ENVIRONMENTAL/RELIABILITY ENGINEERING

TEST REPORT

7800(3600) SYSTEM MTBF PREDICTIONS

MOE 2/15/84
ATARI INTEROFFICE MEMO

TO: D. SHAH
FROM: GIL SEYMOUR

DATE: 2/17/84
SUBJECT: 7800 (3600) SYSTEM MTBF PREDICTIONS
MEMO 2/15/84
(C024673-154)

Appreciate your effort in identifying the 7800 system failure rate. However, I might suggest the following future considerations, such that various departments do not misuse or misinterpret your point estimate failure rate number:

1. Please communicate with design assurance to inquire if any predictions are in existance. (Reliability guidelines for the 3600, presently known as the 7800, have been in existance since 10/14/83. The 3600 guidelines indicates a system prediction in document number (C024673-102).

2. The predicted failure rate summarized is the console only, not the 7800 system. The baseline 7800 system would include the power adaptor, game cartridge, switch box, controllers and the console.

3. The failure rate prediction identified in your 2/15/84 memo needs further clarification.

   (a) Identify the original return rate goal for the 7800 (3600) system.

   (b) Your assumptions need clarification:
       - Game play per day in hours
       - Warranty period
       - Power on/off cycling impact per day
       - Reliability model for the system
       - Basis of quality factors,
         (i.e. screening level assumed)

   (c) LSI's & IC failure rates must be determined on the basis of number of device gates. One cannot use a "standard" LSI failure rate when device complexity varies 3:1 and new unproven LSI devices are used.

   (d) Parts failure rates used need review. (i.e. source, assumptions and stress considerations)

   (e) Missing a cost/benefit analysis which is one of the prime purposes of doing a prediction. (Ref. 5100 Console) C024673-132

(C024673-154)
* Identifying the principal high failure rate components by % contribution. Further, considering component burn-in screening and its impact on the failure rate.

* Return rates under different screening conditions and associated warranty costs.

* Impact of in house burn-in/repair cost for various burn-in levels.

4. A failure rate prediction without an integrated product test plan, reliability guidelines, field feedback and knowledge of design decisions will provide nothing to the reliability of the product.

cc: K. Ashton
J. Gray
G. Kuczynski
R. Lewis

GS/jg
Attached is preliminary estimate of Atari '7800' system predicted failure rate and MTBF.

The calculations are based on Atari '7800' system - Rev 6, and Mil-HDBK-217D - Part Count Method.

The calculations assume that:

1) All infant mortality failures have been eliminated prior to shipment of the product (by system or component burn-in)

2) System operates in ground-benign environment with ambient temperature to 30°C.

3) The part applications are within their specifications

4) \( \eta \)-Quality factors used are considered adequate for commercial quality parts.

5) Failure rate data of custom LSI's are same as standard LSI's.

The predicted failure rate of system is: \( 142.31 \times 10^{-6} \) failures/hrs

The predicted MTBF of '7800' system is: \( \frac{1}{142.31 \times 10^{-6}} \) or 7026.9 hours.

This MTBF implies about 1.5% failures out of the first 100 hours of life.

Any comments or suggestions will be appreciated.

DS: paw

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