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To: The IEEE History Committee

Review of IEEE Milestone Proposal – Manchester "Baby" Computer

Dear Committee Members,

I have read the Milestone proposal carefully, and agree the correctness of the citation on the plaque, together with the supporting documentary material. I wholeheartedly recommend that the Committee should approve the project as described in the proposal.

The date of the correct running of the first program Monday 21st June 1948 was indelibly fixed in the minds of the pioneers at the time, corroborated by entries in the notebook of G C Tootill. Independently from enquiries by others in the past, I was involved with an extensive discussion with T Kilburn and G C Tootill in March 1996 regarding the exact nature of the first program and the circumstances of its running on 21st June 1948. The results of that discussion were published by G C Tootill in 1998 in https://computerconservationsociety.org/resurrection/res20.htm#e

The date cited on the proposed plaque is evidently correct.

There is a further consideration to add to the supporting information of the proposal that resolves an apparent ambiguity. For many years, the reference in the paper in *Nature* [ref. 1(a) in the submission] to successful running of the factoring program for 52 minutes has been conflated with the events of 21st June 1948. This is because there was no explicit evidence to the contrary. Our 1996 investigation pointed out that on the day the first program ran, the two engineers T Kilburn and GC Tootill were trying to ensure that the hardware of the machine was correct so that their program would run correctly. As well as any wiring modifications they had been making up to that point, there were a number of adjustable controls that had to be set, such as the clock period and associated timing delays. On the Monday it was that kind of setting-up that they were doing, while testing how far the program would progress before failing. Clearly they would need to see the result of an attempted run as soon as possible after making an adjustment. So they initially used small trial numbers to factorise in the program, which could then run to completion quickly. Once those trials succeeded, for the rest of the morning and then in the afternoon of the 21st, and in the following days, they progressively used larger numbers up to the 52-minute run. That signified not only the correct functioning of the storage system, but also that it had adequate reliability for useful work. In our context, the relevant fact is that the program first ran correctly in electronic storage on 21st June 1948.

F C Williams and T Kilburn are unequivocally the inventors of the Williams-Kilburn CRT storage tube technology They and only they were responsible for the unique technique that made digital storage applicable and successful in electronic computers. Furthermore, that technique was the basis of and the reason for the construction of the "Baby" computer. Without that final experiment it would not have been justifiable to declare that the storage technology was appropriate and successful in a "universal" (in the

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Turing sense) computer. The proof was that they showed that an electronically stored program and its data worked correctly and reliably at electronic speed. As a result that computer became the prototype for a highly successful series of developments leading to commercial deliveries of computers. The storage technology and the first successful running of a program using it, are inextricably bound to their two names.

Thank you for the opportunity for me to support this excellent proposal.

Yours sincerely,

Christopher Philip Burton FIEE CEng. Hon FBCS

I joined the Ferranti Computer Division in 1957 and worked on a succession of large-scale computer systems from vacuum-tube machines onwards to AI applications in the 1980s. I have been a member of The Computer Conservation Society since its foundation in 1989, leading a number of Working Parties conserving and restoring early computers. In 1994 I proposed and directed a project to build an authentic working replica of the Manchester "Baby" which successfully publicly demonstrated the running of the first program on the 50th anniversary in 1998, and is now an operational display in the Museum of Science and Industry in Manchester. I received a number of awards for this project. Currently I am a member of the team building a working replica of the Cambridge University EDSAC.