



FAQ's for Actel's Antifuse FPGA Programming

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General

1. What programmers can I use to program Actel devices?

Ans. Actel only tests the programming of Actel devices on Silicon Sculptor II and Silicon Sculptor 3 programmers. Each release of Silicon Sculptor goes through a rigorous testing procedure to ensure the best programming yield possible. This test procedure includes programming devices and functionally testing these devices.

Note: The Activator programmer, Silicon Sculptor 1 and Silicon Sculptor 6X have been discontinued. Actel no longer provide software updates for these programmers. The last software version that supported Silicon Sculptor 1 and 6X was v4.68.1 WIN and v3.93 DOS.

BP Microsystems programmers that are equivalent to Silicon Sculptor II and 3 (BP1610 and BP1710) are fully supported. Multisite BP programmers BP2610 and BP2710 and BP autoprogrammers BP4710, BP4610, BP3710 MK2, and BP3610 also support Actel devices. However, Actel adapter modules must be used to program Actel devices. Where an auto-programmer is used, the appropriate open-top adapter module from BP Microsystems must be used. Auto-programmers are not to be used for programming RadTolerant devices such as RTSX-SU and RTAX-S.

Actel does not test programming solutions from any other vendor and cannot guarantee programming yield. Actel will accept Programming Failure RMAs up to the allowed fallout, but we reserve the right to reject any RMA requests if the fallout is excessive. We will not perform Failure Analysis on devices programmed by hardware from other vendors.

For details on programming failure guidelines please review "[Programming and Functional Failure Guidelines](#)".

Programmers

Silicon Sculptor II and III

2. Where can I find a list of the supported devices for the Silicon Sculptor programmer?

Ans. Devices currently supported by Silicon Sculptor, are listed at:

www.actel.com/download/program_debug/ss/device_list.aspx.

3. What is the Power-On Self-Test (POST) for Silicon Sculptor?

Ans. When power is applied to the Silicon Sculptor programmer, it performs a power-on self-test (POST). This test checks RAM, ROM, CPU, analog circuits, and basic system integrity.

Note: Do not attempt any programming operation until POST is complete. If POST fails, the red ERROR LED turns on.

Failure codes are:

- Three short flashes-- cannot self-calibrate
- Two short flashes -- ROM checksum error
- One short, one long flash-- RAM error

If you encounter any of these errors, contact Actel Technical Support tech.support@actel.com. Do not attempt to program any devices if POST fails.

4. Does the Silicon Sculptor programmer have any memory? Does it retain any programming data after the programming?

Ans. Yes. Memory is used to broadcast the programming information in concurrent mode. As soon as the programmer is powered down, no design content remains in the memory components.

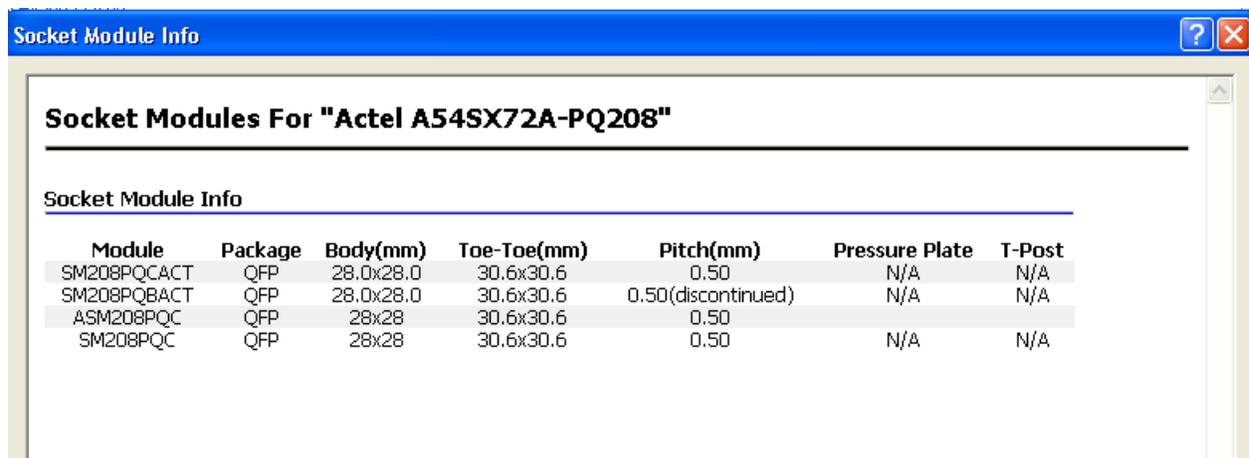
Refer to the non-volatility certificate available at:

www.actel.com/documents/Memory_SiliconSculptor_CL.pdf for more information.

5. Where can I find a list of adapter module part numbers for Silicon Sculptor?

Ans. The adapter modules are device, package, and programmer specific. The list of modules for Silicon Sculptor is available at: www.actel.com/products/hardware/program_debug/ss/modules.aspx.

You can also get the module information from the SculptW software: **Device > Device Info and Device > Socket Module Info**



Module	Package	Body(mm)	Toe-Toe(mm)	Pitch(mm)	Pressure Plate	T-Post
SM208PQCACT	QFP	28.0x28.0	30.6x30.6	0.50	N/A	N/A
SM208PQBACT	QFP	28.0x28.0	30.6x30.6	0.50(discontinued)	N/A	N/A
ASM208PQC	QFP	28x28	30.6x30.6	0.50		
SM208PQC	QFP	28x28	30.6x30.6	0.50	N/A	N/A

Figure 1: Socket Module Info Window

Part number naming convention:

- ACT = initial release
- AACT = -1 (i.e. SM208PQ-ACTEL-1)
- BACT = -2 (i.e. SM208PQ-ACTEL-2)

6. Is there any limit on how many devices can be programmed with a Silicon Sculptor adapter module?

Ans. Below is the Life cycles of Actel Silicon Sculptor modules:

Table 1: Silicon Sculptor Modules Life Cycles

Adapter Type	Typical Insertion cycle life
Module Base	> 50,000 insertions
Standard Pitch Socket Modules	10,000 to 20,000 insertions
BGA Sockets Modules	2,500 to 10,000 insertions

Carefully insert and remove the module from the programmer to avoid damage to the DIN connectors (pins at the backside of the adapter module). Typical insertion cycles can be prolonged if the module base and socket modules are properly cleaned and maintained. Handling and cleaning practices can affect the number of insertions achieved.

