Optoelectronic TTL-Converter for NIKON
for SUBAL underwater photo housings

# (with Retra HSS functionality support)

Specifications

- Compatible photo cameras: Nikon
- Compatible underwater housings : Subal
- Compatible TTL strobes: Inon Z-240, Z-330,
  Sea&Sea YS-250, YS-D1,
  Sea&Sea YS-D2 strobe version "made in China"
  Ikelite DS-161, DS-160
  Retra Pro (including HSS functionality)
  Subtronic Pro 270, Pro 160
- TTL outputs onboard: 2 optical, 2 electric
- ISO camera range: 50….25600
- HSS (High Shutter Speed sync) support — manual type HSS with Retra Pro strobe - up to 1/8000 s
- Continuous shooting mode (CL / CH) support: yes
- "Rear/Front Curtain" modes support: yes
- Switching "TTL / M" underwater: yes
- (+/-) "Flash Exposure compensation" control underwater: yes
- Switching power "ON/OFF": automatic by camera command
- Battery type: CR2032 (2pcs.)
- Current consumption (in standby mode) 0.01 mkA
- Battery capacity (+20°C): 65 000 flashes, 1 year in standby mode
- Recommended Fiber-optic cable type: 613-fiber type (HowShot 613L, Nauticam #26216 / #26217, Sea&Sea etc.)
- Available Electric Bulkhead type (optional accessory): Nikonos, S-6, Ikelite
- Dual Electric cables support: yes
- Indication: 3-color status LED: "TTL flash", "Manual flash", "HSS flash"

Safety Warning for Batteries usage

- Use batteries only CR2032 type.
- Batteries must be new and undamaged. Carefully check batteries before usage.
- To avoid leakage or explosion, always check appropriate battery terminals position ("plus" / "minus") before installing to the TTL-Converter.
- Never expose batteries to overheating, short-circuiting, disassembling, high pressure, mechanical deformation. Save batteries from high humidity and water. All these circumstances may cause a chemical leakage, electric shock, explosion or fire, which can be dangerous for health.
- Always remove batteries from TTL-Converter after use, before storage.
- Utilize used batteries according appropriate rules.
- Keep out batteries of children. Save batteries in inaccessible for children place

TTL board pinout
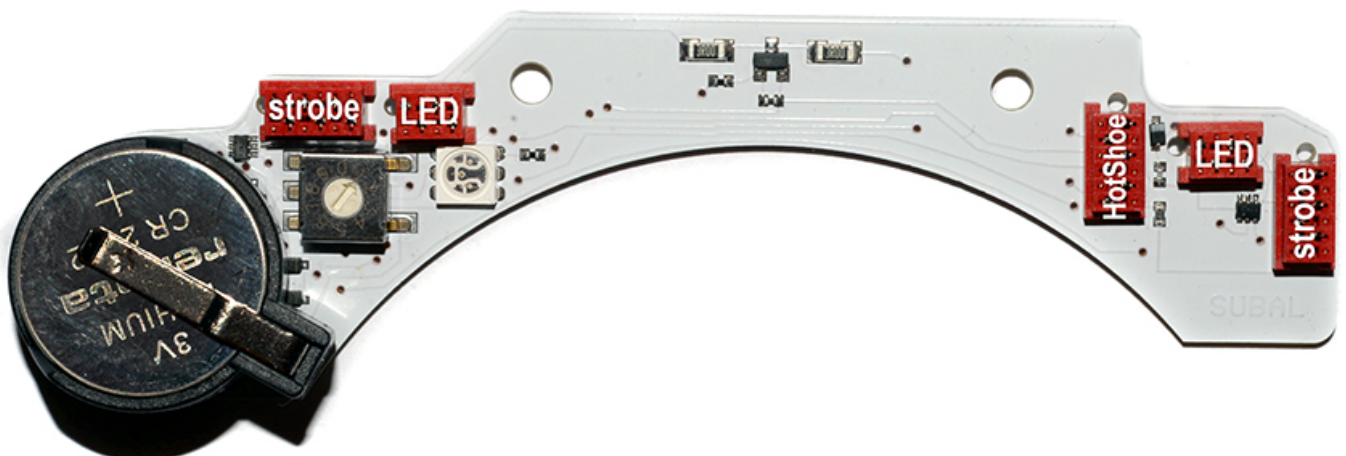
Electric Bulkheads (optional accessories)

