# Version 3 Hardware Testing Procedures

This document describes the testing procedures to be used after a new board is burned. These are designed to test that the board is functioning correctly.

## Load Test Software

Bring up the sensact/arduino/v3\_test sketch in the arduino IDE and load it.

Open the serial connection and enter ‘h’ (the help command). You should see:

Help

'i' + 0 to 15. Sets power to the input jacks according to bit values.

'o' + 0 to 3. Turns on the output ports according to bit values.

'l' + 0 to 7. Sets the value of LED outputs.

'b' Sounds the buzzer.

'r' Reads the value of all input pins.

'r' 1 to 6 Reads the value of a particular input port

repeating until another command is entered.

(1 = I1A, 2 = I1B, 3 = I2A ... 6 = I3B)

'g' Reads I2C Gyroscope. (Leaves non-I2C inputs powered off)

't' Runs the TV IR. On/Off cycling every 1/4 second for two seconds.

Watch with a cell phone camera or with a multi-tester.

This verifies that the test software is loaded.

## Testing the LED

Test the LED by setting the counter bits that support the LED.

The command ‘l7’ (that’s a lower case ‘L’ + 7) should turn the LED off.

‘l6’ should turn it green

‘l5’ should turn it red

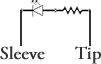
‘l3’ should turn it blue.

‘l0’ will turn on all colors which maybe should be white – but comes out red when I test it.

If you do not get the colors expected one or more of your LED connections are bad or the LED is defective.

## Testing Power to the Input Jacks

Using a breadboard set up a small circuit with an LED and a small resistor in series. Connect the cathode of the LED to the sleeve of a four-wire cable and the anode to the tip via a resistor (200-1000 ohm). Plug the other end of the cable into one of the input jacks.



Using the ‘i’ command test the delivery of power to the input jacks.

i1 should power jack #1 (only)

i2 should power jack #2 (only)

i4 should power jack #3 (only)

i8 should power jack #4 (only)

i15 should power all jacks.

You can play with other values from 0 to 15. Bits 1 to 4 should power on the corresponding jack.

Remember that Sensact software does not actually manipulate these power connections, so in many ways this test doesn’t matter much. As long as ‘i15’ turns on power to all the jacks the Sensact code will work on the board.

## Testing Input Lines

Plug a joy stick into jack #1

Turn on power to the jack (i15 will power all of them)

Enter the command ‘r1’.

The value of input one will be displayed repeatedly. It should be about 500. When you move the joystick on one axis (which will depend on how it was wired) the value should go from near 0 at one extreme to almost 1000 at the other.

Now enter ‘r2’ and check the other axis of the joystick. This will be testing the other input on jack #1.

Now move to jack #2 and test ‘r3’ and ‘r4’

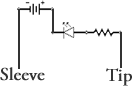
Go to jack #3 and test ‘r5’ and ‘r6’

## Buzzer test

The command ‘b’ should sound the buzzer.

## Output (relay) Test

For this test you need a circuit similar to the one used for the testing power to the input jacks, but with an independent power supply. The circuit should look like this:



For power I generally take 5V power from an Arduino, but any low voltage supply should do.

Hook the circuit up to relay jack #1 and type the command ‘o1’. The LED should light. Due to resistance in the opticoupler circuit the LED will not be a bright as in the input jack power test.

Plug into jack #2 and type the command ‘o2’. The LED should light.

‘o3’ should close both relays lighting an LED connected to either one.

## Gyro Test

Plug a gyro chip into the I2C port.

Then enter the ‘g’ command.

This will initialize the gyro correctly, power on the I2C port and power off all other ports.

The reported Gyro values will be reported. You can manipulate the gyro, re-enter the ‘g’ command and see if the accelerometer values change as expected. It should be easy to test the ‘Accel X’ and ‘Accel Y’ values and to see that the other values are at least reasonable.

## IR LED Test

Using a multi-tester, monitor the voltage across the IR LED leads (or the holes in the board if no LED is installed yet). Enter the ‘t’ command. You should see a short voltage fluctuation (up to 1.5 or 2 volts) lasting a couple of seconds.

This shows that the transistor is successfully controlling the current through the LED. It does not prove much else. The test code switches the LED on and off rapidly for a short time. The test is design to last long enough to generate measurable voltage fluctuations without driving the LED too hard and burning it out.