

## Simple Water-Tight Box – Part I

by Brian P. Koehler



Ask five captains how to do something in this hobby and you will get five different answers. One of the joys of this hobby is going around the “pits” looking inside other captains’ ships and seeing how each has done things differently. However, for a new captain, I think the ‘dry box’ is probably the most important and nerve-wracking piece of the ship (it is the part that if it fails, the hobby gets more expensive quick). For my first ship, the Northampton class cruiser USS Chester, I made a very simple water-tight box out of a standard ‘unibody-type’ electrical box available at Lowe’s with threaded electrical connectors from Radio Shack. It was very easy to build (no precision drilling and also no “gooping” of over-sized holes with silicone) and the use of all threaded fittings makes it easy to screw in the connectors water-proof-tight.

I was driven to design this box because the standard “Otter” box (divers box) was a little too wide for my Chester hull and I did not own the band saw needed to cut it down smoothly. After a little looking around I noticed a particular electrical box at the local Lowe’s made from a solid one-piece-no-holes construction (I have also seen them at Home Depot).

This particular electrical box has three particular advantages:

- One piece – no holes or wire access

vents that must be sealed.

- Comes with a thick rubber gasket and rigid lid that screws down tight without any “flexing” in-between the screws (which results in a leaky seal).

- The walls are also rigid enough not to flex when the servos push against the MAV poppet valves screwed into the side. This lack of flex, combined with mounting the metal servo arm very close to the valves, has allowed a rate of fire almost as fast as the solenoid-type set-ups in my other boats.

In Photo 1 you can see the completed box. The receiver (not

drive motors (top right). All these servos are screwed into small stubs of wood I glued in place that hold the servos just off the bottom of the box, allowing most of the main electrical wires to run underneath the servos. The green wire at top is where I clip my antenna lead of the receiver in to attach to the external antenna in the boat.

For making the electrical connections into the box, I have really come to love a particular type of Radio Shack binding post (RS#: 274-661). The advantage of these connectors is that they are very adaptable in how you connect to

them (banana plug, split-spade, or straight wire) AND they are very leak resistant! The reason for this is because they are completely external, so no large hole (that could leak) needs to be made into the dry box. Since they are threaded, the best way to

install these is to drill a small hole (smaller than the screw-end of the connector) in the dry box and forcibly screw the connector into the

*How does a beginner make his first dry box when he has no precision tools and lives in a town with no dive shop (for buying fancy dive boxes)?*

shown) sits in the open pocket where all the servo cables end. You can see the installed servos that fire the cannons (left servo) and switch on/off the pump (bottom right) and

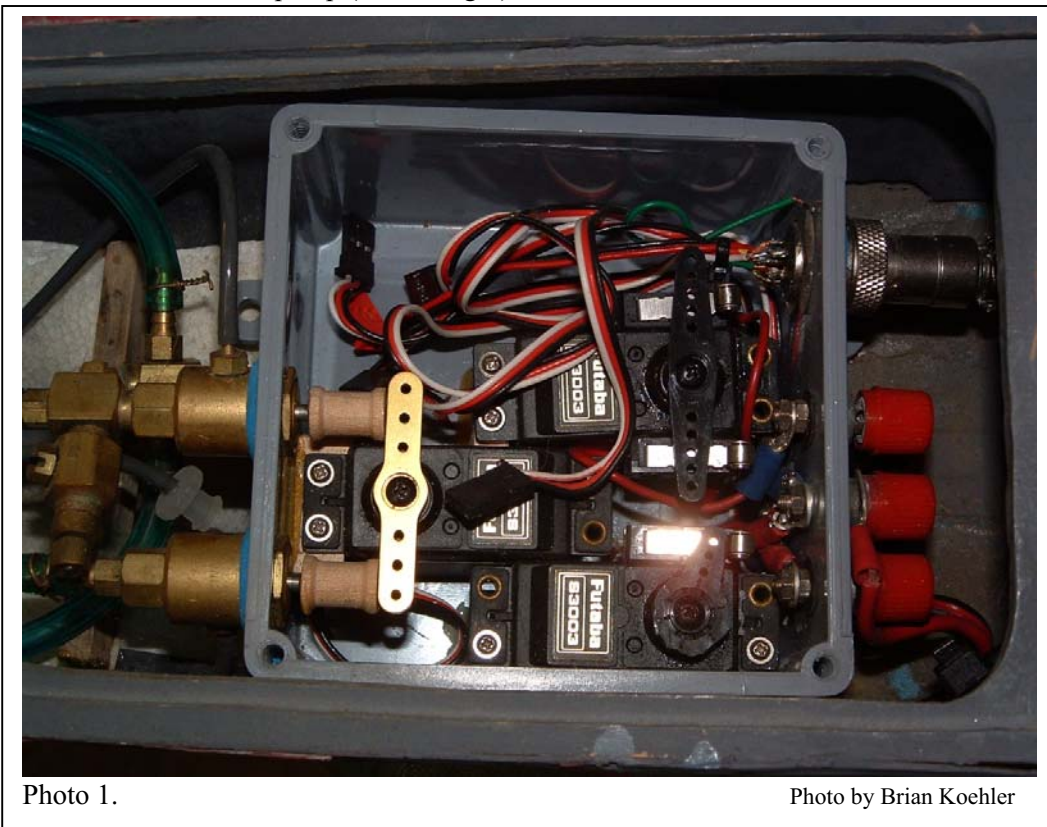


Photo 1.

