



Silicon Sculptor Verification of Calibration Work Instruction

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Silicon Sculptor Verification of Calibration Work Instruction

Overview

This document describes how to verify the internal power supply calibration for the Silicon Sculptor 3 programmer, and how to check and auto calibrate the Icc calibration with the latest Silicon Sculptor software.

The procedure validates that the test limits used during the Programmer Diagnostics are accurate. During operation, each pin driver is continuously monitored and calibrated by a special supervisory circuit. The Programmer Diagnostic test verifies correct operation of the pin drivers, power supply, CPU memory, and communications. [Table 1](#) lists the frequency Microsemi® recommends for running the Programmer Diagnostic test.

Table 1: Recommended Programmer Diagnostic Testing Frequency

Frequency	Type of Product	Recommendation
Once for every job	Non RT/RH	Required
Prior to programming every device	All RT/RH devices	Required

Note: Do not place any FPGA in the module during the Programmer Diagnostic.

It is also necessary to validate the accuracy of the Programmer Diagnostics. This validation ensures the Programmer-Diagnostics provides accurate results.

[Table 2](#) lists the frequency Microsemi recommends for running the calibration verification test. Microsemi performs the calibration verification test before shipping every unit.

Table 2: Calibration Verification Frequency

Frequency	Type of Product	Recommendation
Once every year	All non RT/RH	Required
Once for every job	All RT/RH devices	Required

Figure 1 shows the materials required for verification of calibration:

1. Silicon Sculptor 3 programmer
2. Oscilloscope
3. SM48D/SM48DB adapter module
4. Digital multimeter with two probes
5. Probe with a ground connection.

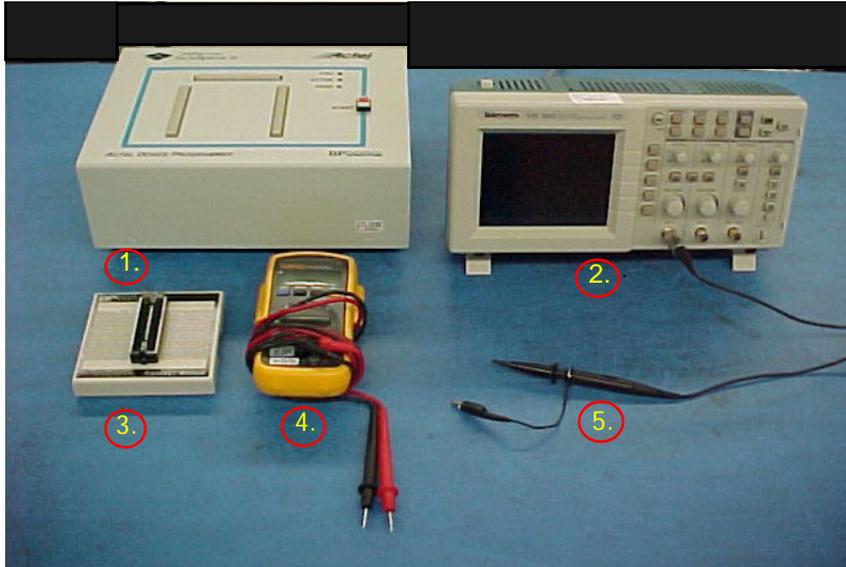


Figure 1: **Materials Required for Verification of Calibration**

The latest Silicon Sculptor software is available here: <http://www.microsemi.com/products/fpga-soc/design-resources/programming-debug>.

SM48D and SM48DB both have two rows of pins. Figure 2 shows how to mark the SM48D/SM48DB module pin numbers and identify the pin numbers. Pin 1 is mentioned at the top left and marked on the chassis.

The pin starts from the top left to pin 24 on the bottom left, then pin 25 on the bottom right to the pin 48 on the top right.



Figure 2: SM48D/SM48DB Module Pin Numbers

Verifying the Calibration

Here are the steps to verify the calibration of the Silicon Sculptor 3 programmer.

1. Connect the programmer to a USB 2.0 port on your PC. Connect one end of the USB cable to the programmer's connector. Plug the other end of the cable into the computer's USB port.
2. Plug the Silicon Sculptor AC power cord into a power socket.

Note: The Silicon Sculptor 3 power supply operates from 90 to 250 VAC for simplified worldwide use.

3. Secure the SM48D or SM48DB on the programmer ensuring a snug fit.
4. Turn on the computer and programmer. Both the green Power LED and the yellow Active LED will light up.

Silicon Sculptor 3 is performing a power-on self-test when the Active LED is on. After the test is complete, the yellow Active LED will turn off and only the green Power LED will remain on. If the red Fail LED turns on, the Silicon Sculptor 3 programmer has detected an error during the power-on self-test. If this occurs, contact Microsemi SoC Tech Support (soc_tech@microsemi.com).

