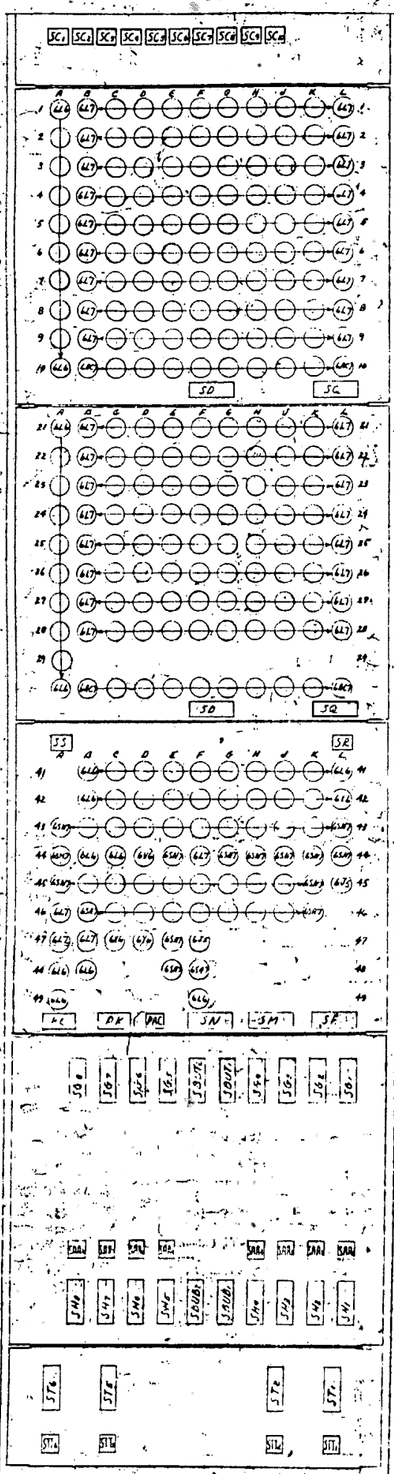
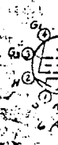
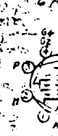
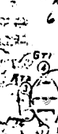
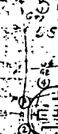
PANEL #2

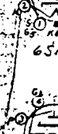












Programmer's Instructions for Dynamic Testing of the Multiplier

The following program should be set up on the multiplier and its associated accumulators. The multiplier should be programmed to perform a 10 place multiplication and clear both the multiplier and multiplicand accumulators, with all other switches set to zero - except as indicated otherwise in the notes. At the same time the multiplier and multiplicand accumulators should be programmed to receive the numbers indicated in the notes. The sweep program pulse (called the sweep pulse if comes in the 0th addition time of the multiplication) should be used to stimulate an otherwise unused accumulator repeat program control (or a set of two such controls) so as to provide a program pulse at any addition time desired for sweeping or unblanking the oscilloscope. The sweep pulse from the multiplier program control should be fed to an accumulator repeat program control, and thence to the input of the multiplier program control. This ring is set up so that the multiplier is programmed repeatedly with an interval of at least one addition time between multiplications so as to allow various circuits to become quiescent.

The program pulses referred to in the sweep, rise, and fall columns are numbered as follows: The program pulse used to stimulate the multiplier program control and the multiplier and multiplicand accumulators is called the 0th pulse, as it comes over the end of the 0th addition time. The program pulse coming over the end of the first addition time is referred to as the number 1 program pulse, etc.

A single number, or set of such numbers separated by commas, appearing in the sweep column, refers to the program pulses. Thus 1,15 means that the oscilloscope should be swept with the number 1 program pulse (to see the rise of the pulse) and with the number 15 program pulse (to see the fall of the pulse). Two numbers separated by a dash are used to refer to a pulse time within an addition time. Thus 17-19 means the sweep inaugurated by the 19th pulse following the number 12 program pulse (thus the number 13 program pulse, coming at 12-20 or 13-0 may be seen). Actually the sweep is stimulated every pulse time by the 13th pulse (not from the sweep mixing unit 52-2-108) and the oscilloscope unblanked by the number 12 program pulse and blanked by the number 14 program pulse. The word sweep is used in its inclusive sense; thus, 8 to 10 means sweep with 9 different program pulses.

The rise, duration, and fall columns specify the time characteristics of the signal to be viewed. In the case of a gate the time specified in the rise column is the time at which it should rise, and the time specified in the fall column the time by which it should fall. Thus 17-100 means that it should rise (or fall) within 100 microseconds following the number 17 program pulse. 0-20 means that it should rise (or fall) within 20 microseconds after the pulse indicated in the sweep column. In the case of a pulse the rise time, duration, and fall time are specified in microseconds.

