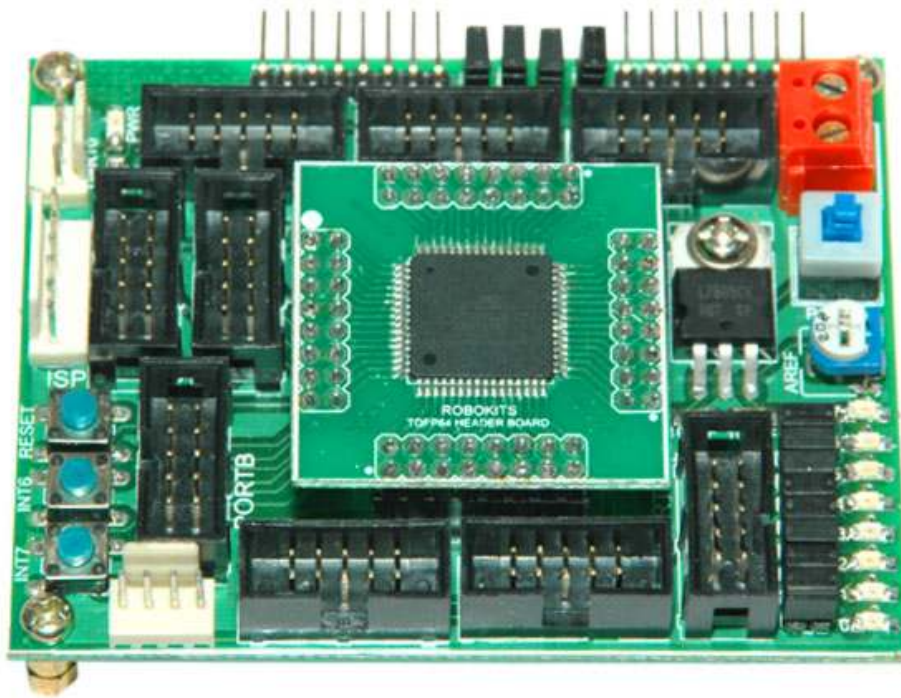


## **ATMega128 Rapid Robot Controller Board [RKI-1148]**



### **Users Manual**

### **Robokits India**

<http://www.robokits.co.in>  
[info@robokits.co.in](mailto:info@robokits.co.in)

### **Robokits World**

<http://www.robokitsworld.com>

Thank you for purchasing the ATmega128 Rapid Robot Controller Board. This unit has been carefully engineered and tested to provide superior performance. This document covers the features and operation of the ATmega128 Rapid Robot Controller Board.

## Robot Controller Board Features

- On Board Regulator with filters and Operating voltage from 6V - 20 V
- 8 LED's selectable though individual jumpers
- 3 Switches including reset
- 2 Switches on interrupt pins
- Power on/off toggle switch
- 16MHz crystal for maximum speed
- AREF setting potentiometer
- LED Power Indicator
- 4 DC/2 Stepper motor driving capability with external I298 modules (optional)
- PWM pins connected to motor drivers for speed control of motors
- Full Speed/PWM Speed control selection jumpers
- All Pins accessible through FRC 10 pin male connectors
- Serial Programmer and PC-MCU serial link optional
- All required connectors included

## Optional items

- AVR Programmer & Debugger (Selectable among None, Serial and USB JTAGICE)
- PC-MCU link (Selectable among none, serial and USB port)
- AVR programmer (Selectable between none, serial, parallel and USB port)
- 2A Dual Motor driver module, Can be directly attached with this board.

## Setting up the Board

### Providing Power Supply

- You can provide the power supply to the board from any DC source from 6V to 20V.
- The microcontroller is preprogrammed for Blinking LED's. This is the default program provided on CD in folder named Blink.
- To provide the supply from AC adapter plug the jack in the DC IN socket.
- To power up the board using any DC source use VDD terminal as +VE terminal and GND as -VE terminal.
- Be careful while applying power otherwise the regulator IC will blow up.
- To give supply other than power supply provided open the screws, insert the supply wires and fasten them again.

