GrandEVBavr

evaluation board for AVR microcontrollers .

User's Manual

REV 1.0

Prepox®

Many ideas one solution

Contents

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Introduction

The GrandEVBavr is an Evaluation System. It was created to support You in building systems based on Atmel AVR microcontrollers. This flexible base will allow You to create and verify projects and "shark ideas" quick and easily. Our remedy idea "many ideas one solution" was implemented in this project. That is the reason why we've created Evaluation System, able to handle most of AVR microcontrollers in DIP or SMD (with special adapter) package (all adaptors are available at www.propox.com). Board was designed to give an access to all of the MCU ports (available on gold-pin connectors). Grand EVBavr include very flexible set of peripheral devices and extension connectors. In our opinion this set is great to start Your life with AVR as well as journey in the FABULOUS WAY to Your advanced designs and projects.

The list of peripherals starts from simple relays, LED diodes or Buzzer and goes to USB interface and SRAM memory. The most experienced users can build embedded units which can be equipped in Ethernet. That is why we've designed GrandEVBavr to support PROPOX LAN module (MMlan02). List of interesting peripherals: LM32 thermometer, 2 relays, 2 potentiometers, reference power supply, adjustable reference voltage, ADC and DAC converters, RTC clock, EEPROM memory, FLASH memory, SRAM memory, four 7-segment displays, 8-channel driver, PS2 connector (keyboard or mouse or some of Your ideas), photoresistor, IR transmitter and receiver, USB interface, UART interface, 1Wire connector, I2C connector.

The most interesting are options provided by our evaluation board: common 2x16 alphanumeric display, graphical display(controller T6963C) or PROPOX LAN interface (MMlan02). All the system of GrandEVBavr is prepared to support ETHERNUT NutOS, and of course :) The most important for us users all available at All that peripheries are easily available on standard gold-pins connectors.

The Power supply solution? We did it for You. On a board is placed bridge and voltage regulators, so what will You need to provide power to GrandEVBavr? Just a basic AC form DC Power supply, the polarisation of supply will be checked and connected automatic by GrandEVBavr.

We thought about "masters of designs" bright and clever users, that is the reason why GrandEVBavr provide the prototype field and extension connector.

We wish great success and full satisfaction while designing and constructing appliance bases on GrandEVBavr.

1.1 Features

- Sockets for many kinds AVR microcontrollers .
- ISP (In-System Programming) connectors
- JTAG connectors for OCD (On-Chip Debugging)
- All I/O ports easily accessible trough pin header connectors
- Base regulated power supply VTG for 1.25 to 5V
- Regulated precise source of reference voltage VREF
- Sockets for crystal oscillator
- External oscillator RC
- 8 micro switch and 8 LED for general usage
- Buzzer
- Light detector (photo resistor)
- 2 relays
- 2 potentiometers
- Thermometer LM35 witch voltage output
- Infrared transmitter and receiver
- Ethernet Interface Module LAN (1)
- USB Interface
- Port RS232 for general usage
- Eight channel driver
- PS2 socket for mouse or keyboard
- 1-Wire connector
- I^2C connector
- Alphanumeric display - 2x16 chars
- Four 7-segment LED display
- Graphic display 128 x 64 pixels (1)
- I^2C Real Time Clock with Lithium Battery
- I^2C digital to analog (D/A) and analog to digital (A/D) converter
- External 128kB SRAM memory with address latch
- Serial SPI Flash memory with capacity up to16-Mbit (2)
- EEPROM I^2C memory with capacity up to 256 kB (2)
- Additional CMOS logic gates
- Prototyping Area
- Extension slot (PC/ISA standard) for extension cards and prototype boards
- Test points for VTG, VADJ, VREF, AGND
- Segregation of masses, digital GND and analog AGND
- Easy configuration of the system using straps

(1) Installed depending on version GrandEVBavr
(2) Optional

1.2 Supported microcontrollers

GrandEVBavr let You to programmer and test AVR Atmel microcontrollers, starts form easies ATiny in DIP8 package, ends on the most advanced ATmega series in TQFP100 package. The part inserted in the socket can be programmed in the system trough ISP or JTAG (if accessible). Many kind microcontrollers is available in DIP packages, and for them dedicated are sockets SOC1 to SOC7.. Because, advanced microcontrollers to be found only in SMD packages, for them dedicated are special adapters inserting in the sockets SOC8 and SOC9.

- AT90CAN128
- AT90CAN128 Automotive
- AT90CAN32
- AT90CAN32 Automotive
- AT90CAN64
- AT90CAN64 Automotive
- AT90S1200
- AT90S2313
- AT90S2323
- AT90LS2323
- AT90S2333
- AT90LS2333
- AT90S2343
- AT90LS2343
- AT90S4434
- AT90LS4433
- AT90S8515
- AT90S8535
- ATmega103
- ATmega103L
- ATmega128
- ATmega128L
- ATmega1280
- ATmega1280V
- ATmega1281
- ATmega1281V
- ATmega16
- ATmega16L
- ATmega162
- ATmega164P
- ATmega168
- ATmega168P
- ATmega2560
- ATmega2560V
- ATmega2561
- ATmega2561V
- ATmega32
- ATmega32L
- ATmega323
- ATmega323L
- ATmega324P
- ATmega328P
- ATmega48
- ATmega48P
- ATmega64
- ATmega64L
- ATmega640
- ATmega644
- ATmega603
- ATmega603L
- ATmega644P
- ATmega64RZAPV
- ATmega64RZAV
- ATmega8 (L)!!!
- ATmega8515(L)!!!
- ATmega8535(L)!!!
- ATmega88
- ATmega88P
- ATtiny12
- ATtiny13
- ATtiny15L
- ATtiny2313
- ATtiny24
- ATtiny25
- ATtiny26
- ATtiny261
- ATtiny44
- ATtiny45
- ATtiny461
- ATtiny84
- ATtiny85
- ATtiny861

2

Getting Started

GrandEVBavr Evaluation System is included with parts like below:

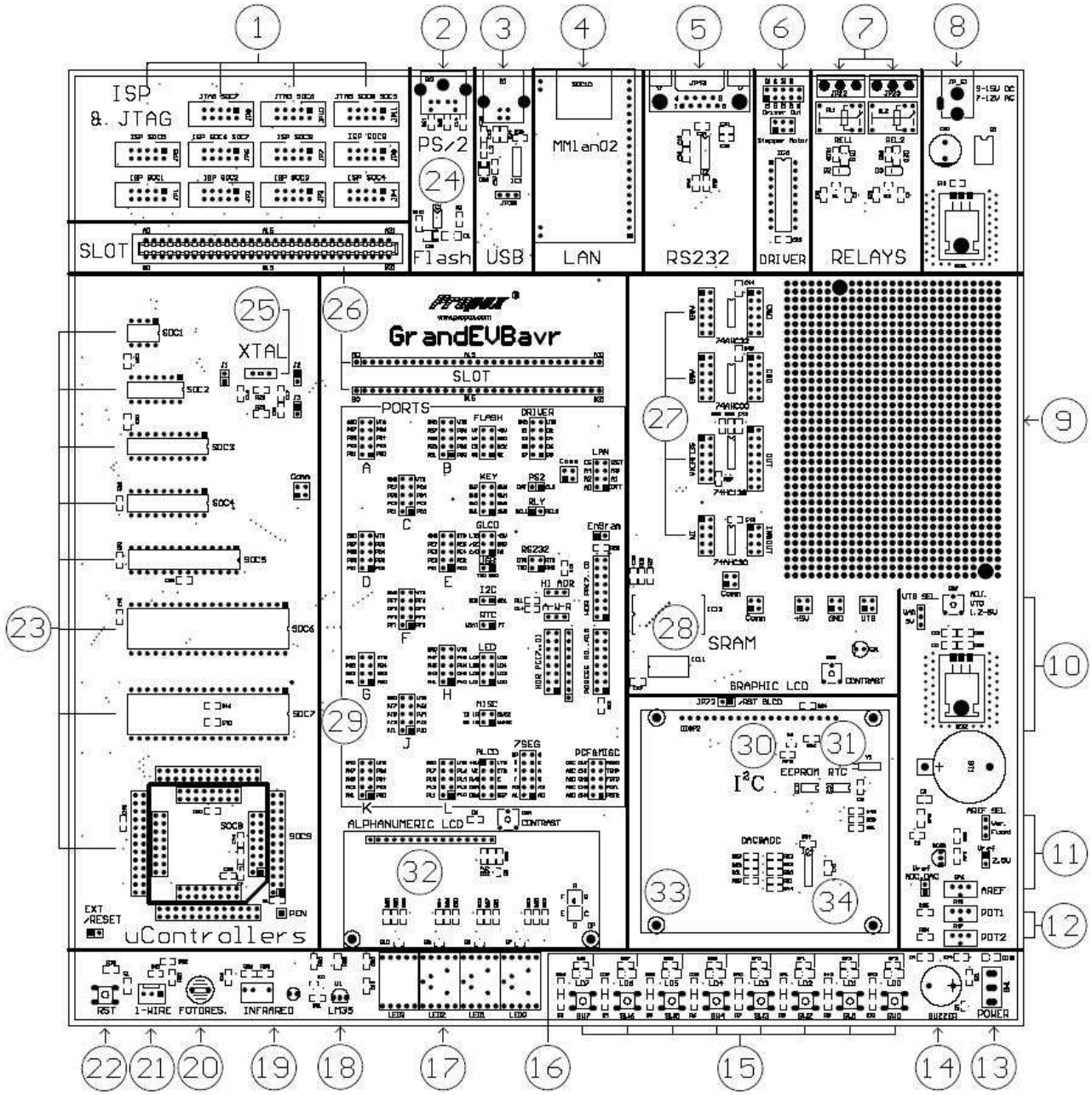
- GrandEVBavr board (1 pieces)
- Power supply (1 pieces)
- ISPcableIII programmer (1 pieces)
- CD witch example software (1 pieces)
- IDC10 cables for connection on board (2 pieces).
- 10-wires cables for I/O ports (2 pieces)
- 1-wire cable (10 pieces)
- Jumpers (10 pieces)

