

STEALTH TRAP—MODEL 2014

Instructions

Description

The U.S. Department of Defense (DoD) has recently developed an interest in developing a mosquito and sandfly trap that does not draw so much attention to itself, *viz.*, a trap without the visible light serving as an attractor AND a trap not requiring carbon dioxide but still capturing all species of hematophagous insects. Our new trap, the **Stealth Trap (Model 2014)**, was designed around this and a number of other DoD-specific requirements. Many if not all of these features are of interest to departments or ministries of public health, mosquito abatement districts, PAHO and WHO surveillance and control projects. Because the Stealth Trap uses ultraviolet light from LEDs as the attraction, it is able to be used in Zika Virus and dengue control and surveillance projects (Vectors: *Aedes aegypti* and *Aedes albopictus*), Encephalitis surveillance and control programs (*Culex* and other genera), malaria surveillance and control programs (*Anopheles* species), and leishmania surveillance and control programs (Old and New World sand flies).

The essential elements of this new trap are as follows:

- Trap has an incandescent light and 8 ultraviolet (UVA) LEDs; individually, they can be switched on or off.
- The trap operates on any voltage between 4 and 24 VDC.
- Power consumption while running only the UVA LEDs and fan is about half that of a CDC light trap.
- There is a built-in photo switch—lights and fan on at dusk, lights off at dawn.
- Can be operated with collection cup or killing jar.
- Designed to reduce pilfering because it is difficult to see during the day or night.
- The trap can be used with modern, lightweight, and very compact Li-ion batteries (see PNs: 1.40 and 2.10). Another battery source is our waterproof Pelican[®] alkaline battery case (PN: 1.50).
- The trap can use everyday, locally-sourced 6- or 12-volt motorcycle, auto, or truck lead-acid batteries from any country in the world.



Figure 1. The new Stealth Trap, Model 2014. Included items are the trap, collection cup and sock, and the battery connector and adapter for all types of batteries.

Electrical Requirements and Connections

Input voltage.

Between 4 and 24 volts, any battery chemistry.

Battery connections.

The trap is supplied with a power supply cord terminated in a 12-volt size, 5.5 x 2 mm barrel connector, center positive; this can plug in directly to our protected and waterproof Lithium-ion battery pack (PN: 1.40). It is also supplied with an adapter ending in red and black insulated alligator clips. So the trap as shipped is also ready to use with our sealed gel-electrolyte batteries (both 6 and 12-volt sizes), our Pelican® waterproof D-cell alkaline battery pack (PN: 1.50); of course it can be used with 6- or 12-volt motorcycle, auto, and truck batteries.

Operation

Setting the Battery Voltage Cutoff switch.

If you are using gel-cell lead-acid batteries, set the voltage cutoff switch LEFT for 12-volt batteries and RIGHT for 6-volt batteries (Figs. 2 and 3). If you are using non-rechargeable batteries, e.g., alkaline D-cells, put the switch in the CENTER position. This is also the position for the Li-ion protected battery case, PN: 1.40.

Setting the LED and incandescent switches.

Use these two switches to allow at dusk for the LEDs and/or the incandescent bulbs to come on (Figs. 2 and 3); left is on and right is off.

Trapping Days per Set of Various Types and Sizes of Batteries

Chemistry	Size	Weight		Motor + LEDs Trap hrs	Trap days	Remarks
		Ounces	Grams			
Li-metal	4 ea. AA-cells	2	60	9	1	Non-rechargeable
Alkaline	4 ea. AA-cells	3	96	6	<1	Non-rechargeable
Lithium-ion	4 ea. 18650	11	300	32	3	Rechargeable
Alkaline	4 ea. D-cells	25	711	24	2	Non-rechargeable
Lead-acid	6 V 12 AmHr	69	1,950	36	4	Rechargeable
Lead-acid	12 V 12 AmHr	127	3,590	93	10	Rechargeable



Figure 2. The Stealth Trap Model 2014 showing battery voltage cutoff switch and LED on/off switch. On the opposite side from the LED switch is the incandescent light off/on switch. Also shown is the trap's battery connection (5.5 x 2 mm barrel connector for the Li-ion battery box); also shown is the adapter cable that allows attachment of the trap to virtually another type of battery. To the right of the trap is the Li-ion battery box (PN 1.40).

Operation, cont'd.

Note runtime vs. battery weight.

The Li-ion battery case and four rechargeable Li-ion 18650 batteries (PNs 1.40 & 2.10) weigh only 11 ounces (300 g) and provides energy for 3 trapping days; compare this with 6 V 12 AmHr lead-acid batteries weighing 6.5-times as much and providing only 1 additional trapping days.

Constant voltage power supply means you can get all of the energy out alkaline D-cells with 100% light output.

