

Air Trigger

<http://www.deathlord.net/AirTrigger/trigger.htm>

Air Trigger



Difficulty Rating:



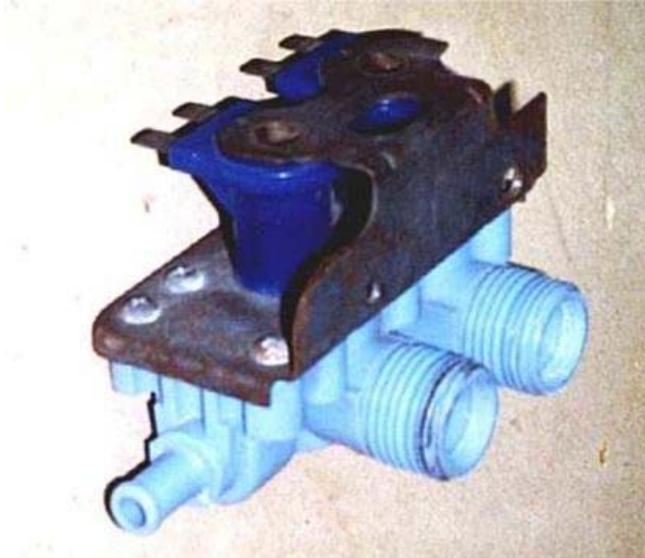
The washing machine hot / cold water valve has been used for years as a trigger for pneumatic props, but how exactly do you make one of these little goodies work? For years I followed the instructions originally offered by Carl Chetta of the Trash Can Trauma fame by using 3/4" PVC pipe threaded end caps on the hot & cold inlets. You need to force them on however, as the threads are different and some of the time they cross-thread, ruining the water valve. Then you would have to drill and tap one of the caps to install your air coupler which can be easier said than done. Here's an easy and safe method for low pressure props use.

Air Trigger - 1 -

In November of 2002 I decided to develop an air cannon using a washing machine valve as the trigger and went on a quest to find a more secure method of sending the air in. What I found makes a \$1 water valve as simple to use to trigger air as any \$65 professional pneumatic solenoid. Here are the details.



Of course you will need a water valve from a washing machine and not just any valve will hold the air back and reseal itself under the rather high pressure I would need for an air cannon. I wound up testing many, many different valves to see which work and which don't.



There are two that I have had success with at high pressure such as what my Aerial Executioner operates at, some 85 lbs. Shown above is Horton C539 / n-6042 which not only worked well, but actually have larger inner porting, so the sound it produced for the cannon was slightly superior to the rest. The other valve that worked well as the N-51 as shown here. The first one (translucent white) is very difficult to find, but the N-51 is readily available at any appliance repair shop used or even from a scrap yard that recycles old washing machines for the scrap metal. It will cost you about \$3 from the repair shop or \$1 from the scrap yard. Be CERTAIN you get the Horton or the N-51! There are lots of other valves out there that look identical to the blue one above, but they are N-50s and DO NOT WORK under high pressure. Look carefully before driving all the way home.

Note;

I have received many emails saying that they couldn't find any of these over the phone calling repair places and parts desks. I need to mention here that this is a part that you will have to get in your car and go hunt down, due to it's low value / high pain in the butt ratio to the repair men. So here's my best tip; you will definitely be able to find these things if you go to the city landfill or scrap yard as mentioned above. Every time I go there I can pick up at least two or three or more. Things to take with you to the landfill; large channel lock pliers to get the old water lines off the valve, flat blade screw driver to undo the exit water line, crescent wrench to remove the valve from the washing machine, a rag to clean your hands with after and a plastic grocery bag to put the valves in. Simple. It only takes roughly 2 minutes to remove these and they are really easy to get at, so don't worry about it.

We have covered the attaining of the water valve so now it is time to get the rest of the goodies needed to make this funny looking doowhacky into something that releases the fear of God into your hapless TOTs.

