

# Actel Recommendations for Programming RTSX-S and RTSX-SU

## Introduction

This technical brief provides programming information and clarification of common questions regarding the programming of Actel RTSX-S (MEC fabricated) and RTSX-SU (UMC fabricated) devices. This document is intended for users performing RTSX-S and/or RTSX-SU device programming only.

## Device Selection in Actel Designer Software

Both RTSX-S and RTSX-SU devices share the same family selection in Actel Designer (Figure 1). You should target the SX-A family and select the appropriate device in the **Device Selection Wizard**. For example, for RT54SX32S and the equivalent RTSX32SU devices, select RT54SX32S and the intended package, speed grade, and die voltage. Designs targeted to the RTSX-S are compatible with both the RTSX-S and RTSX-SU families. The RTSX-S and RTSX-SU devices have the same timing limits, as published in their respective datasheets. The generated programming file (AFM) has the same programming information and can be used to program devices from both families. For example, an AFM file, targeted for programming RT54SX32S devices, can be used to program the equivalent RTSX32SU devices.

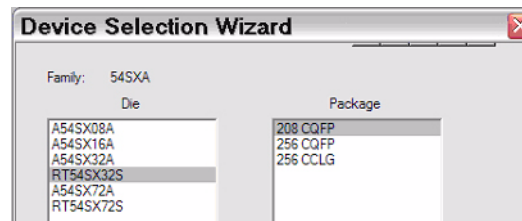


Figure 1 • Actel Designer Software's Device Selection Wizard

## Programming Support

In the Silicon Sculptor programming software, both families share the same device selection entry (Figure 2). You should select the appropriate device in the Device List. For example, when programming either the RT54SX32S or RTSX32SU device, select RT54SX32(S/SU) and the target package from the device list. Actel recommends using the latest Actel Silicon Sculptor software version and the intended programmers, Silicon Sculptor I or Silicon Sculptor II, to program the devices. Only these programmers are tested by Actel prior to software release.

Note: Starting with Silicon Sculptor software version 3.87DOS/4.50WIN, the Silicon Sculptor II programmer must be used to program all RTSX-S and RTSX-SU devices, due to the programmer memory limitation in the Silicon Sculptor I programmer.

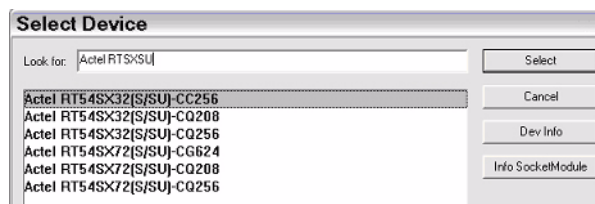


Figure 2 • Silicon Sculptor Software Device List for RTSX-S and RTSX-SU Devices.

Table 1 shows a summary of recommendations for RTSX-S and RTSX-SU devices.

Table 1 • Summary of Recommendations for Programming RTSX-S and RTSX-SU Devices

AFM File Version	RTSX-S (MEC)	RTSX-SU (UMC)	Recommended Sculptor Software Version	Silicon Sculptor Hardware
Designer v6.1 or earlier	"New" MEC Algorithm	Standard Algorithm	v3.86.1DOS/v4.49.1WIN  (v3.87DOS/v4.50WIN or later rejects AFMs from Designer v6.1 or earlier)	Silicon Sculptor I and II
Designer v6.1 SP1 or later	"Modified New" MEC Algorithm	Standard Algorithm	v3.87DOS/v4.50WIN or later  (v3.86.1DOS/v4.49.1WIN or earlier rejects AFMs from Designer v6.1 SP1 or later)	Silicon Sculptor II only

## Recommendations for Programming MEC RTSX-S Devices

Actel strongly recommends using the programming software v3.87DOS/v4.50WIN or later to benefit from the Modified New MEC Algorithm enhancements for RTSX-S devices. The Modified New Algorithm provides improvements to the overall programming performance and yield (for details, refer to the "Summary of Revision History" section on page 3). To utilize the Modified New MEC Algorithm, you must do the following:

- Use Silicon Sculptor programming software v3.87DOS/v4.50WIN or later
- Generate the AFM programming file using Designer v6.1 SP1 or later
- Use Silicon Sculptor II programmer

AFM programming files generated from Designer v6.1 SP1 or later are designed to work with programming software v3.87DOS/v4.50WIN or later and are not compatible with previous releases. AFM programming files generated from Designer v6.1 SP1 or later will be rejected by previous programming software, v3.86.1DOS/v4.49.1WIN and earlier.

