MicroTech

MicroBoard
Robot
BaseBoard

Version 1.01

www.mcu.hk

Warning:
Incorrect power connection to any electronic and electrical equipment may seriously damage them or even cause a fire hazard or explosion. Users must take care to identify the correct pins and supply an acceptable voltage to operate them safely.

June 29th, 2006

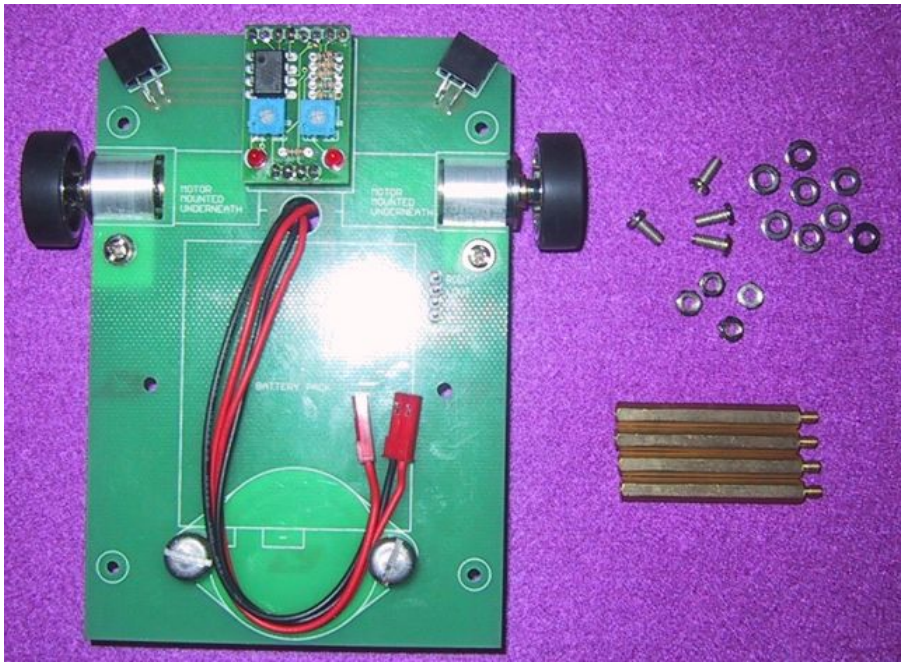
INTRODUCTION

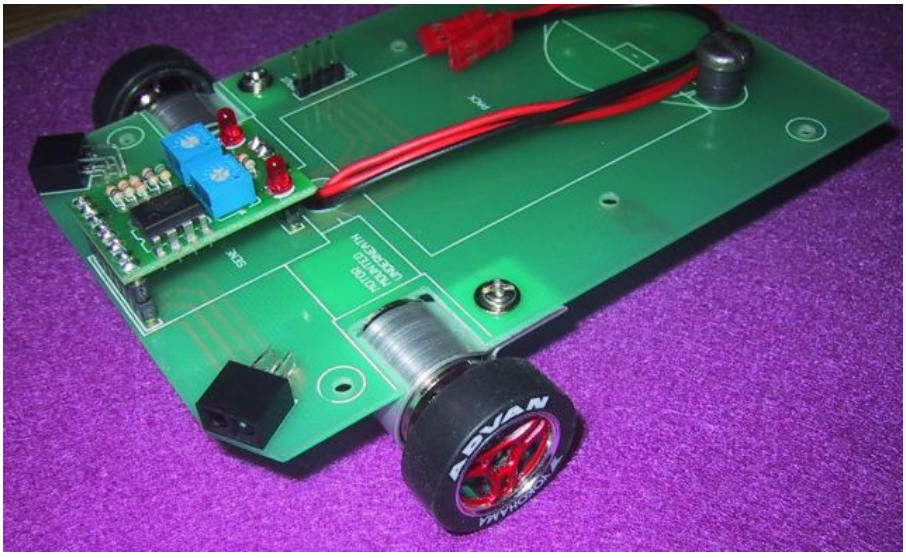
A simple 'ready to go' **robot base board**. Just mount the MicroBoard Robotics Controller (MT-MB2) and battery pack, download the sample program and run. Ideal introduction to educational robotics.

