# Version 4.1 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/Test Code/SensActTesting sketch in the arduino IDE and load it.

Make sure this is the version with the following line in the header:

Update: For V4.1 Hardware.

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

Help

'o' + 'a' or 'b. Turns on an output port.

'o0' (o + zero) Turns all outputs off.

'l' + 'r', 'g' or 'b'. Sets the color of the LED.

'l0' Turns the LED off.

'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.

'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 colors.

‘lg’ should turn it green

‘lr’ should turn it red

‘lb’ should turn it blue.

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

## Testing Input Lines

Plug a joy stick into the jack labelled ‘INPUT-1’

Enter the command ‘r1’.

The value of input one will be displayed repeatedly. It should be 400 to 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 INPUT-1.

Now move to INPUT-2 and test ‘r3’ and ‘r4’

Go to INPUT-3 and test ‘r5’ and ‘r6’

## Testing the pull down resistors

Plug a simple switch into each input using a TASH switch adapter.

A TASH switch adapter connects one of the connections on a TASH switch to VCC on the Senact port and connects the other to one of the two input lines on the port. DO NOT plug a TASH switch directly input a Sensact port. This will short ground and VCC and may damage the board or the Leonardo.

Note that the TASH switch adapter for V3 connected the switch to ground, and not VCC. This will not work for V4.1.

Follow the procedure for testing input lines above.

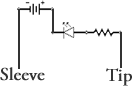
The value reported should be near 0 when the switch is open and near 1000 when it is closed. If the value of the open switch is not near zero there may be a connection problem with the corresponding pull-down resistor.

## 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:



*error – the power source in this diagram is reversed*

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

Hook the circuit up to relay jack ‘OUTPUT-A’ and type the command ‘oa’. The LED should light. Plug into jack ‘OUTPUT-B’ and type the command ‘ob’. The LED should light.

## Gyro Test

Plug a gyro chip into the I2C port.

Then enter the ‘g’ command.

This will initialize the gyro correctly on the I2C port.

The reported Gyro values will be displayed. 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.