

6345  
Memorandum M-1119

Page 1 of 21

Project Whirlwind  
Servomechanisms Laboratory  
Massachusetts Institute of Technology  
Cambridge, Massachusetts

SUBJECT: BI-WEEKLY REPORT, Project 6345, October 27, 1950.

To: J. W. Forrester

From: Project Whirlwind

1.0 SYSTEMS TEST

1.1 Whirlwind I System Test

(S. H. Dodd, R. R. Everett, N. H. Taylor, R. Read)

During this period ES Row has been tested with all 16 tubes operating together with particular emphasis on problems of spot interaction when subject to varying conditions of re-write time. During these test runs it was found that certain digits in the row did not pass the tests very satisfactorily. Furthermore, it was noted that the failure to perform properly was a spasmodic condition which developed only after 10 to 20 minutes of operation. Considerable time was spent studying this condition and as a result of these studies it has been decided that the reading beam does not always strike the spot that has been written on the tube by the writing beam. This lack of registration may be caused by a charging effect on some of the glass portion of the storage tube. Such a charge area could deflect the beam a small fraction of an inch and this would be enough so that it would hit the edge of the storage spot or perhaps miss it altogether. This effect of glass charging within the storage tube has been noted occasionally during previous tests but never before has it been so prevalent as to be considered a first-order source of trouble. This lack of registration between the reading and writing beams is a very important fault which must be corrected before satisfactory operation of storage row can be expected. There is little doubt that this trouble has been the cause of many unexplainable failures in storage operation over the last several months, however, once this is overcome, a major improvement in storage row operation should be realized. At the present time no positive solution to this problem has been reached but the realization that the problem is with us is one of the more important facts uncovered by the storage row testing.

A first attempt to correct this fault has been made by changing the potentials on some of the electrodes which surround this glass area. While this potential change appears to be a possible solution to this glass charging problem, it will reduce the holding gun action on the storage surface and may irritate the problem of spot interaction.

1.1 Whirlwind I System Test (Continued)

(N. Daggett)

Necessary additions are being made to Test Control to permit switching to push button and/or synchronizing a scope from any arbitrary point in a program. This will be accomplished by adding several low-speed counter units to count selected time pulses and give an end carry at a point determined by the counter preset. The program can also be restarted after a variable delay -- this makes it possible to run a program of any arbitrary length cyclically.

(H. F. Mercer)

Component Failures in WWI - The following failures of electrical components have been reported since October 13, 1950:

<u>Component</u>	<u>No. of Failures</u>	<u>Hours of Operation</u>	<u>Reason for Failure</u>
<u>Crystals</u>			
D-357	4	3650-4425	3-Drift 1-Low back resistance
D-358 *	12	1000-2000	Drift
	19	2000-3000	
	13	3000-4000	
	2	4000-4400	
<u>Resistor (Carbon)</u>			
220 ohms 1watt	1	4362	Open
<u>Tubes</u>			
2C51	1	1708	Burn-out
7AD7 *	1	1780	Low I <sub>b</sub>
	1	2094	Low I <sub>b</sub>
	2	2847	Low I <sub>b</sub>
	11	3000-4000	8 Low I <sub>b</sub>
	6	4000-4800	3 Mechanical
			5 Low I <sub>b</sub>
		1 Gassy	

\* All of the 7AD7 tube failures and the majority of the D-358 crystal failures were found as a result of Flip-Flop Complement testing accomplished during this past period.

6345  
Memorandum M-1119

Page 3

1.2 Five-Digit Multiplier

(E. A. Guditz)

Since the last report the Multiplier made errors on October 15th and again on October 17th. The cause of these errors was not determined.

The following components were replaced during this period as a result of marginal checking:

1	D358	crystal	2025 hrs.
1	6A86	check gate	2258 hrs.

6345  
Memorandum M-1119

Page 4

## 2.0 CIRCUITS AND COMPONENTS

### 2.1 Circuits by System Number

#### 400 Input-Output Element.

(J. A. O'Brien)

Some time has been spent in developing a circuit for controlling the film units from the outputs of the proposed In-Out Switch. The principle difficulty has been in satisfying the requirement that the clutch action must be delayed if the film unit has to undergo a speed change relative to the previous time it was called upon to operate. It appears that we now have a fairly economical solution to this problem.

