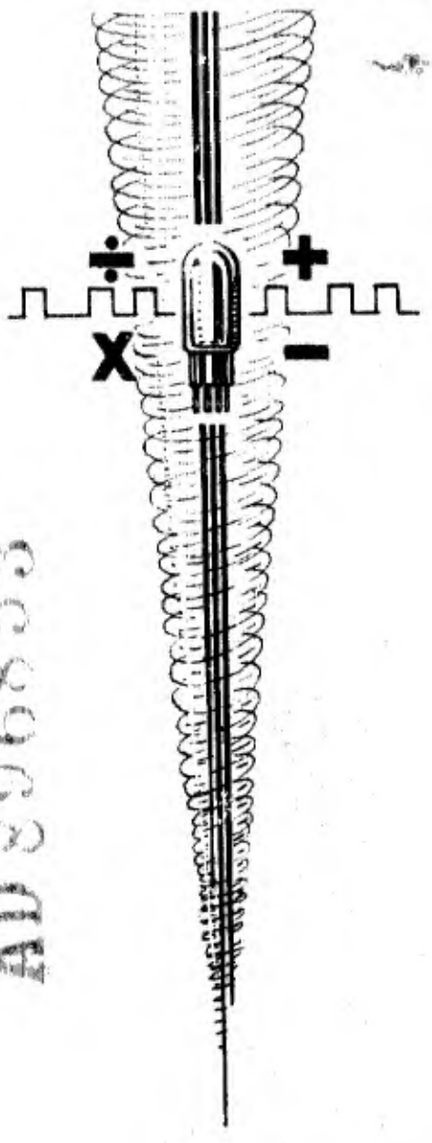


PROJECT WHIRLWIND

Contract N5ori60

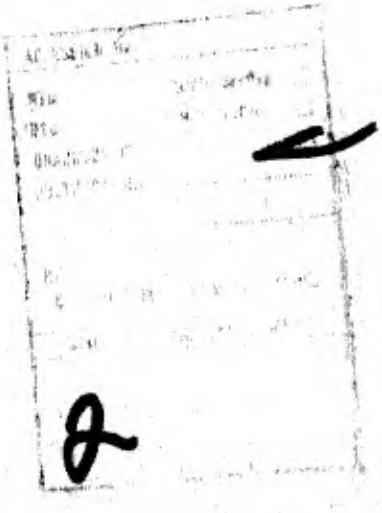
SUMMARY REPORT NO. 2

VOLUME 13

SYSTEM DRAWINGS

SERVOMECHANISMS LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SPECIAL DEVICES CENTER



[redacted]

M-147

PROJECT WHIRLWIND

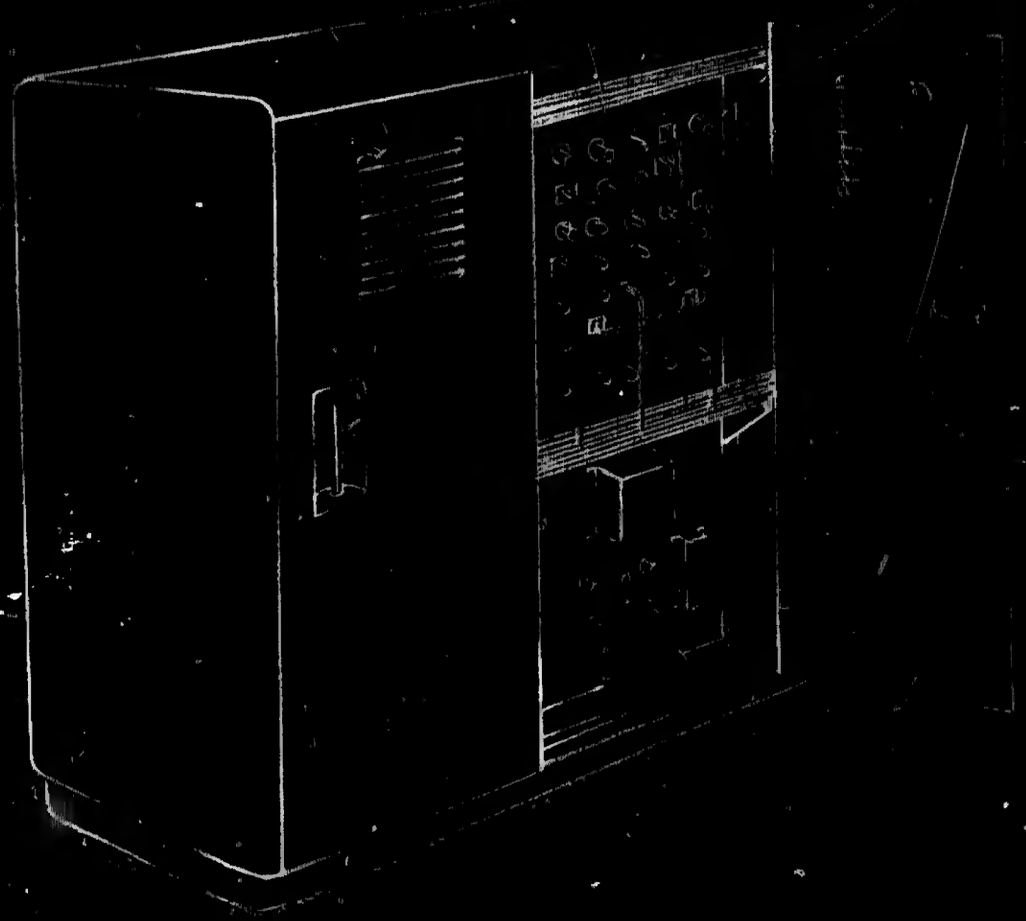
Summary Report, No. 2.

November 1947

SYSTEM DRAWINGS.

Volume 13 of 22 Volumes

Servomechanisms Laboratory
Massachusetts Institute of Technology
Cambridge, Massachusetts



WHIRLWIND I

CONTENTS

INTRODUCTION

Volumes 5 and 6 of this report describe the Whirlwind I computer in block diagram form and indicate the operations which must be performed in the computer. Volumes 15 through 19 describe the development of components and circuits necessary to the performance of these operations. This volume of photographs, circuit schematics, layouts, and mechanical drawings shows the progress which has so far been made in the synthesis of components and circuits into a working electronic system which will satisfy the demands of the block diagram.

To help in relating the circuits to the block diagrams, the drawing lists include, in addition to the drawing title and number, the number which describes the pertinent part of the system in the block diagrams. Consistent with this, the system drawings are presented in five groups headed respectively: System, Control, Storage, Arithmetic Element, and Registers, a sixth group being drawings of test equipment designed and built by this laboratory. The test equipment is described in Vol. 19, E-48, and E-52.

The correspondence between block diagrams and system drawings is not complete, because the requirements of video cabling and construction methods dictate a physical arrangement somewhat different from that indicated by the purely functional block diagrams. Differences will become apparent from a comparison of the block diagram drawings C-37070 and C-37071 in the System group, with the video cabling drawing E-30905 of E-68. All units in the latter bear the same reference numbers as are used in the block diagrams but the arrangement is different. In the block diagrams we find, in general, that a register is treated as a unit, whereas construction follows a digit-by-digit pattern, and one digit of each of several registers may be located on a panel. Assembly drawing R-30797 in the Register group, carries a digit of the program counter, block diagram reference 102, a digit of the program register 103, and a digit of the check register 601.

The System group of drawings includes a block diagram list, two block diagrams and reference to two drawings which appear as a part of the following engineering memorandum. E-68 is a discussion of preliminary Whirlwind I cabling and a proposed physical arrangement of the whole system. E-53 is an estimate of power consumption of the system but is not based on the latest tube estimate given in Vol. 16, M-132.

In the Control group are given, among other things, the block schematics, circuit schematics, and assembly drawings of the program

counter, 102, and the program register, 103. These two assemblies are part of the register panel for which a Panel and Cable Plan, drawing R-30797 is given in the Register group.

The Storage drawings describe the test storage consisting of toggle switches and flip-flops, but do not include anything on electrostatic storage described in Vols. 9 and 10. The addition of electrostatic storage and its attendant circuits to the system, entails only modification of the storage switch and control matrix. A photograph of a storage switch is included in the drawings.

The drawings and photographs headed Arithmetic Element are descriptive of the five-digit multiplier now in operation. This was initially operated at a 100 kc pulse repetition frequency on October 28, 1947, and is now operating at 2 megacycles. Photographs of the multiplier and its controls are typical of the type of construction which will be used in Whirlwind I. The frontispiece of this volume indicates the type of cabinets to be used. The Whirlwind I arithmetic element will be a redesign of this multiplier based on experience gained from it. There will be a considerable extension of the arithmetic element control beyond the somewhat limited capabilities of the multiplier control.

The elements whose status is given in the following summary are subject to certain modifications and revisions not specifically mentioned in the summary. The change from the 6AS6 gate tube to the SR-1030 described in Vol. 16 may eliminate some tubes with attendant revisions of circuits and layouts. Pulse width and resultant duty factor may be modified and call for a revision in the value of some of the circuit components. Checking methods not yet fully investigated may require the addition of some gate tubes, control lines, and bus connections not now included in the system, see Vol. 7, M-127. References are to further descriptions of the various elements. For a time schedule, see Vol. 1, drawing B-31202.

101 Master Clock	-	All components constructed and in use in 5-digit multiplier. Not packaged in one unit for WWI. Vol. 19, E-48, E-52.
102 Program Counter	-	Preliminary model constructed. Vol. 19, E-55, M-105.
103 Program Register	-	Preliminary model constructed. Vol. 19, E-55, M-105.
104 Control Switch	-	Preliminary model constructed and nearly satisfactory in operation. Vol. 17, R-123.
105 Operation Matrix	-	Design data available based on 104 above. Not yet laid out.

106	Time Pulse Distributor	- Constructed by Sylvania and operating satisfactorily.
107	Operation Timing Matrix	- Design data available based on 104 above. Not yet laid out.
108	Program Timing Matrix	- Design data available based on 104 above. Not yet laid out.
200	Storage Arrangement	- Block and Circuit schematics complete. Details below.
201	Storage Switch	- Same as control switch, 104.
203	Flip-flop Storage	- Under construction, Vol. 19, E-63.
301	A Register)	
302	Accumulator)	- Operating in 5-digit multiplier.
303	B Register)	
305	Step Counter	- Operating in 5-digit multiplier. Expand from 3 to 5 stages for WWI. Vol. 19, E-126.
601	Check Register	- Preliminary model constructed. Vol. 19, E-55, M-105.

M-7 Series Memorandum

REF.	VOL.
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M-46	9
M-56	9
M-58	15
M-61	8
M-62	4
M-63	4
M-64	4
M-65	14
M-66	4
M-68	15
M-69	4
M-71	8
M-72	16
M-74	14
M-76	4
M-77	15
M-78	8
M-80	16
M-81	16
M-82	16
M-83	16
M-85	14
M-89	11
M-91	15
M-92	15
M-94	8

REF	VOL.
M-95	8
M-96	9
M-99	15
M-100	8
M-101	11
M-103	16
M-105	19
M-106	11
M-107	19
M-109	16
M-110	15
M-111	7
M-112	9
M-113	7
M-114	19
M-116	16
M-117	7
M-118	16
M-119	16
M-121	9
M-123	7
M-124	8
M-127	7
M-128	16
M-129	7
M-130	9
M-131	16
M-132	16

REF.	VOL.
M-133	18
M-134	7
M-135	7
M-136	7
M-137	7
M-138	15
M-140	4
M-14	7
M-143	8
M-145	9
M-146	10
M-148	12
M-149	12
M-147	15
M-148	14
M-149	15
M-150	16
M-152	17
M-153	18
M-153	19
M-154	20
M-155	21
M-156	22
M-157	11
M-158	7
M-159	9
M-160	8
M-161	7

[illegible]

D Series Memorandums

C Series Memorandum

REF.	VOL.
E-7	14
E-24	7
E-31	10
E-32	10
E-33	19
E-37	15
E-38	19
E-39	15
E-41	15
E-42	15
E-44	19
E-45	19
E-47	15
E-48	19
E-49	19
E-50	16
E-52	19
E-53	13
E-54	19
E-55	19
E-56	15
E-57	15
E-58	19
E-59	19
E-60	19
E-61	16
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REFERENCE INDEX

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R-63	14
R-64	3
R-89	19
R-90	4
R-94	14
R-98	14
R-100	14
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R-104	16
R-106	15
R-108	15
R-109	19
R-110	9
R-111	15
R-113	15
R-114	8

REF.	VOL.
R-115	4
R-116	4
R-117	16
R-118	16
R-120	10
R-121	19
R-122	18
R-123	17
R-124	11
R-125	14
R-126	19
R-127	5
R-127	6
R-128	10
R-129	12
R-130	9
R-131	10
R-132	10

SYSTEM DRAWING LIST

Summary List of Block Diagrams	B-37079
System Block Diagram	C-37071
Bus Connections	B-37070

Following drawings for reference only. They are included in E-68.

Preliminary Video Cable and Panel Arrangement	E-30905
Proposed Arrangement Whirlwind I Installation	D-31016

B-37079-1

TITLE	DWG. NO.			COP
System Block Diagram	C-37071-1			10
Bus Connections	B-37070-1			10
Control Functions	B-37073-1			10
Control	B-37098			10
Timing Diagram Operation ad	B-37080			10
Timing Diagram Operation ca	B-37081			10
Timing Diagram Operation su	B-37082			10
Timing Diagram Operation cs	B-37083			10
Timing Diagram Operation mr	B-37084			10
Timing Diagram Operation mh	B-37085			10
Timing Diagram Operation ts	B-37086			10
Timing Diagram Operation sd	B-37087			20
Timing Diagram Operation sr	B-37088			20
Timing Diagram Operation sl	B-37089			20
Timing Diagram Operation sp	B-37090			20
Timing Diagram Operation cp	B-37091			20
Timing Diagram Operation td	B-37092			30
Timing Diagram Operation sa	B-37093			30
Timing Diagram Operation dv	B-37094			30
				30
Summary List of Block Diagrams	B-37079-1			30
Parallel Digit Computer Codes	B-37001-1			60

Item No.	TITLE	DWG. NO.
101	Master Clock	B-37058-1
102	Program Counter	B-37062
103	Program Register	B-37067
104	Control Switch	B-37066
105	Operation Matrix Part I General	C-37077
105	Operation Matrix Part II Arithmetic Element	C-37078
106	Time Pulse Distributor and Control	B-37076 B-37064
107	Operation Timing Matrix Part I	C-37077
107	Operation Timing Matrix Part II	C-37078
108	Program Timing Matrix	B-37075
109	Repeat Switch - (Removed from System)	B-37059
200	Storage Chassis Arrangement	C-37064-1
201	Storage Switch	B-37066
203	Flip-Flop Storage Section	B-37057
203	Storage Output Section	B-37060
203	Flip-Flop Storage Control	B-37061-1
300	Arithmetic Element	C-37072-1
301	Section of A-Register	B-37056
302	Accumulator Sections	C-37095 C-37063
303	B-Register Sections	B-37097-1 B-37069
304	Step Counter	B-37074-1
601	Check Register	B-37065

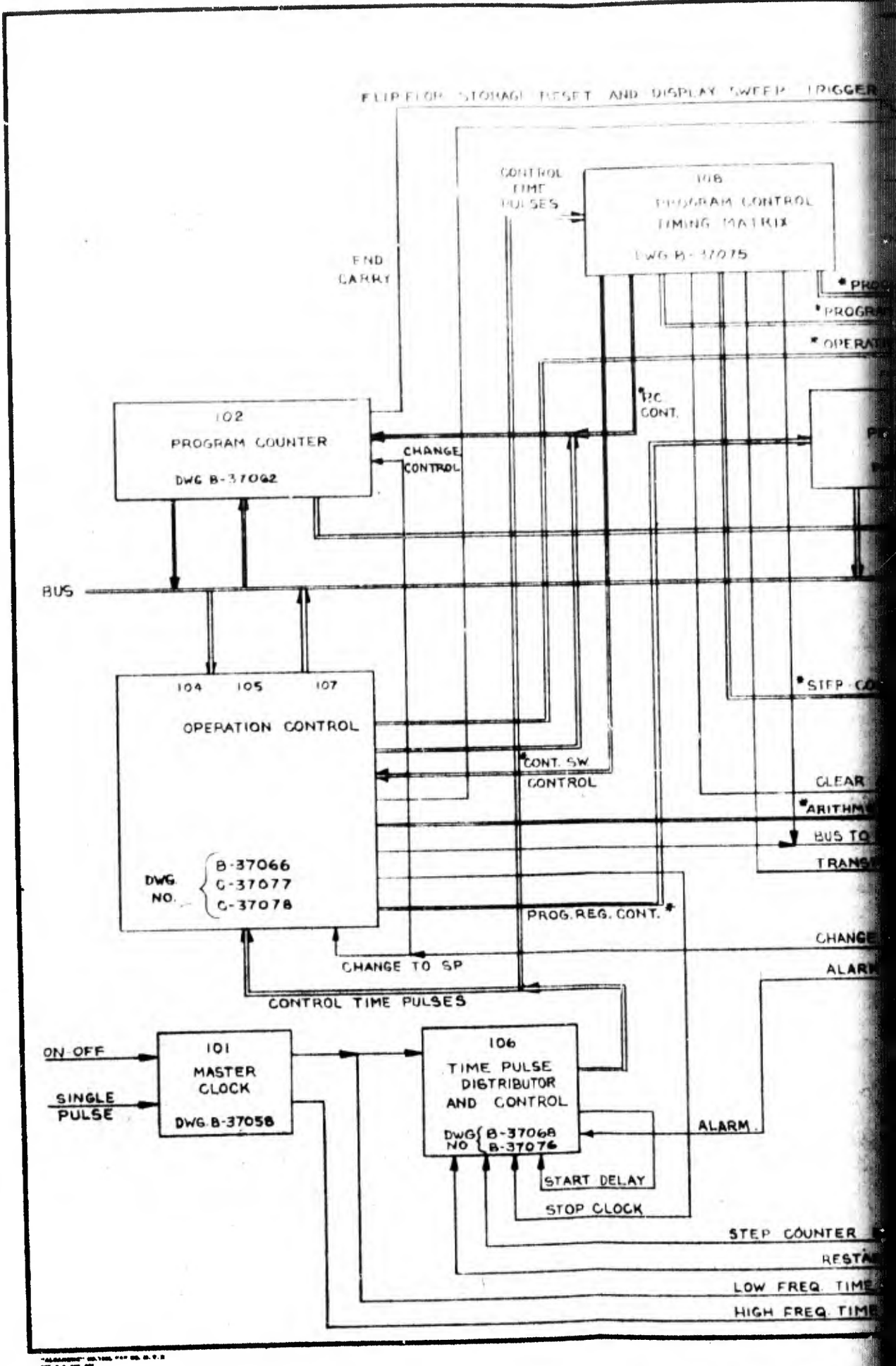
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

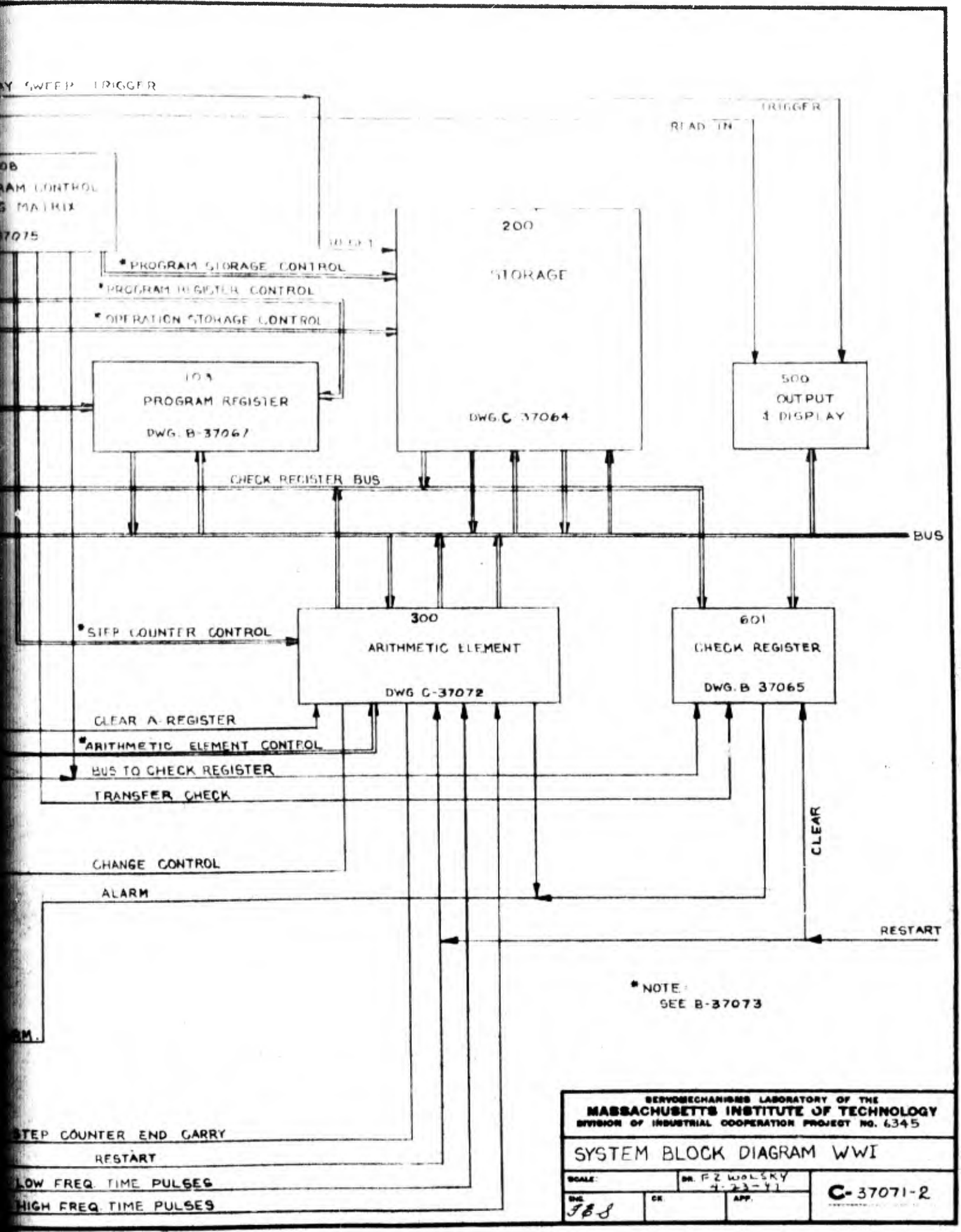
SUMMARY LIST OF BLOCK DIAGRAMS WWI

FES 4/18/47

B-37079-2

C-37071-2


FLIP FLOP STORAGE RESET AND DISPLAY SWEEP TRIGGER
CONTROL TIME PULSES
108
PROGRAM CONTROL TIMING MATRIX
DWG B-37075
END CARRY
*PROG
*PROGRA
*OPERATI
*PC CONT.
102
PROGRAM COUNTER
DWG B-37062
CHANGE CONTROL
BUS
104 105 107
OPERATION CONTROL
*STEP CO
*CONT. SW CONTROL
CLEAR
*ARITHM
BUS TO
TRANS
DWG NO. B-37066 C-37077 C-37078
PROG. REG. CONT.*
CHANGE
CHANGE TO SP
ALARM
CONTROL TIME PULSES
ON OFF
SINGLE PULSE
101
MASTER CLOCK
DWG B-37058
106
TIME PULSE DISTRIBUTOR AND CONTROL
DWG NO B-37068 B-37076
ALARM
START DELAY
STOP CLOCK
STEP COUNTER
RESTA
LOW FREQ. TIME
HIGH FREQ. TIME

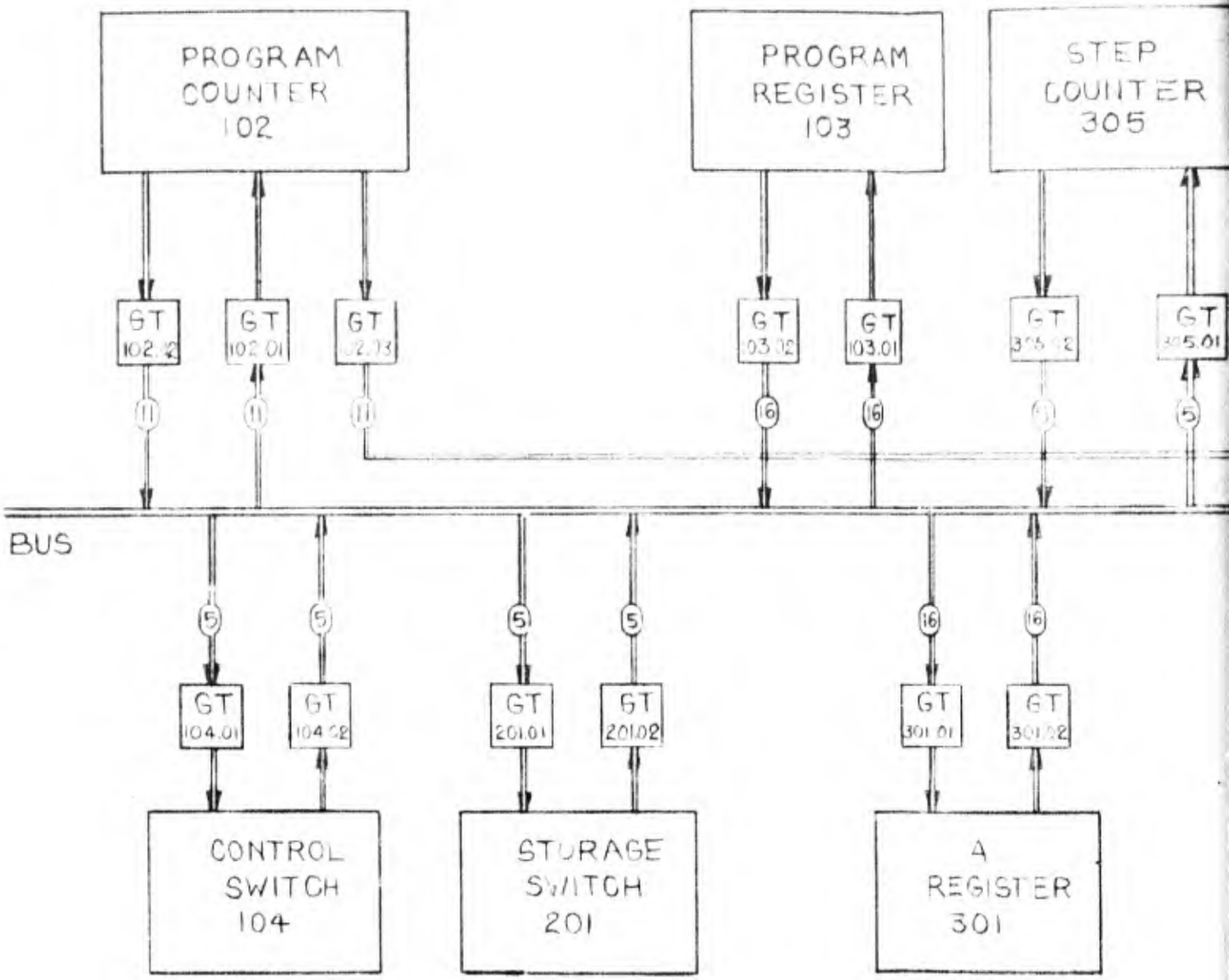


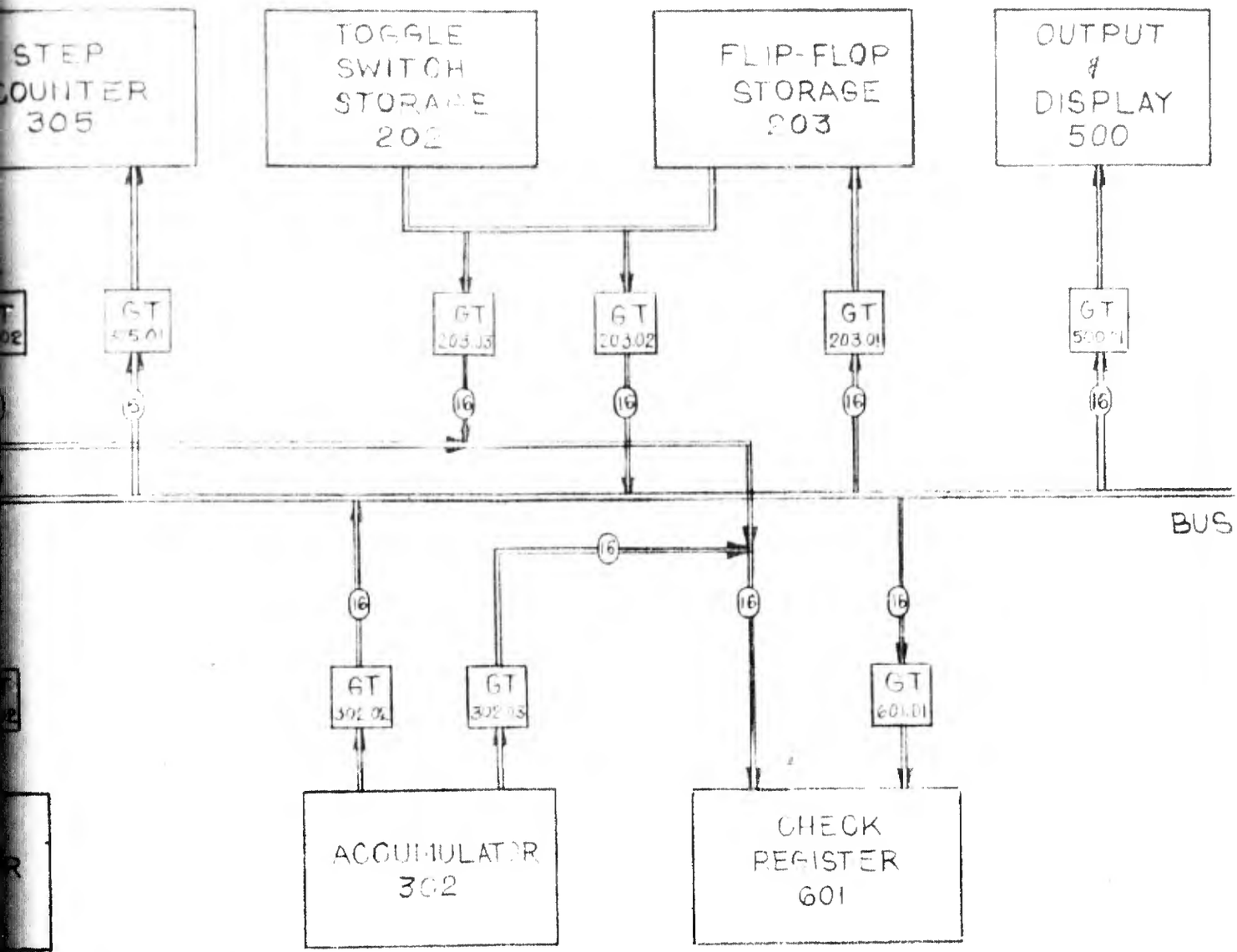
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

SYSTEM BLOCK DIAGRAM WWI

SCALE:	DR. F Z WOLSKY 4-23-51	C-37071-2
ENG. FBS	CK	APP.

2





SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

BUS CONNECTIONS WW I

SCALE:	DR. W.N.L. 4-3-51	B-37070
ENG	CK.	APP.

Project Whirlwind
Servomechanisms Laboratory
Massachusetts Institute of Technology
Cambridge, Massachusetts

SUBJECT: WHIRLWIND I CABLING AND INSTALLATION

TO: 6345 Engineers, Sylvania (3)

FROM: H. Fahnestock

DATE: October 10, 1947

Furnished herewith are two drawings: one, a Preliminary Video Cable and Panel Arrangement, the other a proposed Arrangement Whirlwind I Installation. It is to be clearly understood that these are for information purposes only to assist you in visualizing the complete computer and to act as a guide in making plans and designs. It is not expected that revisions or alternates will be widely or frequently distributed except to those immediately concerned with certain aspects of the design. It has been decided that Whirlwind I should be so packaged that every component and connection should be available for test without shutting down any part of the computer. The result is a much larger package than would otherwise be the case.

DRAWING NO. E-30905 - This drawing is intended primarily to show the approximate number of units in the computer and to give an idea of the interconnecting cables involved. No attempt has been made to make the number of cables very accurate and they will be subject to change as the control functions develop. No detailed work has been done on electrostatic storage control so these connections are omitted entirely. Input and Output Registers are grouped in one box. Their number or size is not yet determined. They may be attached to the register panels or they may become a separate row of panels. Film Readers and Writers and Binary to Decimal Converters are similarly grouped in a box on the diagram. They will require control lines not shown and will probably be large items of equipment rather than rows of panels.

Three rows of panels are shown together with tentative dimensions. The 26" width has been decided on. The vertical dimension for the panel contents as shown is probably within 30% of final design. The driver panels will probably be the same size as the digit panels. No layout has been done on the control panels but some of them, in particular the matrices, will be considerably larger than the other panels. No design has been done on the Operator's Console and this drawing merely indicates connections and what may go in it.

DRAWING NO. D-31016 - This proposed arrangement of Whirlwind I is to be interpreted as one of many ways in which the panels shown on the previous drawing might be fitted into the available space with reasonable cabling symmetry. A double floor is assumed. Air ducts run transversely and feed each cabinet individually. Signal and check busses run fore and aft under the floor; control lines run transversely under the floor between the two sections of a register. In general in the register, each cabinet holds a single digit of each of several registers. The ninth cabinet from the right-hand side holds the control gate drivers. The space assigned to Input and Output Registers is very nebulous. They may be included in the Register Panels. The possible addition of some registers under consideration may require another full row of cabinets. Space for the Control, including the Timing Matrices is a rather rough estimate.

Harris Fahnestock

H. Fahnestock

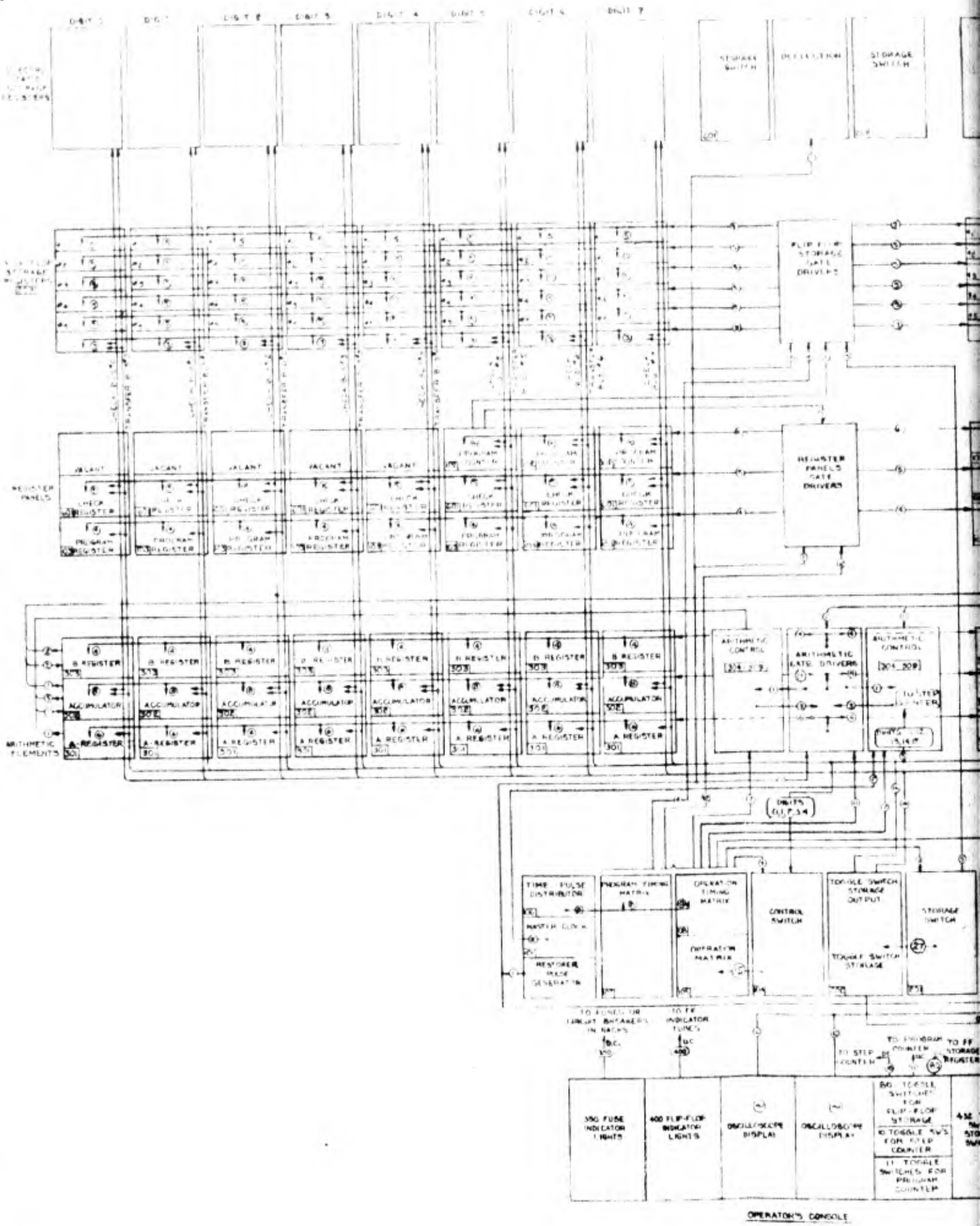
LIST OF DRAWINGS:

E-30905

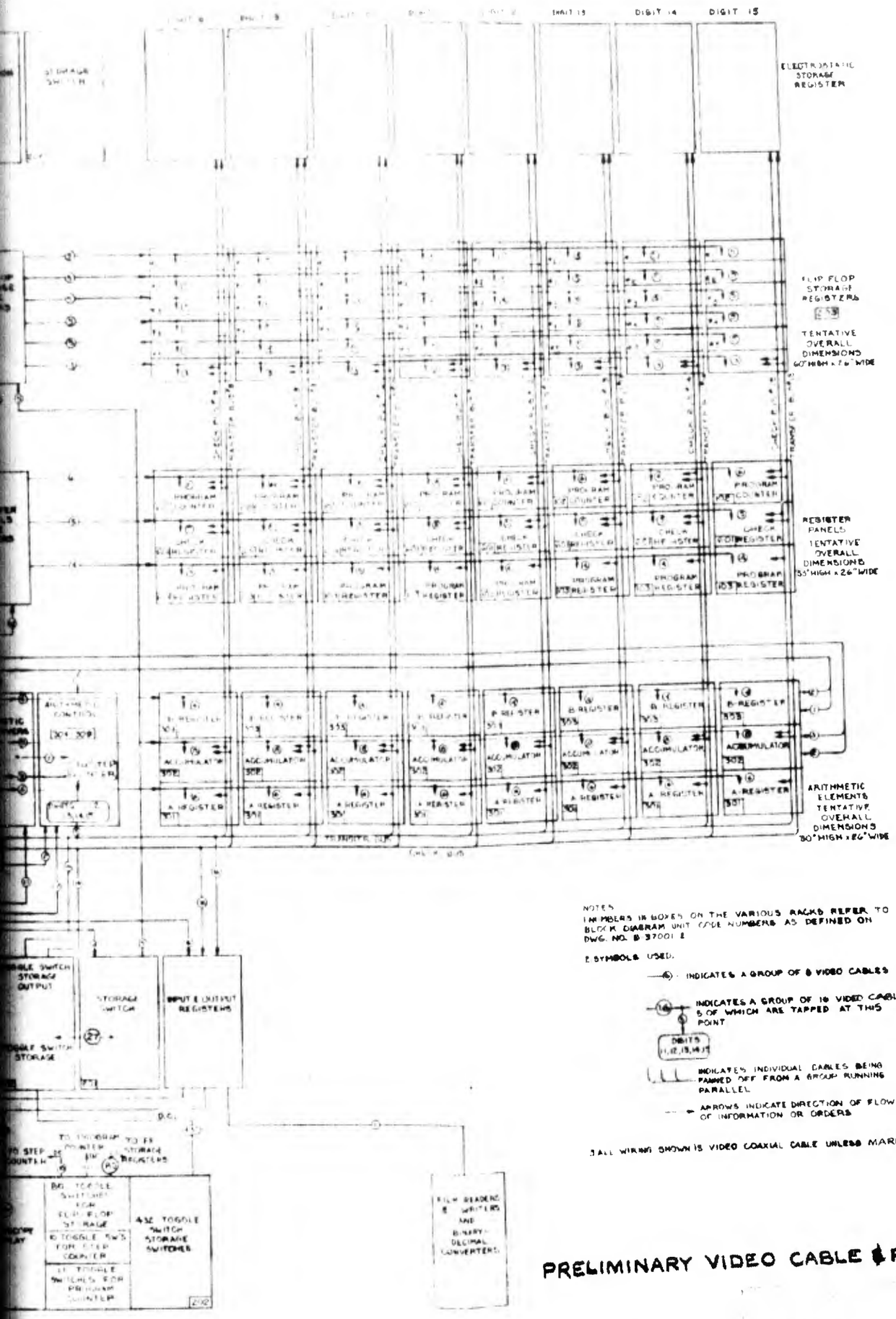
D-31016

HF:hes

E-30905



OPERATOR'S CONSOLE



NOTES

1. NUMBERS IN BOXES ON THE VARIOUS RACKS REFER TO BLOCK DIAGRAM UNIT CODE NUMBERS AS DEFINED ON DWG. NO. B 37001 E

2. SYMBOLS USED.

- (6) — INDICATES A GROUP OF 6 VIDEO CABLES
- (16) — INDICATES A GROUP OF 16 VIDEO CABLES, 5 OF WHICH ARE TAPPED AT THIS POINT
- DIGITS 11, 12, 13, 14, 15
- INDICATES INDIVIDUAL CABLES BEING FANNED OFF FROM A GROUP RUNNING PARALLEL
- ARROWS INDICATE DIRECTION OF FLOW OF INFORMATION OR ORDERS

3. ALL WIRING SHOWN IS VIDEO COAXIAL CABLE UNLESS MARKED "D.C."

PRELIMINARY VIDEO CABLE & PANEL ARRANGEMENT

6345

F. WOLSKY 10/9/47

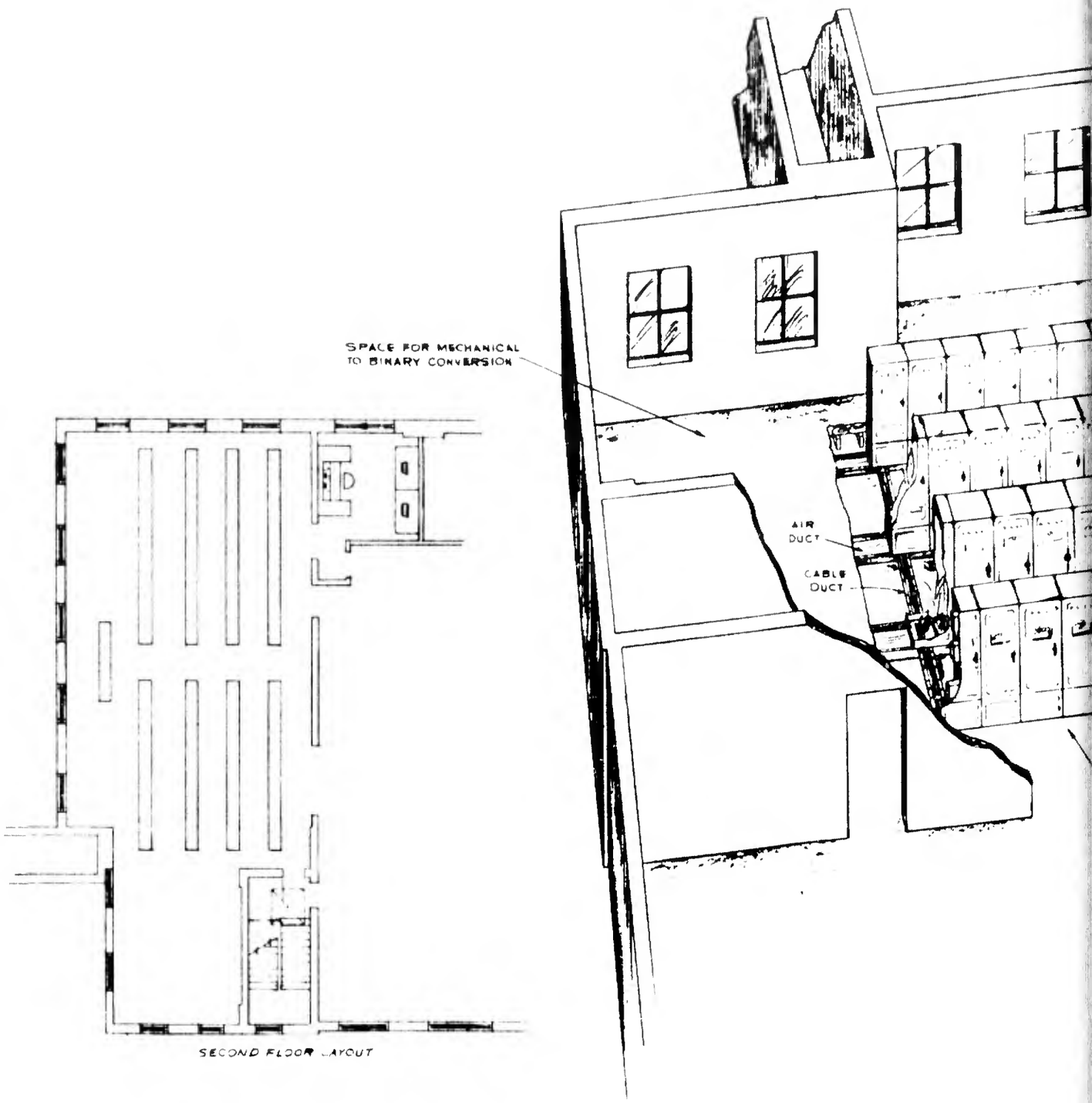
C.W.W. 10-9-47

C.W.W. 10-9-47

E-30905

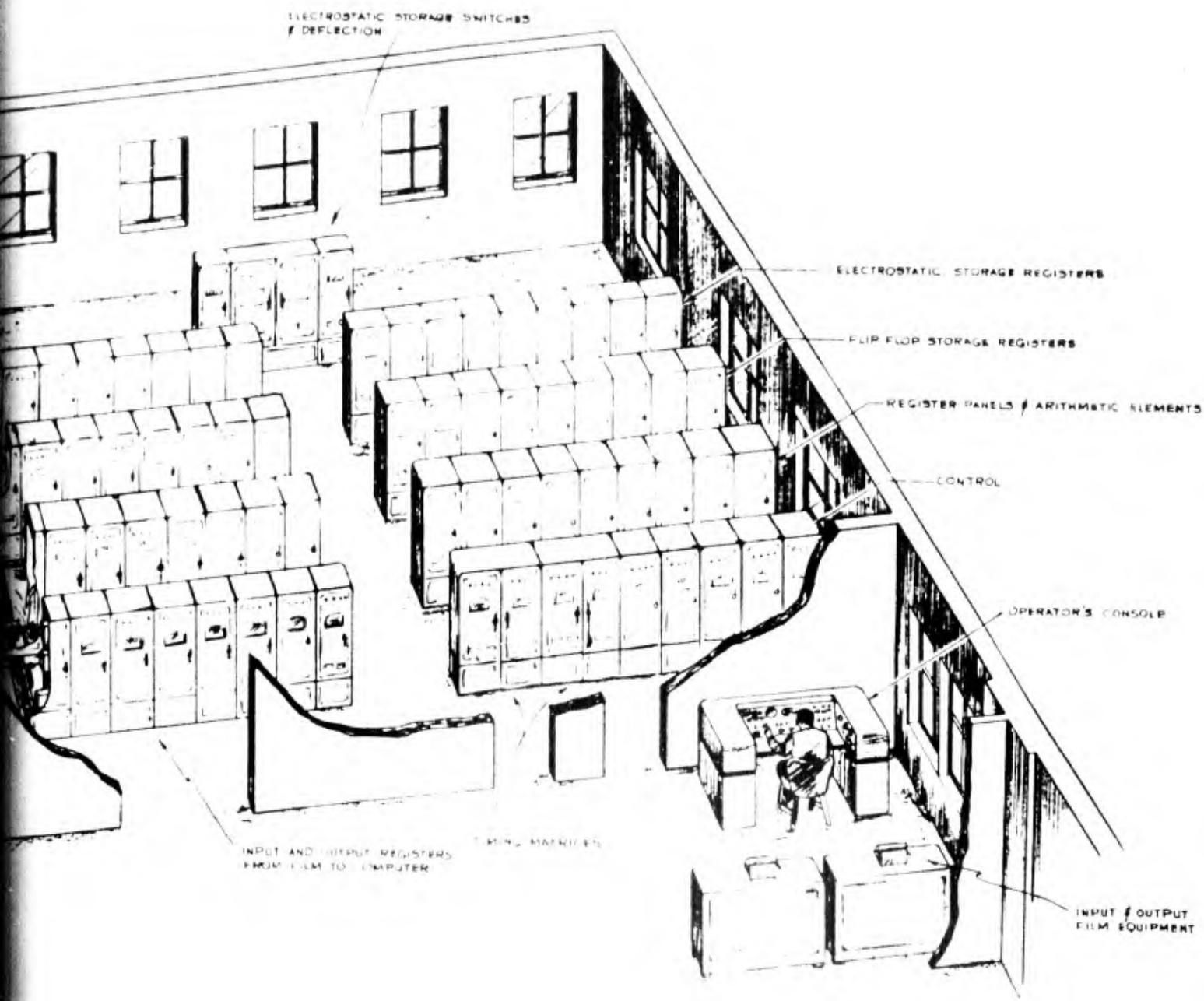
B REDUCTION

D-3.D16



SECOND FLOOR LAYOUT

PROPOSED A
WHIRLWIND I



PROPOSED ARRANGEMENT
WHIRLWIND I INSTALLATION

D-31016

½ REDUCTION

2

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

TO: Engineers of Project 6345 — Page 1 of 4 pages

FROM: Harris Fahnestock

SUBJECT: WWI Power Estimates

DATE: August 8, 1947

A power estimate has been made for WWI and is summarized in the table below and itemized thereafter. No account has been taken of input and output devices. Filament transformer losses are included in each unit. Other power supplies and their losses are not included. Estimates are based on current circuit schematics and block schematics. Estimates for electrostatic storage are less accurate than others as they are shown separately in the summary.

SUMMARY

UNIT	NO. REQ	UNIT POWER	TOTAL
Arith. El., CR, PR, PC	16	370	5900
FF storage	16	168	2700
Register Drivers	1	770	800
Control	1	2000	2000
WWI less in., out., E.S. stor.			11400
E.S. Stor. Reg.	16	500	8000
Deflection	1	5000	5000
E.S. storage			13000
WWI less input and output		25 KW	

Estimates include filament transformer losses of 20% of filament power. The power estimates are conservative with respect to duty cycle.

1	FF :	2-6AG7's	15 watts
1	TT :	1-6AG7	5
1	GT :	1-6AG6	2
1	BA :	1-6AG7	6
1	BA :	1-829	15

Arithmetic element	2 digit	234 tubes
CR, CR PC	1 digit	133
5 RR registers	1 digit	168
Register drivers		336
Arithmetic element drivers		593
2 12 position switches		1002
Time pulse distributor		405
Timing matrix		153
Clock		85
Step counter		116
Control contingencies		234

Harris Fahnestock

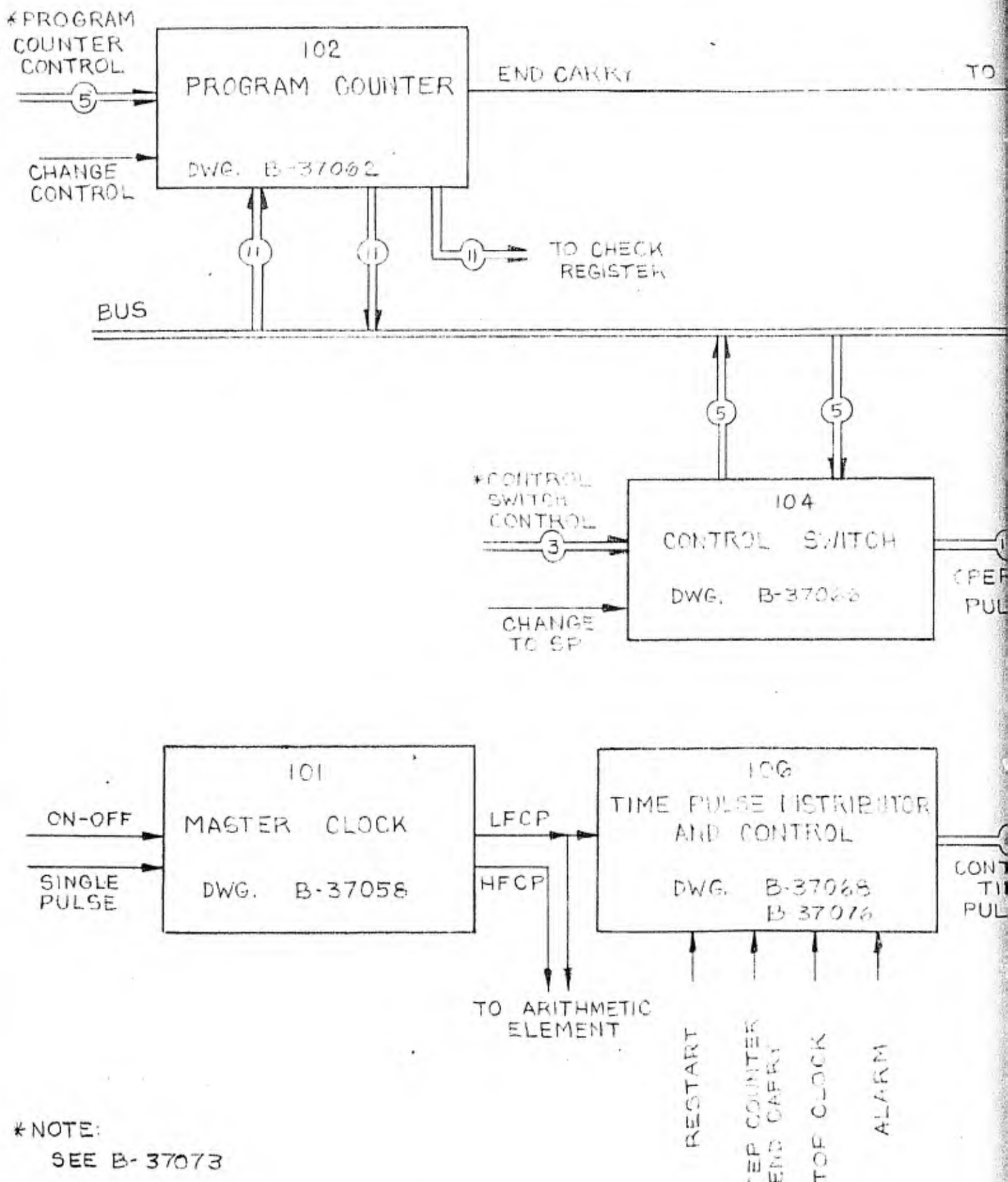
HF:maf

CONTROL DRAWING LIST

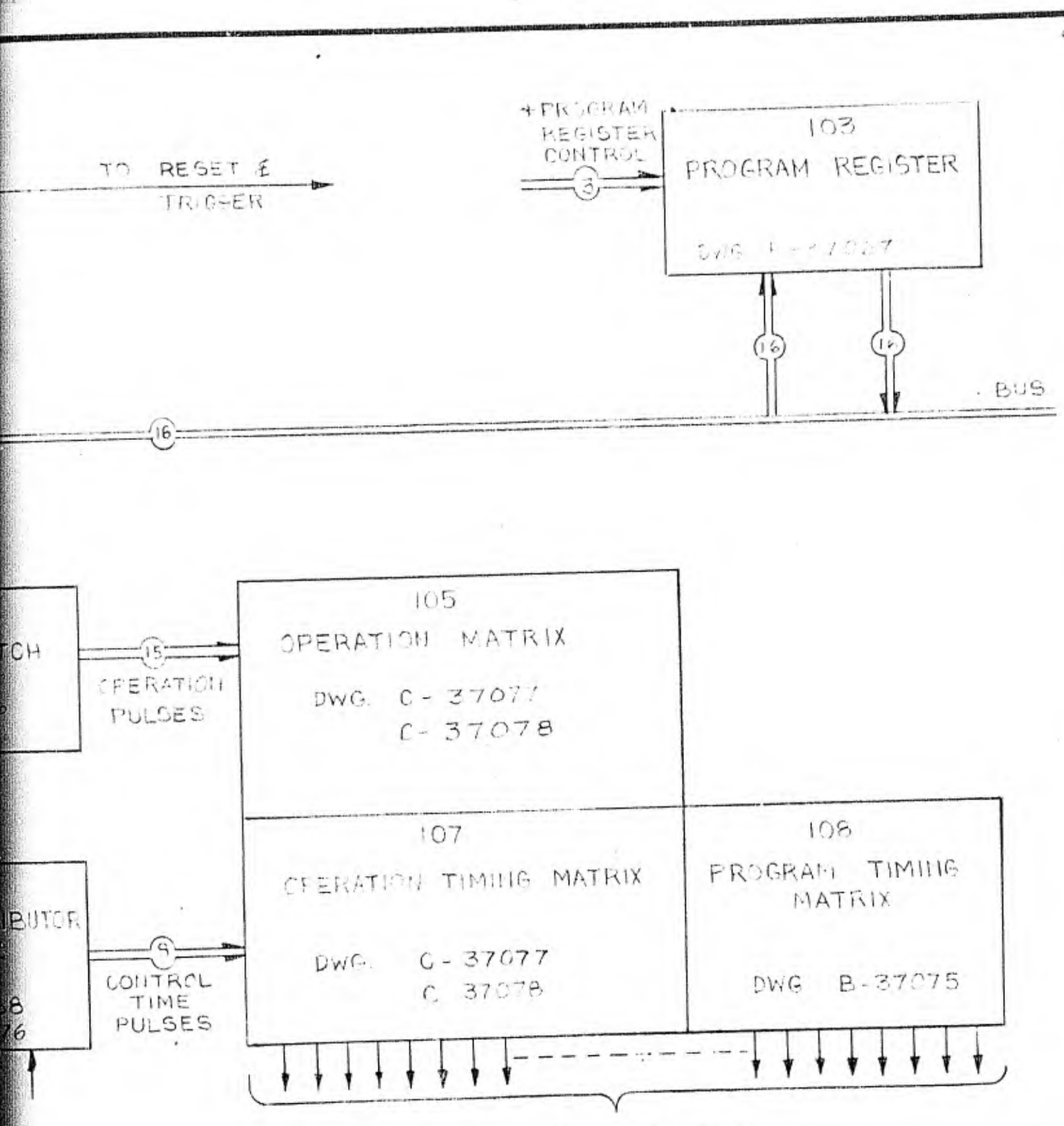
(Block Diagram Reference 100)

Block Diagram	B-37098
102 Program Counter	
Block Schematic	SB-39291
Circuit Schematic	SD-39284
Assembly	D-30800
103 Program Register	
Block Schematic	SB-39239
Circuit Schematic	SD-39283
Assembly	D-30799
104 Control Switch	
Block Schematic	D-30672
Photograph	FB-279
106 Time Pulse Distributor	SB-39447

B-37098-1

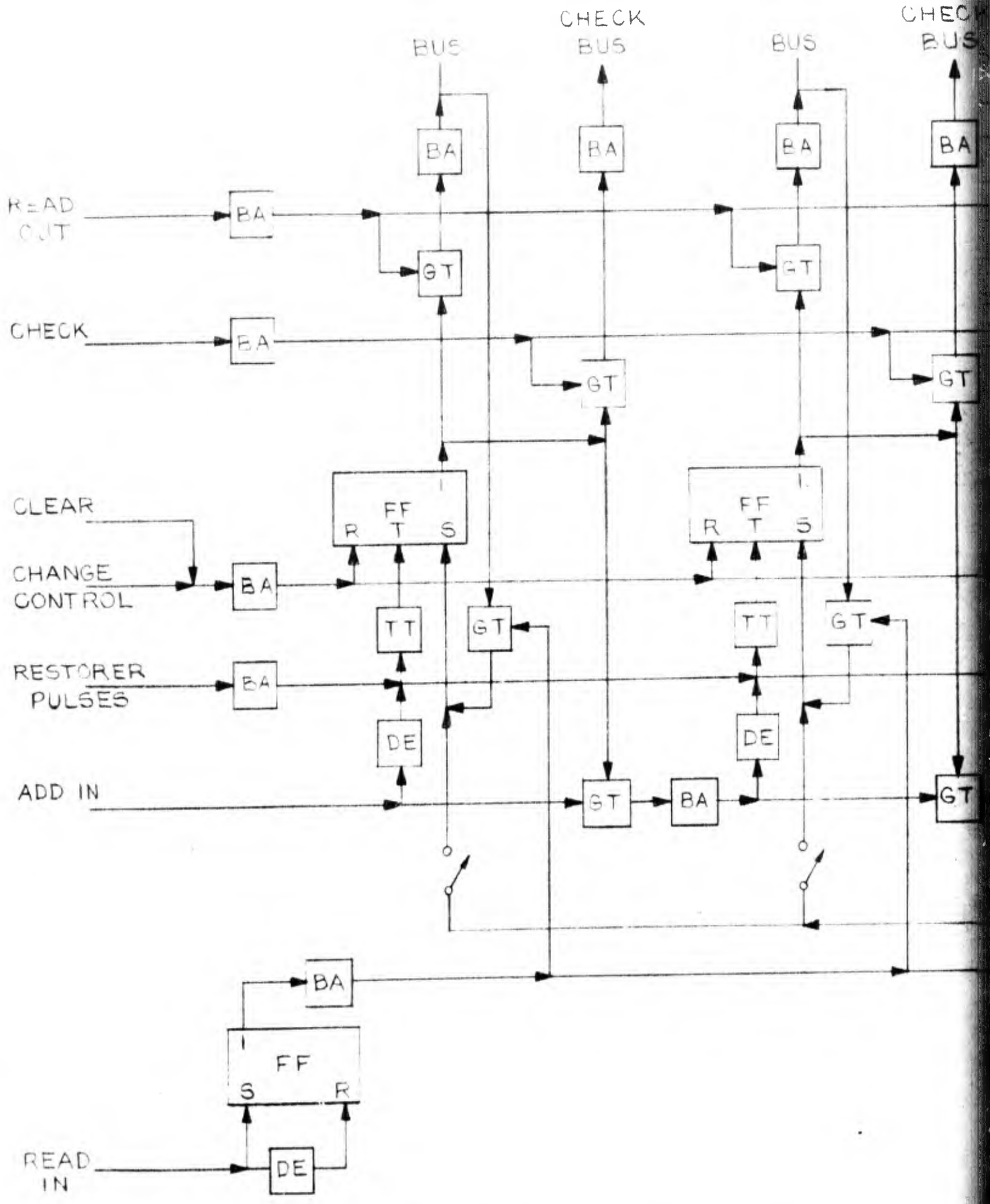


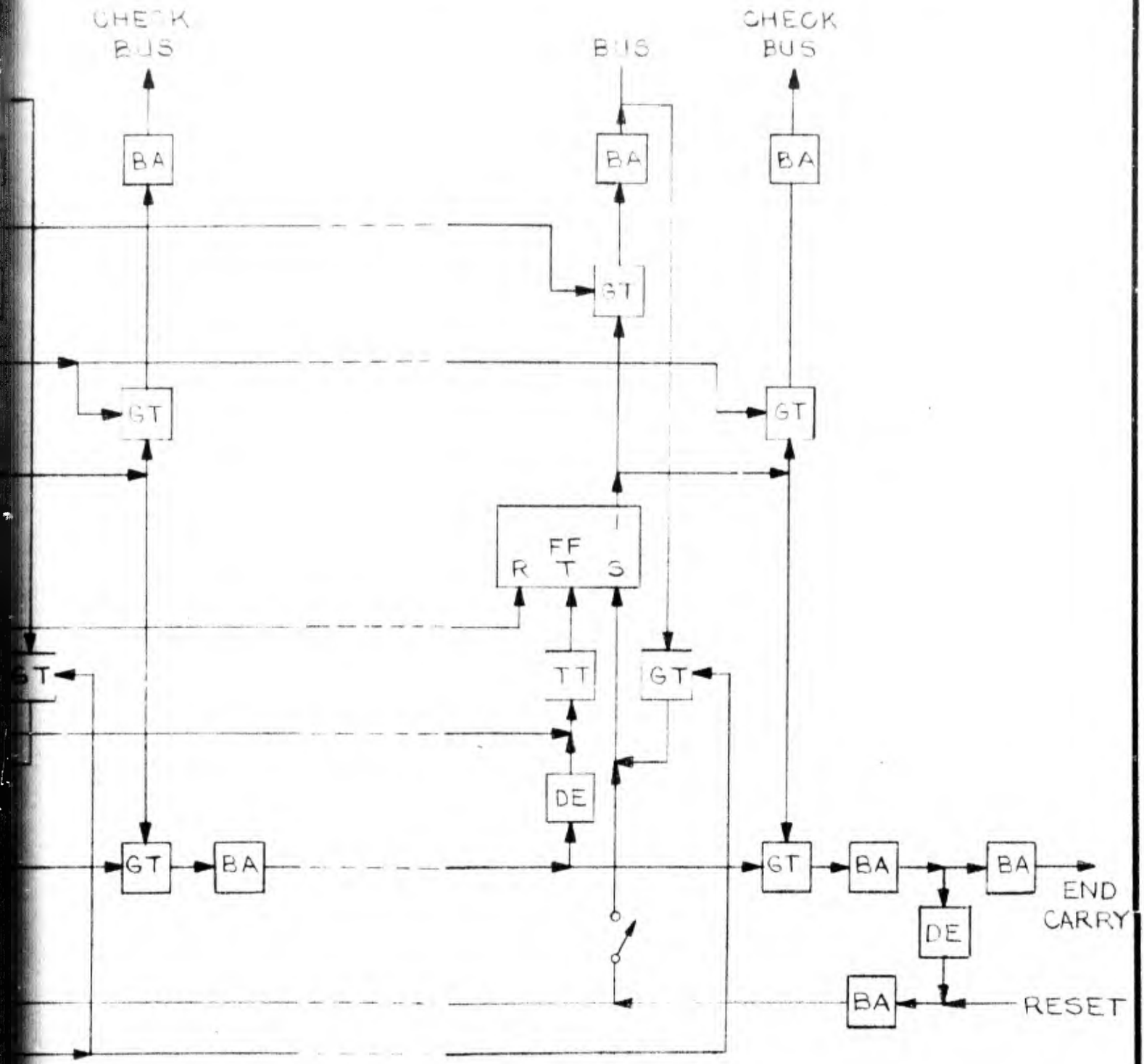
*NOTE:
SEE B-37073



SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

CONTROL WWI		100
SCALE:	DR. [illegible] 5-5-47	B-37098-1
ENG. FES 5/5/47	CK.	APP.



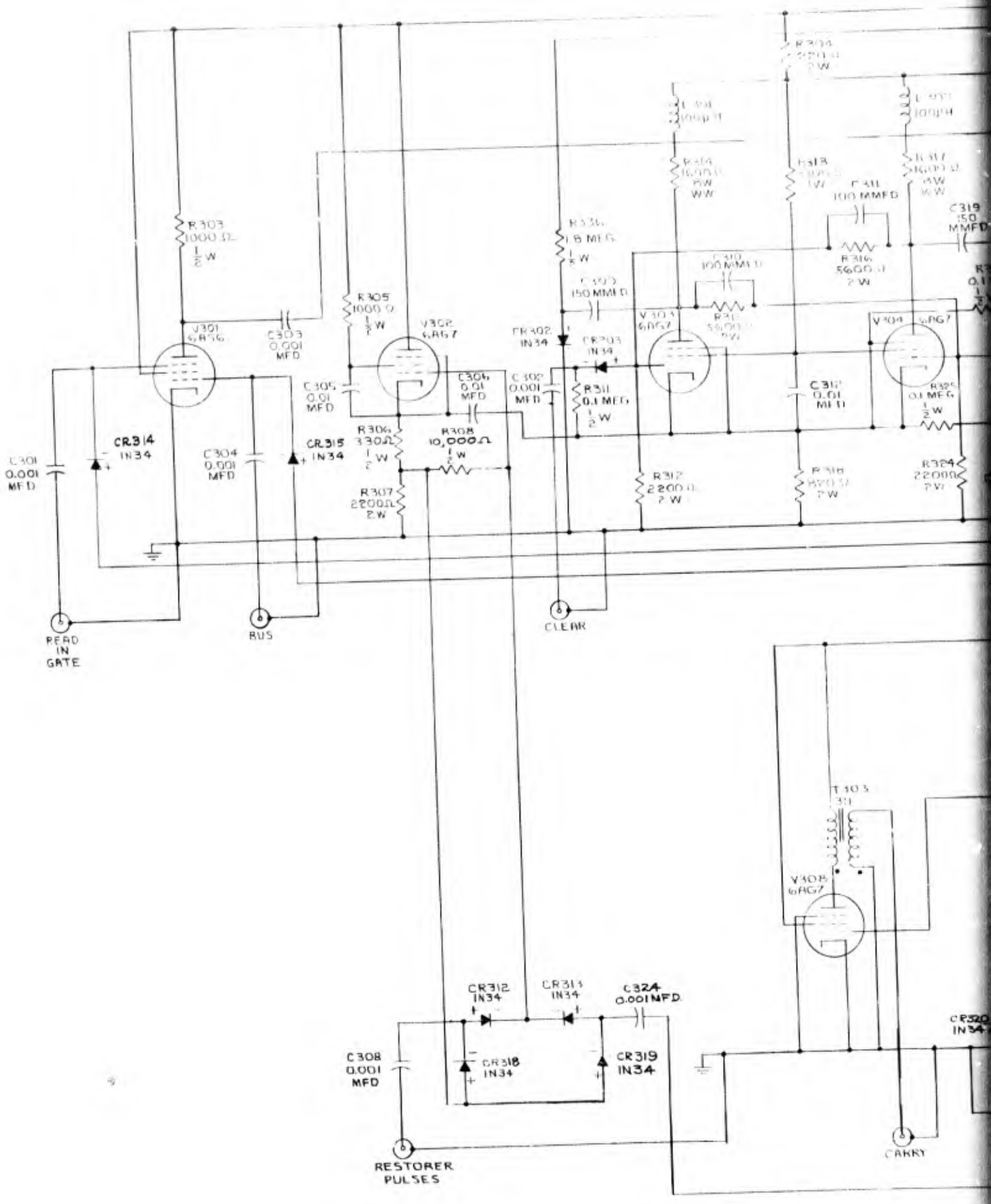


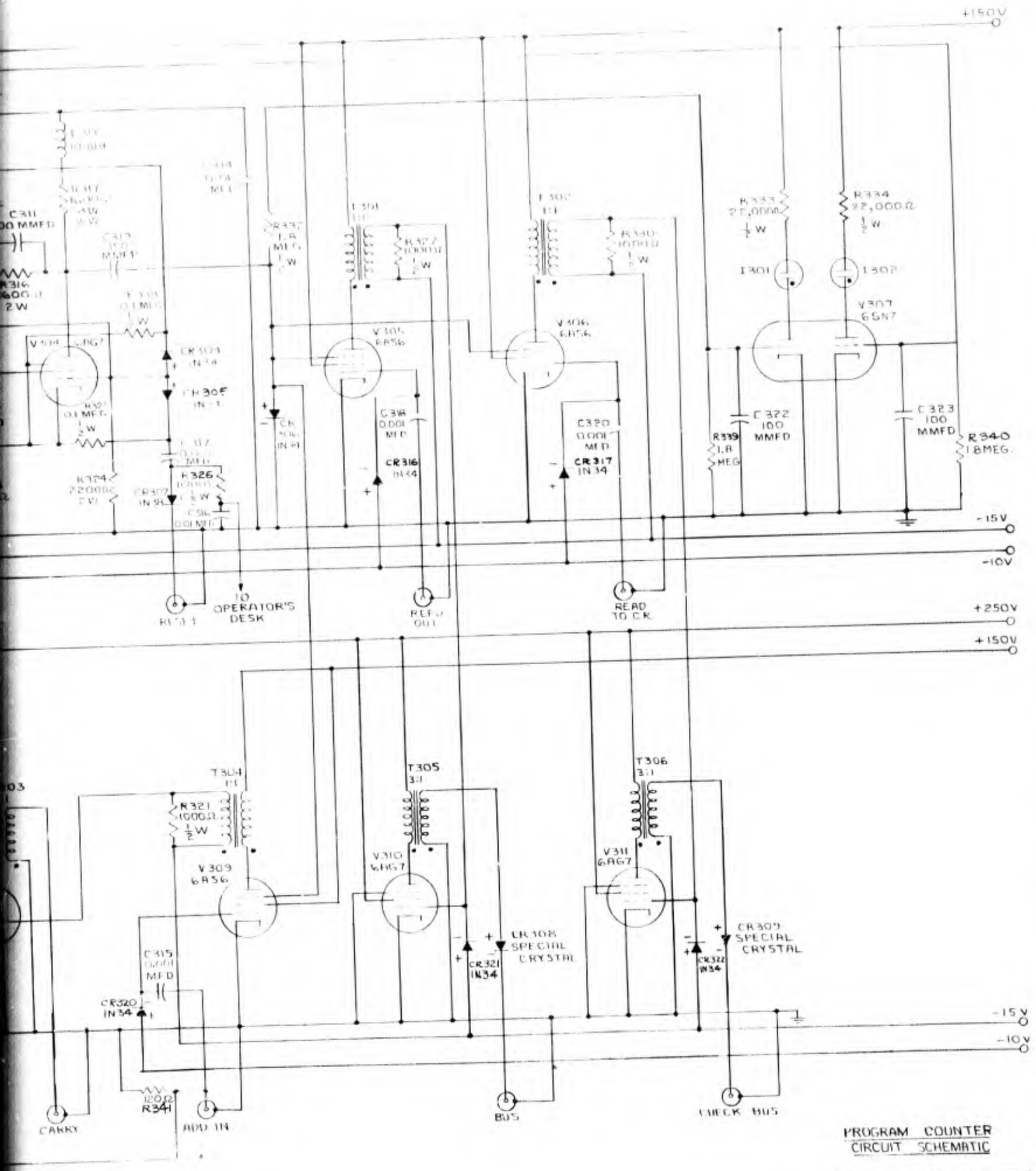
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

PROGRAM COUNTER BLOCK SCHEMATIC

SCALE:	DR. F. WILSON 12-27-47	
ENG. F.R.K.	CK.	APP.

B-39291


R303 1000Ω 1/2W
R305 1000Ω 1/2W
R304 2200Ω 2W
L301 100μH
L302 100μH
R314 16,000Ω 5W WW
R313 2200Ω 1W
R317 16,000Ω 5W WW
C311 100 MMFD
C319 150 MMFD
R316 5600Ω 2W
C310 100 MMFD
R315 5600Ω 2W
R336 1.8 MEG 1/2W
C309 150 MMFD
V301 6AT6
V302 6AG7
V303 6AG7
V304 6AG7
C303 0.001 MFD
CR302 IN34
CR303 IN34
C305 0.01 MFD
C306 0.01 MFD
C302 0.001 MFD
R311 0.1 MEG 1/2W
C312 0.01 MFD
R325 0.1 MEG 1/2W
C301 0.001 MFD
CR314 IN34
C304 0.001 MFD
CR315 IN34
R306 330Ω 1/2W
R308 10,000Ω 1/2W
R307 2200Ω 2W
R312 2200Ω 2W
R318 2200Ω 2W
R324 2200Ω 2W
READ IN GATE
BUS
CLEAR
T303
V308 6AG7
CR312 IN34
CR313 IN34
C324 0.001 MFD
C308 0.001 MFD
CR318 IN34
CR319 IN34
CR320 IN34
RESTORER PULSES
CARRY

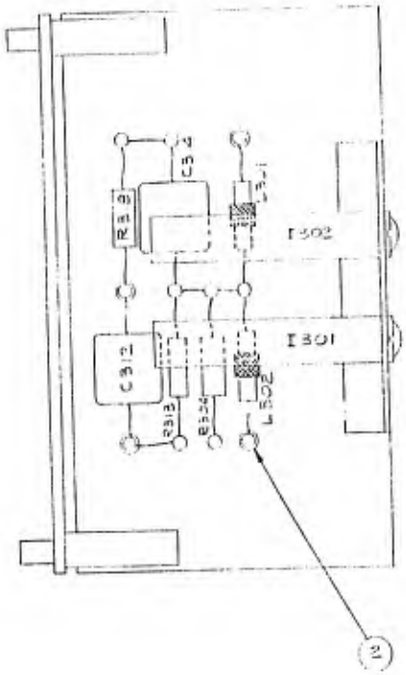


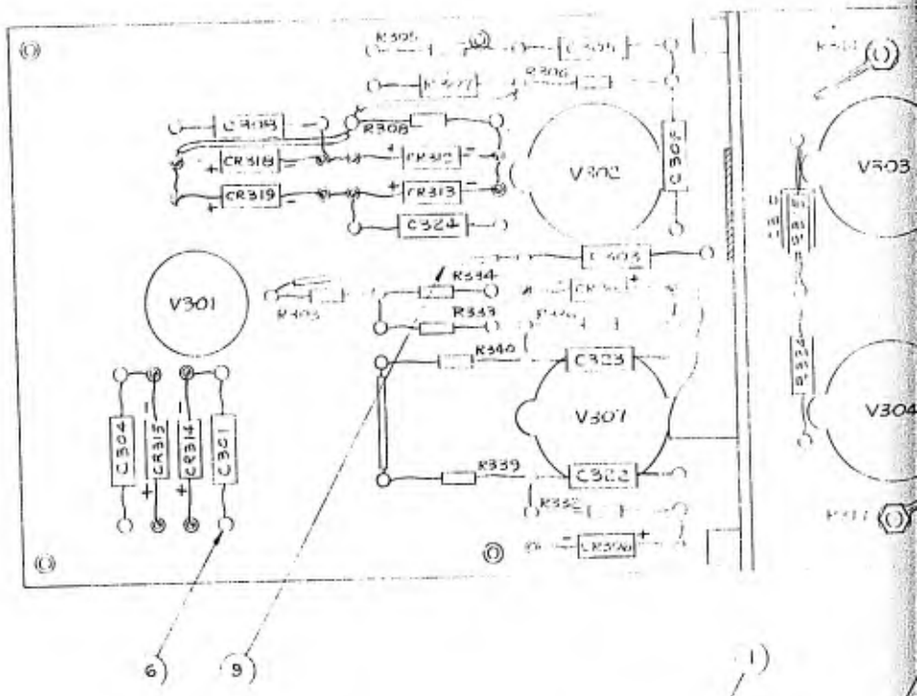
PROGRAM COUNTER
CIRCUIT SCHEMATIC

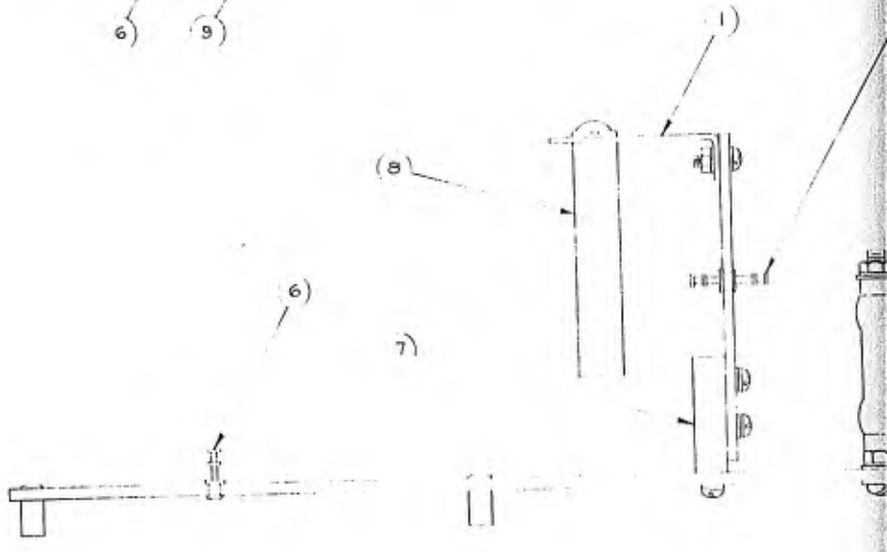
	DEC 8 1961
6515	SD-30284-3
648	

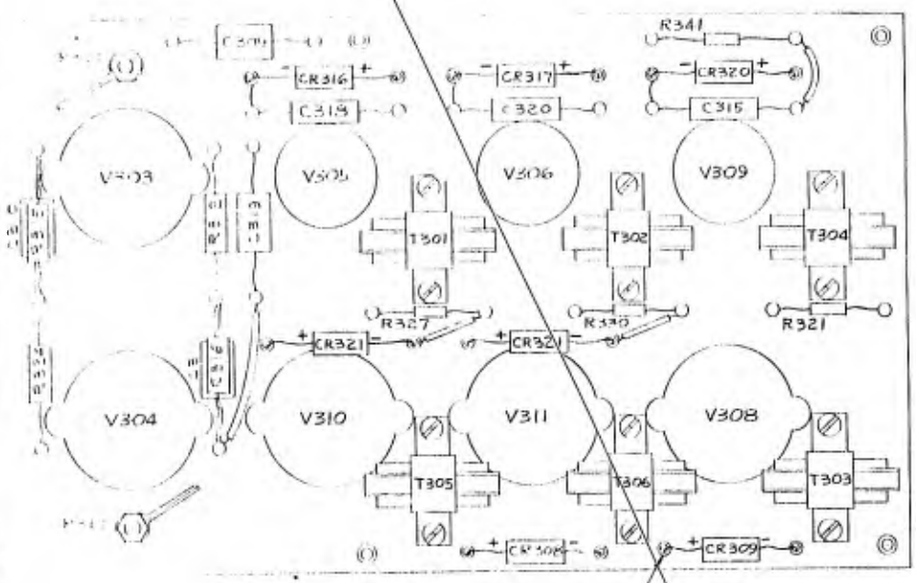
D-80400-1

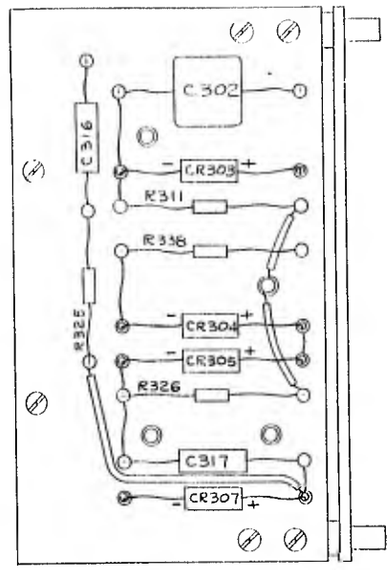
SD-39284





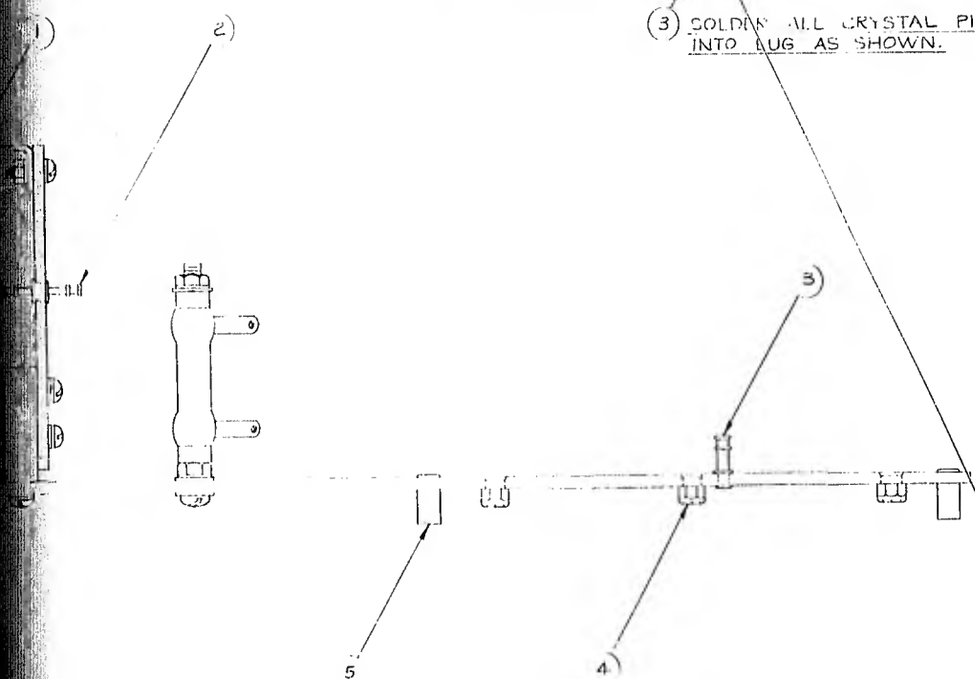






(3) SOLDER ALL CRYSTAL PIGTAILS INTO LUG AS SHOWN.

NOTES
1. V301, V302, V303, V304, V305, V306, V307, V308, V309, V310, & V311 ARE NOT PARTS OF THIS ASSEMBLY & ARE INDICATED FOR REFERENCE ONLY.



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
9	CAMBRIC SLEEVING	———	AS REQ'D
8	INDICATOR KELLOG	#49	2
7	PANEL MOUNTING POST	A-30754	2
6	TURRET LUG-SINGLE C.T.C.	#1724D	78
5	MOUNTING POST C.T.C.	#1246D	8
4	CLINCH NUT	#22C5-63	12
3	TURRET LUG HOLLOW C.T.C.	#1558D	38
2	TURRET LUG DOUBLE C.T.C.	#1081A	4
1	INDICATOR MTG PLATE	A-30752	1

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

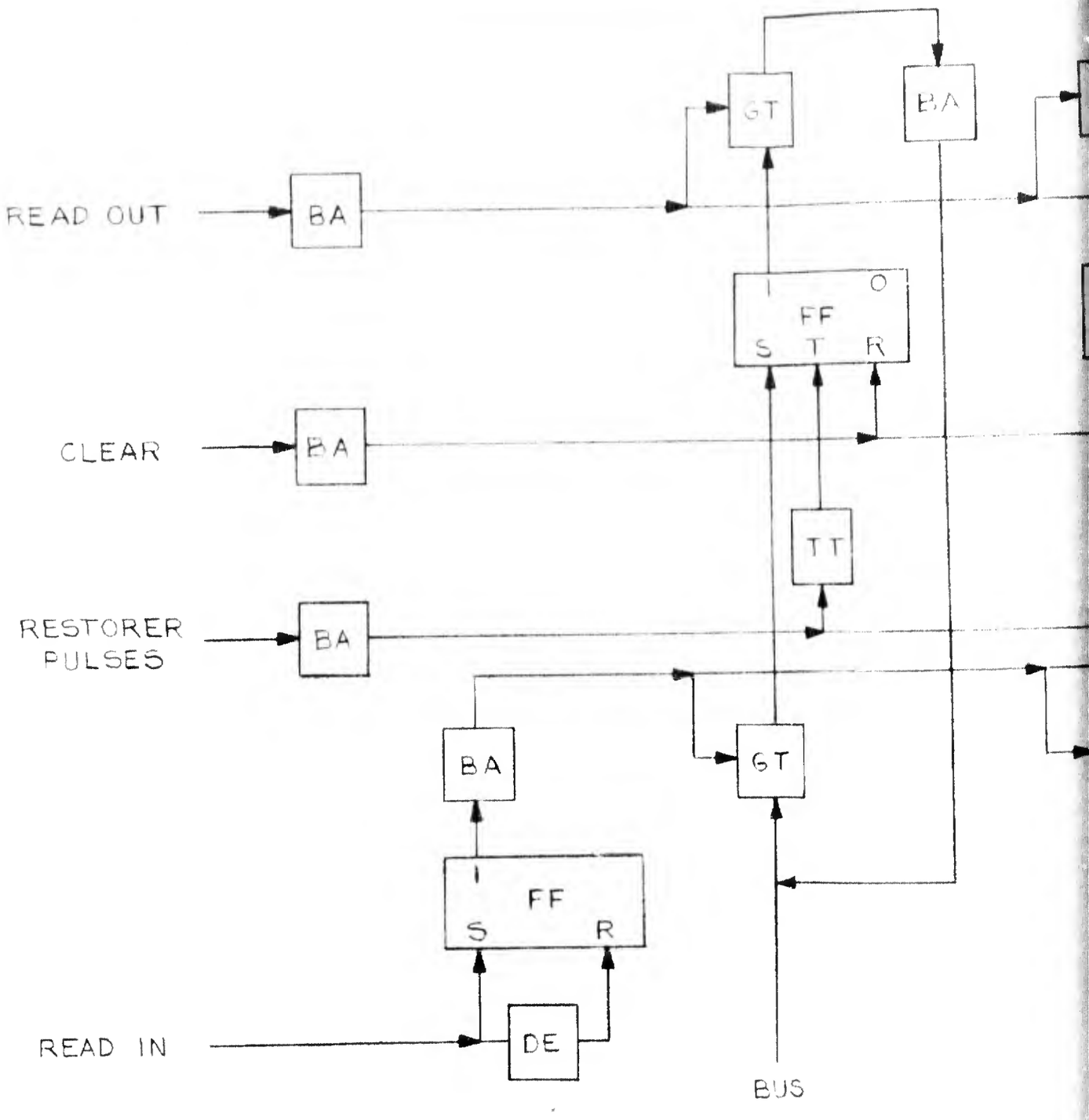
PROGRAM COUNTER ASS'Y.

