
  - Compare is 16-bit, max. resolution 100 ns (TCY)
  - PWM output: PWM resolution is 1- to 10-bit, Max. PWM freq. @: 8-bit resolution = 156 kHz and 10-bit resolution = 39 kHz
- Master Synchronous Serial Port (MSSP) module, Two modes of operation:
  - 3-wire SPI™ (supports all 4 SPI modes)
  - I2C™ Master and Slave mode
- Addressable USART module:
  - Supports RS-485 and RS-232
- Parallel Slave Port (PSP) module
- Compatible 10-bit Analog-to-Digital Converter module (A/D) with:
  - Fast sampling rate
  - Conversion available during SLEEP
  - DNL = ±1 LSb, INL = ±1 LSb
- Programmable Low Voltage Detection (PLVD)
  - Supports interrupt on-Low Voltage Detection
- Programmable Brown-out Reset (BOR)
- 100,000 erase/write cycle Enhanced FLASH program memory typical
- 1,000,000 erase/write cycle Data EEPROM memory
- FLASH/Data EEPROM Retention: > 40 years
- Self-reprogrammable under software control
- Power-on Reset (POR), Power-up Timer (PWRT) and Oscillator Start-up Timer (OST)

- Watchdog Timer (WDT) with its own On-Chip RC Oscillator for reliable operation
- Programmable code protection
- Power saving SLEEP mode
- Selectable oscillator options including:
    - 4X Phase Lock Loop (of primary oscillator)
    - Secondary Oscillator (32 kHz) clock input
- Single supply 5V In-Circuit Serial Programming™ (ICSP™) via two pins
- In-Circuit Debug (ICD) via two pins
- Low power, high speed FLASH/EEPROM technology
- Fully static design
- Wide operating voltage range (2.0V to 5.5V)
- Industrial and Extended temperature ranges

BLOCK DIAGRAM:

