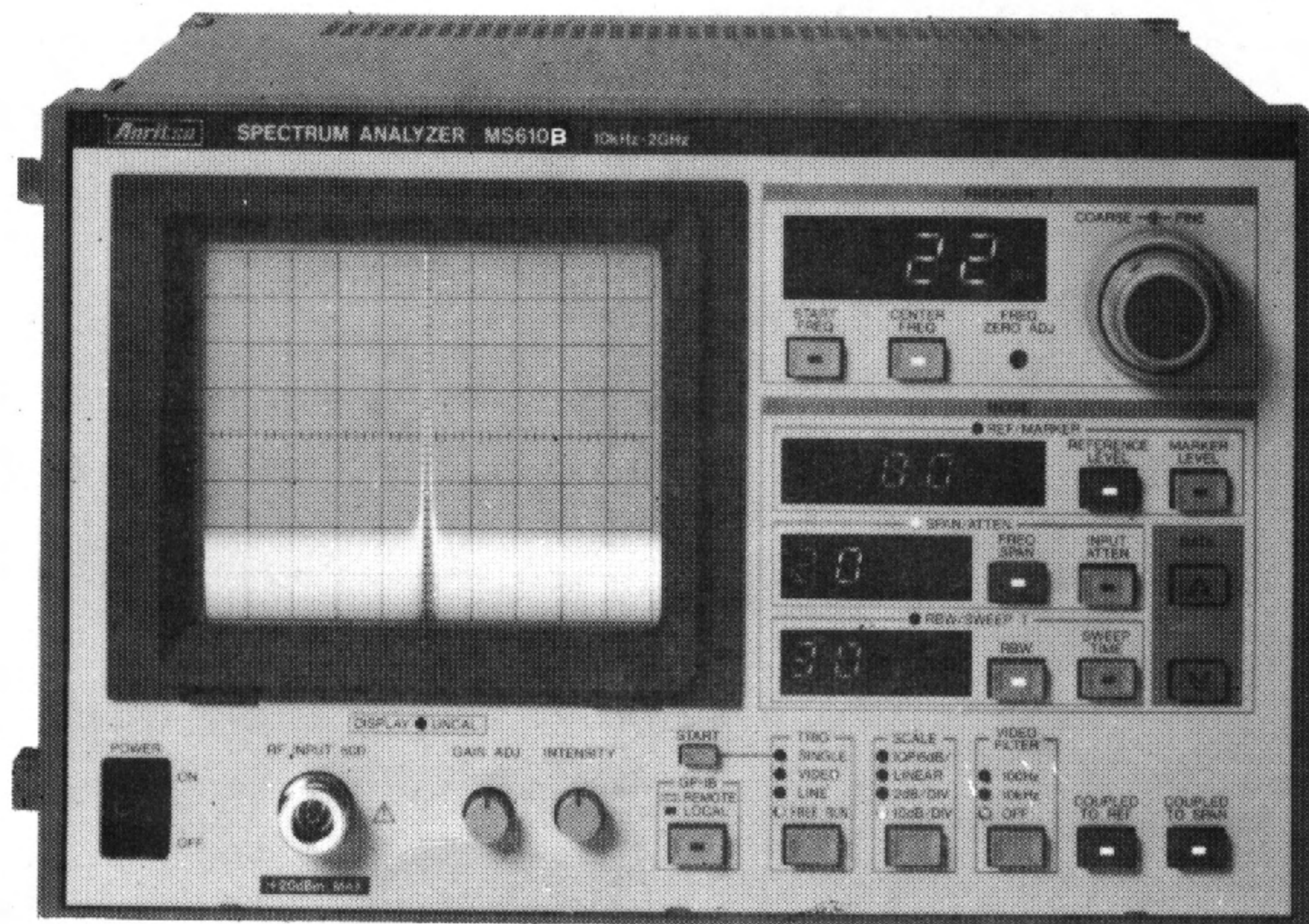


**SERVICE MANUAL**

**SPECTRUM ANALYZER**

**MS610B/J/J1**



**ANRITSU CORP.**

1986.10 x 200 NII-2(Y)  
Printed in Japan



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## SECTION 1

### GENERAL

This is the service manual for the MS610B/J/J1 Spectrum Analyzer. It gives the following information:

#### SECTION 2, MECHANICAL CONFIGURATION AND AC POWER RATING CHANGES:

This section describes the assemblies of the various printed circuit boards (PC boards), and changing the ac line voltage rating.

#### SECTION 3, CIRCUIT DESCRIPTION:

This section describes electrical operation.

#### SECTION 4, CIRCUIT DIAGRAM:

This section gives the block diagrams and circuit diagrams for troubleshooting.

#### SECTION 5, ADJUSTMENT:

This describes instrument adjustment after repair or performance check failure.

#### SECTION 6, REPLACEABLE PARTS:

This lists the parts given in the circuit diagrams and explains ordering of replacement parts.

#### Note:

A service kit is available (sold separately). It is comprised of extender cables and connector adapters (see APPENDIX A).



## SECTION 2

### MECHANICAL CONFIGURATION AND AC POWER RATING CHANGES

#### 2.1 Mechanical Configuration

Table 2-1 lists the mechanical parts. Figures 2-1 to 2-11 show exploded views of the MS610B/J/J1.

---

#### CAUTION

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Before disassembling/reassembling the MS610B/J/J1, turn OFF the POWER switch on the front panel and disconnect the power supply cord from the ac outlet.

---

The various figures and mechanical parts list are given below.

Table 2-1	Mechanical Parts List
Fig. 2-1	Cabinet Assembly
Fig. 2-2	Front Panel Assembly
Fig. 2-3	Front Panel Assembly
Fig. 2-4	Front Panel Assembly
Fig. 2-5	CRT Drive Unit Assembly
Fig. 2-6	CRT Display Unit Z13 Assembly
Fig. 2-7	CPU and SCAN Unit Z9, Z10 Assembly
Fig. 2-8	RF Unit Assembly
Fig. 2-9	RF Unit Assembly
Fig. 2-10	IF Section Unit Z3 Assembly
Fig. 2-11	Rear Panel Assembly



Table 2-1 Mechanical Parts List

<u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Remark</u>	<u>Qty.</u>	<u>Fig. No.</u>
1	32B7680A	frame, front	2/3 MW-4U	1	2-1
2	32B7666	channel, rear	4U	2	2-1
3	33B20662	protector		4	2-1
4	34B73668	nut, front		4	2-1
5	32B7668	channel, top	350D	2	2-1
6	32B7669	channel, bottom	350D	2	2-1
7	322B7672	foot, standard		4	2-1
8	34B73660C	tape, trim	4U	2	2-1
9	349B73661B	handle, side	350D	1	2-1
10	33B22621B	cover, top		1	2-1
11	33B22461B	cover, bottom		1	2-1
12	33B22471	cover, side, right		1	2-1
13					
14					
15	44E80830	key top		3	2-2
16	442E80831	key top		7	2-2
17	442E80831B	key top		4	2-2
18	342E84185	key top		2	2-2
19	44E79340	key top		1	2-2
20	342E73701	knob		2	2-2
21					
22					
23	349B86530	CRT cover	with CRT filter	1	2-3
24	342E84186	knob	small	1	2-3
25	342E84187	knob	large	1	2-3
26	34B78330B	clamp, panel	bottom	3	2-3
27	34B78330	clamp, panel	top	3	2-3
28	32B9274B/C	panel, front	B: MS610B, C: MS610J/J1	1	2-3
29	322B9275	panel, sub		1	2-3
30					



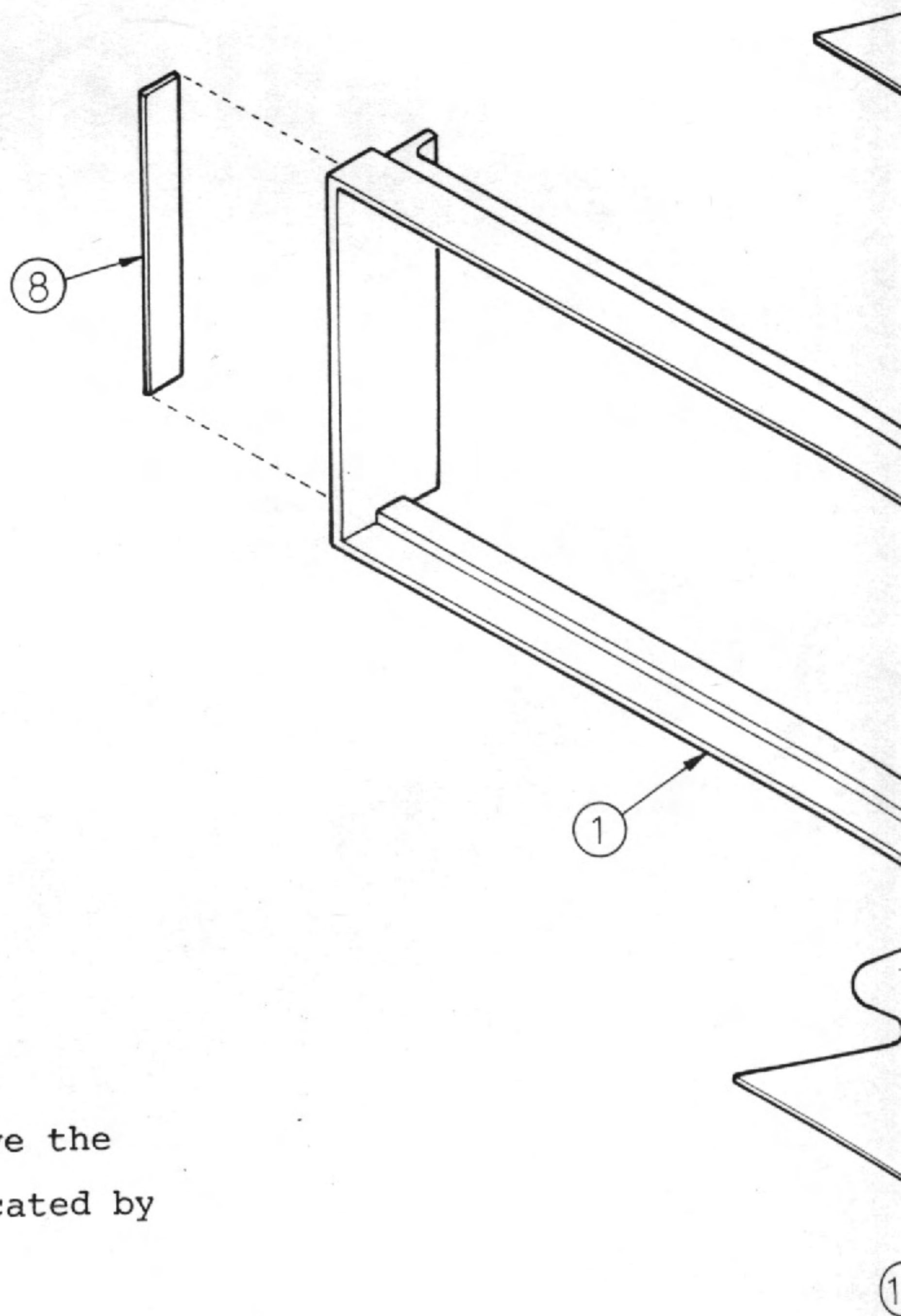
Table 2-1 Mechanical Parts List (Continued)

<u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Remark</u>	<u>Qty.</u>	<u>Fig. No.</u>
31	33B25809B	cover, side left		1	2-5
32	33B25818	shield cover		1	2-5
33	33B3689B	pillar		2	2-5
34	34E84192	foot, side		4	2-5
35					
36					
37					
38	34B84020	shield cover		1	2-8
39					
40	33B25816	shield panel		1	2-10
41					
42	332B25810A/B	panel, rear	A: MS610B, B: MS610J/J1	1	2-11
43	34B73670	cord winder		4	2-11

## Cabinet Assembly

### (1) Top cover (10) removal

Remove the two screws (S1). Then, remove the top cover (10) by lifting it forwards from the rear in the direction indicated by the arrow\*.



### (2) Bottom cover (11) removal

Remove the two screws (S2). Then, remove the bottom cover (11) from the rear as indicated by the arrow\*.

### (3) Right side cover (12) removal

Open the cover of the handle (9) in the direction indicated by the arrow\* and remove the two screws (S3). Then, remove the four screws (S4) and remove the side cover.



Cabinet Assembly

(1) Top cover (10) removal

Remove the two screws (S1). Then, remove the top cover (10) by lifting it forwards from the rear in the direction indicated by the arrow\*.

(2) Bottom cover (11) removal

Remove the two screws (S2). Then, remove the bottom cover (11) from the rear as indicated by the arrow\*.

(3) Right side cover (12) removal

Open the cover of the handle (9) in the direction indicated by the arrow\* and remove the two screws (S3). Then, remove the four screws (S4) and remove the side cover.