TTL-Converter board supports connection 2 pcs Electric Bulkheads of the following type:
- NIKONOS style Bulkhead (M14 screw, Subal pinout) with flat cable and 6-pin MicroMatch connector.

➢ IKELITE style Bulkhead (M14 screw, Subal pinout) with flat cable and 6-pin MicroMatch connector.
➢ S-6 style Bulkhead (M14 screw, Subal pinout) with flat cable and 6-pin MicroMatch connector
Bulkheads are optional products and must be purchased separately.

External cable connections to underwater strobes

▪ TTL-Converter maintains synchronization for underwater strobes by Fiber Optical cable connection and by Electric cable connection as well.

Fiber optical cables:
▪ Maximum 2 Fiber Optic cables can be used (via housing optical bulkheads). Posible to connect 2 underwater strobes.

Electric cables:
▪ Maximum 2 Electric cables can be connected (via housing electric bulkheads).
▪ Dual electric cables ("Sea&Sea") are supported by TTL system at each electric output as well. Using 2 dual cables, possible to control 4 underwater strobes simultaneously.

Shooting in TTL MODE

▪ Set and check camera settings before underwater shooting:
- Set appropriate camera's Exposure Meter Type ("Matrix", "Central-weighted, "Point") according your shooting tasks. Right type of exposure metering is the key setting for accurate TTL work. In case of wrong setting, the shot may be overlighted, or underlighted.
- For TTL operation user can set desired sync speed by camera menu, excluding sync speeds marked as "Auto FP". According the construction underwater strobes cannot work in FP synchronization, that is why "Auto FP" camera command is free for them, and it is assigned in TTL Converter firmware for switching system to Manual mode. Photographer can use it to switch TTL / M underwater.
- Set "exposure compensation" and "flash exposure compensation" to "0ev", as initial settings.
- Set appropriate ISO. TTL-Converter can work in ISO range 50….25600. Recommended to use ISO 200….400 for best resolution and TTL accuracy for most of strobes, ISO 400-640 is recommended for "Retra Pro" strobe. For Macro shooting recommended ISO 100-200.
  Be careful choosing extremely high ISO or "Auto-ISO" mode, it may cause overlighting by underwater strobes. Fixed ISO of medium value is recommended for most of cases.
- Set camera aperture and shutter speed according real underwater conditions and shooting task.
- Set recommended apertures F8-F16 for wide angle photo, and F16-F22 for Macro photo, as initial settings.
- Use other settings recommended by your camera User's Manual.

▪ Set underwater strobe dial switch to desired TTL mode. Please refer to strobe User's Manual to choose appropriate mode. Usually it marked "S-TTL" ("DS-TTL II", "TTL") on the strobe's body.
▪ Set (+/-Ev) dial switch on the strobe body to "0 Ev" position, as initial setting for Optical TTL usage. It may be adjusted later.
▪ For Z-240 Electric cable TTL usage set (+/-Ev) dial switch to position "TTL" (another words "9 o'clock" position). For Z-240 Fiber Optical cable TTL usage set (+/-Ev) dial switch to position "0 Ev" (another words "12 o'clock" position). Magnet must be in "Push" (down) position for both cases.
▪ Set TTL-Converter rotary switch according your strobe type:

  o **0** – **Manual Mode** (TTL protocol is disabled)
  o **1** – **Inon Z-240**
  o **2** – **Sea&Sea YS-D1**
  o **3** – **Sea&Sea YS-D2** (YS-D2 version «Made in China» only)
  o **4** – **Sea&Sea YS-250**
  o **5** – **Ikelite DS-161, DS-160**
  o **6 – Inon Z-330**
  o **7 – Retra Pro** (including HSS functionality)
  o **8 – Subtronic Pro-160**
  o **9 – Subtronic Pro-270**

