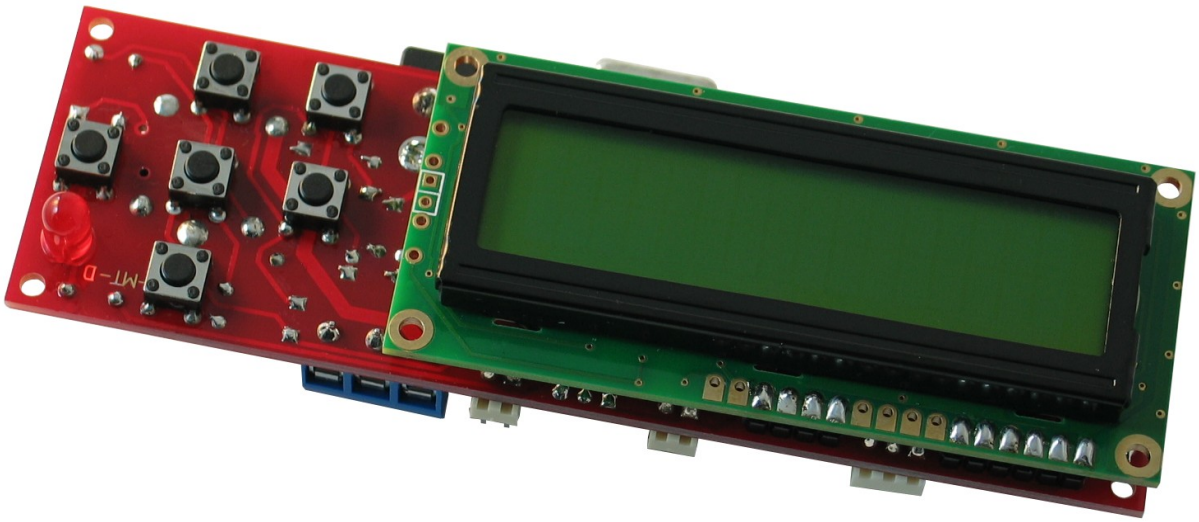

PIC-MT development board

Users Manual

All boards produced by Olimex are ROHS compliant

Rev. A, September 2011

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INTRODUCTION:

PIC-MT is development board for 28 pin PIC microcontroller. With its LCD, six buttons, RELAY, USB, RS232, ICSP, DALLAS, FREQUENCY and ADC connectors this board is suitable for different embedded systems applications.

BOARD FEATURES:

–ICSP/ICD connector for programming with PIC-MCP-USB, PIC-MCP or PIC-PG1, PIC-PG2, PIC-PG3, PIC-PG4 and debugging with PIC-ICD2, PIC-ICD2-POCKET, PIC-ICD2-TINY(* for the PICs with ICD support) for PIC16F87X there is low cost PIC-ICD1

–Dallas touch button port

–Frequency input

–0-10V and 0-5V ADC input with buffer OAMP

–RS232 DB9 female connector

–RS232 interface circuit with Tx, Rx signals

–RS232 TTL levels output connector

–Voltage regulator +5V, 78L05 and filtering capacitors

–Quartz crystal oscillator circuit 20Mhz

–DIL28 microcontroller socket

–Relay with 10A/250VAC contacts

–Buzzer

–Status LED on RB4

–Four mounting holes

–Power plug-in jack

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

–Dimensions 120x36 mm (4,7x1,4")

ELECTROSTATIC WARNING:

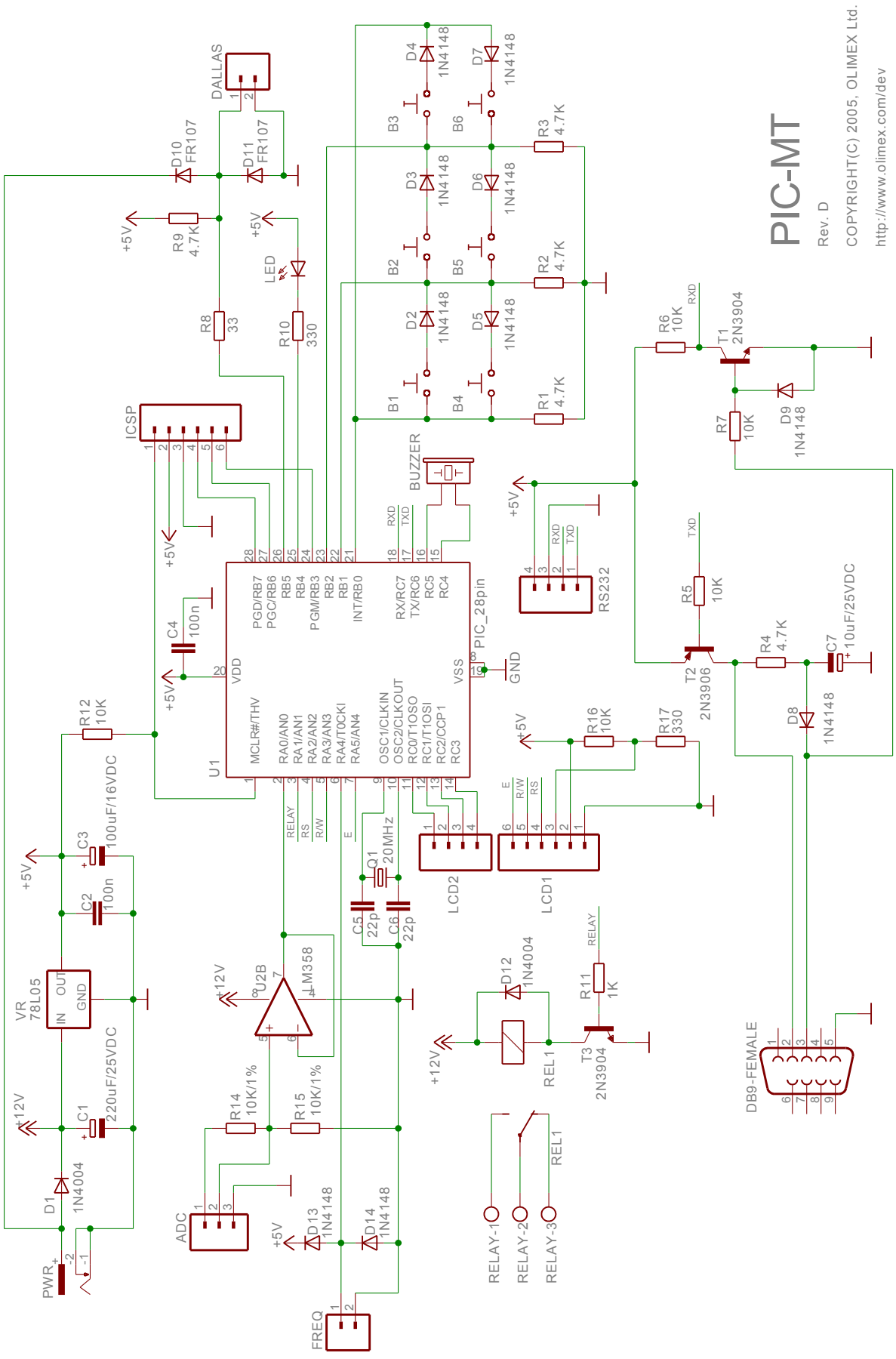
The PIC-MT board is shipped in protective anti-static packaging. The board must not be subject to high electrostatic potentials. General practice for working with static sensitive devices should be applied when working with this board.

