

USER'S MANUAL

PICEBS2

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1 INTRODUCTION

The laboratory has developed a simple Microchip development board. This board is called PICEBS2.

The PICEBS2 board was developed to have a more powerful (and in fact a little more complex) board to be up to date with current processors and interfaces.



Figure 1 The PICEBS2 v.1.2 board

This document intends to explain in details the functionalities of this board.

1.1 FEATURES

- ◆ PIC18F87K22 @ 64MHz, 3.3V (65kWord instruction, 4 kbytes RAM, 1024 bytes EEPROM)
- ◆ 24 A/D 12 bits
- ◆ SPI/I2C
- ◆ UART
- ◆ 6 Timers
- ◆ External CAN interface (MCP2515)
- ◆ Connectivity
 - ◆ 1 x Serial RS-232
 - ◆ 1 x CAN (1.2, 2.0A, 2.0B compatible)

- ◆ 1 x PS2 keyboard
- ◆ 1 x Olimex UEXT standard
- ◆ 3 x Buttons, 10 x user LEDs, 3 x bicolor LED
- ◆ 1 x Extension (17 - IO individually connectable (quasi any CPU pin))
- ◆ 1 x Full CPU connection (72 pins)
- ◆ 1 x PICKIT3 debugger connector

2 HARDWARE

2.1 The USB power supply

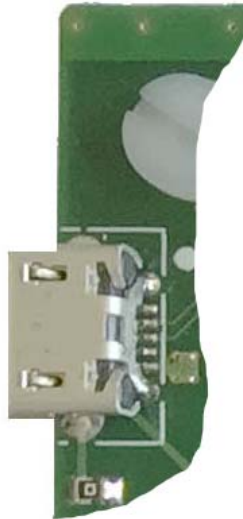


Figure 2 Micro-USB connector

Power supply input is a 5V micro USB connector. Current of 250mA will be sufficient for operation without extensions. The maximal current available on the 3.3V extension connector is about 1 ampere. Be careful in this case of the limited current of a USB host PC connector (500mA).

2.2 The USB debug connection (onboard PICKIT3)

To communicate with this board, we use the onboard PICKIT3. This feature offers the ability to interact directly between the microcontroller and the PC through the USB.

2.2.1 Onboard system selector

There are three board functions available.

- Debug
- Power only
- PICKIT3 only



Figure 3 System function selector

To debug with this board, the selector has to be placed on the top position. In this case, the PICKIT3 communicate with the PIC18F87K22 onboard processor

To have a standalone board (without debug), the selector has to be placed in the middle position. In this case, the PICKIT3 is not powered.

To used only the PICKIT3 with an external CPU board, the selector has to be placed at the bottom position. In this case, the PICEBS2 processor and parts are not powered and the PICKIT3 output connector is available.

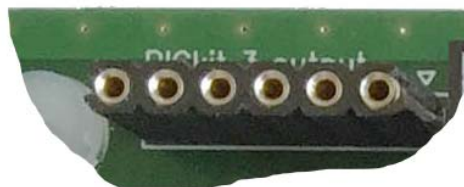


Figure 4 External PICKIT3 connector

2.3 The reset button and power LED

On the left of the PIC18F87K22 CPU is a reset button. Just above is a green power led to indicate when the PICEBS2 is powered.



Figure 5 Reset button & power led

2.4 The LCD screen

On the center of the PICEBS2 board is a graphical color LCD screen with a resolution of 320x240 pixels. This LCD has a backlight and a touchscreen.

