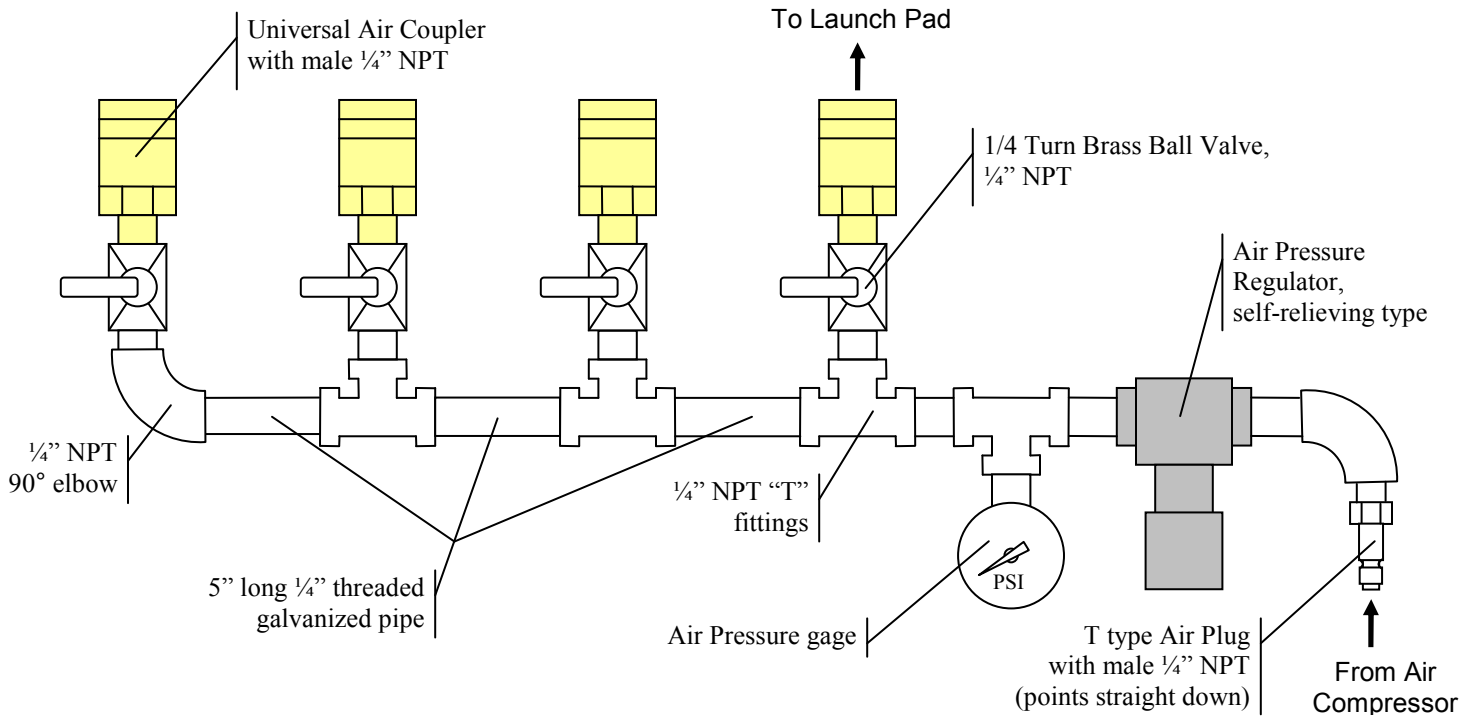
How to build a Water Rocket Launch Control Table

When running a Water Rocket Derby using multiple Launch Pads it is convenient to have a central control to regulate the air pressure and pressurize the rockets individually. It is also nice to be able to locate the launch control and launch pads a good distance from the noisy air compressor. The air compressor should be connected directly to the power outlet. If the compressor is connected to a standard outdoor extension cord, you may find a power drop in the cord that results in insufficient power to run the compressor. This is another reason why it is best to attach a long air hose to reach from the air compressor to the launch table rather than using a long extension cord.

What works well for the Water Rocket Launch Control is a manifold with regulator, air pressure gage and a valve for each launch pad. The diagram below shows a configuration to support four launch pads. It is built using standard ¼" galvanized pipe, T-connectors and valves and fittings available at most hardware / home improvement stores.



The air pressure regulator is needed to control the launch pressure in the rockets without adjusting the controls at the air compressor. The pressure gage is used to know what pressure is being used. When choosing an air pressure regulator it is important to select a "self relieving" type which lets the down stream (launch pad side) air escape when lowering the pressure. If the regulator does not have this feature you will need to release the pressure manually to see the new pressure setting on the gauge.

The recommended valves are ¼ turn brass ball valves. The ¼ turn valve is easy to open and close quickly but a typical gate valve requires multiple turns to open or close and gets tiring to use.

Air hose couplers come in a few different types. The most common types are called "T" and "I/M". Any type will work but to avoid compatibility issues you can get "universal" female couplers which will accept either type of male plug.

When assembling the parts be sure to use Teflon Plumbers Tape on the threads to insure a good airtight seal.

The manifold should be mounted to a small table to make it easy for the operator. When mounting the manifold to the table you need to make sure the Air Couplers have clearance because the outside needs to move. This is best done by mounting the assembly on a board and then mounting the board to the table. This also gives more clearance to operate the regulator.

If desired a second air pressure gage can be added to indicate the inlet pressure to the regulator. This was done when our Launch Table was re-built because we had a good gage and a gage came with the new regulator.

Parts List [with approximate prices in brackets, as of Oct-2007]:

1 Air Pressure Regulator, self relieving type [$19.96 with pressure gage]
1 Pressure Gage (sometimes comes with regulator – see above)
4 ¼" NPT Universal Air Couplers with male threads [$2.78 each]
4 ¼" NPT ¼ Turn Brass Ball Valves [$5.77 each if bought in plumbing, more in the air tool department]
4 ¼" NPT galvanized pipe T fittings (only 3 if the pressure gage is mounted on the regulator) [$1.39 each]
3 5" long ¼" galvanized pipe [$2.39 each]
2 2" long ¼" galvanized pipe (one each side of the regulator to allow room for operator's hand) [$1.07 each]
5 ¼" NPT threaded pipe couplers (one for each valve plus one for the pressure gage T) [$0.98 each]
2 ¼" pipe 90 degree elbows [$1.04 each]
1 ¼" NPT male Air Plug either "T" or "I/M" type to match the rest of your hose fittings [$1.39]
1 Small table, preferably with folding legs for easy storage
5/8" plywood spacer sheet
8 2-hole ½"conduit mounting straps to clamp the manifold to the table [15 pack for $2.13]

The approximate total cost for these parts $80.00 (not counting the table or wood spacer)

(Note: NPT stands for Normal Pipe Thread)

An alternate arrangement when using an Air Pressure Regulator that comes with its own Pressure Gage is shown below. Most of the pressure regulators available have a port (or two) on them to mount the gage and the gage has the fitting in the back. Mounting it on the gage will make this type easier to read. This also simplifies the manifold and uses one less "T" fitting but the gage will stick up higher off the table and you will need to be carful in transport and storage so the gage does not get damaged.