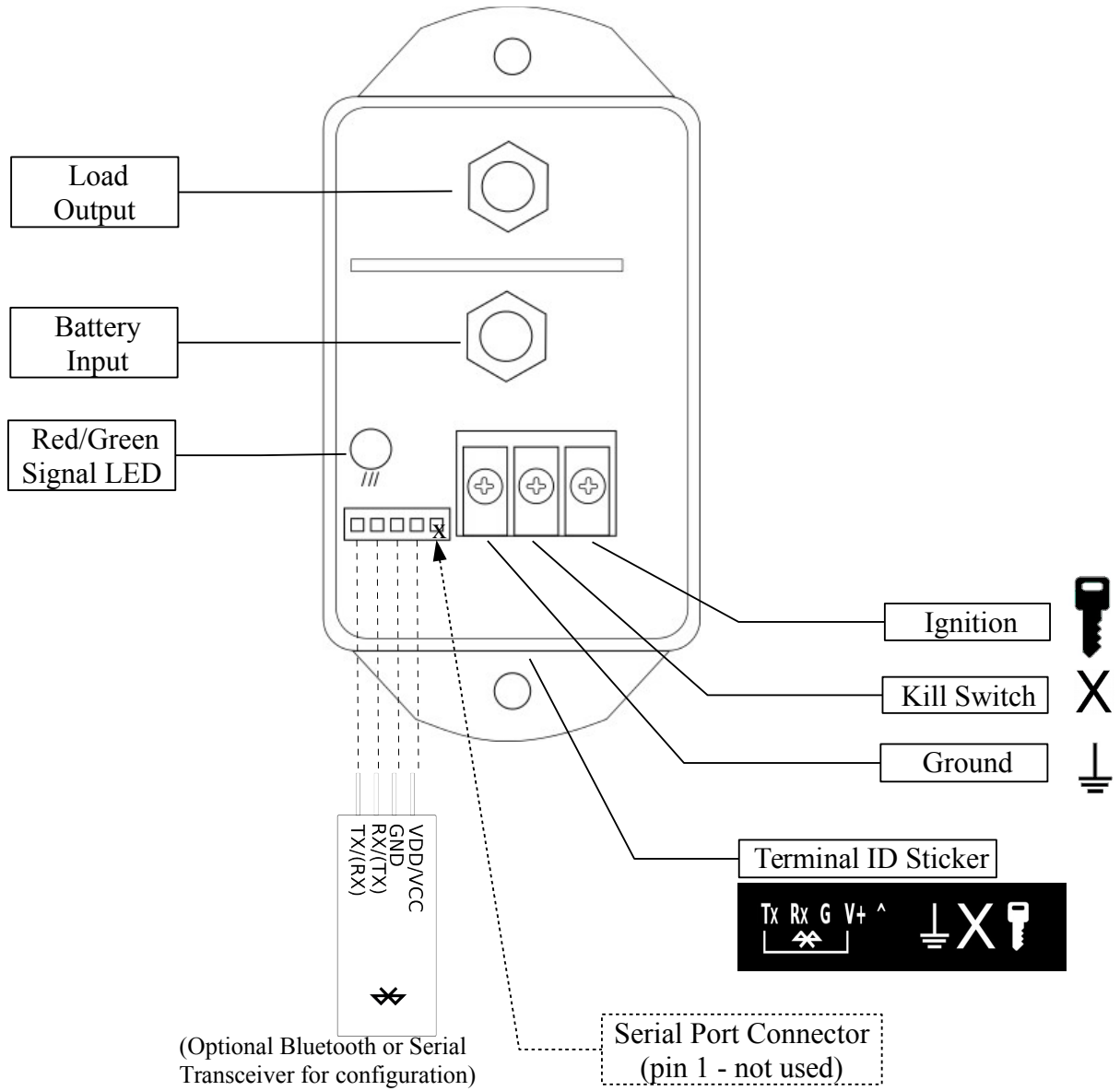


Copeland TOP H.A.T. SS - Device I/O

Version: November 1, 2015



Overview – Copeland TOP H.A.T. SS

High Current Control with Maximum Configurability

The TOP H.A.T. SS device is a power accessory timer with a high current configurable channel rated of over 200 Amps breaking current. The device can be easily configured via Smart Phone, Tablet or PC using a standard terminal interface making changes to installed units easy, forever. The device can have its firmware updated through its serial port.