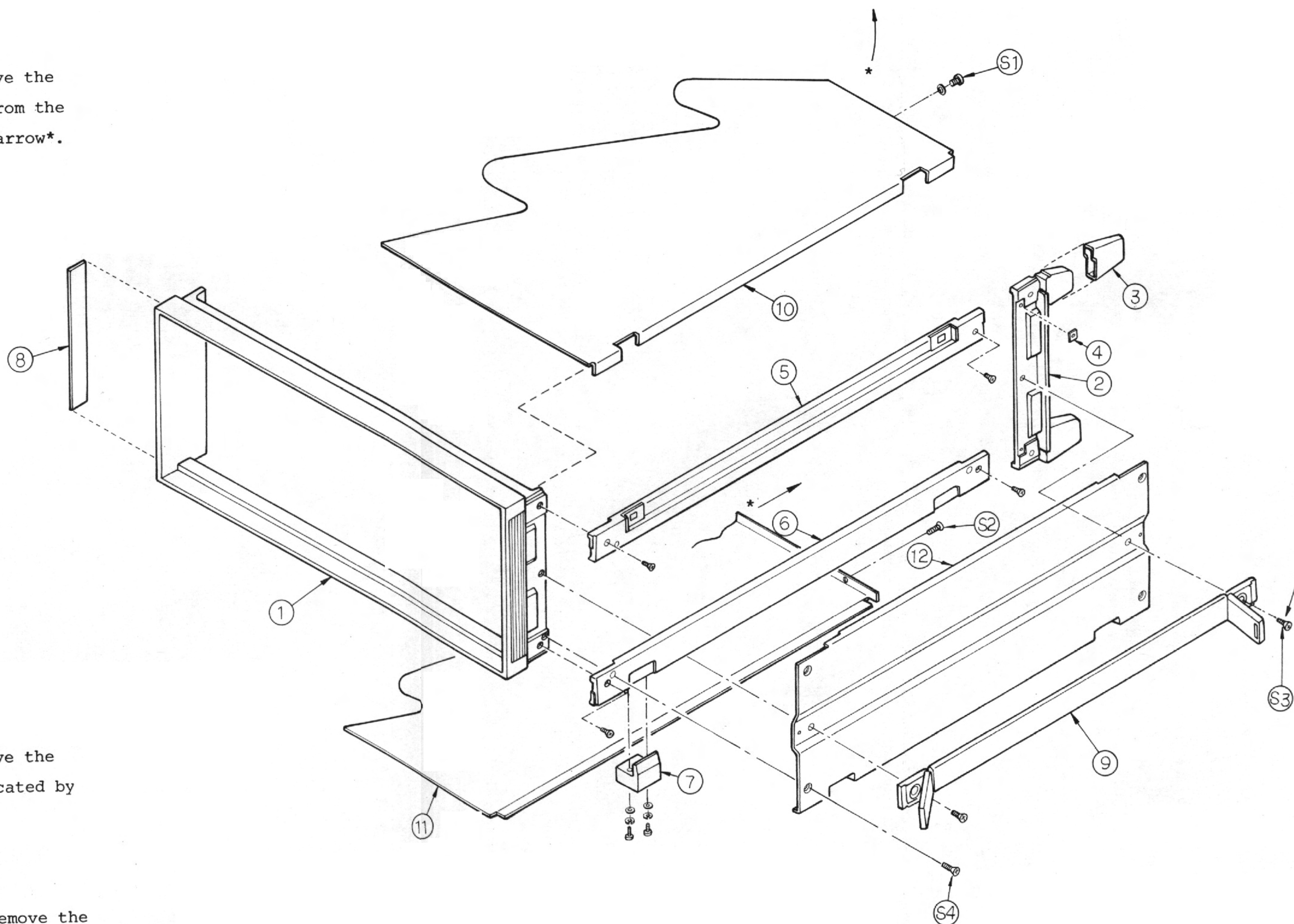


Fig. 2-1 Cabinet Assembly



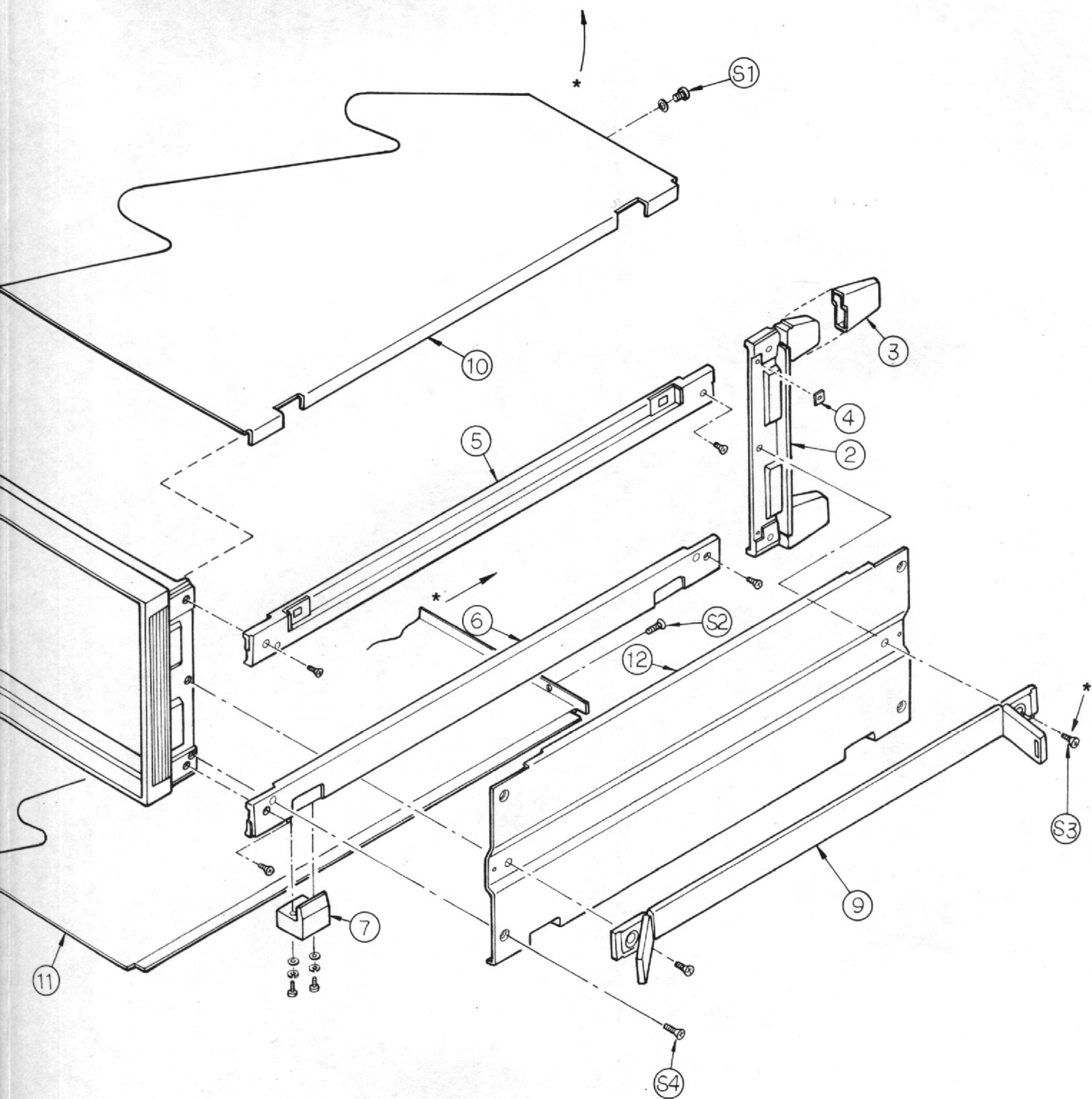
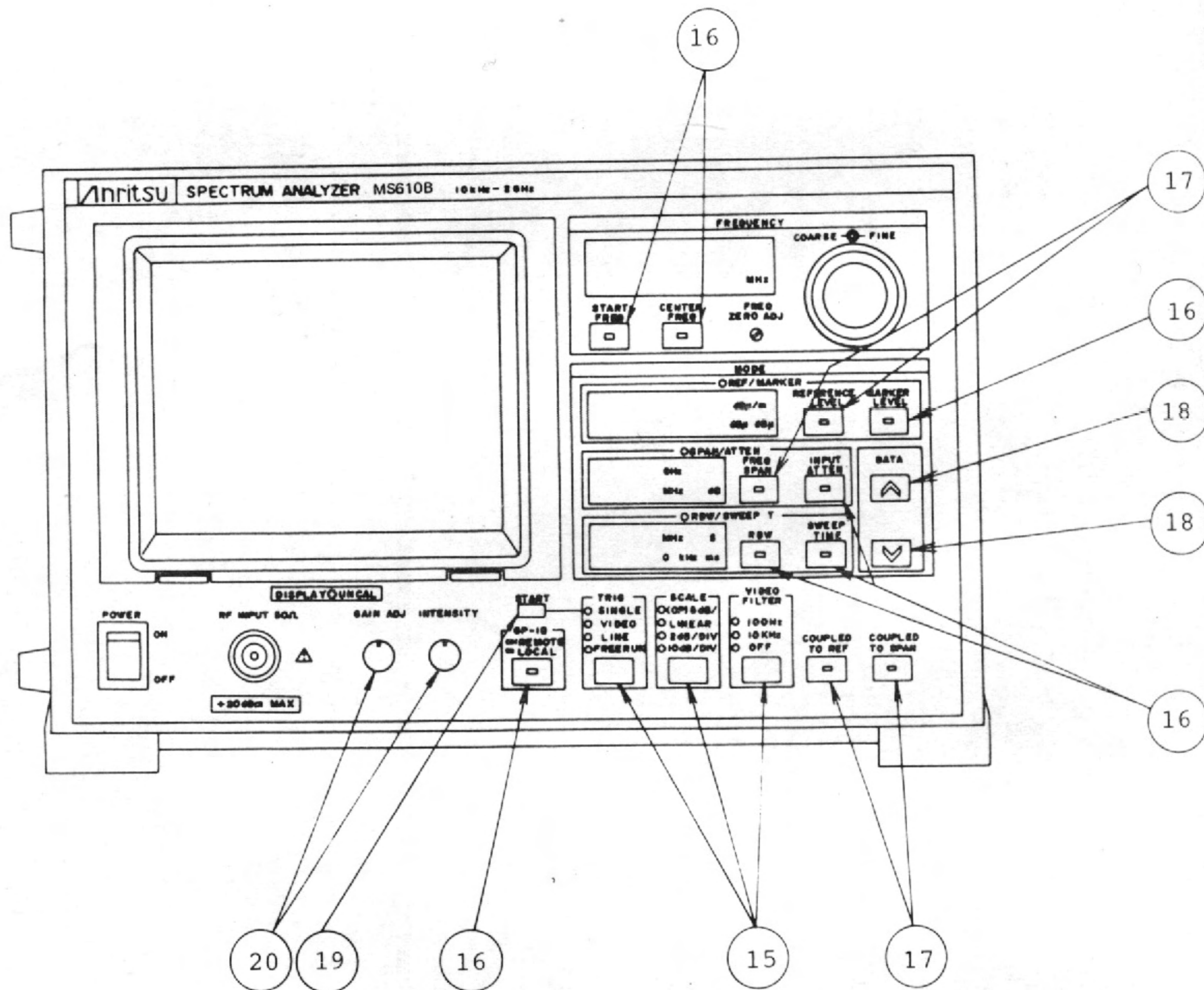


Fig. 2-1 Cabinet Assembly

2-5/2-6 (blank)







Front Panel Assembly

When replacing key tops (15) through (19), remove them with a pair of pliers as shown in the figure.

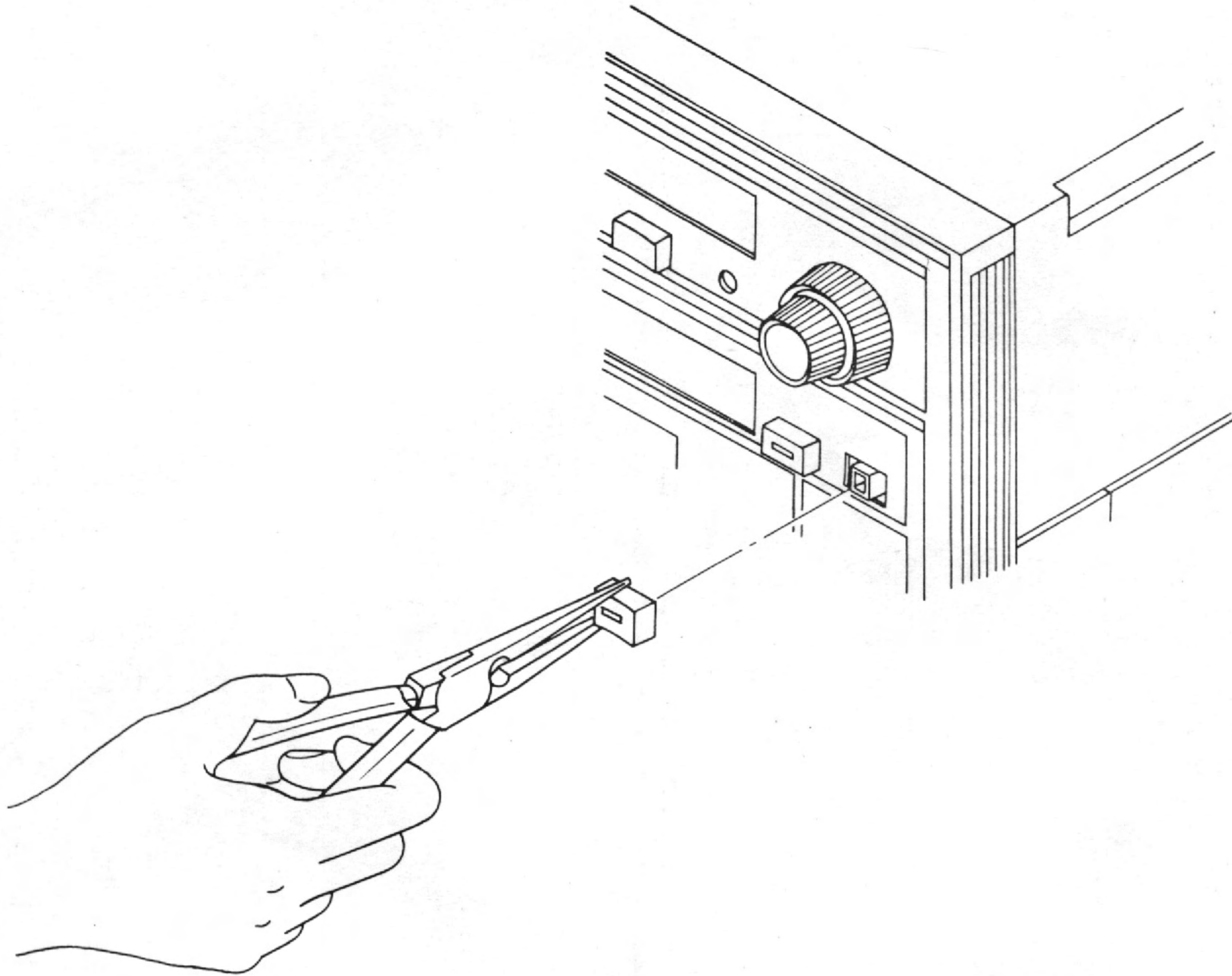
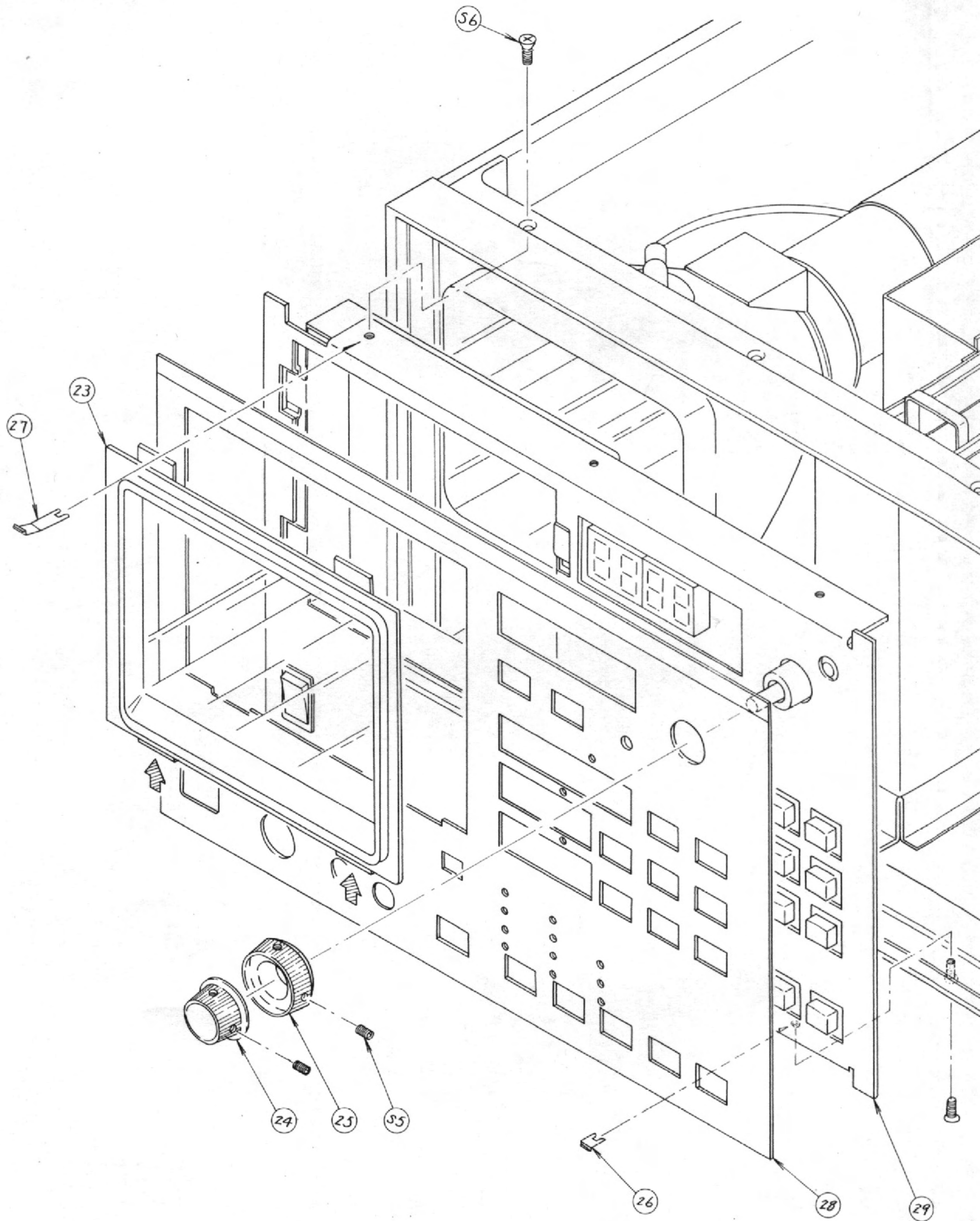
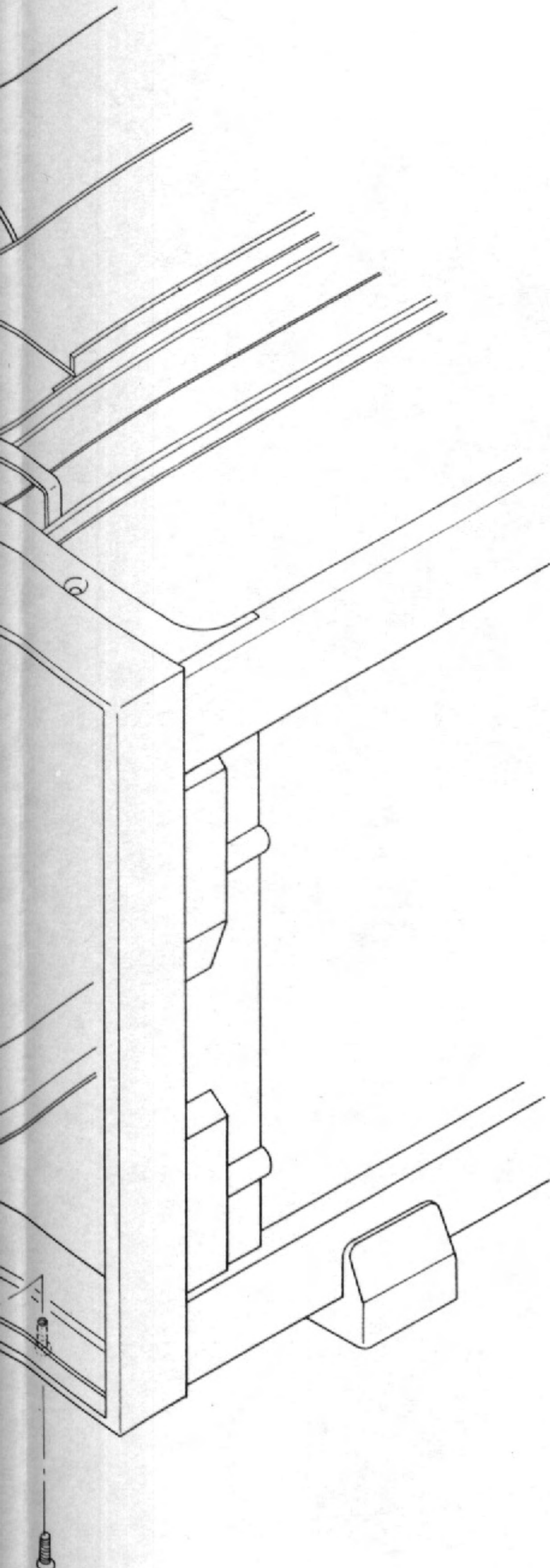


Fig. 2-2 Front Panel Assembly







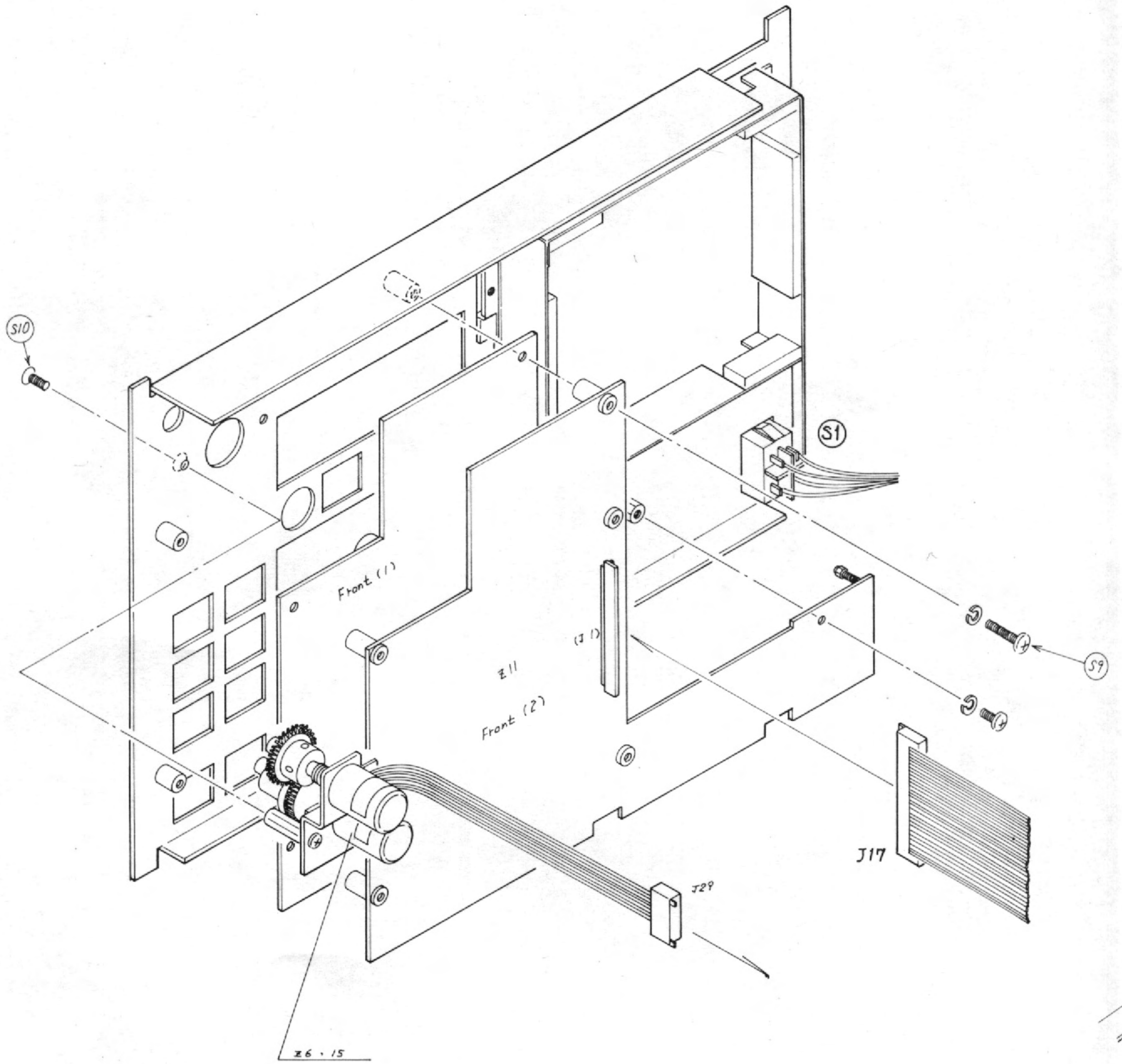


### Front Panel Assembly

- (1) Lift the lower part of the CRT cover (23) in the direction indicated by the arrows and remove it.
- (2) Loosen both set screws (S5) for knobs (24) and (25), and then remove both knobs.
- (3) Remove the six screws (S6). Then pull and remove the six panel clamps (26) and (27). Remove the front panel (28).
- (4) Disconnect the connectors and wires connected to the front panel. (J29, J17 (Fig. 2-4), J16 (Fig. 2-10), Power switch cable (Fig. 2-5))
- (5) Remove the sub panel (29).

Fig. 2-3 Front Panel Assembly  
(continued)







### Front Panel Assembly

- (1) Remove the six screws (S9) and then remove the front unit Z11.
- (2) Remove the two screws (S10) and then remove the frequency volumes Z6 and Z15.
- (3) Remove the power switch (S1).