In addition to maintaining the adapter module within the insertion limit, if you experience a lot of continuity failures, then isolate the module and debug the issue. Please see details in Question 8 below.

7. Can I use the same module for different devices? For example, if I have an SM84P-ACTEL-1 module, can I use it to program an A1020B-PL84 or an A3265DX-PL84 device?

Ans. You can program the majority of Actel antifuse devices using the same package module on Silicon Sculptor. However, some devices require a new revision or a different module for programming. For the appropriate module needed to program each Actel device, refer to the module list at:

www.actel.com/products/hardware/program_debug/ss/modules.aspx.

8. How to debug continuity failures?

Ans. Isolate the adapter module if you experience a lot of continuity failures. Run blank check with continuity check selected (see screen shot below) 20 times on a known blank device. If you experience intermittent failures then the module may be defective. You should confirm this by running blank check 20 times with another adapter module and the same device. If you see consistent PASS then it is confirmed that the subject adapter module is bad.

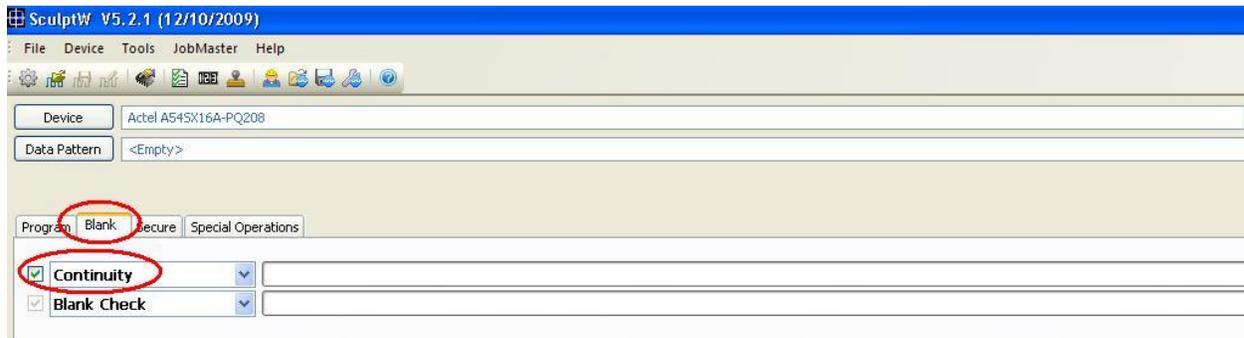


Figure 2: Debugging continuity failures

Note: By default the continuity test is not enabled. In order to enable continuity test, select any APA device from the device list and select the **Program** tab. You can see continuity test as pre-selected. Click on the **Program** button without inserting any device or module in the Programmer. The operation will fail but at the same time the continuity test will be enabled for other devices. The continuity test is not available for all antifuse devices. Most of SXA, eX, AX devices support this test. If you are using a device that does not support continuity test, contact tech@actel.com for further assistance.

9. Can I use Silicon Sculptor Adapter Modules to program Actel devices with other BP programmers such as BP1710, BP2710 or vice versa?

Ans. Yes, Actel recommends using Silicon Sculptor Adapter Modules to program Actel devices with other BP programmers. However, you cannot use all BP Adapter Modules to program Actel devices with Silicon Sculptor. Check Question 5 above to find out the appropriate BP module for a given Actel device.

10. The self test failed for the BGA329 Adapter Module for Silicon Sculptor. Is there any specific handling required?

Ans. The lid of the BGA 329 Adapter Module is made of metal. When you run the self test with the lid closed, the lid may come in contact with the base of the socket, which is also made of metal. This will result in a "self test failed" result for this particular adapter module. It is recommended to run the self test for this particular adapter module by keeping the lid open. If it still fails the self -test, contact Actel technical support for replacement.

You can run self test for all other modules with the lid closed.

11. How frequently should I run the self test?

Ans. You must ensure that all programming hardware is in good, working condition. This requires regular execution of the hardware self-diagnostic test and maintaining valid calibration of the programming hardware. Perform the self-diagnostic test before every programming session.

12. How do I perform Silicon Sculptor's calibration verification?

Ans. Refer to the *Silicon Sculptor Verification of Calibration Work Instruction* (www.actel.com/documents/SiliSculptProgCali_UG.pdf) for details on performing the verification of calibration of Silicon Sculptor.

13. How do I setup Silicon Sculptor for concurrent programming?

Ans. Silicon Sculptor is a concurrent programmer that allows multiple sites to simultaneously program the same design. Your PC is used to hold the data that will be programmed into the devices. Specific programming algorithms and instructions are stored on the PC and downloaded to the programmer when you select a chip and load the buffer. Thus, the algorithm is actually executed by each programmer's internal microprocessor. This guarantees accurate waveforms and precisely controlled critical time delays independent of the PC's performance. The speed of your PC will only affect the rate at which the programming algorithm and data is downloaded to the programmer, not the programming yield.

For more information on how to setup multiple Sculptors to facilitate concurrent programming, refer to the *Silicon Sculptor User's Guide* (www.actel.com/documents/silisculptII_sculpt3_ug.pdf).

