STATUS REPORT ON COLOR TV RECEIVERS AND SYSTEMS

October 12, 1956

I. STANDARD APPLE

It should be noted that all parts of this program have been slowed to some extent by a reduction in personnel and probably will be slowed still further for the same reason.

A. Equipment for the Color Uniformity Program

Tracking equipment making use of the vectorimeters is being developed at a slow pace. An additional photo phase meter and improved transit time measuring equipment are being made ready for the task force.

An additional flat field stand has bean completed and is now in service at Lansdale. This makes it possible to use one flat field stand for quality control purposes and the other for the diagnosis of the causes of color non uniformity.

B. Task Force at Lansdale

A set of shipment criteria were developed from discussions between our group, Lansdale and Engineering. Four tubes have been shipped to Boothroyd which approximately meet these criteria. Other tubes are being evaluated fox this purpose as rapidly as possible.

Several additional observations have been made in the course of evaluating these tubes. The correlation between the subjective appearance of flat fields and the actual measured color non uniformity is poor. More work will be done to try to improve this correlation. A fair number of tubes are now being made which do not show the effects of charging of the walls on transit time and index frequency. The reasons for this are not yet fully understood and there is no guarantee that all tubes in the future will not show charging. Some tubes which did not show charging when new, afterwards would show evidence of charging. Among those tubes which do not charge, it has been possible to observe the effects of lip height on transit time. The measured results of such tests closely confirm the predictions made by Burgett from his electrolytic tank tests.

C. Transit Time

Burgett's tests of the effect of lip height on transit time are continuing. At sometime before the next prescription for a mask is issued, it will be necessary to make a final decision on lip height and the tolerances on lip height.

D. Yoke Studies

A series of tests has been made on the effect of yokes on color uniformity. These tests showed the effects of yoke adjustment as well as those of yoke to yoke variations. It was determined that a part at least of the yoke to yoke variation was caused by lack of care in mounting the yokes. The yokes used in these tests were then returned to Bloomsburgh in Engineering for further tests.

II. ADVANCED APPLE

A. Time-sharing System

New tubes for this system have been received from Lansdale and used in showing both pictures and flat fields in the time-sharing system stand. The main characteristics of these pictures and flat fields are as follows: The color uniformity is fairly good. The signal-to-noise ratio is not quite adequate even with the best photo multiplier tubes. This is due in part to not having an ideal phosphor for this system. The loop stability appeared to be adequate. The brightness available was limited by insufficient video drive and by poor spot size in the picture tubes used for this test. A slight half-frequency component was visible in the pictures due to shadowing of the visible phosphors by the index phosphor. Circuit work on this system will be continued and the tubes which we now have will probably be adequate.

B. 3/2 Semi-ambiguous System

A few tubes were received for this system but did not prove to be adequate. The duty cycle of the index lines was so high that the AC to DC ratio was very poor. This resulted in overloading the photo multiplier tube before sufficient signal was developed to make the system operate. More tubes for this system are now being made at Lansdale. A great deal of circuit work also remains to be done on this system before a comparison will be possible between the two photo electric systems.

C. Phosphors and Photo Tubes

An evaluation curve for phosphors is being prepared. This curve will show, for each of the two proposed systems, the relative desirability of index phosphors with peak response at various wavelengths. All known system factors, including the leakage of visible light through the aluminum coating, will be included in this evaluation curve. The curve will indicate whether it is desirable to try to have phosphors developed in other parts of the spectrum.

Due to the lack of personnel, no additional phosphor measurements have been made in the last month.

The life test of 931-A tubes is still continuing. The tubes which are operated far below rated output current continue to show good life. DuMont 6365 tubes continue to show excellent life at rated output currant. The samples are now running at 2200 hours.

Comments have been received from the EMI Company in Great Britain on the tentative specs for photo multiplier tubes which we issued last Summer. Tests are now being made on a sample EMI tube. When these tests are completed, we will reply to the EMI comment. The results so far indicate that the EMI tubes may be approximately what we desire. In general, we agree with the comments made by EMI on the proposed specifications. A new set of specifications will be issued as soon as possible. No further discussions will be held with suppliers until this has been done.

III. ELECTRON OPTICS

At the present time no additional work is being done an electron optics for the Apple project. All of the effort has been put into preparing proposals for military electron optics projects.

A proposal is being prepared for the Bureau of Aeronautics on a display system which includes an improved cathode ray tube as well as a recording camera and other parts. The work which would be done if we obtain this contract will include almost all of the advanced electron optical studies which we would like to make, index studies which we would like to make, and also a great deal of other display system work which is really of no particular significance to the Apple project but is necessary in order to obtain the contract. It now appears that if Philco gets this contract, it will be necessary to add several people to our group in order to carry it out. The proposal is almost complete and will be transmitted to the Navy Department on November 2nd.

IV. COLOR TECHNOLOGY

The results of the Burroughs computation of the colorimetry of sequential displays are now in the drafting room, where curves are being prepared to show the results in the clearest possible form. It is believed to be wise to devote a good deal of effort to showing the results clearly in order to obtain the full benefit from the large amount of money and effort which have been put into this project.

A study has been made in the Gertrude stand of the brightness which may be obtained from wide-red-line Apple tubes. It is now realized that there are three possible definitions of peak brightness of an Apple tube. The first is the peak brightness which can be obtained in a display without corrections and where desaturation of primary or complementary colors puts the limit on brightness. Under this definition we believe the peak brightness of a present wide-red-line tube is 50 foot lamberts. The second definition is the peak brightness which can be obtained with diode, monochrome and equi-angle corrections which has been the customary practice in our displays, and with the normal demands for saturated colors as they exist in the test slides available to us. Under this definition the brightness is 75 foot lamberts. The third definition is the peak brightness which can be obtained with the maximum amount of white stretch which is subjectively tolerable. Under this definition the peak brightness of the wide-red-line tube is about 100 foot lamberts. Further studies of this kind should be made.

V. SIGNAL CENTER

Operation for sometime with only a single man in the Signal Center has resulted in a gradual accumulation of maintenance work which should be done at some time to keep the Signal Center at peak performance. Both for this reason and to take care of the demands for demonstrations, which are now increasing it will be necessary to operate with two men in the Signal Center for much of the time for the next several weeks.

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