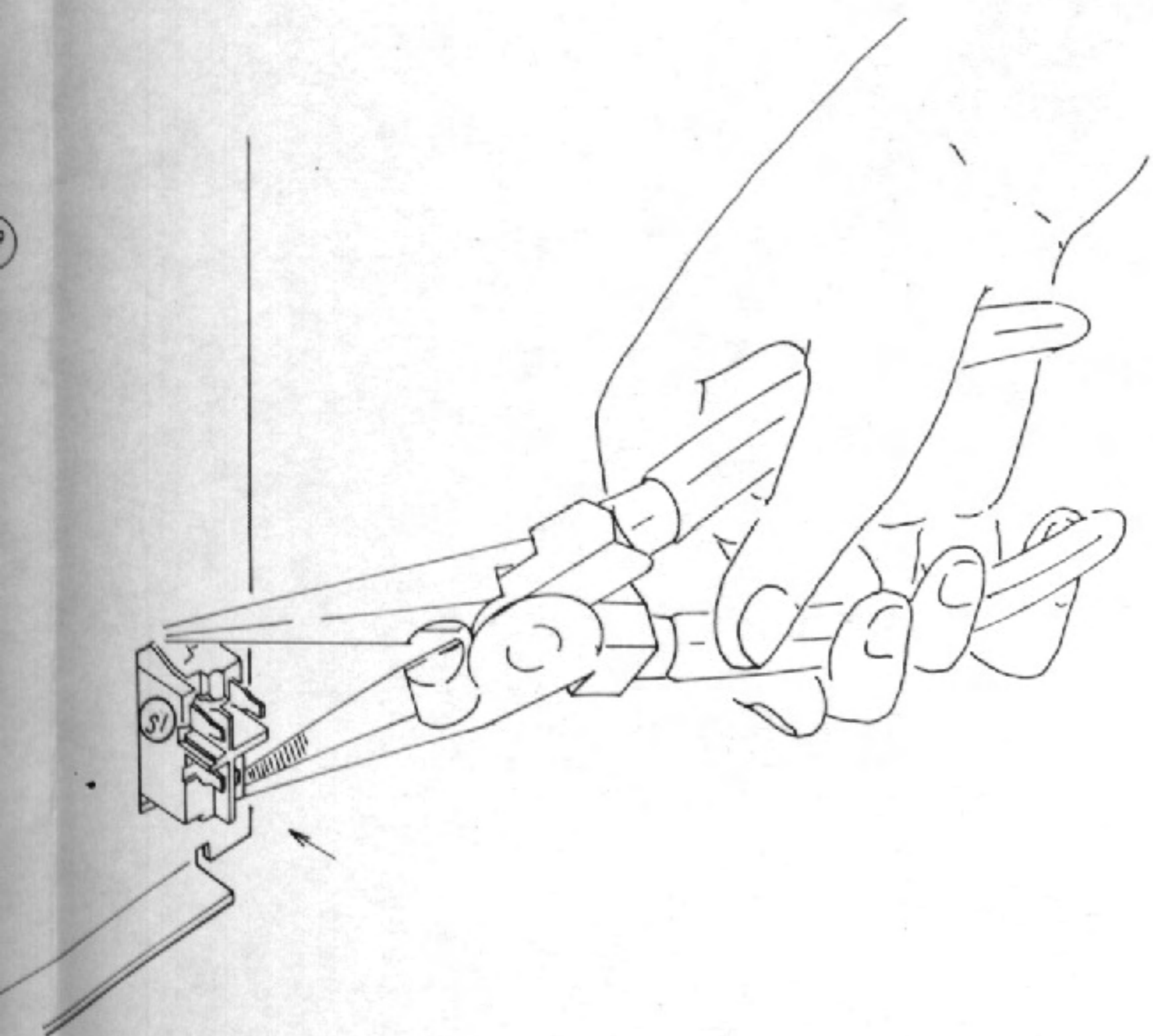
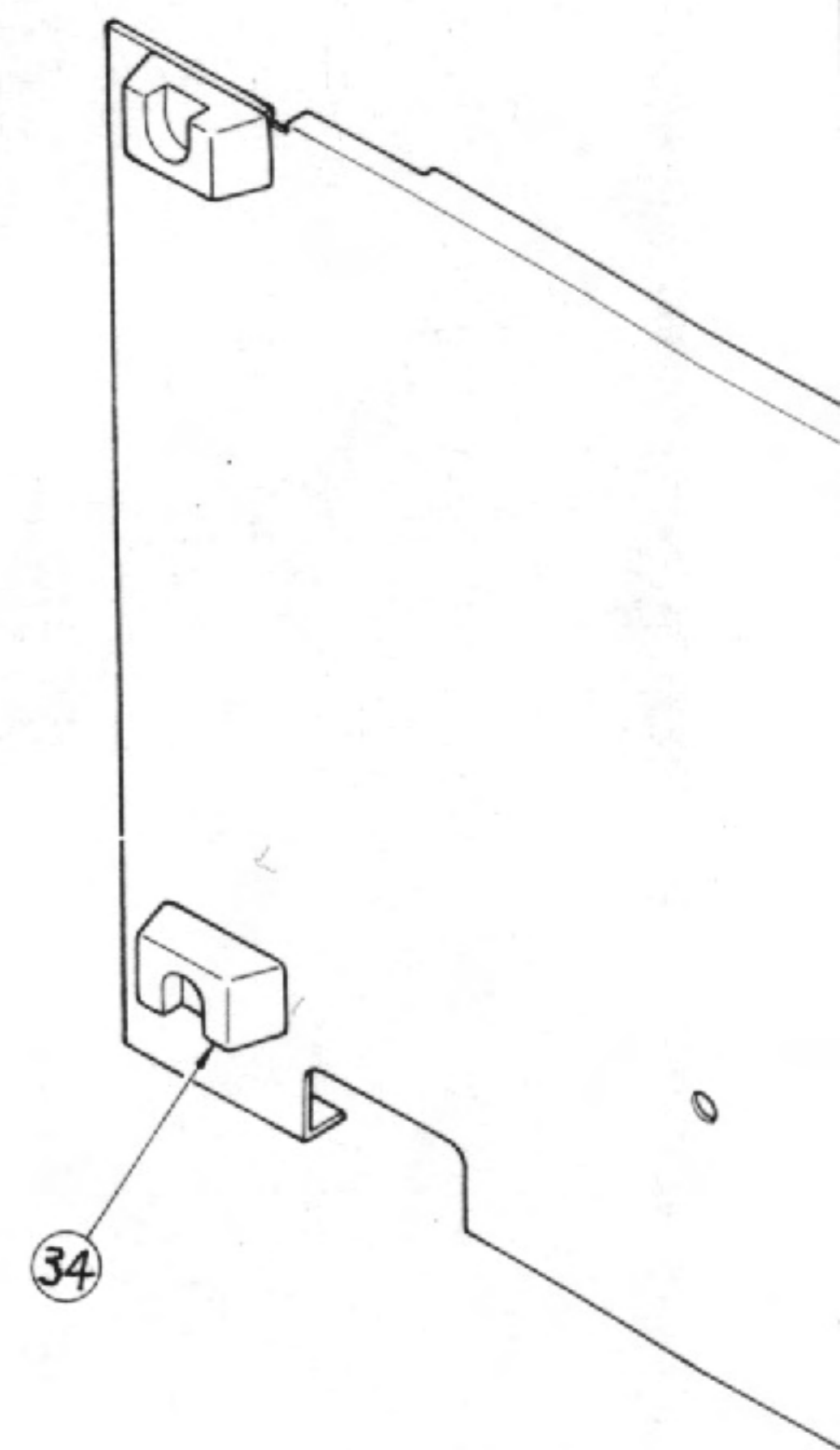


Fig. 2-4 Front Panel Assembly  
(continued)





#### CRT DRIVE UNIT Assembly

- (1) Remove the four screws (S11) and remove the left side cover (31).
- (2) Remove the four screws (S12) and remove the shield cover (32).
- (3) Disconnect the five connectors J9, J22, J11, J19, J21 and CRT anode (Fig. 2-6).
- (4) Remove the four screws (S13) and the two pillars (33). Then, remove the CRT DRIVE unit Z12.



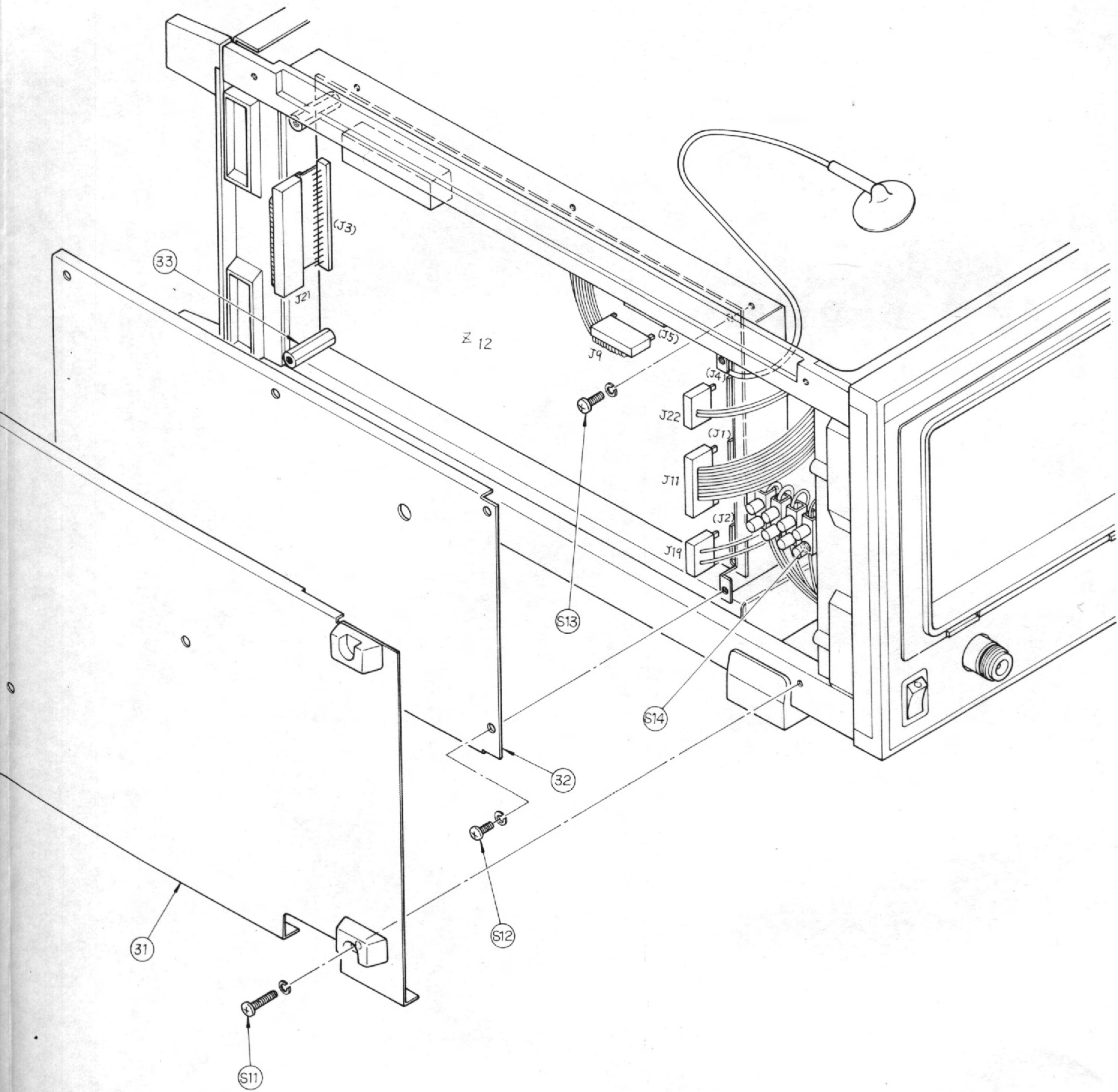
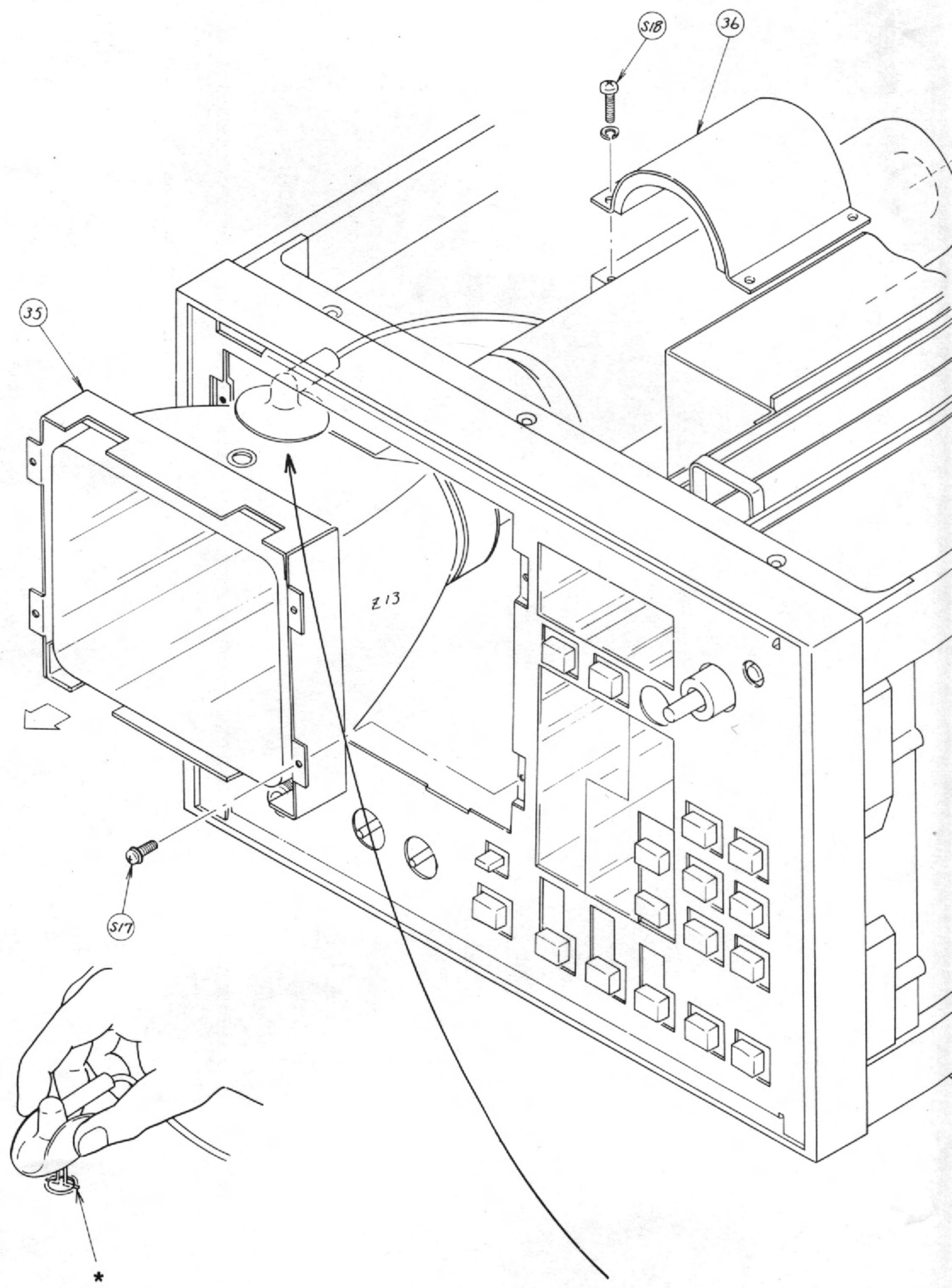


Fig. 2-5 CRT DRIVE UNIT Assembly

2-13/2-14 (blank)





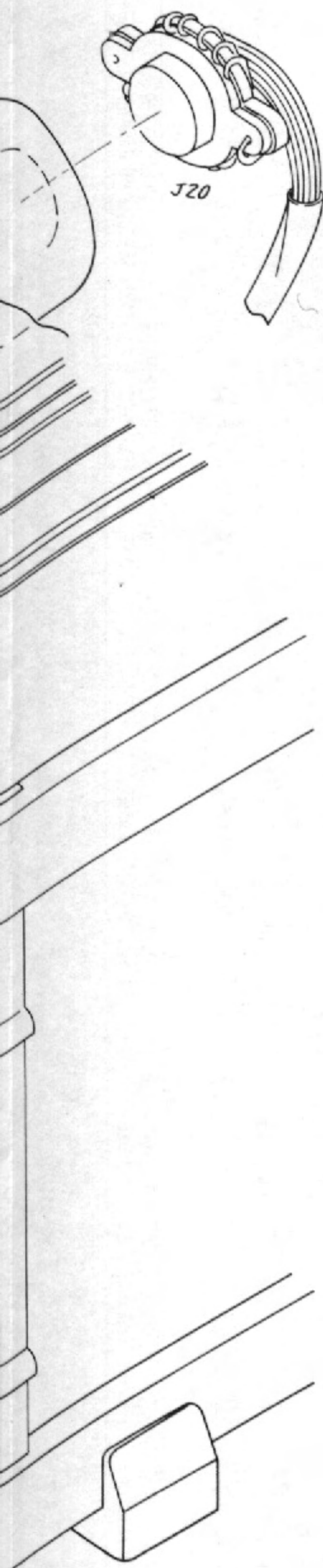
CAUTION

Before removing the anode  
the high voltage line \* wi  
or similar item.



### CRT DISPLAY UNIT Z13 Assembly

- (1) Remove the front panel (28) as in Fig. 2-3.
- (2) Remove the CRT anode cap (see CAUTION).
- (3) Remove the four screws (S17) and remove the CRT frame (35).
- (4) Remove the four screws (S18) and remove the CRT clamp (36).
- (5) Disconnect the connector J22 connected to the CRT drive as in Fig. 2-5. Then, pull out the CRT and disconnect the CRT socket J20.