2.1 System Requirements

- Processor 400Mhz (Pentium recommended)
- 256 MB RAM
- 50 MB free space on HDD
- Windows 98, Windows NT 4.0, Windows 2000, XP or higher
- LPT Printer port (Centronics) (1)
- RS232 port (115200 bauds) (2)
- USB Port (3)
- Power Supply 9-12 DC or 7-9 AC min.750mA (4)

Note:
1: Version with ISPcable I Programmer
2: Version with ISPcable II Programmer
3: Version with ISPcable III Programmer
4: Version without power supply

2.2 GrandEVBavr Components



1. ISP and JTAG Connectors
2. PS2 Connector
3. USB Interface
4. LAN Interface (option)
5. RS232 Interface
6. Eight Channel driver
7. Relays Connectors
8. Power Connector for AC or DC Power Supply
9. Prototype Area
10. Variable Voltage Source
11. Reference Voltage Source
12. Potentiometers
13. Power Switch
14. Buzzer
15. Switches
16. LED's
17. Four 7-segment LED display
18. LM35 Thermometer
19. Infrared Receiver and Transmitter
20. Photoresistor
21. 1-Wire Connector
22. RESET switch
23. Sockets for microcontrollers
24. FLASH Memory
25. Crystal oscillator
26. Extension slot (PC/ISA standard) for extension card
27. CMOS logic gates
28. SRAM Memory
29. All I/O ports available on the board
30. EEPROM memory
31. Real Time Clock DS1307
32. LCD display (option)
33. Graphic display 128x64 pixels (option)
34. Converter A/C and C/A

2.3 Quick start

The GrandEVBavr starter kit is shipped with ATmega128 microcontroller mounted in ADPmega adaptor in socket marked SOC8. The default jumper settings will allow microcontroller to execute test program from the clock source (internal oscillator 1MHz) and voltage regulator (VTG=5V) on the GrandEVBavr board.

Connecting programmer to correct header, placed close to the back edge of the board. For ATmega128 and ISP programmer is “ISP SOC8” connector. Connection for other microcontrollers is described on Chapter 3.

Connect the power supply to power connector (8). Next, turn on the POWER switch (13) . The red LED is lit when power is on. An external 7…12V AC, or 9…15V DC power supply with standard power jack (2.1mm bolt diameter) is required. The input circuit is a full bridge rectifier, and the polarity of the input voltage can be selected either positive or negative center connector.

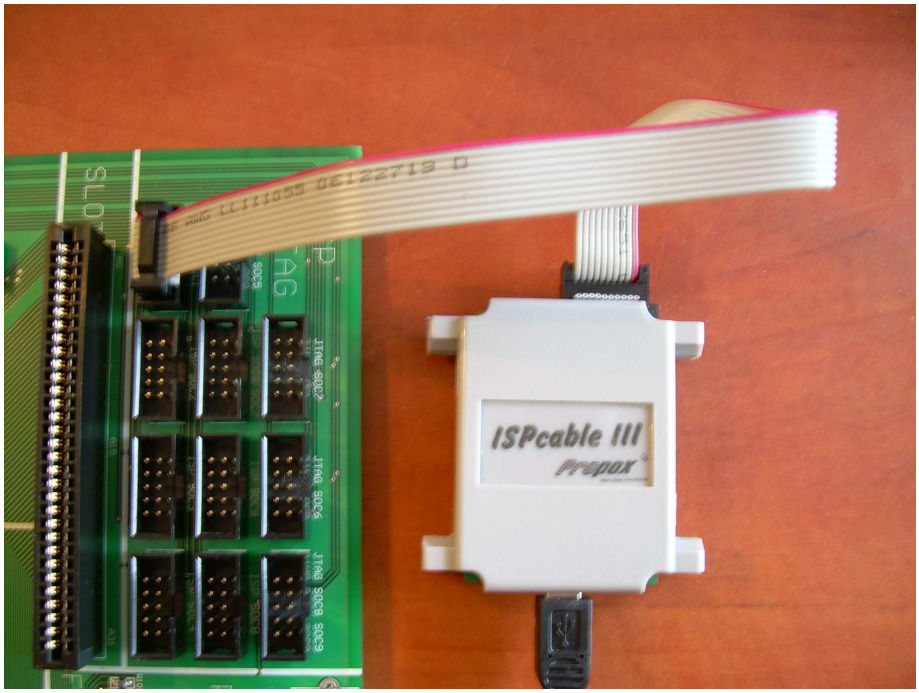


Figure 1. Connection of programmer

The microcontroller is programmed with a test program toggles LEDs when the button pressed. Use the supplied 10-pin ribbon cables to connect the header marked “PORT F” with the header marked “LED” and connect header marked “PORT C” with the header marked “KEY”. The connection are shown in Figure 2.

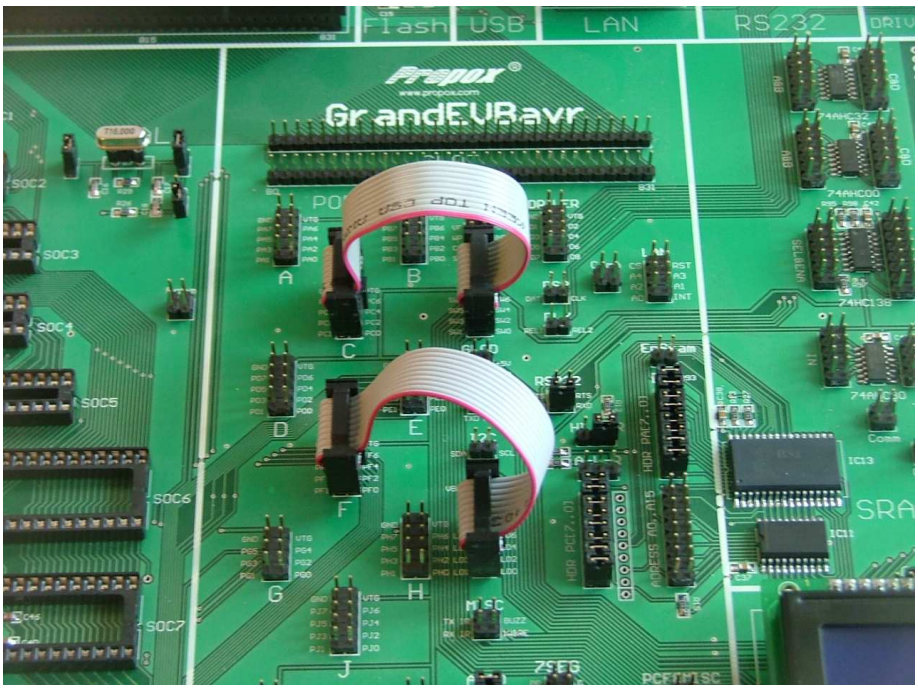


Figure 2. Default setup of GrandEVBavr

Before turn on POWER switch, make sure the microcontroller is properly inserted and the notch on the microcontroller matches the notch on the socket.

2.4 Programming AVR microcontroller

ISPcableIII programmer is seen like STK500 by *AVRStudio* environment. Configuration and other parameters are included in ISPcableIII user manual.

First step after start AVRStudio is choosing type of microcontroller.

Pressing  buton, will start user interface as shown on Figure 3:

Figure3. User Interface AVR Studio

A device is selected by selecting the correct device from the pull-down menu. This group also includes a button that performs a chip erase on the selected device, erasing both the flash and EEPROM memories. Load input .hex (i.e. example1.hex) file to Flash Memory.

