



# PIC-MINI-WEB development board Users Manual

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#### **INTRODUCTION:**

PIC-MINI-WEB is with dimensions only  $55 \times 36$  mm but don't let this fool you. This board is very powerful and will allow you to connect almost everything to Internet.

The board has PIC18F25J10 microcontroller with 32KB of program Flash memory, 1024 RAM memory and allows Microchip free TCP-IP stack to be programmed. In addition on-board flash of 1 Mbit (128KB) is available as data storage for web pages and other data. The LAN connector could be connected to 10 Mbit Ethernet switch or hub.

There is also IDC14 connector with 10 GPIOs available for future extension and power supply and reset signals.

What CAN YOU do with this board? You name it: you can setup web server with dynamic web pages which allows you to read PIC resources or to drive them through web interface, i.e. to read ADC and display it on the web or to toggle GPIO outputs from the web, very conveninet way to make home automation for instance and to monitor and control your home from anywhere with Internet. Another service this board can run is FTP server, either you can control the PIC by Telnet, or you can send and receive e-mails and trigger hardware events with them. All this is possible due to the free firmware which Microchip provides, and the best of all - it has neither upfront charges for software nor royalies.

#### **BOARD FEATURES:**

- PIC18F25J10 microcontroller, ENC28J60 Ethernet controller, 32KB Flash, 1KB RAM
- 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 connected to RB0 interrupt
- 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, 10 GPIOs and power supply, reset signals
- Dimensions 55x36 mm (2.16x1.42")

#### **ELECTROSTATIC WARNING:**

The PIC-MINI-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 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-MINI-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.

#### **PROCESSOR FEATURES:**

**PIC-MINI-WEB** board uses MCU **PIC18F25J10** from Microchip with these features:

- Operating voltage range: 2.0V to 3.6V
- 5.5V tolerant input (digital pins only)
- On-chip 2.5V regulator
- Low-power, high-speed CMOS Flash technology
- C compiler optimized architecture:
  - Optional extended instruction set designed to optimize reentrant code
- Priority levels for interrupts
- 8 x 8 Single-Cycle Hardware Multiplier
- Extended Watchdog Timer (WDT)
  - o Programmable period from 4 ms to 131s
- Single-Supply In-Circuit Serial Programming<sup>TM</sup> (ICSP<sup>TM</sup>) via two pins
- In-Circuit Debug (ICD) with three Break points via two pins
- Power-Managed modes:
  - o Run: CPU on, peripherals on
  - o Idle: CPU off, peripherals on
  - o Sleep: CPU off, peripherals off
- Two Crystal modes, up to 40 MHz
- Two External Clock modes, up to 40 MHz
- Internal 31 kHz oscillator
- Secondary oscillator using Timer1 @ 32 kHz
- Two-Speed Oscillator Start-up
- Fail-Safe Clock Monitor:
  - o Allows for safe shutdown if peripheral clock stops
- High-current sink/source 25 mA/25 mA (PORTB and PORTC)
- Three programmable external interrupts
- Four input change interrupts
- One Capture/Compare/PWM (CCP) module
- One Enhanced Capture/Compare/PWM (ECCP) module:
  - o One, two or four PWM outputs
  - o Selectable polarity
  - o Programmable dead time
  - o Auto-Shutdown and Auto-Restart

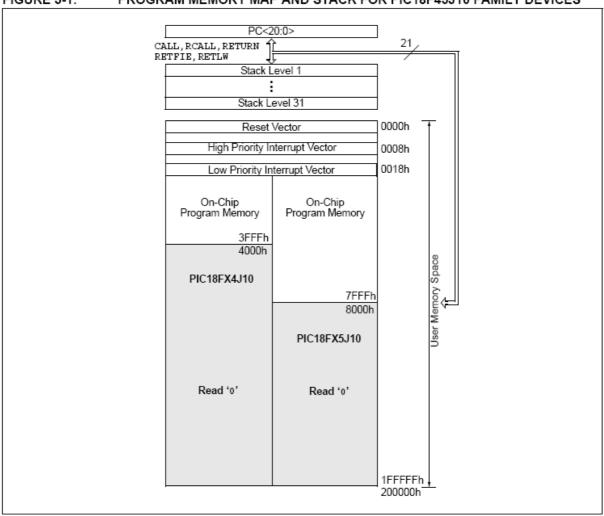
- Two Master Synchronous Serial Port (MSSP) modules supporting 3-wire SPITM (all 4 modes) and I2CTM Master and Slave modes
- One Enhanced Addressable USART module:
  - o Supports RS-485, RS-232 and LIN 1.2
  - o Auto-Wake-up on Start bit
  - o Auto-Baud Detect
- 10-bit, up to 13-channel Analog-to-Digital Convertor module (A/D):
  - o Auto-acquisition capability
  - o Conversion available during Sleep
  - o Self-calibration feature
- Dual analog comparators with input multiplexing

