

Review of the Gates Underwater Housing option for the Sony HVR-Z1U 3CCD High Definition Video Camcorder.

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This review is made from a completely unbiased stand point. I had been looking for a while to get into the HDV format and keep up with the Jones'. Searching for a suitable housing to compliment my filming style matched with a want for complete manual operation of the camera led me to elect for the Gates FX1/Z1 housing. I should take this time also to state that I am in no way affiliated to Gates, I don't have any interest in the promotion of their product and nor have I been commissioned to write this report. This review is of the housing, its accessories, and its performance in the water. This review is not about lighting, filming techniques or other matters relating to issues of underwater film production.

I had been waiting for some time in Palau trying to decide which housing option I would settle for with regards to housing my shiny new Sony HVR-Z1U HDV Camcorder. I must just mention a very special thanks at this point to the unbelievable help and support offered by a host of people during the acquisition stage during this recent bout of equipment renewal. Steve Douglas, Nick Martorano and of course the people at Gates, in particular Pamela Mazey Mertz and Gates President John Ellerbrook.



Fig. 1. The housing



Fig. 2. Filming in Palau



Fig. 3. Ready for action.

OK, so to get started. The main housing comes in two separate parts, the front assembly, without the port, and the rear assembly. The front section is where all of the main controls are found, most of them on the left side of the housing. The top of the front section has grooves cut into it to facilitate the modular design for the attachment of an array of additional extras such as grip handles, monitors, carrying handles and buoyancy elements. Inside the main section you will find the main mounting bracket for the camera

as well as the feed through of the AV cables when the use of an external monitor is required. The controls found on the left side of this section are for (from the front of the housing) Manual Focus Ring, Iris Setting, ND Filter, Gain and WB presets, Auto / Manual Focus and the WB Set – Iris Set – Gain Set controls. At the front of the section you have the CC flip filter arm control and on the right side of the section is found the Blue colour coded Zoom rocker.



Fig. 4 (Above) Shows the left hand side of the main front section of the housing, the large circular dial at the front being the manual Focus ring. **Fig. 5. (Lower)** shows the CC flip filter arm control on the front face.



Fig. 6 (Above) Shows the right hand side of the main section. The blue rocker is for Zoom with an optional Video Out (plugged) port and the bulkhead connection for the use of external monitors.

The Rear Section:



Fig. 7. Inside the rear section. Note the position of the 9v cell.



Fig. 8. The On / Off switch on the rear of the unit.



Fig. 9 (Left) Shows the (optional) control for expanded focus and the REC / Standby lever. Above Right shows the eyepiece / viewfinder.



The rear section of the housing contains, on the left hand side, the controls for WB and Shutter Speed Select. On the rear of the section is found the On/Off switch along with the viewfinder that is comfortably magnified and can easily be used for filming and composition, especially when using expanded focus. The right side of the rear unit has the controls for Record / Standby and Expanded Focus. The inside of the rear unit also houses a 9v battery that serves to power the optional moisture alarm feature. The two sections are connected by way of three security locked clamps, one on top and one each side of the housing.

Getting Ready for Action:

As with any housing it is prudent to check and double check the functions of all buttons and controls before you start loading in the camera in your eagerness to get filming. This caution will definitely extend the effectiveness and reliability of the housing. The Gates engineers have done a great job with this particular unit. Their manual trademark controls are all sealed through the casing of the housing with internal O-rings creating a watertight seal on the shaft as they pass through a shaft gland. The nice touch on this particular housing is when you take a closer look at the controls that require a spring action to return the control once the camera feature has been selected. This particularly relates to



White Balance Set / Iris and Gain Selection controls shown here as the circular control nearest the camera. The second dial in the background is of a similar spring action nature and controls the Shutter Speed Selection and White Balance modes. Seeing as these housings are depth rated to 450fsw it is a nice touch to see that the controls have a carefully designed safety feature. This feature is a set of small holes set at just the right location so that the dial can be selected to control each feature. A small male pin is located on the control dial so that the operation can be perfectly aligned and operated. When not needed the dial can then be turned so as not to allow pressure at deeper depths to depress the dial therefore messing with any crucial camera settings.