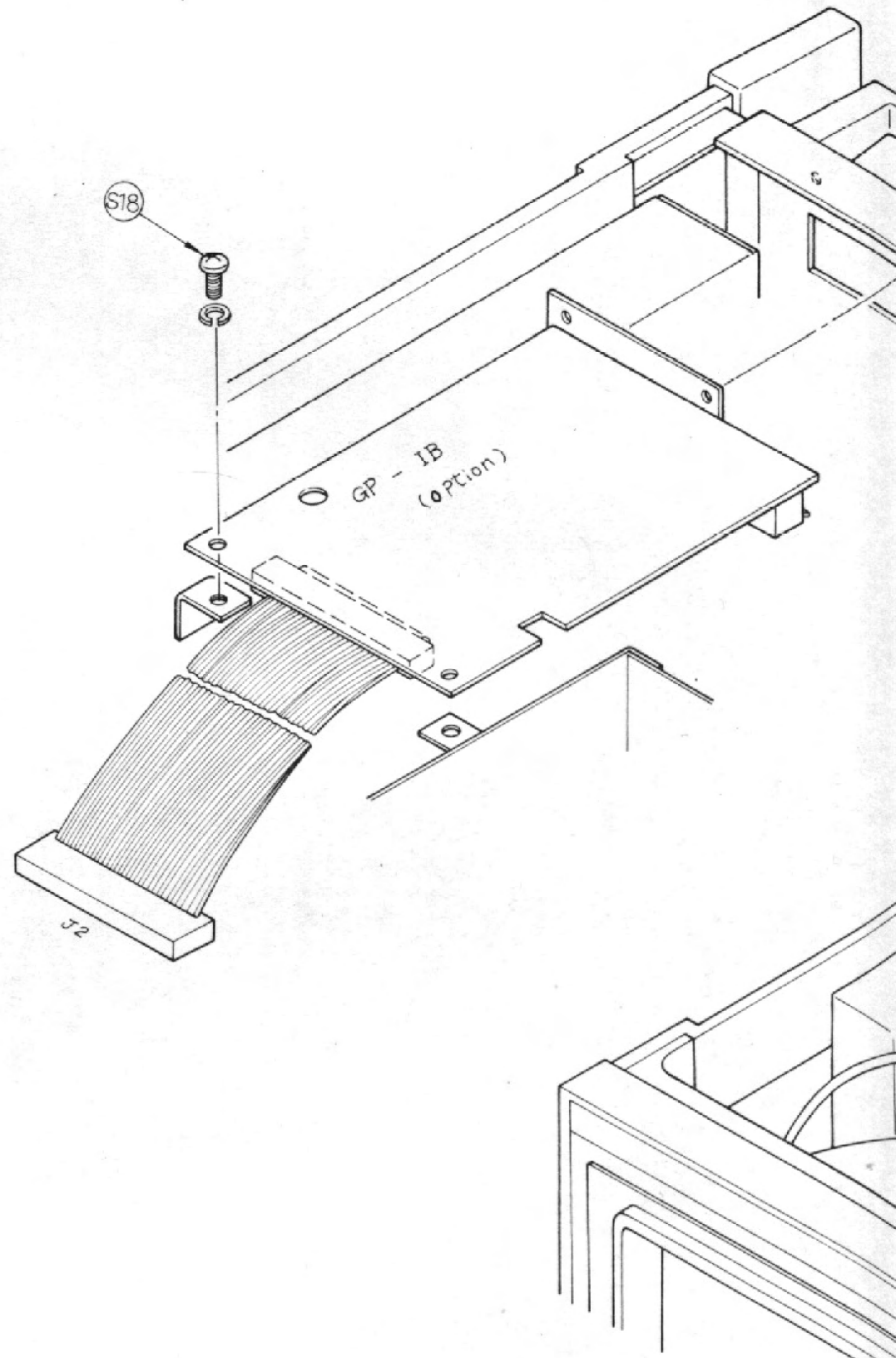
ode cap, discharge  
\* with a screwdriver

Fig. 2-6 CRT DISPLAY UNIT  
Z13 Assembly



#### GP-IB UNIT Assembly

- (1) Remove the four screws (S18) and then remove the GP-IB unit.
- (2) Remove connector J2.



#### CPU and SCAN UNIT Z9, Z10 Assembly

- (1) Disconnect the six connectors (J2, J11, J12, J13, J15 and J17).
- (2) Lift out the units Z9 and Z10 using the handles.

#### POWER SUPPLY UNIT Z7 Assembly

- (1) Disconnect the three connectors (J4, J9 and J20).
- (2) Lift out the unit Z7.



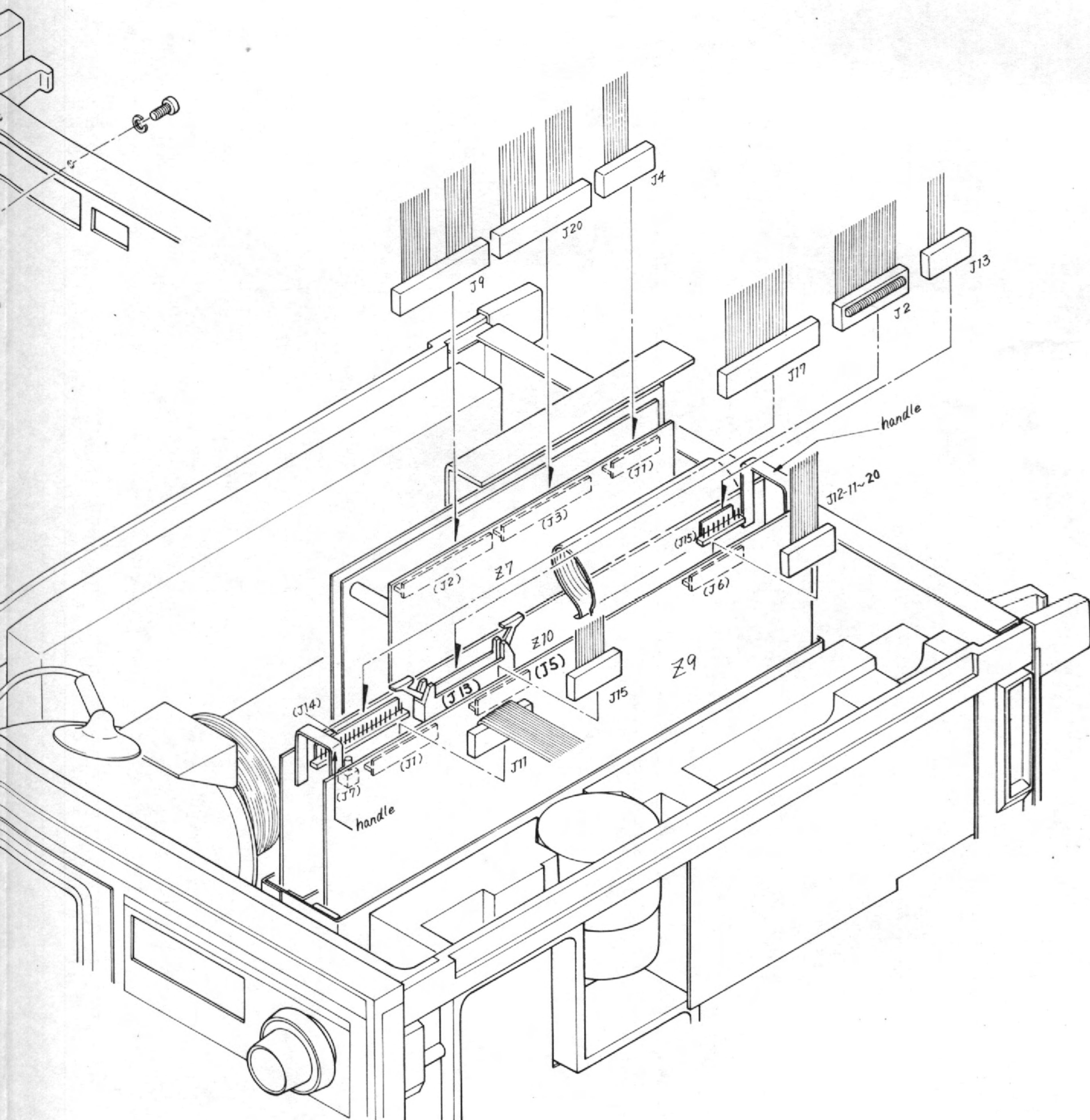
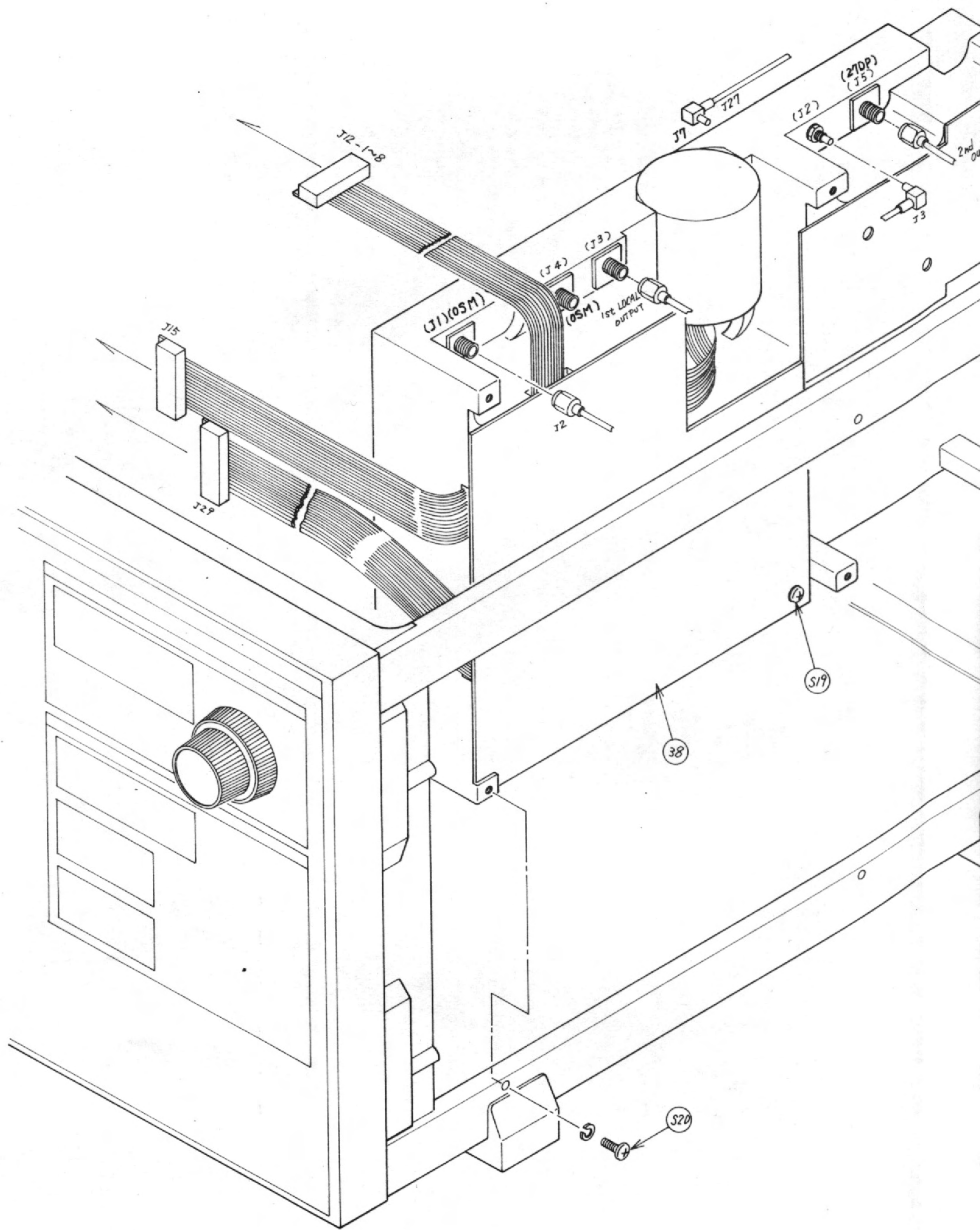
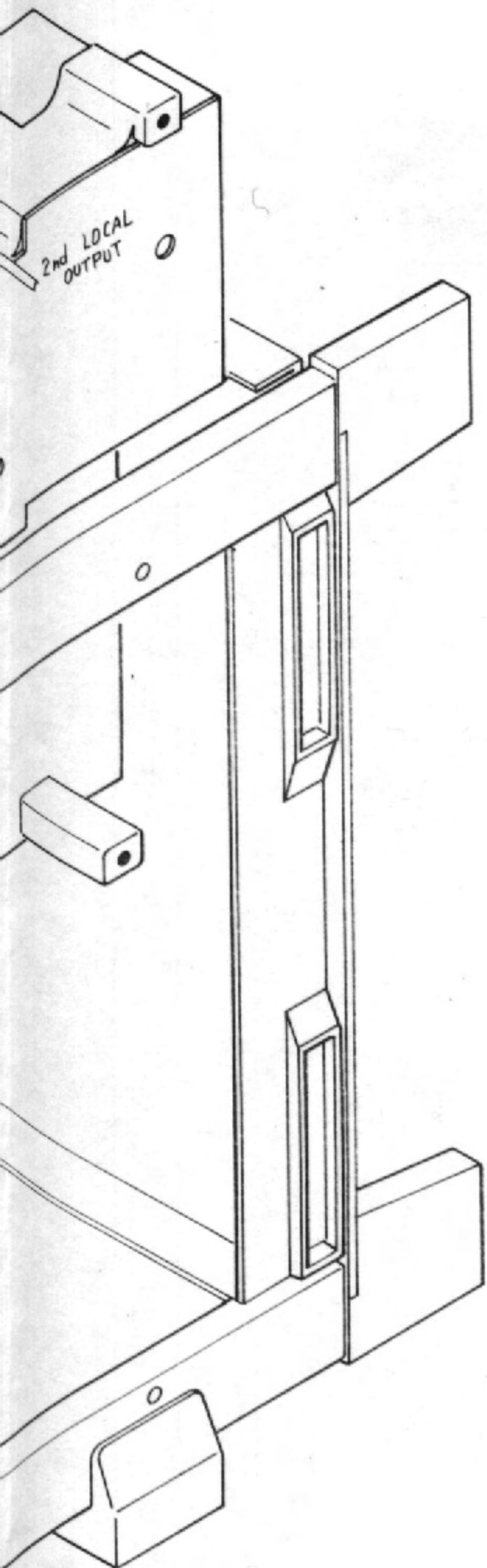


Fig. 2-7 CPU and SCAN UNIT Z9, Z10 Assembly







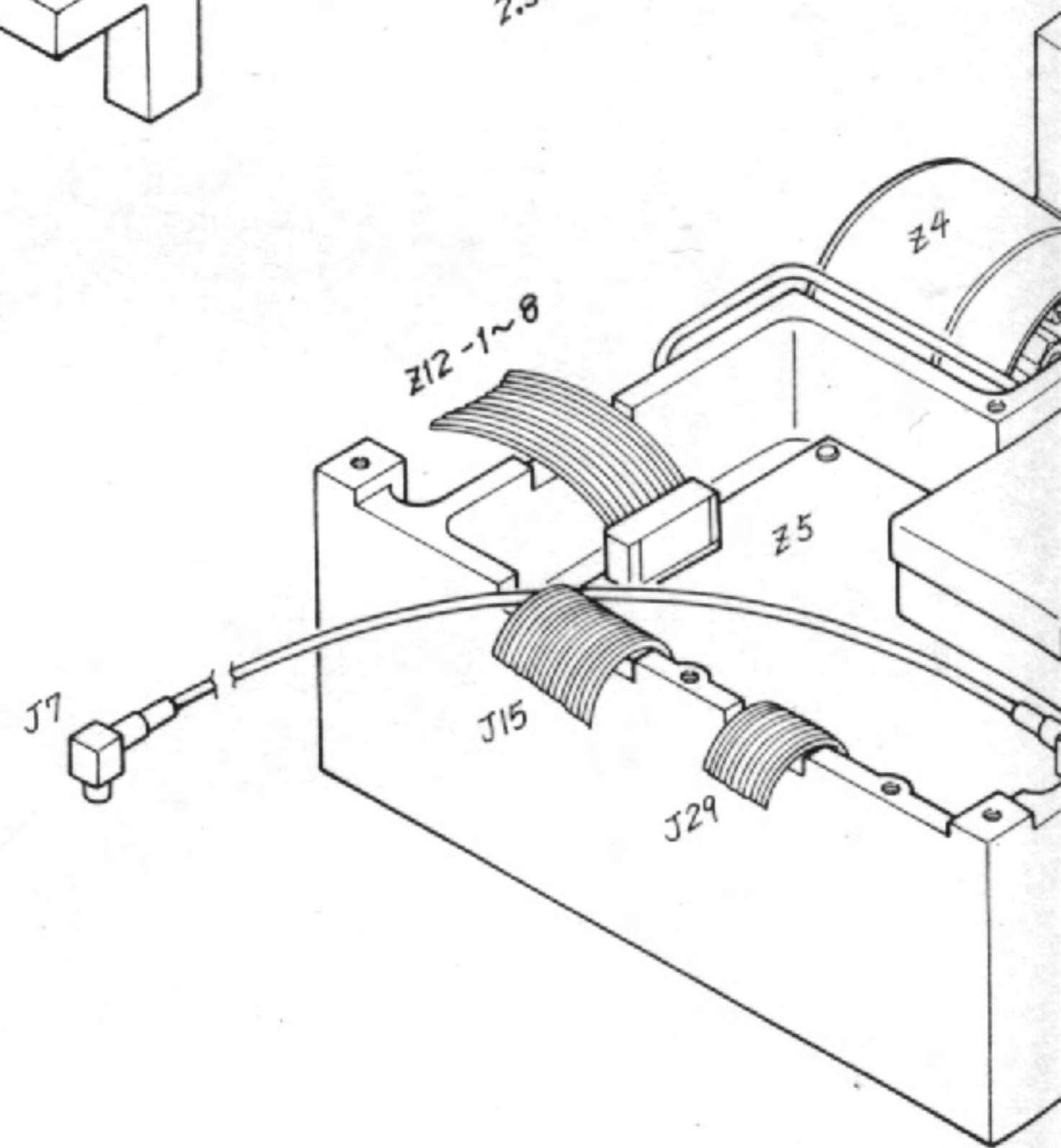
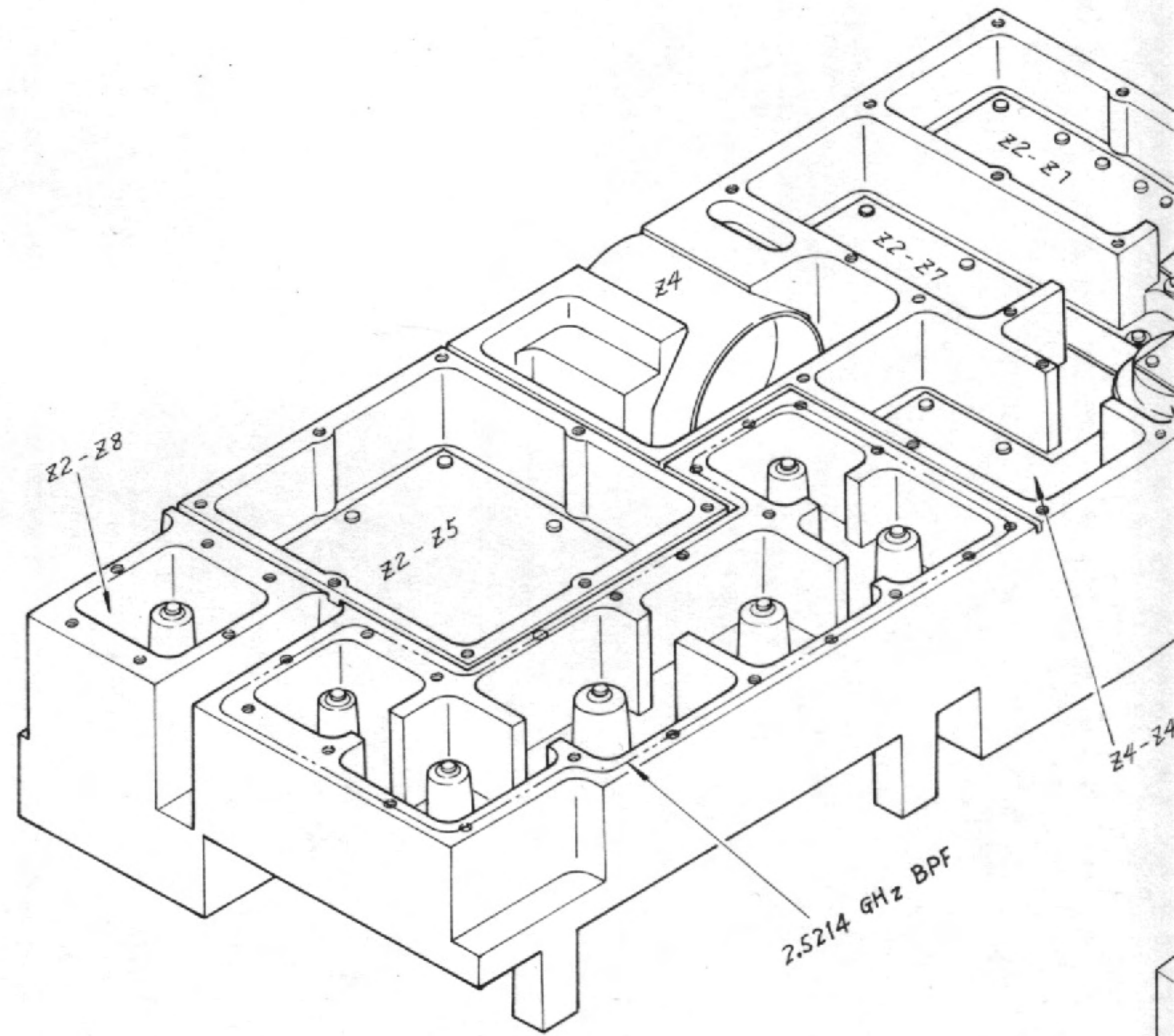


#### RF UNIT Assembly

- (1) Remove the screws (S19) and open the shield cover (38). Then, disconnect the three connectors (J12, J15 and J29).
- (2) Disconnect the coaxial connectors (J2, J3, J27, 1st and 2nd LOCAL OUTPUT), and remove the six screws (S20). Then, remove the RF Block.

