

A SIMULTANEOUS SEALER CONTROL SYSTEM

Photostat Price \$	<u>1.80</u>
Microfilm Price \$	<u>1.80</u>
Available from the Office of Technical Services Department of Commerce Washington 25, D. C.	

By  
R. L. Tomlinson

Pile Physics Unit  
Pile Engineering Sub-Section

August 15, 1955

Hanford Atomic Products Operation  
Richland, Washington

**LEGAL NOTICE**

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission

A. Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or

B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission to the extent that such employee or contractor prepares, handles or distributes, or provides access to, any information pursuant to his employment or contract with the Commission.

UNCLASSIFIED

-3-

A SIMULTANEOUS SCALER CONTROL SYSTEMINTRODUCTION

In the beta counting of short lived radioisotopes manual operation of more than two scaling assemblies simultaneously by one technician is virtually impossible. In order to simplify scaler operation and to speed up the overall counting operating, a simultaneous control unit was designed and built that would handle up to eight scalers with about the same effort required by a technician as for previous operation of two assemblies. Decay correction for the various radioisotopes is simplified when using the control unit because the same calculation applies to the several foils counted simultaneously in the various scalers.

SUMMARY

The primary purpose of this writeup is to present a description of the electrical and mechanical features of the developed system for use in maintenance and operation of this equipment. The circuitry contains no electronic tubes and is completely 110 V AC. In addition to all of the basic scaler operations two variable time cycles and manual operation are available. Unwanted scalers may be removed from the system by disengaging a toggle switch on the front panel of the control unit; disengaged scalers may be operated in the normal fashion either manually or by use of the timers built into each automatic scaler.

DISCUSSION

The simultaneous control unit consists basically of ten 110 V AC relays, assorted switches and two Microflex timers, one having a range of 0 - 2 minutes and the second of 0 - 20 minutes; the 0 - 2 minute Microflex yields much better accuracy for short time intervals. At the time the instrument was built a solenoid reset clock was not available; this item should be added for maximum efficiency.

Nine of the ten relays are of the plug-in type for ease in servicing. Three push buttons are provided to start the counting to stop the counting in emergency, and to provide ganged electrical resetting of the registers and scaling strips.

314 2

UNCLASSIFIED

The count and stop switches are used exclusively when operation of a group of scalers is manual. A three-position switch is accessible from the front panel for selecting the type of operation desired: manual, 0 - 2 minute Microflex, or 0 - 20 minute Microflex. The electronic circuitry for the system is divided into 2 separate circuits: (1) Circuit one includes the power to the Control unit and to the register reset mechanism. (2) Circuit two includes power to the scalers including the high voltage supplies. Power may be supplied to the registers from either the control unit or the scaler, so that a scaler may be operated either remotely or manually and still have a functioning electrically reset register. Care must be taken in wiring the circuitry to maintain the correct polarity of the electrical components. In many cases electrical equipment will function without regard to polarity but such is not the case if this unit is to be operated both manually and remotely.

#### OPERATION

##### 1. Ganged remote manual operation

In order to be ganged together all connected scalers must have their scaler selector switches (switches S-5 through S-12 as shown in Figure 1 in the up or actuating position.) These switches are the eight DPDT toggle switches located on the lower left and lower right of the front panel of the Simultaneous Control Unit shown in Figure 2. For manual operation, the three-position toggle switch (S-3) must be in the center position. This switch is located directly below the clock near the center of the front panel. With S-3 in this position, resetting of the system by depression of the reset switch (S-2) will not reset either of the Microflex timing units; however, the scaling strips and their respective registers will be reset. After it has been assured that power is supplied to all three circuits and that the scalers have been reset, the counting may be started by actuation of the count switch (S-4). The ganged scalers will then count until the stop switch (S-1) is actuated.

UNCLASSIFIED

314 3



2. Ganged remote operation using 0-2 minute Microflex

All scalers ganged together must again have switches S-5 through S-12 in the actuating position. The three-position toggle switch (S-3) must be in the extreme left position incorporating the 0-2 minute Microflex in the circuit. With S-3 in this position resetting of the scalers and the Microflex may be accomplished by depressing the reset switch (S-2). However, if the register has been reset previously without S-3 in the 2 minute position, the 2 minute Microflex will not have been reset; therefore, it is necessary to push the reset button following a change in position of the S-3 switch in order for the proper Microflex timer to operate.

3. Ganged remote operation using 0 - 20 minute Microflex

This operation is identical with 0-2 minute Microflex operation with the exception that S-3 must be in the 20 minute position.

