How to build an underwater housing

by Ed Sauer

Yes, you too can build an underwater housing at home with complex everyday tools.

For starters I **DO NOT** recommend anyone build one. But, if your mind is made up, lets get started.

First, define your reason for building your own underwater housing.
My reasons:

- I have a Sony PDW-530 broadcast camera that records at 50mbs in MPEG IMX format at 4:2:2 on a blue laser disc. The image quality is D-beta.

- I personally like Sony products and purchased it from the wonderful people at Film/Video Equipment Service Co. Inc. The commercially available housings are too expensive and too heavy - about 80 lb. loaded. I need to be able to carry it without breaking my back and if the housing costs an arm and a leg, it will be hard to lift.

- My last reason - I was bored - sitting around eating cheetos, drinking beer, and watching “The Simpsons”. I needed to do something with my life!

Now to build it.

Remember, always follow proper safety procedures and work safely – use eye protection, respirators etc.

I started with my camera and made a foam core model, just to make sure everything fits. I then made calculations on size for displacement of water, thickness of aluminum for the anticipated water pressure and total weight so that the housing would be close to neutral and balanced. For this housing I opted for 5/16 inch thick aluminum for the main body parts

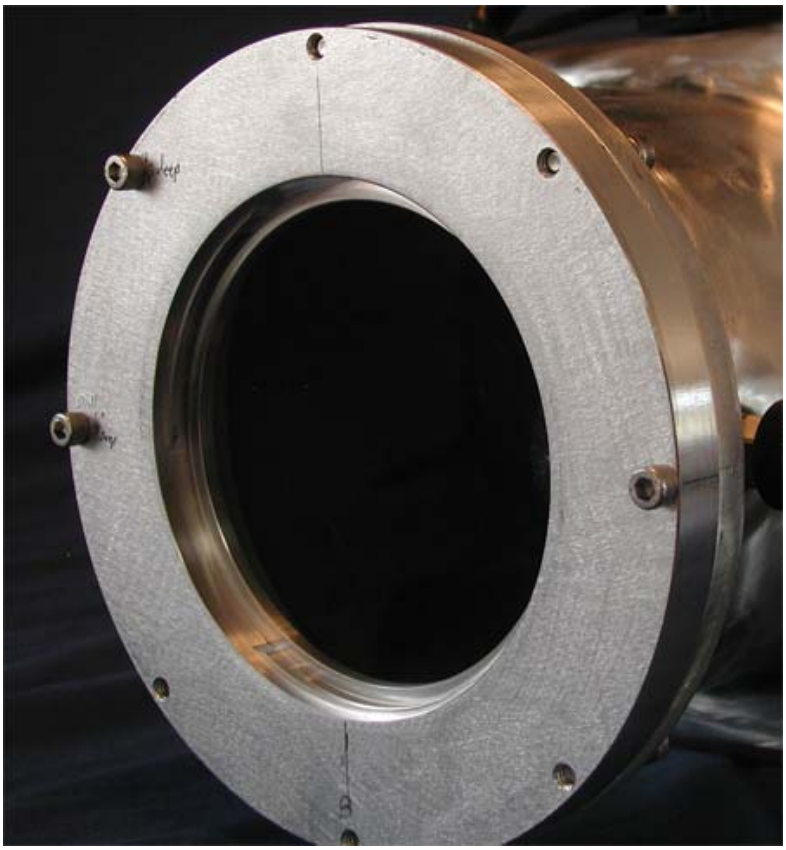
I used 6061 aluminum for the parts that were welded, and 7075 aluminum for the non-welded parts that get machined.