14. What is the maximum number of Silicon Sculptor II or 3 programmers that I can daisy-chain?

Ans. Two Silicon Sculptor II units can be joined together using standard IEEE 1284 parallel cables. From a single PC (through USB port), a maximum of 12 Silicon Sculptor 3 can be connected to run programming concurrently.

For more details refer to the *Silicon Sculptor User's Guide* (www.actel.com/documents/silisculptII_sculpt3_ug.pdf).

Activator¹

15. How can I verify that the software driver for the Activator (2/2S) is configured properly?

Ans. Double-click the device icon located in the Control Panel program group. Look for the “Aspi32” driver. The driver status must be **Started** and **Automatic**.

16. How do I configure the Adaptec AVA-1505A SCSI Card for Windows[®] 95/98?

Ans. To configure the Adaptec AVA-1505 SCSI controller card for Windows 95, refer to the *Installing the 1505A Card* section of the *Activator and APS Programming System - Installation and User's Guide* (www.actel.com/documents/ActivatorUG.pdf.)

17. How do I configure the Adaptec AVA-1505 SCSI Card for Windows NT 4.0?

Ans. To configure the Adaptec AVA-1505 SCSI controller card for Windows NT 4.0, refer to the *Installing the 1505A Card* section of the *Activator and APS Programming System - Installation and User's Guide* (www.actel.com/documents/ActivatorUG.pdf.)

18. Can I use an existing Adaptec SCSI Controller on a PC?

Ans. You can only use an Adaptec SCSI controller card with Activator 2 or 2S. You cannot use any other manufacturer's SCSI card. You need to find an appropriate SCSI cable to match your board's external SCSI connector to the Activator 2 or 2S connector (female DB50 for Activator 2, DB25 for Activator 2S).

IMPORTANT: Activator 2 or 2S must be the last device in the SCSI chain, as Activator 2 and 2S contain termination resistors. If SCSI ID number 5 is not available on your SCSI bus, set the rotary switch on the back of your Activator 2 or 2S to an available SCSI ID and invoke the APSW programming software with an additional parameter, as described below. These examples assume that your Actel software is installed in the “c:\actel” directory, and that you want to use SCSI ID number 4.

The following procedure is for Windows NT 4.0 and Windows 95.

1. From the main window, right-click **Start**.
2. Select **Open All Users (Open for Windows 95) > Programs > Designer Series 3.1** and click **Windows Programming**.

¹ Activator 2/2S and hardware accessories have been discontinued and hence Actel will provide limited support. Actel will not approve RMA for the failed devices if they exceeded the programming failure guideline.

3. From the **File** menu, select **Properties > Shortcut**.
4. Append `devactivator2: <SCSI ID>` to the command line, as shown below:
`C:\actel\bin\apsw.exe devactivator2:4`

19. How can I determine what IRQ and I/O addresses are used by the installed add-in cards?

Ans. To determine the IRQ and I/O addresses being used by the installed add-in cards, follow the instructions below:

1. Double-click the **Computer** icon. The **Computer Properties** window is displayed.
2. Click the **Interrupt Request (IRQ)** button to view the IRQ already in use.
3. Click the **Input/output (I/O)** button to view the I/O addresses already in use.

The default interrupt number is IRQ11, but can be set from IRQ9 to IRQ12. The default I/O address is 340h-35Fh, but can be set to 140h-15Fh. For information about changing the I/O address on the 1505A card, refer to the *Jumper Block Settings* section in the [Adaptec AVA-1505A AT-to-SCSI Host Adapter Installation Guide](#).

If all the interrupts between IRQ9 and IRQ12 are being used, you must change the IRQ settings on another card to free one of these interrupts for the 1505A card.

20. The green power light is blinking after I turn on the power in Activator. What is the problem?

Ans. A self test has failed. Activator has been discontinued and Actel no longer supports failed units. Refer to the Actel website for a list of supported programmers.

21. What does the error message “SCSI Controller not found” (PC only) mean?

Ans. The SCSI controller board has not been installed in the PC or there is a SCSI I/O address conflict. Also, verify that the device driver(s) were installed correctly. For more information, refer to knowledgebase article 1184 (www.actel.com/kb/article.aspx?id=SL1184.)

22. What does the error message “Firmware load failed. WARNING: Could Not Connect With Activator 2” mean?

Ans. This message is displayed by Actel's Windows Programming software when no contact with the programmer can be found. If this occurs, check that you have turned on the Activator 2/2S programmer and that the SCSI cable is correctly installed. Make sure that the SCSI cable connection is secure.

The locking arms on the SCSI board can easily be misaligned. Also, verify that the device driver(s) were installed correctly.

For more information, refer to the *Activator and APS Programming System - Installation and User's Guide* (www.actel.com/documents/ActivatorUG.pdf.)

23. What does the message “Error: Activator communication link down. Exiting” mean?

Ans. There is a problem with the connection between the Activator and the PC or the Activator has lost power. Check the connections (the Activator power light should be illuminated), and try re-invoking APSW.

For more information, refer to the *Activator and APS Programming System - Installation and User's Guide* (www.actel.com/documents/ActivatorUG.pdf.)

24. Is there any memory in the Actel Activator programmer?

Ans. No. The programming information is downloaded to the programmer during the programming of a device.

25. Where can I find a list of adapter module part numbers for Activator?

Ans. The adapter modules are device-, package-, and programmer-specific. The list of modules for Activator is available at: www.actel.com/products/hardware/program_debug/activator/modules.aspx.

26. How do I run the Activator 2 test Procedure?

Ans. You can run the diagnostic test for the Activator 2 and 2S. The procedure is described in the knowledgebase article 1233 (www.actel.com/kb/article.aspx?id=SL1233.)

If you use the programmer occasionally, run the self test before programming. If you use the unit daily, test it once a week.

