

Digital Computer Laboratory
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

SUBJECT: BI-WEEKLY REPORT, August 15, 1952

To: Jay W. Forrester

From: Laboratory Staff

1.0 SYSTEMS OPERATION

1.1 Whirlwind I System

1.11 Operation (D. Morrison)

The following is an estimate by the Computer operators of the usable percentage of assigned operation time and the number of computer errors for the period 1 August - 14 August 1952.

Number of Assigned Hours	176.0
Usable Percentage of Assigned Time	84.5
Usable Percentage of Assigned Time Since March 1951	84.6
Number of Transient Errors	5
Number of Steady-State Errors	7
Number of Intermittent Errors	82

(S.H. Dodd)

The change of the cycle left order from position 30 to position 2 in the control matrix cannot be done until after the completion of the proposed shutdown for installation of the in-out system.

The change of cycle left order is further restricted to the complete change-over of the mechanical reader to the new in-out system which may not occur until sometime in September.

We plan the change cycle left order as soon as possible after September 1 and expect this change to be completed before the end of September.

The computer shutdown for installation of the new in-out system has been in progress for one week. Progress has been very satisfactory to date and the work slightly ahead of schedule. During this period a number of the power supplies were moved from the power supply room to the corridor outside the storage tube test lab.

The new in-out system has been completely wired up and operation is good enough to use the new display system for operating display programs. We are in the process of checking all pulse amplitudes and timing and during the next two weeks, we will transfer, one at a time, different pieces of terminal equipment so that they may operate from the new system. During the last week

1.11 Operation (continued)

we will make comprehensive system tests to insure reliable operation and work out marginal checking procedures.

(A.J. Roberts, H.L. Ziegler)

A spare digit has been provided for use with Bank B. When not in use it operates in parallel with the parity digit. The parity digit may still be used as a spare in the event that two replacements are needed.

Higher wattage eating resistors and larger termination boxes have been provided for terminating the r-f phase reference line. The Bank A phase reference line has been removed. Intermittent troubles in the r-f pulser are being investigated.

Storage reliability has been good during the last bi-weekly period. Several tubes are scheduled for replacement because of weak high velocity guns and consistent failures.

(N.L. Daggett)

Intermittent failures in the storage readout system have been traced to badly overheated terminating resistors on the r-f pulse line. New terminator boxes were built and installed which have larger resistors and much better provisions for heat dissipation.

The stability of the gate-generators in the r-f pulser has been improved by converting them to standard WWI flip-flop circuits. The gate length is now determined by a pulse (from a delay line amplifier) rather than by the RC delay of the original one-shot multivibrator circuit.

(C. Watt)

1. WWI Installation

During the recent power shutdown of August 12 and August 13 the following work was completed:

- A. Scheduled installation of rack AX3
- B. " " " " AX5
- C. " " " " C3
- D. " " " racks TC17, TC18, TC19
- E. Scheduled installation of modified D-C In-Out Register panels in racks C12, C14, and C15.
- F. Clearance of all power circuits temporarily installed in racks AX1, AX2 and AX3.
- G. Scheduled modification of ES Power Supply Control Panel, placing ground side of relay K47 on the Digit Interlock bus for racks E0-E15 and EX6. This prevents the application of ES high voltages

1.11 Operation (continued)

to ES racks until WWI low voltages are on panels.

H. Scheduled modification of Storage Selection Control Panel, placing 250 volts on pin 20.

2. Installation of Racks P16 and P17

A. The structural assembly of racks P16 and P17 was completed this week except for painting.

B. Assembly of the wireway connecting rack P17 to room 224 and to console room was also completed, except for painting.

C. Job sheets have been written for the wiring installation of racks P16 and P17.

1.12 Component Failures in WWI (L.O. Leighton)

The following failures of electrical components have been reported since August 1, 1952:

<u>Component</u>	<u>No. of Failures</u>	<u>Hours of Operation</u>	<u>Reason for Failure</u>
<u>Crystals</u>			
D-357	2	1868	Drift to low R_B
<u>Potentiometer</u>			
HVG Bias 10000 ohm 2 watt Allen Bradley	1	4146	Open Control
2500 ohm 2 watt Allen Bradley	1	7833	Intermittent contact
<u>Tubes</u>			
7AD7	2	1000-2000	Low I_b
	2	2000-3000	1-Mechanical; 1 Low I_b
	1	3000-4000	Low I_b
	2	4000-5000	Low I_b
	1	12324	Mechanical
	1	13104	Mechanical
6AK5	1	4263	Low I_b
	9	5000-6000	5 Low I_b
			4 Mechanical
6Y6G	1	1423	Low I_b
3E29	1	10185	Low I_b

1.14 Storage Tube Complement in WWI (L.O. Leighton)

Following is the storage tube complement as of 2400 August 14.

<u>Digit</u>	<u>Tube</u>	<u>Hours at Installation</u>	<u>Hours of Operation</u>
0 B	ST-607-1	8954	383
1 B	ST-521	7059	2278
2 B	RT-247	5198	4139
3 B	ST-601	8524	813
4 B	ST-516	6641	2696
5 B	ST-548-1	8299	1037
6 B	ST-534-2	7469	1868
7 B	ST-540	7937	1400
8 B	ST-549	8259	1078
9 B	ST-519	6624	2713
10 B	ST-544-1	8683	654
11 B	ST-542	8148	1190
12 B	ST-608-1	8918	420
13 B	RT-258	5207	4130
14 B	ST-541-1	7961	1376
15 B	ST-603	8322	1014
16 B	ST-533	7801	1536
16 A	ST-613	9046	291

ES Clock hours as of 2400 August 14, 1952 9337

Average life hours of tubes in service 1612

Average life hours of last 5 rejected tubes 2373

1.2 Five-Digit Multiplier (C.N. Paskauskas)

Multiplier operation during this period was rather poor due to occasional fits of sparking at the brushes of the +150 v supply and various troubles in the TASBC frequency divider which included unbalanced FF tubes, cross-over networks, and bad crystals.

One 6AS6 tube with 3328 hours in service was replaced as a result of marginal checking.

Two tubes were replaced as a result of a tape short check:

- 1 7AD7 BA tube (25320 hours in service)
- 1 6AG7 BA tube (574 hours in service)

2.0 CIRCUITS AND COMPONENTS

2.1 Circuits by System Number

2.14 Input-Output (J.A. O'Brien, R.H. Gould, T.J. Sandy,
J. Dintenfass)

A schedule for the installation of equipment during the computer shutdown has been made up. The installation work began on Tuesday the 12th and so far progress has been very satisfactory.

With the exception of the mechanical tape-reader, all the components needed for this installation are on hand. There have been some after thoughts on the design of the mechanical tape-reader, but it still appears as though it can be assembled in time.

At present the display function of the new In-Out System is being worked on. The system seems to be working quite well. As was expected, a few installation errors have been uncovered and there are probably many more to be found.

