

# Off Hook Detector:

Many circuits used in telephony depend on knowing the state of a telephone station: whether it is on-hook or off-hook. Telephone people refer to this as “supervision” or in context of business telephone systems “A Lead Control.” In traditional office telephone systems, the “A lead” is grounded when the associated line appearance is in use. This ground is used to light a lamp and for control of the HOLD state. For model railroad telephone systems, the A lead is used to stop ringing or buzzing when a station is answered (goes off hook) and may be used for a busy station display where a LED or lamp lights when the associated phone is off-hook. Normally, when using classic telephones such as 500/554 desk and wall sets, we borrow one of the hook-switch contacts to provide an A lead. However not all telephones have an extra hook-switch contact, some consumer phones (including some retro decorator phones that have a nice transition-era look) are sealed and contacts are inaccessible and sometimes extra conductors are not available in the cable to the telephone. In those cases, it is useful to have a device which looks for current drawn on the telephone line itself and reports status accordingly (somewhat like a track occupancy detector). This is the Off-Hook Detector.

## Off Hook Detector Features

- Modular jacks and 6 position screw terminals provide for connections via modular cables or unterminated cable (usually Cat5).
- Detects on loop (telephone line) current > 10 mA
- Does NOT detect on ringing
- Fully isolated from the telephone line via dual opto-isolator on the input
- Fully isolated from the output circuit via DPDT (2 form C) 2 Amp/220V contacts on relay.
- Optional grounds for the common positions of both contacts to simplify wiring.
- The A lead connection of the line side jack may be set as normally open or normally closed.
- Dimensions are 69mm x 100mm and fits our standard DINRail track.
- Blocking diode to protect against reversing power connection.
- Compatible with our “Morse Code Buzzer Controller” and “Relay Latch”
- Provisions for breaking out all wires in a 6-conductor modular cable
- Uses local 12V power, either via a wall wart with a 2.1mm center-positive plug or via screw terminal connections on CON 9.
- Current draw is 0 mA on hook, 15 mA off-hook.

## Setting the Options

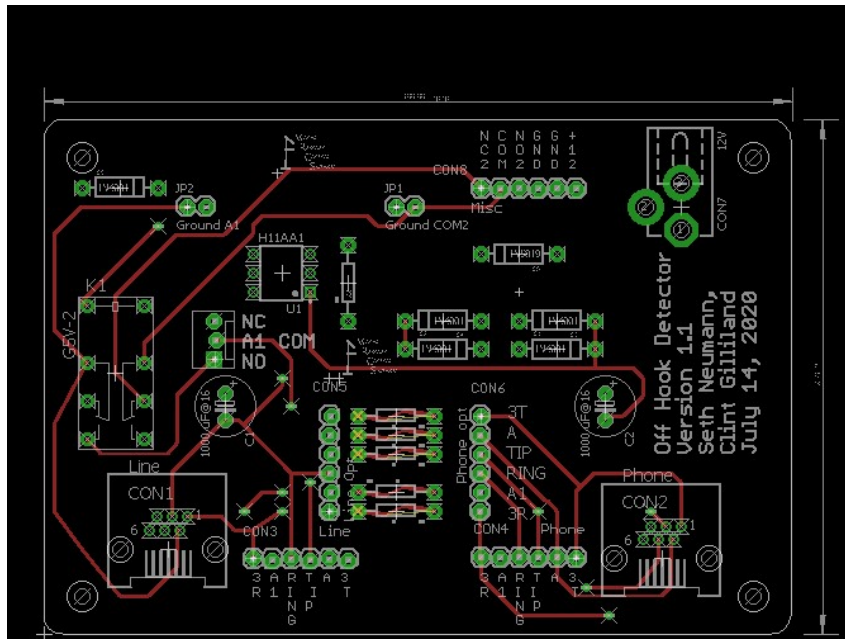


Figure 1- Board Layout from Top

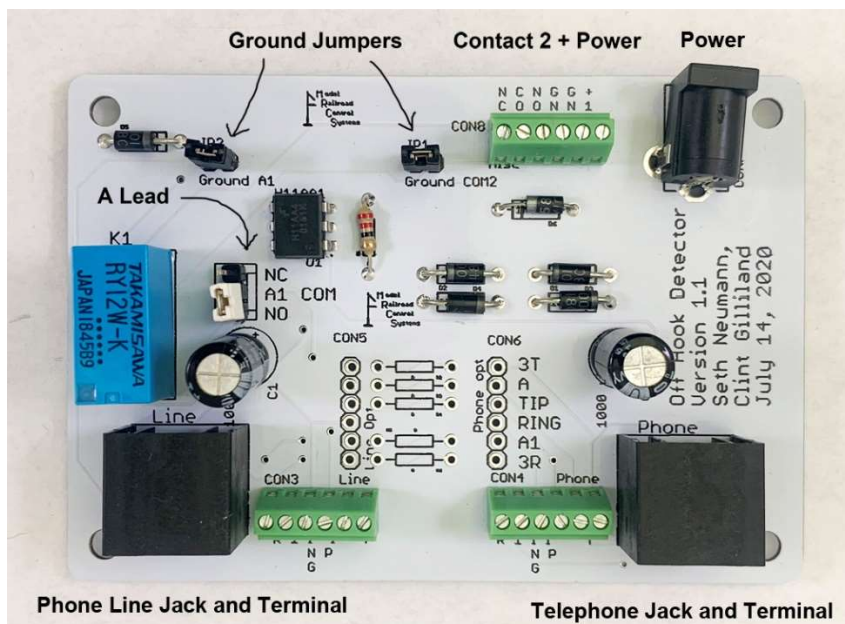


Figure 2- Assembled OHD with Call-outs

The Off Hook Detector offers many configuration options. Either or both of the double pole, double throw contacts on the relay, K1, can be set to ground the common, as most of my circuits expect a ground.

Designation	Label	Comment
JP1 (top right)	Ground COM2	Puts a ground on the common of contact 2, connected to the terminal block on top
JP2 (top left)	Ground A1	Connects the common of the A lead (contact 1) to ground. Contact one appears on the LINE jack and terminal
CON 9 (next to relay)	Choice of NO or NC	Connects A to A1 depending on NO or NC and ground or A1 as input. You MUST select one or the other.

*Table 1- Jumper Options*

In addition, the pads “line opt” CON5 and “phone opt” CON6 are connected by traces can be cut (except for Ring, which goes through the detector). You can use the pads to make additional connections to any lead or cut the thin leads between the pads on the top side, and re-map the connections or add series resistors or diodes etc. These pads are on 0.100 centers and can be populated with screw terminals, male and female headers as desired. Contact us for a quote if you need something special!  
[sales@modelrailroadcontrolsystems.com](mailto:sales@modelrailroadcontrolsystems.com).

## Power Connections

Power is positive 12VDC and may be applied on either the 2.1 MM Jack or the GND and 12V terminals on CON9. An extra ground is provided for your convenience.

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