Fig. 2-8 RF UNIT Assembly







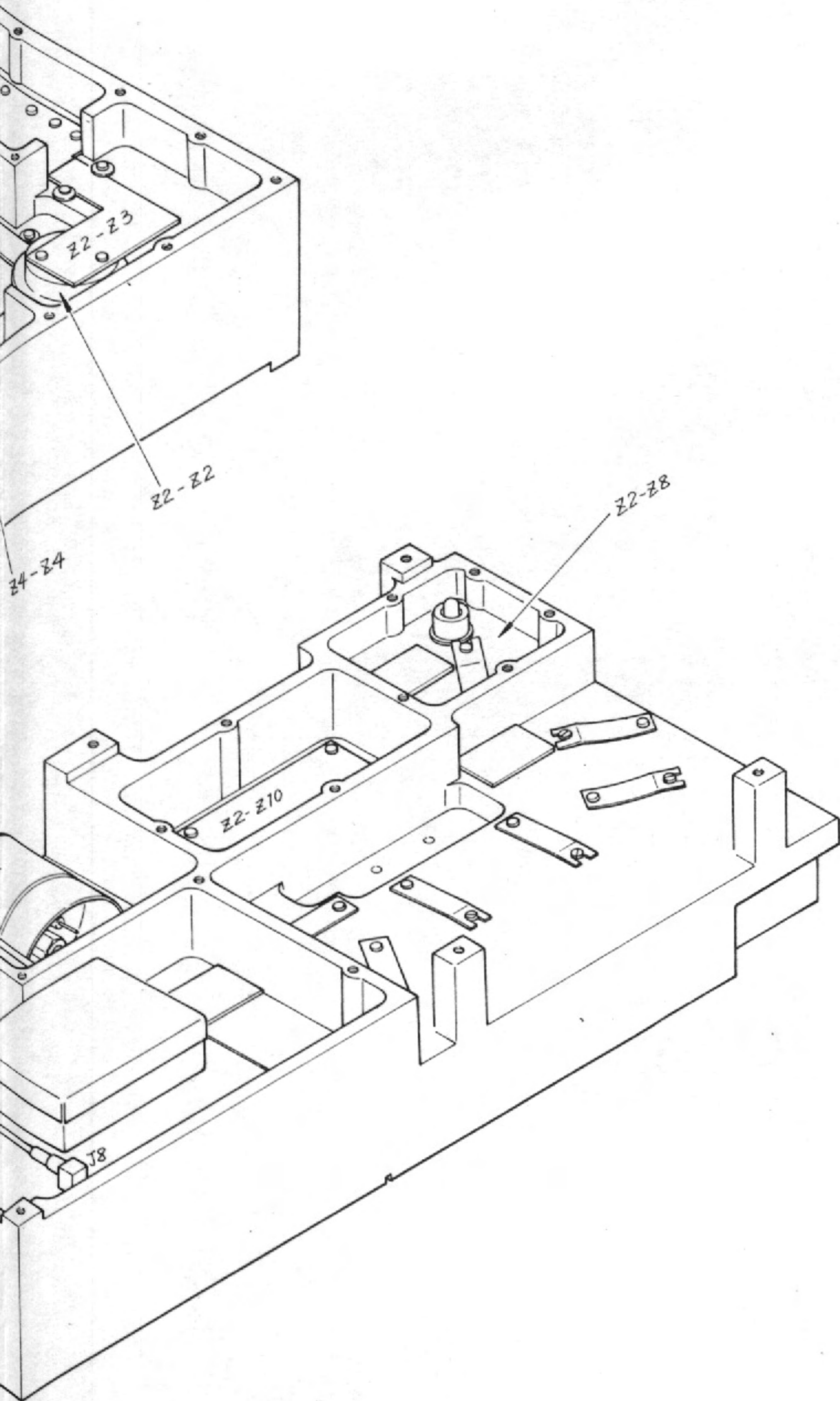
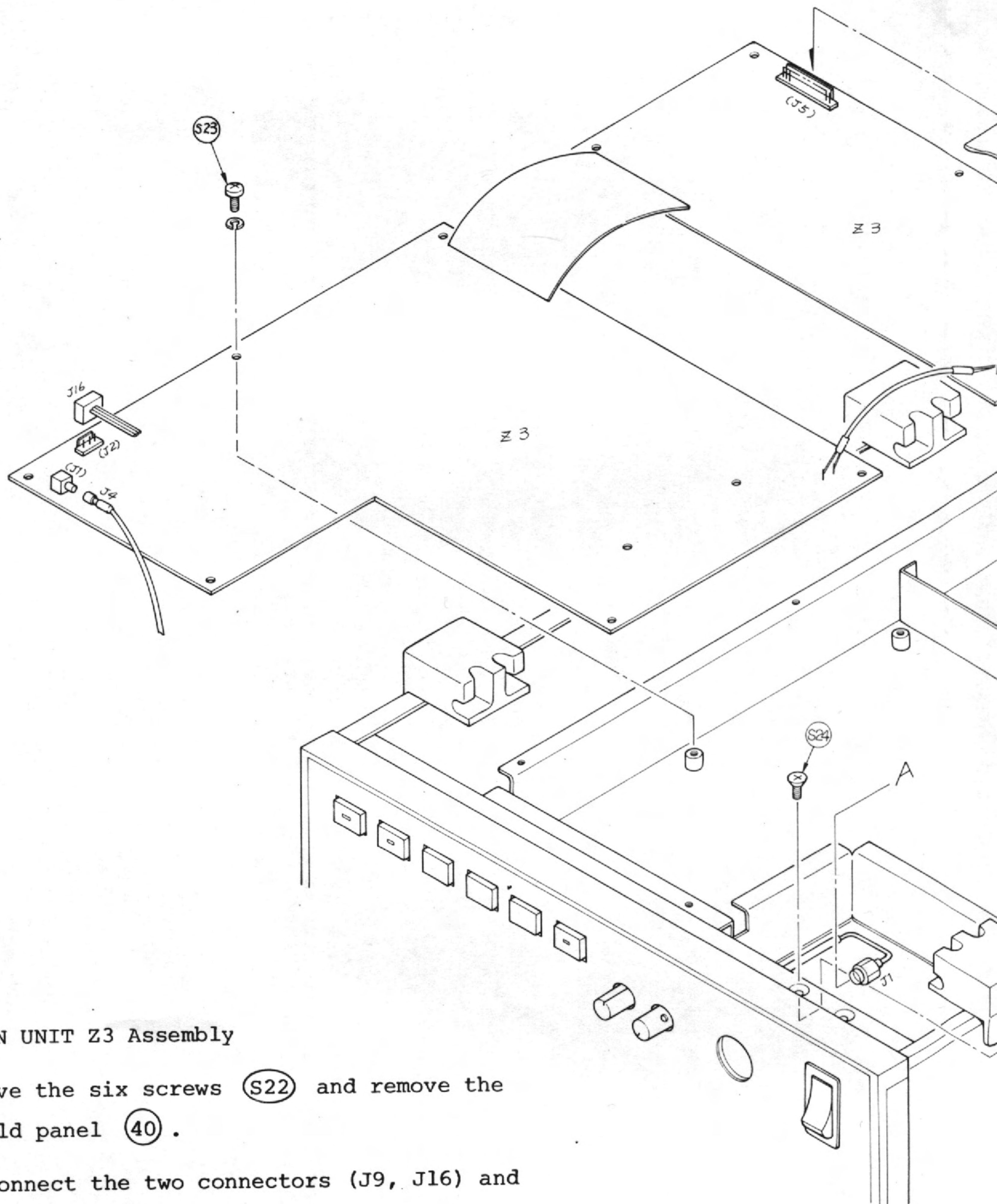


Fig. 2-9 RF UNIT Assembly  
(continued)

2-21/2-22 (blank)

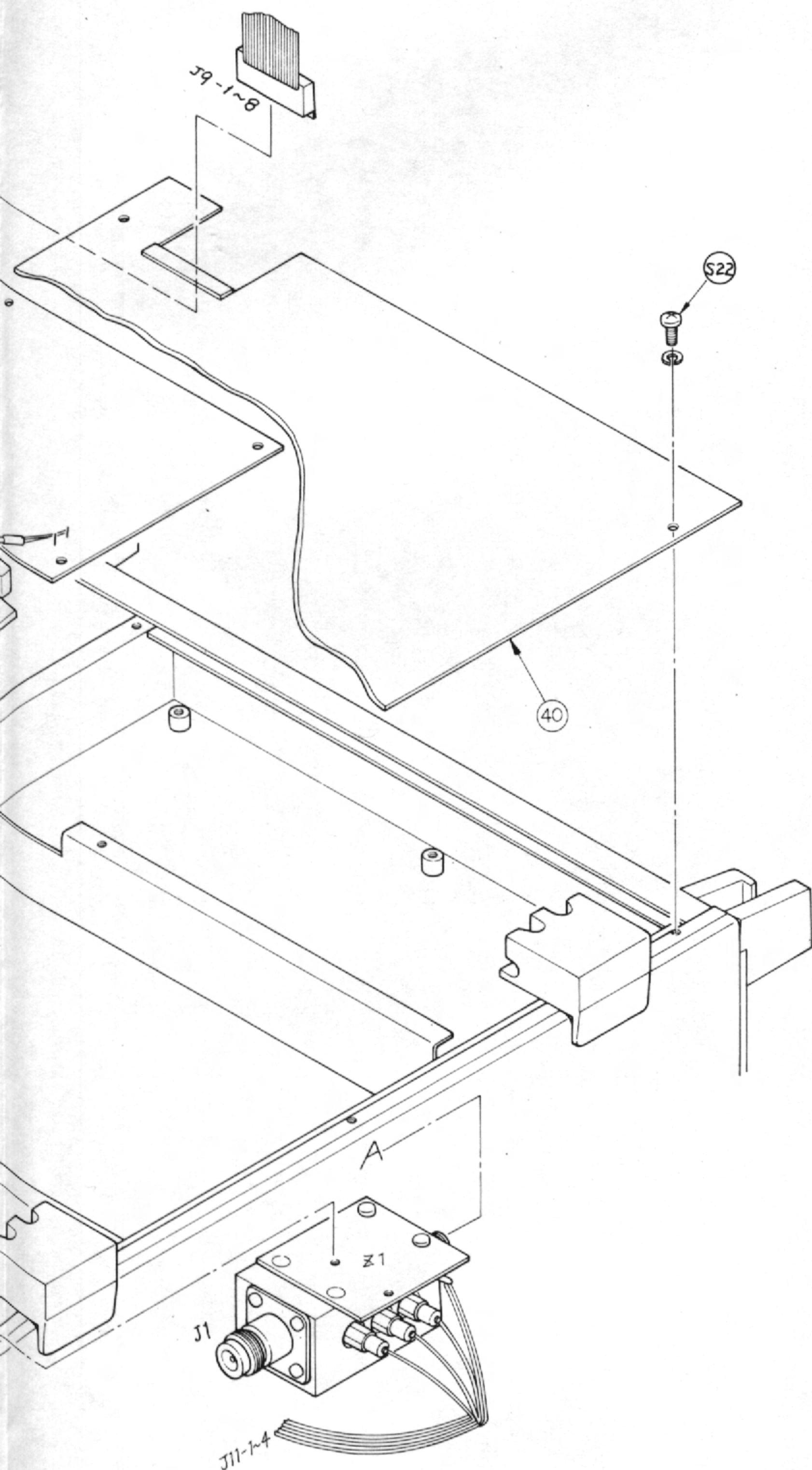




#### IF SECTION UNIT Z3 Assembly

- (1) Remove the six screws (S22) and remove the shield panel (40).
- (2) Disconnect the two connectors (J9, J16) and the coaxial connector J4.
- (3) Remove the twelve screws (S23).
- (4) Remove the IF section unit Z3.



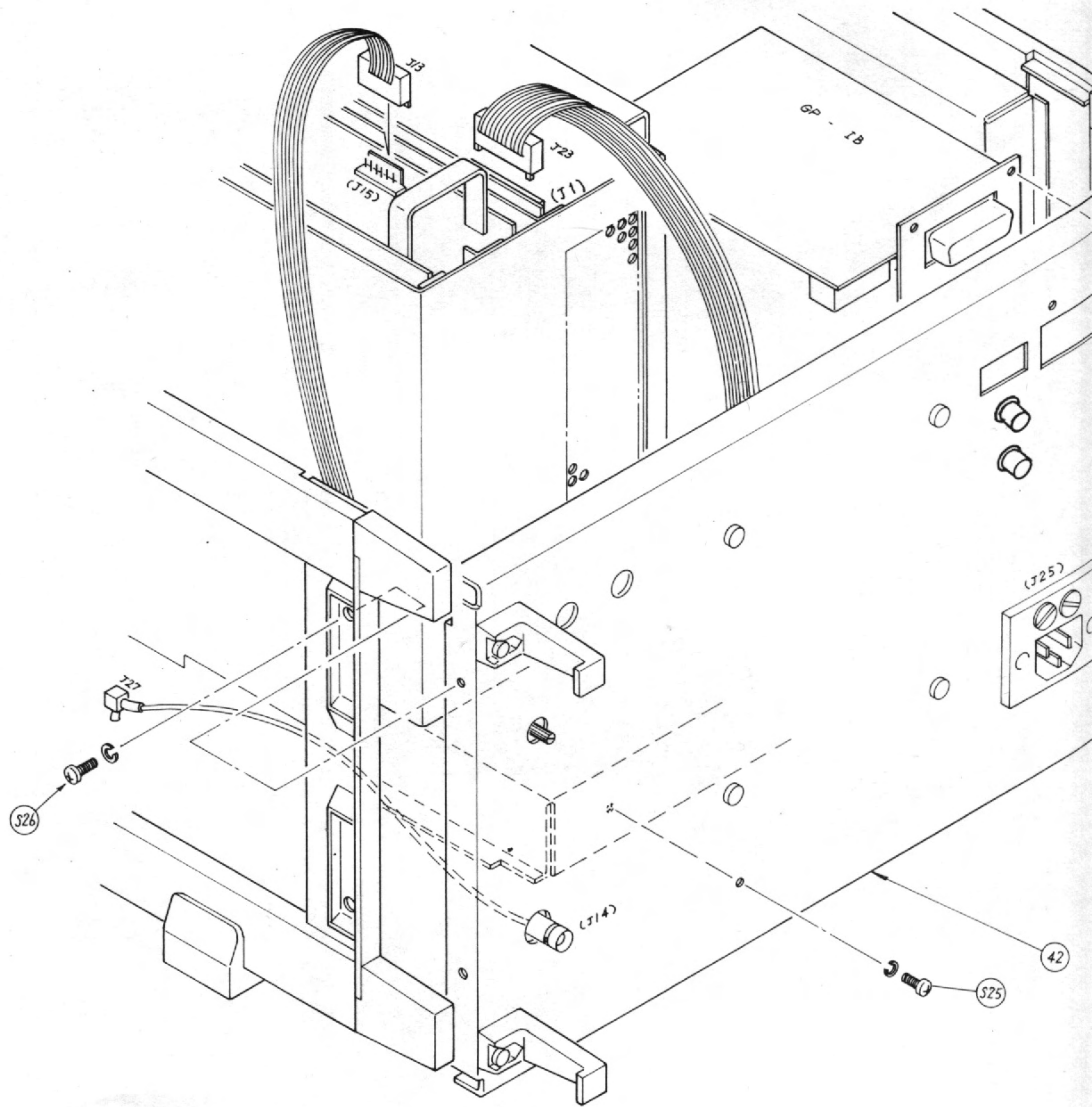


P-ATT UNIT Z1 Assembly

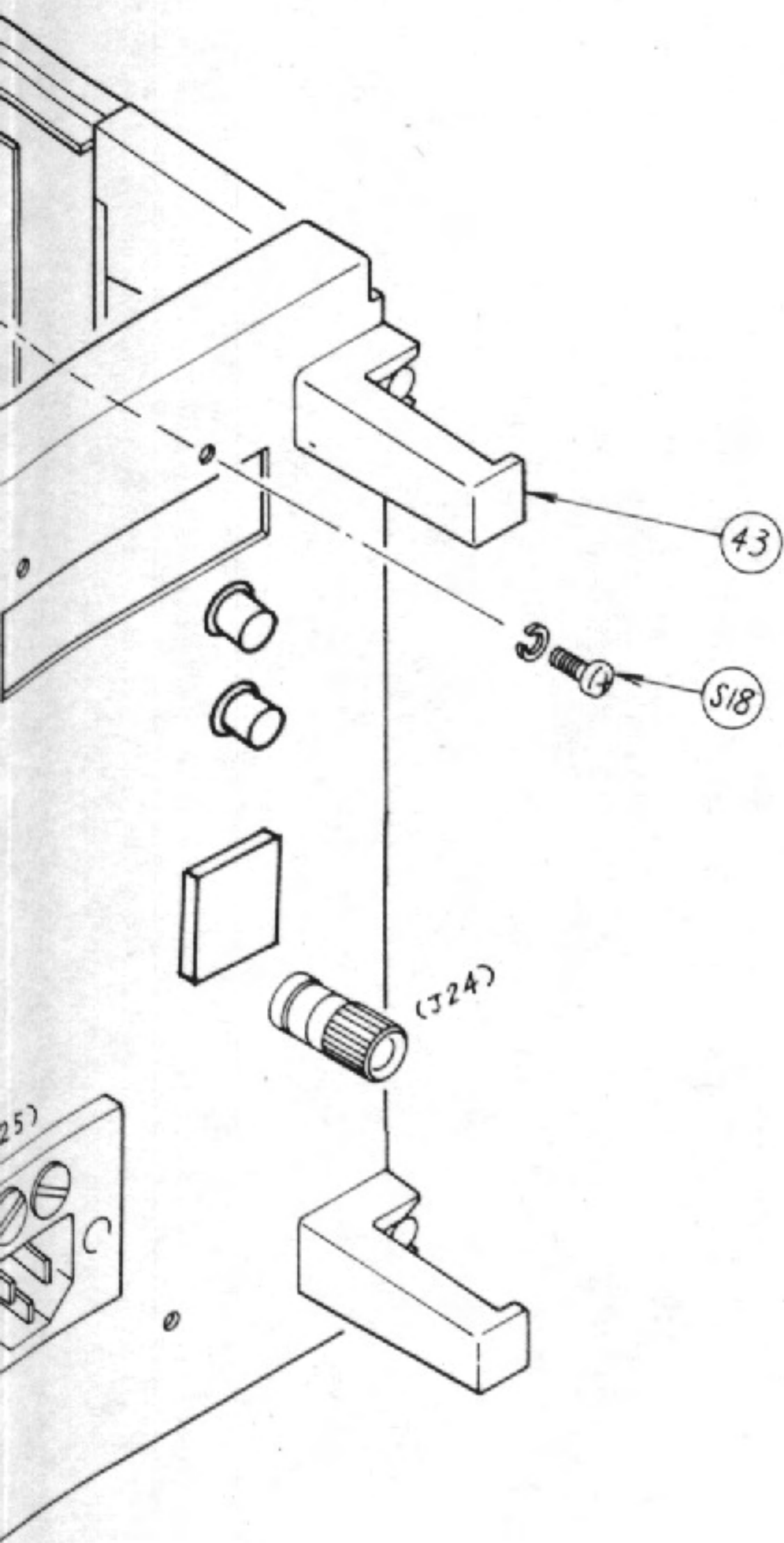
- (1) Remove the two screws  
S24.
- (2) Disconnect connector J11  
 and the coaxial connector  
 J1.
- (3) Remove the P-ATT unit Z1.

