Silicon Sculptor Verification of Calibration Work Instruction

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This document describes how to verify the internal power supply calibration for the Silicon Sculptor II or Silicon Sculptor 3, 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 self-diagnostic are accurate. During operation, each pin driver is continuously monitored and calibrated by a special supervisory circuit. The self-diagnostic test verifies correct operation of the pin drivers, power supply, CPU memory, and communications.Table 1 lists the frequency Actel recommends for running the self-diagnostic test.

Table 1: **Recommended Self-Diagnostic Testing Frequency**

Frequency	Type of Product	Recommendation
Once a month	Commerical products	Recommended
Once for every job	RTSXSU	Required
Prior to programming every device	RTAXs ad RG products	Required
Note: *Run the self-diagnostic test using the socket module you will use for programming.*		

It is also necessary to validate the accuracy of the self-test. This validation insures the test provides accurate results. Actel recommends completing the calibration validation annually.

Both procedures are performed by Actel prior to shipment of units and can also be performed by end customers.

The following materials will be used:

- Digital Voltmeter
- Oscilloscope
- 48-Pin Socket Module, PN SM48DB
- Silicon Sculptor II or Silicon Sculptor 3
- Silicon Sculptor Software v4.62.0 or higher
- 3-Row Header

Figure 1 shows an SM48DB and a digital voltmeter in front of a Silicon Sculptor programming module. The unit next to the programmer is an oscilloscope.

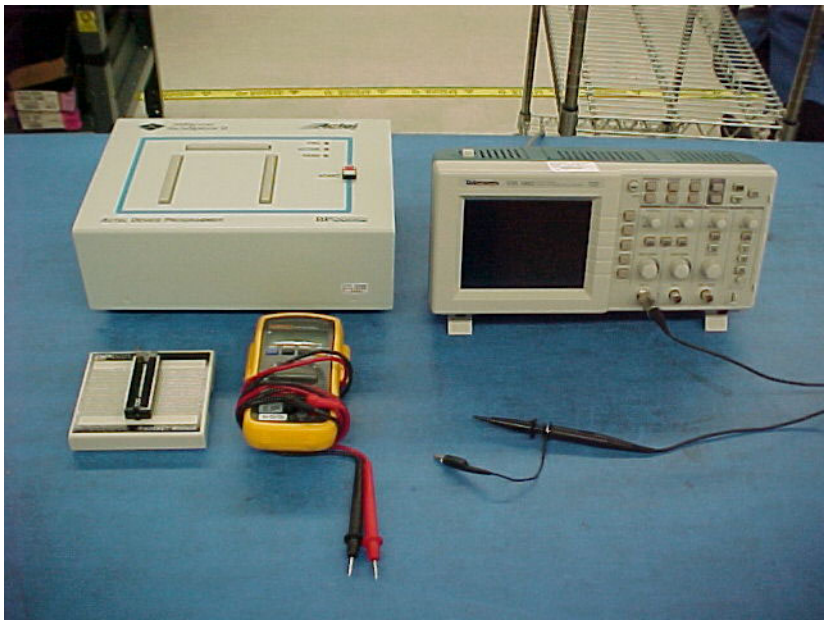

Figure 1: **Materials Needed for Verification of Calibration**

Verifying the Calibration

This procedure can be implemented using Silicon Sculptor II or Silicon Sculptor 3 programming modules. *Silicon Sculptor* refers to either *Silicon Sculptor II* or *Silicon Sculptor 3*, depending on your programmer of choice.

1. Connect the Silicon Sculptor programmer to a parallel printer port on your PC.

   For Silicon Sculptor II, connect the programmer to a parallet printer on your PC. Connect one end of the cable to the programmer's connector and tighten the screws. Plug the other end of the cable into your parallel printer port.

   For Silicon Sculptor 3, connect the programmer to a USB port on your PC. Connect one end of the cable to the programmer's connector and tighten the screws. Plus the other end of the cable into the USB port.
2. Place the programming module on top of the Silicon Sculptor programmer.
3. Plug the Sillicon Sculptor programmer AC power cord into a power socket.
4. Turn on the computer and programmer. Silicon Sculptor II is performing a power-on self-test when the Active LED is on.
5. Open Silicon Sculptor software v4.62.0.