Browse to the correct file by pressing the ... button or type the complete path and filename in the text field. Next push *Program* button.

For more information, can be found in manual of Propox programmers.

Caution ! Be careful setting fuse bits. Disable RESET or „ISP programming" not allowed programming devices!

3

Hardware description

3.1 Power supply

Four voltage sources on the board is available :

1) +5V regulated
2) Variable from 1.25V to 5V
3) Reference voltage VREF variable from 0 to 5V
4) VCC DC voltage from external power supply

Fixed +5V voltage is obtained from LM7805 standard IC regulator. Can be used to supply microcontroller and peripheries such as character LCD, graphic LCD and LAN module. Maximum output current is 600mA.

LM317 voltage regulator can supply the variable voltage VADJ. from 1.25V to 5V. VADJ can be adjusted trough VADJ. potentiometer (P1). Maximum output current is 600mA.

Reference voltage VREF, is produced by circuit with OP07 and LM285 devices. VREF can be adjustable trough VREF(P2) potentiometer between 0 and 5V.

Reference voltage AREFuC supply on-chip A/D converters, is obtained with VREF source when the jumper is mounted.

Voltage Target VTG supply microcontroller and peripherals is selected between +5V source (+5V jumper position) and VADJ source (VADJ position) on VTG SEL. header.

Additionally test points placed close to right edge of board, allows to easy measure and control voltage. On the board is many places with VTG,GND and +5V connector, allows connect external devices.

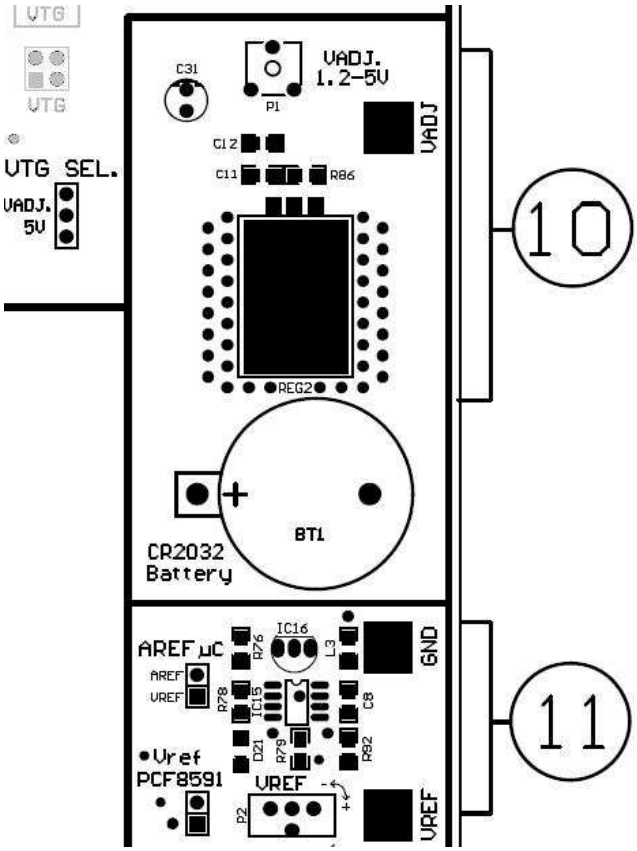


Figure 4. VREF and VADJ supply

3.2 Microcontrollers sockets

Microcontroller inserted in the dedicated sockets can be programmed in the system trough ISP or JTAG (if accessible) connector. Programming connectors for programmer, is placed close to back edge of board.

Microcontroller installed do dedicated sockets (SOCx) on the board (23). Be careful, when inserting a device in the socket.

Caution! When inserting a device in the socket, notice the orientation of device! Only one microcontroller should be inserted in the socket at a time!

Make sure that implemented AVR microcontrollers not require external crystal.

Detailed information on system clock can be found in the appropriate device datasheet. Table 5, shows which socket suits which AVR device, and which target programmer connector to use for ISP or JTAG programming.

MICROCONTROLLER	SOCKET	ISP CONNECTOR	JTAG CONNECTOR	CAUTIONS
AT90CAN128	SOC8	ISP SOC8	JTAGSOC8SOC9	
AT90CAN128 Automotive	SOC8	ISP SOC8	JTAGSOC8SOC9	
AT90CAN32	SOC7	ISP SOC7	JTAGSOC8SOC9	
AT90CAN32 Automotive	SOC8	ISP SOC8	JTAGSOC8SOC9	
AT90CAN64	SOC8	ISP SOC8	JTAGSOC8SOC9	
AT90CAN64 Automotive	SOC8	ISP SOC8	JTAGSOC8SOC9	
AT90S2313	SOC4	ISP SOC4	-	Require ext. crystal oscillator (connected toPA0 and PA1)
AT90L(S)2323	SOC1	ISP SOC1	-	Require ext. crystal oscillator (connected toPB3 and PB4)
AT90L(S)2333	SOC5	ISP SOC5	-	Require ext. crystal oscillator (connected to PB6 and PB7)
AT90L(S)2343	SOC1	ISP SOC1	-	
AT90L(S)4433	SOC5	ISP SOC5	-	Require ext. crystal oscillator (connected to PB6 and PB7)
AT90S8515	SOC6	ISP SOC6	-	
AT90S8535	SOC7	ISP SOC7	-	
ATmega103(L)	SOC8	ISP SOC8	-	
ATmega128(L)	SOC8	ISP SOC8	JTAGSOC8SOC9	
ATmega1280(V)	SOC9	ISP SOC9	JTAGSOC8SOC9	
ATmega1281(V)	SOC8	ISP SOC8	JTAG SOC8	
ATmega16(L)	SOC7	ISP SOC7	JTAG SOC7	
ATmega161(L)	SOC6	ISP SOC6	-	
ATmega162	SOC6	ISP SOC6	JTAG SOC6	
ATmega164P	SOC7	ISP SOC7	JTAG SOC7	
ATmega168(P)	SOC5	ISP SOC5	-	
ATmega168(V)	SOC5	ISP SOC5	-	
ATmega2560V	SOC9	ISP SOC9	JTAGSOC8SOC9	
ATmega2561V	SOC8	ISP SOC8	JTAGSOC8SOC9	
ATmega32(L)	SOC7	ISP SOC7	JTAG SOC7	
ATmega323(L)	SOC7	ISP SOC7	JTAG SOC7	
ATmega324P	SOC7	ISP SOC7	JTAG SOC7	
ATmega328P	SOC5	ISP SOC5	-	
ATmega48(P)	SOC5	ISP SOC5	-	
ATmega64(L)	SOC8	ISP SOC8	JTAGSOC8SOC9	
ATmega603(L)	SOC8	ISP SOC8	-	
ATmega640	SOC9	ISP SOC9	JTAGSOC8SOC9	
ATmega644	SOC7	ISP SOC7	JTAG SOC7	
ATmega644P	SOC7	ISP SOC7	JTAG SOC7	

Table 5. Microcontrollers and dedicated programming connectors

MICROCONTROLLER	SOCKET	ISP CONNECTOR	JTAG CONNECTOR	CAUTIONS
ATmega64RZAV	SOC7	ISP SOC7	-	
ATmega64RZAPV	SOC7	ISP SOC7	-	
ATmega8(L)	SOC5	ISP SOC5	-	
ATmega8515	SOC6	ISP SOC6	-	
ATmega8535	SOC7	ISP SOC7	JTAG SOC7	
ATmega88(P)	SOC5	ISP SOC5	-	
ATtiny12	SOC1	ISP SOC1	-	
ATtiny13	SOC1	ISP SOC1	-	
ATtiny15L	SOC1	ISP SOC1	-	Pin PB3 and PB2 are swap
ATtiny2313	SOC4	ISP SOC4	-	
ATtiny24	SOC2	ISP SOC2	-	
ATtiny25	SOC1	ISP SOC1	-	
ATtiny26	SOC3	ISP SOC3	-	
ATtiny261	SOC3	ISP SOC3	-	
ATtiny44	SOC2	ISP SOC2	-	
ATtiny45	SOC1	ISP SOC1	-	
ATtiny461	SOC3	ISP SOC3	-	
ATtiny84	SOC2	ISP SOC2	-	
ATtiny85	SOC1	ISP SOC1	-	
ATtiny861	SOC3	ISP SOC3	-	

Table 6. Microcontrollers and dedicated programming sockets (cont.)

3.3 System clock

Microcontroller can be operated with external crystal oscillator or RC oscillator. Sockets for crystal oscillator allows applicable crystal from 32kHz to 16MHz. For devices with dedicated XTAL1 and XTAL2 pins only for crystal (i.e. Atmega128), only need to short jumper XTAL1 and XTAL2.