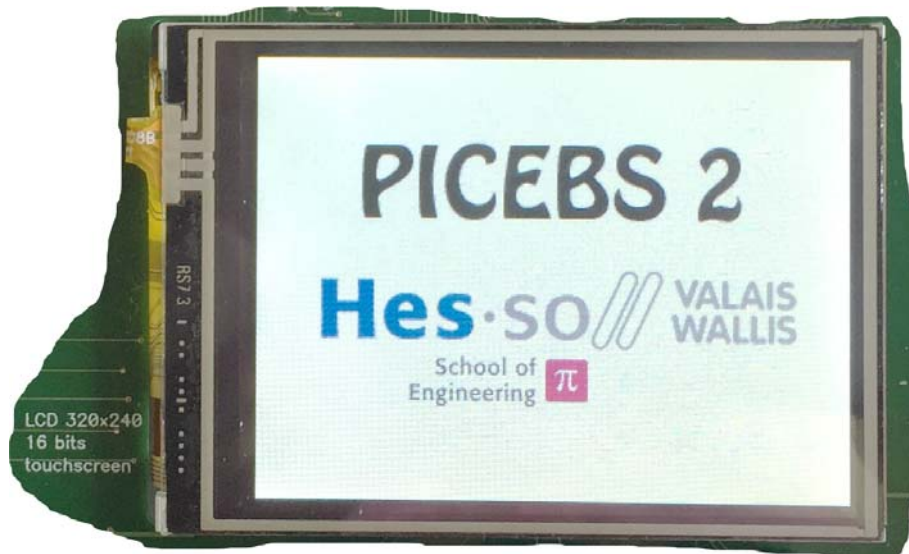


Figure 6 LCD screen

To use this screen, you can directly use the existing libraries (or implement yours based on the LCD datasheet).

2.5 The Buttons and the LEDs

Under the LCD are three user buttons available. These buttons contains bicolor leds (red/green) depending on the chosen polarity. On the left is a bar graph with 10 individual red leds.



Figure 7 User buttons and leds

2.6 The CAN bus

On the right part of the board is a RJ-45 CAN connector. It includes the CAN termination resistor.



Figure 8 CAN connector

2.7 The RS-232 interface

On the left of the board is an UART DB-9 female connector. This connector can be directly connected with a PC (DCE equipment).



Figure 9 RS-232 connector

Serial port	
Pin number	Signal description
1	nc
2	TX

3	RX
4	nc
5	GND
6	nc
7	nc
8	nc
9	nc

Table 1 Serial port 0 pinning

The connections used on this interface are RX, TX and GND. There is no hardware handshake implemented.

2.8 The Olimex UEXT connector

On the top of the PICEBS2 board is a 10 pins connector called Olimex UEXT. This connector offers a standard connector for olimex modules (or others).

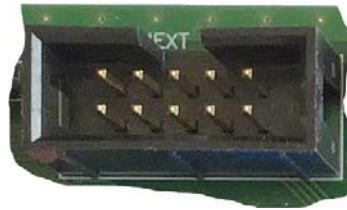


Figure 10 Olimex UEXT connector

Olimex UEXT pinout		
<i>Pin number</i>	<i>Description</i>	<i>Processor pin</i>
1	VCC	3.3 volts
2	GND	0 volt
3	UART_TX	RG1
4	UART_RX	RG2
5	I2C_SCL	RD6
6	I2C_SDA	RD5
7	MISO	RC4
8	MOSI	RC5
9	SCK	RC3
10	/CS	RD2

2.9 The PS2 keyboard

On the bottom right of the PICEBS2 board is a RJ-12 connector. This offers the ability to connect a PS2 keyboard.



Figure 11 PS2 keyboard connector

2.10 The Extension connectors

On the right of the PICEBS2 board is one extension connector. This is useful to integrate any new system on this board and to use the already existing extension modules.

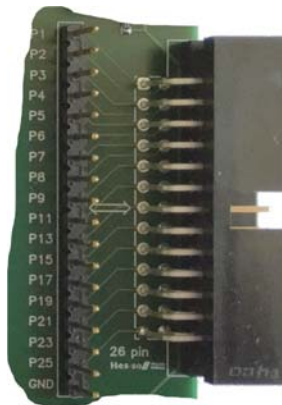


Figure 12 Extension connector

The user can bind any I/O extension pin with most of the microcontroller pin. The table below describes the extension pinout. Some of the extension pin are fixed by the Hes-so//Valais standard.

Extension pinout			
<i>Pin number</i>	<i>Description</i>	<i>Pin number</i>	<i>Description</i>
1	P1	2	P2
3	P3	4	P4
5	P5	6	P6
7	P7	8	P8
9	P9	10	GND
11	P11	12	GND
13	P13	14	GND
15	P15	16	GND
17	P17	18	GND

19	P19	20	GND
21	P21	22	GND
23	P23	24	GND
25	P25	26	VCC (3.3V)

Table 2 Extension connector pinout

3 SOFTWARE

A lot of functions are available to use any part of this board.

- LCD
- Touchscreen
- CAN
- Keyboard

All of these libraries could be requested to the laboratory responsible.

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