6. Press the **Device** button to open the Select Device window (see image below).

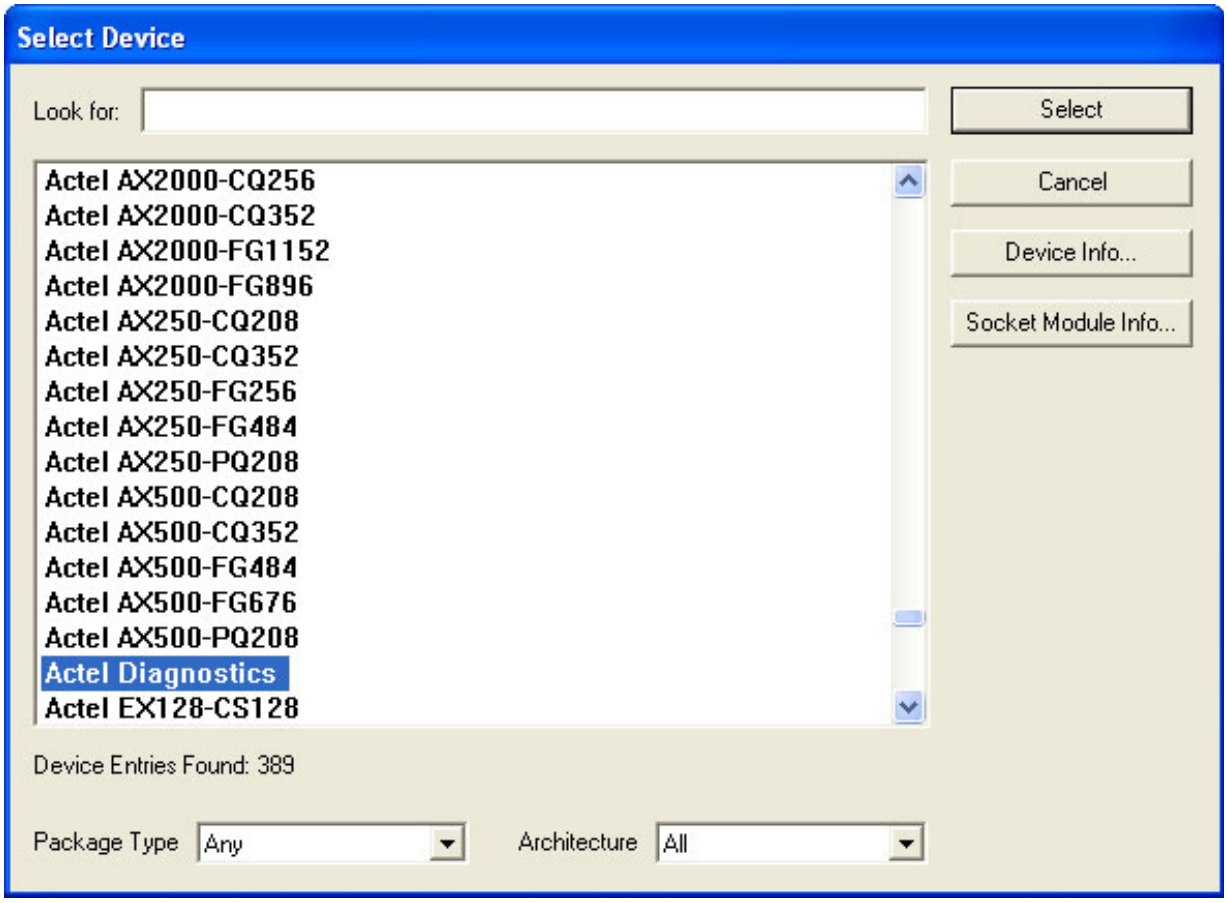

Figure 2: **Select Device Dialog Box**

7. Select **Actel Diagnostics** and press **Select**.
8. Press the **Test** button. The Test window appears (see image below).