Part of the time of the last bi-weekly period has been spent in investigating circuits with which to implement the proposed design of the In-Out Switch. These circuits include d-c Flip-flops and amplifiers, and electronic circuits for relay control.

### 2.5 Tubes and Components

(H. B. Frost)

I have been transferred to full time work on vacuum tube and crystal diode problems. During the next few months I expect to analyze as much of the failure data as possible and to put the life test data in as good condition as possible. Subject material for a possible doctorate thesis will be sought.

During the last period the design of a vacuum tube pulse tester was completed, and special components have been procured. This equipment will be used in the vacuum tube test shop for evaluation of failures, and, it is hoped, in the initial testing of new tubes.

On Tuesday, October 24, a long conference was held between Roger Slinkman of Sylvania and several members of the Barta staff. Among other things, a method of rating vacuum tubes so that the center of the characteristic distribution curves is on the nominal or "bogis" values was discussed. This procedure is being used by ARINC. An important consequence of this type of rating is that equipment may be designed for operation on "bogis" with the assurance that most of the tubes will be near this value, and that a better operating point probably is not available. Development of the SR 1407 (modified 7AD7) was also discussed; active work is being done on this type at the present time. A recent lot showed very good quality, with very few shorts and leaks and no gas; however, the electrical characteristics were not satisfactory.

6345  
Memorandum M-1119

Page 5

2.5 Tubes and Components (Continued)

More material on the ARINC program has become available and will be circulated to the interested parties.

(F. E. Irish)

An engineering note has been prepared which compares the static characteristics of the Sylvania crystal diodes IN38-A and D-358 to those of the Raytheon CK-707 and General Electric IN63.

2.7 Three-Dimensional Magnetic Storage

(W. N. Papian)

The 2X2X1 array is operating satisfactorily. As expected, non-selecting outputs add to the selected output; this raises the amplitude of a zero output. In the case of this array, where there are only two cores contributing non-selecting noise at any one time, the increase in the zero output is not enough to cause any trouble, but for larger arrays the non-selecting noise could rise to prohibitive values.

One suggested solution for this difficulty is to alternate the terminal polarity of each core along every column and every row of a digit plane. Most or all of the non-selecting outputs would cancel each other. The output circuit would, of course, have to be sensitive to signals of either polarity. An attempt will be made to construct such a circuit, and the scheme given a quantitative check.

The chief engineer of Transducer Corp. (Boston) was here for a discussion of mutual problems in this field. They have a large military contract which involves investigation and development of magnetic binary devices for replacing digital computer sections and components (largely tubes) wherever possible. One result of the talk may be that Transducer, or their contracting government agency, may let a contract to some ceramics firm for the development of rectangular hysteresis loops in the magnetic ferrites, thus paralleling our efforts in that direction.

6345  
Memorandum M-1119

Page 6

### 3.0 STORAGE TUBES

#### 3.1 Construction

(P. Youtz)

Four tubes, ST-195, ST-196, ST-197, and ST-198, for WWI were processed this period. These tubes were identical with the earlier storage tubes in the 100-Series for WWI except the mosaics were lined up with the deflection plates and the mosaic spacer was redesigned to give uniform spacing between the screen and the mosaic surface.

During this period, we exhausted our stockpile of mica for storage surfaces. We were unable to replenish this supply until late in the period. We have only two mosaic surfaces available for storage or research tubes this next week.

Recent results from the test group indicated that we should re-examine all of our cleaning, handling and processing procedures. These procedures are now under careful scrutiny.

We have dissected several rejected storage tubes and have definitely traced one alleged type of surface leakage to air inclusions in the mica. These air inclusions have developed within the mica after the mica surface was processed and put into a storage tube.

(R. Shaw)

Since Pyrex and synthetic sapphire are both being considered as materials for use in electron gun structures, a simple test set-up was made to measure the deflection of small beams of these materials. The results indicate that Pyrex has a rupture strength of 18,000 psi and a modulus of elasticity of about  $1.5 \times 10^7$  psi. On the other hand, the sapphire did not break under a stress of 24,000 psi and had a modulus of elasticity of about  $7.5 \times 10^7$  psi. Tests of plastic deformation at elevated temperatures would probably also indicate superiority of the latter material.

Engineering notes E-364, on the construction of beryllium boilers, and E-365, on the construction of screen assemblies, are in preparation.