27. How frequently do I need to calibrate Actel Activators?

Ans. Actel Activators are calibrated before leaving the factory and should not require any further calibration during their lifetime. Actel provides a diagnostic utility (Activator Diagnostic Test) that you can run to guarantee that Activator is operating within the calibration specifications. Actel recommends that you run this diagnostic test on a schedule that coincides with your normal hardware calibration routine (typically once every six months). If you find the Activator “out of specification” after running the diagnostic tool, you must calibrate the unit.

28. How do I perform the Activator 2/2S calibration?

Ans. Actel used to provide contacts of third-party vendors for performing calibration. Since Activator is now discontinued, Actel no longer provides this information.

29. What is the maximum number of Activator programmers that I can daisy chain?

Ans. Activator programmers cannot be daisy chained.

30. Where can I get the APSW software?

Ans. You can download the APSW software from the Actel site:
www.actel.com/products/hardware/program_debug/activator/default.aspx.

31. Does the programming software also work on HP/Solaris workstations?

Ans. APSW is available for HP and Solaris workstations, but Silicon Sculptor is only available for Windows.

32. How do I verify the functionality of a programmed device with the APSW debugger?

Ans. The Activator 2/2S can be used to verify functionality of an Actel FPGA (not available for SX and newer devices) by using special debugger software to stimulate inputs and to observe outputs and internal nodes. For complete information on how to invoke the debugger software and write verification commands, refer to *Activator and APS Programming System - Installation and User's Guide*.

33. What is the *.avi/*.txt file? When and where is it generated?

Ans. The *.avi/*.txt file is a log file that is generated when an Actel FPGA is programmed. The file contains information about the number of VPP voltage pulses applied to program each fuse and the programming current sensed through each fuse. If a programming failure occurs, the *.avi/*.txt file contains information about the programming failure mode. A new *.avi/*.txt file is generated each time the programming sequence begins. If you want to save a *.avi/*.txt file, you must rename it before restarting the programming sequence. You can find an example and explanation of an *.avi file in the *Activator and APS Programming System - Installation and User's Guide*.

The *.avi file is generated by Activator and the *.txt file is generated by Silicon Sculptor. Silicon Sculptor generates the *.txt file for RadTolerant and RadHard devices only. However, due to some limitations, it does not generate a .txt file for RTSX/RTSX-S devices.

34. After loading the *.afm file successfully, why am I getting "Unable to open AFMBLANK file" when I click on Blankcheck in Activator?

Ans. Check if the file <family>.afm exists in the \$ALSDIR/data/a<family>/<family>/<family>.afm directory. If the file does not exist, APSW gives this message. Uninstall and reinstall the software to resolve this problem.

35. If I program four devices in the Activator's four sockets, will I get four different *.avi files for four parts?

Ans. No, you will get only one *.avi file that contains information about all four sockets.

36. Can I still program with *.def and *.fus files on Activator?

Ans. Yes, you can still program Actel FPGAs with the *.def and *.fus files by using the appropriate method described in the knowledgebase article 1270 (www.actel.com/kb/article.aspx?id=SL1270.) Currently, Actel Designer tool only generates an *.afm file.

Programming Software

37. Where can I get Silicon Sculptor?

Ans. Silicon Sculptor for Windows is available for download from the Actel website: www.actel.com/download/program_debug/ss/default.aspx.

38. What is the minimum version of Designer and Silicon Sculptor required to generate *.afm files for different devices?

Ans. Actel recommends using the *.afm file generated from the latest Designer version. Table 2: lists the minimum Designer and Sculptor version to be used for the different antifuse families. Actel may deny return material authorization (RMA) or failure analysis requests if you use older versions of the software. Actel recommends checking Libero® Integrated Design Environment (IDE)/Designer and Silicon Sculptor release notes as well as customer notifications before programming any device. The release notes and customer notifications contain requirement of using specific software versions.

Libero IDE/Designer release notes: www.actel.com/download/software/libero/default.aspx

Silicon Sculptor release notes: www.actel.com/download/program_debug/ss/default.aspx

Customer notifications: www.actel.com/support/notifications/default.aspx

Table 2: Minimum Designer and Sculptor Software Version Requirements

Family	Designer Version	Silicon Sculptor version	Comments
ACT1, ACT2, ACT3, 1200XL, 3200DX	R2-1999 or later	Any supported version	N/A
RT1020, RT1280A, RT1425A, RT1460A, and RT14100A	R2-1999 or later	Latest version	N/A
RH1020, RH1280	R2-1999 or later	Latest version	N/A
40MX, and 42MX	R2-1999 or later	Latest version	N/A
54SX, RT54SX	R1-2000 or later	SculptW v4.62.2 or later	Check PCN0706
54SXA	6.2 SP1 or later	SculptW v4.72 or later	Check PCN0801
eX	R1-2000 or later	SculptW v4.72 or later	Check PCN0801
RT54SX-S, RTSX-SU	6.2 SP1 or later	SculptW v4.68.1 or later	Check PCN0718
AX, RTAX-S, RTAX-DSP	Latest version	Latest version	N/A

39. Can I have more than one version of Silicon Sculptor installed on the PC at the same time? If so, how?

Ans. To have more than one version of Silicon Sculptor installed on your PC, use the following steps:

1. Go to www.actel.com/custsup/updates/silisculpt/ and download the latest Windows version of Silicon Sculptor (SculptW) programming software.
2. Go to **Start > Run**.
3. Browse and select the SculptW executable file. Add a "-P" flag.
4. Click **OK**. The installation wizard starts and prompts you to complete the installation.

After the installation is complete, you will find both old and new versions in **Start > Programs > Actel**.

40. Can I get the programming time of different antifuse devices?

Ans. Table 3: shows the programming time collected from in house programming center. It may vary slightly.

