

INTERNAL DISBRIBUTION ONLY

Memorandum 6M-3738

Page 1 of 2

Division 6 - Lincoln Laboratory
Massachusetts Institute of Technology
Lexington 73, Massachusetts

SUBJECT: EXTENSION OF SUBCONTRACT No. 49

To: Jay W. Forrester

From: David R. Brown

Date: July 6, 1955

Abstract: A one-year extension of Subcontract No. 49 with the Philco Corporation is recommended to (1) continue research aimed at establishing the reliability of the surface-barrier transistor and improving its performance in digital-computer circuits, (2) establish specifications for a computer surface-barrier transistor, (3) develop transistors for driving magnetic-core memories, and (4) develop digital-computer basic circuits. The cost of the one-year extension is \$240,159.

A one-year extension of Subcontract No. 49 with the Philco Corporation is recommended as a necessary part of our program to develop transistor techniques for high-speed digital computers. The Philco surface-barrier transistor is the only transistor available which permits the development of an experimental computer system which will operate at a speed as great as that obtainable with vacuum tubes. It is a critical component to be used in an experimental computer now being designed here for assembly early in 1956.

The scope of work of the subcontract should be amended to include the following tasks:

1. Continue work already agreed on, which is concerned with an investigation of the reliability of the surface-barrier transistor and the improvement of its performance in digital-computer circuits.
2. Establish specifications for a computer surface-barrier transistor for application in computer circuits designed by MIT.
3. In conformity with specifications to be furnished by MIT, develop transistors to drive magnetic-core memories and deliver to MIT such samples as become available.

INTERNAL DISTRIBUTION ONLY

Memorandum 6M-3738

Page 2

4. Develop, test, and evaluate basic circuits for computers, the performance characteristics of such circuits to be specified by MIT.

The estimated cost, by tasks, is as follows: Task 1, \$110,000; Task 2, \$24,000; Task 3, \$60,000; and Task 4, \$46,000. The quoted total cost of the extension is \$240,159.

Task 1 will be carried out in Philco's Research Division and be concerned with such things as high-temperature deterioration of transistor characteristics, collector breakdown potentials, and improvement of the encapsulation procedure. Possible changes in geometry, or materials, which might reduce the recovery time or otherwise improve the performance in digital-computer circuits will also be investigated.

Task 2 will include work at the Lansdale Tube Laboratory.

Task 3 has been under discussion for some time. MIT engineers have already prepared their first specifications and discussed these with members of the Philco Research Department. The first samples were delivered recently.

Task 4 will be carried out in the Government and Industrial Division where other computer systems, including one for a Government agency, are under development. Herman Affel, Jr., of this division, has been designated by Philco as the project engineer for all tasks of the subcontract. Work on basic circuits at Philco is expected to supplement and strengthen our own basic-circuit work. Some duplication of work being done here is expected. Task 4 will make possible better integration of the program at Philco, and may contribute some worthwhile basic-circuit configurations.

Group 35 will participate in Group 63's direction of the subcontract, particularly for the evaluation and guidance of work carried out under Task 1. Group 35 will also assist in the direction of work carried out under Task 3 to make sure that the best possible approach is being taken to obtain a satisfactory memory-driver transistor. Division 3 will contribute \$40,000 for support of the extension.

Signed


David R. Brown

DRB/jg

cc: R. R. Everett	N. L. Daggett	R. H. Rediker
J. C. Proctor	J. B. Goodenough	I. L. Lebow
S. H. Dodd	W. N. Papian	J. M. West
N. H. Taylor	K. H. Olsen	
F. E. Vinal	D. J. Eckl	
T. H. Meisling	B. Lax	