However this neat little idea, in my case, needed some fine-tuning. I noticed on my particular housing that the mechanism was not working as intended due to the spring slipping over the internal stopper of the control dial. I must point out that ***I had bought a second hand housing*** and as such was expecting there to potentially be a couple of small operations I would need to perform. This in turn highlights a very important factor when dealing with equipment in remote locations, ***field serviceability***. The remedy was quite simple; see figures below for a photographic guide. I basically removed the outer dial of the control that is kept in place by a small grub screw. I then placed a small broad washer against the inside shoulder of the control dial so as to offer the return spring a wider base to sit on and eliminating the potential for control failure. If you decide to go about this home improvement yourself be sure to re-align the controls on the inside of the housing with the camera located in the housing before tightening the grub screw into place. Also a slight dollop of Silicone sealant around the grub screw doesn't go amiss.



Fig. 10 Shows the steps from top left of how to remove the spring loaded dials. Make sure to keep an eye on the grub screw once removed!! I now know every floorboard in my office personally....you can see how the spring diameter is bigger than the internal stopper of the control dial in the second image down on the right. I placed a washer over the control shaft that would give a better, more secure, base for the spring to rest against. Make sure to re-align the controls before replacing the outer control dial.

Once put back together I checked the controls and they all sat well. I was planning a wet test before putting the camera in the housing, as I suggest you always should do with a new housing, so any problems would come to light at that point.

Nice feet, and a great way to protect the SWP44 during rest periods:

Gates have designed a new foot assembly for the FX1/Z1 housing. This is of greater importance if you, like me, intend to use the housing in conjunction with the Fathoms Imaging SWP44 120 degree external wide-angle lens.

Fig. 11 Shows the base for the housing when using the Fathoms Imaging SWP44. It slides easily into place along the base guide grooves of the housing and is tightened and secured by the brass coloured retaining screw as shown in the bottom right image. When standing upright and with the lens in place, with the lens protective cover on, it offers approximately 1cm (1/3rd Inch) of clearance to the surface on which the housing is placed. Images to follow.



Colour Correction Flip Filter Arm:

This is a standard URPro filter with option of PVC or ground glass. I opted for the ground glass option. It should be noted that the flip filter ***cannot be used*** if the camera is fitted with an ancillary wide angle lens fitted to the camera if you are not using the SWP44. At the outset the housings were designed specifically for use with the FX1 / Z1 to exploit its 67 degree field of view. A lot of competitors in the housing industry do offer wide angle ports for an additional 15 degrees or so but Gates decided to look at giving the client the choice of working with the camera solo or to think big and go with the SWP44. Its operation is via a flip filter control arm as earlier shown in ***Fig. 5***

Further to tests carried out I found that when placing a diopter on the camera the use of the flip filter whilst not compromised does result in a very ominous scraping sound as the frame of the flip filter comes into contact with the outer ring of the diopter. This is not too surprising seeing as the flip filter was designed to operate in a very narrow gap between the camera and SWP44 port. ***Let me also point out that when using the SWP44 I have since learned that the lens is not designed to allow use of diopters. The reason is because the port is designed for use with the Z1 through the entire zoom range of the camera with no distortion, reflections or vignetting. Adding a diopter is like wearing the wrong prescription glasses. Unless the diopter was designed with the entire optical chain in mind it will likely impair image quality. You may not notice this impairment until you actually see it on an HD monitor and it shows as myopic or fuzzy. That is way too late a time to realize the error.***

Fitting the Ports:

As most of you know on this forum, I elected to go with the SWP44 120 degree external wide-angle lens from Fathoms Imaging. The reasoning behind this is due to my location. Palau is home to the regular kind of dive sites, reefs, walls etc but also home to a large selection of Japanese WWII wrecks and unique environments such as Jellyfish Lake etc. This lens, it is planned, will allow me to film and document these environments to the best of the camera's ability. Plus I didn't want to compromise on FOV when diving the wrecks. The lens also offers complete zoom through so with a diopter in place I can get those smaller critters if the opportunity arises. All of the ports have a bayonet-style mount allowing for precise union with the housing.