Kill Switch

The device has an optional Kill Switch input that when grounded by an attached switch disables all outputs.

Out of Range Voltage Protection:

The TOP H.A.T. SS has programmable voltage thresholds for Low Battery and Over Voltage to protect from over-drain or voltage regulator failure.

Factory Default Voltage Levels: (defaults can be changed for custom orders)

Low Battery: 11.0V
Ignition Off: 13.2V
Over Voltage: 18.0V

Out of Range Timeouts:

The TOP H.A.T. SS has programmable system timeouts for Low Battery and Over Voltage. The range can be set from 1 second to 18 hours in one second increments.

Factory Default Out of Range Timeouts: (defaults can be changed for custom orders)

Low Battery: 60 seconds
Over Voltage: 15 seconds

Ignition Off Timeout Setting:

The output can be configured to have from one tenth of a minute (six seconds) to over four days timeout in tenth of a minute increments.

Factory Default Ignition Off Timeouts: (defaults can be changed for custom orders)

Load Output: 15.0 minutes

Configuring settings via Bluetooth or serial terminal connection

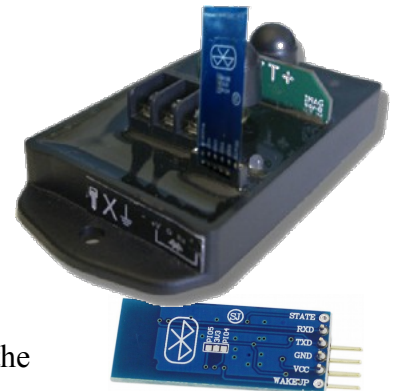
With a standard Bluetooth adapter inserted the device can be configured with a smart phone, tablet or Bluetooth enabled PC. A serial adapter can also be connected direct wired configuration from a PC. The device generates a VT100 compatible terminal mode interface so no special software is needed.



Connecting the Device for Terminal Configuration

Option 1: Connecting Bluetooth transceiver

Insert the Bluetooth transceiver into the Serial Port Connector leaving Pin 1 of the serial connector open (Pin 1 is plugged at the factory and opened for firmware update). Align the VDD/VCC pin to pin 2 and the rest of the pins will fall into place; ground, RX and TX will go into pins 3, 4 and 5. Some transceivers reverse the TX/RX designations (as seen by the transceiver) but this does not affect connection. The system has been tested with two modules that are 5V tolerant and adhere to the standard “Wireless Bluetooth RF Transceiver Module serial RS232 HC-06 for Arduino”. Pair the transceiver to the smart phone or tablet.



- Ventisonic® Wireless Bluetooth RF Transceiver Module serial RS232 HC-06 for Arduino TTL
- SunFounder Wireless Bluetooth RF Transceiver Module HC-06 RS232 4 Pin Serial With Backplane for Arduino UNO R3 Mega 2560 Nano

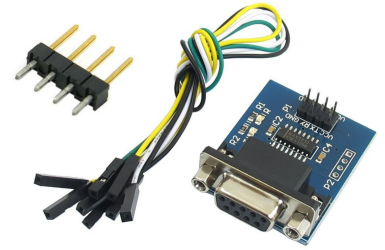
The default parameters for the Bluetooth transceiver should be the same as for the TOP H.A.T. SS: 9600 baud, no parity, 8 data bits, 1 stop bit. Most Bluetooth transceivers have Passkey: 1234 or 0000

Install a VT-100 terminal emulator on the PC/Tablet/Phone, this example uses BlueTerm, an open source client for Android. Free terminal emulators are available for Android, Apple, Windows and Linux.