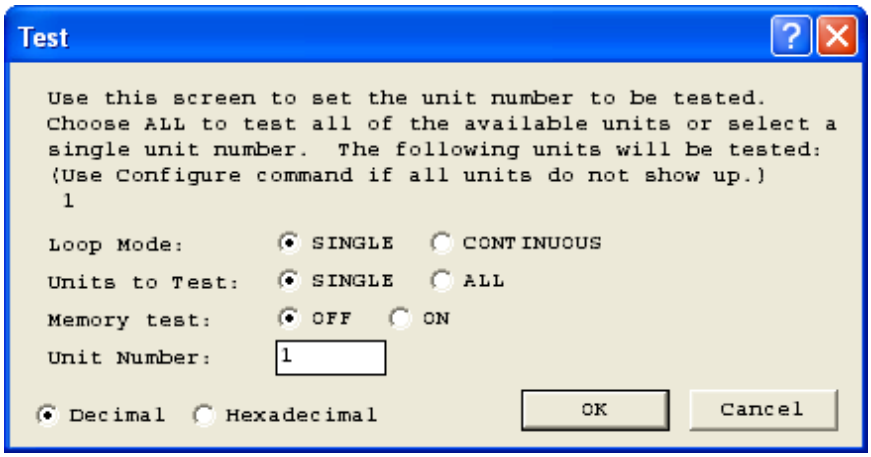

Figure 3: **Test Window**

9. Use the default selections:
   Loop Mode: Single
   Units to Test: Single
   Memory Test: Off
   Unit Number: 1
   Decimal
10. Press **OK**. The software will detect the power supply calibration.

If the software detects an incorrect calibration, it generates a *Failure* message: *Testing current regulators: Coarse mode Icc regulation faulty or needs calibration (9.205mA should be 30mA).* Silicon Sculptor will automatically recalibrate the programmer.

When the procedure is complete, Silicon Sculptor generates a *Pass* message.

In the event the calibration is severely outside of automatic update limits, the software will ask for a 50 Ohm (1% tolerance) resistor to be placed across specific pins of the SM48DB socket module (typically pins 1 and 8) and will instruct for the test to be repeated. This enables the calibration to be brought into alignment. If calibration fails at this stage, the unit will need to be sent back to BP Microsystems for recalibration.

The power supply verification is complete. If it passed and the calibration date is acceptable, it is possible to stop at this point.

The remainder of the procedure focuses on complete validation of the calibration.

Validating the Calibration

This section requires the use of an SM48DB 48-pin socket module.