## Board Information

### Switches

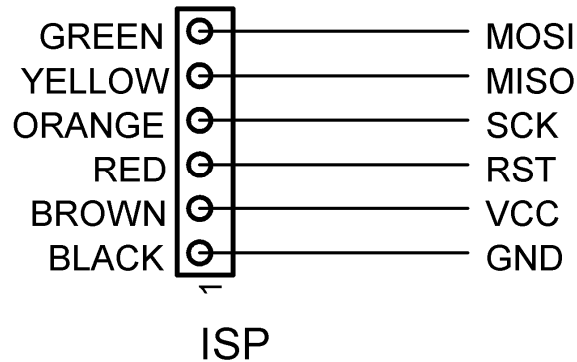
- There are three small and one big switch on the board to facilitate user.
- The toggle switch written with POWER on the top is to control power supply to the board.
- The one written Reset at bottom is a Reset switch for microcontroller.
- Switches INT6 and INT7 are connected with microcontroller pins PE6 & PE7 respectively.
- Both switches named INT6 and INT7 are connected to external interrupt pins for general use.
- These switches do not affect the operation of the pins they are connected with. So, you can use this microcontroller I/O pins for other use also.

### LED's

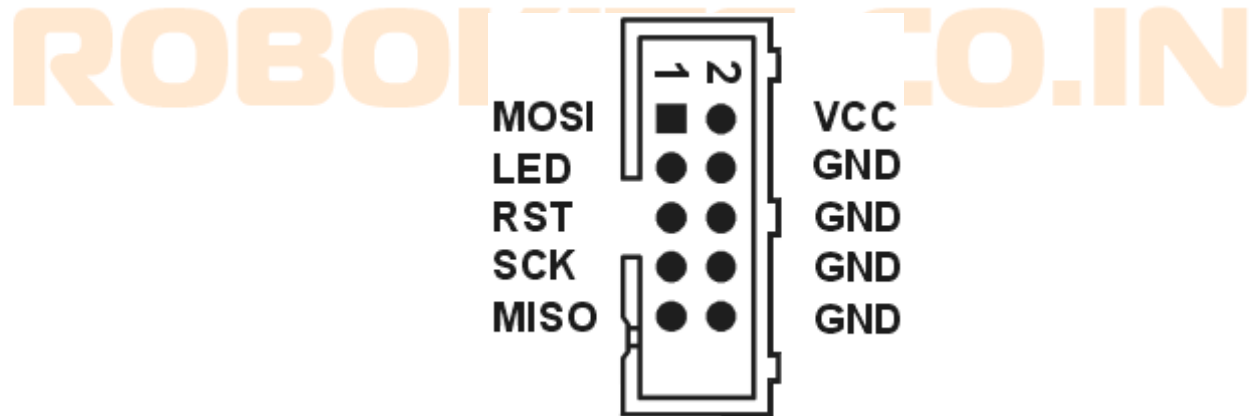
- There are nine LED's on the board.
- LED near UART0 connector is power indicator.
- Rest eight led's named LED0 to LED7 are connected to PC.0 to PC.7 respectively.
- All LED's are selectable through individual Jumpers so that those pins can be used for other external purpose.
- Pull out the jumper to use the Pin as normal I/O pin.

## ISP (In System Programming) Connector

- 6 pin male header denoted by **ISP-DIP** on the board is used to program AVR.
- The pins are connected to **MOSI (PB5), MISO (PB6), SCK (PB7), RESET, VCC and GND (Near UART0 connector)**.

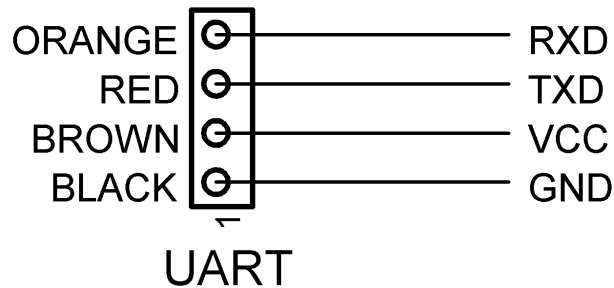


- Also 10 pin FRC header denoted by **ISP** on the board can be used to program AVR.
- The pins configuration is as below.