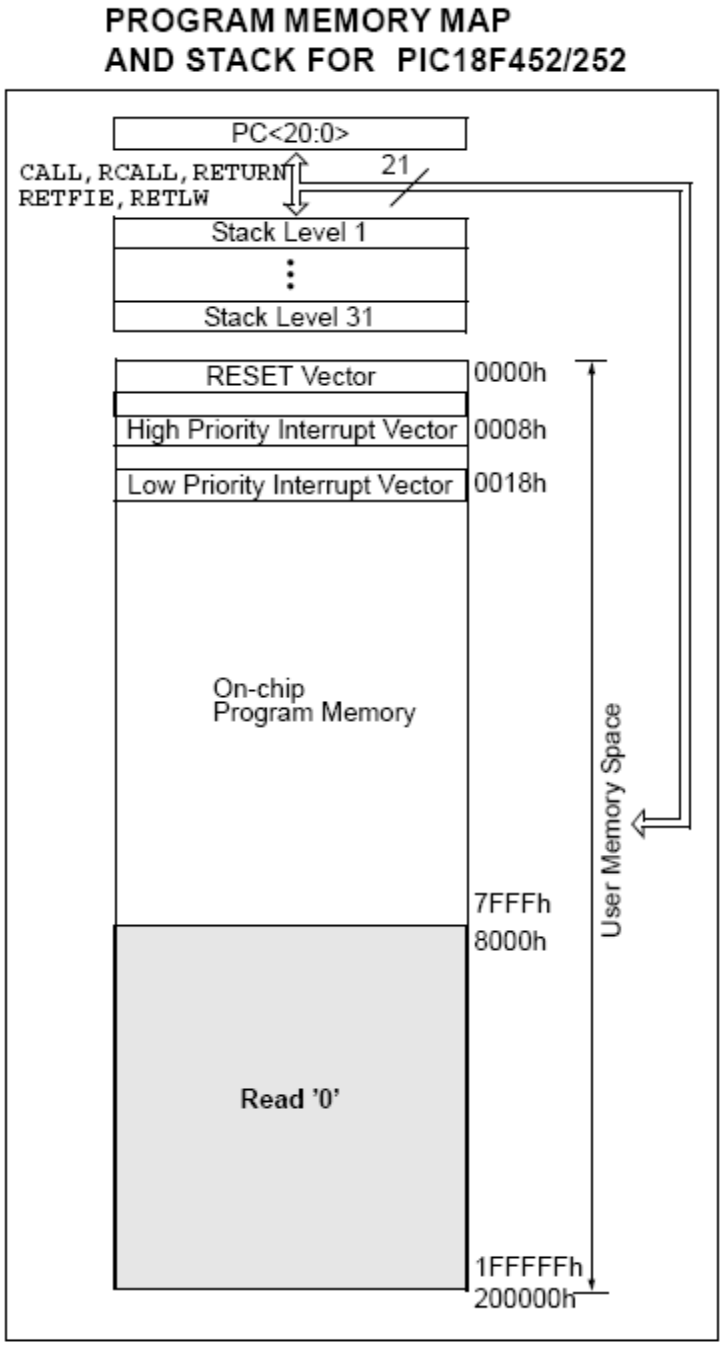


Note 1: Optional multiplexing of CCP2 input/output with RB3 is enabled by selection of configuration bit.

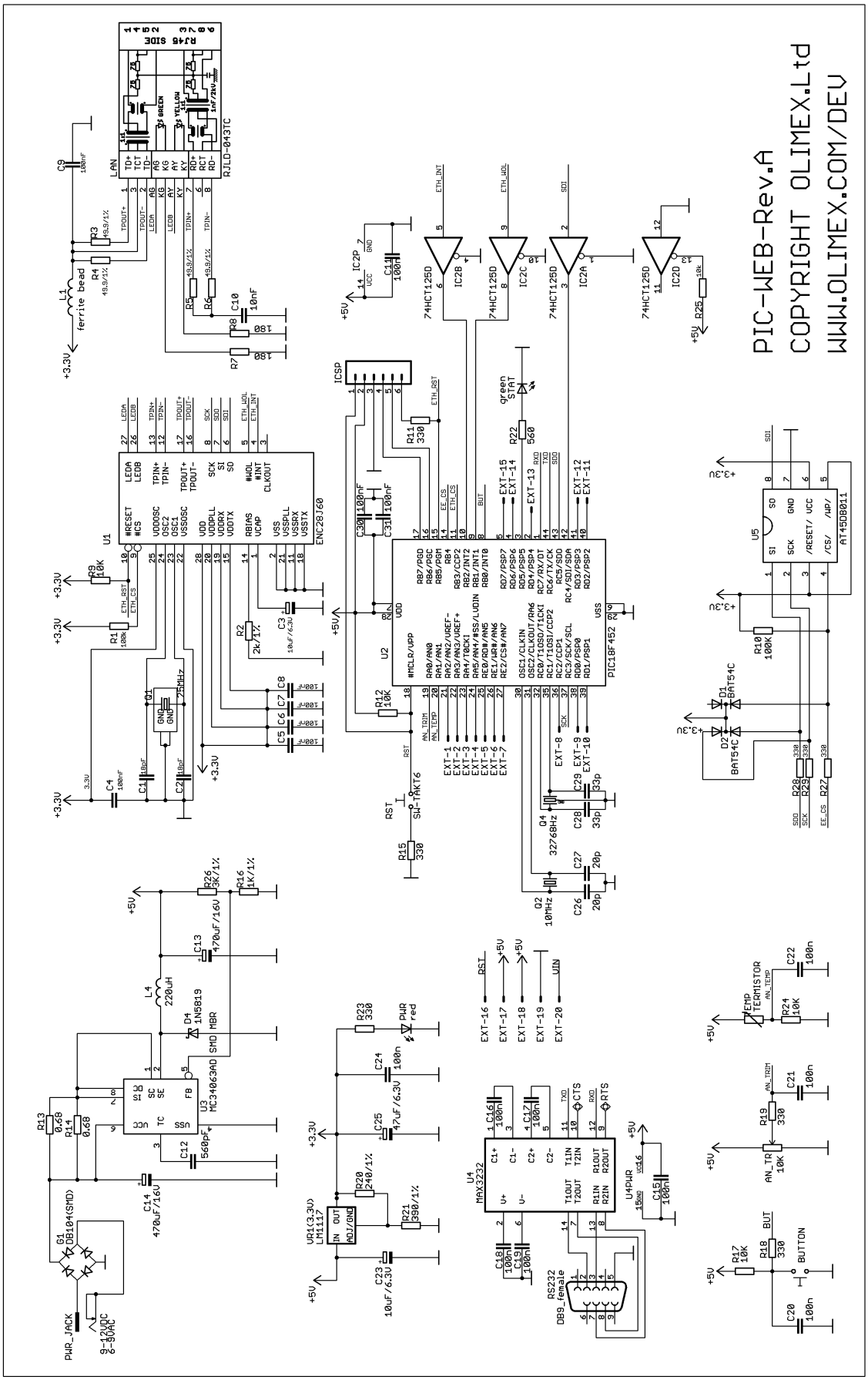
2: The high order bits of the Direct Address for the RAM are from the BSR register (except for the `MOVFF` instruction).