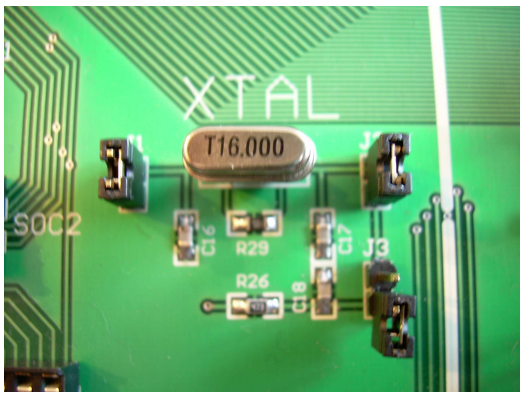


Figure 7. External system clock

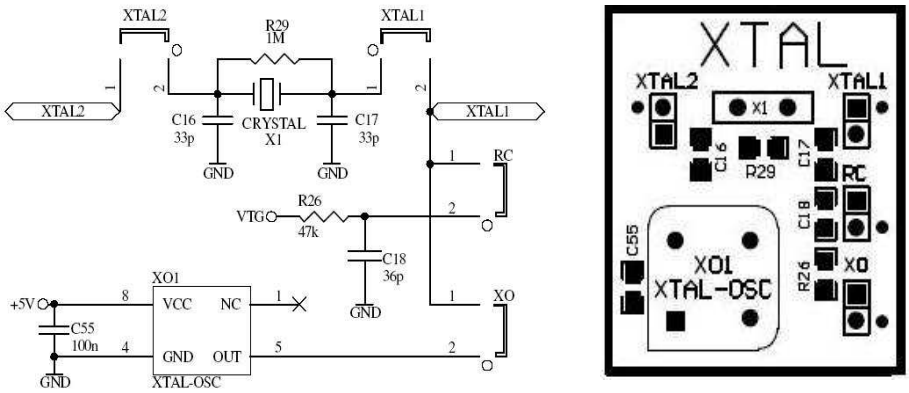


Figure 8. System clock

Jumper RC allows connected external RC oscillator to microcontroller. User may install precision clock oscillator (XO) close to crystal oscillator. When use of clock oscillator, jumper XO must be shorted.

When use RC or XO, jumpers XTAL1 and XTAL2 must be removed.

3.4 Port Connector

All microcontroller I/O ports are available on the headers marked from A to L. That, what ports are available depends what microcontroller is being using at the moment. Ports are connected with peripherals using peripheral cables like on Figure 9.

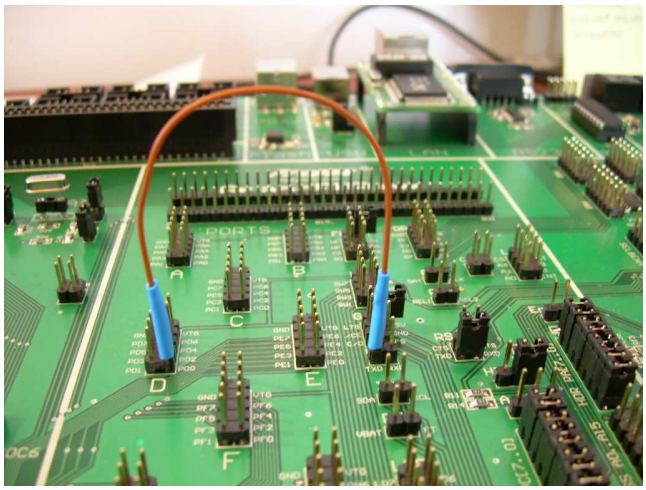


Figure 9. Connection of 1-wire cable between port and peripheral devices

3.5 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 Ldn (n = 0 – 8).

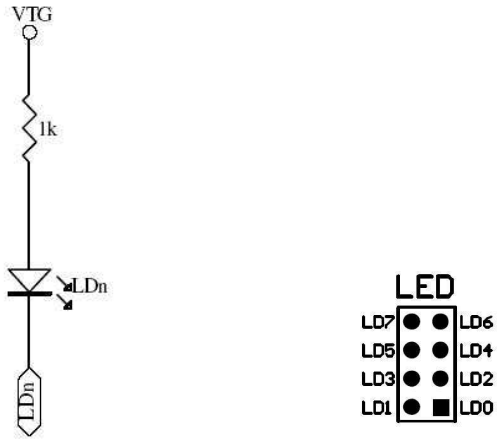


Figure 10. Implementation of LED

3.6 Switches

Eight switches is available on the board. Pushing a switch causes the corresponding SWx to be pulled low, while releasing it will result in VTG on the appropriate switch header connector.

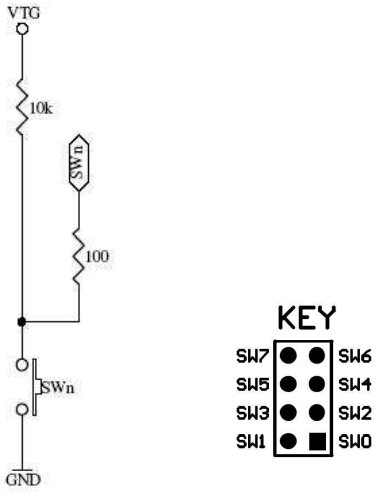


Figure 11. Implementation of Switches and Switch Headers

3.7 Relays

Two relays controlled by transistor are available on the board. Bases of transistors are connected to REL1 and REL2 pins RLY header, and pins: NC,NO,COM of the relay terminal block on the rear edge of the board. Logic level 0 applied to the RELx pin, will activate the relay. External circuits can be controlled via NC, NO, COM I/O pins. Led indicate activated relay.

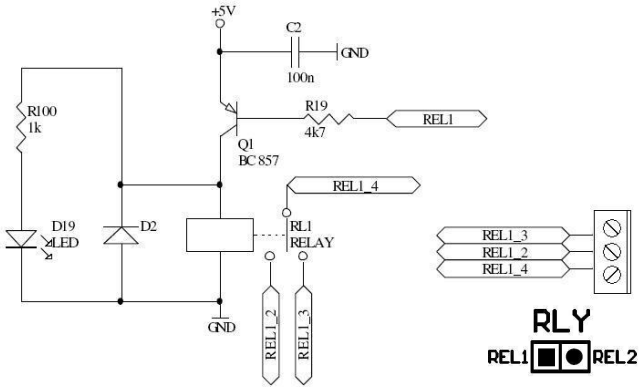


Figure 12. Implementation of relay

3.8 Buzzer

The board has an acoustic indicator turned on and off by the transistor. The base of the transistor is connected to the BUZZ pin of the MISC header. Logic level `0` applied to the SPK pin, will activate the buzzer.

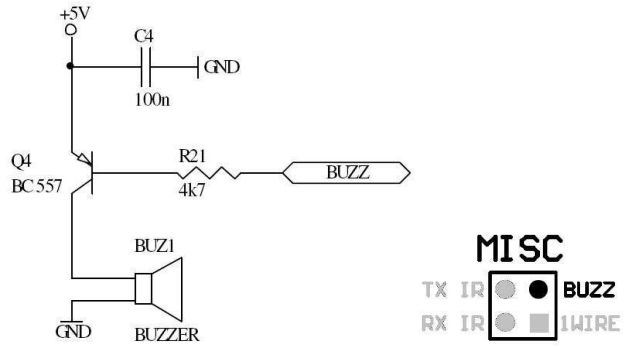


Figure 13. Implementation of buzzer

3.9 Seven-segment LED Display

The board is equipped with four 7-segment led display. They make an interface between the system and the user, allowed to display up to four chars. Each led display has two anodes, seven segments and DP (digital point), which become active after applied to their pin logic level ‘0’.

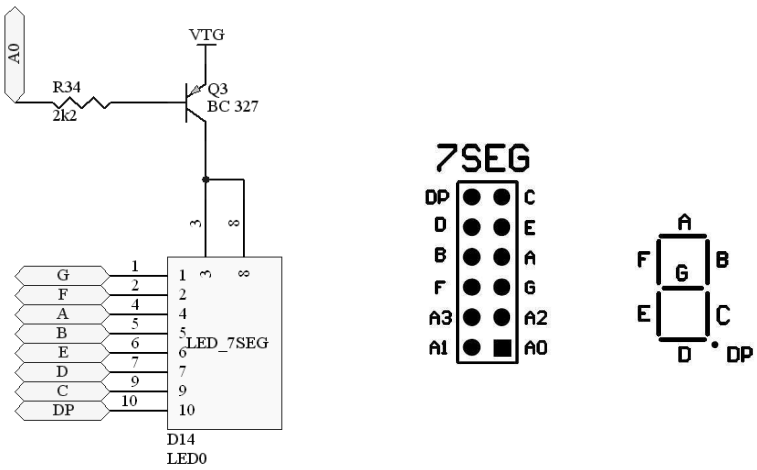


Figure 14. Implementation of 7-segment LED

3.10 Alphanumeric LCD Display

The board has one alphanumeric LCD display with HD44780 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 may be done by two way:

- By CONTRAST potentiometer with shorting VC and CTR
- By microcontroller

Backlight is turned on by host LTG pin to high level.