Fig. 2-10 IF SECTION UNIT  
 Z3 Assembly









#### Rear Panel Assembly

- (1) Remove the two screws (S18) and the GP-IB option.
- (2) Remove the two screws (S25) and the four screws (S26).
- (3) Remove the rear panel (42) and disconnect connectors J13, J23 and J27.
- (4) Disconnect the inside terminal of ac power inlet J25.
- (5) Remove the inside nut of J24 and the earth-tag.

Fig. 2-11 Rear Panel Assembly



## 2.2 Ac Line Power Supply Rating Changes

The MS610B/J/J1 has a power transformer with several taps so that nominal ac line voltages specified from 100 to 254 Vac can be used.

When changing to a different nominal ac line voltage, change the wiring on the appropriate primary taps of the power transformer according to Fig. 2-12.

(Refer to the circuit diagram **24** in Section 4.)

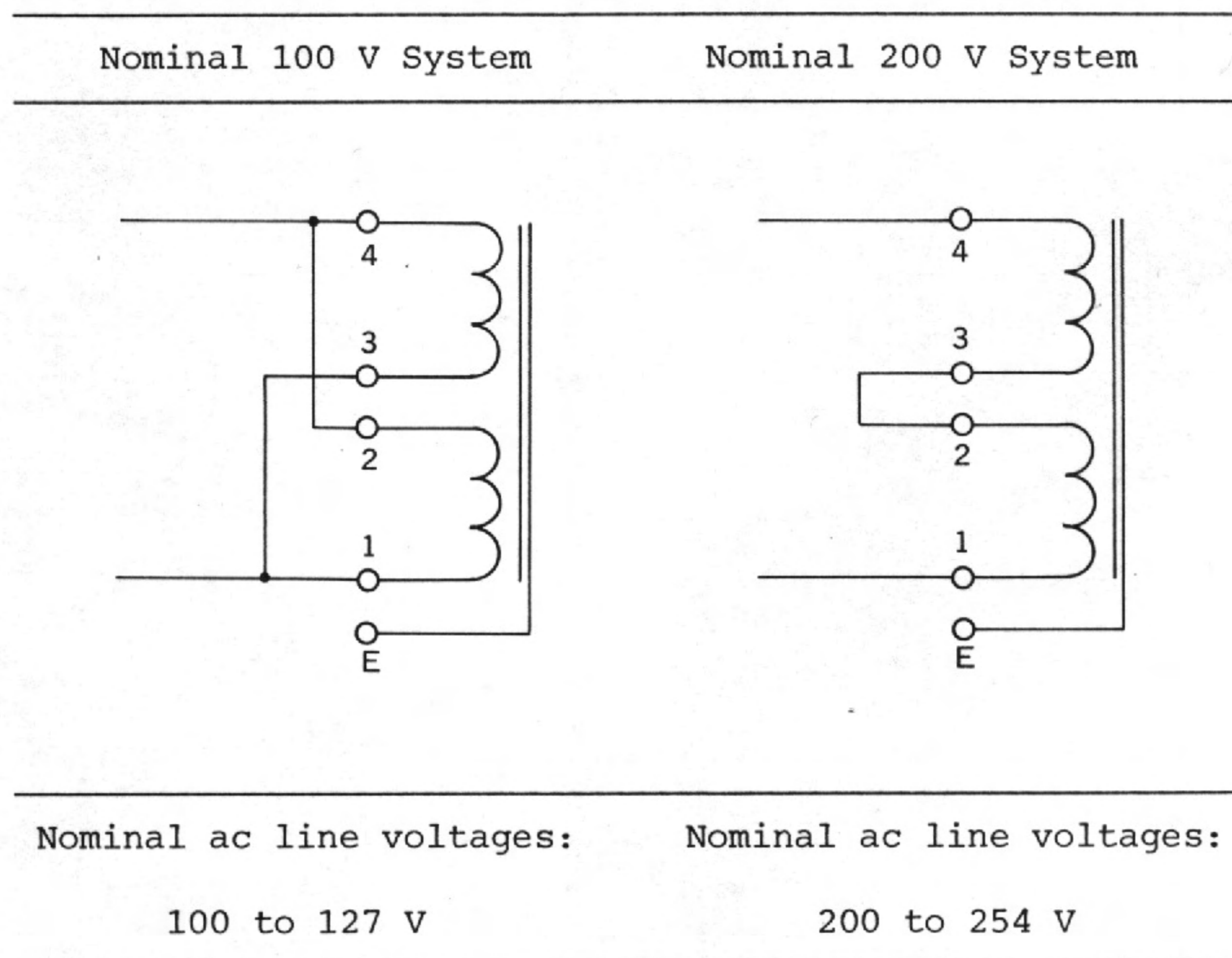


Fig. 2-12 Ac Line Power Supply Rating Change



## SECTION 3

### CIRCUIT DESCRIPTION

#### 3.1 Introduction

The MS610B/J/J1 is a superheterodyne type scanning spectrum analyzer.

The block diagram is shown in Fig. 3-1.

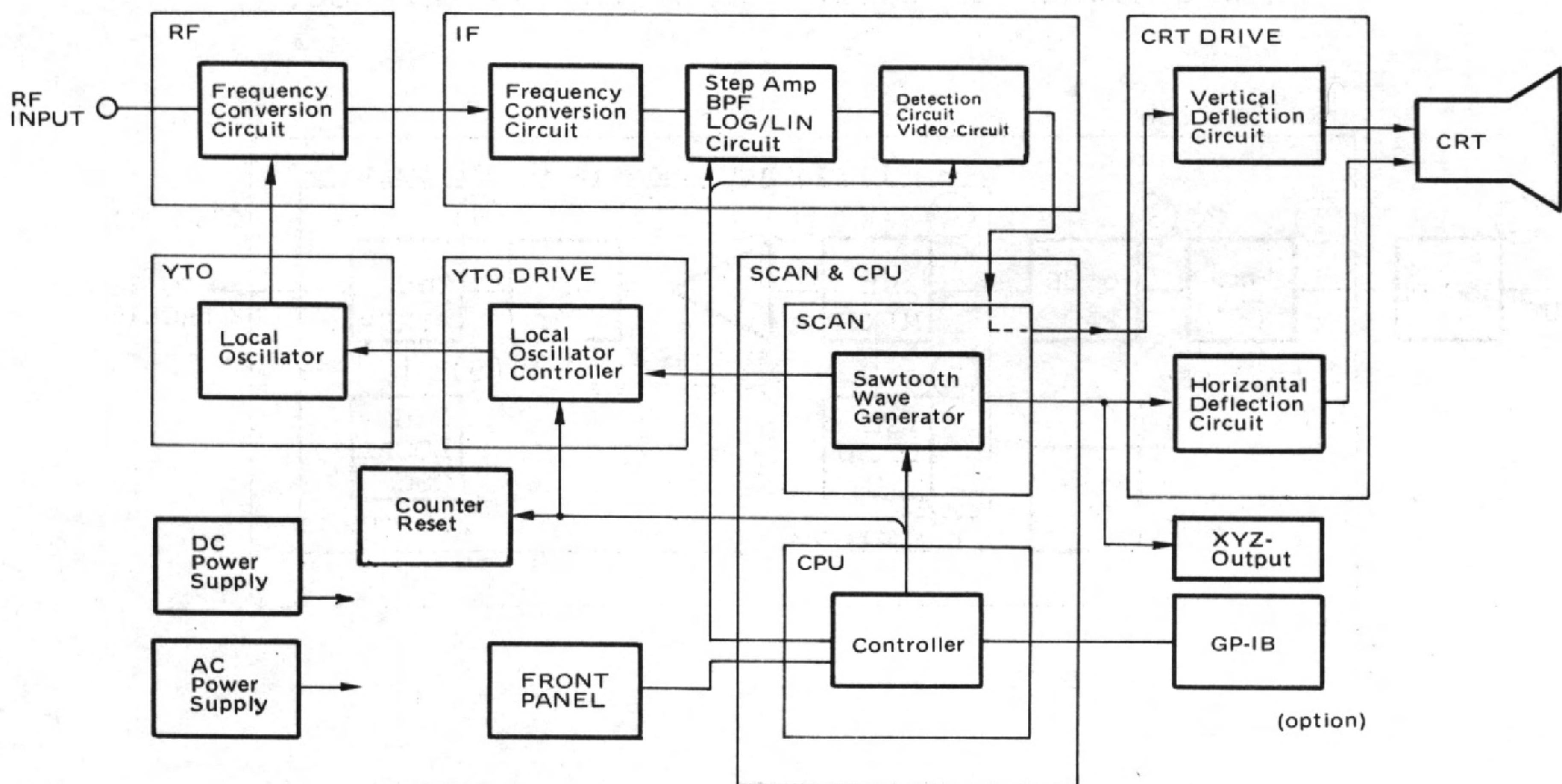


Fig. 3-1 MS610B/J/J1 Block Diagram

The RF input signal is converted to an IF signal by the frequency conversion circuit mixer in RF and IF Sections. This IF signal is detected and is applied to the CRT vertical deflection plate. The sweep signal is generated by a sawtooth wave generator and is applied to the CRT horizontal deflection plate. This sweep signal simultaneously sweeps the local oscillator, and frequency sweep corresponding to the CRT horizontal axis is performed. A controller controls each section using a microcomputer.



### 3.2 RF Section

After the RF input signal passes through the P-ATT (Programmable Attenuator), 0 to 2 GHz LPF and 6 dB PAD, it is sent to the Frequency Conversion Circuit. The input signal is converted to a 21.4 MHz IF signal after double frequency conversion as shown in Fig. 3-2. After the input signal is beat up to 2.5214 GHz to prevent image response, it is converted to 21.4 MHz.

The CAL signal is generated by the 50 MHz OSC.

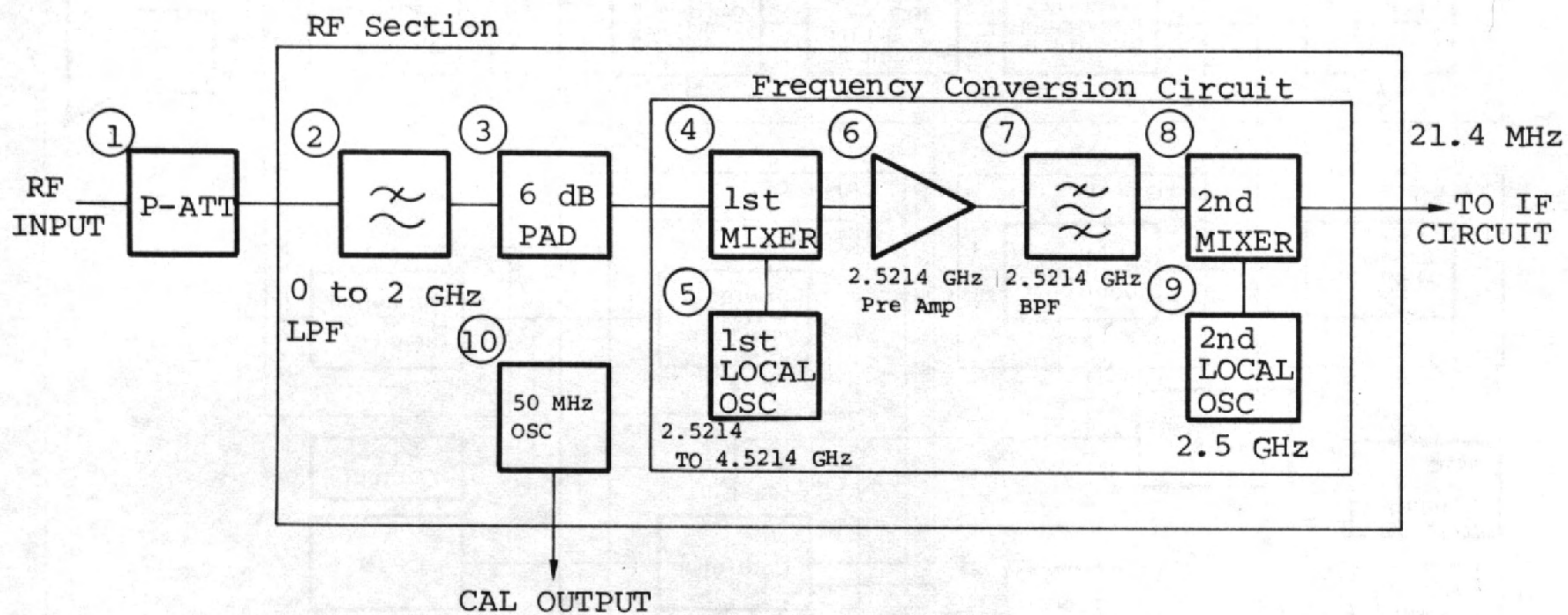


Fig. 3-2

The P-ATT is exposed in a front corner when the bottom cover is removed.

A diecast case, which includes the RF section, is exposed on the right side when the top and right side covers are removed.

The layout of the RF Section in the diecast case is shown in Fig. 3-3. The numbers in Fig. 3-3 correspond to the numbers in Fig. 3-2.



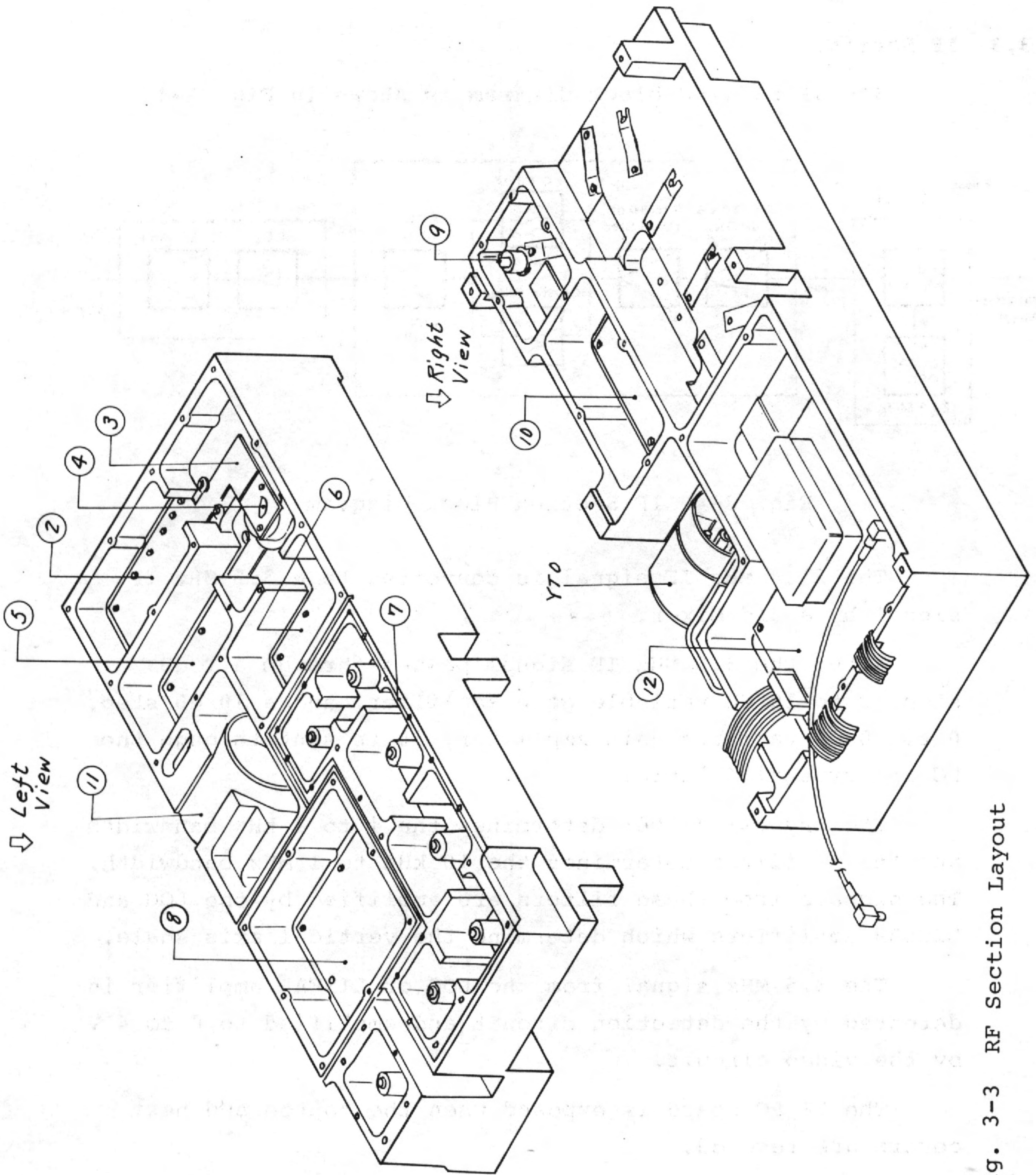


Fig. 3-3 RF Section Layout



### 3.3 IF Section

The IF SECTION block diagram is shown in Fig. 3-4.

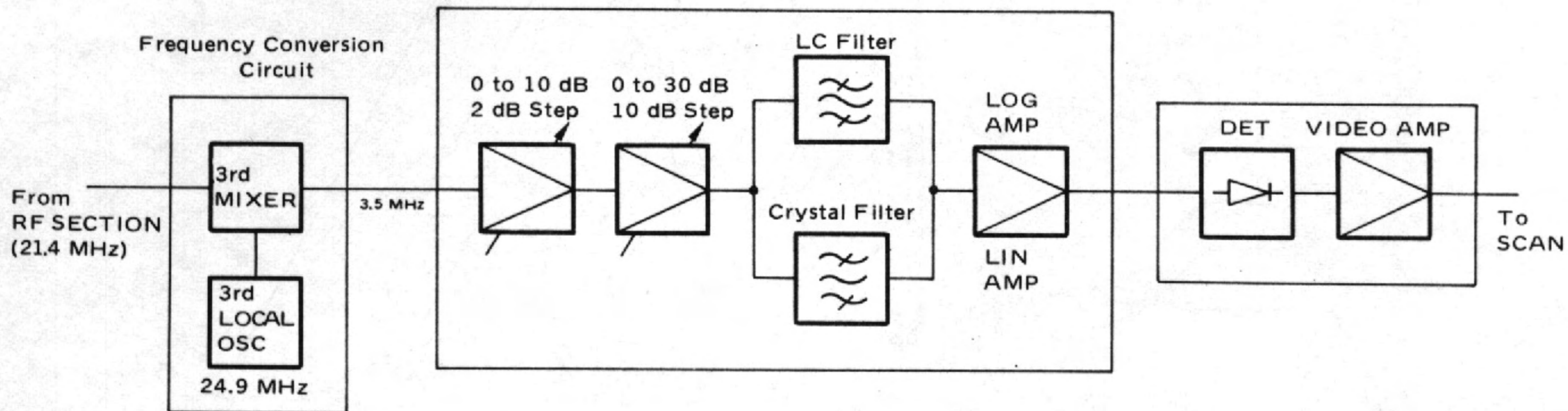


Fig. 3-4 IF Section Block Diagram

The 21.4 MHz IF signal is converted to a 3.5 MHz IF signal by a 3rd Mixer.

After the 3.5 MHz IF signal passes through a 2 dB step, 0 to 10 dB variable gain amplifier, and a 10 dB step, 0 to 30 dB variable gain amplifier, it is sent through the LC and crystal filters.

