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November 30, 1962

402 261

QUARTERLY REPORT

Prepared On

CONTRACT NO. NOber 81262

Prepared For

BUREAU OF SHIPS
Department of the Navy
Washington 25, D. C.

491-01

Prepared By

APPLIED RESEARCH INC.
76 South Bayles Avenue
Port Washington, N. Y.

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1.0 ABSTRACT

1.10 This report covers work done on the development of an RF Spectroscope in the range from 100 MC to 1000 MC for the three month period from May 1, 1962 to July 31, 1962. It deals with the following subjects:

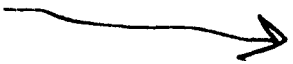
1.11 Purpose for the development.

1.12 Names of technical personnel engaged in the development program, together with a summary of the manhours work performed by each.

1.13 A description of the work done during the period from May 1, 1962 to July 31, 1962.

1.14 A project performance and schedule chart is included.

1.15 Program for the next three month interval.

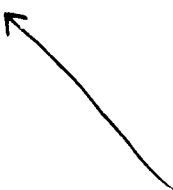
 *Research is presented on,*
~~2.0 PURPOSE FOR THE DEVELOPMENT~~

being
2.10 → The RF Spectroscope shall be developed for the visual display of amplitude and frequency of RF signals in the frequency range of 100 MC to 1000 MC.

~~2.20~~ The frequency range of 100 MC to 1000 MC shall be displayed in four swept bands on a 5^{inch} oscilloscope screen.

~~2.30~~ The spectroscope shall have sweep coverage up to 300 MC electronically with high resolution, with no spurious responses and no internally generated interference.

~~2.40~~ It shall be useful as a search receiver, spectrum analyzer, noise interference analyzer or as monitoring equipment.



3.0 TECHNICAL PERSONNEL ENGAGED IN THE PROGRAM AND MAN HOURS

3.10 The following is a list of technical personnel engaged in the development of the spectroscope together with the total number of hours spent by each during the period from May 1, 1962 to July 31, 1962.

<u>Name</u>	<u>Total Hours Per Man</u>
Leonard Pollachek	144.50
Martin Heller	184.00
Earl Morrison	171.75
Thomas Vlismas	55.50
Joseph Fazzino	51.00
Melvin Merberg	10.50
Harry Brown	<u>7.00</u>
	624.25

4.0 DESCRIPTION OF WORK

4.10 During the period covered by this report, the following tasks have been undertaken.

4.11 The power supply for the spectroscope was ordered. This consists of two different types of power supply packages. Package type No. 1 supplies all units of the spectroscope except the RF heads. Package type No. 2 supplies power to each RF head. There will be a total of four type No. 2 packages, each supplying one of the four RF heads.

4.11.1 The No. 1 type power supply package has the following design objectives:

Input Voltage: 115V $\pm 10\%$, 50 to 400 CPS, single phase

<u>Output Voltage and Current</u>	<u>Regulation</u>	<u>Ripple</u>
+205 to +210 VDC at 250 MA	0.1%	2 MV RMS
+200 VDC at 100 MA	0.01%	200 μ V RMS
+33 VDC at 400 MA	0.1%	1 MV RMS
+30 VDC at 350 MA	0.01%	100 μ V RMS
-23 VDC at 150 MA	0.1%	1 MV RMS
-20 VDC at 150 MA	0.01%	100 μ V RMS
+28 VDC at 1.5 A	Unregulated	10%
6.3 VDC adj. ± 0.5 V at 7.5A	0.25%	50 μ V RMS
6.3 VAC at 3.0A	Unregulated	—

4.11.2 The No. 2 type power supply package has the following design objectives:

Input Voltage: 115V $\pm 10\%$, 50 to 400 CPS, single phase

<u>Output Voltage and Current</u>	<u>Regulation</u>	<u>Ripple</u>
+200 VDC at 0.1A	0.1%	2 MV RMS
6.3 VDC at 3.0A	0.25%	15 MV RMS

4.12 The Tektronix Model RM15 Mod. 101 was ordered as the oscilloscope for the spectroscope during this period. This scope was chosen in preference to the Hughes Memoscope which was at first considered for use with the spectroscope. The advantages of the Model RM15 over the Hughes Memoscope are as follows:

- 4.12.1 It has a more intense, sharper trace.
 - 4.12.2 It is physically shorter and conserves cabinet space.
 - 4.12.3 Its front panel layout is more compatible with the rest of the spectroscope.
 - 4.12.4 It costs less.
 - 4.12.5 It operates from a 50 CPS to 400 CPS source without modification.
 - 4.12.6 The Tektronix scope has a self-contained delay line and wide band video amplifier appropriate for the display of spectrum signature.
- 4.13 During this period, the 775 MC to 30 MC converter, Unit No. 1A7A10, Dwg. No. B600813, Fig. 1 and photo Fig. 2, was bread-boarded. The unit was aligned and tested. It has the following characteristics:
- 4.13.1 Input Signal Frequency: 775 MC
 - 4.13.2 Local Oscillator Frequency: 402.5 MC (the second harmonic or 805 MC is used)
 - 4.13.3 LO Power: 100 MW at 402.5 MC
 - 4.13.4 Output Frequency: 30 MC
 - 4.13.5 Conversion Gain: Greater than 0 DB
 - 4.13.6 Overall Bandwidth (3 DB Points): 3 MC
- 4.14 The 30 MC to 775 MC converter, Unit No. 1A7A14, Dwg. No. B600814, Fig. 3 and photo Fig. 2, was designed and bread-boarded during this period. It was aligned and tested. It has the following characteristics:
- 4.14.1 Input Signal Frequency: 30 MC
 - 4.14.2 Local Oscillator Frequency: 402.5 MC (the second harmonic or 805 MC is used)

4.14.3 LO Power: 100MW at 402.5 MC

4.14.4 Output Frequency: 775 MC

4.14.5 Conversion Gain: Greater than 0 DB

4.14.6 Bandwidth 1 DB: 4 MC

4.15 During this period, the 402.5 MC local oscillator, Unit 1A7A13, Dwg. No. A600812, Fig. 4 and photo Fig. 2, was designed and breadboarded. The unit was aligned and tested. At each of its two output ports is available at 402.5 MC greater than 150 MW of power into 50 ohms.

4.16 The power IF amplifier-linear detector, Unit 1A7A8, Dwg. No. D600802, Fig. 5 and photo Fig. 6, was designed and breadboarded during this period. It was aligned and tested. It has the following characteristics:

4.16.1 Dynamic Range: >35 DB

4.16.2 Output Voltage (Video): >20 volts

4.16.3 Bandwidth (3 DB): 7 MC

4.16.4 Data of DC output voltage versus input voltage at 775 MC for the power IF amplifier-linear detector is presented in Table I below:

Table I

Output volts DC versus input volts RMS at 775 MC for IF power amplifier-linear detector, Unit 1A7A8.

Input Volts (RMS)		Output Volts
DBM	775 MC	DC
+ 6	0.45	21.0
0	0.225	10.5
- 6	0.112	4.9
-12	0.056	2.2
-18	0.028	0.88
-24	0.014	0.32
-30	0.007	0.10

4.16.5 A plot of Table I is given in Fig. 7.

4.17 During this period, a lin-log IF amplifier, Unit 1A7A7, Dwg. No. D600806, Fig. 8, was designed and breadboarded. In the log mode of operation, the original breadboard model was sensitive to input signal level. Oscillation occurred when the input signal approached a critical level of -10 DBM. Below and above this level the amplifier was stable. In addition, the amplifier saturated too soon on large input signals. As a result, the dynamic range of the amplifier was too restricted. Accordingly, the breadboard was modified in the following manner:

4.17.1 Four transistor stages of the lin-log amplifier, which comprise the feed back section, were reduced to two stages. The two stages are each emitter followers. By reducing the gain of the feedback section, the lin-log amplifier in the log mode was made stable and its dynamic range increased.

4.17.2 The characteristics of the lin-log IF amplifier are as follows:

Center Frequency:	775 MC
Bandwidth (3 DB):	6 MC
Linear Mode Gain:	45 DB
Log Mode Gain:	35 DB (for small signals)

4.18 A lin-log IF preamplifier Unit 1A7A17, Dwg. No. C600853, Fig. 9, and photo Fig. 10, was designed and breadboarded during this period. It operates in front of the lin-log IF amplifier and, together with the latter, gives a gain of better than 60 DB in the lin mode of operation for small signals. The lin-log IF preamplifier has the following characteristics:

4.18.1 Center Frequency: 775 MC

- 4.18.2 Bandwidth (3 DB): 16 MC
- 4.18.3 Linear Mode Gain: 23 DB
- 4.18.4 Log Mode Gain: 20 DB (for small signals)
- 4.18.5 A test was conducted to determine the overall amplitude response from the input of the lin-log preamplifier to the output of the power IF amplifier-linear detector in the log mode. Results are presented in Table II below. Refer to block diagram, Dwg. No. R700449, Fig. 11.

Table II

Amplitude response from IF lin-log preamplifier input to output of power IF amplifier-linear detector.

<u>775 MC input at Lin-Log IF Preamplifier in DEM</u>	<u>Linear Detector Output Volts DC</u>
-90	0
-85	0.02
-80	0.06
-75	0.18
-70	0.4
-65	0.74
-60	1.08
-55	1.35
-50	1.46
-45	1.50
-40	1.55
-35	1.58
-30	1.60
-25	1.60
-20	1.62
-15	1.67
-10	1.73
- 5	1.82
0	2.0

4.18.6 A plot of Table II is shown in Fig. 12.

4.19 During this period, the lin-log IF amplifier was relocated in the overall system. This was done for the following reason. In the log mode, the bandpass of the lin-log IF amplifier increases as its input signal is made larger. The lin-log amplifier has been placed in front of the second set of IF bandpass defining filters in order that the overall desired system

bandpass remain constant in the log mode of operation. A new block diagram showing the current arrangements of components in the system is given in Dwg. No. R700449, Fig. 11.

4.20 During this period, two bandpass crystal filters were ordered and received. Each crystal filter is centered at 30 MC. Crystal filter No. 1 has a 3 DB bandwidth of 5 KC. Crystal filter No. 2 has a 3 DB bandwidth of 25 KC. Each of the crystal filters exhibited excessive spurious responses outside of its pass band under test. Each filter exhibited erratic behavior in testing. The filters were returned to the manufacturer for correction.

4.20.1 The results of tests performed on Crystal Filter No. 1 are as follows:

Insertion Loss:	-6.3 DB
Peak to Valley Ripple Across Flats:	0.6 DB
Bandwidth -3 DB:	4.3 KC
Bandwidth -6 DB:	5.8 KC
Bandwidth -60 DB:	19.3 KC
Spurious Responses:	$\geq$ 64 DB low side to 16 MC $\geq$ 70 DB high side to 49 MC

4.20.2 The results of tests performed on Crystal Filter No. 2 are as follows:

Insertion Loss:	-2.7 DB
Peak to Valley Ripple Across Flats:	0.4 DB
Bandwidth -3 DB:	24.6 MC
Bandwidth -6 DB:	27.7 MC
Bandwidth -60 DB:	95.8 MC
Spurious Responses:	$\geq$ 57 DB to 25 MC $\geq$ 57 DB to 49 MC

4.21 During this period, all units of the spectroscope have been

completed by engineering and released for fabrication.

4.22 A project performance and schedule chart is given in Dwg. No.
SF-138, Fig. 13.

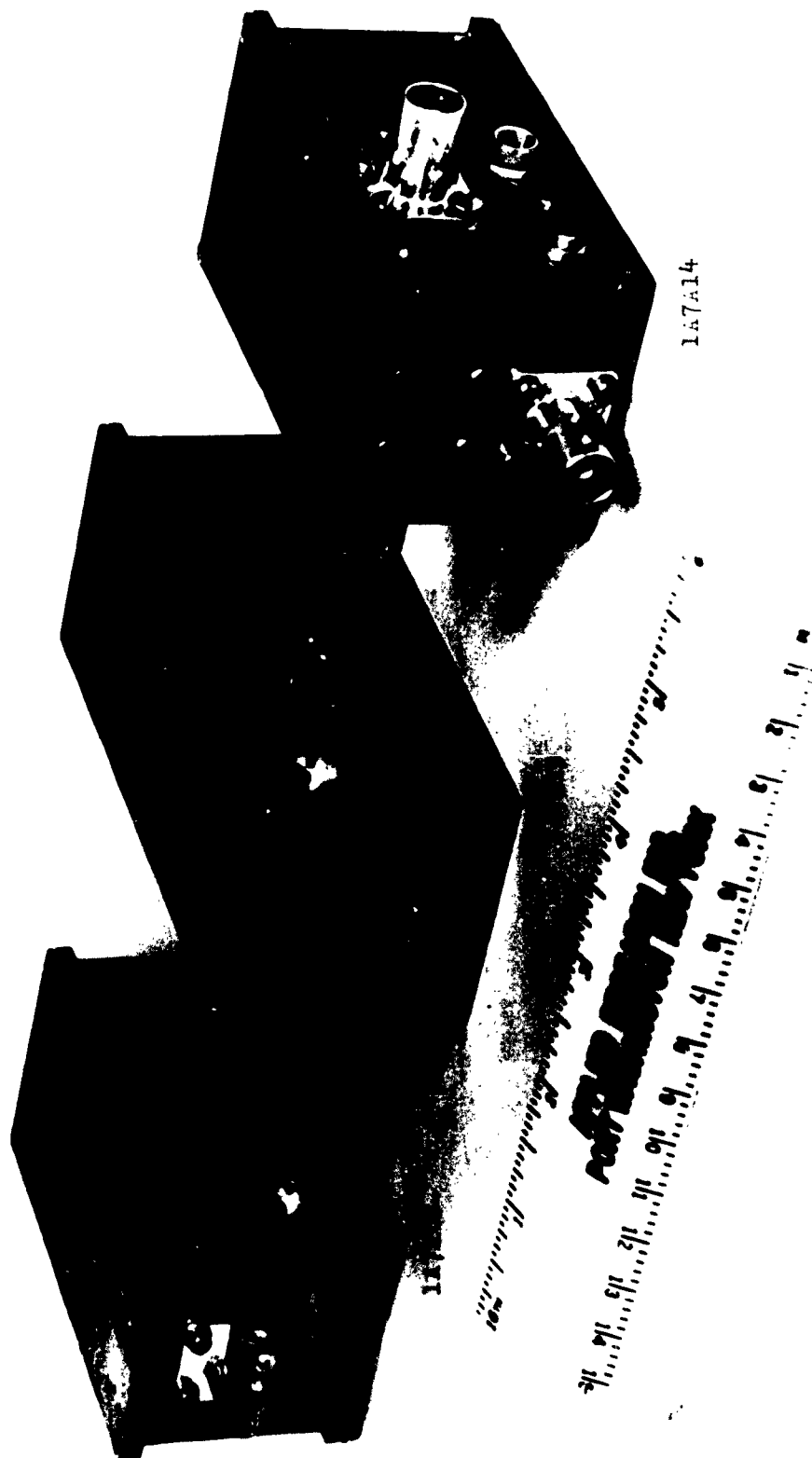
5.0 PROGRAM FOR THE NEXT THREE MONTH INTERVAL

5.10 During the next interval, it is expected that the following tasks will be completed.

5.11 All individual units will be fabricated.

5.12 The units will be final tested and assembled and wired in the cabinet.

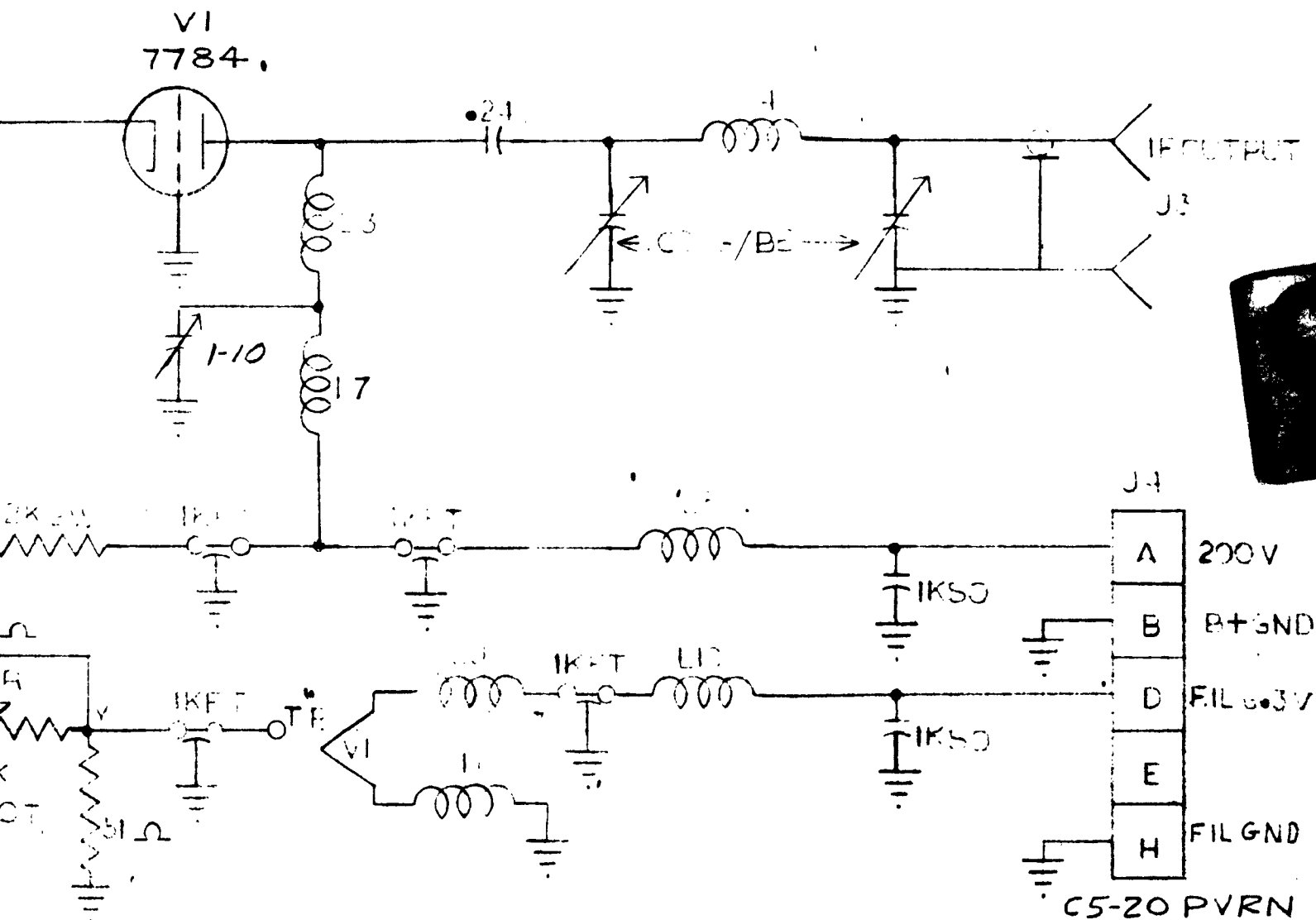
5.13 Final system testing will be completed.