BOARD USE REQUIREMENTS:

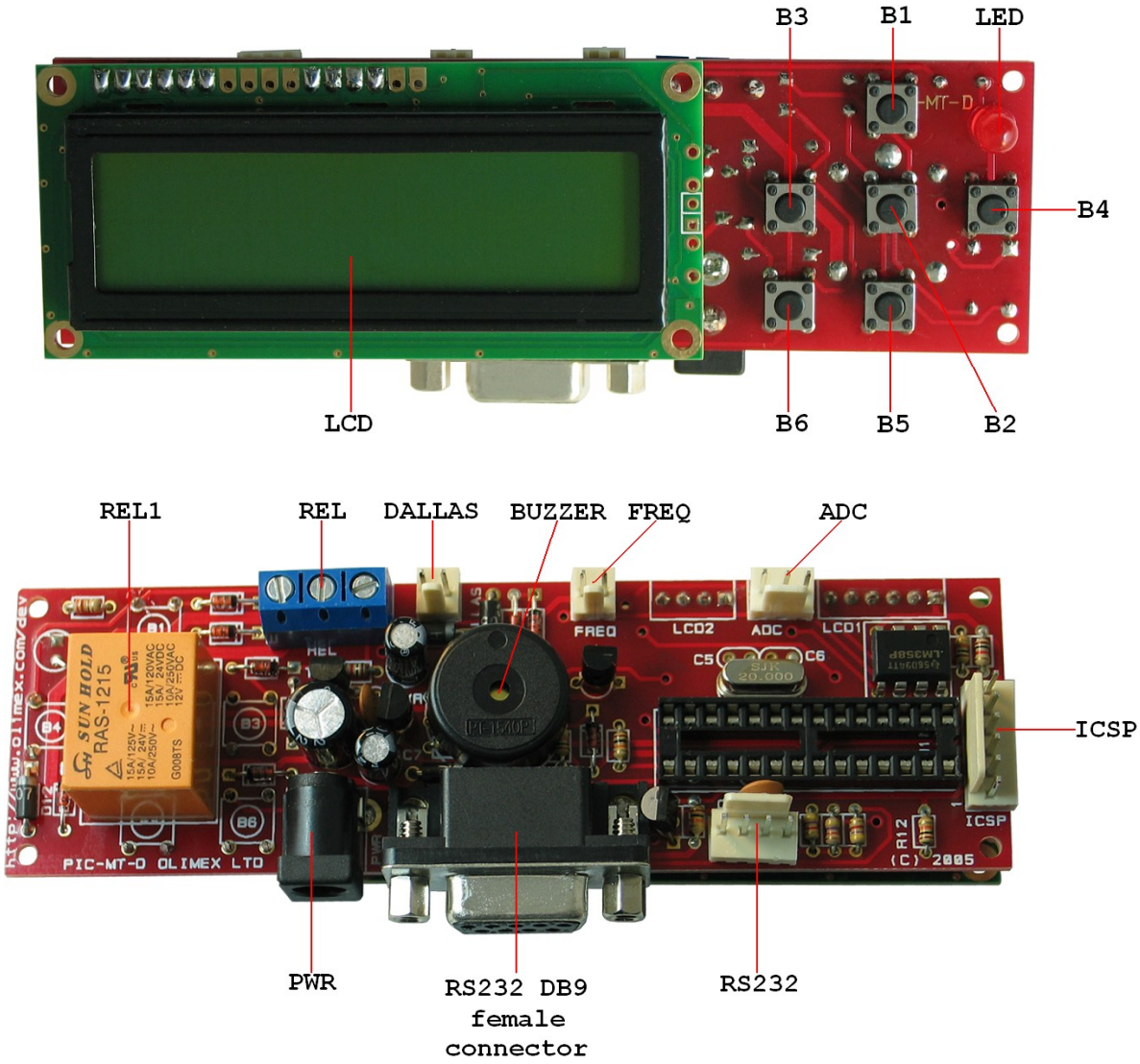
Cables: Depends on the used programming/debugging tool. It could be 1.8 meter USB A-B cable to connect PIC-Kit3, PIC-ICD2-POCKET, PIC-ICD2, PIC-MCP-USB to USB host on PC, RS232 cable in case of PIC-PG1, PIC-PG2, PIC-PG4, PIC-ICD2-TINY, PIC-MCP, LPT cable in case of PIC-PG3, or other programming/debugging tools.