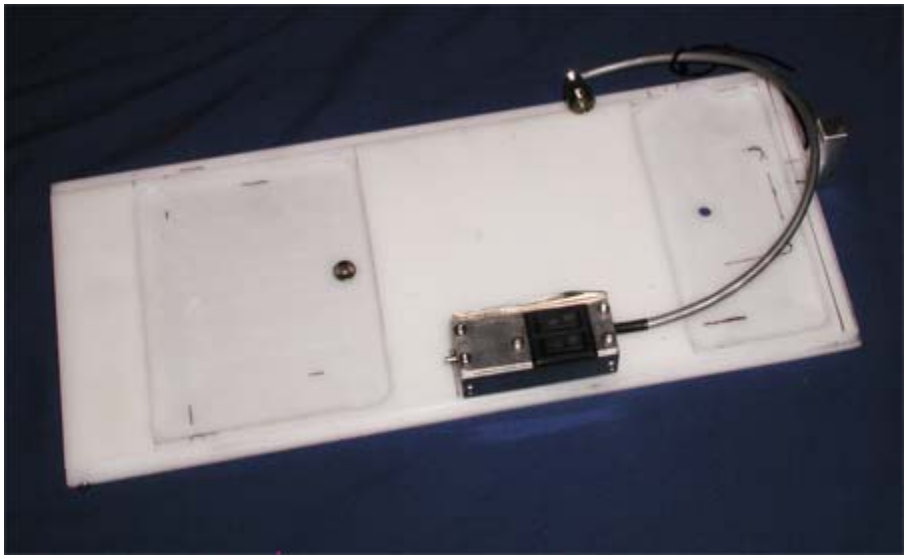
The welding needs to be 100% perfect. It cannot leak! A 300 amp water-cooled tig torch works great.

Have the port adapter plate machined out to the port of your choice on one side and an o-ring to seal it to the housing with stainless steel bolts on the other side.

The housing will be milled on the front and back to be square to cut the 0-ring in the back.

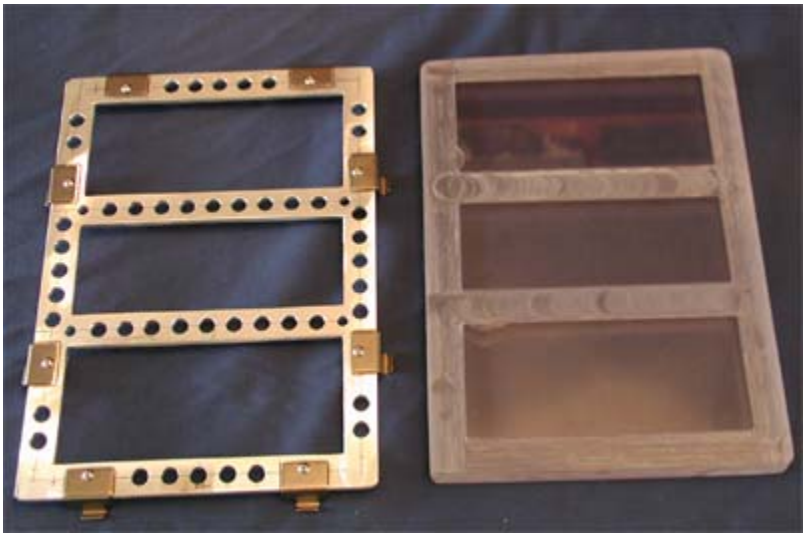
Make sure your measurements allow for the milling!



