

Test procedure for the NCS5651MNSEVB

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Introduction

This document describes the test procedure for the evaluation board (EVB) of the NCS5651. With the provided test board, it is possible to test the input current, the VCOM voltage and the different output signals.

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1 Equipment required

The NCS5651 test board (figures 4 and 5) has 2 inputs and 5 outputs to interface with the measurement instruments required:

- A digital multimeter to measure the input current.
- A digital multimeter to measure the common voltage (VCOM).
- A digital multimeter to measure the output of the 3.3 V regulator. If no third multimeter is available, the VCOM multimeter may be re-used by swapping the test point.
- An oscilloscope with at least 3 inputs to observe the input signal and the two opamp outputs.
- A DC power supply with an output voltage of 12 V and a current rating of at least 2 A.
- A function generator capable of generating a 100 kHz, 8 Vpp signal.

2 Set-up procedure

Set up the equipment as shown in figure 1 so that the input current, the VCOM and the input and output of the two opamps can be measured.

1. Set oscilloscope channels 1–3 to DC coupling, with a 1 M Ω impedance, full bandwidth, and 2 V/div scale.
2. Connect channels 1–3 of the oscilloscope to the BNC sockets J1–J3 with BNC–BNC cables.
3. Set the ground level of each channel at the centre horizontal grid line on the oscilloscope.
4. Configure two measurements on channel 1: Peak-to-peak, Phase (Channel 1→2).
5. Configure a peak-to-peak amplitude measurements on channels 2 and 3.
6. Set the horizontal scale to about 5 μ s/div to show enough cycles on the screen during the amplitude measurement.
7. Connect a current-sensing multimeter to measure the input current at the test board. Connect the multimeter between the white and the green banana sockets.
8. Connect a voltage meter to measure the VCOM to the test board. Connect the meter between the yellow and the black banana sockets.
9. Connect the output of the function generator to the black BNC socket.
10. Verify the oscilloscope shows a 100 kHz, 8 V peak-to-peak sine on channel 1. If not, adjust the function generator.

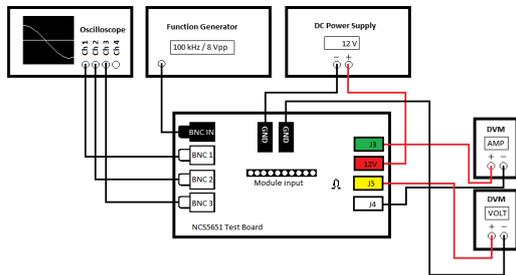


Figure 1: Measurement set-up for the NCS5651 evaluation board.

11. Connect the DC power supply to the board. The ground connects to a black banana socket of the test board, the positive output to the red banana socket.

3 Test procedure

1. Visually check the evaluation board for overall solder quality. Look for tombstoning, shifted parts, etc.
2. Plug the NCS5651MNSEVB in the center connector. There is only one way to do this correctly. The bottom side of the NCS5651MNSEVB has to face the two ground connectors.
3. Prepare a stopwatch.
4. Turn on the power switch on the test board. Start the stopwatch at the same time.
5. Stop the timer when LED2 on the NCS5651MNSEVB lights up. LED2 is the user programmable warning threshold flag, activating when the junction temperature reaches a preset threshold. This has no influence on the operation of the internal opamps.
6. If any other LEDs on the EVB light up, reject the board.
7. Observe the VCOM voltage on the DVM. Acceptable values are 5.8–6.2 V.

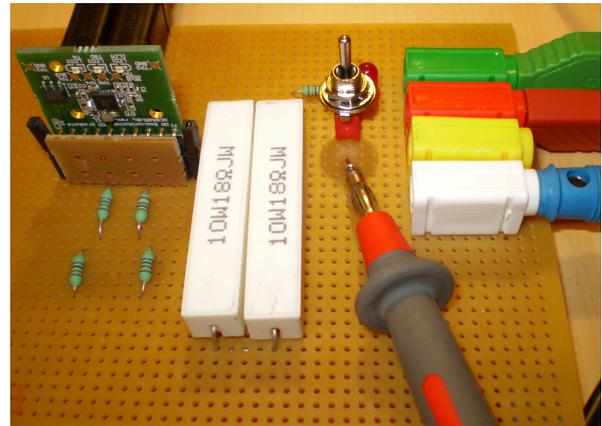


Figure 2: Connecting the probe of the DVM to the hook on the board.

8. Observe the input current on the DVM. Acceptable values are 135–170 mA.
9. Check the signal on channel 1. This has to be almost the same as the input signal (100 kHz, 8 Vpp); the DC level should equal VCOM though. Check the peak-to-peak voltage of this channel; it should equal the input peak-to-peak voltage.
10. Check the signal on channel 2. A phase shift of 160–175° to the signal measured at channel 1 is acceptable.
11. Check the signal on channel 3. This has to be a phase shift of 160–175° to the signal measured at channel 1 and coincident with the signal on channel 2.
12. Disconnect the DVM probe from the hook or the yellow banana socket and place this on test point 1 (TP1) of the NCS5651MNSEVB. The output voltage on this point should be 3.3 ± 0.15 V. The method is shown in figure 3.
13. Toggle the switch off. The red LED extinguishes.
14. Remove the NCS5651MNSEVB.