Fig. 12 Shows the range of ground glass ports. For use with additional wide angle lenses the SP44, the FP44 flat port for macro filming options and the monster SWP44 from Fathoms Imaging.

The ports all fit by inserting the collars of the bayonet mount into the recess of the housing and then being turned, gently, through 90 degrees. There is a small white indicator on the front of the housing and a small recessed circular mark on the ports to allow for precise marriage of the two surfaces. Once fitted the lenses are free of any contact with the ground surface due to the inclined aspect of the feet elements as mentioned earlier. The next image shows the clearance offered to the SWP44 with its protective cover in place.



For security reasons I also fitted the protective cover of the port with a clip so that I could attach that to a lanyard once I had entered the water and before handing the camera up to a boat handler after diving. The passage of any camera unit into and out of the water can be fraught with potentially dangerous drops and dings to any port. I always take this precaution. This could also be something for Gates or Fathoms to incorporate into future protective lens covers.

Fitting the handles and Accessories:

The housing's main section has a series of 3 dovetailed grooves running along its top. These are for the placement of a selection of accessories such as handles, external monitors and white balancing arms as offered by Gates. This is the feature of the housing where its modularity shines.

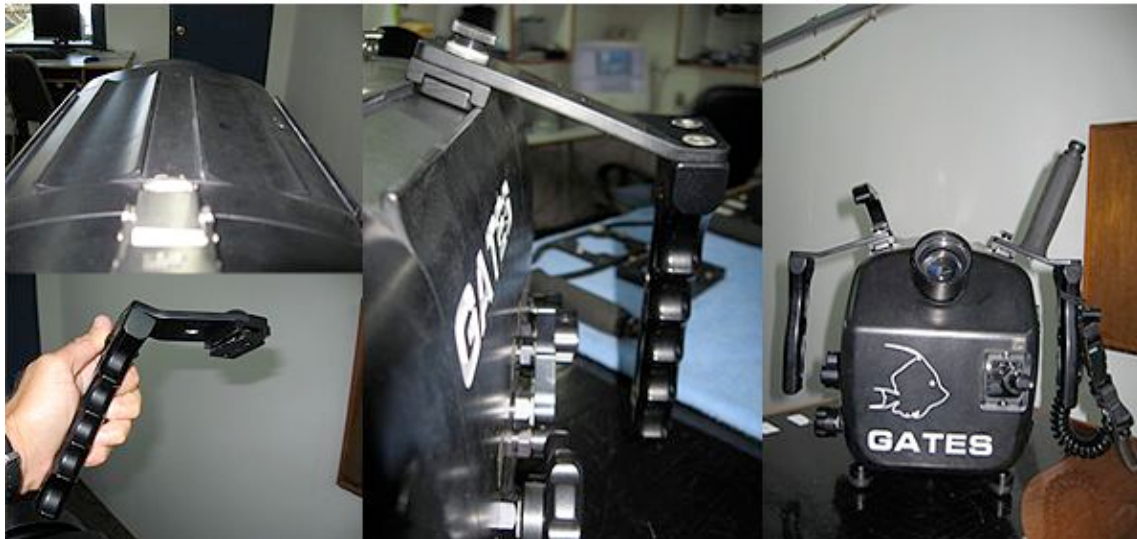


Fig.13 shows the modularity of the housing with regards to the adaptation and fitting of the control arms and carrying handles. You'll notice that I choose to offset the carrying handles to facilitate the handing of the unit to others.



Once the handles have been successfully mounted you can then select their exact position to suit your shooting style. I choose to have the left handle slightly more forward so that I have fingertip control on the zoom gear. This leaves a bit of a stretch to access the shutter speed dial but I normally require much more access to focus, critical for HDV, than I do for shutter speed selection. You are always able to shift these grips around as you see fit.