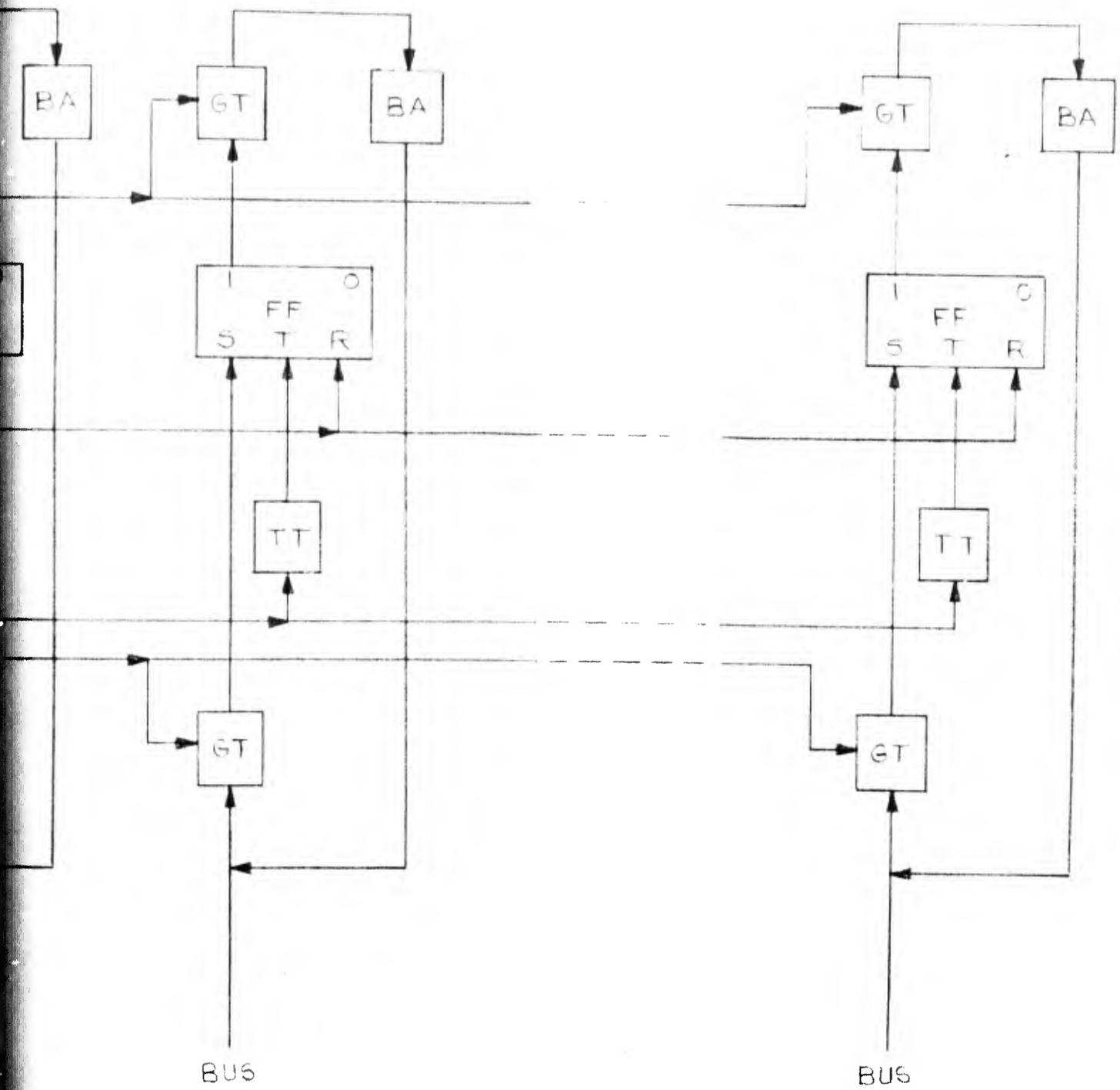
SCALE 1-1 1/2 DRAWN R.P.M.

TR. [illegible] CK. [illegible]

D-[illegible]-20-1

	WAS	APP.	DATE
G			
F			
E			
D			
C			
B			
A			

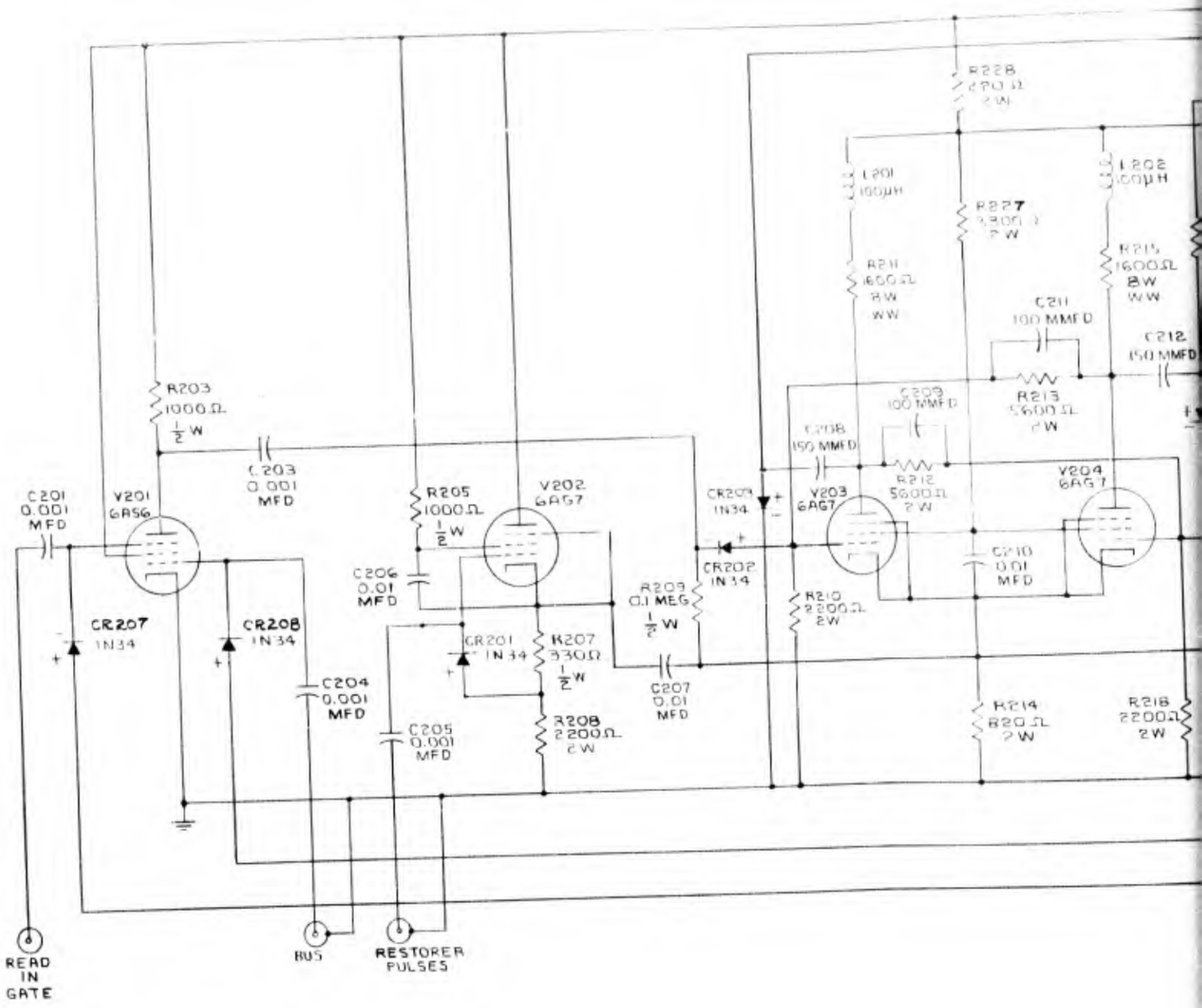

READ OUT
BA
GT
BA
I
O
FF
S
T
R
CLEAR
BA
TT
RESTORER
PULSES
BA
BA
GT
I
FF
S
R
READ IN
DE
BUS

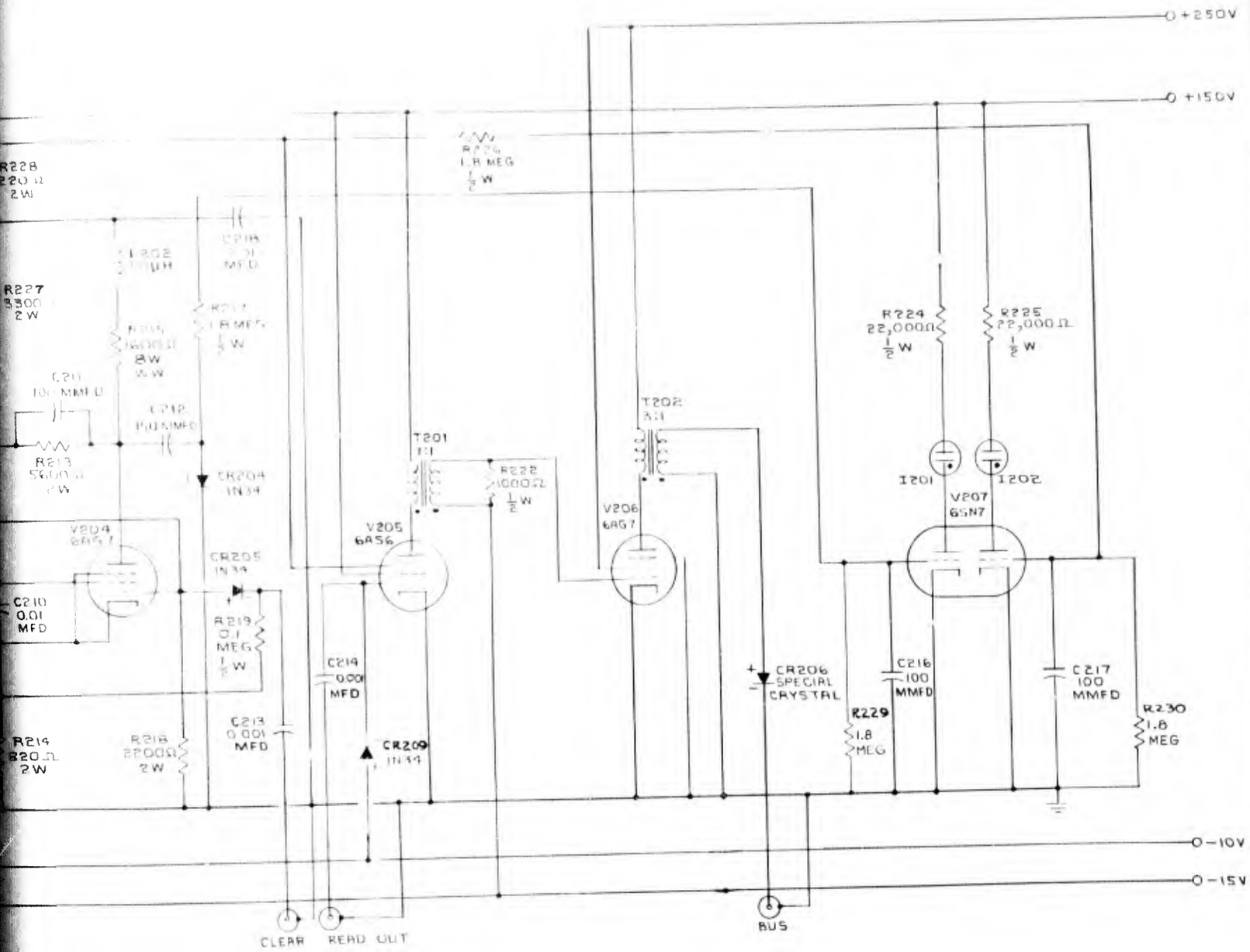


SERVOMECHANISMS LABOPATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

PROGRAM REGISTER BLOCK SCHEMATIC

SCALE:	DR. F. WOLSKI 12-22-47	B-39289
ENG. D.R.C.	CK.	APP.

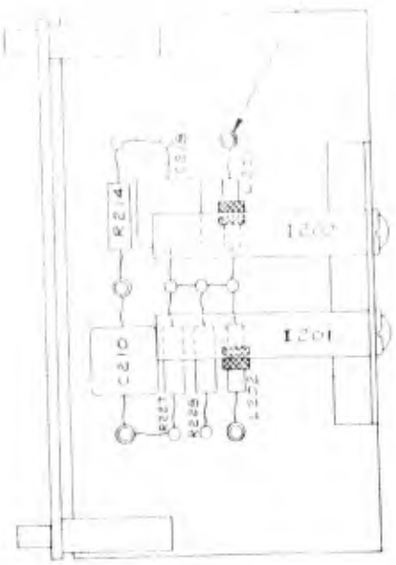

R228
C201
100μH
R227
R231
1600Ω
2W
WW
R215
1600Ω
2W
WW
C211
100 MMFD
C212
150 MMFD
R213
5600Ω
2W
C209
100 MMFD
C208
150 MMFD
R212
5600Ω
2W
R203
1000Ω
½W
C203
0.001
MFD
C201
0.001
MFD
V201
6AS6
R205
1000Ω
½W
V202
6AG7
CR209
1N34
V203
6AG7
V204
6AG7
C206
0.01
MFD
CR202
1N34
C210
0.01
MFD
R209
0.1 MEG
½W
R210
2200Ω
2W
CR207
1N34
CR208
1N34
CR201
1N34
R207
330Ω
½W
C204
0.001
MFD
C207
0.01
MFD
C205
0.001
MFD
R208
2200Ω
2W
R214
820Ω
2W
R218
2200Ω
2W
READ
IN
GATE
BUS
RESTORER
PULSES

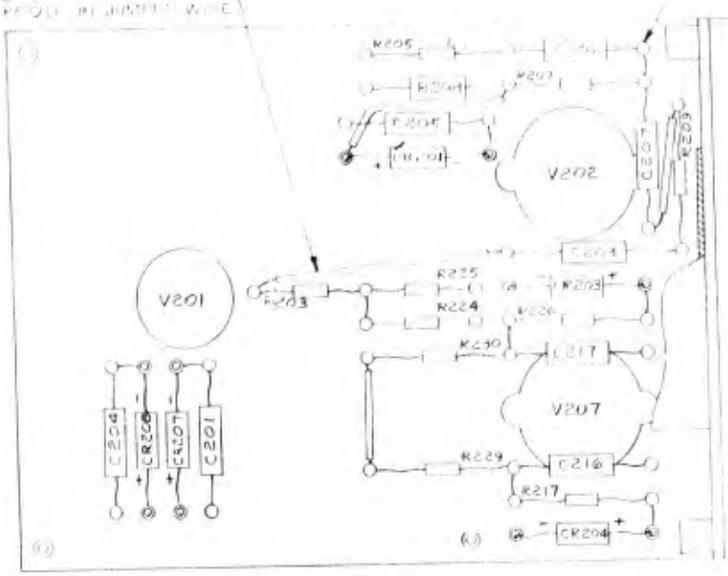


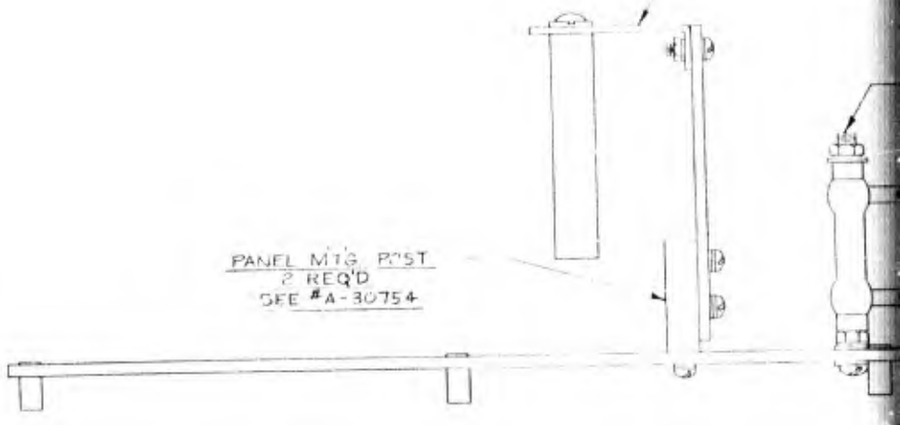
PROGRAM REGISTER
CIRCUIT SCHEMATIC

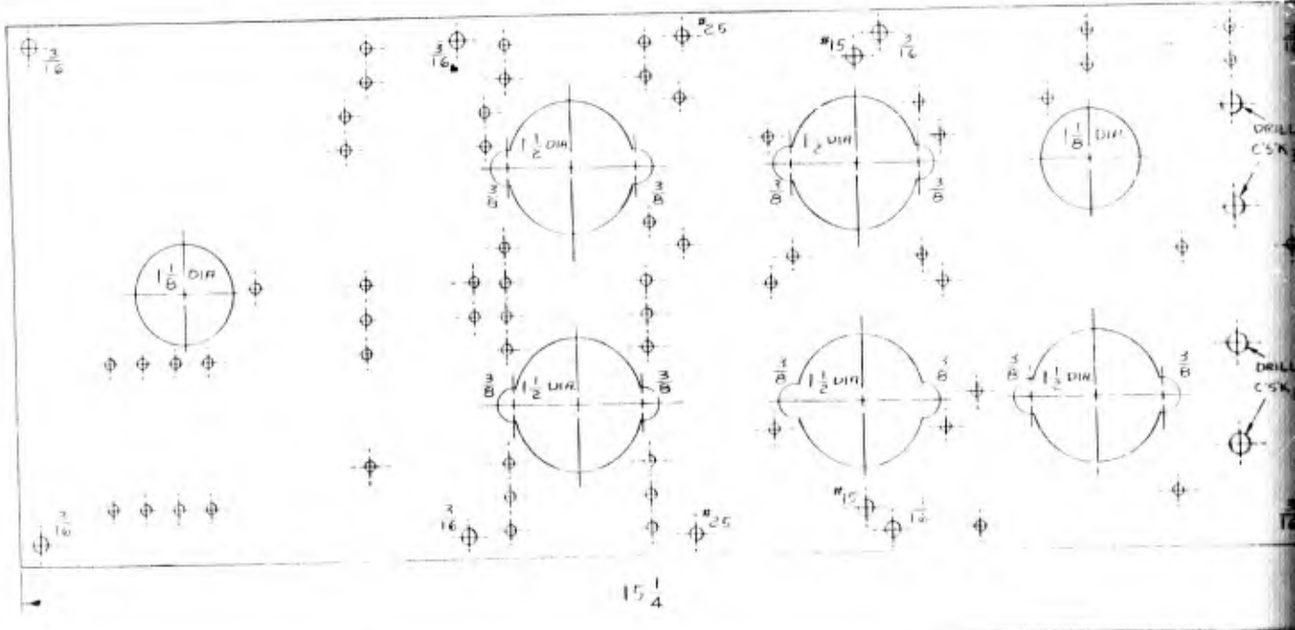
MASSACHUSETTS INSTITUTE OF TECHNOLOGY		
SIZE 6.375	DWG 8-19-47	REV
APP	APP SD-39283-3	

D-30799-1

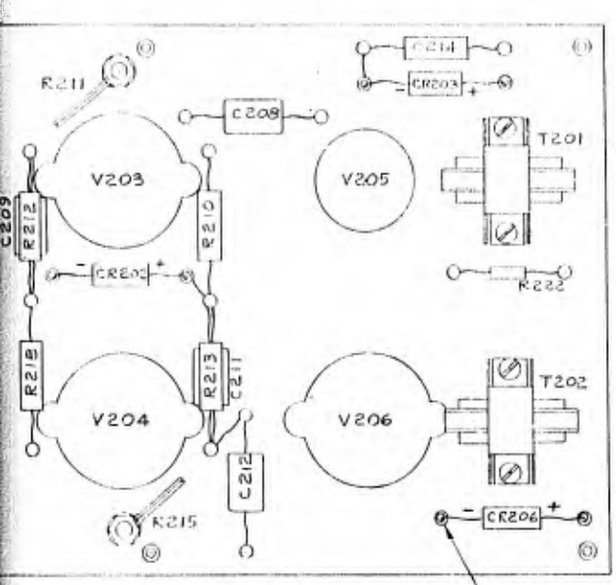

R214
C210
R227
R228
C212
I202
I201

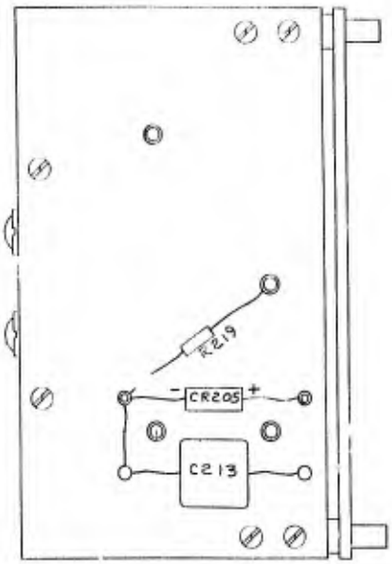

R206
R204
R207
R205
CR201
V202
C207
R203
V201
R223
R225
R224
R226
R230
C217
V207
C204
CR206
CR207
C201
R229
C216
R217
CR204
V203
C203
R211
CR202
R218
V204


PANEL MTG POST
2 REQ'D
SEE #A-30754


1 1/8 DIA
1 1/2 DIA
3/16
3/8
#25
#15
15 1/4

TURRET TERMINAL LUG
CTC #1124D
53 REQ'D



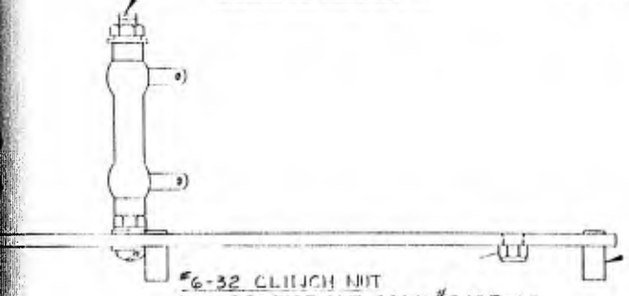


INDICATOR M'T'G PLATE
SEE #A-30752

HOLLOW TERMINAL LUG
CTC # 1558D
18 REQ'D.
SOLDER ALL CRYSTAL
PIGTAILS INTO LUG
AS SHOWN.

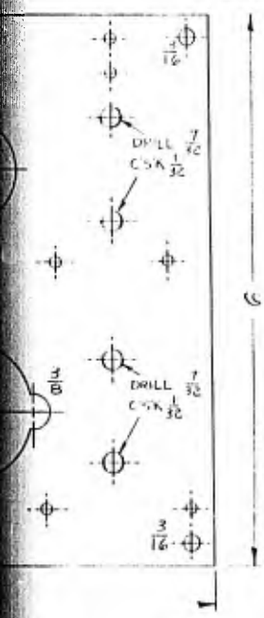
ASS'Y NOTE
1. V201, V202, V203, V204, V205, V206, & V207
ARE NOT PARTS OF THIS ASS'Y & ARE
INDICATED FOR REFERENCE ONLY

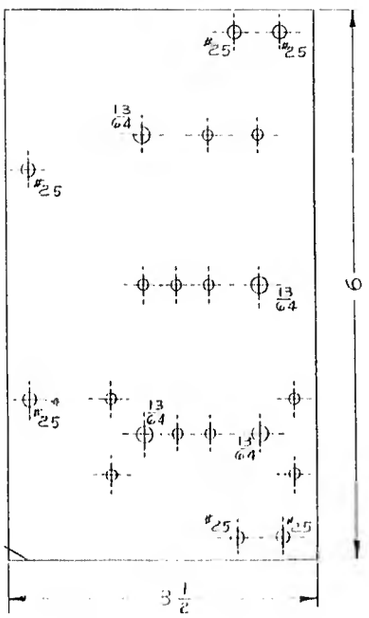
#8-32 FASTENINGS
ALL OTHER #6-32



STANDOFF - RIVET TYPE
CTC # 1246D
8 REQ'D.

#6-32 CLINCH NUT
ELASTIC STOP NUT CORP #22C5-62
4 REQ'D.





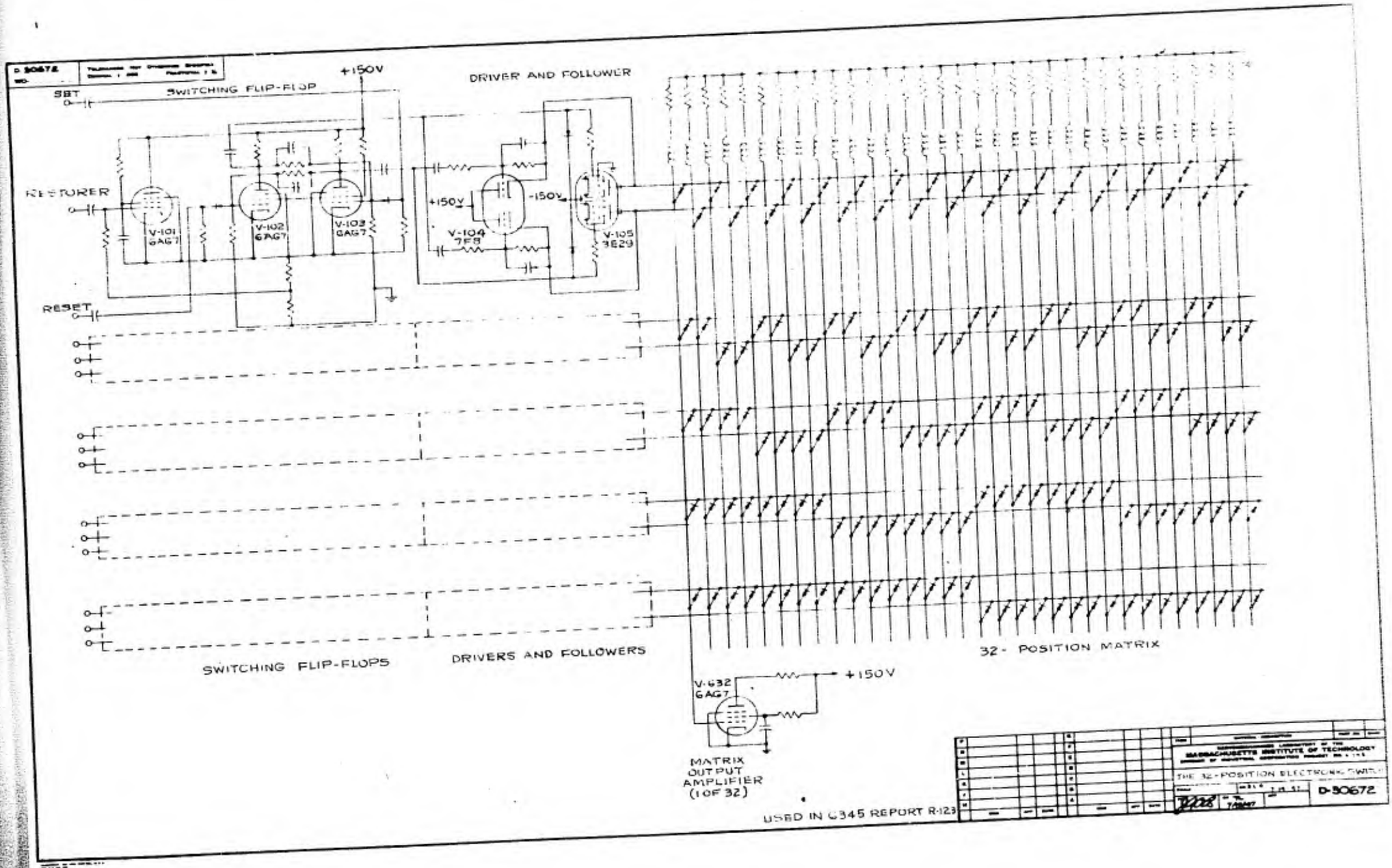
NOTES
1. MAT'L - 1/8 TH'K LINEN BASE PHENOLITE
2. HOLES NOT NOTED DRILL #32

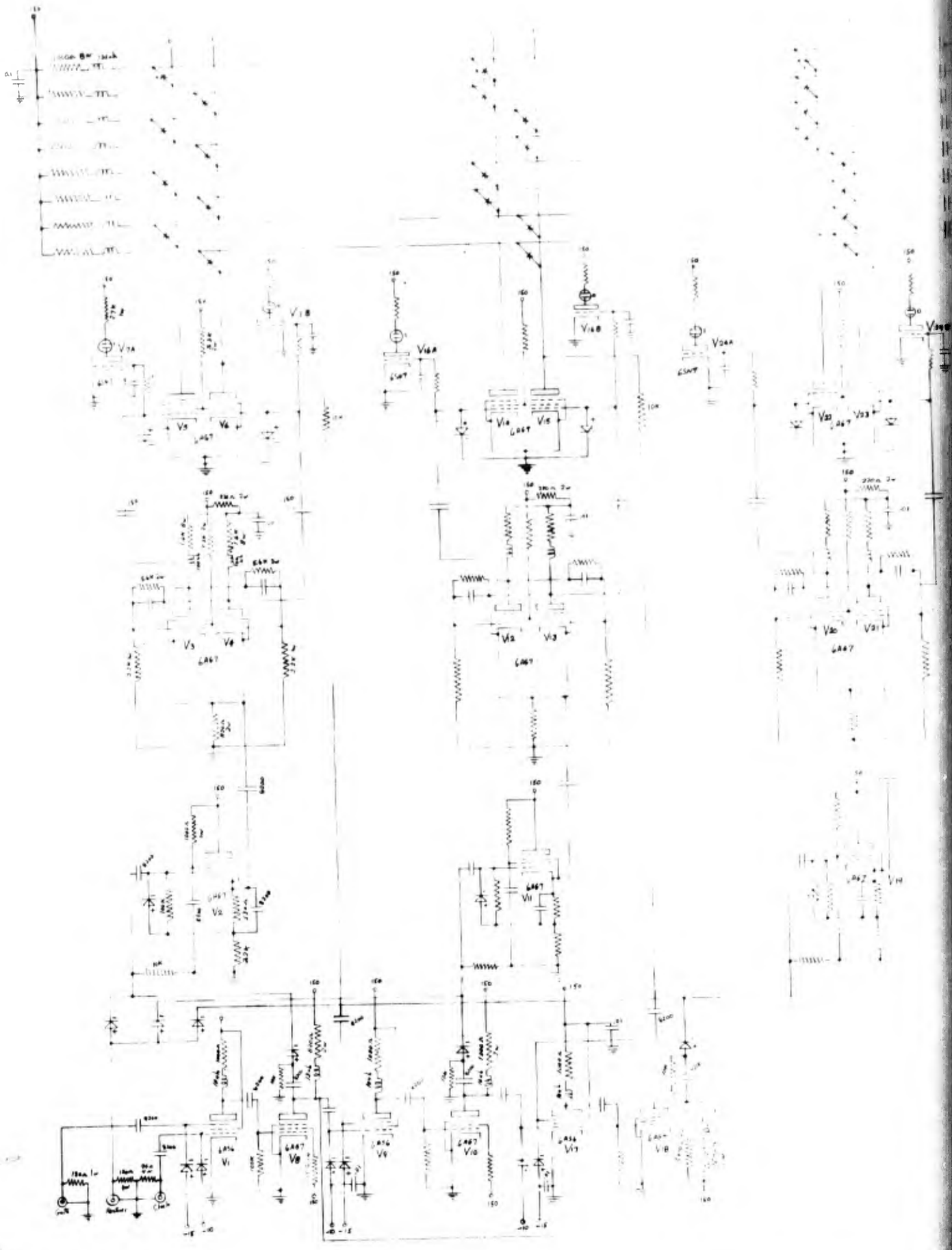
PROGRAM REGISTER DRILLING TEMPLATE & ASS'Y.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SERVOMECHANISMS LABORATORY

D.I.C. NO. 6345	DR. G. C. [illegible] 8-14-47	CK.
[illegible]	APP. D-30799-1	

D-30672 KEEP IN FILE - USE FOR PRINTS





WW 1
TIME PULSE DISTRIBUTOR
(PRELIMINARY)
K M 1/2/47
revised 7/13/47

Note: Constants identical in similar stages except as indicated

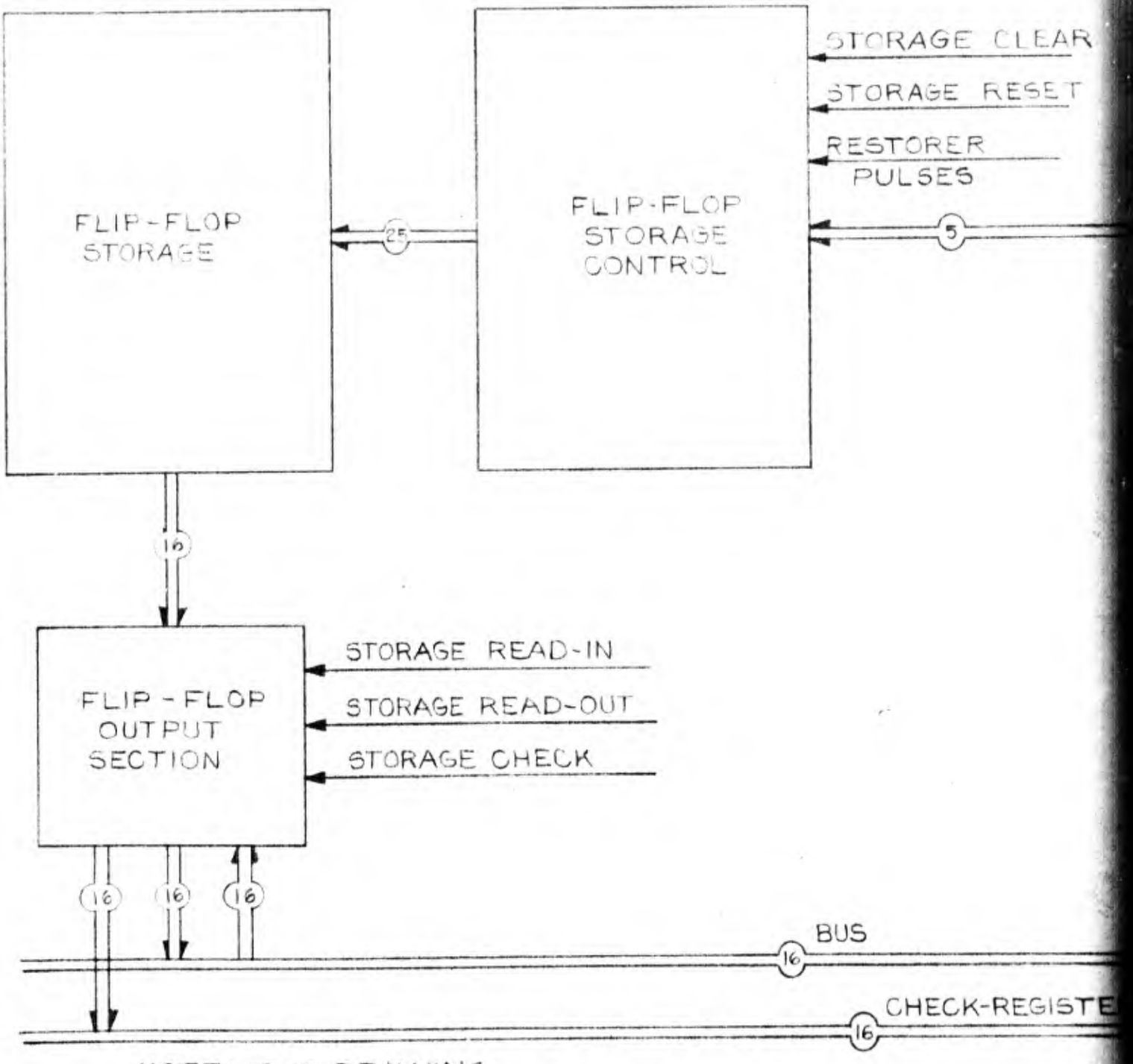
M.I.T. DRAWING
SB - 39447

STORAGE DRAWING LIST

(Block Diagram Reference 200)

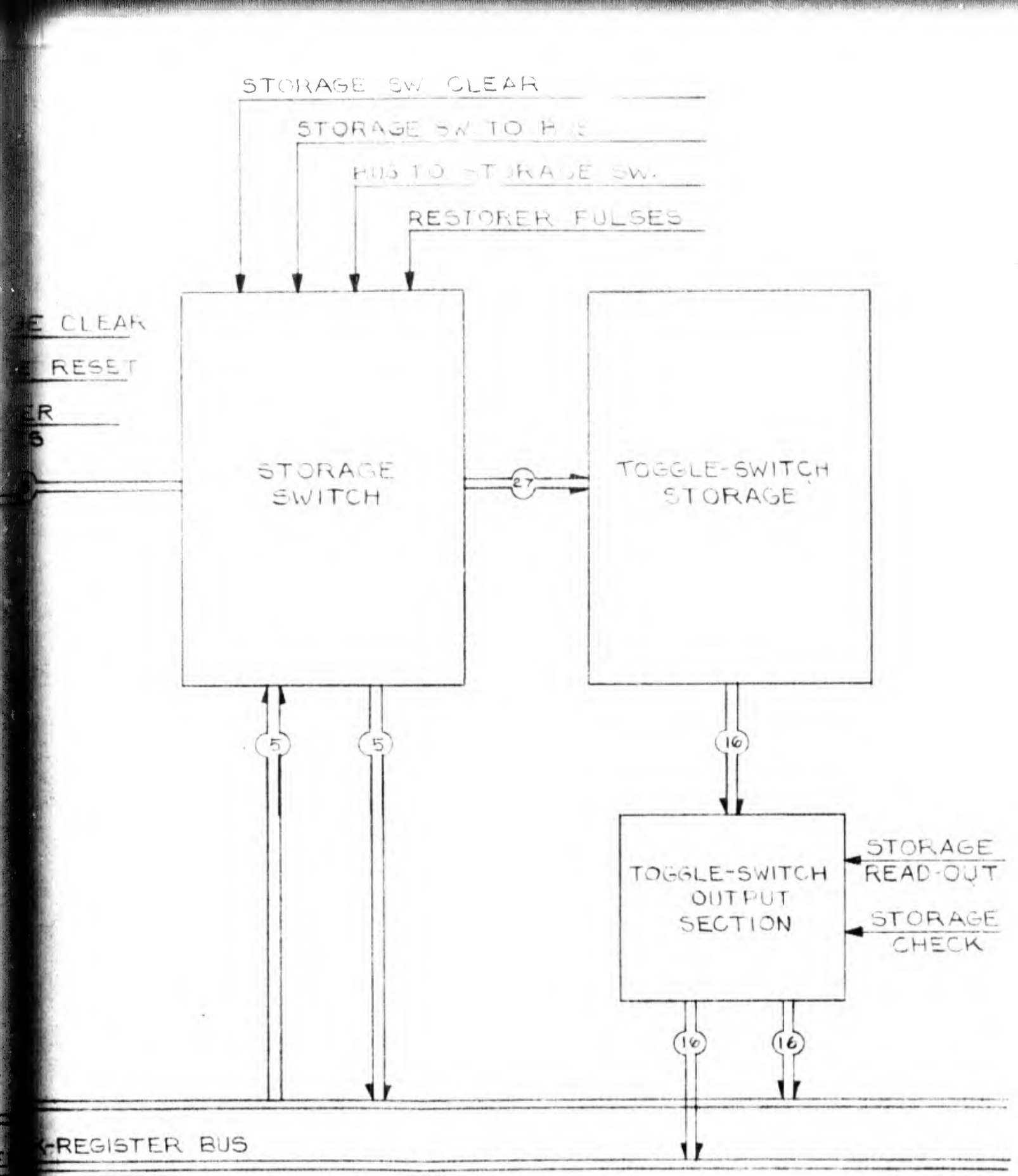
200	Storage - General Arrangement	B-31160
201	32-position Switch - Block Schematic	C-31152
201	32-position Switch - Circuit Schematic	D-30672
201	32-position Switch - Photograph	A-30694
202	Toggle Switch Storage - Block Schematic	B-31151
203	Flip-flop Storage - Block Schematic	SD-39278
203	Flip-flop Storage - Circuit Schematic	SD-39285
203	Flip-flop Storage Output - Circuit Schematic	SD-39286
203	Flip-flop Register Panel Assembly	E-30900
203	Flip-flop Register Assembly	D-30872
203	Flip-flop Storage Output Assembly	D-30879

B-31150



NOTE: THIS DRAWING SUPERSEDES SD-39277-1, 11/4/47.

STORAGE-GENERAL

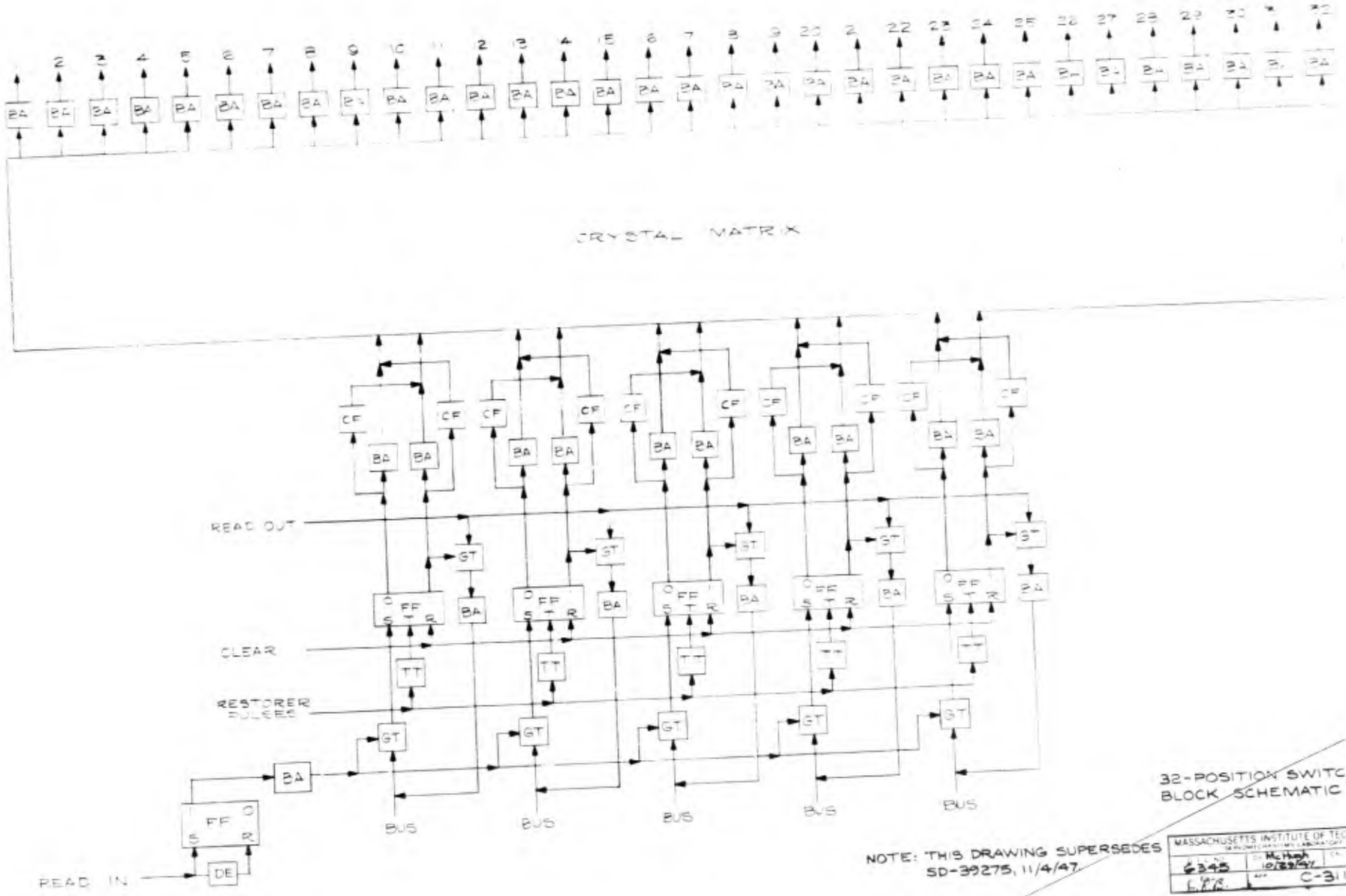


ENERAL ARRANGEMENT

6345

F.Z. WOLSKY
10/29/47

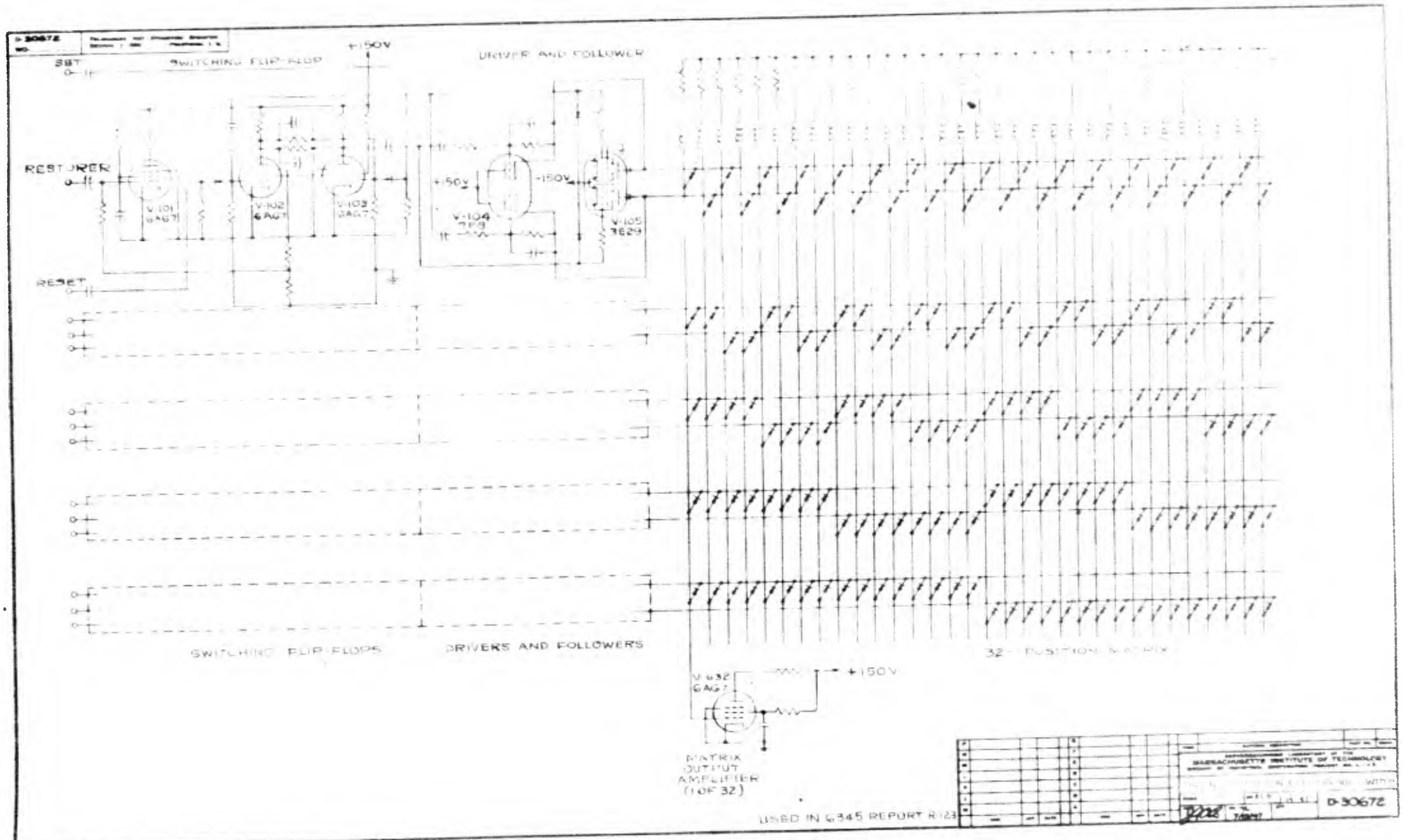
B-31150



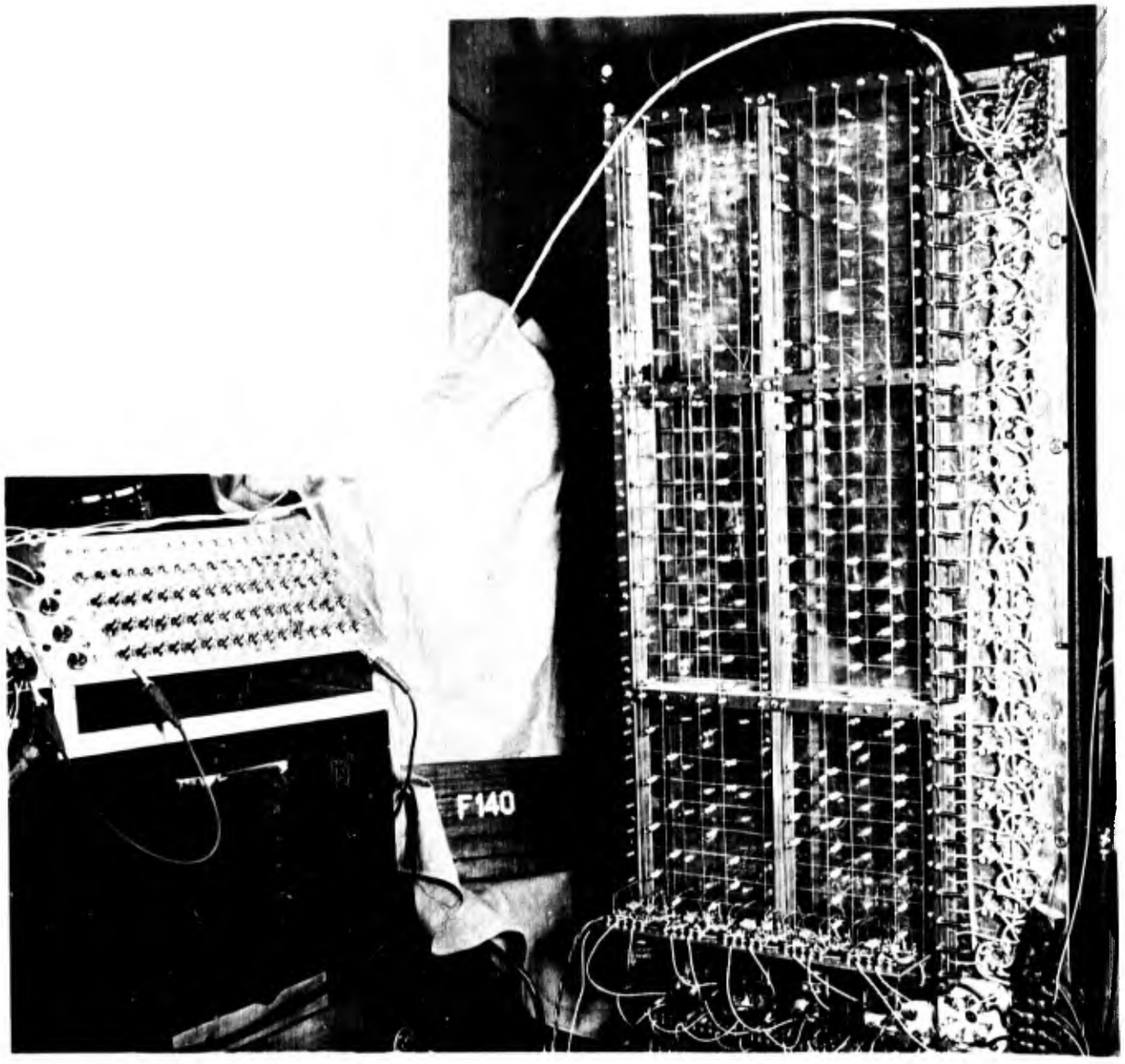
32-POSITION SWITCH
BLOCK SCHEMATIC

NOTE: THIS DRAWING SUPERSEDES SD-39275, 11/4/47

MASSACHUSETTS INSTITUTE OF TECHNOLOGY		
6345	Hc Hugh 10/22/47	
L.W.R.	APP.	C-31152


SET
SWITCHING FLIP-FLOP
+150V
DRIVER AND FOLLOWER
RESTORER
RESET
V-101 6AG7
V-102 6AG7
V-103 6AG7
+150V
-150V
V-104 7F8
V-105 3629
SWITCHING FLIP-FLOPS
DRIVERS AND FOLLOWERS
32 - POSITION MATRIX
V-632 6AG7
+150V
MATRIX OUTPUT AMPLIFIER (1 OF 32)
USED IN 6345 REPORT R-123
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
D-30672

MASSACHUSETTS INSTITUTE OF TECHNOLOGY SERVOMECHANISMS LABORATORY		
D. I. C. NO. 6345	DR.	CK.
ENG. J.A.O'B	APP.	A-30694

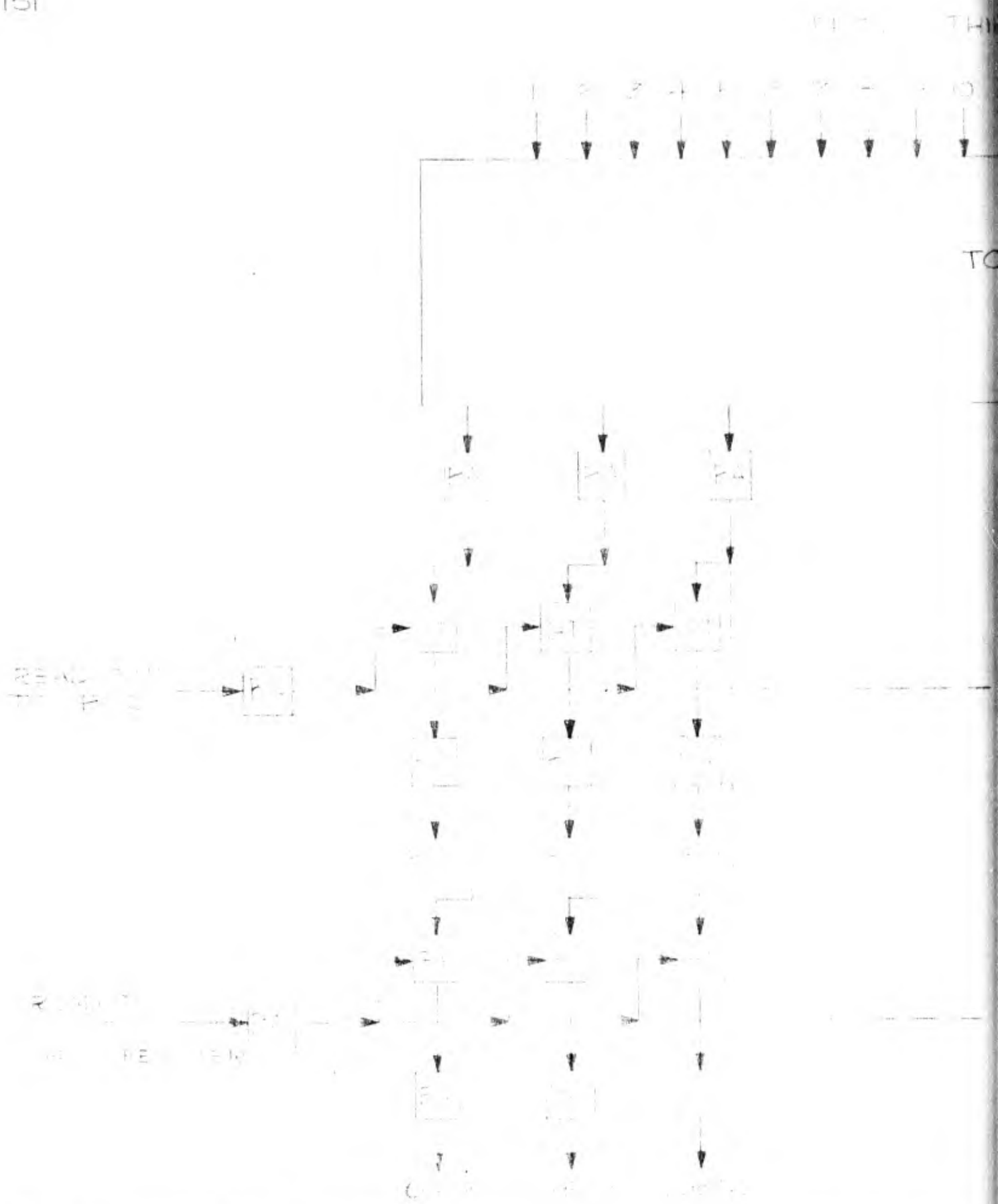


CRYSTAL MATRIX AND TOGGLE SWITCH STORAGE
USED IN THE 32 POSITION SWITCH

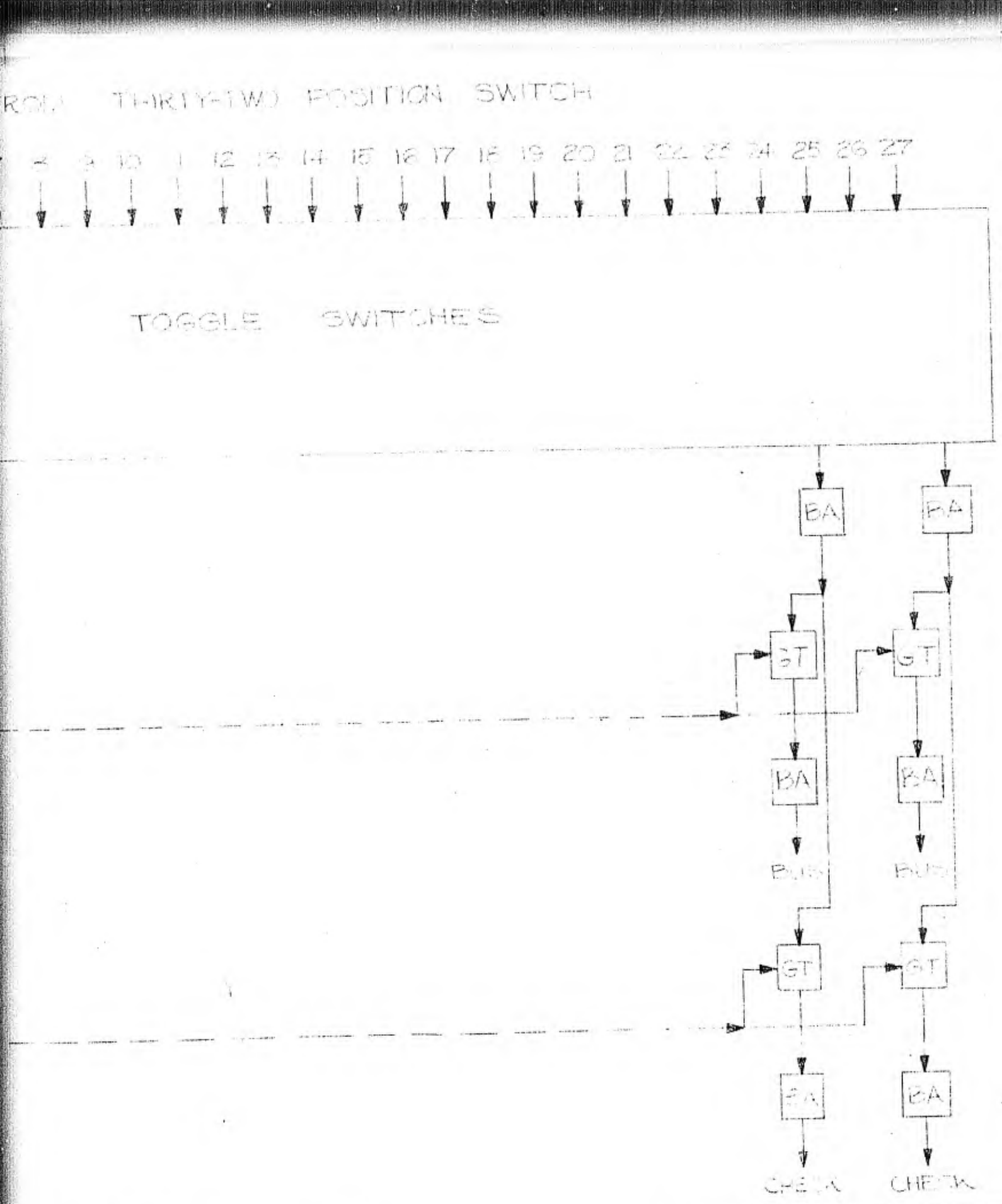
A-30694

USED IN 6345 REPORT R-[illegible]3

3-31151



NOTE: THIS DRAWING SUPERSEDES
SD-39276, 11/4/47.

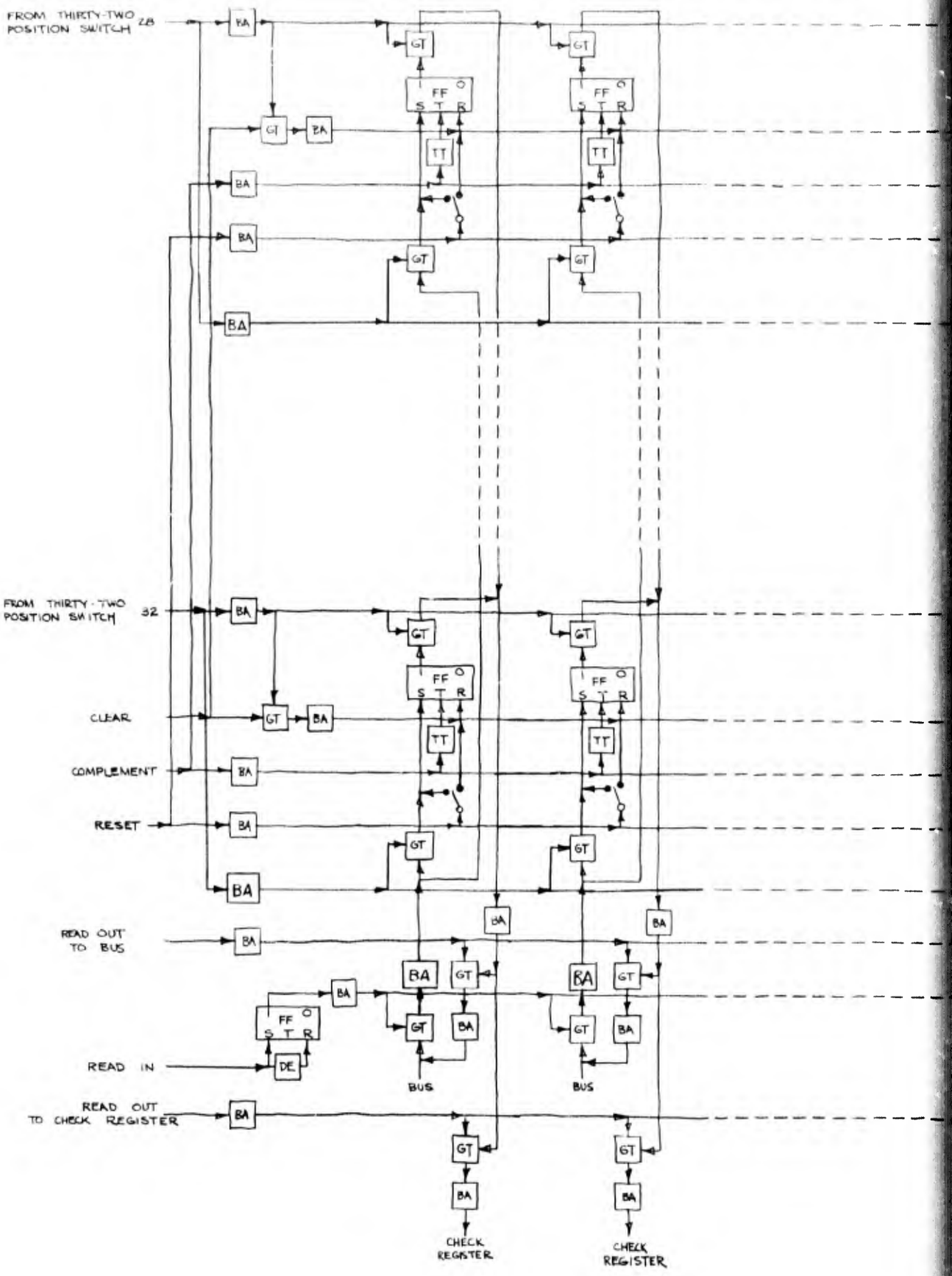


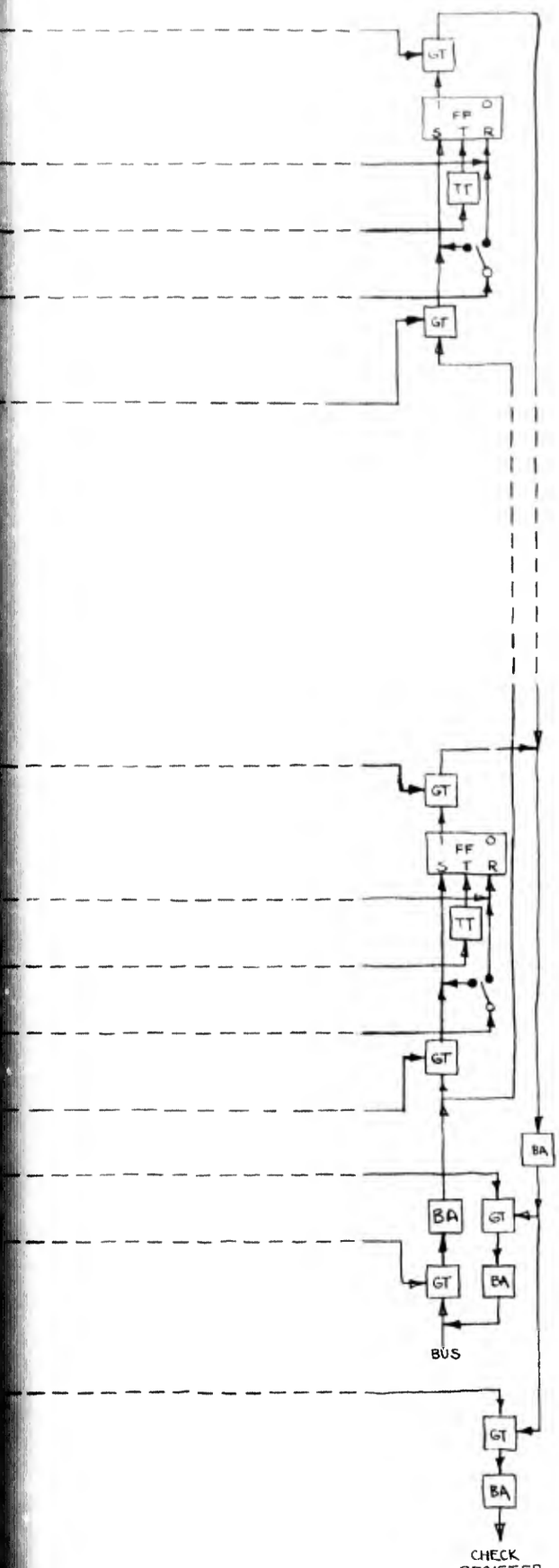
TOGGLE-SWITCH STORAGE
BLOCK SCHEMATIC

6345	McHugh 10/30/47
S.R.B.	B-31.151

2

SD-39278-1

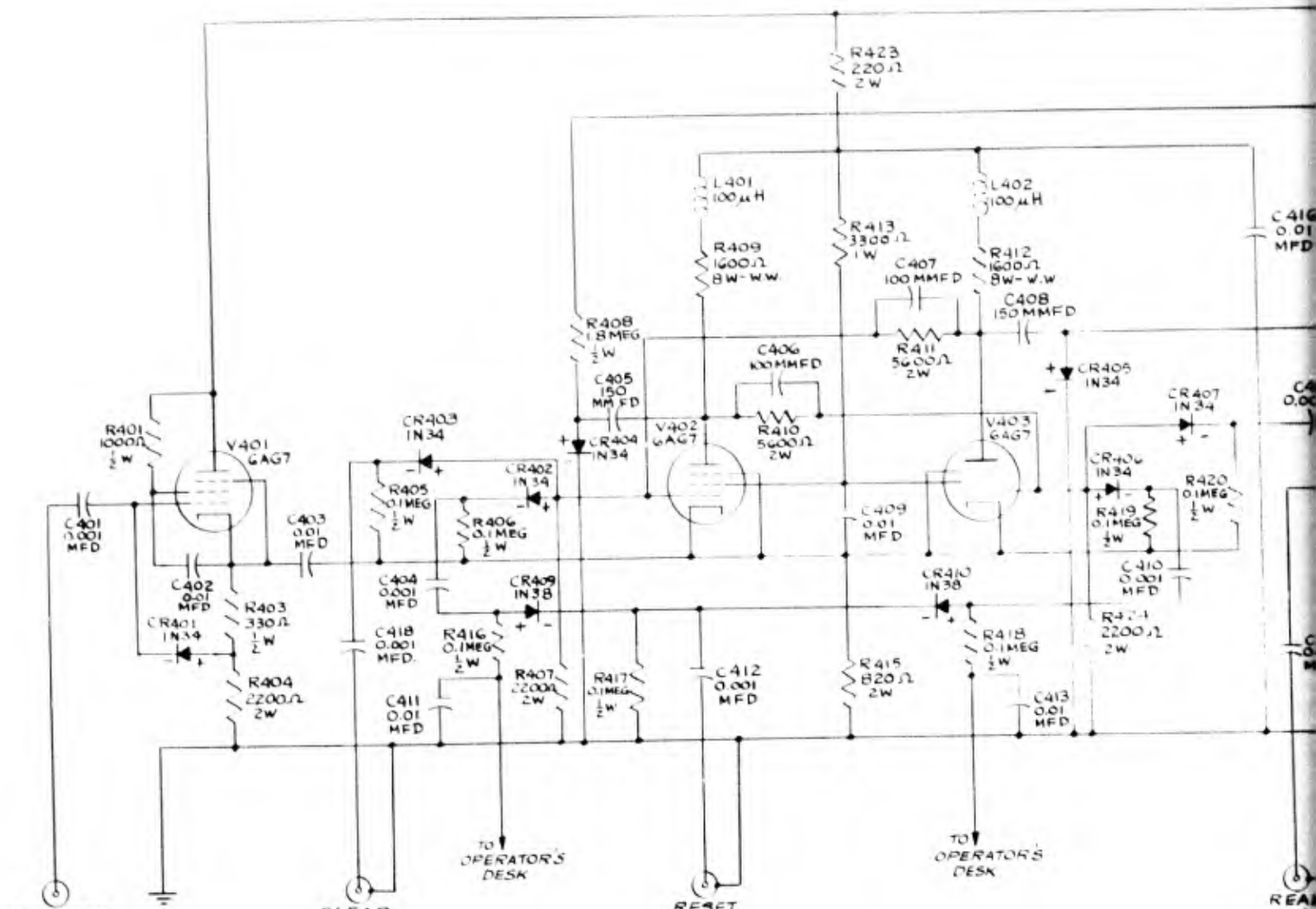

FROM THIRTY-TWO POSITION SWITCH 28
FROM THIRTY-TWO POSITION SWITCH 32
CLEAR
COMPLEMENT
RESET
READ OUT TO BUS
READ IN
READ OUT TO CHECK REGISTER
BA
GT
FF
S T R
TT
DE
BUS
BUS
CHECK REGISTER
CHECK REGISTER

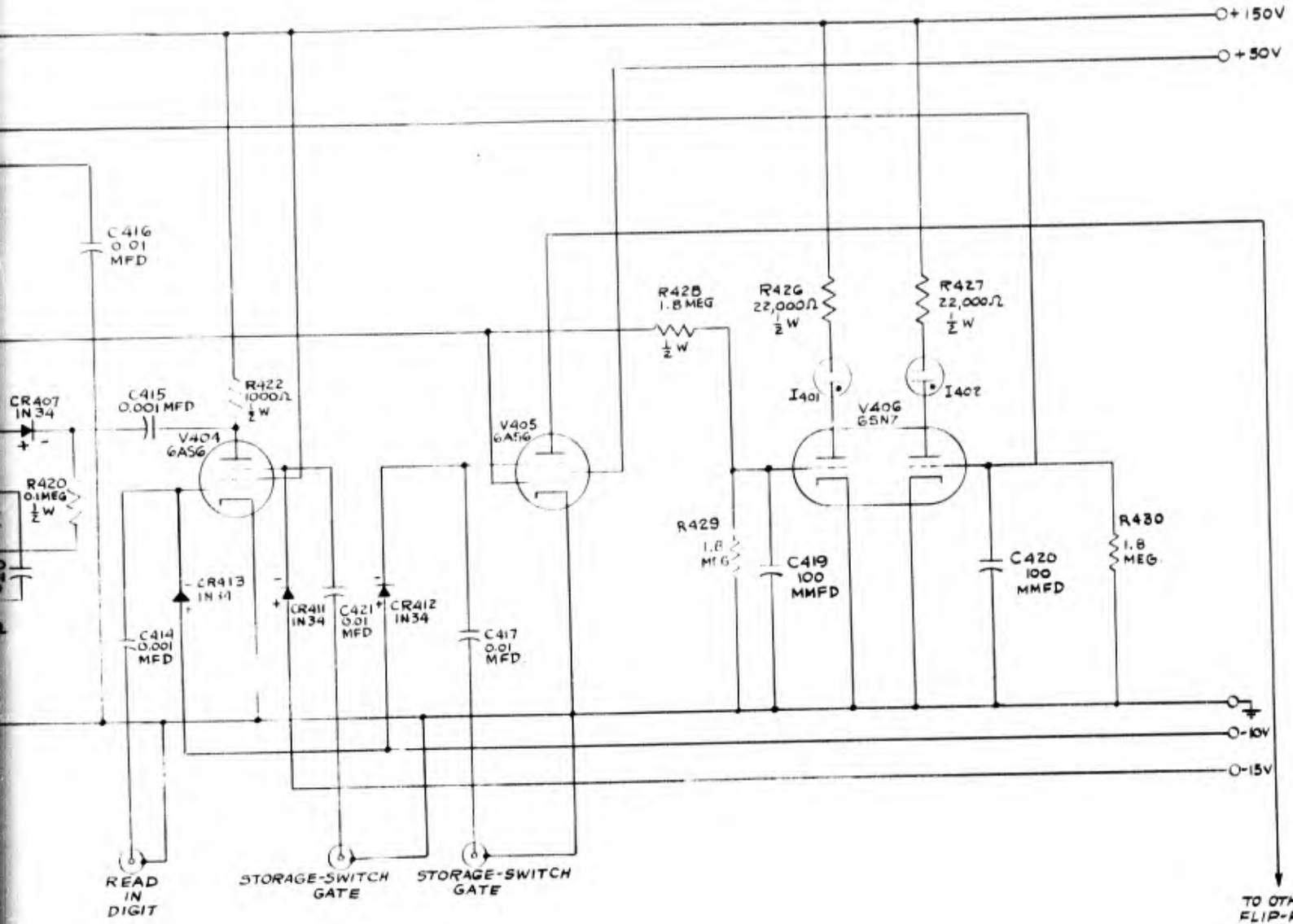


FLIP-FLOP STORAGE
BLOCK SCHEMATIC

D.R.B. JUNE 27, 1947

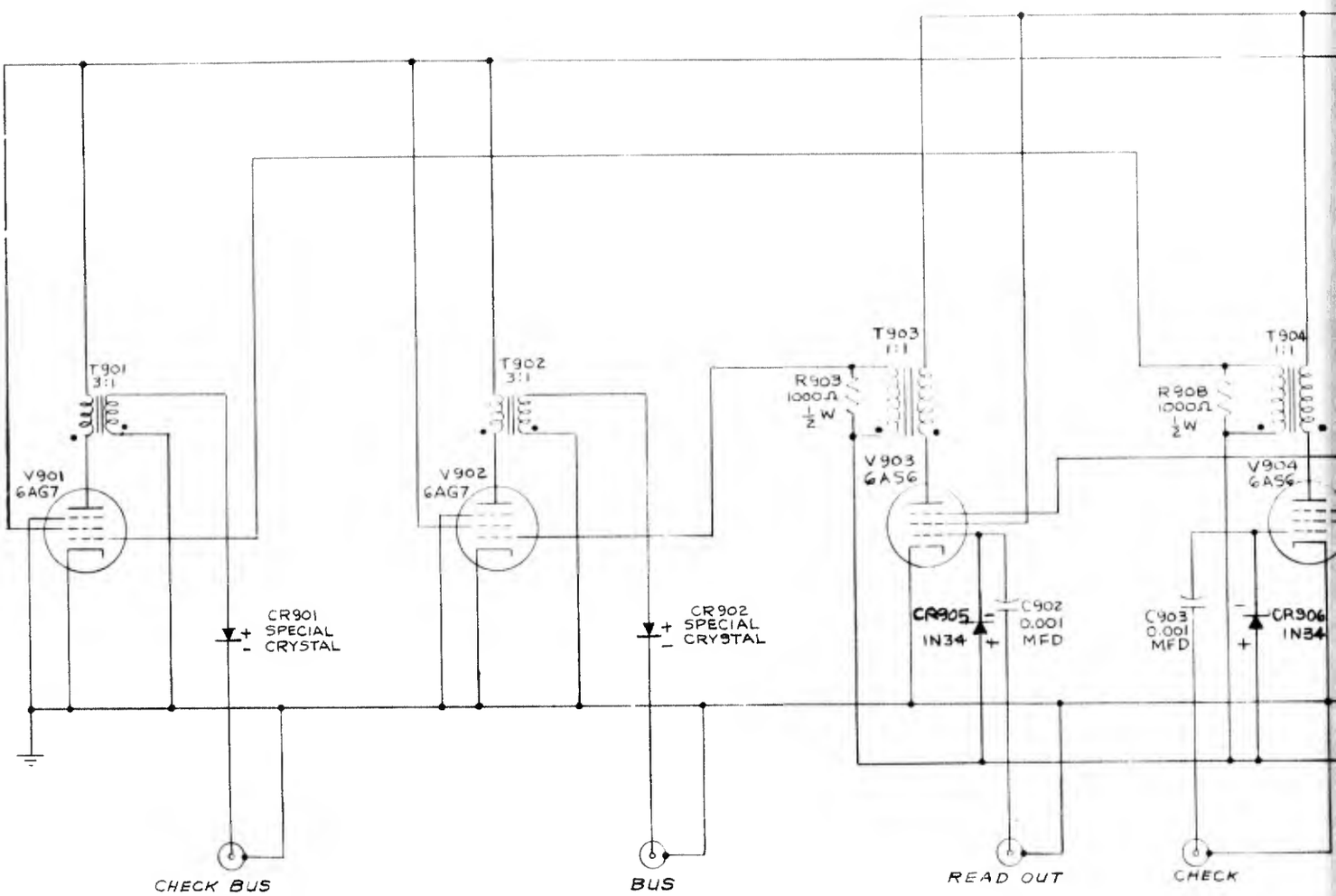
DRB
6/27/47
DRB SD-3927A-1

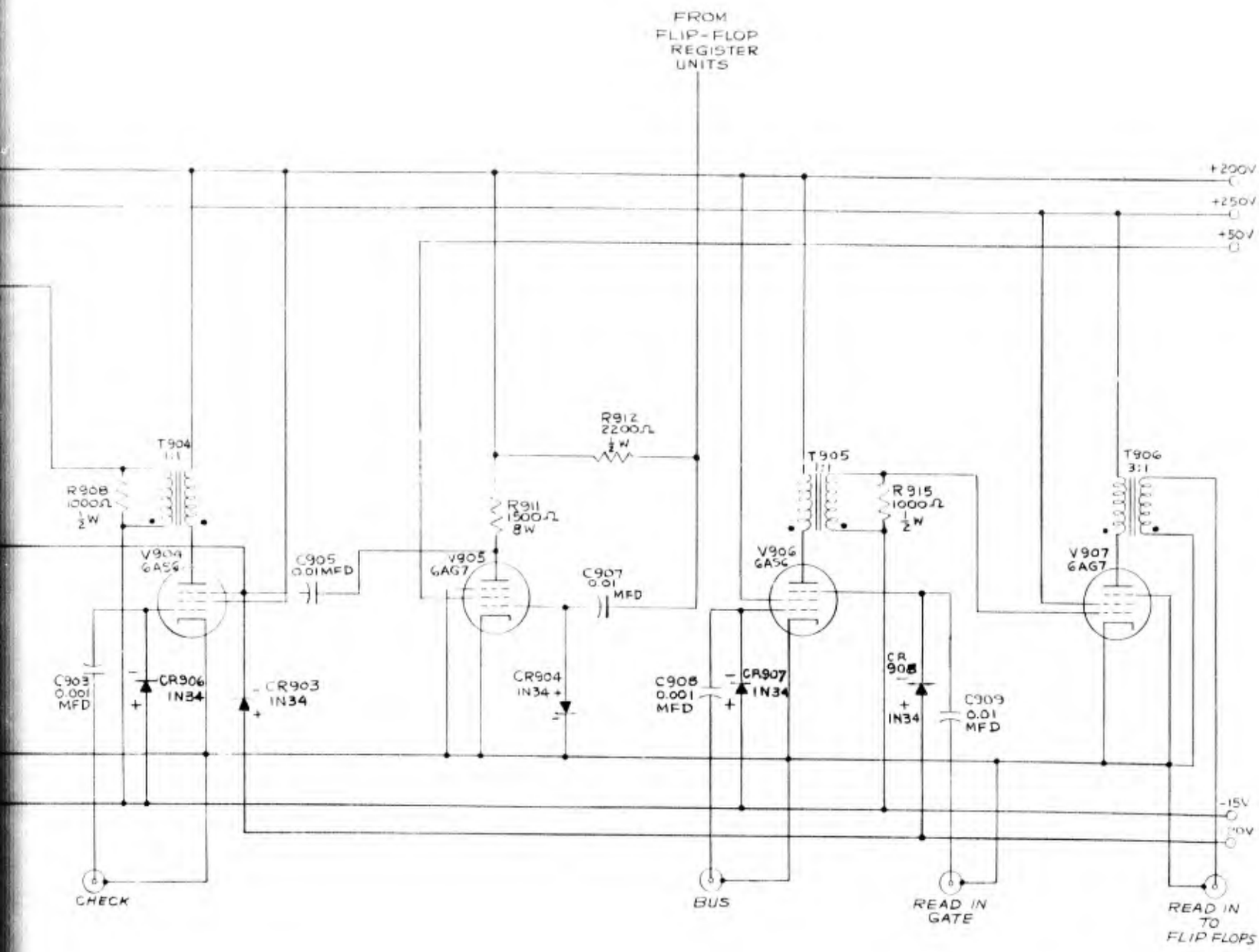

R423
220Ω
2W
L401
100μH
L402
100μH
R409
1600Ω
8W-WW
R413
3300Ω
1W
R412
1600Ω
8W-WW
C407
100 MMFD
C408
150 MMFD
R408
1.8MEG
½W
C406
100MMFD
R411
5600Ω
2W
CR405
IN34
C405
150
MMFD
CR403
IN34
V401
6AG7
V402
6AG7
V403
6AG7
CR407
IN34
R401
1000Ω
½W
CR404
IN34
R410
5600Ω
2W
CR402
IN34
CR406
IN34
R405
0.1MEG
½W
R420
0.1MEG
½W
R406
0.1MEG
½W
R419
0.1MEG
½W
C401
0.001
MFD
C403
0.01
MFD
C409
0.01
MFD
C404
0.001
MFD
CR409
IN38
C410
0.001
MFD
CR410
IN38
C402
0.01
MFD
R403
330Ω
½W
R424
2200Ω
2W
CR401
IN34
C418
0.001
MFD.
R416
0.1MEG
½W
R418
0.1MEG
½W
R404
2200Ω
2W
R407
2200Ω
2W
R417
0.1MEG
½W
C412
0.001
MFD
R415
820Ω
2W
C411
0.01
MFD
C413
0.01
MFD
TO
OPERATOR'S
DESK
TO
OPERATOR'S
DESK
RESTORER
PULSES
CLEAR
RESET



