

EVBST7-02 Evaluation board for
Microcontrollers, series ST7Lite1 and ST7Lite2

**User's
manual**

REV 1.2

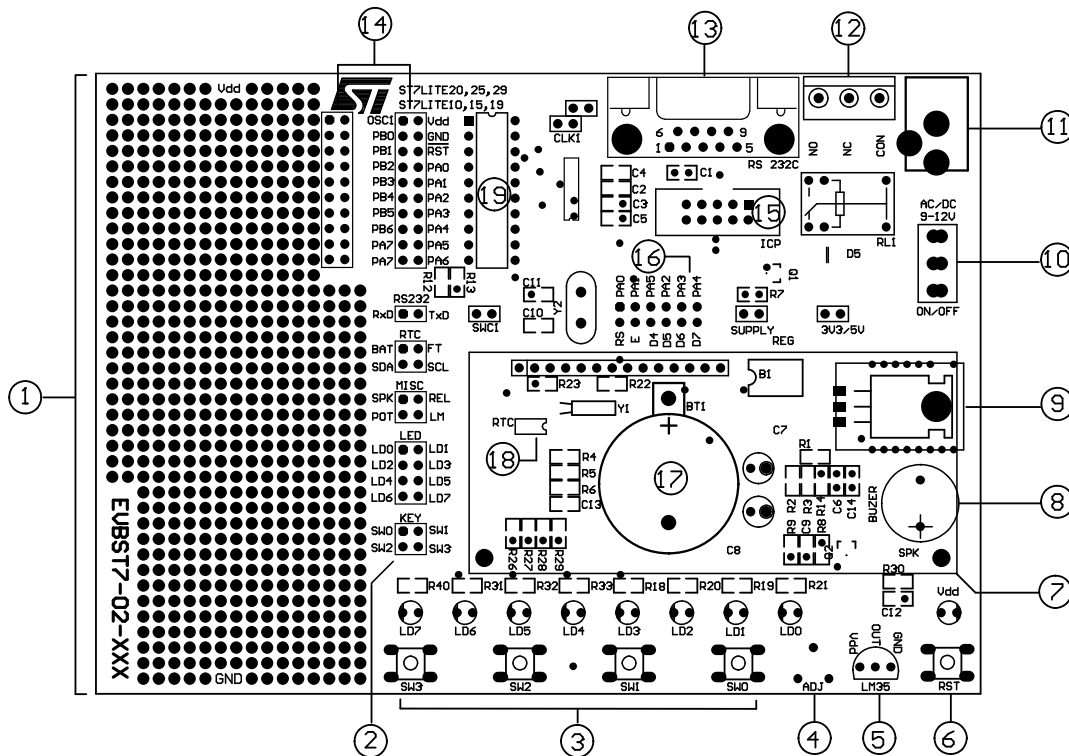
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1. Introduction

EVBST7-02-XXX is a development board designed for the hobbyists and engineers who want to quickly prototype their system based on LITE1 and LITE2 family of microcontrollers from ST Microelectronics. Developer has access to all pins of the micro, which are brought to the header (pin connectors) and labeled accordingly. Depending upon the board's configuration (listed versions) some or all of the following components are found on the board: analog thermometer, potentiometer, relay, buzzer, RTC (real time clock) and LCD display (2x16). The pin headers provided allow easy access to all these components. In addition, there are four micro-switches and eight diodes which could be connected to any of the pin connectors or additional components, which may be placed on the large, adjacent prototype area. The power circuitry on board (bridge, voltage regulator) eliminates the need for an external regulated power supply. This board comes with the several examples of the C code routines (source form), to facilitate testing and quick development in using the board's resources.

We wish great success and full satisfaction while designing and constructing appliances based on EVBST7-02-XXX

2. Board layout



1. Prototype area
2. Additional components connector
3. LED's and micro-switches
4. Potentiometer (may be connected to the ADC of the processor)
5. LM35 thermometer
6. RESET switch and power supply LED
7. 2x16 display (optional)
8. Buzzer
9. LM317 voltage regulator
10. Power ON/OFF switch
11. Input power jack (AC/DC)
12. Relay header
13. Programmer header
14. Dual header – port A, port B
15. Programmer header
16. Standard LCD display connector
17. Socket for lithium battery
18. Real time clock M41T00 (optional)
19. Socket for processors LITE10, 15, 19, 20, 25, 29

