

EduKitBeta

User's manual

Educational board for MU Alpha / MU Beta
and Microchip PIC[®] microcontrollers with DIL18 package



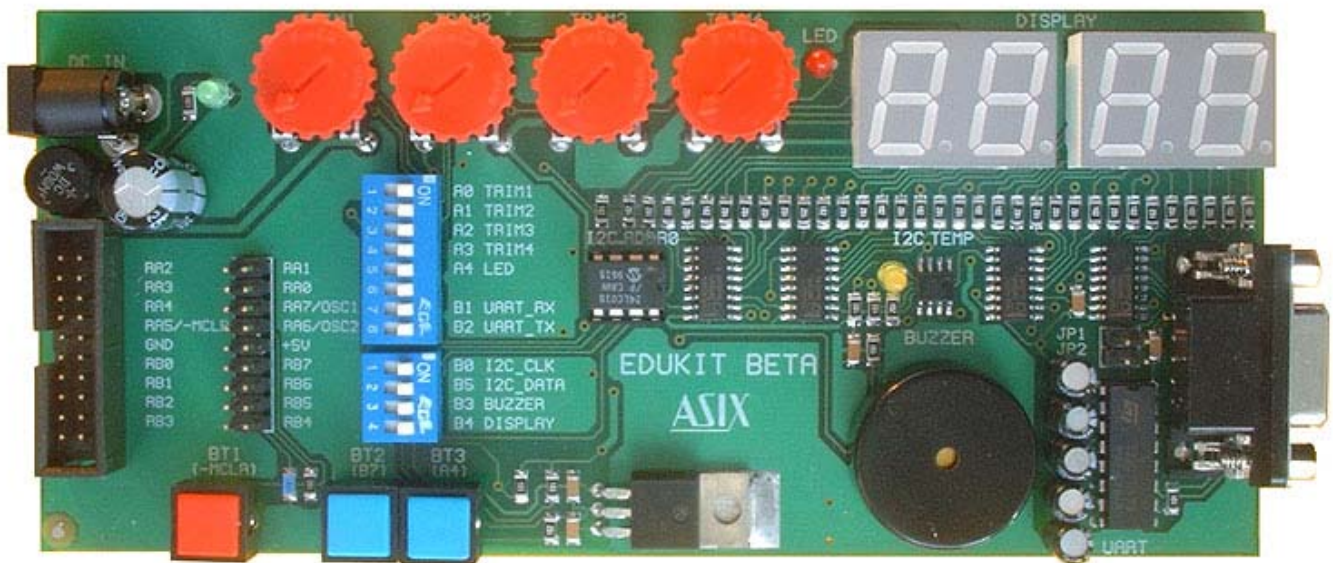
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EduKitBeta

Is an educational board – designed as an add-on to MU Beta emulator by ASIX s.r.o. It is suitable especially for debugging of applications with PIC16F627 and PIC16F628 microcontrollers but also with PIC16C710, PIC16C711 and others.

EduKitBeta together with MU Beta emulator is advisable for both beginners who would like to learn to work with PIC microcontrollers and advanced developers who need to quickly and easily check functionality of a program.



Equipment description

EduKitBeta is mainly targeted to be used as an add-on to MU Beta emulator by ASIX s.r.o. It is also possible to use it with MU Alpha but in such case it is not possible to take advantage of some of the peripherals though. For example it does not make any sense to set analog voltage at PIC16F84 inputs.

The board contains following peripherals:

- 4 potentiometers connected to analog inputs
- 4-digit 7-segment LED display (3-wire controlled)
- Application LED
- 3 pushbuttons (including 1 reset button)
- I²C serial EEPROM in a socket (24LC01)
- I²C thermosensor
- RS232 receiver/transmitter
- Buzzer (connected to PWM output)
- DIP switches for disconnecting of the peripherals
- Power supply circuitry, +5 V voltage regulator

Pin connection table for EdukitBeta

PORTA

Port A	Type	Function
bit 0	analog input	connected to potentiometer 1
bit 1	analog input	connected to potentiometer 2
bit 2	analog input	connected to potentiometer 3
bit 3	analog input	connected to potentiometer 4
bit 4	input	state of pushbutton BT3 - log.0 represents button pressed
	output	log.0 lights red LED
bit 5	input	external reset (-MCLR)
bit 6		not connected
bit 7		not connected

PORTB

Port B	Typ	Function
bit 0	output	I ² C clock
bit 1	input	UART receiver (RX)
bit 2	output	UART transmitter (TX)
bit 3	output	buzzer
bit 4	output	clock signal for LED display shift register; also used as display enable signal (1=enable - display is on, 0=disable - display is off)
bit 5	input/output	I ² C data
bit 6	output	display shift register strobe (1 = overwrite display contents, 0 = no change)
bit 7	input	state of pushbutton BT2 - log.0 represents button pressed
	output	display shift register data

Note: If the on-board peripherals are disconnected using DIP switches DISPSW1 or DISPSW2 it is possible to connect user peripherals.