Option 2: Connecting via Serial transceiver to PC

Use a MAX232 or other compatible serial port transceiver like the one shown. Insert a four pin header post strip, also shown, into the Serial Port Connector leaving Pin 1 of the serial connector open (Pin 1 is plugged at the factory and opened for firmware update). Using four jumper wires (usually supplied with the transceiver) connect:

- Pin 1 Not Connected
- Pin 2 to VDD/VCC of transceiver
- Pin 3 ground
- Pin 4 RX
- Pin 5 TX



Configuring the Device

Once the device is connected, pressing any key brings up the menu: (menus may differ depending on revision)

```
Rev 0.4

      V Levels:
a: Batt Low: 11.0
b: Run: 13.2
c: Over charge: 18.0

      T Secs:
d: T Over Chg: 60
e: T Batt Low: 15

      T Mins:
f: T IGN OFF:

      Factory:
g: ADC Hot: 1008
h: T Hot: 64

r: Factory Reset

Choose a-k, enter(refresh menu),
r(factory reset),x(exit)->
```

To change a setting press a letter from a to k to select the setting, type in the new setting, and press <Enter>. This menu will be displayed again with the new setting included.

- To reset the values to the factory defaults press `r` and <Enter>
- To exit, press `x` and “Console Off” will be displayed
- If nothing is entered the display will eventually time out and display “Time!” pressing any key will resume.

Debug Mode

Debug mode allows the technician to turn on and off output channels and watch system variables with a PC, smart phone or tablet. To enter Debug Mode, connect device as previously instructed, press any key to get into configuration menu, then press ? to get into debug mode. This brings up the menu:

```
1 to toggle channel, r to reset count, all else exits
Debug Countdown: 196

Status: IGNSWon Running AuxOn
Prescale: 06
  Status  Count(disabled)
Output: OFF 00

Levels
VBatt      13.3v
Aux        196
IgnSw      249 IGNbit 1
Temp       228

Targets
Batt Low   11.0v
Run        13.2v
Over charge 18.0v
AuxOn      225
IGNSWon    20
VtempShort 1008
```

Once in Debug Mode the technician can watch system variables such as *vehicle voltage*, *count down* for each channel, *AUX input state*, *Ignition Switch input state*, and see the thresholds the system compares inputs to such as *Aux Input* and *Ignition Switch*. Values shown are raw and unformatted, as used internally, for greatest accuracy.

Any channel can be toggled ON or OFF by pressing that channel number (1 through 6).

Useful when installing to a device channel, technician can turn OFF a channel, connect items to it, and turn it on to assure proper connection, turn it off again to button up installation, and turn channel on again to perform final test before exiting Debug Mode.

Debug Mode is exited if 'r' is not pressed before Debug Countdown reaches 0 or if a key other than 1-6 or 'r' is pressed.

DEBUG MODE NOTES:

- Channels are left in whatever On/Off state they were in when Debug Mode was entered.
- Channels power states do NOT change automatically when in Debug mode. Counts continue but do not affect output state.
- If the AUX input is grounded all outputs are off regardless of count, or mode. However turning on a channel will result in it being turned on momentarily, which is useful for quick power tests.
- If Aux input is grounded (usually with a switch), all outputs go off, and do not turn on even if Aux is ungrounded (switch turned off), however each channel can then be turned on manually.
This is to assure technician never accidentally turns on any channel in debug mode accidentally

LED Signals

Red/Green Signal LED

- Green Steady – Run Mode, Ignition is ON
- Red Blinking – Count down to channel being turned off
(one or more channels may already be off)
- Red Steady – All counts expired, all channels off
- Green/Red alternating – Edit or Debug Mode, terminal connection in progress