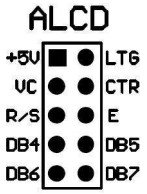


Figure 15. Alphanumeric Display connector

3.11 Graphic Display

On board is placed LCD AV-G12864B1-A601-R 128x64 with T6963C interface connector. This display has embedded character table. On connector are placed control signals C/D, /CD and FS. 8-bit data Line is connected to common data line with SDRAM memory and LAN on HDR PA[7..0] connector which is connected to A port of microcontroller.

Backlight may by turn on by shorting LTG with high state. The adjustment of contrast may be done by CONTRAST potentiometer (R58). Jumper /RST GLCD is connecting display reset with system reset.

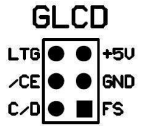


Figure 16. Graphic Display connector

3.12 UART Interface

On board is place DB-9 connector with ST3232 logic converter unit. Signals form logic converter are connected to gold-pin connector which allow user to connect them to microcontroller.

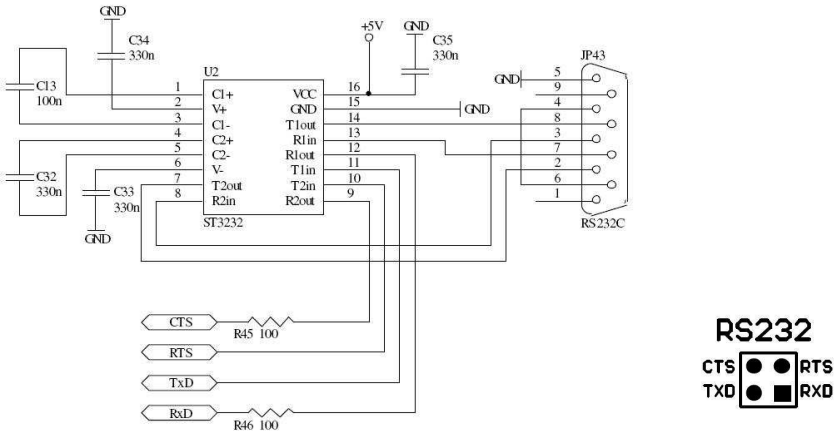


Figure 17. UART Interface Implementation

3.13 USB Interface

On board is placed USB interface using FTDI FT232RL chip. Jumper JP38 is using to choose high state level (3.3V or 5V).

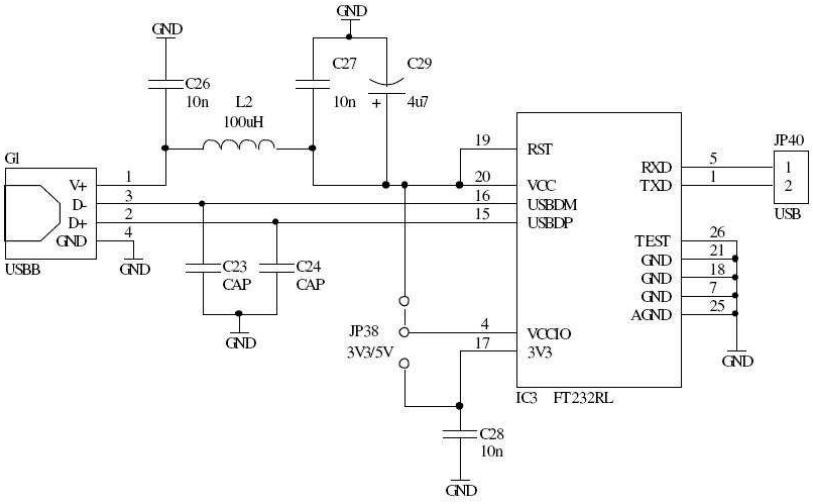


Figure 18. USB interface implementation

3.14 LAN Interface

On board is placed connector for LAN module – **MMlan02** producing by PROPOX. 8-bit data signal is connect to half of HDR_PA[7..0] connector. Other signals are available on LAN connector.

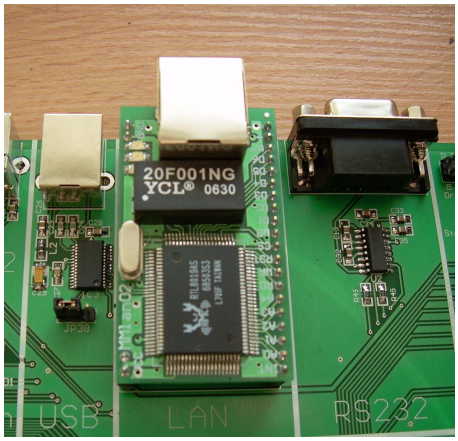


Figure 19. LAN Module

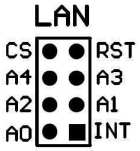


Figure 20. LAN connector

3.15 *I²C Connector*

This connector allow to connect unit which are using I2C interface, like EEPROM memory, RTC clock DS1307 or ADC and DAC converters.

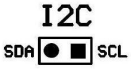


Figure 21. I²C connector

3.16 *1-WIRE Interface*

On board is placed 1-Wire connector which allow to connect DS18S20 Digital Thermometer or other units which are using this type of interface to communication.

Rysunek 22. 1WIRE connectors

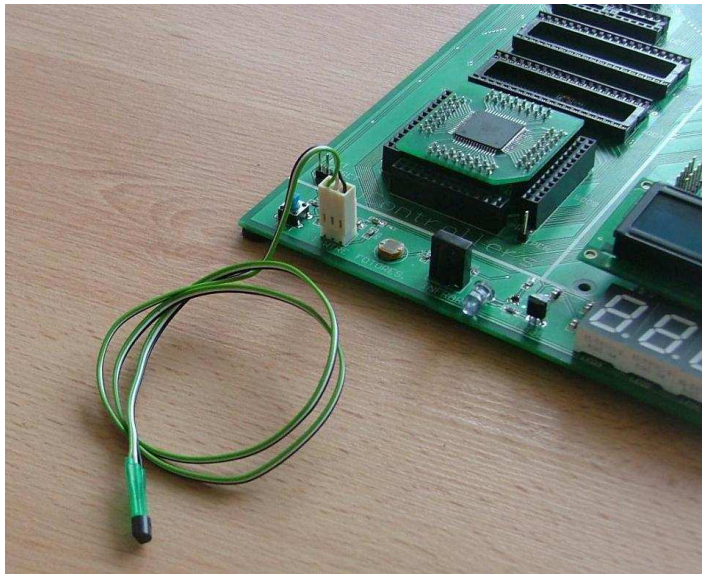


Figure 23. Connection of DS18S20 Digital Thermometer

3.17 Driver

That Driver allow to connect units which needs higher current. We can connect some relays, step motors or other units with 12V power supply. We have to remember to do not overdraw current above 0.5A. Additionally is placed connector to four-phase step motor.

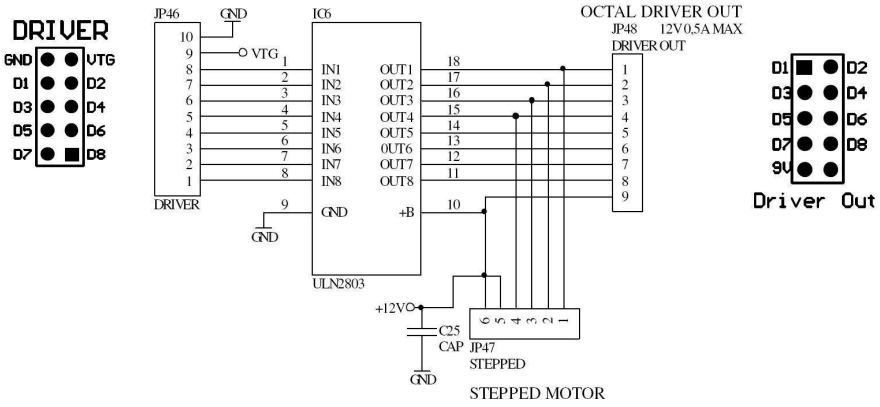


Figure 24. ULN2803 Driver Implementation

3.18 *PS2 Interface*

Allow connected mouse or keyboard via PS2 connector.