Four alkaline D-cells in series will give you 24 or 25 hours of runtime. In other words, you can get two trap nights from a set of batteries. The circuit in the new Stealth Trap will run at 100% light levels and motor speed until each of the D-cells drains from 1.5 VDC to 0.9 volts. Virtually all of the energy in the D-cell is consumed by the trap when the circuit stops at 0.9 volts * 4 D-cells = 3.6 volts. Before using conventional CDC light traps you had to either live with the reddish light and slow motor/fan to get all of the energy out of the battery OR throw out the batteries with maybe 1/3 of the Amp hours still in the battery. Also, as the circuit either bucks or busts the voltage giving you constant motor and LED output.

Photo Switch.

The circuitry of the trap includes a photo switch which turns light(s) and fan motor on at dusk; in the morning the photo switch shuts off the light(s) leaving only the fan running to keep the specimens in the collection cup. It is possible to have both lights and fan run independently of light levels. Putting a piece of black electrical tape on the photo-transistor will result in fan and light(s) always on (if the light switches are *on*).

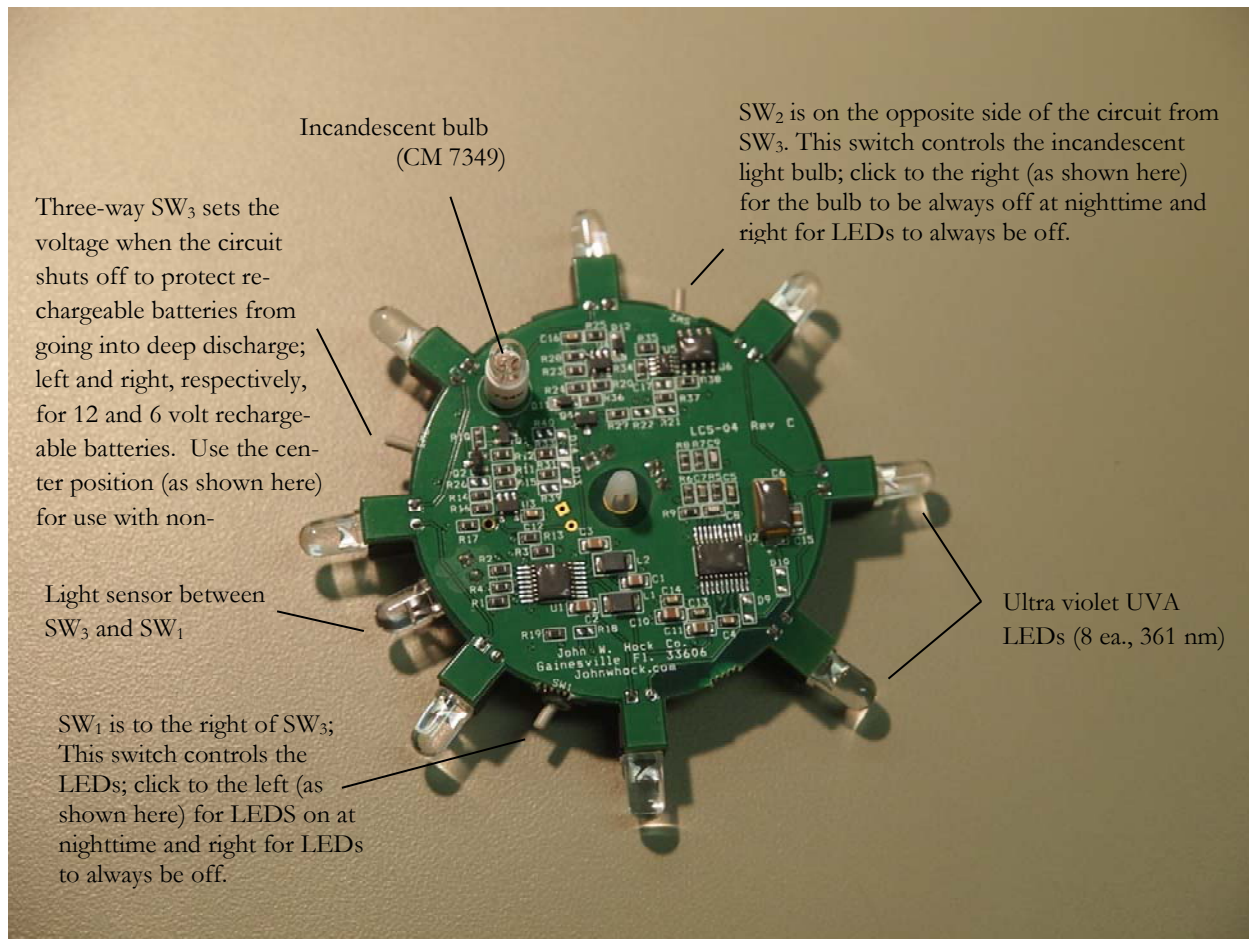


Figure 3. Top view of electronics of the Stealth Trap.