



**PIC-01 Development Board
User's Guide**

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1. Introduction.

1.1. Welcome.

Thank you for purchasing *PIC-01 Development Board* from *LoginWay*. Using this board you are able to learn about *Microchip PIC®micro* devices. You can use 18, 28 and 40-pin microcontrollers.

The board can be used stand-alone with programmed chip, with in-circuit debugger or in-circuit programmer. Debugger and programmer are not part of the kit.

The board is available as:

- *PIC-01 A* Development Board – base unit, with pre-programmed PIC16F877A
- *PIC-01 B* Development Board – base unit, with pre-programmed PIC16F877A and AC/DC power adaptor (UK plug)
- *PIC-01 C* Development Board – base unit, with pre-programmed PIC16F877A and RS232 computer cable (straight-through)
- *PIC-01 D* Development Board – base unit, with pre-programmed PIC16F877A and RS232 computer cable (straight-through) and AC/DC power adaptor (UK plug)

1.2. Main features.

The main features *PIC-01 Development Board* includes are:

- PIC16F877A programmed
- 18, 28, 40-pin sockets
- +5V voltage regulator
- Serial EEPROM
- RS232 interface
- 16x2 LCD
- 4 x red LED
- 2 x pushbutton
- Reset pushbutton
- 2 x *In-Circuit Programming™* connector
- Pot connected to Analog-to-Digital Converter (ADC) input
- Green power-on LED
- LCD contrast pot
- 4MHz crystal in socket
- 32.768 kHz crystal connected to timer1 input
- RC oscillator
- Port A,B,C,D,E connectors
- Solderless breadboard prototyping area
- Configuration jumpers

2. Getting started.

2.1. PIC-01 as stand-alone board.

The board can be demonstrated in following steps:

- Check if pre-programmed PIC is in the socket
- Check if LED, SDA pull-up, SCL pull-up, OSI, OSO, RB6, RB7 jumpers are placed
- Check if there is no RC Osc jumper
- Check if X2 crystal is in the socket
- Connect power supply: AC 6-9V or DC 7,5-16V
- Set LCD contrast if necessary

2.2. PIC-01 with an In-Circuit Programmer/Debugger/Emulator (*ICSP*[™])

For how to use In-Circuit tools refer to an appropriate producer's user guide.

PIC-01 Development Board provides two different connectors for *In-Circuit Programming*[™]

- ICD1 connector is compatible with Microchip *ICD2*[®]
- ICD2 connector is for programmers based on Microchip's *30277d* Application Note

2.3. Demo program.

The demo program consists of four parts:

- Intro
- Voltmeter
- Clock
- RS232 and EEPROM test

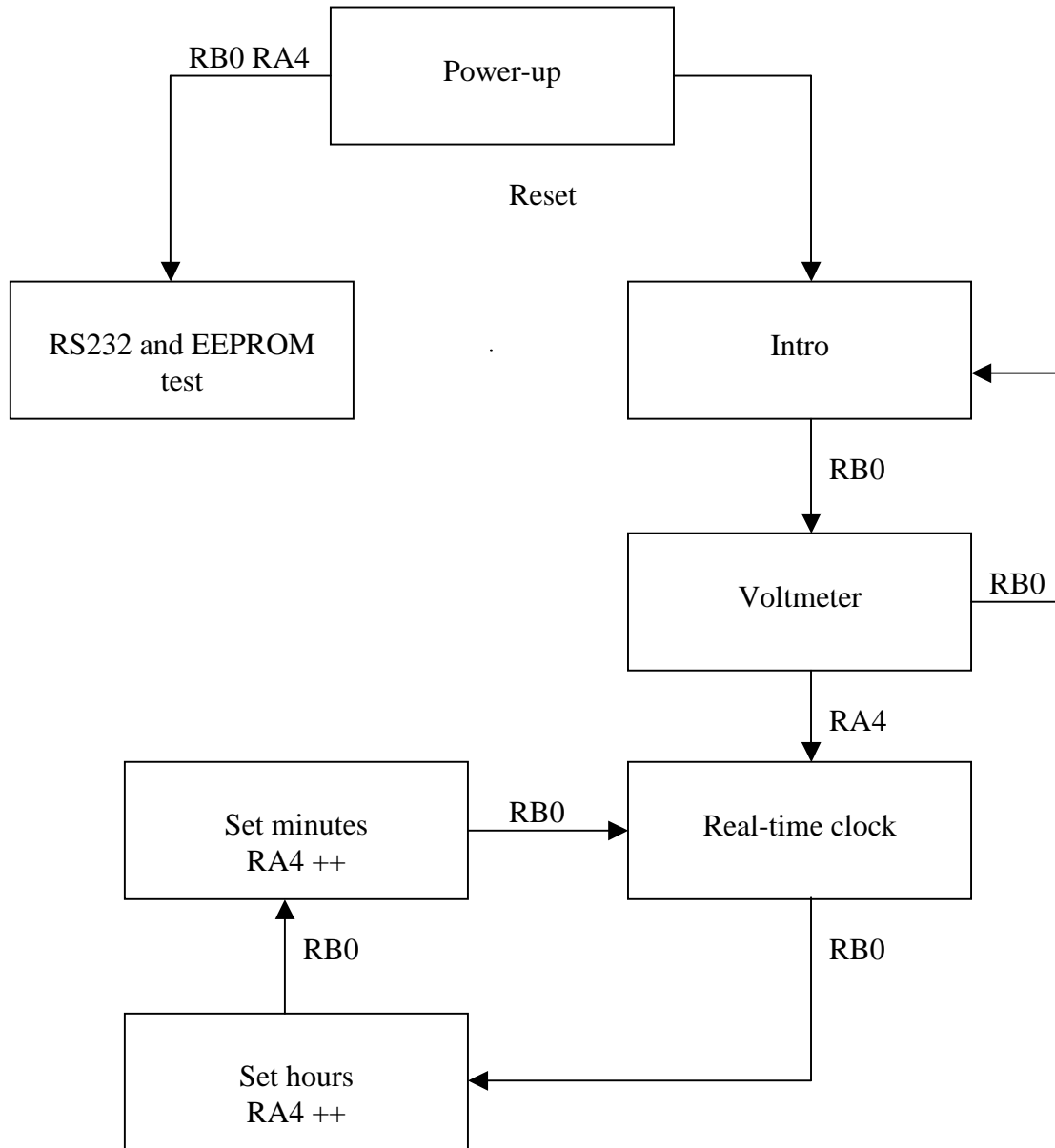
Intro. After power-up introducing text is displayed on LCD, and red LEDs blinks. Set LCD contrast with RV2 pot if necessary.