Power supply

Power supply with following parameters may be used: DC voltage of 8 to 20 V, 100 mA current. Recommended AC/DC adaptor is MW903GS (9 V/300 mA), which can be ordered separately.

Peripheral description

LED diode

Red LED diode can be turned on by setting bit 4 of port A as output and writing log.0 to it. Writing log.1 turns the LED off.

LED display

The display is using 7-segment LED devices. The display is static, the data is first transferred to shift register (4 x 74HC4094) and then using STROBE signal (port B, bit 6) written to outputs. Enable signal of the display is shared with clock signal (port B, bit 4) and thus it is necessary to turn the display on by setting the clock signal to log.1 after data is transferred to shift register.

Pushbuttons (BT1 .. BT3)

When a button is pressed a log.0 appears at corresponding pin. To read the state of a button the pin must be configured as an input.

Buzzer

Buzzer is connected to pin 3 of port B. Because the buzzer acts as a capacitor, it is possible to use pin 3 of port B for a user peripheral.

EEPROM memory (I²C, ADDR0)

There is 24LC01B memory in a socket communicating with the microcontroller over [I²C bus](#). The device address is hardwired to 0.

Thermo sensor (I²C TEMP, ADDR1)

The board is equipped with intelligent thermosensor TCN75-5.0 by Microchip which can be interfaced using I²C bus. The device address is hardwired to 1.

RS-232 interface (COM)