The External Monitor:

I decided to go for the 4 inch version of Gates' underwater external monitors the EM419. This monitor sits in the dovetailed grooves found on the top of the housing and fits in the same way as the handles and other accessories as shown above in Fig.13. Powered by 8 AA cell batteries it also has additional controls for Contrast / Colour and Brightness. These controls need to be set once the camera has been connected to the monitor. In order to get the monitor to display the image you will need to reset the camera (found on the LCD panel control pad) and then select **MENU > OTHER > DISPLAY OUTPUT > V-OUT / PANEL**. Mind you, having executed this action many times my camera still fails to display the camera information on the monitor. I can get the image out on the monitor (I select down convert to letterbox) but in order to see the camera settings I have to peer through the viewfinder of the camera. This is not a bad thing either as I feel that the image in the viewfinder offers a better idea to the operator of what the camera is actually doing. If anyone out there has a remedy for this I'd appreciate it.



Fig.14 showing the various aspects of the EM419 external monitor including the dovetailed connector plate, the bulkhead connector jack and the internal battery bay. Note that above the battery bay you have the three controls for Brightness, Colour and Contrast. These need to be set when the camera is connected to the monitor via the AV cable once it has been mounted through the bulkhead connection. My housing came with the bulkhead connector already in place hence the lacking of images to show its preparation and mounting. Another note is that I personally feel the monitor lacks contrast and sharpness. This is to be expected when using an SD monitor for an HDV camera.

Inserting the Sony HVR-Z1U:

Using the camera base which screws directly into the tripod mounting thread, with a guide nipple for good measure. Don't forget to mount the supplied focusing gear on the camera's focus ring **before** you mount the camera on the mounting tray. This gear when fitted correctly then marries up with the internal focus gear of the manual focus dial of the housing.



Fig.15 shows the differing stages of preparing the housing to receive the camera. The focus ring should be placed on the camera before mounting the camera on the fixing tray. You will notice the existence of two retaining screws on the base of the camera tray to hold the tray in place once correctly situated in the housing. Make sure to retract all manual shaft controls before inserting the camera. The viewfinder should also be placed in a 10 o'clock position so that it marries up with the external viewfinder. Connect the camera to the internal AV connecting cable if using an external monitor and then check to ensure all controls finally meet their respective controls adequately.

Ready to get wet? Well almost....

OK so you have the camera placed inside the housing, its bolted down, the lens / port of choice is located, the handles are in place, the monitor plugged in and the glass is clean. I strongly suggest a wet test without the camera. You've just played around with a very intricate and well designed underwater housing getting it ready to shoot your opus movie but first do a test to satisfy the work you've done thus far. Take out the camera, wrap a 2lb weight in a towel and place that into a ziplok bag (that way the towel won't absorb any leaks that may occur) and then close that all inside the housing. I wet tested my system for 1 hour in a rinse tank and then, when no leaks were found, went on a 1 hour dive to a max of 60ft. Yes, I did hold up the housing as if I was shooting a Whale shark having triplets above me and as I filmed the mating dance of Mandarin fish, normal,

right? Having a HDV housing in your grasp for the first time brings out the kid in all of us, he he!

Wet Testing and Fine Tuning the Trim:

If you are fortunate enough to have a rinse tank sizeable enough for the unit to dunk pre dive then I would suggest using that. The reason being that once the housing, with your selected port and with the camera loaded and locked you may need to look at fine-tuning its buoyancy.

The Fathoms Imaging SWP44 is a big lens and as such I have to employ the use of a couple of additional buoyancy tubes. Made from reinforced PVC the tubes come in their own bracket that also have the dovetailed adapter plates so that they can slide along the grooves on the upper section of the housing. Again you can customize exactly as to how you want these tubes to sit.