FLIP-FLOP REGISTER
CIRCUIT SCHEMATIC

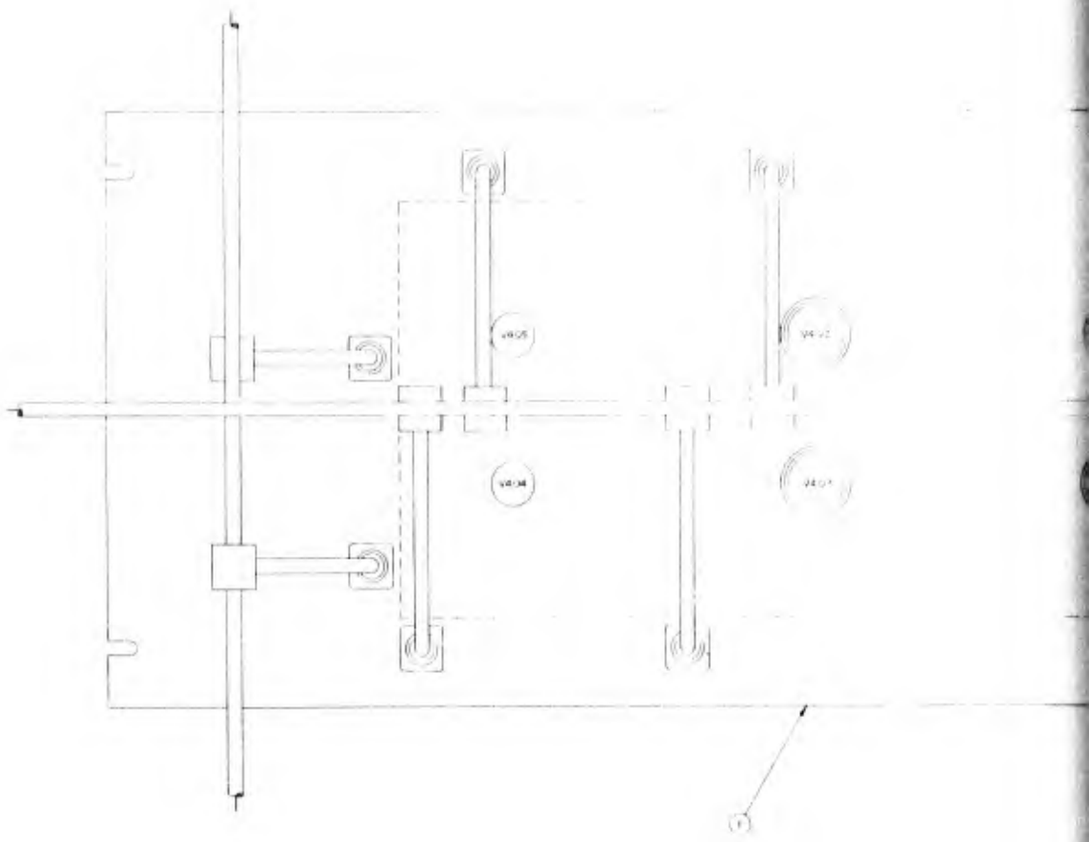
SD-39285-3

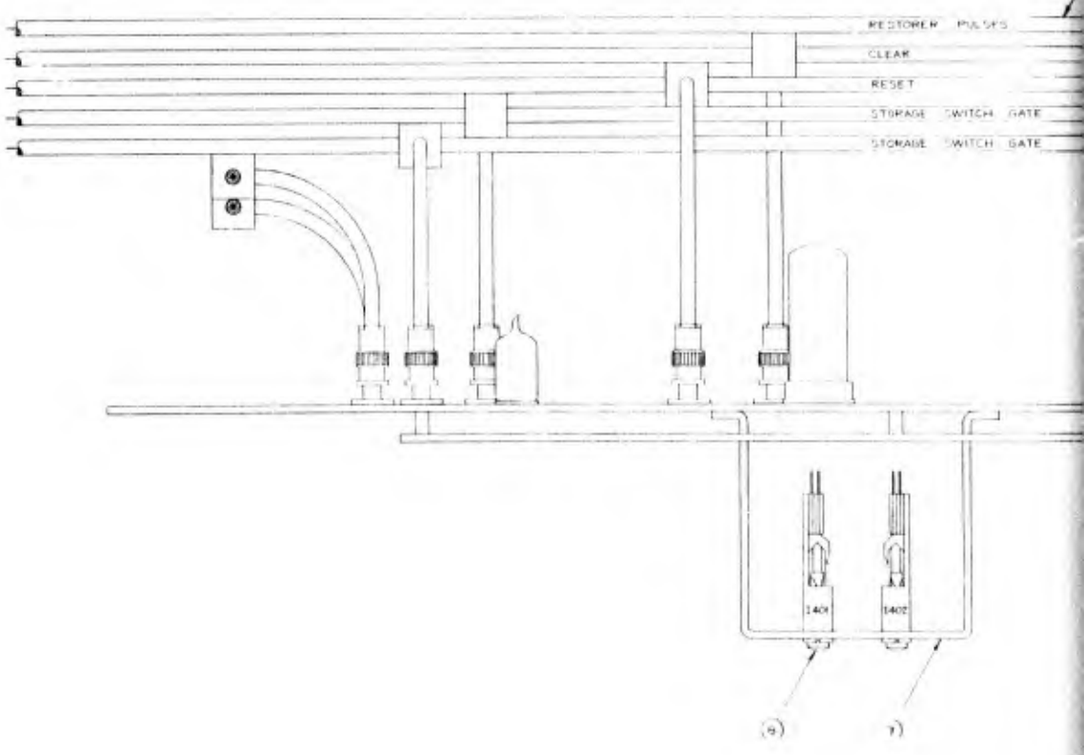

T901
3:1
V901
6AG7
T902
3:1
V902
6AG7
T903
1:1
R903
1000Ω
½W
V903
6AS6
T904
1:1
R908
1000Ω
½W
V904
6AS6
CR901
SPECIAL
CRYSTAL
CR902
SPECIAL
CRYSTAL
CR905
IN34
C902
0.001
MFD
C903
0.001
MFD
CR906
IN34
CHECK BUS
BUS
READ OUT
CHECK

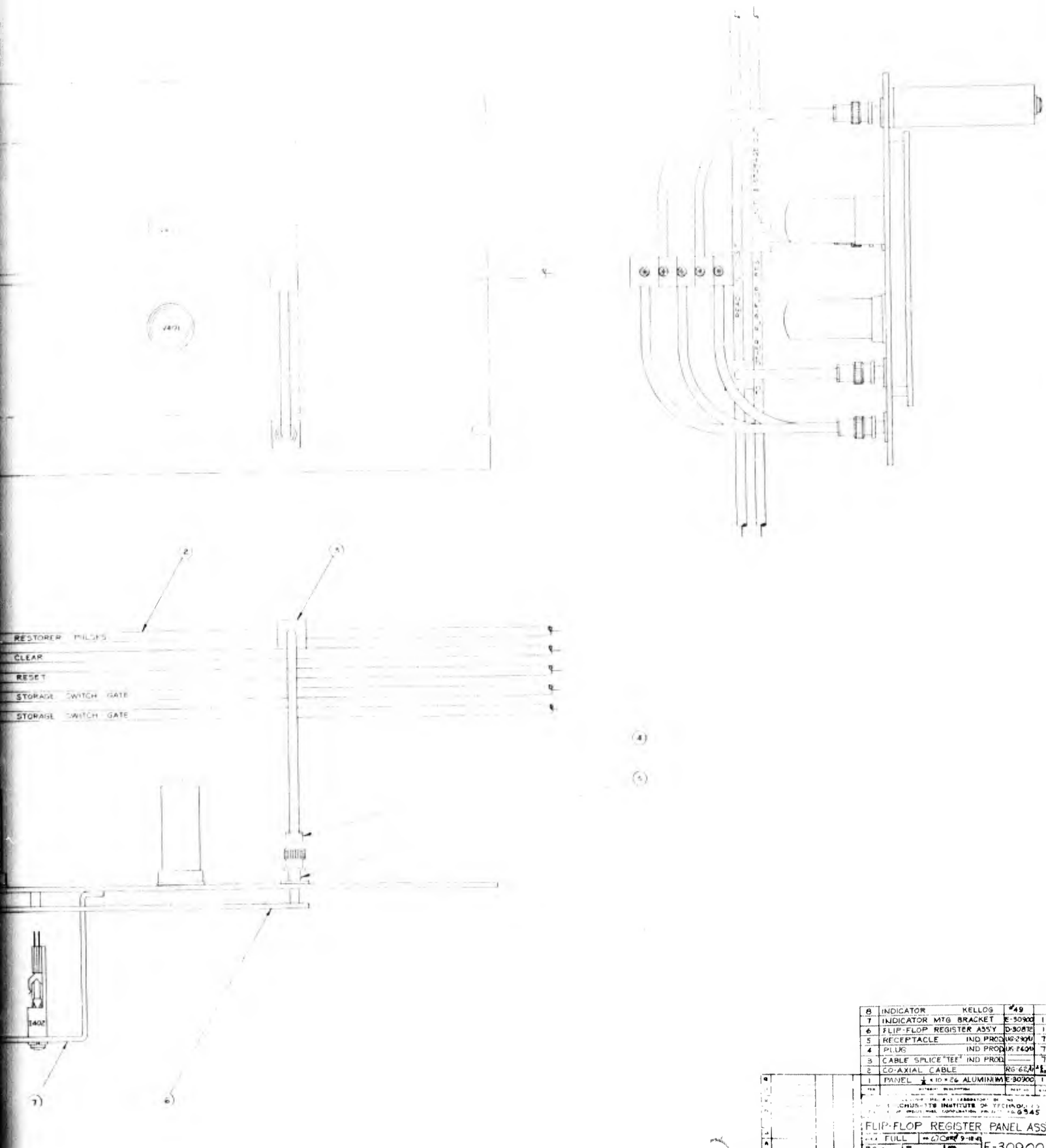


FLIP-FLOP STORAGE
OUTPUT CIRCUIT SCHEMATIC

SD-39786-3







8	INDICATOR	KELLOG	#49	1
7	INDICATOR MTG BRACKET		E-30900	1
6	FLIP-FLOP REGISTER ASSY		D-30832	1
5	RECEPTACLE	IND PROD	UG-290U	7
4	PLUG	IND PROD	UG-260U	7
3	CABLE SPLICE "TEE"	IND PROD	———	7
2	CO-AXIAL CABLE		RG-62A/U	As Req'd
1	PANEL ⅛ × 10 × 26 ALUMINUM		E-30900	1

M.I.T. DIGITAL COMPUTER LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS

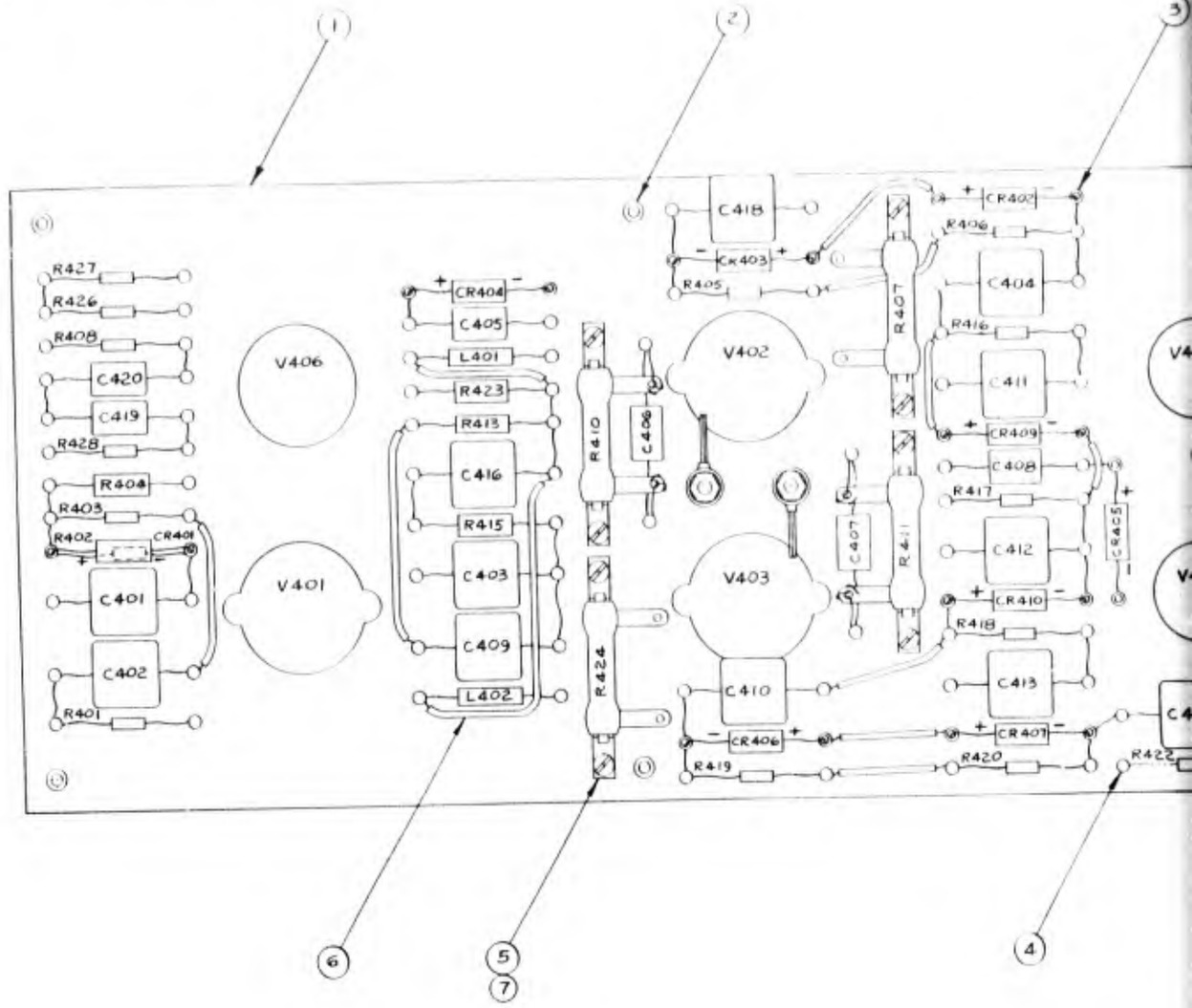
FLIP-FLOP REGISTER PANEL ASSY

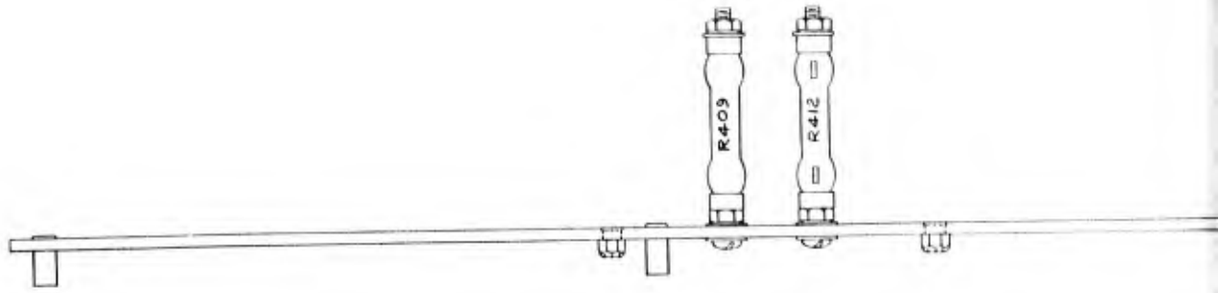
SIZE: FULL | SCALE: 9-18-49 | DWG. NO. E-30900

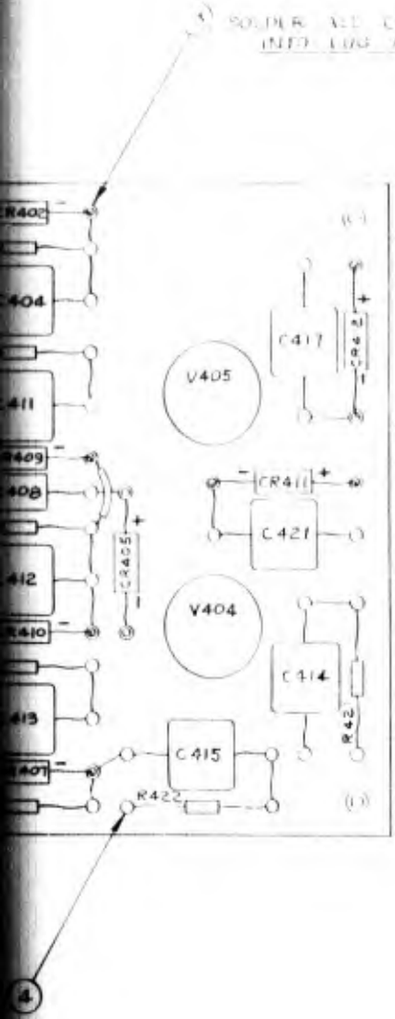
D. 30872
WO.

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y SD-39285







NOTES

1. R407, R410, R411, & R424 ARE AS IDENTIFIED ON SD-39285 EXCEPT THAT RATING IS INCREASED TO 8 WATTS.
2. V401, V402, V403, V404, V405, & V406 ARE NOT PARTS OF THIS ASS'Y & ARE INDICATED FOR REFERENCE USE ONLY.

ITEM	MATERIAL - DESCRIPTION		PART NO.	QUAN.
7	CLINCH NUT	ELASTIC STOP NUT CORP	#22C5-62	8
6	CAMBRIC SLEEVING		———	AS REQ'D
5	RESISTOR MTG FOR 116B RESISTOR	I.T.E.	———	8
4	TURRET LUG SINGLE	C.T.C.	#1724D	86
3	TURRET LUG HOLLOW	C.T.C.	#1558D	22
2	MOUNTING POST	C.T.C.	#1246D	6
1	RESISTOR BOARD		D-30872	1

P				Q			
N				F			
M				E			
L				D			
K				C			
J				B			
H				A			
	WAS	APP.	DATE		WAS	APP.	DATE

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

FLIP-FLOP REGISTER ASS'Y

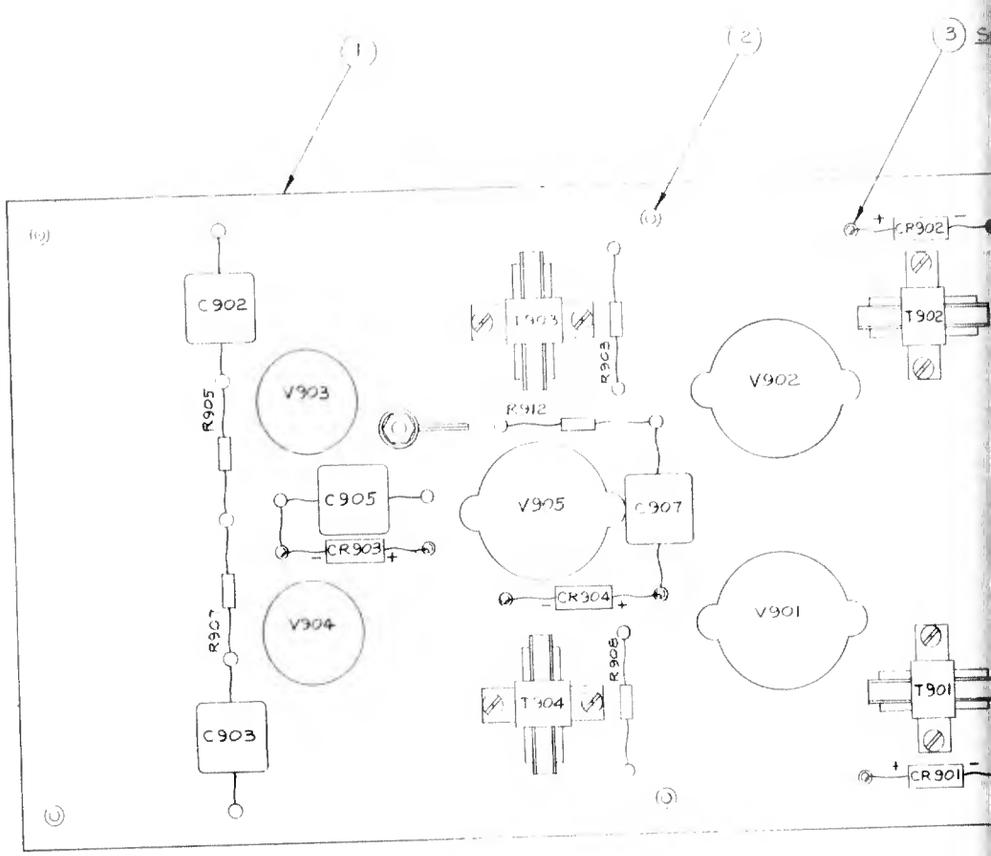
SCALE: FULL | DR WDC 9-6-47 | TR. DRB | CK. | APP.

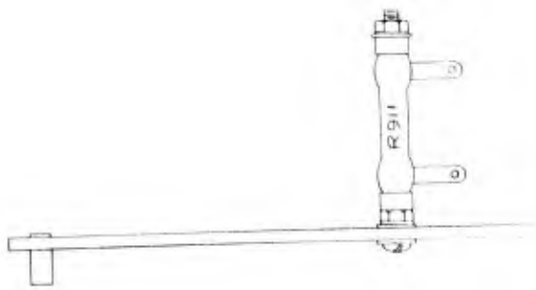
D-30872

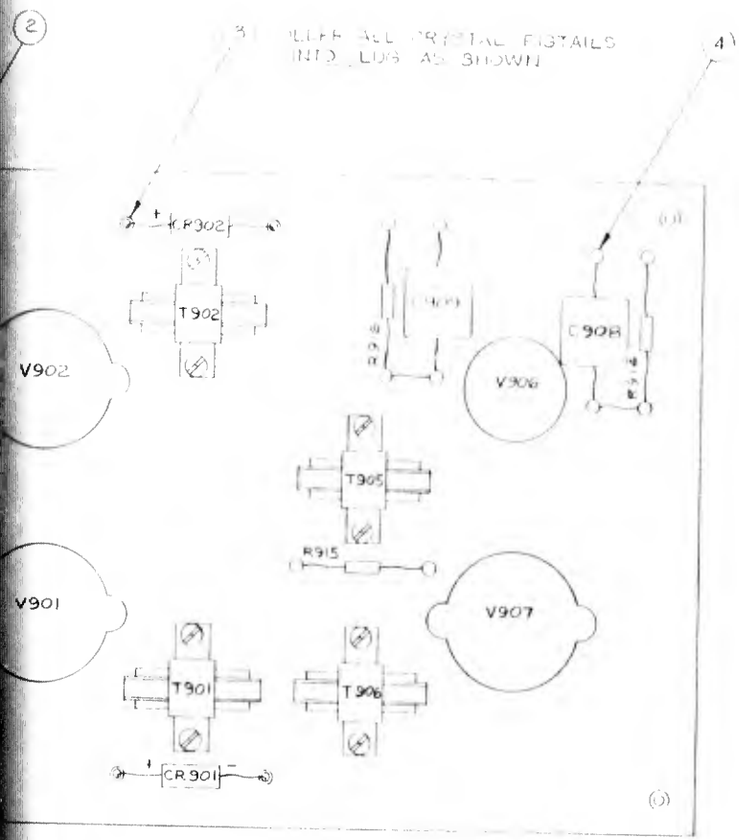
D- 30879
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y SD-39286







NOTE - V901, V902, V903, V904, V905, V906 & V907 ARE NOT PARTS OF THIS ASS'Y & ARE INDICATED FOR REFERENCE USE ONLY.

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
5	CLINCH NUT ELASTIC STOP NUT CORP	#22C5-62	12
4	TURRET LUG SINGLE CTC	#1724D	23
3	TURRET LUG HOLLOW CTC	#1558D	8
2	MOUNTING POST CTC	#1246D	6
1	RESISTOR BOARD	D-30879	1

	WAS	APP.	DATE		WAS	APP.	DATE
P				G			
N				F			
M				E			
L				D			
K				C			
J				B			
H				A			

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

FLIP-FLOP STORAGE OUTPUT ASS'Y.

SCALE: FULL | DR W. Cook 9-11-47 | TR. DRB | CH. | APP.

D-30879

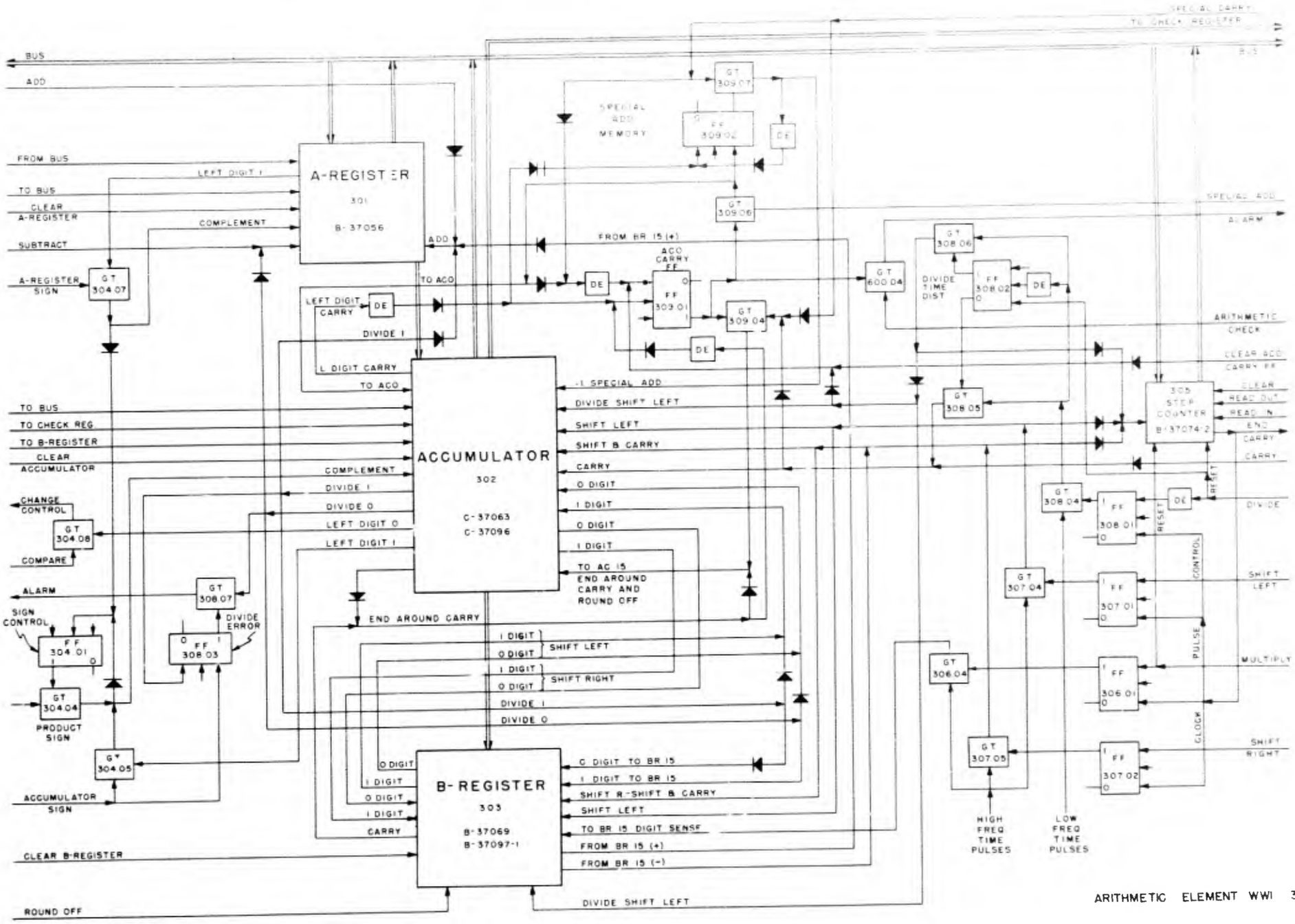
ARITHMETIC ELEMENT DRAWING LIST

(Block Diagram Reference 300)

300	Arithmetic Element, Whirlwind I	C-37072
	5-digit Multiplier, Photograph	PB-265
	Multiplier Digit, Photograph	PB-267
	Circuit Schematic	D-30369
201	A Register	SD-39335
303	B Register	SD-39333
306	Multiplier Control	
	Photograph	PB-231
	Photograph	PB-232
	Block Schematic	C-30906
	Circuit Schematic	SD-39318
	Power Control	SB-39320
	Power Control	SB-39334
300	Multiplier Assembly and Details	B-37511 D-37512 D-37513 D-37514 D-37515 D-37516 D-37517 D-37518 C-37521 C-37522
300	Multiplier Color Code	A-30631

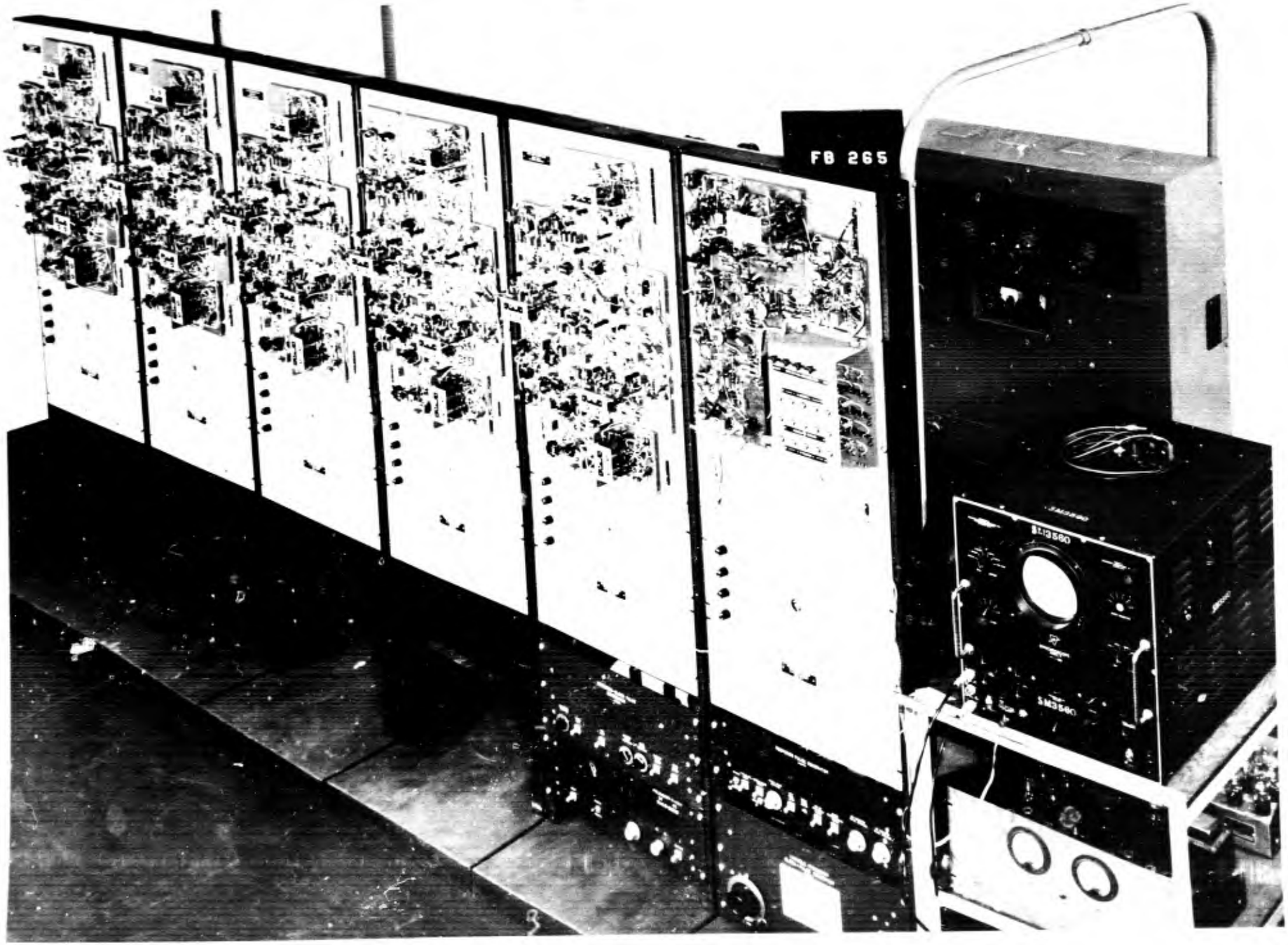
Arithmetic Element Drawing List (Continued)

300	Multiplier Cables	SA-39321 SA-39322 SB-39323 SB-39324 SB-39325 SB-39326 SB-39327
305	Step Counter	
	Photograph	FB-270
	Circuit Schematic	E-30884
	Panel Assembly	D-30878
	Sub Assemblies	D-30875 D-30849 C-30866 A-30865 A-30840 D-30847 C-30867 D-30848 C-30868

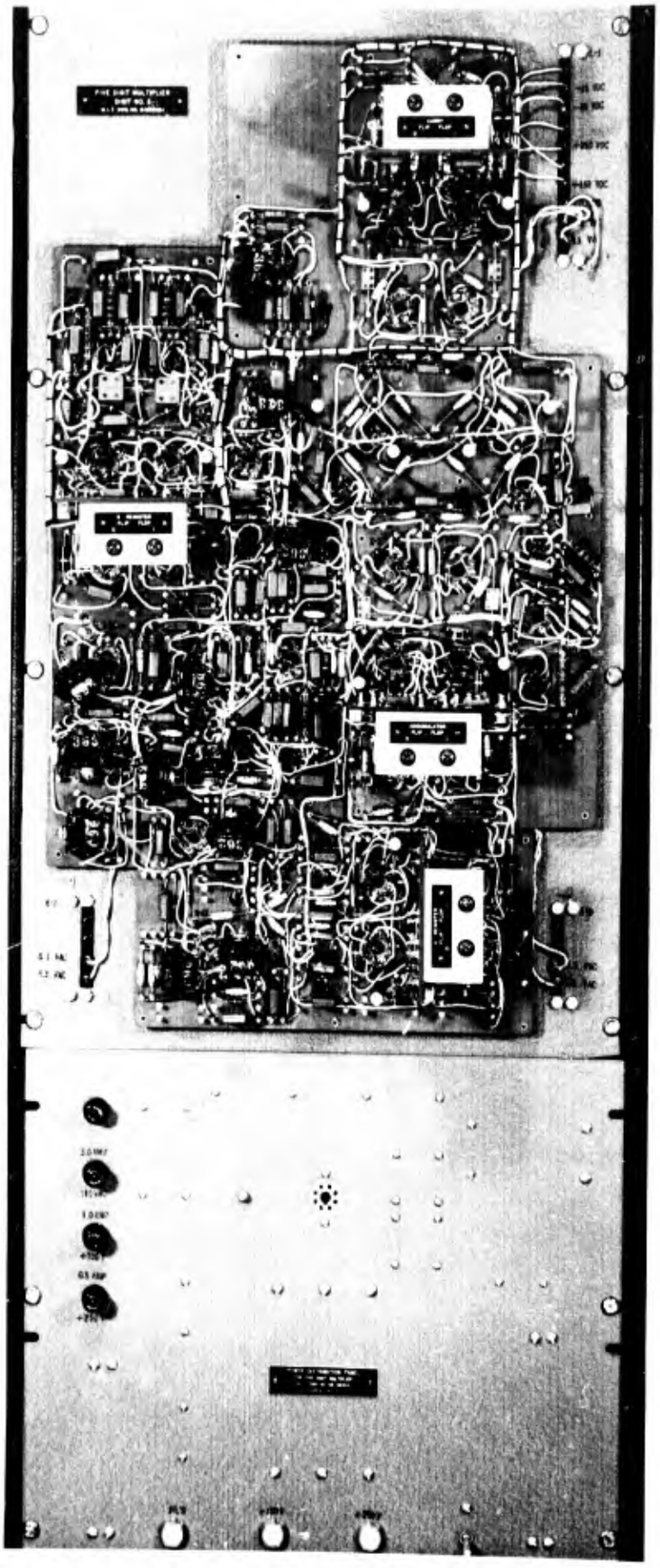


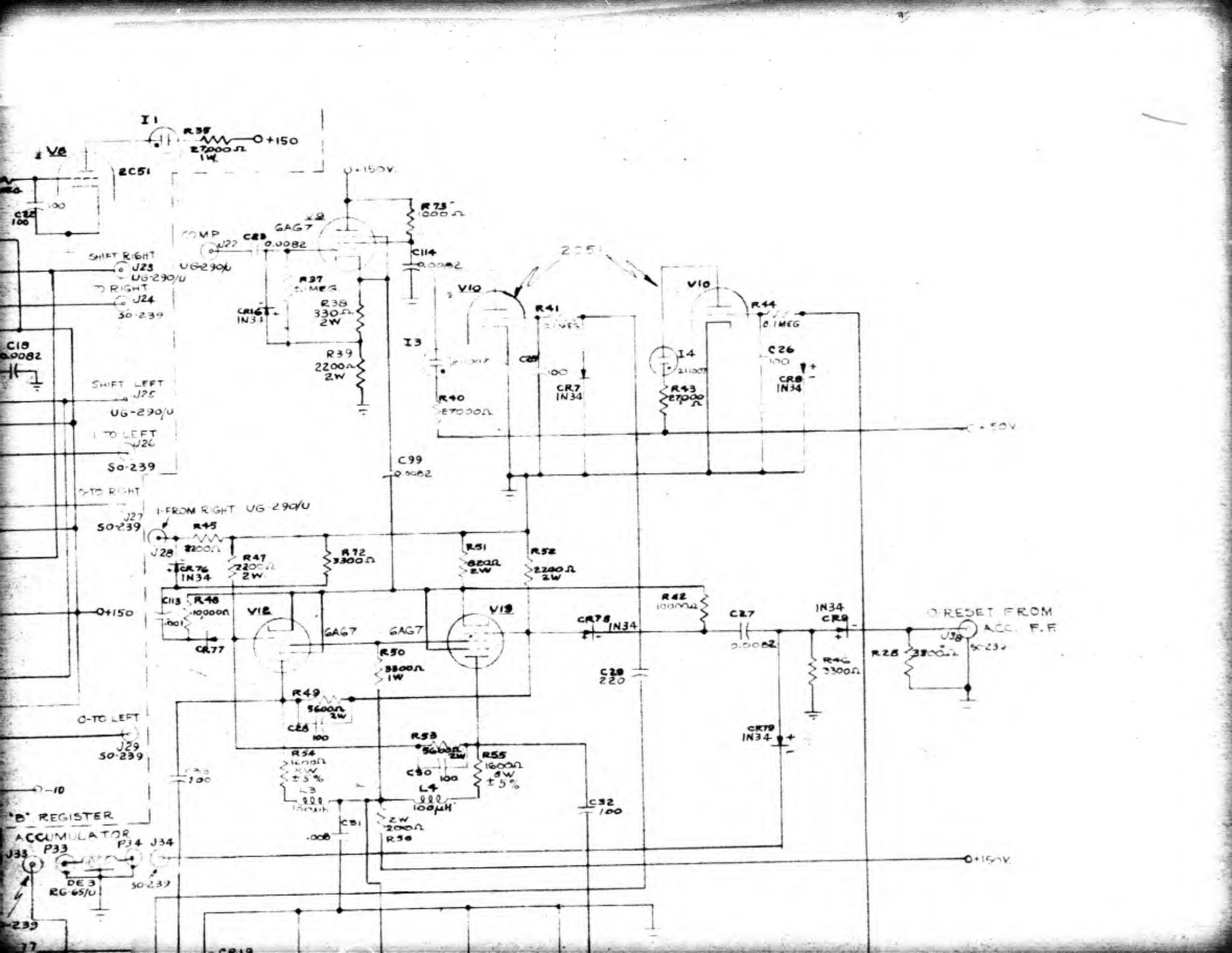
ARITHMETIC ELEMENT WWI 300

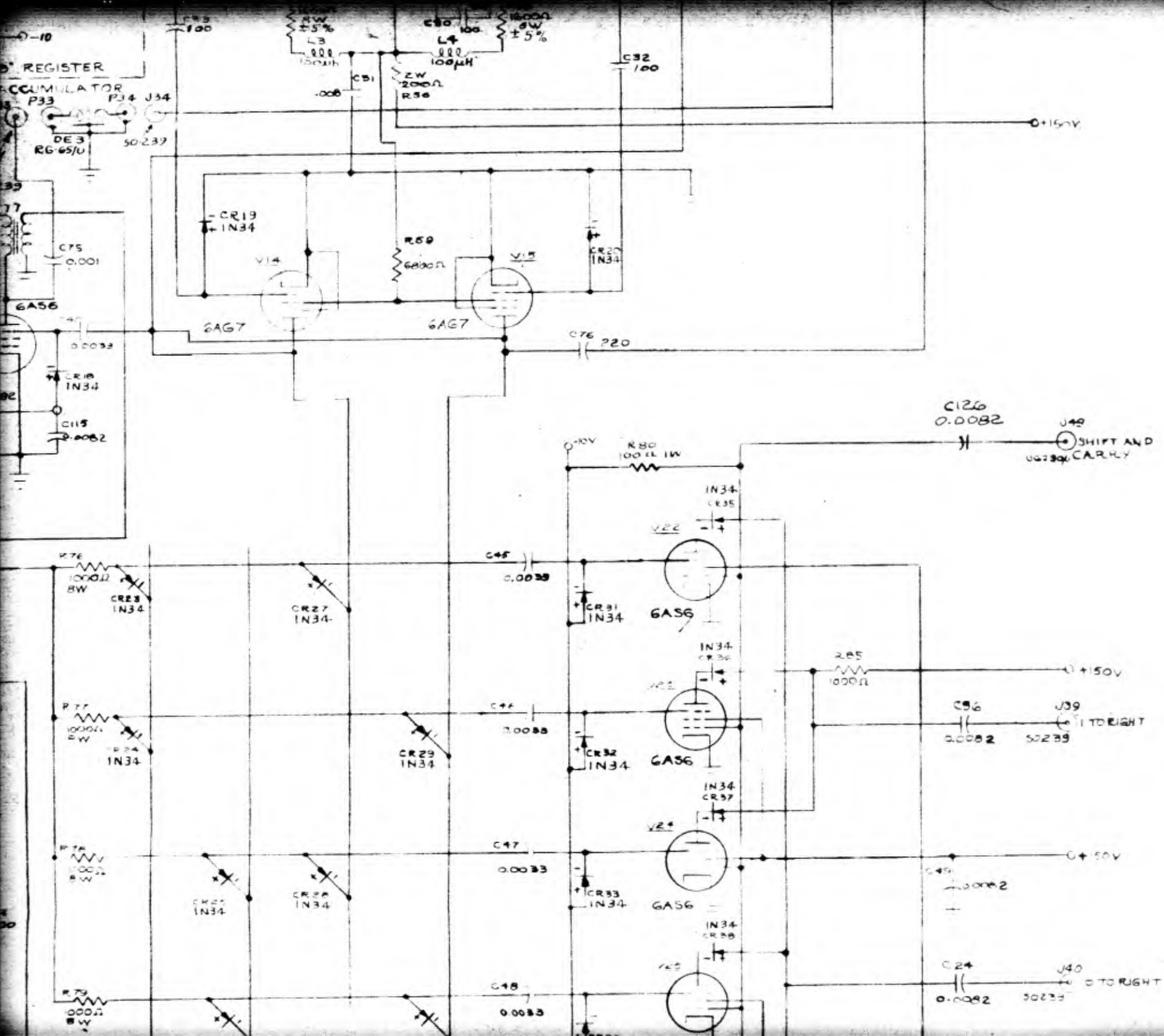
C-37072-3

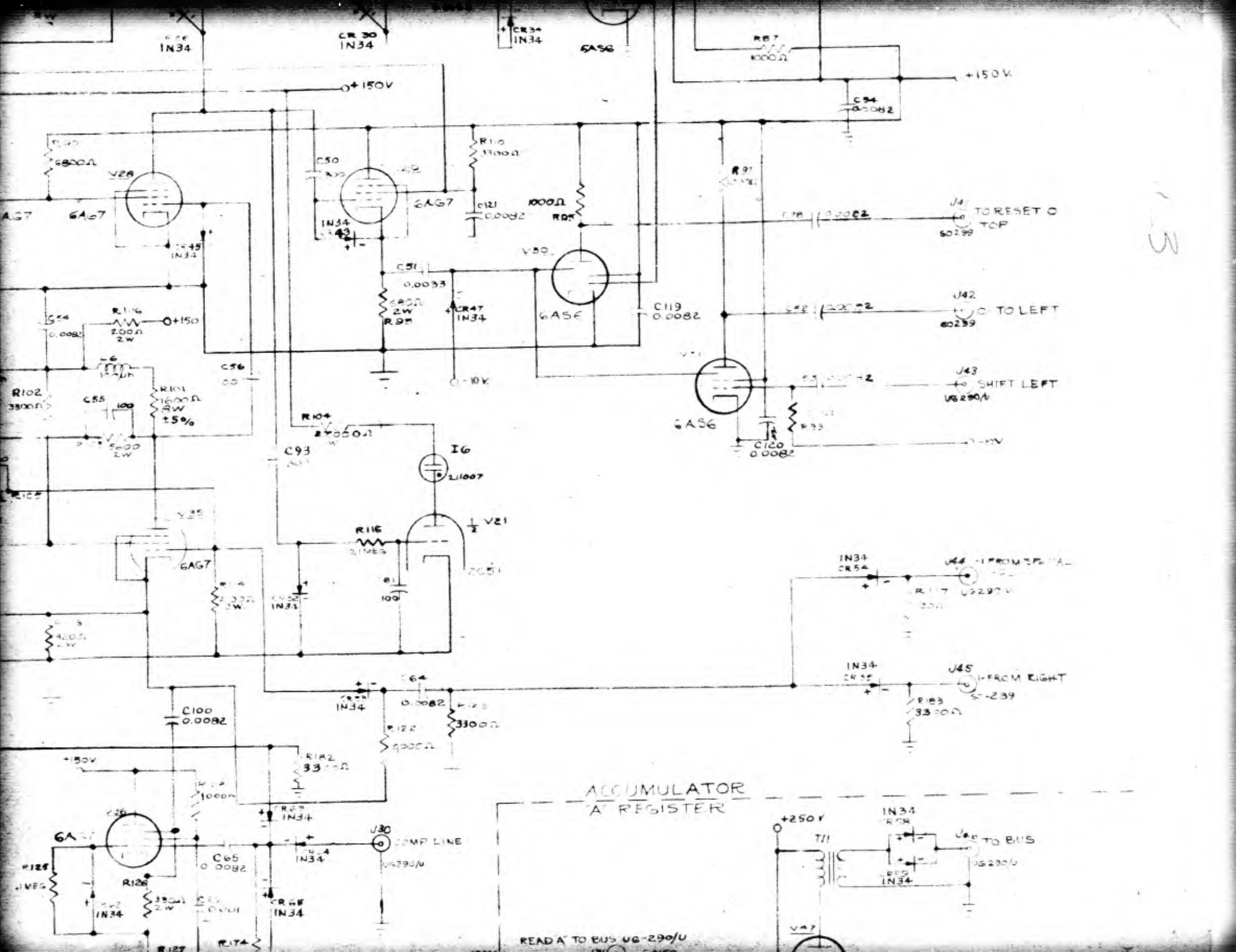

FB 265

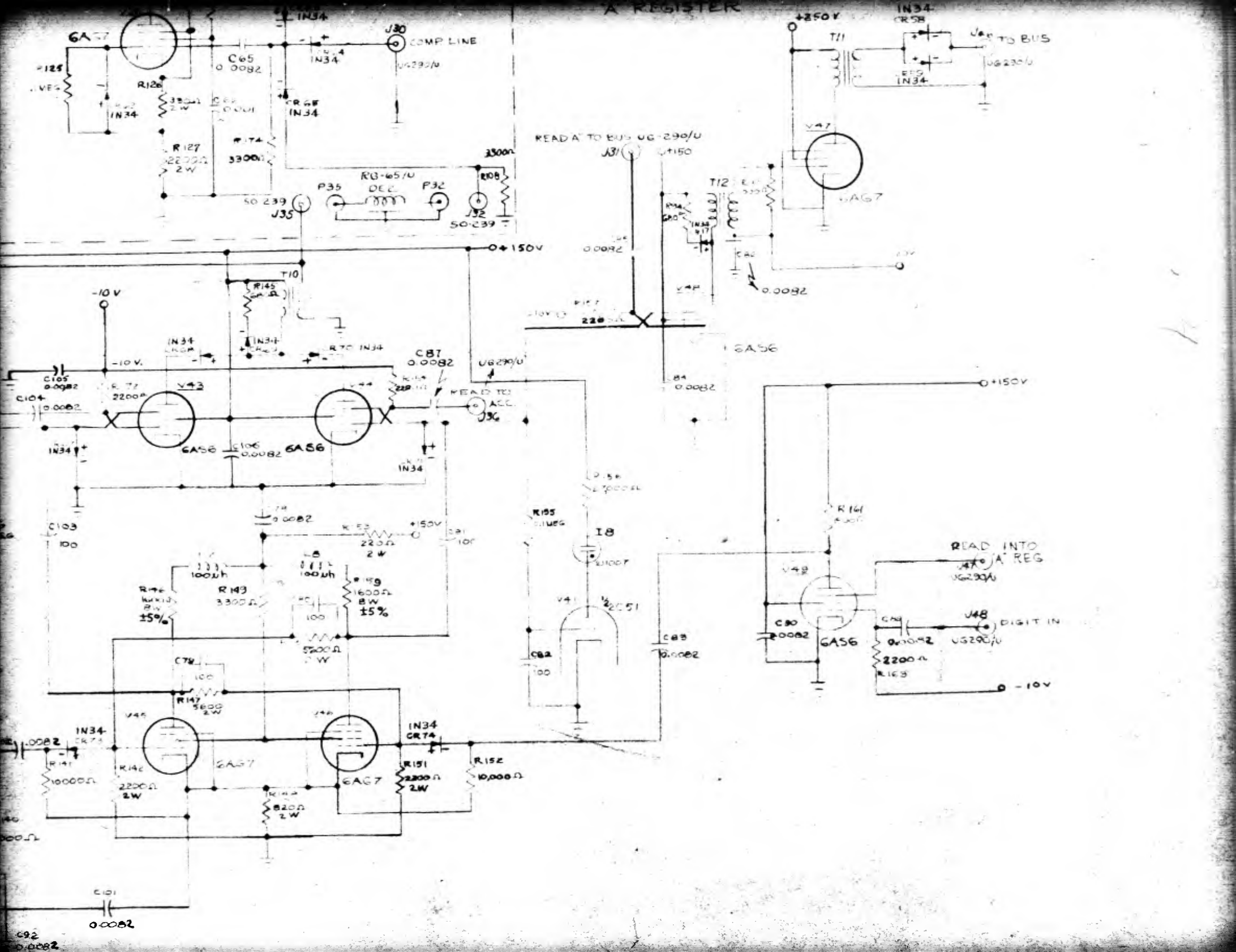
FB 267

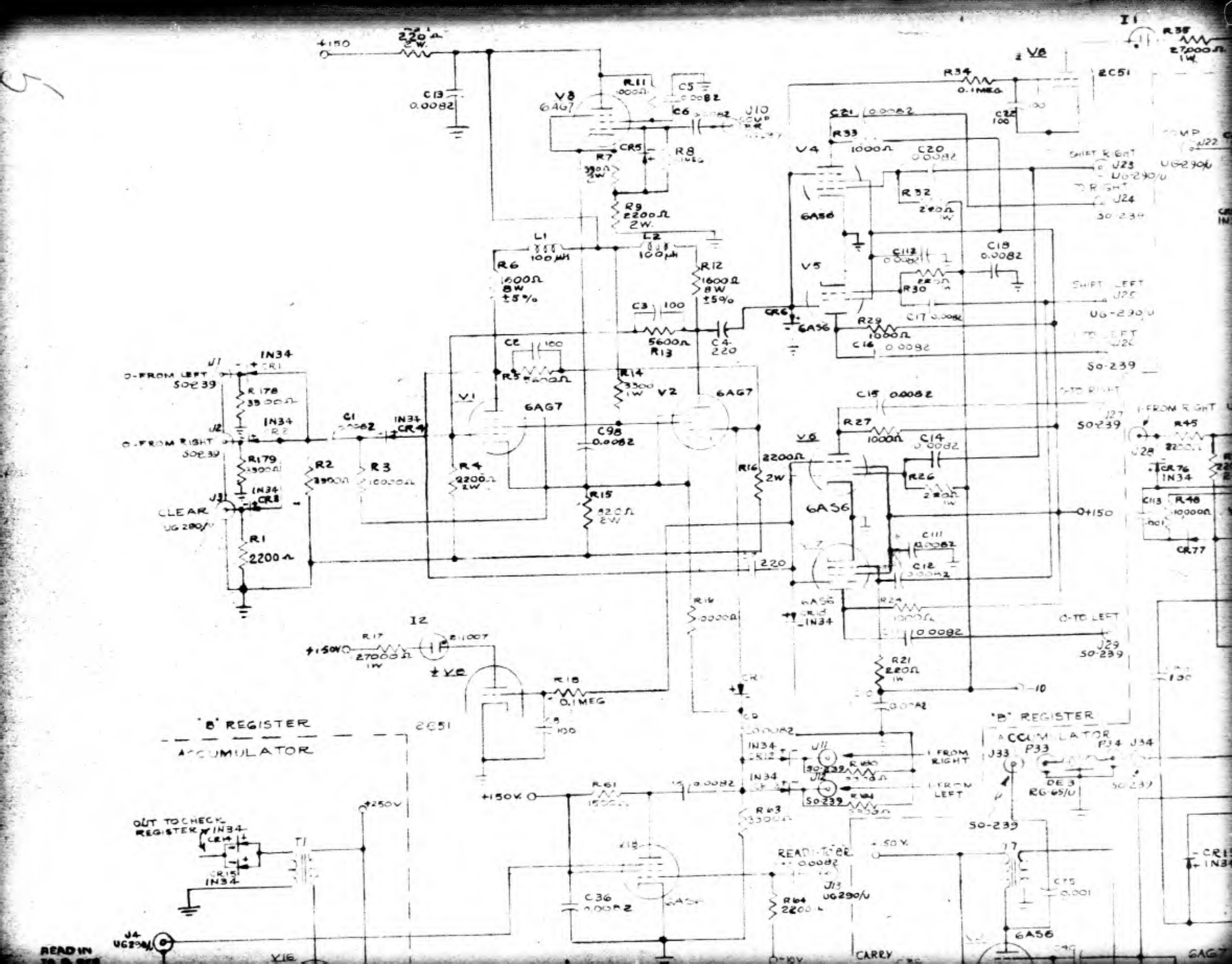


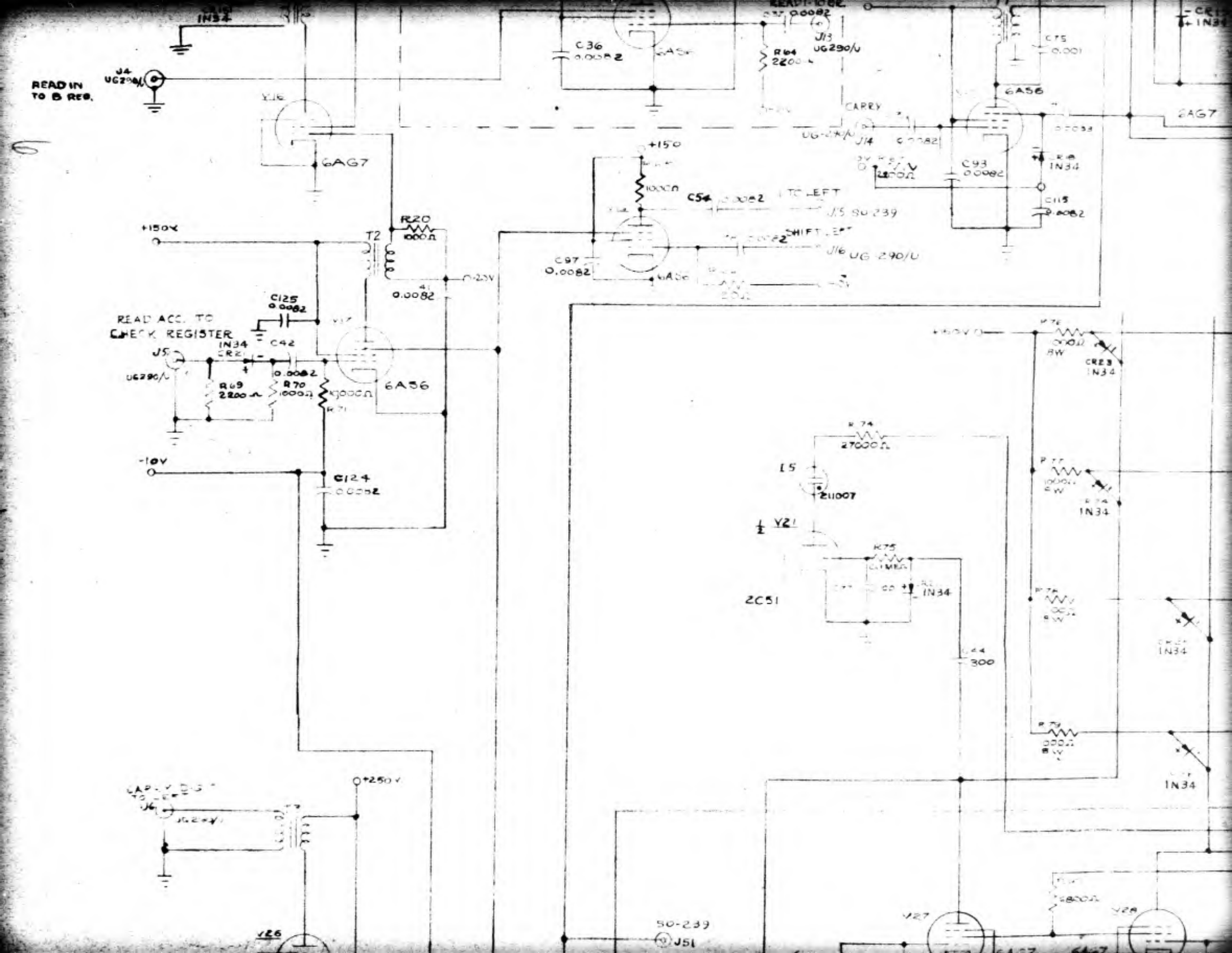

I1
R38
27000Ω 1W
+150
V8
2C51
C22
100
+150V
R73
1000Ω
GAG7
x2
COMP
J27
C23
0.0082
C114
0.0082
SHIFT RIGHT
J23
UG-290/U
TO RIGHT
J24
50-239
R37
1 MEG
R38
330Ω 2W
R39
2200Ω 2W
CR6
IN34
V10
R41
0.1MEG
I3
C25
100
CR7
IN34
R40
27000Ω
V10
R44
0.1MEG
I4
C26
100
CR8
IN34
R43
27000Ω
+150V
C18
0.0082
SHIFT LEFT
J25
UG-290/U
TO LEFT
J26
50-239
C99
0.0082
TO RIGHT
J27
50-239
FROM RIGHT UG-290/U
J28
R45
2200Ω
CR76
IN34
R47
2200Ω 2W
R72
3300Ω
R51
820Ω 2W
R52
2240Ω 2W
C113
.001
R48
100000Ω
CR77
V12
GAG7
V13
GAG7
R50
3300Ω 1W
CR78
IN34
R42
100000Ω
C27
0.0082
IN34
CR9
R46
3300Ω
R28
3300Ω
J38
50-239
RESET FROM ACC. F.F
C28
220
R49
5600Ω 2W
C28
100
CR79
IN34
0+150
TO LEFT
J29
50-239
R53
5600Ω 2W
R54
16000Ω 8W ±5%
R55
16000Ω 8W ±5%
C30
100
L3
100μH
L4
100μH
C31
.008
2W
200Ω
R56
C32
100
C33
100
-10
"B" REGISTER
ACCUMULATOR
J33
P33
P34
J34
DE3
RG-65/U
50-239
+150V

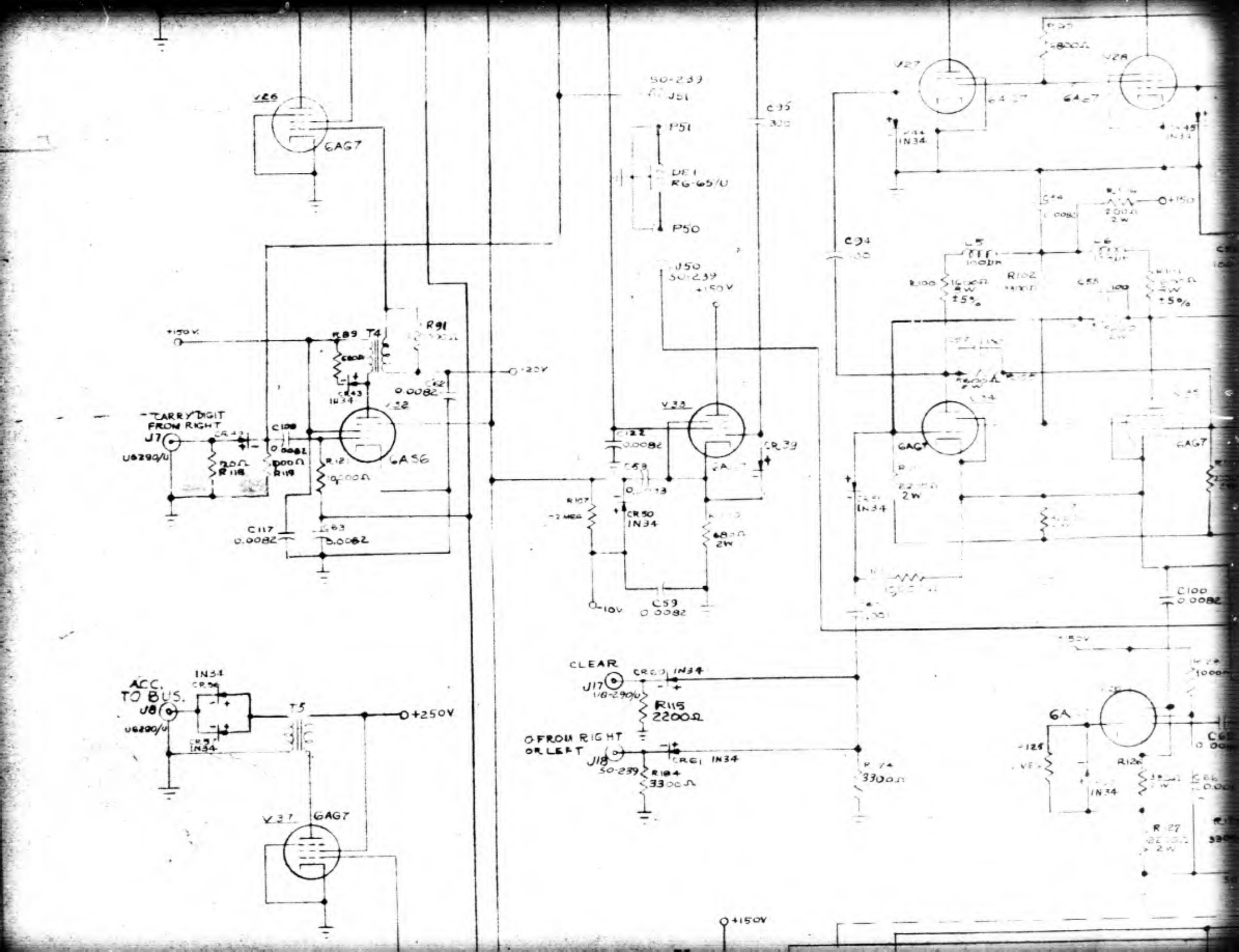

REGISTER
ACCUMULATOR
P33
P34
J34
DE 3
RG-65/U
50-239
CR19
IN34
C75
0.001
6AS6
V14
6AG7
R69
6800Ω
V15
6AG7
CR20
IN34
C76
220
+150V
CR18
IN34
C115
0.0082
C126
0.0082
J49
SHIFT AND
CARRY
R80
100Ω 1W
IN34
CR35
V22
6AS6
R76
1000Ω
BW
CR28
IN34
CR27
IN34
C45
0.0033
CR31
IN34
IN34
CR36
285
1000Ω
+150V
R77
1000Ω
BW
CR24
IN34
CR29
IN34
C46
0.0033
CR32
IN34
6AS6
C96
0.0082
J39
TO RIGHT
50239
IN34
CR37
V24
6AS6
R78
1000Ω
BW
CR25
IN34
CR26
IN34
C47
0.0033
CR33
IN34
+150V
C49
0.0082
IN34
CR38
C24
0.0082
J40
TO RIGHT
50239
R79
1000Ω
BW
C48
0.0033


+150V
-10V
6AG7
6AS6
IN34
TO RESET O TOP
TO LEFT
SHIFT LEFT
I-FROM RIGHT
COMP LINE
TO BUS
+250V
ACCUMULATOR
'A' REGISTER
READ A TO BUS UG-290/U


A REGISTER
6AG7
IN34
J30
COMP LINE
C65
0.0082
R125
R126
R127
R174
3300Ω
CR68
IN34
R108
3300Ω
R3-65/U
P35
DEC.
P32
J35
J32
50-239
READ A TO BUS UG-290/U
J31
+150
T12
V47
6AG7
+250V
T11
CR58
IN34
J49
TO BUS
UG-290/U
+150V
T10
R145
-10 V
IN34
R70 IN34
C87
0.0082
UG290/U
READ TO ACC
J36
C105
0.0082
C104
0.0082
V43
V44
6AS6
6AS6
C106
0.0082
IN34
IN34
C84
0.0082
6AS6
C103
100
+150V
R155
I8
V41
½2C51
C82
100
C83
0.0082
R161
READ INTO A REG
J47
UG290/U
V48
C90
0.0082
6AS6
C91
0.0082
J48
DIGIT IN
UG290/U
2200Ω
R163
-10V
100μh
R146
R149
3300Ω
R159
1600Ω
8W
±5%
100
5200Ω
1W
C78
100
R147
5600
2W
V45
V46
IN34
CR74
IN34
CR74
R141
10000Ω
R142
2200Ω
2W
6AG7
6AG7
R144
820Ω
2W
R151
2200Ω
2W
R152
10,000Ω
C101
0.0082
C92
0.0082


+150
220Ω 2W.
C13 0.008Z
V8 6AG7
R11 1000Ω
C5 0.008Z
C6
J10 CVD OUT
CR5
R7 330Ω 2W
R8 10MEG
R9 2200Ω 2W.
L1 100μH
L2 100μH
R6 1600Ω 8W ±5%
R12 1600Ω 8W ±5%
C3 100
5600Ω R13
C4 220
C2 100
R5 2200Ω
R14 3300 1W
V1 6AG7
V2 6AG7
C98 0.008Z
R15 82.0Ω 2W
R4 2200Ω 2W
R2 3300Ω
R3 10000Ω
C1 .008Z
IN34 CR4
J1 IN34 CR1
0-FROM LEFT SO239
J2 IN34 CR2
0-FROM RIGHT SO239
R178 3300Ω
R179 3300Ω
J3 IN34 CR3
CLEAR UG290/U
R1 2200Ω
220
I2
R17 27000Ω 1W
+150V
B1007
±V6
R18 0.1MEG
C9 100
2C51
"B" REGISTER ACCUMULATOR
OUT TO CHECK REGISTER
IN34 CR14
CR15 IN34
T1
+250V
J4 UG290/U
X16
C36 .008Z
6AS6
R61 15000Ω
C10 .008Z
+150V
R63 3300Ω
X15
READ IN TO B REG
R64 2200Ω
J13 UG290/U
+10V
CARRY
+50V
READ TO BR .008Z
C15 .008Z
J17
6AS6
6AG7
V4
V5
V6
6AS6
6AS6
6AS6
R34 0.1MEG
C21 .008Z
C22 100
R33 1000Ω
C20 .008Z
R32 2200Ω 1W
C112 .008Z
C19 0.008Z
R30 2200Ω 1W
C17 .008Z
R29 1000Ω
C16 0.008Z
C15 .008Z
R27 1000Ω
C14 .008Z
R26 2200Ω 1W
C111 .008Z
C12 .008Z
R24 1000Ω
C110 .008Z
R21 2200Ω 1W
C11 .008Z
R16 2200Ω 2W
R16 10000Ω
IN34 CR9
IN34 CR12
IN34 CR13
R60 33.0Ω
R62 33.0Ω
J11
J12
1 FROM RIGHT
1 FROM LEFT
SHIFT RIGHT J23 UG290/U
0 RIGHT J24 SO-239
SHIFT LEFT J25 UG-290/U
0 LEFT J26 SO-239
0 TO RIGHT J27 SO-239
0 TO LEFT J29 SO-239
0+150
-10
I1
R35 27000Ω 1W
R45 2200Ω
CR76 IN34
C113 .001
R48 10000Ω
CR77
"B" REGISTER ACCUMULATOR
P33 J33
P34 J34
DE 3 RG-65/U
SO-239
C115 .001
CR78 IN34
6AG7
READ IN TO B REG


READ IN TO B REG.
J4
UG290/U
IN34
6AG7
C36
0.0082
6AS6
J13
UG290/U
R64
2200Ω
C75
0.001
6AS6
CARRY
J14
C93
0.0082
6AG7
+150
100Ω
C54
0.0082
TO LEFT
J15 SU-239
SHIFT LEFT
J16 UG-290/U
C97
0.0082
6AS6
+150V
T2
R20
1000Ω
0-25V
0.0082
C125
0.0082
READ ACC. TO CHECK REGISTER
J5
UG290/U
IN34
CR21
C42
0.0082
R69
2200Ω
R70
1000Ω
R71
100000Ω
6A56
-10V
C124
0.0082
+250V
J6
UG290/U
V26
J50-239
J51
R74
27000Ω
L5
+211007
½ V21
R75
2C51
C44
300
IN34
IN34
IN34
IN34
V27
V28
6800Ω


V26
6AG7
50-239
J51
P51
DE1
RG-65/U
P50
C35
300
V27
V28
6AG7
6AG7
R44
IN34
R45
IN34
+150
2000Ω
2W
C34
.05
L5
100μh
L6
R100
16000Ω
2W
±5%
R102
C55
100
R101
2000Ω
2W
±5%
+150V
R89
T4
R91
C62
0.0082
-20V
V32
6AS6
V33
6A
CR39
CARRY DIGIT
FROM RIGHT
J17
U6290/U
CR42
IN34
C108
0.0082
R118
2200Ω
R119
1000Ω
R120
10,000Ω
C117
0.0082
C63
0.0082
C122
0.0082
C58
0.0082
R107
2 MEG
CR50
IN34
68000Ω
2W
-10V
C59
0.0082
6AG7
R
82000Ω
2W
CR51
IN34
C100
0.0082
+150V
1000Ω
6A
+12V
R126
IN34
R127
C66
0.0082
R 27
2W
330Ω
ACC.
TO BUS.
J8
U6290/U
IN34
CR36
CR37
IN34
T5
+250V
V37
6AG7
CLEAR
J17
U6-290/U
CR40
IN34
R115
2200Ω
FROM RIGHT
OR LEFT
J18
50-239
R104
33000Ω
CR41
IN34
R 24
3300Ω
+150V

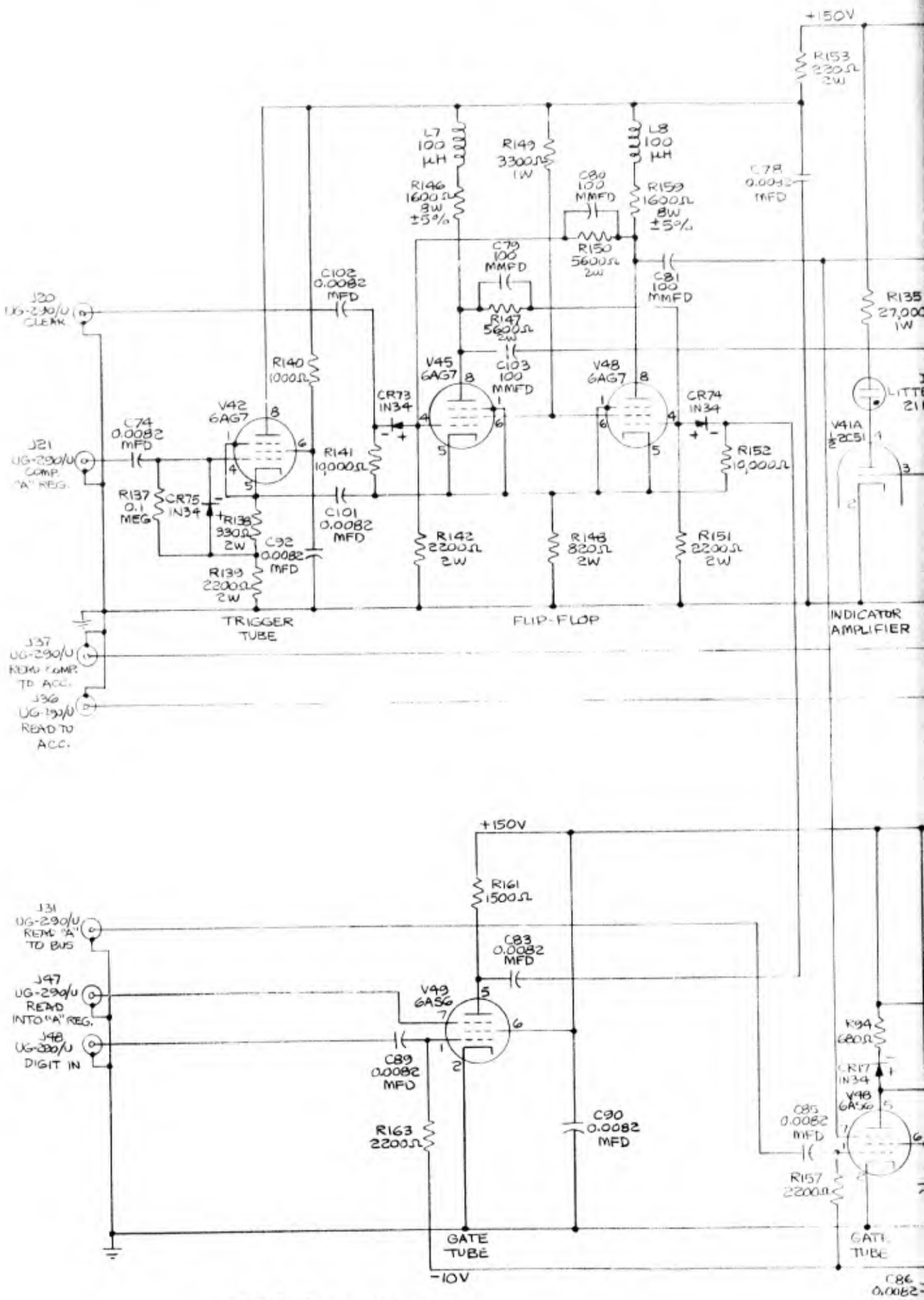
NOTE.

ALL RESISTORS ½ WATT EXCEPT WHERE NOTED
FOR PANEL DRILLING TEMPLATE SEE R-37511

SINGLE DIGIT OF MULTIPLIER SCHEMATIC

THE ELECTRICAL SYMBOLS ON THIS DRAWING ARE NOT DRAWN TO STANDARD SIZE AND MAY BE DRAWN THUS ONLY BY SPECIAL PERMISSION.

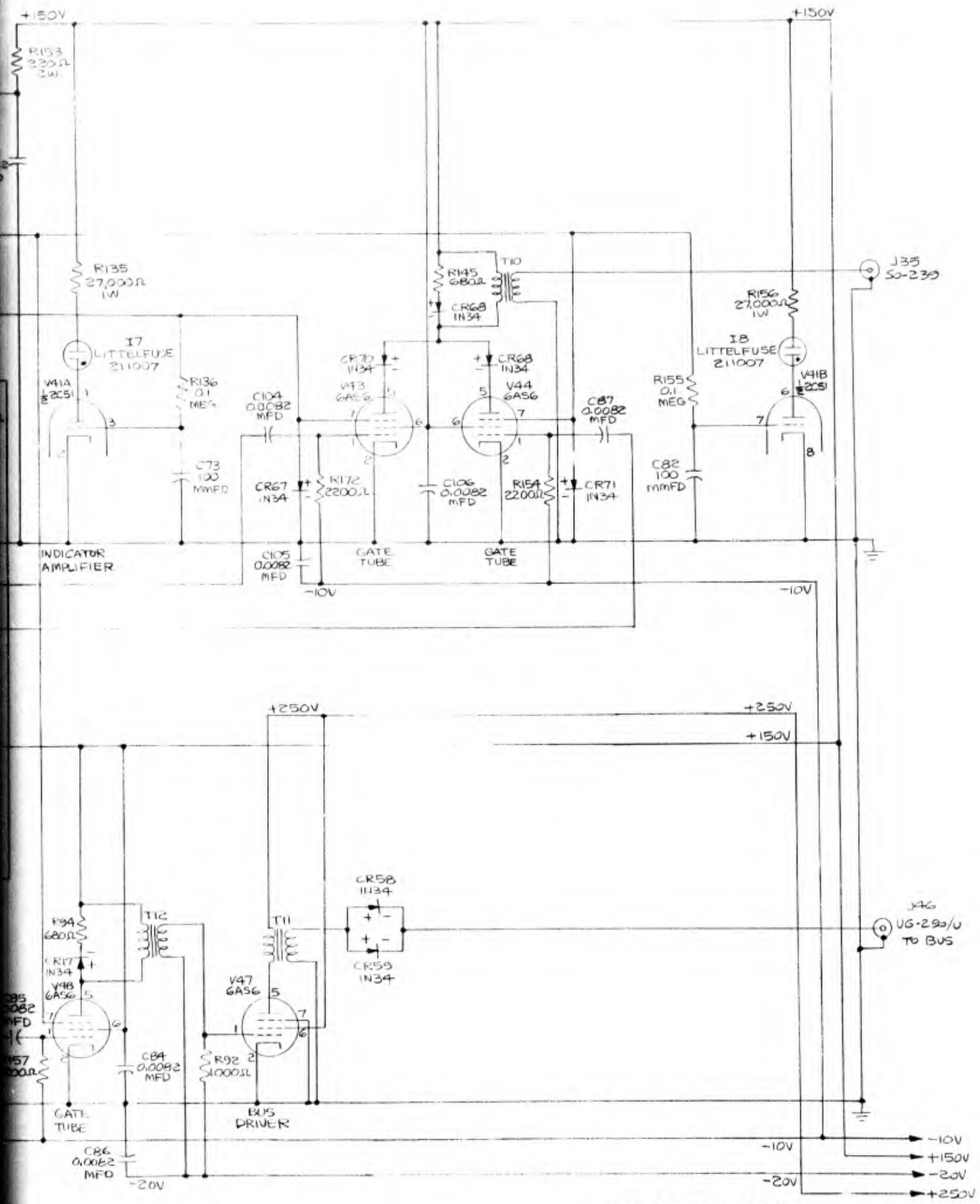
FOR PANEL DRILLING TEMPLATE SEE R-37511.



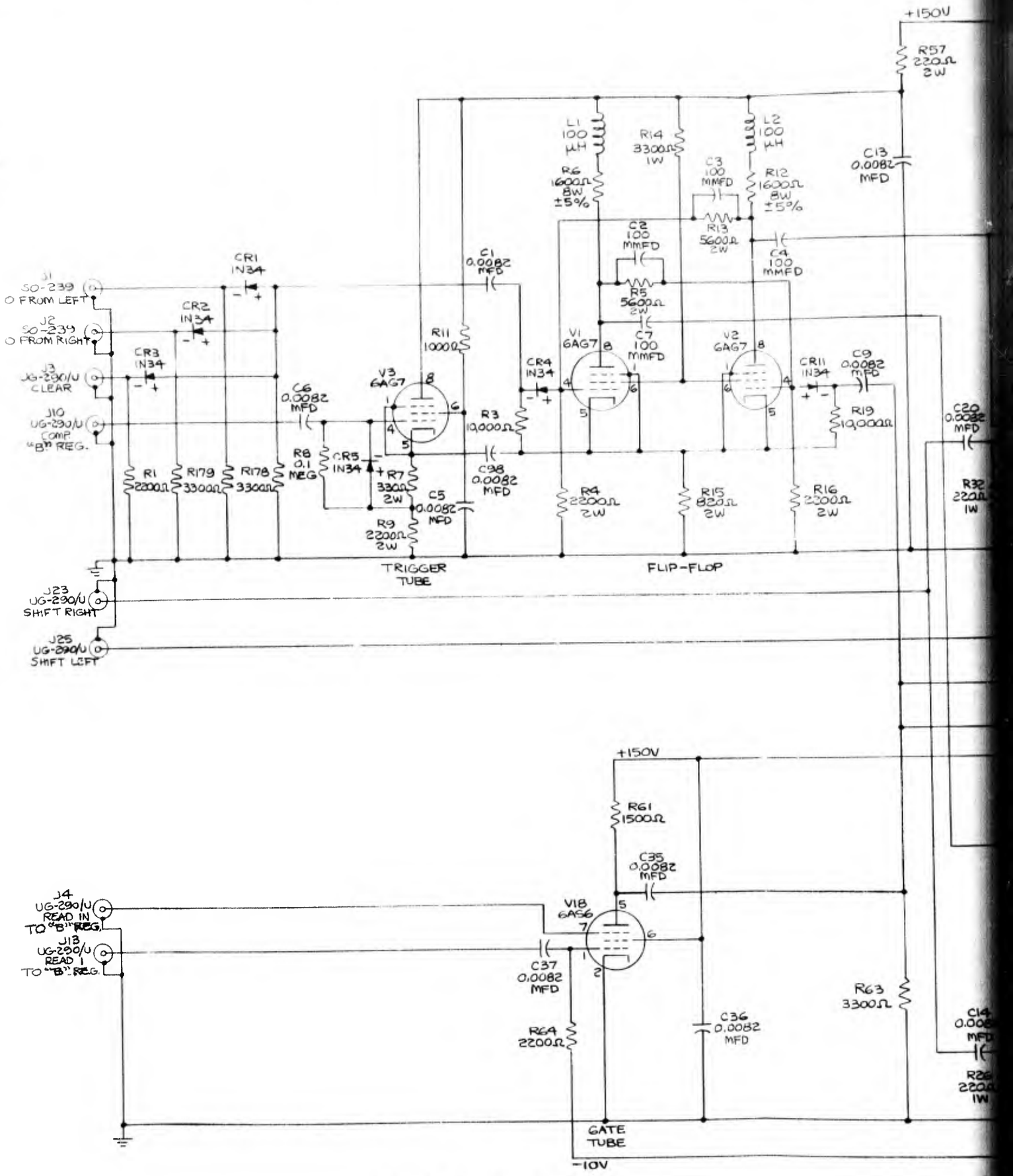
HEATER PIN CONNECTIONS

2C51: 1 & 9
6AG7: 2 & 7
6AS6: 3 & 4

NOTE: INTER-UNIT SHIELD, PIN 5 OF 2C51, IS GROUNDED.



MULTIPLIER "A"
REGISTER SCHEMATIC 6345 1 Th 12/7/47
SD-39335



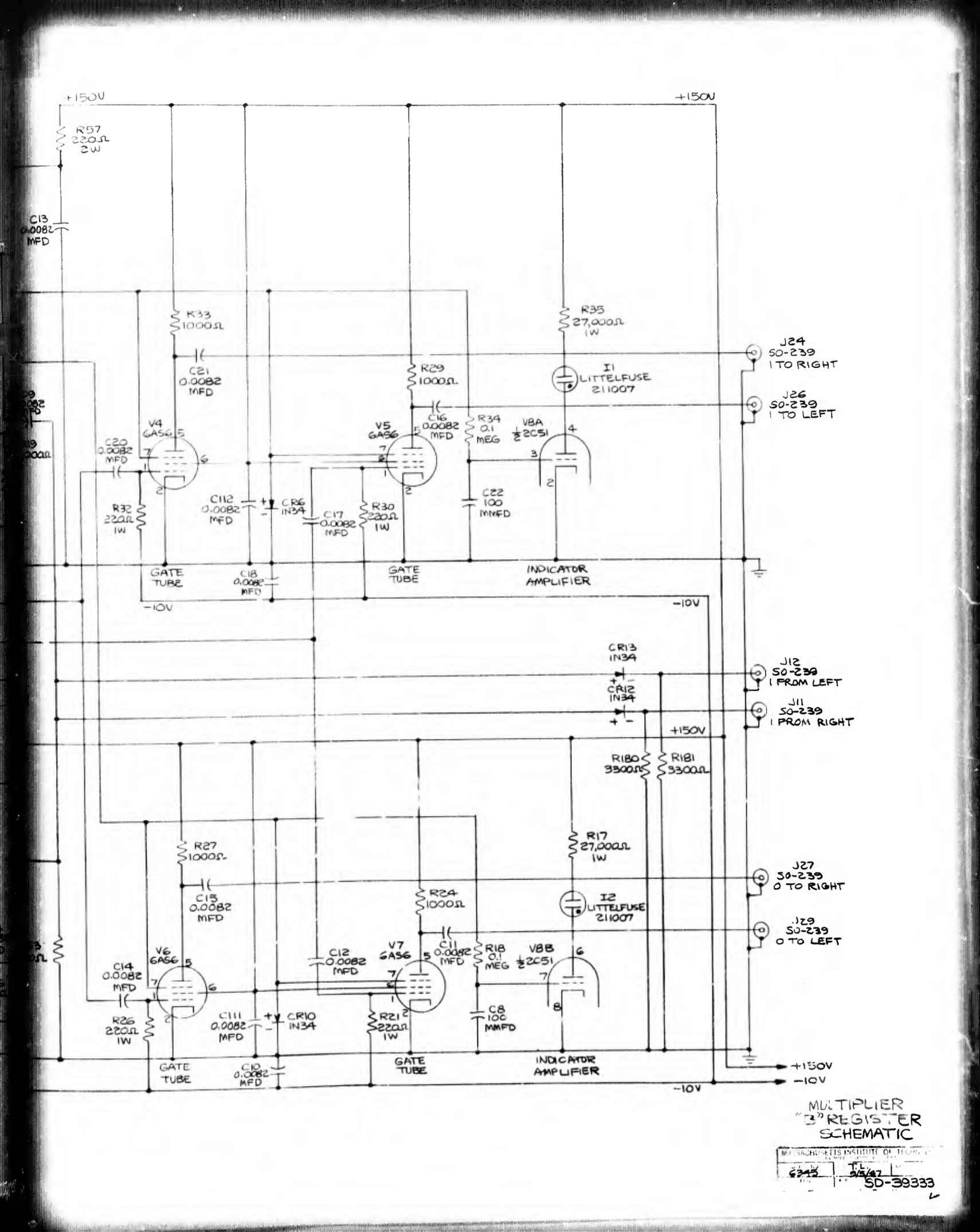
HEATER PIN CONNECTIONS

2C51: 1 & 9

6AG7: 2 & 7

6AS6: 3 & 4

NOTE: INTER-UNIT SHIELD, PIN 5 OF 2C51, IS GROUNDED.