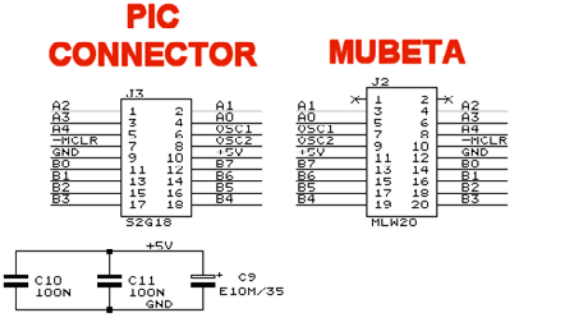
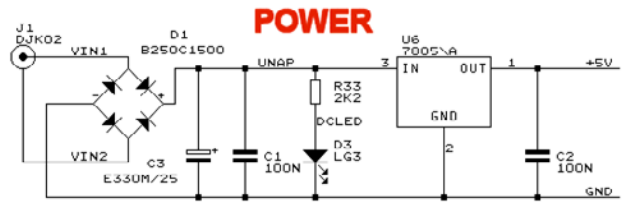
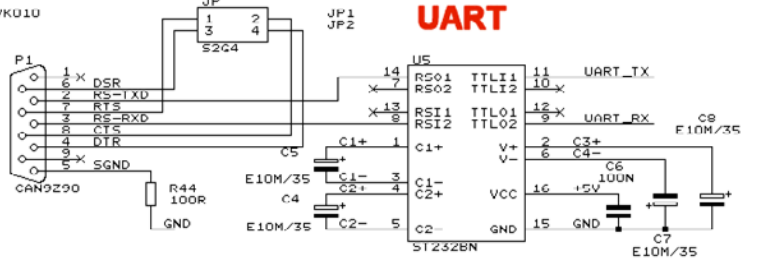
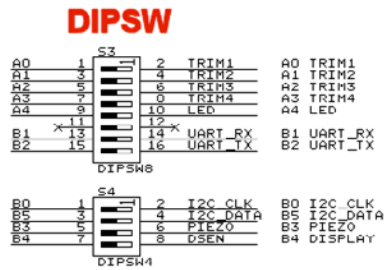
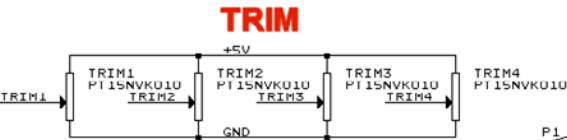
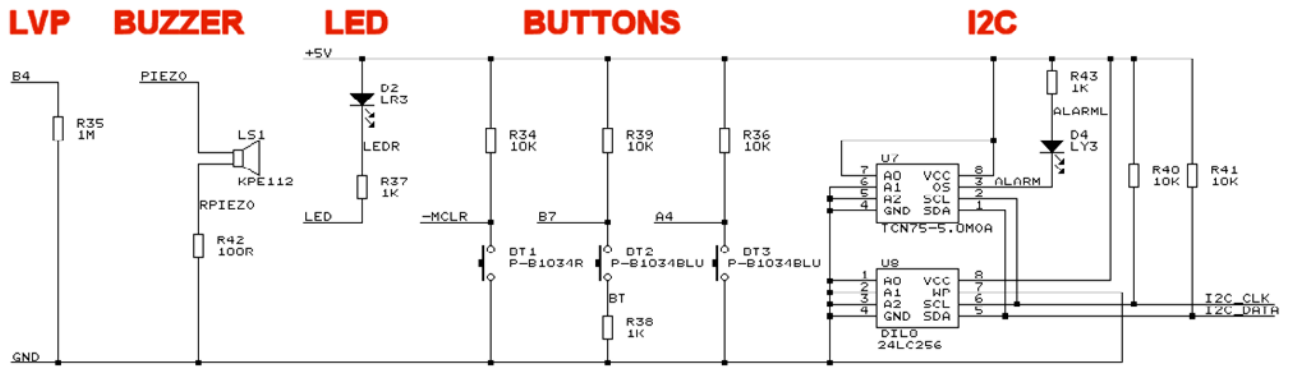
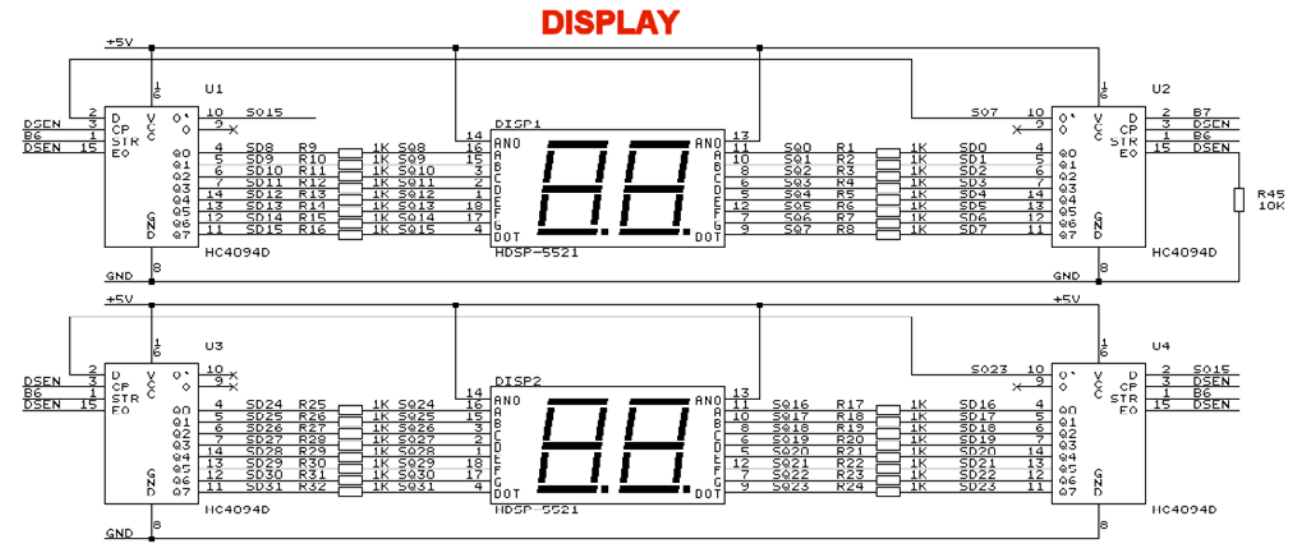
The board contains a voltage converter between TTL and RS-232 (+12 V a -12 V) levels which is connected to UART of the microcontroller (pins B1 and B2). Jumper JP1 may be used to short-circuit pins 7 (RTS) and 8 (CTS) on 9-pin Sub-D connector, similarly JP2 interconnects pins 4 (DTR) and 6 (DSR).

