M32 Development Board
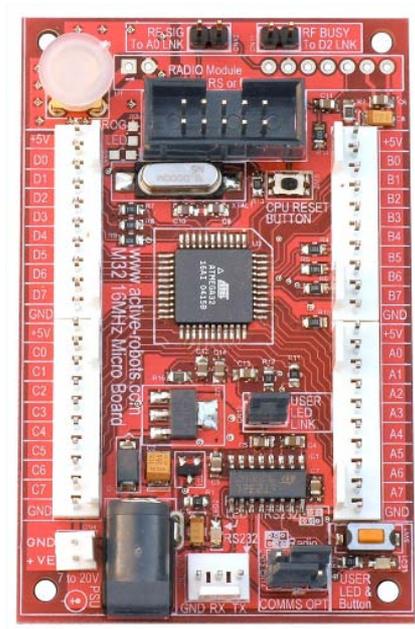

User Guide

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Document History

Author	Release Date	Reference	Release Notes
JSL	23rd October 2005	A.0	WIP Draft
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ACTIVE ROBOTS

TABLE OF CONTENTS

3

ACTIVE ROBOTS

1 INTRODUCTION

The M32 development board is ideally suited to robotics and control applications. It uses an Atmel® microcontroller which is fast and powerful (ATmega32, running at about 16Million instructions per second).

The standard M32 board can be upgraded with a radio transceiver or can be purchased radio ready. Two main frequencies are available; 433MHz or 868MHz. Using the radio link (separate transceiver module also required) the M32 board can communicate with a PC (or any computer with a serial link) and be controlled without wires.

1.1 Main Technical Features

- ❑ Small footprint
- ❑ ATmega32 Micro   **ATMEL**   32K Flash ROM, 1K EEPROM, 2K SRAM, 16 MIPS
- ❑ Input voltage range – 6.8 to 20VDC
- ❑ Logic supply reverse polarity protected
- ❑ Power LED
- ❑ User LED (can be disabled by a jumper)
- ❑ User Button
- ❑ 5V PSU input over-voltage protection (5V6 clamp)
- ❑ Quality 0.1" Pitch Molex® connectors
- ❑ Supply input via 3mm plug or 2 pin 2mm plug-in Molex® header
- ❑ Programming IDC header (Kanda pinout)
- ❑ RESET button
- ❑ Gold plated SMA antenna connector
- ❑ Jumpers to configure comms options (RS232/Radio/Radio Config. setup) etc.
- ❑ Filtered analogue supply voltage (AVCC)
- ❑ Filtered Radio supply voltage
- ❑ Radio Busy and signal strength signals available to micro (jumper selectable)

1.2 IMPORTANT INFORMATION

1.2.1 PORT IN CONNECTIONS (PA0-7, PB0-7, PC0-7, PD0-7)
Take care when using the port connections, we have protected some of these with 1K2 series resistors (PD0,1,2, PB5,6,7, PA0 and PA7) all the other ports go directly to the pin connectors so take care not to overload the ports.

1.2.2 POWER SUPPLY CHARACTERISTICS
The power supply for the M32 board (+Ve and GND) is a minimum of 6.8Vdc and a maximum of 20Vdc via the power connector inputs (3mm Plug or 2mm Molex®).
The on-board regulator can supply a maximum of 200mA (at 2Watts), the microcontroller uses 23mA when working at 16MIPS.

1.2.3 MICRO CONTROLLER CONFIG
Take care – incorrectly configuring the microcontroller can leave the ATmega32 in an unusable state!
If using the 'Pony' programmer **do not** use: 'Write PRG' *button* in 'Lock and Fuse Bits' *TAB*

You also need to select the clock source by setting appropriate FUSE BITS, the example program uses: external oscillator (slow or fast start-up is OK).
You can run the ATmega32 chip at a variety of speeds using it's in-built RC oscillator – if you don't need the full 16MIPS.

The ATmega32 has JTAG enabled by default so you can't use PORTC.2-PORTC.5, but you can disable JTAG with the programmer [Hi fuse byte, BIT H:1 JTAG Disabled] to free up these ports for your own use.

1.2.4 SERIAL COMMUNICATIONS
If you are using RS232 (Via a PC) then you must make this connection via the supplied lead, to the 3 Pin Molex® connector on the M32 board.

If you are using the radio module for serial comms then its default setup is;19200,N,8,1.
This can be altered by using the EASY RADIO setup software.

The Comms setup for the PC, Easy Radio module and ATmega32 micro must all be the same for successful communication.