A holding gun with a metal A<sub>2</sub> cylinder has been drawn and constructed.

A "gadget" has been made for providing a flow of thoroughly clean, warm air for drying mica surfaces.

6345  
Memorandum M-1119

Page 7

### 3.2 Test

(M. F. Mann and A. Stein)

Pretests as outlined in M-1077-3, Sections B, C and K were carried out on the television demonstrator unit.

The following tubes were pretested and passed:

ST-138	ST-194
ST-189	ST-195
ST-190	ST-197
ST-193	

Upon opening several previously rejected ST's and RT's it was found that certain phenomena previously referred to as surface leakage were due to air inclusions within the mica sheet.

ST-120 and ST-191 were passed marginally. Both tubes have considerable surface leakage, so that an array begins to fuse in less than 2 seconds with the holding beam off. Furthermore, ST-120 possesses a H.V. cathode which shows poor emission characteristics.

The following tubes were pretested and rejected:

ST-171  
ST-175  
ST-198

All these tubes have excessive surface leakage with an array beginning to fuse less than a second after the holding beam is turned off. ST-171 has several air inclusion spots, which require extra charges in order to write minus. ST-198 also has air inclusions; but no extra writing charge is needed.

Special surface leakage tests were given to tubes ST-153, ST-170, ST-171, ST-191 and ST-168. These tests are similar to the one outlined in M-1077-3, section C. All these tubes with the exception of ST-168 had previously been rejected. ST-168 had been rejected from the E.S. row.

(A. R. Tanguay)

The "Miller" sweep generator has been completely checked out with the aid of W. J. Nolan. Parasitic oscillations at a frequency of approximately 130 - 140 megacycles were observed in the mixing circuit and were eliminated by inserting resistance in the control grid, suppressor grid, and cathode leads.

Mod. I of the restoring current testers is no longer in existence; a revised and more compact setup is now nearing completion.

6345  
Memorandum M-1119

Page 6

3.2 Test (continued)

(C. I. Corderman and H. J. Platt)

The preparation for the use of the STRT for testing storage tubes according to M-1077-3 has been continued during the last period by actually making a trial run on ST-157, which has been rejected by WW. During this trial, many difficulties encountered in operation procedure were ironed out. Additional leads and block circuits were devised to facilitate the work.

A new chassis was built which now allows all the push-buttons of the Push-Button Synchronizer to be operated at another station. To this chassis were also added control switches for TV and HG and an additional switch which allows the storage surface to be made positive with one switching action. This centralized control eliminates unnecessary movements of the Reliability Tester operator between widely separated controls.

We are in the process of adding a circuit which will allow continuous adjustment in HG time.



6345  
Memorandum M-1119

Page 9

4.0 INPUT-OUTPUT EQUIPMENT

4.1 Eastman Kodak Film Units

(J. A. O'Brien, D. Hageman)

A recent attempt to record information involving deflection of the cathode-ray-tube beam was unsuccessful. This type of recording had been accomplished satisfactorily on a number of previous occasions, but not with the larger recording mask and the very high intensity beam recommended by Eastman. The difficulty was subsequently traced to a faulty delay-line termination in the reader-recorder.

It also appears that some changes in the phototube circuits associated with the recording function are advisable. These would involve the use of positive pulses from the 9th dynode rather than negative pulses from the anode. Unfortunately, the waveform obtained from the phototubes is dependent upon the beam intensity of the CRT. Thus the circuitry must to some extent be designed to accommodate a particular range of beam intensity.

The high voltage power supply is regulating less and less satisfactorily. In view of (1) the need for fairly precise beam positioning and deflection, (2) the presence of considerable corona discharge, and (3) the occurrence of several component failures in the past, it is likely that a different power supply will be necessary.

4.3 Typewriter and Tape-Punching Equipment

(J. S. Hanson)

Tape Output Equipment: Following several periods of successful operation in conjunction with WWI, the tape output equipment is now undergoing performance tests to determine operating characteristics, relay timing, marginal characteristics, power requirements, fusing, and to further suppress undesirable transients on a-c and d-c supply lines, if this is found necessary.

A report on tape output equipment operating instructions will be issued shortly for use by WWI operating personnel.