The Gates buoyancy tubes for use with the SWP44 offer an additional lift to the housing underwater. These tubes can be fitted to either sit side by side, as I have set on my unit, or to sit further apart therefore freeing up the centre top groove of the housing for free forward and backward positioning of the monitor. When placed side by side and situated at their furthest forward position they hinder the tilting ability of the monitor so bear that in mind if you want to look at getting your housing into a tight spot where you would need to tilt the monitor to a higher angle for viewing. To fine-tune the buoyancy, if for example you have a list to either port or starboard, you can also use the additional trim weights supplied with the housing. These weights fix to the inside of the housing at points as desired.



By using the “Dual Lock” strips to locate the trim weights, being sure not to block any of the housing to camera controls, offers the user the full freedom to achieve the best trim for their housing underwater. I have opted to not using any of the trim weights with the SWP44 and rely on the buoyancy tubes. I had started with one weight located inside the rear section of the housing but took that out after a few dives as I had noticed a slight tail end bias.



Getting the trim just right from the start will stand you in good stead for the future. The internal trim weights are kept in place by strips of “Dual Lock” a stronger than Velcro material produced by 3M. You can decide where to locate the trim weights depending on the attitude of your system in the water. Just be sure that their placement doesn’t impair the correct functioning of all manual controls.

Working with the Gates FX1/Z1 Housing:

Once the trim had been set, this would take a few more dives to fine tune, I was ready to start daily filming with the unit to put it through its paces. I had attached a lanyard to the right pistol grip which, during surface intervals, also doubles as a security line to keep the protective cover for the SWP44 in place. I also have a second strap that I use for a wrist security line.

Final preparations for regular dives saw me check and double check all O-rings. Note that on Gates housings there are two types of o-rings. The main housing and external monitor back plate o-rings are orange in colour and ***do not require greasing***. They are made from a silicone based substance which petroleum based lubricants can damage over time leading to a wet camera, never a good thing. The other o-rings are found on the ports and

in the shaft glands for the controls. These shaft o-rings should only be serviced by Gates trained technicians. **If they don't leak on the wet tests leave them alone!**

My first dives were a bit of a fumbling affair. I was making the transition from a semi electronic (Sealux) housing to the fully manual operation of the Gates so it takes a while to get used to it. My work flow fluidity is increasing daily but I still have to cock my head to the side every now and again to check or double check the controls. This is especially true when operating the spring loaded controls for WB and Gain seeing as they have very precise locations to find before they can be correctly operated. That said I normally leave the control for WB set exactly at the optimum operational point so that I can set it as and when required. I normally don't dive too deep in Palau so the spring-loaded mechanism to counteract pressure build up is never really tested. Still it is nice to have that insurance. I find that all the controls are easily accessible on both sides of the unit whilst a slight stretch of my left thumb can access the shutter speed selection dial if I choose to adjust that.

Expanded Focus operation is easy. The control for that is on the upper right side of the housing and easily operated with the right thumb. Setting focus with the left fingertips and then a quick flick with the right thumb to disengage manually the expanded focus setting. The blue coloured zoom rocker located just forward of the REC / STANDBY lever on the right side of the housing. Easily operated with the right index finger the spring-loaded operation allows for slow to fast zooming if needed. I never film zooms unless I really have to and then it would be tight to wide at the most.

Housing Summary:

Overall though I think it is the modularity of the housing that sells. It's a "tough as old boots" system that will probably out live its current owner. Built to last and designed just so. I have now got the trim exactly as I want, for the SWP44 anyway, and will endeavour to continue in my learning curve with it. The housing is easy to push through the water but I have noticed a slight decline in my air consumption performance. It is a mass to push and that said requires more fuel for the body to do so, especially in Palau where we have some pretty heavy current during most reef dives. If you are entering similar conditions take a surface marker buoy as you will find, more often than not, you *will* need it.

This is a serious housing. Would it be suited for the vacation shooter who would dust it off twice a year to document their family dive vacation? Personally I would suggest a smaller option from the Gates line of suitable housings for smaller cameras.