Table 3: Elapsed Programming Time

Family	Device	Programming Time (mins)
ACT1	1010A	5
ACT1	1010B	5
ACT1	1020A	10
ACT1	1020B	10
ACT1	RT1020	45
ACT2	1225A	12
ACT2	1240A	15
ACT2	1280A	20
ACT2	RT1280	20
ACT3	14100A	45
ACT3	1415A	20
ACT3	1425A	15
ACT3	1440A	25
ACT3	1460A	35
ACT3	RH1280	60
ACT3	RT1280	20
ACT3	RT14100A	45
ACT3	RT1425A	25
ACT3	RT1460A	35
1200XL	1225XL	20
1200XL	1240XL	25
1200XL	1280XL	45
DX	32100	45
DX	32140	45
DX	32200	45

Family	Device	Programming Time (mins)
DX	32300	60
DX	32300V	60
DX	3265	25
40MX	40MX02	10 (20: -F)
40MX	40MX04	10 (20: -F)
42MX	42MX09	15 (20: -F)
42MX	42MX16	20 (25: -F)
42MX	42MX24	35 (40: -F)
42MX	42MX36	45 (50: -F)
SX	SX08	10
SX	SX16	17
SX	SX16P	17
SX	SX32	31
RTSX	RTSX16	17
RTSX	RTSX32	31
SXA	SX08A	8
SXA	SX16A	17
SXA	SX32A	30
SXA	SX72A	50
RT54SXS	RT54SX32S	45
RT54SXS	RT54SX72S	50
RTSXSU	RTSX32SU	45
RTSXSU	RTSX72SU	50
AX	AX125	12
AX	AX250	17
AX	AX500	28
AX	AX1000	70
AX	AX2000	120
RTAXS	RTAX250S	18-30
RTAXS	RTAX1000S	70

Family	Device	Programming Time (mins)
RTAXS	RTAX2000S	120
RTAXS	RTAX4000S	240

41. Do I need a license to run Silicon Sculptor?

Ans. No, you do not need to have a license to run the software.

42. Do I need admin rights to install and run Silicon Sculptor?

Ans. Yes, you need Administration rights to the local workstation for both installation and at least the first launch of BPWin

- You must have full control permissions for the following registry keys and all subkeys:
 - HKEY_LOCAL_MACHINE\Software\BP Microsystems
 - HKEY_CURRENT_USER\Software\VB and VBA Program Settings\SculptW

43. Silicon Sculptor II programmer does not communicate with computers installed with Windows 2000/XP, and the GUI is fixed in demo mode. What is the communication problem and why is the GUI fixed in the demo mode?

Ans. Silicon Sculptor II programmers are based on the BP x600 technology. These programmers are faster than other programmers from BP, partly because they use EPP communication on the LPT1 port. You must set the Silicon Sculptor II programmer to EPP; otherwise, it does not communicate on most computers and the GUI will remain fixed in demo mode.

You need to go into the BIOS setup, find the LPT1 port settings, and change the LPT1 Port mode to EPP.

There may be cases where the Silicon Sculptor II programmer will still fail to communicate with computers with Windows 2000, no matter which parallel port setting is used.

In this case, if the Silicon Sculptor II programmer still cannot communicate with the computer, the parallel port cable may be the problem. Silicon Sculptor II programmers must use IEEE 1284-compliant parallel port cables.

If Silicon Sculptor 3 comes as demo mode, check if the USB driver is installed properly. Then manually uninstall/reinstall the driver to make sure it is not the driver issue.

44. Can I use BPWin to program Actel devices?

Ans. No. You need to use Silicon Sculptor (SculptW) to program Actel devices. Although Actel devices are supported in BPwin, sometimes specific fixes are not available in BPwin. If you use BPwin to program an Actel device and encounter programming failure, contact tech@bpmicro.com.

45. Is the *.avi/*.txt file supported in Silicon Sculptor?

Ans. The *.txt file is supported in Silicon Sculptor only for RadTolerant and RadHard devices. No *.txt file is supported for RTSX/RTSX-S devices.

46. Why am I getting a five digit checksum (example: CSUM=7EA7C) under "Data Pattern" when I load an *.afm file in the SculptW?

Ans. This checksum is not related to an Actel device or an Actel *.afm file. The BP software calculates this number for other use. There is no need to worry about this as it is not related to Actel.

47. In Silicon Sculptor, under Device > Option, I see two other options: "secure after programming" and "secure after verifying". What is the difference between these two options?

Ans. **Secure After Programming** is the option we use for Actel devices. **Secure After Verifying** is used for EPROM devices. BP uses the same interface for the Actel software and the BP software. Selecting **Secure After Verifying** does not do anything to Actel devices. If you want automatic secure, use the **Secure After Programming** option.

48. What are the functions of the Blankcheck and Checksum commands in the software?

Ans. The **Blankcheck** button or menu command executes a test to determine if a device has already been programmed. Blankcheck is performed automatically before the chip is programmed or when the command is executed. Executing Blankcheck results in either "blank" or "not blank", followed by the silicon signature, checksum, and security fuse status read from the device. Only blank devices of the correct type (according to the design parameters) result in a blank status.

The **Checksum** button or menu command verifies that the current programming file is the same as the one used to program the device. The **Checksum** command compares the checksum number, computed from the programming file, to the checksum number programmed into the chip. If the two numbers are the same, the program displays “PASSED.” If the two numbers are not the same, the program displays “FAILED,” with additional comments to briefly explain why it failed.

49. What version of SculptW has the PV_NVCC test (charge pump) for MX devices?

Ans. SculptW v4.78.1 or later.

50. Why do I get the following error message: "BpUsb:CSystem:BulkRead: Bulk In Transfer Failed"?

Ans. This error occurs due to a USB driver issue. Uninstall/Reinstall Windriver manually.