▪ Slide Hot Shoe connector into the camera Hot Shoe socket.
▪ Camera recognizes Nikon compatible TTL device on it's HotShoe and confirms it by appropriate symbol "Flash" on the service screen.
▪ Dive and make TTL underwater photo, checking image quality and histogram via camera LCD.
▪ Dependently of concrete underwater subject type, strobes condition, ambient light underwater and etc, photographer should use +/- TTL correction ("Flash Exposure Compensation") to reach balanced TTL lighting.
▪ Photographer can adjust +/-TTL correction by 2 ways:
- Use optical +/- TTL correction (+/-Ev) dial switch on the underwater strobe body (available for Fiber-optical connection only).
- Use camera's "flash exposure compensation" function for +/- TTL correction (available for both Fiber-optical TTL and Electric Wire TTL connections). Available range for Nikon cameras "Flash exposure compensation": -3ev…0...+1ev. User can adjust it by steps 0.3ev or 0.5ev (set by camera menu), viewing +/-Ev value on the camera screen.
▪ TTL-Converter maintains normal accuracy TTL lighting control only for underwater conditions. Land tests may give little bit different results.
▪ Continuose shooting in CL/CH camera modes are available for all modes of TTL Converter. But udnerwater strobe usually recycles a significant time (2-3 seconds), so the shots in series may have different lighting. For accurate TTL work it is strongly recommended to make 2-3 seconds interval between shots. To reach acceptable lighting for shots in fast series, user should use Manual mode and set minimum strobe intensities for CL/CH shooting.

- TTL-Converter activates automatically (switch ON) when user pushes camera's Shutter Release Button for focusing or shooting. Device goes to standby mode (switch OFF) also automatically few seconds later, also after camera switch OFF, and also after disconnection of camera's HotShoe.
- **IMPORTANT**! For normal TTL accuracy don't set your strobe closer than 0.35m to object underwater (for land tests - not closer than 0.7m) **to keep the system inside of working TTL range**.
- In some shooting conditions TTL may be not effective or **out of working range.** This case please use Manual modes.

Shooting in MANUAL MODES

Camera menu Controlled Manual Mode (switching M mode by camera menu assigned command – "Auto FP")

- Switching TTL-Converter to camera menu Controlled Manual Mode during the diving (underwater) is a useful feature. It also gives possibility to adjust flash intensity manually by camera controls. User can keep hands on the housing during the operation.
- Underwater strobes must be in "S-TTL" ("DS-TTL", "TTL") mode. Strobe's dial (+/-Ev) corrector must be at "0" position.
- Nikon menu does not have any original command for switching to M mode, that is why "Auto FP" command is assigned for this aim in TTL-Converter firmware. Please switch TTL-Converter to "Controlled Manual Mode", using camera menu:
  Bracketing/flash >> Flash sync speed >> 1/200 Auto FP (or 1/250 Auto FP)
  All sync speeds in menu, marked **"Auto FP",** point TTL-Converter to "Controlled Manual Mode" without pre-flashes. Then, underwater strobe light power can be adjusted by camera controls, using camera "flash exposure compensation" scale and wheel.
- Available adjustment range for underwater strobe: from Minimum strobe's power (displays as "-3ev" on camera screen) to Maximum strobe's power (displays as "+1ev" on camera screen). Possible to set step 0.3ev or 0.5ev, by menu.
- TTL-Converter does not make pre-flashes in this mode.
- Pay attention, that "Auto FP" function also makes available high shutter speeds of the camera. To avoid mistakes for lighting using underwater strobes, set shutter speeds not faster than normal *speed of synchronization* for your camera. Most modern Nikon cameras with mechanical shutter have maximum sync speed 1/200 or 1/250 (without Auto FP). Some old Nikon cameras have electronic shutter and maximum synchronization speed up to 1/500 without Auto FP.
- Only "Retra Pro" strobe supports FP (high shutter speeds) up to 1/8000 s. For it's FP support please set manually the rotary switches on the "Retra Pro" strobe body. Please look the details of Retra Pro usage in User Manual appropriate partition.