6345  
Memorandum M-1119

Page 10

4.3 Typewriter and Tape-Punching Equipment (Cont'd)

(R. E. Hunt)

Punched Tape Equipment: Preliminary adjustment specifications for Flexewriter equipment are being drawn up. These specifications are in the form of check off sheets which will give us a permanent record of adjustment dates, extent of misalignment, and in time some idea of operating margins, if we correlate this data with actual failures as they occur.

These specifications will be in a fluid state until we have had several months of operating experience on these units.

The Flexewriter typewriters have been modified to include a switch whereby a 7th hole may be inserted in every line.

Punched tape equipment has been assembled in Room 216 to provide the following facilities:

1. Preparation of unchecked tapes, separate from tape preparation unit.
2. Preparation of checked tape - with library tape insertions if desired.
3. Reproducing checked or unchecked tapes.
4. Printing checked or unchecked tape.

(C. W. Watt)

Output Printer and Punch: Two evening sessions were spent with the output equipment tied to the computer, with some very interesting results. The first time the machine made contact with the outer world it said:

"all ok  
will write  
more later  
love, WWI"

This sentence was repeated monotonously several hundred times. The few errors made were due to a poorly adjusted printer, and in general the equipment worked well. Only when a different set of characters was placed in test storage did it fulfill its promise however, writing the skillfully composed sentence "the quick brown fox jumps over a lazy dog" a hundred or more times. The second session saw the first

6345  
Memorandum M-1119

Page 11

computed material printed out by WWI. At the behest of Adams conversion program it read out and printed 4096 numbers comprising the conversion of the number  $2^{-15}$  to the base 7, and followed with 3 more pages, each holding  $2048$  numbers, being the conversion (or part of it) of  $2^{-15}$  to the bases 3, 9, and 11. This number sequence was excellent for testing the printing capabilities of the output equipment. No apparent errors were made; a little trouble with the synchronizer slowed up operations for a while, but was fixed temporarily by switching channels. No relay or equipment troubles appeared. The Flexwriter equipment, having been adjusted, worked very well.

4.4 Input Output Planning

(E. S. Rich)

Further study has been made of a basic block diagram for an integrated system of terminal equipment. Detailed work has been done on the magnetic-tape unit control and amplifier diagrams and on the requirements that must be met by the new I-O register. J. A. O'Brien has proposed an I-O switch design which requires less equipment than was originally visualized.

As a result of planning done to date, the principle features of an in-out system which appears to be practicable have been worked out. Considerable more study will be necessary to fill in all the details.

(F. Boess)

Magnetic Tape Equipment: Preliminary progress has been made in designing a recording circuit for magnetic tape using a d-c erase. A d-c current through the recording head will saturate the tape with one polarity of magnetic flux while pulses will be recorded in the opposite polarity. Several circuits to do the job are contemplated. Actual tests of the circuits will not be possible until Raytheon delivers our tape driving equipment.

6345  
Memorandum M-1119

Page 12

5.0 INSTALLATION AND POWER

5.2 Power Supplies and Control

(J. J. Gano)

D-C Power Supplies: The cascading of three regulated supplies, the 120-208 Laboratory Supply, the Plate Alternator Supply and WWI D-C Supplies appears to be causing difficulties. Each operating individually is stable. When the computer load is introduced, the stability is good until the +90 volt supply is added. A very small oscillation appears at the alternator output and is passed through the D-C Supplies. The oscillation is accentuated when the E. S. load is added. The degree of stability of each system will be reviewed. There is no doubt but that the +90 volt supply can be improved considerably.

5.3 Video Cabling

(T. Leary)

The 42 cables mentioned in the last bi-weekly have been completed and tested. At the moment there are only two or three more cables which need to be made.

The cabling for eight WWI panels for which video cabling panel schedules had never been made has been checked and schedules for these panels issued.

A block schematic (C-36079) for the Interim Tape Equipment has been completed and graded and will be issued shortly.

## 6.0 BLOCK DIAGRAMS

(R. P. Mayer)

A new up-to-the-minute drawing, showing details of the Selective Write that occurs on a ts to an ES Register, is now available in the test control room.

Recent changes include: (1) On order ck, the accumulator now reads to CR via the main bus instead of the check bus. This change required that "Reset CR" be delayed  $1/2 \mu s$  rather than  $1/4 \mu s$ , and that the check be delayed  $3/4 \mu s$  rather than  $1/2 \mu s$ . The "CR Check" cannot conveniently be delayed that much, so the "CR Check" (on all orders that use it) has been temporarily replaced by "transfer check" (time pulse  $8 \frac{3}{4}$ ). (This problem of the "CR check" timing is now under consideration.) (2) The ES Holding Gun operation can now be controlled by switches in Test Control (Video Switch Panel).

