

## Chapter 11 Video and Strobe

Just about any canister divelight can also be used as a video light, though a different reflector or reflector bulb is usually desirable in order to obtain a suitable, wider flood beam.

In the old days, the Dive Rite Neutralite was available with two individually switched MR16 lighthoods with clunky plastic diffusers which slipped over the lighthoods to give them to give a softer beam, and the new one-piece HID UK Light Cannon comes with a plastic diffuser for the same purpose. Diffusers have the major disadvantage of wasting a lot of light - usable output is usually cut at least in half - and better results will usually be had by using a proper wide beam bulb or reflector. However, diffusers do a great job of smoothing out irregularities in the beam, and especially filament shadows, and are easily and cheaply added to an existing light, making them idea for a dual-purpose or temporary setup.

Commercial video lights often use the MR16 bulbs, but for the home builder it is probably easier to use standard test tube lighthoods. Lowel Light makes a #1 peened wide beam reflector, part #IP-15 that fits in the same housing as the #3 Super Spot. For a bigger reflector many commercial divelights use the 5" (125mm) Lumadyne.

It's actually quite a bit easier and often cheaper to make the 5" version than the 3". The 5" reflector has an extension at the back, so just a simple adaptor collar and lock screw to hold the slug is required. This takes a much smaller piece of stock and less machining than the full housing for

the 3" - I made one when I was in a hurry and didn't have a proper piece of stock by cementing a scrap of 1" PVC plumbing pipe inside a bit of 1 1/4", then turning the outside down to fit. Since the 5" reflector only costs \$5 more than the 3", the extra cost of the reflector is more than offset by the savings in stock. The downside, of course, is that since the 5" reflector is larger than the 3", and not enclosed in a housing, it is much more easily damaged making it less suitable for all-around use.

Two lighthoods are much more useful than one for video work, since they can give more even lighting. This doesn't have to mean two canisters



Commercial housing with homebuilt light arms and battery canister.

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- they can both be easily run off the same canister using either two watertight glands in the lid or a tee fitting on the cable.

Video lights require adjustable arms to hold the lighthoods in the right position in relations to the camera and allow quick adjustment. There are a number of commercial units available for doing this, but the cheapest method for the home-builder is Loc-Line or equivalent (there are several rival brands, which work the same, but may not be interchangeable with each other) coolant line.

This is a hollow ball-and-socket flexible line used on machine tools and available from most industrial suppliers. A 12" length with end fittings costs about \$10 from M-C in the 3/4" size usually used for dive lights, and additional segments can be added or subtracted to adjust the length.

It's good stuff, good enough that several commercial UW video light manufacturers use it. The line is hollow, and with enough ingenuity one could run the cord up inside it but it's a lot easier to just wrap it around the outside.

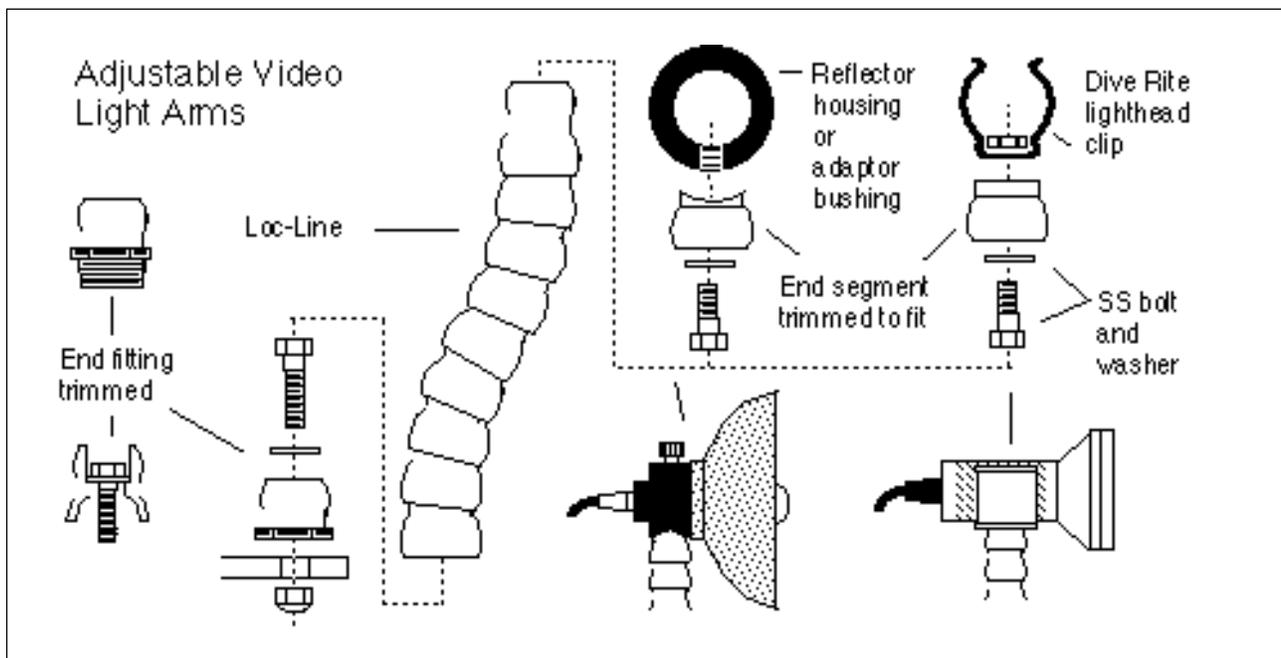
The line comes with NPT fittings on one end. It's possible to thread the light canister, bracket, or video housing handles to fit, but since the fittings have a convenient shoulder inside it's easier