### **BLOCK DIAGRAM:**

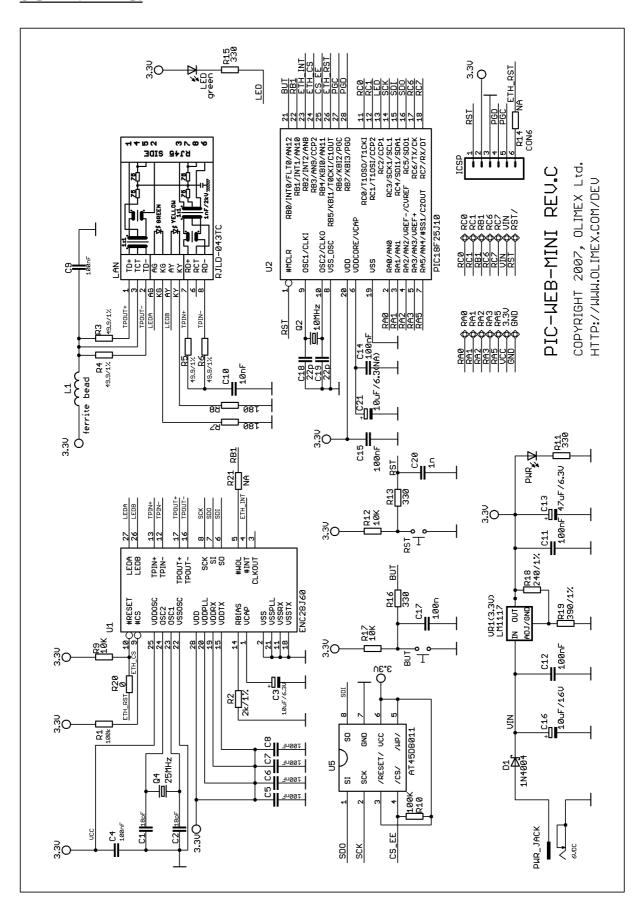
FIGURE 1-1: PIC18F24J10/25J10 (28-PIN) BLOCK DIAGRAM Data Bus<8> Table Pointer<21> Data Latch PORTA 8 8 inc/dec logic RA0/AN0 RA1/AN1 Data Memory (1 Kbyte) PCLATU PCLATH 21 RA2/AN2/VREF-/CVREF RA3/AN3/VREF+ Address Latch 20 PCU PCH PČL RA5/AN4/SS1/C2OUT Program Counter 12 Data Address<12> 31 Level Stack /12 Address Latch BSR Access FSR0 Program Memory (16/32 Kbytes) STKPTR Bank FSR1 FSR2 12 Data Latch PORTB inc/dec RB0/INT0/FLT0/AN12 RB1/INT1/AN10 logic Table Latch RB2/INT2/AN8 RB3/AN9/CCP2<sup>(1)</sup> RB4/KBI0/AN11 Address ROM Latch RB5/KBI1/T0CKI/C1OUT Decode Instruction Bus <16> RB6/KBI2/PGC RB7/KBI3/PGD IR 8 State Machine Instruction Control Signals Decode and Control PRODH PRODL PORTC 8 x 8 Multiply RC0/T10S0/T1CKI RC1/T10SI/CCP2<sup>(1)</sup> RC2/CCP1 BITOP W RC3/SCK1/SCL1 **4**8 RC4/SDI1/SDA1 RC5/SDO1 Internal Oscillator VDDCORE X Power-up RC6/TX/CK RC7/RX/DT osc1 Oscillator Start-up Timer ALÚ<8> INTRO osc2 Oscillator Power-on 8 Reset T10SI Watchdog T10S0 🛛 Timer Brown-out(2) Precision Single-Supply Band Gap Reference MCLR 🖂 Programming Reset Fail-Safe In-Circuit VDD, VSS Clock Monitor Debugge ADC BOR<sup>(2)</sup> Timer0 Timer1 Timer2 10-bit Comparator CCP1 CCP2 MSSP EUSART 1: CCP2 is multiplexed with RC1 when configuration bit CCP2MX is set, or RB3 when CCP2MX is not set. BOR is not available in PIC18LF2XJ10/4XJ10 devices.