A new policy regarding changes in the Operation Matrix is described in Note E-391, "Operation Matrix; Change Procedure". Briefly, the up-to-the-minute drawing, plus red tags, should always show the condition of the matrix, which should be connected in a permanent fashion.

Modification Notice # 1143 initiates changes, in accordance with E-391, cleaning up the matrix. It also:

- (1) Combines functions of CPO Units in two instances, freeing two CPO Units for further uses.
- (2) Removes order qs, Switch Check.

6345  
Memorandum M-1119

Page 14

7.0 CHECKING METHODS

7.1 Test Problems

(G. Cooper)

Two more ES Test Programs have been written ESTPR XII; Progressive Spot Interaction and ESTPR XIII; Cyclic Spot Interaction. E-359 has been revised to include ESTPR XII, but ESTPR XIII will be described in a separate memo. This step was taken to put an end to the constant revision of E-359, so that it can appear within a reasonable period of time. It is now being typed up and, in all probability, should be published during the forthcoming period.

A program to test ES in conjunction with marginal checking is being worked on in collaboration with R. P. Mayer. The program is designed to be stored in ES and will perform a simple test on a portion of the surface. It will then "pick itself up by its own bootstraps" and store itself elsewhere in ES and proceed with the test. This process will continue cyclically. This program should also be of use without marginal checking.

6345  
Memorandum M-1119

Page 15

## 8.0 MATHEMATICS

(G. W. Adams)

On October 25, from 2000 to 2400, a lecture and demonstration of Whirlwind, using only test storage, was given for the benefit of new members of the various applications programming groups. About fifteen new full- and part-time people attended along with several members of long standing in the 6673 group. M-1117 outlines the material covered in the meeting. It seems likely that a few more similar, but possibly shorter, sessions should be held to review what was covered and to include electrostatic storage and special terminal equipment.

The EDSAC report on programming, emphasizing library subroutines, has recently been received here and is proving extremely valuable. Especially useful is the complete account of their experience with subroutines for use in checking newly-written programs.

E-387, Interim Equipment and Techniques for Input, Output and Control for WWI, is completed and will be issued when and if approved by R. R. Everett. Excerpts from it were issued for temporary internal use in connection with the training program mentioned above.

There are at present eight MIT students (juniors, seniors, and graduates) working on various programming problems. Their first efforts, which are being made while they are still in the process of learning about the computer, have been directed along several different lines, as mentioned in M-1111. Two are coding display programs (one programming the computer to play a generalized version of Nim and the other displaying a high order polynomial plotted as a curve on calibrated axes with decimal digital values of the roots being written in one corner of the scope face). Two are developing output programs for use with the interim equipment. Four are beginning work on the development of a subroutine library, starting by elaborating and completing earlier project work on such things as the solution of a system of linear algebraic equations and the evaluation of definite integrals, exponential, logarithmic and trigonometric functions. All of the part-time people appear to be making good progress.

(J. D. Porter)

A program has been written for determining all the real roots within any specified range of a polynomial of arbitrarily high degree. I have also been working on the problem of selecting a subroutine and adapting it to the main program.

6345  
Memorandum M-1119

Page 16

## 8.0 MATHEMATICS (continued)

(F. C. Helwig)

The past period has been spent in preliminary study of checking subroutines. This term is used in EDSAC literature to refer to library subroutines whose purpose is the localization of errors within a program which has been put into a computer. In general, such subroutines modify the main program so as to print extra information.

(J. M. Frankovich)

Since completing the indoctrination period I have been programming various methods for finding eigenvalues of the linear differential equation

$$y'' + \left( \lambda - \frac{z(x)}{x} - \frac{l(l+1)}{x^2} \right) y = 0,$$

where  $z(x)$  is a tabulated function.

The principle difficulty in writing a program arises from the large change in magnitude of the coefficient of  $y$  over the given range of  $x$ . This is met by the use of floating point routines and/or repeated scale factoring. However, these methods lead to lengthy programs. None of the methods under consideration explicitly solve for  $\lambda$ .