The old in-out systems using the temporary orders are still functioning and available, except for magnetic tape and display. The next unit to be tried will be the photoelectric tape reader and it should be working by the first of next week.

(R. Paddock, A. Werlin)

All Plug-in units have been modified and the video checking of these and subsequent units is progressing satisfactorily. The block schematic of the drum terminal equipment composed of plug-in units, and also the physical location of the types of units within a rack is now in the drafting room and should be completed by the first of the week. The construction of the three-panel terminal equipment prototype has begun and it should be completed and ready for video testing by the middle of next week.

Three more test panels for video-checking the individual plug-in units have been completed by the sheet metal shop and the construction of these should be done by the next bi-weekly period.

2.2 Vacuum Tubes and Crystals

2.21 Vacuum Tubes (H.B. Frost, S. Twicken)

The 12BY7 (Hytron) has been run for 2000 hours under cutoff conditions and has been found to develop a rather large interface impedance. It is, therefore, not recommended for service in flip-flop or similar circuit applications.

2.21 Vacuum Tubes (continued)

A considerable amount of data on the geometry of a wide variety of tubes has been taken. The rated transconductance per watt of heater power can be used to give a fairly good approximation of grid-to-cathode spacing. Various other relationships between step-current factor of merit, cathode area, grid-to-cathode spacing, and grid pitch have been found with varying degrees of correlation. The physical significance and practical application of these relationships in the design and choice of tubes have not yet been completely determined.

A cycle timer has been ordered to determine the effect of temperature cycling on the incidence of shorts.

2.22 Transistors

Test Equipment (N.T. Jones, I. Aronson)

Lamacoid labels for the Alpha Test Unit have been received and installed, and the panel is now in use.

A four step automatic curve tester has been built in breadboard form, and de-bugging is almost complete. The unit now operates reliably with a 60 cycle sine-wave trigger of non-critical amplitude, (50-75 volts). The goal in this respect is to achieve reliable operation over the range of 100 to 125 volts.

Thermal Variation of Parameters (N.T. Jones, I. Aronson)

This experiment was completed on August 14 and the setup was dismantled. Robert Schmidt and Dorothy Smith are now processing the vast amount of data gathered from the thermal tests in preparation for the E-note to be written by Schmidt.

Life Tests (N.T. Jones, I. Aronson)

The saturation life test panel has been completed and all the elapsed time meters are now installed along with their driving relays.

A standard measuring procedure was set up for the life tests and will be incorporated in an M-note now in process on Life Test plans, circuits, and measuring procedures.

All of the life test transistors have been processed, including the selection of 12 special units to be used in the Jacobs counter.

The static and the blocking oscillator life tests will start this afternoon.

2.22 Transistors (continued)

Parameter measurements (N. T. Jones, I. Aronson)

The first 12 RCA's of our order for 300 have been received and measured.

Five more Westcrels have been tested, with the results now being written into an M-note.

Ten Raytheon CK 716's from Bradbury of the Cambridge Research Center were also tested.

Visits (N. T. Jones, I. Aronson)

N. T. Jones, D. Eckl, J. Woolf, and I. Aronson visited the Raytheon Plant in Newton on August 13. George Freedman of Raytheon conducted us on a tour of the transistor pilot production line, after which a discussion was held with three other Raytheon people. The details of this discussion will be covered in an M-note by J. Woolf.

Diode Research (N. T. Jones, I. Aronson)

V.I. characteristics were obtained for three of each of three new types of Western Electric bonded gold point germanium diodes.

Transistor Driven Matrix Switch (W.A. Klein)

In the one week remaining in this period after a vacation, the work on the matrix switch driving transistor gates was completed. The switch operates up to 300 KC. Work is progressing on replacing the transistor gates with diode gates in order to speed up the circuit; and also on connecting the driving flip-flops thru diode gates to form a counter, thus allowing the circuit to function as a time pulse distributor.

Transistor Accumulator (D. Eckl, R. Callahan)

A running time meter has been installed to read hours of operation for transistors in the accumulator. At this writing the reading is 96 hours. The total time on most units is well over this since parts of the accumulator have been in operation since April. This is not continuous operating time since changes are still being made at frequent intervals to improve the system. Records are being kept of the values of a , r_{co} , and V_{c34} for each of the 69 transistors in the unit. The machine is shut down for two hours each Monday morning while this check is made. A log is being kept of errors as they occur and the changes necessary to correct them. Most changes so far have resulted in the removal of the older transistors which are of poorer quality than ones now available.

2.22 Transistors (continued)

The present test problem which is being run is 12×15 , i.e. - the binary number 1111 is added to itself 12 times in the partial sum register. Only the last five digits of the result are available due to the short register length. This result 10100 is checked against a toggle switch register. Non-correlation rings an alarm and produces an indication on a mechanical counter.

Transients on the d-c lines are causing the Gate and Delayed-Pulse Generators in the control unit to produce spurious pulses which are indicated as errors. To eliminate this difficulty, a separate 250 v. regulated supply is being connected to these units.

Two units for push button control and three amplifier units have been completed and added to the control system. In a recent 15-hour test in which 18,900 complete cycles were performed (or 226,800 separate additions) 52 errors were indicated. At present there is no way of separating the actual accumulator errors in this total from those caused by spurious pulses from the test equipment. It is certain that the total number of mistakes was less than the indicated number.

SEAC (S. L. Thompson)

The basic SEAC circuit package, consisting of five crystal diode "and" circuits, five crystal diode "or" circuits, and a pulse repeater circuit has been built and is now being tested. The diode gates are made of type 1N34A germanium diodes and the pulse repeater uses a type 6AN5 tube in a transformer-coupled amplifier circuit.

A 1 mc. oscillator with four separate outputs spaced 90° in time phase has been designed and is now being constructed by Louis Guinesso. It will be used as a clock for the SEAC circuits.

Because SEAC does not use the power supply voltages that are supplied to the laboratory, special power supplies must be built. Voltage regulator circuits that operate from a standard laboratory voltage and can be adjusted to have an output equal to a SEAC power supply voltage are being tested.

Felker System (J. Jacobs, A. Heineck)

A fresh start was made on the design of a transistor dynamic flip-flop and the results have been very promising. A circulating flip-flop was constructed which could be set and cleared reliably at a frequency of 1 mcps. This flip-flop was designed around a high performance transistor, however, and would not work with low performance transistors. With some revisions which allow for a smaller alpha, the circuit should work also with the poorer transistors.

2.23 Crystal Diodes (H.B. Frost, S. Twicken)

A group of approximately 20 Amperex (Philips) 1N38A crystals were tested for recovery after the passage of forward current. They were found to be not quite as good as Sylvania 1N38A's but in the same general class.

2.3 Ferromagnetic and Ferroelectric Cores

2.31 Magnetic-Core Materials

Analysis and Preparation of Ferromagnetic Materials (J. H. Baldrige)

A sample of magnesium ferrite is being analyzed in connection with x-ray studies being carried out. An assay is being made on the manganese dioxide recently received from General Ceramics. Two cylinders of magnesium-manganese ferrite (A-series) have been prepared and delivered to Dr. Gold for use in elastic measurements and microstructure studies. An attempt is being made to obtain high-purity materials for synthesis of ferromagnetic materials similar to $\text{LaMnO}_3 \cdot \text{SrMnO}_3$.