The crystal filter determines the 1 to 3 kHz bandwidth and the LC filter determines the 10 kHz to 1 MHz bandwidth. The signals from these filters are amplified by the LOG and LINEAR amplifiers which determine the vertical axis scale.

The 3.5 MHz signal from the LOG or LINEAR amplifier is detected by the detection circuit and amplified to 0 to 4 V by the video circuit.

The IF PC board is exposed when the bottom and next covers are removed.



### 3.4 Scan & CPU Sections

#### (1) Scan section

The Scan section block diagram is shown in Fig. 3-5.

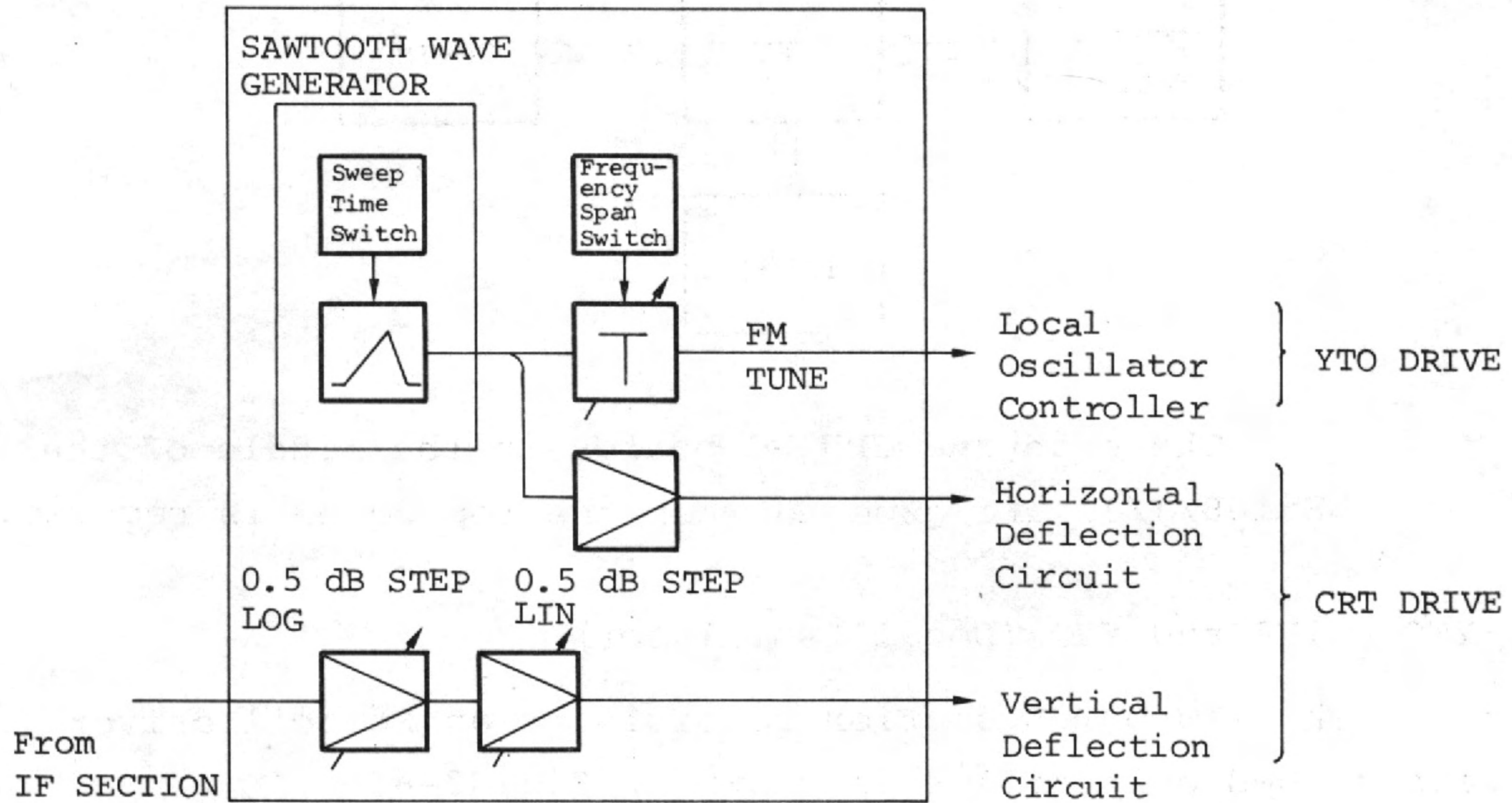


Fig. 3-5 Scan Section Block Diagram

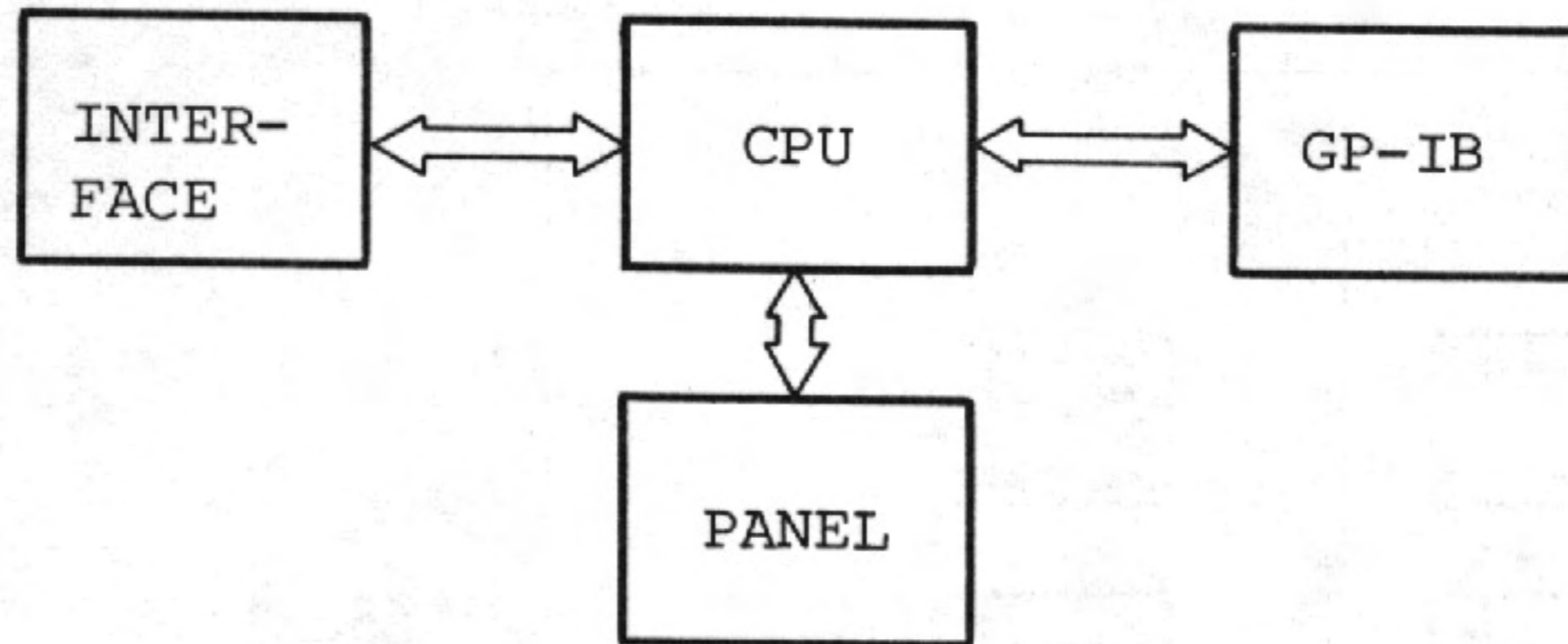
The sweep time is determined by the SWEEP TIME switch; the sawtooth wave signal sweeps the 1st local oscillator through the FREQ SPAN switch that controls the FREQ SPAN. The SWEEP TIME switch and FREQ SPAN switch are controlled by the controller. The sawtooth wave signal also sweeps the CRT horizontal axis.

After the detected signal from the IF section passes through a 0.5 dB step Log amplifier and a 0.5 dB step Linear amplifier, it is sent to the vertical deflection circuit in the CRT DRIVE section.



(2) CPU section

The MS610B/J/J1 uses a CPU controller. Each circuit is controlled via an interface circuit for panel key inputs. GP-IB control is also performed.



The scan and CPU PC boards in the middle of the MS610B/J/J1 are exposed when the top cover is removed.

3.5 YTO DRIVE and YTO (Local Oscillator)

The YTO DRIVE section consists of an FM coil driver and a TUNE coil driver as shown in Fig. 3-6.

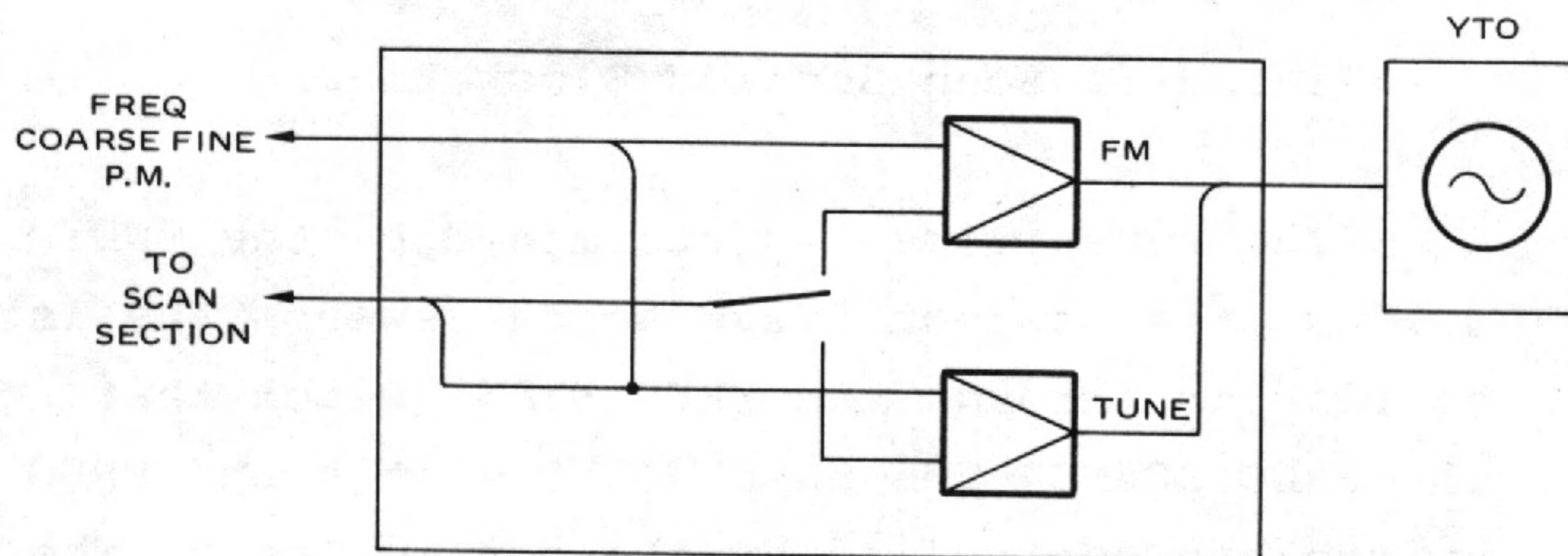


Fig. 3-6 YTO DRIVE Block Diagram



The YTO (1st Local Oscillator) contains tuning and FM coils that are driven by current.

A YTO tuned coil is used in the 5 MHz to 2 GHz wide-band sweep and a YTO FM coil is used in the 100 kHz to 2 MHz narrow-band sweep.

The YTO and YTO driver are mounted in the diecast case as shown in Fig. 3-3.

### 3.6 CRT DRIVE

The CRT DRIVE section receives X-, Y-, Z-axis (Blanking) and marker pulse signals from the Scan section, and intensity-controlling signal. These signals are converted to the high voltages which drive the CRT.

The PC board can be seen by removing left and protection covers.

Be careful of the high voltage.

### 3.7 Power Supply and Front Panel

#### (1) Power supply

The Power Supply section produces the dc power supply ( $\pm 15$  V,  $\pm 12$  V, +5 V).

The angle (hatched) with the power supply PC board is exposed in the middle when the top cover is removed. (See Fig. 5-2.)

#### (2) Front panel

The front panel section drives all LEDs under control of the CPU and sends the status of front panel keys to the CPU.

The front panel PC boards are installed in front behind the displays and keys.



SECTION 4  
CIRCUIT DIAGRAMS

Table 4-1 lists the names of all PC boards. It also gives the circuit diagram numbers.

Table 4-1 Circuit Diagrams and PC Boards

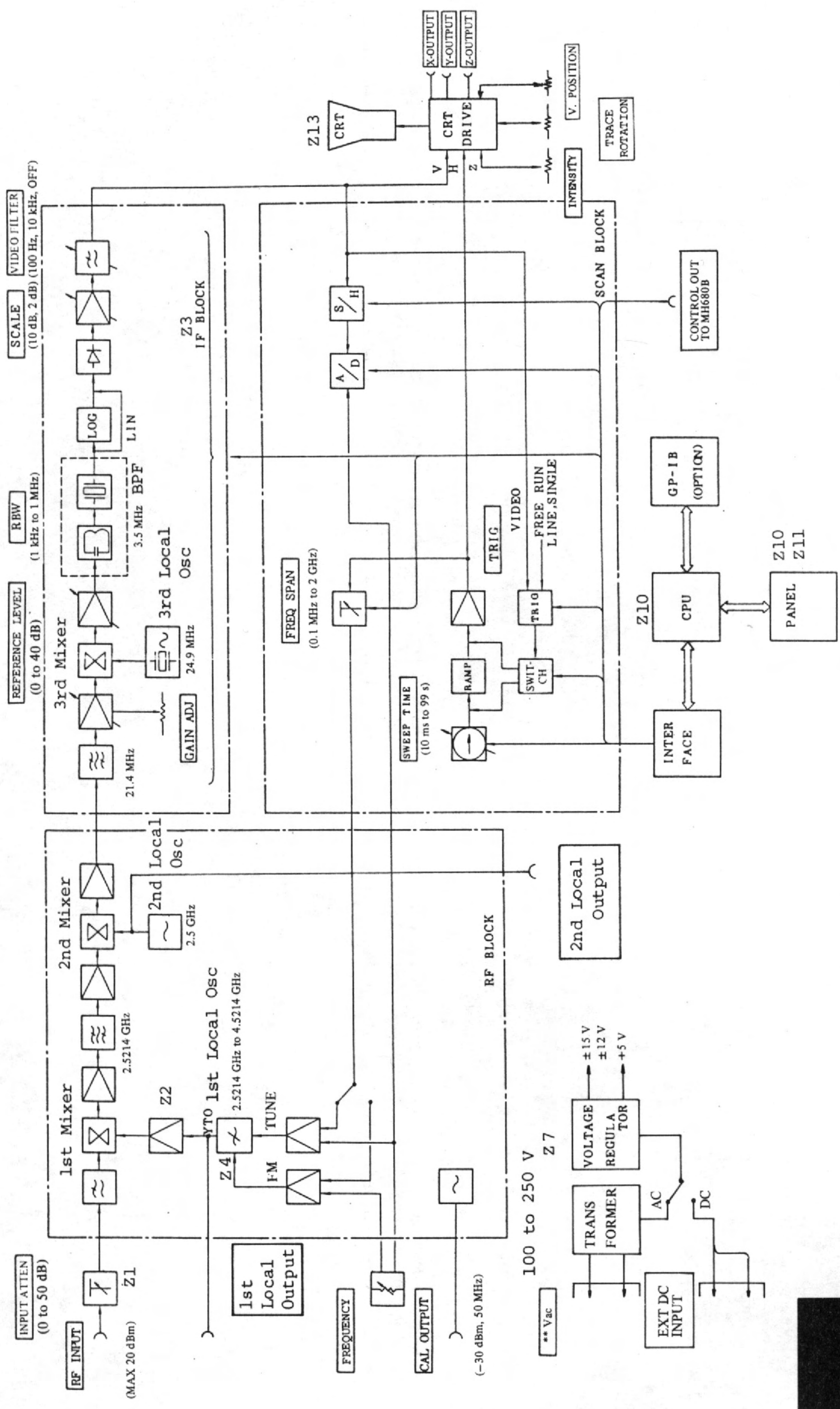
Circuit Diagram No.	Z No.	Name	PC Board No.
1		MS610B/J/J1 Block Diagram	_____
2		MS610B/J/J1 Circuit Diagram	_____
3		FRONT PANEL (1) (2) Block Diagram	_____
4	Z11	FRONT PANEL (1) Circuit Diagram	332U25794
5	Z11	FRONT PANEL (2) Circuit Diagram	332U25792
6		IF Block Diagram	_____
7	Z3	IF Circuit Diagram	322U10018 (or 322U9289)
8		SCAN (Scan & CPU) Block Diagram	_____
9		CPU (Scan & CPU) Block Diagram	_____
10	Z9 & Z10	SCAN & CPU Circuit Diagram	322U9261
11		CRT DRIVE Block Diagram	_____
12	Z12	CRT DRIVE Circuit Diagram	332U25790



Table 4-1 (Continued)

Circuit Diagram No.	Z No.	Name	PC Board No.
13		YTO DRIVE Block Diagram	_____
14	Z5	YTO DRIVE Circuit Diagram	332U25796
15		RF CONVERTER Block Diagram	_____
16	Z2	RF CONVERTER Circuit Diagram	_____
17		2nd. CONVERTER Circuit Diagram	332U25775
18		50 MHz OSC Circuit Diagram	342U84163
19		2.5214 GHz PRE AMP Circuit Diagram	332U25772
20		2.5 to 4.5 GHz LO AMP Circuit Diagram	332U27955
21		6 dB PAD Circuit Diagram	342U84146
22	Z14	DIGITAL SW Circuit Diagram	342U84816
23		POWER SUPPLY Block Diagram	_____
24	Z7	POWER SUPPLY Circuit Diagram	(No number)
25	Z17	XYZ OUTPUT Circuit Diagram	342U88434
26	Z16	GP-IB Circuit Diagram	332U25798





MS610B/J/J1 Block Diagram





33W28091 //

2

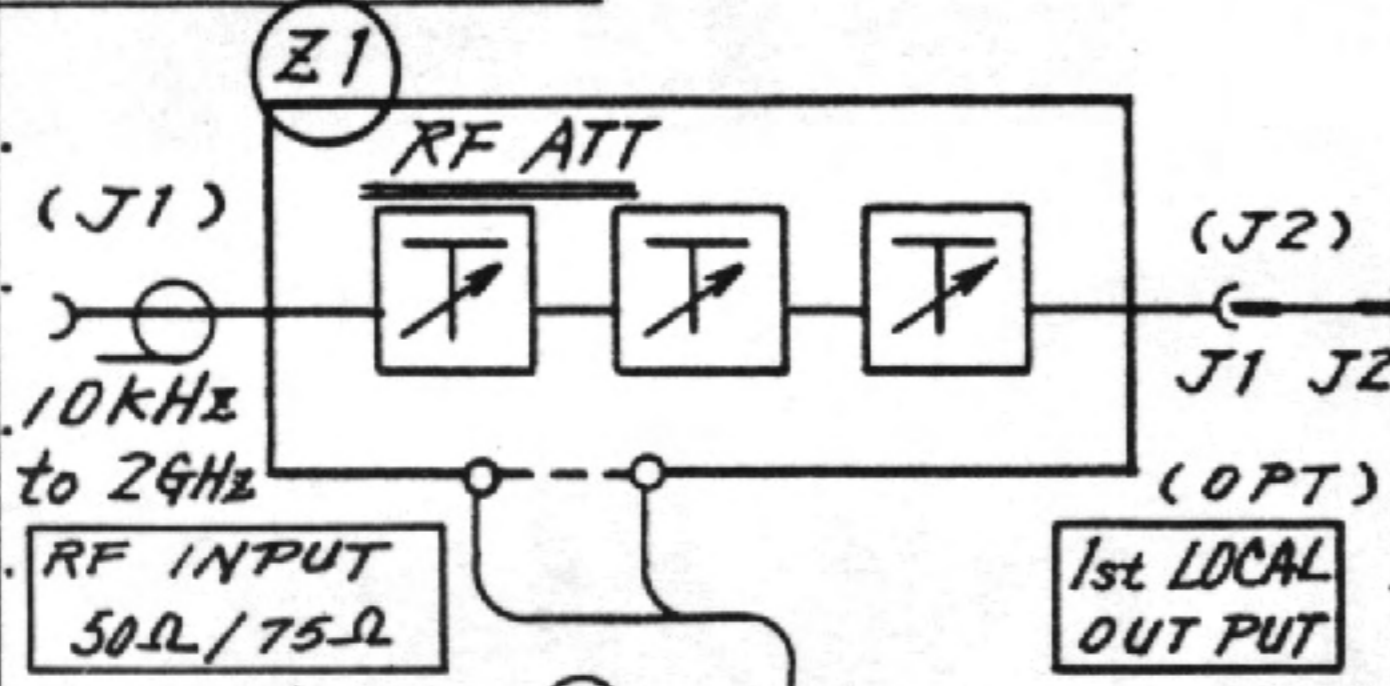
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4