3: Many of the general purpose I/O pins are multiplexed with one or more peripheral module functions. The multiplexing combinations are device dependent.

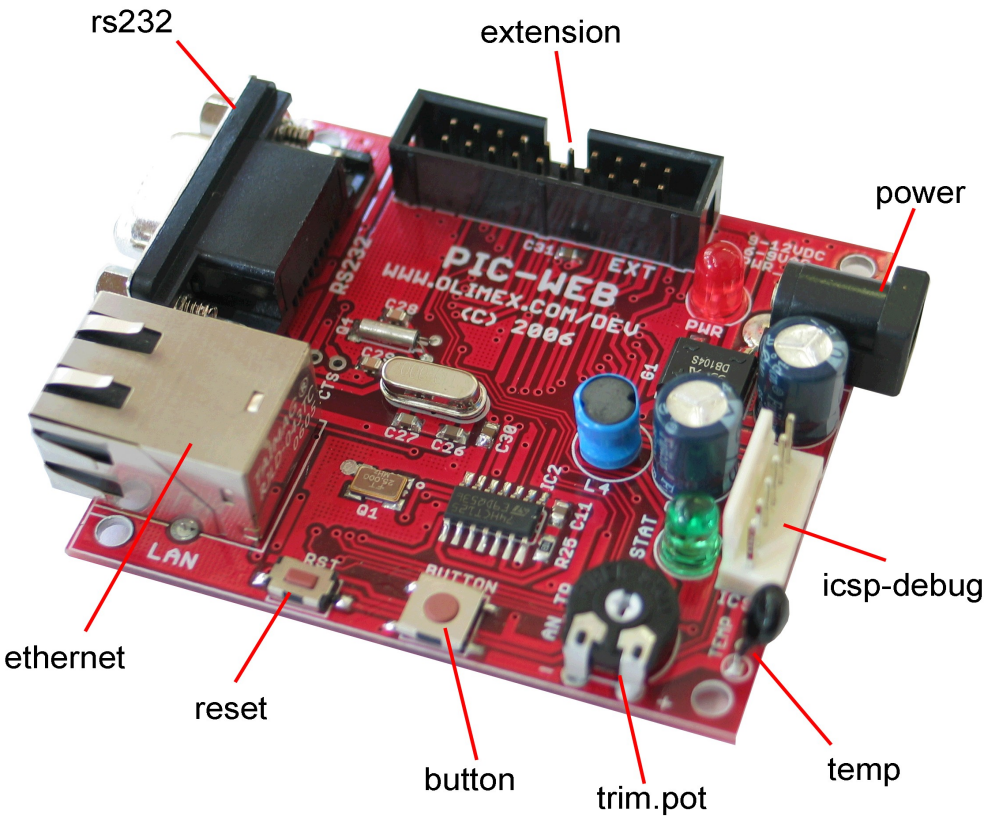
MEMORY MAP:


PROGRAM MEMORY MAP
AND STACK FOR PIC18F452/252
PC<20:0>
CALL, RCALL, RETURN
RETFIE, RETLW
21
Stack Level 1
Stack Level 31
RESET Vector
0000h
High Priority Interrupt Vector
0008h
Low Priority Interrupt Vector
0018h
On-chip
Program Memory
7FFFh
8000h
Read '0'
1FFFFFh
200000h
User Memory Space

SCHEMATIC:



BOARD LAYOUT:



POWER SUPPLY CIRCUIT:

PIC-WEB can take power from two sources:

- PWR_JACK where 9-12 VDC (or 6-9 VAC) is applied by external power source.
- EXT-20 pin VIN with the same DC voltage range.

The board power consumption is: about 130 mA with all peripherals and MCU running at full speed.

RESET CIRCUIT:

PIC-WEB reset circuit is made with R12 (10k) pull-up, R15 (330R) serial resistor and RST button.
On the schematic is made provision for external reset through EXT-16 pin. Manual reset is possible by the RST button.