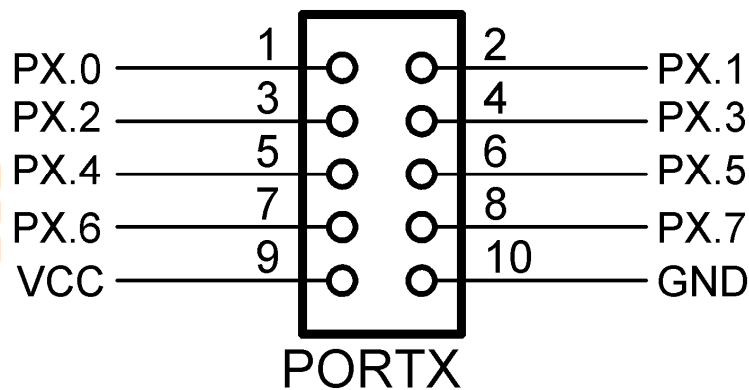
## UART Connector

- 4 Pin male header denoted by **UART0 & UART1** on the board.
- Used for serial communication between MCU & PC or MUC & MCU of same or different made.
- The pins on **UART0** are connected to **RXD0(PE0), TXD0(PE1), VCC and GND (Near ISP-DIP connector)**.
- The pins on **UART1** are connected to **RXD1(PD2), TXD1(PD3), VCC and GND (Near DC Jack)**.



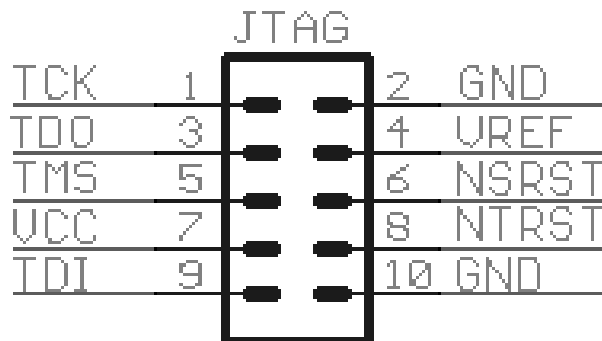
**PORTA, PORTB, PORTC, PORTD, PORTE, PORTF & PORTG Connectors**

- All 8 port pins and VCC and GND are accessible through male header pins and 10 pin FRC connectors.



**JTAG Connector**

- JTAG Connector is standard JTAG 10 pin FRC connector which connects to AVR JTAG. The connection of this connector is as below.



## AREF Potentiometer

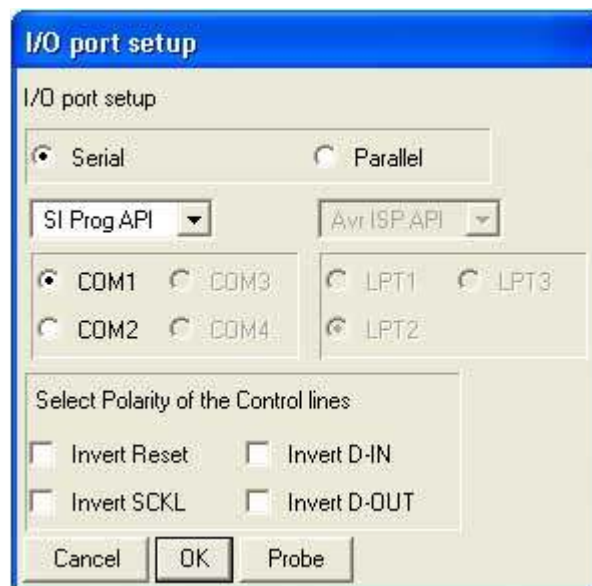
- For setting reference voltage for ADC at AREF pin of microcontroller.

