

Memorandum M-1243

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Electronic Computer Division  
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SUBJECT: VISIT TO THE 1101 COMPUTER

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From: Norman H. Taylor

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Abstract: A one day visit to ERA's 1101 System is discussed. The system seems to be very reliable and is in use 90-95% of the time scheduled. Marginal Checking is used with filament voltage as the method of voltage variation. This results in a high tube replacement rate. The Magnetic Drum Storage is of particular interest as its performance seems to be highly satisfactory.

On July 9 R. R. Everett and N. H. Taylor visited the ERA Type 1101 Computer. The System was demonstrated doing test problems and solving Poisson's equation as the actual application is highly classified. Fairly extensive records are being kept of its reliability and these showed some interesting results which are listed below.

Marginal Checking is done each morning for about a one-hour period. The System employs filament voltage depression in five sections as the only voltage variation feature. A rather extensive test program is used, however, and the nature of the failures in this test problem uniquely define the circuit causing trouble in almost all cases. A few circuits require the oscilloscope to locate the failure, however, such as the High Speed Carry Line. The results of this checking provide reliable operation about 90 to 95% of the scheduled time which is about 14 hours per day.

Tube replacements seem to run higher than in our Whirlwind system. This may be due to the rather extreme marginal checking test (5 volts in the filaments). February was their worst month and showed 147 6AS6 replacements out of 1118 sockets and 55 12A07 Flip-Flop tubes from 485 sockets. The average tubes/month replacement estimate is 60 in 2200 sockets or roughly 30% per year. This is almost 4 times higher than our Whirlwind overall replacement rate for 1950 which was 8%.

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Two other large equipments at this location show 5% tube replacement per year in a 2000 tube unit and 80% per year in an 8000 tube unit.

The Photoelectric tape reader used with the 1101 is quite satisfactory, due to two changes made after delivery. First a gray opaque tape is used. This is available from Commercial Controls in Rochester, New York, Spec. #1152755-10247, Second a CE25 Phototube has been substituted for the 927 originally used.

The Magnetic Drum system used as a memory with the 1101 seems to be quite satisfactory. A slight amount of trouble has been encountered in checking the thyatron writing circuits as they do not lend themselves to marginal checking very well. No hard tube writing circuits are used. A second drum was delivered to the 1101 but was not as reliable as the first for mechanical reasons such as loose inserts uneven spacing, etc. ERA has taken it back and plans to replace it.

The switching circuits associated with writing and reading amplifiers are considered acceptable by the 1101 users except those using relays. Apparently the Clare type relays used by ERA have been the largest source of trouble in the whole system.

Power supplies and regulations are satisfactory.

Crystal reliability has been fair although no data was available on this. A rather effective marginal check in this point has been used. Forward voltage of from 5 to 10 volts is applied in the forward direction for a short time and then the crystal is asked to show high valued stable back resistance for about a minute. This shows up drifters and low back resistance units. This test has been applied in the overall system so no details are available in just how much current is used on the increase of forward voltage.

IBM typewriters are used as output units. They have limited reliability but these failures are not considered 1101 systems failures.

The overall impressions gained from visiting the 1101 were very favorable. The reliability figures indicate that the System performs at least as well as Whirlwind.

Signed

*NH Taylor*

NHT:bmb