Caution: For a scaler to operate remotely by means of the Simultaneous Control Unit, the count switches on the ganged scalers must be in the "off" position. If any one count switch is in the "on" position, all of the ganged scalers are then controlled by that count switch, since all of the count switches in the control system are connected in a series circuit. Similarly all automatic control switches on the scalers must be set on the manual control position.

4. Individual operation of a scaler using manual control or control from a scaler's self-contained Microflex

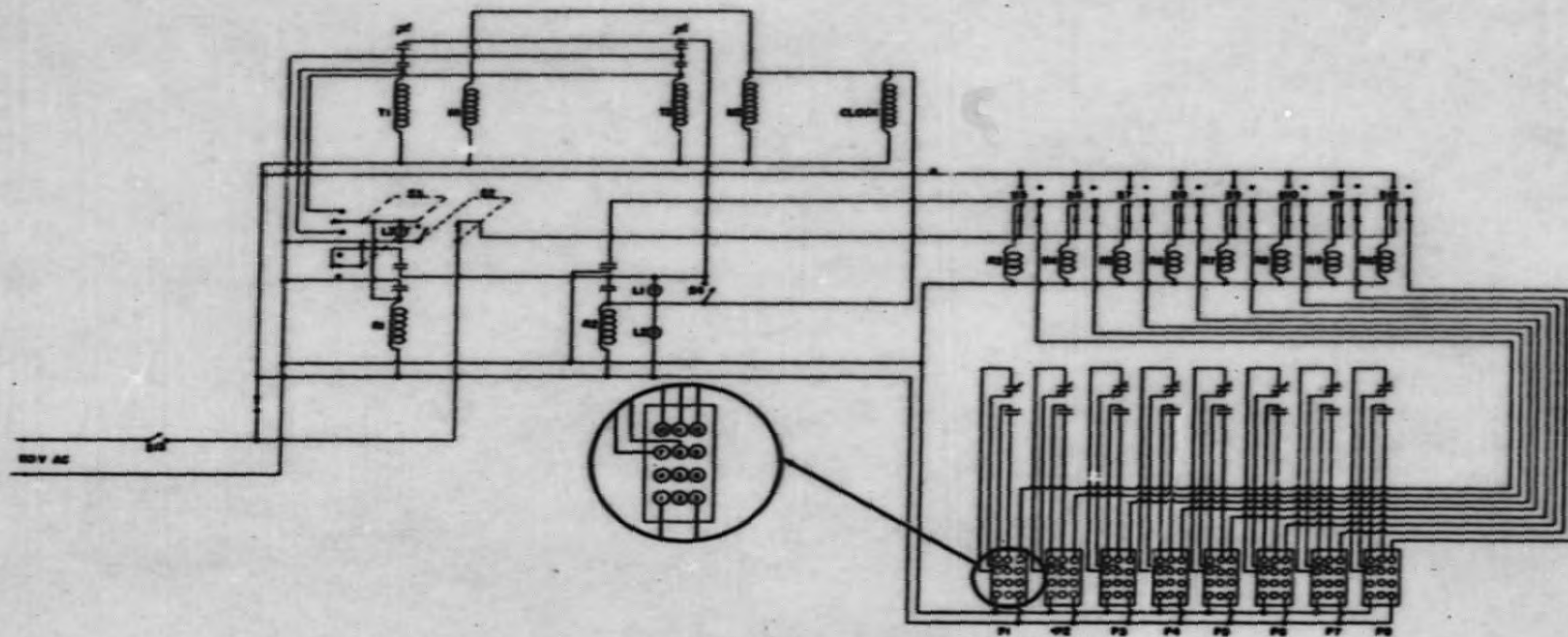
The appropriate scaler selector switch (S-5 through S-12) must be in the "off" position in order to isolate a particular scaler from the control unit. Operation of the scaler in question is then done manually by using the scaler's self-contained count switch.

Figures 2 through 4 show placement of the various electrical components on the assembled Simultaneous Control Unit. Figures 5 and 6 show the control unit in use with 4 scalers ganged to the control unit.