1A7A14

1A7A14

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY



DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
 DIMS ± 1/64 ANGLES ± 1/2°
 L.S. XX ± .010 .XXX ± .005

MATERIAL:

DATE:

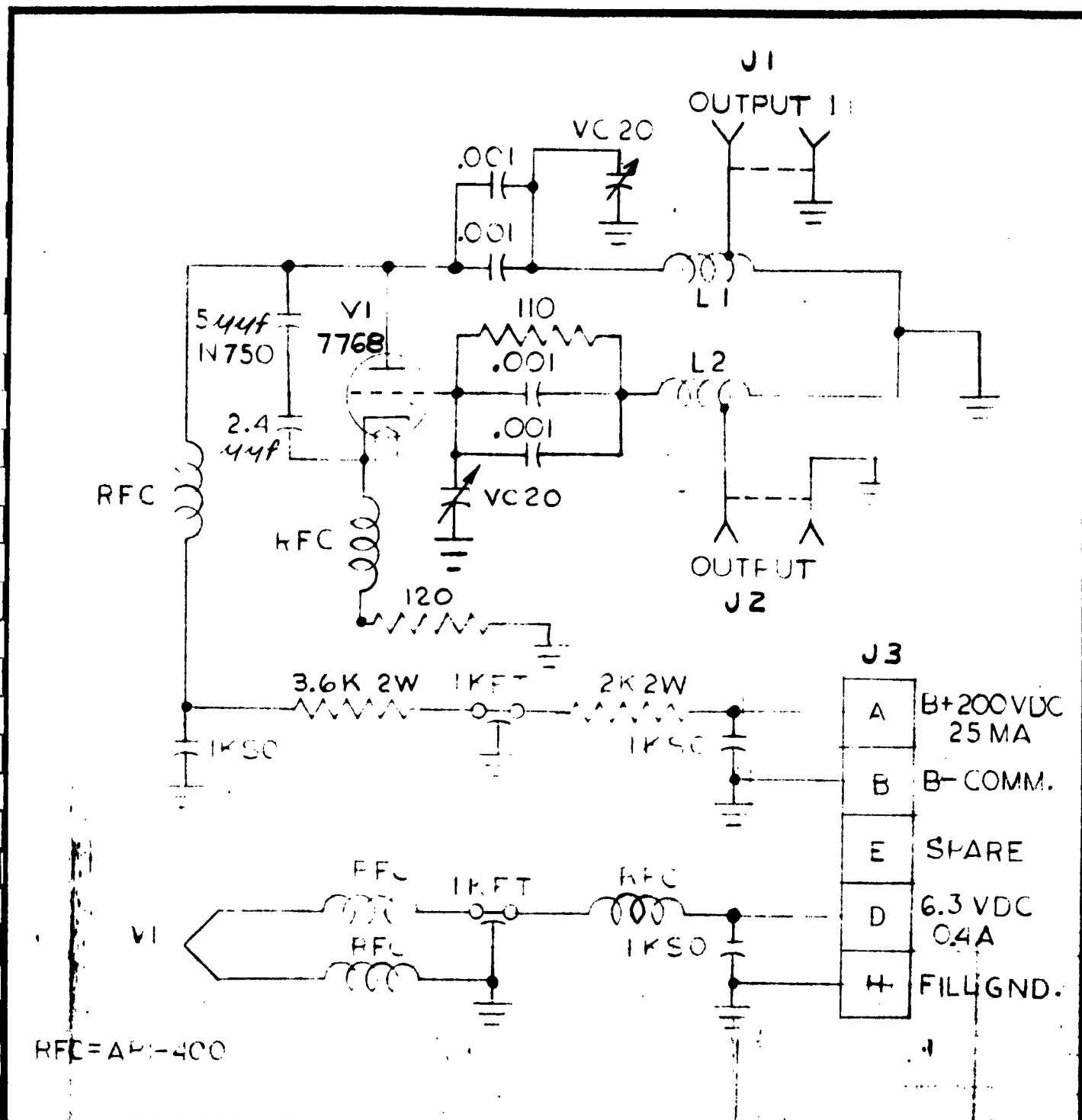
DRAWN
6-7-62
 DRAWN BY
W/M.M.
 CHECKED
 APPROVED
 APPROVED

**SCHEMATIC
 CONVERTER
 30MC/775MC
 UNIT 1A7A14**

SCALE _____ UNIT WT. _____

**APPLIED RESEARCH INC.
 PORT WASHINGTON
 NEW YORK**

DWG. SIZE
B
600814
 ISSUE A



ALL DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$
DECIMALS .XX $\pm .010$.XXX $\pm .005$

MATERIAL:

FINISH:

SCHEMATIC
STRIP LINE
LOCAL OSCILLATOR
UNIT 1A7A13

JOB NO.
491-01

DRAWN
JML

SCALE

APPLIED RESEARCH INC.
PORT WASHINGTON
NEW YORK

DWG.
SIZE

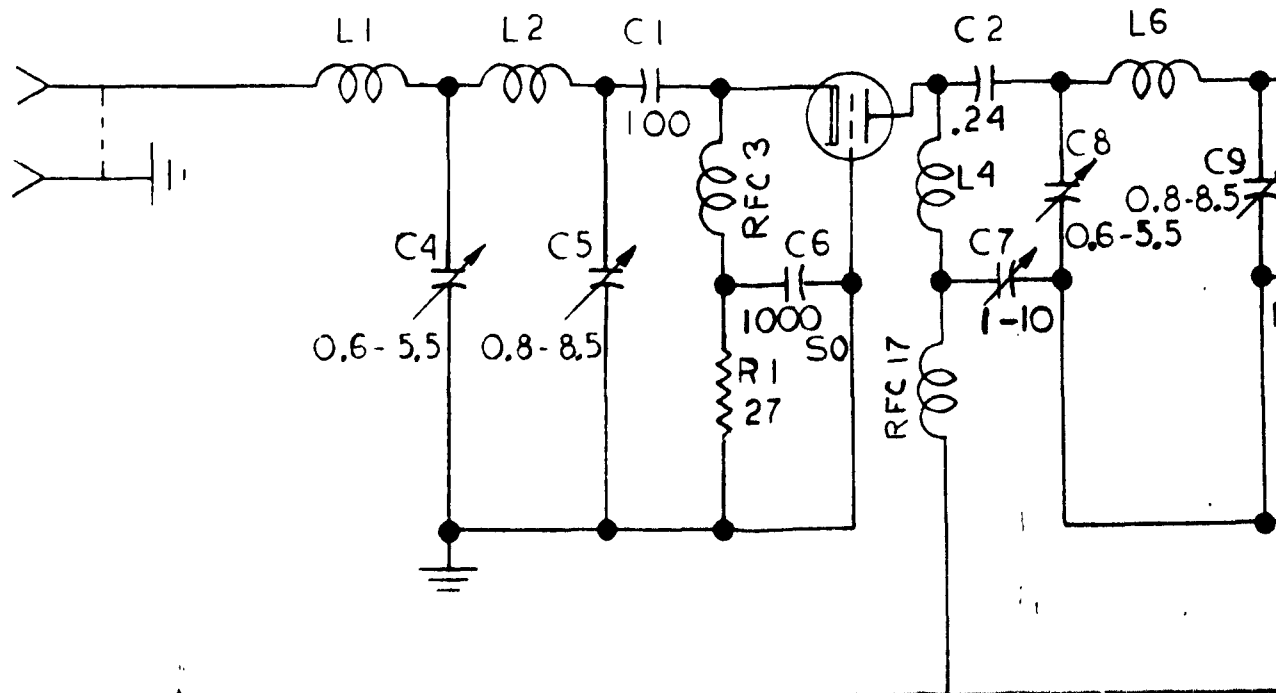
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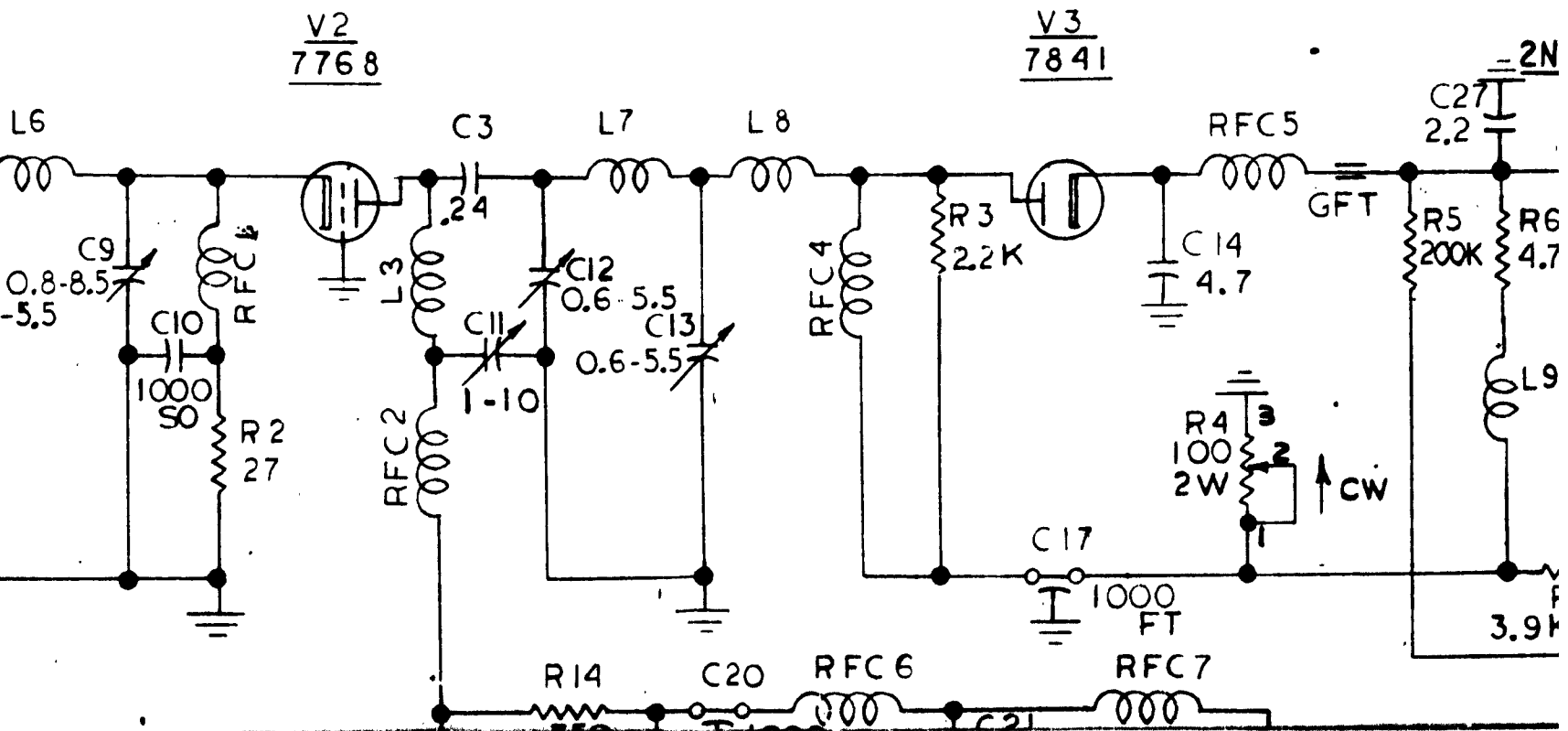
600812

ISSUE C

J1
INPUT

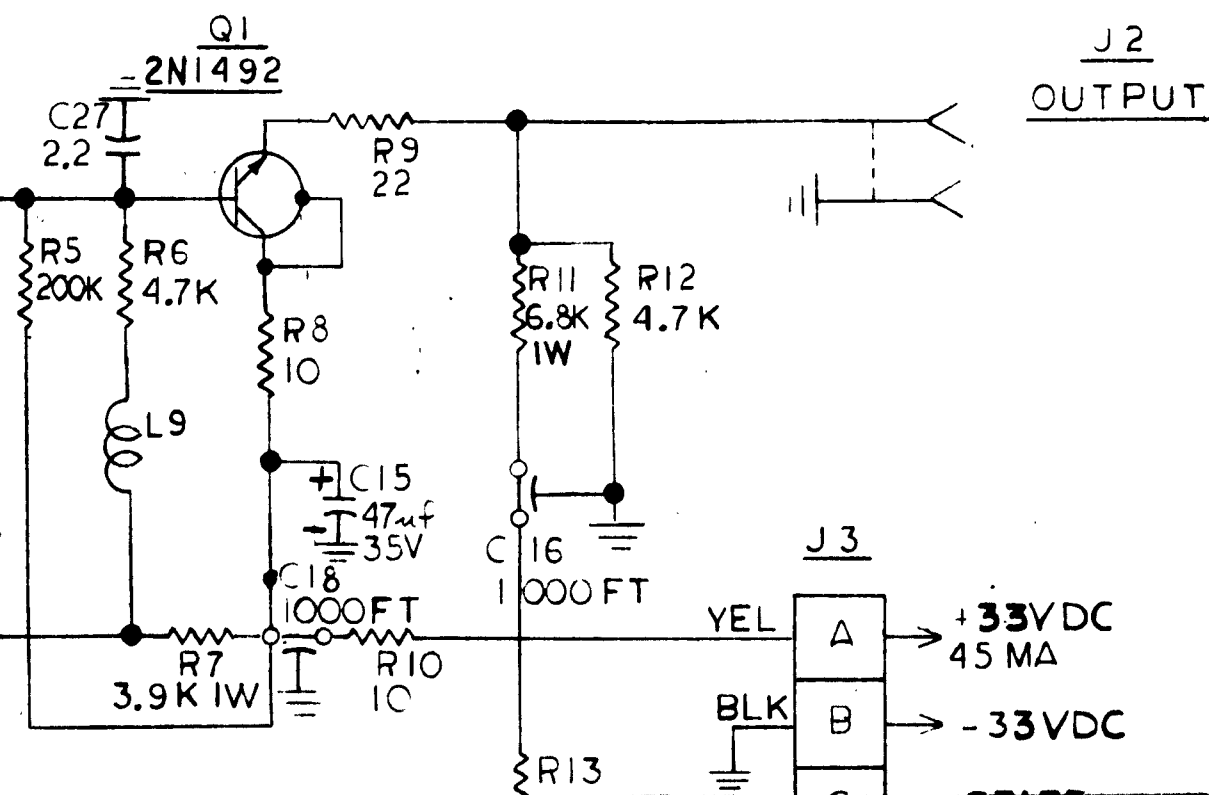
V1
7768





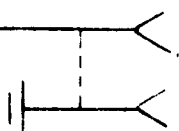
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B	EL

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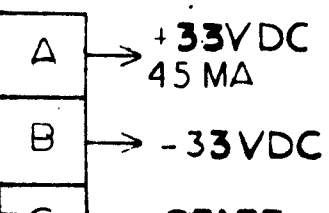


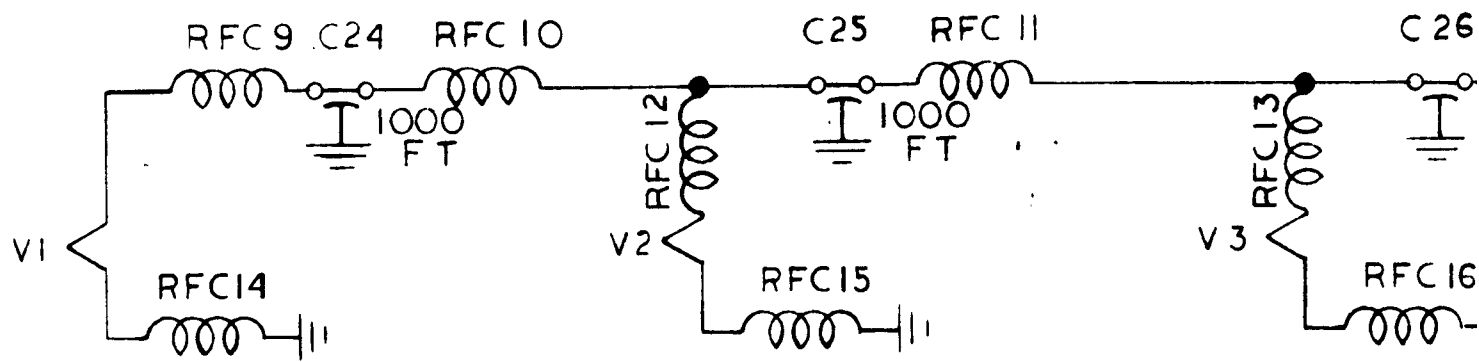
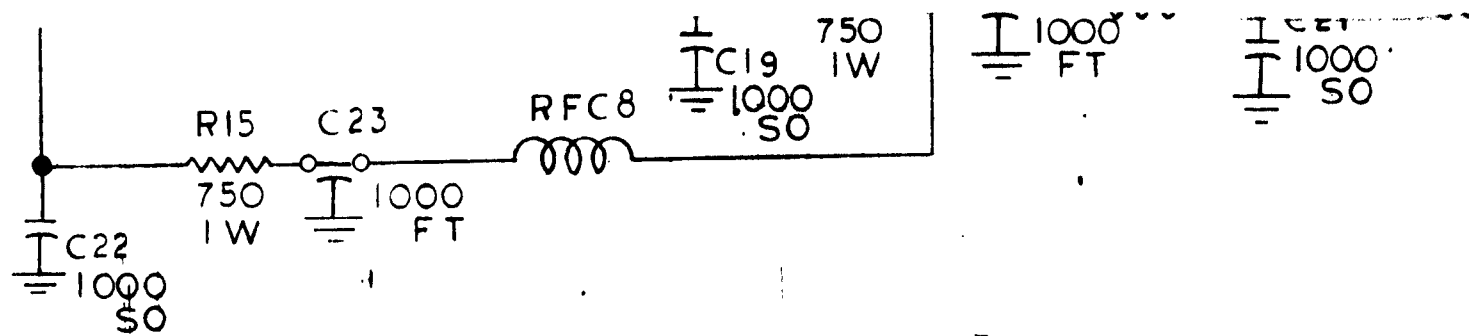
REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
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J2
OUTPUT