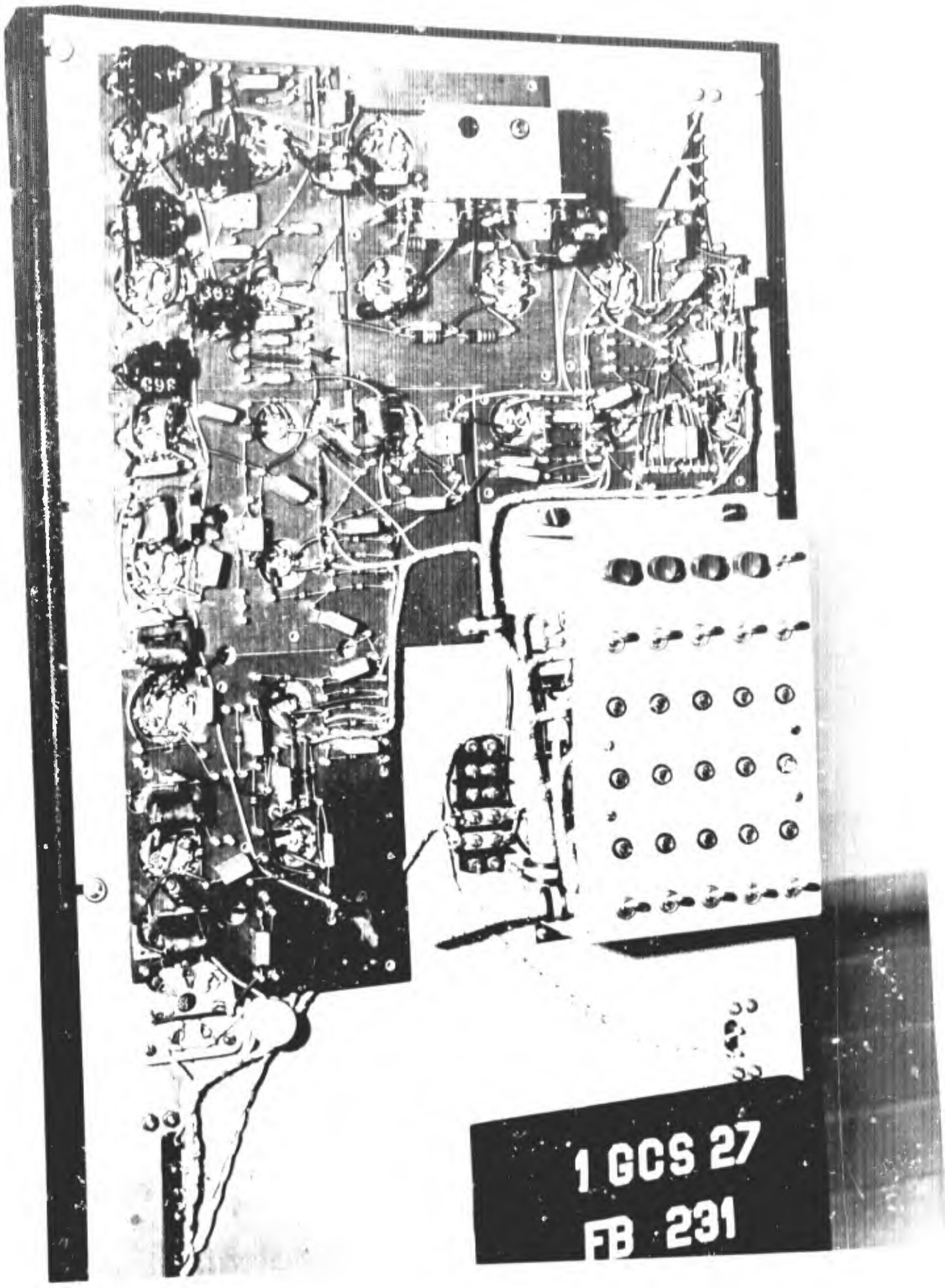


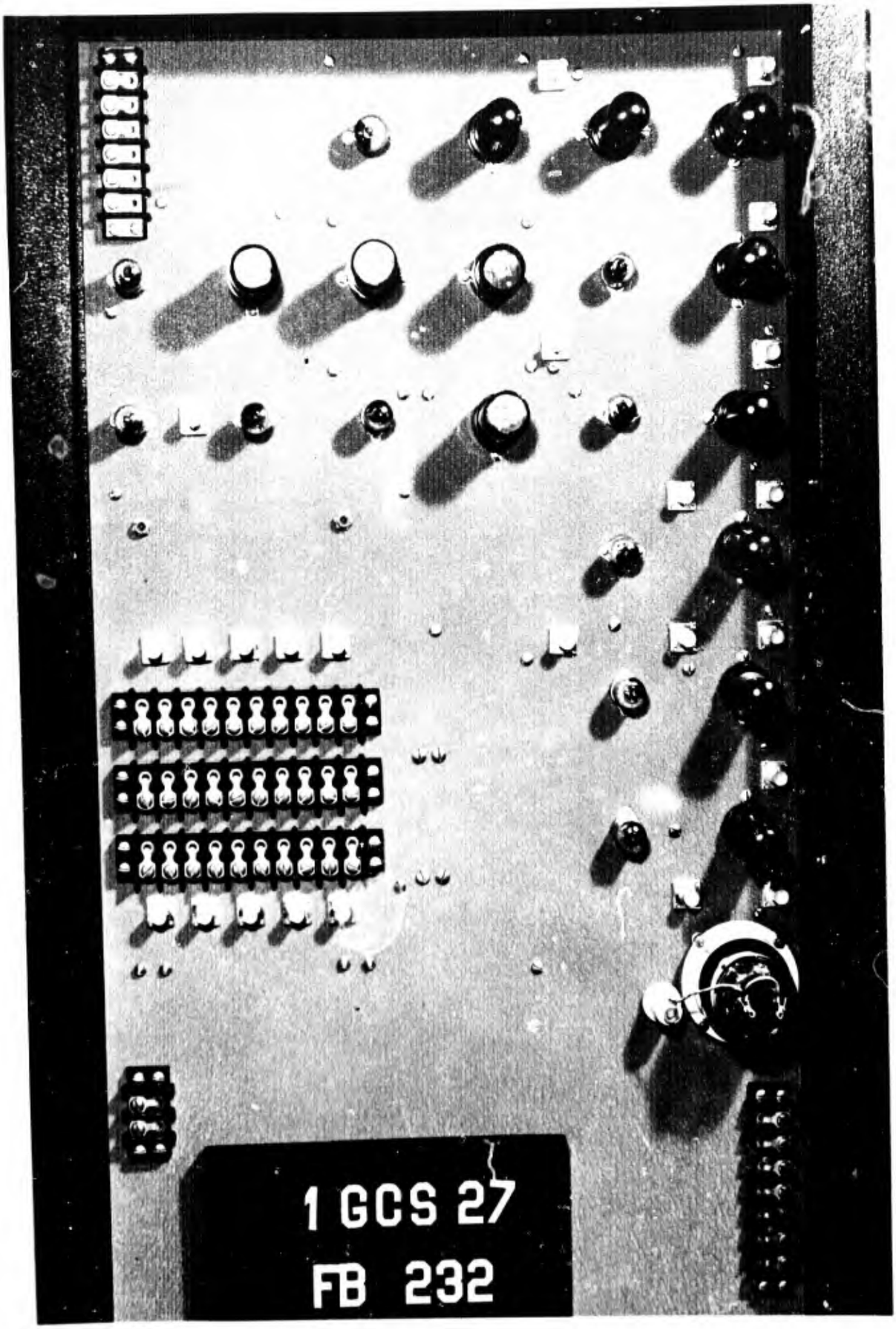
MULTIPLIER "D" REGISTER SCHEMATIC

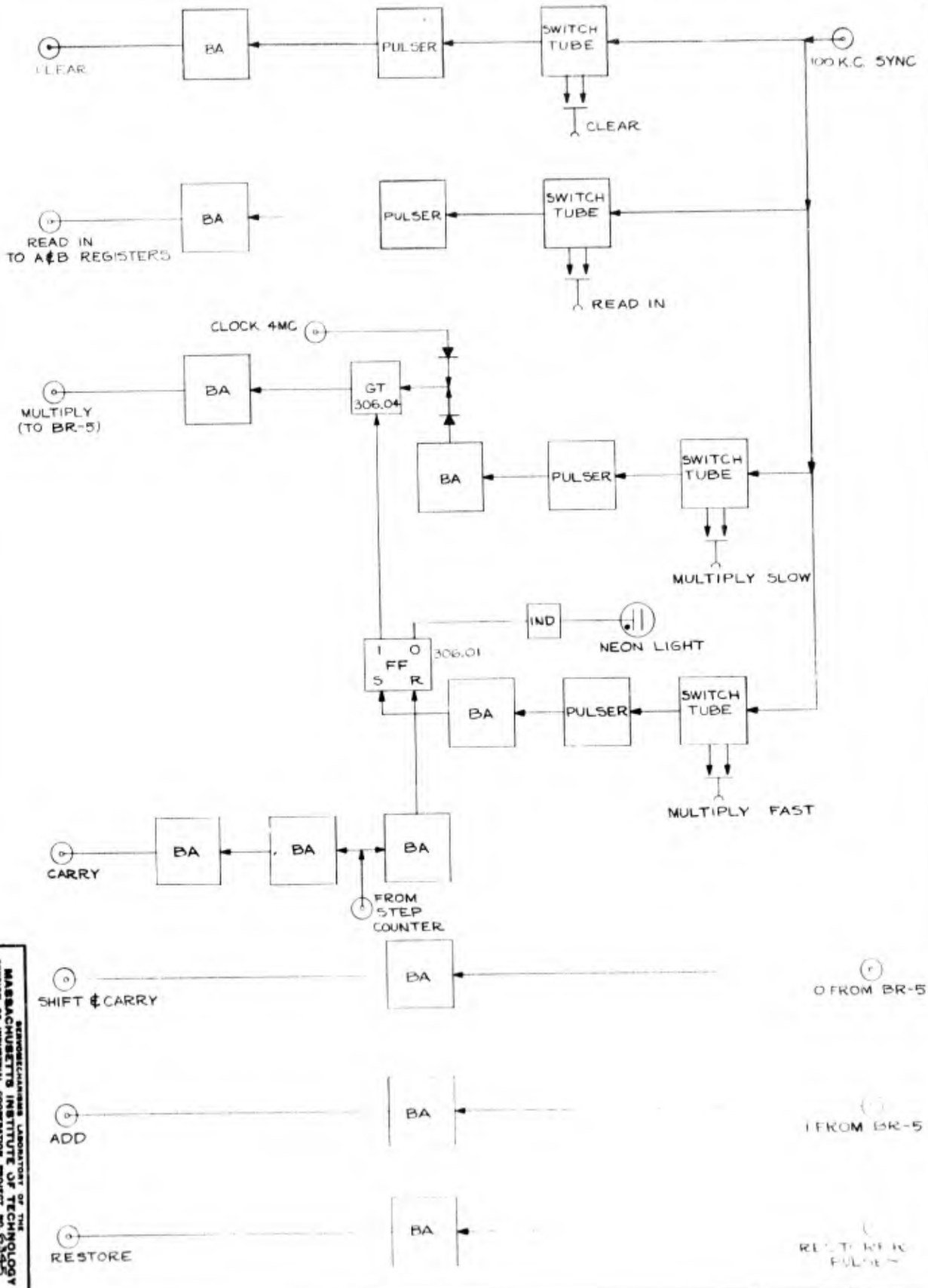
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

6345	TL 5/5/67

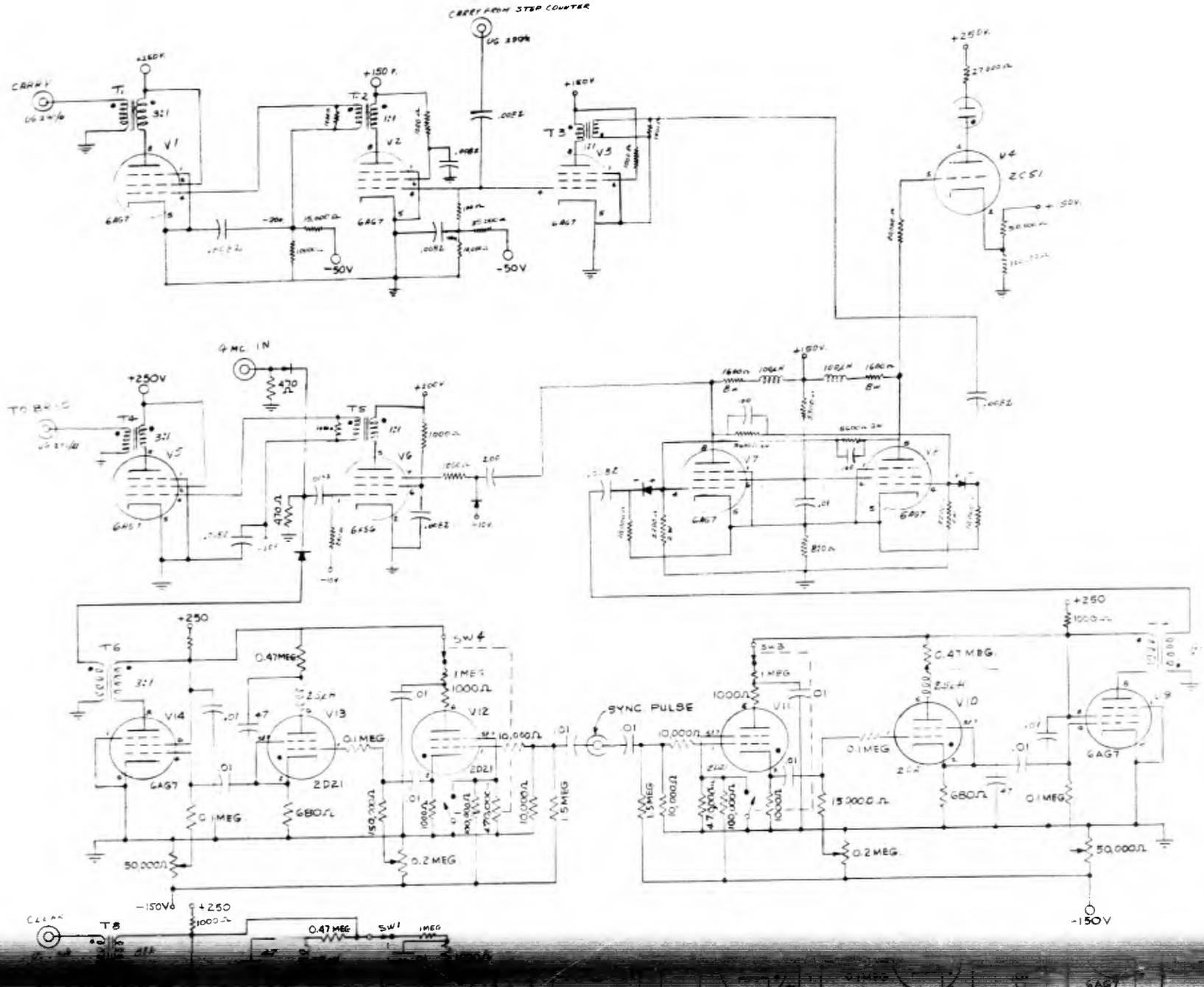
SD-39333

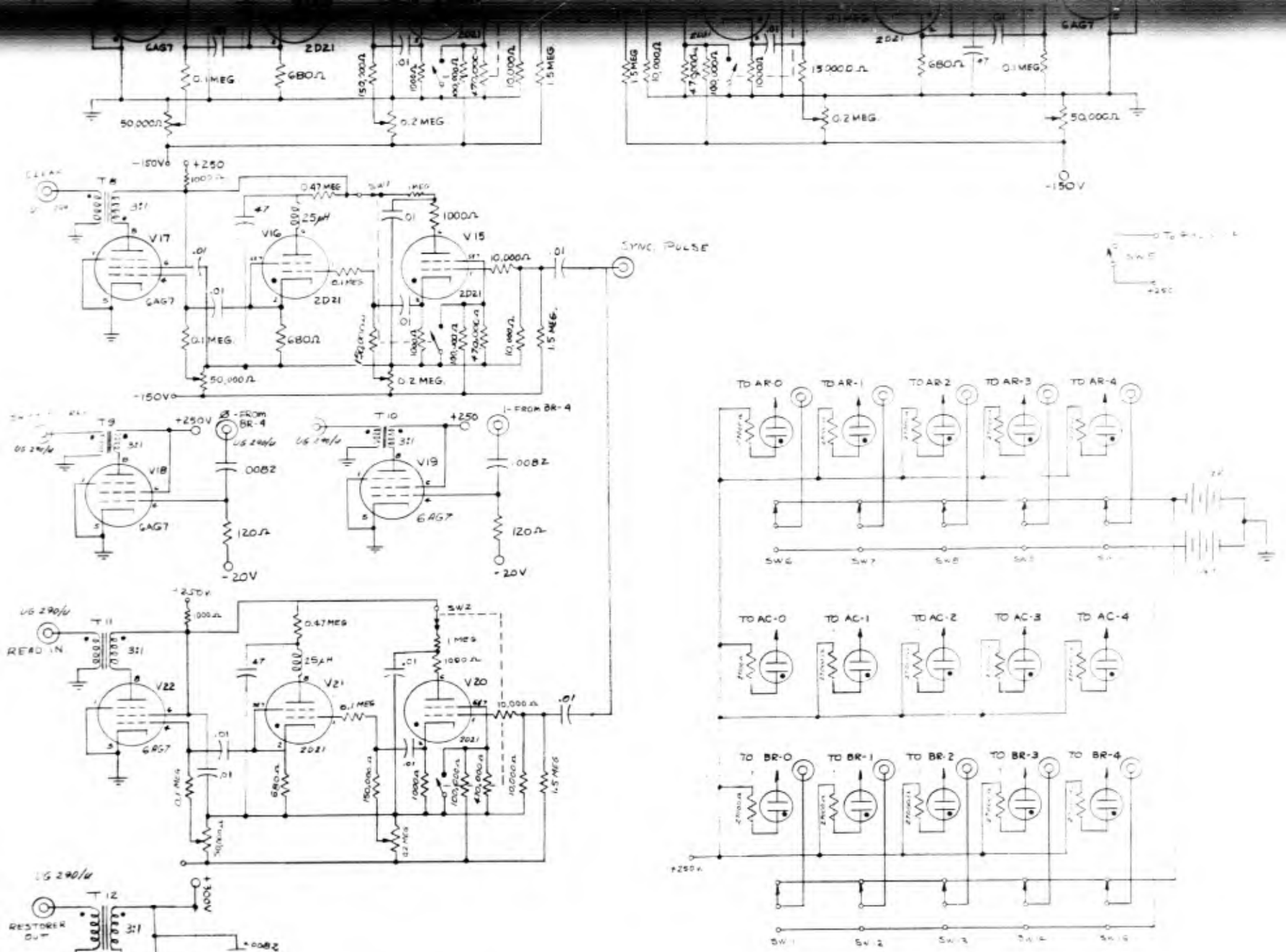

1 GCS 27
FB 231


1 GCS 27
FB 232



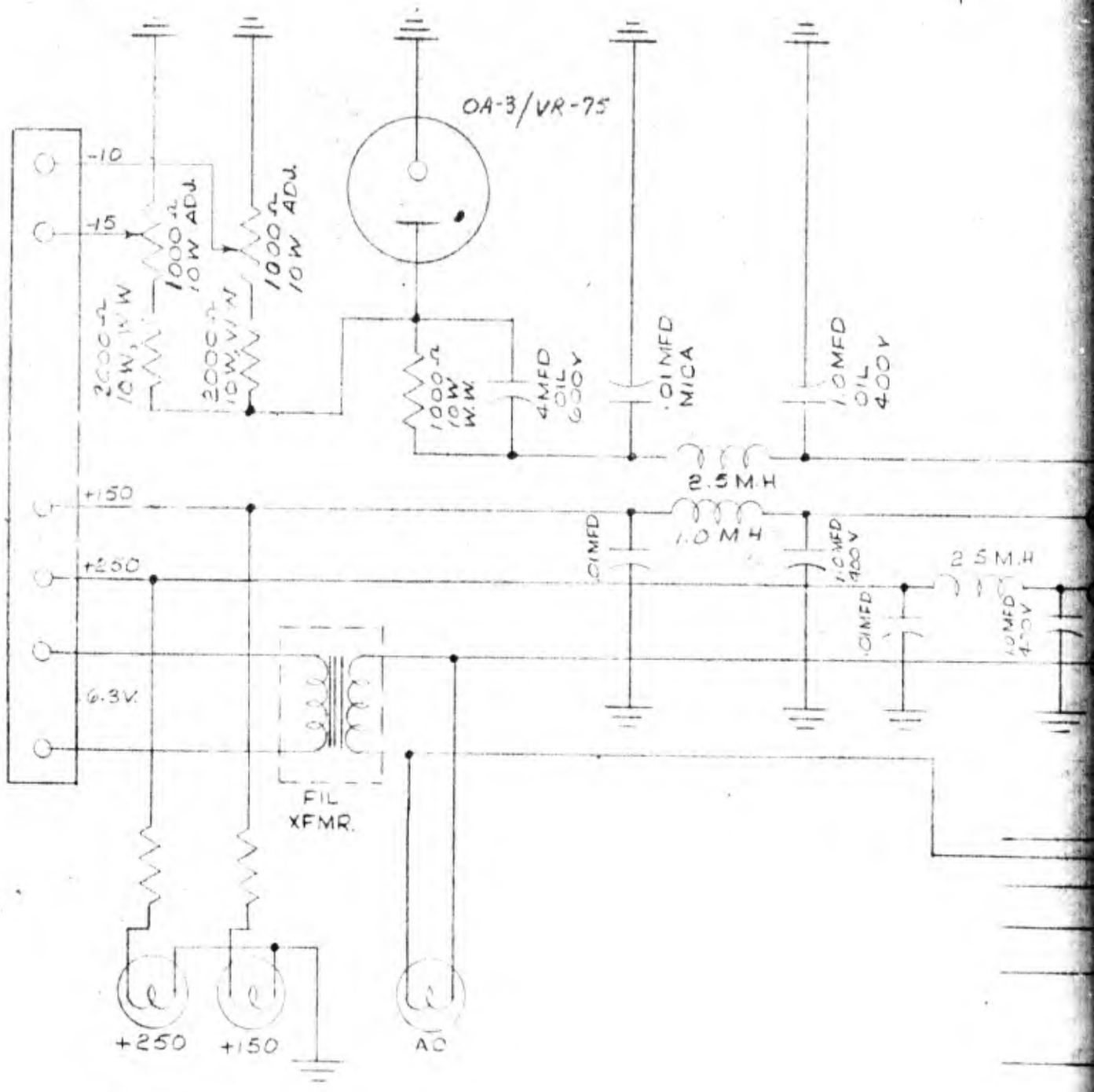
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345
DRAWN
SCALE
DATE
CHECKED
APP.
5-DIGIT MULTIPLIER CONTROL
C-30906

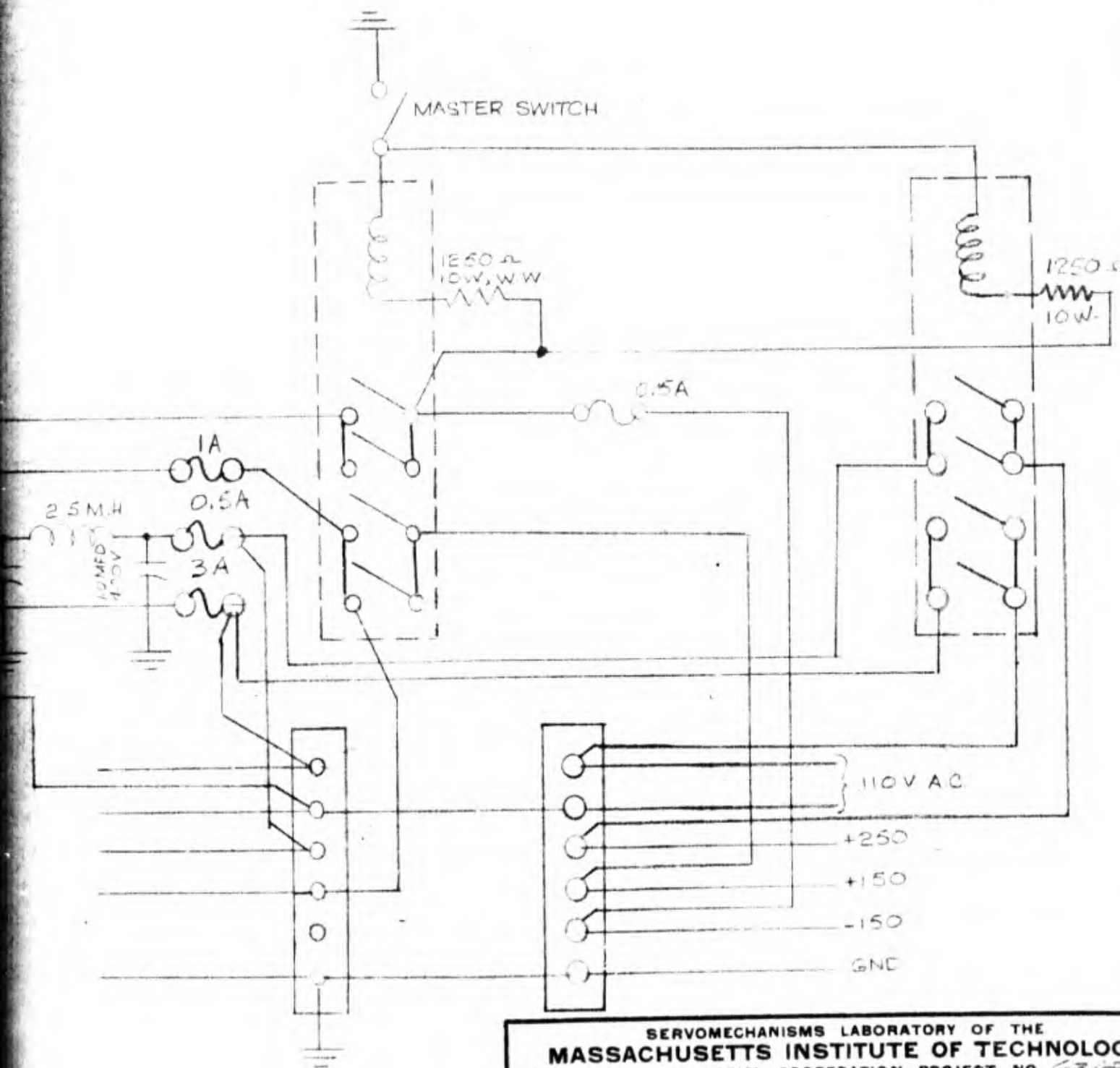

CARRY FROM STEP COUNTER
CARRY
+250V
T1
3:1
V1
6AG7
+150 V.
T2
1:1
V2
6AG7
.005Σ
.005Σ
-50V
-50V
+150V
T3
V3
6AG7
+250V.
27,000Ω
V4
2C51
+150V.
4 MC. IN
470Ω
TO BUFFER
+250V
T4
3:1
V5
6AG7
+200V
T5
1:1
1000Ω
V6
6AS6
470Ω
-10V
+150V
1600Ω
1600Ω
V7
6AG7
V8
6AG7
820Ω
+250
T6
3:1
0.47MEG
SW4
1MEG
1000Ω
V14
6AG7
V13
2D21
V12
2D21
0.1MEG
680Ω
0.1MEG
0.2MEG
50,000Ω
SYNC PULSE
10,000Ω
1.5MEG
SW3
1000Ω
V11
0.47MEG
V10
0.1MEG
680Ω
0.2MEG
+250
1000Ω
V9
6AG7
0.1MEG
50,000Ω
-150V
-150V
CLEAR
T8
0.47MEG
SW1
1MEG



MULTIPLIER CONTROL PAN
SCHEMATIC

SB-3932B-1



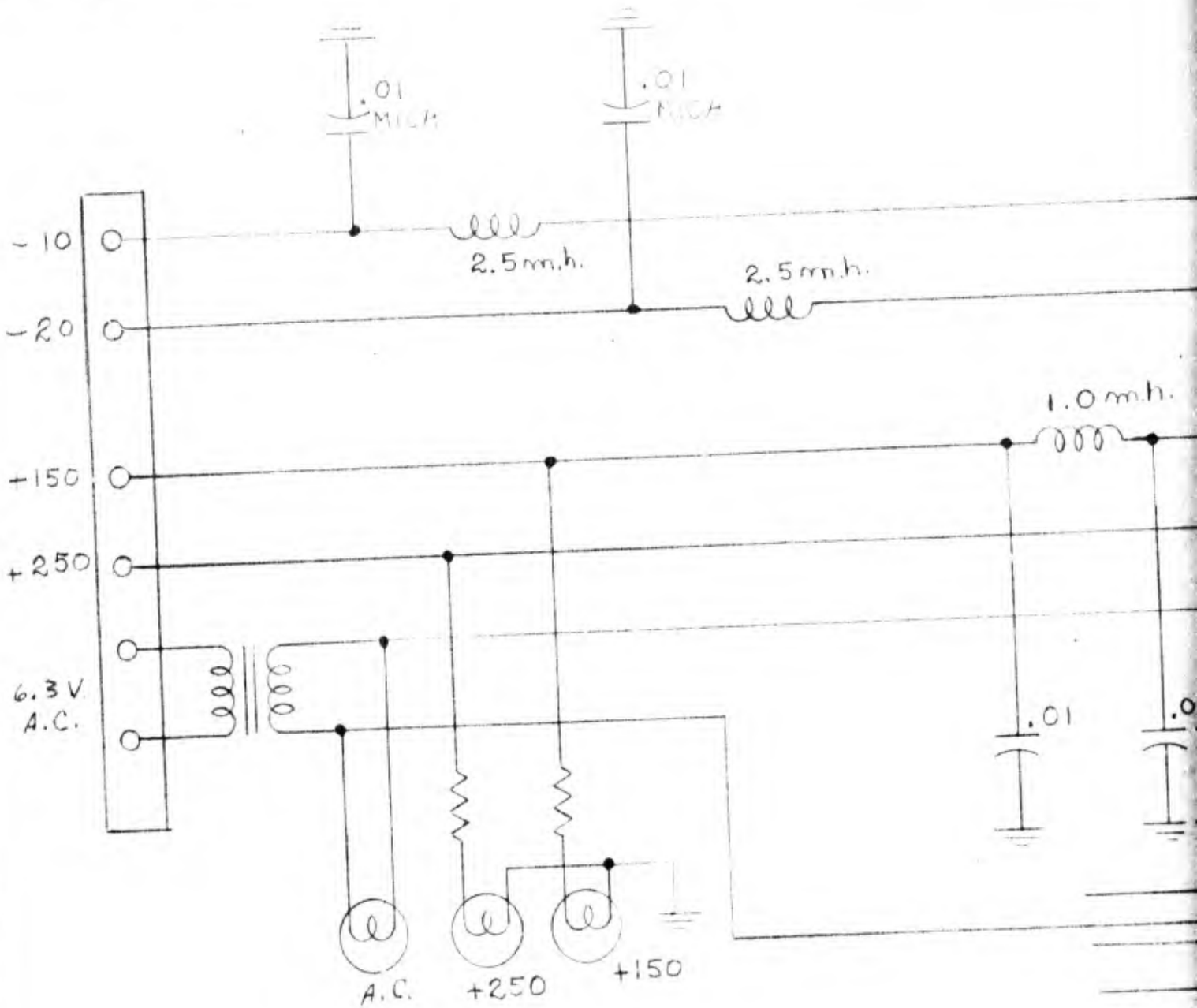


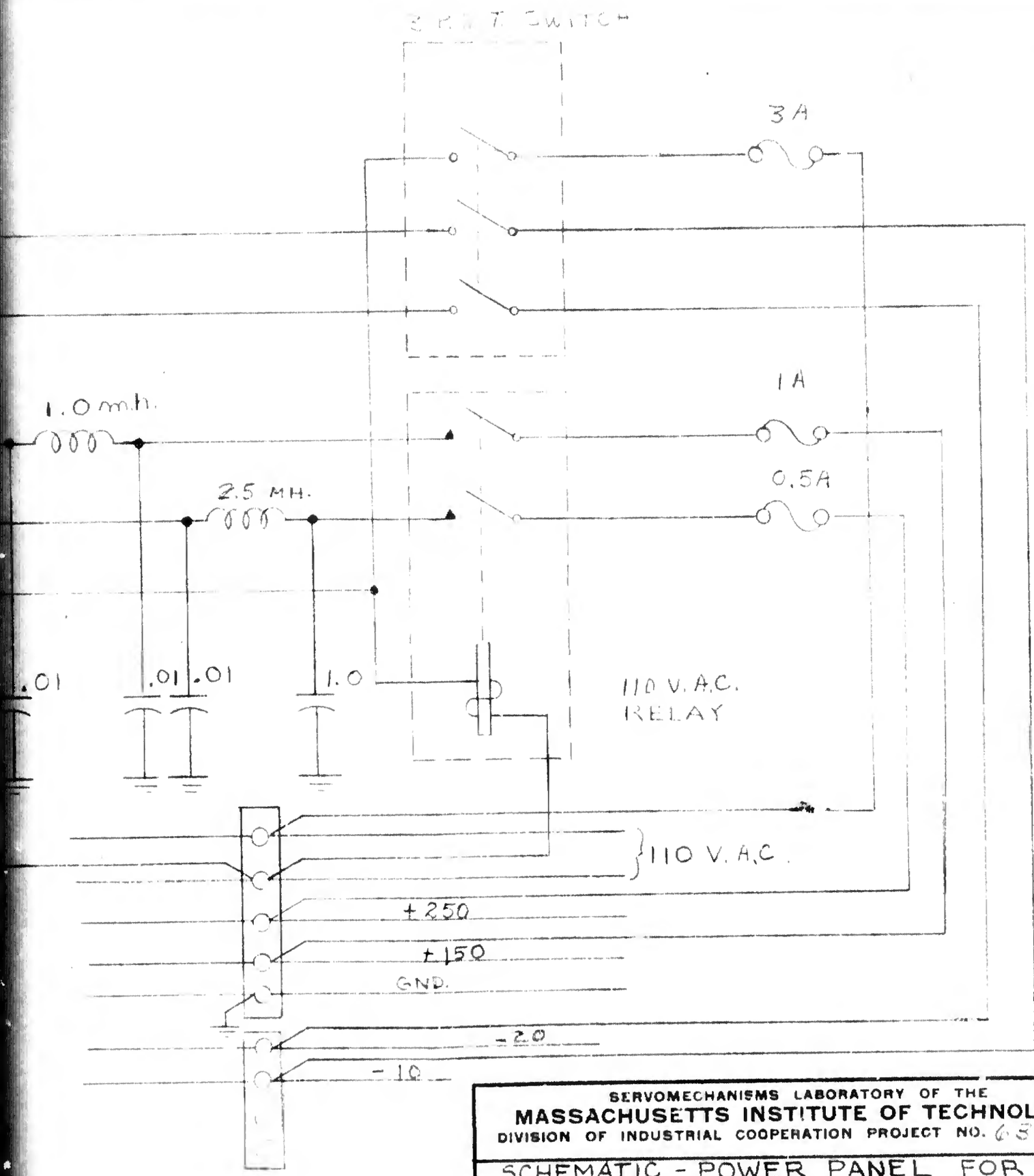
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

SCHEMATIC - POWER PANEL FOR 5-DIGIT MULTIPLIER CONTROL RACKS

SCALE:	DR	SB-39329-1
ENG. C.W.W. 8/22/50	CK.	APP.

SB-30334

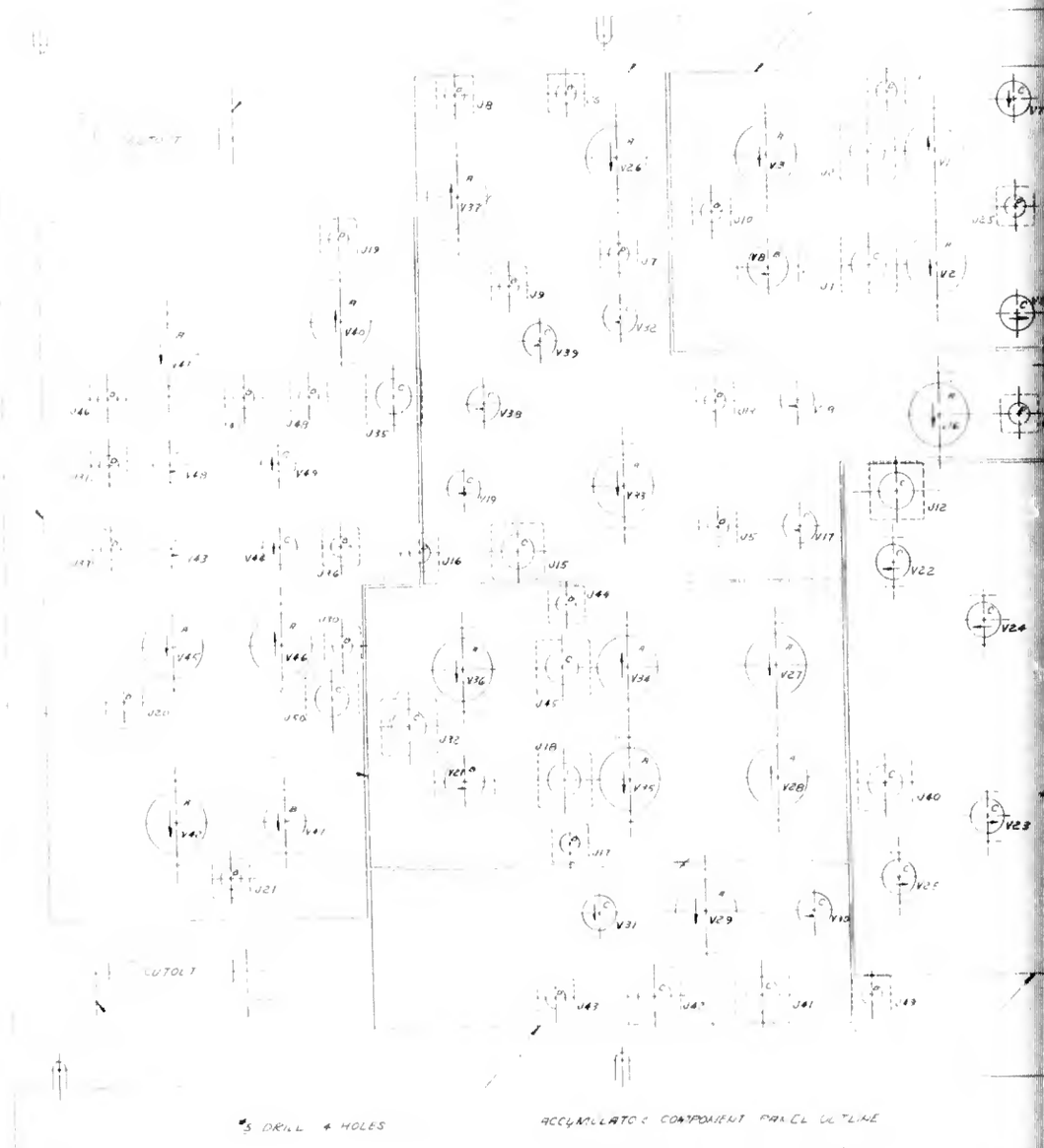




SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6845

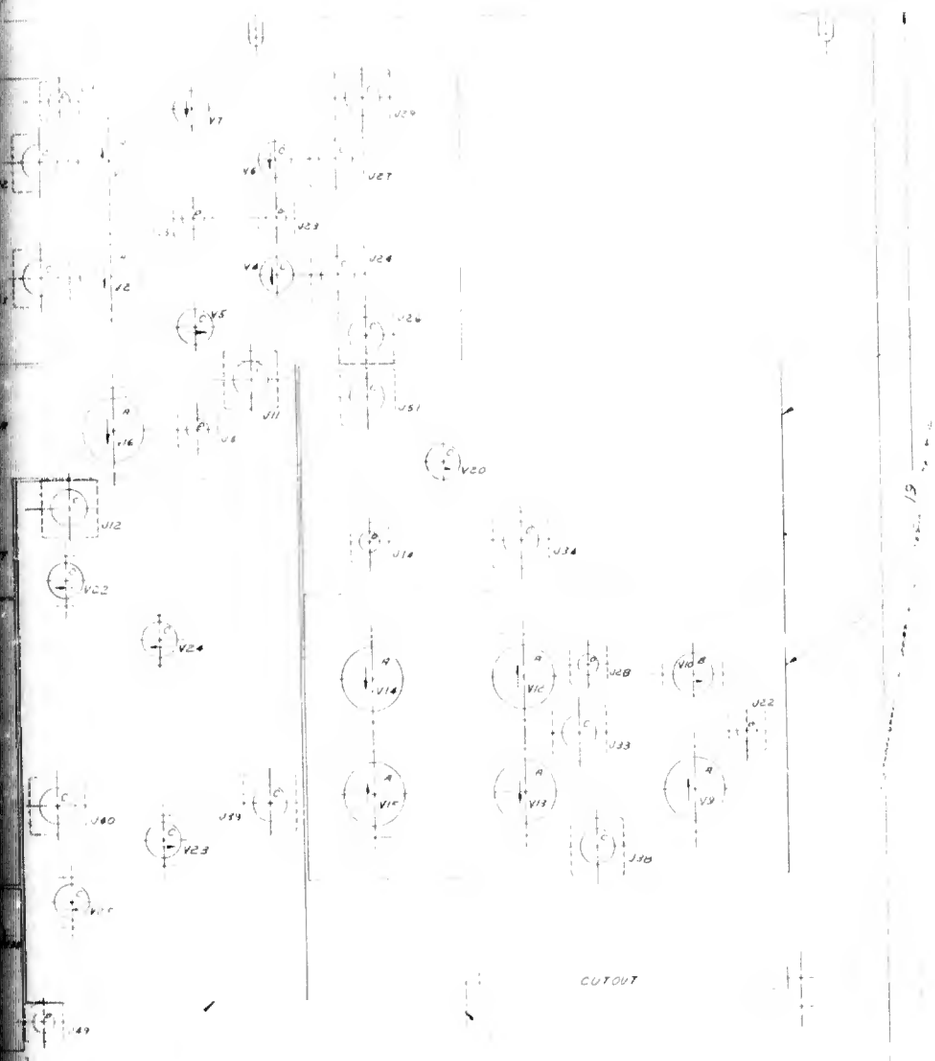
SCHEMATIC - POWER PANEL FOR 5 DIGIT MULTIPLIER DIGIT RACKS

SCALE: —	DR WOLLEY	SB- 30334
ENG C.W. 9-10-47	CK.	APP.


"A REGISTER COMPONENT PANEL OUTLINE
ACCUMULATOR COMPONENT PANEL OUTLINE
"S DRILL 4 HOLES
"S DRILL 4 HOLES
ACCUMULATOR COMPONENT PANEL OUTLINE
3 1/2"
GATE & BUFFER AMPLIFIER PANEL "S OUTLINE
"C DRILL
"A" 1/2" DIA HOLE
"D DRILL
"B" 3/4" DIA HOLE
"E DRILL
"C" 7/8" DIA HOLE
"D" 1" DIA HOLE

R.F. PANEL #1 OUTLINE

R.F. FILTER COMPONENT PANEL OUTLINE



GATE & BUFFER AMPLIFIER PANEL #2 OUTLINE

CARRY R.F. COMPONENT PANEL OUTLINE

#3 DRILL & HOLES

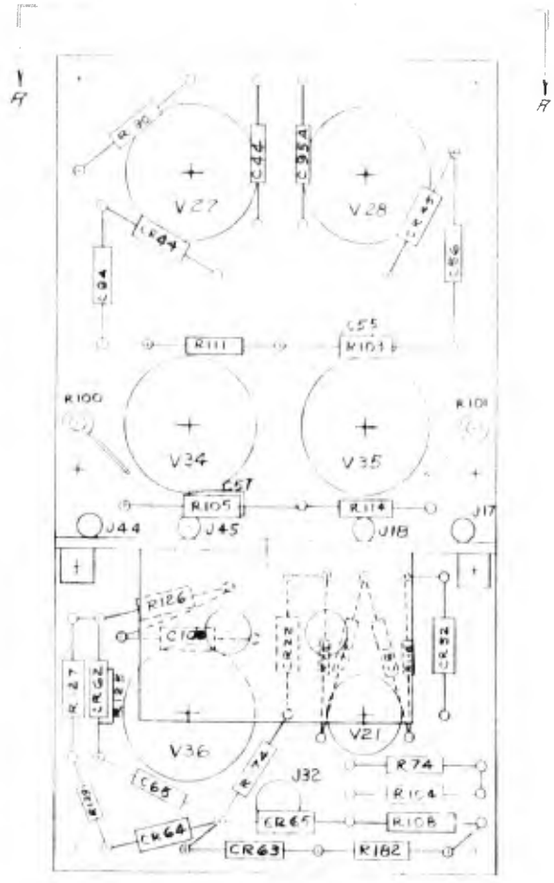
MATERIAL - 1/8 ALUMINUM

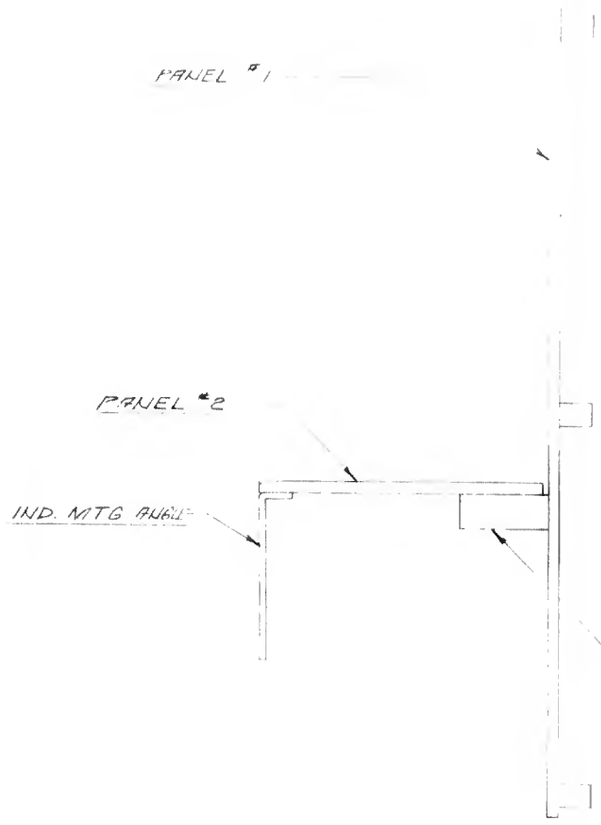
ARROW THUS ⟶ INDICATES DIRECTION OF KEY

D 1/8 DIA HOLE

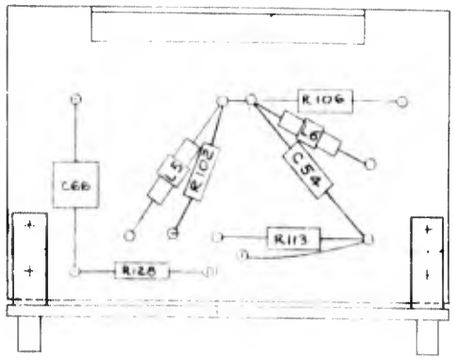
MULTIPLIER CHASSIS
DRILLING TEMPLATE
SCALE FULL SIZE
DRAWN KHT
R-37511

D-3751C



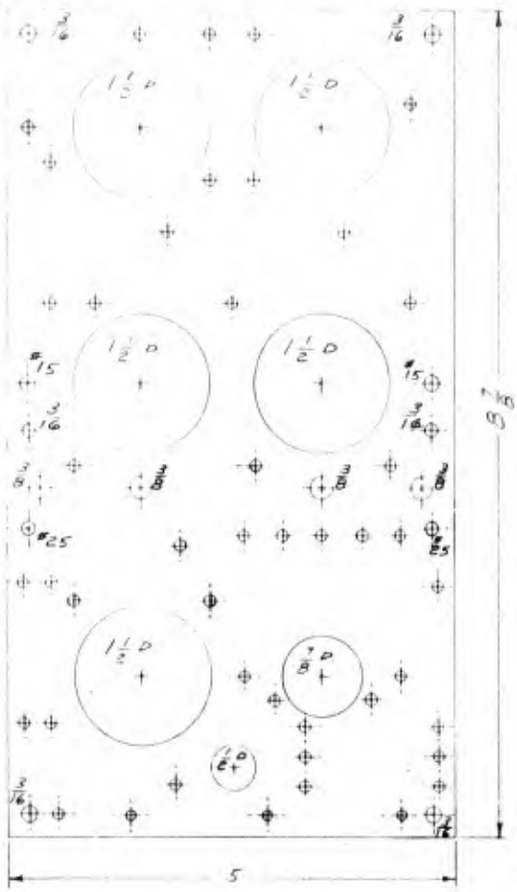


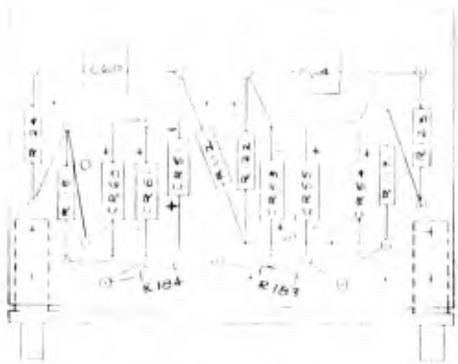
NOTE - "V" & "J" NUMBERS ARE FOR REFERENCE ONLY.



DRILLING TEMPLATES
HOLES NOT NOTED DRILL #33

PANEL #1 - 1/8 THK PHENOLITE OR EQUAL



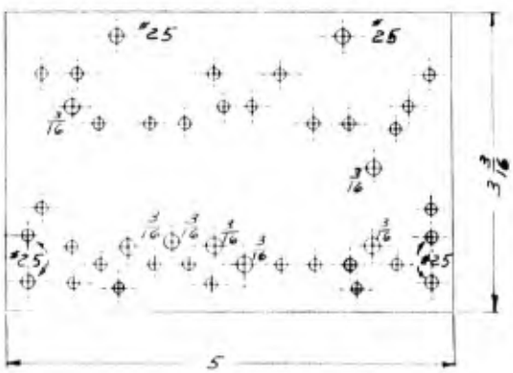


VIEW (LOOKING RIGHT) A-A SHOWING COMPONENT ASS'Y PLAN.

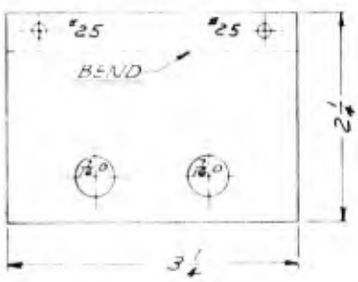
PANEL MTG POST
REF L-37518

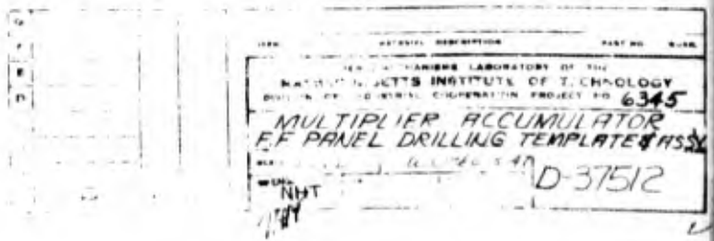
ERENCE DAILY.

PANEL #2 - 1/8 THK PHENOLITE OR EQUAL

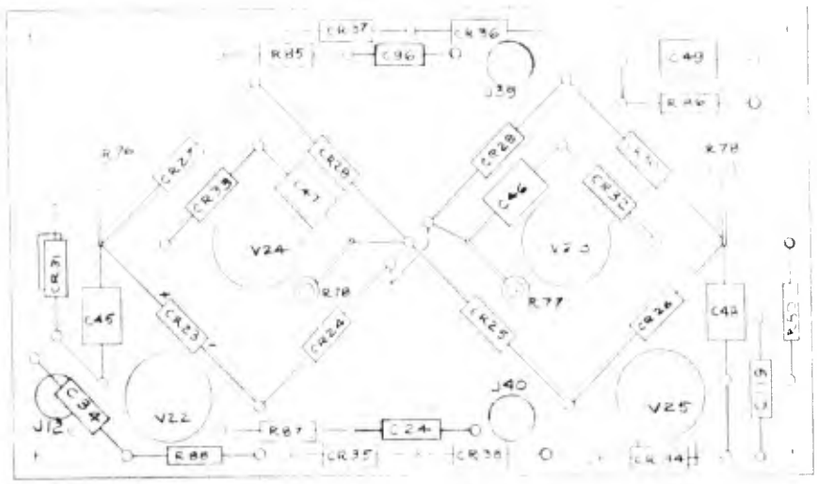


INDICATOR MTG. ANGLE
1/16 THK ALUM - 1 REQD



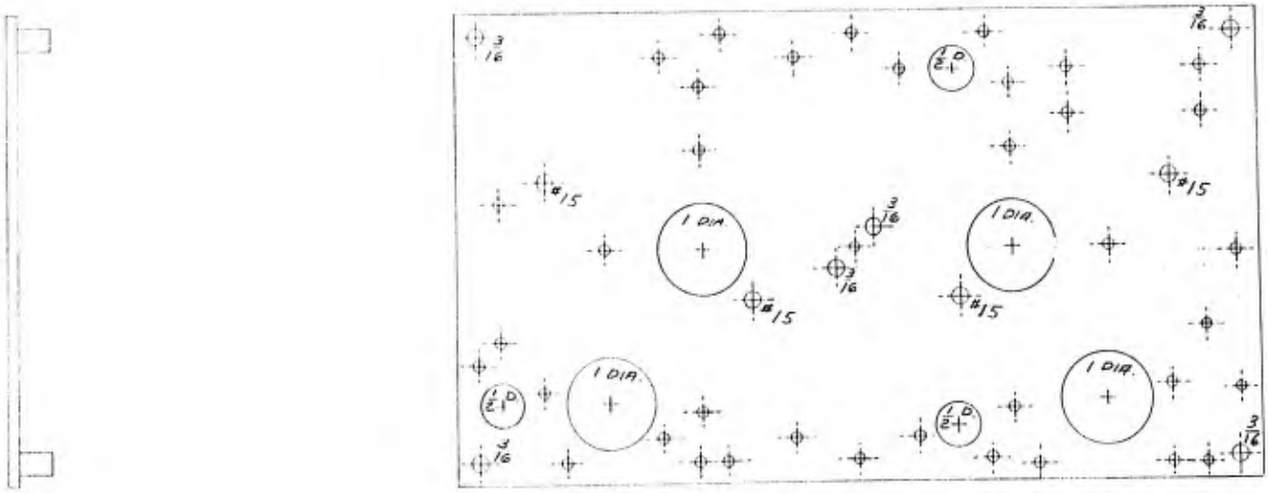


D-37513



NOTE: V & J NUMBERS FOR REFERENCE ONLY

DRILLING TEMPLATE

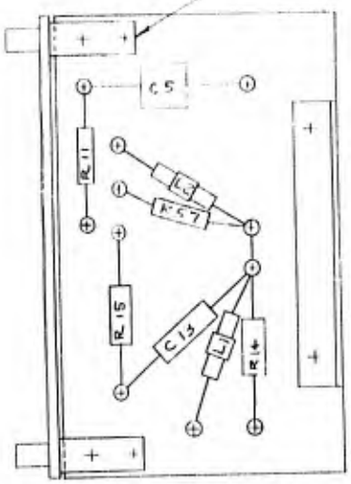


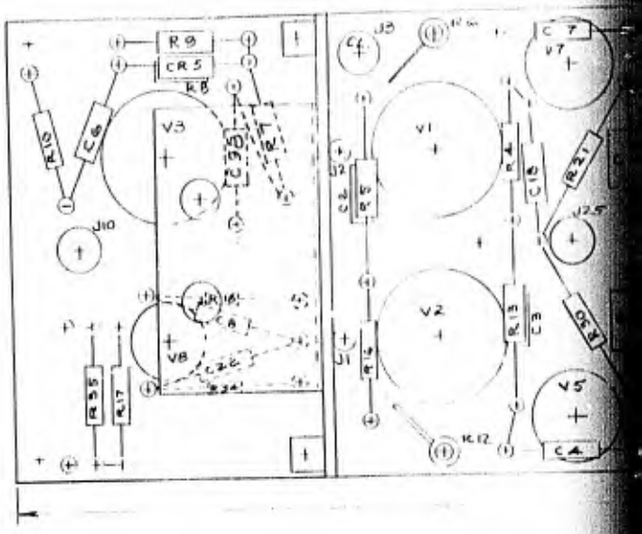
MAT'L - 1/8 TH'K PHENOLITE OR EQUAL
HOLES NOT NOTED DRILL #33

G				ITEM	PART NO.
F					
E				SERVO MECHANISMS LABORATORY OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345	
D					
C				MARK IV PIEK DECUMULATOR PANEL DRILLING TEMPLATE & ASS'Y	
B				MAT'L FIN'L	D-37513
A				DR. NHT 4/11/67	
	ITEM	APP.	DATE		

NOTE - "V" & "J" NUMBERS

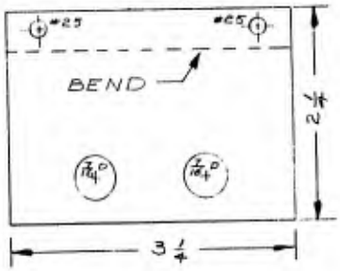
PANEL MTG POST
REF. L-37518

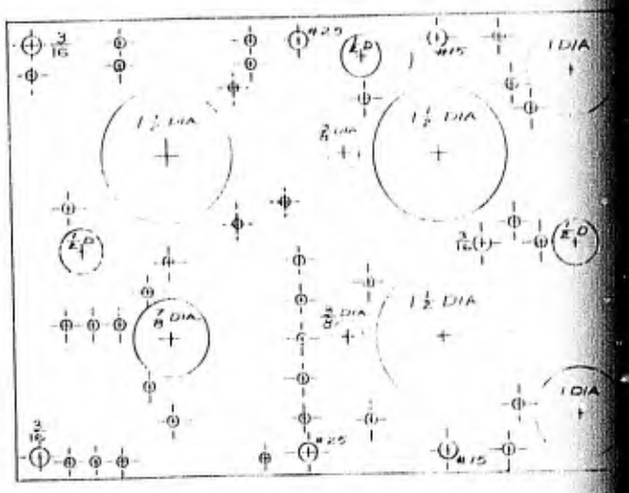




PANEL 1 - 1/8"

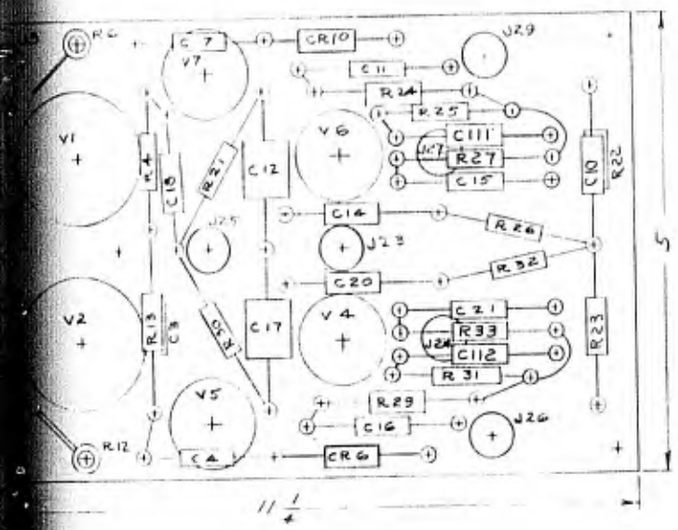
INDICATOR MTG. ANGLE
1/16 TH'K. ALUM. - 1 REQ'D



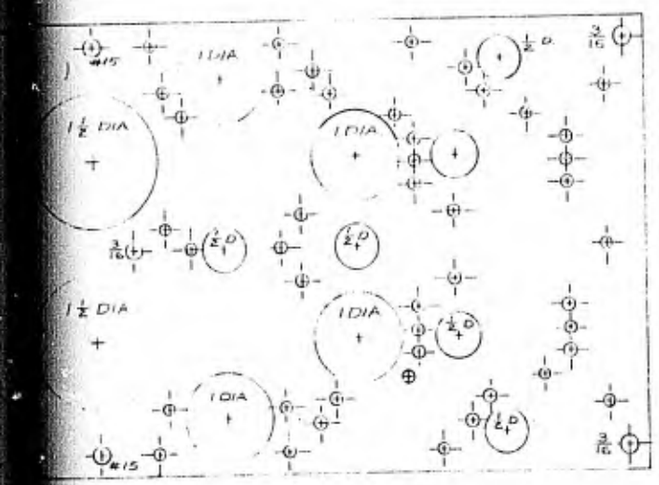


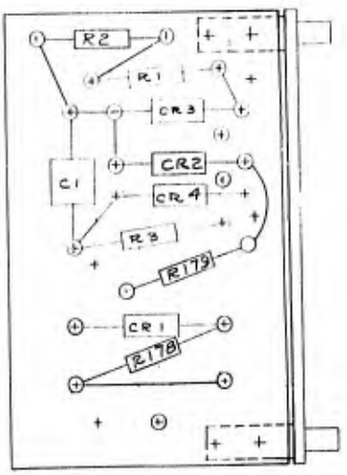
HOLES NOT NOTED DR 11-33

'J' NUMBERS ARE FOR REFERENCE ONLY.

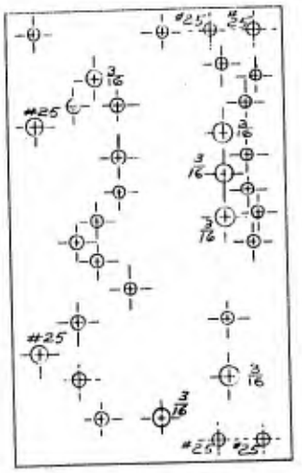


PANEL 1 – 1/8 THK PHENOLITE OR EQUAL





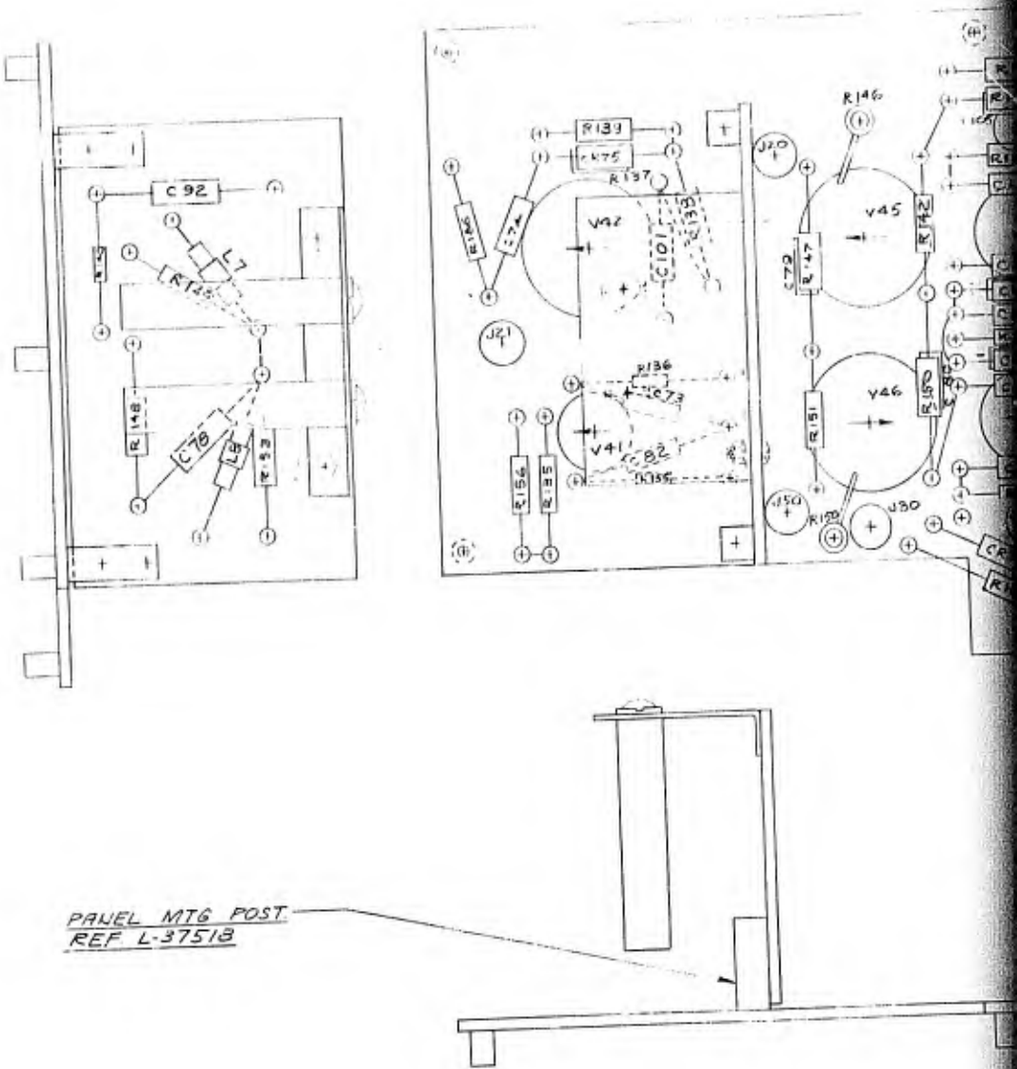
PANEL 2
1/8 TH'K PHENOLITE OR EQUAL



TED DR #33

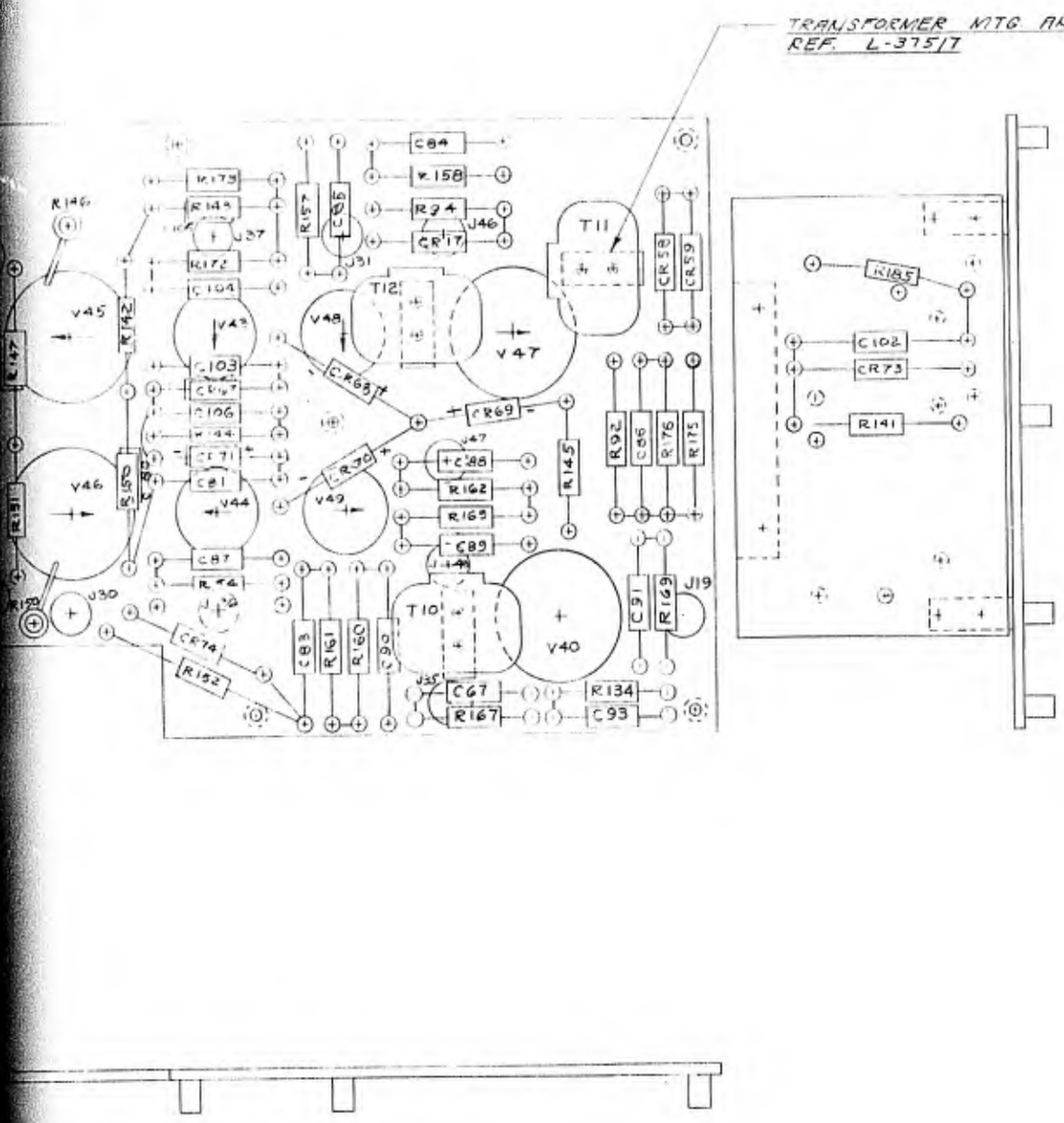
MULTIPLIER "B" REGISTER PANEL DRILLING TEMPLATE & ASS'Y.

D-37515



PANEL MTG POST
REF L-37518

NOTE : V & J NUMBERS FOR REFERENCE ONLY

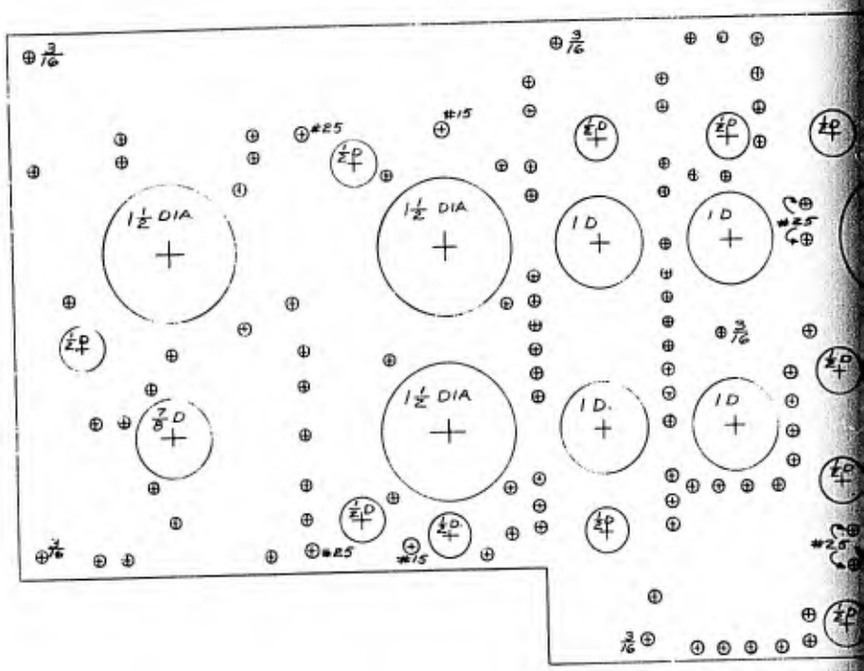


MULTIPLIER "A" REGISTER COMPONENT ASS'Y.

PANEL TEMPLATE REF. L-37516

2345 NHT - D-37515

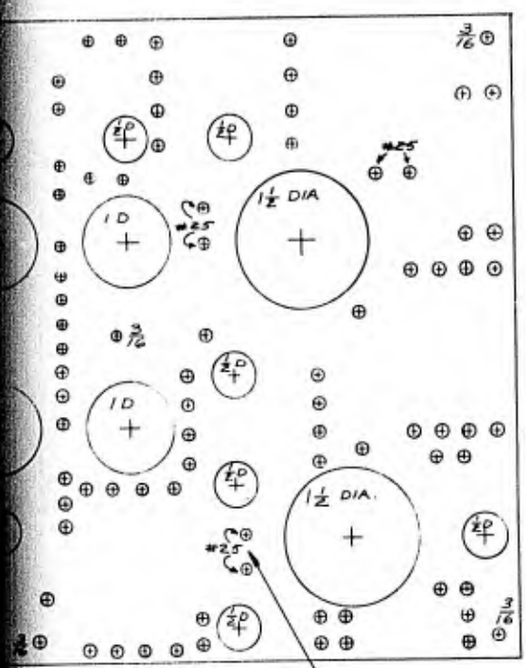
D-37516

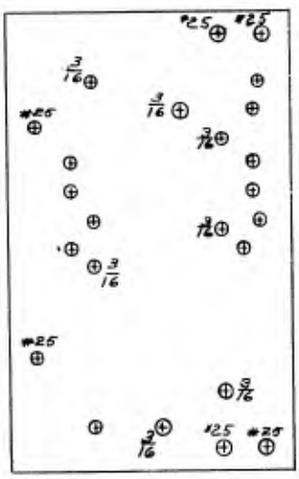


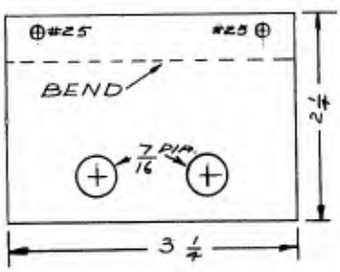
HOLES NOT NOTED DR. #3

MATERIAL - ⅛ PHENOLITE OR EQUAL

MULTIPLIER "A" REGISTER PA







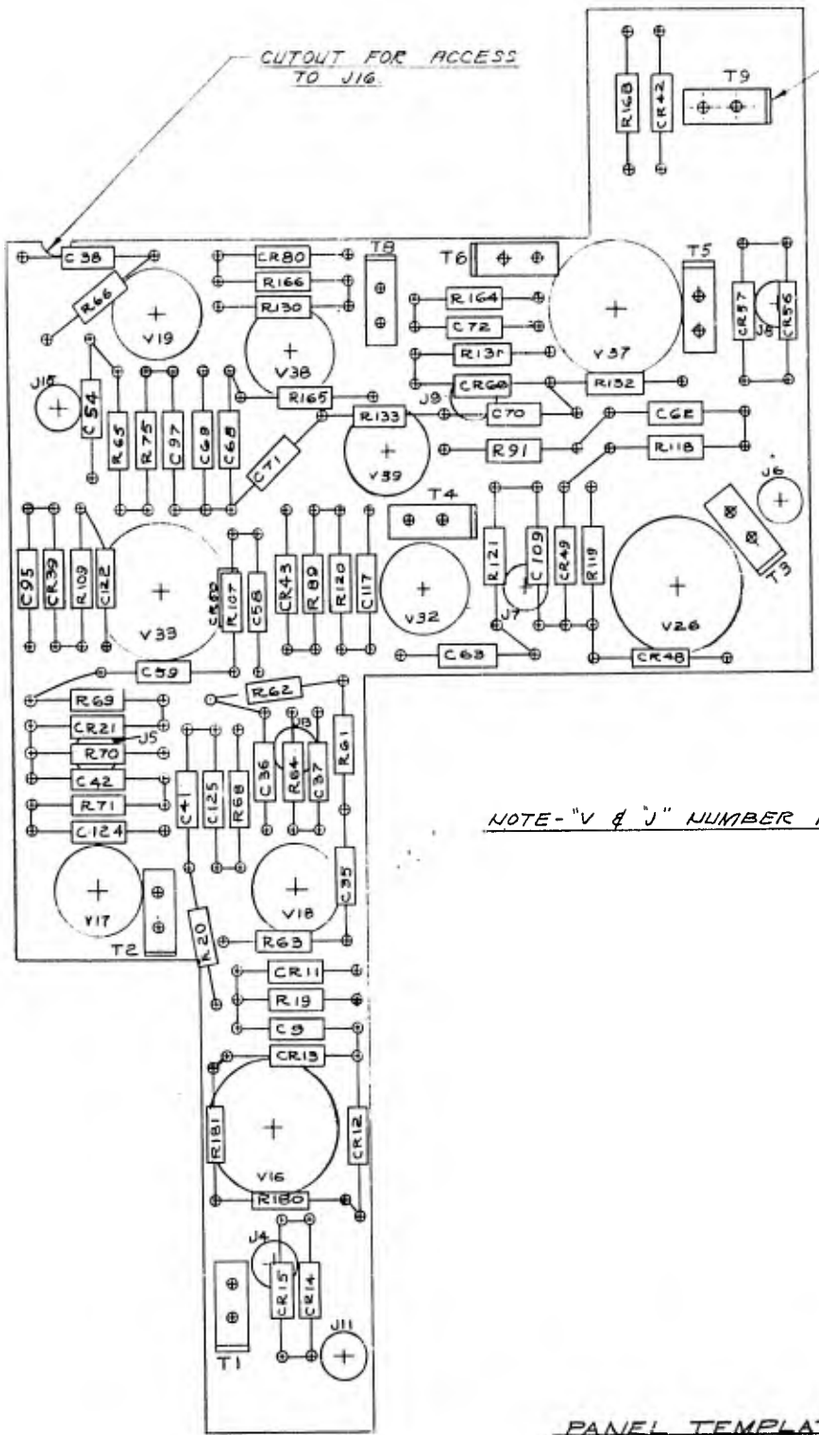
NOTED DR. # 33

LITE OR EQUAL

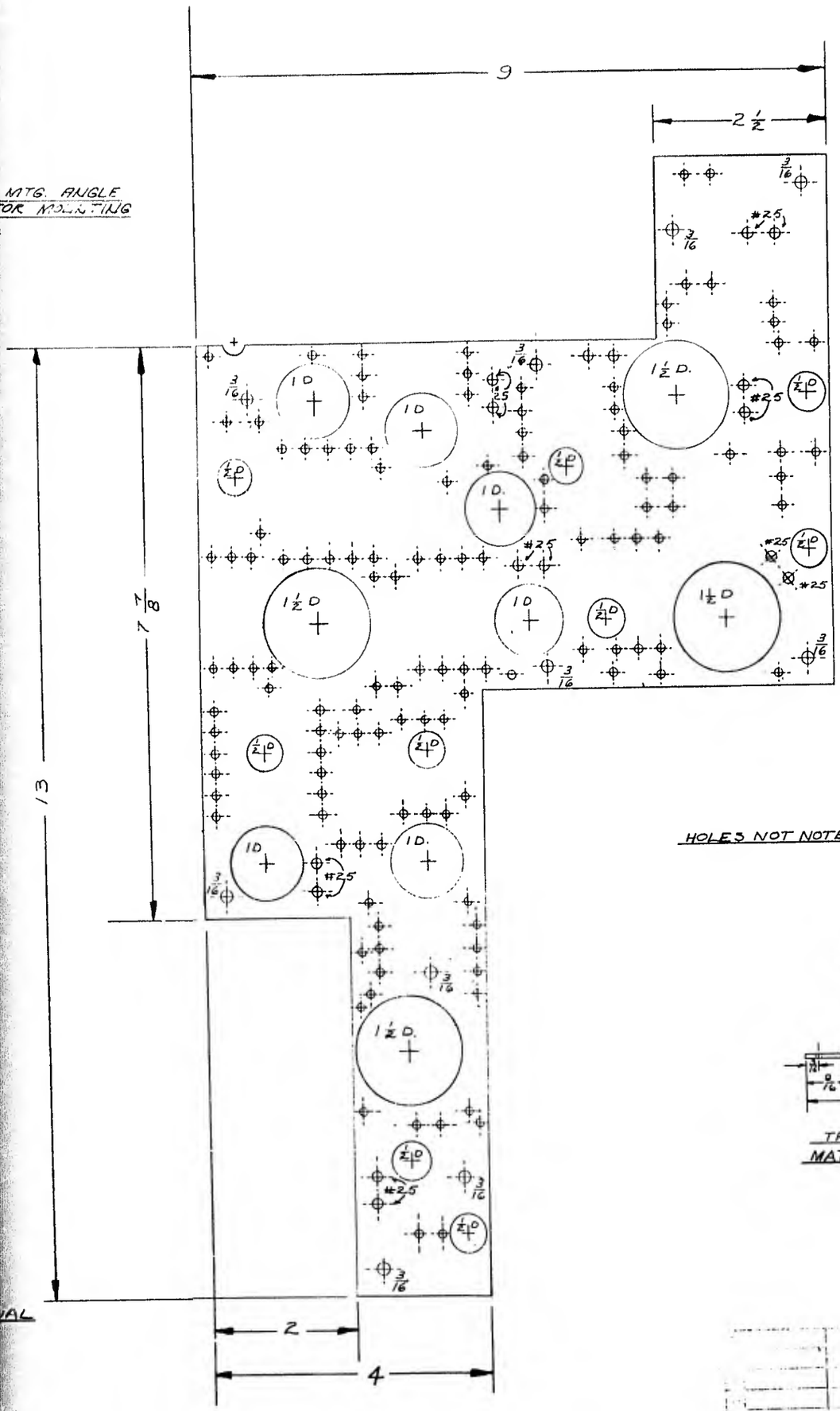
ISTER PANEL TEMPLATE

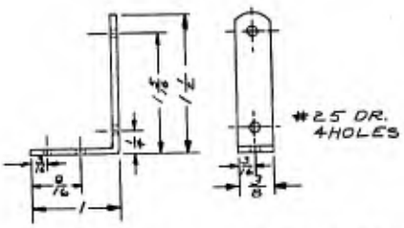
2

D-37517


CUTOUT FOR ACCESS TO J16
TRANSFORMER MTG. ANGLE SEE L-37515 FOR MOUNTING TRANSFORMER.
T9
R168
CR42
T8
T6
T5
C38
R66
V19
CR80
R166
R130
V38
R165
R133
V39
R164
C72
R131
V37
CR60
R132
C70
R91
C68
R118
C71
J16
C54
R65
R75
C97
C88
C68
J9
CR97
CR96
J8
J6
T4
T3
C95
CR39
R109
C122
V33
C58
R107
C56
CR43
R80
R120
C117
V32
R121
C109
CR49
R119
V26
J7
C63
CR48
C59
R62
R69
CR21
J5
R70
C42
R71
C124
J13
C41
C125
R68
C36
R64
C37
R61
V17
T2
V18
C35
R20
R63
CR11
R19
C9
CR13
R181
V16
CR12
R180
J4
CR15
CR14
T1
J11
NOTE- "V & J" NUMBER FOR REF. ONLY.
13
7 7/8
PANEL TEMPLATE
MAT'L - 1/8 PHENOLITE OR EQUAL

MTG. ANGLE
FOR MOUNTING
R.





TRANSFORMER MT'G ANGLE - 7 REQ'D.
MAT'L - 1/16 STAIN. ST'L. OR EQUAL

UAL

6345

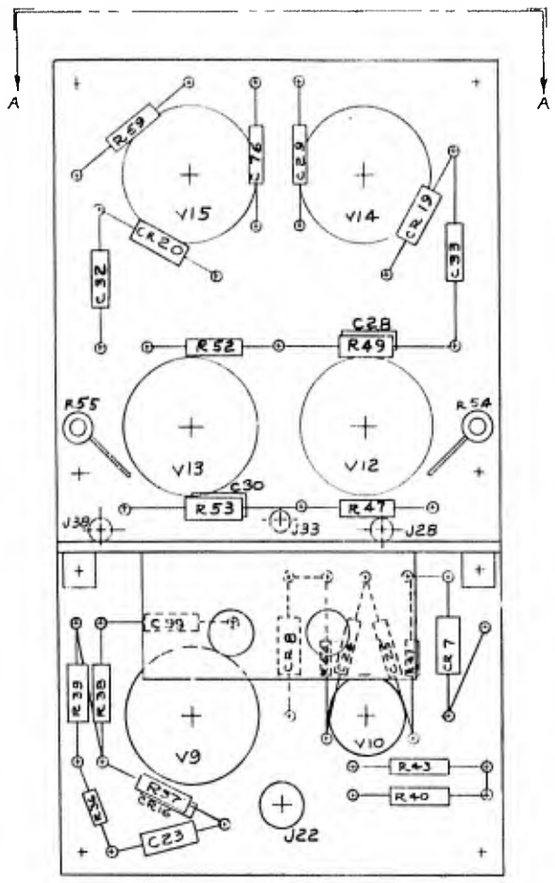
GATE AND BUFFER PANEL NO. 1
DRILLING TEMPLATE & ASSY.

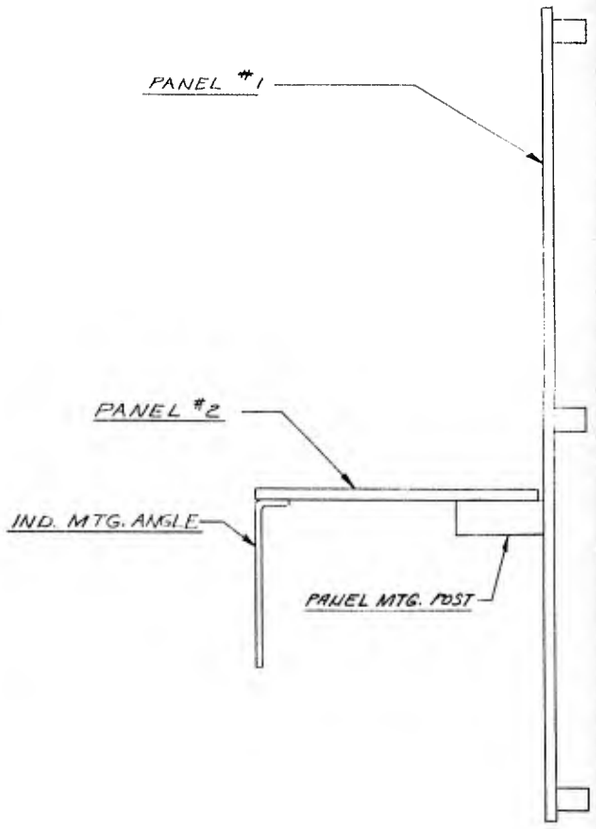
FULL

7-3-47

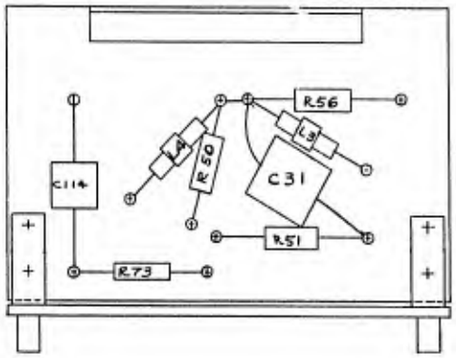
D-37517

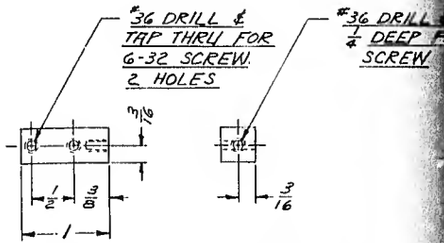
D-37518-1





NOTE - "J" & "V" NUMBERS ARE FOR REFERENCE ONLY.

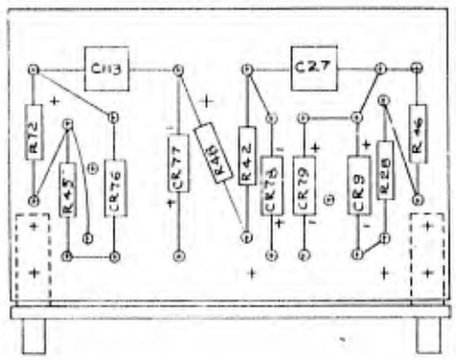




PANEL MTG POST - 2 REQ'D.
MAT'L - 3/8 SQ. BRASS STOCK

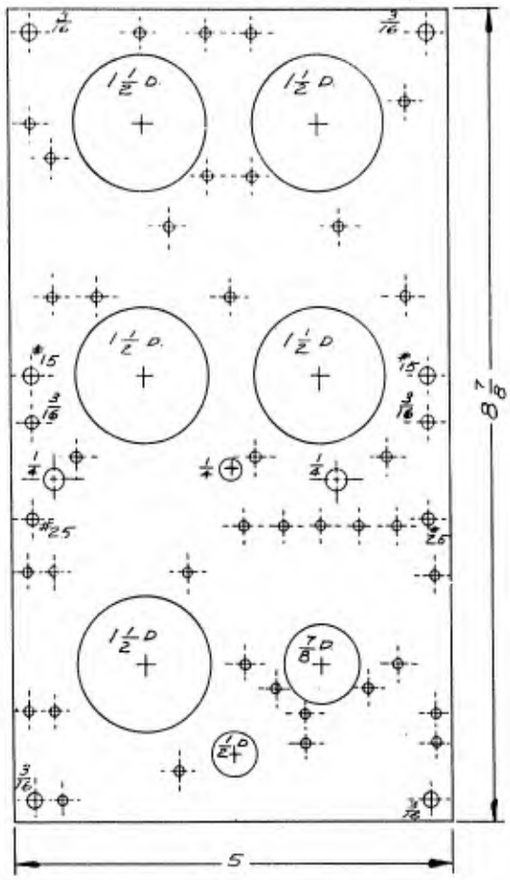
DRILLING TEMPLATES

HOLES NOT NOTED DRILL #33

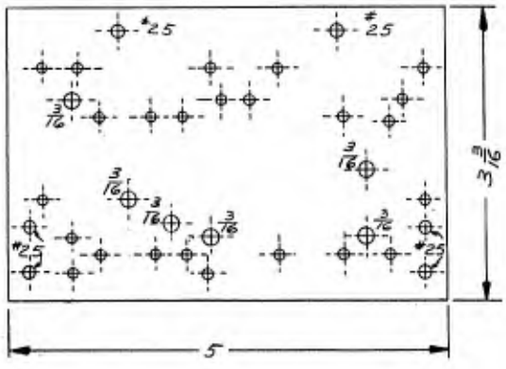


VIEW (UPRIGHT) A-A SHOWING COMPONENT ASS'Y PLAN

PANEL #1 - 1/8 TH'K PHENOLITE OR EQUAL



PANEL #2 - 1/8 TH'K PHENOLITE OR EQUAL



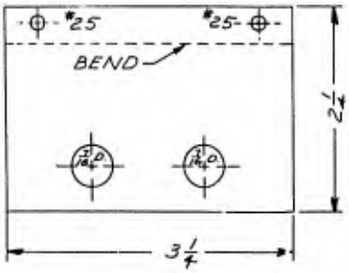
#36 DRILL & TAP 1/4 DEEP FOR 6-32 SCREW

3/16

REQ'D. STOCK

INDICATOR MTG. ANGLE

1/16 TH'K ALUM. - 1 REQ'D



MATERIAL DESCRIPTION	PART NO.	ITEM

SERVOMECHANISMS LABORATORY OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

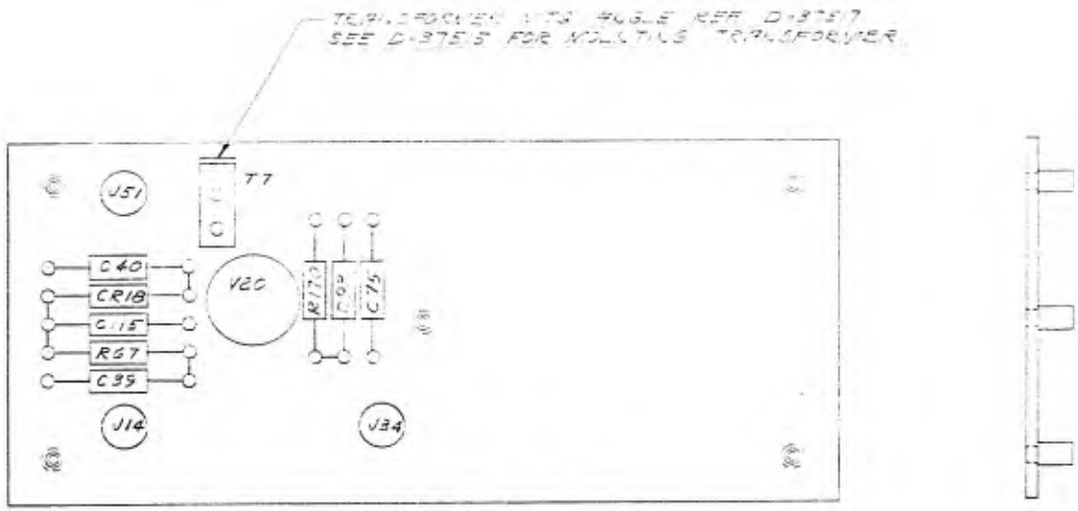
MULTIPLIER CARRY F.F. PANEL DRILLING TEMPLATE & ASS'Y.