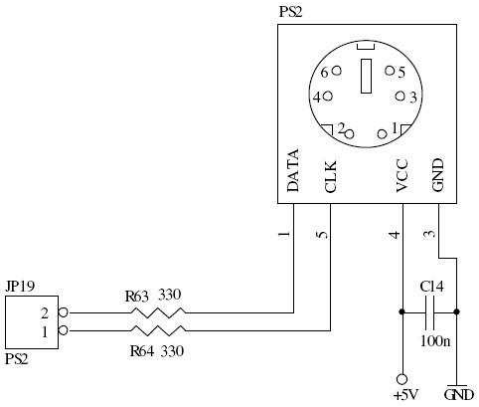


Figure 25. PS2 connector

3.19 FLASH Memory

On board is placed Data Flash memory AT45DB041B – 4MB. It is using SPI interface to communication. WP (Write Protect) signal do not allow to write to memory or erase memory, by sending low level signal. VF signal allow to connect power supply between 3.3V and 5V.

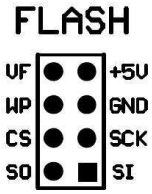


Figure 26. Flash Memory Implementation

3.20 EEPROM Memory

EEPROM memory 24C08 placed under graphical display is communicating by I2C interface.

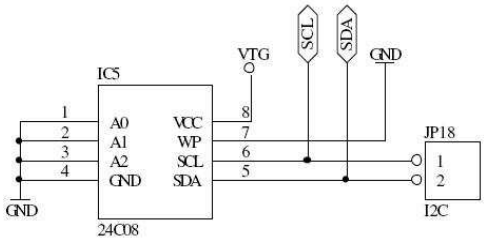


Figure 27. EEPROM Memory Implementation

3.21 SRAM Memory

Is placed 128kB SRAM memory with lath unit 74AHC573. Control signals are available on connectors: A-W-R , EnSRAM and HI ADR. Data and address signals are placed on HDR PC[7..0] and HDR PA[7..0] connectors.

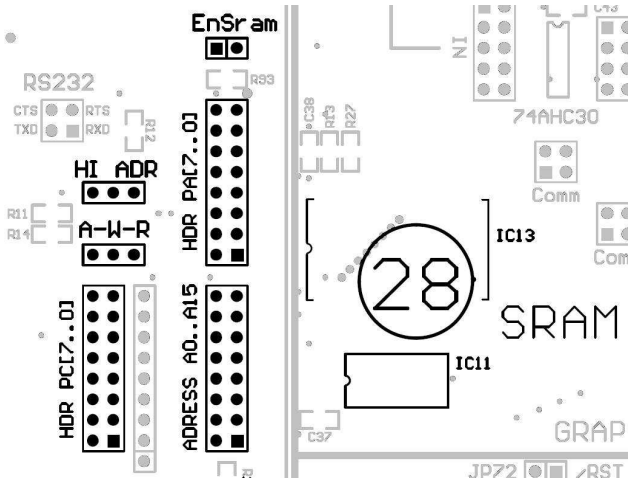


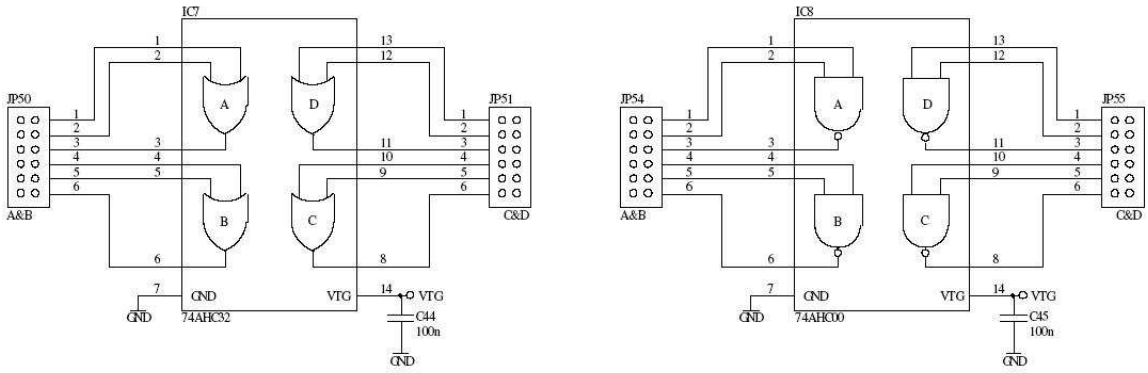
Figure 28. SRAM Memory

A-W-R – are available signals ALE, WRITE and READ
EnSRAM – Enable SRAM
HI ADR – memory banking

When is placed jumper on A15 SRAM and address line – is used only 64kB memory space.

3.22 Additional Logic Gates

On board are placed CMOS Logic Gates units: 74AHC00, 74AHC30, 74AHC32, 74AHC138. It allows to build gating unit or SRAM addressing. Power supply is form VTG. Every inputs and outputs are placed on gold-pin connectors.



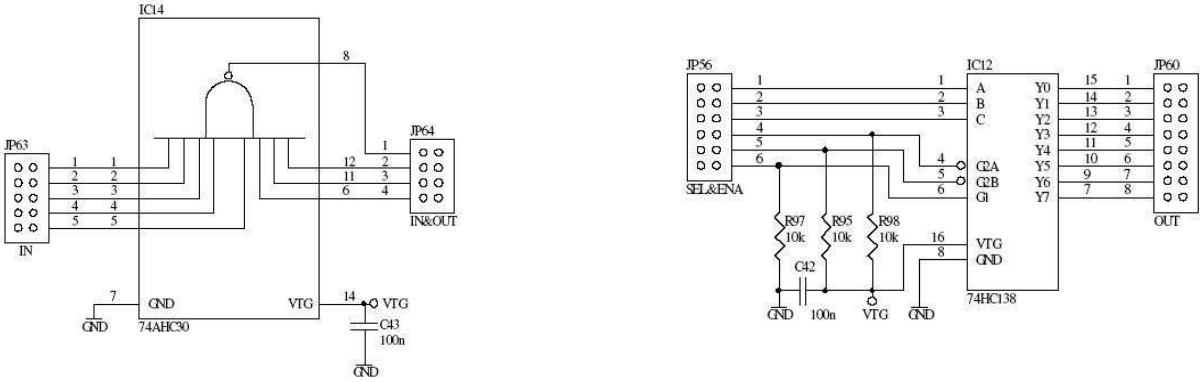


Figure 29. CMOS Logic Units

3.23 Prototype field

This prototype field allow to implement additional units and modules. Near this field are placed VTG, 5V and GND lines. Holes allow to place above this field additional prototype board PX22 with dimension 60x100mm.

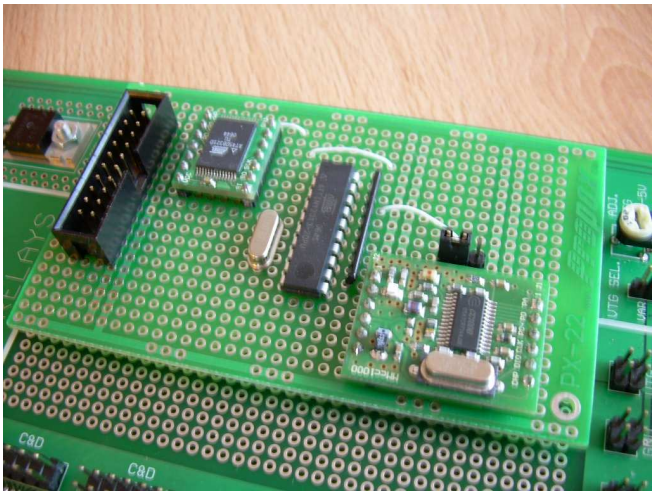


Figure 30. Prototyping Field

3.24 Prototype board socket

GrandEVBavr have socket for prototype card. It is compatible with PC XT/AT (ISA). All signals are available on gold-pin connectors.

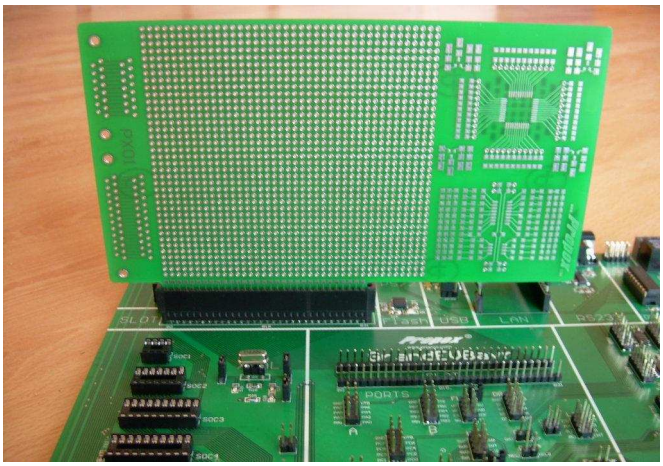


Figure 31. Prototype Card

3.25 Potentiometers

The board is equipped with two potentiometers, allowing for simulation of the analog circuit outputs. Potentiometer enables the adjustment of voltage in the range 0 - VTG. The potentiometers outputs are accessible on the POT1 and POT2 pin of the ANALOG header.

