

Digital TTL

by Jean-Sebastien Morisset

My wife decided it was time to upgrade her underwater photography equipment. She's been using a Sony P&S with a Sony housing and Ikelite DS-50 for over 2 years, so this upgrade is long overdue. After looking over the features of different housings and cameras, she decided flash TTL was one of her requirements. This article explores the different options available, with flash TTL support, for underwater digital cameras in September 2004.

Underwater housing and substrobo (underwater flash) manufacturers have found several ways to offer TTL support:

Flash Sensor

This is the most popular technique. It consists of mounting a flash sensor in front of the camera's own flash, either inside or outside a transparent housing. The flash sensor detects the camera's pre-flash (used for metering purposes), triggers a pre-flash in the substrobes, detects the real flash from the camera, and then triggers the substrobes for the exposure. The power of the substrobo's output is based on the intensity measured by the sensor. The strength of the camera's flash may be limited, which may in turn limit the amount of light the substrobes will project. In clear housings, the camera's flash may also 'leak' into the surrounding water and create backscatter, ghosting and/or lens flares (especially with wide angle lenses). Since the camera has to use its internal flash for every



picture, you'll have to wait for it to re-charge every time. This will also drain your camera's battery much faster. Typically, substrobes are also much faster to re-charge, so you may be waiting on your internal flash while your substrobo is ready for the next picture. If your flash sensor is exposed to light from the surrounding water, your substrobo will probably fire when other photographers are around you. Near the surface, reflections may also trigger your substrobo.



Hot-Shoe

This second method is connecting a wire to the camera's hot-shoe. If the hot-shoe is "intelligent" (most dSLRs and some prosumer cameras), it will communicate to the substrobo the amount of flash required. The alternative is to set the power level on the flash / substrobo manually, and use the camera in manual mode. The protocols used to communicate between the hot-shoe and flash are often proprietary to each camera manufacturer. If housing and/or substrobo manufacturers want to support these protocols, they must decode the protocol and add an special electronics to their housing.



clear how - some electronics in the housing may be involved, or it may be completely camera based.

Most digital dSLR and prosumer cameras use a pre-flash to meter and determine the amount of flash required. Because light behaves differently underwater, pre-flash systems are less precise than film-based methods that measure light reflected from the film media. Currently, only the Fuji S2 Pro dSLR uses a more sophisticated system from Nikon called 3D Multi-sensor Balanced Fill Flash System. It fires a series of mini flash pulses instead of a single pre-flash. This should make metering a little more precise.

After considering all the usual quality issues (lens sharpness, chromatic aberration, image noise, auto-focus speed, etc.) and feature set, we were left with three cameras to choose from: the Olympus C-8080 Wide Zoom, Canon 300D, and Fuji S2 Pro.

All three offer flash TTL with a hot-shoe connection in an Ikelite housing. Choosing between the Canon 300D and Fuji S2 Pro also means choosing between Canon and Nikon lens mounts -- we plan on using Canon lenses in the future, so we decided against the Fuji S2 Pro. So that left the Olympus C-8080 WZ (plus: wide-angle converter, housing and dome port), and the Canon 300D (plus: wide-angle lens, macro lens, housing, flat port, and two dome ports). The Canon 300D is by far the more expensive of the two when you add the lenses and ports.

The only problem we could find with the Olympus camera was at the wide-angle end: 28mm + a 0.8x wide-angle converter gives just 22.4mm. The Canon 300D can go down to 16mm using the



new EF-S 10-22mm lens. We decided to visit a local dealer and try out the two cameras side-by-side, to see if one would be the clear winner. Personally, I liked the Canon 300D, but Melanie was un-decided until the sales person showed us the soon-to-be-released Canon 20D. Ikelite doesn't have a housing for it yet, and the flash TTL protocol hasn't been decoded, but we figure Ikelite will address these issues shortly. :-) So, in the end, we've chosen the Canon 20D to upgrade Melanie and my digital camera (yes, this will be an expensive upgrade). We'll be sharing lenses and will probably opt for the Canon EF-S 10-22 f3.5-4.5 USM, Canon EF 28-105mm f3.5-4.5 II USM and Canon EF 100mm f2.8 Macro USM lenses for underwater use.

Housed Flashes

Another alternative to support flash TTL underwater is to house the original manufacturer's flashes. The down-side to this for the photographer is maintaining one or two additional housings (batteries and o-rings). Typical flashes are also less powerful than some substrobes.

Before you start shopping for a camera, you should determine the TTL system you prefer (if flash TTL is a requirement for you), and find all the housings that support it. We chose the Hot-Shoe method for 2 reasons: It's reliable (unlike the sensor method), and we already have some underwater substrobes (so housed flashes would be an additional expense). At the moment, I'm only aware of Ikelite housings that offers TTL with a hot-shoe connection. They've decoded the TTL flash protocols for Olympus and the Canon 300D. The Fuji S2 Pro flash TTL is also supported, but it's not

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