3. Supported processors

	ST7LITE1			ST7LITE2		
	ST7LITE10	ST7LITE15	ST7LITE19	ST7LITE20	ST7LITE25	ST7LITE29
FLASH	4kB			8kB		
RAM(stos)	256(128)B			384(128)B		
EEPROM	-	-	128B	-	-	256B
Peripherals	Lite Timer with Watchdog, Autoreload Timer, SPI, 10-bit ADC with Op-Amp		Lite Timer with Watchdog, Autoreload Timer with 32-MHz clock, SPI, 10-bit ADC with Op-Amp	Lite Timer with Watchdog, Autoreload Timer, SPI, 10-bit ADC with Op-Amp		Lite Timer with Watchdog, Autoreload Timer with 32-MHz clock, SPI, 10-bit ADC with Op-Amp
Supply voltage	2.4V – 5.5V					
Clock frequency	To 8MHz (out OSC to 1MHz)		To 8MHz (out OSC to 16MHz and in 1MHz RC 1% PLLx8/4MHz)	To 8MHz (out OSC to 1MHz)		To 8MHz (out OSC to 16MHz and in 1MHz RC 1% PLLx8/4MHz)
Temperature range	from -40°C to 85°C					
Cases	SO20 300", DIP20					

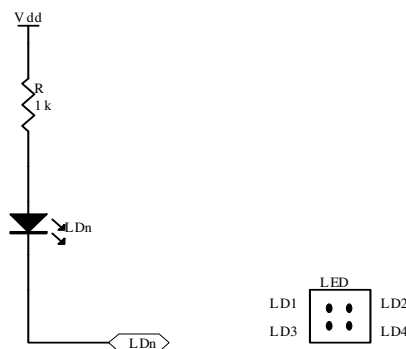
4. Power supply for board

Recommended external power supply voltage is 7-12V AC, or 9-15V DC. A standard power jack (bolt diameter 2.1mm - negative) is provided at the edge of the board. Stabilized voltage V_{dd} is available on the double header and on the prototype area of the board. The selection of the V_{dd} is provided through a 3V3 header. The default voltage V_{dd} is 5VDC (no jumper on 3V3 header). By placing a jumper V_{dd} becomes 3.3 VDC. The SUPPLY header allows for direct access to the power jack input. Placing a jumper bypasses the bridge and voltage regulator.

5. Peripheral circuits

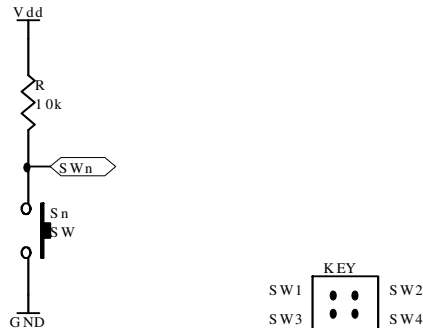
5.1. LED's

The board has 8 LED diodes, which make the simplest interface between the system and the user. This is especially useful for the beginners, who want to manipulate or debug their program with different hardware configurations. The diode turns on after grounding of the associated LD_n (n = 0 – 8) pin.



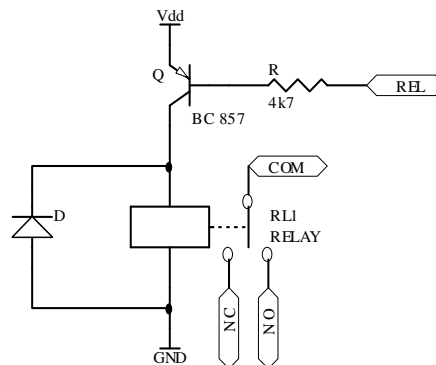
5.2. Switches

The board is equipped with 4 micro-switches. Pressing one of them causes grounding of the corresponding pin on the KEY header.



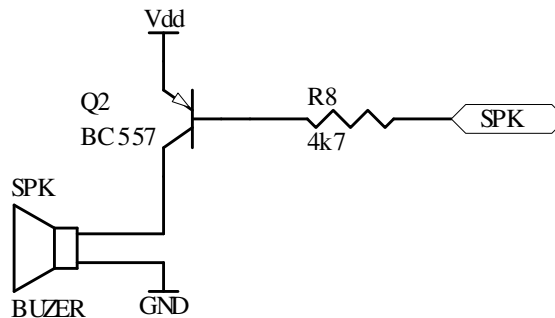
5.3. Relay

Access to the relay circuitry consists of the REL pin of the MISC header and pins: NC, NO, COM of the relay header. REL pin is indirectly connected to the base of the transistor. Logic level 1 (5 or 3.3 VDC) applied to the REL pin, will activate the relay. External circuits can be controlled via NC, NO, COM I/O pins.