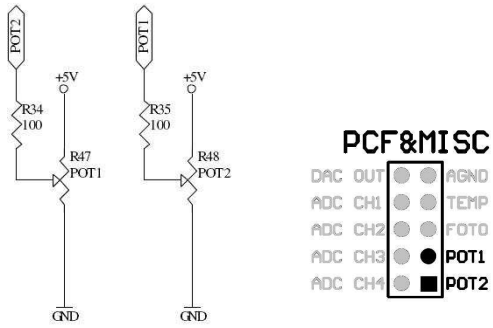


Figure 32. Potentiometers

3.26 LM35 Thermometer

It allow to measure environment temperature and display it by example on 7-segment displays. Vout voltage is proportionally to temperature. It is available on ANALOG connector under TEMP name.

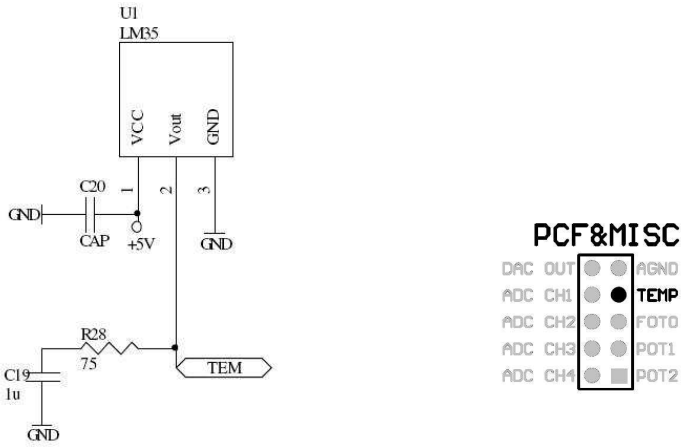


Figure 33. LM35 Implementation

3.27 Photo resistor

It allow to measure light strain. Output voltage is changing for about 0,95V (light) to about 3,4V (dark). It is available on ANALOG connector under FOTO name.

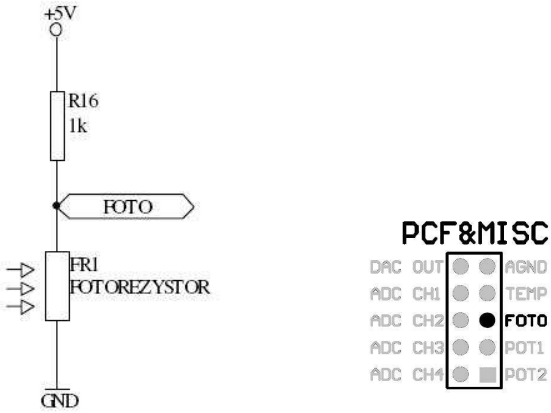


Figure 34. Photo resistor Implementation

3.28 Real Time Clock DS1307

Board has placed RTC clock with backup battery (CR2032 3V). It is using I2C interface to communicate with environment.

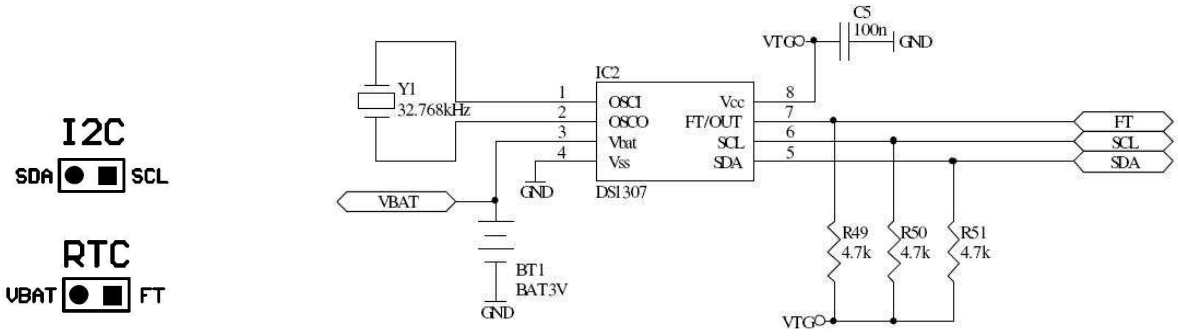


Figure 35. RTC clock Implementation.

3.29 Digital – Analog & Analog – Digital Converters

Board have 8-bit, 4 channel ADC converter and DAC PCF8591 converter. It is using I2C interface to communicating. All inputs and outputs are placed on gold-pin connector PCF&MISC.

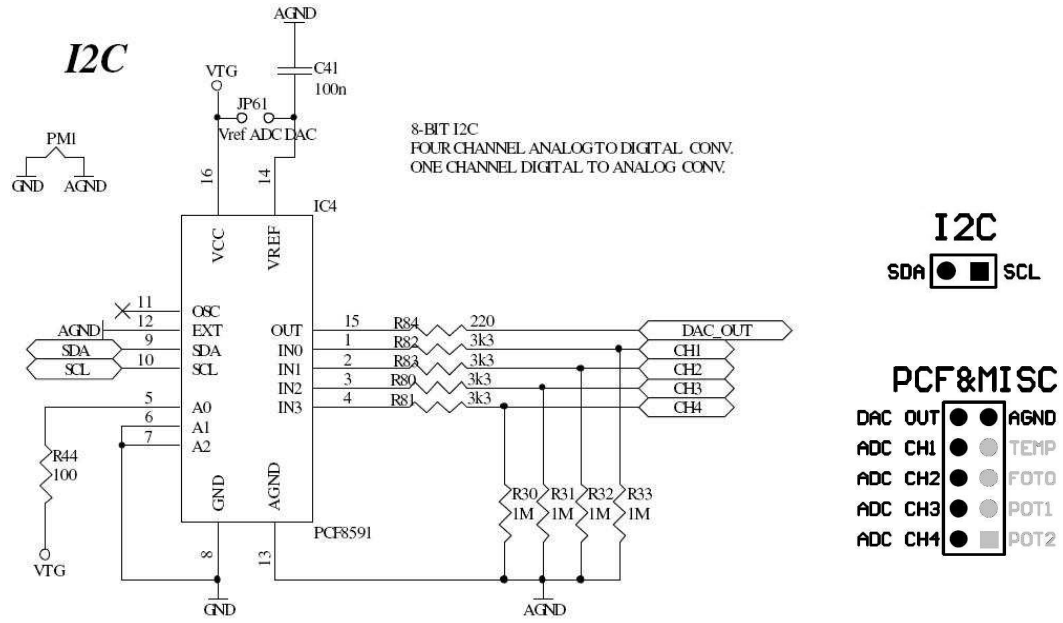


Figure 36. DAC and ADC converters implementation

Jumper *Vref ADC DAC* feed target voltage VTG, on the reference voltage input VREF PCF8591 device. Instead jumper we can connecting voltage reference source.

3.30 Infrared transmitter and receiver

On board is placed IR receiver TFMS5360(TSOP1236) which is working on 36kHz and IR transmitter diode with wave length 880nm. It allow to build IR transceiver.

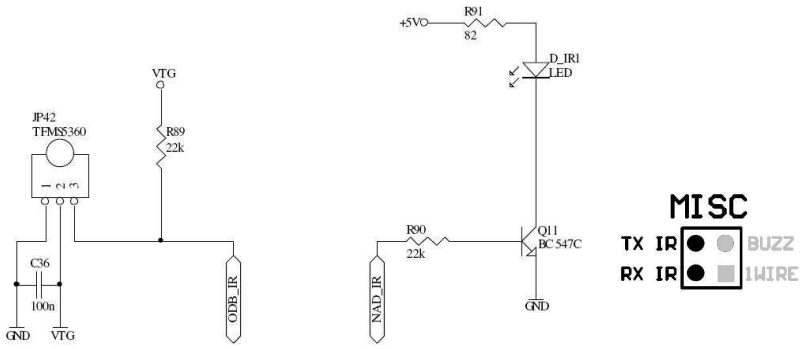


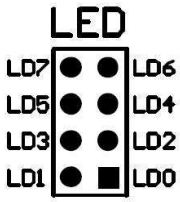
Figure 37. Implementation infrared transmitter and receiver.