R. L. Tomlinson  
R. L. Tomlinson  
Pile Physics Unit  
Pile Engineering Sub-Section

314 4

UNCLASSIFIED



**SIMULTANEOUS CONTROL UNIT**

- S2 - STOP SW - PUSH BUTTON
- S3 - RESET SW - PUSH BUTTON
- S4 - SELECTOR SW FOR TIMERS - TOGGLE
- S5 - COUNT SW - PUSH BUTTON
- S6
- S7
- S8
- S9 } SCALES SELECTOR SW - SPST TOGGLE
- S10
- S11
- S12 - POWER SW - TOGGLE SPST
- L1 - RESET LIGHT - NEON ASSEMBLY
- L2 - COUNT LIGHT - NEON ASSEMBLY
- L3 - STOP LIGHT - NEON ASSEMBLY
- R1 - RESET RELAY FOR CLOCK - LEACH 117-03 110V AC SPST
- R2 - COUNT RELAY - EDWARDS 5700 110V AC SPST

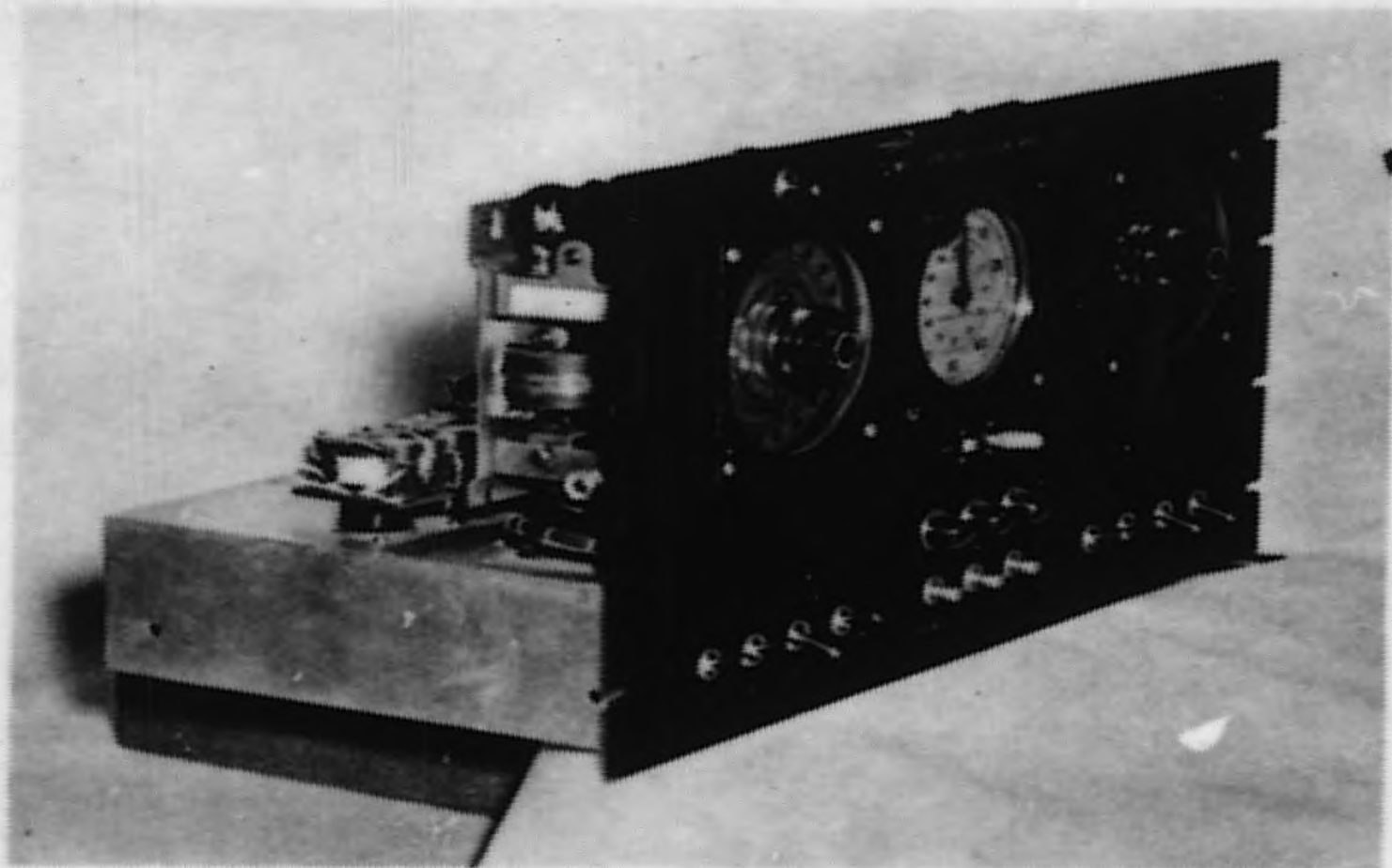
- R3
- R4
- R5
- R6
- R7
- R8 } RESET RELAYS FOR SCALES - LEACH 117-03 110V AC SPST
- R9
- R10
- R11
- T1 } MICROFLEX TIMER 0-2 MIN
- T2
- T3 } MICROFLEX TIMER 0-20 MIN
- P1
- P2
- P3
- P4
- P5
- P6 } JAMES PLUG 16 CONTACT MALE W/ RECEIVED PLUG
- P7
- P8

