



This project assumes that the student has already built or is familiar with a Manual Robot. The automation addition is expected to add 20 hours to the Project. In addition to the Basic Robot kit - The automation project kit includes 1 main board assembly with microcontroller installed

- 1 USB programming cable
- 9 pin connector kit for hand controllers
- Interconnection Cable Assemblies

The Robot Challenge Automation board is a complete, tested circuit board assembly that will plug into the control units of your robot and operate the robot by a software program. The purpose of this board is to duplicate the button pressing functions performed by students when the robot is operated in the manual mode.

This board contains a modern micro-controller daughter board which plugs into the main board. The micro-controller software is written in the C++ language and programmed into the microcontroller via a USB connection from your computer.

(NOTE: We use a board from Digilent. It a Chipkit Uno32 which uses a Microchip processor. If you go to digilentinc.com and search on UNO32 the board information will come up. There is an IDE for it and the program is written in C++. You can download the software from the following web site link. (Download is password protected. The password will be provided on the day of teacher training)

<http://ewh.ieee.org/r2/baltimore/robot/automation/automation%20software.html>.)

There are several options with this board. You can choose to use the program provided with the board which will need modifications to work with your specific robot or you can write your own program in whatever language you choose. A manual for the micro-controller module is provided with the manual along with a schematic of the automation board for those students that want to explore beyond the basics. For those students that want to further automate their robot, there is an experimenter's port on the board labeled "EXP 1", where you can add your own circuitry or limit switches to the robot so the software can sense when a leg reaches its limit and react properly to it.

ADDITIONAL MATERIALS NEEDED: you will need to supply the following materials

- 6 AA alkaline or lithium batteries
- Laptop computer with Windows XP or newer operating system, a CD drive and a USB port

Tools and materials required

- Wire strippers for 22 awg wire
- Wire cutters
- Needle nose pliers
- Small Phillips head screw driver
- Low power soldering iron (15 Watts) w/ a small tip
- Rosin core solder
- Jig saw with a small blade
- Hand drill
- Drill bits – 7/64", 1/8", 3/16", 1/16"
- Small semi-round file
- 1" masking tape
- White glue