SCALE: FULL | TR. McHUGH 12-1-47

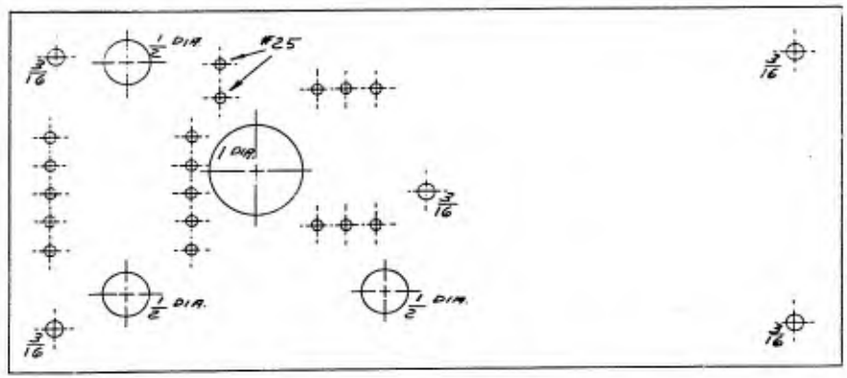
W. ENG. | CK.

D-37518-1

C-37521



NOTE - "V" & "J" NUMBERS FOR REF. ONLY

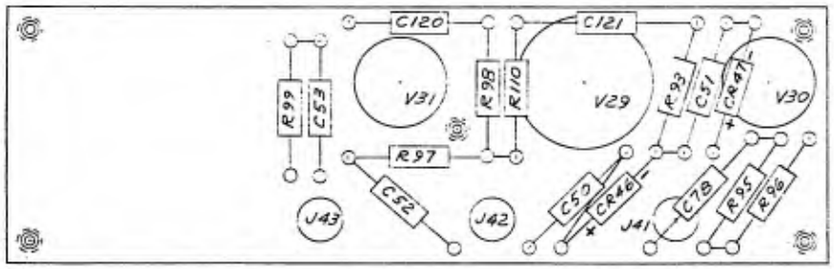


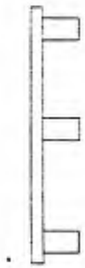
NOTE - MAT'L: 1/8 TH'K LINEN BASE PHENOLITE
HOLES NOT NOTED DRILL #33

GATE & BUFFER AMPLIFIER PANEL #2
DRILLING TEMPLATE & ASS'Y.

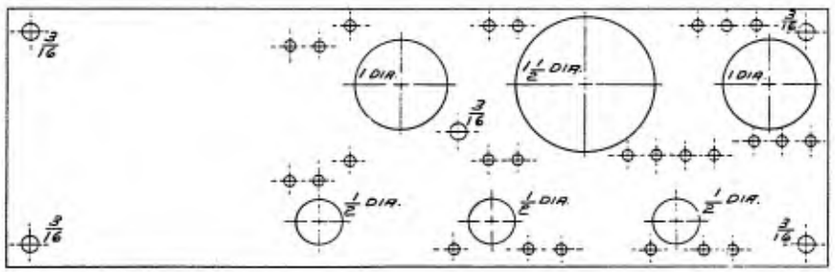
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ELECTRONICS LABORATORY
E.L.S.No. G345 | M.I.T. Cont. # | T-14-61
Dwn. TLG | No. C-37521

C-37522





NOTE - "V" & "J" NUMBERS FOR REF. ONLY.



NOTES - MAT'L: 1/8 TH'K LINEN BASE PHENOLITE.
HOLES NOT NOTED DRILL #33.

GATE & BUFFER AMPLIFIER PANEL #3
DRILLING TEMPLATE & ASS'Y.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SERVOMECHANISMS LABORATORY

DRN.	W.J.C.	7-15-47
CHK.		
APP.		C-37522

MULTIPLIER COLOR CODE

+250 V.	WHITE	WITH	RED	TRACER	#20
1150 V.	"	"	YELLOW	"	"
GROUND	"	"	BLACK	"	"
-50 V.	"	"	BLUE	"	"
GRID LEADS	"	"	GREEN	"	"
MISC. JUMPERS	"	"	NO	"	"
FILAMENTS	"	"	BROWN	"	#16 & #20
-20 V.	"	"	VIOLET	"	#20
-10 V.	"	"	GRAY	"	"

A-3068A-1

SA-39321

CONNECTOR: UG 260-U

CABLE RG-62 U

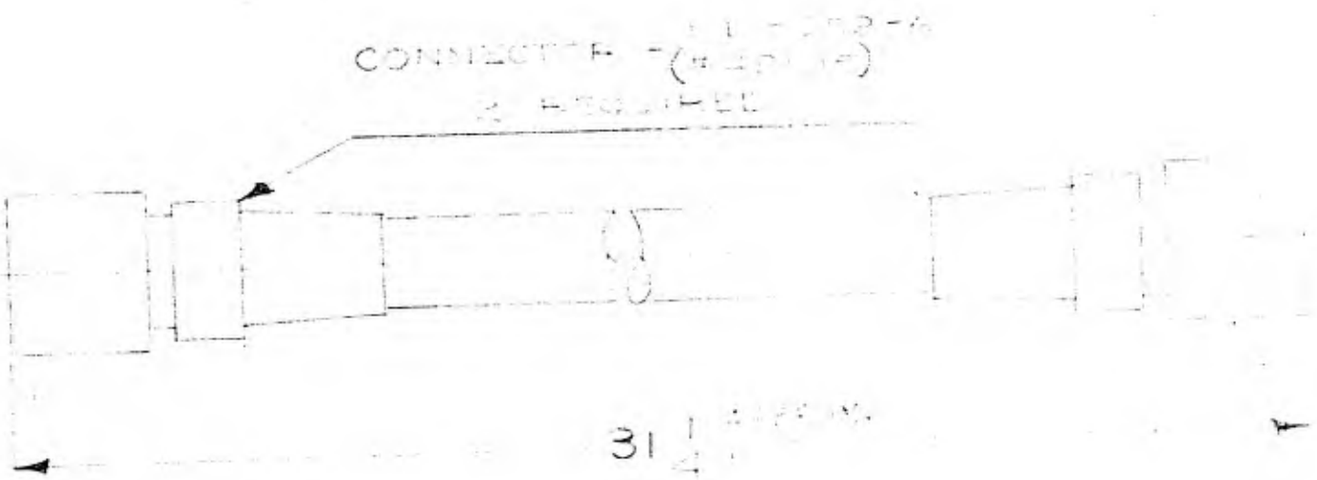
No.	CABLE DESIGNATION	LABEL END #1	LABEL END #2	LENGTH "C"	NO. REQ.
A	CARRY DIGIT	PL19	PL28	33"	4
B	HI-SPEED CARRY	PL6	PL7	28"	4
C	MULTIPLY	BR5, PL23	MULTIPLY	38"	1
D	TO RT BR4-5	BR4, PL27	BR5, PL1		1
E	TO RT BR4-5	BR4, PL24	BR5, PL12		1
F	AC5 TO BRD	AC5, PL30	BR3, PL12		1
G	AC5 TO BRD	AC5, PL40	BRD, PL1		1
H					
I					

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

SINGLE VIDEO CABLES

SCALE: —	DR. JLC 8-25-47	SA-39321
ENG. [illegible]	CK.	APP.

SA-39322



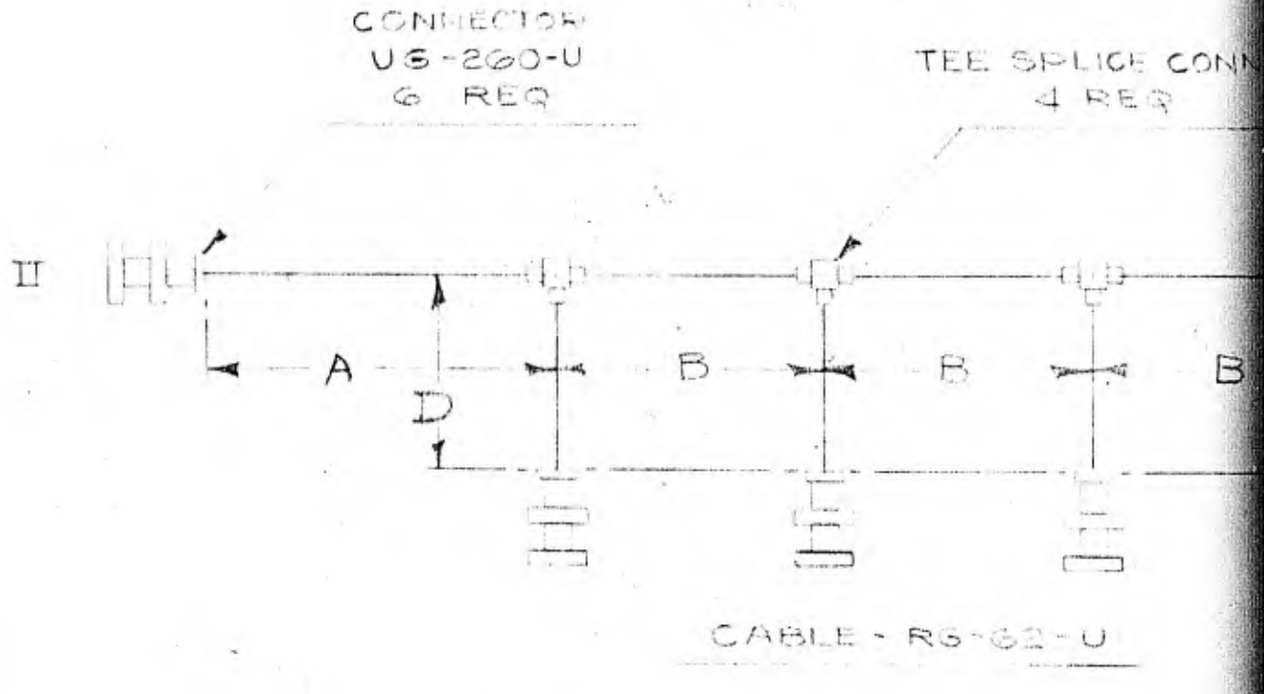
CABLE - RG-65U
CABLE LENGTH -
CUT TO 30" BEFORE ASSEMBLY
NO. REQUIRED - 24

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. [illegible]

DELAY CABLE

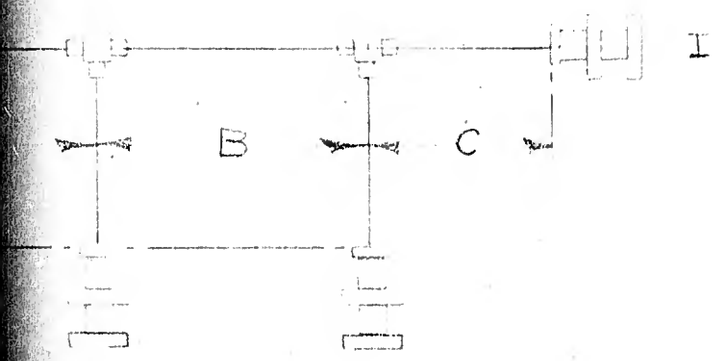
SCALE: —	DR. [illegible]	SA-39322
ENG [illegible]	CK.	APP.

"ALBANENE" NO. 1965 K&E CO., N.Y.X



NO.	NAME	LABEL			
		END I	END II	EACH BRANCH	
"X"	CARRY ORDER BUS	CARRY	PL 14	PL 14	3
"Y"	ADD ORDER BUS	ADD	PL 56	PL 86	3

SPLICE CONNECTOR
4 REQ



2-U

EL		LENGTH				NO. REQ
D	EACH BRANCH	A	B	C	D	
4	PL14	30	20	16	11	1
6	PL36	30	20	16	11	1

FOR 5-DIGIT MULTIPLIER ONLY

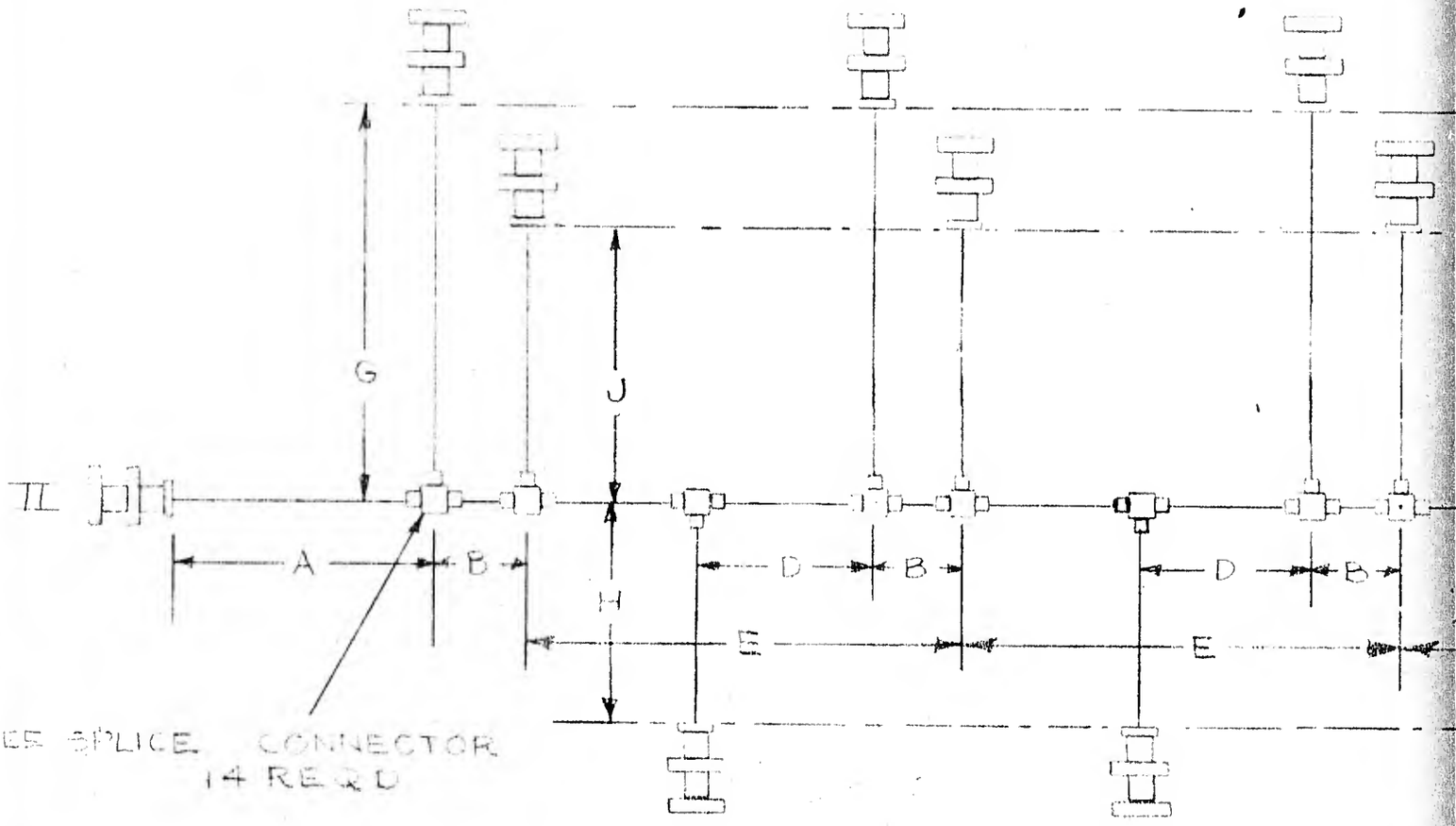
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

ADD AND CARRY ORDER BUSES

SCALE:	DR. MHG 8-26-47	SB-39323
ENG. C.W.W. 8/27/47	CK.	APP.

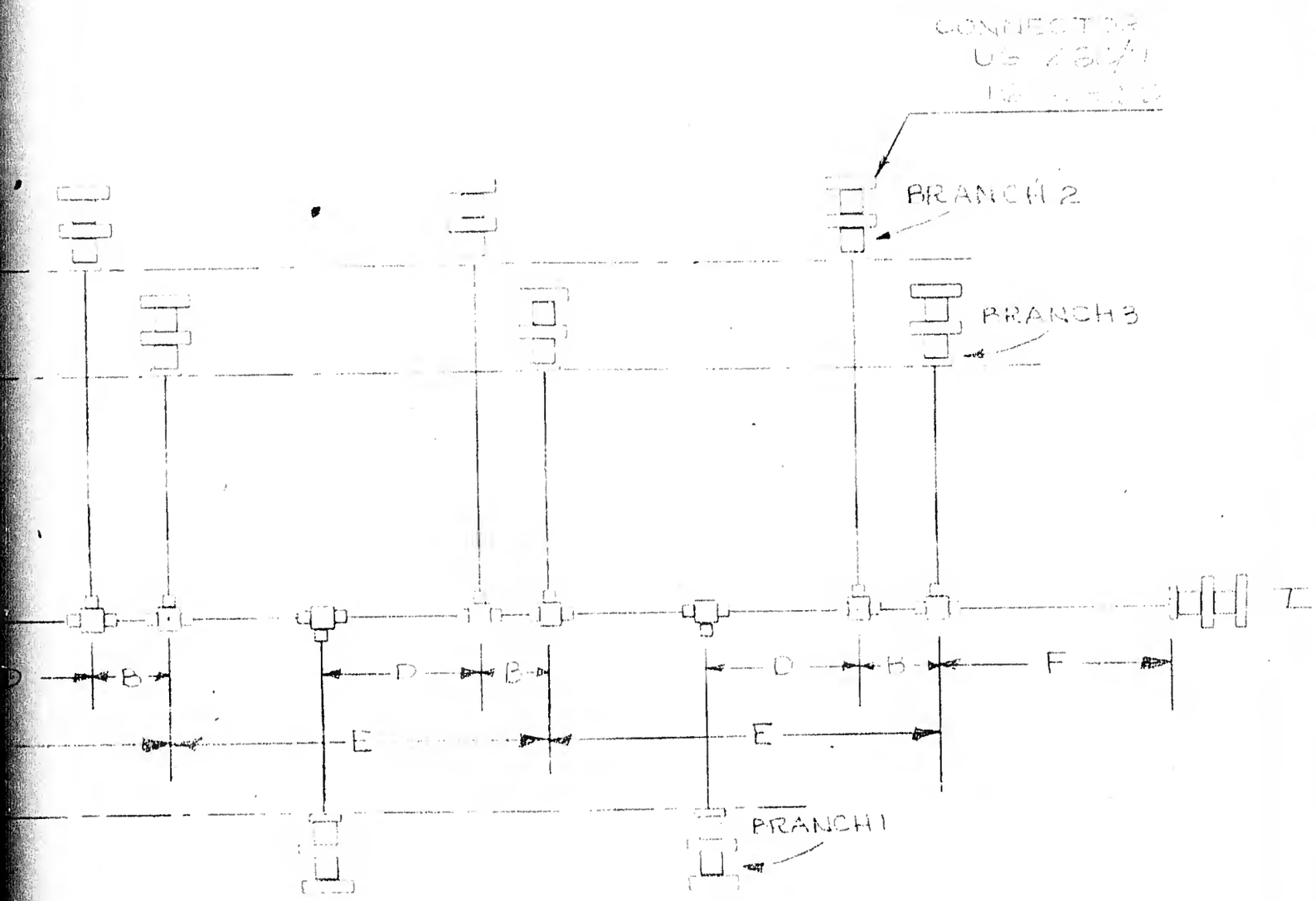
2

DB-59304



CABLE RG-62/U

NAME	LABEL					A	B
	END 1	END 2	BRANCH-1	BRANCH-2	BRANCH-3		
CLEAR ORDER BUS	CLEAR	PL-3	PL-3	PL-20	PL-17	15	2 5/8



RG-62/U

NOTE: ALL BRANCHES OF EQUAL LENGTH HAVE SAME BRANCH NO.

LENGTH									NO. REQ'D
A	B	C	D	E	F	G	H	J	
15	$2\frac{5}{8}$	$23\frac{1}{2}$	$10\frac{1}{2}$	20	21	15	$6\frac{1}{4}$	5	1

FOR 5-DIGIT MULTIPLIER ONLY

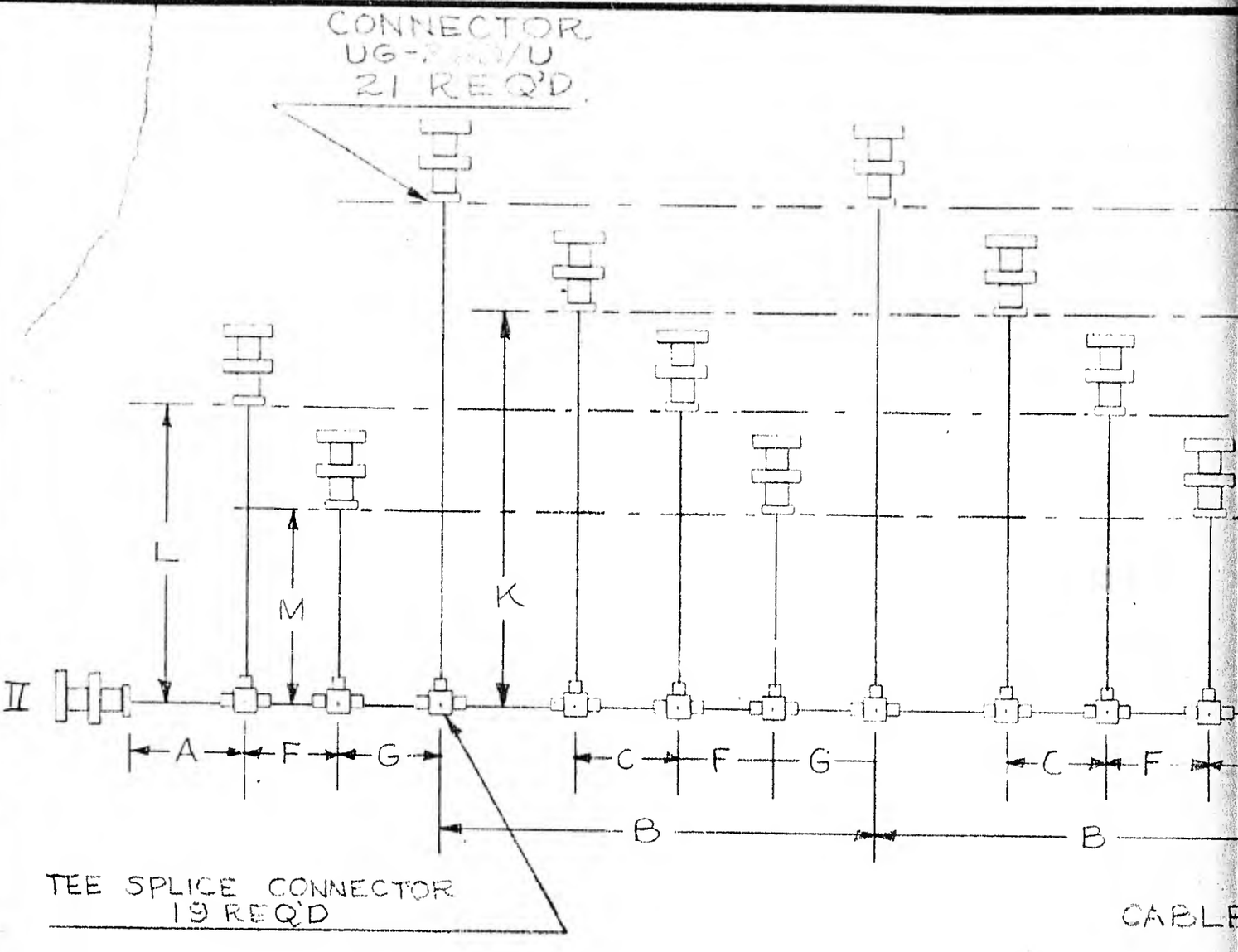
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

CLEAR ORDER BUS

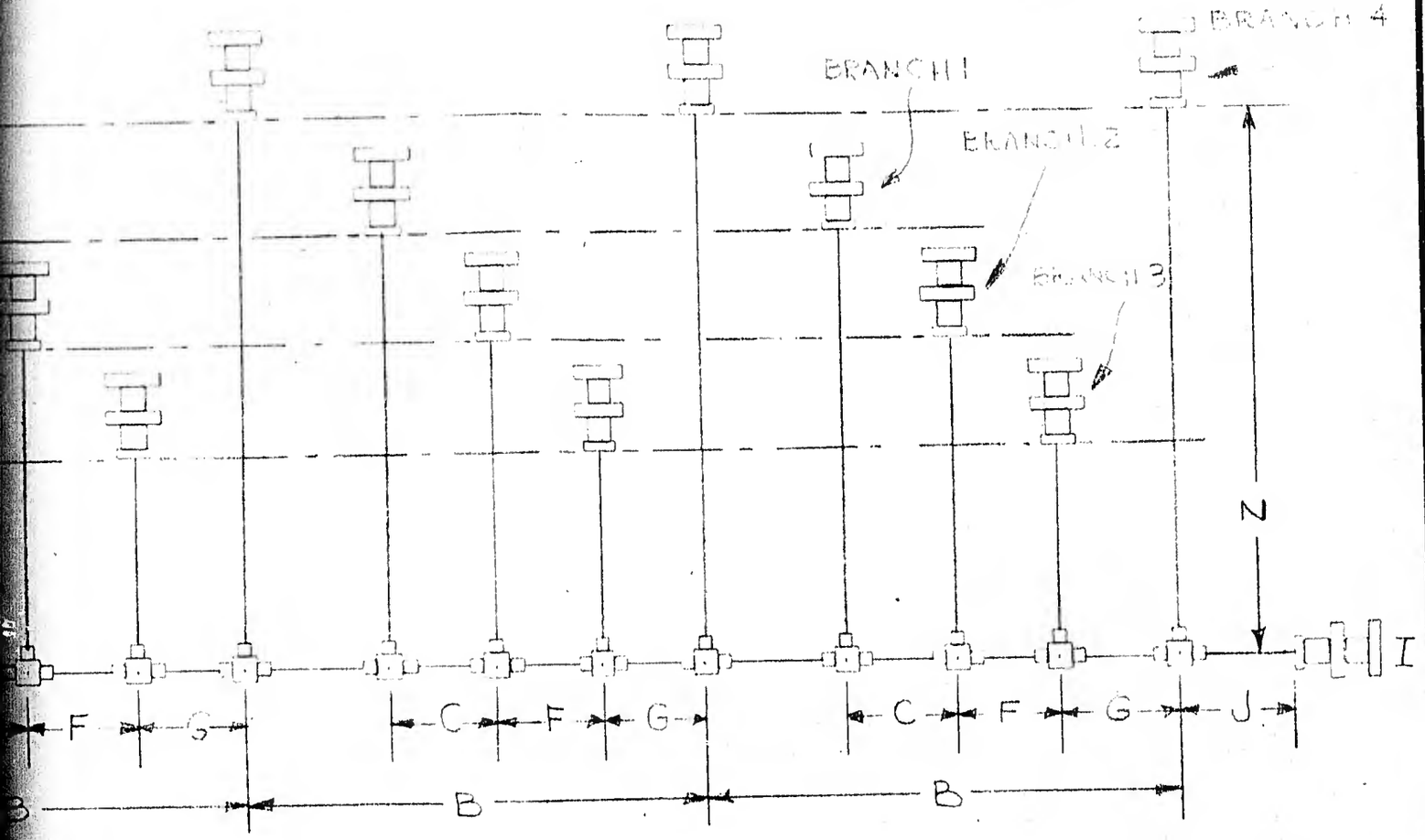
SCALE:	DR. [illegible] 8-27-47	SB-39324
ENG. C.W.W. 8/28/47	CK.	APP.

2

SB-39325



NAME	LABEL							
	END I	END II	BRANCH-1	BRANCH-2	BRANCH-3	BRANCH-4	A	B
RESTORE ORDER BUS	RESTORE	PL-10	PL-10	PL-30	PL-21	PL-22	21 1/2	20



CABLE RG-62/U

NOTE: BRANCHES OF EQUAL LENGTH HAVE SAME BRANCH NO.

	LENGTH									NO. REQ'D
	B	C	F	G	J	K	L	M	N	
	20	8	4 1/4	2 1/4	15	16	5	7	37	1

FOR 5-DIGIT MULTIPLIER ONLY

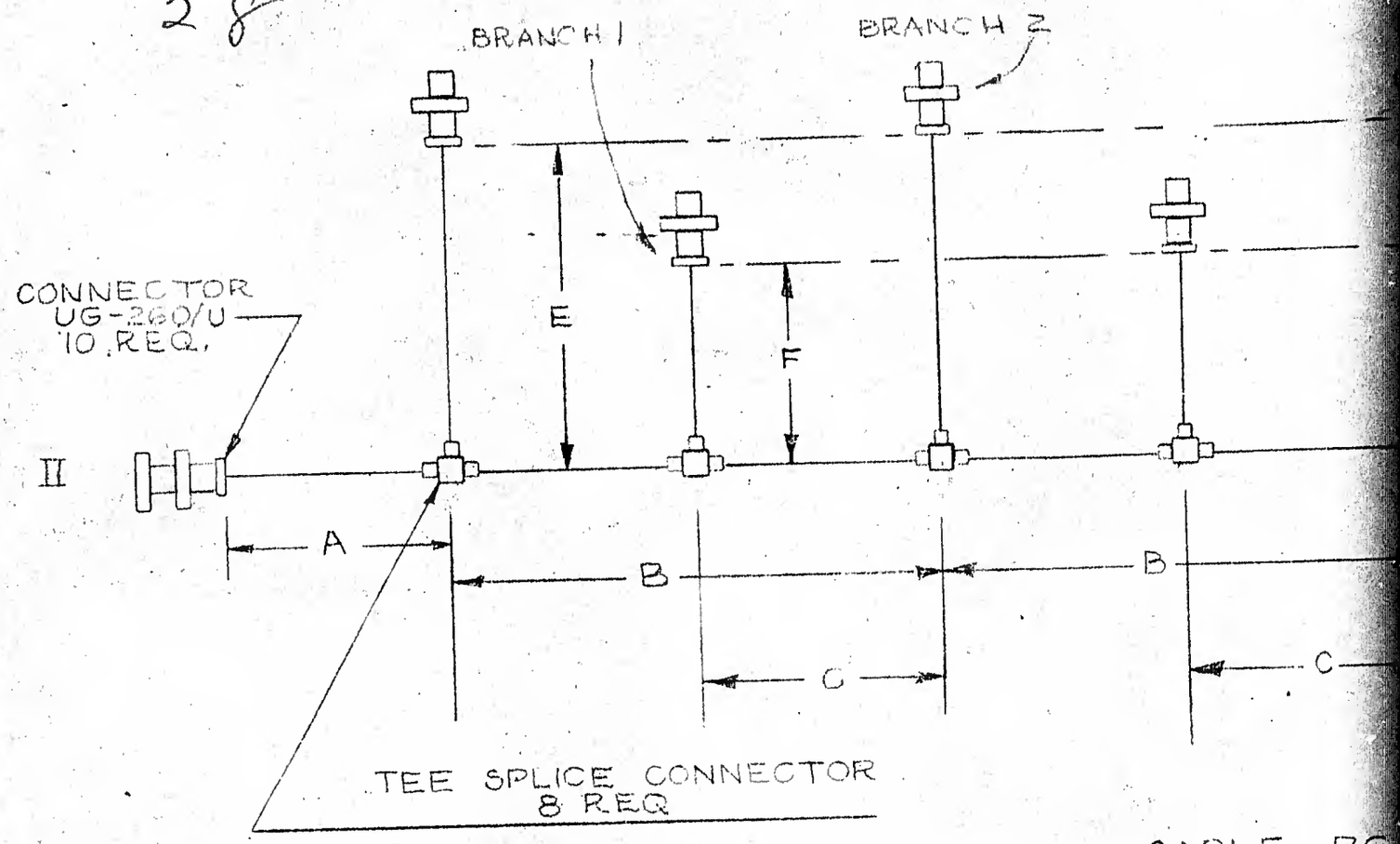
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

RESTORE-ORDER BUS

SCALE:	DR. McHugh 8-27-47	SB-39325
ENG. C.W.W. 8/28/47	CK.	APP.

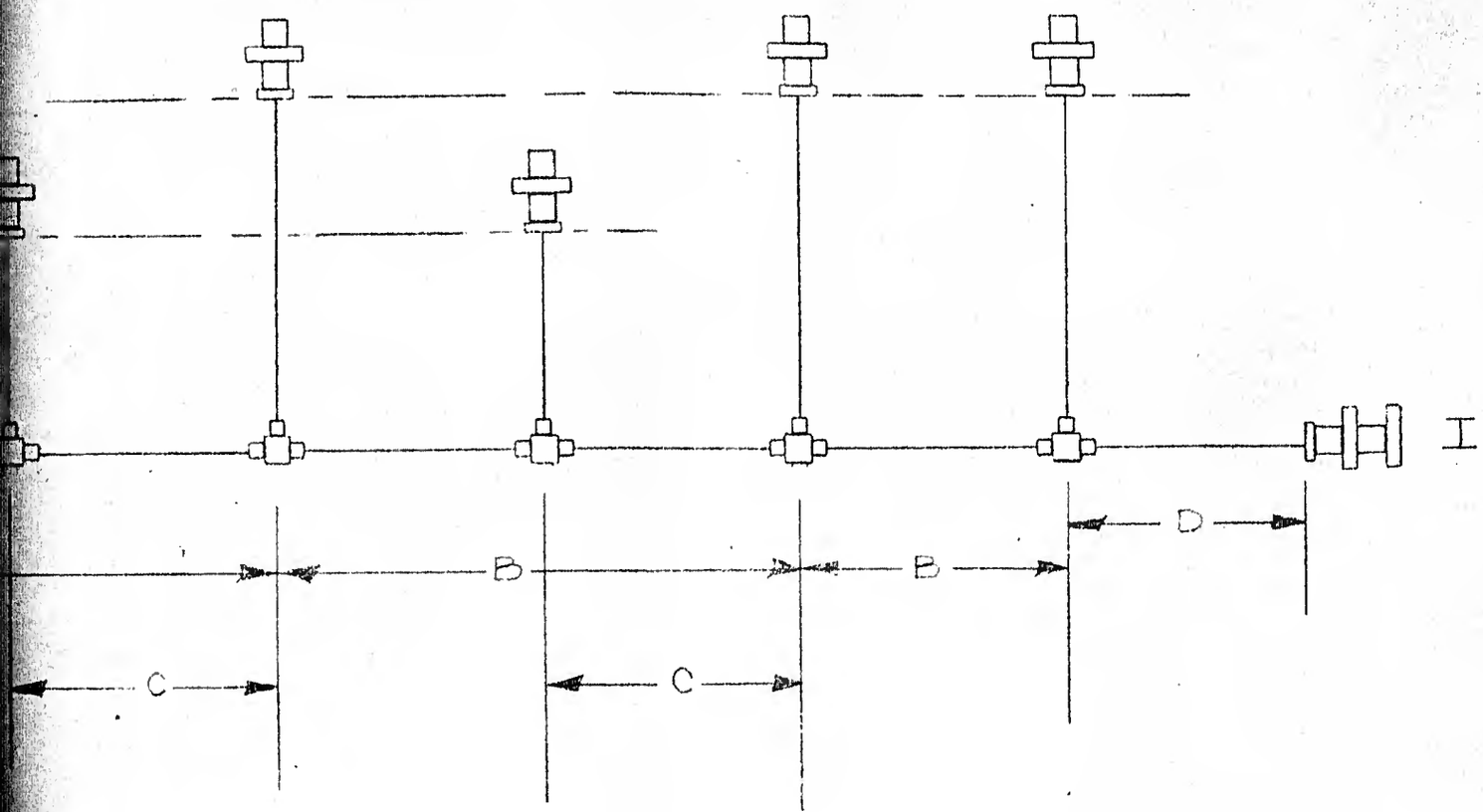
SB-39326

28



CABLE - RG

NAME	LABEL			
	END I	END II	BRANCH I	B
SHIFT & CARRY ORDER BUS	SHIFT & CARRY	PL-23	PL-23	P



CABLE - RG-62/U

NOTE: BRANCHES OF EQUAL LENGTH HAVE SAME BRANCH NO.

CEL. II	BRANCH 1	BRANCH 2	LENGTH A	B	C	D	E	F	NO. REQ.
3	PL-23	PL-19	22	20	14 1/4	13 1/2	5	9	1

FOR 5-DIGIT MULTIPLIER ONLY

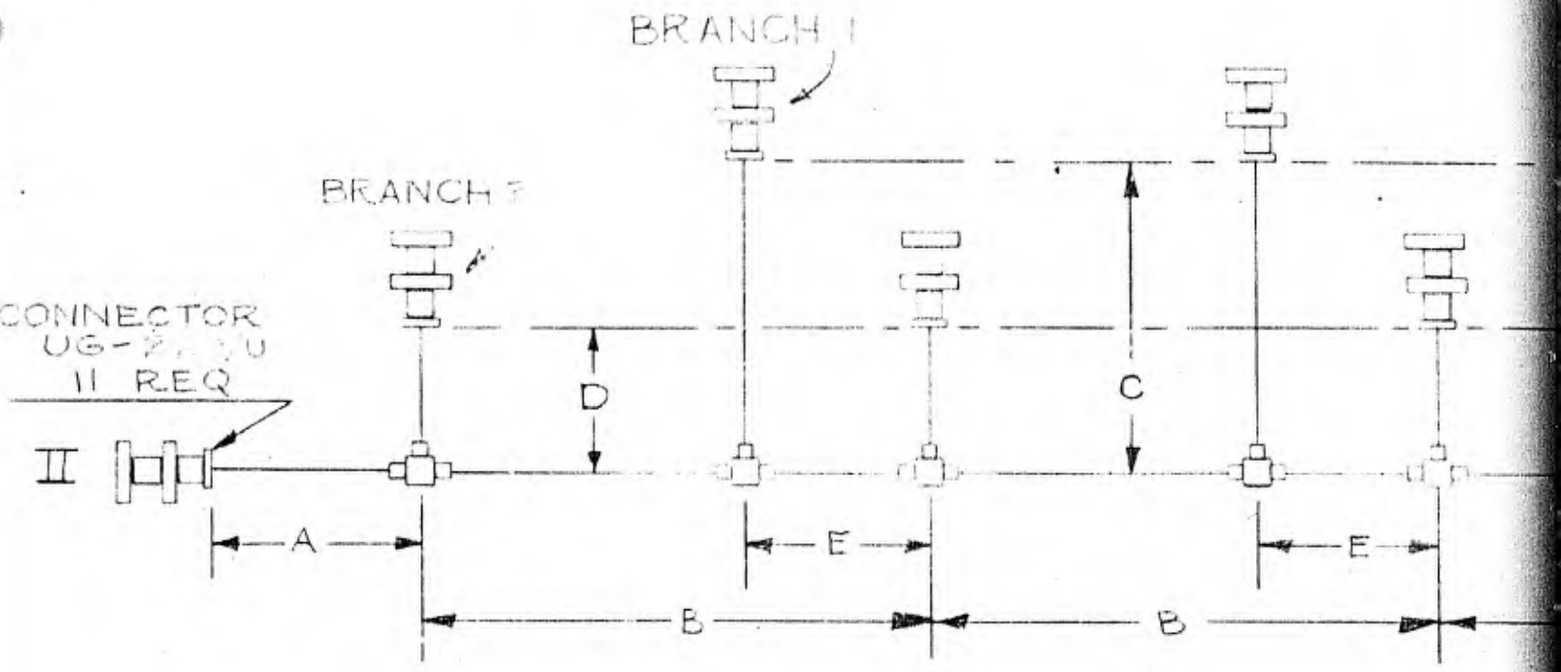
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

SHIFT AND CARRY ORDER BUS

SCALE:	DR. V.T.M. 8-27-47	SB-39326
ENG. C.W.W. 8/28/47	CK.	APP.

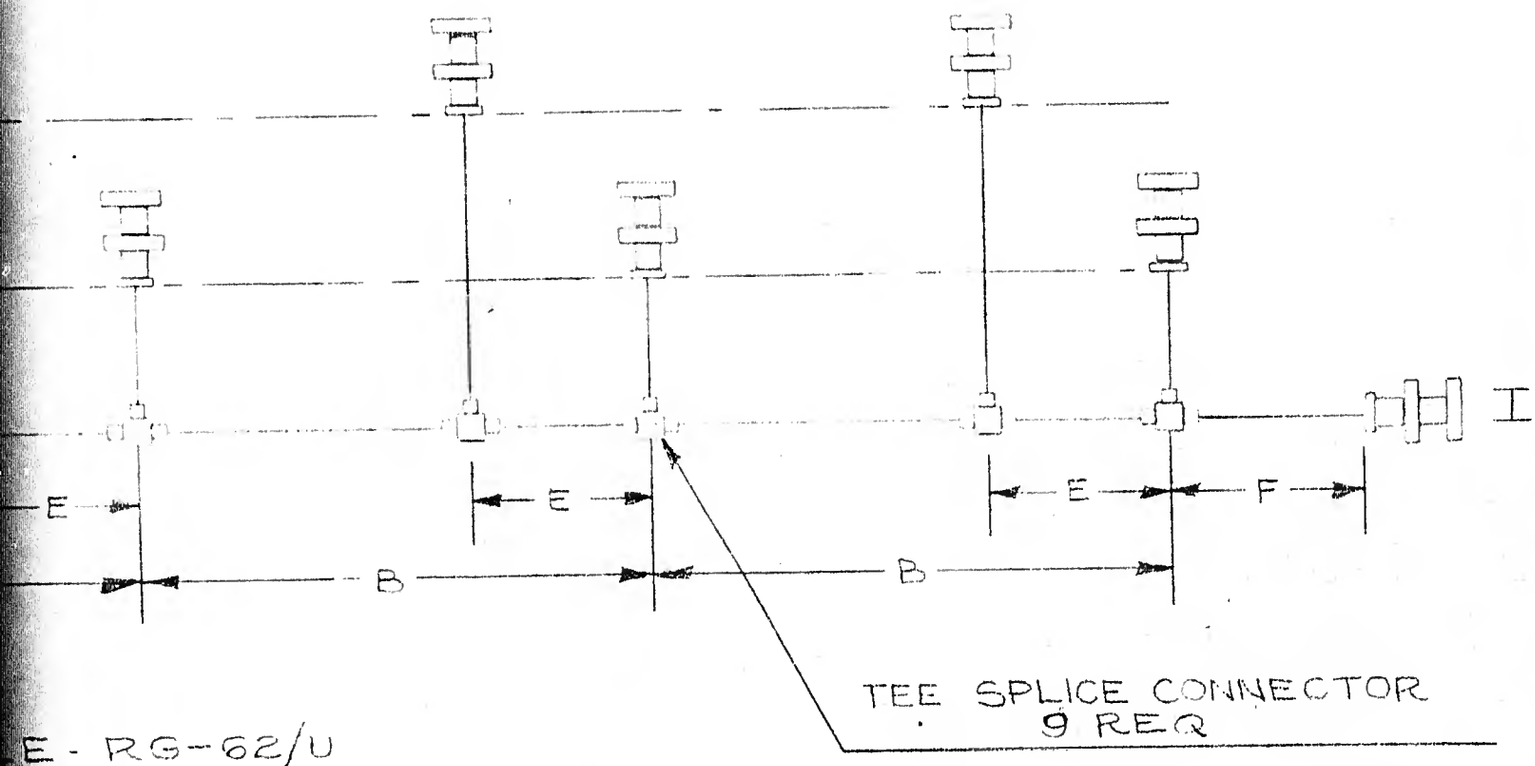
2

SB-39327



CABLE - RG-6

NAME	LABEL				L	
	END I	END II	BRANCH-1	BRANCH-2	A	B
READ IN BUS	READ IN	PL-13	PL-13	PL-47	16	20



E - RG-62/U

NOTE: BRANCHES OF EQUAL LENGTH HAVE SAME BRANCH NO.

	LENGTH						NO REQ
1-2	A	B	C	D	E	F	
7	16	20	14	5	2 1/4	27	1

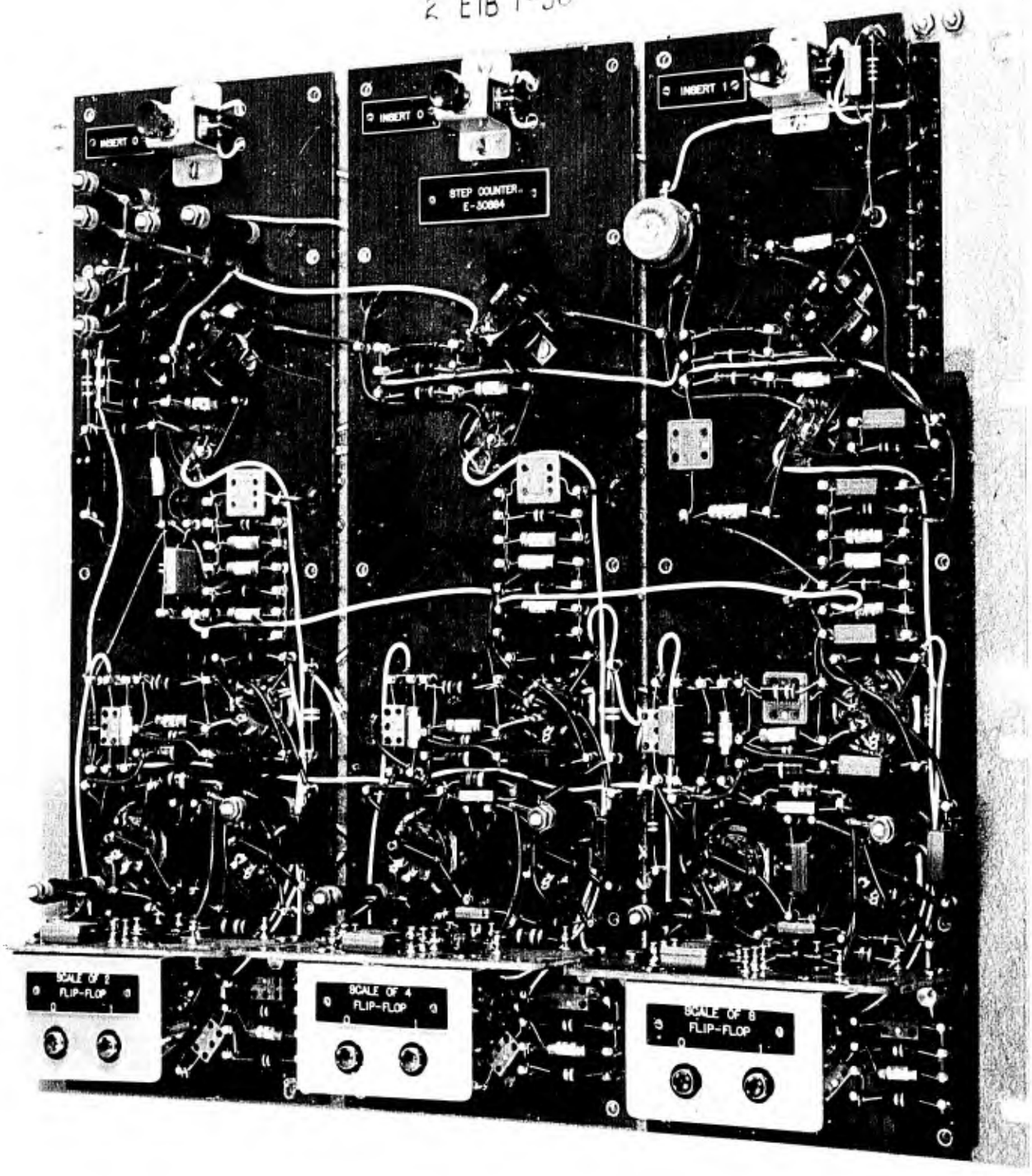
FOR 5-DIGIT MULTIPLIER ONLY

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

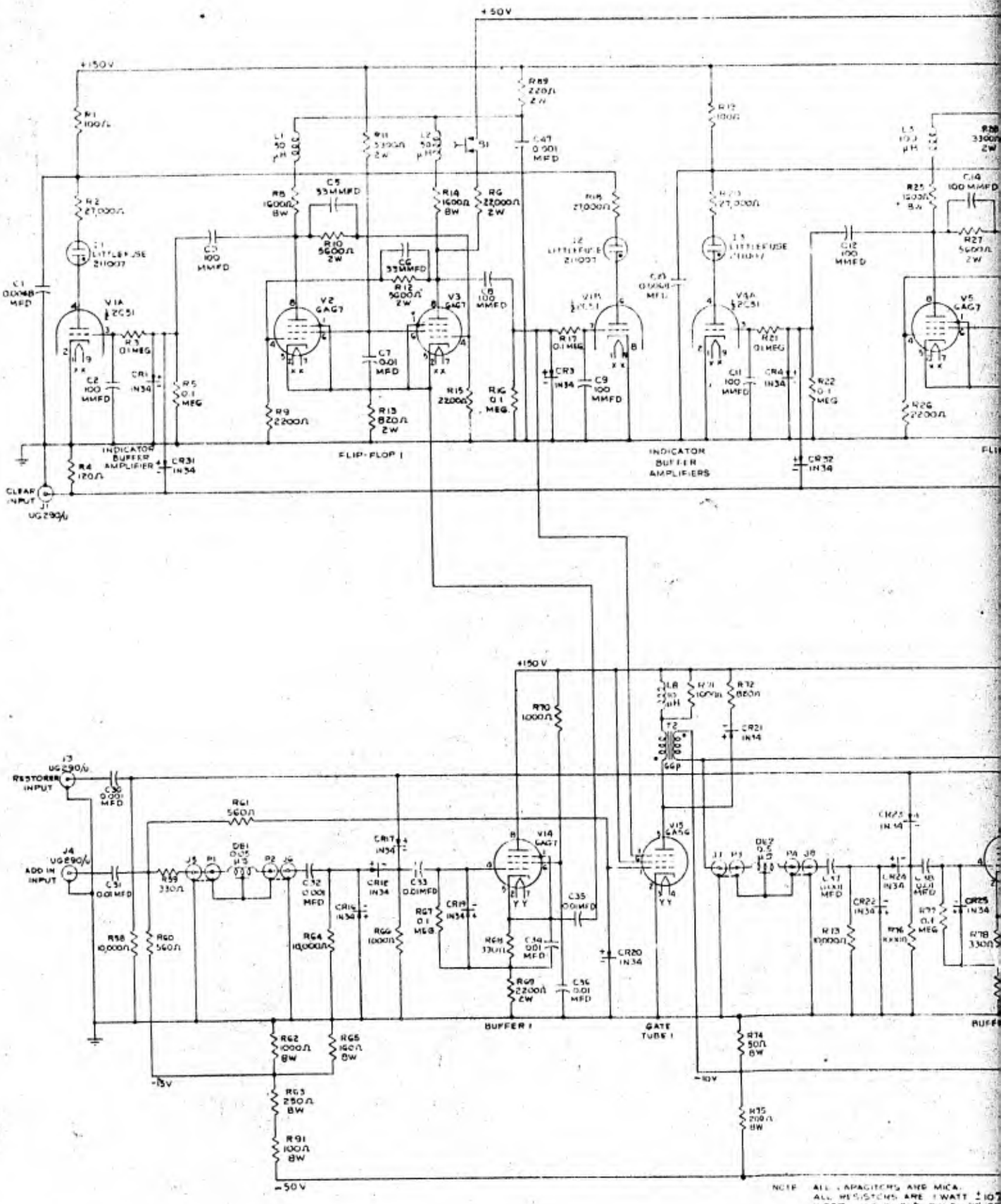
READ IN BUS

SCALE:	DR. McHUGH 8-27-47	SB-39327
ENG. C.W.W 8/28/47	CK.	APP.

FB 27C
2 EIB 1-50

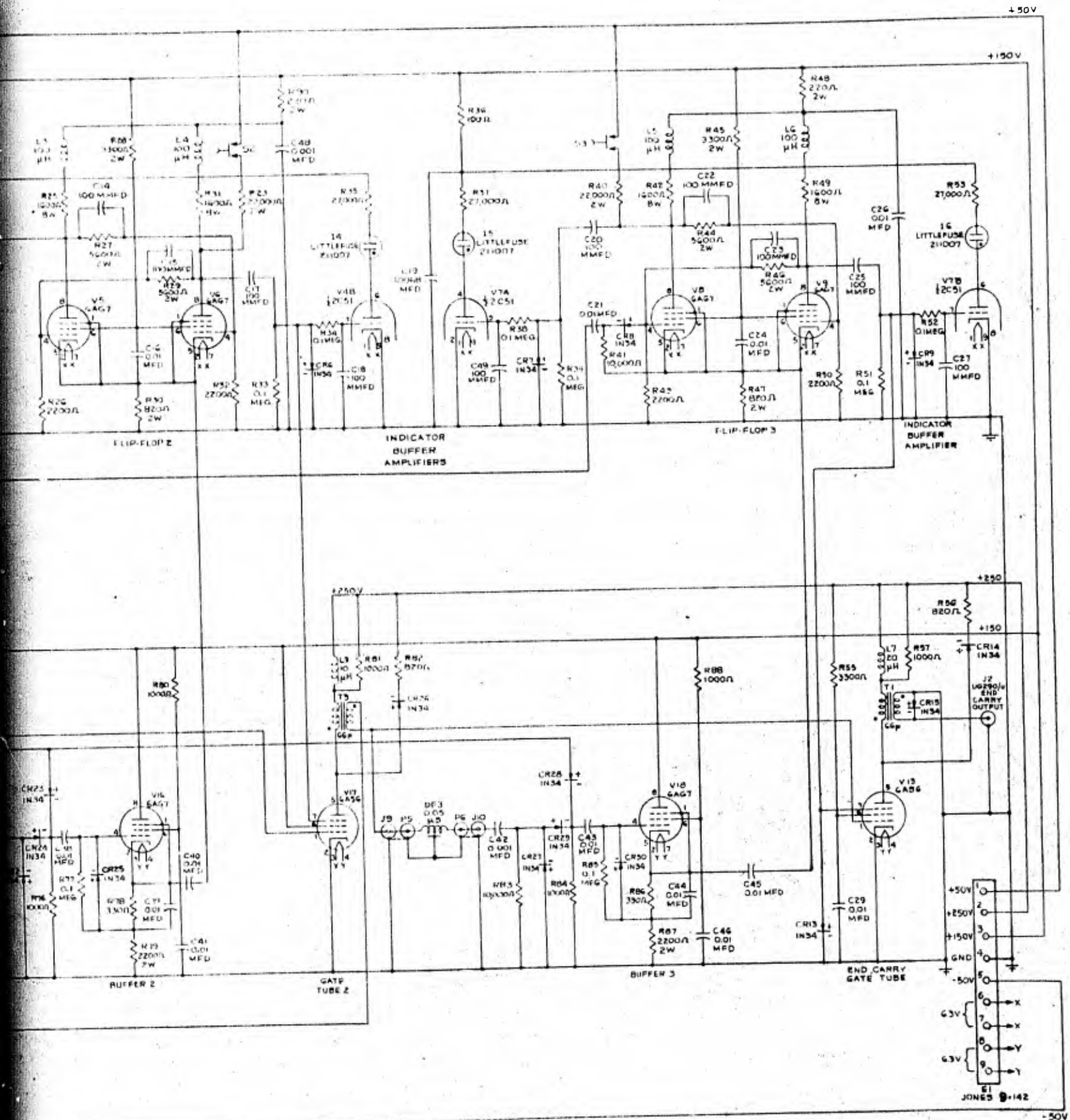


E-30884-1



NOTE ALL CAPACITORS ARE MICA.
ALL RESISTORS ARE 1 WATT ±10%
INTER-UNIT SHIELD, PIN 5, OF 20
DE1, DE2, AND DE3 ARE 9½ INC

USED IN 6345 REPORT R-126



TORS ARE MICA.
TORS ARE 1 WATT ±10% UNLESS OTHERWISE SPECIFIED.
SHIELD PIN 5, OF 2C51'S MUST BE GROUNDED.
AND DE3 ARE 9½ INCH LENGTHS OF RG65/U CABLE.

STEP COUNTER CIRCUIT SCHEMATIC II.

6345

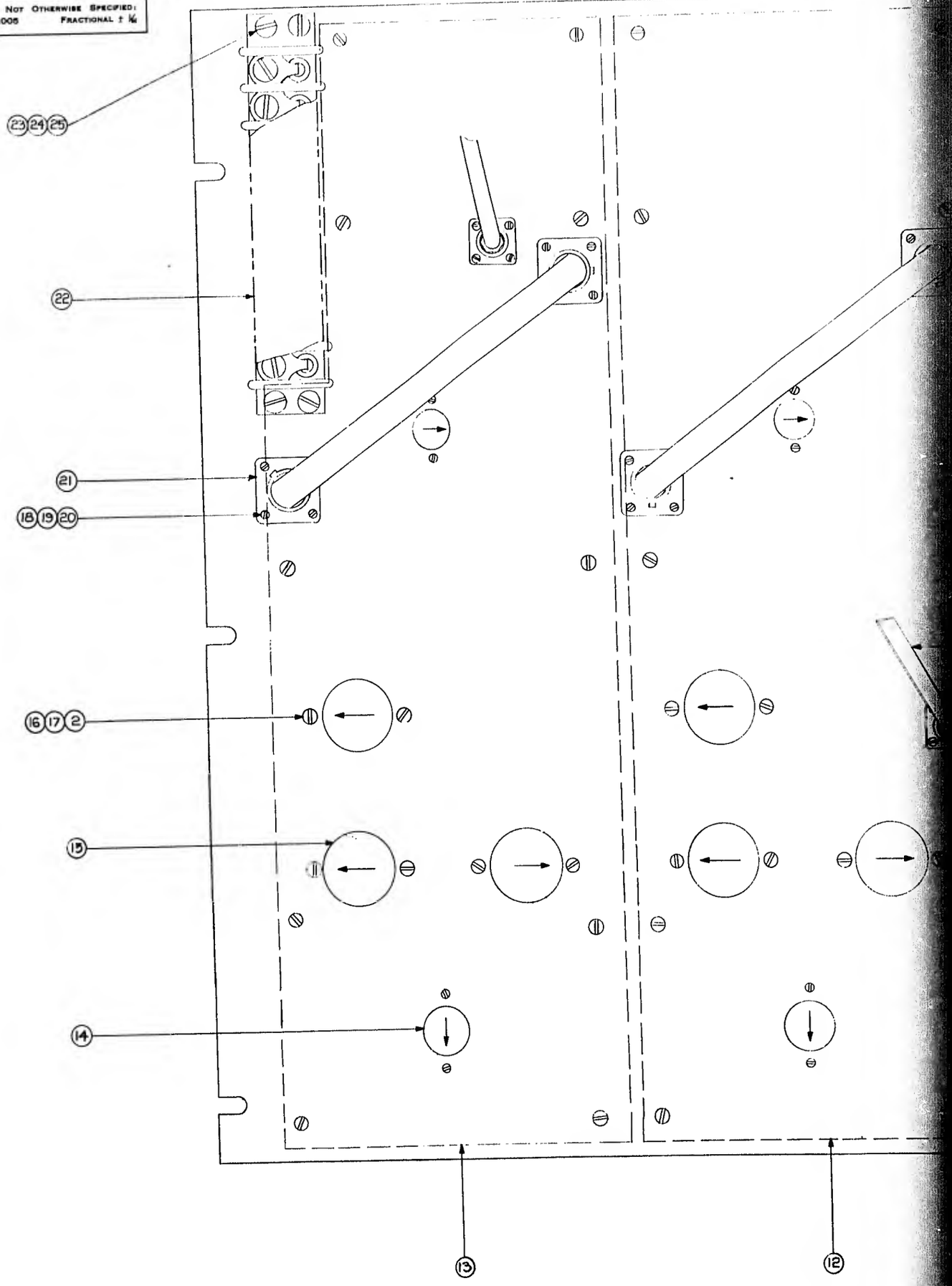
DR F.B. 10/3/47

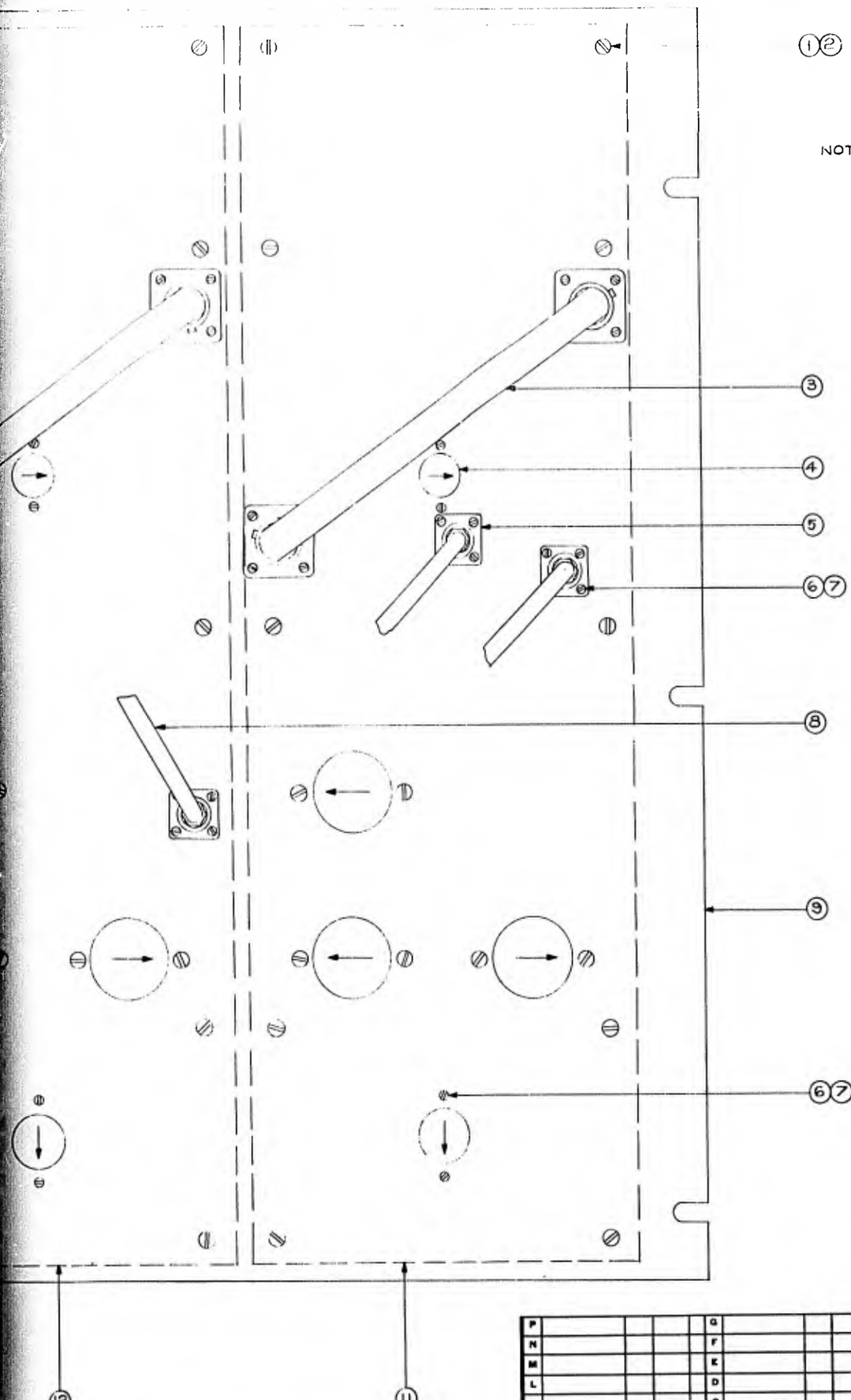
E.I.B

E-30884-1

D. 30878-1
WC-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64





NOTES: 1. THE EXACT LENGHT OF RG/6875 CABLE WILL BE DETERMINED BY ENGINEER.
2. ARROWS INDICATE DIRECTION OF SOCKET KEY.

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
25	HEX NUT #8-32		4
24	LOCKWASHER #8 SHAKEPROOF	#1708	4
23	RD. HD. SCREW #8-32		4
22	JONES STRIP	#142-9	1
21	DELAY LINE CONNECTORS	PL259A	6
20	HEX NUT #4-40		24
19	LOCKWASHER #4 SHAKEPROOF	#1704	24
18	RD. HD. SCREW #4-40 $\frac{3}{8}$ LG		24
17	HEX NUT #6-32		18
16	RD. HD. SCREW #6-32 $\frac{1}{4}$ LG		18
15	TUBE SOCKET (6AG7) CINCH	#9661	9
14	TUBE SOCKET (2C51) CINCH	#8559A	3
13	SUB PANEL #3	C-30868	1
12	SUB PANEL #2	C-30867	1
11	SUB PANEL #1	C-30866	1
10	HEX NUTS #3-56		12
9	MAIN PANEL	D-30875	1
8	INPUT AND OUTPUT CABLES	RG/6875	NOTE 1
7	LOCKWASHER #3 SHAKEPROOF	#1703	28
6	RH. SCREW #3-56 $\frac{1}{4}$ LG		28
5	CABLE CONNECTORS CARO	UG/260	4
4	TUBE SOCKET (6A8G) CINCH	#9335	3
3	DELAY LINE CABLE 9 $\frac{1}{8}$" LG.	RG/65/U	3
2	LOCKWASHER #6 SHAKEPROOF	#1706	48
1	BH. HD. SCREW #6-32 $\frac{3}{8}$ LG.		30

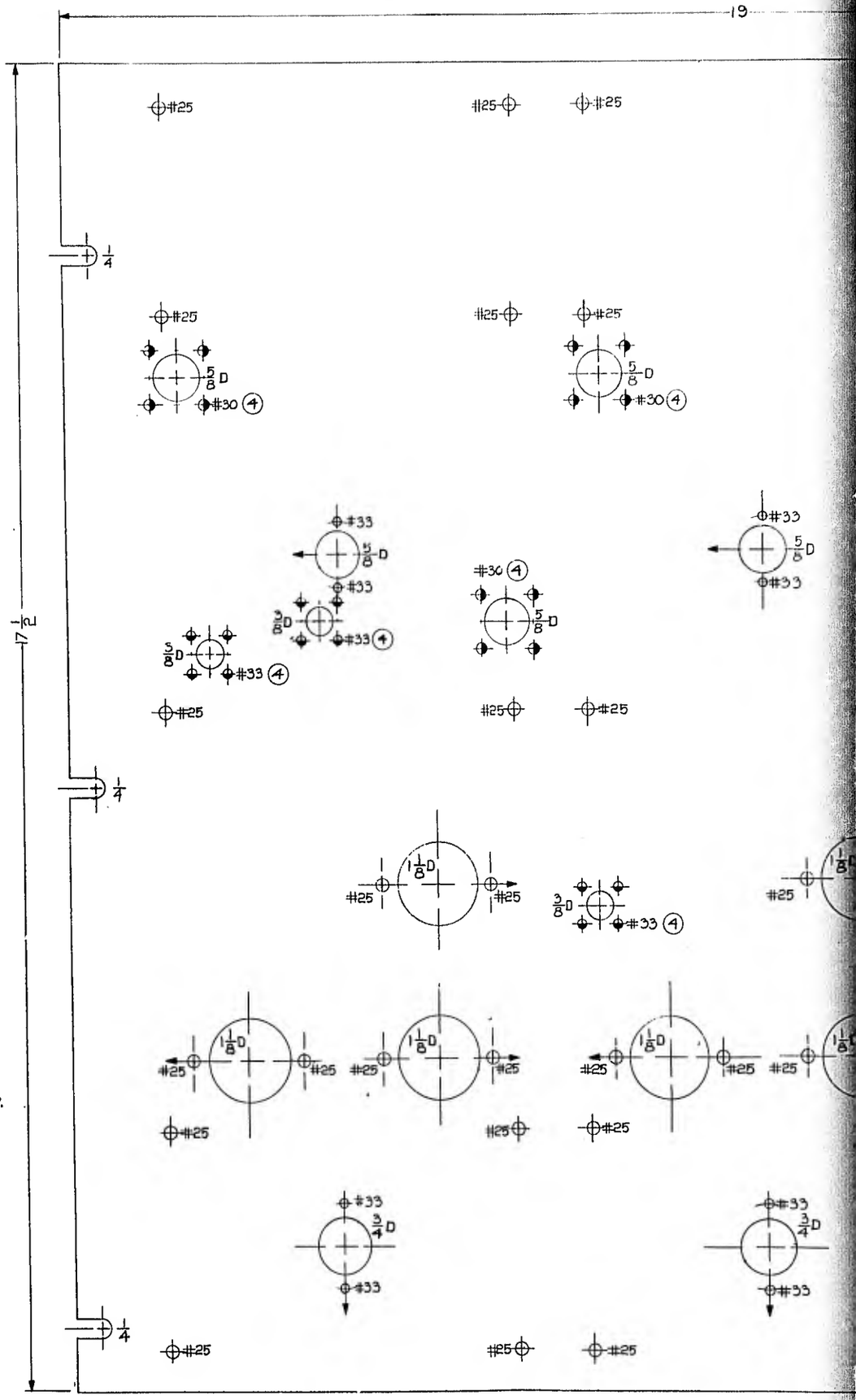
P					G				
N					F				
M					E				
L					D				
K					C				
J					B				
H					A				
	WAS	APP.	DATE			WAS	APP.	DATE	

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO.

FRONT VIEW OF MAIN PANEL OF STEP-COUNTER

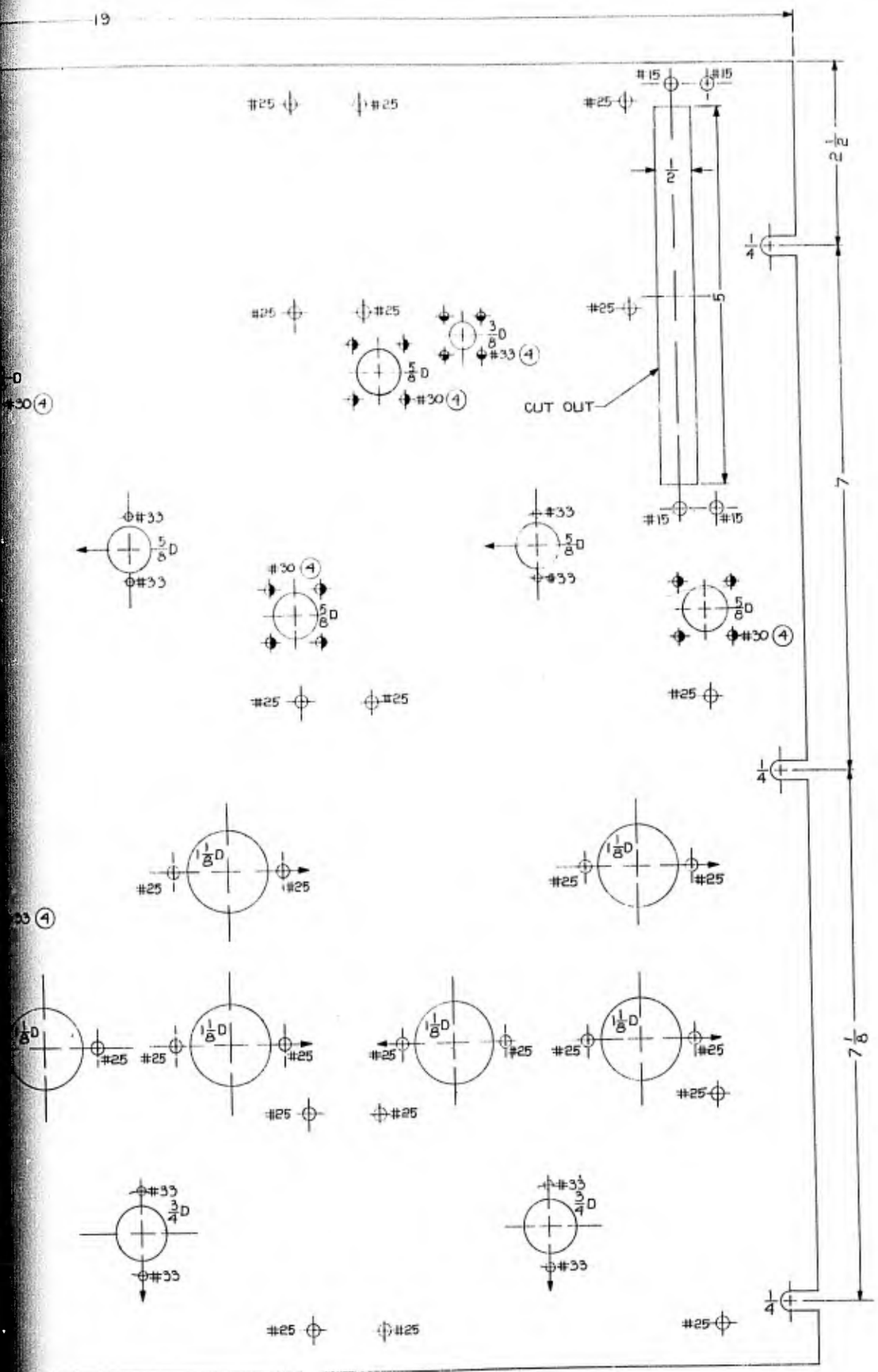
SCALE: FULL | DR. RVWeston 10-11-47 | TR. | CK. | APP.

D-30878-1



NOTE: ARROW HEADS INDICATE DIRECTION OF SOCKET KEY.

PANEL MOUNTING SLOTS ARE 1/2" DEEP.



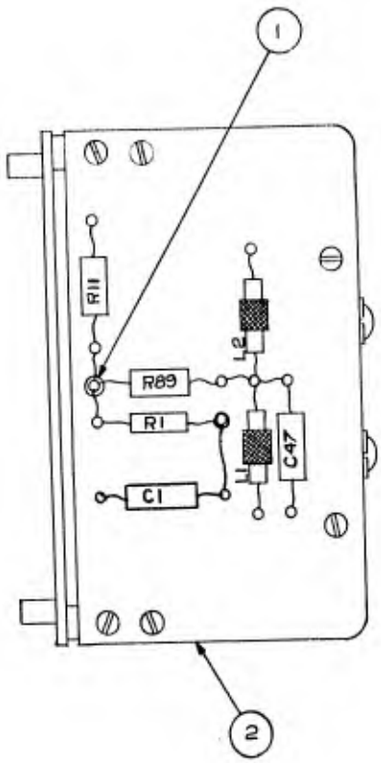
MATERIAL : 1/8" ALUMINUM-CRACKLE FINISH.

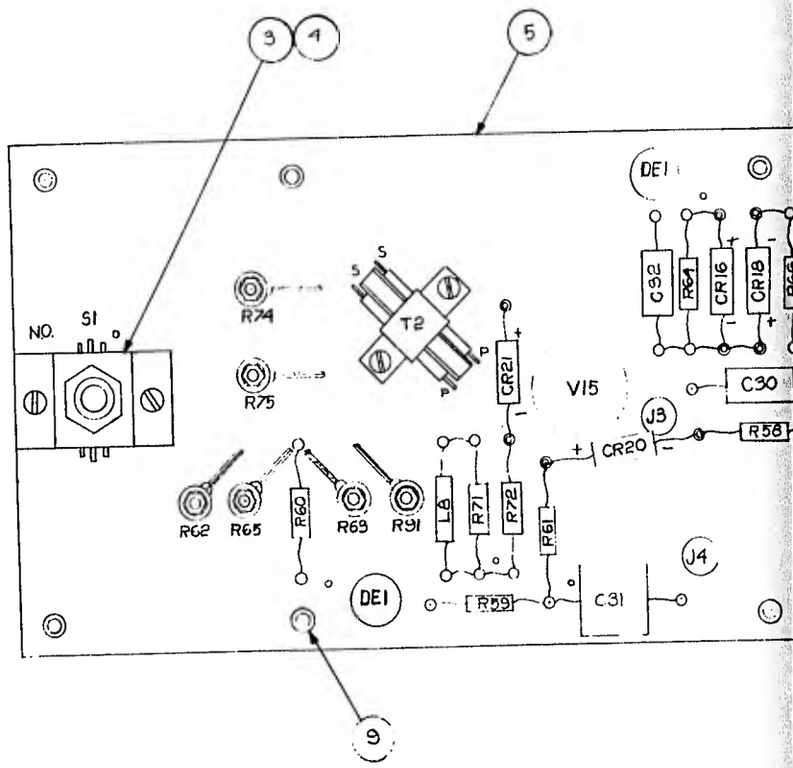
DRILLING TEMPLATE OF STEP-COUNTER

FULL RWeston 9/10/47 D-30875

D- 30849-1
WO-

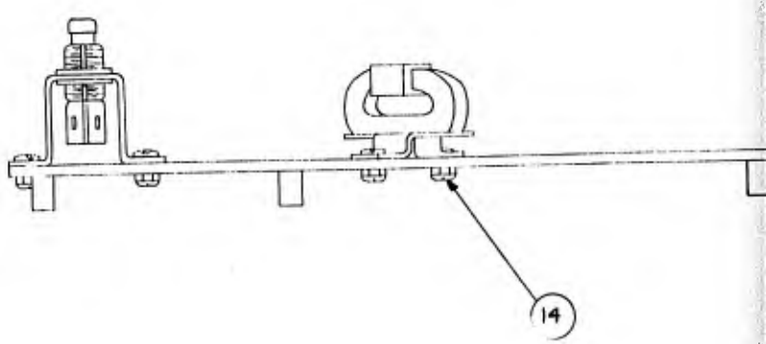
TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

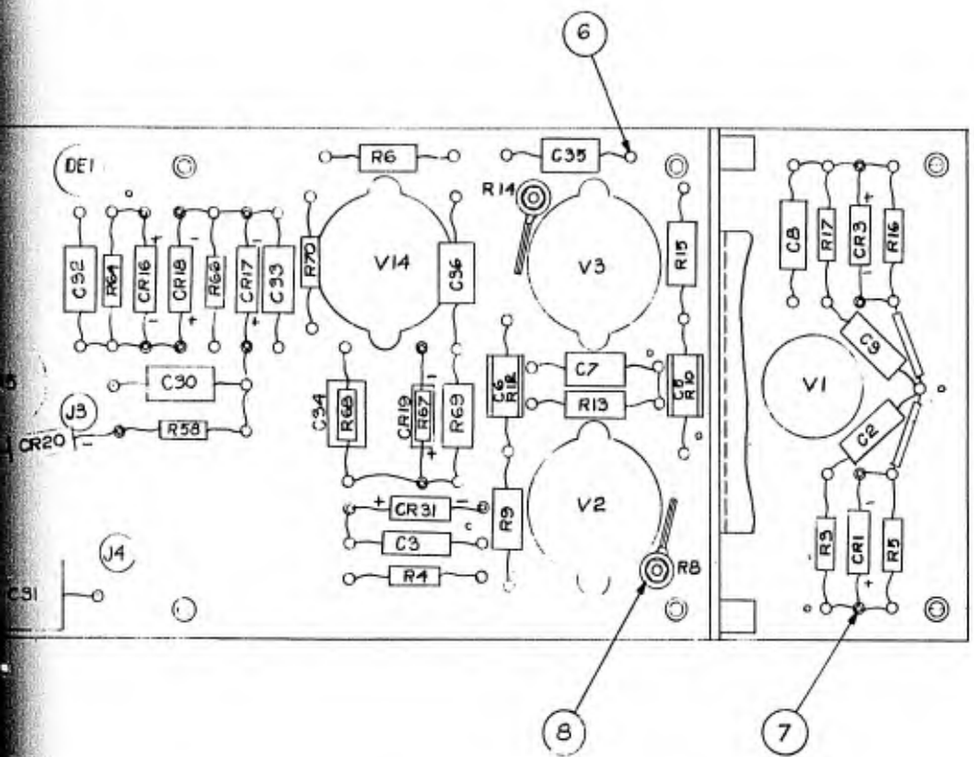


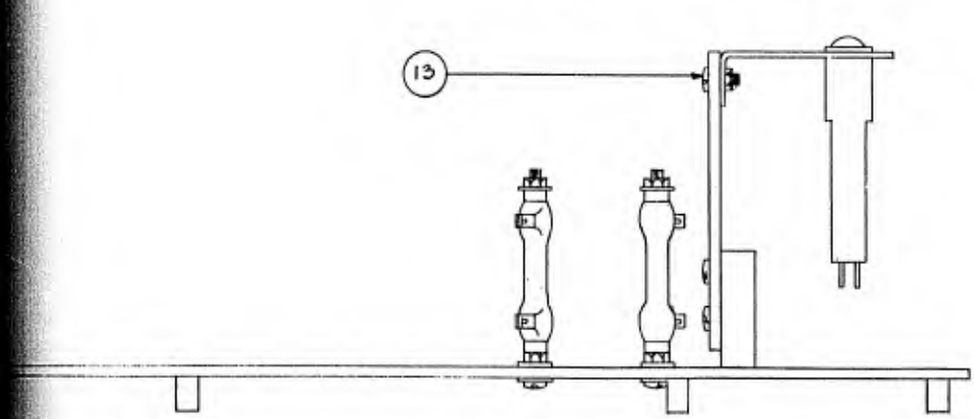


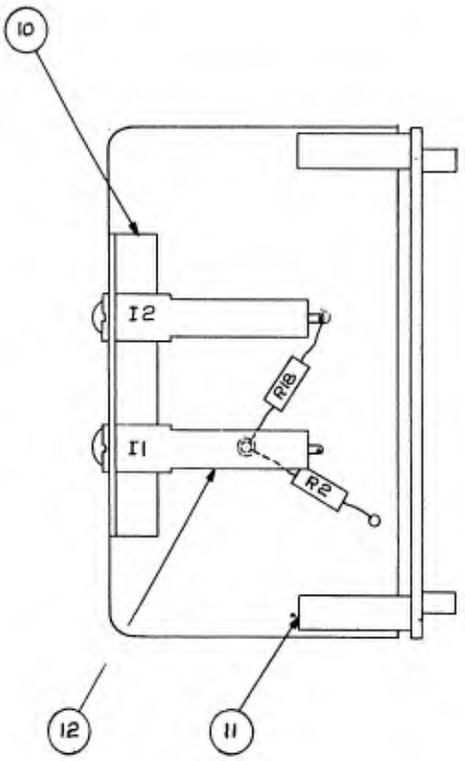
NOTE:

DE, J AND V NUMBERS ARE FOR REFERENCE ONLY.









14	6-32 ELASTIC STOP NUT TYPE	9965-62	4
13	6-32 FASTENINGS	——	2
12	INDICATOR KELLOG	#48	2
11	MOUNTING POST	A31013	2
10	INDICATOR MTG. PLATE	A30752	1
9	PANEL MOUNTING POST C.T.C.	#1246D	10
8	8-32 FASTENINGS	——	8
7	HOLLOW TURRET LUG C.T.C.	#1568D	18
6	SINGLE TURRET LUG C.T.C.	#1784D	68
5	TERMINAL BOARD	C-30866	1
4	PUSH-BUTTON I.C.A.	#1282	1
3	PUSH-BUTTON MTG. BRKT.	A30840	1
2	TERMINAL BOARD	A30865	1
1	DOUBLE TURRET LUG C.T.C.	#1081A	2
ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.

P						Q									
N						F									
M						K									
L						D									
K						C									
J						B									
H						A									
	WAS		APP.	DATE			WAS		APP.	DATE					

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO.

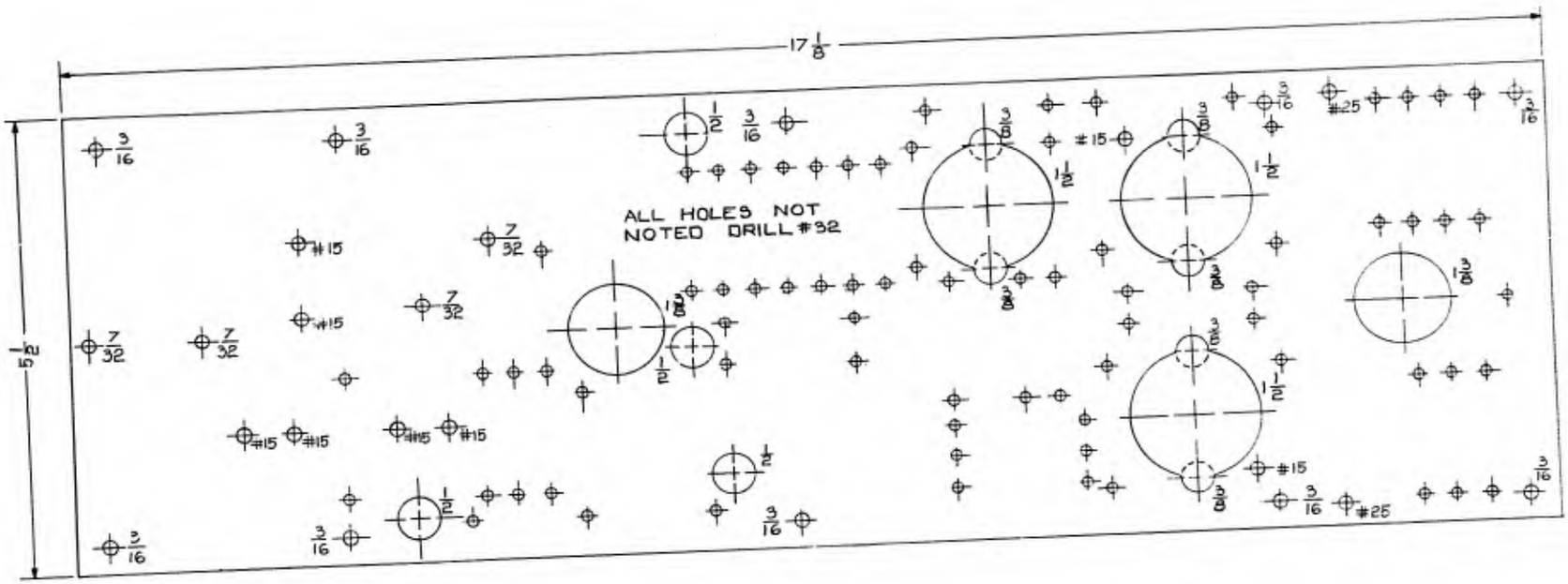
PANEL 1 OF STEP-COUNTER ASSY

SCALE: FULL | DR. R.V. Weston 9/4/47 | CH. E.I.B. | APP.

