

## Chapter 15. Armatron Robot Control

The Armatron robot arm is one of the coolest toys ever made. Put out by Radio Shack the robot is operated via a couple of levers on the base. Came with all kinds of accessories to pick up and move around. The toy was made by Tomy and later versions showed this name on the box.



Fig. 90 Armatron robot arm

The Armatron we introduce here is micro-programmable version which comes with a separate relay board.



Fig. 91 Micro-programmable version of Armatron robot arm

The one we actually have does not have the control pad: it has only the Armatron body and the 7-wire ribbon cable. The focus in the chapter is first to know how to operate the Armatron, and how we develop our own relay board, which in turn can be controlled by the output port of 16F877.

### ***1. Motion Control of the Armatron***

The Armatron can move forward, backward, turn right and left, move the arm up and down, and twist, and clamp the jaw. At the bottom there is a big battery housing, and it need 4 D-type 1.5 V dry cell batteries. As soon as you turn on (or by putting the batteries), there are voltages developed at each of the 7 wires in the ribbon cable. This means there is more than slight chance of short circuit unless you separate each wire before turning on the Armatron. Therefore it is safe to separate (on insulate) each wire of the ribbon cable before you inset batteries.

Once the power is on to the Armatron, you have the following voltages developed at each wire:

Black -- 0V (or Ground)

Brown -- 6V

Red -- 3V

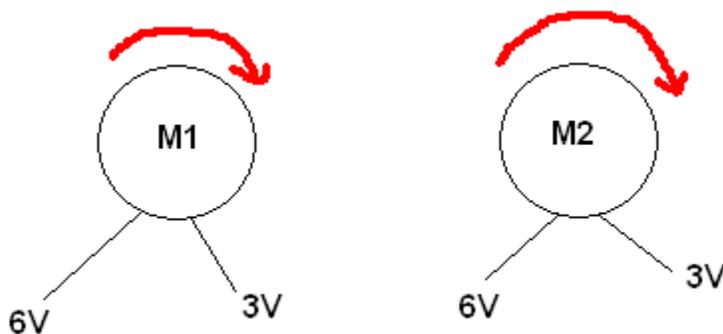
Yellow -- 3V

Orange -- 3V

Green -- 3V

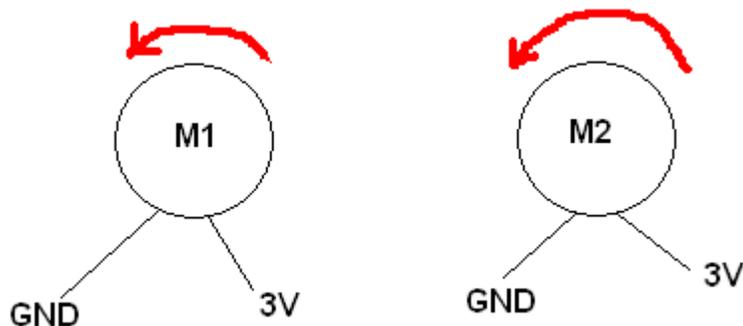
Blue -- 3V

There are motors (DC motors) inside the Armatron, and as you know the direction of the motor turning is controlled by the polarity of the voltage applied to the terminals of the motor. Let's consider an example.



As seen above, if a terminal of the motored is connected to 6V source, and the other terminal is to 3V source, then left terminal higher potential than right, so voltage has positive potential and the motor turns clockwise. If two motors are polarized same, then two would make the body move leftward.

If, instead, the right terminal has higher potential, the motor would turn counter-clockwise, moving the whole body leftward.



This is the principle of controlling the Armatron. Then, how do we change the direction of the motors inside the Armatron? We connect the wires together, based on the original design, we can change the direction of the motor running. Take look at the illustration shown in the next page.