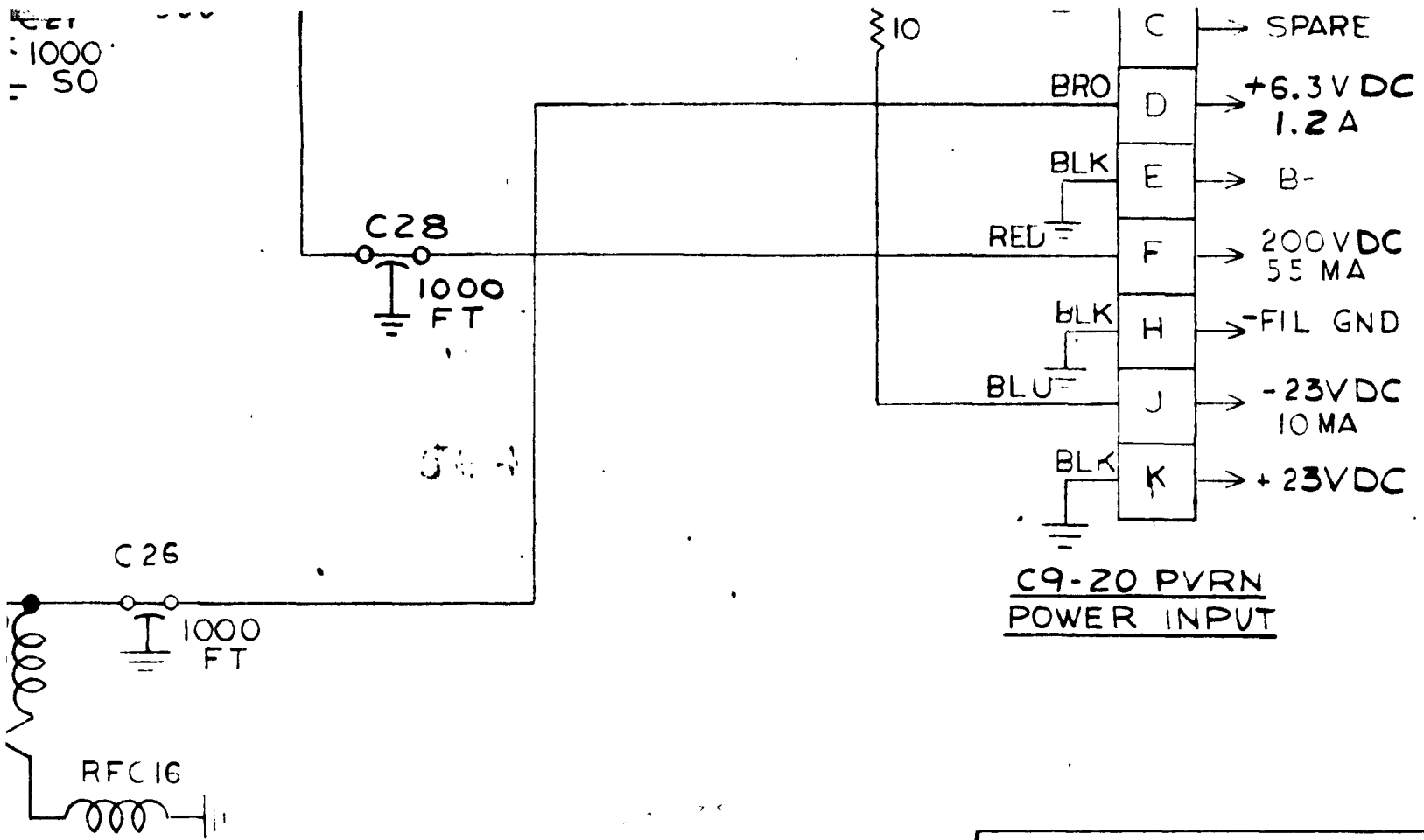
J3





5

1000
= 50



LAST COMP				REF	DESIG
C	J	L	Q	R	RFC V
28	3	9	1	15	17 3

6

		ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$ DECIMALS .XX $\pm .010$.XXX $\pm .005$
491-01 501580		FINISH:
JOB NO.	NEXT ASSEMBLY	
APPLICATION		

C	→ SPARE
D	→ +6.3VDC 1.2A
E	→ B-
F	→ 200VDC 55 MA
H	→ -FIL GND
J	→ -23VDC 10 MA
K	→ +23VDC

O PVRN
R INPUT

COMP	REF	DESIG
L	Q	R
9	1	15

NOTE

1- UNLESS OTHERWISE NOTED

ALL CAPACITORS IN UUF

ALL RFC = ARI 800

ALL RESISTORS ARE 1/2W

7

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$
DECIMALS .XX $\pm .010$.XXX $\pm .005$

MATERIAL:

FINISH:

DRAWN
5-24-62

DRAWN BY
Brown

CHECKED

APPROVED

APPROVED

SCHEMATIC
POWER AMPLIFIER
DETECTOR
UNIT 1A7A8

SCALE

UNIT WT.

APPLIED RESEARCH INC.
PORT WASHINGTON
NEW YORK

DWG.
SIZE

D

600802

ISSUE B

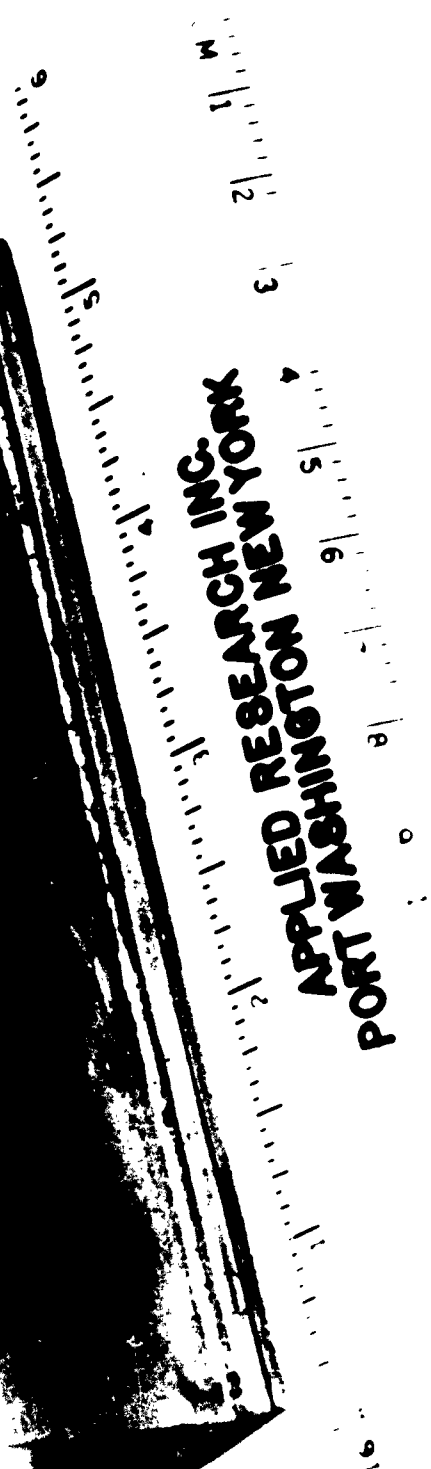
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600802

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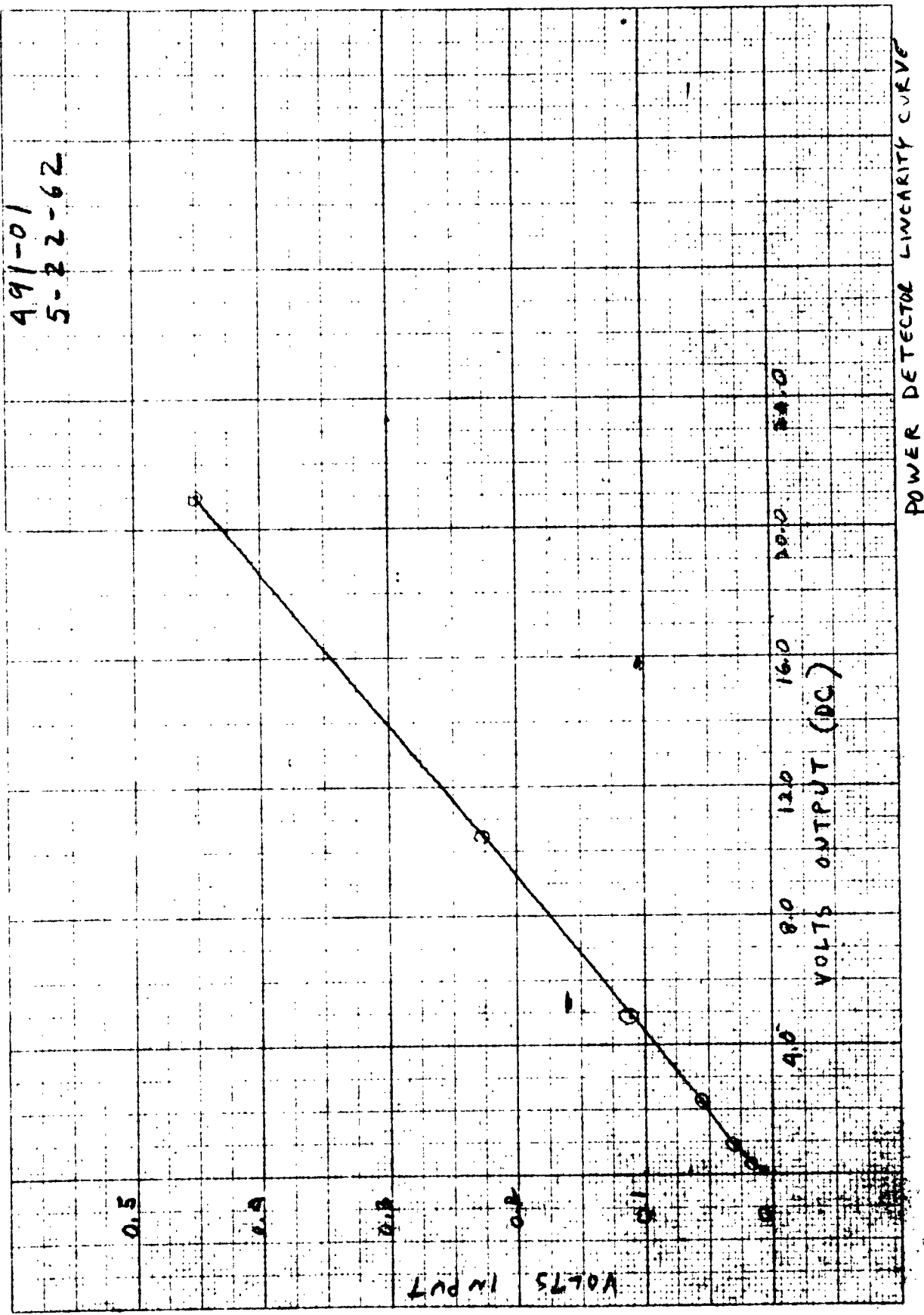


APPLIED RESEARCH INC.
PORT WASHINGTON NEW YORK



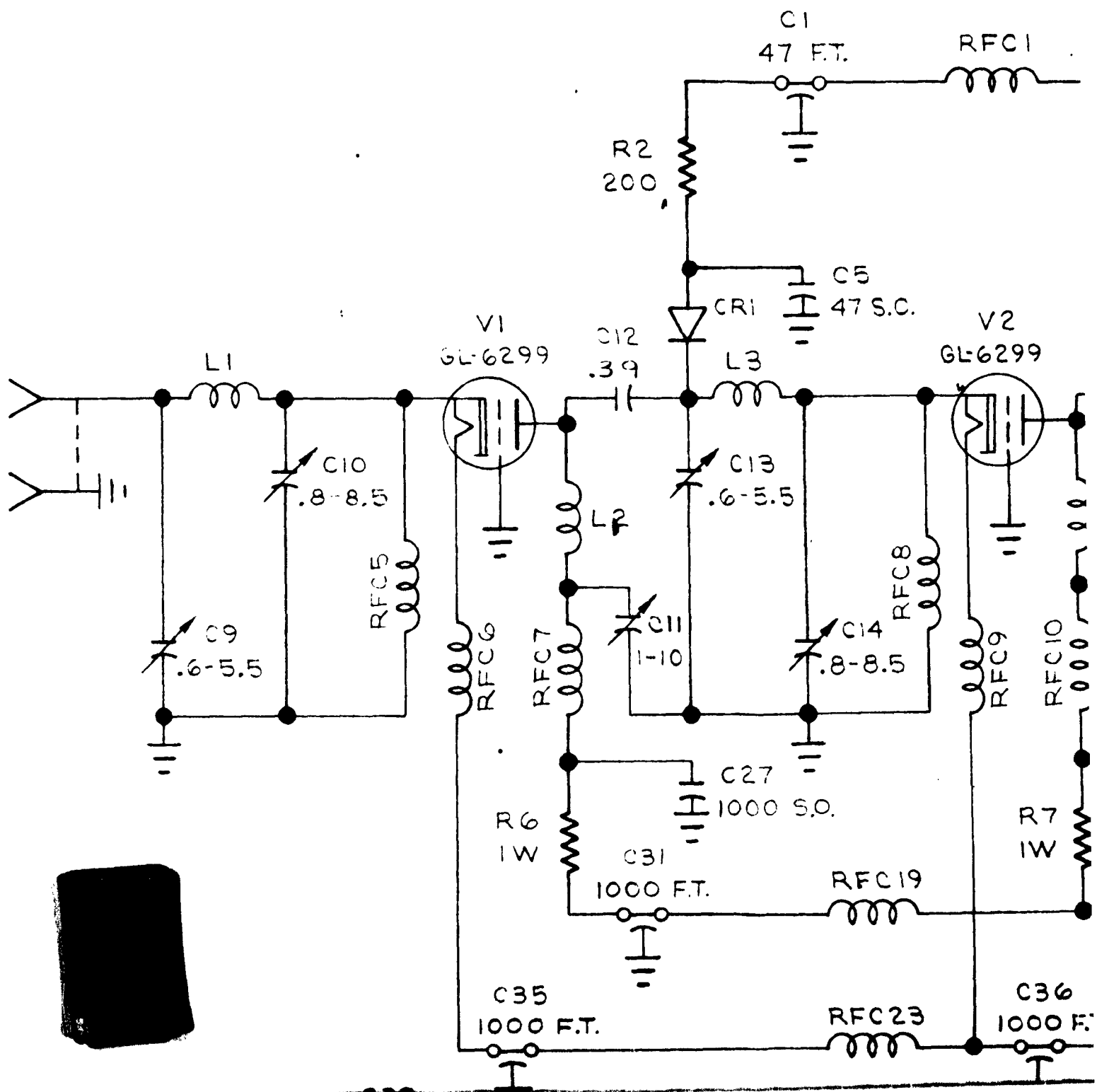
POWER DETECTOR
MAY 1962

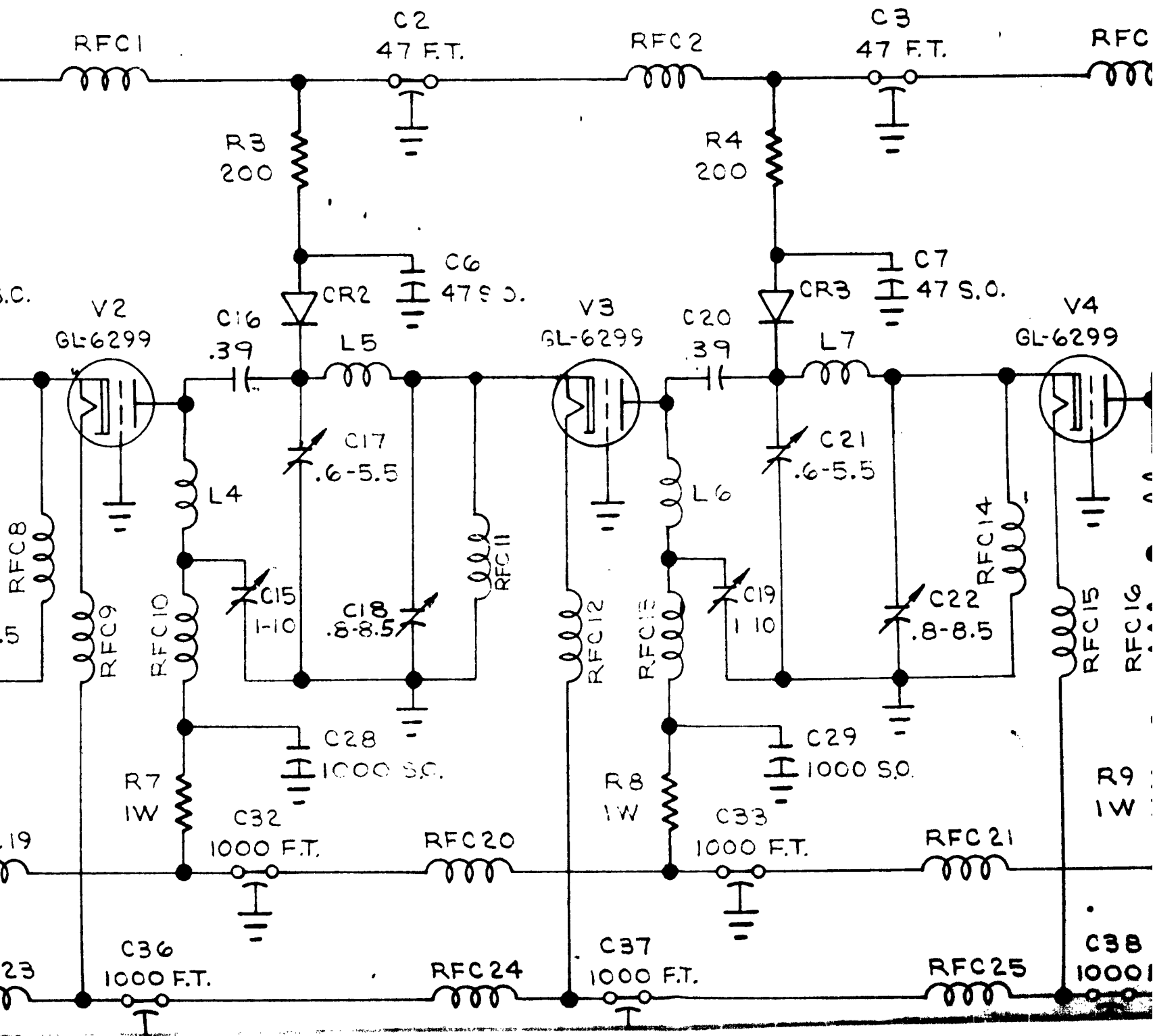
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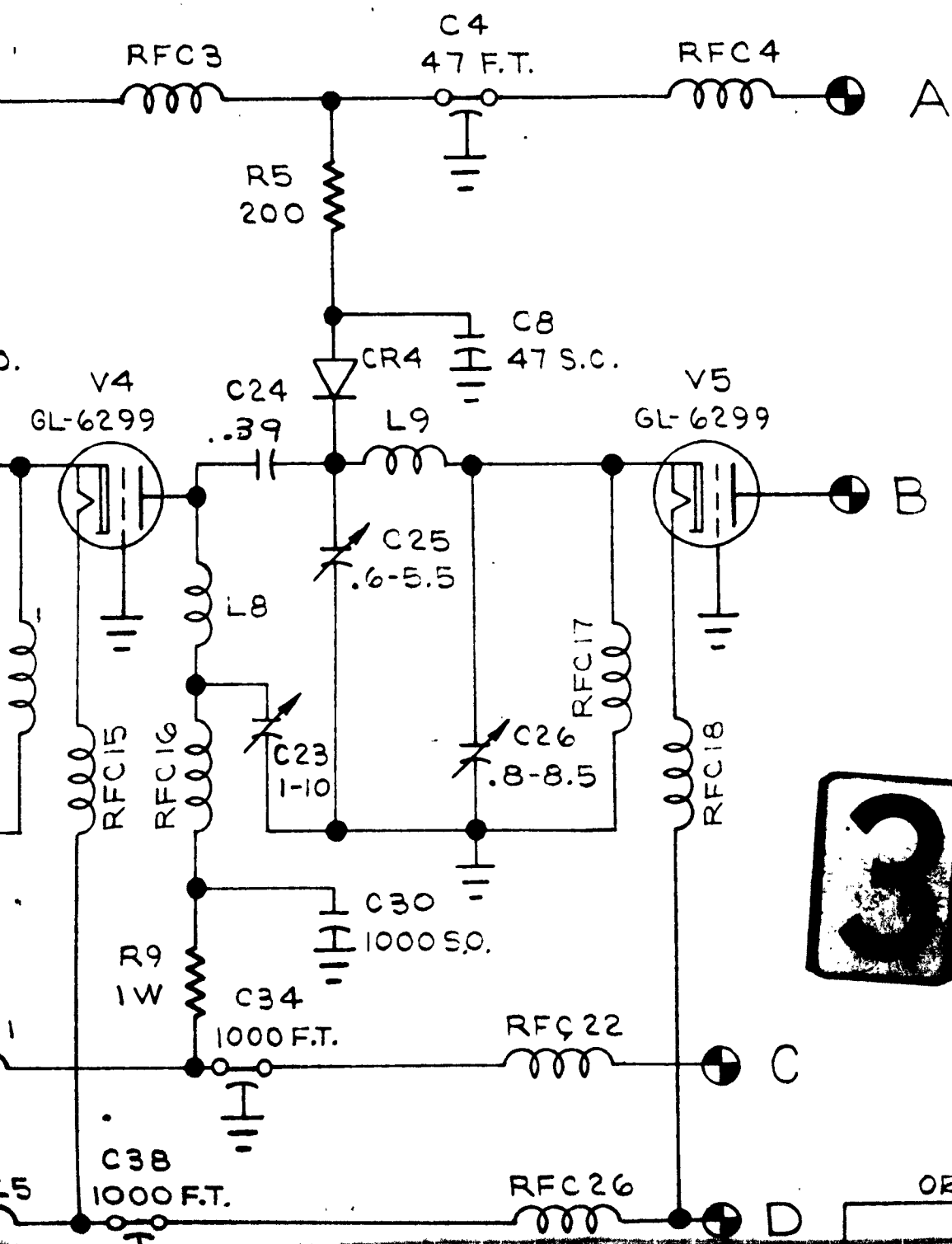