D-30849-1

C-30866

USED IN ASS'Y D-30849



NOTES: MATERIAL - 1/8 THICK GRADE LE BLUE-LINE LINEN-BASE BAKELITE.

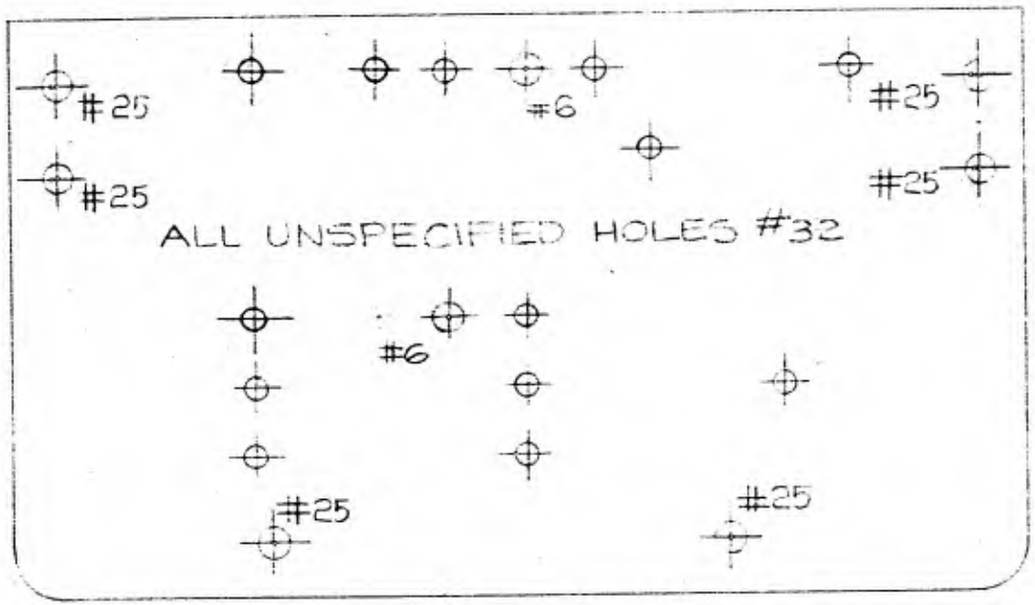
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

DRILLING TEMPLATE OF STEP-COUNTER PANEL 1

SCALE: FULL	DR. R. Westin 9/8/47	C-30866-1
ENG. EAB	CK.	APP.

A-30865-1

D-30847, 8, & 9



NOTES:

MATERIAL - $\frac{1}{8}$ THICK GRADE LE
LINEN-BASE BLUE-LINE BAKELITE

ROUND OFF INDICATED
EDGES APPROXIMATLY $\frac{1}{4}$ R.

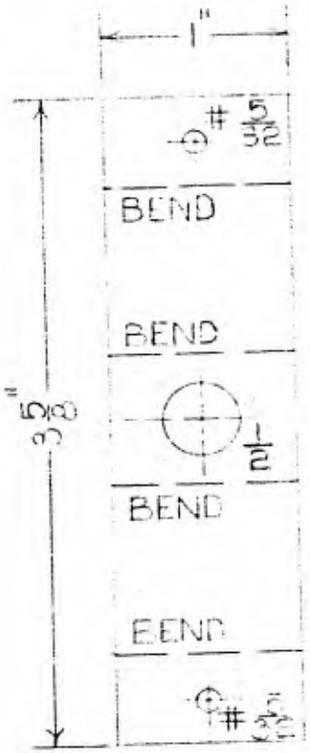
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

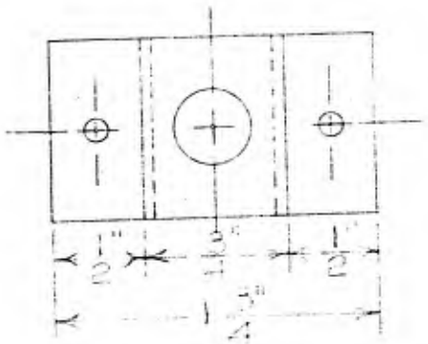
DRILLING TEMP - STEP-COUNTER VERT. BOARD

SCALE: FULL	DR. R. Weston 9/8/47	A-30865-1
ENG. EAB	CK.	APP.

A-30840-1

D-30847, 48, AND 49

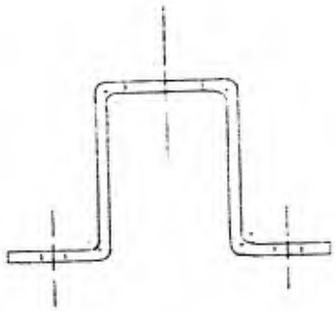




NOTES:

MATERIAL - 1/16" ALUMINUM.

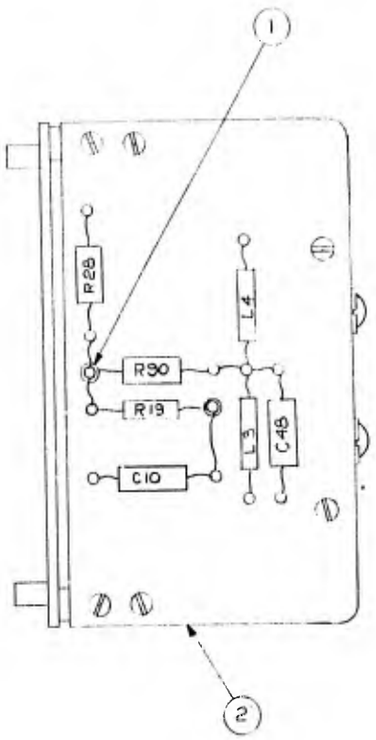
BEND ALL ANGLES 90°

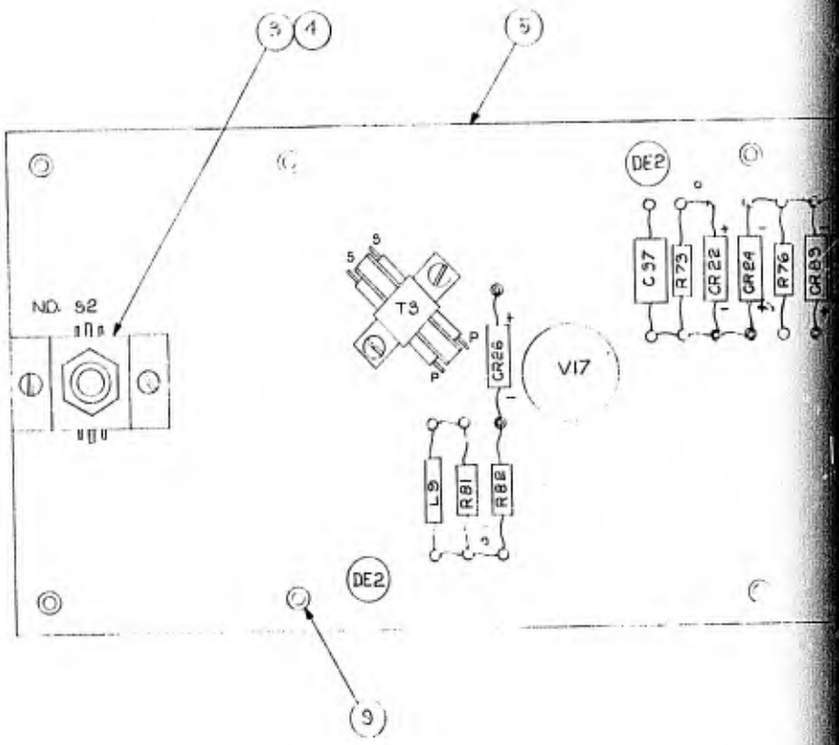


SERVOMECHANISMS LABORATORY OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345			
PUSH-BUTTON MTG. BRKT.			
SCALE: FULL	DR. R.W.ESTON 9-24-47		A-30840-1
ENG. EAB	CK.	APP.	

D 30847-1
WO

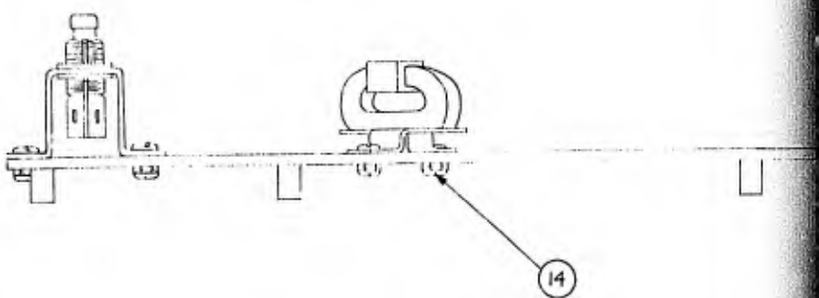
TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

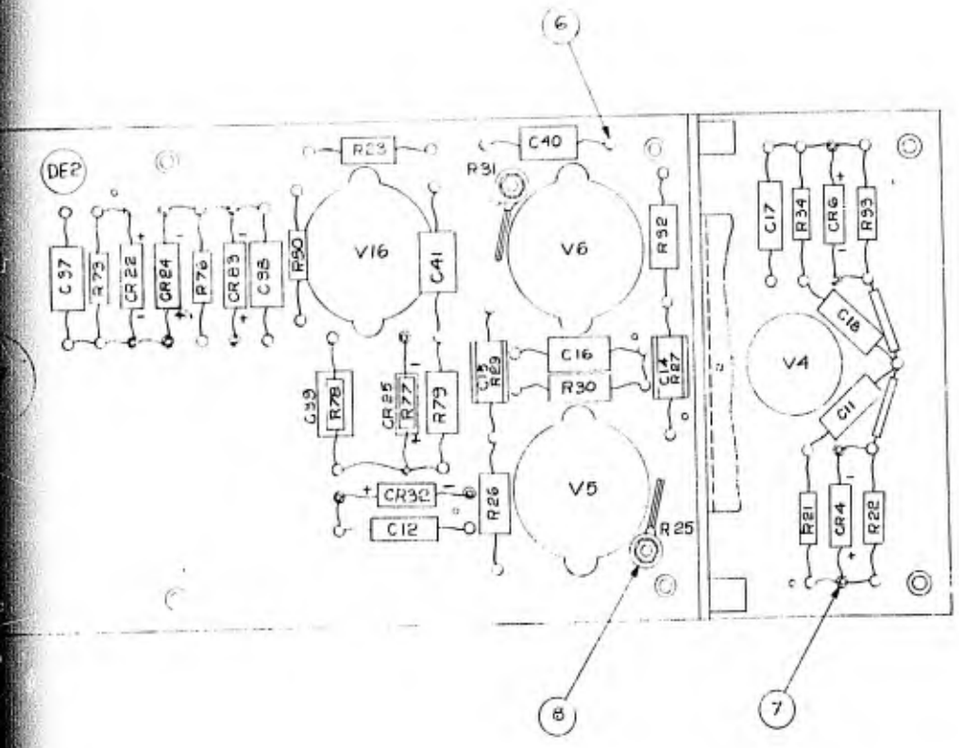


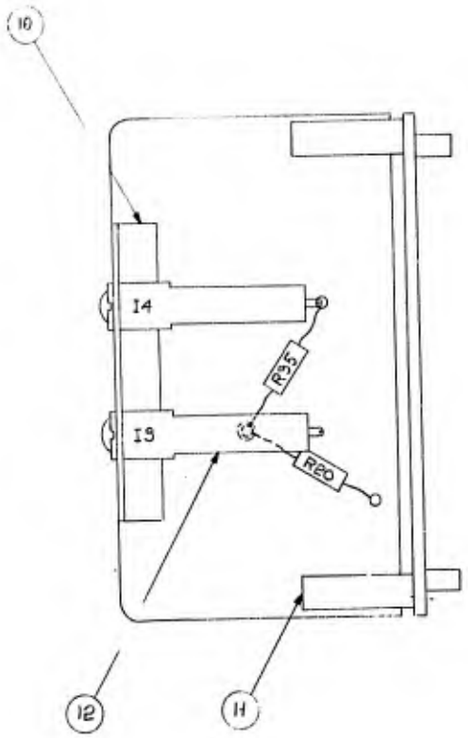


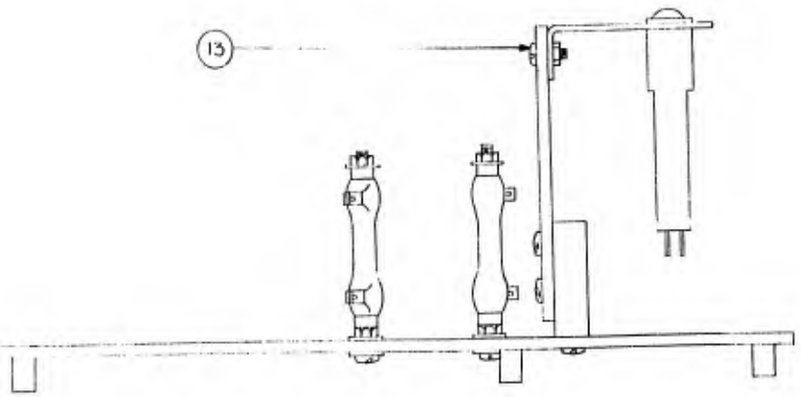
NOTES:

DE, J AND V NUMBERS ARE FOR REFERENCE ONLY.









ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
14	6-32 ELASTICSTOP NUT TYPE	9365-6B	4
13	6-32 FASTENINGS	——	2
12	INDICATOR KELLOG	#49	2
11	MOUNTING POST	A31013	2
10	INDICATOR MTG. PLATE	A30752	1
9	PANEL MOUNTING POST C.T.C.	#1246D	10
8	8-32 FASTENINGS	——	2
7	HOLLOW TURRET LUG C.T.C.	#1558D	18
6	SINGLE TURRET LUG C.T.C.	#1721D	61
5	TERMINAL BOARD	C-30867	1
4	PUSH-BUTTON I.C.A.	#1282	1
3	PUSH-BUTTON MTG. BRKT.	A30840	1
2	TERMINAL BOARD	A30865	1
1	DOUBLE TURRET LUG C.T.C	#1081A	2

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

PANEL 2 OF STEP-COUNTER ASS'Y

SCALE: FULL | DR. R.V. WESTON 9-4-47 | TR. EdB | CK. | APP. | D-30847-1

	WAS	APP.	DATE
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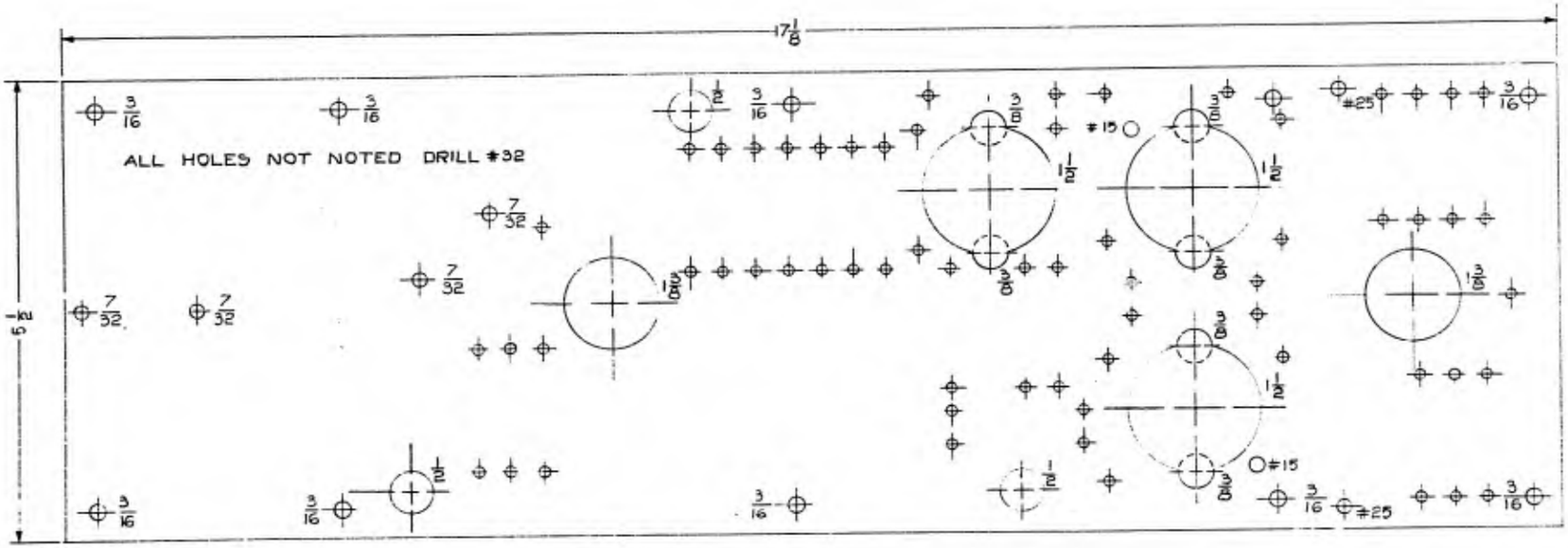
C			
B			
A			

C-30867-1

USED IN ASS'Y D-30847



NOTES:
MATERIAL - 1/8 THICK GRADE LE BLUE-LINE LINEN-BASE BAKELITE.

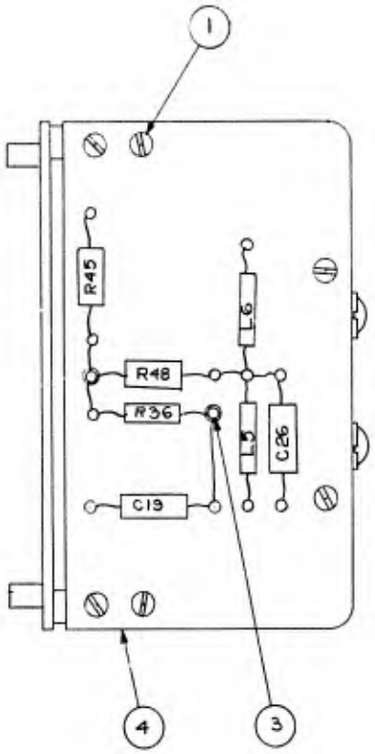
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

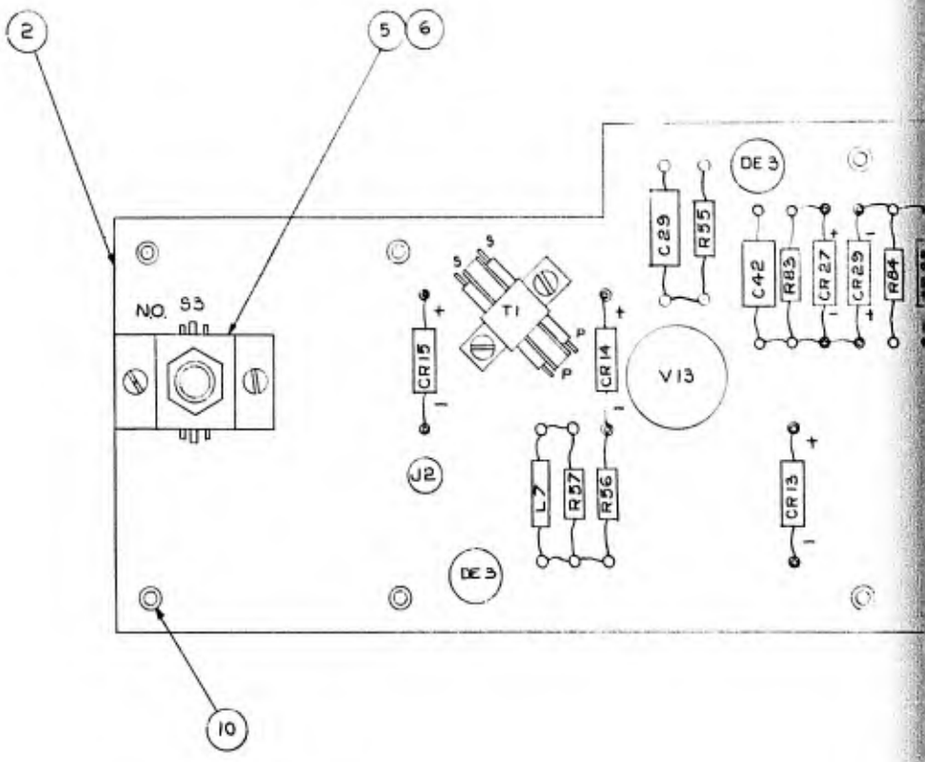
DRILLING TEMPLATE OF STEP-COUNTER PANEL 2

SCALE: FULL | DR. R West 9-[illegible]-7 | ENG. E13 | CK. | APP. | C-30867-1

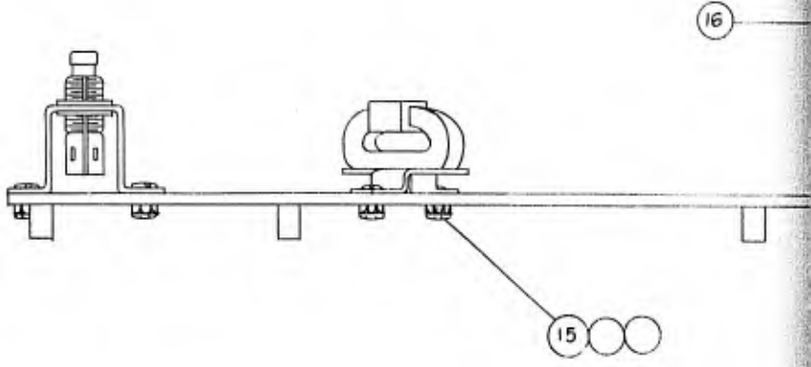
D. 30898-1
WO.

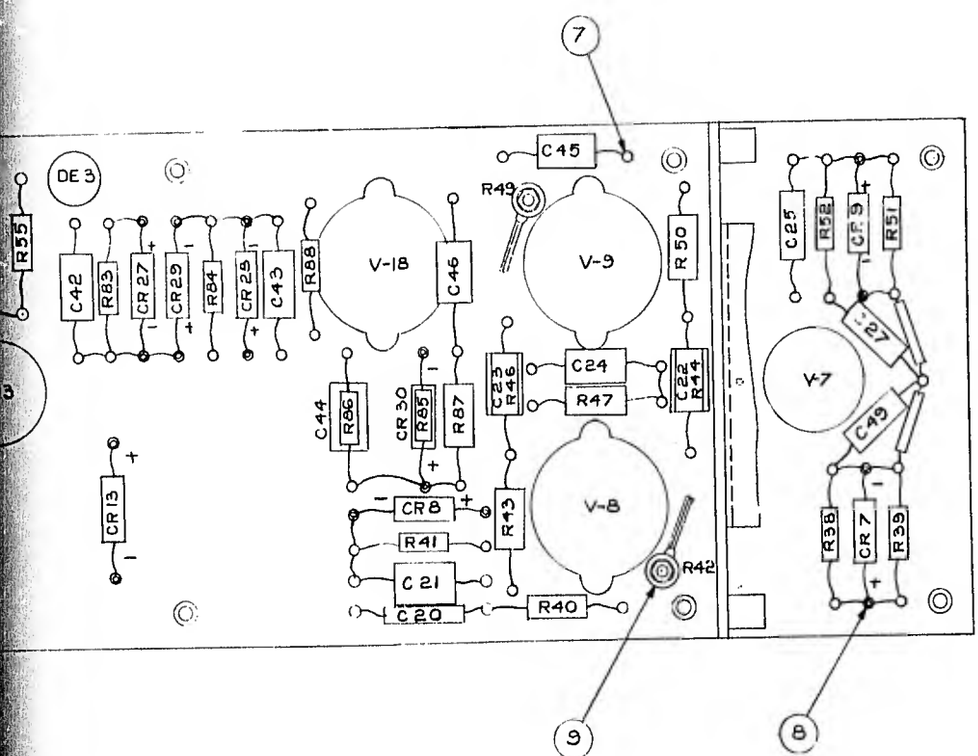
TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

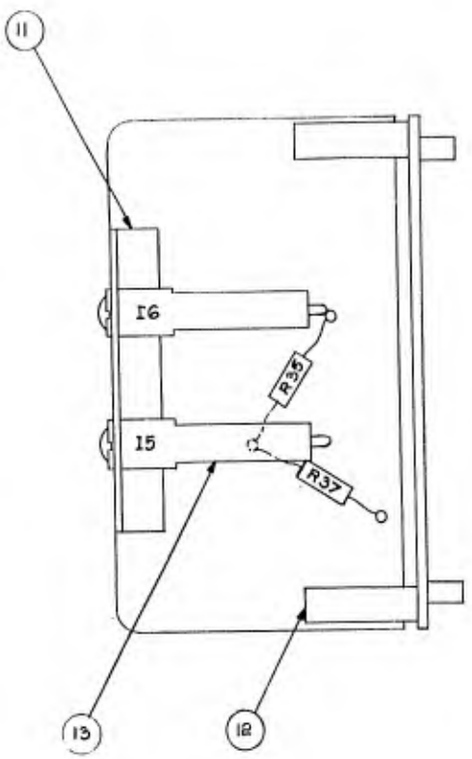


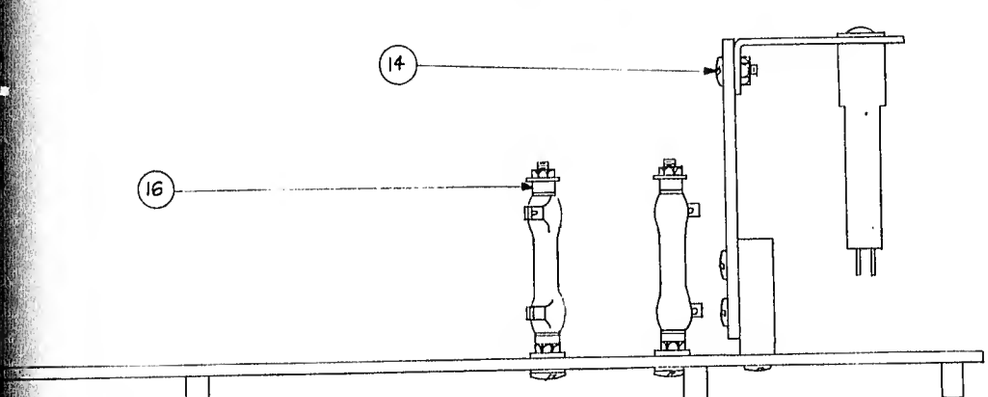


NOTE:
DE, J AND V NUMBERS ARE FOR REFERENCE ONLY.









ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
15	6-32 ELASTIC STOP NUT	5905-62	4
14	6-32 FASTENINGS	——	2
13	INDICATOR KELLOG	*49	2
12	PANEL MTG. POST	A31013	2
11	INDICATOR MTG. PLATE	A30752	1
10	MOUNTING POST C.T.C.	*1246D	10
9	8-32 FASTENINGS	——	2
8	HOLLOW TURRET LUG C.T.C.	*1558D	18
7	SINGLE TURRET LUG C.T.C.	*1724D	69
6	PUSH BUTTON MTG. BRKT.	A30840	1
5	PUSH BUTTON I.C.A.	*1282	1
4	TERMINAL BOARD C-	30868	1
3	DOUBLE TURRET LUG C.T.C.	*1081A	2
2	TERMINAL BOARD A-	30865	1
1	BINDER HEAD SCREWS 6-32		12

	WAS	APP.	DATE
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SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

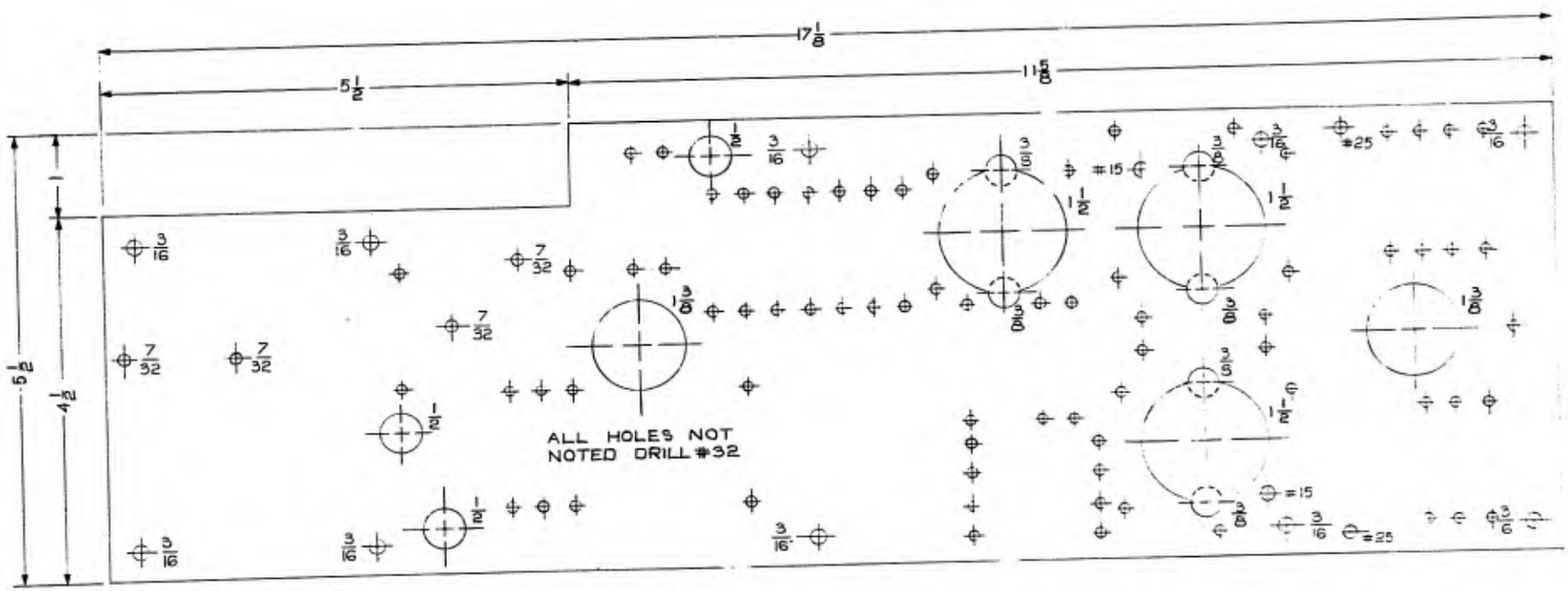
PANEL 3 OF STEP-COUNTER ASS'Y

SCALE: FULL | DR. RVW 9-2-47 | TR. EAG | CK. | APP.

D-30848-1

C-30868

USED IN ASS'Y D-30848



NOTES: MATERIAL- 1/8 THICK GRADE LE BLUE-LINE LINEN-BASE BAKELITE.

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

DRILLING TEMPLATE OF DRAWOUT TAPE 3

SCALE: FULL | DR. R. [illegible] 9/2/47 | C-30868-1

DES. SAB | CK. | APP.

REGISTER DRAWING LIST

(Block Diagram Reference 102, 103, 601)

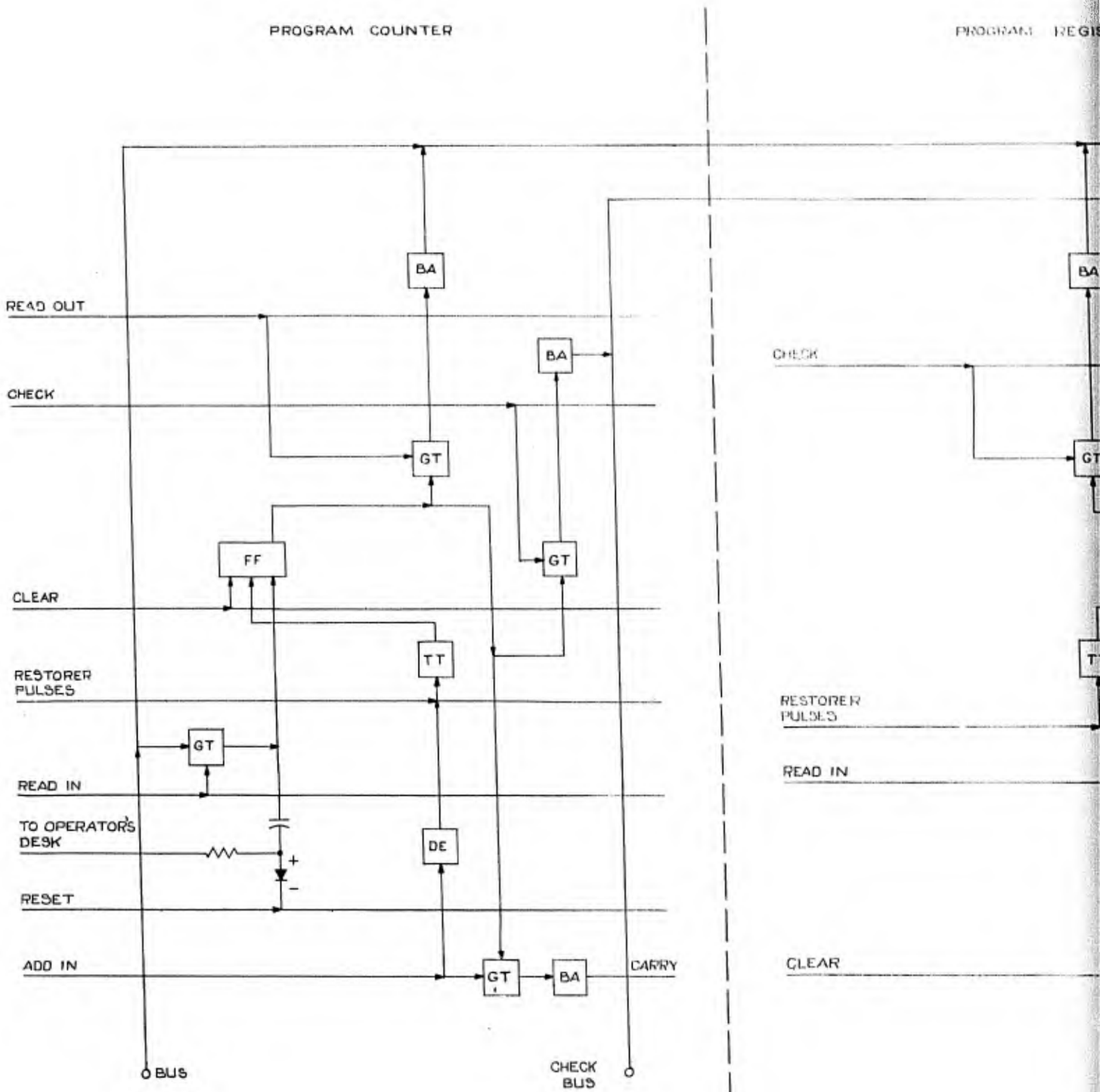
Drawing List	SA-39292
Block Schematic	D-30773
Panel and Cable Plan	R-30797
601 Check Register	
Block Schematic	SB-39288
Circuit Schematic	SD-39282
Assembly	D-30798

REGISTER PANEL

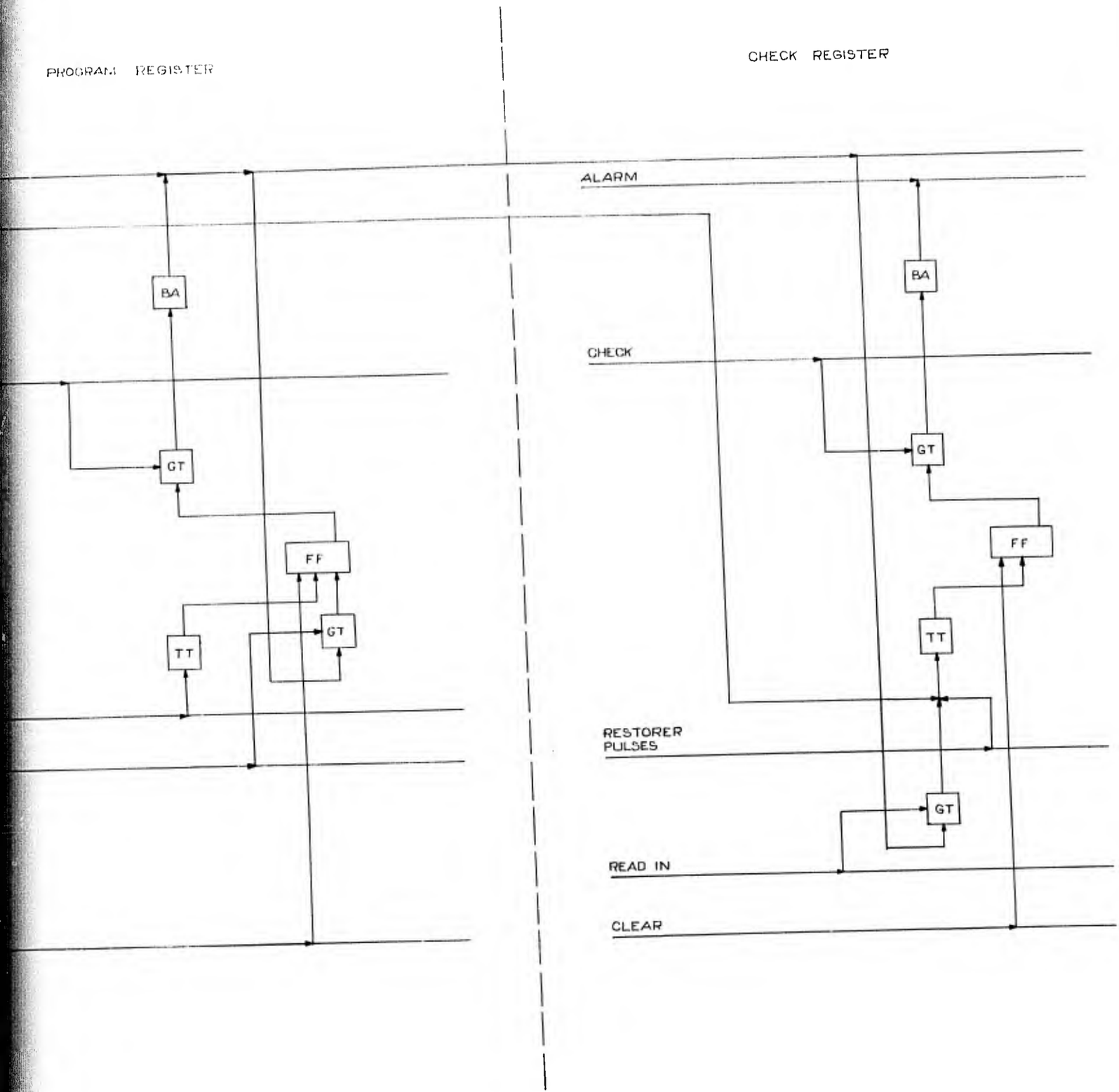
LIST OF DRAWINGS

REGISTER PANEL	
BLOCK SCHEMATIC	D-30773
MAIN PANEL & CABLE PLAN LAYOUT	R-30797
CHECK REGISTER	
BLOCK SCHEMATIC	B-39288
CIRCUIT SCHEMATIC	SD-39282-2
DRILLING TEMPLATE & ASS'Y	D-30798
PROGRAM REGISTER	
BLOCK SCHEMATIC	B-39289
CIRCUIT SCHEMATIC	SD-39283-2
DRILLING TEMPLATE & ASS'Y	D-30799
PROGRAM COUNTER	
BLOCK SCHEMATIC	B-39291
CIRCUIT SCHEMATIC	SD-39284-2
ASSEMBLY	D-30800

SA-39292-2

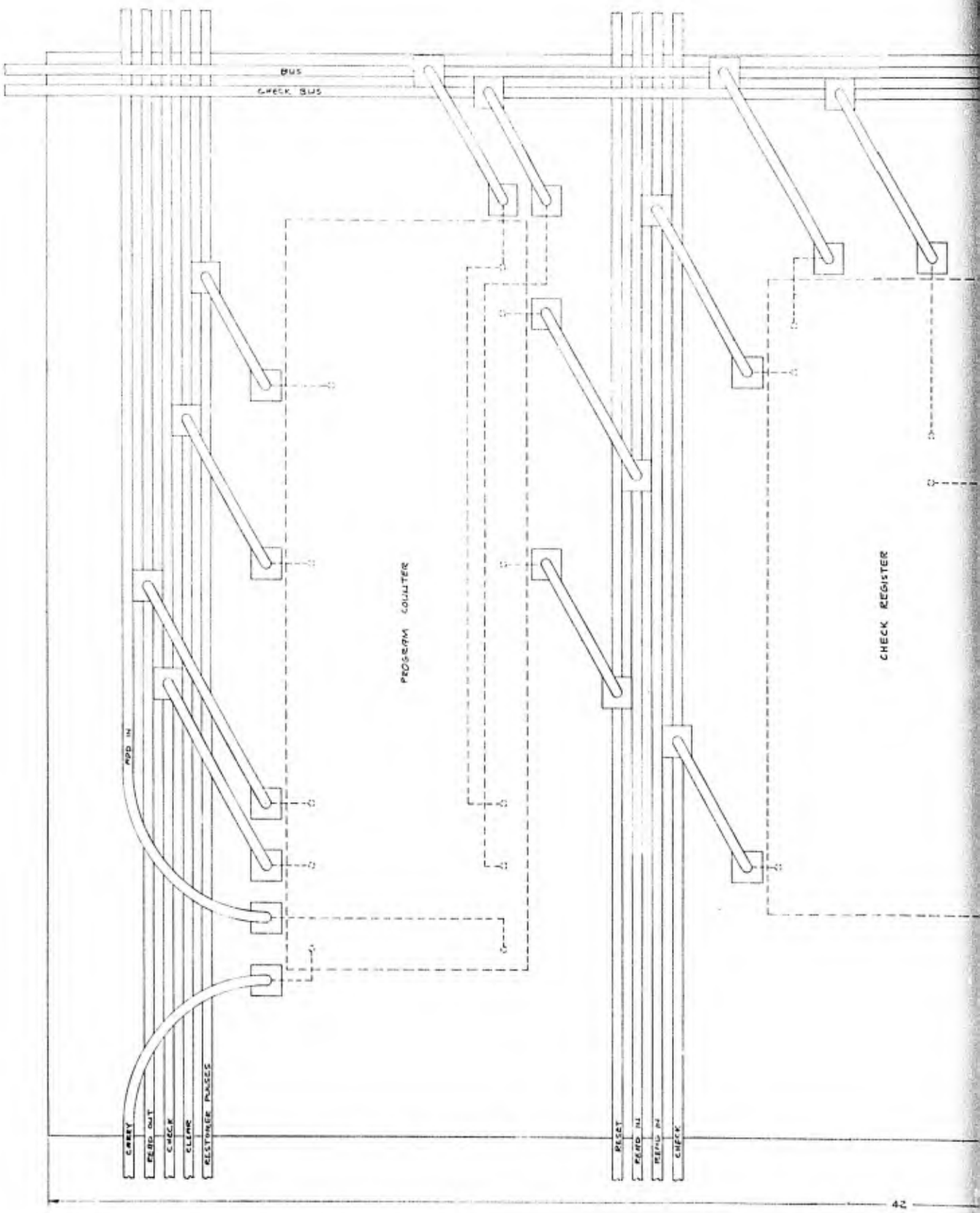


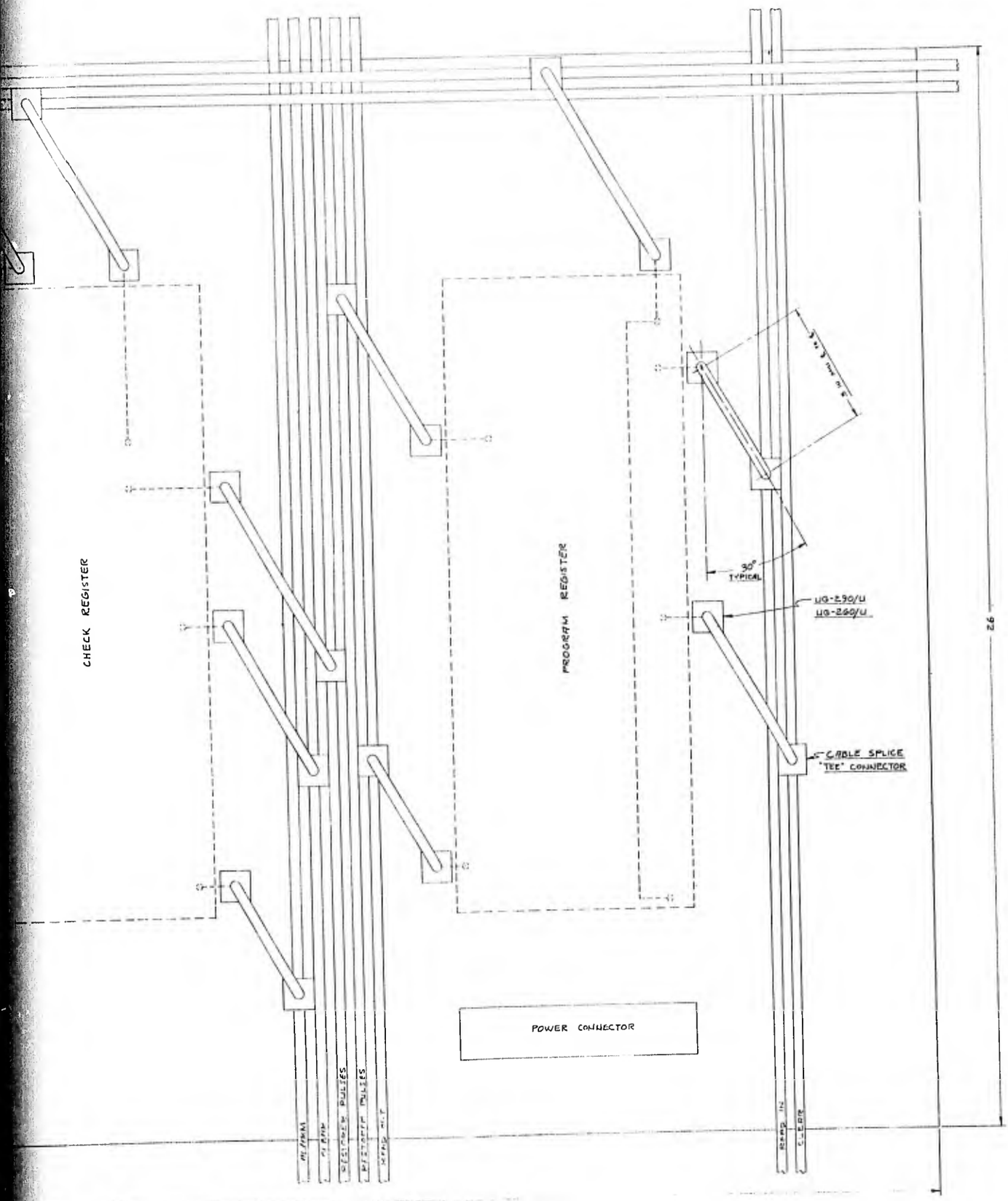
REGISTER PANE



STER PANEL BLOCK SCHEMATIC

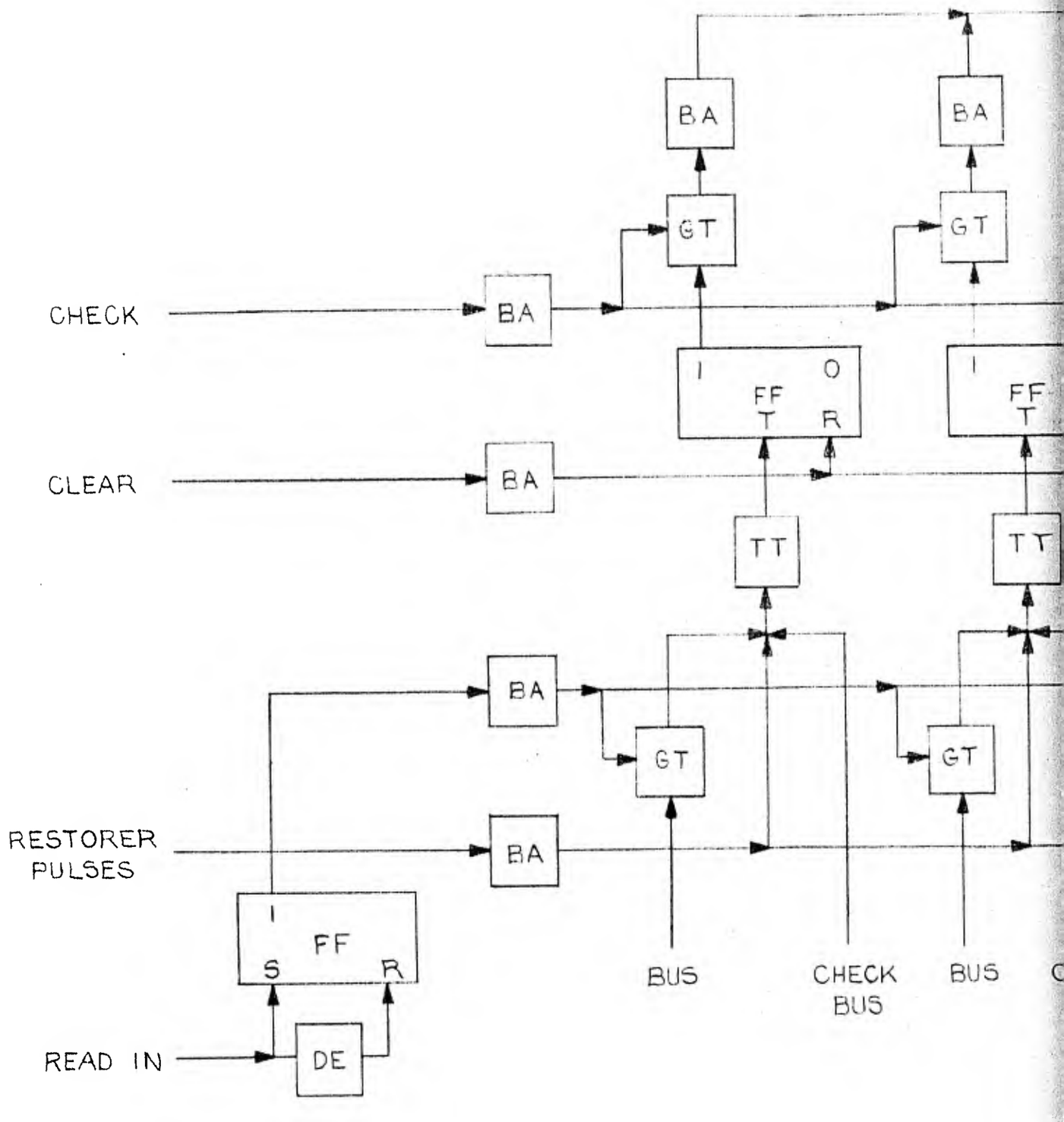
2

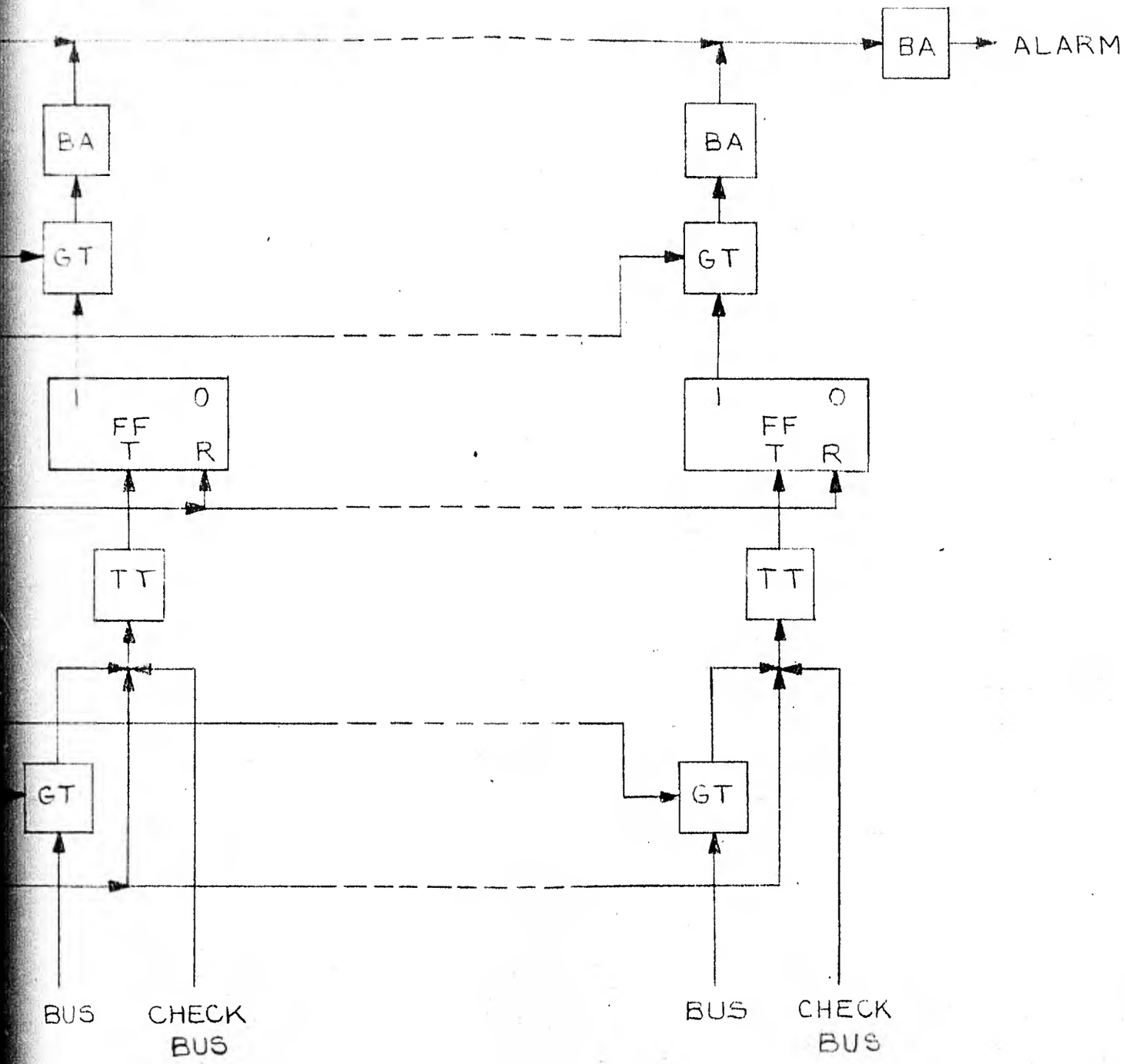

BUS
CHECK BUS
PROGRAM COUNTER
CHECK REGISTER
ADD IN
CARRY
ADD OUT
CHECK
CLEAR
RESTORER PULSES
RESET
ADD IN
CHECK



REGISTER MAIN PANEL & CABLE PLAN

B-3925.2

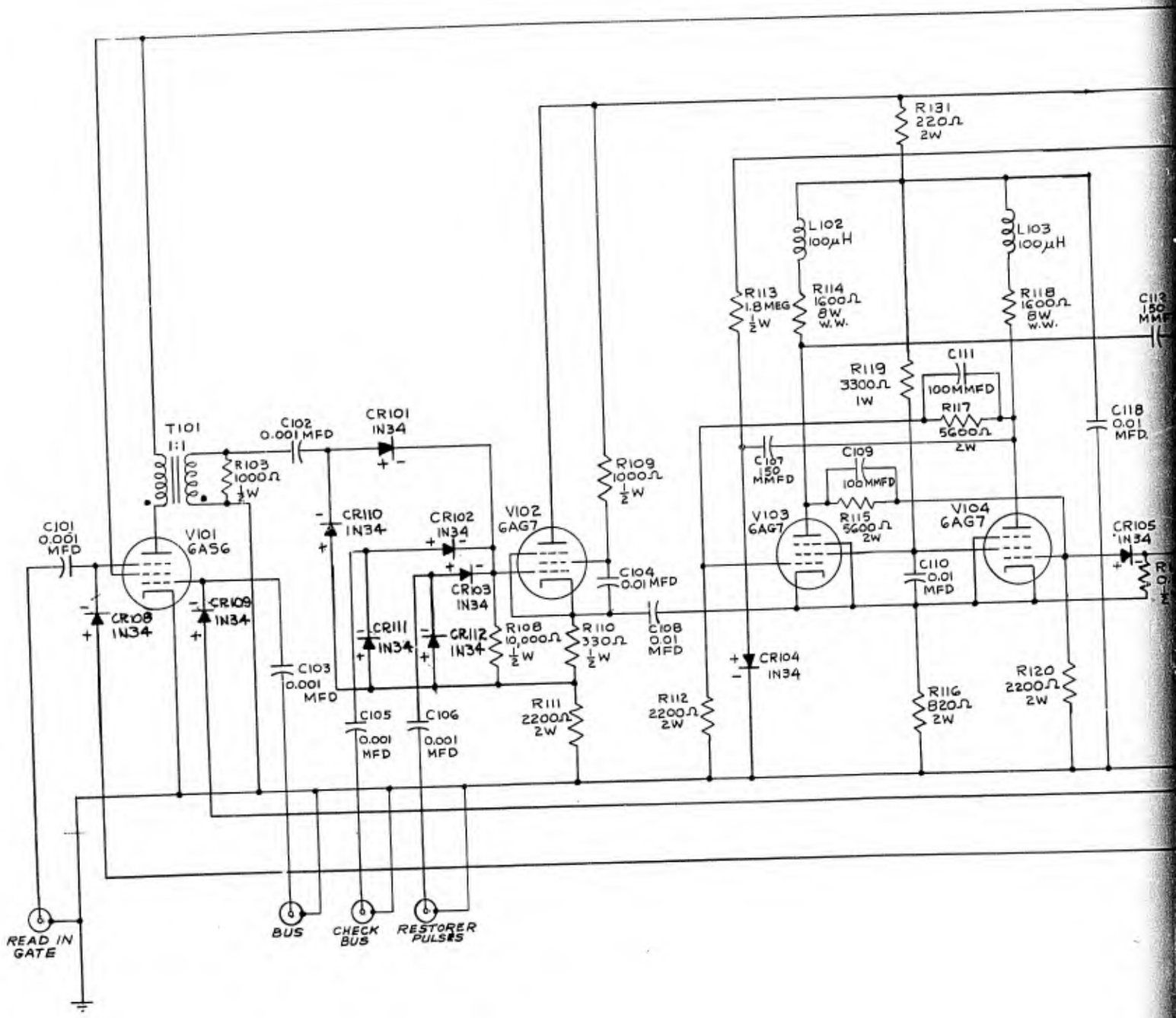

BA
BA
GT
GT
CHECK
BA
I
O
FF
T
R
I
FF
T
CLEAR
BA
TT
TT
BA
GT
GT
RESTORER
PULSES
BA
I
FF
S
R
BUS
CHECK
BUS
BUS
READ IN
DE

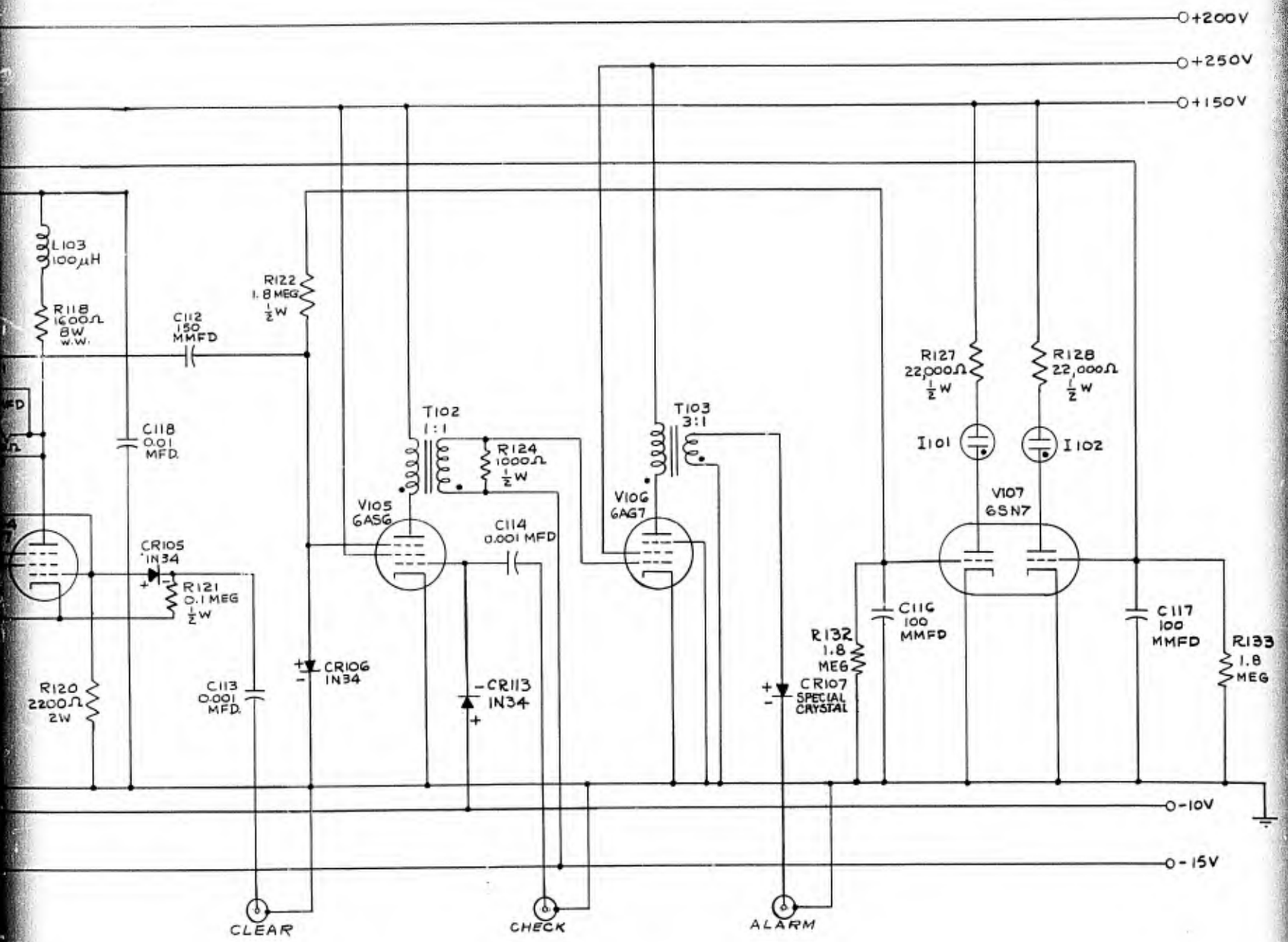


CHECK REGISTER BLOCK SCHEMATIC

6345 F.W.O.E.N.Y.

B.R.B. B-39288


R131
220Ω
2W
L102
100μH
L103
100μH
R113
1.8 MEG
½W
R114
1600Ω
8W
W.W.
R118
1600Ω
8W
W.W.
C112
150
MMFD
C111
100MMFD
R119
3300Ω
1W
R117
5600Ω
2W
C118
0.01
MFD.
C107
150
MMFD
C109
100MMFD
R115
5600Ω
2W
T101
1:1
C102
0.001 MFD
CR101
IN34
R103
1000Ω
½W
R109
1000Ω
½W
V102
6AG7
V103
6AG7
V104
6AG7
CR105
IN34
C101
0.001
MFD
V101
6A56
CR110
IN34
CR102
IN34
CR103
IN34
C104
0.01 MFD
C110
0.01
MFD
CR108
IN34
CR109
IN34
CR111
IN34
CR112
IN34
R108
10,000Ω
½W
R110
330Ω
½W
C108
0.01
MFD
CR104
IN34
C103
0.001
MFD
C105
0.001
MFD
C106
0.001
MFD
R111
2200Ω
2W
R112
2200Ω
2W
R116
820Ω
2W
R120
2200Ω
2W
READ IN
GATE
BUS
CHECK
BUS
RESTORER
PULSES

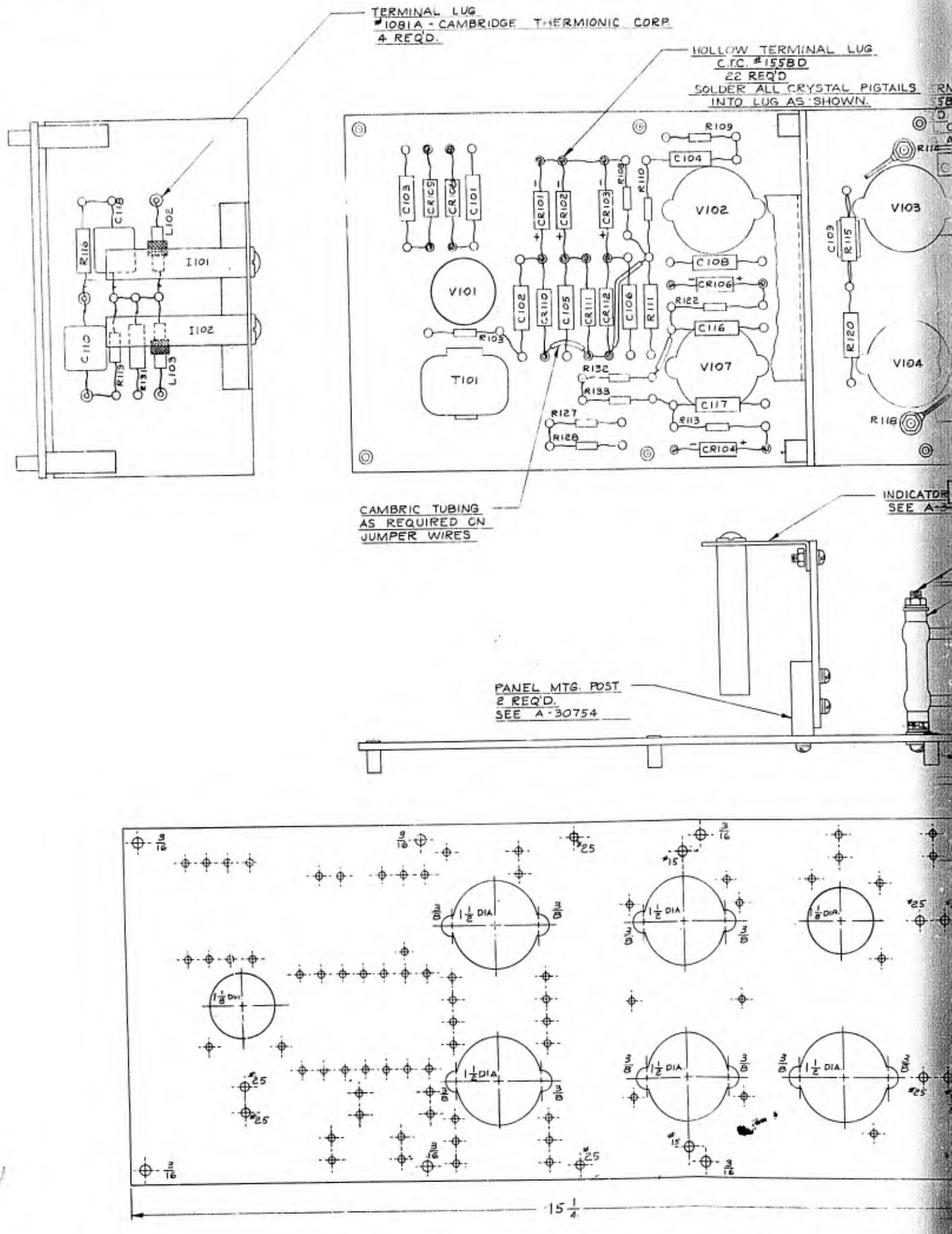


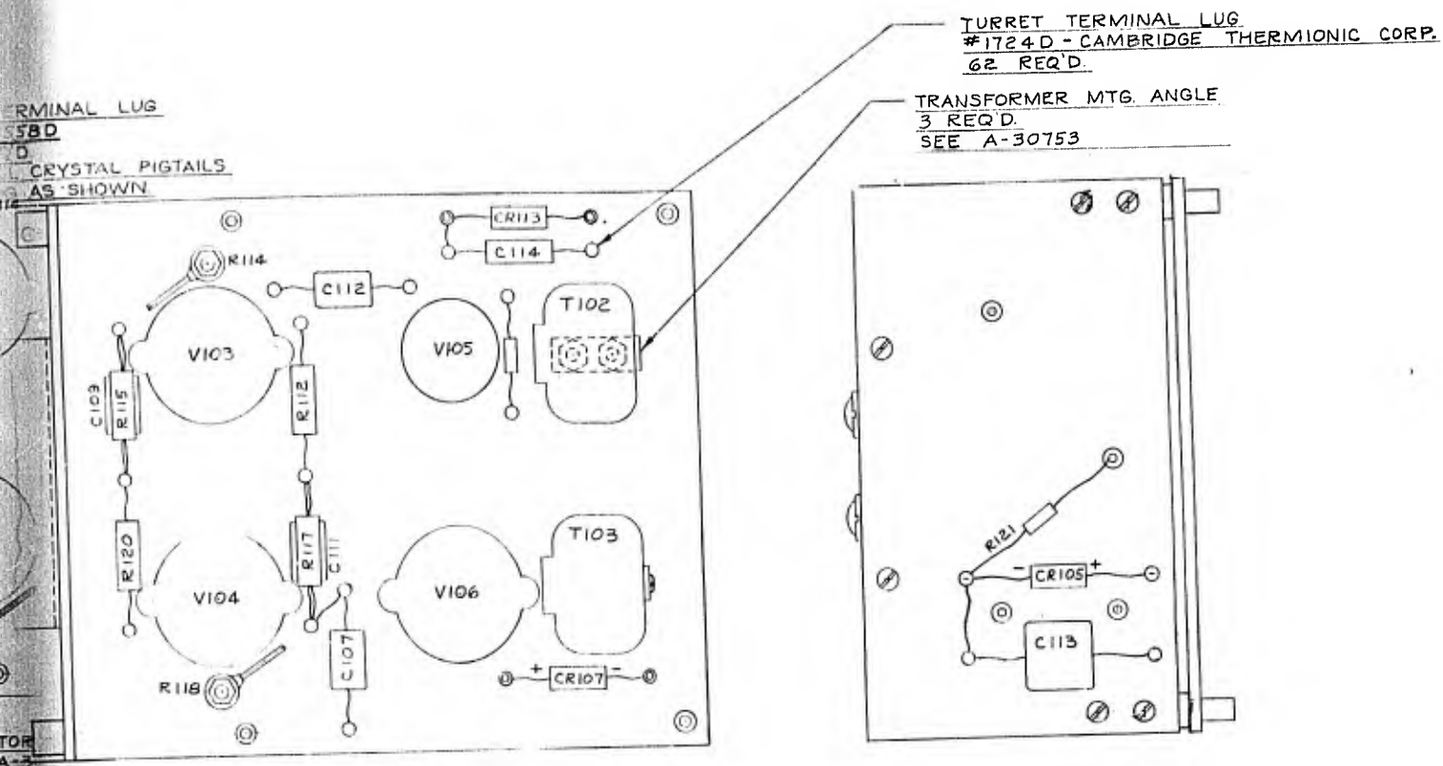
CHECK REGISTER
CIRCUIT SCHEMATIC

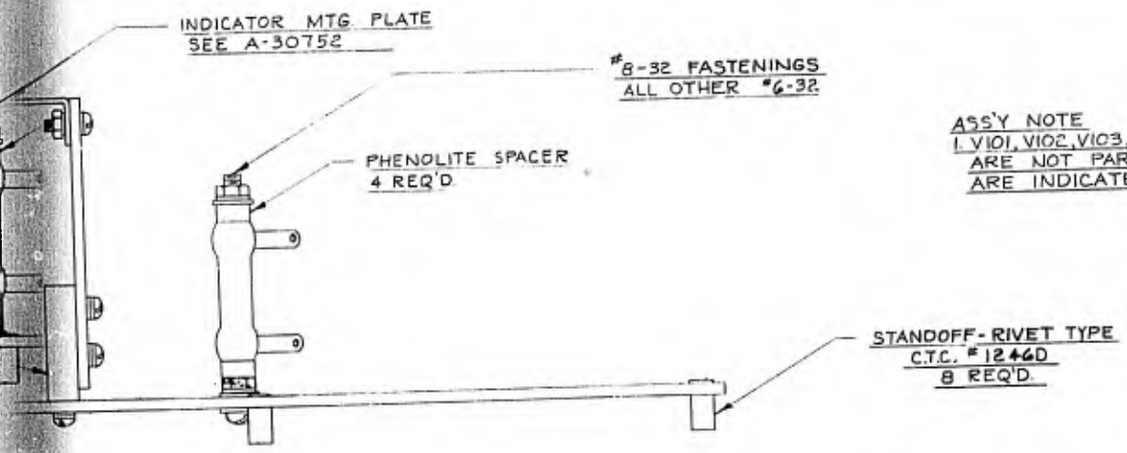
MASSACHUSETTS INSTITUTE OF TECHNOLOGY	
D.I.C.No. 6345	DR F. BRUNSWIG Ck. 8-19-47
Dwg. No. D-[illegible]	App. SD-39282-3

D-30798-1

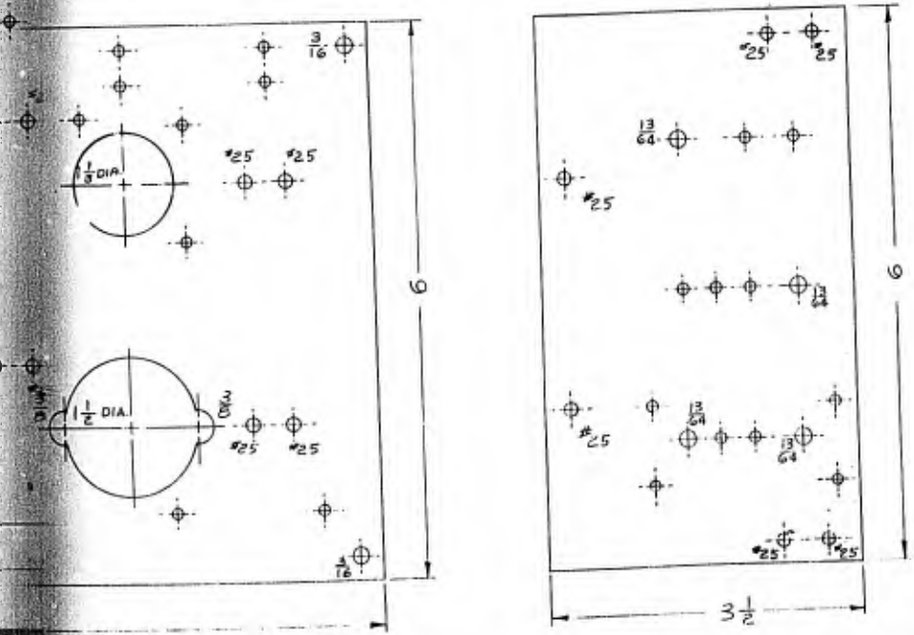
USED IN ASS'Y SD-39282







ASS'Y NOTE
1. V101, V102, V103, V104, V105, V106, & V107, ARE NOT PARTS OF THIS ASS'Y & ARE INDICATE FOR REFERENCE ONLY.



NOTES
1. MAT'L - 1/8 TH'K LINEN BASE PHENOLITE
2. HOLES NOT NOTED DRILL #33

CHECK REGISTER DRILLING TEMPLATE & ASS'Y.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SERVOMECHANISMS LABORATORY
6345 W.C.C. T-25-49
DRB D-30798-1

TEST EQUIPMENT DRAWING LIST

Variable Frequency Clock Pulse Generator, Vol. 19, E-48

C-30607

B-30821

B-30820

A-30822

A-30814

A-30823

A-30813

A-30815

A-30816

A-30817

A-30818

A-30819

A-30846

B-30824

A-30750

A-30749

A-30843

A-30810

A-30827

A-30748

A-30811

A-30845

B-30825

A-30842

A-30844

A-30826

A-30841

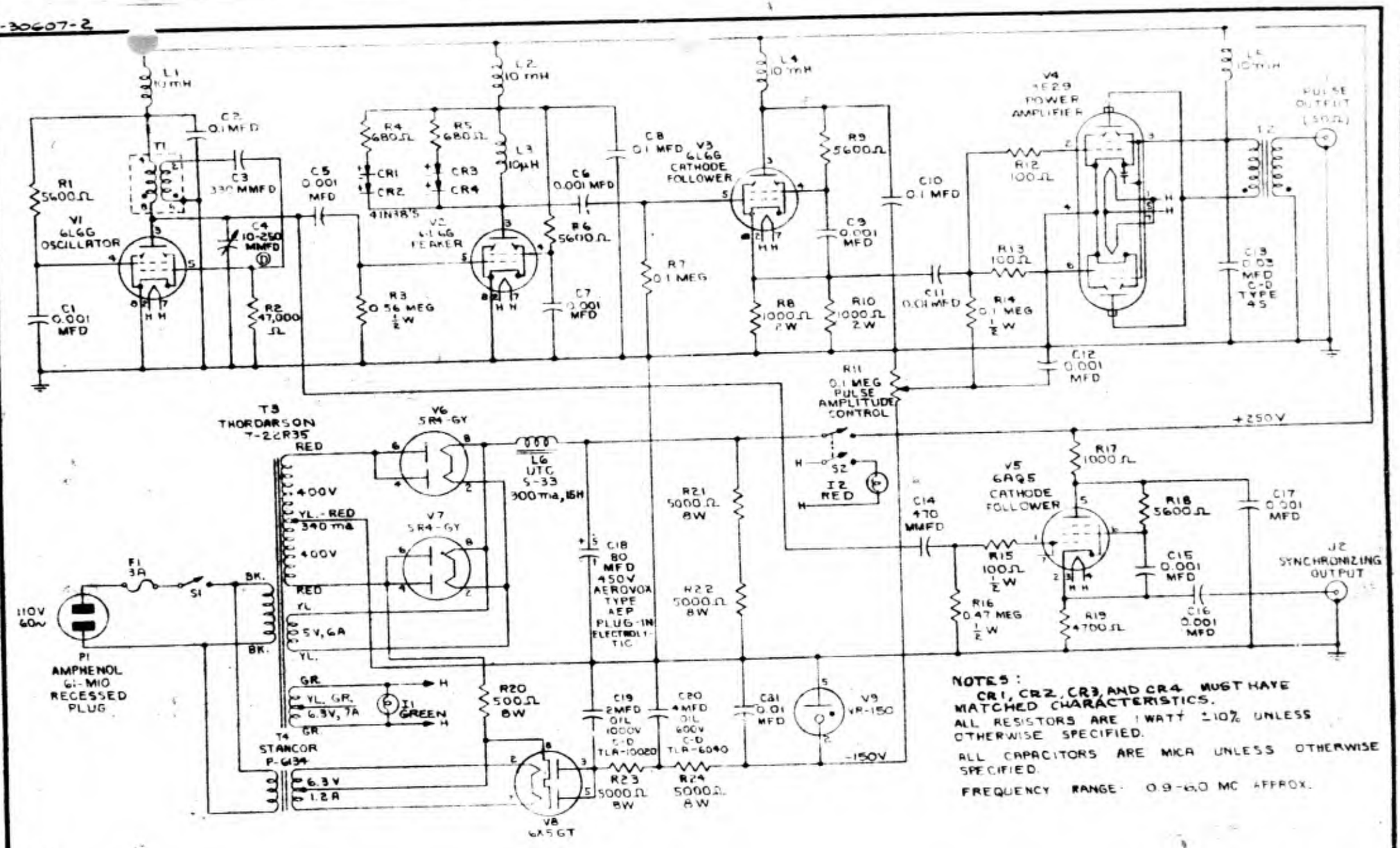
E-30618

C-30620

A-31090

A-38350

C-30607-2



NOTES:

CR1, CR2, CR3 AND CR4 MUST HAVE MATCHED CHARACTERISTICS.

ALL RESISTORS ARE 1 WATT ±10% UNLESS OTHERWISE SPECIFIED.

ALL CAPACITORS ARE MKA UNLESS OTHERWISE SPECIFIED.

FREQUENCY RANGE: 0.9-6.0 MC APPROX.