For more details refer to the *Silicon Sculptor User's Guide* (www.actel.com/documents/silisculptII_sculpt3_ug.pdf).

51. What is broadcast mode? How do I initiate it?

Ans. While programming a batch of same target device, you can select the broadcast mode in order to save time (by avoiding repetitive command in the software). You can select **Quantity more than 1** (see Figure 3:), the programmer automatically enters in broadcast mode.

If this mode is selected, the first device has to be programmed successfully in order to complete broadcasting to the other sites of the programmer (for multi-site programmer). After the first device is successfully programmed and the broadcast is completed, users will not depend on the software GUI and just need to change the devices and push the **START** button on the programmer.

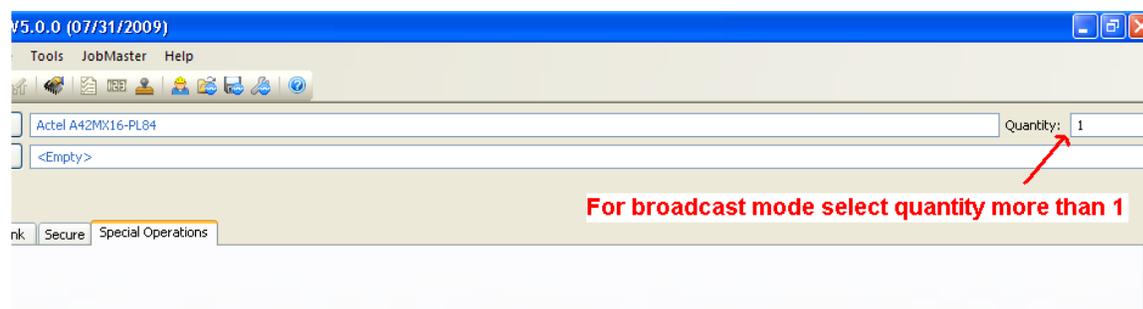


Figure 3: Quantity Selection

Programming Files and Functions

52. What files can I use to program a device?

Ans. For details on the files that you can use to program a device, see Table 4: below:

Table 4: Files for Programming

Activator	Silicon Sculptor
*.adb or *.afm file	*.afm file

53. Can I generate *.afm files from *.def and *.fus files?

Ans. Yes, it is possible to generate *.afm files from *.def and *.fus files. Refer to Knowledgebase article 1270 (www.actel.com/kb/article.aspx?id=SL1270) for more information.

54. What does AFM stand for?

Ans. AFM stands for Actel Fuse Map (programming file type for antifuse devices only).

55. Can I read back the design content from a programmed FPGA to make a copy of the same design?

Ans. No, you cannot read back design content from a programmed antifuse device.

56. Why does the log file say that the size of the file is zero when I load the *.afm file?

Ans. The *.afm file is corrupted. Regenerate the *.afm file and compare with the existing one. Also compress (Zip) the file before transmitting from the host PC.

57. I get the following error message when loading my *.afm file into SculptWin: “bad data format in data file”. “Expected header code of 70, received code 3C and cannot program”. How can I resolve it?

Ans. This error message is generic and does not refer to the header. The *.afm file is corrupted and must be regenerated.

58. Is there a way to determine if the *.afm file is corrupted?

Ans. After loading the *.afm file in Silicon Sculptor, check whether the log file (C:\BP\DATA\LOG) has been loaded successfully. Then regenerate the *.afm file using the same version of Designer and compare the regenerated *.afm file against the existing file; they should be identical. Make sure to zip the *.afm file to transfer it out of the host computer.

Note: Prior to SculptW v5.54, the programming used to fail if there was any blank space or carriage return. Starting v5.54 programming will continue even if there is blank space or carriage return. So you should look for other character differences in the *.afm file if you are using v5.54.

59. Generating a programming file in Designer, returns the following error message: "You are not licensed to program this device. Please contact Actel Customer Support for further information". Why?

Ans. You are using a 45-days Platinum Evaluation license. This license restricts generating a programming file. You can either buy a full Platinum license or use a one-year Gold license, if it supports your target device. For more information on device support, refer to

www.actel.com/products/software/libero/default.aspx#device.

60. Can I program an RTSXSU (UMC) device with the *.afm file created for an RT54SXS (MEC) device or vice versa?

Ans. You can ONLY target an RT54SXS device in Libero IDE or Designer. RTSXSU device selection is only available in Silicon Sculptor.

You can load the *.afm file and program a mixed batch of RTSXSU and RT54SXS devices with any of the two devices selected in Silicon Sculptor.

61. Can I program a -1 speed grade device with the *.afm file created for a standard speed grade device?

Ans. Yes, the programming software does not check the speed grade. However, you may have functionality problems due to different timing numbers.

62. Can I use the same programming file with devices of different technologies?

Ans. If you generate a programming file with one technology, (for example, a1020A), but actually program a different technology of the same device (for example, an RH1020), there are risks that this operation will not be successful. Because of the differences in separate revisions of devices, there are variations in programming. They include the programming voltage level and length of time allowed before the device "times out," which might result in a programming failure. In addition, there are AC timing differences from one technology to the next. If proper simulation is not performed, the new device technology may not exhibit the same AC characteristics as the original. To avoid these issues, Actel recommends using the *.afm files generated specifically for the device you want to program.

User Action

Required: Whenever you change to a new device, you must update the design files to the targeted device type prior to programming the new device. This ensures that the device receives the proper programming steps and settings.

Recommended: Actel recommends that you re-simulate your designs for the new device type to ensure that all timing requirements are met.

Warranty: Actel does not provide any warranty for devices that are programmed with an incorrect device type file. Programming failures resulting from the device being programmed with the incorrect file types will not be accepted for replacement unless approved by Actel Technical Support.