to use a SS bolt and washer inside. The NPT threads can be trimmed off the end fittings if a cleaner appearance is desired. Note that you don't really need the end fittings - the ball and socket line segments can be clamped the same way - but since they come with the line you might as well use them, and they add a nice, finished look.

There are a number of ways to handle the lighthouse end. For broomhandle and MR16 lighthoods the easiest way is to buy the clip fitting that Dive Rite sells for mounting lighthoods on helmets and Goodman handles. It's very basic clip, a longer and more rustproof version of the ones sold in hardware stores to hold brooms. The clip is bolted to the Loc-Line using a washer and bolt inside as on the other end. If your lighthoods are short enough one clip can be cut in two and used for both sides.

For test tube lighthoods it usually works better to bolt the Loc-Line directly to the reflector housing or to an adaptor collar.

A quick and dirty way to make an adaptor to fit almost any lighthouse is to make a curved saddle from a scrap of PVC pipe, bolt it to the Loc-Line with a SS flat-head bolt and fasten the lighthouse to it using tie-wraps or hose clamps.



Usual practice is to mount the light arms on the videocam housing, usually to the top of the handles or the bar the handles are on, and mount the canister beneath the housing. The easiest way to do this is with hose clamps, using a simple adaptor bar made out of delrin, PVC, aluminum or even wood, slotted to accommodate the clamps. If there's no other place to put the light arms a cross bar can be incorporated into the adaptor bar.

Some divers prefer to keep the canister separate, and carry it on the belt or harness as for a regular light. This makes the video housing less bulky and draggy to push through the water, but at the cost of encumbering the diver more.

Though it's beyond the scope of this book, the current incarnation at least, there are obvious similarities between a battery canister and a videocam housing, and a housing can be made using the same methods. The one big difference to be aware of is that when you flood a divelight canister you get a couple batteries wet, and maybe a \$3 switch. Flood a videocam housing and the bill is a little higher.



Another commercial housing with home-built Loc-Line arms and Patco lightheads.



Think HID is the only way to get "Big Light"? A 250 watt halogen video light, by Mike Griffin, using 4 - 7Ah/12v batteries. The PVC tubes are for buoyancy.