DESIGNED UNDER THE LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

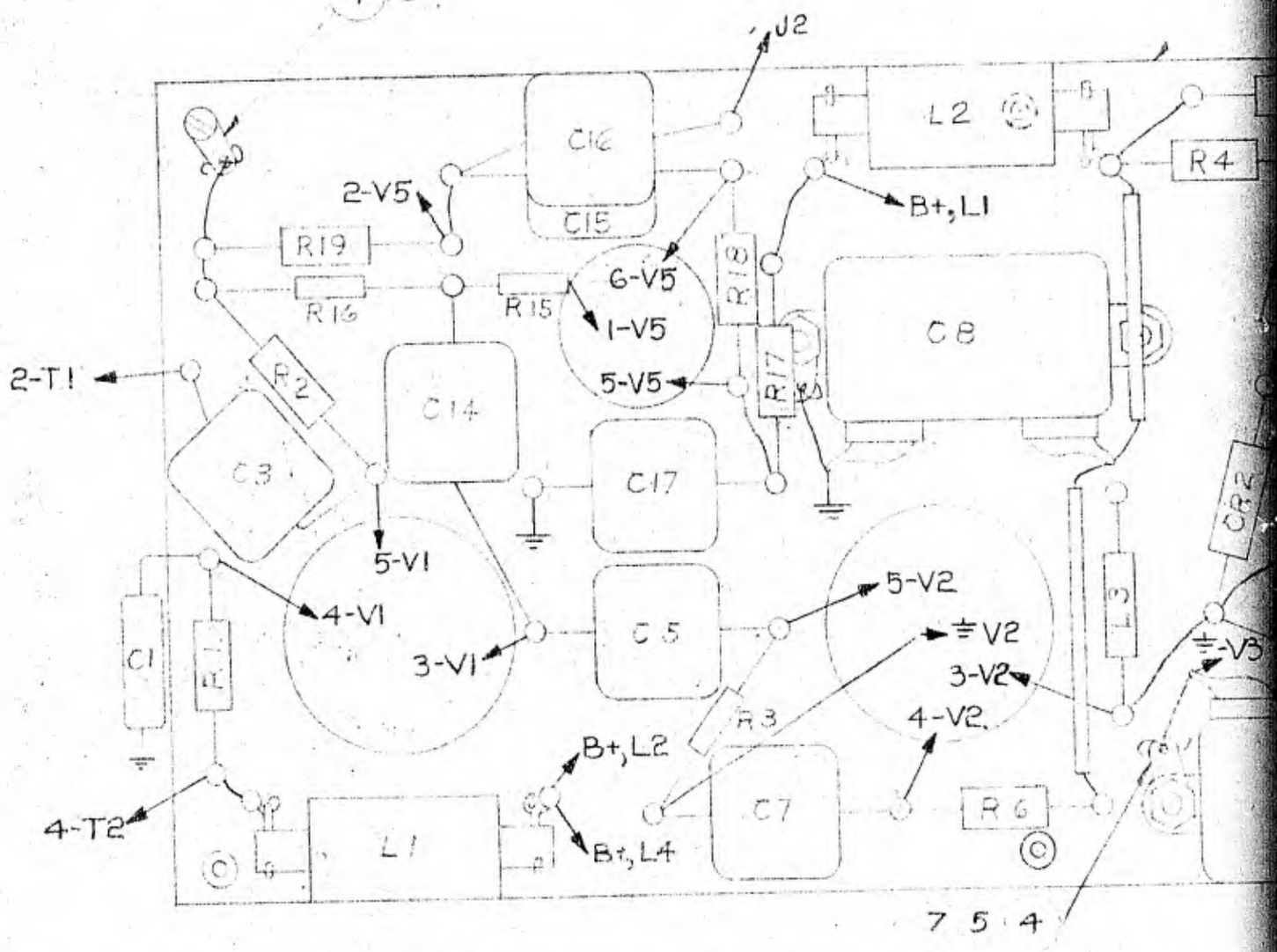
VARIABLE-FREQUENCY CLOCK-PULSE GENERATOR

SCALE	DR. D.L.O. 7-1-47		C-30607-2
DES. H.L.	CH. T.L. 7/3/47	APP.	A-REDUCTION

USED IN 6345 ENG NOTE E-48

B-30821

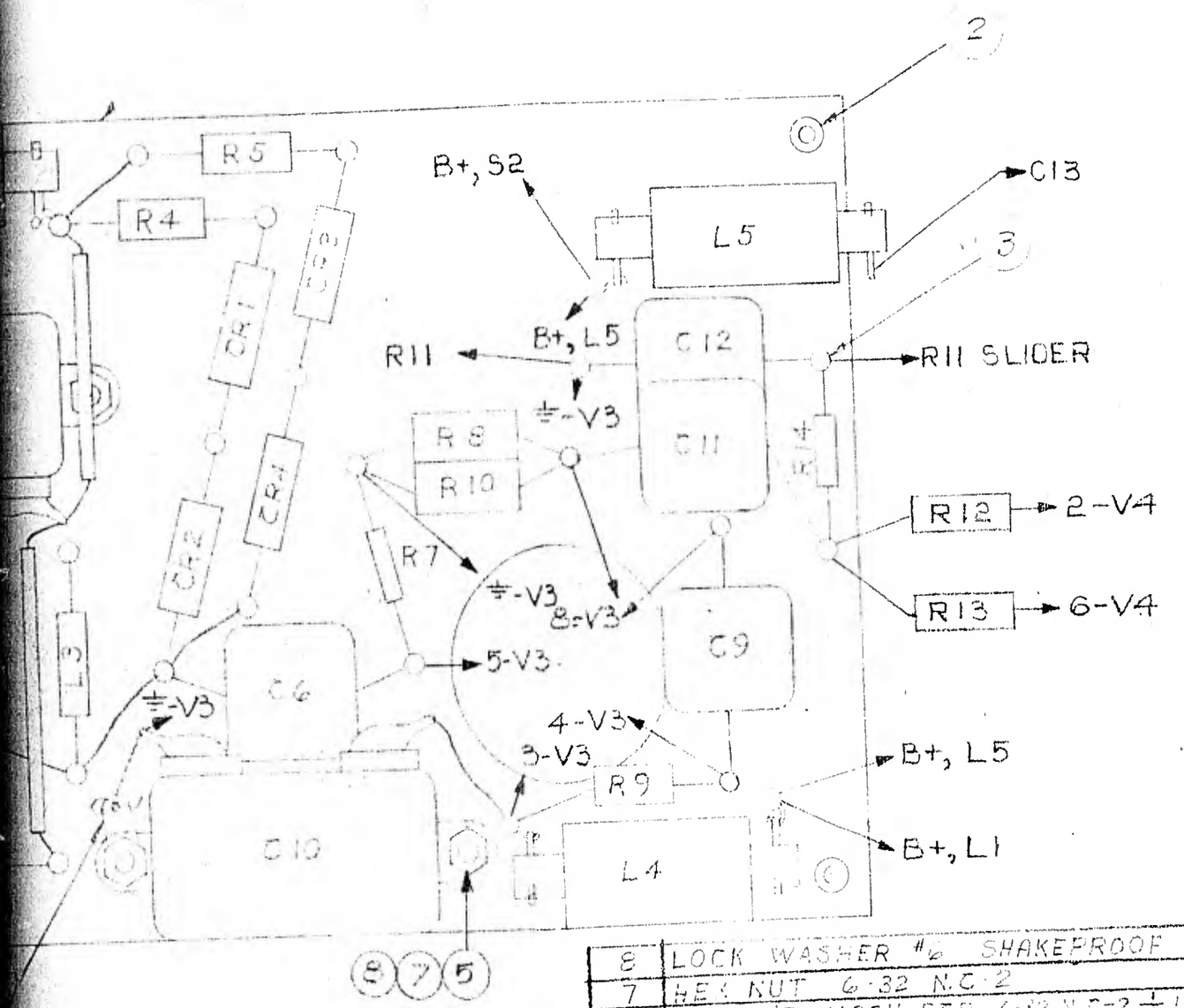
USED IN ASS'Y B-31021



R12, R13	100 Ω 1W
SERIAL NO.	VALUE
R1	560 Ω 1W
R2	47,000 Ω 1W
R3	0.5 MEG ½W
R4, R5	68 Ω 1W
R6	5600 Ω 1W
R7	0.1 MEG 1W
R8	1000 Ω 2W
R9	5600 Ω 1W
R10	1000 Ω 2W
R11	0.1 MEG ½W

ELECTRICAL PARTS LIST

SERIAL NO.	VALUE	SERIAL NO.
R15	100 Ω ½W	C10
R16	0.47 MEG. ½W	C11
R17	1000 Ω 1W	C12
R18	5600 Ω 1W	C14
R19	47,000 Ω 1W	C15, C16, C17
C1	0.001 MFD, MICA	L1, L2
C3	330 MMFD, MICA	L3
C5, C6, C7	0.001 MFD, MICA	L4, L5
C8	0.1 MFD, OIL	CR1, CR2
C9	0.001 MFD, MICA	CR3, CR4



ITEM	MATERIAL - DESCRIPTION	PART NO	QUAN.
8	LOCK WASHER #6 SHAKEPROOF		2
7	HEX NUT 6-32 N.C. 2		4
6	B'D. H'D. MACH. SCR. 6-32 N.C-2 $\frac{1}{4}$ LG.		1
5	B'D. H'D. MACH. SCR. 6-32 N.C-2 $\frac{3}{8}$ LG.		4
4	SHAKEPROOF LUG #6	2101-6	3
3	TURRET LUG CTC	1724-D	44
2	MOUNTING POST CTC $\frac{3}{8}$	X-1246-D	6
1	TERMINAL BOARD	B-30820	1

SERIAL NO.	VALUE
C10	0.1 MFD, OIL
C11	2.01 MFD, MICA
C12	0.02 MFD, MICA
C14	4.02 MFD, MICA
C15, C16, C17	2.01 MFD, MICA
L1, L2	10 mH
L3	10 MH
L4, L5	10 mH
CR1, CR2	IN38
CR3, CR4	IN39

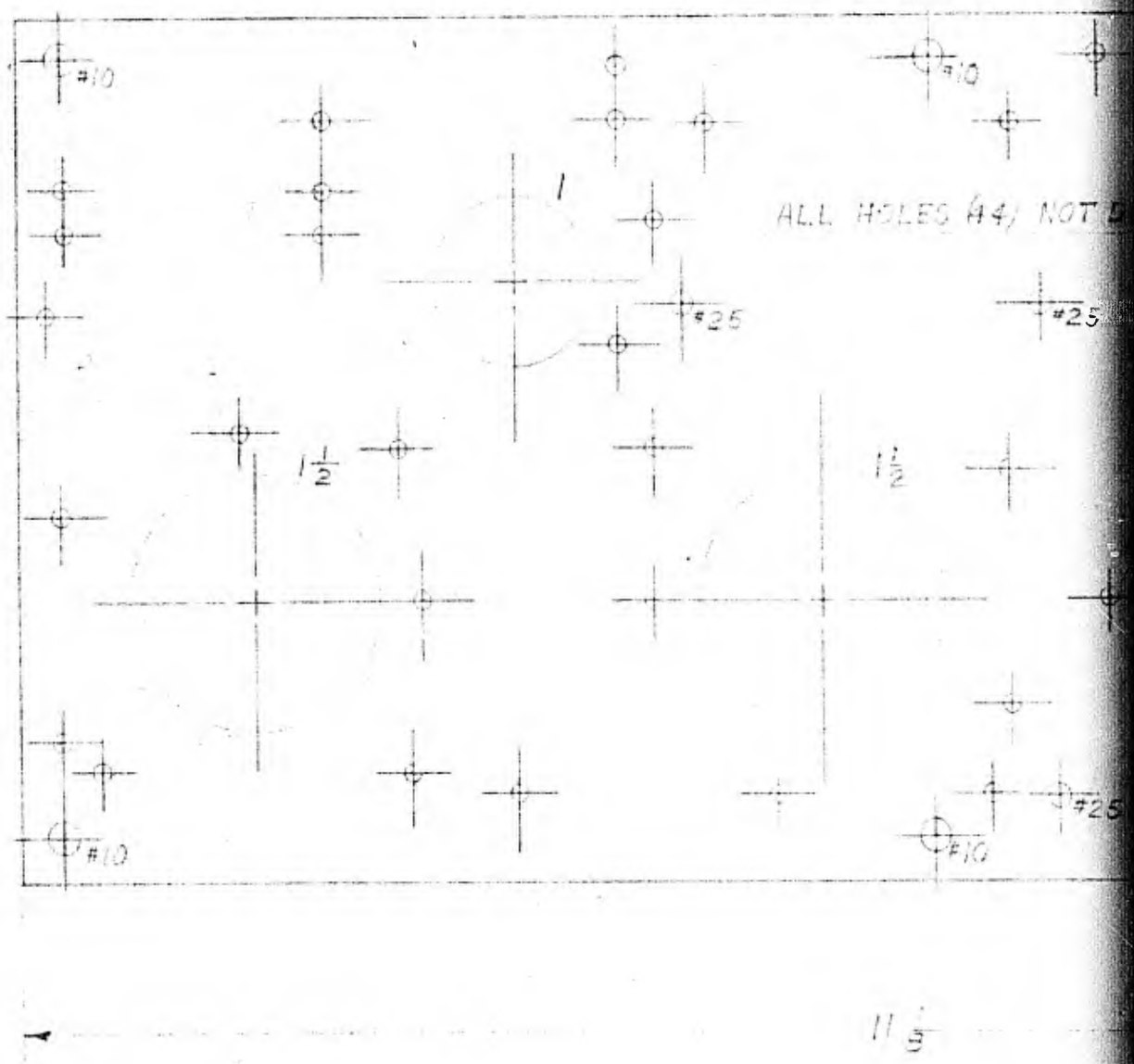
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

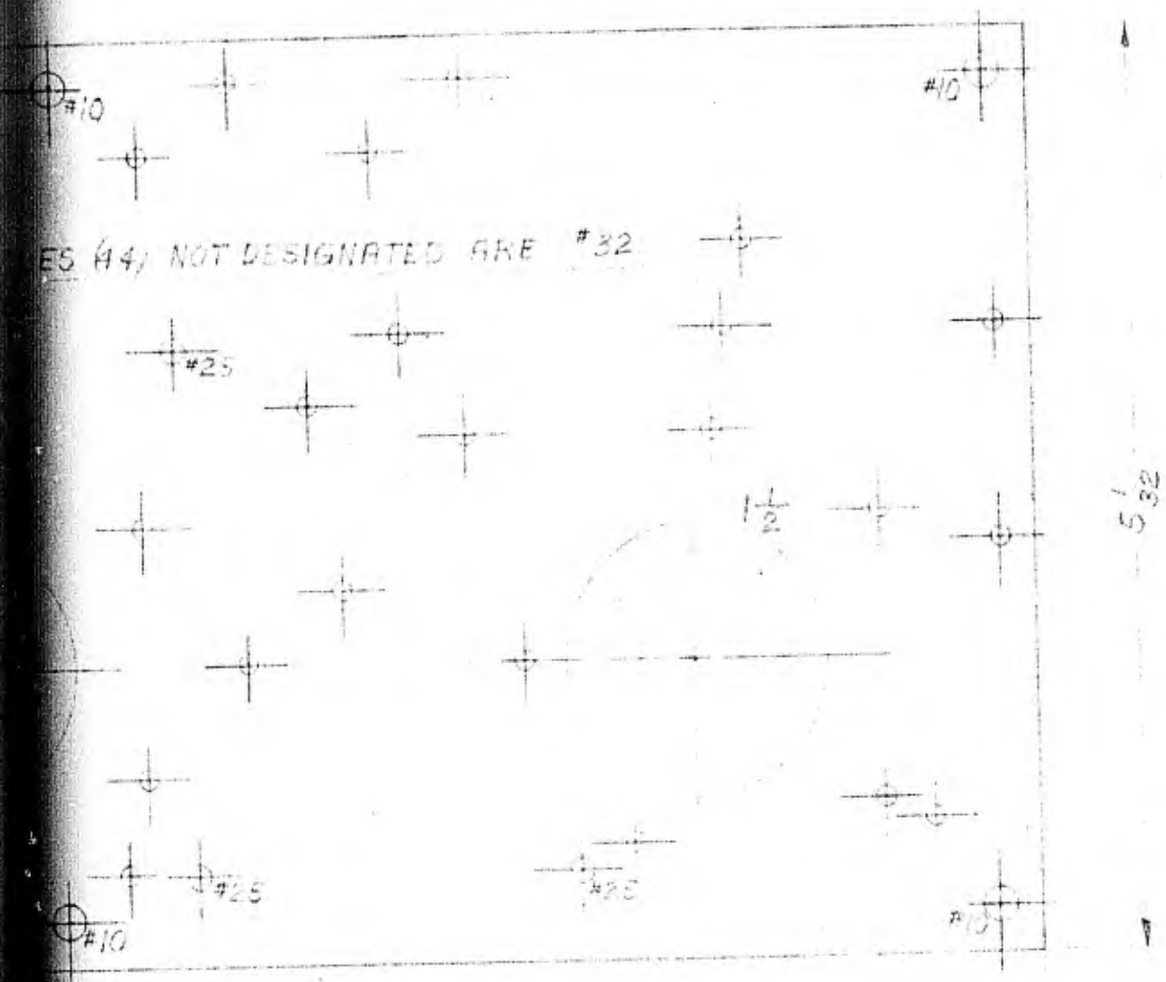
TERMINAL BOARD ASSEMBLY FOR VARIABLE FREQUENCY CLOCK-PULSE GENERATOR

SCALE:	DR. R.M.G 8-20-47	B-30821
ENG. WK	CK. RMM 10/14/47	APP.

B-30820

USED IN ASSY B-30821





MATERIAL — 1/8 LINEN BAKELITE

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6534

TERMINAL BOARD & DRILLING TEMPLATE FOR VARIABLE FREQ CLOCK PULSE GEN.

SCALE: 1 : 1	DR. R.M.G. 5-20-47	
ENG. HK	CK. RHM 10/14/47	APP.

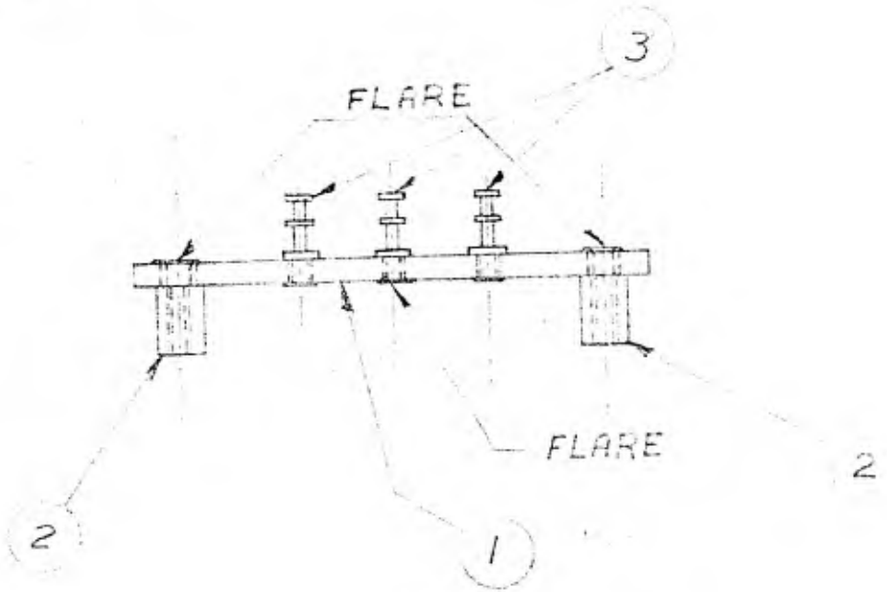
B-30820

A-308

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y B-31021



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
3	TURRET LUG C.T.C.	A-1724-D	3
2	MOUNTING POST CTC 3/8	FY-1244-D	2
1	TERMINAL STRIP	A-30814	1

P				G				
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	WAS	APP.	DATE		WAS	APP.	DATE	

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

3-TERMINAL STRIP ASS'Y

SCALE: 1 : 1 DR. R.M.G 8-23-47

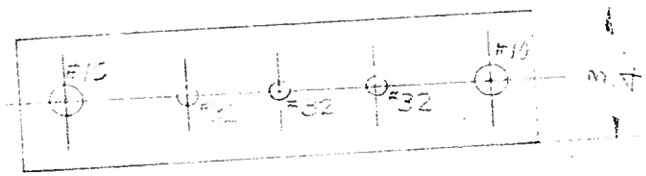
TR. HC CK. R.K.M. 10/14/47 APP.

A-30822

"ALBANENE" NO. 1685 K&E CO., N.Y.X

A-30814

B-30822



$2\frac{3}{4}$

MATERIAL— $\frac{1}{8}$ LINEN BAKELITE

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 2545

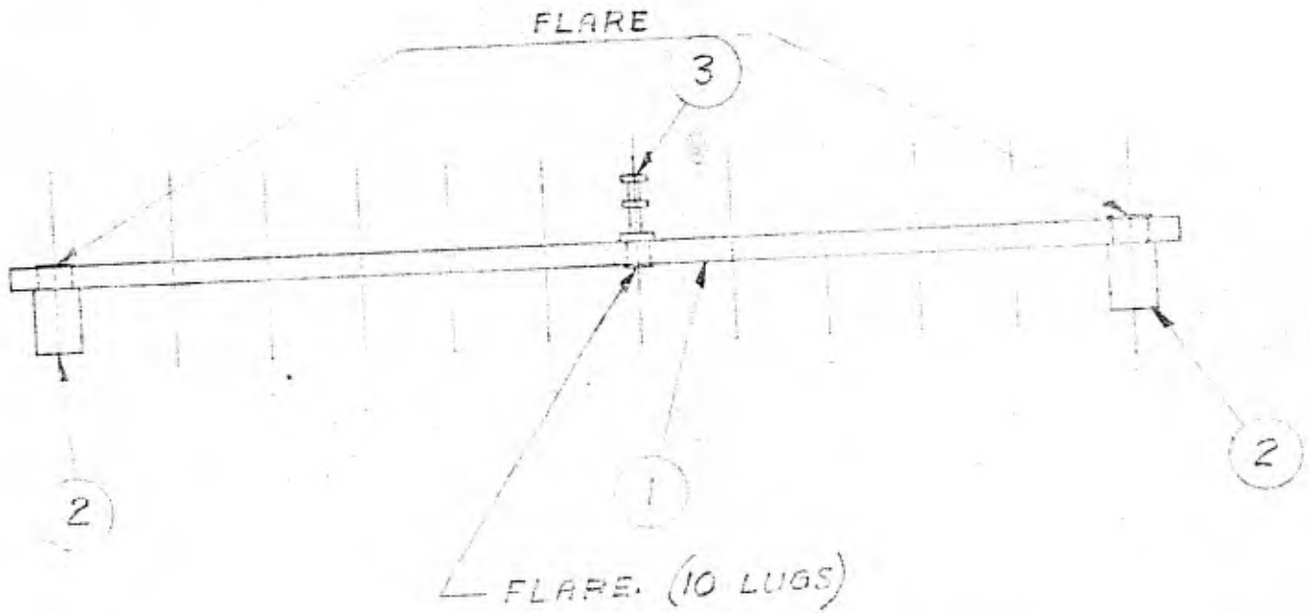
5-TERMINAL STRIP $\frac{1}{8}$ DRILLING TEMPLATE

SCALE: 1:1	DR. R.M.S. 8-21-47		A-30814
ENG. HK	CK. RKM	APP.	

A-30823
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y B-31021



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
3	TURRET LUG C.T.C.	#1724-D	10
2	MOUNTING POST CTC 3/8"	#X-1246-D	2
1	TERMINAL STRIP	A-30813	1

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	WAS	APP.	DATE			WAS	APP.	DATE	

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

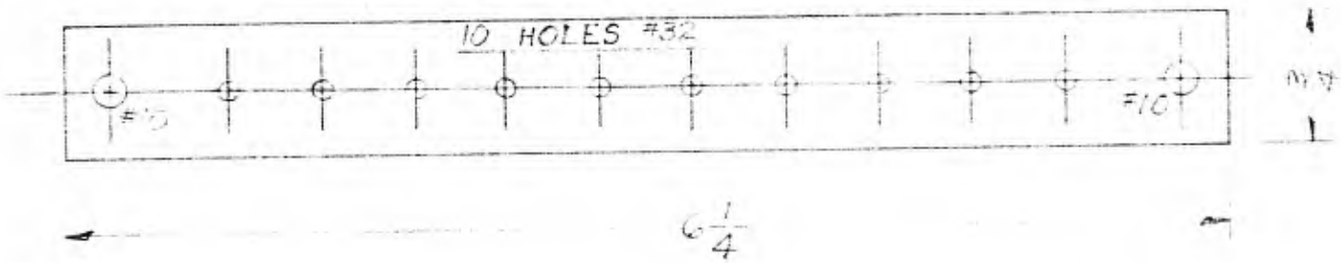
10 - TERMINAL STRIP ASS'Y

SCALE: 1 : 1 | DR. PMcG 8-23-47 | TR. HK | CK. RHM 10/14/47 | APP.

A-30823

A-30813

USED ON ANY B-30823



MATERIAL— 1/8 LINEN BAKELITE

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6348

10-TERMINAL STRIP ℄ DRILLING TEMPLATE

SCALE: 1:1	DR. [illegible] 8-21-47	A-30813
ENG. HK	CK. RB TM	APP.

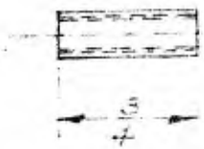
"ALBANENE" NO. 1085, K&E CO., N.Y.C.

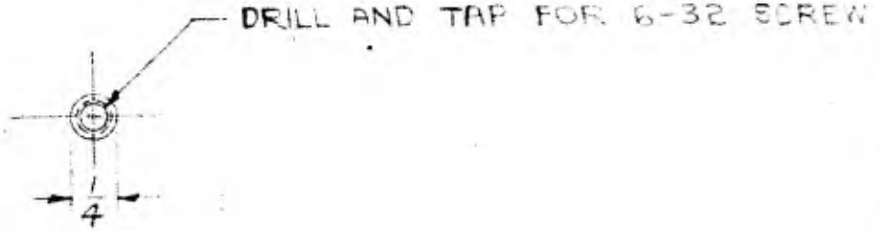
A-30815

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y B-31021





	WAS	APP.	DATE			WAS	APP.	DATE
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K					C			
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H					A			

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
	1/4 BRASS ROD		

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

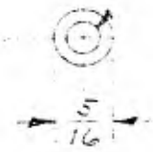
SPACER

SCALE: 1:1 DR. P. McG. 8-21-47 TR. HK CK. R.H.R. 10/14/47 APP.

A-30815

A-30816 WO-	TOLERANCES NOT OTHERWISE SPECIFIED: DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASSY B-31021



—#15 (.180) DRILL

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	WAS	APP.	DATE			WAS	APP.	DATE	

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
	5/16 BRASS ROD		

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 48-P

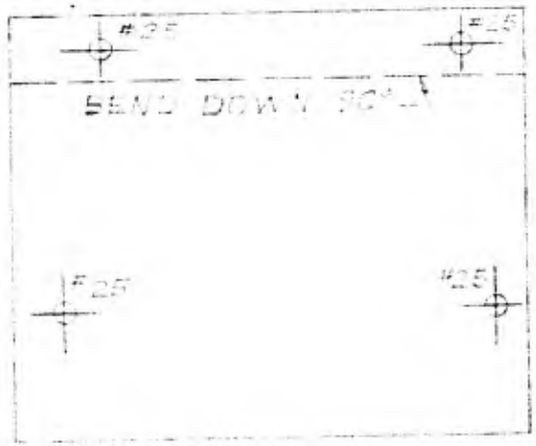
SPACER

SCALE: 1 : 1	DR. P.McG 8-21-47	
TR. HK	CK. RHM 10/14/47	APP.

A-30816

A-30817

ASSEMBLY A-30817 B-31021



3/4

MATERIAL 1/16 ALUMINUM

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

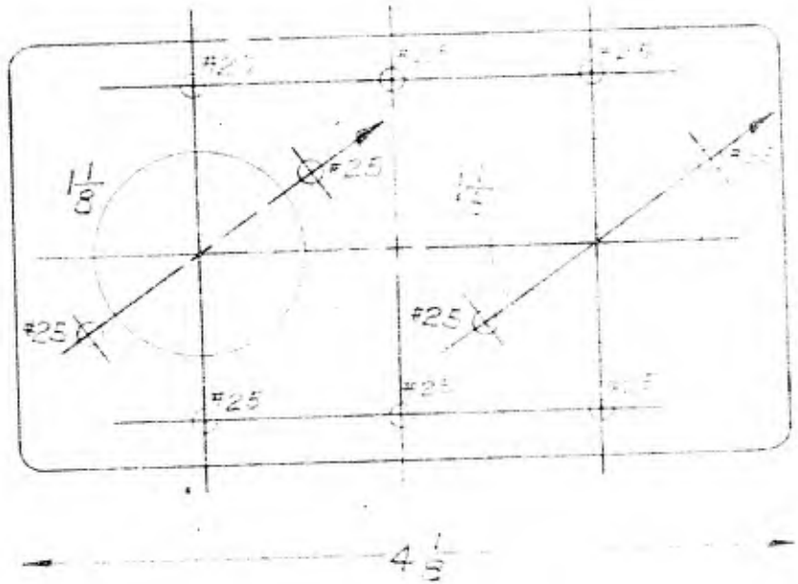
MOUNTING BRACKET FOR VARIABLE FREQUENCY CLOCK-PULSE GEN.

SCALE: 1:1	DR. RMS 3-12-47		A-30817
ENG. HK	CK. RBM	APP.	

"ALBANENE" NO. 1996 KEE CO., N.Y.C.

A-30818

ENGINEERING B-31021



MATERIAL — ALUMINUM

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

COIL 1 T2 PLATE FOR VARIABLE FREQUENCY — PULSE GEN.

SCALE:	DR. [illegible] 5-2-47		A-30818
ENG. HK	CK. RMT 10/14/47	APP.	

"ALBANENE" NO. 1358L K&E CO., N.Y.X

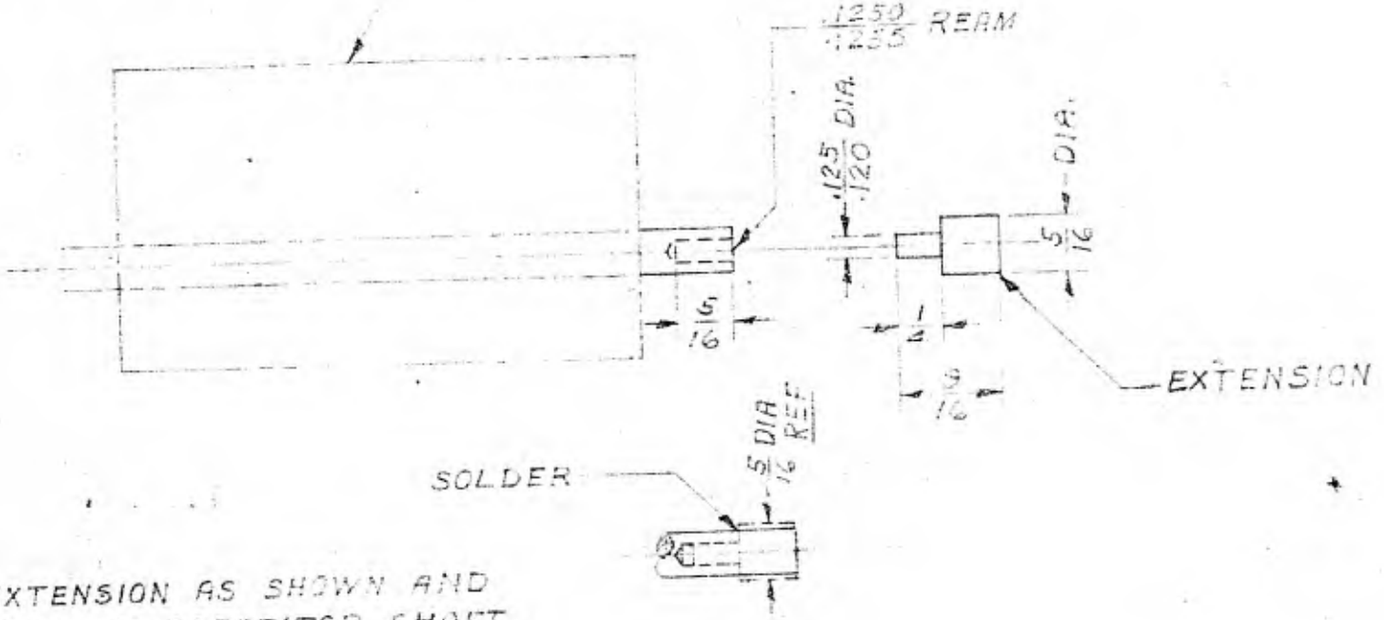
A-30819

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y B-31021

CAPACITOR. (HAMMERLUND MC-250-M)



MAKE EXTENSION AS SHOWN AND TURN DOWN TO CAPACITOR SHAFT DIA. AFTER SOLDERING AS INDICATED

P					G						
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	WAS	APP.	DATE			WAS	APP.	DATE			

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
	5/16 BRASS ROD		

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

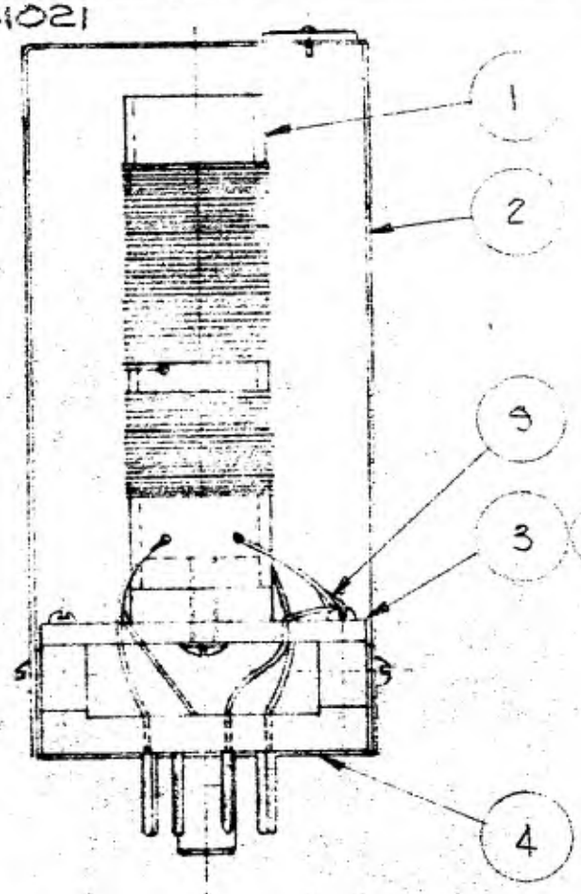
TUNING CAPACITOR SHAFT EXTENSION
FOR VARIABLE FREQ. CLOCK - PULSE GEN

SCALE: 1:1	DR. R McG 8-23-47	A-30819
TR. HK	CK. RKM 10/14/47	APP.

A- 30846-1
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y B-31021



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
9	LUG	#2300	1
8	LOCKWASHER ~ SHAKEPROOF #4	1704	2
7	LOCKWASHER ~ SHAKEPROOF #6	1706	1
6	RD. HD. SCREW #4-40 x 1/4 LG.		2
5	BINDER HD. SCR. #6-32 x 1/2 LG.		1
4	SHIELD CAN BOTTOM	A30811	1
3	MOUNTING PLATE	A30748	1
2	NAMEPLATE ASS'Y (HIGH FREQ.)	A30843	1
1	COIL WINDING ASS'Y (HIGH FREQ.)	B30824	1

	WAS	APP.	DATE			WAS	APP.	DATE
P					G			
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J					B			
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SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

HIGH. FREQ. COIL ASS'Y

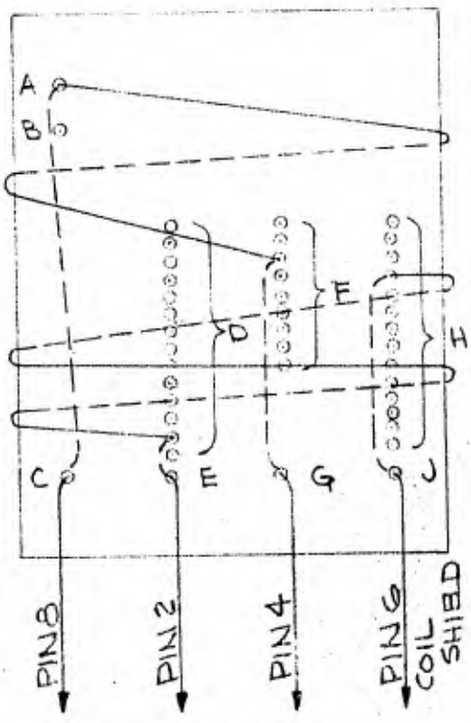
SCALE: FULL | DR. R Kelley 9/4/47 | TR. H.K | CK. R.K.H. 9/10/47 | APP.

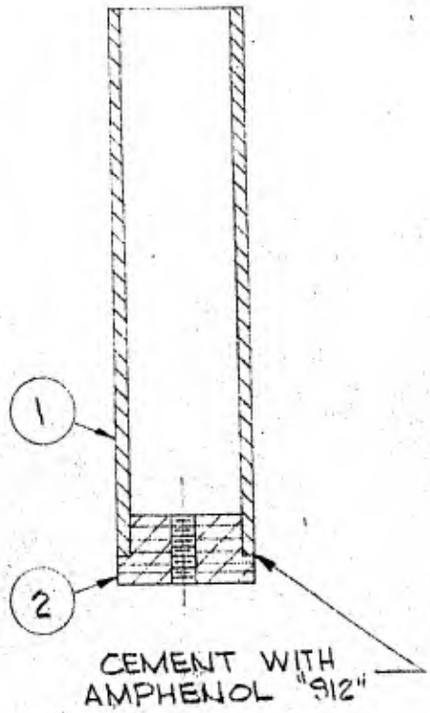
A-30846-1

"ALBANENE" NO. 1001 KOH-I-NOOR CO., N.Y.C.

B 30824-1 WO-	TOLERANCES NOT OTHERWISE SPECIFIED: DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASSY - A [illegible]





COIL DEVELOPMENT #A-30750

P					G
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K					C
J					B
H					A
	WAS	APP.	DATE		

HIGH FREQUENCY COIL INSTRUCTIONS

Use #20 formex magnet wire

(1) Plate Winding: Feed wire in through hole A and draw down inside of tube and out hole C leaving a 4" lead. Start winding from hole A and wind a single layer close wound coil of 35 turns ending last turn by feeding wire in through nearest hole of group F draw wire down inside of tube and out through hole G leaving a 4" lead.

(2) Feed Back Winding: Feed wire in through a hole in group H so that there is 1/8" spacing between the Plate winding and the feedback winding. Draw the wire down inside of tube and out hole J leaving 4" lead. Wind on a single layer close wound coil of 17 turns making sure that 1/8" spacing has been left between plate winding and feed back winding. End last turn by feeding through nearest hole in group D draw down inside of tube and out hole E leaving 4" lead.

(3) Cement windings with Amphenol 912 coil dope.

(4) Cement coil mounting plug (A-30749) in place with Amphenol 912 coil dope.

(5) Let coil dry for at least an hour.

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
2	MOUNTING PLUG	A30749	1
1	OSCILLATOR COIL FORM	A30750	1

APP.	DATE			WAS	APP.	DATE
			G			
			F			
			E			
			D			
			C			
			B			
			A			

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

COIL WINDING ASSY (HIGH FREQ.)

SCALE: Full | DR. R Kelley 8/20/47 | TR | CK. RHM 9/10/47 | APP | B-30824-1

A-30750-1

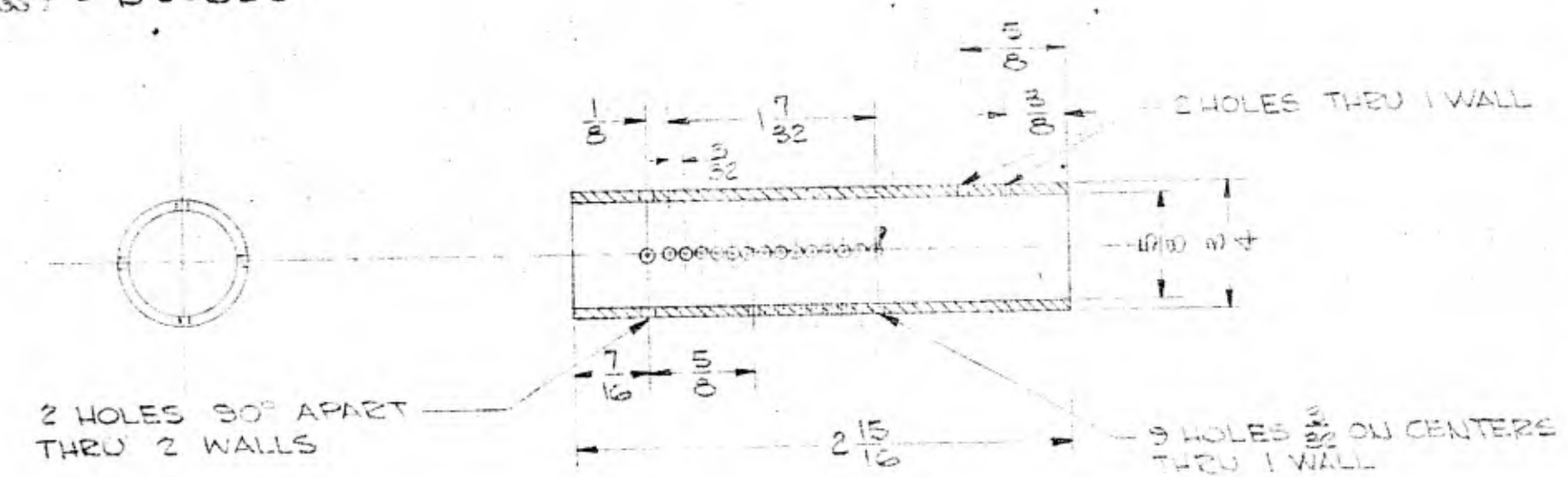
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y - B30824

USED IN ASS'Y - B30825

USED IN ASS'Y - B30826



NOTE:-
ALL HOLES ARE #55 DRILL (.052)

P					G					
N					F					
M					E					
L					D					
K					C					
J					B					
H					A					
	WAS	APP.	DATE			WAS	APP.	DATE		

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
	LINEN BAKELITE		

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

OSCILLATOR COIL FORM

SCALE:	DR.		
Full	RKK 8/20/47		A-30750-1
TR. HC	CK. RKH 9/10/47	APP.	

A- 30749

WO-

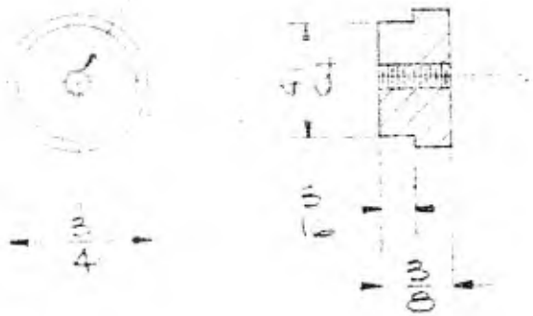
TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASSY - B30824

USED IN ASSY - B30825

USED IN ASSY - B30826

#30 DRILL (.106)
#6-32 N.C.2



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
	LINEN BAKELITE		

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

MOUNTING PLUG

SCALE: FULL. DR. R Kelley 8/31/47

TR. H1C CK. RHM 9/10/47 APP.

A- 30749

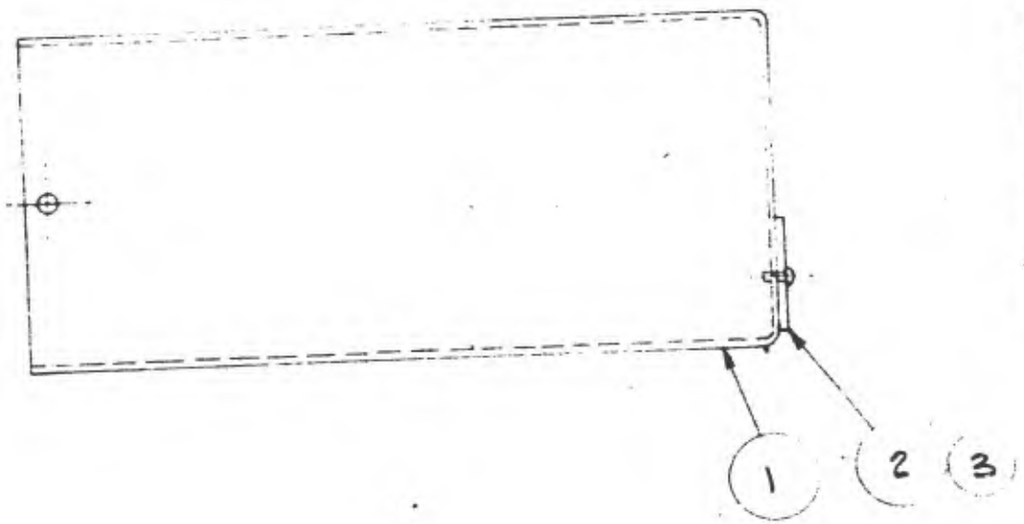
	WAS	APP.	DATE			WAS	APP.	DATE
P					G			
N					F			
M					E			
L					D			
K					C			
J					B			
H					A			

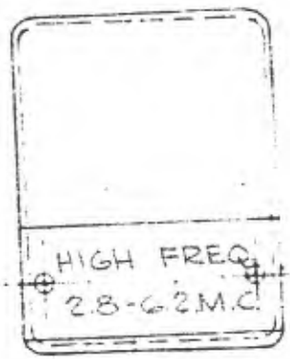
A- 30843

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y A-30846





ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
3	DRIVE SCREW - PARKER-KALON	#00	2
2	SHIELD NAMEPLATE	A30827C	1
1	SHIELD CAN	A30810	1

P					G					
N					F					
M					E					
L					D					
K					C					
J					B					
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	WAS	APP.	DATE			WAS	APP.	DATE		

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

NAMEPLATE ASS'Y (HIGH FREQ)

SCALE: FULL DR. RKeley 8/25/47

TR. WTL CK. RKM 9/10/47 APP.

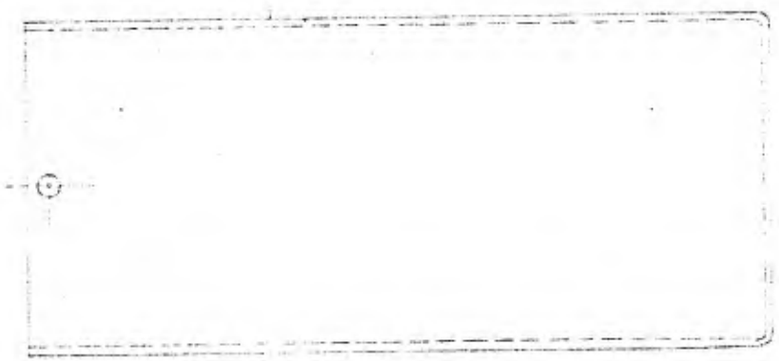
A-30843

A- 30810

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y - A30841
USED IN ASS'Y - A30842
USED IN ASS'Y - A30843



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H					A						
	WAS	APP.	DATE			WAS	APP.	DATE			

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
	ALTER SHIELD CAN J. MILLEN CO.	*74400	

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

SHIELD CAN

SCALE: FULL DR. R.K. Kelley 8/20/47

TR. 1 & IC CK. RKK 9/10/47 APP.

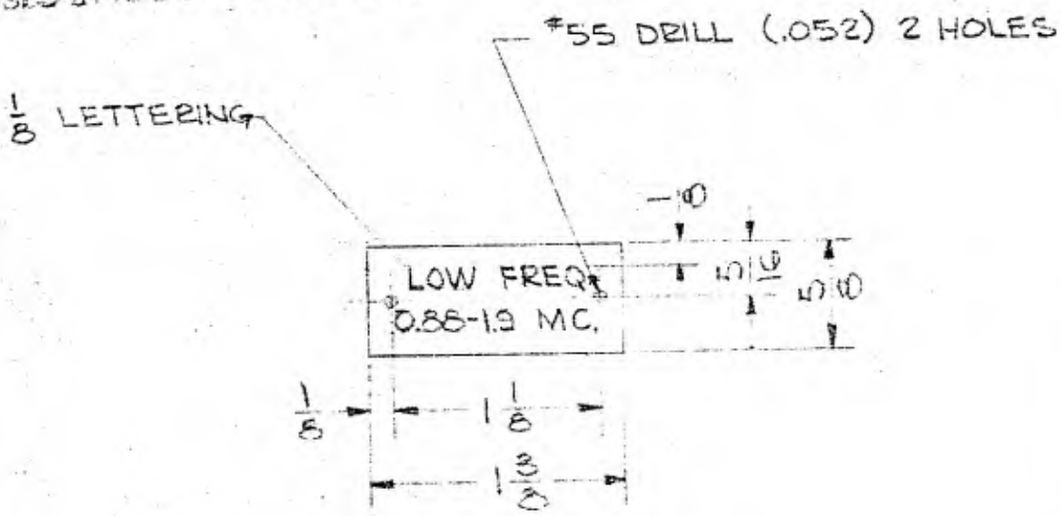
A- 30810

A-30827-1

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y - A 30841
USED IN ASS'Y - A 30842
USED IN ASS'Y - A 30843



A-30827-A

ITEM	ENGRAVING
A	LOW FREQ. 0.88-1.9 M.C.
B	MED. FREQ. 1.8-3.9 M.C.
C	HIGH FREQ. 3.8-6.2 M.C.

P					G					1/16	LAMICOID		
N					F					ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
M					E								
L					D								
K					C								
J					B								
H					A								
	WAS	APP.	DATE			WAS	APP.	DATE					

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

SHIELD NAMEPLATE

SCALE: FULL | DR. P.K. Keller 8/25/47 | A-30827-1

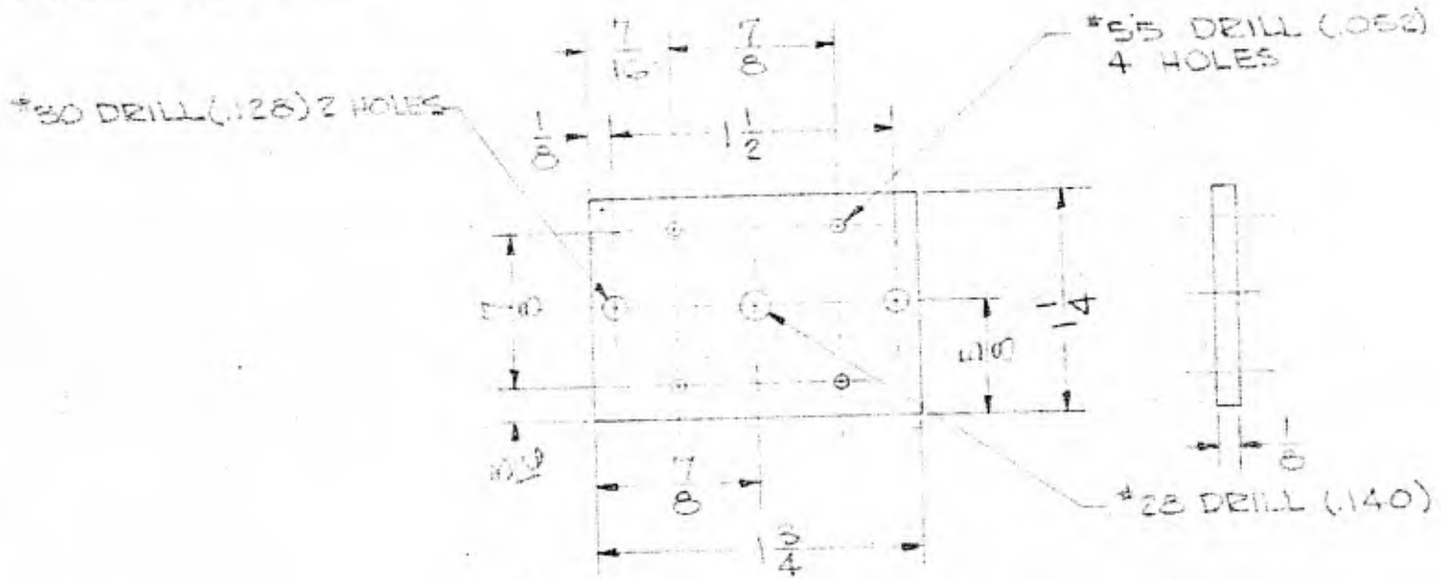
TR. HMC | CK. R.H.M. 9/10/47 | APP.

"ALBANENE" NO. 1085 KAS CO., N.Y.-X

A- 30748
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y - A 30844
USED IN ASS'Y - A 30845
USED IN ASS'Y - A 30846



P					G						
N					F						
M					E						
L					D						
K					C						
J					B						
H					A						
	WAS	APP.	DATE			WAS	APP.	DATE			

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
	LINEN BAKELITE		

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

MOUNTING PLATE

SCALE: FULL	DR. P.K. Kelley 8/20/47	A- 30748
TR. HC	CK. RHM 9/10/47	APP.

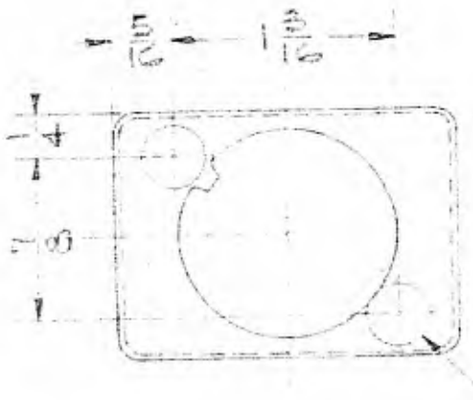
"ALBANENE" NO. 1861 K&E CO., N.Y.X

A- 30811

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y - A 30844
USED IN ASS'Y - A 30845
USED IN ASS'Y - A 30846



- 3/8 DRILL 4 HOLES

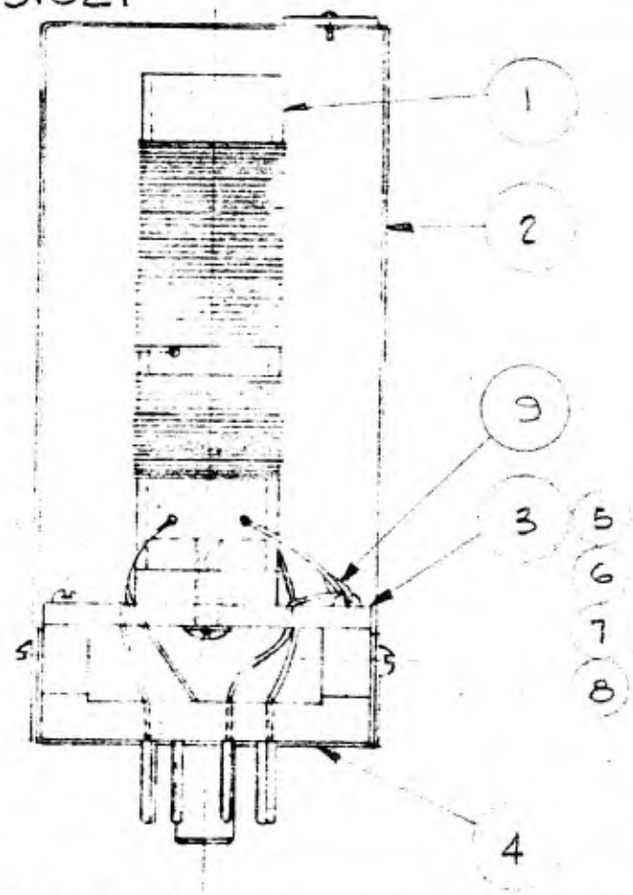
P					G						ALTER CAN BOTT. J. MILLEN CO.	F74400	
N					F					ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
M					E						SERVOMECHANISMS LABORATORY OF THE		
L					D						MASSACHUSETTS INSTITUTE OF TECHNOLOGY		
K					C						DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345		
J					B						SHIELD CAN BOTTOM		
H					A					SCALE: Full	DR. [illegible] 8/20/47	A- 30811	
	WAS	APP.	DATE			WAS	APP.	DATE		TR. HC	CK. [illegible] 9/10/47	APP.	

"ALBANENE" NO. 1951 K&E CO., N.Y.X

A- 30845-1
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

DRAWING NO. B-31021



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
9	LUG	#2300	1
8	LOCKWASHER - SHAKEPROOF #4	1704	2
7	LOCKWASHER - SHAKEPROOF #6	1706	1
6	RD. HD SCREW #4-40 x 1/4 LG		2
5	BINDER HD. SCR. #6-32 x 1/2 LG.		1
4	SHIELD CAN BOTTOM	A30F11	1
3	MOUNTING PLATE	A30748	1
2	NAMEPLATE ASS'Y (MED. FREQ)	A30842	1
1	COIL WINDING ASS'Y (MED. FREQ)	B30825	1

P					G				
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J					B				
H					A				
	WAS	APP.	DATE			WAS	APP.	DATE	

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6845

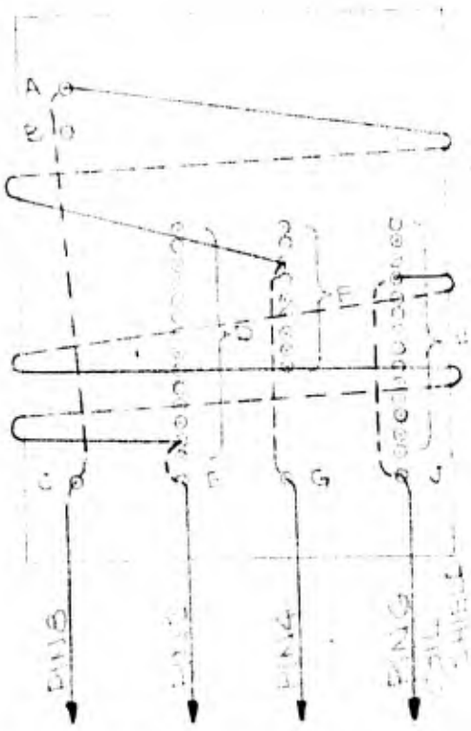
MED. FREQ. COIL ASS'Y

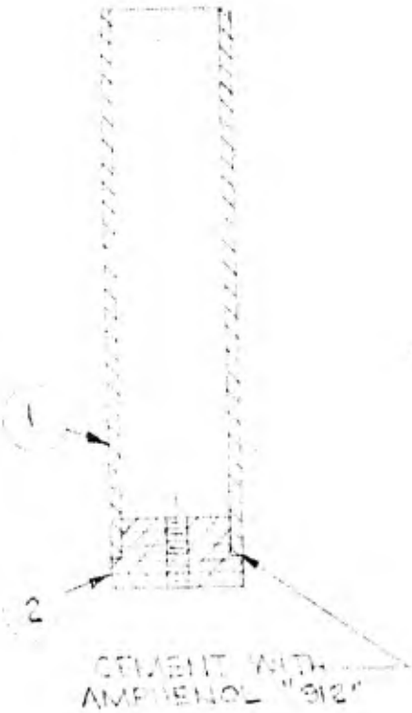
SCALE: FULL | DR. R.L.Kelley 9/3/47 | TR. IAK | CK. R.B.M. 9/10/47 | APP.

A-30845-1

B- 30825-1	TOLERANCES NOT OTHERWISE SPECIFIED:
WO-	DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASSY A - 30545





COIL DEVELOPMENT "A-30765"

P				
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H				
	WAS	APP	DATE	

MEDIUM FREQUENCY COIL INSTRUCTIONS

Use #24 formex magnet wire

(1) Plate Winding: Feed wire in through hole A and draw down inside of tube and out hole C leaving a 4" lead. Start winding from hole A and wind a single layer close wound coil of 60 turns ending last turn by feeding wire in through nearest hole of group F draw wire down inside of tube and out through hole G leaving a 4" lead.

(2) Feed Back Winding: Feed wire in through a hole in group H so that there is 1/8" spacing between the Plate winding and the feedback winding. Draw the wire down inside of tube and out hole J leaving 4" lead. Wind on a single layer close wound coil of 30 turns making sure that 1/8" spacing has been left between Plate winding and feed back winding. End last turn by feeding through nearest hole in group D draw down inside of tube and out hole E leaving 4" lead.

(3) Cement windings with Amphenol 912 coil dope.

(4) Cement coil mounting plug (A-30749) in place with Amphenol 912 coil dope.

(5) Let coil dry for at least an hour.

ITEM	MATERIAL - DESCRIPTION	PART NO	QUAN.
2	MOUNTING PLUG	A-30749	1
1	OSCILLATOR COIL FORM	A-30750	1

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6240

COIL WINDING ASS'Y (MED. FREQ.)

SCALE	DRAWN	APP
FULL	9/2/47	
TR HLL	CK RMG 9/10/47	

B-30825-1

2

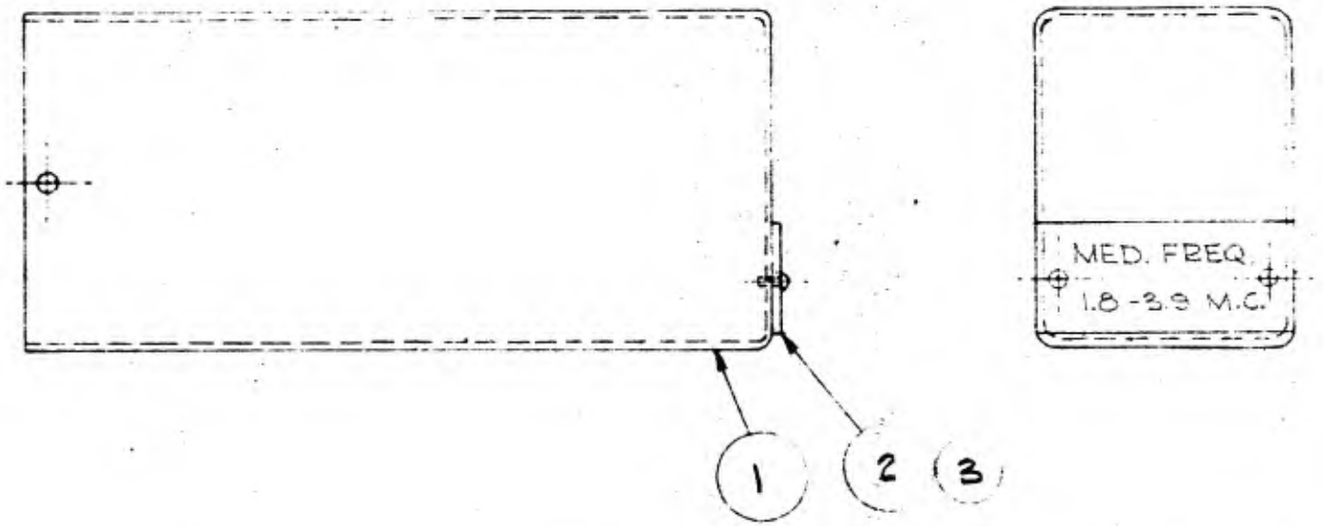
			G						
			F						
			E						
			D						
			C						
			B						
			A						
	APP	DATE		WAS	APP	DATE			

A-30842

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

UNIT IN ASS'Y A-30845



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
3	DRIVE SCREW - PARKER-KALON	#00	2
2	SHIELD NAMEPLATE	A30827B	1
1	SHIELD CAN	A30810	1

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H					A				
	WAS	APP.	DATE			WAS	APP.	DATE	

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

NAMEPLATE ASS'Y (MED. FREQ)

SCALE: FULL | DR. RKaley 8/25/47 | TR. HL | CK. RK 9/1/47 | APP.

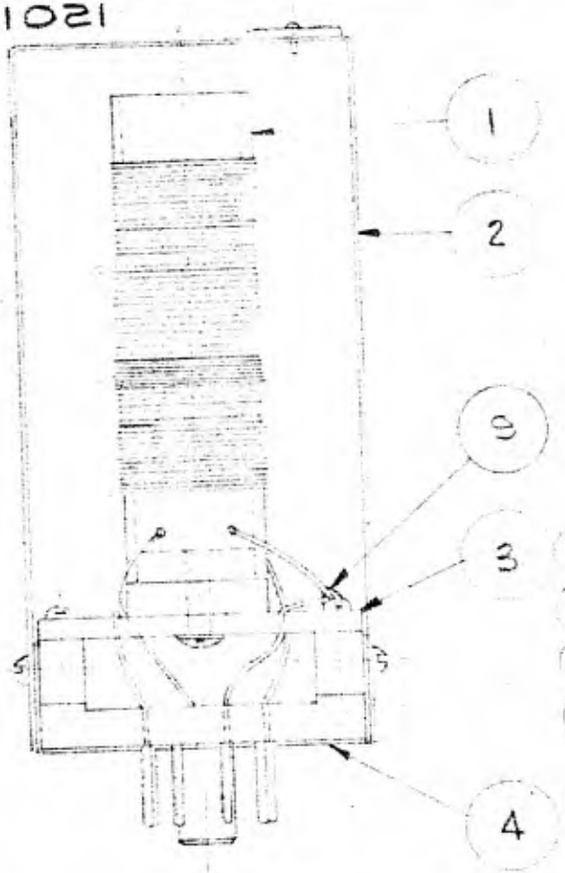
A-30842

A- 30844-1

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y B-31021



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
9	LUG	*2800	1
8	LOCKWASHER - SHAKEPROOF #4	1704	2
7	LOCKWASHER - SHAKEPROOF #6	1706	1
6	RD. HD. SCREW #4-40 x 1/4 LG		2
5	BINDER HD. SCR. #6-32 x 1/2 LG		1
4	SHIELD CAN BOTTOM	A30811	1
3	MOUNTING PLATE	A30748	1
2	NAMEPLATE ASS'Y (LOW FREQ)	A30841	1
1	COIL WINDING ASS'Y (LOW FREQ)	B30826	1

P					G				
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K					C				
J					B				
H					A				
	WAS	APP.	DATE			WAS	APP.	DATE	

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

LOW FREQ. COIL ASS'Y

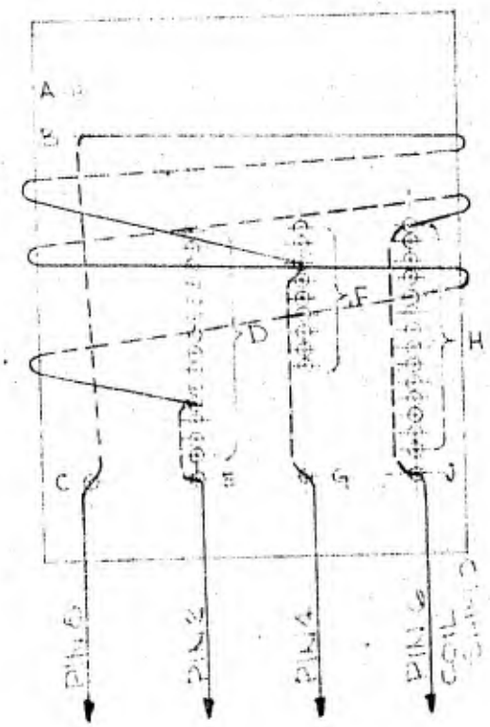
SCALE: FULL | DR. [illegible] 9/3/47 | TR. VK | CK. RA 9/10/47 | APP.

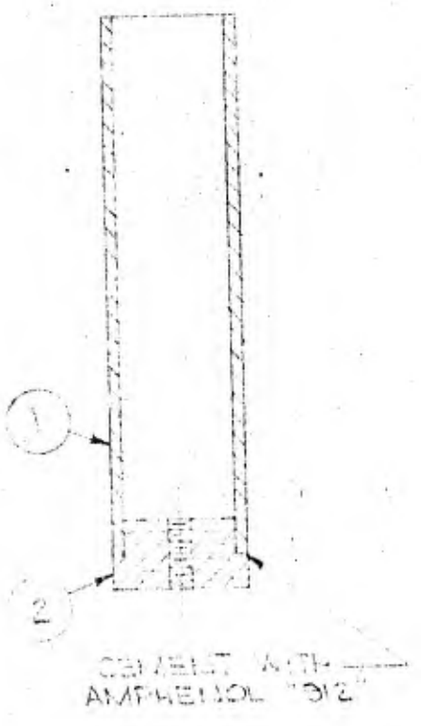
A-30844-1

"ALBANENE" NO. 1951 K&E CO., N.Y.X

B- 30826-1	TOLERANCES NOT OTHERWISE SPECIFIED:
WO-	DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y A-30844





COIL DEVELOPMENT *A-30750

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N				
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H				
	WAS		APP	DATE

LOW FREQUENCY COIL INSTRUCTIONS

Use #32 formex magnet wire

(1) Plate Winding Feed wire in through hole B. draw down inside of tube and out hole C., leaving a 4" lead. Winding of coil is now started from hole B. Wind on a single layer close wound coil of 110 turns ending the last turn by feeding wire through the nearest hole in group F. Draw the wire down inside of tube & out hole G. leaving a 4" lead

(2) Wind two turns of .001" polystyrene tape over the lower end of the winding just completed, letting the tape cover 3/8" of the winding.

(3) Feed Back Winding: Feed wire through hole in group H nearest the plate winding and draw down inside tube and out hole J leaving a 4" lead. Winding is now started from hole H by laying wire up onto the lower end of the plate winding 1/8" and winding back over the lead so that 1/8" of the feed back winding overlaps the plate winding. The winding is now continued to make a total of 50 turns (all turns close wound)and ended by feeding through the nearest hole in group D,drawing down inside tube and out hole E, leaving 4" lead.

(4) Cement coil with Amphenol 912 coil dope.

(5) Cement coil mounting plug (A-30749) in place with Amphenol 912 coil dope.

(6) Let coil dope dry for at least an hour.

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
2	MOUNTING PLUG	A-30749	1
1	OSCILLATOR COIL FORM	A-30750	1

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

COIL WINDING ASS'Y (LOW FREQ)

SCALE FULL DR [illegible] 4/29/47 CK [illegible] APP.

FR 1+1C

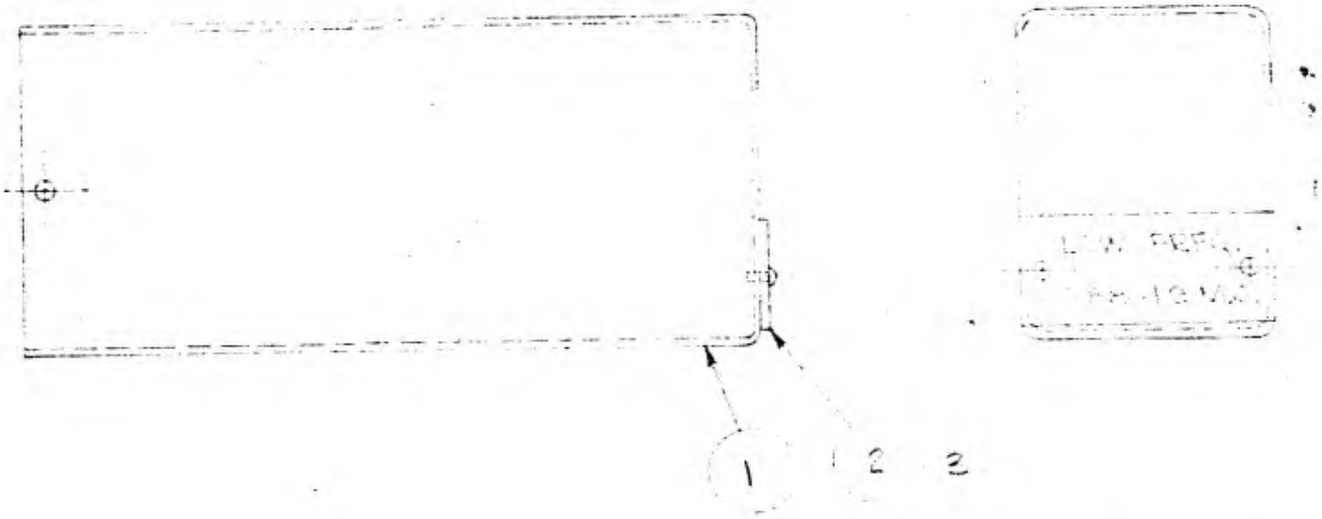
B-30826-1

PP	DATE			WAS	APP	DATE
			G			
			F			
			E			
			D			
			C			
			B			
			A			

A- 30841
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y - A 30844



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
3	DRIVE SCREW - PARKER KALON #00		2
2	SHIELD NAMEPLATE	A-30843	1
1	SHIELD CAN	A-30840	1

P					G				
N					F				
M					E				
L					D				
K					C				
J					B				
H					A				
	WAS	APP.	DATE			WAS	APP.	DATE	

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

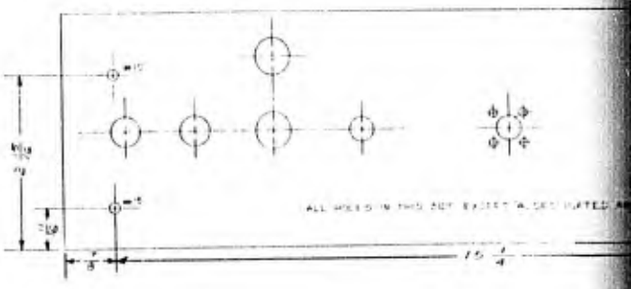
NAMEPLATE ASS'Y (LOW FIELD)

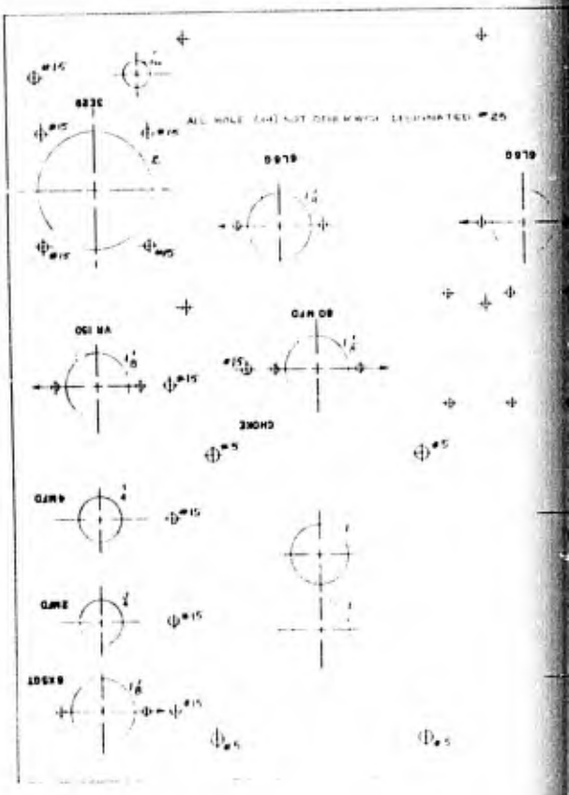
SCALE: FULL | DR [illegible] 8/20/47 | TR. H 1A | CK. [illegible] 9/3/47 | APP.

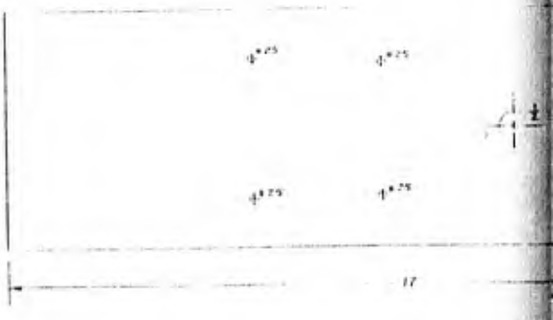
A- 30841

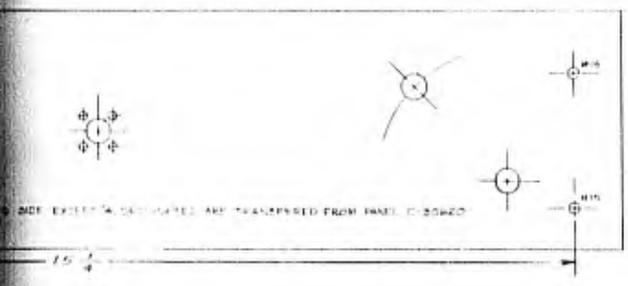
"ALBANENE" NO. 1501 KEE CO., N. Y. X

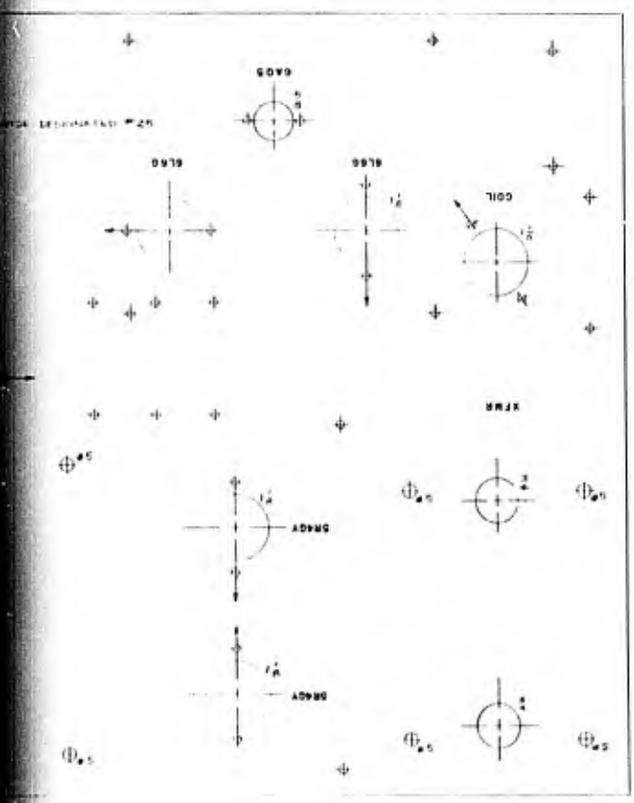
E-30618-2

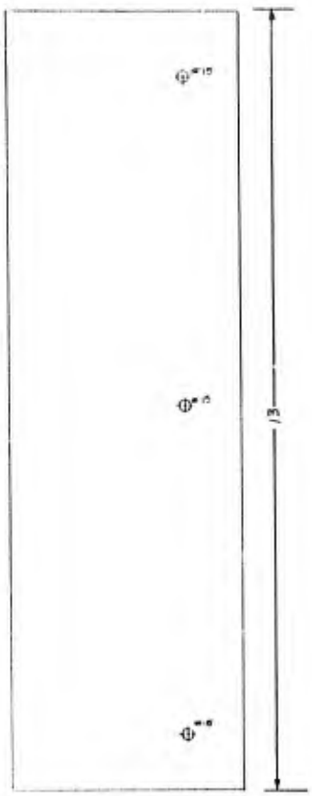


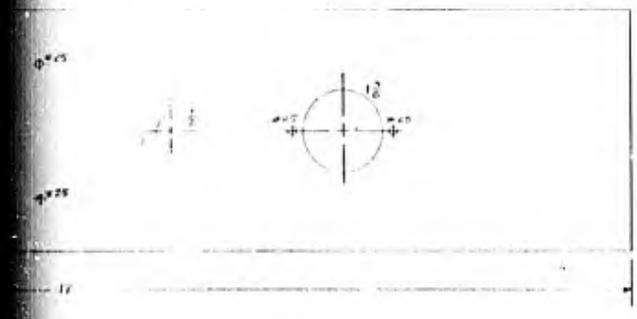












CHASSIS DRILLING TEMPLATE FOR VARIABLE FREQUENCY CLOCK-PULSE GEN.	
	E-30618-2

2

C-30620-2

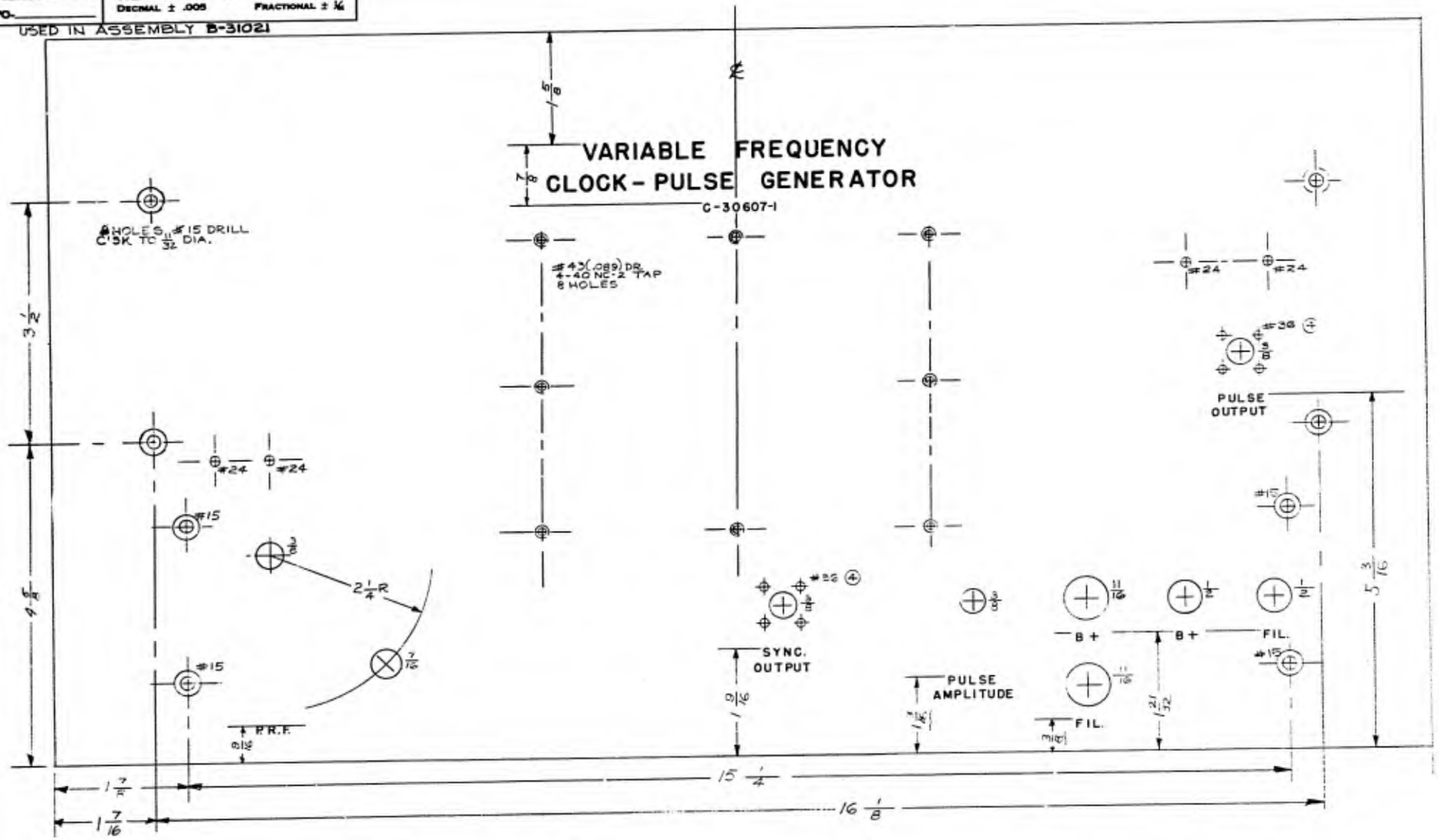
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/16

USED IN ASSEMBLY B-31021

VARIABLE FREQUENCY CLOCK-PULSE GENERATOR

C-30607-1

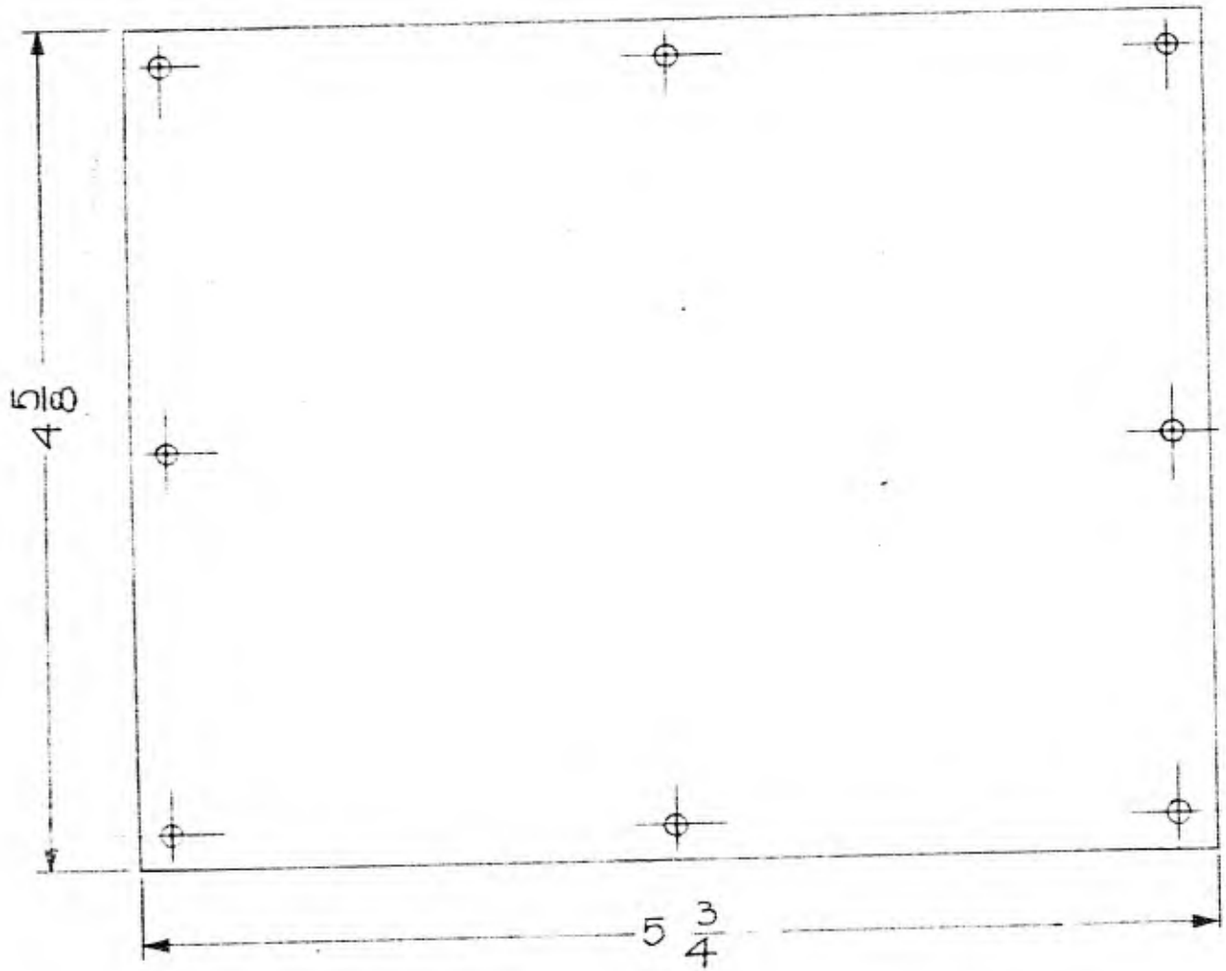


NOTE: ALL ENGRAVING NOT SPECIFIED OTHERWISE TO BE 1/8 HIGH.

P					G					BUD MFG. CO. DENSFORD, IOWA	
N					F				ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
M					E					SERVOMECHANISMS LABORATORY OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 2345		
L					D					PANEL & DRILLING TEMPLATE FOR VARIABLE FREQUENCY CLOCK-PULSE GEN.		
K					C					SCALE: FULL	DR. [illegible]	
J					B					TR. HK	CK. [illegible] 10/14/47	APP.	C-30620-2
H		WAS	APP.	DATE	A		WAS	APP.	DATE			

A-31090

USED IN ASSY B-31021



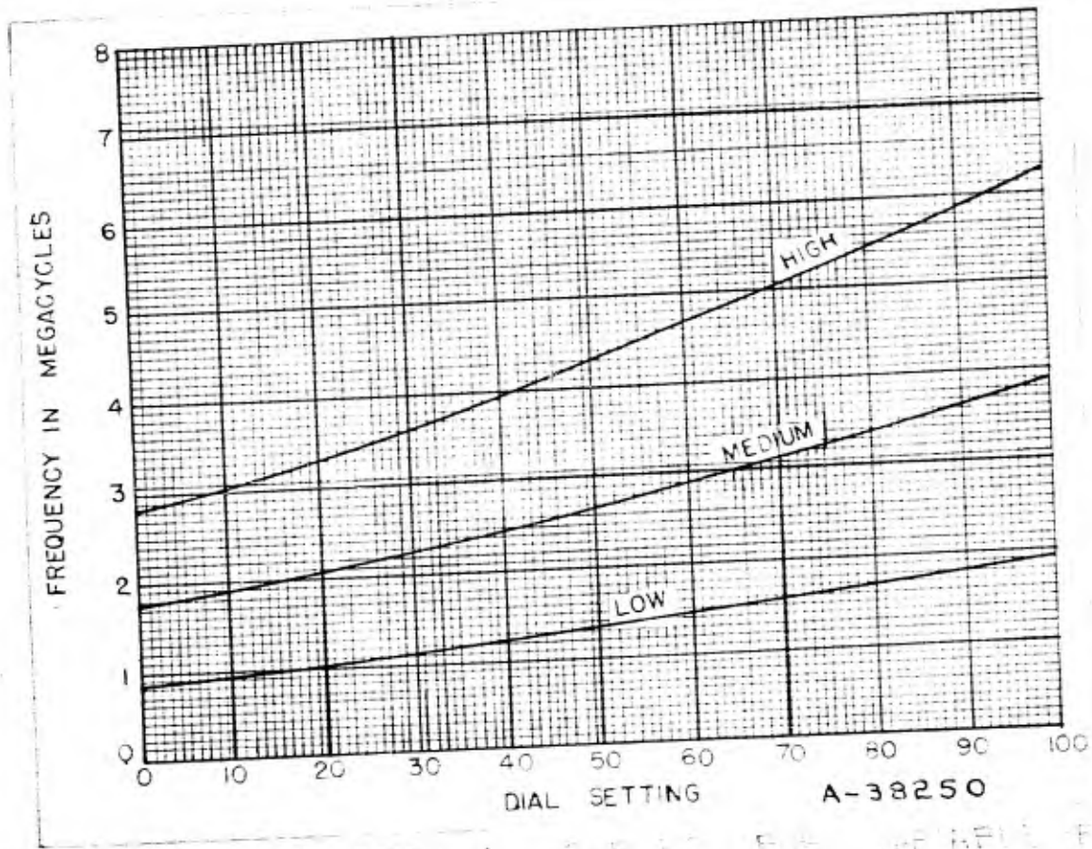
MATERIAL- 1/16 THICK, PLEXIGLASS
(ROHM AND HAAS CO.)

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

CHART FACING

SCALE: FULL	DR R.V.W. 10/14/47		A-31090
ENC HIC	CK. R.H.M. 10/15/47	APP.	

"ALBANENE" NO. 1995 K&E CO., N.Y.C.