CLOCK CIRCUIT:

Quartz crystal 10 MHz is connected to **PIC18F452** clock in (OSC1/CLKIN) and clock out (OSC2/CLKOUT).

32.768 KHz quartz crystal is connected to **PIC18F452** T1OSO and T1OSI pins for its internal Real Time Clock.

JUMPER DESCRIPTION:

There aren't any jumpers.

INPUT/OUTPUT:

One **User button** with name **BUTTON** – connected to PIC18F452 pin 8 (PORTB.RB0/INT0);

Status green LED with name **STAT** connected to PIC18F452 pin3 (PORTD.RD5/PSP5).

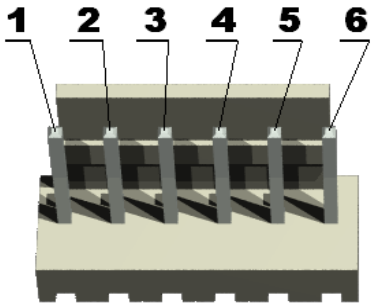
Power supply red LED with name **PWR** – indicates that external powers source is applied and board power supply is applied;

One trimmer AN_TR is connected to PIC18F452 pin 19 (PORTA.RA0/AN0).

EXTERNAL CONNECTORS DESCRIPTION:

ICSP:

Pin #	Signal Name
1	RST
2	+5V
3	GND
4	PGD
5	PGC
6	PGM

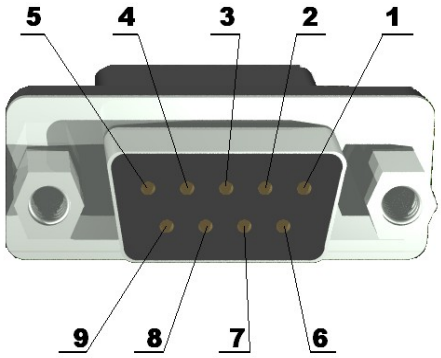


PGD I/O **Program Data.** Serial data for programming.
PGC Input **Program Clock.** Clock used for transferring the serial data (output from ICSP, input for the MCU).
PGM Input **Program Enable** (output from ICSP, input for the MCU).

RS232:

Pin #	Signal Name

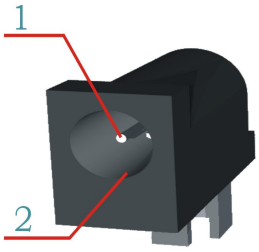
1	NC
2	TXD
3	RXD
4	NC
5	GND
6	NC
7	RTS
8	CTS
9	NC



TXD Output **Transmit Data.** This is the asynchronous serial data output (RS232) for the shift register on the UART controller.
RXD Input **Receive Data.** This is the asynchronous serial data input (RS232) for the shift register on the UART controller.
RTS Pin **Request To Send.** This is the RST pin on the board which is not connected to the PIC18F452 MCU.
CTS Pin **Clear To Send.** This is the CTS pin on the board which is not connected to the PIC18F452 MCU.

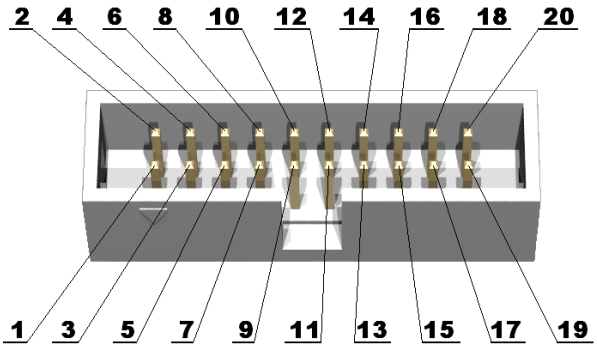
PWR JACK:

Pin #	Signal Name
1	Power Input
2	GND



The power input should be +9VDC/6VAC.