POWER DETECTOR LINEARITY CURVE

1
PUT







REVISIONS

ISSUE	DESCRIPTION	DATE	BY
B	ELECTRICALLY REVISED	9-5-62	FP
C	ELECTRICALLY REVISED	10-9-62	FP
D	ELECTRICALLY REVISED	11-7-62	RD

⊕ A

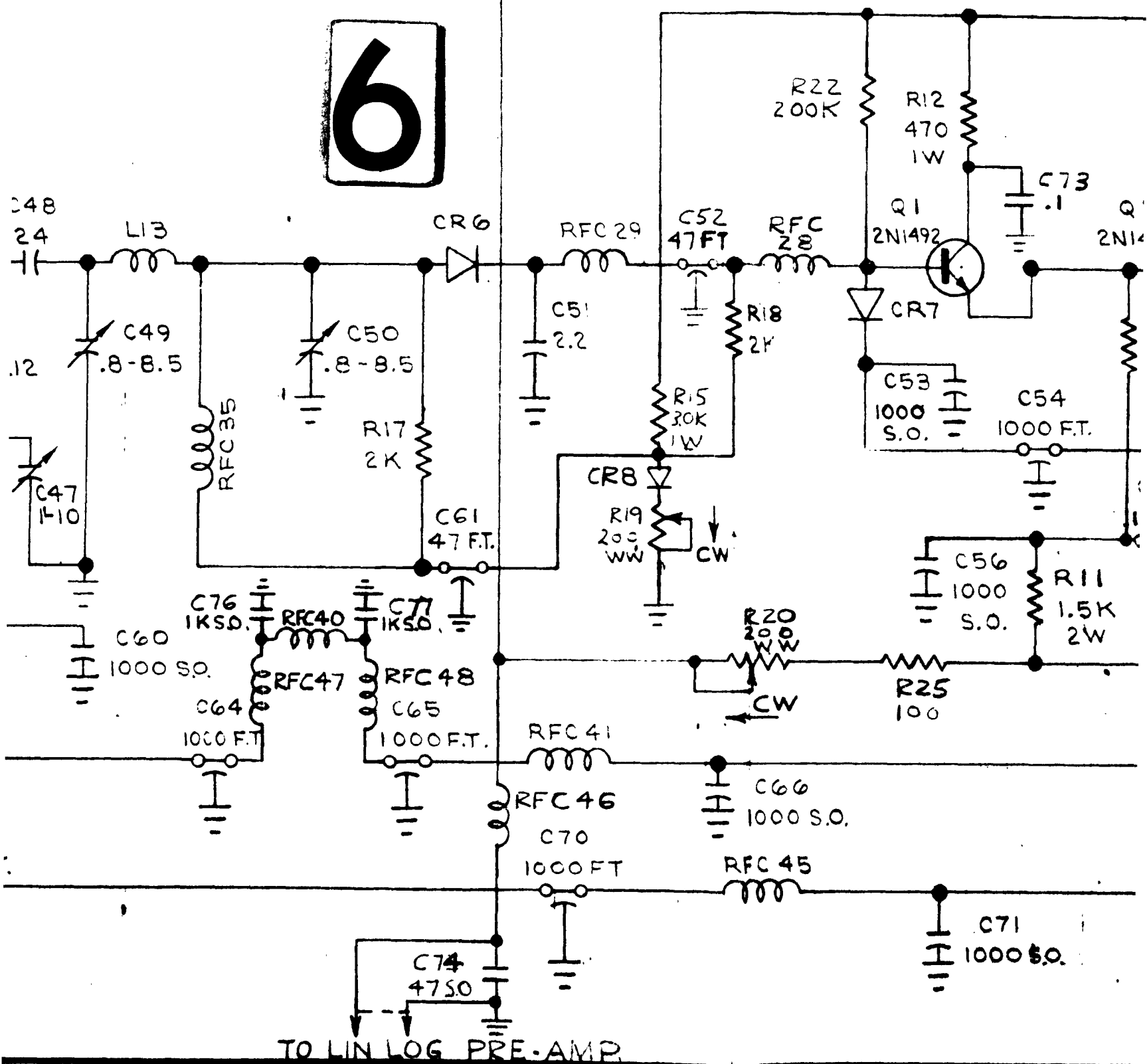
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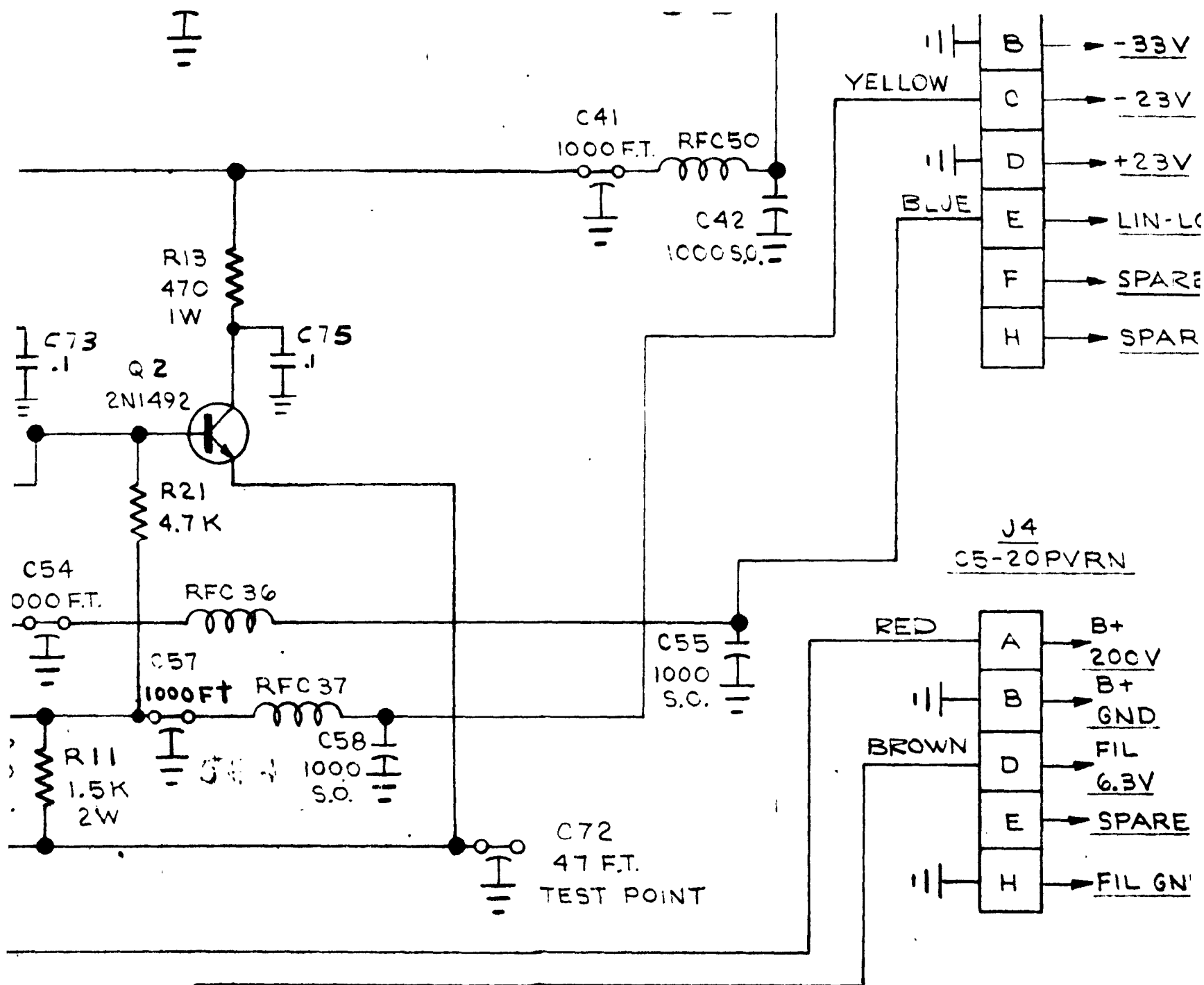
4

J3
C7-20PVRN

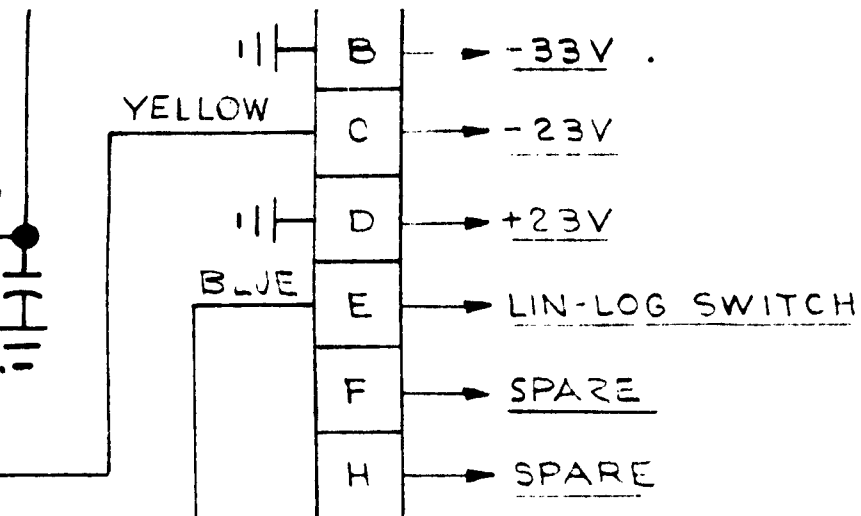
ORANGE → A → +33V

6





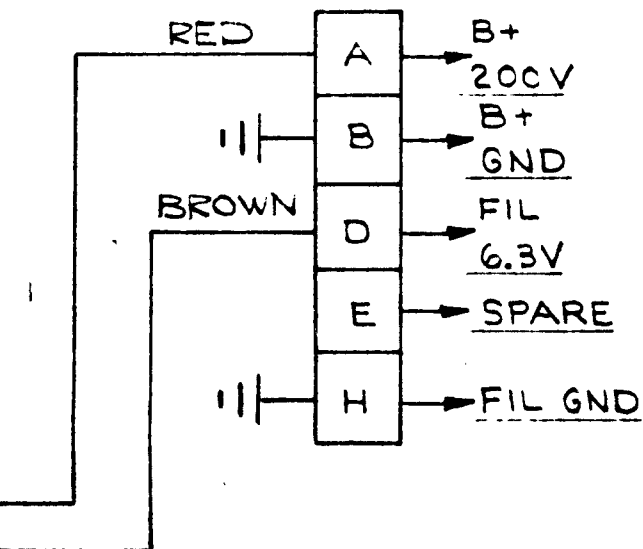
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			DRAWN BY D. Hemmick
MATERIAL: ~		CHECKED	
FINISH: ~		APPROVED	
APPLICATION		APPROVED	SC.



J4
C5-20PVRN

NOTE:

1. UNLESS OTHERWISE SPECIFIED
ALL CAPACITORS ARE IN $\mu\mu f$
ALL RESISTORS ARE $\frac{1}{2} W$



8

LAST COMPONENT DESIGN							
C	CR	R	J	V	Q	L	RFC
77	8	25	4	6	2	18	50

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS $\pm \frac{1}{64}$ ANGLES $\pm \frac{1}{2}^\circ$
DECIMALS .XX $\pm .010$.XXX $\pm .005$

MATERIAL:

FINISH:

DRAWN
5-5-62

DRAWN BY
A Kennard

CHECKED

APPROVED

APPROVED

SCHEMATIC
LIN-LOG IF AMPL.
UNIT 1A7A7

SCALE NONE

UNIT WT.

APPLIED RESEARCH INC.
PORT WASHINGTON
NEW YORK

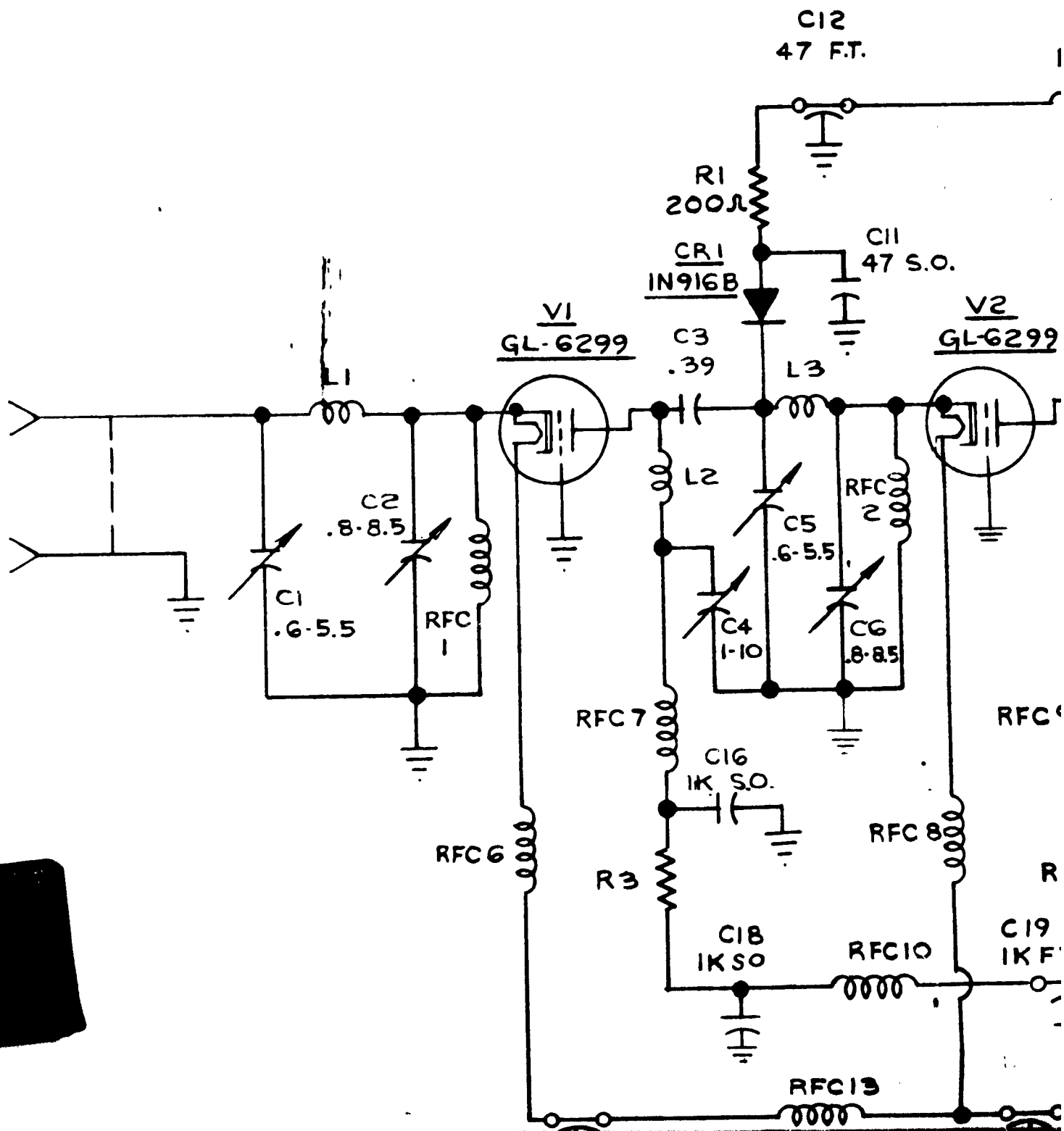
DWG.
NO.