Two programs are being prepared. One, suggested by Professor Kopal, utilizes a method that requires a continued fraction, obtained from a set of linear equations in  $y$  involving  $\lambda$ , to be zero on the condition that  $\lambda$  be an eigenvalue. The program length here is somewhat less than 256 registers long, but there is some uncertainty as to the accuracy of the solution. The other method solves the differential equation by extrapolation, using the Runge-Kutta method, but here the program for a complete solution is of the order of 500 or 600 registers long.



6345  
Memorandum M-1119

Page 17

9.0 FACILITIES AND CENTRAL SERVICES

9.1 Publications

(J. N. Ulman, Jr.)

The following material has been received in the library,  
Room 217, and is available to all 6345 personnel.

6345 Reports

<u>No.</u>	<u>Title</u>	<u>No. of Pages</u>	<u>Date</u>	<u>Author</u>
E-372	Glass Construction of Two-Arm Envelope	4	9-7-50	W. E. Pickett
E-377	Glass Construction of Single-Arm Envelope	2	9-7-50	W. E. Pickett
E-391	Operation Matrix: Change Procedure	2	10-26-50	R. P. Mayer
M-1107	Vacuum Tube Failures During the Month of September, 1950	5	10-1-50	H. B. Frost
M-1110	Reliability Tester Modifications for M-1077-3	3	10-11-50	C. Corderman
M-1111	Tentative Assignments of Part-Time Student Mathematicians. FOR INTERNAL DISTRIBUTION ONLY.	3	10-13-50	C. W. Adams
M-1112	Bi-Weekly Report, Project 6345, October 13, 1950	16	10-13-50	
M-1113	September 1950 Storage and Research Tube Summary	5	10-16-50	M. F. Mann
M-1115	Bi-Weekly Report, Project 6751, October 16, 1950	1	10-16-50	
M-1116	Code System for Dielectric Surfaces	2	10-18-50	J. Palermo
M-1117	Preliminary Outline and Reference Material for Computer Demonstration, October 25, 1950	10	10-23-50	C. W. Adams

Library Files

.004	European Scientific Notes: 1 October, 1950			ONR/London
47	Technical Information Pilot: June 14, September 19, September 21, September 27, October 2, October 4, 1950			(ONR/Library of Congress RLE/MIT
180	Document Office Bulletin: Vol. IV, No. 20			DuMont Labs
333	The Oscillographer: April - June, 1950			(National Bureau Standards
559	Technical News Bulletin: September, 1950 (including a description of SEAC); October, 1950			RLE/MIT
600	Quarterly Progress Report: October 15, 1950			IEE
698	Physics Abstracts: September, 1950			(Moore School, U. of Penna.
963	Signal Corps Electronic Computer Research and Development. Quarterly Progress Report No. 3, 4 July to 3 October, 1950			

6345

Memorandum M-1119

Page 18

9.1 Publications (Continued)

Library Files (Continued)

<u>No.</u>	<u>Title</u>	<u>Author</u>
978	Report on the Preparation of Programmes for the EDSAC and the Use of the Library of Sub-Routines September, 1950	{Univ. Mathematical {Lab., England
979	The EDSAC (Electronic Delay Storage Automatic Calculator). Reprint from MTAC, April, 1950	{M. V. Wilkes {W. Renwick
980	Dielectrics in Electrical Engineering. Technical Reports XXVII and XXVIII. March, 1950	{Lab. for Insulation {Research, MIT
981	Magnetic and Electric Properties of Natural and Synthetic Single Crystals of Magnetite. Reprint from <u>The Physical Review</u> , May 15, 1950	{C. A. Domenicali {Lab. for Insulation {Research, MIT
982	Dielectric and Piezoelectric Properties of Barium Titanate. Reprint from <u>The Physical Review</u> , June 15, 1947	{S. Roberts, Lab. {for Insulation {Research, MIT
983	Reliable Electron Tubes for Use in Airborne Electronic Equipment. A description of the Arinc reliable tube program and a report of progress. May 26, 1950	{Aeronautical Radio, {Incorporated
984	Moments About the Axis of a Simplified Flight Table Gimbal Structure. Project MX-794, UMM-39, Aeronautical Research Center, U. of Michigan, December, 1949	J. H. Brown
985	Letter from Bell Telephone Labs. regarding equipment for reading punched paper tape at high speeds, using A. C. Keller photo-electric cells.	
986	Proceedings of Symposium on Improved Quality Electronic Components. Including section on Component Failure Analysis in Computers, by E. S. Rich and N. H. Taylor. Held May 9, 10, 11, 1950	{A. I. E. E. {I. R. E. {Radio Manufacturer's {Association
987	Swedish Automatic Relay Computer. Technical Report ONRL-67-50. 20 July, 1950	{P. M. Marcus {ONR/London
988	Brief Description of the Zuse Computer, Model 4	{Institute of Applied {Mathematics, Switzerland
989	A New Germanium Diode of Improved Design. Paper presented to I. R. E. West Coast Convention, September 14, 1950	{H. Q. North {Hughes Aircraft
990	Deterioration of Oxide-Coated Cathodes under Low Duty-Factor Operation. Technical Report No. 159, July 20, 1950	{J. F. Waymouth, Jr. {RLE/MIT