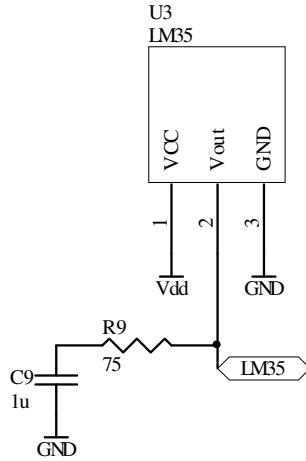
5.4. Acoustic indicator

The board has an acoustic indicator turned on and off by the transistor. The base of the transistor is connected to the SPK pin of the MISC header. Logic level '1' (5 or 3.3 VDC) applied to the SPK pin, will activate the buzzer.



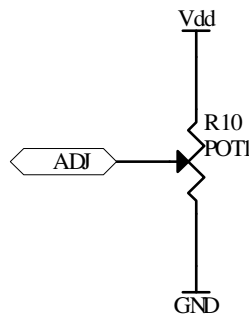
5.5. Thermometer

The board has one temperature sensor LM35. This voltage on output (Vout) is proportional to the gradient of the ambient temperature. Access to Vout is provided by LM35 pin of the MISC connector. User can wire this pin to the micro's A/D input and manipulate temperature measurements



5.6. Potentiometer

The board is equipped with one potentiometer, allowing for simulation of the analog circuit outputs. The potentiometer enables the adjustment of voltage in the range 0-Vdd. The potentiometer output is accessible on ADJ pin of the MISC connector.



5.7. Interface RS232

There is a DB-9 connector on the board, connected with the ST3232 state converter. On the other side of the converter there are pin connectors with converter circuit terminals, allowing to plug in to the processor.

5.8. Real time clock M41T00

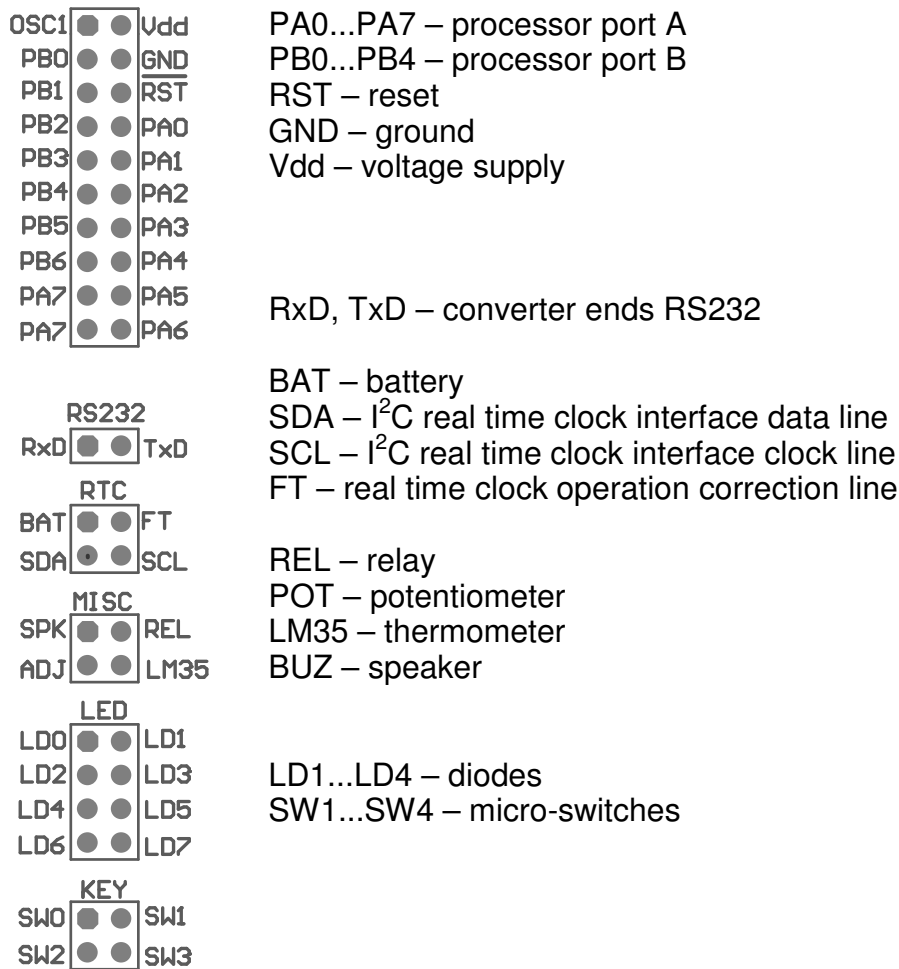
The board has one real time clock with battery back-up. The clock communicates with the micro through the I²C interface. All the connections needed for controlling the M41T00 circuit are brought out to the RTC pin header. The battery pin is also placed on the header.

