



RMA Procedures for FPGA Failures User Guide

Introduction

FPGA device failures can occur by different types. For handling the FPGA device failures, follow the appropriate Return Material Authorization (RMA) procedures described in this document. Technical Support provides only the technical evaluation of the RMA request.

Note: The RMA request will be reviewed by the RMA team before approving it for processing.

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1. RMA Procedures for Failures

The following sections describe the RMA procedures for failures.

1.1 Functional or Electrical Failure

When the FPGA is programmed correctly but does not function as expected (such as, output stuck at High, incorrect output) on the board is considered as functional failure. When the FPGA is programmed correctly but exhibits incorrect electrical behavior (such as, High current, the lower voltage level at the output) is considered as electrical failure.

Follow the below instructions to address functional and electrical failures:

1. Open a case through Customer Portal - www.microchip.com/support.
2. Attach the completed [FA checklist](#) (fill in the "Electrical-Functional" tab) in the case opened through Customer Portal.
3. Provide all the required design files to perform the failure analysis. This includes, but is not limited to source files (schematic or HDL), Designer database file (*.adb), board schematics, test vectors and test bench, programming files, and timing analysis results. If needed, the Technical Support team might request for additional files. If any of these files are missing, it may hinder or impede the ability to perform a failure analysis.
4. The Technical Support team will respond with further instructions after the investigation.
5. If the failure is legitimate functional or electrical failure and not an apparent user error, then the Technical Support team will instruct you to send the device for Failure Analysis (FA). The instructions will include how and where to send the device(s).

Note: If the failed device is not Radiation Hardened (RH)/Radiation Tolerant (RT), it can be sent for FA using FA case number (RMA number is not required). RMA number is only required for RT/RH devices. On completion of FA, RMA decides the replacement of the failed device(s).

1.2 Hardware Failure

The following actions must be taken for hardware failures such as, evaluation/demo/development, programming adapter modules, sockets, adapter sockets, programmers (such as, FlashPro5, Silicon Sculptor 3/4), and debuggers (such as, Silicon Explorer II).

1. Open a case through Customer Portal - www.microchip.com/support.
2. Provide necessary evidence (such as, test results, log files, pictures, and any other evidence) about the failures.
3. The Technical Support team will respond with RMA instructions after the investigation.

1.3 Programming Failure

The following sections describe the required actions for programming failures.

1.3.1 Non-RH/RT Devices

If the programming failure quantity is within the range of values provided in, [Table 1-1](#) through [Table 1-5](#), open a technical support case at www.microchip.com/support.

For fallout with quantities greater than those listed in, [Table 1-1](#) through [Table 1-5](#), a case must be initiated with Technical Support to investigate the issue further.

1. Open a case through Customer Portal - www.microchip.com/support.
2. Attach the completed [FA checklist](#) (fill in the "Programming" tab) in the case opened through Customer Portal.
3. Attach the programming log file in the case opened through the Customer Portal.

Table 1-1. Antifuse FPGAs (Non -F Speed Grade) Maximum Allowed Programming Failures

Sample Size	Maximum Number of Programming Failures Allowed
<10	1
10–18	2
19–30	3
31–45	5
46–60	7
61–75	8
76–99	10
100	3%

Note: For details of SX32A and SX72A devices, see [Table 1-3](#).

Table 1-2. Axcelerator Family (All Speed Grades) Maximum Allowed Programming Failures

Guidelines for AX125, AX250, and AX500		Guidelines for AX1000 and AX2000	
Sample Size	Maximum Number of Programming Failures Allowed	Sample Size	Maximum Number of Programming Failures Allowed
<10	2	<10	3
10–18	3	10–18	5
19–30	4	19–30	6
31–45	8	31–45	8
46–60	10	46–60	11
61–75	12	61–75	13
76–99	15	76–99	15
>100	8%	>100	12%

Table 1-3. SX32A and SX72A (All Speed Grades) Maximum Allowed Programming Failures

Sample Size	Maximum Number of Programming Failures Allowed
<10	4
10–18	6
19–30	8
31–45	11
46–60	14
61–75	16
76–99	19
100	15%

Table 1-4. -F Antifuse FPGAs Maximum Allowed Programming Failures

Sample Size	Maximum Number of Programming Failures Allowed
<10	3
10–18	5
19–30	7
31–45	10
46–60	12
61–75	14
76–99	15
100	12%

Note: The table provides information about maximum allowed programming failures for -F Antifuse FPGAs other than SX32A and SX72A devices.

Table 1-5. Flash/Re-Programmable Devices

Devices	Programming Failure Rate Allowance
IGLOO [®] /e (including ARM-enabled), IGLOO nano, IGLOO ^{PLUS} , ProASIC [®] 3/e (including ARM-enabled), Military ProASIC3/EL, ProASIC3 nano, ProASIC3L, SmartFusion [®] , and Fusion [®] (including ARM-enabled)	0.5%
ProASIC and ProASIC ^{PLUS} [®] (including -F)	1% if total volume programmed <1000, 0.5% if volume >1000

1.3.2 RH/RT Devices

For all programming failures on RH/RT devices, a case must be initiated with Technical Support to investigate the issue further, as described below.

1. Open a case through Customer Portal - www.microchip.com/support.
2. Attach the completed [FA checklist](#) (fill in the “Programming” tab) in the case opened through Customer Portal.
3. Attach the programming log file in the case opened through the Customer Portal.

1.4 Visual or Mechanical Failure

Visual or mechanical failures are related to the failures or damages external to the devices. Hence your claim is valid if you file the case immediately after the incoming inspection (prior to any other processing of the devices). If you handled the device besides the incoming inspection, your claim is forfeited.

Follow the below instructions to address visual or mechanical failures for all devices:

1. Open a case through Customer Portal - www.microchip.com/support.
2. Attach the completed [FA checklist](#) (fill in the “Visual Mechanical” tab) in the case opened through Customer Portal).
3. Attach pictures of the failed devices. Do not mark the devices with sticky paper, rather take clear pictures and mark the picture to highlight the area of concern.
4. Attach pictures of the outer box.
5. The Technical Support team will respond with RMA instructions after the investigation.

2. Revision History

Revision	Date	Description
A	12/2021	Initial Revision.

Microchip FPGA Support

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Contact Technical Support Center through the website at www.microchip.com/support. Mention the FPGA Device Part number, select appropriate case category, and upload design files while creating a technical support case.

Contact Customer Service for non-technical product support, such as product pricing, product upgrades, update information, order status, and authorization.

- From North America, call **800.262.1060**
- From the rest of the world, call **650.318.4460**
- Fax, from anywhere in the world, **650.318.8044**

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- Distributor or Representative
- Local Sales Office
- Embedded Solutions Engineer (ESE)
- Technical Support

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Technical support is available through the website at: www.microchip.com/support

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ISBN: 978-1-5224-9344-0

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