Voltmeter. Built in Analog-to-Digital Converter (ADC) measures 0-5V voltage form RV1 pot.

Clock. Built in timer1 is used to demonstrate real-time clock. The time can be set by using pushbuttons.

RS232 and EEPROM test. Testing procedure is available if the board is powered while both pushbuttons RA4 and RB0 are pressed. Text is first written into EEPROM and then sent through RS232 interface. A HyperTerminal[™] program on the PC will be able to display information if data is sent by straight-through computer cable. RS232 parameters are: 8-bit data, 1-bit stop, no flow control, 9600bd.

Figure1. Demo program flow chart.



Demo program is available as .hex file from www.loginway.com

3. Hardware details.

PIC-01 Development features the following elements:

3.1. Microcontroller sockets.

There are three sockets provided:

- 18-pin
- 28-pin
- 40-pin

Only one device can be used at a time.

3.2. Power supply.

Green LED indicates power-on.

PIC-01 can be powered by either AC or DC power adaptor. DC voltage on U1 input should not be lower than 7.5-8V and must not exceed 16V. Board can be supplied through ICD connectors.

Note: If any power consuming peripherals are connected to the board, it may damage *ICSP*[™] device. Check for maximum power sink of used In-Circuit device.

There are +5V and GND connectors provided to power user hardware.

3.3. RS232 serial interface.

PIC-01 contains DB9F connector for computer connection. The board can be connected to a PC using a straight-through cable. The PIC16/PIC18 RX and TX pins are tied to the RX and TX lines of the MAX232 or compatible.

3.4. Serial EEPROM.

The memory is placed in the socket and can be removed or replaced. It illustrates I²C bus idea. PIC devices use SDA and SCL pins for communication. Address of the device is set to A₀ A₁ A₂=000 (all address lines are connected to GND). While using additional I²C external device some other available address should be chosen. Serial Data (SDA) and Serial Clock (SCL) lines should be pulled-up by resistors (SDA Pull-up and SCL Pull-up jumpers connected).

3.5. LEDs.

Four LEDs are ready to use connected to RB port lines. LEDs can be disconnected by removing the jumper.

Note: LED jumper should be removed while using external interrupt on RB0 input.

3.6. Pushbuttons.

- Reset – hard reset. Line connected to /MCLR.
- RB0
- RA4

3.7. ICD connectors.

Two connectors are provided for *In-Circuit Programming*[™]. ICD1 is modular connector used in Microchip's development tools. ICD2 is 6-way header for low-cost programmers.

3.8. Analog input.

4.7 kΩ pot is connected with A0 input. The input voltage can be set from GND to Vcc.

3.9. Oscillator option.

Microcontrollers can work in two modes:

- With crystal X2 placed in socket provided.
- RC oscillator. Can be disabled by the jumper.

3.10. Timer 1.

32.768 kHz (watch type) X1 crystal is connected to ISO and OSI pins. Easy way for real-time clock implementation. Can be disabled by the jumpers.

3.11. Display.

16x2 lines LCD is connected to all 18, 28 and 40-pin sockets.

Connection map:

<i>PIC[®]micro</i>		LCD
A1	→	E
A2	→	R/W
A3	→	RS
B4	→	DB4
B5	→	DB5
B6	→	DB6
B7	→	DB7

Note: Microchip's *In-Circuit Programming*[™] specification do not allow any hardware connected to RB6 and RB7 lines while downloading program into microcontrollers memory. During downloading any connections to these lines should be removed and RB6 and RB7 jumpers disconnected.

Use RV2 pot for LCD contrast regulation.