DIP switches

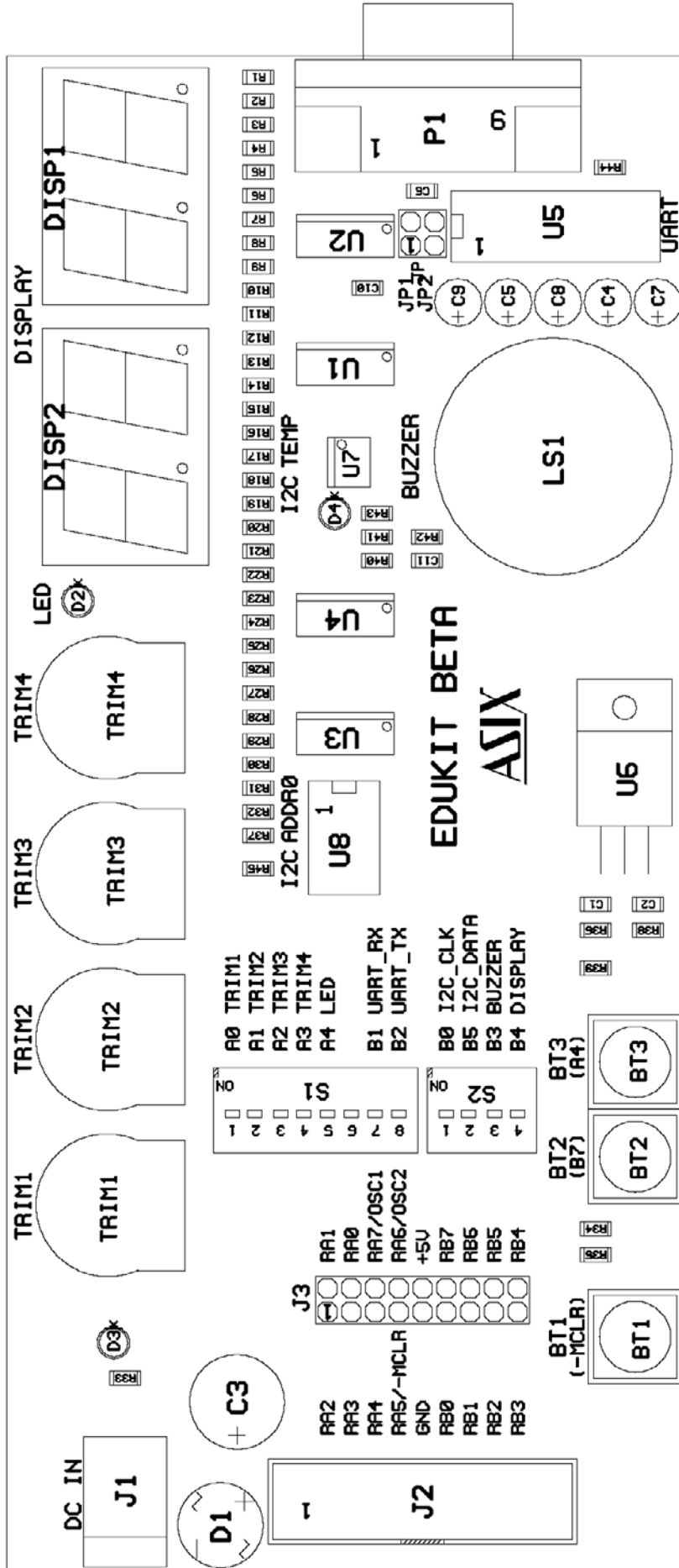
Most of the peripherals on EduKitBeta board can be disconnected from the microcontroller using DIP switches. This feature is convenient if the user needs to connect own devices. If an on-board peripheral is to be used, please remember to turn corresponding DIP switch to ON position.

EduKitBeta – schematics

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EduKitBeta - board layout



Connector to MU Beta

Connector to MU Beta (J2) has 20 pins. First 2 pins are unused, while pins 1 to 18 connect to microcontroller signals:

unused	x	x	unused
RA2	1	18	RA1
RA3	2	17	RA0
RA4	3	16	RA7/OSC1
RA5/-MCLR	4	15	RA6/OSC2
GND	5	14	+5V
RB0	6	13	RB7
RB1	7	12	RB6
RB2	8	11	RB5
RB3	9	10	RB4

Expansion connector

Expansion connector (J3) contains all microcontroller signals. The pin layout corresponds with the pinout of the microcontroller:

RA2	1	18	RA1
RA3	2	17	RA0
RA4	3	16	RA7/OSC1
RA5/-MCLR	4	15	RA6/OSC2
GND	5	14	+5V
RB0	6	13	RB7
RB1	7	12	RB6
RB2	8	11	RB5
RB3	9	10	RB4

Recommended add-ons

MW903GS - power supply adaptor, 9 V/300 mA

Further information

[1] <http://www.pic-tools.com>

[2] <http://www.microchip.com>

Contact to manufacturer

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