Books

Methods of Applied Mathematics. Notes for Course M-39

{F. B. Hildebrand  
{MIT

6345  
Memorandum M-1119

Page 19

9.2 Standards, Purchasing, and Stock

(H. B. Morley)

Standards:

Military Specifications (JAN) recently issued:

JAN C-20A - Capacitors, Fixed, Ceramic-Dielectric  
(Temperature-Compensating)

ASESA List #100, Issue No. 10 - Index of JAN Standards

Procurement and Stock:

Priorities DO .07 (Project 6673) and DO .21 (Project 6345) have been authorized for use by this laboratory. These priorities may be applied to orders for critical materials under the regulations prescribed by the MPA and should help to expedite delivery. Open undelivered orders are being reviewed for application of priority if necessary.

To preclude misapplication of priorities all inquiries and contacts with vendors should be coordinated with this office.

Again the basement storage stockroom in room 045 has been arranged in an orderly manner. It would be appreciated if all personnel having access to the room notify the stockroom before removing or storing material.

It is imperative that any personnel taking instruments or tools from the stockroom after regular laboratory hours shall note these withdrawals on the record sheet provided and kept on the desk next to the main stockroom door.

New Items:

Bauer & Black have announced a complete line of electrical tapes including polyethylene and fiberglass as well as conventional cambric and other insulating tapes. They also have available colored coding tapes. Sample card available in procurement office.

9.3 Construction

(R. A. Osborne)

Production Report

The following items have been completed and inspected since October 13, 1950:

39 Video Cables

Repair of one D-C Filter Panel

6345  
Memorandum M-1119

Page 20

9.3 Construction (continued)

(R. A. Osborne)

4 Nameplates

Work continues on the final lot of 16 S.T.  
Mounts

(L. Prentice)

Machine Shop

All parts for 25 storage tubes have been completed. Machine work is non-existent at the present time. The annealing oven for the glass shop is complete except for slight modifications.

Sheet metal work on hand at present will last several weeks.

9.4 Drafting

(A. M. Falcione)

1. WWI Rack Terminal Schedules

B reductions are now available for all terminal schedules for WWI. Terminal schedule books have been distributed to WWI Service File, C. W. Watt and Library File.

2. Drawing Security

In accordance with our established procedure of security we have sent out 1176 drawings for microfilming. These microfilms are placed in permanent storage for future reference.

3. Meter Dials

A new method of making a good meter dial has been tried and found satisfactory for our future use when required. The old type made with Dry photo Sepia was found to be unsatisfactory because it faded badly. The new method makes use of Chart film which gives a black line on a white background and sharper scale division lines. The glossy surface is removed by rubbing with a hard rubber eraser. The back of the meter face should be rubbed with sandpaper to give a rough surface. 3M (Minnesota Mining) Adhesive should be used to stick it on. New Chartfilm Meter dials have been made for all the Meters in the 2 Tube Testers in the Tube Test Lab.

6345  
Memorandum M-1119

Page 21

10.0 GENERAL

(J. C. Proctor)

New Non-Staff

Wilfred H. Powers of Cambridge is the new junior sheet metal technician in the construction shop. He transferred from the Building and Power Department of MIT. His experience includes several years in construction work and technical training at Franklin Technical Institute.

Charles W. Paskauskas is a new junior electronic technician working with the Whirlwind I operations group. He received a Bachelor of Science in Electrical Engineering from the University of Massachusetts in June and has several years experience in electronic work.