Hardware: Programmer/Debugger – some of Olimex programmers are applicable, for example **PIC-PG1**, **PIC-PG2**, **PIC-PG3**, **PIC-PG4**, **PIC-Kit3**, **PIC-ICD2**, **PIC-ICD2-POCKET**, **PIC-ICD2-TINY**, **PIC-MCP**, **PIC-MCP-USB** or other compatible programming/debugging tool.

SCHEMATIC:


PIC-MT
Rev. D
COPYRIGHT(C) 2005, OLIMEX Ltd.
http://www.olimex.com/dev
DALLAS
ICSP
BUZZER
RS232
PIC_28pin
U1
LCD2
LCD1
DB9-FEMALE
ADC
FREQ
PWR
VR 78L05
LM358
U2B
REL1
RELAY-1
RELAY-2
RELAY-3
LED
Q1 20MHz
T1 2N3904
T2 2N3906
T3 2N3904
D1 1N4004
D12 1N4004
D13 1N4148
D14 1N4148
D10 FR107
D11 FR107
D8 1N4148
D9 1N4148
D4 1N4148
D7 1N4148
D3 1N4148
D6 1N4148
D2 1N4148
D5 1N4148
R1 4.7K
R2 4.7K
R3 4.7K
R4 4.7K
R5 10K
R6 10K
R7 10K
R8 33
R9 4.7K
R10 330
R11 1K
R12 10K
R14 10K/1%
R15 10K/1%
R16 10K
R17 330
C1 220uF/25VDC
C2 100n
C3 100uF/16VDC
C4 100n
C5 22p
C6 22p
C7 10uF/25VDC
+5V
+12V
GND

BOARD LAYOUT:



POWER CIRCUIT:

PIC-MT takes power via PWR jack. The power supply should be in range +10 to +14VDC.

RESET CIRCUIT:

PIC-MT reset circuit includes R12 (10k) pull-up, ICSP pin 1, U1 - pin 1 (MCLR#/THV).

CLOCK CIRCUIT:

Quartz crystal **Q1** (20 MHz) is connected to **U1** pin 9 (OSC1/CLKIN) and pin 10 (OSC2/CLKOUT).

JUMPER DESCRIPTION:

- There are no jumpers on this board.

INPUT/OUTPUT:

Buttons connection:

The Button interface uses three microcontroller ports RB0, RB1, RB2. The ports are connected with pull down resistors and are read as "0". To scan the buttons user should set one of the ports in "1" and to check the other two ports.
For example: set port RB0 as output RB1, RB2 as inputs and make RB0= 1. If buttons B1 is pressed RB1 will be "1" too, if button B6 is pressed RB2 will be "1" too. The same way you can scan all other buttons

LCD 16x2 display without BACKLIGHT.
LCD connection:
LCD is connected for 4-bit interface
RS - LCD register select RA2
R/W – LCD read write select RA3
E - LCD enable RA5
D4 – RC0
D5 – RC1
D6 – RC2
D7 – RC3
Sample demo program how to drive the LCD is available on Olimex's site.

Buzzer with name **BUZZER**, connected to U1 pin 15 (RC4) and pin 16 (RC5).
User must apply frequency to these microcontroller pin to sound:
RC4=0, RC5=1, delay, RC4=1, RC5=0, delay

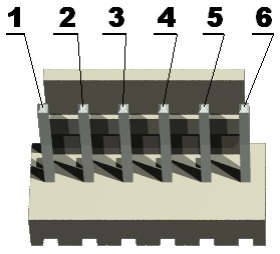
Status Led (red) with name **LED** connected to U1 - pin 25 (RB4). LED is ON when RB4=0.

RELAY with name **REL1**, connected to U1 pin 3 (RA1).

EXTERNAL CONNECTORS DESCRIPTION:

ICSP:

Pin #	Signal Name
1	MCLR#/THV
2	+5V
3	GND
4	U1 – pin 28 (RB7)
5	U1 – pin 27 (RB6)
6	U1 – pin 24 (RB3)



ICD/ICSP connector layout:

The ICD/ICSP connector is 6 pin with 0,1" step.