## Connecting the Serial Link

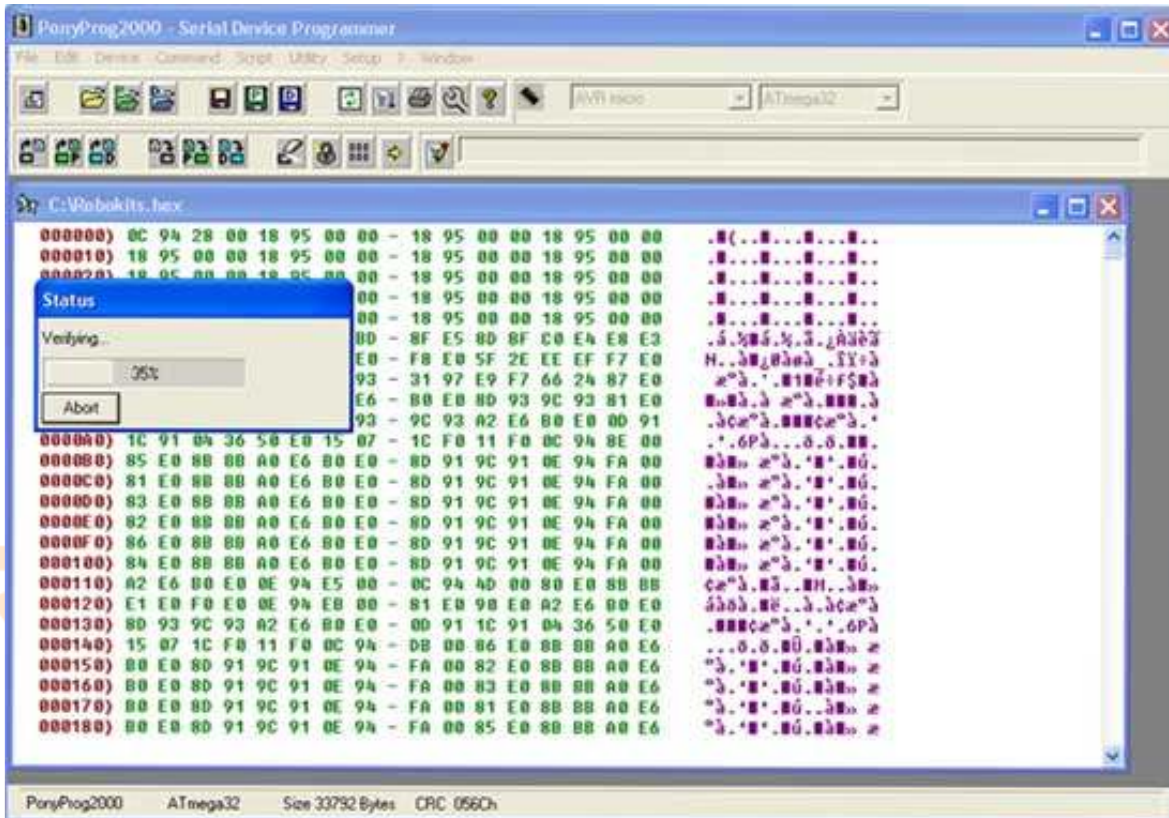
- Connect the PC-MCU serial link to serial port.
- Insert the female header in the board as shown in figure. (Keep black wire towards ISP-DIP connector)
- You can communicate with microcontroller with PC software like Hyper Terminal. Set appropriate baud rate and com port to setup the communication.
- See sample code for more details.

## Programming the Microcontroller

- To program the microcontroller use the provided serial programmer.
- If any other programmer is chosen see the documentation for the same.
- If any other programmer is selected please see help file of that programmer.
- Inset the programmer port to serial port of your pc.
- Inset the female header to the board as shown below. (Black wire at the Crystal side)
- You can use the programming software Pony Prog for programming. (Use following Settings)



- You can also directly program the microcontroller with WinAVR. Use tools ->Program option. If you find the error make correction in provided make file.



- To quickly program you can use Robokits.bat provided on the CD. Copy your compiled hex file and the bat file in a folder and rename the hex file as Robokits.hex. Run Robokits.bat to program the device through serial programmer.
- We suggest ponyprog to program the fuse bits. It can also be done by AVRdude. See the AVRdude manual for more information.
- If you are programming fuse bits thought AVRdude, you can use this link to calculate fuse bits. <http://palmavr.sourceforge.net/cgi-bin/fc.cgi>.

## Using sample codes

- **Sample codes are provided in WinAVR.**
- **WinAVR is free source GNU C compiler for AVR microcontroller series.**
- **First install WinAVR from CD.**
- **Copy sample code folder in your harddisk.**
- **If the files are read-only remove that setting.**
- **Open Programmers notepad which is IDE for WinAVR.**
- **Open any Robokits.c file provided in the CD in folder sample programs.**
- **Change related makefile if using any different programmer or MCU (Need not to be changed for normal board with serial programmer).**
- **Use Programmer documentation which you are using.**
- **Change makefile parameters if required.**
- **To compile use Tools – Make All**
- **To program use Tools – Program**

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## Service and Support

Service and support for this product are available from Robokits India. The Robokits Web site (<http://www.robokits.co.in>) maintains current contact information for all Robokits products.

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