Standard kit includes the following items (see photo):

- MB3 baseboard
- IR Sensor Board and diodes
- 2 x 140-160 RPM gearhead motors and tyres
- Motor cables (not connected for easier shipping)
- 5/8" carbon steel ball transfer unit
- Jumper wires (not shown)
- standoffs, screws, nuts & washers

An optional Lithium-Polymer battery pack and universal charger is also available.





AN 'AUTONOMOUS MICROMOUSE'

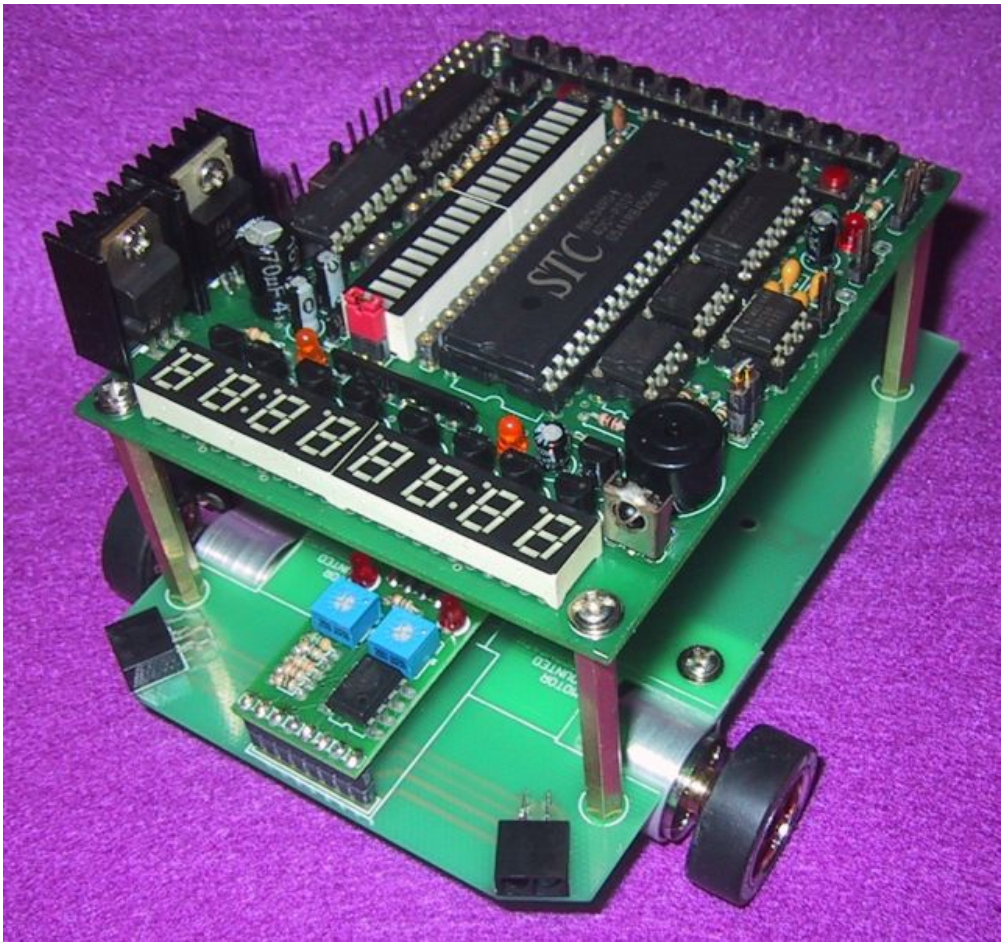
One of the sample programs available demonstrates how to use the MicroBoard and Baseboard to make an 'autonomous micromouse' robot. The micromouse moves around a room avoiding obstacles as it goes.