Note: Do not invoke the SculptW software before the programmer's power-on self test is completed. If this is done, the software displays in "Demo Mode". Programming operations cannot be done in the Demo Mode.

5. Launch the latest *Silicon Sculptor software*.

6. Click **Device** to open the **Select Device** window, as shown in [Figure 3](#). Alternatively, the Diagnostics can be accessed from the **Tools** menu by selecting **Programmer Diagnostics**.

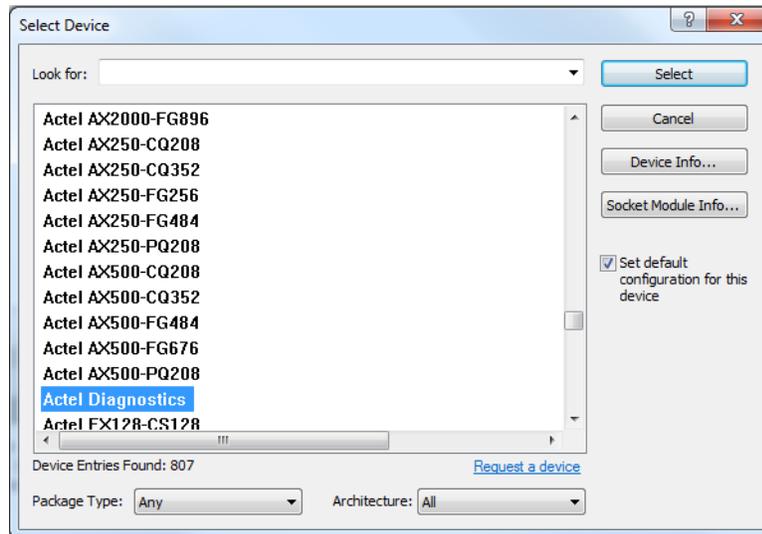


Figure 3: Select Device Dialog Box

7. From the **Device** window, select **Actel Diagnostics** and click **Select**. Now select the **Execute** button (found on the software GUI), you will see a light blue play sign next to it.
8. The **Self Test Configuration** window appears, as shown in [Figure 4](#).

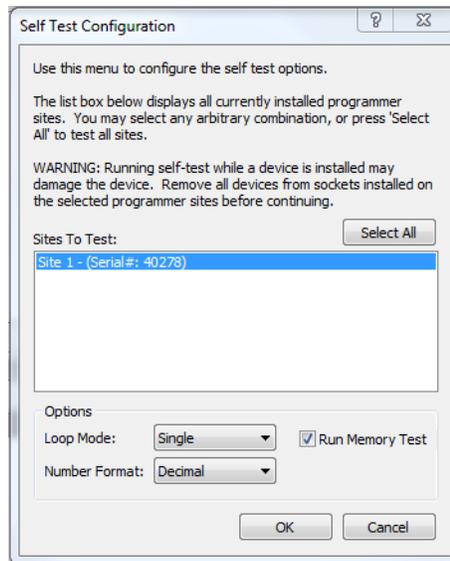


Figure 4: Self Test Configuration Window

9. Use the default selections:
 - Loop Mode: Single
 - Memory Test: On (Checked)
 - Number Format: Decimal

10. Click **OK**. The software detects the power supply calibration.

If the software detects an incorrect calibration, it generates a **Failure** message. In the event of any failure, contact Microsemi SoC Tech Support (soc_tech@microsemi.com) along with the log file (C:\BP\DATALOG).

11. During the test, the **Diagnostics Info** window appears, as shown in [Figure 5](#).

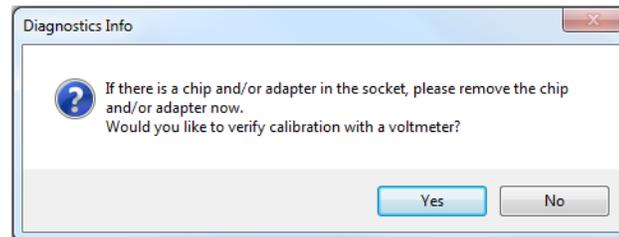


Figure 5: Diagnostics Info

12. Click **Yes** to check the settings with a voltmeter.

The program runs a quick check on some of the functions. The **Verify Voltage Calibration** window appears, as shown in [Figure 6](#).