Hardwire Manual Mode of TTL-Converter   (switching M mode by TTL-Converter rotary switch)

- **Switch system to Manual mode by setting TTL-Converter onboard rotary switch to "0" position.**
- This operation can be done only before submerging, when the housing is open. This is forced Manual mode, determined only by the device hardwire this case.
- Camera TTL protocol is totally disabled. Simbol "Flash" disappeares from camera service screen.
- TTL-Converter outputs single flash pulse (long duration) at each shutter release.
- In this Manual mode all Pre-flashes in system are disabled.
- On the strobe body user should set "Manual mode without Pre-flashes" by the dial switch, and adjust strobe light intensity by the other dial switch on the strobe body.

Underwater strobe Manual Mode (switching M mode by underwater strobe rotary switch "Mode")

- **Set underwater strobe dial switch to M (or FULL) mode without pre-flashes. Adjust strobe light intensity by the dial switch on the strobe body.**
- Shooting in this mode, it is strongly recommended to set TTL-Converter also to M mode (by camera menu "Auto FP" command), to exclude Pre-flashes in system (for energy saving).

HSS (High Speed Synchronization) with "Retra Pro" strobe

- New generation "Retra Pro" strobe supports High Speed Synchronization ("HSS" in Canon terminology, "FP" in Nikon terminology).

- HSS (FP) speeds for Nikon are available in range 1/320 ….1/8000 s, dependently of camera model.

- Pay attention, that "Retra Pro" High Speed sync supports only Manual type flash, but not TTL. In this strobe mode Retra flash intensity can be adjusted by the strobe knob only.

- For shooting with a flash at HSS speeds, use the following settings:
  - Only once: Assign "HSS (FP)" function to U1 or U2 switch position on the strobe body, using "Retra-UWT" application via I-Phone or I-Pad bluetooth connection.
  - Set Retra Pro strobe switch to U1 or U2 position (according the assigned position)
  - Set Manual flash mode for the system by camera menu (using "Auto FP" command).
  - Use camera at any shutter high speeds (1/320 …1/8000). Test shooting with HSS flash. Adjust necessary flash intensity by the strobe knob.
  - Pay attention that 1/200 and 1/250 camera speeds don't require HSS type flash. Independently of menu "Auto FP" setting, camera uses just a normal sync flash for them. If set Retra Pro at HSS knob position, but camera at 1/200 or 1/250 Auto FP position, than a small black strip (1-st curtain) can be visible at the image. So, for 1/200 and 1/250 please use normal sync speed modes of the strobe, to get properly lighted images.

Shutter High Speeds availability for shooting with ambient light

- Classic underwater strobes produce a mono-flash, they cannot work in FP (HSS) range speeds (excluding Retra Pro), camera automatically limits sync speed 1/250 for them, usually until HotShoe plug is connected. But our new TTL-Converter firmware allows shutter high speeds usage for shooting underwater with ambient sunlight as well (without flash) even if HotShoe plug is connected. User does not need to reopen the housing to disconnect the HotShoe plug.

- Shutter high speeds for shooting are available in Manual mode of the system (use "Auto FP" command) in range 1/320 ….1/8000 (and faster, dependently of camera model). All models uw strobes (excluding Retra Pro) in this case don't produce a flash, automatically OFF via TTL-converter control. Only Retra Pro strobe in this mode can produce a flash (HSS flash).

Continuous (Serial) Shooting using underwater strobes

- TTL-Converter supports Continuous shooting in all modes, including TTL and M modes. But the main role in this case plays underwater strobes specific (read below).