5

2 BILL OF MATERIALS

Standard Version
M32 PCB (less Easy Radio Module)
RS232 Serial Lead
User Guide (Download from website)

Radio Version
M32 PCB (Includes Easy Radio Module, **433MHz** or **868MHz**)
RS232 Serial Lead
User Guide (Download from website)
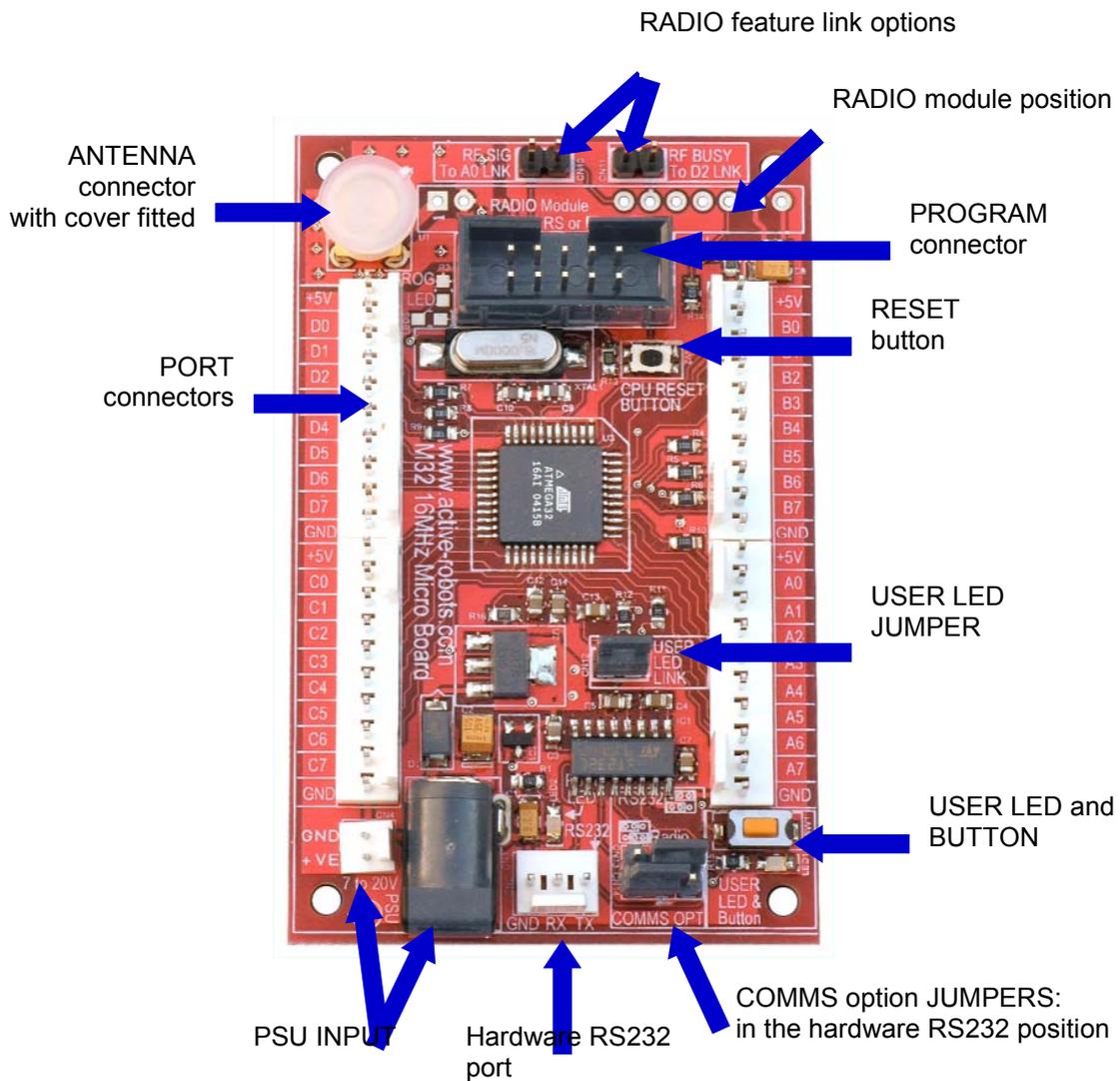
Versions supplied with BASCOM AVR Compiler
Hardware as other versions described above
Full licensed unlimited version of BASCOM AVR Compiler on CD ROM

6

3 GETTING STARTED

You will need a PSU with at least 6.8Vdc output rated at least 50mA to run the M32 development Board. A PP3 (9V) battery lead with the correct connector is supplied.

Any Kanda compatible programmer will work with the M32 board. A programmer is available from Active Robots LTD to match the M32 board (Product Code. AVR-ISP).


RADIO feature link options

RADIO module position

ANTENNA connector with cover fitted

PROGRAM connector

RESET button

PORT connectors

USER LED JUMPER

USER LED and BUTTON

PSU INPUT

Hardware RS232 port

COMMS option JUMPERS: in the hardware RS232 position

7

Getting Started Continued…

Basic setup procedure

1. Install the programmer software (supplied with programmer or STK200/300/500)
2. Install your preferred compiler (C or BASCOM AVR etc)
3. Compile a program in to a HEX file
4. Connect the programmer between PC and M32 board
5. Apply power to the M32 board
6. Ensure correct fuse-bits for the ATmega32 chip (see 1.2.3)
7. Program the M32 board with the HEX file

A demo version of BASCOM AVR and a sample program specially written for the M32 board is available from the Active Robots web site.