For professional everyday use it is a compliment to any serious shooter. It's relatively straightforward to use and is a means to an end. It allows the user full access to the required controls for all applications of underwater shooting. As we all know, its not the housing that delivers great footage, it's the knowledge of the user given the camera in their hands. This system certainly allows you to shoot exactly to your style. Know the camera, know the housing, **and you'll be glad you never took a chance!**

I would also like to mention, seeing as I had this point recently asked of me, about the complete manual control of the housing. I moved from a semi electronic unit to this new system. Yes it can be a bit confusing to begin with but with time in the water my hands have already started to move to the right controls as required. It will take a while longer before I can dance, eyes closed, with this puppy in a rip current on Blue Corner but that day *will* come and when it does I'll be sure to post some footage!

Another important factor for my selection of a completely manual system is the ability to rescue it in the field if something needs fixing. The field serviceability of the unit is pretty straightforward. I for one wouldn't want to be stuck on a rock in the middle of a six-month long filming commission only to have an electronic component crap out on me and have to wait weeks for one to be delivered so I could resume filming. In both cases it's prudent to carry a full set of replacement parts for those potentially prone to failure.

The size of the housing has also been raised. I liken this issue to weapons. Imagine having a pistol in one hand and a rifle in the other. A small shake of the hand holding the pistol will result in a greater error at the target end than that realized by the rifle if it experienced the same shake. Size in the underwater housing world offers stability and control. Period.

Working with the Fathoms Imaging SWP44:

To wrap up this review I would like to just offer some words on the performance of the Fathoms 120 degree external wide-angle lens option. My reason for buying this lens is straightforward. I live in Palau. Palau as a destination has reef walls, cave systems, lakes of Jellyfish, WWII war wrecks and other attractive dive options. The SWP44 is the perfect lens to allow me to document these environments. For the tests to date I have not used any lighting. I am waiting for some HMI lighting options to arrive before I start posting reviews on lighting and other port options. I will be planning to make a complete appraisal on all ports for the system in good time but for the moment am willing to share my initial experiences with the big glass from Fathoms.

The first still below was taken at 15m – white balanced on a white dive slate at full zoom capability (that's 100% full zoom). The subject was 12 inches from the front of the lens.



A Pink Leaf Fish lies in ambush as glass sweepers dance just out of gulping range.

The second still below is set at half zoom range. Again, white balance was set on a slate using ambient light at a depth of 17m / 51ft on a particularly cloudy day.



A Grey Reef Shark cruises the reef as a diver snaps it from a distance.

The last image below was taken at full wide at a depth of 17m on the main plateau of Blue Corner, Palau. White balanced on a regular white dive slate.



One of the trademark sights at Palau's Blue Corner dive site. Schooling horse eyed Jacks get together at the back of the plateau during out going tides.

This glass is huge, in every aspect. In conjunction with the additional lift tubes supplied by Gates to those electing to go with this glass it becomes a major element complimenting both the housing and, more importantly, the camera. HDV is all about

being big in the imaging department, impress clients with nice sharp wide views etc and they will be sold. Mind you it comes at a nice price too!

The lens works effortlessly. It provides amazingly sharp images at all depths. I have not yet ventured to any wrecks with the lens but will do so during bad weather days within the coming months. Thus far since getting the new system I have elected to spend all available time out on the main reefs to get the housing down, to work with it and become familiar with the controls. Another reason for this was also to get enough time in the water to recognize the differences of perceived image in the viewfinder and that which the camera actually records. There is a slight difference but a slight one at that. I guess the most important factor for this lens is the zero vignetting or distortion factor. You pay for 120 degrees and that's what you get, no if's but's or maybe's, exactly how it should be.

To wrap it all up I am happy with the housing, in fact more than happy. The move to HDV has not been without its ups and downs but that's all a part of the roller coaster of a ride we call life. Thanks for reading this review. I hope it helps people in their understanding of the housing a bit better. Please also note that I am English and therefore use Oxford English as my grammatical benchmark. Any discrepancies between my mother tongue and other loosely connected dialects should be taken into account when deciphering my above paper.

Sincerely,
Mark Thorpe
a.k.a CamDiver



“Flying the Gates ‘n Glass on Blue Corner, with just a bit of current”