- Compact size underwater strobes like Z-240, Z-330, YS-D1, YS-D2 etc. have rather weak charger inside, which can not charge the strobe quick enough between series of TTL doubled flashes (pre-flash + main flash). Each next shot the energy is not enough to keep accurate pre-flash duration. That is why, compact size underwater strobes are not recommended for Continuous (Serial) Shooting in TTL mode. The 1st shot will have normal lighting, next shots will have different lighting or none at all. The effect depends on specific strobe's capabilities.

- Large size underwater strobes, like YS-250, DS-161, DS-160 etc. have more powerful charger inside and large main capacitor. Those strobes work some better in Continuous (Serial) Shooting TTL mode. The user can make more shots with acceptable lighting. However the best lighting accuracy will be on only the first 1-3 shots in series, the others may have different lighting. The effect depends on specific strobe's capabilities.

- For Continuous (Serial) Shooting with underwater strobes, it is strongly recommended to use **Manual mode** and set **small flash intensities** manually. This way it is possible to get serial shots with acceptable lighting accuracy due to reduced recycle times.

Battery energy saving

- Set acceptable "Standby Timer" in camera menu, this is important for TTL-Converter battery saving. When camera is in Standby mode, the TTL-Converter is switched OFF automatically. **Recommended time – 4…10 seconds.** This is a normal time to look an image underwater and save energy the same time.

Continuous (Serial) Shooting using underwater strobes

- Small size underwater strobes like Z-240, Z-330, YS-D1, YS-D2 etc. have rather weak charger and capacitor inside, which cannot charge strobe enough between quick TTL double flashes (pre-flash + main flash, - for each shot). Each next shot the energy is not enough to keep accurate pre-flash duration. That is why, small size underwater strobes are not recommended for Continuous (Serial) Shooting mode in TTL. Normal lighting will have only 1-st shot in series, next shots will have different lighting.

- Large size underwater strobes, like YS-250, DS-161, DS-160 etc., have more powerful charger and large main capacitor inside. Those strobes work some better in Continuos (Serial) Shooting mode in TTL. User can make some more shots with acceptable lighting. But anyway, the best lighting accuracy will have only 1-st shot in series, the others may have different lighting.

- In common case, all underwater strobes support accurate TTL lighting only in Single Shot mode. Underwater strobe must be fully charged before each flash. Usually, charging time for modern underwater strobes takes 2…3 seconds.

- In common case, for Continuos (Serial) Shooting with underwater strobes, it is strongly recommended to use Manual mode (without Pre-flashes) and set minimum strobe intensities. This way possible to get more quantity of shots in series with acceptable lighting accuracy.

Shooting with flash off

- Photographer can assign "Fn" camera button (by menu) to option "flash off".
  Then, pushing "Fn" button, user can shoot with flash off.

Indication

- Onboard 3-color status LED purposed for system functionality check only, it shows system information after each flash:
  - **GREEN** – "TTL Mode"
  - **BLUE** – "Manual Mode"
  - **RED** – "HSS" (High Speed Sync) flash occured

Storage

- After shooting please switch Off the camera.
- Slide Off TTL-Converter's connector from the camera's Hot Shoe socket. This way you defend the TTL-Converter from any accidents. Also, you save TTL-Converter's battery, because its current consumption is minimum then.
- For a long time storage remove batteries from TTL-Converter.

Warranty

- Product warranted against any manufacturing defects for 2 year from the date of purchase for consumer use.
- Manufacturer accepts no liability for any damage to and defects in the housing caused by improper use and/or poor maintenance.
- Manufacturer does not hold responsibility for damage of any nature, to any equipment used with the product.
- Manufacturer accepts no liability for any loss of captured images or the inability to capture images even if it is due to the malfunctioning of the product.
- This warranty only applies to products purchased from authorized dealers and does not extend beyond the original retail purchaser.
- Unauthorized modifications and/or repairs of the product will automatically invalidate this warranty.
- To return products for service, please contact authorized dealer in your region.