#### **MEMORY MAP:**

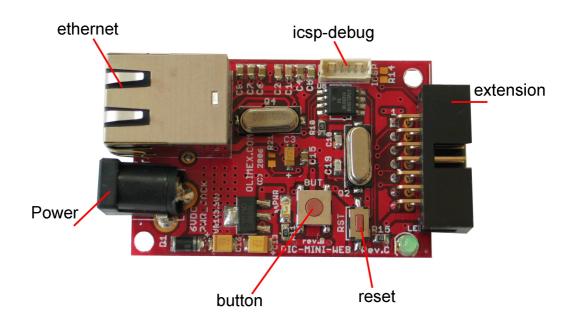
FIGURE 5-1: PROGRAM MEMORY MAP AND STACK FOR PIC18F45J10 FAMILY DEVICES



## **SCHEMATIC:**



#### **BOARD LAYOUT:**



## **POWER SUPPLY CIRCUIT:**

**PIC-MINI-WEB** takes power from PWR\_JACK where 6-9 VDC is applied by external power source

The board power consumption is: about 180 mA with all peripherals and MCU running at full speed.

## **RESET CIRCUIT:**

**PIC-MINI-WEB** reset circuit is made with R12 (10k) pull-up, R13 (330 $\Omega$ ) and capacitor C20 (100nF) and RST button. Manual reset is possible by the RST button.

## **CLOCK CIRCUIT:**

Quartz crystal 10 MHz is connected to **PIC18F25J10** pin 9 clock in (OSC1/CLKIN) and pin 10 clock out (OSC2/CLKOUT).

## **JUMPER DESCRIPTION:**

There aren't any jumpers.

## **INPUT/OUTPUT:**

One **User button** with name **BUTTON** – connected to PIC18F25J10 pin 21 (PORTB.RB0/INT0/FLT0/AN12);

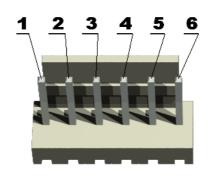
Status green LED connected to PIC18F25J10 pin13 (PORTC.RC2/CCP1).

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

## **EXTERNAL CONNECTORS DESCRIPTION:**

## **ICSP**:

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

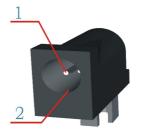


**PGD** I/O **Program Data.** Serial data for programming.

**PGC** Input **Program Clock.** Clock used for transferring the serial data (output from ICSP, input for the MCU).

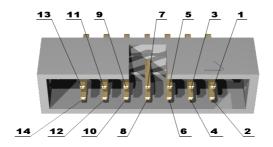
#### **PWR JACK:**

Pin #	Signal Name
1	Power Input
2	GND



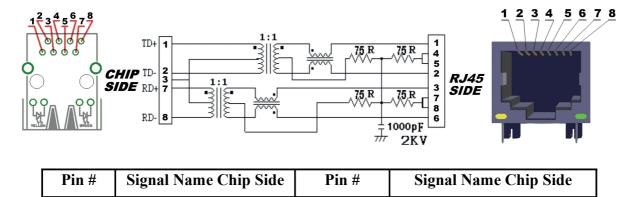
The power input should be +(6 - 9)VDC.

#### EXT:



Pin #	Signal Name	Pin#	Signal Name
1	RA0/AN0	2	RC0/T1OSO/T1CKI
3	RA1/AN1	4	RC1/T1OSI/CCP2
5	RA2/AN2/VREF-/CVREF	6	RB1/INT1/AN10
7	RA3/AN3/VREF+	8	RC6/TX/CK
9	RA5/AN4/#SS1/C2OUT	10	RC7/RX/DT
11	VCC +3.3 V	12	VIN
13	GND	14	RST/

## <u>LAN:</u>

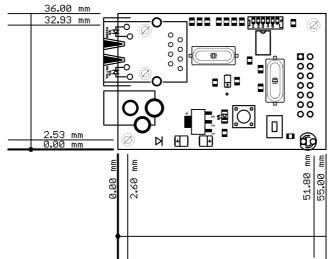


Pin #	Signal Name Chip Side	Pin #	Signal Name Chip Side
1	TPOUT+	5	Not Connected (NC)
2	TPOUT-	6	Not Connected (NC)
3	3.3V	7	TPIN+
4	Not Connected (NC)	8	TPIN-

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 mm.

## **AVAILABLE DEMO SOFTWARE:**

You could find information about PIC-MINI-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-MINI-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 <a href="https://www.olimex.com/dev">www.olimex.com/dev</a> for more info.



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

#### **Revision history:**

REV.A - created July 2008

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