Two MPEG movies showing a prototype mouse in action are available on the manufacturer's website at the following links:

www.mcu.hk/MicroBoard/robot-1.mpg and www.mcu.hk/MicroBoard/robot-2.mpg.

ASSEMBLY AND WIRING DETAILS

1. Fit the 4 standoffs to the baseboard using the screws supplied.
2. Turn the baseboard over so that it rests on the standoffs and solder the motor cables to the motors. One of the motor pins has a blue dot next to it – solder the black wire to this pin. When done poke the cables through the large hole in the baseboard. Take care not to strain the solder joints.
3. Fit the MicroBoard to the standoffs as per the following photo.



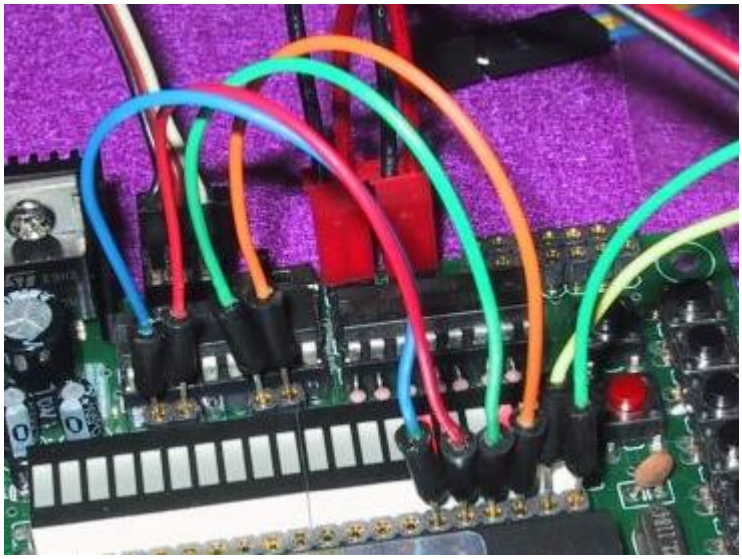
Baseboard with MicroBoard mounted

4. Plug the motor cables onto the MicroBoard motor output connectors. These are the two 2-pin connectors next to the power switch. The black wire should face towards the switch.

5. Use some jumper wires from the MicroBoard kit to make the connections from the I/O pins to the motor control pins. Any I/O pins can be used but the following connections match the sample program. Use the next photo as a guide.

   Motor controller input pin M1A ..... I/O pin 14 (blue wire)
   Motor controller input pin M1B ..... I/O pin 15 (red wire)
   Motor controller input pin M2A ..... I/O pin 16 (green wire)
   Motor controller input pin M2B ..... I/O pin 17 (orange wire)

   The motor controller input pins are the 4 pins to the left of the L293D chip. They number from top to bottom with M1A at the top and M2B at the bottom (left to right on the photo).

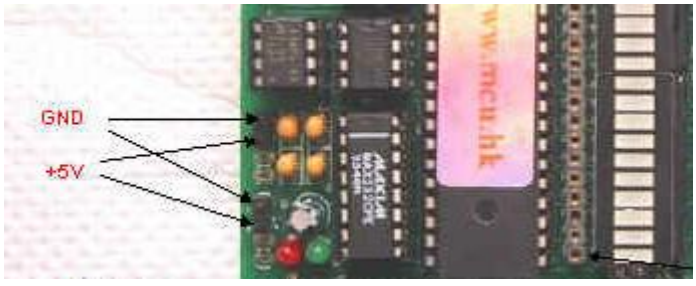


Motor input and output connections
Cables to motors are at the back (red/black wires)

6. Now make the connections to the IR sensor board. The sensor board is already mounted on the baseboard and the power and output connections brought out to a 4-pin header.