4

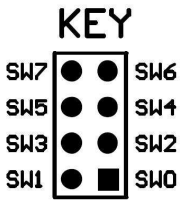
Header and Connectors

4.1 Connectors

LED's & Switches Header

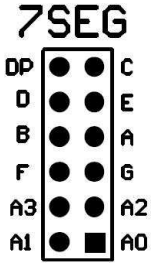


LD0...7 – diodes



SW0...7 – micro-switches

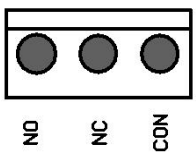
7-segment LED Header



A0...A3 – Anodes Supply
A,B,C,D,E,F,DP – Segment Supply (description on the board)

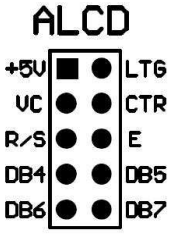
Relay Connector

REL1 – RELAY1 control pin
REL2 – RELAY2 control pin



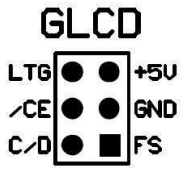
NO – Normal Open
NC – Normal Close
CON – Common

CLCD Character Display Header



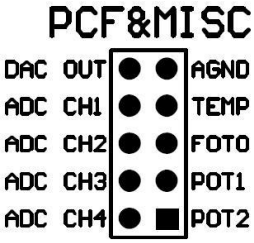
+5V – +5V Voltage
LTG – Backlight Display pin control
VC – Contrast Potentiometer Output Voltage
CTR –LCD Contrast line
R/S – Control line LCD data/command
E – strobe line LCD
DB4,DB5,DB6,DB7 – data line

GLCD Graphic Display Header



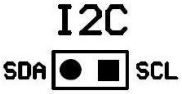
LTG – Backlight Display pin control
+5V – +5V Voltage
/CE – Chip Enable (low active)
GND – Ground
C/D – Command/Data Line
FS – Font Select

ANALOG Header



DAC OUT – Output Digital-Analog Converter PCF8591
AGND – Analog Ground Converter PCF8591
ADC CH1 – Input 1 Analog-Digital Converter PCF8591
TEMP – LM35 voltage output
ADC CH2 – Input 2 Analog-Digital Converter PCF8591
FOTO – Photo resistor Voltage Output
ADC CH3 – Input 3 Analog-Digital Converter PCF8591
POT1 – Potentiometer Voltage Output
ADC CH4 – Input 4 Analog-Digital Converter PCF8591
POT2 – Potentiometer Voltage Output

I²C Header

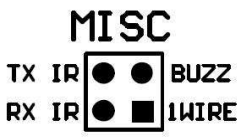


SDA – I²C data line
SCL – I²C clock line

RTC Header

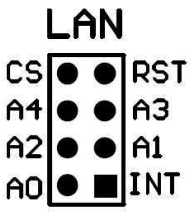
VBAT – pin with battery voltage
FT – Real Time Clock operation correction line

MISC Header



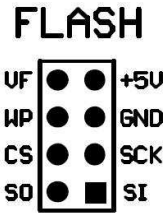
TX IR – Infra Red input data
BUZZ – buzzer
RX IR – Infra Red output data
1WIRE – 1-Wire output pin

LAN Header



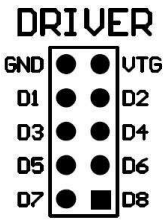
CS – Strob Line LAN module
RST – Reset LAN module (activ hi level)
A4,A3,A2,A1 – Address Line
INT – Interrupt Line

FLASH Header



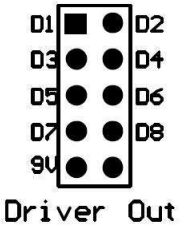
VF – FLASH supply voltage
+5V – +5V Voltage
WP – Write Protect Memory
GND – Ground
CS – Strobe Line
SCK – SPI Clock Line
SO – SPI Outputs Data
SI –SPI Inputs Data

DRIVER Header



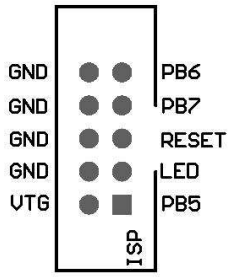
GND – Ground
VTG – Target Voltage
D1..D8 – Driver's inputs

DRIVER OUT Connector



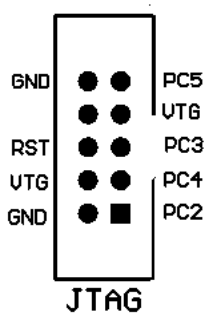
D1..D8 – Output driver
VCC – Driver supply

ISP Programmers Connector



GND – Ground
VTG – Voltage Supply
PB6 – Data Input Line MISO
PB7 – Programmator's clock line SCK
RESET – RESET Line
LED – Line connected witch diode LED. During programming the diode is lightning
PB5 – Programator's output data line MOSI

JTAG Programmers Connector



PC5 – TDI (Test Data In) Line
PC4 – TDO (Test Data Out) Line
PC3 – TMS (Test Mode Select) Line
PC2 – TCK (Test Clock) Line
RST – Reset Line
VTG – Voltage Target
GND – Ground

4.2 Jumpers

Jumpers	Function
Jumper *J1 J2*	Short – connect oscillator to XTAL1 and XTAL2. Jumper J3 have to be short.
Jumper *J3*	Short – connect RC oscillator to XTAL1. Jumpers J1 and J2 have to be open.
Jumper *Vref 2.5V*	Short – reference voltage 2,5V. Open – reference voltage 4,5V.
Jumper AREF SEL.	Fixed – AREF = VREF. Var – AREF can be changing between 0V and VREF.
Jumper *VTG SEL.*	5V – power supply is +5V VAR – power supply can be changing.
Jumper *Vref ADC, DAC*	Short – reference voltage of ADC is equal to VTG.
Jumper */RST GLCD*	Short - /RST of GLCD is short to system reset.
Jumper JP38	It sets power supply of USB unit. Choosing between 5V and 3,3V.

4.3 LED's & buttons

Name	Function
POWER led	The RED Led is directly connected to the +5V supply. The power led is always lit when power is applied to GrandEVBavr
RESET	The RESET push button resets the target AVR Device when pushed.

5

Troubleshooting Guide

Table 2 Problems

Problem	Reason	Solution
The red power LED is not on	Supply cable not connect.	Connect supply cable.
	Wrong supply power.	Check power supply.
	Power switch off.	Turn on power switch.
Example code does not toggle the LEDS	ATmega128 is not on his place.	Check ATmega128.
	LED diodes are not connect to microcontroller's ports.	Connect diodes to ports.
UART serial communication does not work properly	Signals RxD and TxD are not connect to microcontroller's ports.	Connect signals to ports.
RTC does not work properly	I2C signals are not connect to microcontroller's ports.	Connect signals to ports.
SRAM does not work properly	Wrong jumpers settings.	Check jumpers settings.
ALCD does not work properly	Wrong connection of ALCD signals to ports.	Check configuration.
ISP device cannot be programmed	ISP cable connect wrong.	Check cable.
	Microcontroller placed wrong.	Check microcontroller.
	Wrong oscillator or J1 J2 J3 jumpers settings.	Check oscillator and jumper settings.

6

Technical Data

System unit:

Dimensions board:	30cm x 30cm
Weight:	c.a. 650g

Operating Conditions

Supply voltage DC (VDC):	9-15V DC
Supply voltage AC (VAC)	7-12V AC
Max. Current POWER (Izas):	1.5 A @ VDC 9V or VAC 7V 1A @ VDC 12V or VAC 9V 700mA @ VDC 15V or VAC 12V
Base voltage VTG:	1,2 – 5V DC
Max. current (Ivtg):	1.0 A but not greater then Izas
Voltage +5V	5V DC
Max. current (I5v):	1 A but not greater then Izas
VREF voltage	+2,5V or +4,5V
Max. current	15mA or 100mA
VREF voltage drift	max. 80ppm
XTAL frequency `range	32kHz – 24MHz

Connectors:

Power Connector	5.7mm x 2.1mm
UART Connector RS232	9 (D-SUB) female
USB Connector	USBB female
LAN Connector	RJ45 female
Extension Slots Connector :	PC XT/AT (ISA)

7 Technical Support

For technical support, please contact support@propox.com. When requesting technical support, please include following information:

- Version number of GrandEVBavr
- Complete target device part number
- Programming voltage
- Jumper settings
- A detailed description of the problem

8 Example Application

Examples programs are available with ordered Evaluation System.

9 Schematic

Full schematics are available with ordered Evaluation System.

10 Warranty Statement

GrandEVBavr warranty is for six month. Repair will be completed at no cost to user if user has not caused failure. User is responsible for shipment charges.

Limitation and Liability

Although all the information contained herein have been carefully verified, Propox assumes no responsibility for errors that might appears in this document, or for damage to things or persons resulting from technical errors, omission and improper use of this guide and of the related software and hardware.