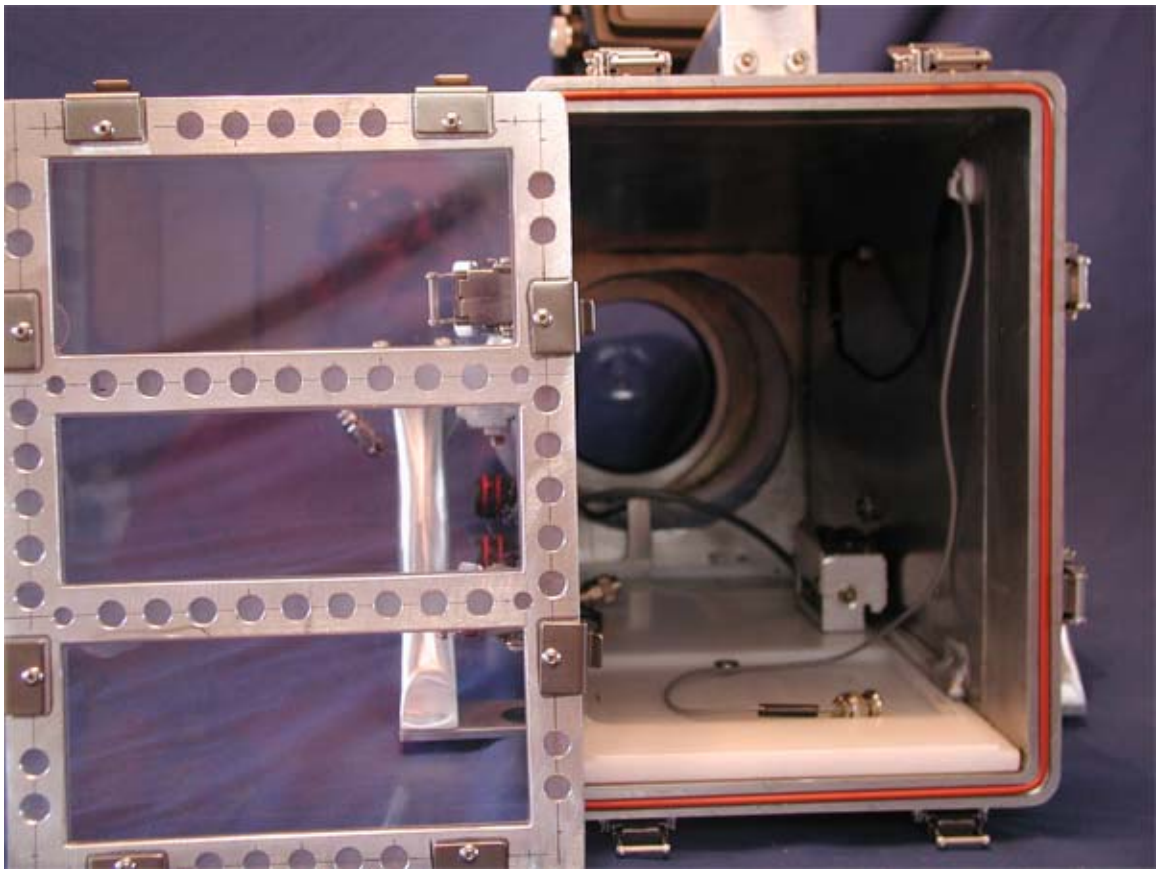


The docking plate is made of nylon and slides easily in and out of the housing. It can be routed or machined to fit.

The rear plate is 3/4 “ polycarbonate. It is bullet proof.



