

UNCLASSIFIED

AD 402 260

*Reproduced
by the*

DEFENSE DOCUMENTATION CENTER

FOR

SCIENTIFIC AND TECHNICAL INFORMATION

CAMERON STATION, ALEXANDRIA, VIRGINIA



UNCLASSIFIED

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

63-3-2

402260

CATALOGED BY ASTIA
AS AD No. _____

ASTIA
RECEIVED
APR 26 1963
TISIA

**Best
Available
Copy**

⑨ March 25, 1963

⑤ 69 650

⑥ 1 A

⑦ QUARTERLY REPORT, Nov 62 - 3 Apr 63

Prepared On

⑧ CONTRACT NO. N0bsr 81262

⑩ 11

⑪ 11 p illus.

⑫ 11

⑬ 11

⑭ 11

⑮ 11

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.

1.0 ABSTRACT

1.10 This report covers work done on the development of an RF Spectrum Analyzer in the range from 100 MC to 1000 MC for the three month period from November 1, 1962 to January 31, 1963. 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 man hours work performed by each.
- 1.13 A description of the work done during the period from November 1, 1962 to January 31, 1963.
- 1.14 A project performance and schedule chart is included.
- 1.15 Program for the next three month interval.

2.0 PURPOSE FOR THE DEVELOPMENT

- 2.10 The RF Spectrum Analyzer 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" 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 RF Spectrum Analyzer together with the total number of hours spent by each during the period from November 1, 1962 to January 31, 1963.

<u>Name</u>	<u>Total Hours Per Man</u>
Brafman, R.	119.75
Brown, H.	76.00
DeProspero, M.	16.00
Garbauskas, A.	30.25
Heller, M.	144.75
Pollachek, L.	13.75
Strasser, L.	44.00
Vlismas, T.	126.75
Vulcan, A.	58.25
Dennis, W.	48.50
Walker, A.	72.25
Meyer, J.	56.00
Morrison, E.	108.00
Duplatre, R.	40.00
Vergara, J.	67.00
Brovetto, W.	71.25
Merberg, M.	100.00
Kertesz, Z.	16.00
Williams, A.	26.75
Kennard, A.	185.00
Kennedy, P.	<u>21.75</u>
TOTAL	1,442.00

4.0 DESCRIPTION OF WORK

4.10 During the period of this report the power IF amplifier/linear detector, Unit 1A7A8, was fabricated, aligned and tested. A schematic diagram of this unit is shown in Dwg. No. D600802, Figure 1. For convenience, a block diagram of the RF Spectrum Analyser is given in Dwg. No. R700449, Figure 2. Unit 1A7A8 was found to have the following characteristics:

Center Frequency:	775 MC
Peak to Valley Ratio:	0.1 DB at 775 MC ± 2.75 MC
Bandwidth 3 DB:	11.8 MC
Gain:	26.5 DB
Input VSWR:	<1.5:1 (at 50 ohms)

4.11 The lin-log preamplifier, Unit 1A7A17, Dwg. No. C600853, Figure 3, fabricated in late August of 1962 was aligned and checked during this period. It consists of two stages of amplification with a shaping diode across the output of each stage. In the linear mode of operation, the diodes are back-biased and present a high impedance at the output of each stage. In the log mode of operation, the diodes are forward biased. In system operation, the biasing voltage is a DC feedback voltage derived from a feedback amplifier stage in the lin-log IF amplifier, Unit 1A7A7, and introduced via J3. See Figure 1. Gain, bandwidth, and peak to valley of the passband of Unit 1A7A17 were measured for different levels of DC voltage introduced at J3. The results are presented in Table I below.

TABLE I

Characteristics of Lin-Log IF Preamplifier, Unit 1A7A17

<u>DC Bias Voltage at J3</u>	<u>Bandwidth 3 DB</u>	<u>Peak to Valley Ratio</u>			<u>Gain</u>
		<u>DB</u>	<u>From</u>	<u>To</u>	
-20 volts	13 MC	0	771.75 MC	778.25 MC	+22 DB
-10 volts	19.5 MC	0.5	769.25 MC	780.25 MC	+19 DB
0 volts	23 MC	1.0	769 MC	781 MC	+15 DB
+0.2 volts	22 MC	1.0	767 MC	783 MC	+9 DB
+0.23 volts	23.1 MC	1.0	768 MC	783 MC	+6 DB
+0.38 volts	23 MC	3	768 MC	783 MC	-3 DB

4.12 Two +200 volt power supplies used in the RF heads were returned to the vendor for repair in August of 1962. The reason is that one supply became excessively noisy after one hour of operation. The other supply kept blowing fuses. One of the two supplies sent back was lost on its way to the vendor. Its whereabouts could not be established. Therefore, an ARI regulated +200 volt DC power supply was tested during this period. This supply was considered as a possible replacement for the one lost. The unit when first tested exhibited a 40 millivolt to 50 millivolt bounce at its output. It was found that an oscillation of 800 KC was present at its output. A .01 μ fd capacitor was connected from collector to ground of the regulating transistor in this power supply which removed the oscillation. The unit was then tested at no load to full load at a line frequency of 60 CPS and at 400 CPS. The measured results are presented in Table II below.

TABLE II

Measured Regulation and Ripple of +200 VDC Supply

<u>Line Frequency</u>	<u>Volts</u>	<u>Ripple (MV)</u>		<u>Regulation (MV) NL to FL</u>
		<u>NL</u>	<u>FL</u>	
60 cps	105	0.8	1.3	30
60 cps	115	1.0	1.0	20
60 cps	125	1.4	1.4	20
400 cps	105	1.0	1.0	30
400 cps	115	1.0	1.0	30
400 cps	125	1.0	1.0	30

4.13 The +200 volt DC supply of Paragraph 4.12 was temperature tested. The DC voltage was set to +200 volts under 100 MA load at room temperature (+21°C) after sufficient warm-up. The temperature was raised to 62°C and allowed to stabilize. The output voltage decreased to +199 volts. The ARI supply exhibits similar stability characteristics to the purchased supplies. The ARI supply has greater reliability and availability.

4.14 During this period the +33 volt, +30 volt DC supply, Unit 1A8PS4, was received from the vendor and was tested at room temperature. It proved to be within spec. The 30 volt output was accidentally shorted. The 0.5 amp fuse in that section blew and was replaced. In subsequent testing of the unit, it was found that ripple from the 33 volt output increased rapidly as the line voltage was reduced below 118 volts at 60 CPS and with both the +33 volt and +30 volt DC outputs under full load. The unit had evidently been damaged by the shorting. The unit was returned to the vendor for correction.

- 4.15 During this period the vendor sent back to Applied Research the +30 volt/+33 volt DC supply, Unit 1A8PS2, after having corrected the unit to meet specifications. The vendor also temperature tested the unit. The unit was then tested at Applied Research at 60 CPS under no load, full load, and low line, high line conditions. The 30 volt output was within specification with respect to ripple and regulation. The +33 volt output did not meet every specification but was considered adequate for trial in the system.
- 4.16 The -20 volt, -23 volt supply, Unit 1A8PS3, was received from the vendor. It was checked at room temperature from no load to full load and at low line and high line. The unit was found to be within spec. The unit was returned to the vendor, since he had failed to test it under varying temperature conditions. During this period, the vendor returned the -20 volt/-23 volt DC power supply, Unit 1APS3, after having temperature tested this unit. The unit was tested at Applied Research under no load to full load conditions and under low and high line at 60 CPS and found to be within spec.
- 4.17 The 6.3 volt DC power supply, Unit 1APS4, was returned by the vendor during this period after the vendor had given the unit a temperature test. The unit was tested under the same conditions as in Paragraph 4.16 and was found to be within spec.
- 4.18 The +28 volt DC supply, Unit 1A8PS5, was returned from the vendor after having been temperature cycled during this period. It was tested under the same conditions as in Paragraph 4.16 and found to be within spec.

4.20 During this period two low pass filters, Units 1A7A15 and 1A7A16, reworked in manufacturing were returned to the lab. The components of each filter were better shielded from each other to prevent feed-through. The filters were tested. The measured characteristics of low pass filter, Unit 1A7A16, are as follows:

- a) 0.2 DB attenuation at 400 MC
- b) 3 DB attenuation at 430 MC
- c) 44 DB attenuation at 610 MC
- d) 60 DB attenuation at 635 MC
- e) 90 DB attenuation at 775 MC
- f) VSWR Input: ≤ 1.5 up to 402.5 MC
- g) VSWR Output: ≤ 1.5 up to 402.5 MC

The measured characteristics of low pass filter, Unit 1A7A15, are as follows:

- a) 0.1 DB attenuation at 400 MC
- b) 3.0 DB attenuation at 435 MC
- c) 40.0 DB attenuation at 588 MC
- d) 60 DB attenuation at 705 MC
- e) 90 DB attenuation at 775 MC
- f) Input VSWR: $\leq 1.5:1$ up to 402.5 MC
- g) Output VSWR: $\leq 1.5:1$ up to 402.5 MC

4.21 The 25 KC crystal filter centered at 30 MC, Unit 1A7A11, was tested during this period. The unit was found to be substantially within spec. It has the following measured characteristics:

Center Frequency:	30 MC
Bandwidth 3 DB:	24.4 KC

Bandwidth 6 DB	27.2 KC
Bandwidth 60 DB:	49 KC
Shape Factor $\frac{(BW_{60DB})}{BW_{3DB}}$:	1.82:1
Insertion Loss at 30 MC:	3.25 DB
Spurious Responses:	>60 DB

4.22 The 30 MC 5 KC wide crystal filter, Unit 1A7A12, received from the vendor in July was returned to him for correction of excessive spurious responses outside the pass band. During the period of the report, the filter was returned to Applied Research. It was tested and found to be within spec. Its measured characteristics are as follows:

Center Frequency:	30 MC
Bandwidth 3 DB:	4.8 KC
Bandwidth 6 DB:	5.2 KC
Bandwidth 30 DB:	9.2 KC
Bandwidth 60 DB:	13.4 KC
Spurious Responses:	None Discernible
Shape Factor $\frac{(BW_{60DB})}{BW_{6DB}}$:	2.57:1

4.23 A preliminary subsystem bench test was made on the section involved in the 775 MC to 30 MC to 775 MC conversion during this period. This included the bicoupler, Unit 1A7A9; the 775 MC to 30 MC converter, Unit 1A7A10; the 30 MC crystal filter, Unit 1A7A11; the 30 to 775 MC converter, Unit 1A7A14; the 402.5 MC local oscillator, Unit 1A7A15, and the two low pass filters, Units 1A7A15 and 1A7A16. See the block diagram, Figure 1. A swept signal centered at 775 MC was applied

at J3 of Unit 1A7A9 and the output of Unit 1A7A14 was observed. A loss of -18 DB was found from input to output instead of the design objective of -15 DB. The 775 MC to 30 MC converter, Unit 1A7A10, exhibited a conversion loss of -4 DB instead of the expected 0 DB while the 30 MC to 775 MC converter, Unit 1A7A14, exhibited a conversion gain of +1 DB instead of the expected 0 DB. An attempt will be made to modify the 30 MC conversion units to achieve a lower overall loss while still retaining the basic design concepts and module sizes.

- 4.30 A project performance and schedule chart is given in Dwg. No. BSF-138, Sheets 1 and 2, Figures 4 and 5.

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.

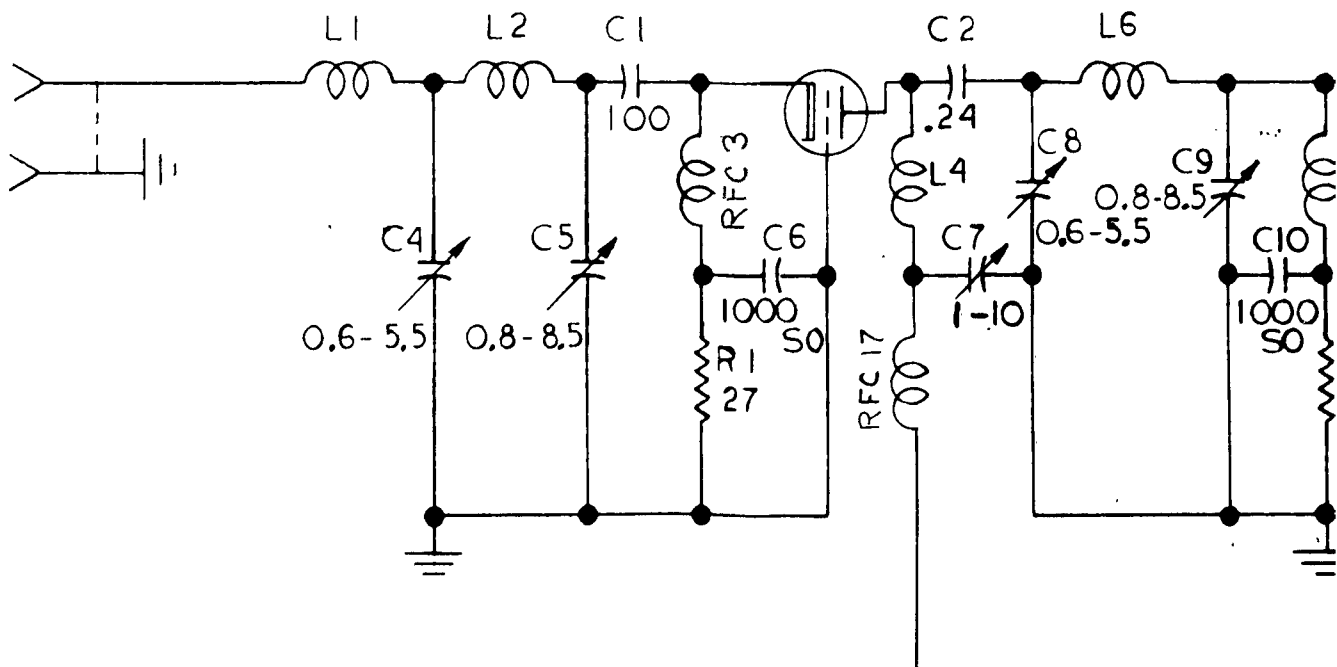
5.11 The console will be completely assembled and wired.

5.12 Final system testing will be completed.

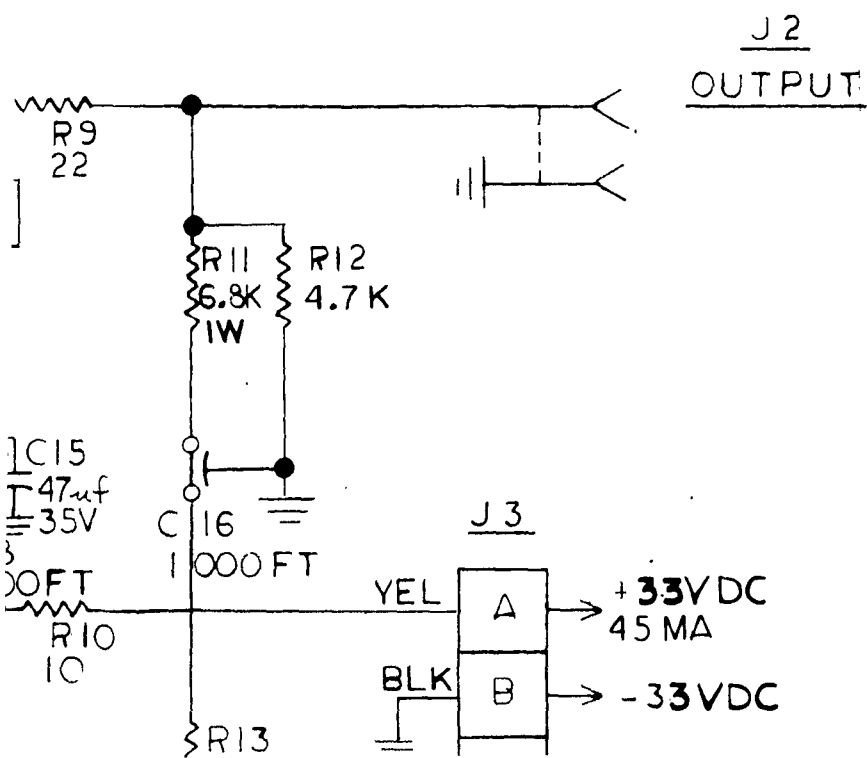
5.13 The Spectrum Analyzer will be shipped.

J1
INPUT

V1
7768



REVISION	
ISSUE	DESCRIPTION
B	ELECTRICALLY REVISED

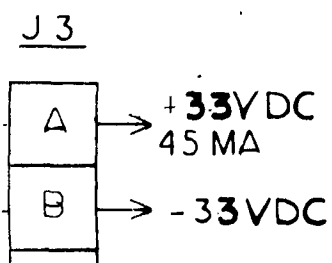
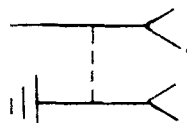


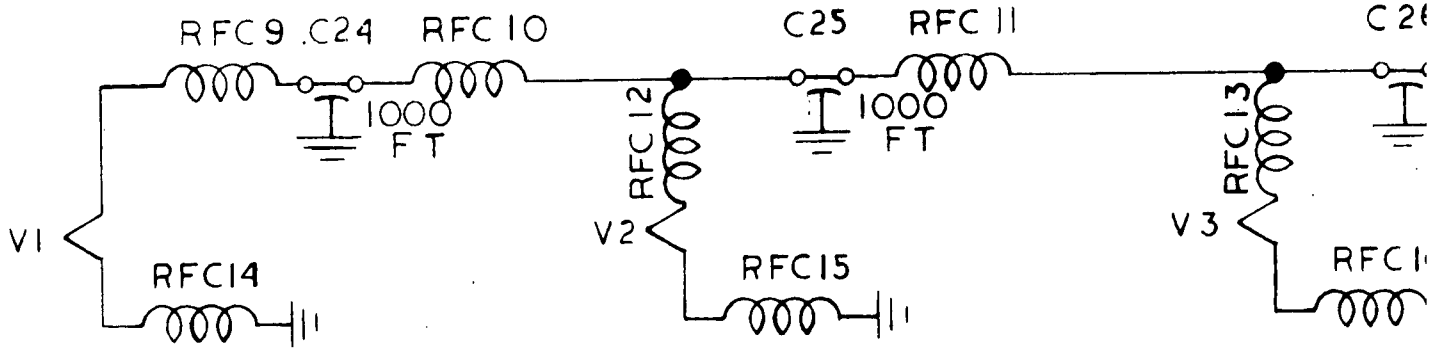
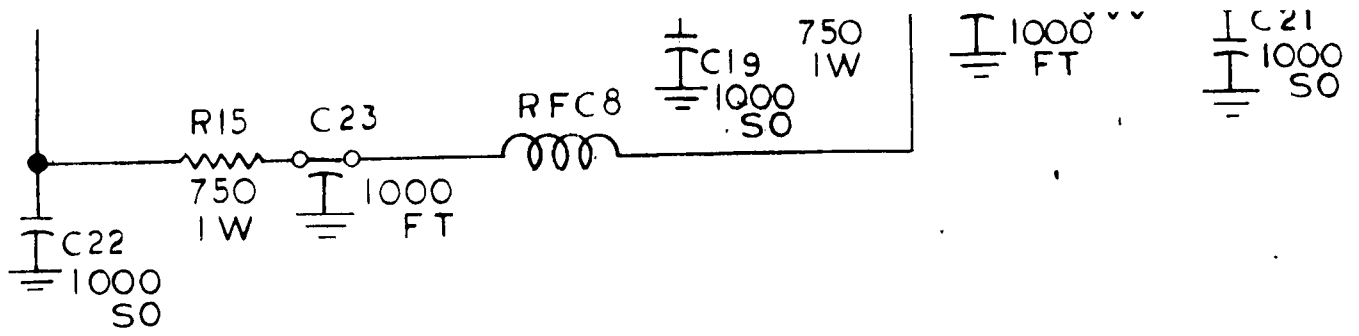
3

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	ELECTRICALLY REVISED	11-3-62	R.D.

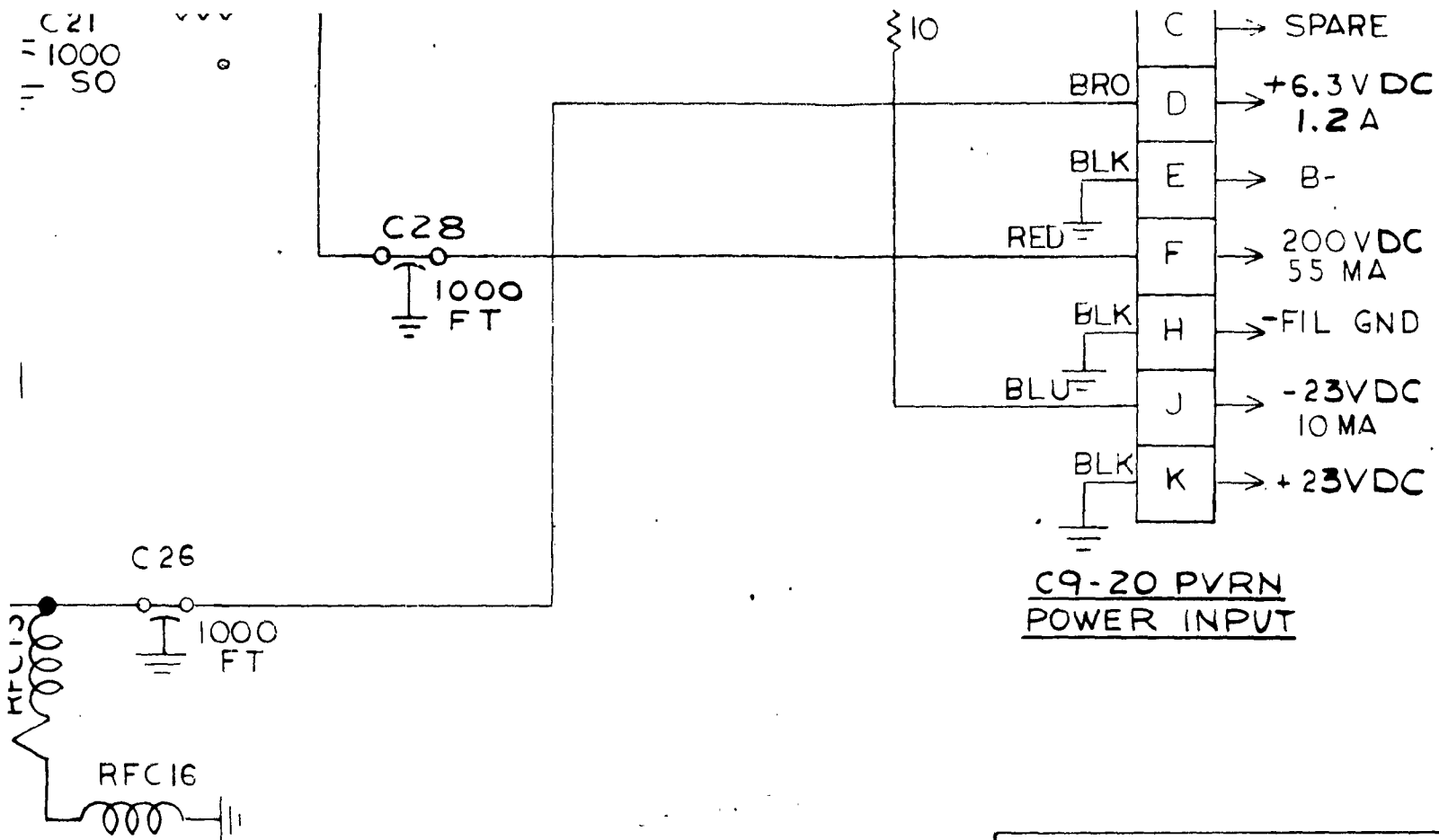
4

J 2
OUTPUT





5



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

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: _____
491-01	501580	FINISH: _____
JOB NO.	NEXT ASSEMBLY	
APPLICATION		

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

0 PVRN
R INPUT

COMP	REF	DESIG		
L	Q	R	RFC	V
9	1	15	17	3

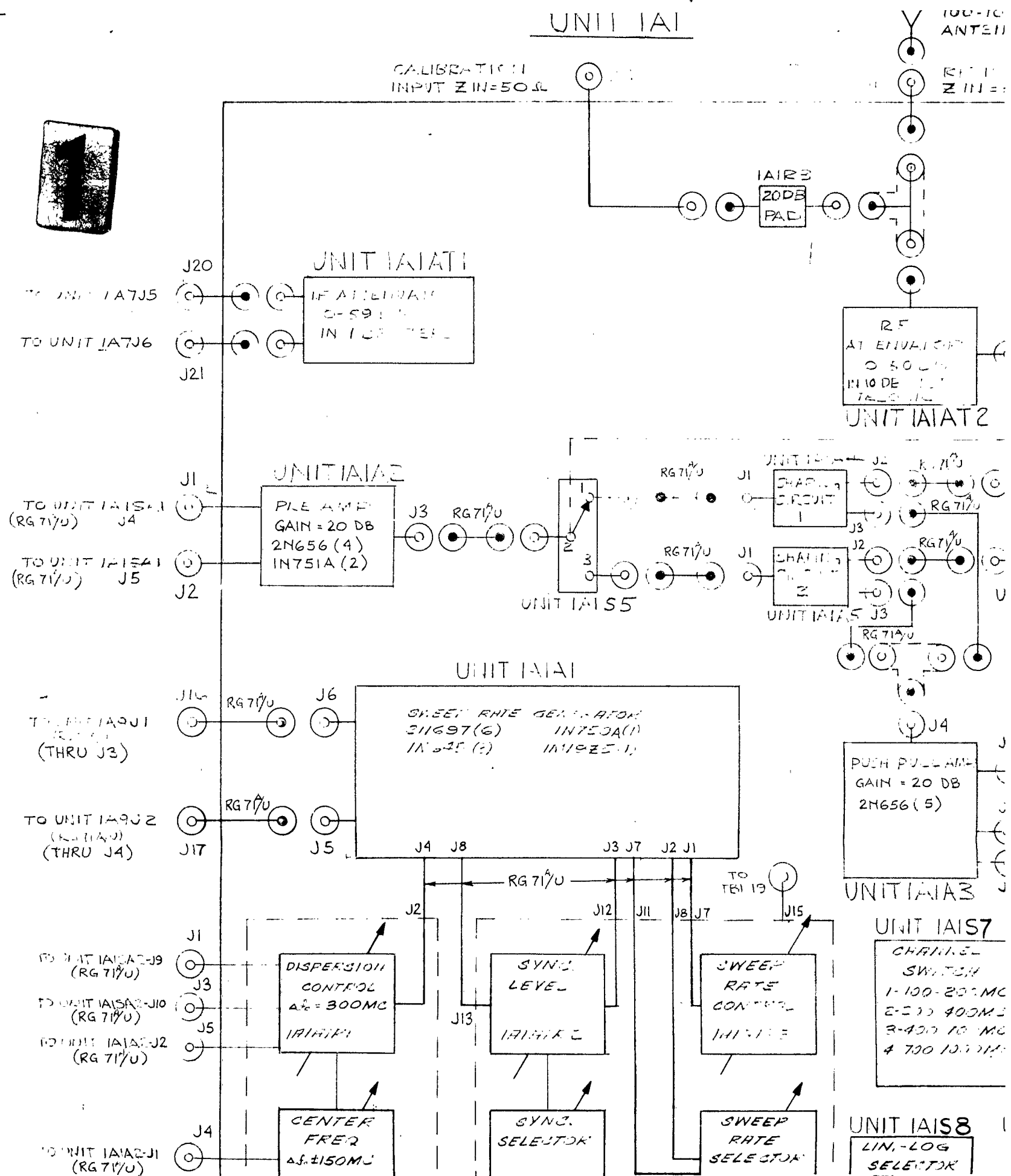
NOTE
1- UNLESS OTHERWISE NOTED
ALL CAPACITORS IN UUF
ALL RFC = ARI 800
ALL RESISTORS ARE 1/2W

7

ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS ± 1/64 ANGLES ± 1/2° DECIMALS .XX ± .010 .XXX ± .005 MATERIAL: _____ FINISH: _____	DRAWN 5-24-62	SCHEMATIC POWER AMPLIFIER DETECTOR UNIT 1A7A8		APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK	
	DRAWN BY Brown				
	CHECKED				
	APPROVED				
	APPROVED	SCALE _____	UNIT WT. _____	DWG. SIZE D	600802 ISSUE B

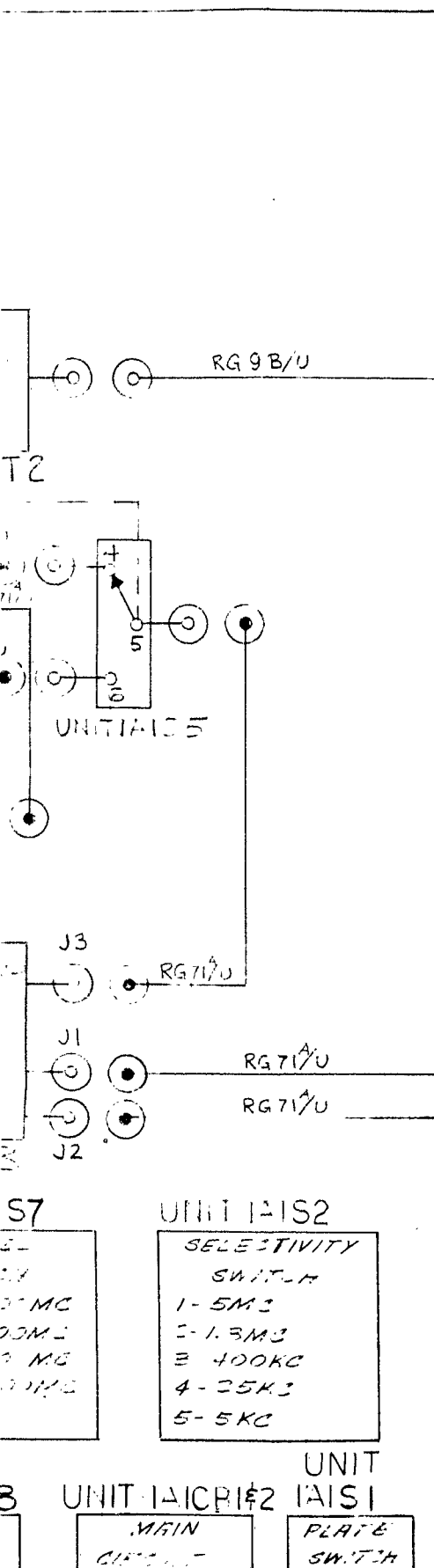
FIG-1

ISSUE B
600802



TO-1000 MC
ANTENNA

UNIT 1-502



J22

RG 9 B/U

RG 9 B/U

2

J19

TO UNIT 1A2J5

J18

TO UNIT 1A2J6

1A2

UNIT 1S1

J1

J2

J3

J4

J1

J1

1A3K1

DELAY RELAY

J1

J1

1A4K1

DELAY RELAY

UNIT 1A3

UNIT 1A3A1

LP-HF BANDPASS FILTER
100-300MC ± 0.1 DB
3DB PTS 2-4W, 206MC
11DB PTS 50.6MC, 396MC
I.L. = 0.2 DB

UNIT 1A3A2

CONVERTER

AMPLIFIER 100-300MC +20DB P.V. = 0.4 DB GLG299 (3)	MIXER 1N416E -6 DB	IF AMPLIFIER f ₀ = 775MC BW = 15MC +11DB GLG299 (1)
--	--------------------------	--

1A3K1
2DB
PAD

UNIT 1A3PS1

REGULATED DC POWER SUPPLY +200V @ 100MA	REGULATED DC POWER SUPPLY +6.3V @ 3AMP
---	--

2DB
PAD 1A3K2

M

1A3M1

UNIT 1A4

UNIT 1A4A1

LP-HF 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. = 0.4 DB GLG299 (3)	MIXER 1N416E -6 DB	IF AMPLIFIER f ₀ = 775MC BW = 15MC +11DB GLG299 (1)
--	--------------------------	--

1A4K1
2DB
PAD

UNIT 1A4PS1

REGULATED DC POWER SUPPLY +200V @ 100MA	REGULATED DC POWER SUPPLY +6.3V @ 3AMP
---	--

2DB
PAD 1A4K2

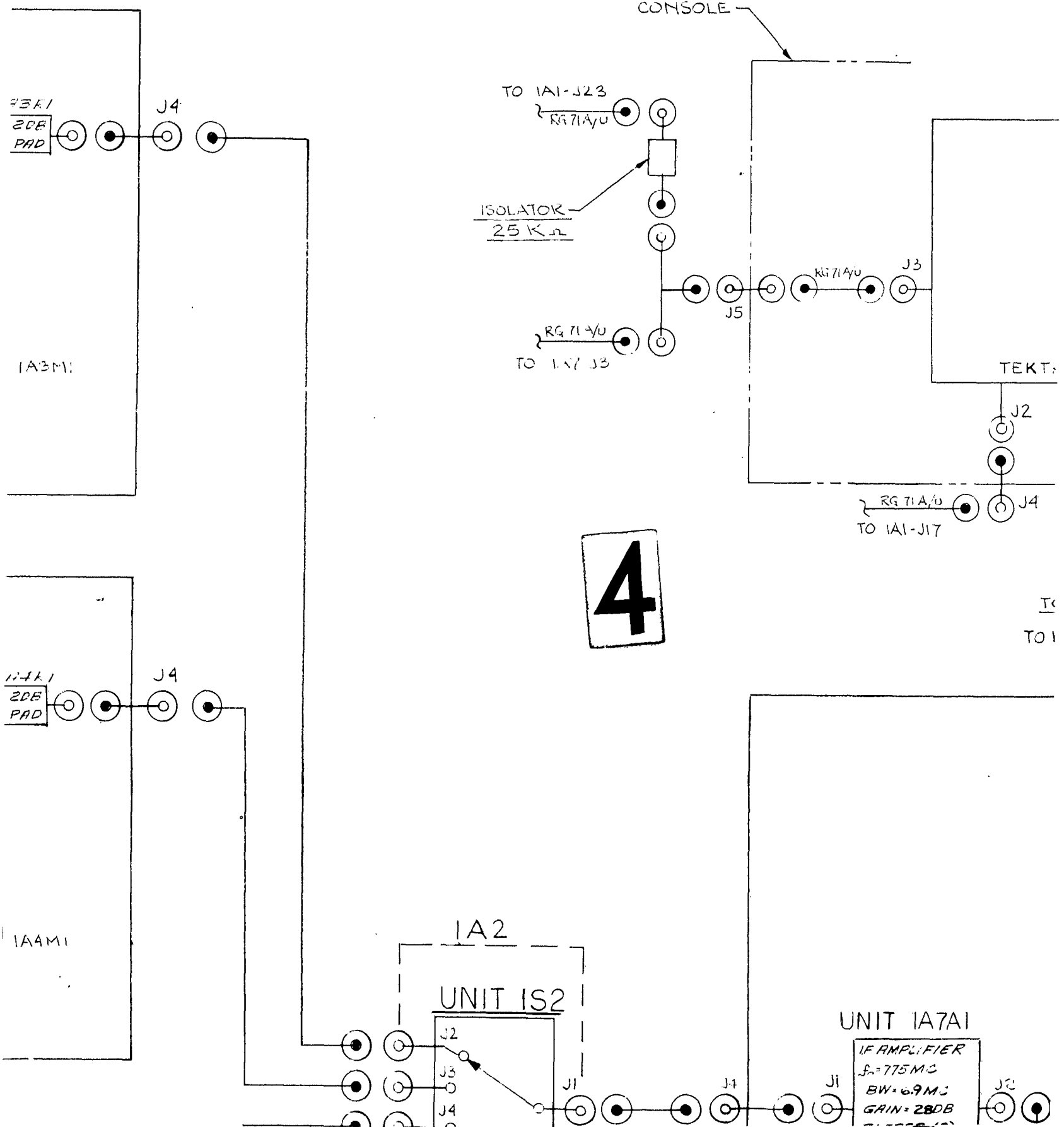
M

1A4M1

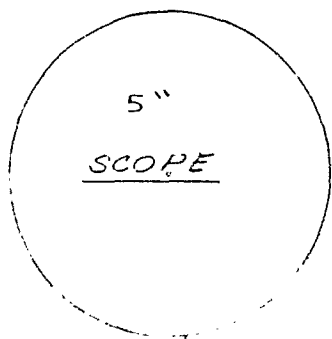
3

UNIT 1A5

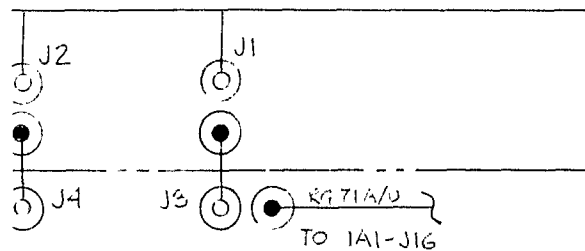
TO UNIT 1A2J1



UNIT 1A9



TEKTRONIX MODEL #RM15-MOD101

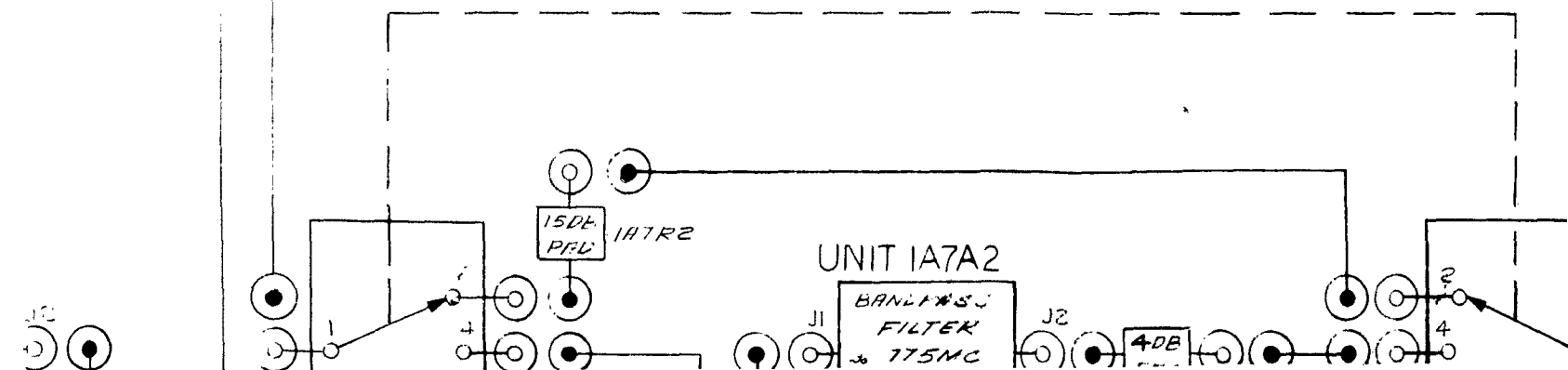


5

(UNIT 1A1A1)
TO IF ATTENUATOR

TO 1AU21 TO 1AU20

J6 J5



UNIT 1A8

UNIT 1A8PS1

DC POWER
SUPPLY
REGULATED
22.1 @ 100MA

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
+5V @ 7.5A
UNREG.
6.3VAC @ 3.0A
(TO UNITS 1A1
1A2 & 1A7)

6

(UNIT 1A1S3)
TO LIN LOG SW

UNIT 1A7

UNIT 1A7A7

LIN LOG IF AMPLIFIER
 $f_0 = 775 \text{ MC}$
BW = 6 MC
LIN GAIN = 45 DB
LOG GAIN = 35 DB
GLG @ 775 MC
11413
114105 (1)
211472 (2)

UNIT 1A7A7

LIN LOG IF
PRE AMPLIFIER
 $f_0 = 775 \text{ MC}$
BW = 12 MC
LIN GAIN 23 DB

2 DB
PAD

1A7R10

15 DB
PAD

1A7R2

UNIT 1A7A5

BAND PASS
FILTER
 $f_0 = 775 \text{ MC}$
BW = 1.63 MC
I.L. = 7 DB

4 DB
PAD

1A7R11

4 DB
PAD

PHL

UNIT 1A8PS5

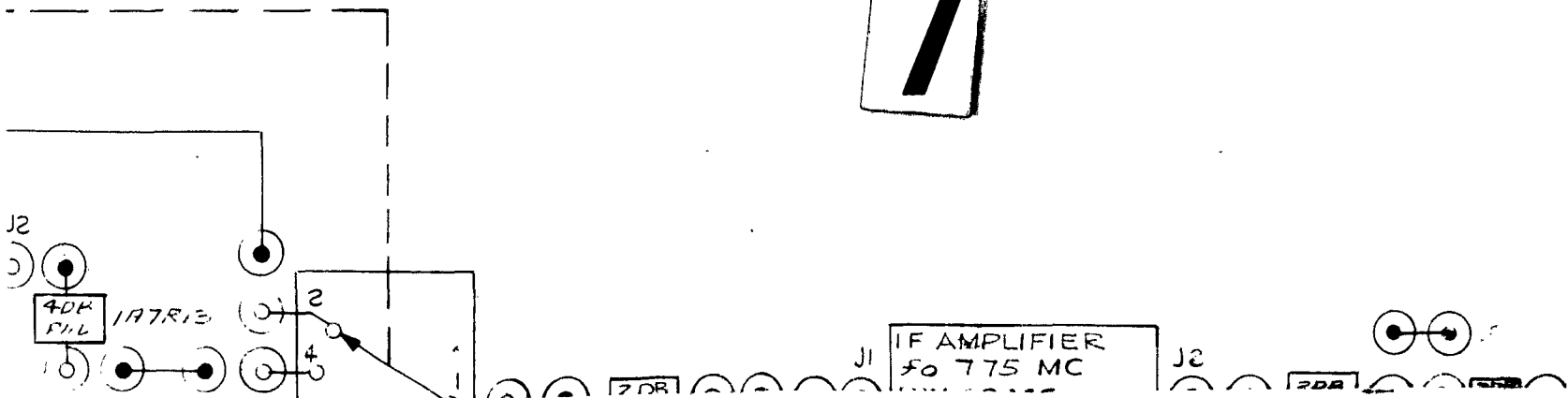
DC POWER
SUPPLY

$I = 1.5A$

NOTE -

1. UNLESS OTHERWISE SPECIFIED, ALL
RF CABLING TO BE RG 55B/U.

7



REVISIONS			
ISSUE	DESCRIPTION	DATE	BY
B	REVISED	7/26/62	FP
C	REVISED	10/1/62	FP
D	REVISED	11/6/62	JM
E	REVISED TITLE	12/17/62	AW
F	REVISED	1-4-63	RD
G	REV 1A8 SI	2-1-63	JM
H	REVISED	3-8-63	RD
J	REV. 1A2, 759320 WAS RG195/U	3-21-63	RD

8

USE SPECIFIED, ALL
BE RG 55B/U.

UNIT 1A7A8

POWER I.F. AMPLIFIER f ₀ = 775MC BW = 10MC	LINEAR DETECTOR 7341
--	----------------------------



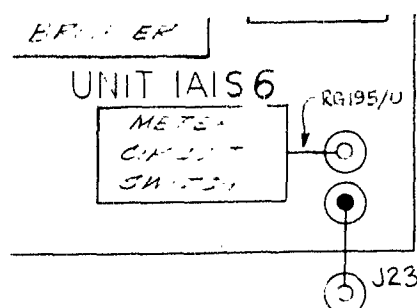
J1

J2

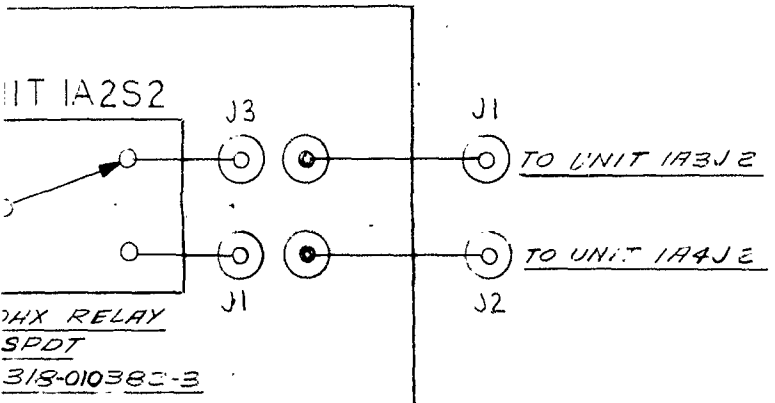
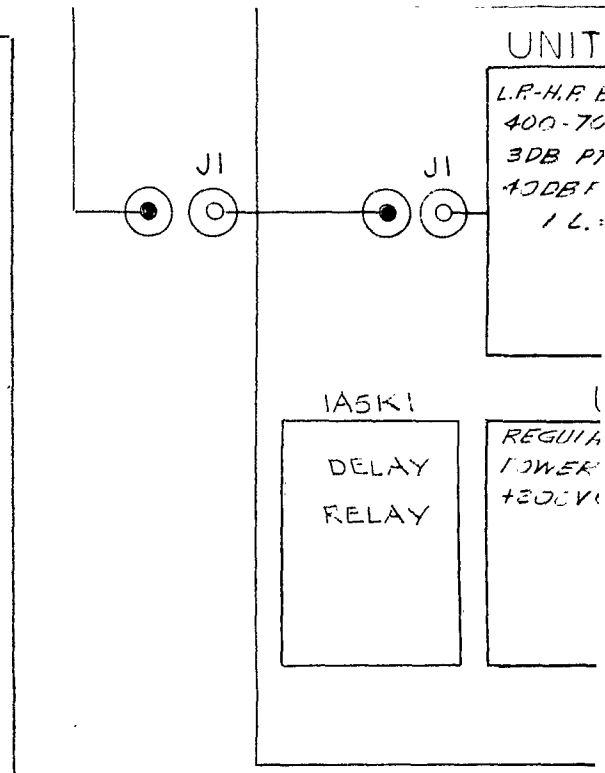
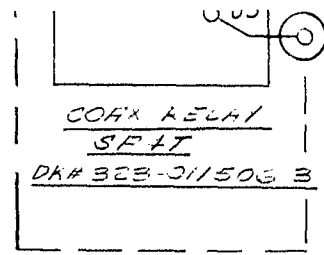
RG71/J

J3

VIDEO OUTPUT

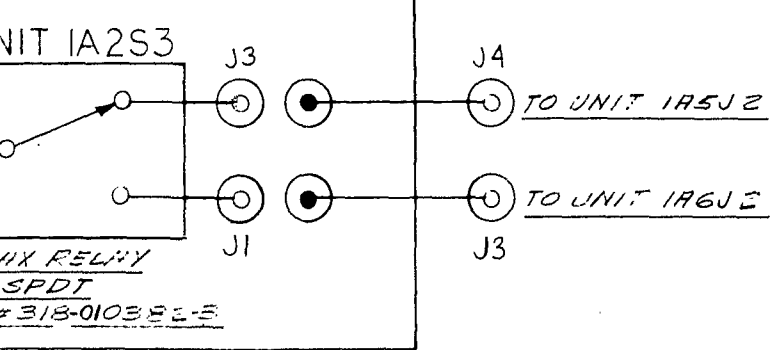


TO IA9-J3 (THRU J5)
(RG 71A/U)



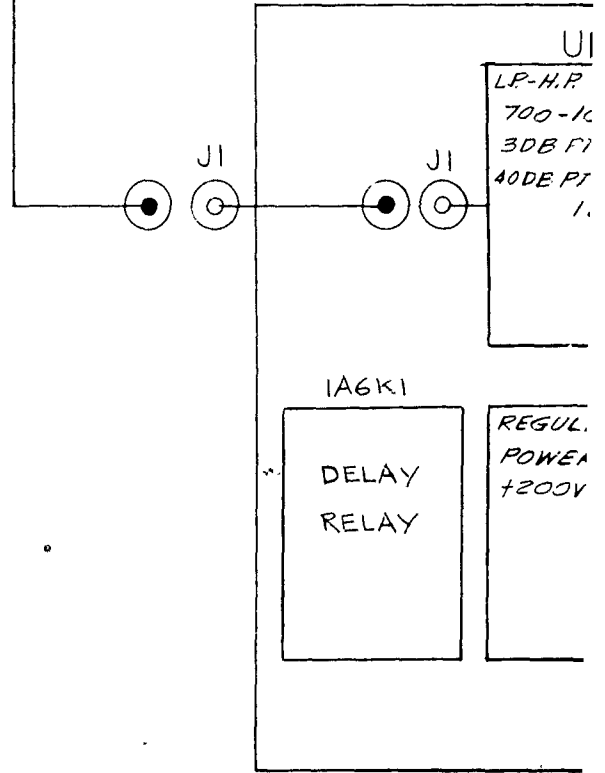
TO UNIT IA3J2

TO UNIT IA4J2



TO UNIT IA5J2

TO UNIT IA6J2



10

UNIT 1A5A1

P-H.P. BANDPASS FILTER
400-700MC ± 0.1 DB
3DB PTS. 350MC, 795MC
12DB PTS. 201MC, 1330MC
IL = 0.2 DB

J2

J1

UNIT 1A5A2

CONVERTER

AMPLIFIER
400-700MC
+20DB
P-V-0.4DB
GL6229(4)

MIXER
1N416E
-6DB

IF AMPLIFIER
 $f_0 = 775$ MC
BW = 15MC
+11DB
GL6229(1)

J3

1A5K1

2DB
PAD

UNIT 1A5PS1

REGULATED DC
POWER SUPPLY
+200V @ 100MA

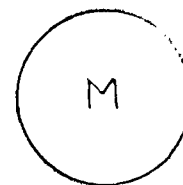
REGULATED DC
POWER SUPPLY
+6.3V @ 3AMPS



J2

2DB
PAD

1A5K2



1A5M1

J2

TO UNIT 1A2V4

UNIT 1A6

UNIT 1A6A1

P-H.P. BANDPASS FILTER
700-1000MC ± 0.1 DB
3DB PTS. 654.6MC, 1000MC
10DB PTS. 421MC, 1900MC
IL = 0.2 DB

J2

J1

UNIT 1A6A2

CONVERTER

AMPLIFIER
700-1000MC
+20DB
P-V-0.4DB
GL6229(4)

MIXER
1N416E
-6DB

IF AMPLIFIER
 $f_0 = 475$ MC
BW = 15MC
+11DB
GL6229(1)

J3

4DB
PAD

1A6A1

UNIT 1A6PS1

REGULATED DC
POWER SUPPLY
+200V @ 100MA

REGULATED DC
POWER SUPPLY
+6.3V @ 3AMPS

2DB
PAD

1A6K2

J1

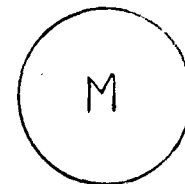
475-775MC
CONVERTER
MIXER
5435(1)
LO 7391(1)
1250 MC

UNIT 1A6A3

J2

1A6K3

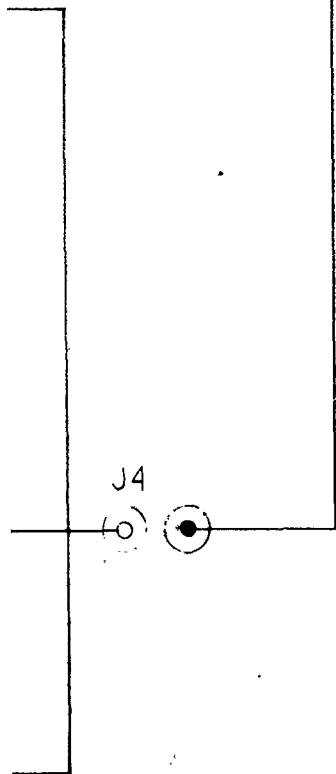
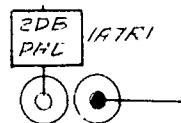
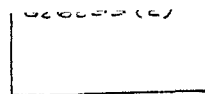
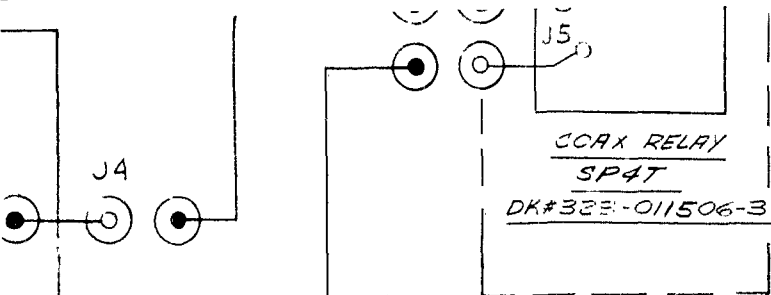
2DB
PAD

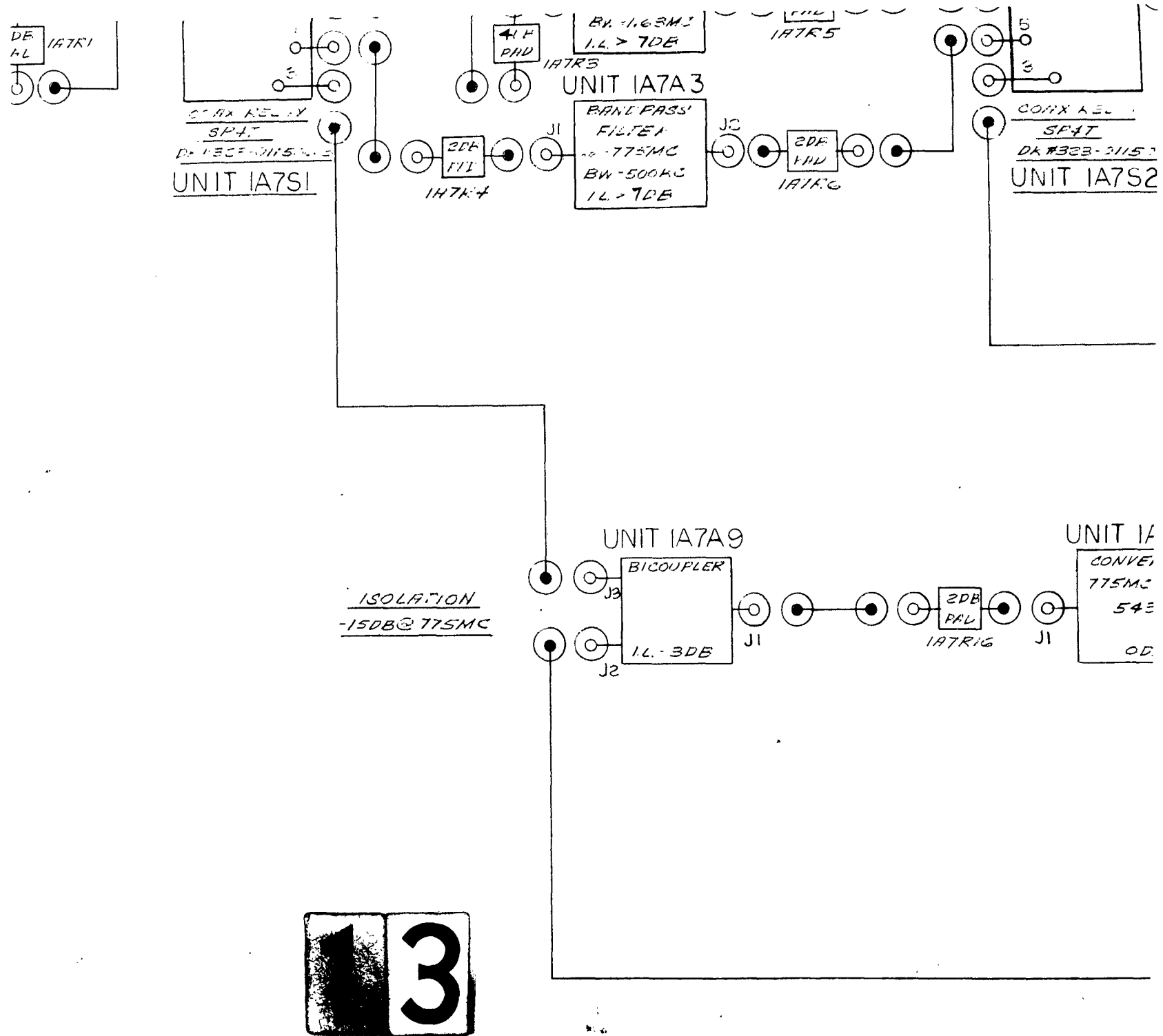


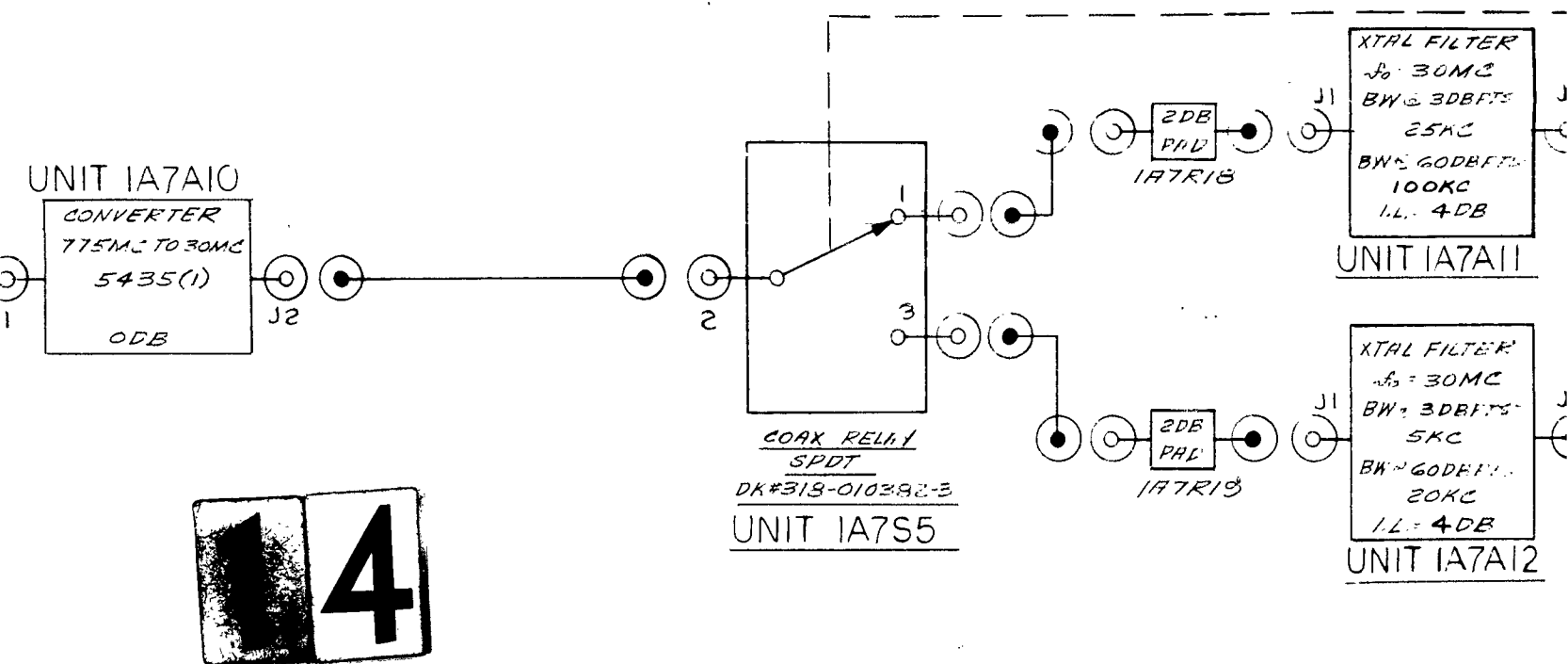
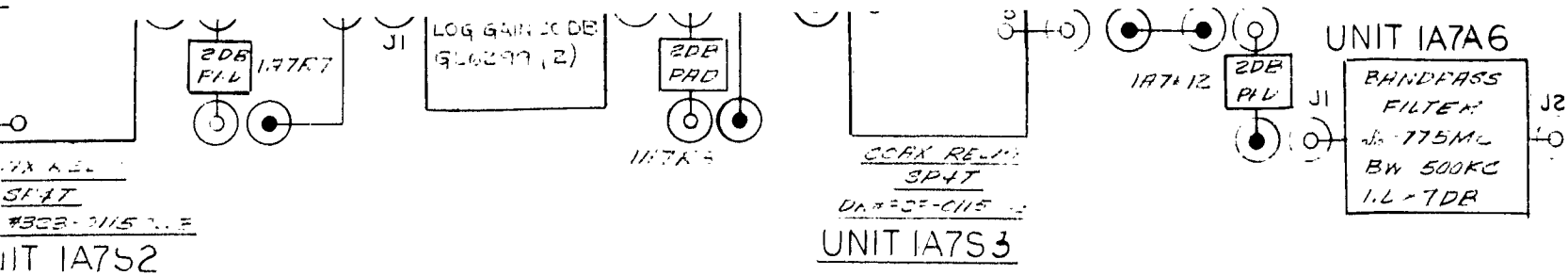
1A6M1

J2

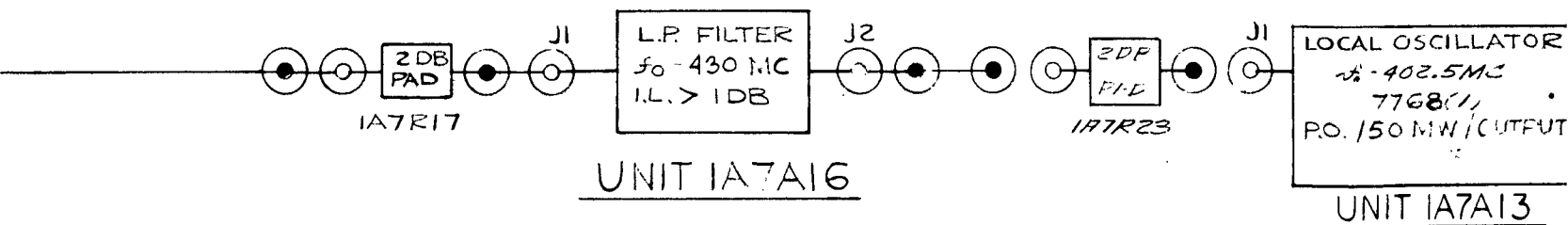
TO UNIT 1A2V3

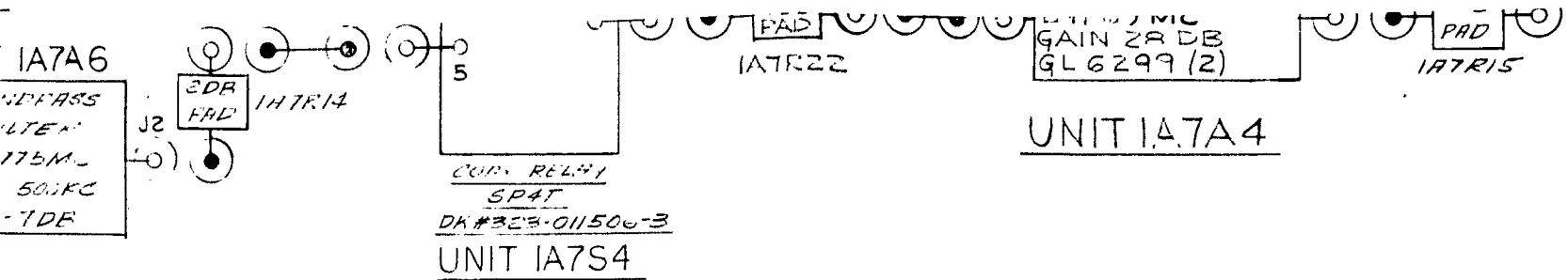




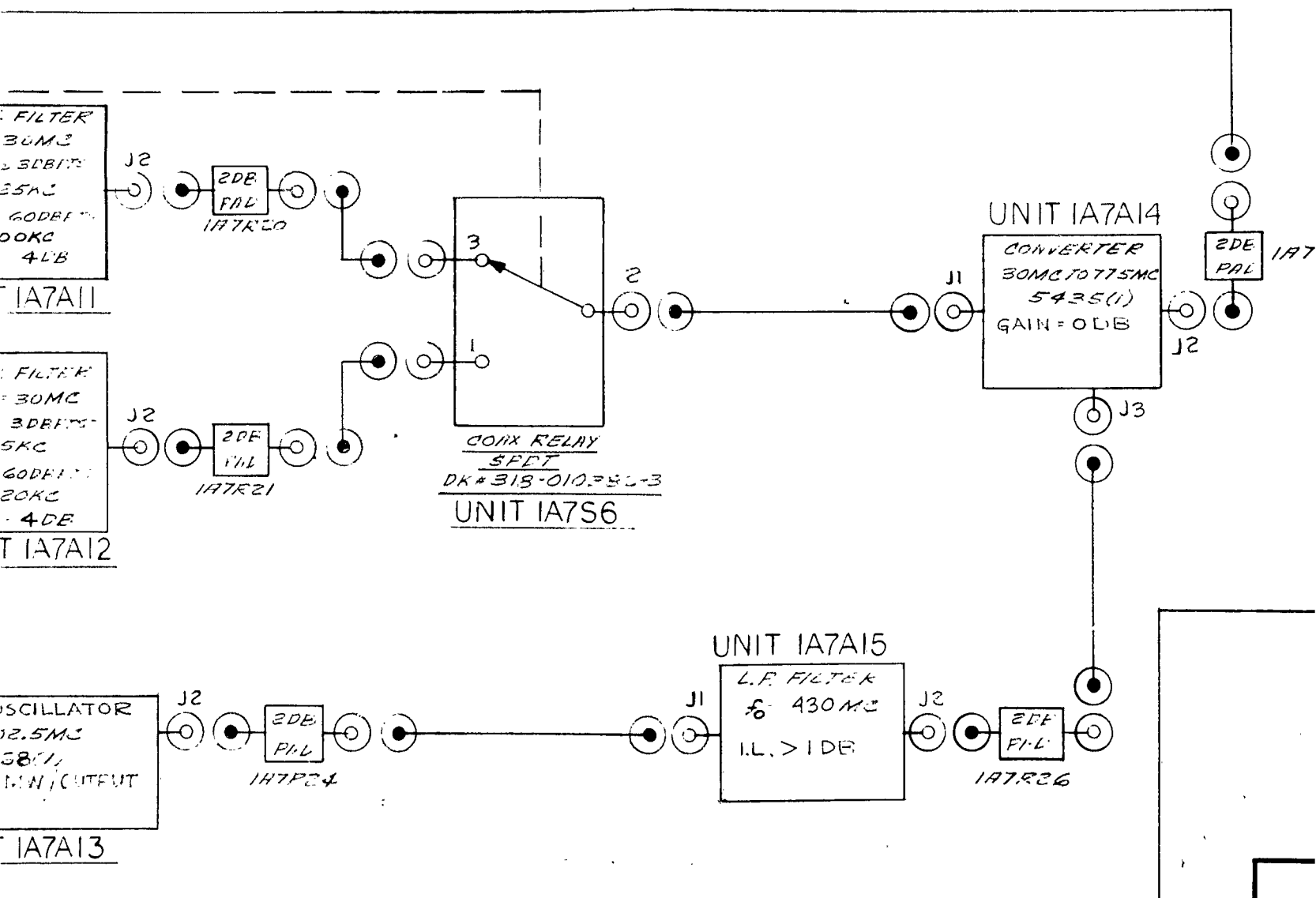


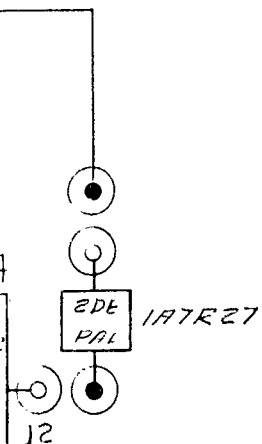
14





15





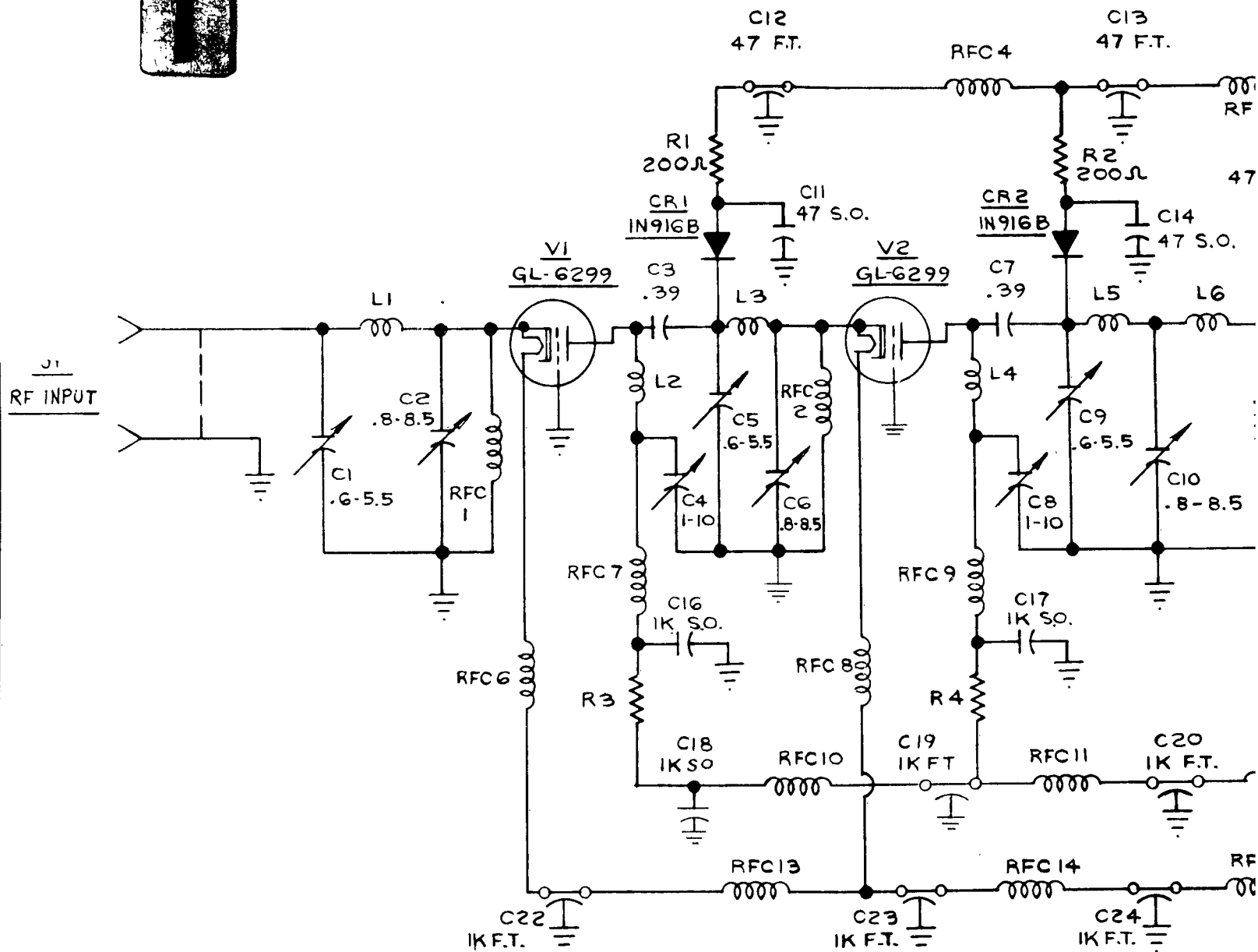
16

42131 JOB NO. NEXT ASSEMBLY APPLICATION		ALL DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$ DECIMALS .XX $\pm .010$.XXX $\pm .005$ MATERIAL: FINISH:	DRAWN 10M 16C	BLOCK DIAGRAM RF SPECTRUM ANALYZER	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK
			DRAWN BY F		
CHECKED	SCALE UNIT WT.	DWG. SIZE R	700449 ISSUE 1 J		
APPROVED					
		APPROVED			

FIG-2

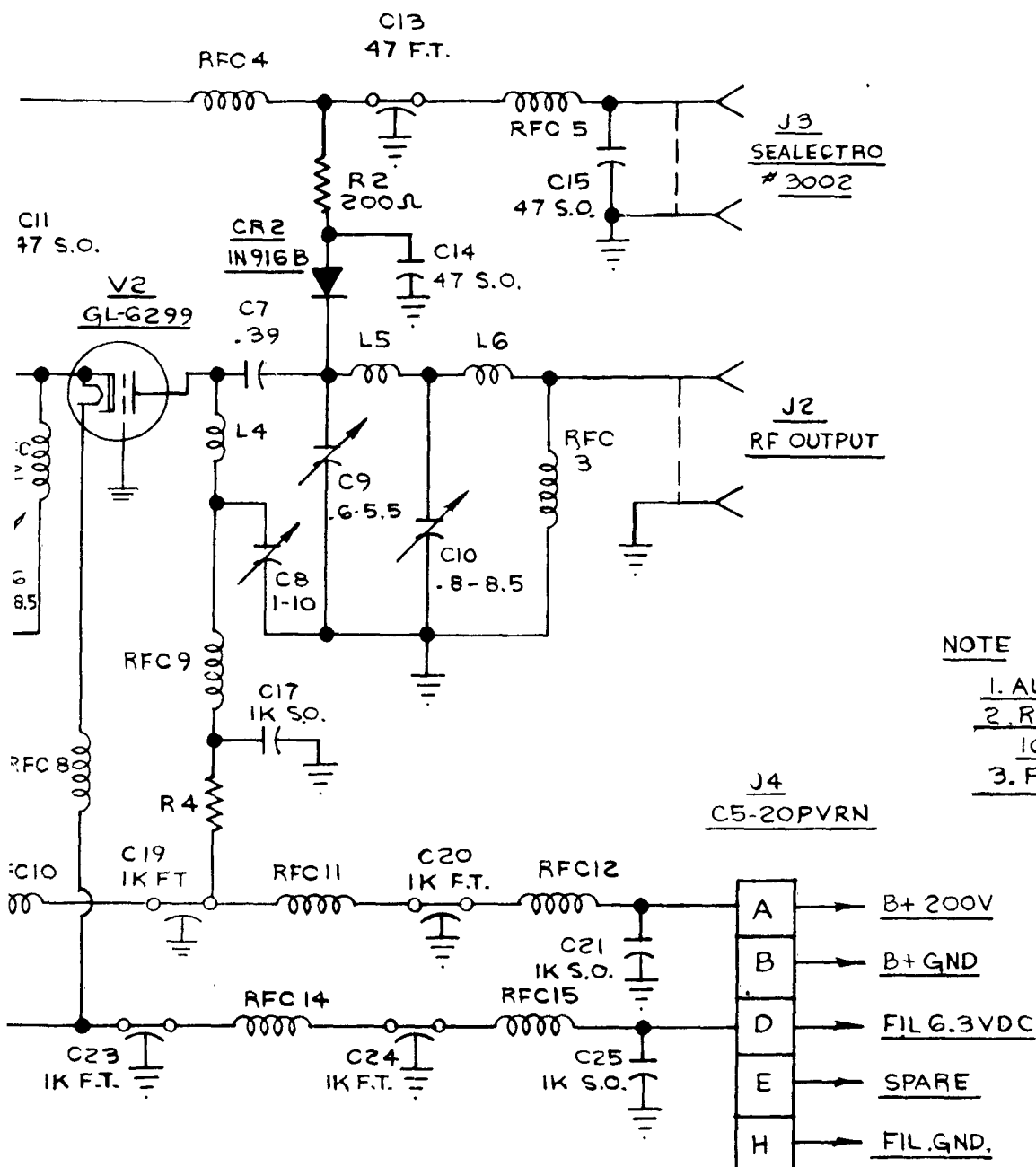
J
700449

1



ALL DIMENSIONS IN IN
OTHERWISE SPECIFIED
FRACTIONS ± 1/64
DECIMALS .XX ± .010

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



NOTE

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

2

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

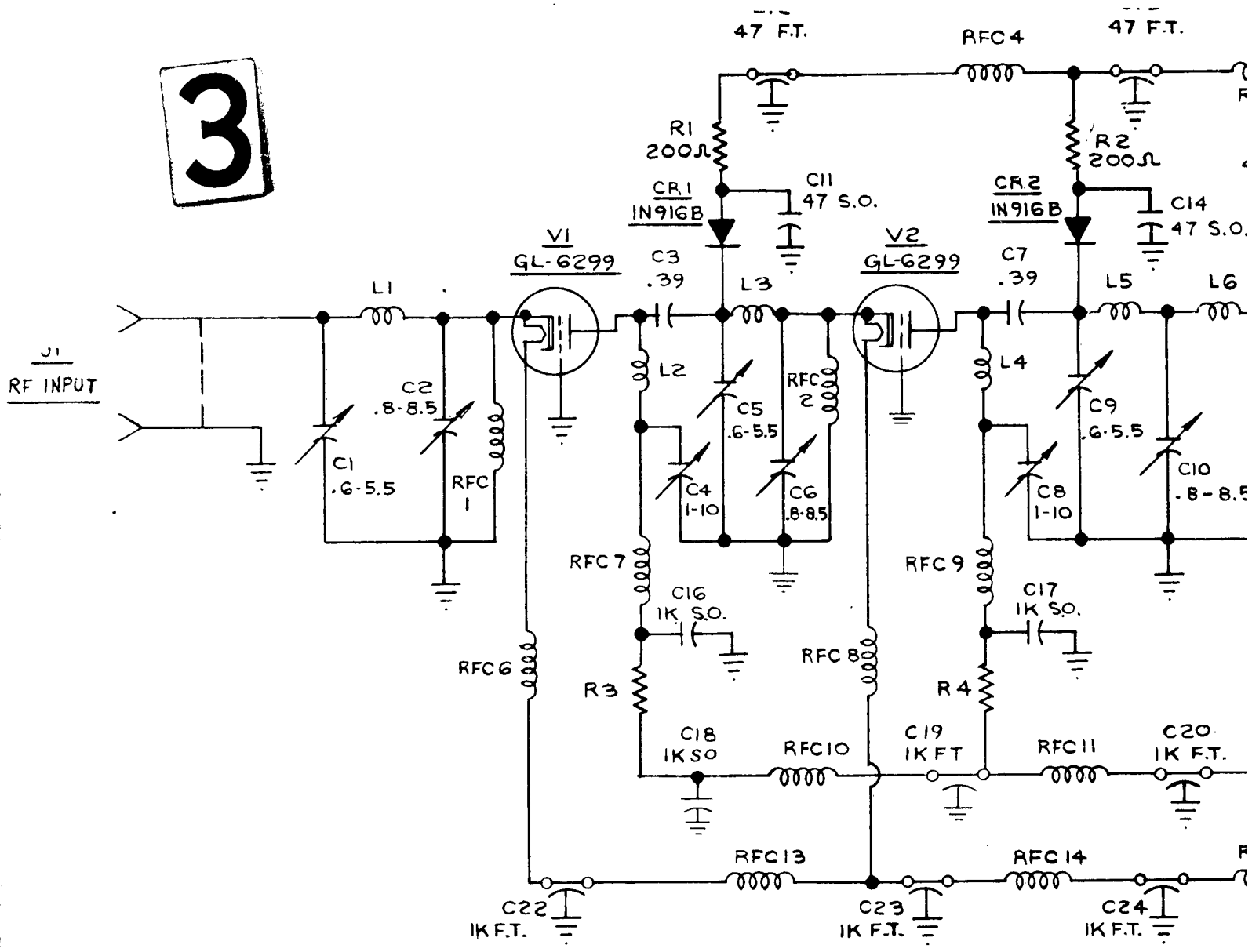
DRAWN BY
8-14-62
M. MERBERG

SCHMATIC
E-2(A)775/6 LIN-LOG IF

APPLIED RESEARCH INC.
PORT WASHINGTON

ISSUE B
600853

3



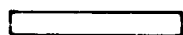
		ALL DIMENSIONS IN OTHERWISE SPECIFI FRACTIONS $\pm 1/64$ DECIMALS .XX $\pm .010$
		MATERIAL:
		FINISH:
491-01	501677	
JOB NO.	NEXT ASSEMBLY	
APPLICATION		

C-600853

	FEB	MARCH	APRIL	MAY	J
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 $.XX \pm .010$ $.XXX \pm .005$	6-2 DR WIL CP AP AP
		MATERIAL: _____	
		FINISH: _____	
JOB NO.	NEXT ASSEMBLY		
APPLICATION			

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY

APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC

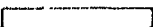
1962

2

DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED TOLERANCES: ± 1/64 ANGLES ± 1/2° X ± .010 .XXX ± .005	DRAWN 6-21-62	SPECTRUM ANALYZER PROJECT PERFORMANCE AND SCHEDULE CHART	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK		
	DRAWN BY WILLIAMS				DWG. SIZE B
	CHECKED				
	APPROVED				
	APPROVED	SCALE	UNIT WT.	ISSUE: B	

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

1963

 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 $\pm .005$	3
			DF
		MATERIAL: _____ FINISH: _____	J
			C
JOB NO.	NEXT ASSEMBLY		AI
APPLICATION			AI

REVISIONS			
ISSUE	DESCRIPTION	DATE	BY

MARCH	APRIL

1963

2

DIMENSIONS IN INCHES, UNLESS SPECIFIED TOLERANCES: 1/64 ANGLES $\pm 1/2^\circ$ $\pm .010$.XXX $\pm .005$	DRAWN	SPECTRUM ANALYZER PROJECT PERFORMANCE AND SCHEDULE CHART	APPLIED RESEARCH INC. PORT WASHINGTON NEW YORK	
	3 11-63			
	DRAWN BY			
	J.M.			
	CHECKED			
	APPROVED		DWG. SIZE	SF 138 ISSUE.
	APPROVED	SCALE	UNIT WT.	