The PIN.1 is marked with square pad on bottom and arrow on top. ICSP signals are: 1- MCLR, 2- VDD, 3- VSS/GND, 4- PGD/RB7, 5- PGC/RB6, 6- PGM/RB3.

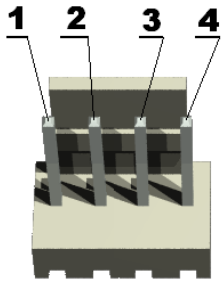
Programming:

To program PIC-MT you need serial port or parallel port PIC programmers with ICSP connector.

The serial port ICSP programmer (PIC-PG1) works with IC PROG ICPROG software, written by Bonny Gijzen. The latest release of ICPROG may be download for free from http://www.icprog.com

RS232:

Pin #	Signal Name
1	TXD
2	RXD
3	GND
4	+5V

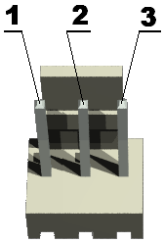


RS232 interface connection:

TTL connector: PIN.1 (square) –TXD, PIN.2 –RXD, PIN.3 – GND, PIN.4 – VCC.

ADC:

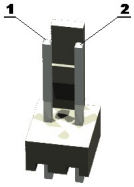
Pin #	Signal Name
1	Input for ADC, which is directly connected to buffer LM358 and after the buffer is connected to U1 pin 2 (RA0/AN0)
2	Input for ADC, which is connected via divider 10 kΩ/10 kΩ to buffer LM358 and after the buffer is connected to U1 pin 2 (RA0/AN0)
3	GND



Input voltage may be 0-5V between PIN.2 and PIN.3 (GND) or 0-10V between PIN.1 and PIN.3.

DALLAS:

Pin #	Signal Name
1	U1 pin 26 (RB5)
2	GND



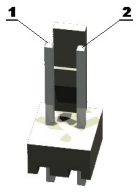
Dallas iButton interface:

Connected to PB5 via protection circuit.

Dallas connector: PIN.1 (square) – Dallas input, PIN.2 – GND.

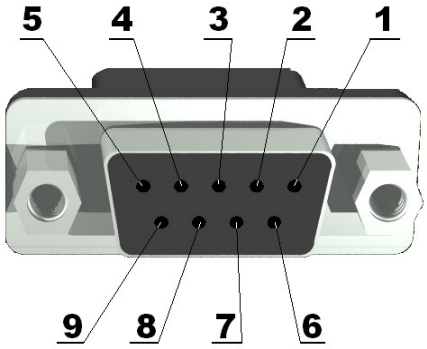
FREQ:

Pin #	Signal Name
1	U1 pin 6 (RA4)
2	GND



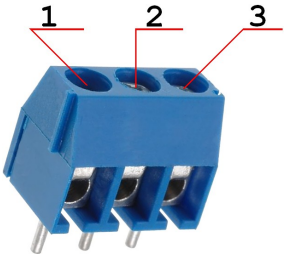
RS232 DB9 female connector:

Pin #	Signal Name
1	Not Connected
2	TXD – U1 pin 17
3	RXD – U1 pin 18
4	Not Connected
5	GND
6	Not Connected
7	Not Connected
8	Not Connected
9	Not Connected



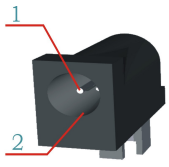
REL:

Pin #	Signal Name
1	RELAY1(Normal Open)
2	RELAY2(COMMON)
3	RELAY3(Normal Close)



PWR:

Pin #	Signal Name
1	Power Input
2	GND



AVAILABLE DEMO SOFTWARE:

- Blink LED for PIC16F876 demo code (C source and HEX)
- Buzzer, relay, buttons LCD for PIC16F876 demo code (C source and HEX)
- LCD write demo code for PIC16F876 demo code (C source and HEX)
- RS232 send receive for PIC16F876 demo code (C source and HEX)

ORDER CODE:

PIC-MT - completely 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:

Manual's revision:	Rev. A - created September 2011
Board's revision:	Rev. D – created March 2005

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