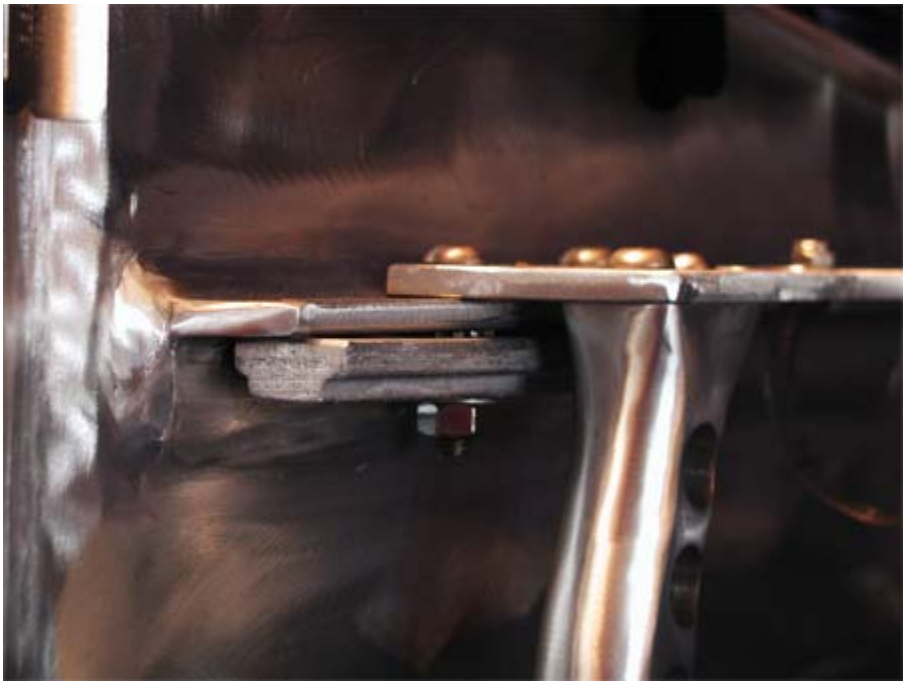
I opted for an aluminum frame machined into the polycarbonate so all the hardware is drilled and tapped into the aluminum.



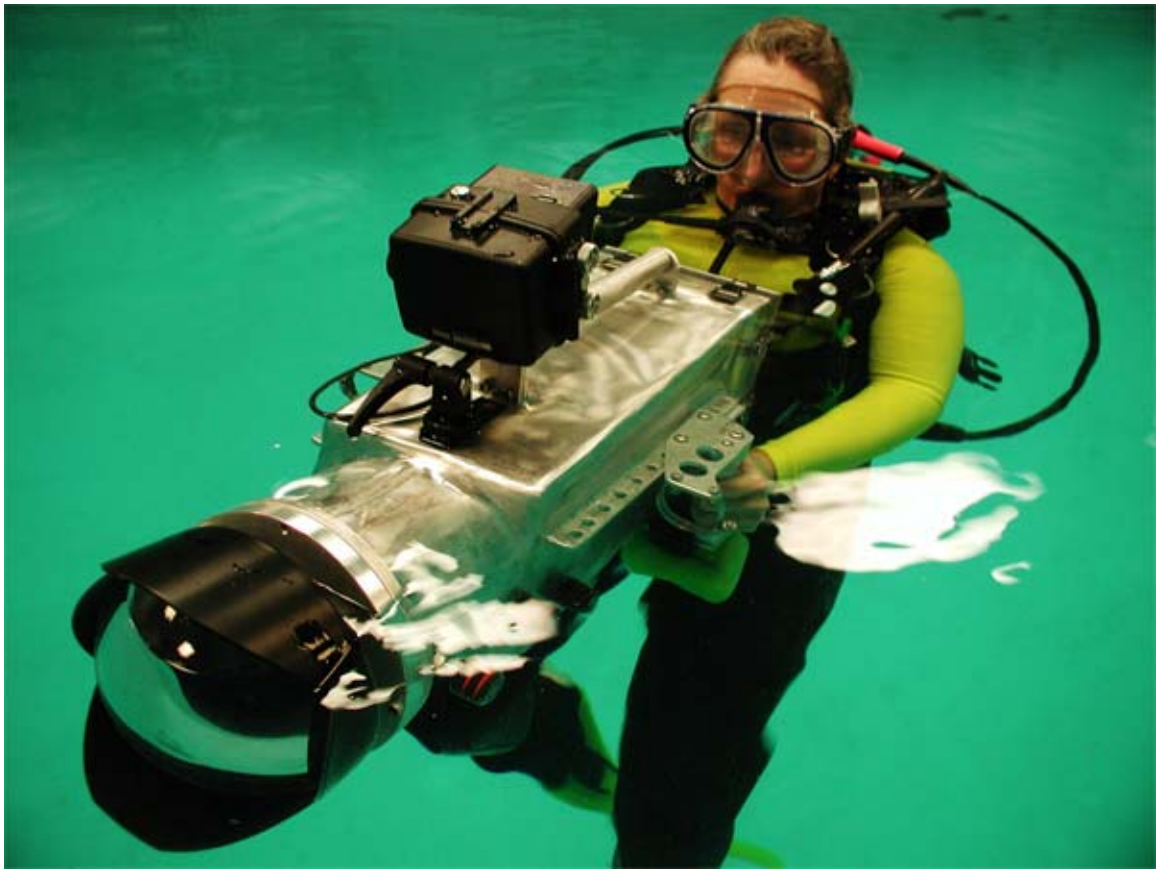
(**Editors Note**: Notice the self portrait. Ed is such a camera hog!)