**FIGURE 1**



UNCLASSIFIED

UNCLASSIFIED



UNCLASSIFIED

314

UNCLASSIFIED

UNCLASSIFIED

FIGURE 2  
SIMULTANEOUS CONTROL UNIT PANEL.

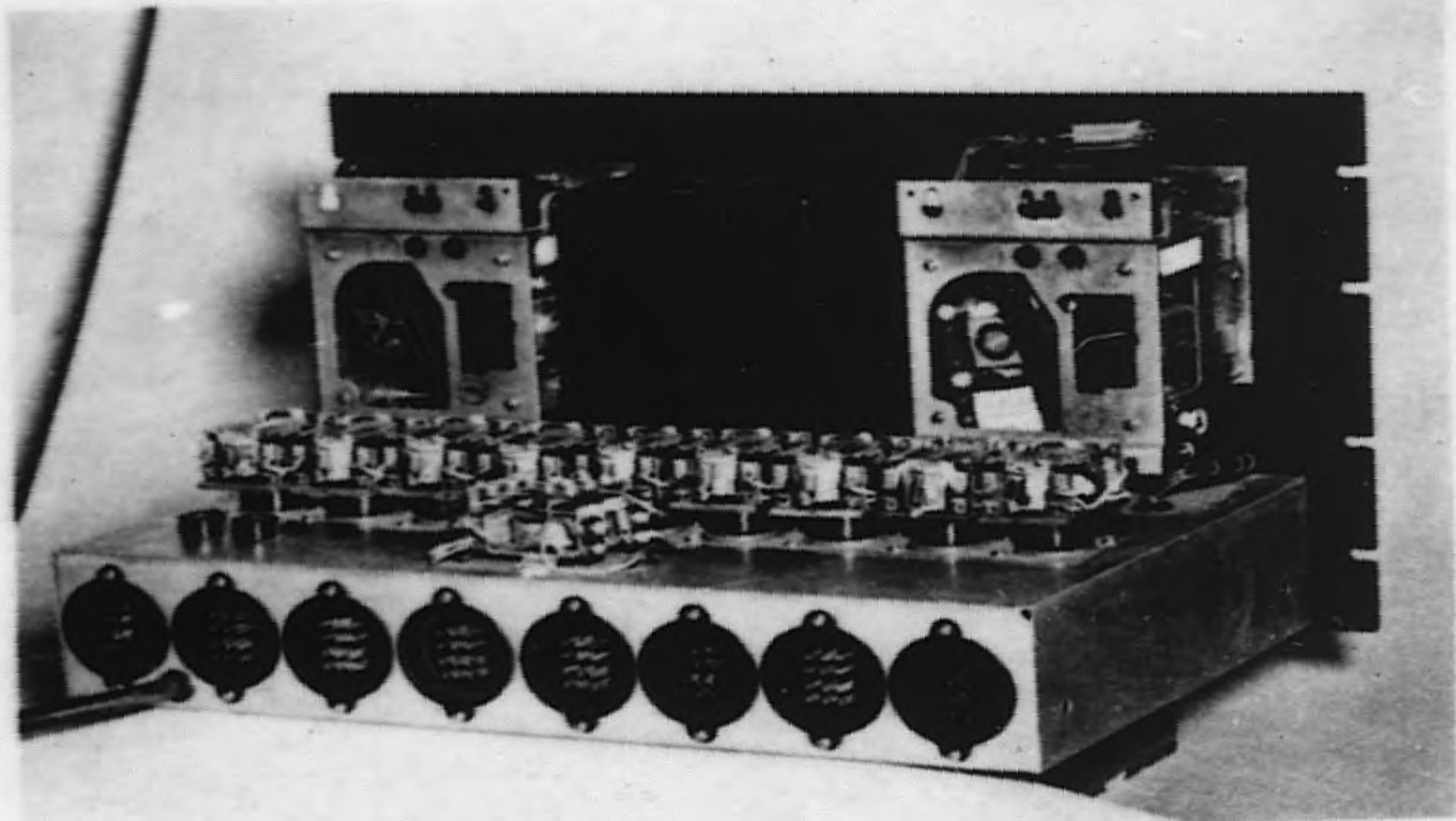


FIGURE 3  
SIMULTANEOUS CONTROL UNIT TOP VIEW

UNCLASSIFIED

+