If you continue using previous AFM versions, against Actel recommendations, you should use the following:

- Silicon Sculptor programming software v3.86.1DOS/v4.49.1WIN (the last release prior to v3.87DOS/v4.50WIN)
- AFM files generated from Designer v6.1 or earlier
- Silicon Sculptor I or Silicon Sculptor II programmers

AFM programming files generated from Designer v6.1 or earlier will be rejected by the programming software v3.87DOS/v4.50WIN or later.

## Recommendations for Programming UMC RTSX-SU Devices

The Modified New MEC Algorithm is an improvement to increase overall programming performance for the MEC RTSX-S devices only. RTSX-SU devices continue to use the same algorithm in v3.87DOS/v4.50WIN that was introduced in v3.83DOS/v4.46WIN, with minor programming improvements to increase the overall programming yield (for details, refer to the "Summary of Revision History" section on page 3). Actel strongly recommends using AFM files generated from the latest version of Designer software with the latest programming software release. You are encouraged to update your AFM files to Designer v6.1 SP1 or later and use the programming software v3.87DOS/v4.50WIN or later to program RTSX-SU devices as well. You must generate AFM files from Designer v6.1 SP1 or later for compatibility with the v3.87DOS/v4.50WIN or later release.

If you continue using previous AFM versions, you should use the following:

- Silicon Sculptor programming software v3.86.1DOS/v4.49.1WIN (the last release prior to v3.87DOS/v4.50WIN)
- AFM files generated from Designer v6.1 or earlier
- Silicon Sculptor I or Silicon Sculptor II programmers

AFM programming files generated from Designer v6.1 or earlier will be rejected by the programming software v3.87DOS/v4.50WIN or later.

## Summary of Recommendations

Actel recommends that you generate (or regenerate) AFM programming files from Designer v6.1 SP1 or later and use Sculptor software version v3.87DOS/v4.50WIN or later.

## Summary of Revision History

Actel has developed a New MEC Algorithm (Sculptor software v3.81DOS/v4.44WIN) to enhance performance in programming MEC RTSX-S devices. Support for UMC RTSX-SU devices was introduced in Sculptor software v3.83DOS/v4.46WIN. A Modified New Algorithm has also been developed (Sculptor software v3.87DOS/v4.50WIN or later) to improve the programming of low current dynamic antifuses for MEC RTSX-S devices, further enhancing the overall programming performance and yield. The AFM programming files generated from Designer v6.1 SP1 or later contain enhanced information to support the Modified New MEC Algorithm. [Table 2](#) provides a summary of revision history since the New MEC Algorithm was introduced in v3.81DOS/v4.44WIN.

Table 2 • Summary of Revision History

Sculptor Software Version	Modifications
3.81DOS/4.44WIN	<ul style="list-style-type: none"> <li>• New algorithm for RTSX-S (MEC)</li> <li>• No restrictions on AFM requirements</li> </ul>
3.83DOS/4.46WIN	<ul style="list-style-type: none"> <li>• Support for RTSX-SU (UMC)</li> <li>• No restrictions on AFM requirements</li> <li>• Improved testing for EOP/EOC failures for MEC</li> </ul>
3.85DOS/4.48WIN	<ul style="list-style-type: none"> <li>• Post-programming verification change on RTSX-S and RTSX-SU (I<sub>CCA</sub> fix)</li> <li>• Issue with SM208CQSX-ACTEL module not working on Sculptor I for RT54SX32S and RTSX32SU devices</li> <li>• Issue with RT54SX72S programming (Check6 failures)</li> <li>• No longer supports WinNT</li> </ul>
3.86DOS/4.49WIN	<ul style="list-style-type: none"> <li>• Fix for SM208CQSX-ACTEL module not working on Sculptor I for RT54SX32S and RTSX32SU devices</li> </ul>
3.86.1DOS/4.49.1WIN	<ul style="list-style-type: none"> <li>• Fix for RT54SX72S programming (Check6 failures)</li> </ul>
3.87DOS/4.50WIN	<ul style="list-style-type: none"> <li>• All fixes from prior releases including v3.86DOS/v4.49WIN and v3.86.1DOS/v4.49.1WIN are incorporated in this release</li> <li>• Modified New MEC Algorithm for RTSX-S (MEC)</li> <li>• Must use AFM from Designer v6.1 SP1 or later</li> <li>• Will reject older version AFMs</li> <li>• There are no enhancements for RTSX-SU</li> </ul>

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