63. Can I retarget to a compatible device with just an *.afm file?

Ans. No, the *.afm file for one technology cannot be used to program a device of another technology—even if the parts are compatible. In general, there is no way to regenerate any design database information from just the *.afm file.

64. Can I use ACT 2 *.afm files to program 1200XL devices?

Ans. While it is true that ACT 2 and 1200XL devices are pin-to-pin compatible, their *.afm files are not the same. The primary difference between ACT 2 devices and 1200XL devices is the length of the register used for programming; 1200XL devices have a much longer register chain.

To program a 1200XL device, you must regenerate the *.afm file. Actel also recommends that you rerun timing and simulation since the 1200XL devices are faster.

Note: You may use ACT 2 *.afm files to program "A" rev ACT 2 devices (that is, 1280 *.afm file can program 1280A device) since the register chains are of the same length.

65. Can I use 1020A files to program a 1020B device?

Ans. Yes, the 1020B is compatible to the 1020A, but the timing will be different because the 1020B device technology is faster. Actel strongly recommends that you rerun all timing analyses after making the compatible die change.

66. How do I check which version of Designer was used to create my *.afm file?

Ans. Open the *.afm file in a text editor. The header states the Designer release number that was used. The following example is an excerpt from a *.afm file:

```
| PROGRAM Designer Series (tm) Development System
| VERSION R2-2001 Post-Prod 4.3.4.7
```

67. What is the silicon signature?

Ans. A silicon signature is a 1-5 digit hexadecimal number that can optionally be programmed into an Actel device. The silicon signature must be assigned by you during the **Fuse Generation** function in Designer. This feature is provided so you can program an individual identification code into your devices. After programming, the silicon signature can be read from the device by executing **Dev_Status** from the **Special Operation** tab.

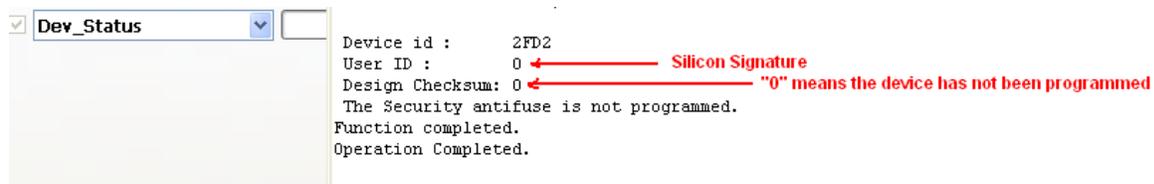


Figure 4: The Silicon Signature

68. What is PINCHECKSUM in the *.afm file?

Ans. The PINCHECKSUM variable in the *.afm file is the package-pin checksum. This checksum always has the following two values:

```
; VAR PINCHECKSUM 5e7dbf37_c9cf9fee
```

The first value (5e7dbf37) represents the package type used (for example, 84PLCC vs. 84CQFP). The second value refers to the mapping between design I/Os and their pin assignments.

69. How do I verify that a device has been programmed?

Ans. You can verify that an Actel FPGA has been programmed by placing it in any supported programmer and running a blank check/Dev_Status. If the device is programmed then you will see Fuse checksum in the Design Checksum. See [figure 4](#) above.

70. How do I determine the status of the Actel security fuse?

Ans. To determine the status of the Actel security fuse, run Dev_Status. See [figure 4](#).

71. What is the fuse checksum?

Ans. The fuse checksum is a four digit hexadecimal number programmed into all Actel devices at the end of the programming sequence. This information can be used to match a programmed device to its programming (*.afm) file. The fuse checksum is calculated from the fuses in the *.afm file and stored in the device. This number is unique for each fuse map. This number can also change when the target die is changed, even if no change is made to the layout of the device. The checksum is the last information programmed to the device, which is the best way to ensure that all the information has been programmed successfully.

72. Why do I see a different fuse checksum in the Axcelerator[®] *.afm file when it is regenerated from 8.0 Sp2 or later?

Ans. Starting from 8.0 SP2, the checksum calculation of an AX/RTAX-S device includes IO CSR (configuration shift register, responsible for I/O attributes) fuses. If you regenerate the *.afm file from an older *.adb file, you will see a change in the checksum, even though nothing has changed. Previously, only a layout change would trigger to change the checksum. When you change the I/O attribute (in MVN) you do not need to run-layout. The layout button stays green, so the checksum remains the same.

With the new change, we are now calculating the checksum taking I/O attributes into consideration, so that if there are any changes in I/O attributes, the change will be reflected in checksum.

However, as we are adding I/O fuse into calculation, even if there is no change in IO attribute, opening Libero IDE 8.0 SP2 will change the checksum.

73. What is the difference between Array, Security, Probe, and Program fuse types?

Ans. When you program an Actel FPGA with either the APSW software and an Activator, or SculptW software and Silicon Sculptor, you have the option to select the fuse type. Depending on the device family you are using, you will be given the options as shown below:

Table 5: Fuse Types

Fuse Types For All Actel Antifuse Devices Except ACT 1 and 40MX	Fuse Types For ACT 1 and 40MX Devices
Array	Array
Security	Probe
	Program

The differences between these fuse types are as follows:

- **Array Fuses:** Used to implement your design on the FPGA
- **Security Fuse:** Used to disable Silicon Explorer Debugger capabilities
- **Probe Fuse:** Used to disable Silicon Explorer Debugger capabilities (ACT 1 and 40MX only)
- **Program Fuse:** Prevents additional data from being programmed into the device (ACT 1 and 40MX only)

For more information please refer to the *Silicon Sculptor User's Guide* (www.actel.com/documents/silisculptll_sculpt3_ug.pdf).

74. Will parts programmed with Silicon Sculptor have the same checksum as devices programmed on the Activator?

Ans. Yes.

