

**Building
and
Using:**

The Keyer Accessory kit
from Jackson Harbor Press
regulator and SSR (solid state relay)

Introduction: The kit is intended to provide both a low power, regulated 5 volt or 3 volt supply AND a tube transmitter keying relay for any keyer which doesn't have these features built in.

The kit has been updated with a silk screened, solder masked board (gold plated) along with a series red LED to indicate current consumption.

General notes on building the Keyer accessory kit: The Solid State Relay (S1) is an MOS device as are the Seiko voltage regulators. This means that they should be handled as little as possible to prevent static damage. The builder should use a grounding strap and anti-static mat if available or at the very least, work on a grounded metal surface and be sure to touch ground prior to touching these devices. One decision the builder should make before starting construction of the Keyer Accessory kit is how the project will be mounted in the keyer case. The single mounting hole is sized at 1/8 inch for 4-40 (or M3) sized hardware. The pads and traces are small and delicate - a small tipped, low power (25 watts or less) soldering iron should be used.

Building the Keyer accessory kit: Step 1) Get the parts together: All of the board mounted components have been supplied but you will still have to provide off-board items to fully implement the kit. These items include:

Input power connector (a 9V battery "snap")

Output keying connector

mounting hardware, 4-40 (or M3) sized

Step 2) Identify and orient the components: Most of the components should be fairly easy to identify and place - see the parts list and the board top view picture for descriptions. C3, the tantalum cap is marked for polarity - be sure to orient the side with the red (positive +) stripe (this side bulges out slightly) to match the + sign on the circuit board.

Step 3) Place and solder the components on the main circuit board: Use the top view board photo for information on the placement and orientation of the parts as well as the schematic and silk screen legend. Clip the leads of the through hole parts after soldering.

- a) the 6 pin socket for S1, orient the notch side towards the WB9KZY marking on the board
- b) U1, TO92 packaged +5V TI regulator IC. Orient U1 with the flat side towards the left side of the board as indicated on the silk screen legend. OR U2, TO92 packaged +5V or +3V Seiko regulator IC.
- c) U2 is inserted next to U1 as indicated on the silk screen.
- d) R1, bend one of the leads of this part over and mount it vertically next to the S1 socket

- e) C1, .1 uF, (marked 104), placed to the left of U1, C2, .1 uF, (marked 104), also placed to the left of U1
- f) C3, 2.2 uF, place at top left side of board with positive stripe (bluing side) towards the + symbol on the board
- g) D1, the clear LED, place at bottom of board with flat side (cathode) towards U1
- h) Connect the 9V battery snap (or other power input connector to the ground and +Vin holes at the bottom left side of the board. Connect the black wire of the snap to ground, the red wire to +Vin.
- i) S1 (6 pin SSR), form the leads of S1 and insert into the socket, with the pin 1 side (indicated by the round indented circle on the top of the part) towards the WB9KZY marking on the board.
- j) Connect the +5V output to the keyer power input
- k) Connect the keyer ground to the Keyer accessory kit ground
- l) Connect the keyer output transistor to pin 2 of S1.
- m) Connect the outputs of S1 to the output connector, usually one side of the connector will be grounded, it doesn't matter which of the two outputs of S1 are grounded. S1 will key both positive and negative voltages.

step 4) Check the board: Before proceeding, take the time to check the bottom of the board for solder bridges. Use the board top picture and bottom view diagrams as a guide to visually check for these shorts. It may help to clean the flux from the board and then use a strong light in conjunction with a magnifying glass to see these problems. Also, double check the orientation of the critical components such as the 2.2 uf tantalum cap and U1. After you are convinced that the board is OK, connect the board to a 9V battery using a VOM to measure the current used, current should be less than 2 mA (depending on the keyer), if it's larger, power down and re-check the board for shorts and polarity problems. If the current is relatively low, power down, disconnect the meter, the board is ready for use.

Circuit description: The circuit consists of a a low quiescent power, either the low dropout +5V regulator, the LM2936 OR the +3V Seiko S812C30 OR the +5V Seiko S812C50. C1, C2 and C3 are bypass capacitors used to prevent problems with RFI and oscillation. U1 should use about 7 uA of current at 9 volts of input with no load. This is low enough that a power switch may not be required. U1 is quite rugged and should be able to withstand relatively high input voltages (35 volts) along with polarity reversals. U2 should use about 1 uA of current at 9 volts of input with no load (quiescent). U2 isn't as rugged as U1 but uses less quiescent power. The keying circuit uses a 6 pin Solid State Relay (SSR) which can switch upto 400 V DC or AC at 120 mA of load current.

Note that the D1 LED can be replaced by a regular 1n400x power diode or a 1n581x Schottky diode. One bad thing about LEDs is that they are easy to damage and can fail shorted. But the LED can be very nice to indicate when the keyer is "sleeping" (LED dim) versus active (LED bright).

Please feel free to email with any questions, comments, suggestion or problems with this kit.
My email address is: wb9kzy at wb9kzy dot com

Thanks for choosing the Keyer accessory kit and Best Regards,

Chuck Olson, WB9KZY

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List of parts included with the Keyer accessory kit

Part	Description
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C1	.1M or 104.1 uf multilayer ceramic .1" lead space cap
C2	.1M or 104.1 uf multilayer ceramic .1" lead space cap
C3	2.2 uf tantalum .1" lead space cap, red stripe indicates positive (+) side
D1	clear bright red LED, flat side indicates cathode (negative) side of the diode
R1	for +5V: 1000 ohms, purple, green, brown, gold 1/4 watt resistor
R1	for +3V: 180 ohms, brown, gray, brown, gold 1/4 watt resistor
S1	VOR1142A6 SSR (Solid State Relay), 6 pin DIP, 400 V, 120 mA
U1	LM2936 low power +5V regulator IC
U2	S812C30 ultra low power +3V regulator IC
U2	S812C50 ultra low power +5V regulator IC

circuit board Items you may need to provide to complete the Keyer accessory kit:

4-40 sized mounting hardware
9V battery snap connector OR other power connector
transmitter output jack
solder, wire, good quality desoldering braid

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