Ferromagnetic Core Materials and Equipment (G. Economos)

A small core die (F-304) has been received from the General Ceramics Co. It will be used primarily for the preparation of pulse test specimens. A pressing assembly is now being made which will permit the use of this die in our hydraulic presses. This die size, however, is not satisfactory for hysteresis loop tests; therefore, a modified F-109 die has been ordered. The modification will give a toroid having a square cross-section.

The manganese dioxide received from the General Ceramics Co. will be used to prepare the square loop body. The polyvinyl alcohol mentioned in the previous report (72-51) was found to be too viscous for use in ceramic preparations so a more fluid modification has been ordered (51-05).

Ceramic Ferrite F-1253A (J. Epstein)

The ceramic ferrite F-1253A shows a quite uniform average particle size of 5 microns, under microscopic examination. Upon removing surface layers, by grinding and polishing, no change was apparent between the surface and the interior.

Hysteresis Loop Heat Test (C. Morrison)

The bi-weekly period was spent experimenting with different types of wire that will be used in the Hysteresis Loop Heat Test. The insulation on the copper wire used in winding cores for normal usage became brittle and provided poor winding insulation after it was heated to 300°C . The ceramic coated wire (Ceroc Teflon #20) seemed to have a satisfactory insulation after being heated to 300°C and this will be used in the heat test.

Life Test (J. H. McCusker)

Tests on the ferrite cores on life test and tests on metallic cores indicate a need for more precise measurements of current amplitudes.

2.31 Magnetic-Core Materials (continued)

Core Tester (J. H. McCusker)

A second high-current core tester Model III, Serial No. 2 has been installed and runs satisfactorily.

MF-1253 and MF-1326 cores have been tested. MF-1326, F-292, shows most promise for a memory core.

Life Test (P. K. Baltzer)

Testing of the ferrite cores after 200 hrs. has been completed and the cores are again on life test.

Equipment for placing the metallic cores on life test has been built and the cores will be placed on life test as soon as they are available.

Core Stresses (P. K. Baltzer)

Ferroxcube 4B was pulse tested under various stressed conditions. The results confirm the work indicated in R-192. The initial 2 μ s output pulse of only one hump was expanded to a 10 μ s output pulse of two humps, when stress was applied.

The "Core Buster" is at present being modified so that stresses may be in a continuous fashion, rather than applied in large increments.

Materials (D. A. Buck)

Five Puron rods have been sent to the N. B. S. Corona Laboratory as part of a cooperative effort to study the possibilities of fabricating magnetic cores by evaporation. Alternate layers of ferromagnetic material and insulation can be evaporated to form cores which may have memory possibilities. Pure iron and quartz will be first tried in an attempt to evaporate a 2 x 2 matrix of cores. Testing will be done here initially. If present plans materialize, large (32 x 32) matrices will be made in a single operation. Great uniformity is assured. In a recent visit to that laboratory, the possibility of evaporating coordinate selection circuits (rows, columns, z-axes, and sensing winding) were discussed along with the possibility of making switch cores in the same operation.

Nuclear Spin Echoes (D. A. Buck)

Contact has been made with a group studying nuclear induction spin echoes as a computer memory device. Tentative results are promising. Pulses are stored in a one-c.c. sample of water which is held in a slightly inhomogeneous magnetic field. At a later time, a large pulse causes the stored information to be read out. Storing and reading of information involve r.f. techniques (30 megacycles). Pulse waveshapes are preserved but inverted upon reading--the last pulse in is the first pulse out.

2.31 Magnetic-Core Materials (continued)

Bismuth (D. A. Buck)

Two bismuth crystals have been grown at the Naval Research Laboratory, Washington, D. C., for our magnetic-resistive gate experiments.

Ferroelectrics (D. A. Buck)

Circuit and layout drawings for the new ferroelectric pulse tester have been completed by J. Woolf. A number of new samples, some containing lead titanate, await testing. Attempts of an outside laboratory to grow ferroelectric WO_3 crystals on our behalf have been unsuccessful.

A non-destructive ultra-sound read scheme for ferroelectrics has been tested with positive results.

Magnetism (D. A. Buck)

A copy of the abstracts of the papers of the forthcoming conference on magnetism (September 2-6) at University of Maryland is available in W3-333 (D. Buck's desk).

Toroid Pulse Transformer (R. E. Hunt)

American Associates in Newton have been given an initial order to assemble and cast 100 of our pulse transformers. We hope to be able to produce 100 of these weekly for a period of four to five weeks. These will be used for test equipment and experimental work.

Project Lincoln has shown some interest in samples of these transformers sent to them.

Core Tester Model IV (R. F. Jenney)

A trip to Magnetics, Inc. showed that their test procedure and equipment are satisfactory.

Burroughs equipment and plug-in units have been substituted for the logic in Model IV, Serial No. 2.

Test procedure is being reviewed and improved.

2.32 Magnetic-Core Memory

16 x 16 Metallic Array (B. Widrowitz, S. Fine)

Took marginal data for R-report on metallic array. Completed the necessary photographs and graphs for this report. The report is now in the process of being corrected and compiled for final printing.

2.32 Magnetic-Core Memory

Coincident-Current Memory (D. A. Buck)

An alternate driving scheme has been suggested for a coincident-current memory which makes the half-amplitude currents in the rows and columns uni-directional. For tube-driven arrays, the scheme eliminates one-half of the heavy-current tubes, but requires more complicated selection circuits. Evaluation is being made by Ken Olsen.

Ceramic Array II (J. L. Mitchell)

A method of checking the number of turns on the switch core windings has been set up and tested. The two-turn side of the switch core is excited with a 60-cycle voltage and the output of each of the four 20-turn windings is measured with a vacuum tube voltmeter. If there is any error in the number of turns on the 20-turn windings a 5% change in voltage is observed for each turn the winding is in error.

The cores in Ceramic Array II will be tested for winding accuracy in the near future. In addition the characteristics of the core material will be checked by pulse tests on each core. From these tests, we hope to gain information that will help evaluate the switch core.

Measured Outputs of Mo-Perm Cores (J. Raffel)

Data was taken and graphs drawn to show the variation in "one" and "zero" disturbed outputs for a Mo-Perm core (1/8 x 1/8 x 5 x 1/8 mil) for the range of temperature 0 to 100° C.

Results showed a gradual increase in output voltage with higher temperature for the one disturb, and a slight decrease in switching time. The maximum increase in voltage was about 20% (at 100° C) and the maximum decrease in switching time about 30%.

In all cases the "zero" disturb was too small to be measured.

Sensing Panel Development (C. A. Laspina)

The direct coupled sensing panel mentioned in the last report has been designed and built. Testing of the unit will have to wait until the laboratory receives the expected shipment of 12AY7's.

Z-axis driver (C. A. Laspina)

A Z-axis driver has been designed and built and is now being tested. The unit will produce a current variable between 20 and 160 ma with a Z-axis winding of the array at ground potential.

2.32 Magnetic-Core Memory (continued)32-Position Crystal Matrix Switch (D. Shansky)

A 32-position crystal matrix switch and associated drivers--part of the memory driving circuits (X-Y axis) for the MTC--has been designed and is now in the shop.

Hysteresis Loop Study (A. Katz, J. McCusker)

A generator, consisting of four current sources and their associated logical equipment, has been assembled so as to produce as its output a "staircase-function" of current followed by a reset current pulse. The heights of each of the three steps in the staircase and the time intervals between steps are both adjustable. By means of this generator, we hope to be able to investigate the three separate regions (as one switches a core from $-\Phi_r$ to $+\Phi_r$) of the idealized rectangular hysteresis loops for both ferramic and metallic cores.

Switch-Core Study (A. Katz, E. Guditz)

The study of switch-core drive for a memory has been continuing and is now bringing to light some interesting facts.

Using turns ratios and numbers of turns previously found to be somewhere near optimum (for a given primary current), Guditz has wound and tested three switch cores for use as drivers for the Z-axis of Ceramic Array I. By varying primary current and measuring secondary current under this condition of constant load, we found that the Kerchoff mmf Law apparently no longer holds when a core is driven into saturation--that is $N_1 I_1 - N_2 I_2$ is non-zero and positive. Over the smaller ranges of driving mmfs the switch core behaves as a linear transformer; but for large net mmfs, its output current remains essentially constant.

It is hoped that these and other facts still to be deduced from the experimental data collected will be of value in establishing a design procedure for switch core drivers.

Switch-Core Tester (R. S. DiNolfo)

In an effort to test the switch cores of Ceramic Array II and future switch cores after they have been wound, a driver has been designed and is being built. This driver will produce a 400 m.a. peak square wave to drive the 20 turn windings, and by sensing the 2 turn secondary with an oscilloscope and an ammeter, it is believed that errors in windings and/or cross sectional area can be found.

2.33 Magnetic-Core Circuits

Magnetic-Core Adder (C. Schultz)

One digit of a magnetic-core matrix switch adder has been constructed and is operating at a low PRF. Tests have been made using various turns ratios on the input and output windings to determine optimum conditions of operation.

Magnetic Gate Stepping Register (G. R. Briggs)

The construction and de-bugging of electronic driving equipment for the magnetic gate stepping register is continuing. It should be completed early next week. A large part of the week (8/11 to 8/14) was lost due to necessary absence.

Pulse Transformers (R. D. Robinson, E. G. Gates)

A thesis entitled "Design of Low-Power Pulse Transformers Using Ferrite Cores" is being completed. The subject matter includes measurement and evaluation of ferrite materials for pulse transformers, design of 1:1 and 3:1 transformers to replace the Hypersil core standard model, and the construction and testing of the completed design. As a result of the effectively non-existent eddy-current loss in the ferrites, the equivalent circuits of the 3:1 and the 1:1 are greatly simplified, and an analytical determination of output waveshape is made and shown to be compatible with scope-viewed waveshapes. Use of "tail reversing inductances" and damping diodes are discussed and their effects on pulse shape and PRF sensitivity reviewed. The thesis is limited in the main to pulse transformers designed specifically for passing the 0.1 microsecond half-sine waveshape.

Earle Gates is taking over the pulse transformer development program, and will continue the work on material evaluation, special transformer design, and transformer theory.

2.4 Test Equipment

Test Equipment Committee (L. Sutro)

Ten Burroughs units have arrived and are being inspected here, 12 units are on their way by truck and 56 units are going through inspection and testing at Control Instrument Co., in Brooklyn. The flow of units from Brooklyn to us should increase until we are receiving 12 to 15 a day. The total of units now on order is 459.

At present the committee is distributing the new units so that every man who has requested units receives an equitable proportion of his request.

Fifteen eight-plug rack power strips have been completed by the shop. Seven have been distributed and the remaining eight are available for those who need them.

Magnetic Core Tester (R.E. Hunt)

This machine is about 30% complete in the machine shop. I have a student working full time on the problem of plating contacts and leads on a test probe .000" in diameter. Satisfactory progress is being made.

Hysteresigraph (R. Pacl)

The hysteresigraph is in the process of being calibrated by means of mutual air core inductors. By making precise measurements of the geometry, we hope to be able to determine flux within 5% on the oscilloscope, using a variety of inductors to cover the range anticipated, viz. 0-2000 maxwells.

2.5 Basic Circuits

Low Performance (12AU7) Flip-Flops (H.W. Boyd)

The last week of the past bi-weekly period was spent trying to analyze the flip-flop's failure to operate with some tubes and yet operate successfully with a majority of others (all 12AU7's).

After attempts at circuit redesign had failed to alleviate the situation, I discovered (on the 4th day) the cause of its tube discrimination to be the improper wiring of the heater elements by the shop; i.e. - the filaments were wired in series (for 12 volt operation) instead of in parallel (for 6.3 volt operation).

Tests are underway again on the original circuit design to determine its ability to operate on cold, unbalanced, and hot tubes, and its maximum prf.

2.5 Basic Circuits (continued)

Plug-In Flip-Flops (H.J. Platt)

Continuing the work on the plug-in flip-flop, it was decided to try some network theory in obtaining the specified transient response as laid down by Ken Olsen. With the help of Bill Linvill a circuit was arrived at. But the output capacitance of the circuit was well below the desired load capacitance.

Other network configurations are being tried.

2.6 Component Analysis (B.B. Paine)

A device has been built which will facilitate pulse testing of miniature ferrite pulse transformers after assembly but before **potting** in plastic. This testing will point out minor repairs necessary in the assemblies which would be impossible after **potting**.

Some time is being spent assisting F. Sandy in sketching up schematics and layouts for the Room 156 Power Control System.

2.7 Memory Test Computer (J.D. Crane, Jr.)

The special plug-in mounting panel model which has been constructed is modified to facilitate wiring of flip-flop indicators. A 34 pin connector made by Winchester Electronics, Inc. is being used in place of the Jones strips in the original model.

Video lines between vertical panels will be supported by a phenolic strip which also serves as a support for d-c bus lines. A section of this phenolic strip is mounted on the panel to show placement of wires, size of phenolic strip, and strength of construction.

A means of containing wires for distributing voltages to the panels is being considered.

(H.K. Smead)

During this period a heat test was conducted on a vertical strip of sixteen plug-in units, with expected operating conditions simulated. Flip-flop units were used. The highest temperature measured, without any air current other than natural convection currents, was 75° C. A small fan was used to direct air upward and downward, and under these conditions the highest temperature measured was 58° C.

2.7 Memory Test Computer (continued)

In all cases this highest temperature was measured between the two tubes. Other measured temperatures were in all cases appreciably lower.

Parts for 260 plug-in units and 400 frames have been ordered.

A tentative design for the rack to contain the plug-in units has been completed.

(R. Von Buelow)

Panels for power distribution, filtering, and fusing have been designed and prototypes are being constructed. There are two types, one to fit the 19" racks that will hold the control element, and one that will fit with the plug-in units. These panels will contain a fuse alarm circuit.

(R.G. Farmer)

A final decision has been reached on the type of power supplies to be used for the Memory Test Computer. The supplies will consist of double WYE rectifiers and series tube regulators.

The supplies will be pre-regulated by a 50 KVA motor-alternator set. This alternator will also supply the filament power. The capacity of the alternator was chosen to anticipate the addition of components not included in the original design of the MTC.

One-half of the supplies will be available by January 1, 1953 and the remaining half by March 1, 1953.

(R. Hughes)

A breadboard has been constructed of the plug-in peaker gate designed by Dick Best and is now undergoing de-bugging.

3.0 STORAGE TUBES

3.1 Construction (P. Youtz)

Most of the Construction Group were on vacation during this bi-weekly period. All construction facilities were shut down. Frank Caswell with a small group, did the annual maintenance work on the construction facilities.

3.2 Test

Pretest (R.E. Hegler, D.M. Fisher)

During this bi-weekly period, two tubes were pretested, RT312-C-1 and ST620-C.

Since the amount of deflection shift is a function of the gas content, RT312-C-1 was made with a stannic oxide conductive coating in an attempt to process cleaner tubes which would reduce this deflection shift by minimizing the amount of positive ions. In the past, an area on the target opposite the tubulation was dark and very hard to write positive which suggested a contamination of the beryllium during the bakeout. This area appeared to be due to the inclining position of the tube. During the bakeout of RT312-C-1, the tube was mounted in a vertical position so the gasses which were liberated from the stannic-oxide coating would not form in one small area, but would be evenly distributed over the target area. Upon first investigation it appeared as though mounting the tube in a vertical position was to a degree, distributing the contaminating gasses fairly evenly over the target, as evidenced by a doughnut shaped area with a slightly lower secondary emission. The difference in secondary emission over the surface was small enough, however, that RT312-C-1 could have been passed if there had not been indications of buckled mica.

Preventive maintenance is being continued on the TVD. Twelve crystal diodes were replaced in the decoder increment generator. Because of the large filament current drawn by this chassis, heavier filament lines were installed from the filament supply to the decoder unit, increasing the voltage from 5.64 to 6.4 volts.

Occasionally when testing new tubes at the TVD, an arc is heard in the vicinity of the storage tube which occasionally resulted in the loss of the HVG cathode current. In an attempt to ascertain whether the tubes or the equipment cause the arcing, a high-pot. test was given to the cathode and grid circuits of the TVD. No breakdowns resulted at 4000 volts, indicating that the source of the arcing is probably in the storage tubes.

This bi-weekly finishes the placement of special storage-tube test equipment in the stock room.

3.2 Test (continued)

STRT Checkout of WWI Storage Tubes (T.S. Greenwood)

The only new tube checked in the STRT was ST615. The error free area in the spot interaction test was somewhat small when plotted on a voltage basis, but appeared nearly normal when plotted on a current basis. This tube was used to compare results between the Alignment Demonstrator and the STRT, and showed some discrepancies between the two units as a result.

ST611 which had been tested during an earlier bi-weekly period and found particularly good was returned from WWI. It had consistently given trouble in Whirlwind by reading positive on a negative surface. The tube, in its original mount, was installed in STRT and it was immediately noted that a written array appeared rotated about 40° from the after-stored array. The after-stored array was nearly aligned with the square mica washer and showed no observable distortion. The array which was written in STRT agreed with original pretest of target and gun. Unfortunately, no records are made of alignment after pretest but the impression of the WWI test group was that the observed array in the computer agreed with the after-storage whenever they observed it. No mechanism for creating such a rotation has been discovered and due to interference between after-storage and the written array, the tube cannot be satisfactorily checked in STRT.

3.3 Research and Development (C.L. Corderman)

Some thought is being given to the equipment necessary for rapidly obtaining HV beam distribution measurements on the Faraday-Cage tubes. A self-contained portable unit will probably be decided upon so that with an oscilloscope only, the necessary data may be taken wherever storage tubes are normally operated. A scope camera will be obtained for the storage tube test lab and a photograph of the beam distribution can then be included as a part of the standard test procedure.

From the thesis work of J. Jacobowitz, it is apparent that the logical solution to the ion-deflection shift problem is one of continuously removing the positive ions in the body of the tube at a rate somewhat faster than they build up, due to the "trapping" field distribution. With the return of the construction group next week a research tube will be made having an ion collector ring. The extent of the ion-deflection shift may be easily studied with the Faraday Cage now included in all storage tubes.

One and a half weeks of this period were spent on vacation.

Deflection Shift (J. Jacobowitz)

This bi-weekly period was spent preparing a thesis report on research that has been conducted for the past two months. The title of this report will be "The Effects of Ions on the M.I.T. Electrostatic Storage Tube."

The work on this thesis is being continued.

3.3 Research and Development (continued)

Alignment Demonstrator (A.J. Cann)

During the first week of this period, ST615 was tested in the AD, in the STRT, and again in the AD. During the tests in the AD a number of things were changed, in particular things which are different in the AD, STRT and WW. An example is the readout sensing gate, which in the AD is more sensitive than in the STRT or WW. The results may be summed up as follows:

1. Repeatability of AD measurements is good.
2. Agreement between AD and STRT is good on a beam current basis.
3. Agreement on a voltage basis is bad but it has been shown that the accuracy of the gate amplitude measuring technique leaves something to be desired.
4. The design differences between the AD and other equipments make negligible difference in the test results, at least insofar as simulation of conditions in the other equipments was attempted.

These results must be verified on more tubes of course, but it begins to look as if we are in business.

During the second week of this period some ideas on pulse read-out were tried out. This work will be continued next week.

Philips "L" Cathode (T.S. Greenwood)

Construction of the two research tubes mentioned in the last bi-weekly report has begun. Some difficulty in packing the heater cavity was encountered but it appears that a successful technique can be evolved.

Considerable time was spent in a literature search on activation and emission problems associated with "L" cathodes.

3.4 General (C.T. Kirk)

I have recently joined the Storage-Tube Group and at present am reading pertinent literature on Storage Tubes.

4.0 TERMINAL EQUIPMENT

4.1 Typewriter and Tape Punch (L.H. Norcott)

The final tape output selector relay panel has been modified to insure that only one flexowriter unit can be operated by the computer at any one time.

"FL" #1101 is being modified to provide a printer "completion" signal. It is expected that this modification will be completed today, giving us two "FL" 's capable of being used with the new tape output system.

Commercial Controls reported on August 13 that they are moving the shipping date of our 5 new "FL" Recorder-Reproducers to August 29th.

Paper Manufacturing Co. reported that they were shipping us a new lot of gray tape on August 13. It is hoped that the new tape can be punched on our "FL" punches -- at any rate, it should clear up the troubles we have been experiencing with the old punches.

Old Reader #3 has been converted to translate "FL" code only. At the same time two new switches have been installed on this machine to adapt it for standby use with the new tape output system and also permit it to be used for printing from magnetic tape.

Old punches #2 and #3 have been modified for use with the new tape output system.

4.2 Magnetic Tape (E.P. Farnsworth)

A twenty-eight pole two-throw toggle switch has been designed to interchange magnetic tape units No. 3 and No. 4 from computer read/record to Flexowriter print-out/punch-out function in the final in-out system. This switch should be ready for installation in the computer by the time the new magnetic tape equipment is checked out, at which time the existing magnetic tape print-out equipment can be moved to the Test Control Room. Final drafting of the print-out equipment is 90% complete, and the final assemblies will be installed in the new WWI Maintenance Room racks next month as they come from the shop.

(K.E. McVicar)

The interim magnetic-tape system has been removed and the final system cabled in. A test set-up has been assembled by which it is possible to record on magnetic tape and control the tape units independent of the computer. System signal tracing is now under way using the test recording equipment.

4.2 Magnetic Tape (continued) (S. Ginsburg)

The Interim Magnetic Tape System has completed its purpose. This system was completely dismantled to make space for the Final Magnetic-Tape System.

A sufficient number of final panels have been installed to operate one tape unit during the initial installation of In-Out equipment. The system is presently being tested using a test recording network composed of standard Whirlwind test equipment and several panels of the interim system.

4.3 Display (D.J. Neville)

The DuMont 304-H Oscilloscope is to be used for visual display in the final WWI Input-Output system. Drift is excessive under normal scope conditions. Testing is being done on this scope to determine the best method of stabilization.

5.0 INSTALLATION AND POWER

5.2 Power Supplies and Control

Commutation Factor Chokes (R. Jahn)

Test of the new commutation factor reduction chokes has been completed. The two test chokes will be returned to the factory for baking and varnishing, and all 6 chokes will then be shipped to us with the correct air gap.

WWI Power Supplies (R. Jahn)

Relocation of the -48, +250, +150, and +90-volt power supplies was completed without incident. We now have space for the new filament alternator.

New Filament Alternator

Drawings and parts are being expedited for construction of the Filament Voltage Control and Filament Alternator Control units.

A request for dimensions of the new M-G set and its motor control panel has been sent to Electric Equipment Company. This will expedite the installation.

Vacation period - August 4 to August 13.

Power Supplies (F. Sandy)

Meetings were held Monday and Tuesday mornings, Aug. 11, and Aug. 12, at which time the final design for Room 156 Power Supply Control

5.2 Power Supplies and Control (continued)

was decided upon. Also decided were: what components should go on each panel; where each panel should be located; and: the power distribution to Room 156.

Room 156 has been painted and all holes for the floor cut but three. This Saturday, August 16, the sills for the racks are to be laid down. Completion of this should take less than one week.

(J.J. Gano)

Dick Farmer has been temporarily loaned to the power group by Norm Taylor in order to engineer the power supplies for the Memory Test Computer.

6.0 BLOCK DIAGRAMS (J.H. Hughes)

The changes in the computer this week have greatly affected D-35146, CPO connections WWI. The changes to the official drawing will take time but the computer room copy is up to date.

Most of the information on D-37192, D-37193, D-37194, "Block Diagram, 105, Control Matrix" is more conveniently presented on D-35146 and a Block Diagrams Department sketch of the physical layout of the matrix -- the CPO interconnections and destinations are not fully shown elsewhere. Norm Daggett and I feel that D-37192, 93, and 94 might well be replaced by a "CPO Interconnections and Destinations" diagram which ought to save a lot of cable tracing. Ideas and comments are welcome.

7.0 CHECKING METHODS

7.3 Video Cabling (T. Leary)

Approximately 300 video cables for the new In-Out Control and Magnetic-Tape Control were installed during the shutdown of August 11th and 12th. On a rush order, 117 of these were constructed and inspected between 1400 and 2330 on August 12th.

8.0 MATHEMATICS, CODING, AND APPLICATIONS

8.1 Programs and Computer Operation

Progress during this bi-weekly period on each general applications problem is given below in terms of programming hours spent by laboratory personnel (exclusive of time spent by outsiders working on some of the problems), minutes of computer time used, and progress reports as submitted by the programmers in question.

- 21. Optical Constants of Thin Metal Films: Neeb; WWI, 1 hour, 48 minutes
- 24. Matrices, Determinants, and Systems of Linear Equations: Aronson, 10 hours; WWI, 6 minutes
- 26. Subroutine Orientation Procedures: Perlis; WWI, 7 minutes
- 40. Input Conversion Using Magnetic Tape Storage: Aronson, 8 hours; Demurjian, 63.5 hours; Frankovich, 60 hours; Gilmore, 80 hours; Helwig, 70 hours; Combelic, 80 hours; Rotenberg, 80 hours

This period was spent discussing the general provisions for the new conversion and input programs. The requirements for using all the output modes were also treated.

- 45. Crystal Structure: Aronson, 7 hours
- 48. Gust Loads on Rigid Airplanes in Two Degrees of Freedom: WWI, 8 hours, 22 minutes

Problem No. 48 is now effectively terminated. The results will be published soon in a report by the Aero Elastic and Structures Research Lab, MIT.

- 50. Lattice Analogy Applied to Shear Walls: WWI, 2 hours; 34 minutes

Program T-1446-2 which consisted of T-1425-2 followed by P-1426-1 and P-1426-2 was unsuccessful. The post mortem indicated that the trouble was in the convergence criteria, that is, the solution would not print out if a small divergence occurred after reaching the lower bound. This trouble was corrected by changing two registers of T-1425-2.

T-1446-3 was then prepared which consisted of T-1425-3 followed by P-1426-1 and P-1426-2. This operated successfully except an arithmetic check alarm when using P-1426-2 prevented obtaining the last of three solutions. This difficulty was not successfully corrected until the same trouble occurred when using program T-1446-4, from which three successful solutions were obtained. At this point it was determined that the arithmetic check alarm was caused by the accumulation of digits in a dummy register, which was then corrected by inserting additional parameters which reset the dummy registers to zero after obtaining each solution.

8.1 Programs and Computer Operation (continued)

50. (continued)

Program T-1446-5 was then prepared to obtain sixteen additional solutions. The program stopped on rso after obtaining five solutions. The presence of the rso was due to my failure to delete it from a parameter which had previously been attached to the end of an earlier program. The program could have been carried to a successful conclusion if the operator had merely pulled in each succeeding parameter manually. The same tape may be used to obtain the solution to these particular parameters.

It is of interest here to note that more time is spent by the equipment in printing out the solutions than in solving the problem.

52. Oil Reservoir Depletion Analysis by Iteration: Porter, 4 hours; WWI, 31 minutes

A modification was made on one of our earlier tapes and results were obtained for eight time steps. These results were in substantial agreement with results obtained earlier.

We are still awaiting word from Dr. Shreve at the Carter Oil Company as to the comparison between these results and their desk-computed results. This comparison will indicate the effects of our accumulated round-off errors.

58. Determination of Energy Levels of Oxygen Molecule: Aronson; WWI, 20 minutes

59. AEC Positron-Electron Calculation: Combelic; WWI, 12 hours, 31 minutes

With the successful completion of the calculations for $Z = 10$ and $Z = 96$, the problem has been terminated. The data obtained is in the form of photographs of decimal numbers. The figures will be transcribed to IBM cards, sorted, and tabulated; the results will be published as a report by the Oak Ridge National Laboratories.

67. A Method for Obtaining the Characteristic Values of Symmetric Matrices by Direct Diagonalization: Perlis

Work on the memorandum concerning the techniques of #67 is continuing.

84. Departure Curves for Various Types of Resistivity Logs in Oil Wells: Porter; WWI, 19 hours, 33 minutes

The complete program was finally made to operate satisfactorily. Results for one family of curves were obtained. These results will be studied during the next few weeks. If these results are satisfactory it is hoped that time will be available on WWI when operation is again resumed to permit the determination of about five more such families of curves.

8.1 Programs and Computer Operation (continued)

86. Unsteady Gas Flow Through Porous Media: Porter, 10 hours; WWI, 14 hours, 20 minutes

Six more complete sets of results and data for completing three of the previous sets were obtained. These results will now be processed by Dr. Aronofsky at the Magnolia Petroleum Company Field Research Laboratory in Dallas. It is expected that these results will soon be described in a technical report.

Computer time, hours	
Programs	107 hours, 53 minutes
Conversion	3 hours, 29 minutes
Demonstration	1 hour, 33 minutes
	<hr/>
Total	112 hours, 55 minutes
Total time assigned	139 hours, 17 minutes
Usable time, percentage	81.7%
Number of programs operated	180

9.0 FACILITIES AND CENTRAL SERVICES

9.1 Publications

(Diana Belanger)

The following material has been received in the Library, Room W2-301, and is available to laboratory personnel.

LABORATORY REPORTS

No.	Title	No. of Pages	Date	Author
E-466	Operation of the In-Out Element	34	7-15-52	E. S. Rich
E-468	Introduction to the Theory of Semi-conductors II, A Brief Discussion of Statistical Mechanics	11	7-28-52	D. J. Eckl
E-469	Usual Display Display Facilities in the Final WWI Input-Output System	13	8-5-52	J. Forgie
M-1573	Laboratory Personnel	11	3-1-52	
M-1574	Plug In Units Engineering Conference	3	8-8-52	S. H. Dodd
M-1575	Bi-Weekly Report, August 1, 1952	36	8-1-52	
M-1576	Vacuum Tube Failures During the Month of March	7	7-28-52	{H. B. Frost A. J. Parisi
M-1579	Vacuum Tube Failures During the Month of April	6	8-1-52	" "
M-1581	Minutes of the Meeting of August 1, 1952	2	8-6-52	L. Sutro
M-1582	High-Speed Magnetic Pulse Control Circuits for Computers	6	8-6-52	H. K. Rising
M-1586	Trip to Magnetics, Inc., August 5, 1952	2	8-8-52	D. R. Brown
M-1587	Plug-In Unit Purchase Approval	1	8-11-52	H. Fahnestock
M-1589	Second Liaison Report, WWI New Equipment Progress	6	8-11-52	J. H. Newitt
M-1590	Proposed Sept., 1952, Input and Conversion Programs	17	8-12-52	C. W. Adams
M-1592	MTC Power Supply Meeting of Aug. 11, 1952	2	8-12-52	{R. Farmer H. K. Smead
M-1593	Minutes of the Meeting of Aug. 11, 1952	3	8-12-52	L. Sutro
M-1594	Tape Room Procedure	1	8-13-52	C. W. Adams
M-1595	Quantity and Distribution of Plug-In Units	3	8-14-52	H. Fahnestock

LIBRARY FILES

No.	Identifying Information	Source
1965	Transistors, Second and Third Quarterly Reports	Bell Tel. Labs.
1966	The Transistor - Selected Reference Material on Characteristics and Applications	Bell Tel. Labs
1968	Some Magnetic Properties of Metals, R. Dingle	Univ. Camb.
1975	Table of $\log_{2p} \frac{1}{2}$, etc., L. Dolansky	Research Lab. Elect.
1976	Military Standard - Sampling Procedures and Tables for Inspection by Attributes	U. S. Govt. Ptg. Off.
1977	Pattern Recording Amplifier, H. G. Schick & C. H. Child	North American Aviation, Inc.
1980	Symposium of Standardization in Technical Information	Inst. Aeron. Science

9.1 Publications (Continued)

LIBRARY FILES (Continued)

<u>No.</u>	<u>Identifying Information</u>	<u>Source</u>
1981	Aviability and Sources of the Ninety-Six Elements in High Purity Forms, E. H. Covey	U. S. Atomic En. Comm.
1982	Development of Techniques and Equipment for Winding Electric Coils Toroidally	U. S. Naval Ordnance Plant, Indianapolis
1983	Strength and Creep Characteristics of Ceramic Bodies at Elevated Temperatures	Nat. Advisory Comm. for Aeronautics
1984	Preliminary Report on the Testing of RCA Improved Cathode Ray Tubes for Application in William's Memory System	Argonne Nat. Lab.
1985	Magnetic Materials Symposium, June 15, 1948	U. S. Naval Ordn. Lab., Md.
1986	Proceedings of Symposium: Progress in Quality Electronic Components, May 5-6-7, 1952	Wash., D. C.
600	R. L. E. Quarterly Progress Report	Rsch. Lab. Electronics
1250	Research Reviews, July, 1952	
1671	Nuclear Science Abstracts	
1690	Technical Data Digest	

BOOKS

<u>No.</u>	<u>Identifying Information</u>	<u>Publisher</u>
B-224	W. R. Page; S. Seely: GENERAL NETWORK ANALYSIS, 1952	McGraw-Hill Bk. Co.

JOURNALS

- Vacuum, April, 1951 and October, 1951
- Industrial Distribution, August, 1952
- Machine Design, July, 1952
- Proceedings of the I. R. E., August, 1952
- Electrical Manufacturing, August, 1952

9.2 Standards, Purchasing, and Stock

Procurement and Stock (H.B. Morley)

Plans are being formulated to institute a Kardex stock control system for standard stocks, to coincide with a projected system of stock withdrawals.

A numbering system has been devised by Hodgdon which agrees essentially with our thinking, whereby individual numbers will be given to each component. We understand this system is also agreeable to drafting. With additional equipment and personnel, this system will be put into effect as soon as possible. For further information on this system, refer to the Standards portion of this bi-weekly.

Deliveries are now becoming progressively slower, particularly on steel items. These should be planned for about 16 weeks in advance.

Requests for improved deliveries, after an order is placed and expedited, greatly delays progress. This requires working the order over again through different sources, often with no gain to the requisitioner, and at great loss of time and effort to this department.

Standards (H.W. Hodgdon)

New standards sheets for relay racks, panels, sensitive switches, rotary selector switches, and most hardware items have been completed and are ready for printing. A revised standard for A-C contactor type relays is also ready for printing.

Full time of the committee has been devoted to establishing stock minimums at the last two meetings. Nearly all items for which standards are written have been covered. New items will be considered as the standards are prepared.

It is felt that some modification and extension of the present Standards classification code would be desirable. I would like to develop a code which would be extensive and flexible enough to serve as a complete identification system for components, to be used in Kardex, stockroom, parts lists, and other places where it may be necessary to refer to a laboratory standard component. With this in mind, comments are solicited on the following suggestions:

(1) Omit the present prefixes "6." and "7." from standards numbers. It serves no purpose except to distinguish between component specifications and test specifications; this is no longer necessary since test specs for components are included in standards, and test specs for equipment are a separate series (400-500).

(2) Add an identifying dash number for each individual component to the abbreviated standards number. This number would have to be decided for each class of components, and I believe could be restricted to three digits

9.2 Standards, Purchasing, and Stock (continued)

or less for most items. Components such as capacitors and resistors could use the JAN value code; others, some figure indicating size or other convenient identifying characteristic. In some cases purely arbitrary serial numbers can be assigned such as has already been done with transformers and relays.

9.3 Construction

Production Control (F.F. Manning)

The following units have been completed since August 1, 1952:

<u>CR#</u>	<u>Qty</u>	<u>Unit Title</u>	<u>Engineer</u>
1492-7	5	Plug-in Mounting Panel serial #5,6,7,8,9.	O'Brien
1492-3A	44	Modified Gate Buffer Amp Plug-In Units serial # 1 through 44	O'Brien
1492-4A	3	Modified Dual Buffer Amp. Plug-In Units serial # 1,2,3.	O'Brien
1492-14	5	Dual Buffer Amp. Plug-In Units serial # 4,5,6,7,8	O'Brien
1492-22	1	Dual Buffer Amp. Plug-In Units serial #1	Gould
1657	1	Paper Tape Output Relay Register	Norcott
1690	1	Magnetic Tape Control Unit Selector Amplifier	O'Brien
1770	1	Generator for 4 Independent Pulses Breadboard	Briggs
1807	50	91-ohm Terminators	Manning
1831	1	IOS Cathode Follower Panel (Unpainted)	Gould
1839	25	D-C Power Cables	Smead
1895	1	Volt-Meter Box	Papian
1904	24	Microphone Cables	McVicar
1913	31	Video Cables	Leary
1915	96	Video Cables	Leary
1919	14	Video Cables	Leary
1920	77	Video Cables	Leary
1923	43	Video Cables	Leary
1928	117	Video Cables	Leary
1925	2	D-C Power Cables	Briggs
1926	10	D-C Power Cables	Briggs

The following units are under construction:

1684	30	Low Speed 2 ⁶ Counter	Taylor
1469	3	Filament Power Panel	Papian
1929	71	1:1 Transformers	Manning
1492-13	15	GTRA Plug-In	O'Brien
1830	35	Lab Bench Mod. of D-C Outlet Boxes	Manning
1492-15	10	D-C Flip-Flop Plug-In Unit	O'Brien
1880	100	91-ohm Terminators	Smead
1492-13	15	GTRA Plug-In Unit	O'Brien

9.3 Construction (continued)

<u>CR#</u>	<u>Qty</u>	<u>Unit Title</u>	<u>Engineer</u>
1415	5	ST Mount	Dodd
1789	30	D-C Power Strip (4 Plug)	Sutro
1492-20	3	Plug-In Test Panel	Werlin
1492-12	12	Gate Tube Plug-In Unit	Papian
1767	700	91-ohm Terminators	Sutro
1767	150	D-C Power Cables	Sutro
1922	5	Delay Lines	VonBuelow
1924	9	Video Cables	Briggs
1881	48	Clip Leads	Smead
1927	1	Core Driver Mod IIA	Boyd
1492-21	10	Special Delay Line	Werlin
1890	80	Video Cables	Smead
1909	1	Modify DCIOR Serial #34	Holmes &
		" " " #20	Desjardins
1892	40	Video Cables	Corderman
1910	1	Modify DCIOR Serial #35	Holmes & Desjardins

9.4 Drafting (A.M. Falcione)

1. New Drawings

<u>Title</u>	<u>Cir Sch.</u>	<u>Ass'y & PL</u>	<u>Al Panel</u>
MT Print Out Sw. Panel	B-51795	E-52055	C-52145
MT Print Out Receptacle Panel	A-52101	C-52102	
MT Print Out Index Pulse Counter	C-51866	D-52061	D-52155
Aux. Panel, Tape Output Relay			
Register	A-52183	D-52184	D-52183
832 EST Output (Panel Serial #16)	C-52137	D-52136	

2. Burroughs' Test Equipment

All Burroughs' Test Equipment Drawings have been redrawn to DCL Standards and will be used in a report by L. Sutro on Laboratory Test Equipment.

3. Thesis Drawings

All thesis drawings have been completed and sent out for line negatives, (140). We expect to do all the reproduction work in our own print room, and meet the required date line on August 22.

4. New Titles

With the increased number of engineering personnel and the great number of breadboard models and prototypes being built, there have been instances

9.4 Drafting (continued)

where titles given to these units are similar or the same as units which already exist. This situation will continue as time goes on. I would suggest that some thought be given to the establishment of a control point for new unit titles so that no duplication of titles will occur which may lead to embarrassing situations. This situation is particularly evident on the new plug-in units. There will be many models, mostly modifications of basic units.

10.0 GENERAL

New Staff (J.C. Proctor)

Mr. Howard Briscoe is a temporary DIC staff member working in Adams' group. He has a B.S. in Geophysics from MIT. In September he will assume a research assistantship in the Electrical Engineering Department.

Mr. Donald J. McCann is a new staff member in Taylor's group. He has a B.S. in E.E. from Northeastern University and an M.S. in Communications from Harvard University. He worked six years in the Underwater Sound Laboratory and has had various other pertinent experience.

Terminated Staff (J.C. Proctor)

John T. Gilmore, Jr.

New Non-Staff (R.A. Osborne)

The following three technicians have joined the Construction Shop:

William Burns
Norman Leafer
John Zeno

Marcia MacStravic is a new clerk in the Purchasing Dept.

Joseph Papandrea is a new senior detailer in the Drafting Room.

Evelyn Williard is Robert Nelson's new secretary.

Terminated Non-Staff (R.A. Osborne)

Jo Ann Cowles
Barbara Halpern
Henry Karshi
Alice Monroe
David Wiesen