RM-39822

UNCLASSIFIED

UNCLASSIFIED

3147



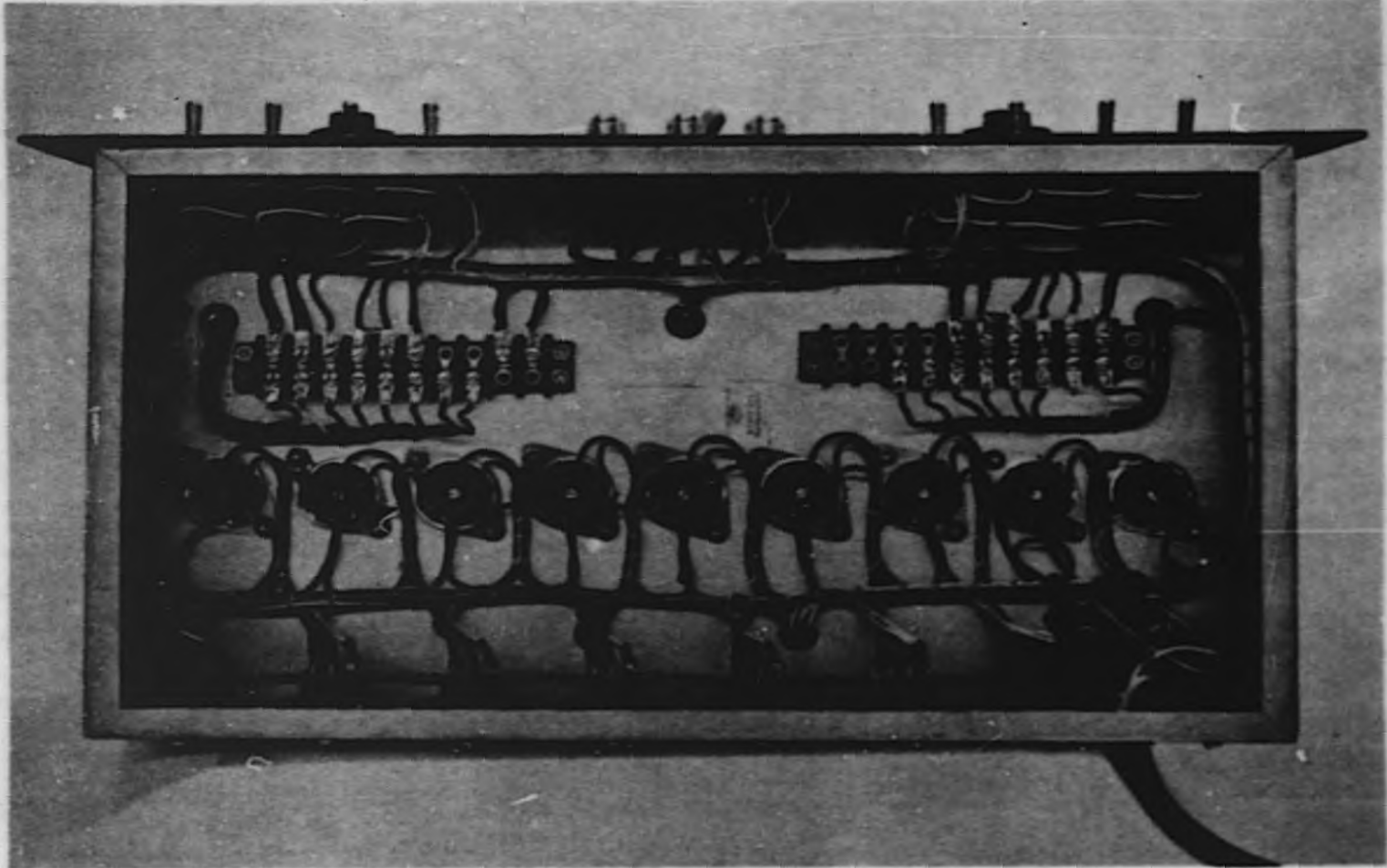


FIGURE 4  
SIMULTANEOUS CONTROL UNIT BOTTOM VIEW

UNCLASSIFIED

UNCLASSIFIED

+

UNCLASSIFIED

HP-34422

314 8



314 9

UNCLASSIFIED

UNCLASSIFIED