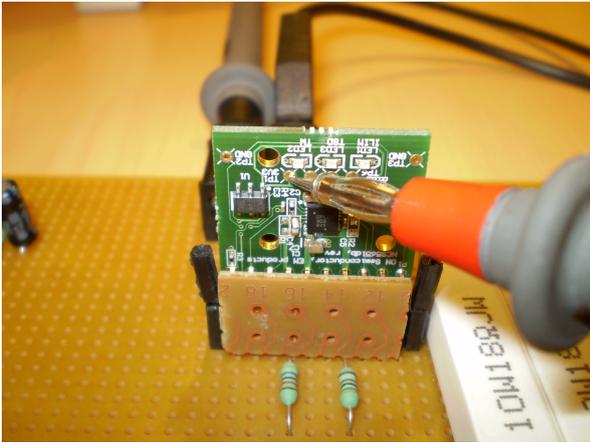


Figure 3: Method to measure the 3V3 logic supply.

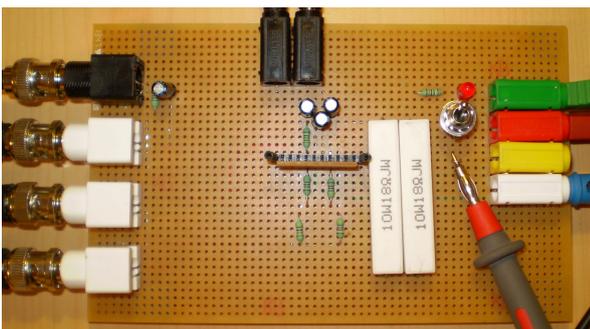


Figure 4: Top view of the test board.

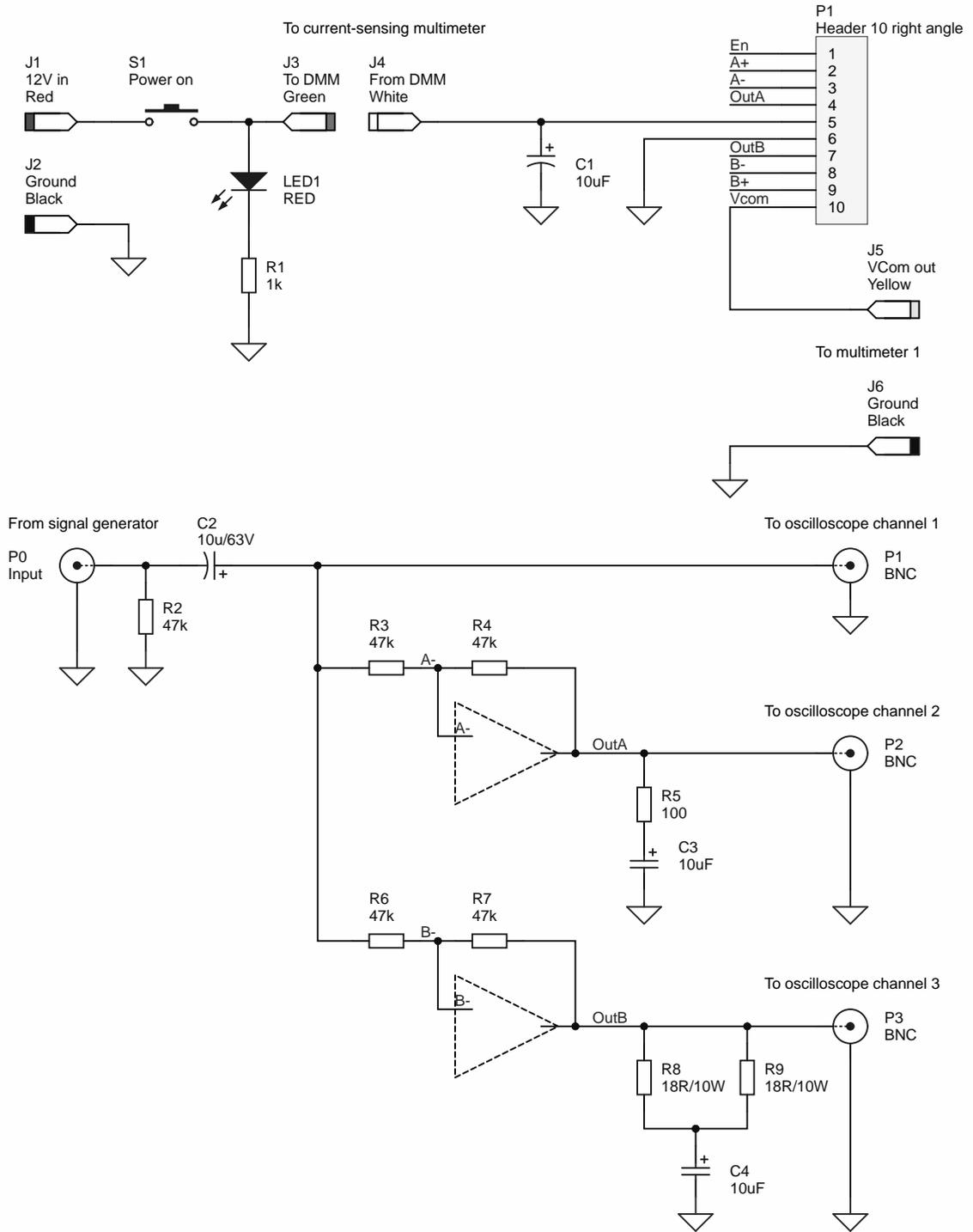


Figure 5: Schematic of the test board.

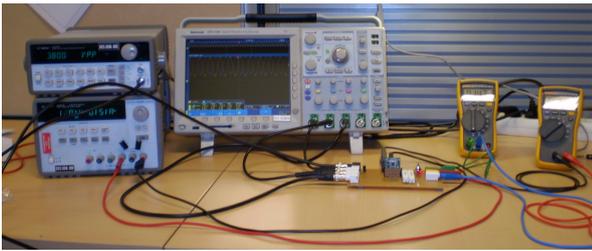


Figure 6: Example measurement set-up.