- (1) Female Hose to FIP Swivel fitting 3/4" x 1/2" = \$3.97 (Home Depot)
 - (1) Hose end cap = \$.53 (Home Depot)
 - (1) 1/2 to 1/4" Galvanized reducer bushing = \$.76 (Home Depot)
 - (1) 1/4" IID male air coupler = \$.49 (Harbor Freight)
 - (1) 6' Extension cord = \$.77 (WalMart)
 - (2) 1/4" Female Quick Slide, 18 ga. crimp cord fittings \$.09 ea = \$.18 (Harbor Freight)
 - (1) Washing machine water valve = \$3.00
- Total = \$9.70



This is simple business. Spin your hose end cap on to the water inlet you will not be using and tighten with a large pair of pliers so it is more than just finger tight. The same for the hose swivel fitting to the chamber that you are using. Attach the air coupler to the reducer and the reducer to the swivel using Teflon plumber's tape. You will need to bring power to the water valve as it runs on 110V, so chop the female end off your extension cord and clamp female quick slide fitting to the end of each of the two leads.



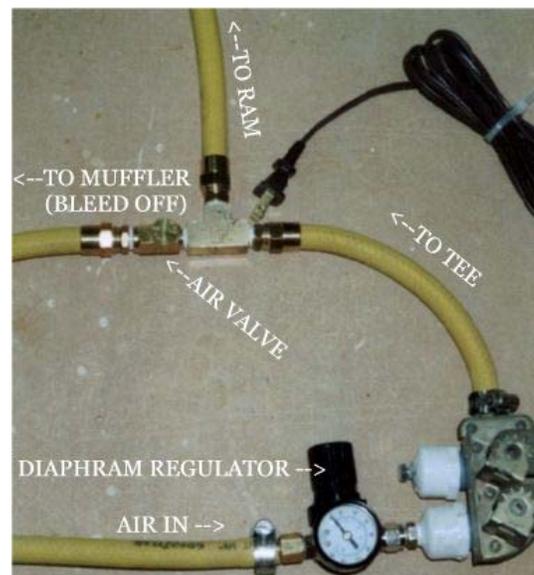
Slip on to either lead on the solenoid that triggers your water valve and then cover each with heat-shrink tubing or electrical tape. It does not matter which power cord lead you send to which connector. Either way will work as long as you attach your air nipple to the corresponding cylinder .



And here is how it will look when completed. The top of this photo got cut off, but you can see that 3/8" air hose slips perfectly over the outlet nipple for feeding the air to your prop. And that's it!

Here is an old photo of the completed system (using the previous method of forcing the PVC pipe end caps on which were tapped with threads for the air fitting) put together for the [Exorcist](#) that illustrates well how this will be used. I attached the air line from the compressor to one end of an air regulator and attached the out directly to a threaded fitting going into the solenoid.

The air out of the water valve is hose-clamped on for a positive fit. For opening the air way to your pneumatic event you will merely send power down the power cord.



Once released the air travels to a three way connector that will split the air to the air cylinder as well as out to a muffler fitted at the end of about 5 feet of line. You can see there is an air valve to the muffler line because we will be dialing in the exact amount of bleed that allows our pneumatic prop to reset.

Air Trigger - 2 -



Here is a photo of the compact regulator I use on all of my animatronics that you might want to consider adding to your air trigger assembly as well. It is a Harbor Freight item [no# 90590-0VGA 1/4" Air Regulator With Gauge](#) and is NOT to be confused with an Air PRESSURE regulator sold for a few dollars less at the same store.

The diaphragm regulator works like the unit on your air compressor, releasing a total air pressure as shown on the gauge and never more than that. An air pressure regulator is a FLOW regulator only. Meaning that if you have a flow regulator adjusted to 28 lbs and are sending 105 lbs of pressure going into the intake AND keep the air flowing through constantly, the pressure coming out will stay at 28 pounds.