I use the silicone type O-rings (no grease needed) front and back in my machined groves. (Download the Parker O-ring handbook for the dimensions of the grooves and O-rings.) For the port and controls I use the manufacturers O-rings.

I went to my local boat dealer for the anodes that I attached with the handle brackets - one on each side. I used a stainless steel star lockwasher to ensure a good electrical contact. It will help keep the housing from rotting away.



I have checked everything out in the pool. It works great. Soon, the housing will receive a hard coat of anodizing to finish it off before a trip to the ocean.



I really have to thank my darling wife for her support and input and oh yeah, the dining room table that easily converts into a workbench.

It's back to the couch for dinner and the "Simpsons"!

Parts used:

- Dome port — Light & Motion
- Latches — Part# HC83314-42LALB
- Back plate — ¾" polycarbonate
- Manual controls — Ikelite
- O-Ring — silicone
- Monitor — Amphibico

Suppliers:

- Sony Business Solutions and Systems
  http://bssc.sel.sony.com/infocomm/category/products/pdw530.html

- Film/Video Equipment Service Co. Inc.
  http://www.fvesco.com/

- Nielsen Sessions
  http://www.casehardware.com/

- Ikelite
  http://www.ikelite.com/

- Light & Motion
  http://www.uwimaging.com/

- Sea & Sea
  http://www.seaandsea.com/

- Parker O-Ring Handbook
  http://www.parker.com/o-ring/Literature/00-5700.pdf

From My Wife's Perspective

We had been married four months.

Ed, my husband, came home in love with a camera. I couldn't even question he would have it eventually, or so I thought. So four weeks later is good.

Then one evening shortly thereafter, he asked me if I had any spare foam core board. (I am a graphic artist so I just happen to have some).

"*Sure, honey what do you need it for?"* I asked, trying to calculate how much he needed.

"I'm going to make an underwater housing for my new camera!"

I say "*OooKaaay!"*

"*You see*," he continues to explain, "*I looked on the internet and I think I can make one smaller, lighter, and cheaper than the commercial housings."*

I say "*Oookaay!"* while in the back of my head I hear "*Your going to put the new $$$$$$$ camera in a homemade housing?*"

Then, one day he proudly brings home a piece of aluminum stating matter of factly "*I should be able to get the sides and maybe the top out of this*".

I say "*Great*!" still thinking the new $$$$$$$ camera. I just kept remembering my father-in-law saying *"He can do anything he puts his mind to*."

He found someone to show him how to weld aluminum. (He is a welder by trade - but aluminum was different.) Then came the very thick plastic for the back plate so he could see if it LEAKED! $$$$$$$ camera!

Then finding a place to have the O-Ring and bayonet mount for the dome port machined.

The shiny aluminum housing was taking shape and really looked like the model he made of the foam core.

Put the handles on.

Make room for the lights,

Test it for balance

Test for leaks. **EEEks!**

Test for pressure

Anodize it

Test it again .....and I knew it!

We have a housing!

But why does he keep saying he will **NEVER** build another one?

Scene 2 - Two years later...

"Honey, do you have any foam core?"