SCSB Decisions Regarding OTP PROM PPBI (List of Heritage OTP PROM Component Types exempted from PPBI)

and

Best Practices for Programming

ESCC REP 011

Issue 1 – December 2019

Document Custodian: European Space Agency – see https://escies.org

LEGAL DISCLAIMER AND COPYRIGHT

DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION

Scope

Under the authority of the CTB, the ESCC CTB Silicon Working Group was established in May 2019 to consider a request to waive the Post Programming Burn-in on heritage PROM components as required by ECSS-Q-ST-60C Rev.2 (clauses 4.6.4, 5.6.4, 6.6.4), and to formulate recommendations toward a potential revision of the subject Post Programming Screening Requirements.

The results and findings are documented in the Tales Alenia Space memo on PPBI requirements for PROMs dated November 2018.

The recommendations of ESCC CTB Silicon WG have been endorsed by the PSWG (in PSWG meeting #88) and the SCSB (in SCSB meeting #54). The corresponding requirements will be introduced in next revision of ECSS-Q-ST-60C Rev.2 which will make reference to this document listing the OTP PROM component types that are found to have sufficient heritage data to renounce the requirement for PPBI and additionally defines best practices to be adopted for the programming of OTP PROM component types.

Part types regarded to have a 'clear and defined heritage'

The following PROM component types have been assessed to have accrued sufficient PPBI test data and space application heritage to renounce the requirement for PPBI as part of the post programming screening sequence. These types meet the criteria of "clear and defined heritage".

- Manufacturer: Renesas (previously Harris Semiconductor, then Intersil):
  - HS-6664RH
- Manufacturer: Cobham (previously UTMC, then Aeroflex):
  - UT28F256QLE
  - UT28F256LVQL
- Manufacturer: BAE Systems (previously IBM / LORAL / Lockheed Martin Fed. Systems):
  - 197A807 / BAEP2568 (*)

    (*) 197A807 is the reference given by BAE Systems in the device data sheet. BAEP2568 is listed in the document governing procurement, SMD5962-96891, as "Vendor similar PIN"

For the part types listed above, the criteria of "clear and defined heritage" shall no longer be considered as fulfilled in the event of any major change according to MIL-PRF-38535 table A-I:

- change type: d (mask changes affecting die size or active element, wafer diameter, final die thickness),
- change type: f (metallization changes)
- change type: o (fab move)
- change type: w (modification of programming algorithms)

Best Practices for OTP PROM Component Programming

As regards programming best practices for OTP PROM components, they shall include (but not necessarily be limited to) the following:

- Incoming control, storage management, device traceability and programming operations of the OTP PROM components shall be documented in procedures.
- Only trained personnel shall be allowed to program flight PROM components.
- A method of configuration shall guarantee the programming file used for the programming. Verification of the conformity shall be performed after programming.
- Software version used for programming shall be recorded against the serial number of the programmed component.
- Calibration verification of the programming hardware shall be performed and recorded. Refer to the manufacturer's recommendation for calibration periodicity
- Self-diagnostic shall be run at the beginning of each programming campaign or prior to each programming operation (depending on PROM component type). Refer to the manufacturer's recommendation concerning self-diagnostic.
- Cleaning and visual inspection of the programming socket shall be periodically performed.
- Power line supplying the programming hardware shall be filtered and protected (i.e. use of on-line UPS (Uninterruptible Power Supply)). Manufacturer's recommendations to be followed.
- Programming area shall be classified as an ESD Protected Area (EPA).