The Programmer that is invoked from within BASCOM AVR
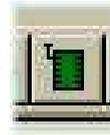
The correct fuse bit options are shown below.
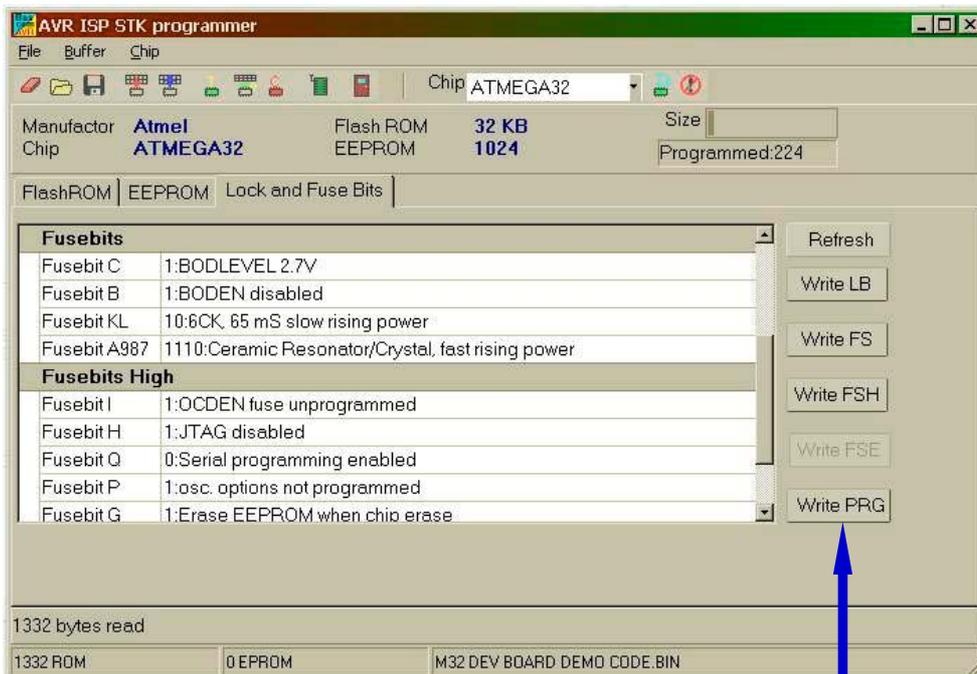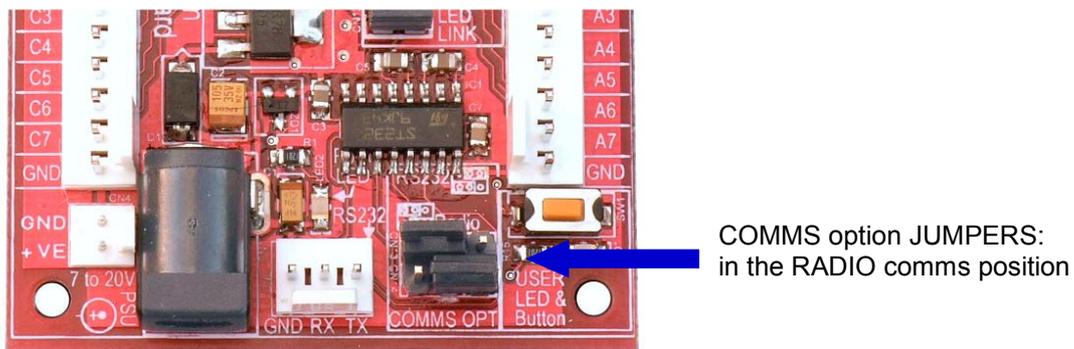

Do not click this button

4 RADIO OPTIONS

The Easy Radio module is available in two forms 433MHz or 868MHz, you must use matching frequencies for correct operation. Several antenna types are available from Active Robots LTD that are designed to suit different applications.

To communicate with a PC you will need an additional radio transceiver. The default comms setup for the radio modules and the demo BASCOM AVR program is:
19200 Baud, 8 Bits, 1 Stop bit, No Parity.

There is a built in terminal program within BASCOM AVR that can invoked with
Remember to set it to 19200,N,8,1**.**
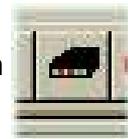
To alter the comms and RF channel of the Easy Radio Module a software utility tool is available from the Active Robots web site.

RF signal level to Port A0 Link, see demo program for more details

Radio HI=BUSY Signal to Port D2 Link

SMA type Antenna connector

COMMS option JUMPERS: in the RADIO comms position

ACTIVE ROBOTS

5 SHEMATIC DIAGRAM Download from website

ACTIVE ROBOTS

NOTES

END OF DOCUMENT.