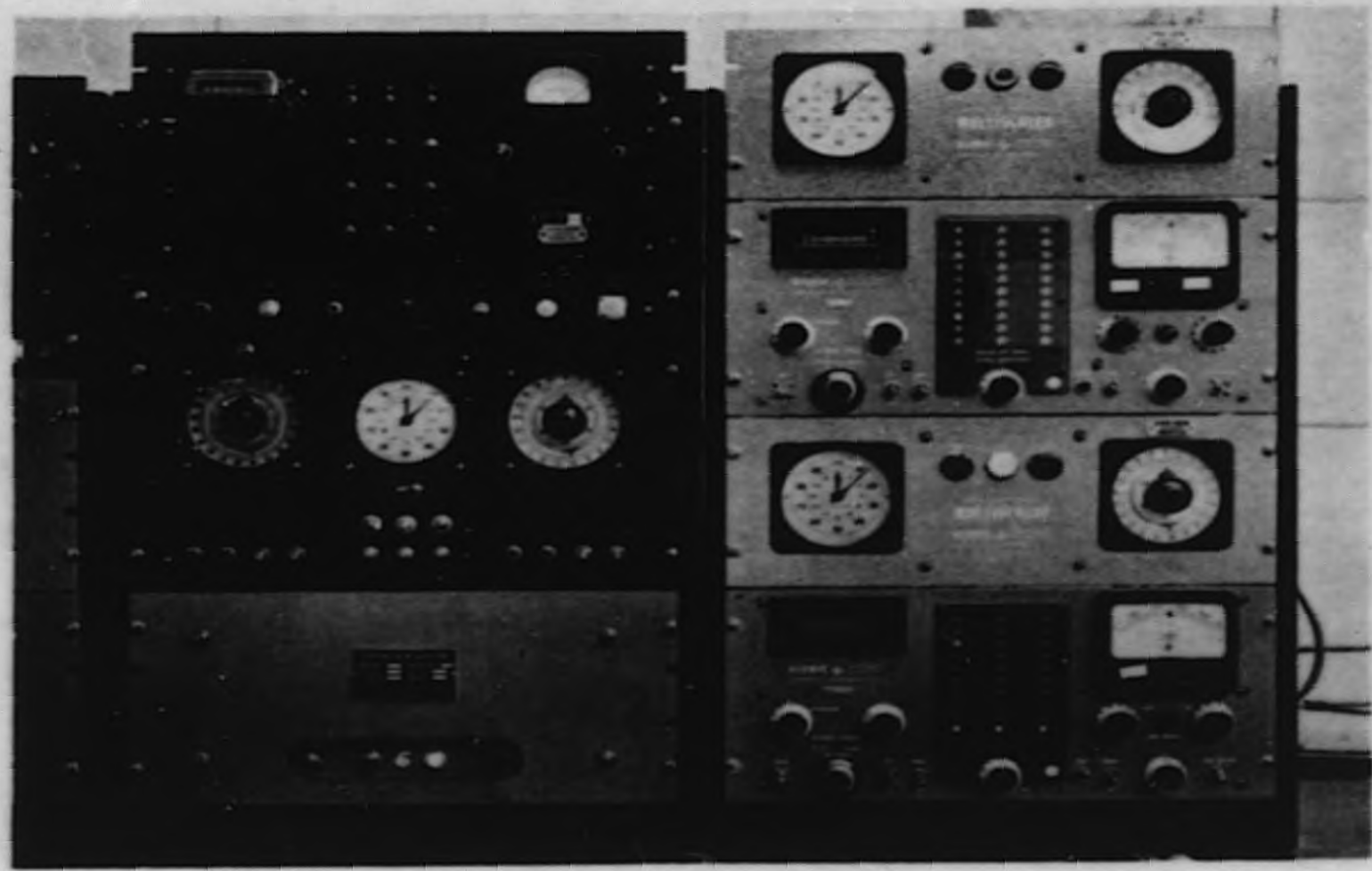


FIGURE 5  
SCALER ARRANGMENT

UNCLASSIFIED

-10-

UNCLASSIFIED

UNCLASSIFIED

-11-

HM-38422



FIGURE 6  
UNIT IN OPERATION

UNCLASSIFIED

ALL INFORMATION CONTAINED  
HEREIN IS UNCLASSIFIED

314 10

**END**