Photo by Brian Koehler

side. This will effectively self-seal the hole as the connector is forced in. For added protection, a little epoxy can be added around the threads and base of the connector as it is screwed in. The inside wiring is then attached directly to the threads of the connector. I used one pair for the main power in, one pair out for the motors and another pair out to the pump. *Note: these connectors make solenoids setups even easier to install, but that is the topic for a future article...*

I used the connectors in Photo 2 for the main drive and pump power in/out of the dry box. While I could have used a whole series of these connectors along the other side of the box for the servo control wires, I opted to use a surface mount microphone connector to consolidate these smaller lower-current connectors through one opening in the box. To these pins I connected

the external receiver battery, rudder servo extension, and antenna wire. In a similar fashion as above, I also



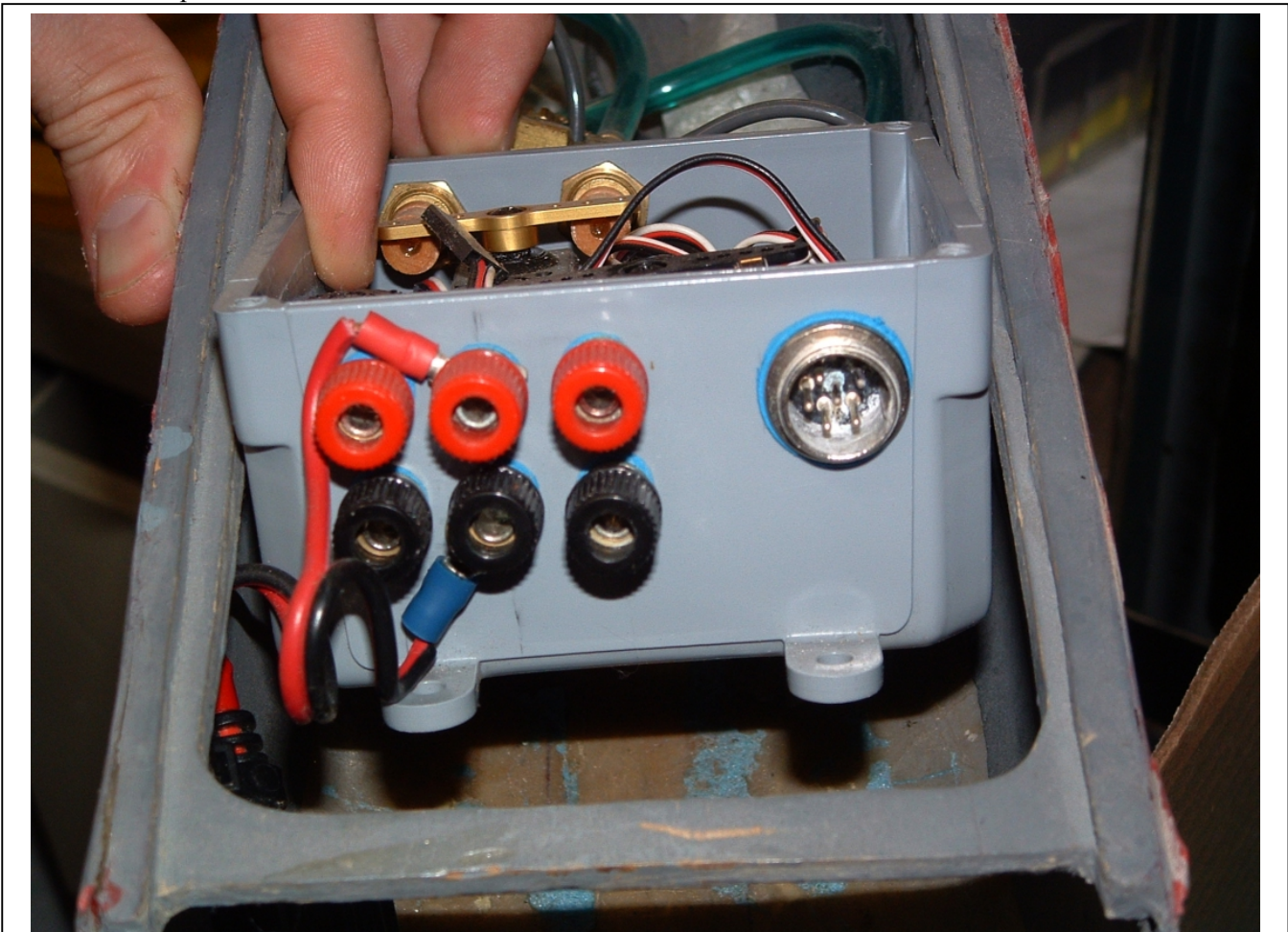
Photo 2

drilled a pair of large holes directly in the sides to mount the MAV actuators for the cannons.

I was not sure the supplied ‘water resistant’ rubber gasket had enough flex to make a good enough ‘water proof’ seal, so I cut a new gasket for the lid from a sheet of ‘hobby foam’ (children’s bathtub foam available in the craft section of

Wal-Mart). I also used a piece to make a gasket for the microphone connector (blue ring around the connector in the photo).

I have used this box many times. It is easy to disconnect and remove from the boat and easy to open. I have not talked about this design much before as being a ‘cautious’ cruiser captain, I have not taken much damage with that ship and was not really sure of its abilities. However, at the Cocoa Beach battle I had the “opportunity” to retrieve the boat several times from fairly deep water (and it had to sit while I changed and swam out to it) and was delighted to see that the box remained completely dry inside. I have to say “thanks” to you Florida Axis guys who helped me “test” this box!



Electrical connectors for watertight box

Photo by B. Koehler