But once you stop this flow, the pressure that backs up against its inner mechanism allows the full blast of pressure you have going in to be emitted initially, until the flow stabilizes. Thus, if you have an animatronic that works on 28 lbs of pressure such as the [Exorcist](#), a PRESSURE regulator, if left hooked up to 105 lbs of direct pressure from the air compressor but set to 28 lbs for your prop, will send your puppet through it's cycle about 4 times as fast as needed and probably through the ceiling. Funny as hell for a just a moment until you realize you have to replace all its working mechanism and patch that hole in your garage roof. So be sure you are buying a DIAPHRAGM regulator. I am asked all the time how to hook this up to your 1/4" IID air fittings and the answer is exactly like regular fittings. Even though these look a little different, they do seal off just fine when using Teflon tape.



For years I have heard the loud hiss as the bypassing air escaped out while my props were triggered and then the long hiss while it reset back to its ready position. This year I determined that I would make a silencer for this sound. Here you will see one very easy way to accomplish just that, however you will find another, newer version at the bottom of this how-to that is more compact and will work with smaller air line and can even be fitted for use with a 2 way air cylinder that requires both inlets to be silenced while in use.

I found that 3/4" PVC pipe has just a little larger diameter inside than the 3/8" air hose I work with has for an outside diameter so it made sense to start there.



I had an extra foam paint brush laying around so I cut a couple of strips off that would slip inside the 5" section of pipe.

Then using a jig saw I slotted up one end of the pipe in about 4 places and simply hosed clamped that end to the air line.

To hold the foam in place I put a screw in the other end. This is a really solid mount to the heavy rubber air hose, so it will not be falling off.

Now When I set up my props I simply run the muffler line out behind the prop behind the wall to hide it.

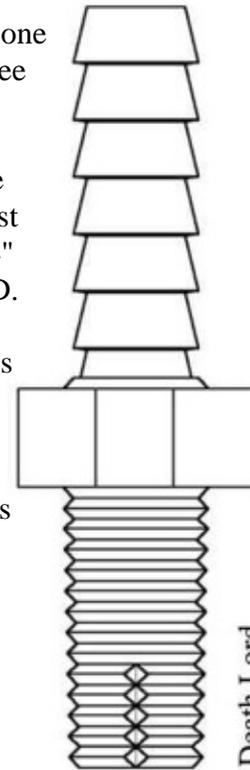
The sound is not only eliminated nearly 100%, but by introducing the muffler to the system actually cuts down on the air pressure needed to activate the prop and in turn less air volume. And that means less refilling of the compressor tank during the night.



NEW! The new "compact" muffler shown here uses 1" PVC pipe just 2 1/2" long with one end capped and threaded for the valve you see installed.

The hose fitting in the other end of the valve (which allows you to choose exactly how fast or slow you want your prop to reset) is a 1/4" slip fitting that is the right size for 3/16" O.D. clear vinyl hose. The muffler is then stuffed fairly tight with foam rubber and then screws are installed at the end to keep the foam from coming back out. This super compact muffler makes all exhaust from the cylinder completely silent, making it both effective as well as extremely easy to fit inside of any pneumatic prop.

In the far right CAD drawing you can see a very simple way to cut the threads into your end cap.



Death Lord

Once you drill out a hole just under the diameter of the threads of your fitting (15/32nds drill bit), you can use the fitting itself as a thread tap by cutting across the bottom few threads with the sharp corner of a metal file. The more vertical the cut is on the right side of the threads (in the perspective shown above) the better it will cut, as the sharp edge cuts cleanly into the plastic. When the threads are cut, remove the fitting, wrap with Teflon tape and re-install. Be sure to turn the fitting in fully past the cross cut so air cannot escape back out of the groove if you are using this technique on a high pressure system. When making the muffler, no tape is needed.



Here is yet another way to use your compact muffler. These photos, which was first used in the 2003 project, the [Lynching](#), shows a second fitting on the top side of the muffler that can be used to silence the exhaust from the secondary air inlet on a 2 way air ram. You must route these two lines into the muffler separately, as if you link them together, you will in essence be attempting to force air into both the PUSH inlet and the PULL inlet of the same air ram.



So there is the first step in making an air-activated scare event. If you would like to see the trigger in use, you can visit one of my other how-tos on this like the [Aerial Executioner](#).

If you want to automate the use of your air props you can do that by using an Event Control Timer (ECT). You can learn more about it on the [Motion Trigger](#) how pages.