D

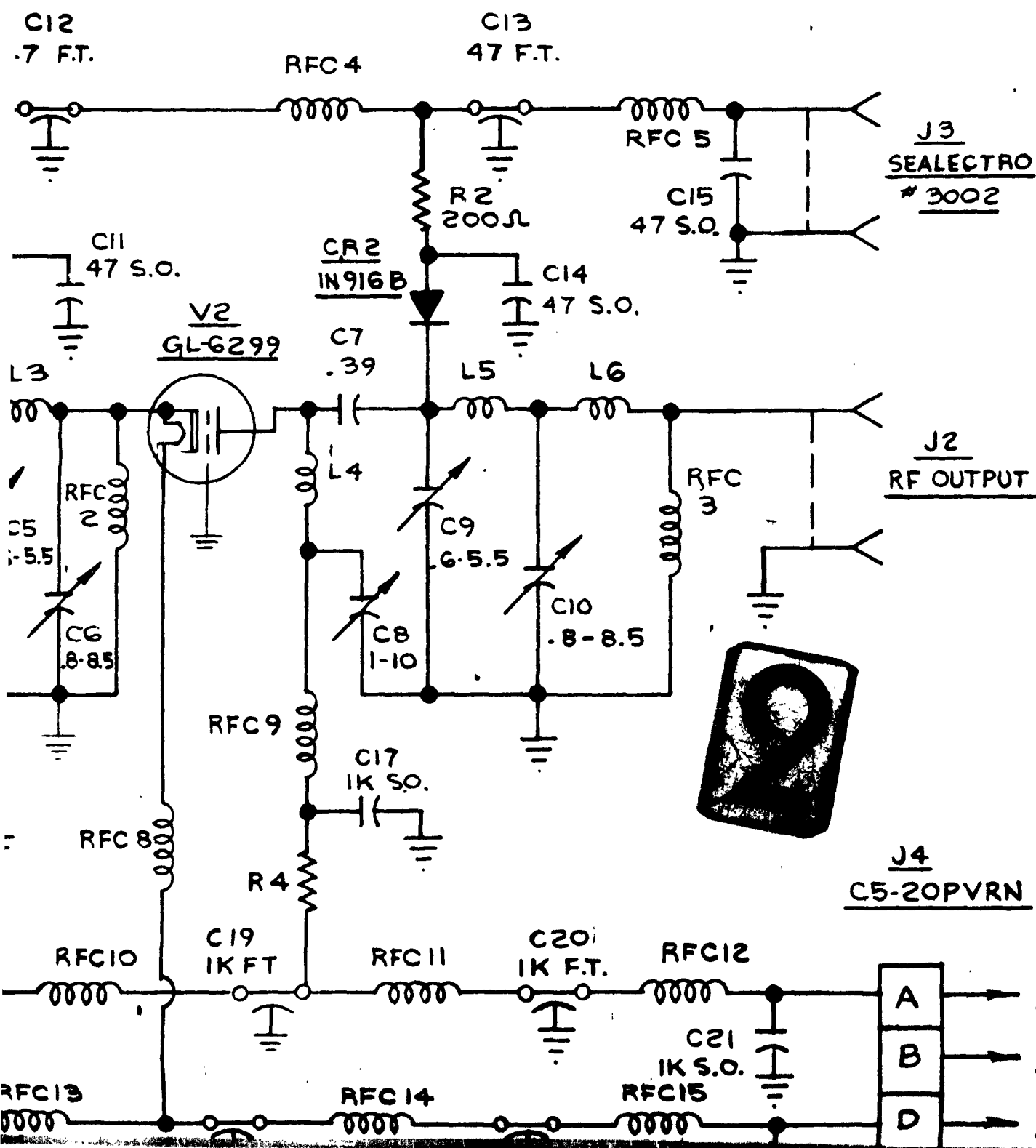
600806

ISSUE D

J1
RF INPUT



ISSUE	0
B	INTERCHAN

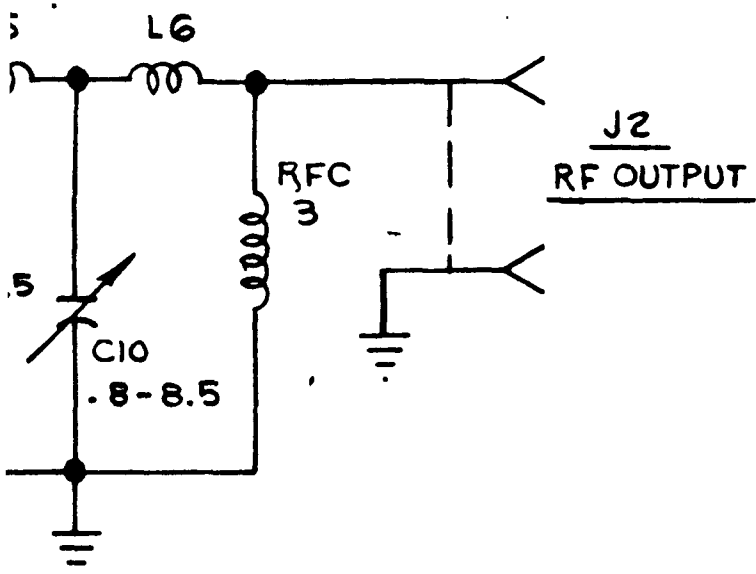
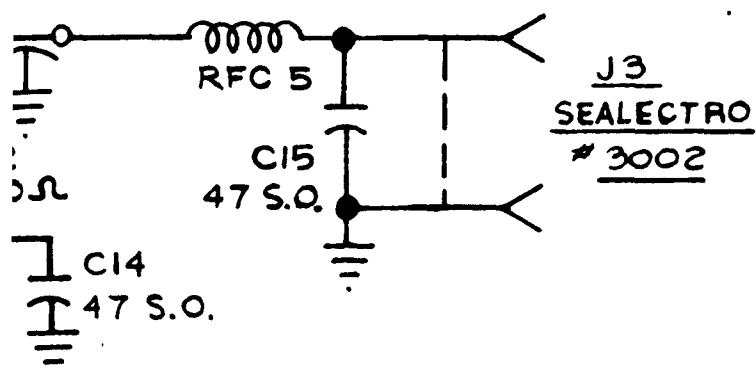


NOTE

1. ALL
2. R3
- 10M
3. F₀ =

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	INTERCHANGE C18 WITH C19	10-16-62	AB

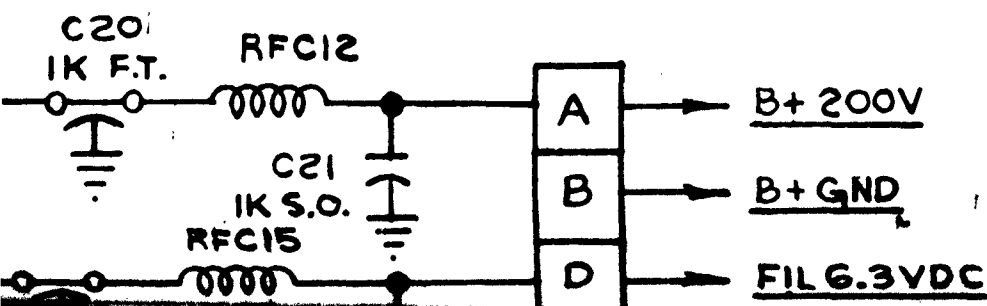
C13
7 F.T.



NOTE

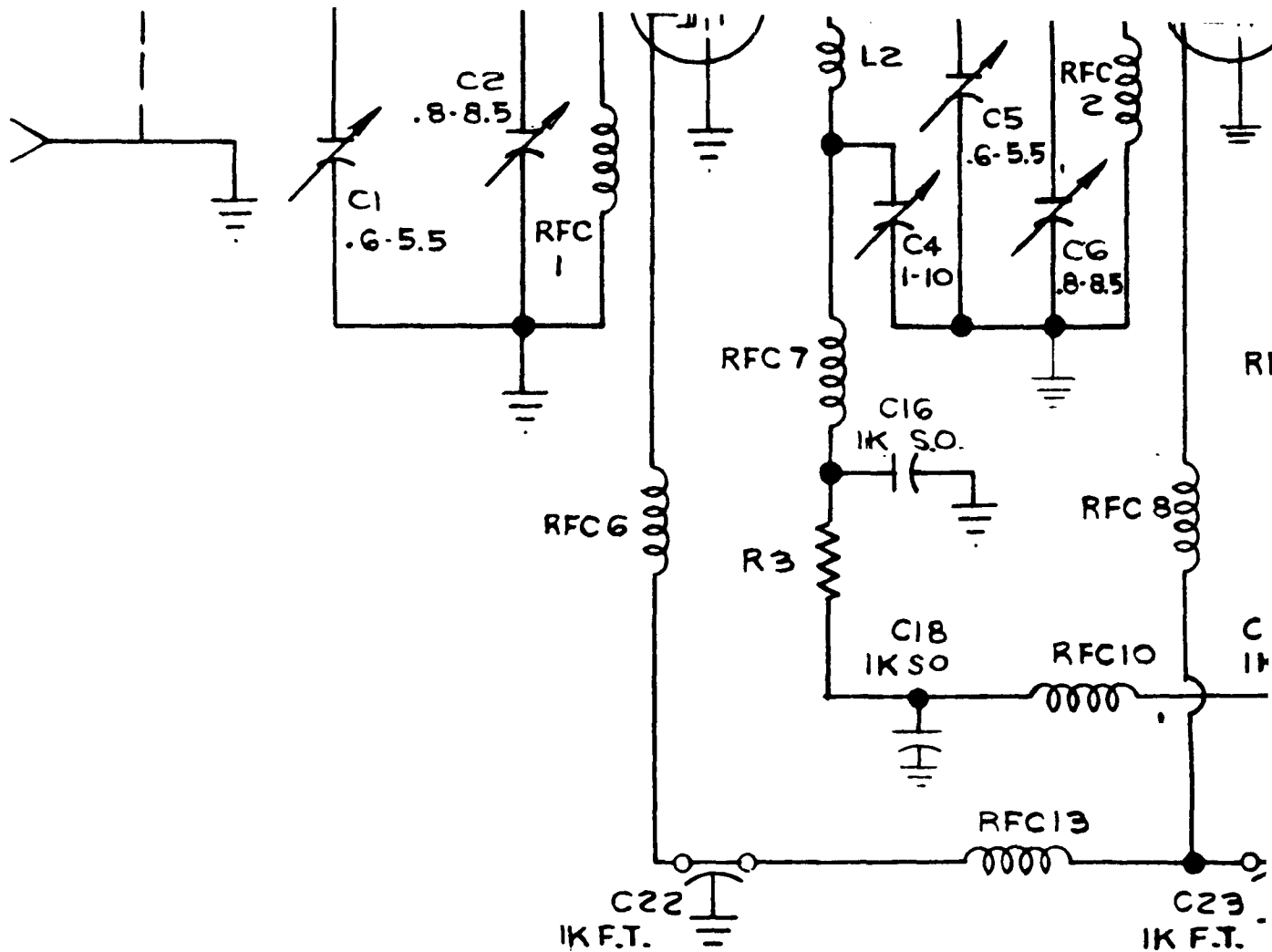
1. ALL CAPACITORS IN μmf
2. R3 & R4 SELECTED FOR
10MA TUBE CURRENT
3. $F_0 = 775 \text{ MC}$

J4
C5-20PVRN



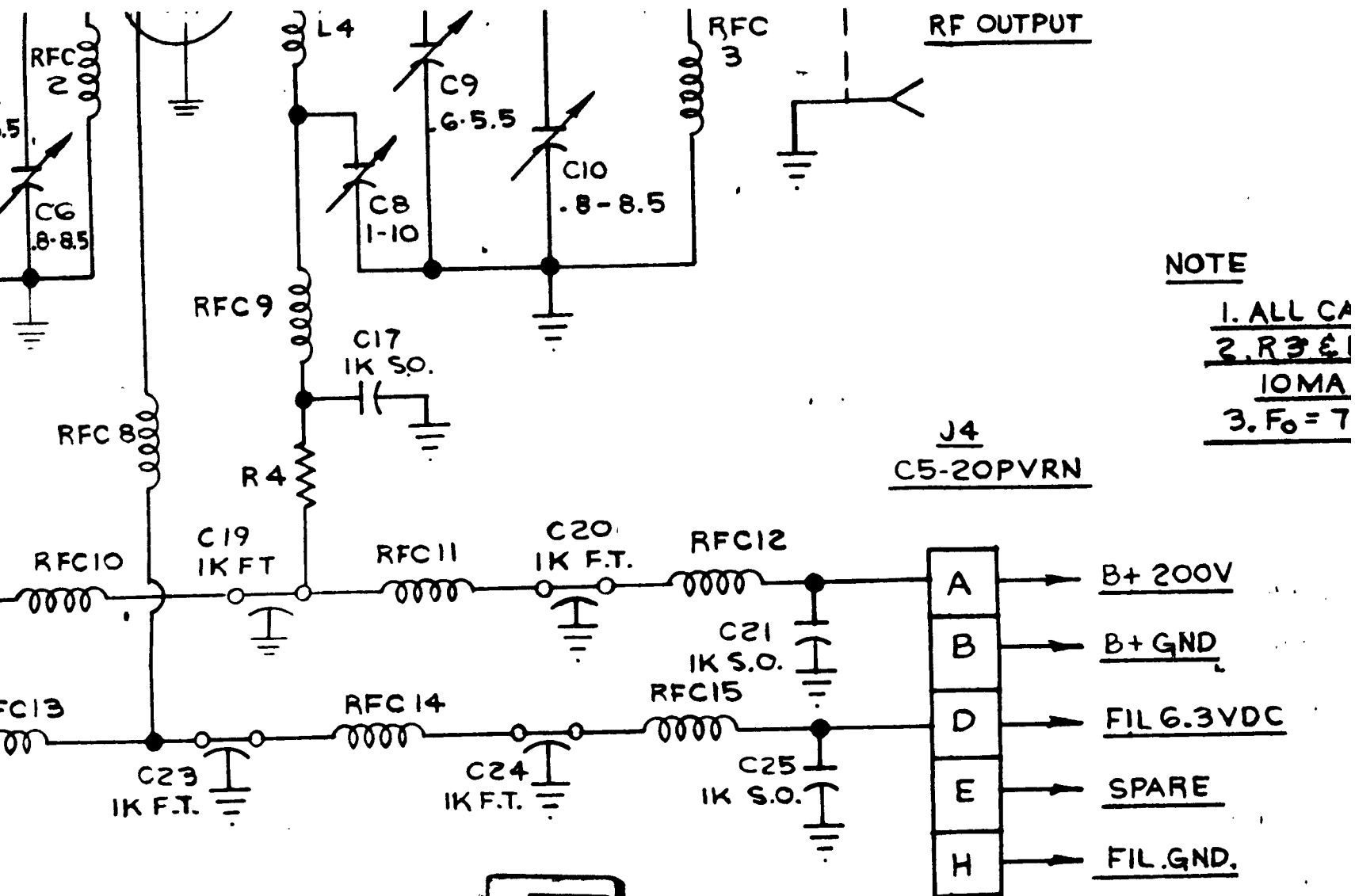
ISSUE B
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J1
RF INPUT

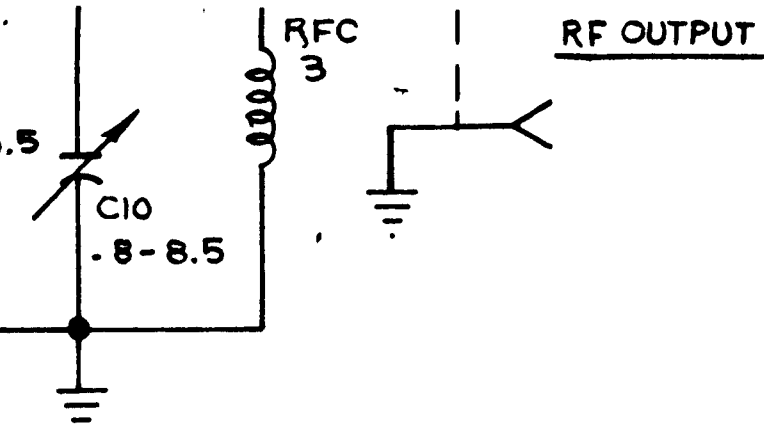


4

49



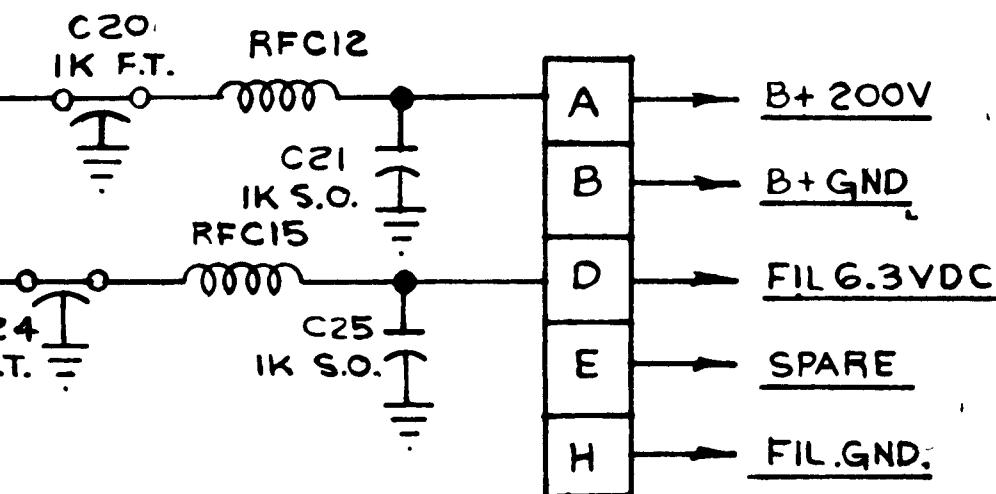
491-01	501677	ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$ DECIMALS .XX $\pm .010$.XXX $\pm .005$	DRAWN 8-14-62	SCHEMATIC E-2(A)775/G LIN-LO PRE-AMPLIFIER UNIT 1A7A17	
		MATERIAL:	DRAWN BY M. MERBER		
		FINISH:	CHECKED		
		APPROVED			
JOB NO.	NEXT ASSEMBLY	APPROVED	APPROVED	SCALE	UNIT WT.
APPLICATION					



NOTE

1. ALL CAPACITORS IN μf
2. R3 & R4 SELECTED FOR 10MA TUBE CURRENT
3. $F_0 = 775 MC$

J4
C5-20PVRN



6

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$
DECIMALS .XX $\pm .010$.XXX $\pm .005$

MATERIAL:

FINISH:

DRAWN
8-14-62

DRAWN BY
M. MERBER

CHECKED

APPROVED

APPROVED

SCHEMATIC
E-2(A)775/6 LIN-LOG IF
PRE-AMPLIFIER
UNIT 1A7A17

SCALE

UNIT WT.