1. During the test, the Diagnostics Info window appears (see figure below).

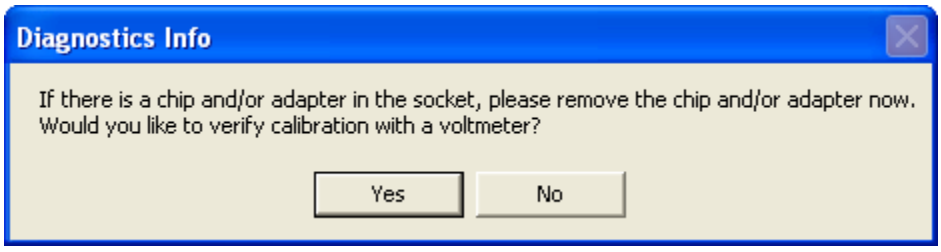

Figure 4: **Diagnostics Info**

2. Press **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.

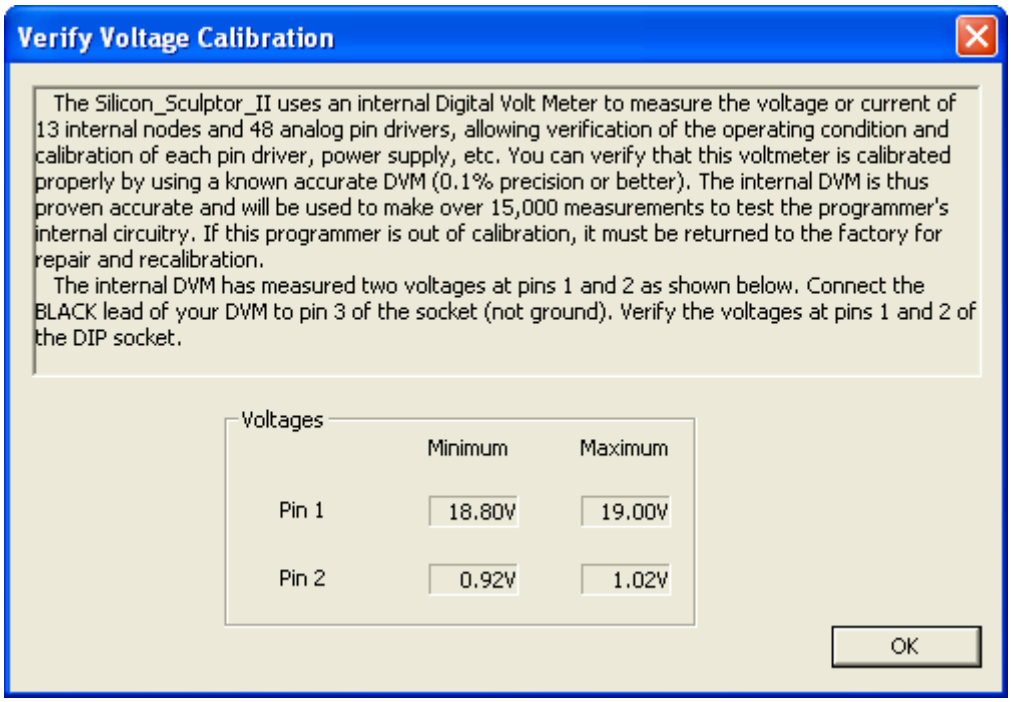

Figure 5: **Verify Voltage Calibration Window**

3. Move this screen off to the side, so that you can view the tolerance levels. Use the voltmeter to view the readings. Record these levels on the verification sheet.
4. Place the red probe onto pin 1 and the black probe onto pin 3. Verify the reading is within the tolerance range and record readings.
5. Place the red probe onto pin 2 and the black probe onto pin 3. Verify the reading is within the tolerance range and record readings.

If readings are not within the tolerance range, Silicon Sculptor needs to be marked as failed.

6. Click **OK**. The Verify AC Calibration window appears (see figure below).

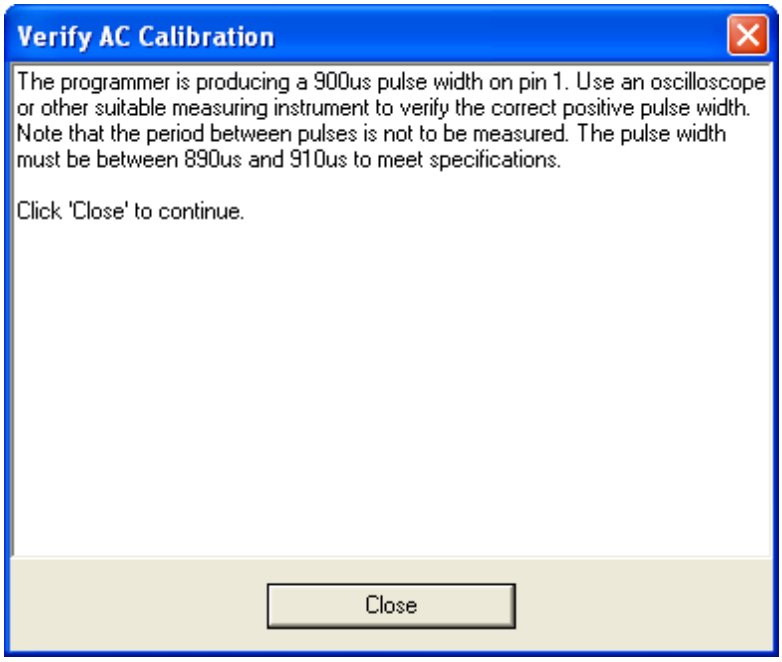

Figure 6: **Verify AC Calibration Window**

The AC calibration window displays the tolerance for the pulse width. The pulse width will need to be viewed using the oscilloscope.

7. Place the probe onto pin 1 and the ground onto pin 3. Verify the pulse width is within tolerance range. Record readings.

If reading is not within the tolerance range, Silicon Sculptor needs to be marked as failed.

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

8. 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 Actel Technical Support for instructions.

If the unit passed the verification of calibration, the associated documentation needs to be replaced.

9. Fill out the *Certificate of Conformance*, and replace the old certificate. Calibration date is the date the test was completed. Calibration is due one year after the date tested.
10. Fill out the certificate sticker with the correct information, and place over the old sticker located on the Silicon Sculptor.

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