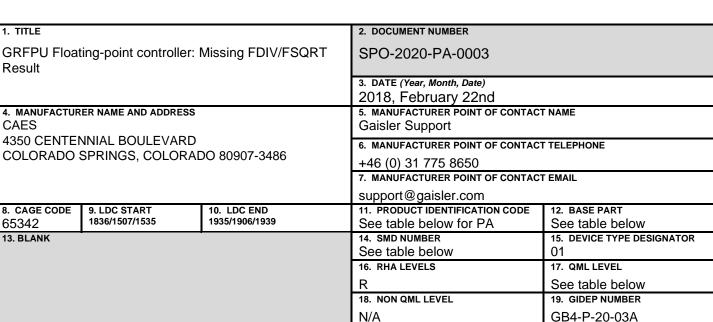
AEROSPACE DATA EXCHANGE PROGRAM TRANSMITTAL **PROBLEM ADVISORY**



20. PROBLEM DESCRIPTION / DISCUSSION / EFFECT

This document describes a corner case present in the GRFPC floating point controller, which is the hardware used to interface the GRFPU floating point unit with the LEON3/FT and LEON4/FT processors. The corner case described in this document can cause a FDIV/FSQRT operation result not to be committed to the floating point register file. The issue manifests if;

two instructions exist in the instruction flow between two FDIV/FSQRT instructions, and

• at least one of them is a floating point operation, and

• the processor encounters certain number of hold cycles after the first FDIV/FSQRT operation reaches execute stage of the pipeline.

| Base part number | PIC | SMD number | QML Level |
|------------------|------|------------|-----------|
| UT699 | WG07 | 5962-08228 | Q,V |
| UT699E | WQ02 | 5962-13237 | Q |
| UT700 | WQ03 | 5962-13238 | Q,V |

GRFPU Floating-point controller: Missing FDIV/FSQRT Result Technical note 2017-12-21 Doc. No GRLIB-TN-0013 Issue 1.3

21. ACTION TAKEN / PLANNED

Missing FDIV/FSQRT results can be avoided by avoiding the sequence described in section 19. This can be accomplished by ensuring that at least two instructions exist after an FDIV/FSQRT operation which is not a FPop1 type operation. If not, insert an extra NOP instructions after the FDIV/FSQRT until the vulnerable sequence is avoided.

The compiler workaround will do the following to prevent vulnerable sequences from being Generated (BCC 1.0.50, BCC 2.0.2, RCC 1.2.22, RCC 1.3-RC3, VxWorks 6.7 1.0.21 – Toolchain 1.0.15,, VxWorks 6.9 2.0.8 – Toolchain 1.0.4, VxWorks 7 – Toolchain 7.2.0.0, and MKPROM 2.0.63). More information on GRLIB-TN-0013, send a request to support@gaisler.com

| 22. DISPOSITIONARY RECOMM 23. ENDATION: | CHECK & 🛛 USE AS IS | CONTACT | REMOVE & | CORRECT & USE AS SPECIFIED |
|--|------------------------|---------|----------|-----------------------------|
| 24. ADEPT REPRESENTATIVE | 25. SIGNATURE | | | 26. DATE |
| Lin-Chi Huang | Sinch | 17- | | 2018, February 22nd |

CAES