5.9. LCD display

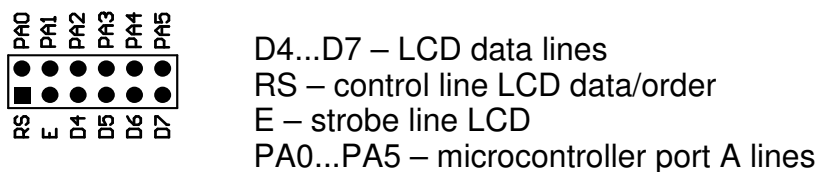
The board has one LCD display interface. The LCD connector has four data lines and two control lines: strobe line E and control line R/S. The display R/W line is permanently connected to ground; all other lines are available at the pin header. The adjustment of contrast is done by the selection of the resistors in the bridge circuit.

6. Headers and connectors

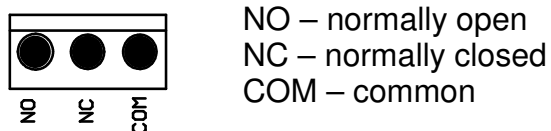
6.1. Peripherals



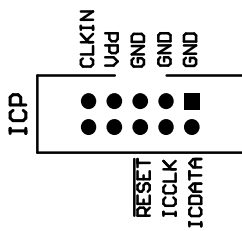
6.2. LCD display



6.3. Relay



6.4. Programmer's connector



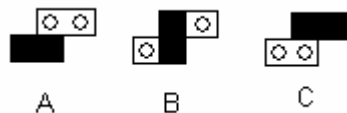
CLKIN –optional external clock closed with the CLK jumper
Vdd – voltage supply
GND – ground
RESET –reset
ICCLK –clock
ICDATA –data

7. Jumpers, supply LED and reset

3V3/5V – jumper shorted power is 3.3V, open 5V.

SUPPLY – shorted regulated voltage is provided from local power circuitry, open voltage comes from the external power supply

CLK1, SWC1 – allow to choose the source of the processor's clock signal. When it is quartz-controlled, both jumpers should be disconnected. When it is controlled by internal RC circuit, both jumpers should be connected to ground. Shorted allows for the external clock to the processor ex. from the programmer. In that case SWC1 jumper should be closed, and CLK1 jumper:



A – clock signal is connected from programmer's connector to PB4
B – signal is connected from programmer's connector to OSC1/CLK input
C – internal RC circuit is chosen

Vdd LED – power LED indicator

RST – pressing this button causes hardware reset

8. Demo programs

- LCD.c displays scrolling "EVBST7-01-XXX" string on the LCD panel
- LED_ADC.c potentiometer setting is displayed by a pattern of the LED diodes
- TERMOMETR.c measured temperature in [°C] is displayed on the LCD panel
- RTC.c displays the current date in the form: hour : min : day : month : year. The update of the clock settings using the keyboard. Microcontroller's port lines should be connected with the appropriate lines SDL and SCL in circuit M41T00 connected to the pin connectors.
- RS.c program RS 232, the program uses external interrupts and those from the timer, the TxD and RxD lines should be connected to the corresponding terminals of the ST3232 circuit, brought out to the pin connectors.
- LED.c pressing one of the switches turns on a pattern of LED lights

9. Available versions

The set EVBST7-02-XXX is sold in three basic versions: Lite, Standard and Advance. Custom orders are also available.

The set **System EVBST7-02 Lite** includes:

- **EVBST7-02-Lite** board, which includes: ST7Lite10 processor, all connectors (excluding RS connector), diodes, switches, transmitter, buzzer, thermometer, potentiometer.
- Cables to connect peripheral devices
- CD-ROM with manuals and software

The set **System EVBST7-02 Standard** includes:

- **EVBST7-02-Std** board, which includes: ST7Lite25 processor, all connectors, diodes, switches, transmitter, buzzer, thermometer, potentiometer, battery-backed RTC
- Cables to connect peripheral devices
- CD-ROM with manuals and software

The set **System EVBST7-02 Advance** includes:

- **EVBST7-02-Adv** board, which includes: ST7Lite25 processor, all connectors, diodes, switches, transmitter, buzzer, thermometer, potentiometer, battery-backed RTC, converter RS with RS connector, LCD 2x16.
- Cables to connect peripheral devices
- CD-ROM with manuals and software

The price list is available on our web page: www.propox.com

8 Schematic diagram

