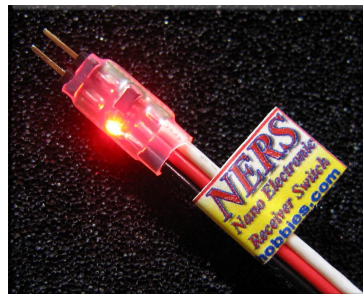


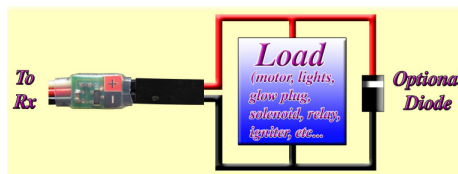
Thanks for purchasing this Hansen Hobbies Nano Electronic Receiver Switch (NERS)! The NERS is designed to allow ON/OFF control of onboard devices like lights, glow plug drivers, motors, smoke systems, rocket igniters, solenoids, relays, and whatever else you can think up. The NERS is not proportional, which means it is either fully-ON or fully-OFF. The NERS performs the operation equivalent to a servo moving a mechanical switch back and forth, but in a much smaller package, and with no moving parts.

Using the NERS, you can safely power any load using power from your receiver battery (3-5 Ni cells) at up to 1.2A (up to 2A for short periods <5s). Switching more current than recommended could overheat and damage the NERS.



Operation: All modern RC systems send 1-2ms pulses at 50Hz to the servos to send positional data. The NERS switches from OFF to ON at 1.5ms (mid-stick), so that it is always OFF above 1.5ms, and always ON below 1.5ms. The NERS can be used on any receiver channel, but is best placed on the gear channel or any other auxiliary channel that allows you to flip a 2-position switch on your transmitter to control the NERS. Adjust the end-points of this channel to their full minimum and maximum positions.

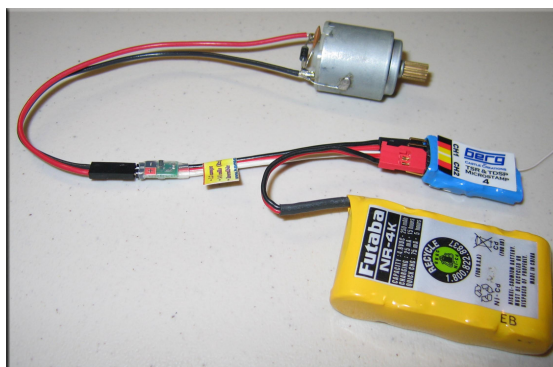
Hook up (see diagram to right): The NERS has two output pins spaced at .1" - the same kind of pins used for servo connectors. Two sets of plastic housings and gold terminals are included to make connectors for your devices. There are instructions for crimping these terminals in the connectors section of our web site (you can purchase additional connectors there too). You can also use preassembled servo leads and just ignore the signal wire, or if you prefer, remove the 2-pin header and solder wires directly to the NERS. The pins are labeled positive and negative so if your device requires special orientation double check this. An example setup is shown below where the NERS is connected to a receiver powered by a 4.8V battery and turns a motor on and off. Notice the diode on the motor.



Safety Features: The small red LED on the NERS lights up when the NERS turns the output ON. The NERS has several safety features and will automatically turn the output OFF if any of the following occur:

- NERS stops receiving a good signal from the receiver (occurs if there is any radio interference or if you turn off your transmitter).
- NERS receives bad pulses from the receiver (anything shorter than .8ms or longer than 2.2ms).

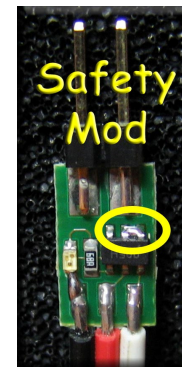
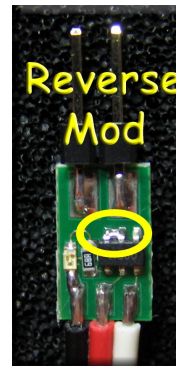
Also note that the NERS will not turn the output on unless it first sees an OFF condition from the receiver. This will prevent your device from turning on in case you accidentally turn on your radio with the switch in the ON position. If your application requires more security (like an igniter for a booster rocket), then it is suggested that you power on your receiver and check the NERS for correct operation before flight by observing its LED, and then plug your device into the NERS right before takeoff. If the NERS isn't easily accessible then you can achieve the same effect by putting a mechanical switch in series with your load.



Modifications: There are two built-in modifications that can be made to the **NERS** which require soldering. If you're unsure of your ability to safely perform the modification please enlist the help of someone more experienced with this kind of work.

1) The ON/OFF operation described above can be reversed (so that it is **ON** above **1.5ms** and **OFF** below **1.5ms**) by bridging two pins as shown in the image on the left.

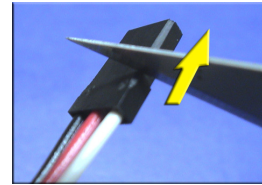
2) The safety features described above can be removed by bridging the two pins shown in the image on the right. In this case if the signal was lost the **NERS** would hold it's last setting until it received another good signal.



Notes:

- If your device is a motor, relay, solenoid, electromagnet, etc... a diode (included) should be connected across its terminals as shown in the connection diagram (pay special attention to its orientation). This will give protection from the reverse high-voltage spikes associated with inductive devices. For motors, you should also place **.01uF** capacitors between each of its leads and the motor casing (many motors come with these caps installed).
- Make sure that your receiver battery can safely supply enough current for the device you're switching. Don't forget that the battery also needs to power your receiver and servos.
- When connecting your device, size your wire appropriately for the current draw.
- If your receiver has a failsafe option you will want to take advantage of this with the **NERS**.
- The maximum allowable current through the **NERS** gets smaller as the receiver battery voltage gets lower. The **NERS** was tested to safely handle **1.2A** with a **4 cell (~5V) NiCad** pack. At **4.0V**, **0.75A** is safe, at **3.2V** current should be kept under **0.35A**. A good test is to feel the temperature of the **NERS** - a little warm after extended use is ok, hot is not ok. The **NERS** has been tested to operate with a **3.0-7.0V** supply.

Modifying Connector Housings: This product contains a standard receiver connector with a rectangular end (no keys or bevels to denote orientation). Some receivers only accept "universal" type connectors with beveled edges. The included connector housing can be easily modified to fit these receivers. Simply take a sharp hobby knife and hold the blade perpendicular to one edge of the housing. Then scrape outwards, taking off layer by layer until the bevel is deep enough to fit your receiver. Do this to both of the bottom edges on the housing.



Have fun, and fly safe!

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