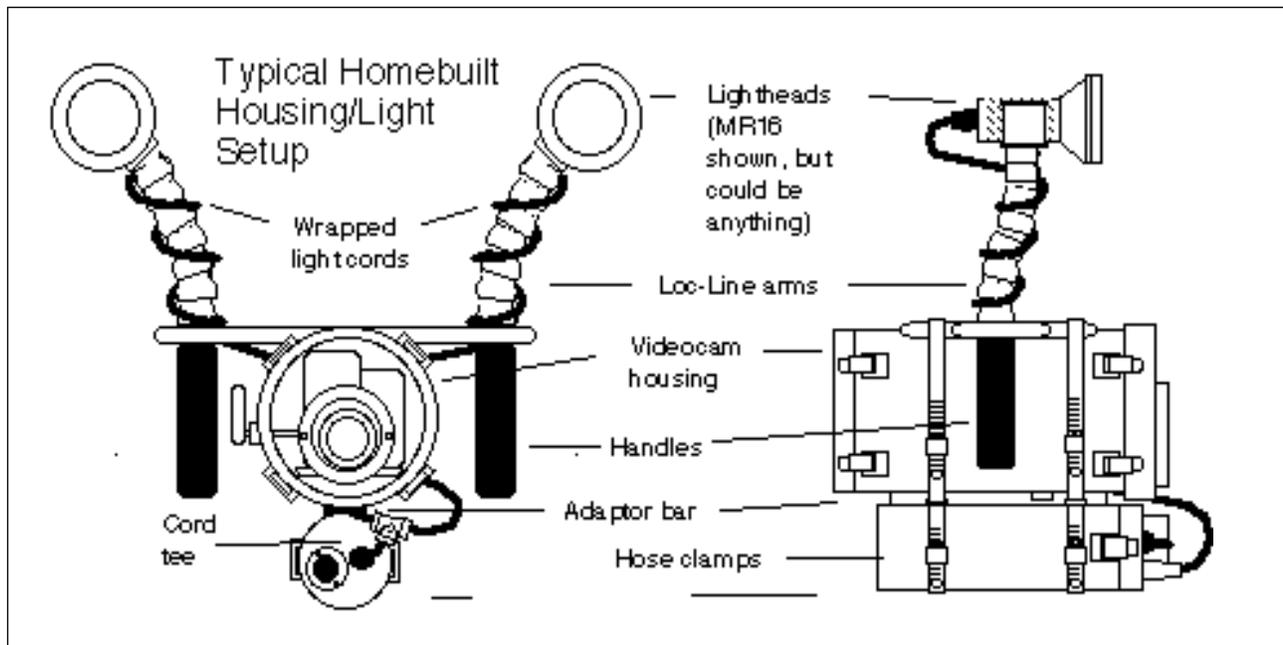
For that reason, it's a good idea to take a few extra precautions. Use four or six latches (depending on how big the tube), and double O-rings (barrel and face) might not be a bad idea.

Video housings often have both ends removable both for access and so that (when the tube is made of something other than acrylic) both ends can be made transparent so any viewfinder screen on the videocam can still be used. While this increases the number of possible leak points it greatly lessens the chance that a bonded end will be knocked off - a latched end, cushioned by the spring loaded latches and the O-ring, is much less vulnerable to impact than a cemented one. If a cemented end is used it should be a tight fitting recessed one, and the bond should be impeccable.

The camera is usually mounted on a slide-in tray. Little blocks made of scrap tube material can be cemented to the inside of the tube to locate it. The tray serves two purposes - it locks the camera in position, but it also keeps it above the bottom of the housing, so there's a sump that will offer a little protection should the housing leak.

There are a lot of different ways to mount the handles. Probably the easiest and best looking is to make a "wing" that goes across the top of the housing, and is held on by hose clamps. Some

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DIY housing plans I've seen use handles - in one case a simple U-shaped piece of bent tubing - screwed onto the housing, but it's a good idea to avoid unnecessarily running fasteners through the housing. Hose clamps may not look as clean, but they have the advantage of spreading the load rather than concentrating it, as well as allowing easy adjustment to get the trim right.

It's possible to improvise controls using the same brass tubing fittings and O-rings as for cord glands but commercial controls that may offer higher reliability are available from a number of sources. Controls should rotate whenever possible rather than push in and out. Usually this is no problem, since when a button must be pushed it's usually easier to arrange a lever to do it, especially as this often allows placing the actuator in a better location.

### Underwater Strobes

It's also possible to make a cheap auxiliary UW flash for a digital or film still camera by putting a slave strobe - one that is triggered by the camera's flash - inside a canister. This can be done either by using a special slave strobe, such as are sold for use with digicams, or a regular flash equipped with a slave switch, which can be bought at most camera

stores for about \$15.

Since old non-automatic strobes are a dime a dozen at flea markets and junk stores, it is possible to make a very powerful, low cost UW strobe this way.

The easiest way to fit the strobe would be to just drop it into the canister, but the way most strobes are laid out this would mean the light would be going through the rounded side of the canister, which may do undesirable things to the beam. If the flash can be located (or its parts rearranged) so its shining through the flat end it will usually work better - or just use a transparent Pelican-style box with flat sides.

There are some problems to be aware of. The beam pattern will be about 25% tighter than it would be above water and the flash will not be automatic which means it may be necessary to compensate at the camera for the additional light. But for fill-in, or lighting very large areas, it should work fine, and a diffuser can be fitted to widen out the beam.

Also, digital cameras sometimes have red-eye or exposure-setting preflash, which can set off the slave prematurely. This can often be turned off, though it can take some doing to figure how.