The amplitude is specified in volts, and is computed on the basis of a new 7dim6ant tube, i.e., on the basis of the RM standards specified in RM-1-103. It is the signal to be expected from the driving tube, and does, in many cases, exceed that required (including safety factors) to drive the driven tube.

Tube	Terminal	Sweep	Amplitude	Rise	Duration	Fall	Notes
P^1 to L^1, 21 to 28 and 1 to 9	6	1	+40	1-100	----	15-100	Multiplicand varies as follows: B126 to L126 22222 22222; B121 to L121 99999 99999; B9 to L9 11111 11111; B1 to L1 99999 99999; Multiplier = 77777 77777
	Grid Cap (only on one column)	2-1 to 2-11	+25				
	3		-5				
A^1 to 10 and 21 to 30	5	2-3 to 2-11	+25				Multiplicand has no zeros; Multiplier = 77777 77777
	3		-50				
B^1k2 to L^1k2	5	B1k2 or 3 to L1k2	+40	8-20		8k1-20	
	3		-37				
P^1k4	5	0-19	+25				
	6	0,1	+40	0-100		1-100	
	3	0-19	-40				
P^1k4	5	0-19	+45				
	6	Seq. note	+40				Terminal 6 receives the initial clear gate. The pulse received on 5 is transmitted on 3 when this gate is on.
	3		-60				
A^1k5	1	1,2	+40	1-40		5-40	
	3		-20				
A^1k6, 47	1	1,2	-35	1-20	----	2-20	A^1k6 ← k pulses on #5 pin; A^1k7 ← 1' pulse on #5 pin
	5	1-8 to 1-12	+40				
	3		-115				
A^1k9	5	1-8 to 1-12	+120				
	6		+40				
Place switch settings	g1k5	1,2	1,7	1-100	----	7-100	2
	c1k5	1,2	1,8	1-100	----	8-100	3
	k5	1,2	1,9	1-100	----	9-100	4
	g2k5	1,2	1,10	1-100	----	10-100	5
		1,2	1,11	1-100	----	11-100	6
	c2k5	1,2	1,12	1-100	----	12-100	7
		1,2	1,13	1-100	----	13-100	8
	r2k5	1,2	1,14	1-100	----	14-100	9
		1,2	1,15	1-100	----	15-100	10
L^1, M^1, P^1, N^1, K^1, L^1 (using Clear Inverter)	1 and 4	$A^1_{k,m}$ or 3 $D^1_{k,m}$ or 4	-40	5-100		8k1-100	
	2 and 5	$D^1_{k,m}$ or 5 $E^1_{k,m}$ or 10 $F^1_{k,m}$ or 11	+110				
P^1k7		11,12	-18	11-60	----	1-60	All place switches set to 10
	3		-40				
P^1k8	4	1-[illegible]	[illegible]				
	5	11,12	+40	11-60	----	12-60	All place switches set to 10
	3	11-19	[illegible]				
P^1k7	5	0-19	+40				Terminal 6 receives the initial clear gate. The pulse received on 5 is transmitted on 3 when this gate is on.
	6		[illegible]				
	3		[illegible]				
P^1k9	4	11-19	[illegible]				
	5		4th				
N^1k7	4	1-3	[illegible]				
	5		-5				
P^1k8	3	1-3	+20				
P^1k8	4	11-19	+40				
	5		-20				
P^1k7	3	11-19	+40				
N^1k4	1	0,14	+40	0-100	----	14-100	
			[illegible]	0-100	----	14-100	
P^1k3	5	1-19	-20				
	3		-20				
N^1k1	2	1-19	[illegible]				
	3		[illegible]				
N^1k4	2	1-19	[illegible]				
	3		-20				
B1k1 to L1k1	3	B1k2 or 3 to L1k2	+40	8-20	----	8k1-0	

Dynamic Test on Ring: Tubes: A^1k4, A^1 to L^1 k3

I. Voltage Tolerance test

a. Freq. held @ 400 K.C.
b. Scope on 14th stage of ring: Tube K^1k4 pins #5 or #2
c. Voltage limits: 135 to 360; Ratio of 3
d. PK 6 = -360; PK 1a = -555
Voltage varied by varying -300

II. Freq. Tolerance test

a. Voltage across ring constant @195V
b. Should count to or greater
c. Scope on 14th stage of ring: Tube K^1k4 pins #5 or #2

MOORE SCHOOL OF ELECTRICAL ENGINEERING
UNIVERSITY OF PENNSYLVANIA
MULTIPLIER TESTING CONSTRUCTION - PANEL 2 - DYNAMIC

Drawn by: [illegible]
Checked by: [illegible]
Approved by: [illegible]
Scale: [illegible]
Date: [illegible]