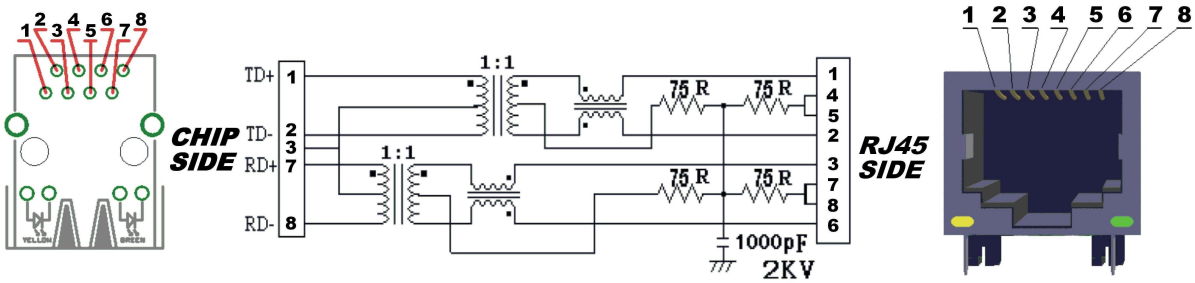
EXT:



ATTENTION!!!: EXT-18 pin is not 3.3V but 5V!!!

Pin #	Signal Name	Pin #	Signal Name
1	RA2/AN2/VREF–	2	RA3/AN3/VREF+
3	RA4/T0CKI	4	RA5/AN4/#SS/LVDIN
5	RE0/RD#/AN5	6	RE1/WR#/AN6
7	RE2/CS#/AN7	8	RC2/CCP1
9	RD0/PSP0	10	RD1/PSP1
11	RD2/PSP2	12	RD3/PSP3
13	RD4/PSP4	14	RD6/PSP6
15	RD7/PSP7	16	RST
17	+5V	18	**+5V!!!**
19	GND	20	VIN

LAN:



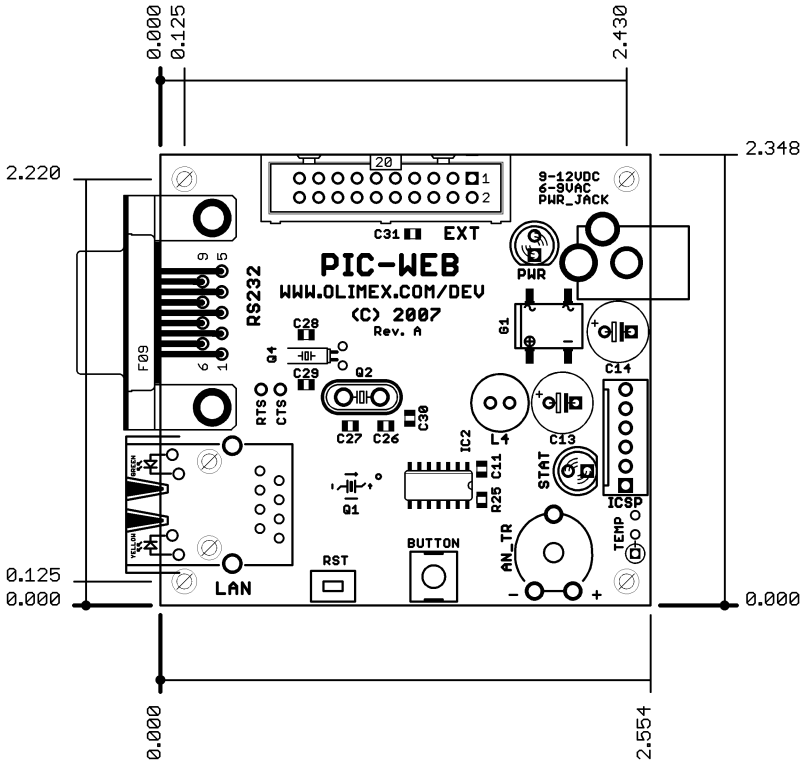
Pin #	Signal Name Chip Side	Pin #	Signal Name Chip Side
1	TPOUT+	5	Not Connected (NC)
2	TPOUT-	6	Not Connected (NC)
3	3.3V	7	TPIN+
4	Not Connected (NC)	8	TPIN-

LED	Color	Usage
Right	Yellow	Activity

Left	Green	100MBits/s (Half/Full duplex)

TPOUT- Output Differential signal output.
TPOUT+ Output Differential signal output.
TPIN- Input Differential signal input.
TPIN+ Input Differential signal input.

MECHANICAL DIMENSIONS:



All measures are in Inches.

AVAILABLE DEMO SOFTWARE:

You could find information about PIC-WEB board, Microchip TCP/IP stack and how to change and configure the software in Understanding PIC WEB boards on www.olimex.com/dev.

ORDER CODE:

PIC-WEB – 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.

All boards produced by Olimex are RoHS compliant

Revision history:

REV.A - created July 2008

Disclaimer: