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Memorandum M-2955

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DIVISION 6 - LINCOLN LABORATORY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
LEXINGTON 73, MASSACHUSETTS

SUBJECT: BIWEEKLY REPORT FOR JULY 30, 1954

To: Jay W. Forrester

From: Division 6 Staff

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By: R.R. Everett  
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SECTION I - CAPE COD SYSTEM

1.1 Group 61

1.10 General

(R.J. Horn, Jr.) (CONFIDENTIAL)

Work on the 1954 Cape Cod System programs continues. Program checkout and testing should begin the first week in August.

The Air Force Personnel training program is now scheduled to start 10 August for Officers and key NCO's and 24 August for all other enlisted men.

A large amount of Group 61 time was spent on preparation of preliminary drafts of a document to replace TM-20.

(D.R. Israel) (CONFIDENTIAL)

This biweekly period has been completely devoted to preparation of a document to replace TM-20. Drafts of Appendices A and B of this document have been prepared by Group 61 and distributed as M-2941 and M-2946 for comment.

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### 1.3 Group 65

#### 1.31 Activities of Group 65

(P. Youtz) (UNCLASSIFIED)

The Tube-Construction Section was on vacation this past period. During this period many of the tube-production facilities were overhauled and modified to meet the new needs that have arisen this past year.

I made two trips with the IBM Tube Group before they went on vacation on 24 July. We spent two days, 21 and 22 July, with General Electric at Owensboro, Kentucky, discussing the production specifications for the Z-2177. This included a thorough discussion of factory techniques and procedures besides the final tube specifications. The specifications were finalized sufficiently so that General Electric could produce and IBM could order production Z-2177. We spent one day, 23 July, with DuMont, Passaic, New Jersey, discussing the engineering specifications for the multiplier phototubes, 6291 and K1303, and the 16-inch cathode-ray tube for the video mapper. Sufficient information was obtained for IBM to write the preliminary engineering and purchase specifications for these tubes.

C. L. Corderman, F. A. Rodgers, and I spent 30 July with the National Union Radio Company at Orange, New Jersey, studying their work on dark-trace tubes. Several of their dark-trace tubes may be obtained for study at Project Lincoln. Under investigation is the feasibility of using a dark-trace surface with the Charactron optics to produce a Charactron-type tube with a memory surface.

Work was done at MIT and Convair on what has been designated as Mod. III Charactron optics. MIT received from Convair the new convergence coil for the Mod. III optics. This coil was evaluated immediately and information exchanged with Convair. Present indications are that Convair will have three preproduction Charactrons with Mod. III optics ready for our evaluation on 16 August 1954. Convair has reported satisfactory progress with their work on the helical-dag coatings.

Hughes Aircraft has made a Typotron with a third set of deflection plates for compensation. There have been frequent exchanges of information about this tube. Sydney Smith is planning to bring this tube to MIT 2 August for evaluation and a discussion about Typotron electron optics.

#### 1.33 Research and Development

(P. C. Tandy) (UNCLASSIFIED)

The helical-dag resistance of three 16-inch tubes, Cht-36, -37, and -43, was found to be 52, 100, and 125 megohms, respectively. All the resistances are higher than the 33.3-megohm average of the first 14 helical-dag tubes.

1.33 Research and Development (Continued)

(P. C. Tandy) (UNCLASSIFIED) (Continued)

Work is being done on a tentative life test for 19-inch Charactrons. The logic and tentative operating conditions have been worked out, and the equipment needed will be determined shortly.

(H. B. Frost) (UNCLASSIFIED)

During the past two weeks my time has been spent almost exclusively on thesis writeup. At this time four chapters have been essentially completed. One chapter and two appendices remain to be written. This material should be completed during the first week of August.

(S. Twicken) (UNCLASSIFIED)

A trip was made with P. Youtz to G. E. at Owensboro, Ky. Talks were given to the factory personnel by a USAF Major, N. P. Edwards of IHM, and P. Youtz on the aims of the Lincoln program, how the Z-2177 fits into this program, and the necessity for meticulous care in the production of the tubes. Some spec changes were made, and inoperatives control and cathode melt selection tests were added to the spec. Approximately 2000 tubes have been made in the factory, but the majority are not yet tested and evaluated.

An analysis of 8 different engineering sample lots of Sylvania SR1782A's is being made. These sample lots were made in an effort to determine the cause of decreased d-c plate current on life.

Some thought is being given to means of measuring the flash intensity and persistence characteristics of CRT's, specifically for the 19-inch Charactron.

(L. B. Martin) (UNCLASSIFIED)

The following is a list of Typotron tubes and their hours of operation in life test:

<u>Tube No.</u>	<u>Hours</u>
265	3334.5
280	2516.5
335	1699.5
366	997.7
389	913.9
390	997.7
392	997.7
394	215.6

1.33 Research and Development (Continued)

(L. B. Martin) (UNCLASSIFIED) (Continued)

These tubes are in satisfactory condition except for No. 265 (as noted in previous reports) which will not store in the center because of ion damage.

The Typotron Leakage Report has been prepared and dispatched to the Print Room. It is interesting to note that not one of the 14 tubes passed the minimum leakage requirements proposed by Hughes. One tube failed by one test, three tubes failed by two tests, and the remainder failed by more than two tests.

Five MIT experimental Charactron tubes and six MIT storage tubes were leakage-tested for comparative purposes. The MIT tubes were far superior in this respect to the Typotrons.

Typotron tube No. 399 has not yet been operating satisfactorily. The original hypothesis of an open ion-collector lead has been discredited. The tube cannot be labeled defective until further tests have been made, but it is safe to call it at most marginal at this time. Since all 8 life-test positions are filled, further tests have yielded to more pressing matters. There is some reason to suspect that the storage surface is poisoned.

The new life-test-mount prints are being modified to provide separate control and measuring jack for the new A<sub>2</sub> lead on the split-focus Typotron.