FREQUENCY CALIBRATION CURVES FOR WIDE RANGE
CLOCK-PULSE GENERATOR

6345

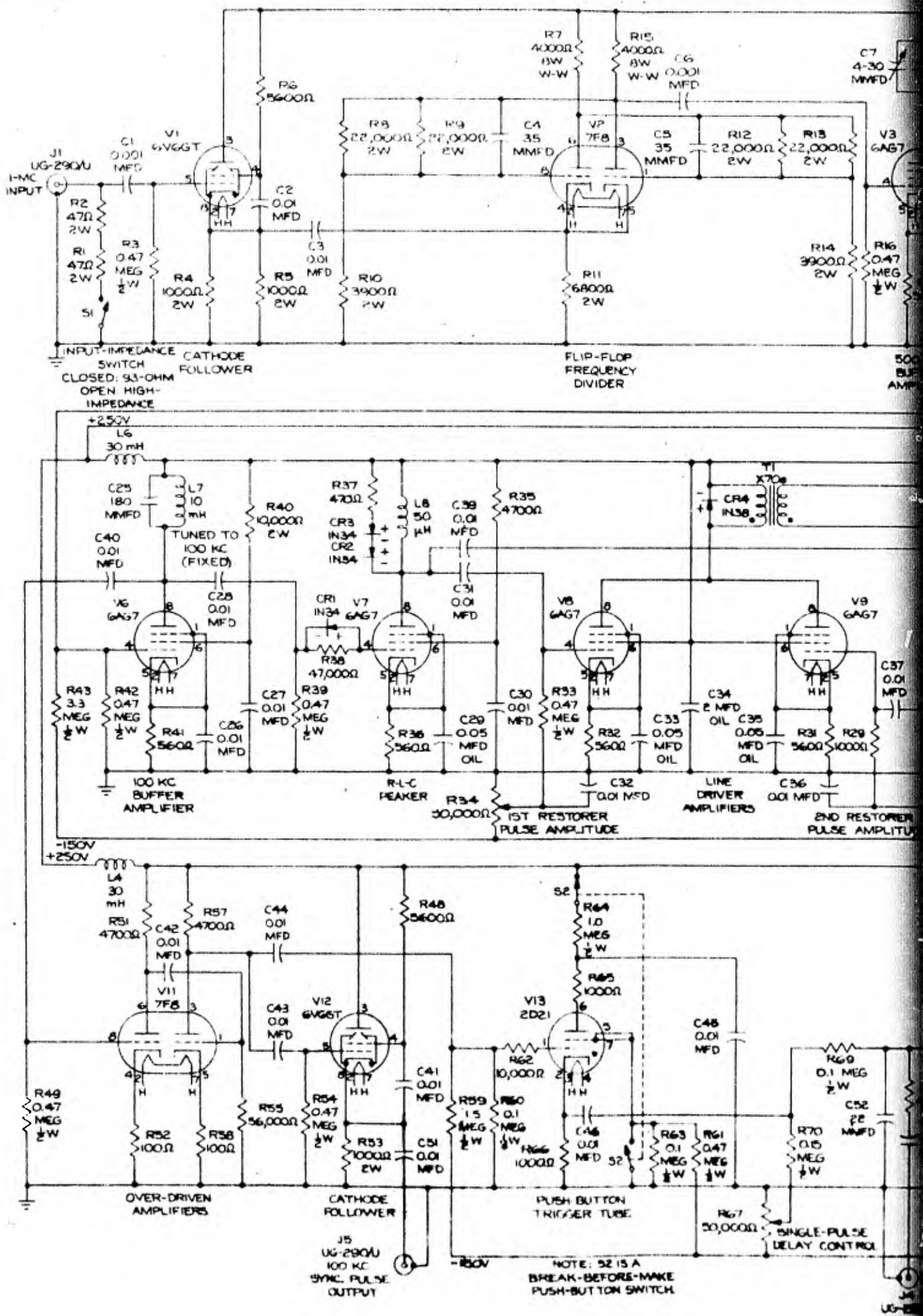
D.L.O.
7-4-47
A-38250-G

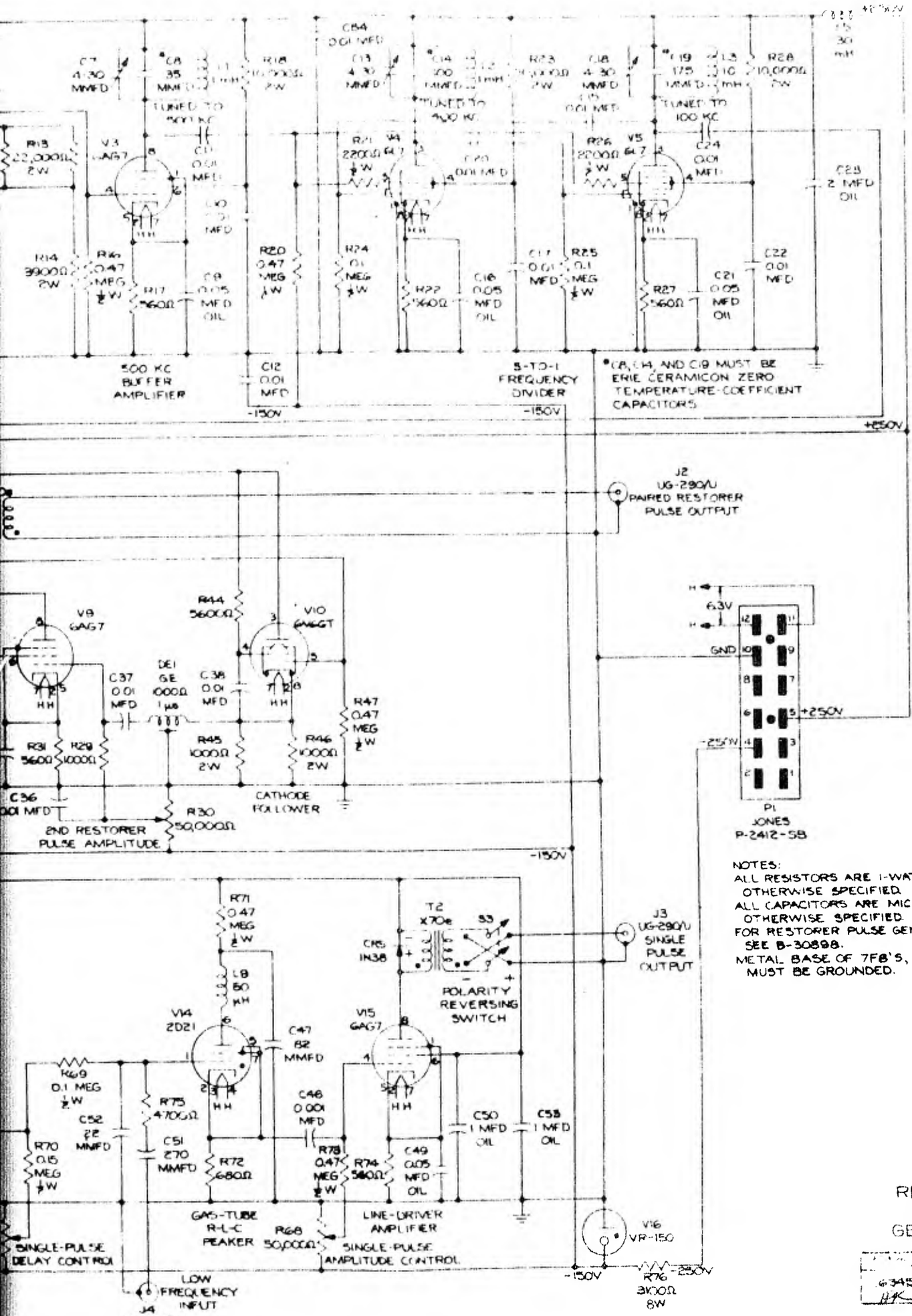
TEST EQUIPMENT DRAWING LIST

Restorer Pulse Generator, Vol. 19, E-52

D-30770	A-30779
B-30784	A-30785
A-30777	A-30778
A-30776	A-30789
A-30791	A-30782
B-30788	A-30790
A-30781	A-30783
B-30787	E-30774
A-30780	C-30775
B-30786	B-30898

D-30770-1


J1 UG-290/U 1-MC INPUT
C1 0.001 MFD
V1 6V6GT
R6 5600Ω
R7 4000Ω 8W W-W
R15 4000Ω 8W W-W
C6 0.001 MFD
C7 4-30 MMFD
R8 22,000Ω 2W
R9 22,000Ω 2W
C4 35 MMFD
VP 7F8
C5 35 MMFD
R12 22,000Ω 2W
R13 22,000Ω 2W
V3 6AG7
C2 0.01 MFD
C3 0.01 MFD
R2 47Ω 2W
R1 47Ω 2W
R3 0.47 MEG ½W
R4 1000Ω 2W
R5 1000Ω 2W
R10 3900Ω 2W
R11 6800Ω 2W
R14 3900Ω 2W
R16 0.47 MEG ½W
S1
INPUT-IMPEDANCE SWITCH CLOSED: 93-OHM OPEN: HIGH-IMPEDANCE
CATHODE FOLLOWER
FLIP-FLOP FREQUENCY DIVIDER
+250V
L6 30 mH
C25 180 MMFD
L7 10 mH
TUNED TO 100 KC (FIXED)
R40 10,000Ω 2W
R37 470Ω
CR3 IN34 CR2 IN34
L8 50 µH
C39 0.01 MFD
R35 4700Ω
T1 X70e
CR4 IN38
C40 0.01 MFD
C31 0.01 MFD
V6 6AG7
C28 0.01 MFD
CR1 IN34
V7 6AG7
V8 6AG7
V9 6AG7
R38 47,000Ω
C37 0.01 MFD
R43 3.3 MEG ½W
R42 0.47 MEG ½W
R41 560Ω
C26 0.01 MFD
C27 0.01 MFD
R39 0.47 MEG ½W
C30 0.01 MFD
R33 0.47 MEG ½W
C34 2 MFD OIL
C33 0.05 MFD OIL
C35 0.05 MFD OIL
R31 5600Ω
R29 10000Ω
R36 560Ω
C29 0.05 MFD OIL
R32 560Ω
C32 0.01 MFD
C36 0.01 MFD
100 KC BUFFER AMPLIFIER
R-L-C PEAKER
R34 30,000Ω
1ST RESTORER PULSE AMPLITUDE
LINE DRIVER AMPLIFIERS
2ND RESTORER PULSE AMPLITU
-150V
+250V
L4 30 mH
R51 4700Ω
C42 0.01 MFD
R57 4700Ω
C44 0.01 MFD
R48 5600Ω
S2
R64 1.0 MEG ½W
R65 1000Ω
V11 7F8
V12 6V6GT
V13 2D21
C43 0.01 MFD
C48 0.01 MFD
R62 10,000Ω
R69 0.1 MEG ½W
C52 22 MMFD
R49 0.47 MEG ½W
R52 100Ω
R58 100Ω
R55 56,000Ω
R54 0.47 MEG ½W
C41 0.01 MFD
R59 1.5 MEG ½W
R60 0.1 MEG ½W
R53 1000Ω 2W
C51 0.01 MFD
R66 1000Ω
C46 0.01 MFD
R63 0.1 MEG ½W
R61 0.47 MEG ½W
R70 0.15 MEG ½W
R67 50,000Ω
SINGLE-PULSE DELAY CONTROL
OVER-DRIVEN AMPLIFIERS
CATHODE FOLLOWER
PUSH BUTTON TRIGGER TUBE
J5 UG-290/U 100 KC SYNC. PULSE OUTPUT
-150V
NOTE: S2 IS A BREAK-BEFORE-MAKE PUSH-BUTTON SWITCH



NOTES:
ALL RESISTORS ARE 1-WATT ±10% UNLESS OTHERWISE SPECIFIED.
ALL CAPACITORS ARE MICA UNLESS OTHERWISE SPECIFIED.
FOR RESTORER PULSE GENERATOR WAVEFORMS SEE B-30898.
METAL BASE OF 7F8'S, V2 AND V11, MUST BE GROUNDED.

RESTORER PULSE GENERATOR

6345 HK	2/20/62	HK
	D-30770-1	

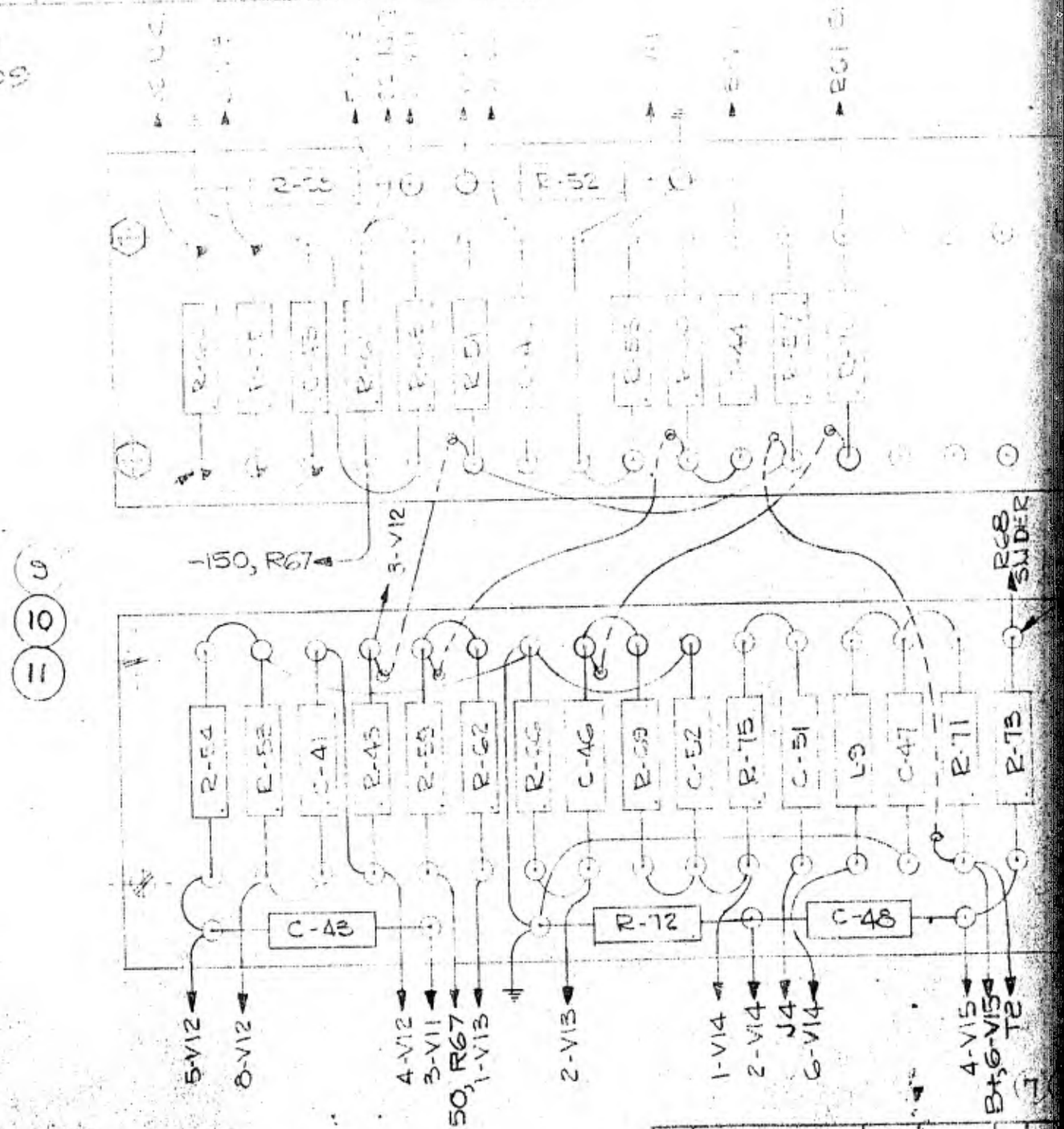
B REDUCTION

B 30784-1

WO-

TOLERANCES NOT OTHERWISE SPECIFIED
DECIMALS .005 FRACTIONAL ±

PRINTED WIRING ASSY
B-30809



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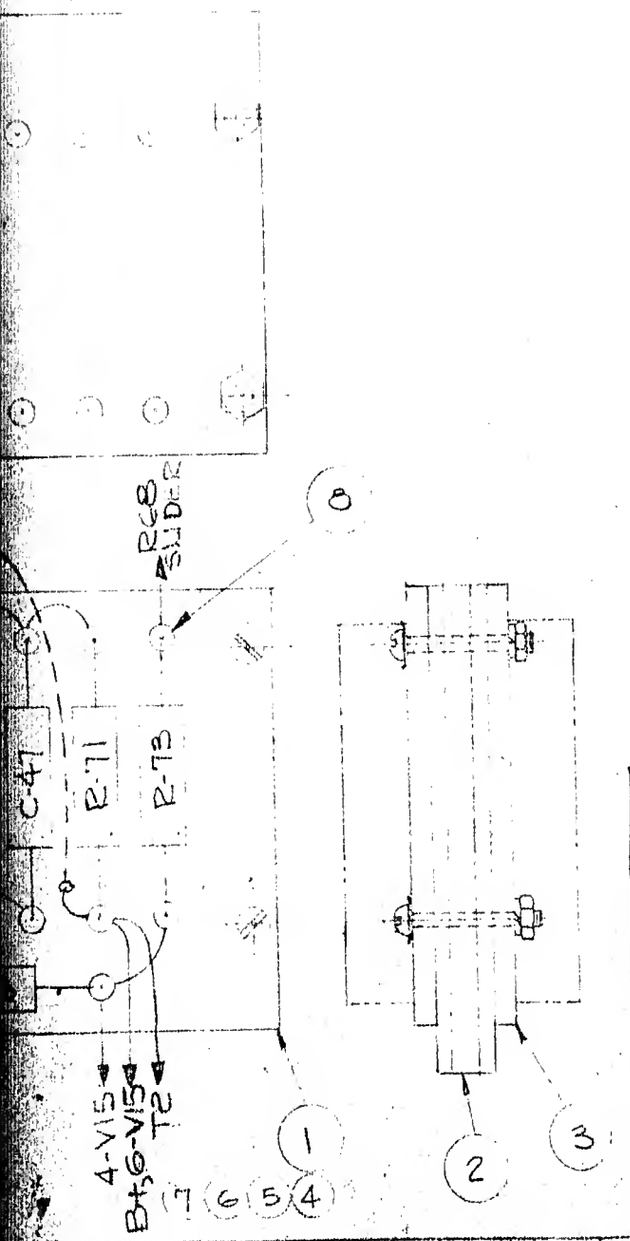
		WAS	APP.	DATE	

ELECTRICAL PARTS LIST

SERIAL NO.	VALUE	SERIAL NO.	VALUE
R45	5600Ω 1W	R70	0.15 MEG ½W
R51	4700Ω 1W	R71	0.47 MEG ½W
R52	100Ω 1W	R72	680Ω 1W
R53	1000Ω 1W	R73	0.47 MEG ½W
R54	0.47 MEG ½W	R74	4700Ω 1W
R55	56,000Ω 1W	C41	0.01 MFD, MICA
R57	4700Ω 1W	C42	0.001 MFD, MICA
R58	100Ω 1W	C43	0.01 MFD, MICA
R59	1.5 MEG ½W	C44	0.03 MFD, MICA
R60	0.1 MEG ½W	C45	0.01 MFD, MICA
R61	0.47 MEG ½W	C46	0.01 MFD, MICA
R62	10,000Ω 1W	C47	82 MMFD, MICA
R63	0.1 MEG ½W	C48	0.01 MFD, MICA
R64	1.0 MEG ½W	C51	220 MMFD, MICA
R65, R66	1000Ω 1W	C52	22 MMFD. CERAMIC
R69	0.1 MEG ½W	L9	50 μH



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
11	LOCK WASHER I.T. SHAKEPROOF	1706	5
10	HEX NUT 6-32 X 5/16		5
9	TERMINAL LUG C.T.C.	X1581-B	5
8	TERMINAL LUG C.T.C.	1724-D	66
7	HEX. NUT #4-40		4
6	LOCKWASHER - KANTLINK #4		4
5	LOCKWASHER - SHAKEPROOF #4	1704	4
4	B.D. HD. MACH SCR. #4-40 x 3/4 LONG		4
3	TERMINAL BOARD	A30776	1
2	MOUNTING POST	A30791	2
1	TERMINAL BOARD	A30777-1	1

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DATE		WAS		APP.	DATE

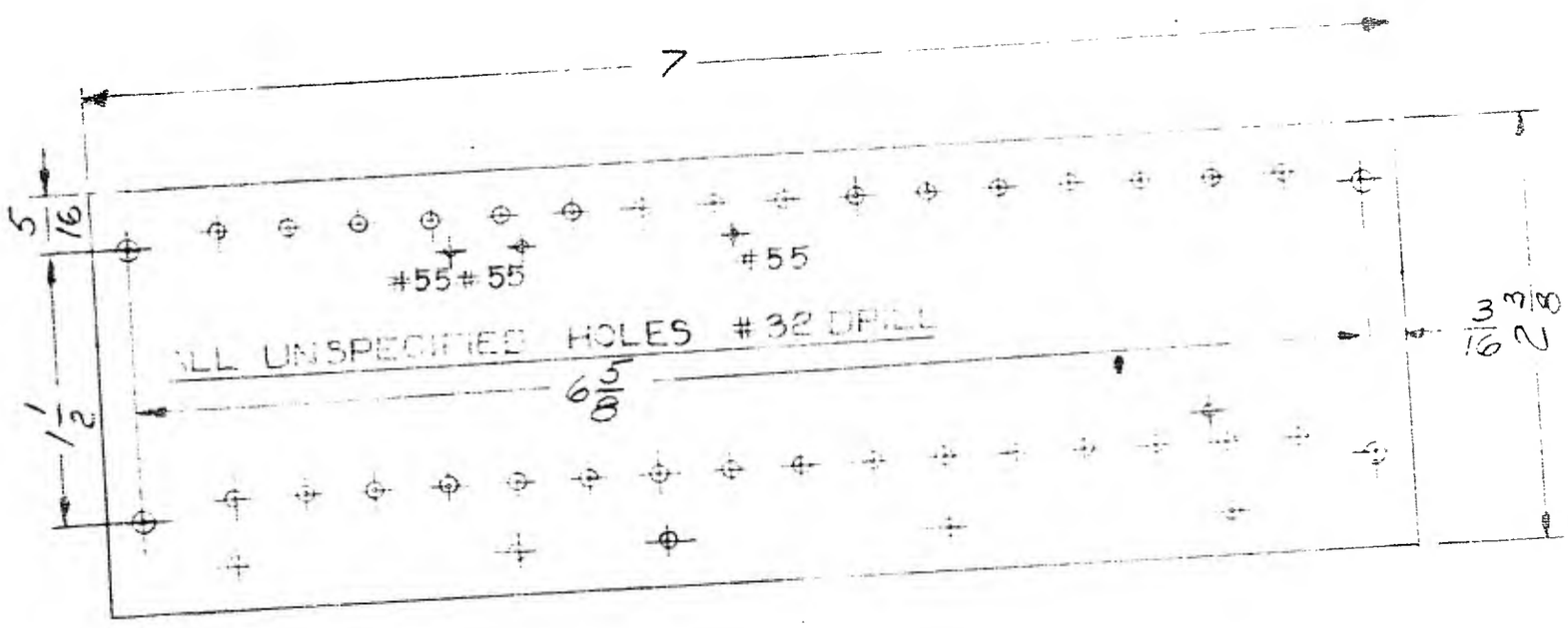
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

TERMINAL BOARD ASS'Y

SCALE: Full	DR P.R. Kelley 8/13/47	B-30764-1
TR. H-K	CK R.H.M. & T2 8/13/47 APP.	

B-30777-3

USED IN ASS'Y B-30784



1/5 LINEN BOND ELITE

CTS 4141

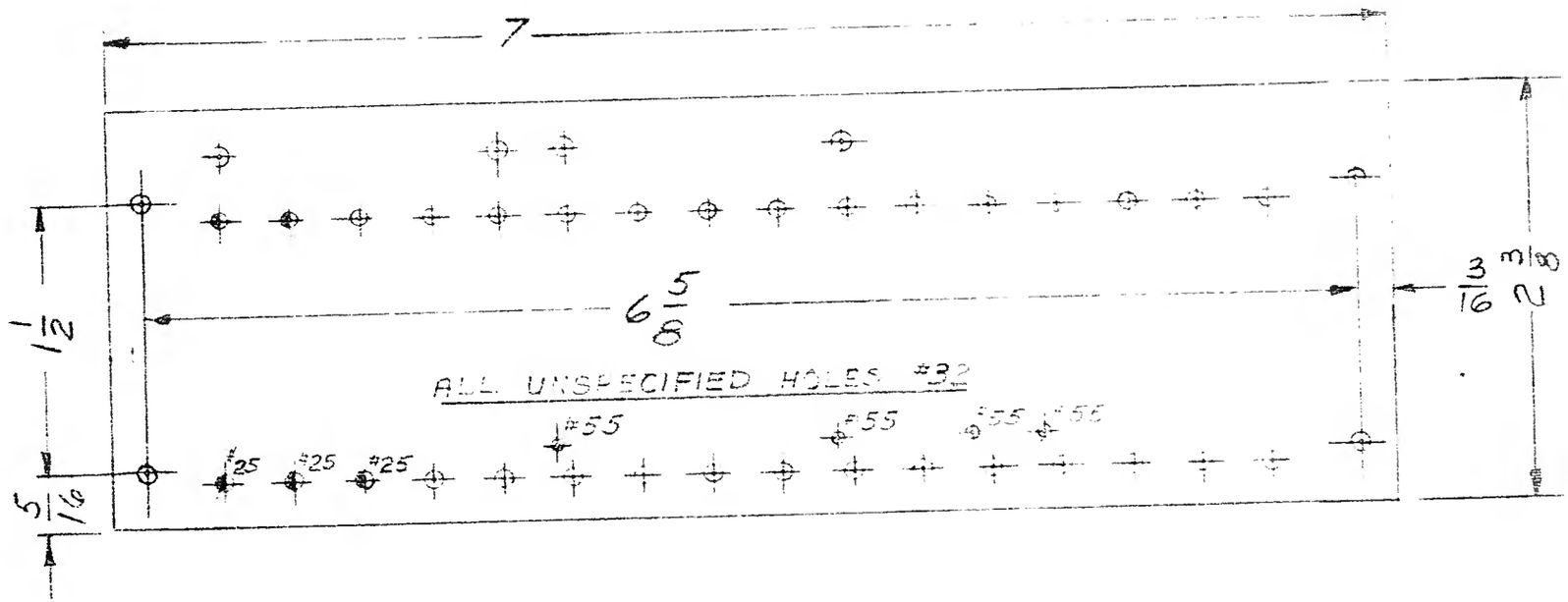
B-30777-3

2345

HK

A-30776-3

USED IN ASSY B-30784



1/8 LINEN E KELITE

DTD 5-11-40

6345

A-30776-3

DRAWN

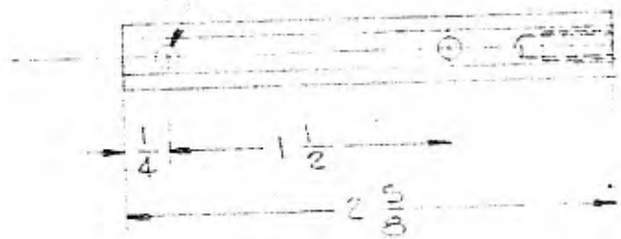
A- 30791

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

#30 DRILL (.132) 2 HOLES

#30 DRILL (.132) 2 DEEP
#6-32 NC-2 1/8 DEEP



P					G						12 HEX. BRASS	
N					F					ITEM	MATERIAL - DESCRIPTION	PART NO. QUAN.
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SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 2515

MOUNTING POST

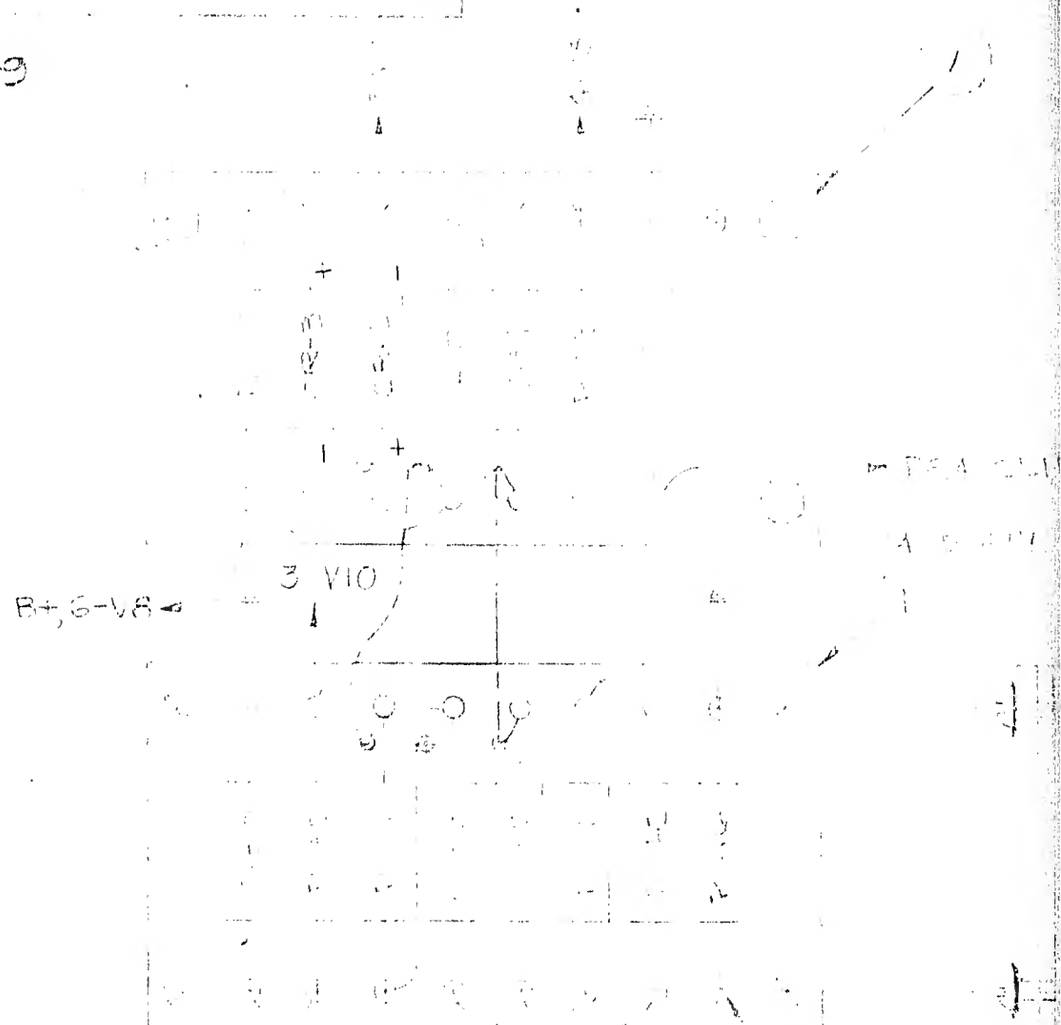
SCALE: FULL	DR. B[illegible] 8/19/47	A- 30791
TR.	CK. RHM & TR 8/19/47	APP.

"ALBANENE" NO. 1881 K&E CO., N.Y.C.

3078 5-2

WAS

B-30809



ELECTRICAL PARTS LISTS								
SERIAL NO.	VALUE	SERIAL NO.	VALUE					
R33	0.47MEG ½W	C31	0.01 MFD, MICA	P				
R35	4700Ω 1W	C32	0.01 MFD, MICA	N				
R37	470Ω 1W	C38	0.01 MFD, MICA	M				
R44	5600Ω 1W	C39	0.01 MFD, MICA	L				
R45, R46	1000Ω 2W	L8	50 μH	K				
R47	0.47MEG ½W	CR2, CR3	IN3-1	J				
C30	0.01 MFD, MICA			H	WAS	APP.	DATE	

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
7	HEX NUT #4-40		4
6	[illegible] WASHER - [illegible] #4		4
5	[illegible] WASHER - [illegible] #4	1704	4
4	[illegible] #4-40 x 3/4 LG.		4
3	[illegible] LUG [illegible]	1124 D	50
2	[illegible]	A30791	2
1	TERMINAL BOARD	A30181	2

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

TERMINAL BOARD ASSY

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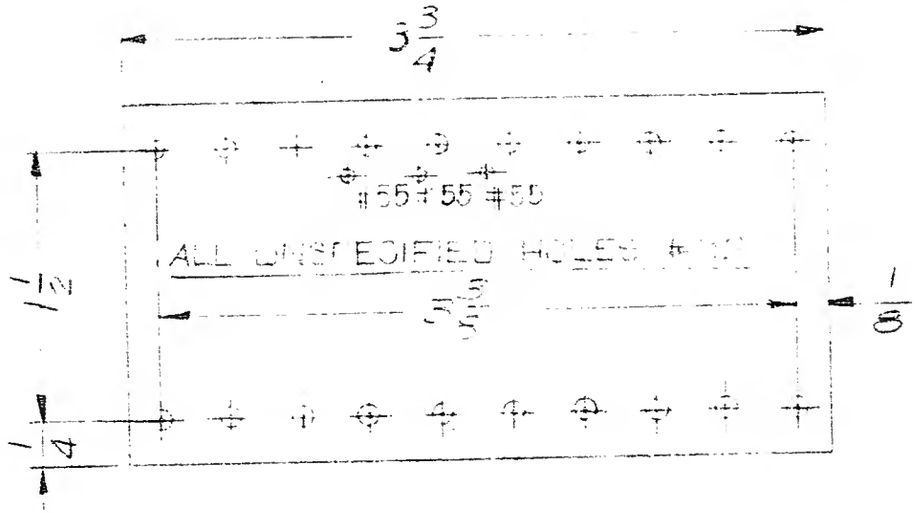
DATE		WAS	APP.	DATE

SCALE Full DR. [illegible] 8/14/47

TR. HK CK. R.H.M. TL 8/19/47 APP.

B-30788-2



CTS-11D

6345

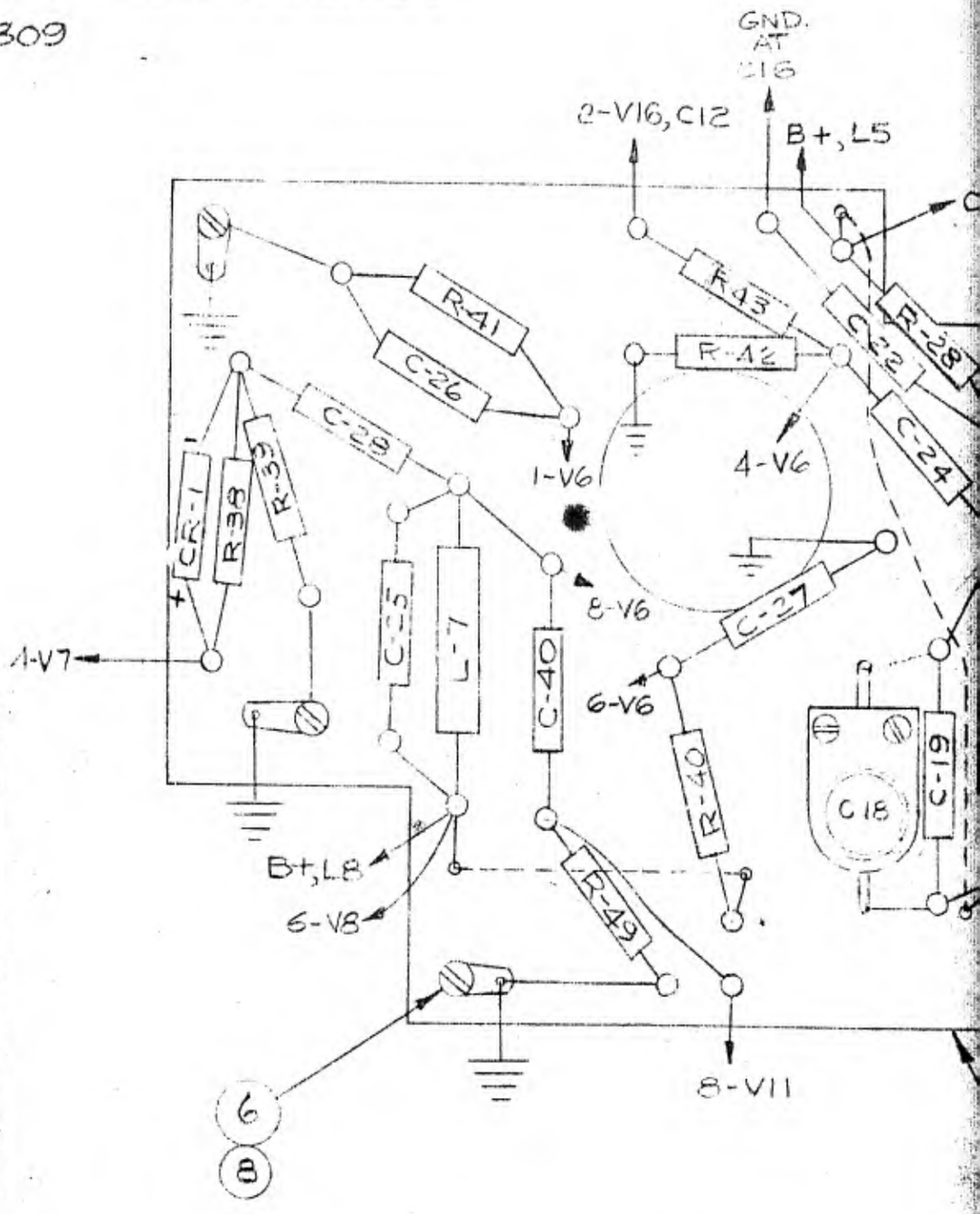
CTS-11D

B-30787-5

WO-

TOLERANCES NOT OTHERWISE SPECIFIED
DECIMAL ± .003 FRACTIONAL ± 1/64

USED IN ASS'Y B-30809



ELECTRICAL PARTS	
SERIAL NO	VALUE
R28	10,000 Ω, 2W
R38	47,000 Ω, 1W
R39	0.47 MEG. ½ W.
R40	10,000 Ω. 2W
R41	560 Ω, 1W
R42	0.47 MEG ½W
R43	3.3 MEG ½W
R49	0.47 MEG ½W
C18	4-30 MMFD ERIE N500 CERAMIC
C19	175 MMFD ZERO TEMP. COEF.
C22	0.01 MFD MICA
C24	0.01 MFD. MICA
C25	180 MMFD MICA
C26	0.01 MFD MICA
C27	0.01 MFD MICA
C28	0.01 MFD MICA
C40	0.01 MFD MICA
L3	10 m H
L7	10 m H
CR1	IN34

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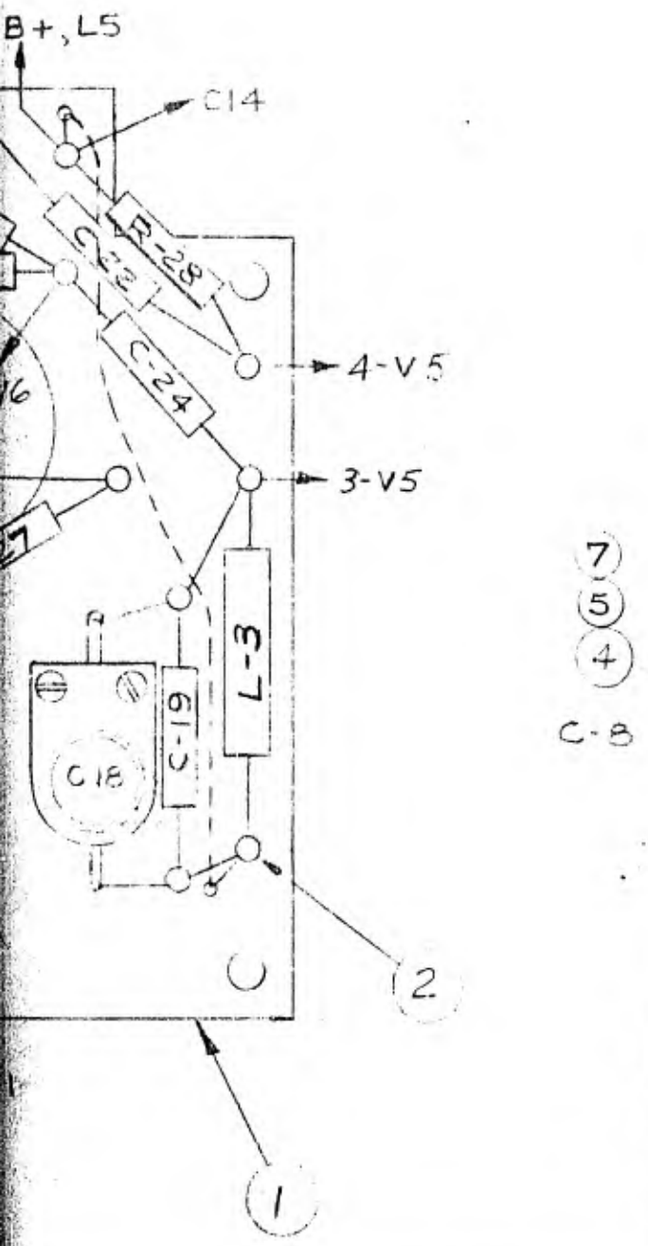

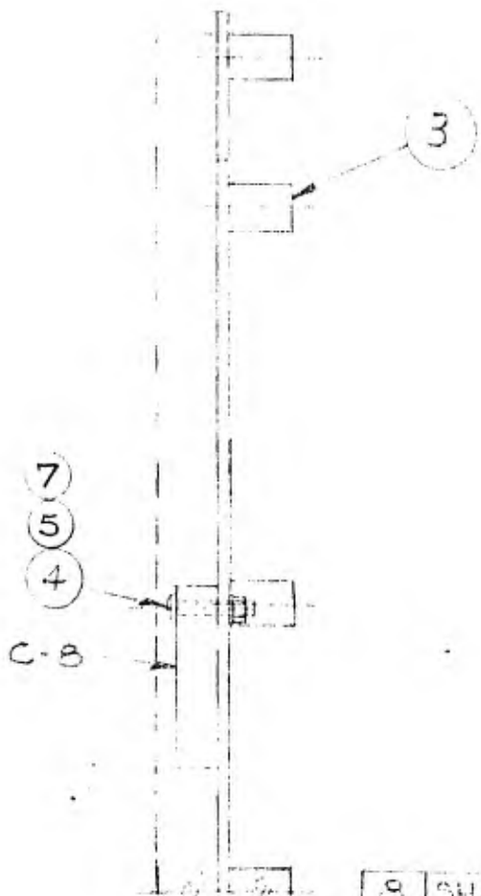

ITEM	MATERIAL DESCRIPTION	PART NO.	QUAN
8	SHAKEPROOF LUG	2102-6	3
7	HEX. [illegible] "4-40		2
6	BD HD SCREW #6-32 - 1/4 LG.		3
5	SHAKEPROOF LOCKWASHER #4	1704	2
4	BD. HD. SCREW #4-40 1/2 LG		2
3	MOUNTING POST C.T.C. 3/8"	#X1246D	5
2	TERMINAL LUG C.T.C.	#1234	34
1	TERMINAL BOARD	A-30790-2	1

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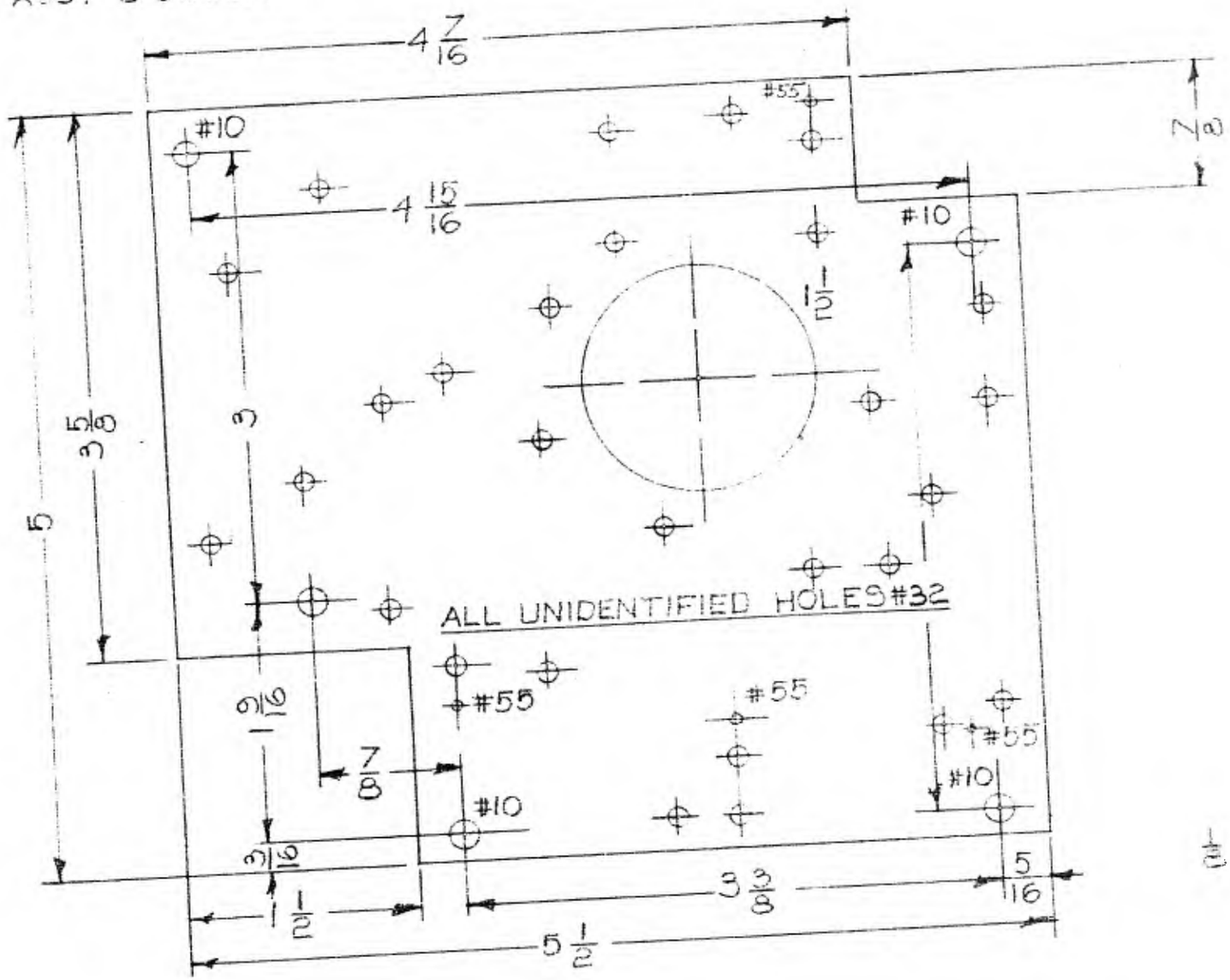
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

TERMINAL BOARD ASS'Y.

SCALE	DR		
1 / 1	[illegible] 8-30-40	B-30787-5	
TR HK	CK [illegible]	APP	

A-3078C-3
USED IN ASSY B-30737



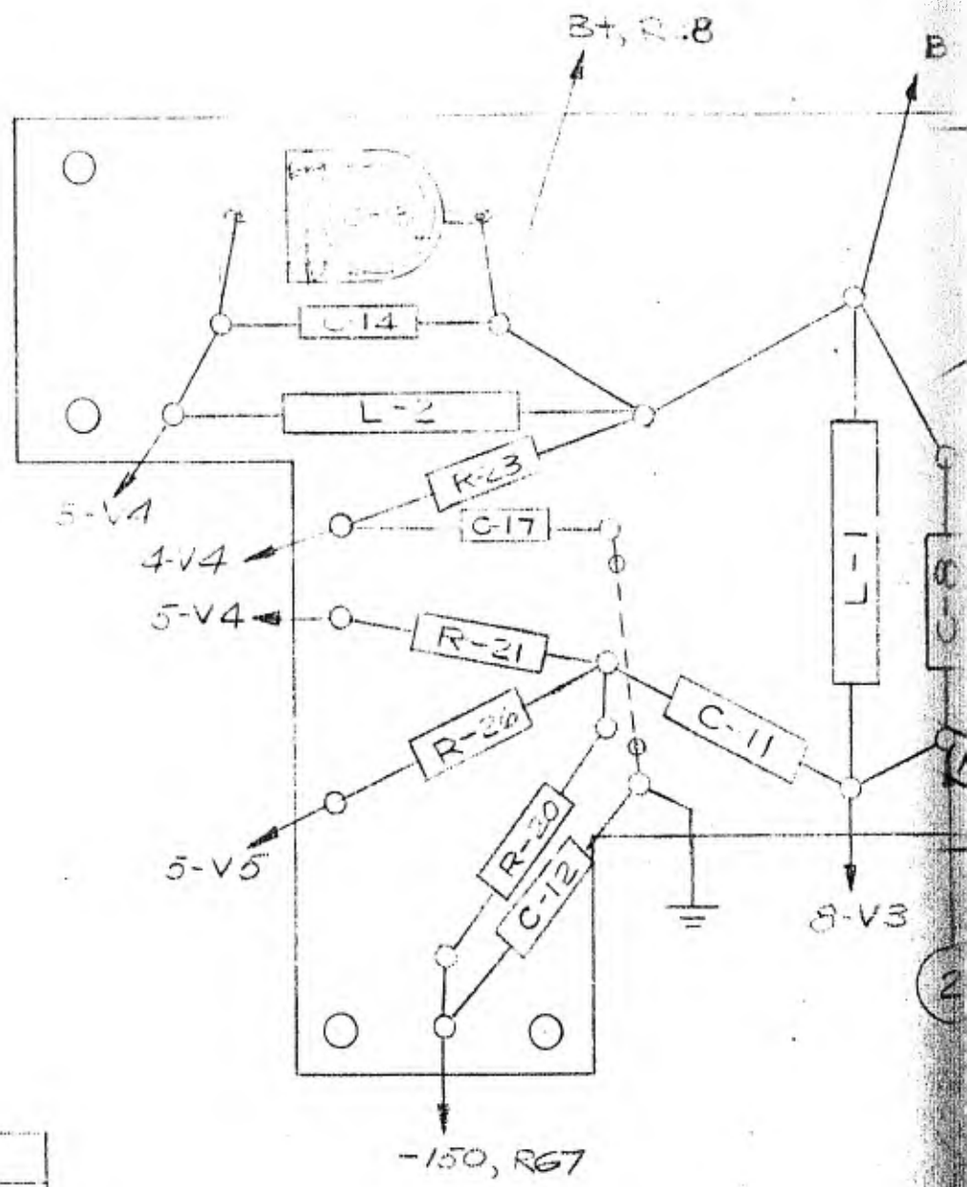
1/2 LINEN BAKELITE

69475	535	A-3078D-3
X K		

B-30823-3

WO

B-30823



ELECTRICAL PARTS LIST	
SERIAL NO.	VALUE
R 20	0.47 MEG ½ W
R 21	2200 Ω ½ W
R 22	10,000 Ω 2W
R 23	2200 Ω ½ W
C7	4-30 MMFD, ERIE N500
C8	35 MMFD, CERAMIC ZERO TEMP. COEFF.
C11	0.001 MFD, MICA
C12	0.01 MFD, MICA
C13	4-30 MMFD, ERIE N500
C14	100 MMFD, CERAMIC ZERO TEMP. COEFF.
C17	0.01 MFD, MICA
L1, L2	1 mH

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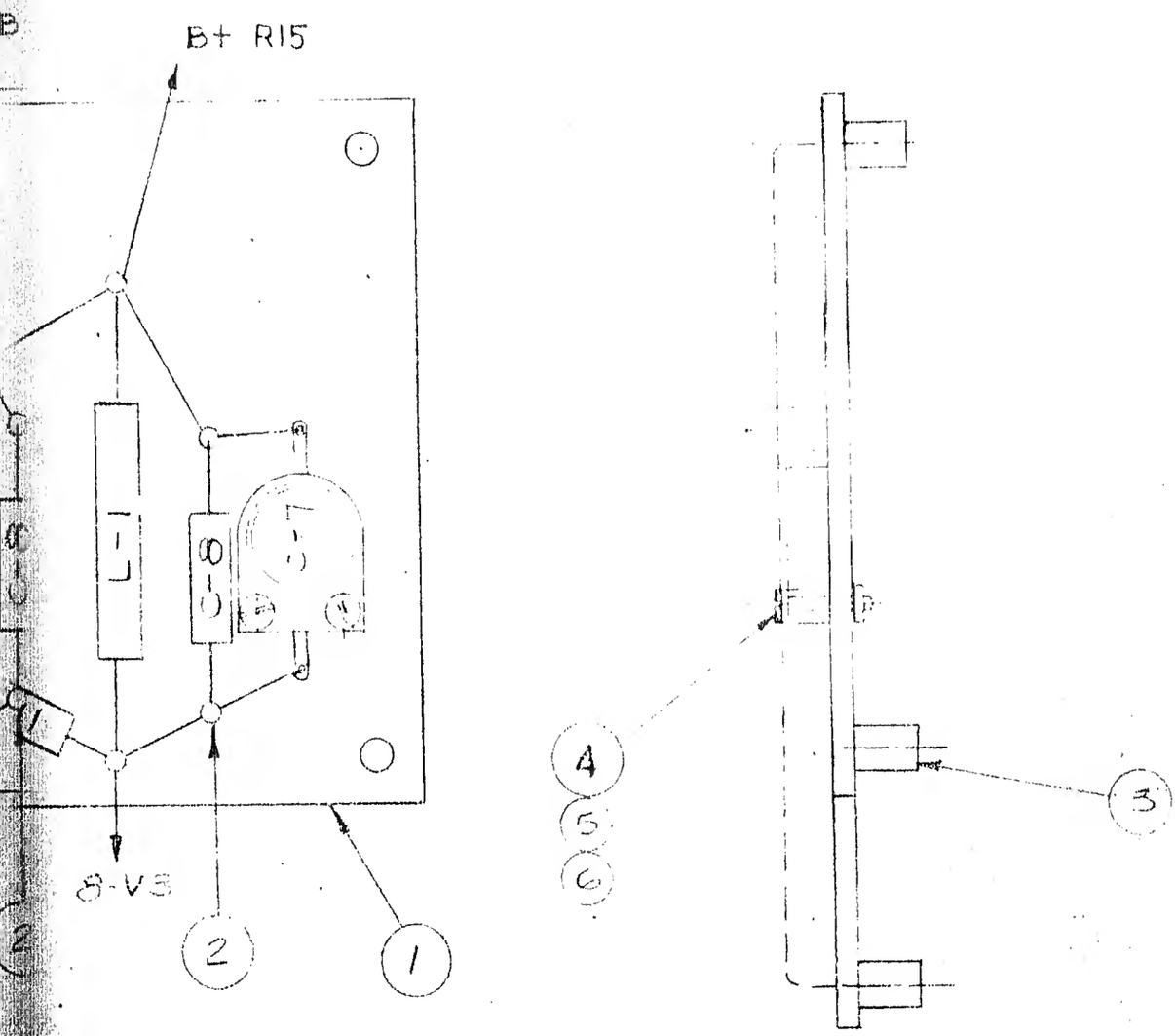
	WAS	APP.	DATE		



ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
6	HEX. NUT #4-40		4
5	SHAKEPROOF-LOCKWASHER #4	1704	4
4	BD. HD. SCREW #4-40 x 1/2 LG.		4
3	MOUNTING POST 3/8" C.T.C.	Y1246-D	6
2	TERMINAL LUG C.T.C.	1724-D	17
1	TERMINAL, BOARD	A-30779	1

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

TERMINAL BOARD ASS'Y

SCALE 1:1 DR. [illegible] 3-11-47

TR. HK CK. R.H.M.E 3/10/47 APP.

B-30786-3

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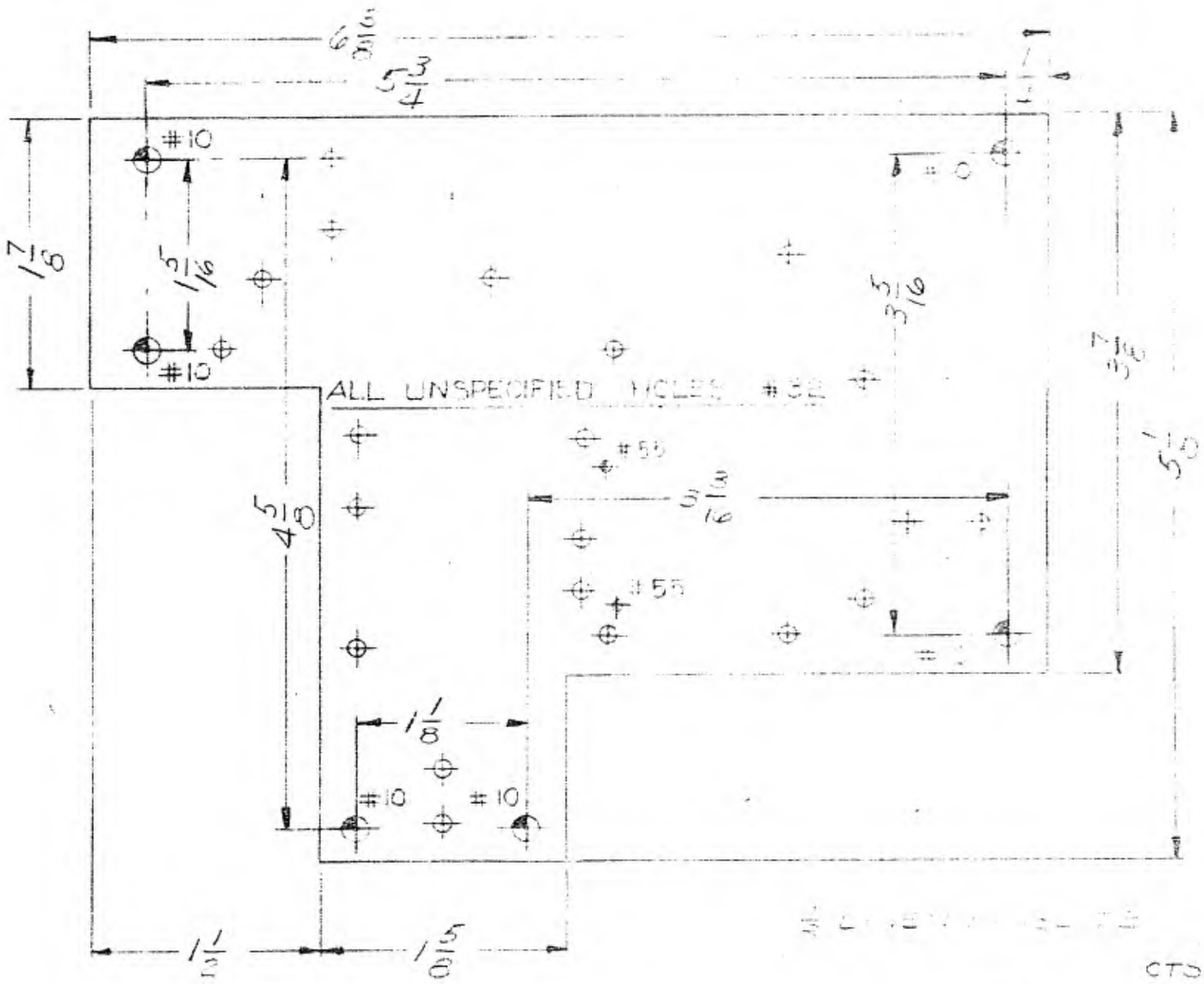
A-30779-2

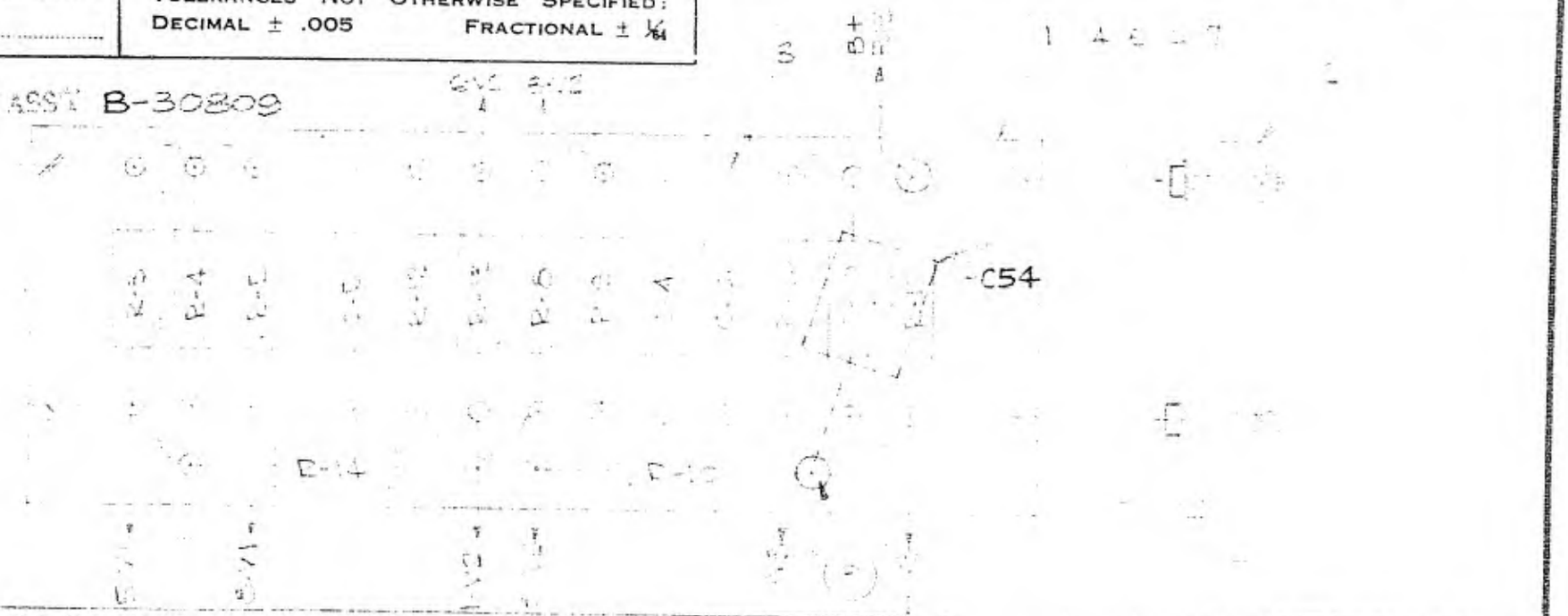
USED IN ASSY B-30786



A- 30785-3
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASSY B-30809



ELECTRICAL PARTS LIST

SERIAL NO.	VALUE	SERIAL NO.	VALUE
R9	0.47 MEG ± 5%		
R4, R8	1000 Ω ± 1%		
R5, R9	22000 Ω ± 2%	R15	2W
R10	3900 Ω 2W	C1 C8	MF CERAMIC
R2, R13	22,000 Ω 2W	C6	0.01 MFD, MICA

ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
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SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO.

SCALE: DR.

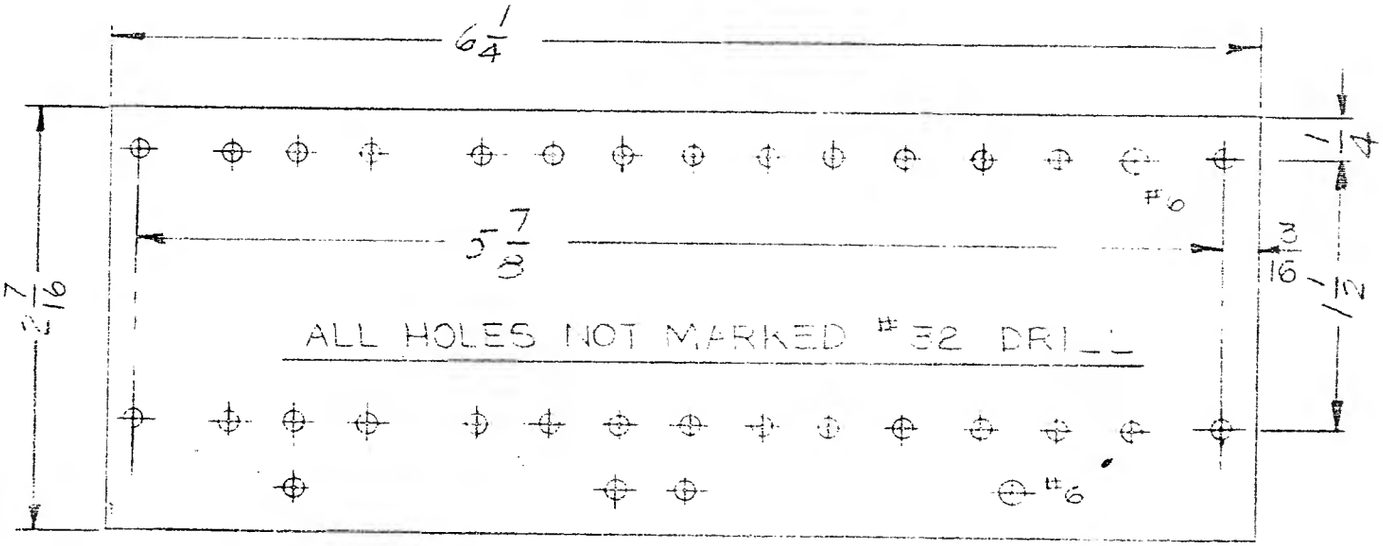
TR. HK CK. APP

A- 30785-3

"ALBANENE" NO. 1851 K&E CO., N.Y.X

4-30778-2

USED IN ASSY A-30775



1/8 LINEN BAKELITE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY	DR CTS 2-64
SERVO MECHANISMS LABORATORY	4-30778-2
DRAWN C.E. 45	
CK RB 7/1	ENG HK

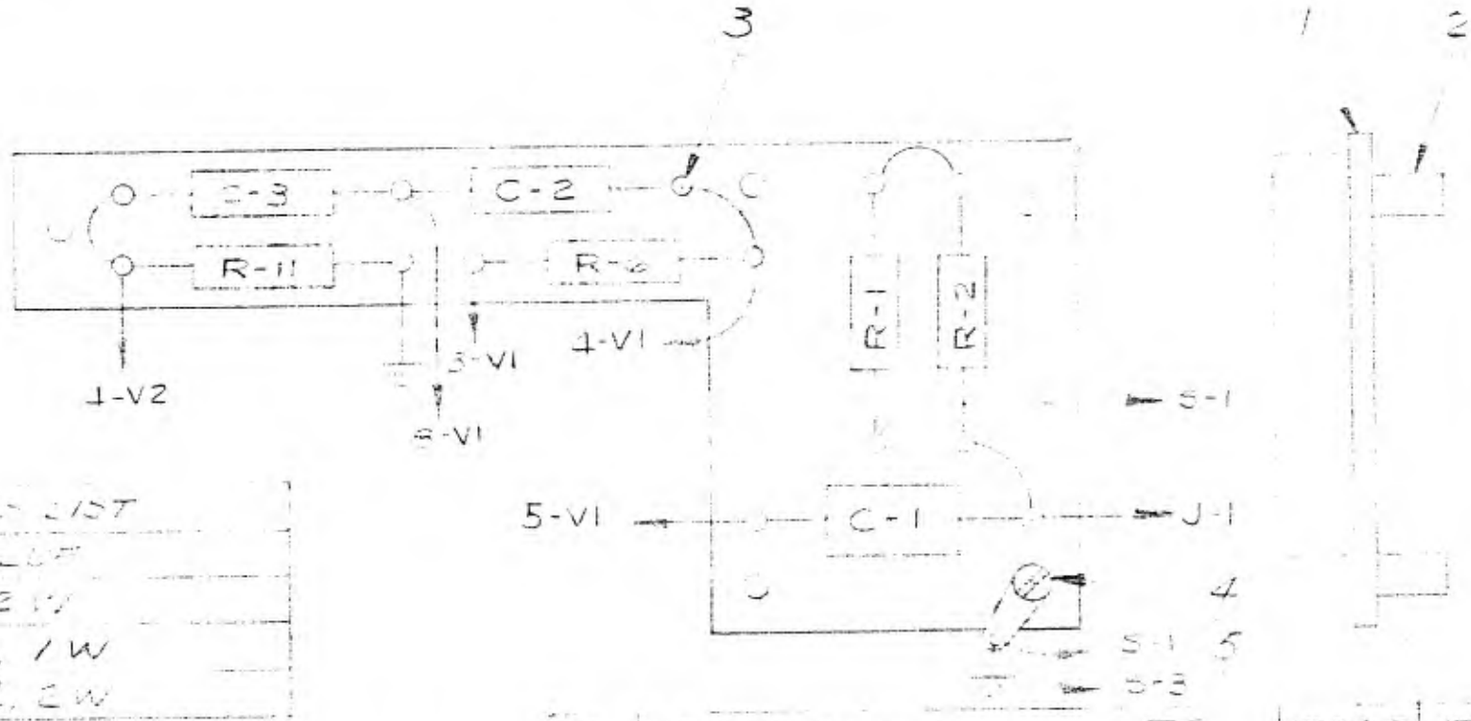
A-30789-2

WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

5	RD. HD. SCREW #6-32 x 1/4		1
4	SHAKEPROOF LUG	#2134-6	1

B-3050



ELECTRIC PARTS LIST

SERIAL NO.	ALL
R1, R2	47 Ω, 2 W
R4	5000 Ω, 1 W
R11	2500 Ω, 2 W
C1	.001 MFD, MICA
C2 C3	.01 MFD. MICA

3	TERMINAL LUG	- T.C.	1734-D	13
2	MOUNTING FOOT 3/8"	- T.C.	X-124-D	5
1	TERMINAL BOARD		A-30789-1	1
ITEM	MATERIAL - DESCRIPTION		PART NO.	QUAN.

P					G				
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SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 345

TERMINAL BOARD ASS'Y

SCALE: 1 : 1 DR [illegible] 7/52

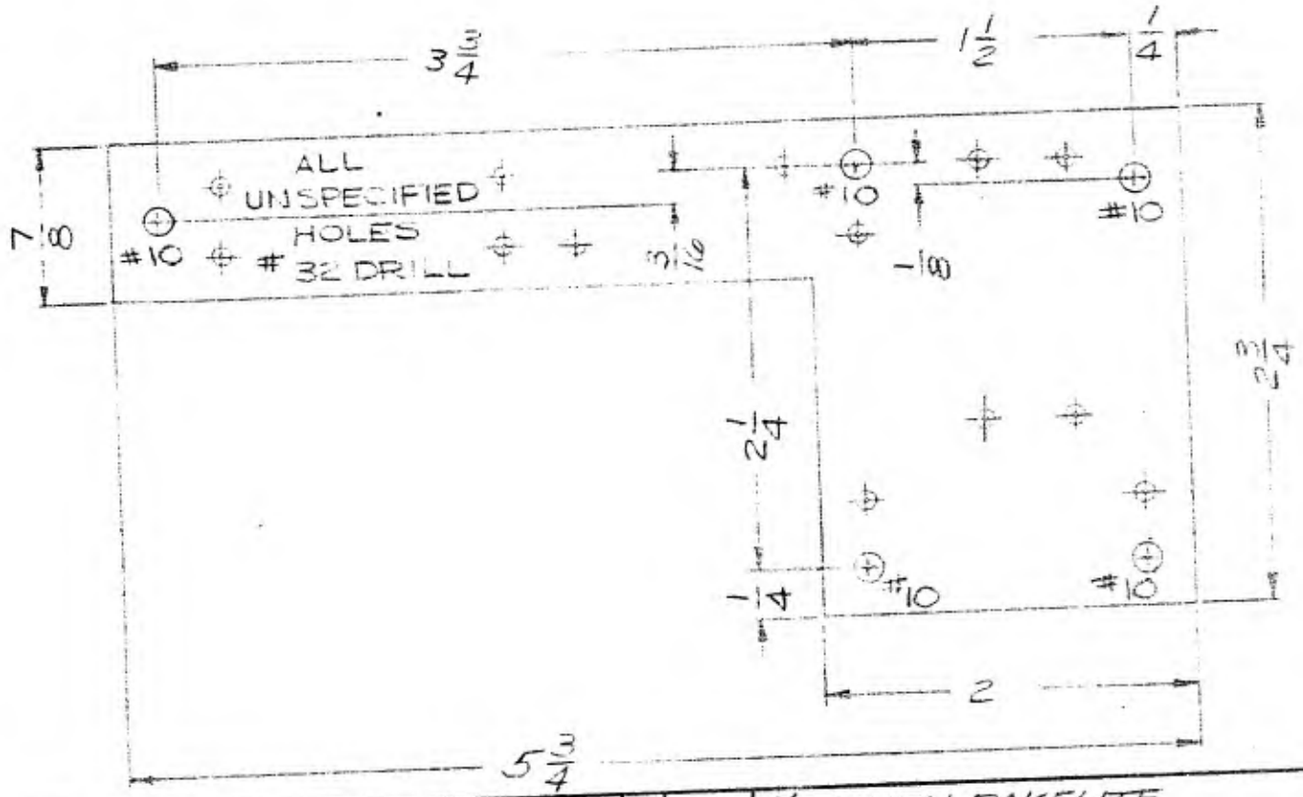
TR. HR CK. KHO APP.

A-30789-2

"ALBANENE" NO. 1995 K&E CO., N.Y.C.

A- 30702-2	TOLERANCES NOT OTHERWISE SPECIFIED:
WO-	DECIMAL ± .005 FRACTIONAL ± 1/64

A-30789



P					G						1/8 LINEN BAKELITE			
N					F					ITEM	MATERIAL - DESCRIPTION		PART NO.	QUAN.
M					E						SERVOMECHANISMS LABORATORY OF THE			
L					D						MASSACHUSETTS INSTITUTE OF TECHNOLOGY			
K					C						DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345			
J					B						TERMINAL BOARD DETAIL			
H					A					SCALE: 1 : 1	DR. ctShreham 9/2/47			
	WAS	APP.	DATE			WAS	APP.	DATE		TR. HK	CK. RHTm	APP.	A- 30782-2	

"ALBANENE" NO. 1951. K&E CO., N.Y.X

A- 30790-2
WO-.....

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASST B-30809

ELECTRICAL PARTS LIST

SERIAL NO.
R.P.
DRAWING

VALUE
1000 Ω 1W
2.01 MFD., MICA

MOUNTING POST

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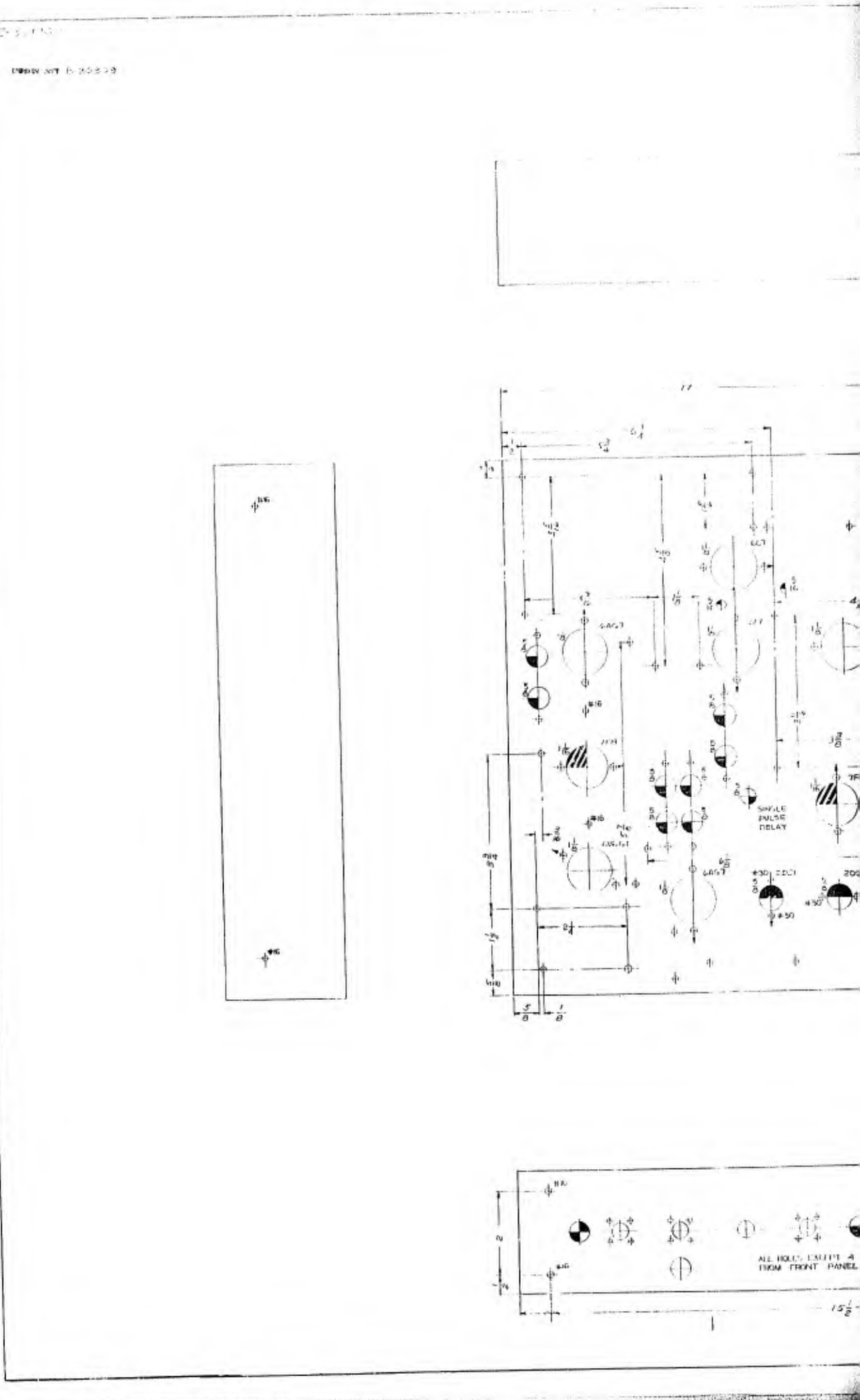
ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.

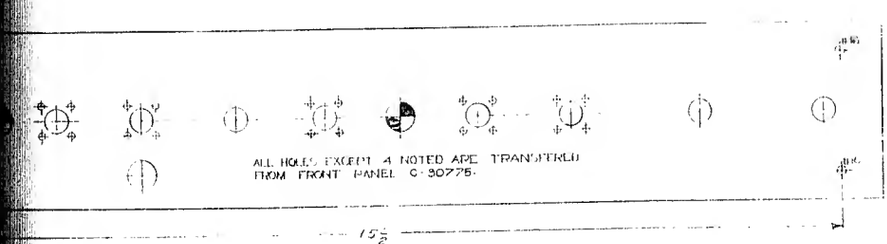
SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO.

TERMINAL PANEL

SCALE:	DR.		
TR. HK	CK. R. M. E. T. L.	APP	A-30790-2

"ALBANENE" NO. 1991 K&E CO., N.Y.C.


SINGLE
PULSE
DELAY
ALL HOLES EXCEPT A
FROM FRONT PANEL

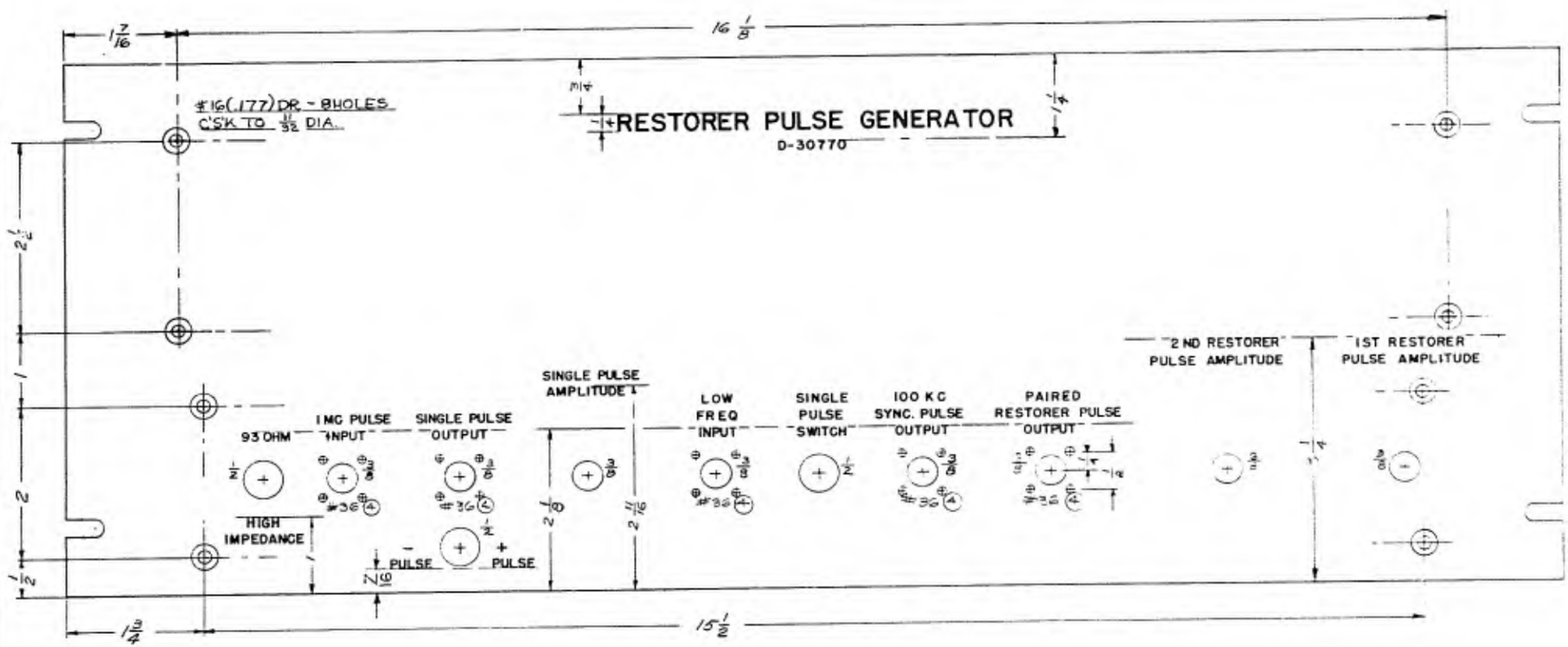


			BUD MFG. CO. 5X15X17 CHASSIS	CB-775	1
			MASTER ALLOTS IN STEEL OF TECHNOLOGY DIVISION OF THE [illegible] CORPORATION PROJECT [illegible] 6385		
			CHASSIS CUTOUTS — RESTORER PULSE GENERATOR		
			DRAWN 7-1		E-30774-1
			TO HK		

C-30775
WO-

TOLERANCES NOT OTHERWISE SPECIFIED:
DECIMAL ± .005 FRACTIONAL ± 1/64

USED IN ASS'Y B-30809



NOTE: LETTERING TO BE 1/8 HIGH UNLESS OTHERWISE NOTED

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ITEM	MATERIAL - DESCRIPTION	PART NO.	QUAN.
	7 X 19 X 1/8 PANEL, BUD MFG CO.	PA-104	1

SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 1545

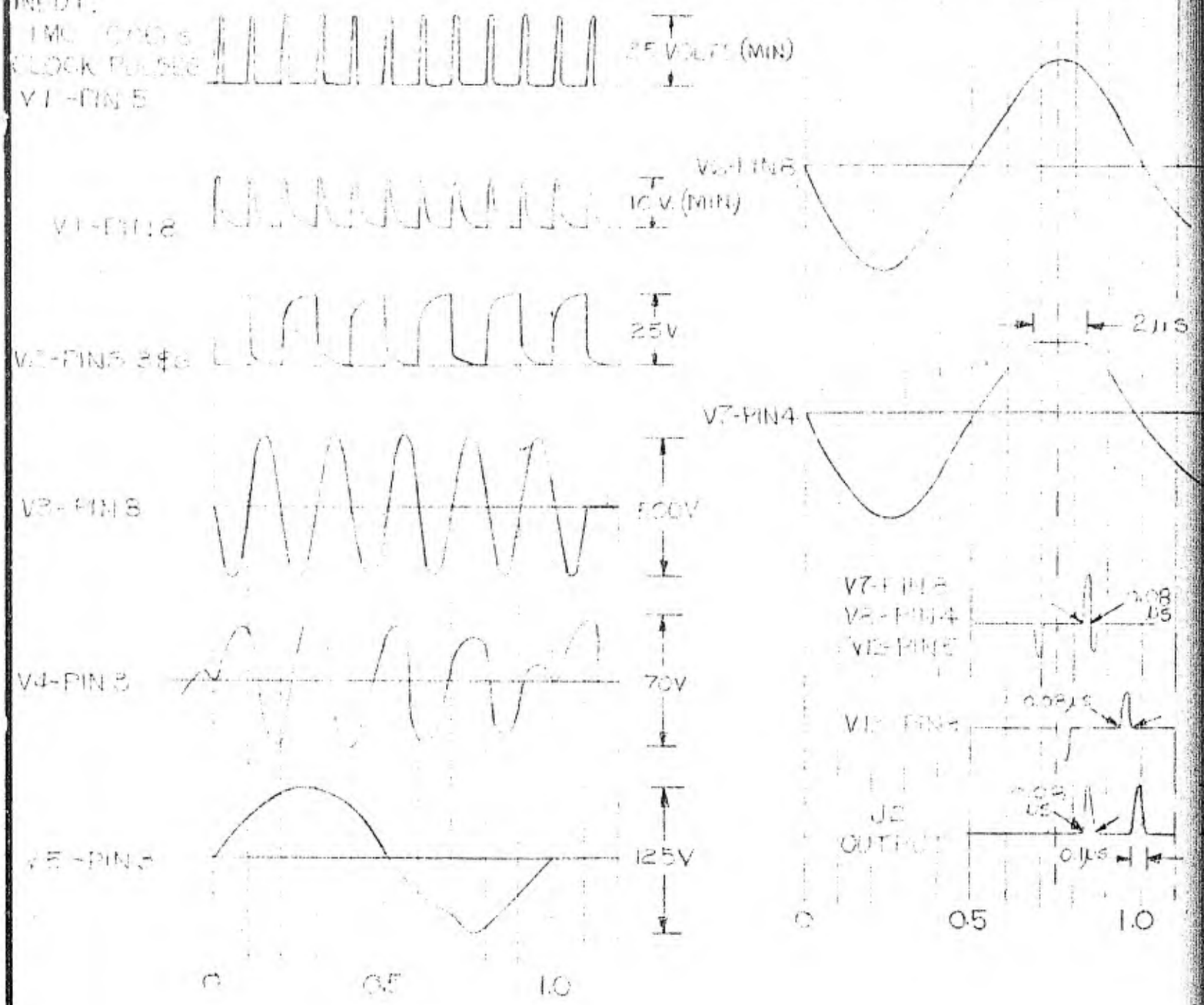
FRONT PANEL LAYOUT
RESTORER PULSE GEN.

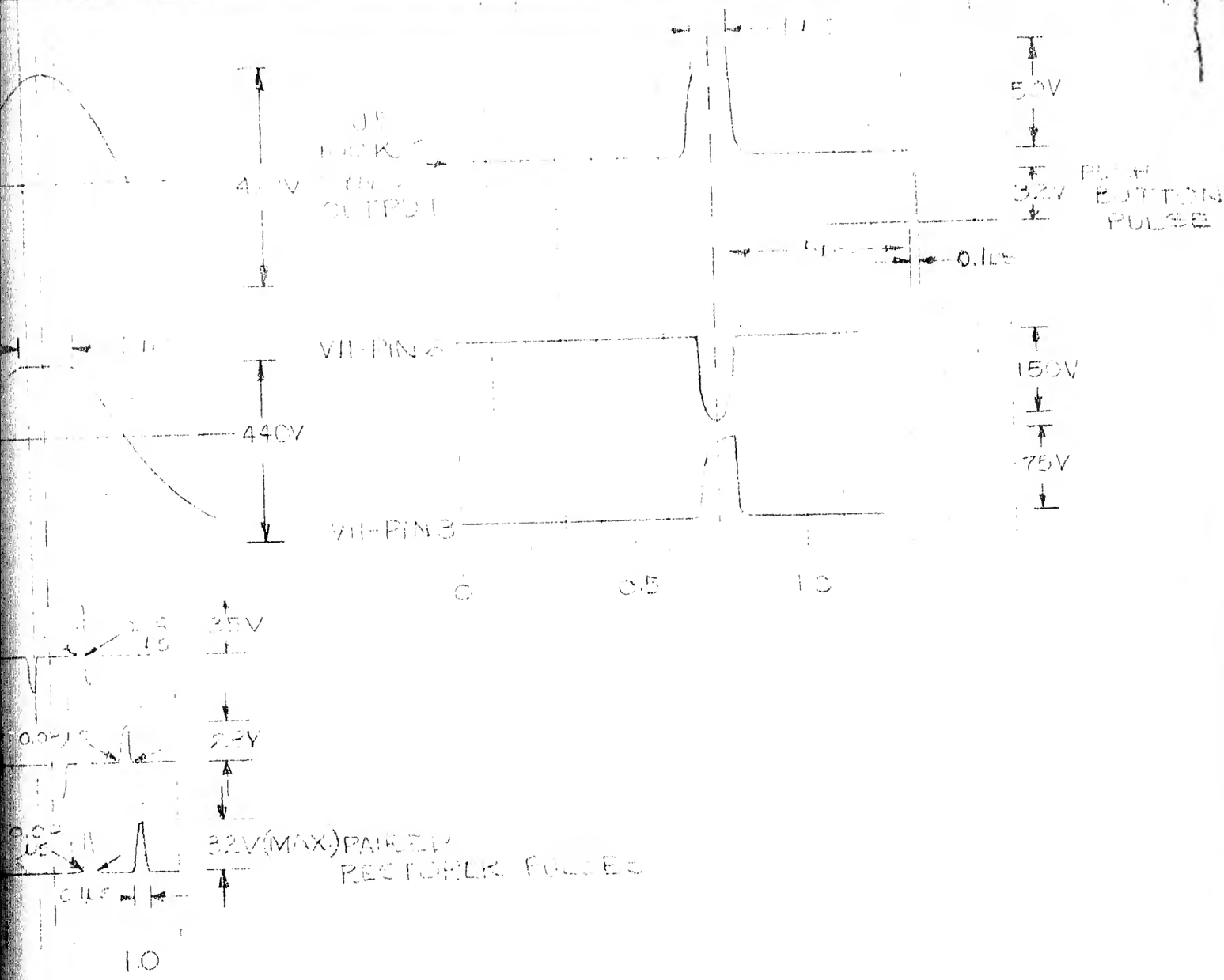
SCALE: 1:1 DR. [illegible] 3/47

TR. HK CK. RHM 3/24/47 APP.

C-30775-1

B-30395





SERVOMECHANISMS LABORATORY OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DIVISION OF INDUSTRIAL COOPERATION PROJECT NO. 6345

TIMING DIAGRAM OF
REGISTERED PULSE GENERATOR

SCALE:	DR. MS. HUGH 9-26-47	B-30998
ENG. H/L	CK.	APP.