75. What is the probability of getting a correct checksum but an incorrect program fuse?

Ans. Each fuse is individually verified during programming and additional programming verification tests are performed before the checksum is programmed. Programming occurs in this order to ensure that the array fuses are programmed correctly. All units that pass programming are guaranteed to function properly.

76. Concerning the programming file *.afm, is there a way of incrementing the silicon signature without redoing place-and-route?

Ans. There is no way of incrementing the silicon signature without regenerating the *.afm file. However, it is not necessary to run place-and-route again.

77. Are all the fuses checked by Silicon Sculptor?

Ans. Each fuse is checked individually as the array is programmed. After all array fuses are programmed, a series of additional "net shorts" tests are performed to verify that no additional fuses have been programmed. Checksum fuses are programmed after the net shorts tests are performed.

78. What does EIT test mean?

Ans. EIT stands for Enhanced Integrity Test. It is one of the final programming tests performed to check the integrity of the un-programmed antifuses in the device.

79. What is the reason of getting "Bad device id" during programming?

Ans. This error occurs mostly due to bad contact. Clean the socket module with a blower. Also, check the leads of the devices. Sometimes, due to the oxidation, the leads cannot make good contact with the module. RoHS devices cannot be in open ambient for more than a day, otherwise they will oxidize quickly.

Another reason could be due to broadcasting in multisite programmer: if you have devices from one UMC in a master site and devices from MEC in the other sites, or vice versa, this will result in this error. This applies to SXA devices only.

80. What does "Function aborted" during programming mean?

Ans. You should not get this error message. This message appears during programming actions if the user stops the action by pressing ESC or Cancel. To avoid this inadvertent situation, set the programmer configuration to Novice Mode (File/Configuration). In this case, any user interruption will be prompted with a confirmation pop-up window.

81. What does the error message “Antifuse xxx, Pulse xxxx, Cannot program” mean?

Ans. The error message “Antifuse xxx, Pulse xxxx, Cannot program” means that programming of that particular fuse failed.

82. What does the error message “Antifuse xxxx, Integrity test xxx failed” mean?

Ans. The error message “Antifuse xxxx, Integrity test xxx failed” means that a specific test failed after programming xxxx fuses.

Programming failure guideline

All the antifuse devices are expected to have 97% to 100% programming yield. The programming failure quantity is little higher in a smaller sample size and it varies from lot-to-lot.

Refer to the *Programming and Functional Failure Guidelines* for additional information on allowable programming failure quantities for different Actel device families.

If programming failure exceeds the allowable range, contact tech@actel.com before you continue programming more devices.

Miscellaneous

83. Is there a need for dynamic or static burn-in after programming?

Ans. There is no need for additional burn-in after the units have been programmed. Static and dynamic burn-in is included in the manufacturing flow for all RadHard/RadTolerant devices.

84. Can 172 CQFP sockets withstand military temperatures (–55°C to +125°C)?

Ans. The 172-CQFP socket used by Actel for military temperature testing is a custom socket made by Yamaichi (part number IC51-196-1952). The socket operates in the military temperature range (–55°C to +125°C).

85. Does Actel recommend programming a commercial part before programming an RH/RT part?

Ans. Before programming a RadHard or RadTolerant device, Actel recommends that you program a commercially equivalent device to ensure the proper setup of the hardware and software. After you have successfully programmed a commercial device, you can program your RH or RT device.

86. Where can I find the lot number and date code on Actel FPGAs?

Ans. To trace a device lot history from qualification test records, Actel must have the lot number of the device under investigation. The lot number allows Actel to identify the silicon ingot and wafer from which the device was fabricated.

For most Actel FPGAs, the lot number is printed on the bottom of the package and the date code is on the top, although there are exceptions. In either case, the lot number is easy to identify given the following example:

Lot Number: 2ACT312381

Date Code: 9919

The date code indicates that the device is fabricated in the 19th week of 1999, and the wafer is from lot number 2ACT312381.

87. Are the electrical characteristics of the device guaranteed after programming? Is it necessary to perform functional tests on the programmed units?

Ans. The electrical characteristics outlined in the Actel device datasheet are guaranteed for all devices that pass programming provided proper electro static discharge (ESD) and device handling procedures are followed. Additionally, correct functional behavior is guaranteed for all devices that pass programming.

88. Can I program the antifuse devices on board?

Ans. No, Actel neither recommends, nor supports this.

89. Is it possible to program antifuse devices in automatic testing equipment?

Ans. No, you can only program Actel's antifuse devices using Silicon Sculptor II or 3 and equivalent BP programmers.

Refer to the *Certified Programming Solutions* section of the [Programming Antifuse Devices Application Note](http://www.actel.com/documents/AntifuseProgram_AN.pdf) (www.actel.com/documents/AntifuseProgram_AN.pdf).

90. Does Actel provide programming services?

Ans. Yes, Actel offers online prototyping solutions (OPS) for limited quantities. For volume programming, Actel offers in-house programming.

For more information, refer to the Services page of the Actel website:

www.actel.com/products/services/default.aspx.

91. For CQFP packages, is there any way to program the Actel FPGA after the lead frame has been trimmed and formed?

Ans. No, once the leads are formed, there is no way to program the FPGA.

92. What is the orientation of the device while inserting the adapter module?

Ans. All adapter modules have a dot in their body to indicate how the device should be inserted. Also all the FPGAs have a pin 1 marking. The dot and xx should match while inserting the device.

Additionally, for CQFP packages follow the guidelines available at Knowledgebase Article 1227:

www.actel.com/kb/article.aspx?id=SL1227.

Actel is the leader in low-power FPGAs and mixed-signal FPGAs and offers the most comprehensive portfolio of system and power management solutions. Power Matters. Learn more at <http://www.actel.com>.



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