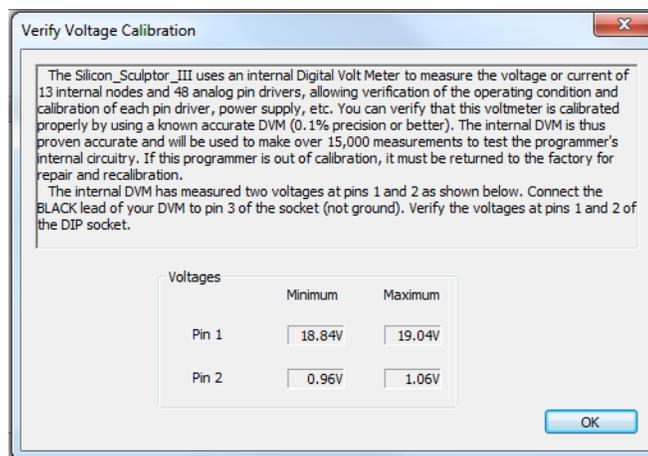


Figure 6: Verify Voltage Calibration Window

13. Before clicking **OK**, use the digital multimeter to verify the readings.

- a. Place the **red probe of the multimeter onto pin 1** and the **black probe onto pin 3**. Verify the reading is within the tolerance range displayed in [Figure 6](#) and record these levels on the verification sheet.
- b. Place the **red probe of the multimeter onto pin 2** and the **black probe onto pin 3**. Verify the reading is within the tolerance range displayed in [Figure 6](#) and record these levels on the verification sheet.

If the readings are not within the tolerance range, the Silicon Sculptor 3 needs to be marked as failed. Contact Microsemi SoC Tech Support (soc_tech@microsemi.com) along with the log file (C:\BP\DATALOG).

14. After verifying the readings with the multimeter, click **OK** on the **Verify Voltage Calibration** window. The **Verify AC Calibration** window appears, as shown in [Figure 7](#).

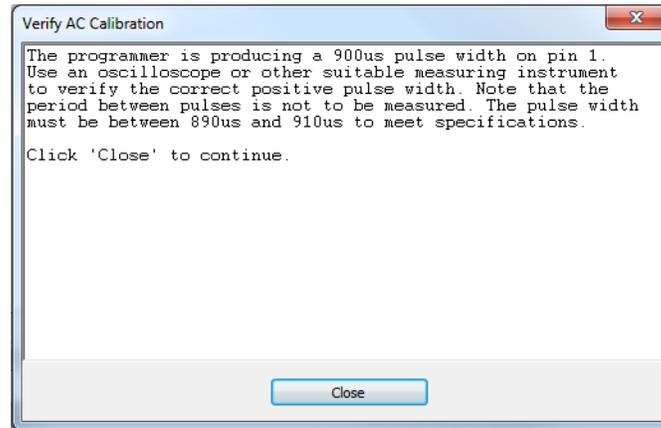


Figure 7: Verify AC Calibration Window

At this point in the test, the programmer will produce a 900us pulse width on pin one of the DIP socket. The AC calibration window displays the tolerance for the pulse width. The pulse width needs to be viewed using the oscilloscope.

15. Place the Oscilloscope's **probe onto pin 1** and the **ground onto pin 3**. Verify the pulse width is within tolerance range. Record the readings.

If the reading is not within the tolerance range displayed in [Figure 7](#), the Silicon Sculptor 3 needs to be marked as failed. Contact Microsemi SoC Tech Support (soc_tech@microsemi.com) along with the log file (C:\BP\DATALOG).

When disconnecting the probe and ground, disconnect the probe first. If the ground is disconnected first the test will read fail.

16. Click **Close**.

The Silicon Sculptor software continues to test the unit and displays the results. The results include the serial number of the unit, and if it passed or failed. Document the results. The verification of calibration is complete.

If the unit failed the verification of calibration, contact Microsemi Technical Support (soc_tech@microsemi.com) for instructions.

If the unit passed the verification of calibration, the verification record sheet needs to be stored in the programming station as a reference document.

17. For your own records:

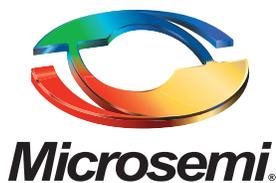
- Fill out your internal Certificate of Conformance and replace the old certificate with it. Calibration date is the date the test was completed. Calibration is to be performed in accordance with the time frames highlighted in [Table 2](#).
- Fill out your internal certificate sticker with the correct information, and place it over the old sticker that is located on the Silicon Sculptor.

List of Changes

The following table lists critical changes that were made in the current version of the chapter.

Date	Changes	Page
Revision 3 (March 2015)	Updated Figure 3–Figure 7 , removed mentions of the discontinued Silicon Sculptor 2 programmer and other minor edits made throughout (SAR 60144).	6–8
Revision 2 (December 2012)	Updated "Overview" section (SAR 29368)	3
	Modified Table 1 (SAR 29368)	3
	Added Table 2 (SAR 29368)	3
	Updated "Verifying the Calibration" section (SAR 29368)	5
	Updated "If the software detects an incorrect calibration, it generates a Failure message. In the event of any failure, contact Microsemi SoC Tech Support (soc_tech@microsemi.com) along with the log file (C:\BP\DATALOG)." section (SAR 29368)	7

Note: The revision number is located in the part number after the hyphen. The part number is displayed at the bottom of the last page of this document. The digits following the slash indicate the month and year of publication.



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