APPLIED RESEARCH INC.
PORT WASHINGTON
NEW YORK

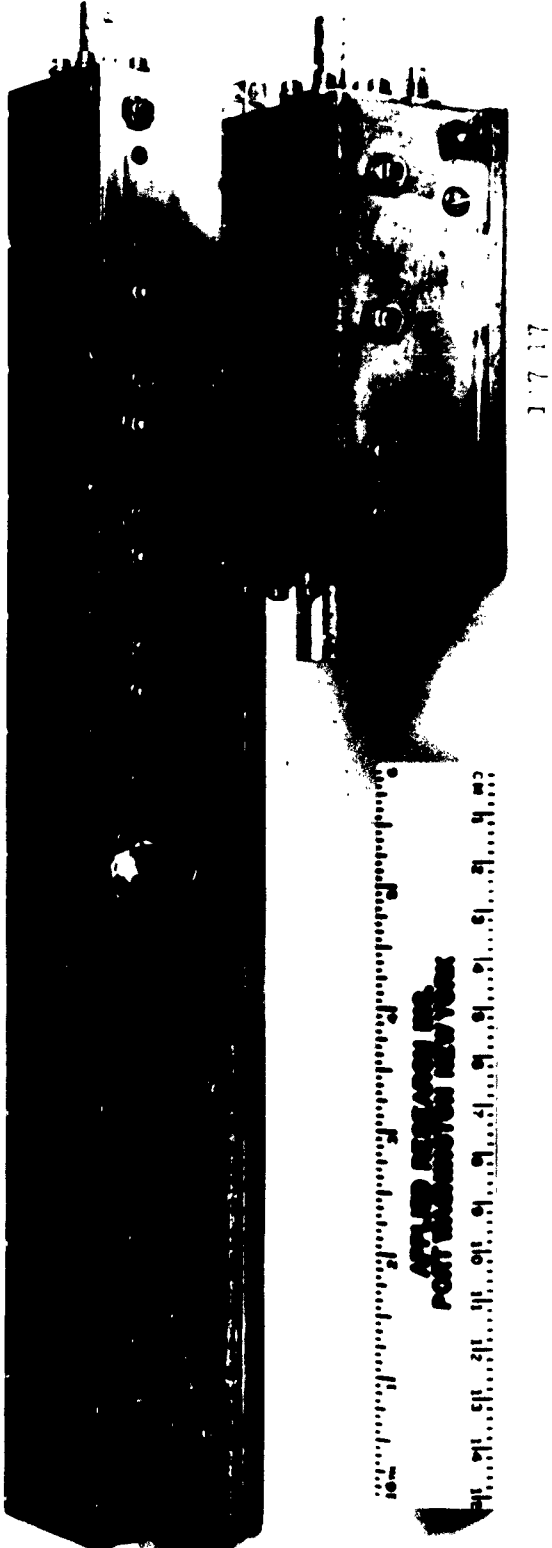
DWG.
SIZE

C

600853

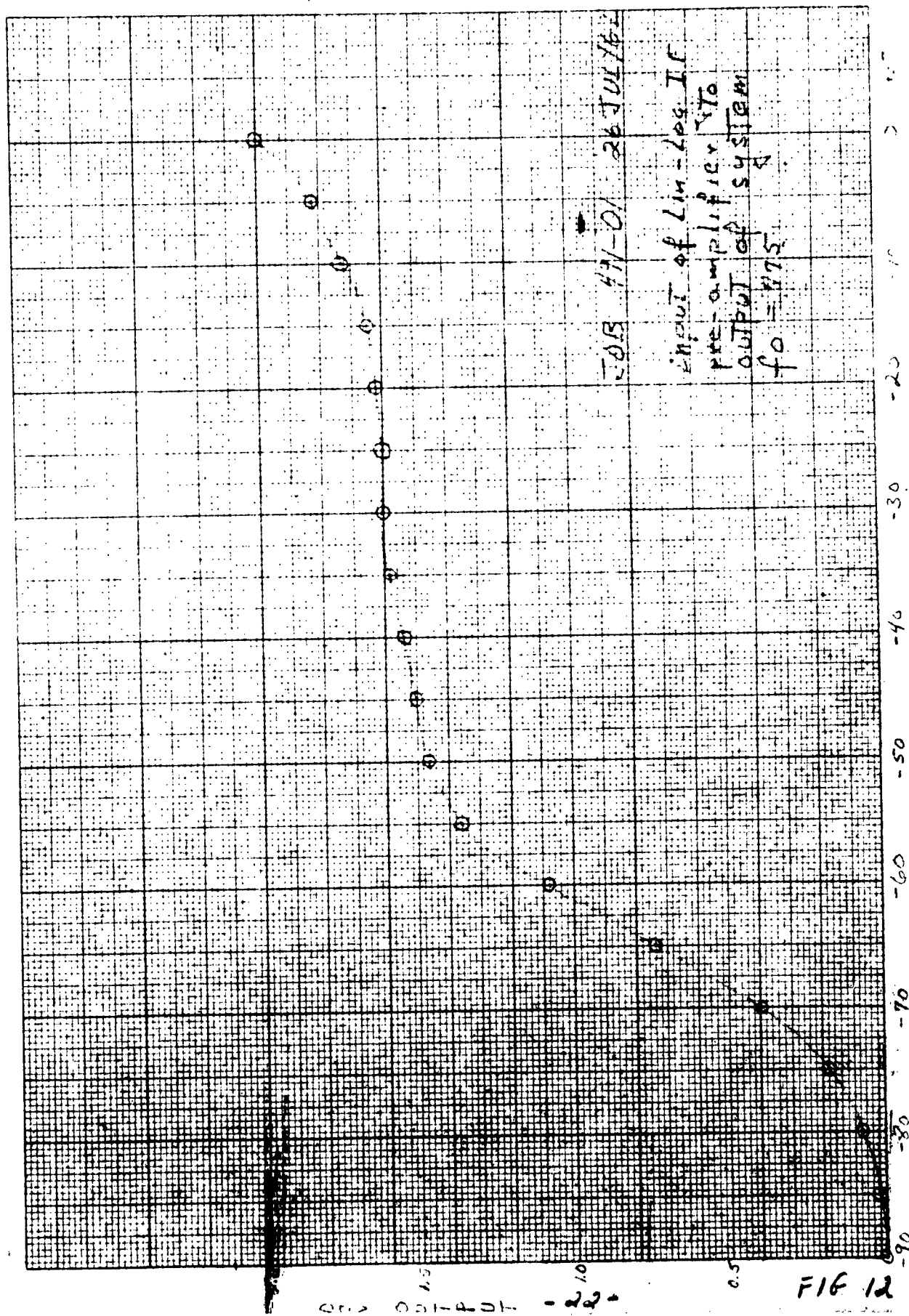
ISSUE B

1.7.7



NO. 340R 20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH

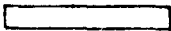
EUGENE DIETZGEN CO
MADE IN U. S. A.



DR. 10 INPUT

FIG 12

	FEB	MARCH	APRIL	MAY	JUN
1. ENGINEERING DEVELOPMENT					
2. MECHANICAL DESIGN					
3. FABRICATION					
4. FINAL TEST					

 WORK COMPLETED
 WORK TO BE COMPLETED



		ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$ DECIMALS $.XX \pm .010$ $.XXX \pm .005$	DRAW 6-21-
			DRAWN WILLIA
		MATERIAL: _____	CHECKI
			APPROV
FINISH: _____		APPROV	
JOB NO.	NEXT ASSEMBLY		
APPLICATION			

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY

MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT



ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$ DECIMALS .XX $\pm .010$.XXX $\pm .005$ MATERIAL: _____ FINISH: _____	DRAWN 6-21-62	SPECTROSCOPE PROJECT PERFORMANCE AND SCHEDULE CHART		APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK		
	DRAWN BY WILLIAMS					
	CHECKED					
	APPROVED					
	APPROVED	SCALE _____	UNIT WT. _____	DWG. SIZE B	SF-138 ISSUE: A	

UNIT 1A1

CALIBRATION
INPUT Z IN=50Ω

J14

J13

100
AN

RF
IN

1A1R3
20DB
PAD

UNIT 1A1T1

IF ATTENUATOR
0-59 DB
IN 5 DB STEPS

J4

TO UNIT 1A7S4

J5

TO UNIT 1A7A7

J5

RF
ATTENUATOR
0-50 DB
IN 1 DB STEPS
TELEVIC

UNIT 1A1T2

UNIT 1A1A2

PRE AMP

TO UNIT 1A1SA1

TO UNIT 1A1SA1

UNIT 1A1S5

UNIT 1A1A4

SHAPING
CIRCUIT
1

SHAPING
CIRCUIT
2

UNIT 1A1A5

UNIT 1A1A1

SWEEP RATE GENERATOR
2N697 (C) INT50 (1)
6BK7B (1) INT885 (1)
1N645 (3)

TO UNIT 1A9J1

J16

TO UNIT 1A9J2

J17

PUSH PULL AM

UNIT 1A1A3

UNIT 1A1
CHANNEL
SWITCH
1-100-20
2-200-40
3-400-70
4-700-100

TO UNIT 1A1SA2

TO UNIT 1A1SA2

TO UNIT 1A1A2

DISPERSION
CONTROL
1A1A1R1

SYNC.
LEVEL

1A1A1R2

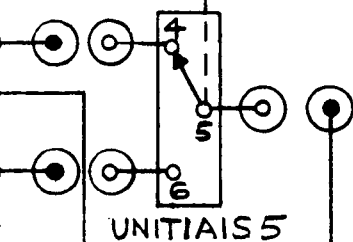
SWEEP
RATE
CONTROL

1A1A1R3

100-1000 MC
ANTENNA

RF INPUT
Z IN = 50Ω

FOR
DB
EPS
UNIT 2



AMP
UNIT 3

UNIT 1A1S7
CHANNEL
SWITCH
1-200MC
2-400MC
3-700MC
4-1000MC

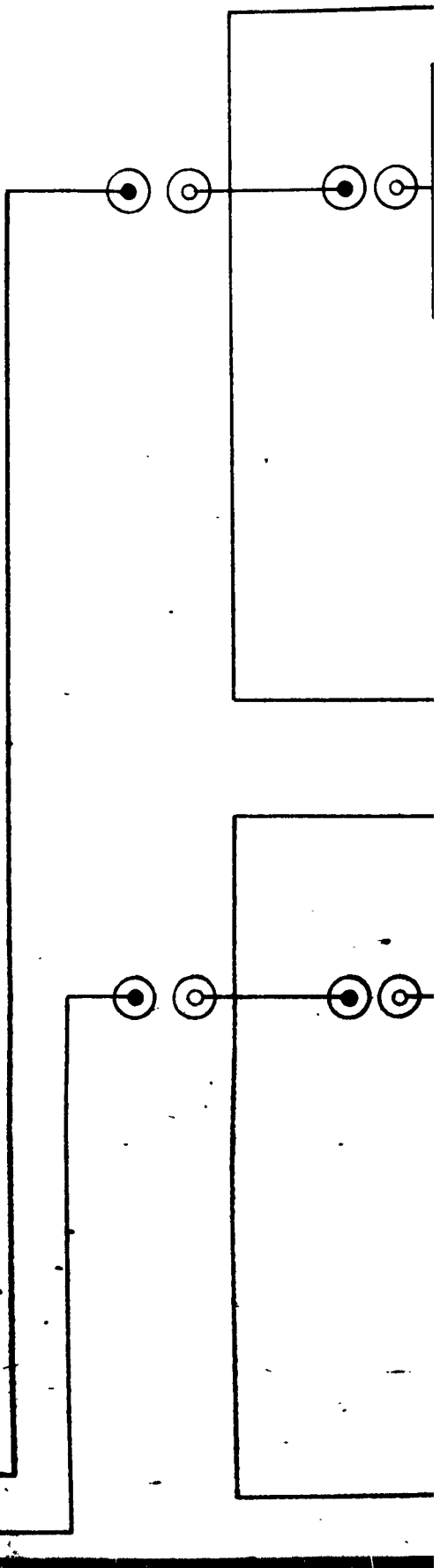
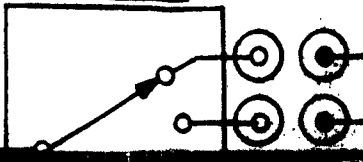
UNIT 1A1S2
SELECTIVITY
SWITCH
1- 5MC
2- 1.3MC
3- 400KC
4- 25KC
5- 5KC

UNIT 1A1S8 UNIT 1A1C1S2 1A1S4



J19 TO UNIT 1A2J5
J18 TO UNIT 1A2J6

UNIT 1S1



UNIT 1A3

UNIT 1A3A1

L.P.-H.P. BANDPASS FILTER
 100-200MC ± 0.1 DB
 3DB PTS 88MC, 226MC
 40DB PTS 50.6MC, 396MC
 I.L. = 0.2 DB

UNIT 1A3A2

CONVERTER

AMPLIFIER
 100-200MC
 +20DB
 P.V. = 0.4DB
 GL6299 (3)

MIXER
 1N4165
 -6DB

IF AMPLIFIER
 f_o = 775MC
 BW = 15MC
 +11DB
 GL6299 (1)

1A3R1

2DB
PAD

UNIT 1A3PS1

REGULATED DC
 POWER SUPPLY
 +200V @ 75MA

REGULATED DC
 POWER SUPPLY
 +6.3V @ 3AMPS

2DB
PAD

1A3R2

UNIT 1A4

TO UNIT 1A2S2

UNIT 1A4A1

L.P.-H.P. BANDPASS FILTER
 200-400MC ± 0.1 DB
 3DB PTS. 175MC, 455MC
 40DB PTS. 100.5MC, 796MC
 I.L. = 0.2 DB

UNIT 1A4A2

CONVERTER

AMPLIFIER
 200-400MC
 +20DB
 P.V. = 0.4DB
 GL6299 (3)

MIXER
 1N4165
 -6DB

IF AMPLIFIER
 f_o = 775MC
 BW = 15MC
 +11DB
 GL6299 (1)

1A4R1

2DB
PAD

UNIT 1A4PS1

REGULATED DC
 POWER SUPPLY
 +200V @ 75MA

REGULATED DC
 POWER SUPPLY
 +6.3V @ 3AMPS

2DB
PAD

1A4R2



R1

B
D

R1

B
D

4

TEKTRON

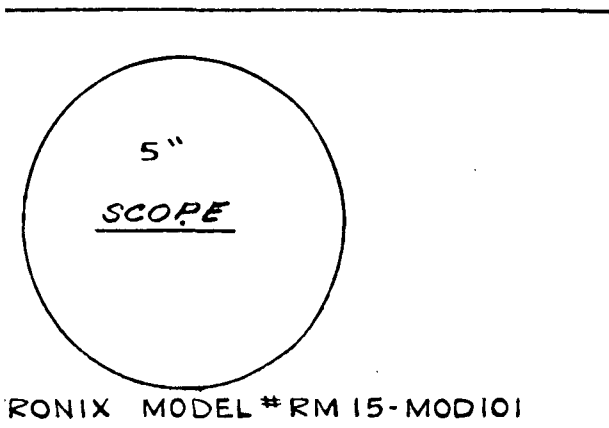
(U1
TO 11

UNIT 1S2

UNIT 1A7A1

IF AMPLIFIER
5.775 MC
BW 6.1 MC
GAIN 100

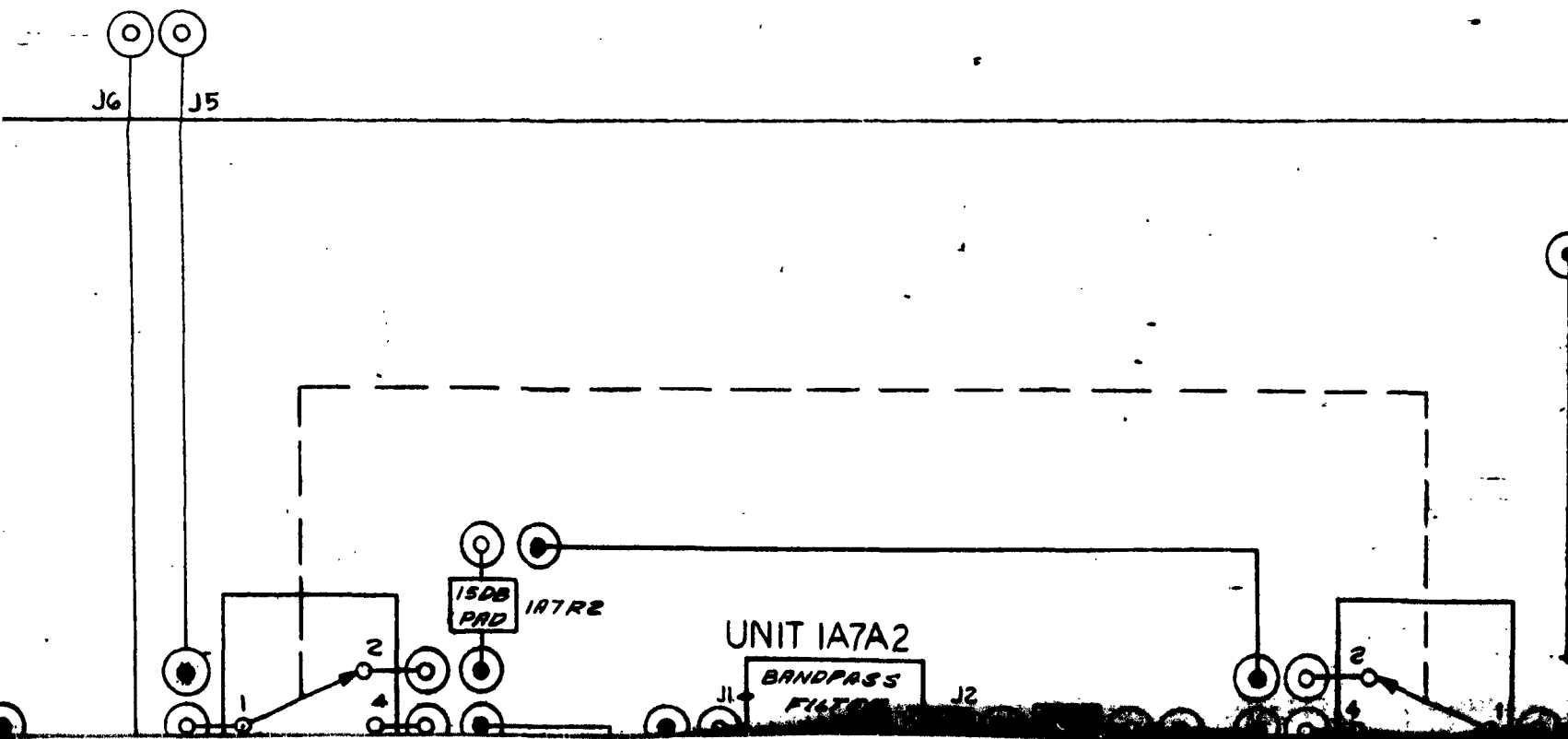
UNIT 1A9



RONIX MODEL # RM 15-MOD101

5

(UNIT 1A1R1)
FO IF ATTENUATOR



UNIT 1A8

UNIT 1A8PS1

DC POWER
SUPPLY
REGULATED
200V @ 100MA IN
205-210 @ 250MA

UNIT 1A8PS2

DC POWER
SUPPLY
REGULATED
+30V @ 350MA
+33V @ 400MA

UNIT 1A8PS3

DC POWER
SUPPLY
REGULATED
-20V @ 150MA
-23V @ 150MA

UNIT 1A8PS4

DC POWER
SUPPLY
REGULATED
+6.3V @ 7.5 A
UNREG
6.3VAC @ 3.0A
(TO UNITS 1A1
1A2 & 1A7)

6

(UNIT 1A1S3)
TO LIN LOG SWITCH

UNIT 1A7

UNIT 1A7A7

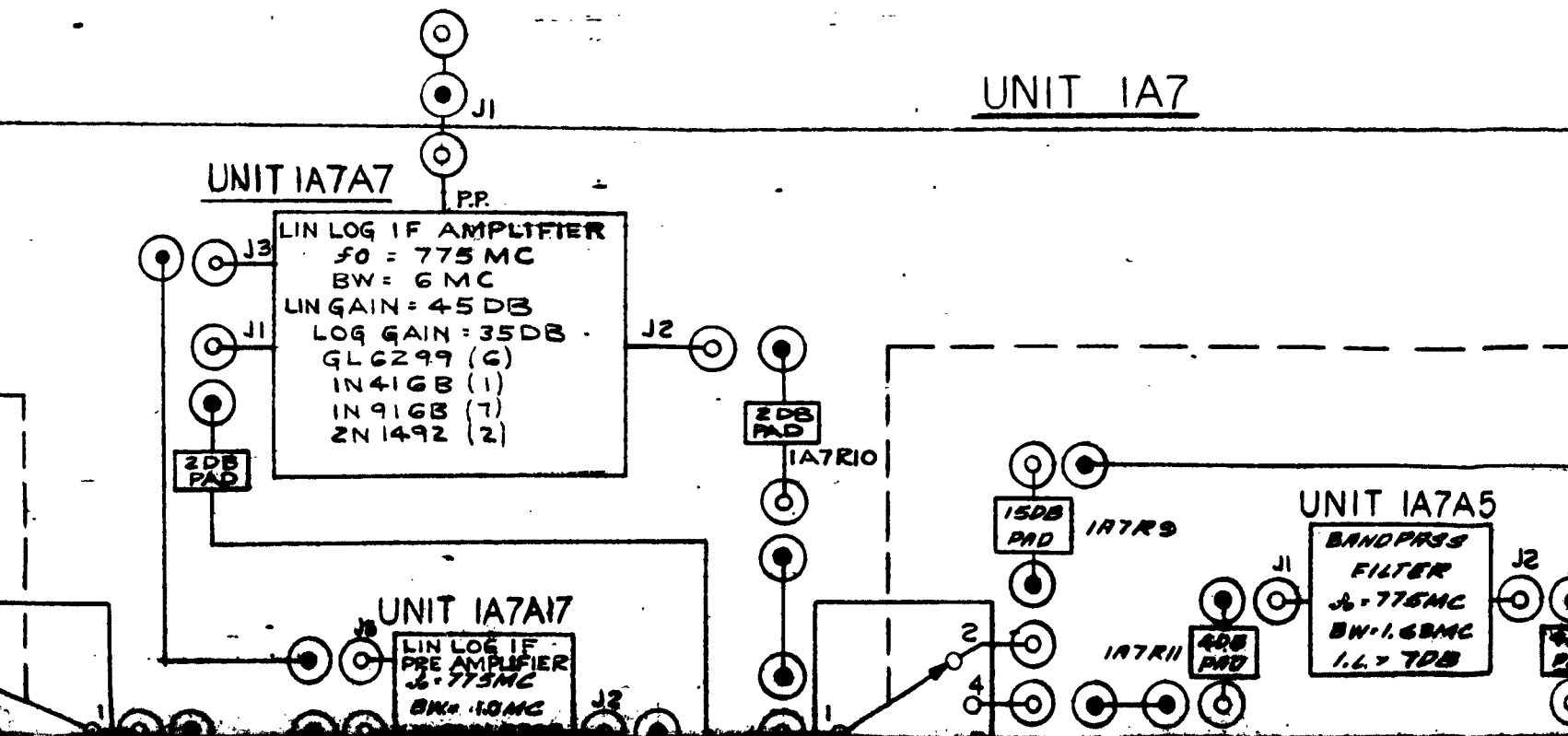
LIN LOG IF AMPLIFIER
f₀ = 775 MC
BW = 6 MC
LIN GAIN = 45 DB
LOG GAIN = 35 DB
GL 6299 (6)
IN 41GB (1)
IN 91GB (7)
ZN 1492 (2)

UNIT 1A7A17

LIN LOG IF
PRE AMPLIFIER
f₀ = 775 MC
BW = 10 MC

UNIT 1A7A5

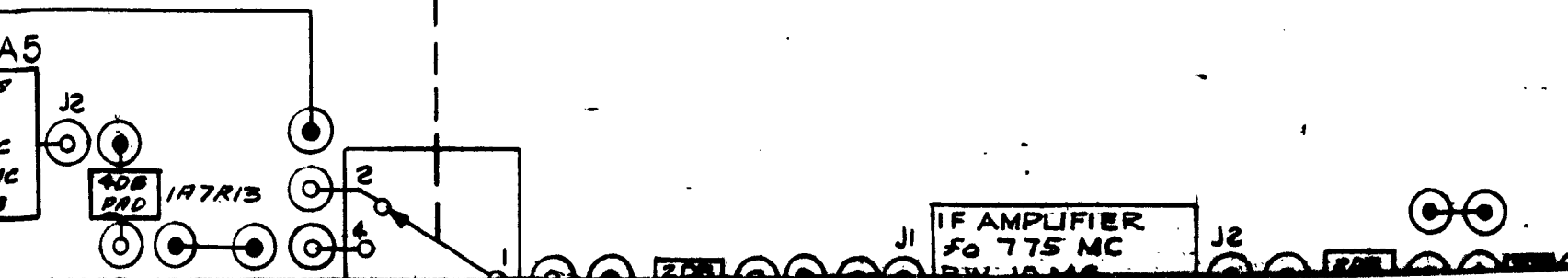
BANDPASS
FILTER
f₀ = 775 MC
BW = 1.6 MC
I.L. > 70 DB



UNIT 1A8PS5

DC POWER
SUPPLY
REGULATED
28V @ 1.5A

7



REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	REVISED	7/26/62	FP

8

UNIT 1A7A8

POWER I.F. AMPLIFIER A-775MC BW-10MC	LINEAR DETECTOR MA4ESX
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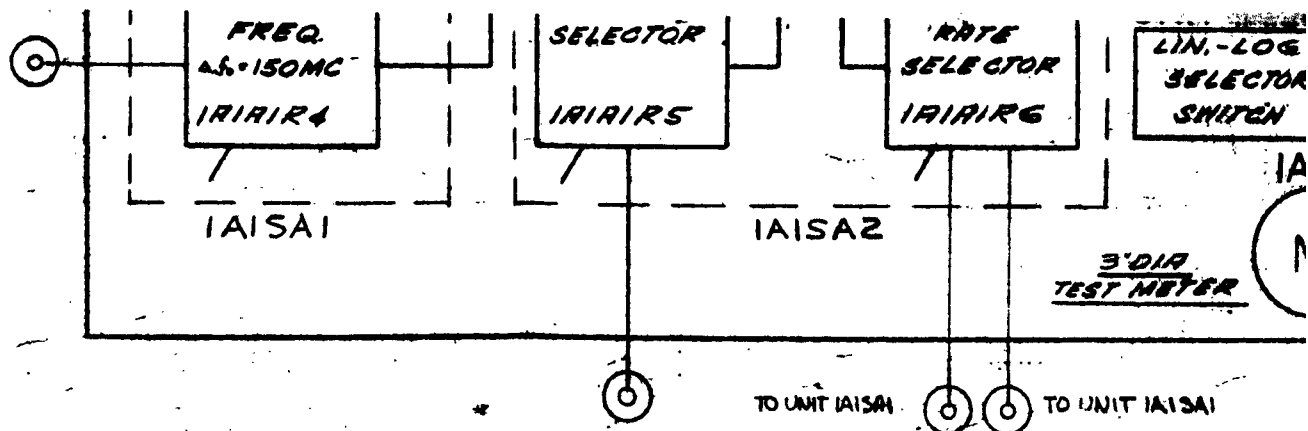
J1

J2

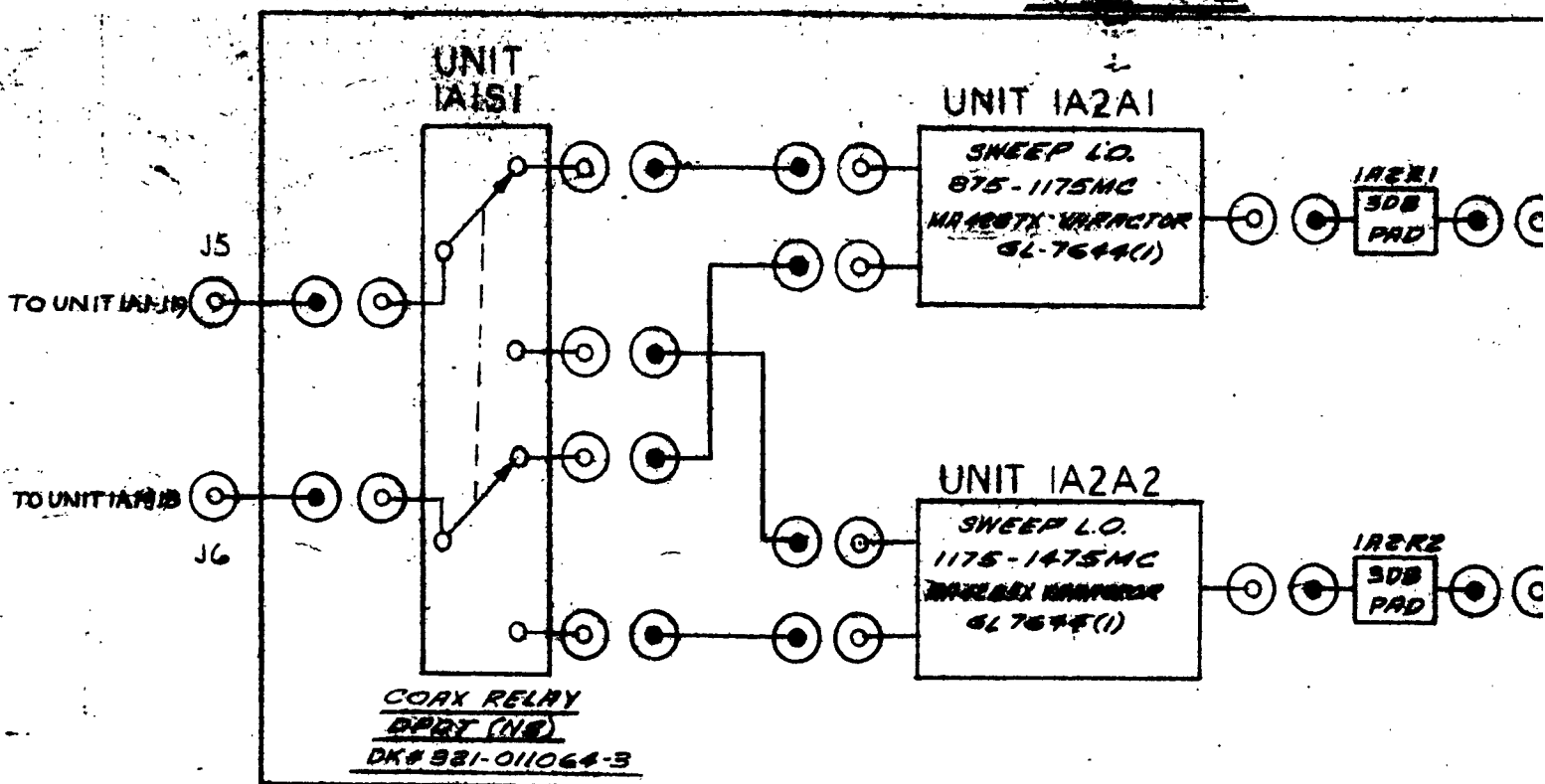
J3

VIDEO OUTPUT

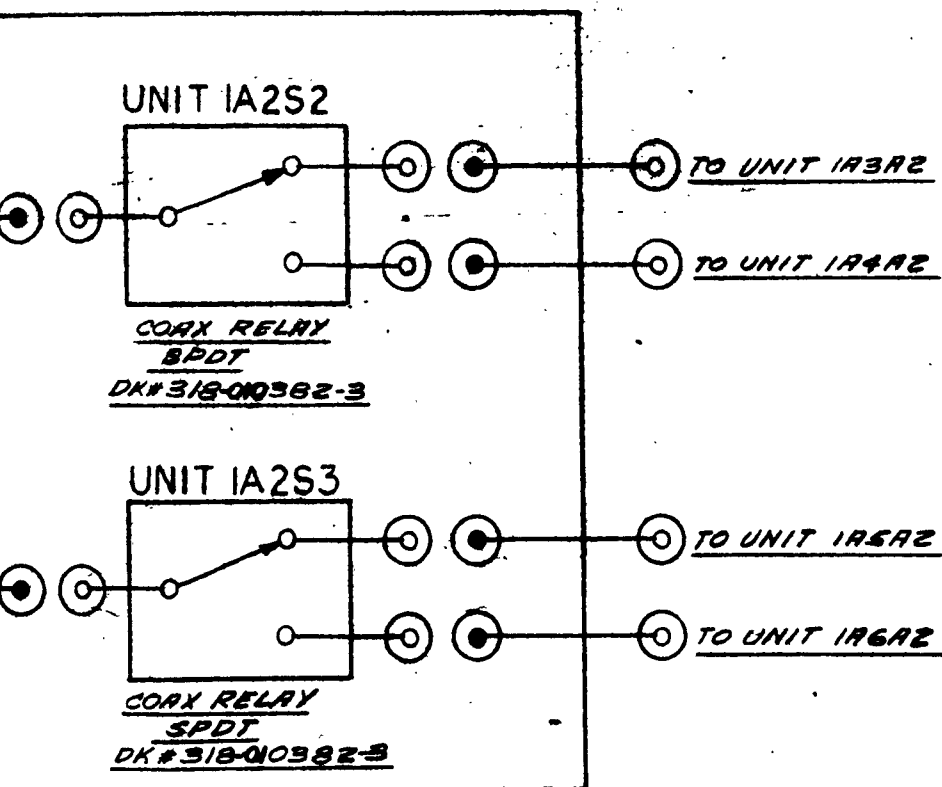
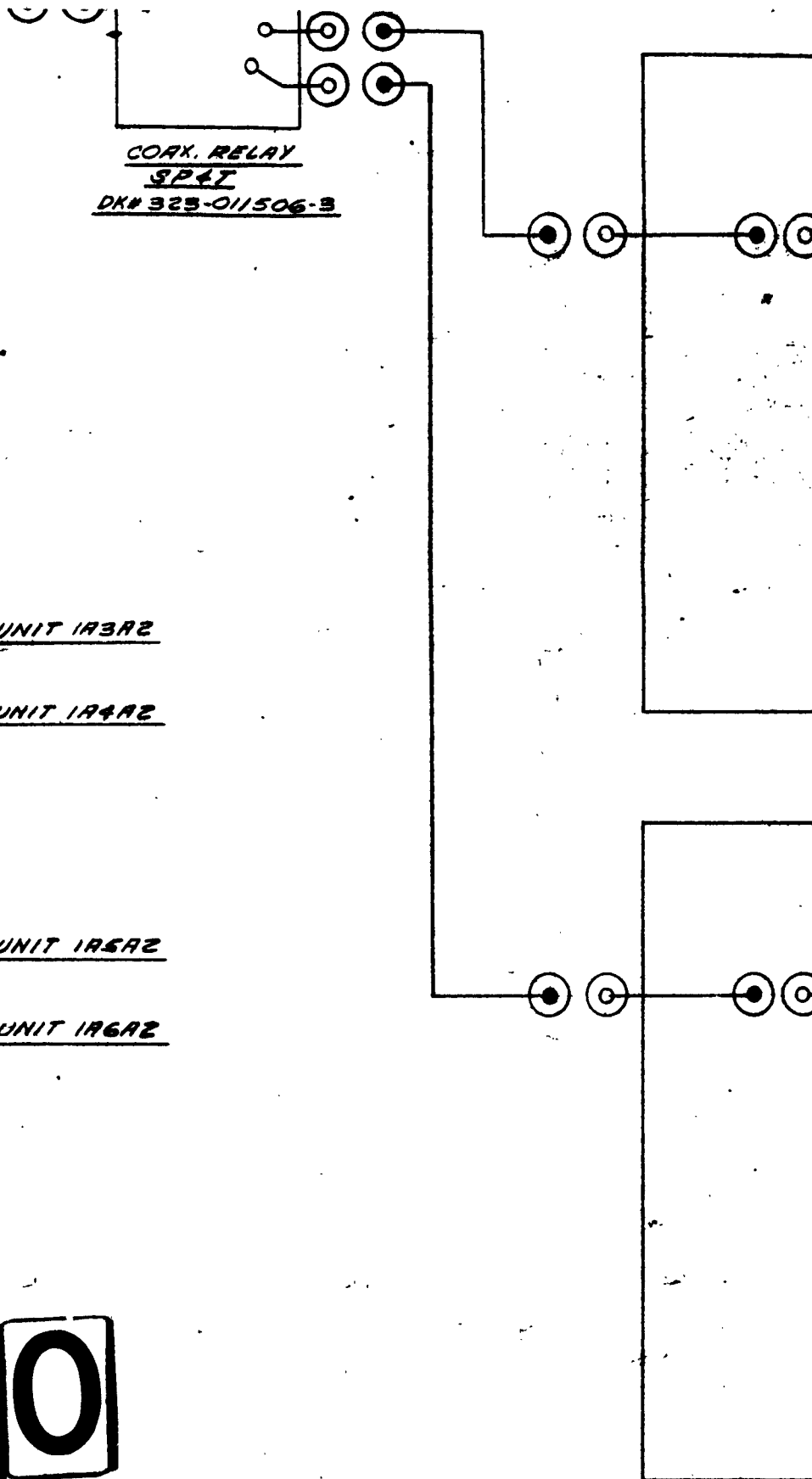
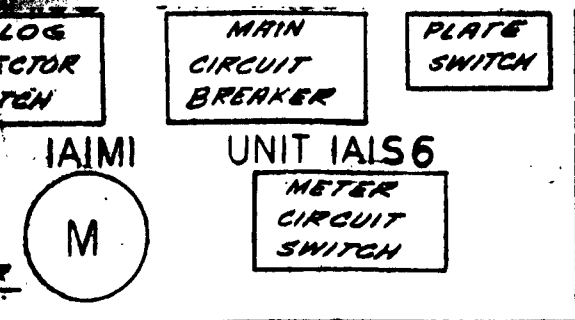
TO UNIT 1A1A2



UNIT 1A2



9



UNIT 1A5

TO UNIT 1A5B

UNIT 1A5A1

L.P.-H.P. BANDPASS FILTER
400-700MC ± 0.1 DB
3DB PTS. 352MC, 795MC
40DB PTS. 201MC, 1390MC
I.L. = 0.2 DB

UNIT 1A5A2

CONVERTER

AMPLIFIER	MIXER	IF AMPLIFIER
400-700MC +20DB P.V.-0.4DB 6L6299(4)	1N416E -6DB	λ : 775MC BW-15MC +11DB 6L6299(1)

1A5R1
2DB
PAD

UNIT 1A5PS1

REGULATED DC POWER SUPPLY +200V @ 75MA	REGULATED DC POWER SUPPLY +6.3V @ 3AMPS
--	---

3DB
PAD 1A5R2



UNIT 1A6

TO UNIT 1A6B

UNIT 1A6A1

L.P.-H.P. BANDPASS FILTER
700-1000MC ± 0.1 DB
3DB PTS. 654.6MC, 1000MC
40DB PTS. 421MC, 1300MC
I.L. = 0.2 DB

UNIT 1A6A2

CONVERTER

AMPLIFIER	MIXER	IF AMPLIFIER
700-1000MC +20DB P.V.-0.4DB 6L6299(4)	1N416E -6DB	λ : 475MC BW-15MC +11DB 6L6299(1)

4DB
PAD 1A6

UNIT 1A6PS1

REGULATED DC POWER SUPPLY +200V @ 100MA	REGULATED DC POWER SUPPLY +6.3V @ 3AMPS
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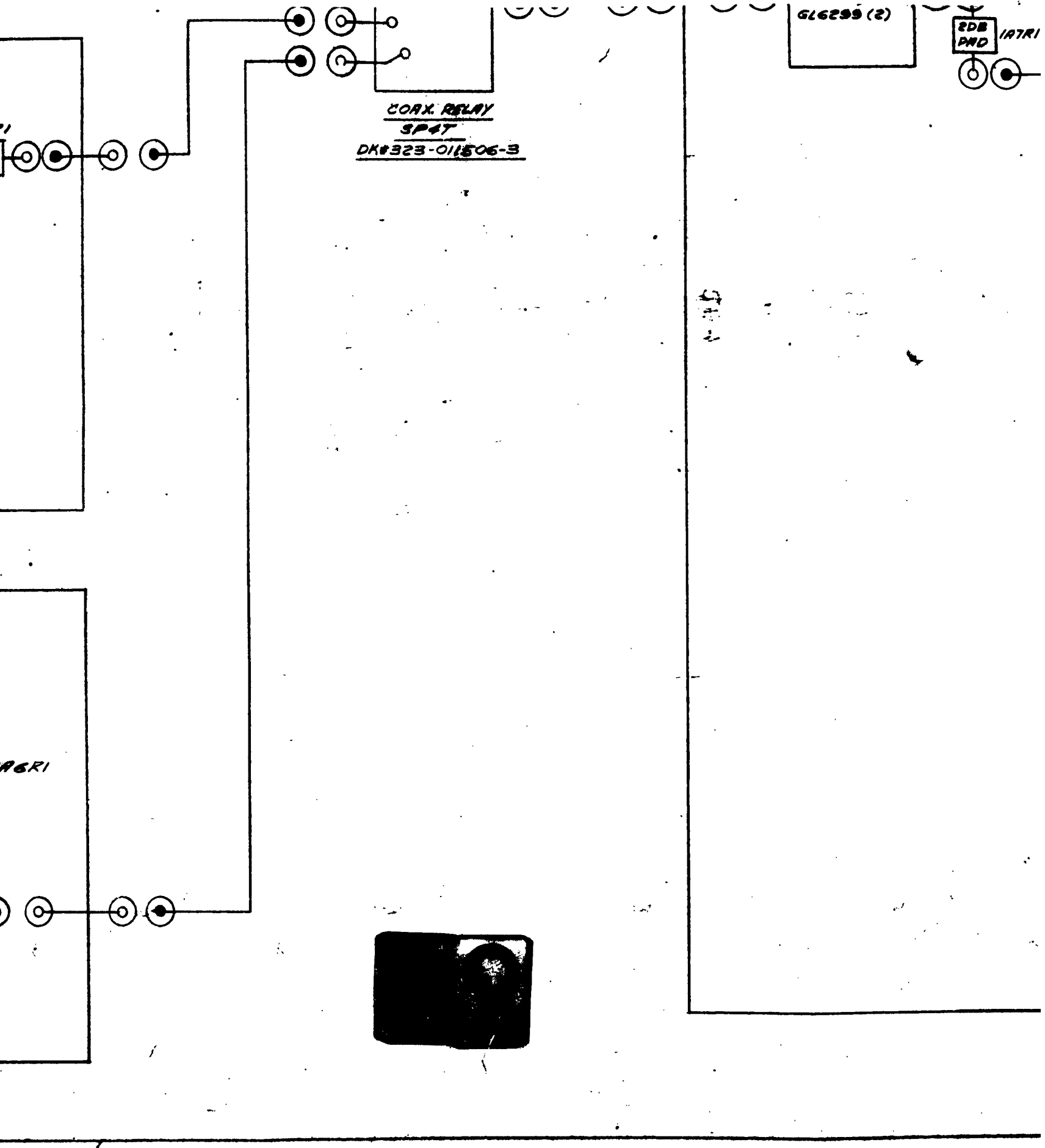
2DB
PAD 1A6R2

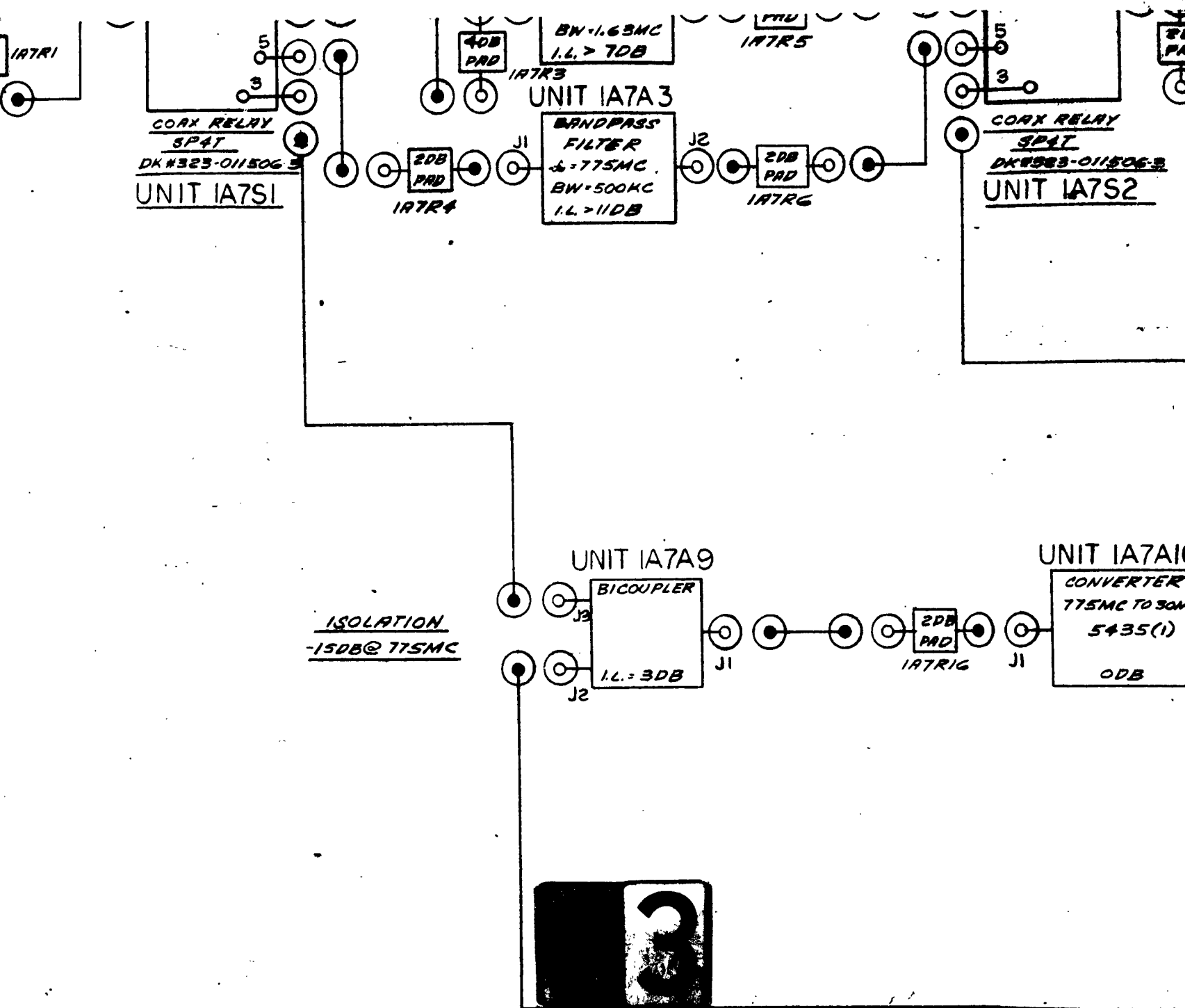
475-775MC
CONVERTER
MIXER
5485(1)
LO 7391(1)
1250 MC

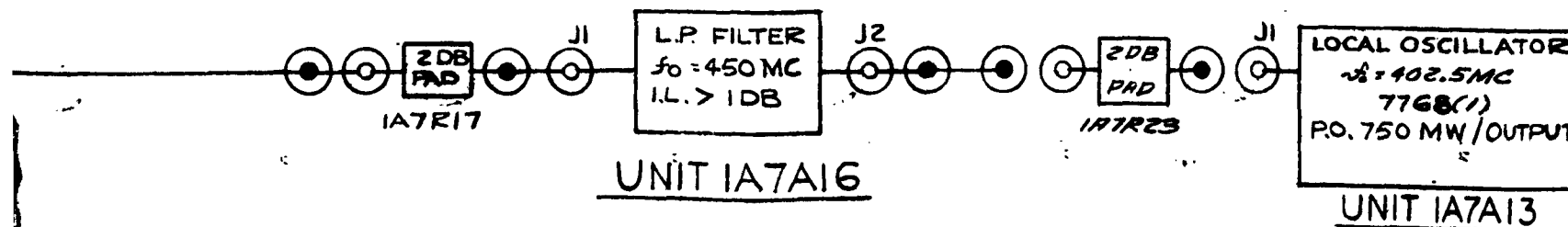
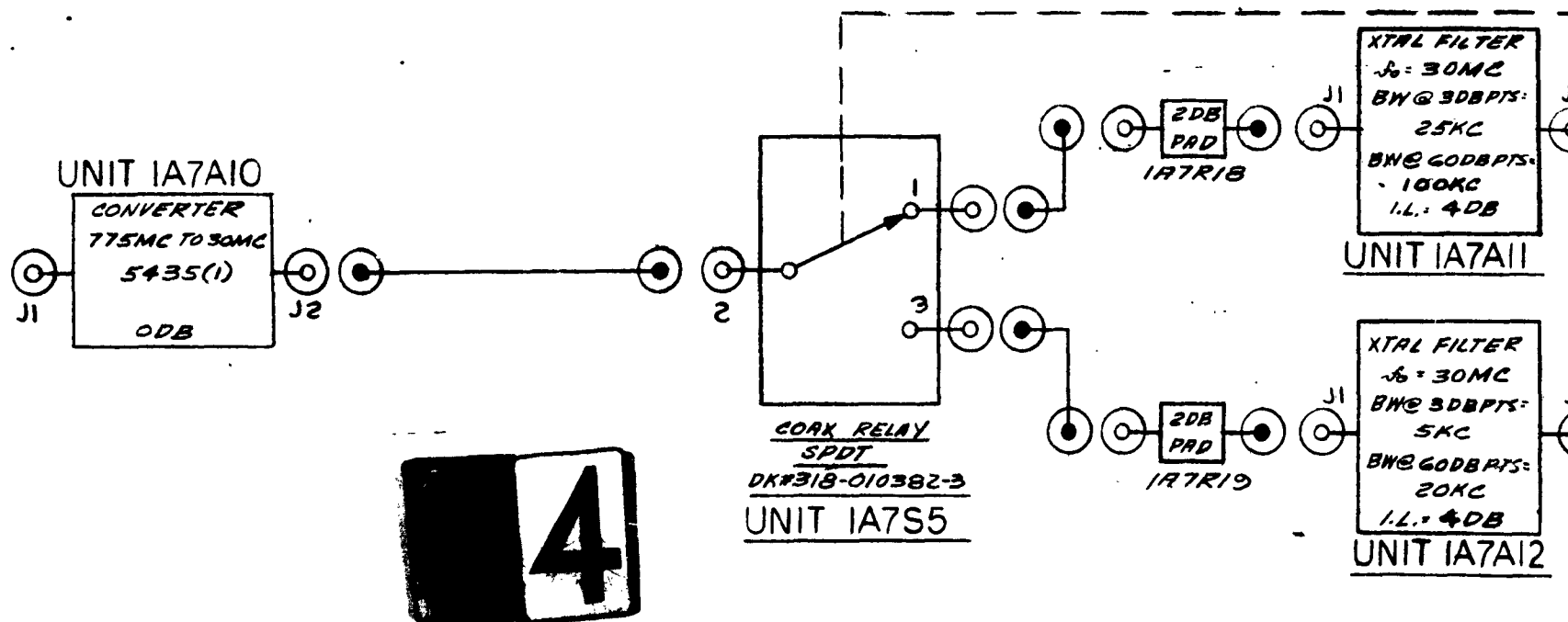
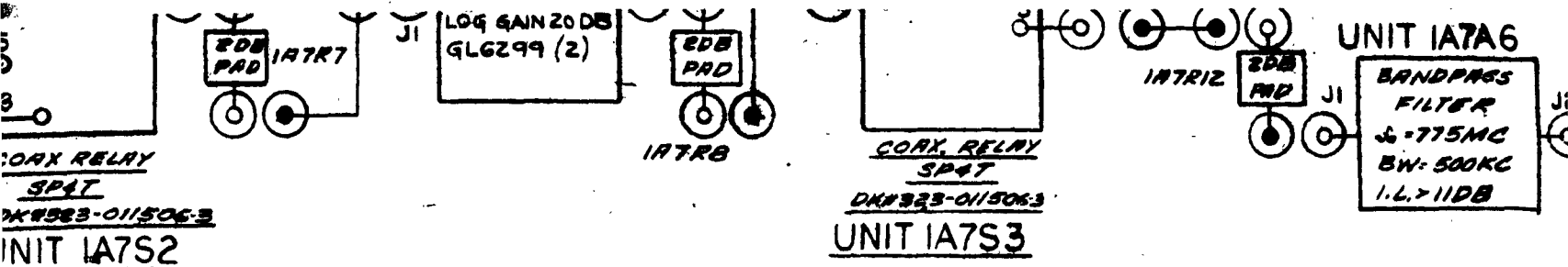
UNIT 1A6A3

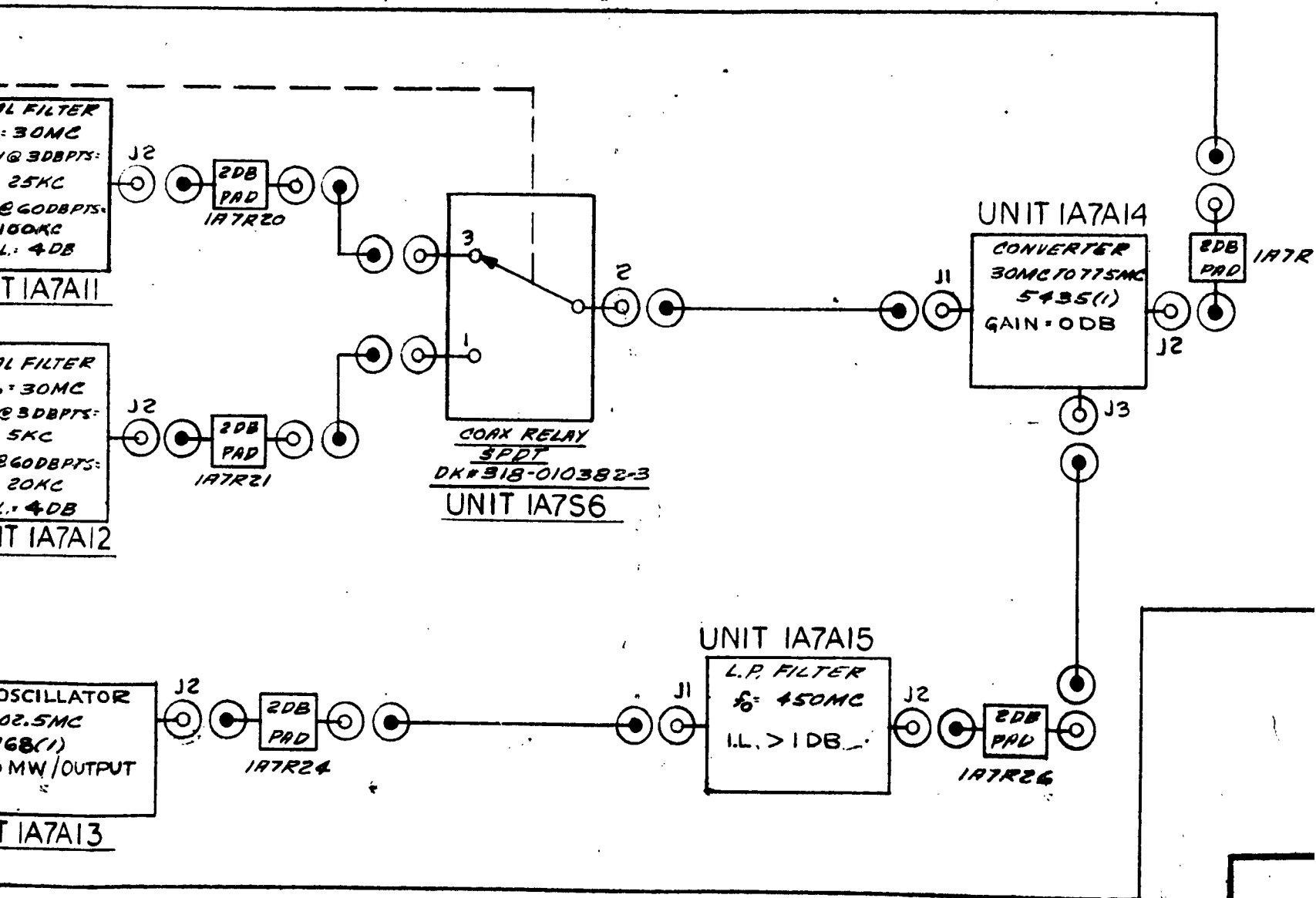
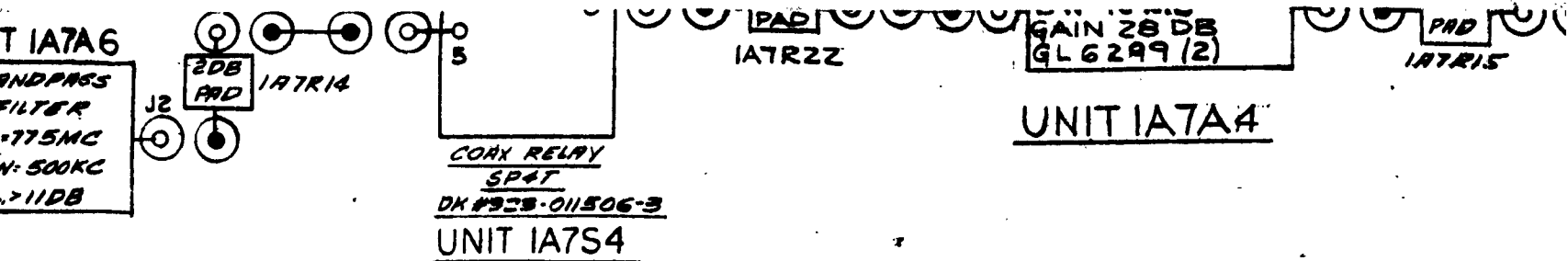
1A6R3
2DB
PAD

TO UNIT 1A6B







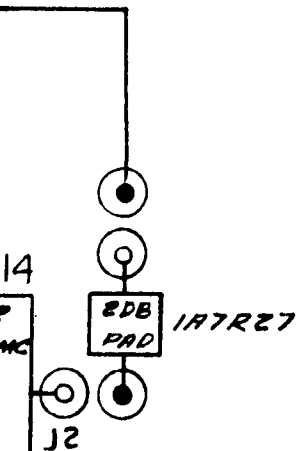


PAD
1A7R15

GAIN=20DB
6771(1)

EMITTER
FOLLOWER

10 24VPS
2-1000~



6

621-21 JOB NO. NEXT ASSEMBLY APPLICATION		ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$ DECIMALS .XX $\pm .005$.XXX $\pm .005$	DRAWN 100-462	BLOCK DIAGRAM SPECTROSCOPE	APPLIED RESEARCH INC. 1001 WASHINGTON NEW YORK
			MATERIAL: ~		
FINISH: ~		APPROVED [Signature]	SCALE	UNIT WT.	[Signature]

700449 R