   A special cable is supplied. One end has a 4-way connector which plugs directly onto the 4-pin header on the baseboard. At the other end there is a 2-way connector that plugs onto the +5V and GND pins on the Microboard (see photo below). The other 2 wires connect as follows:

   ROUT on baseboard ..... I/O pin 18 (yellow wire in previous photo)
   LOUT on baseboard ..... I/O pin 19 (rightmost green wire in previous photo)



+5V and GND pins on MicroBoard

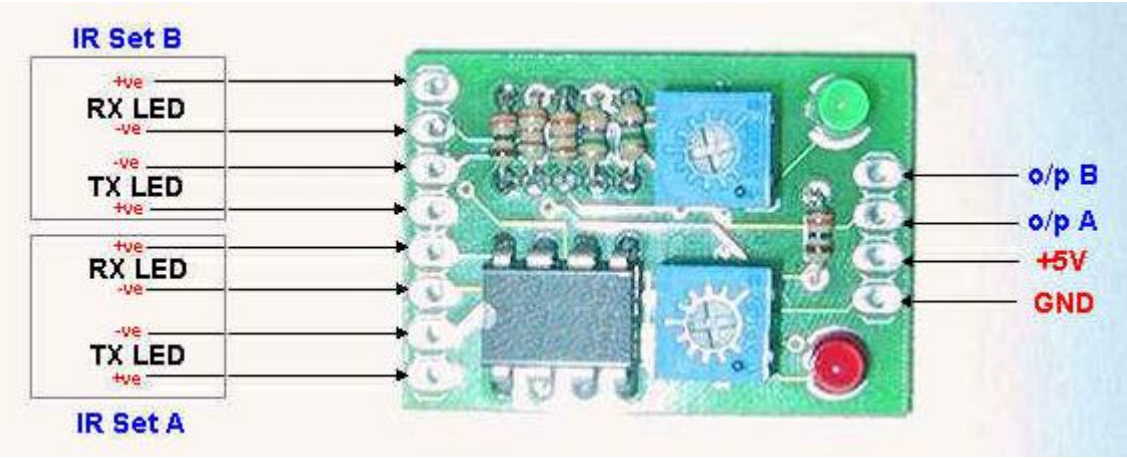
7. Next connect up a suitable battery pack. You can use either the optional lithium-polymer battery or make up your own using 6 or 8 AA batteries in a suitable battery holder. Use some double sided tape to stick the battery pack down onto the baseboard. Connect the battery pack to the input power connector on the MicroBoard.

All that's left to do is download the sample program – 'run-auto.prg' - into the MicroBoard and run. Please refer to the MicroBoard documentation on downloading, storing and running programs.

Examine the sample program – figure out how it works. Make some changes and see what happens. Remember – "**Creativity is only limited by imagination!**"

ABOUT THE SENSOR BOARD

The sensor board uses 2 x infra-red (IR) modules to detect obstacles. The IR modules are simply an IR LED and IR detector diode all housed inside the same package. The IR LED is powered on and constantly sending out an IR beam. Some of the beam is reflected back when it hits an obstacle. The reflected beam is detected by the IR detector diode and connected into a voltage comparator circuit. The voltage comparator provides a sensitivity adjustment and converts the signal into a digital output suitable for the MicroBoard.



IR Sensor Board pin connections

The onboard trimpots are used to provide a sensitivity adjustment. This is simply the range (distance) at which the detector will trigger. When triggered the associated LED will light.

To adjust simply hold your hand or piece of paper in front of the detector module at the required distance and adjust the trimpot until the LED turns on (or off). Maximum range is around 28cm for a white reflective surface. You will need to remove the MicroBoard to allow access to the trimpots.

WHERE TO GET THE SOFTWARE

The latest version of the MicroTech editor IDE, compiler and sample programs can be downloaded direct from the manufacturer's website at www.mcu.hk/download.php.

For just the sample programs then download from www.mcu.hk/experiments.php.

For further information about this and other kits please visit the Ozitronics website at www.ozitronics.com