APPLICATION

34Y83832

A

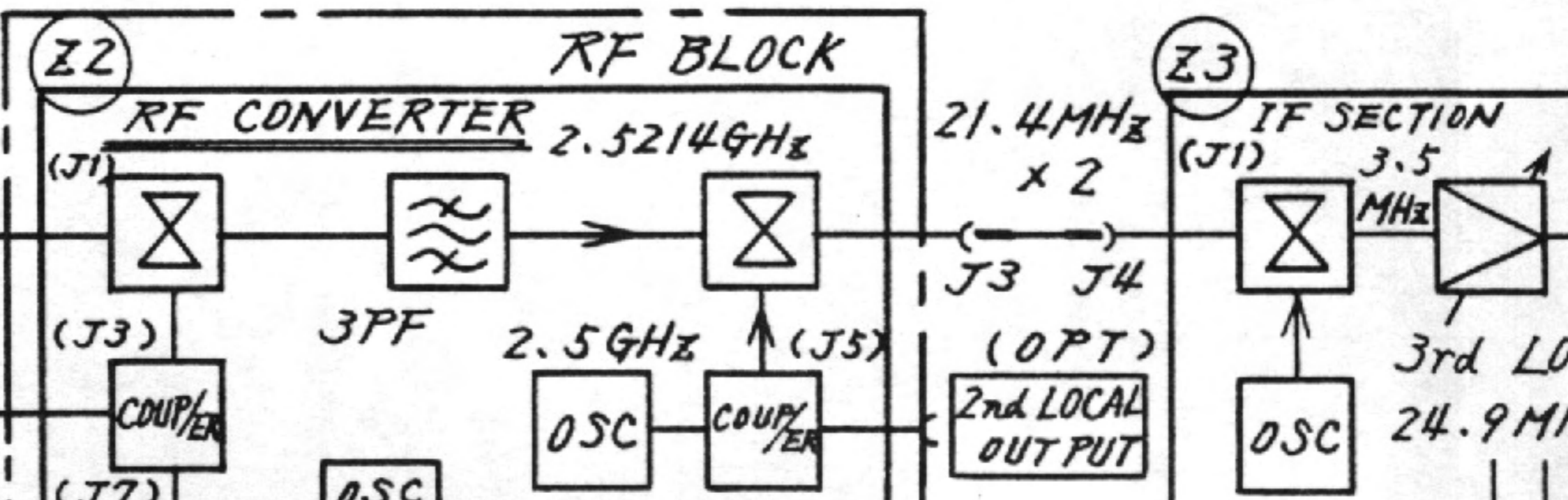
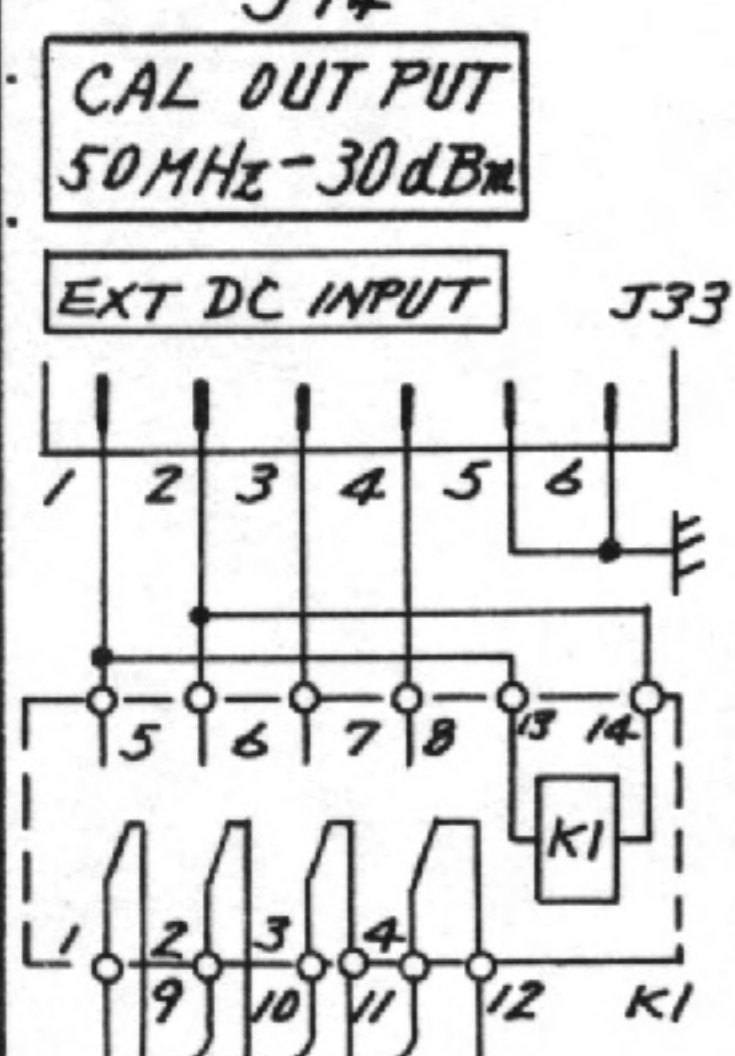


1st Mixer

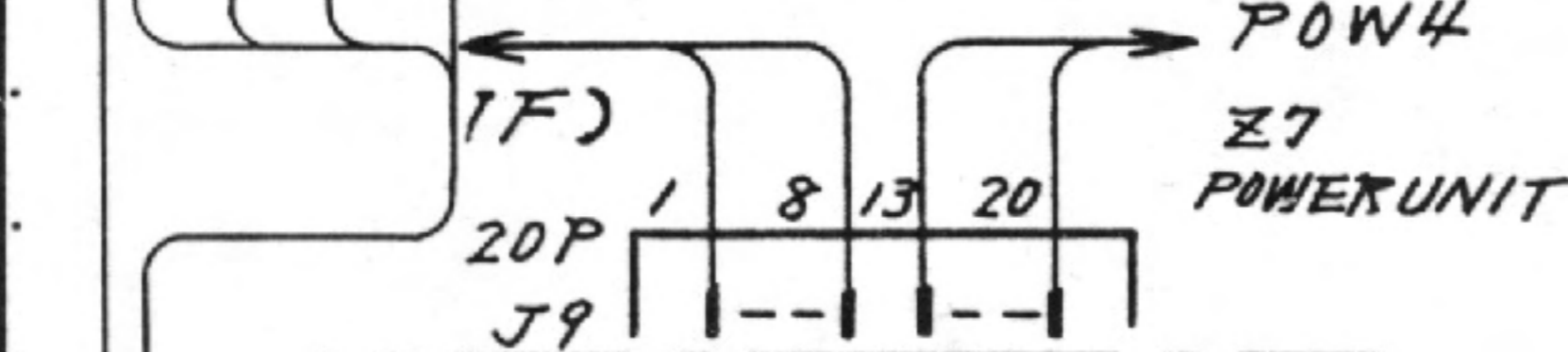
2nd Mixer

3rd Mixer

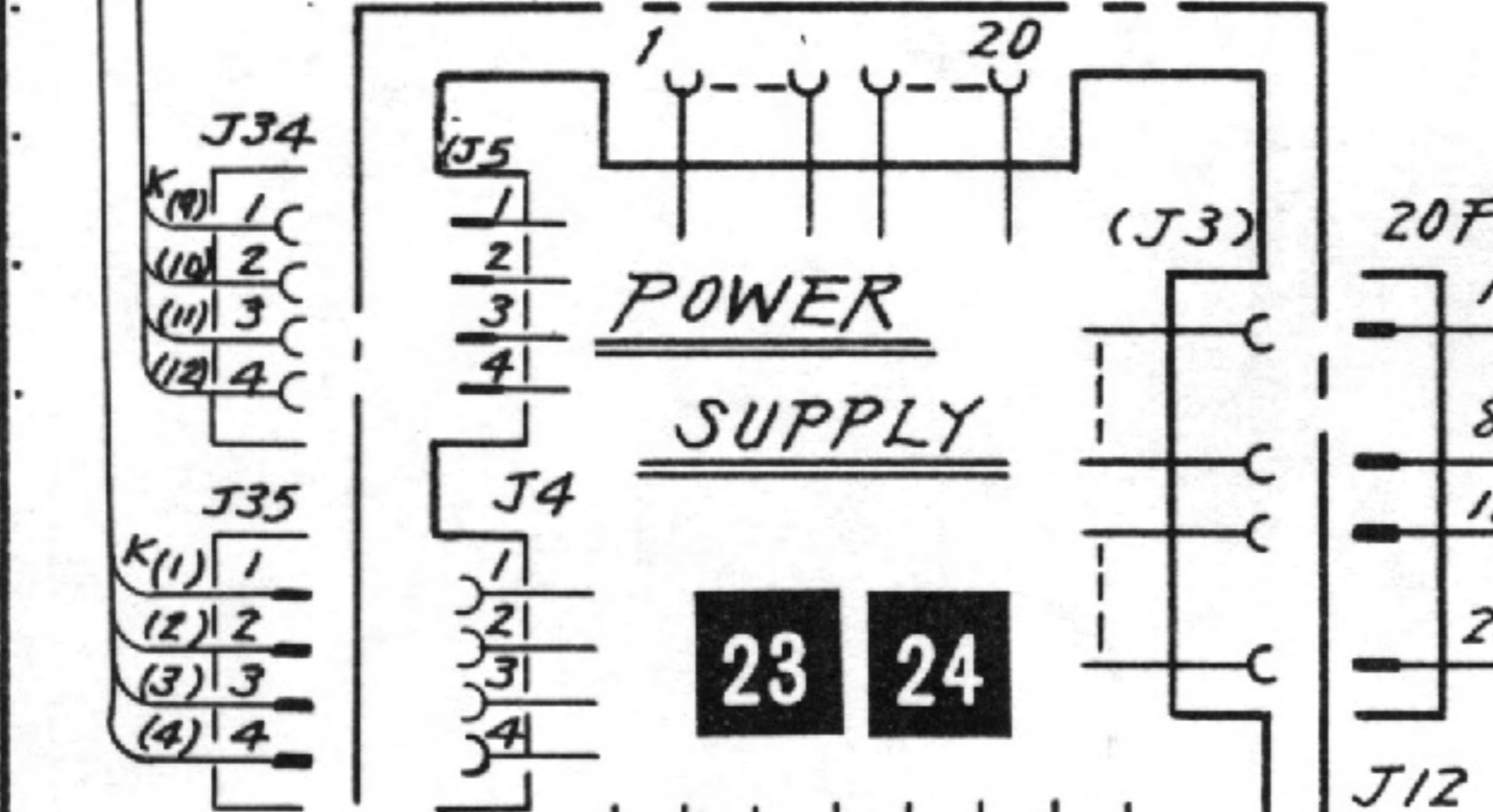
B



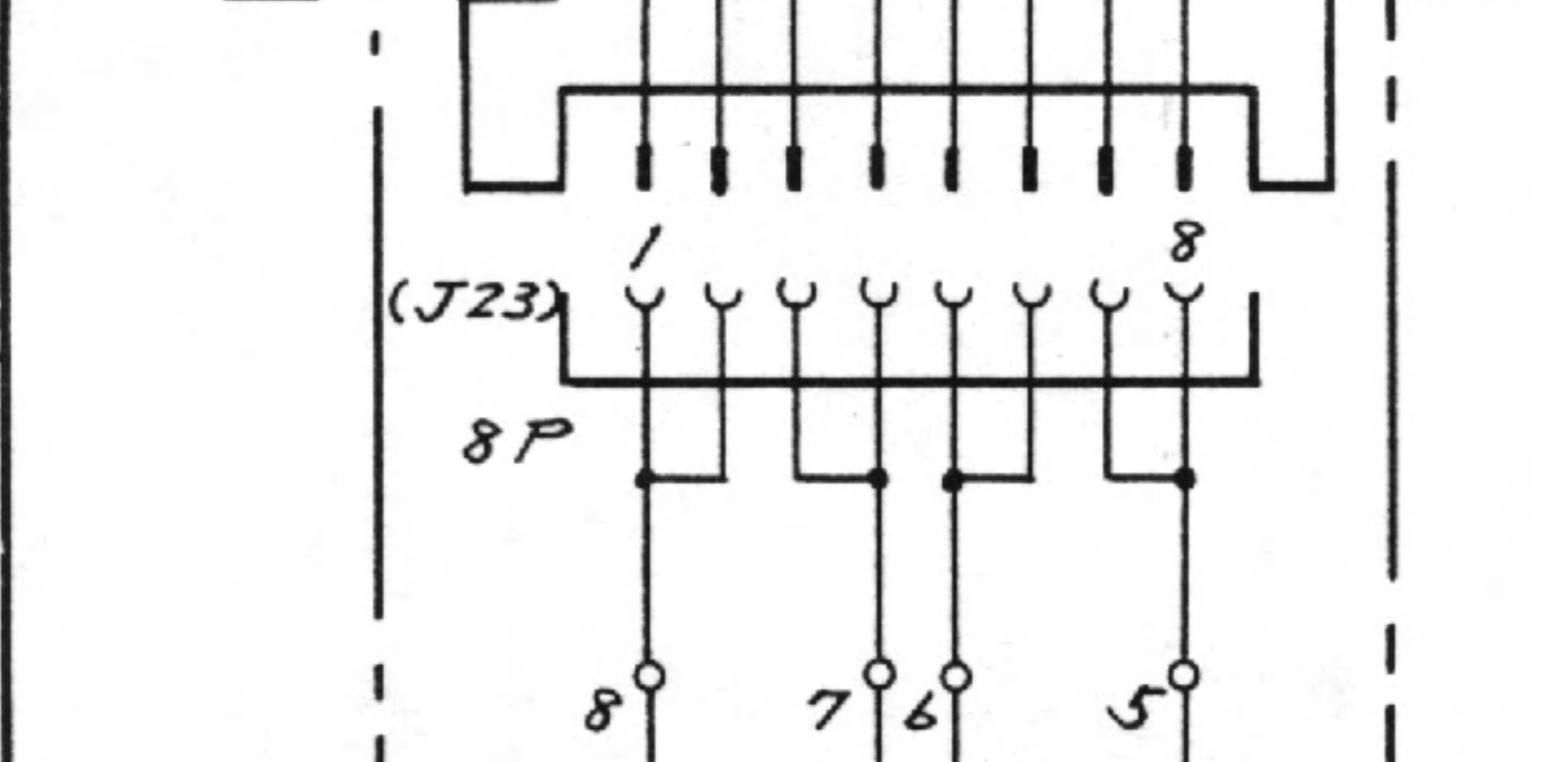
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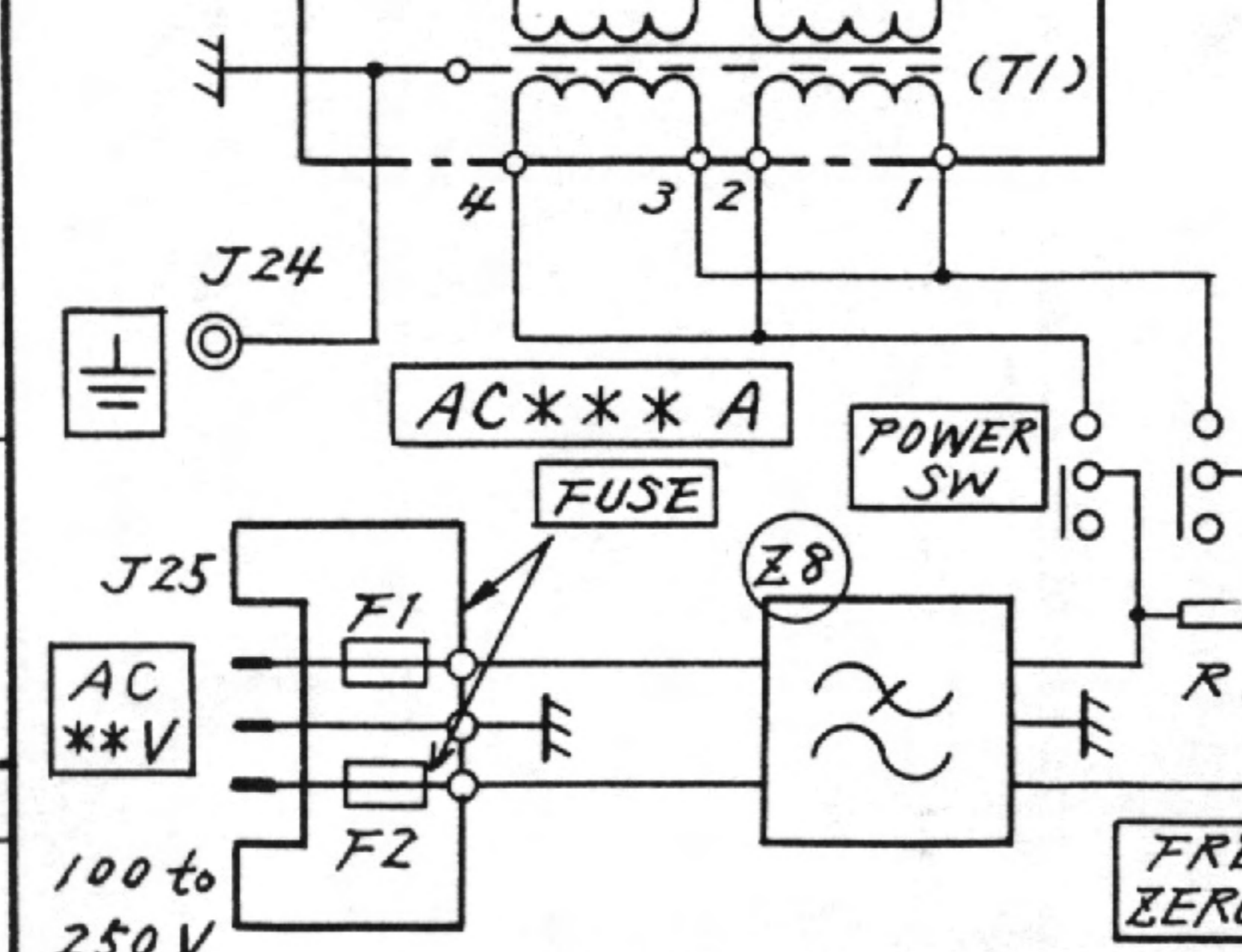
D



E



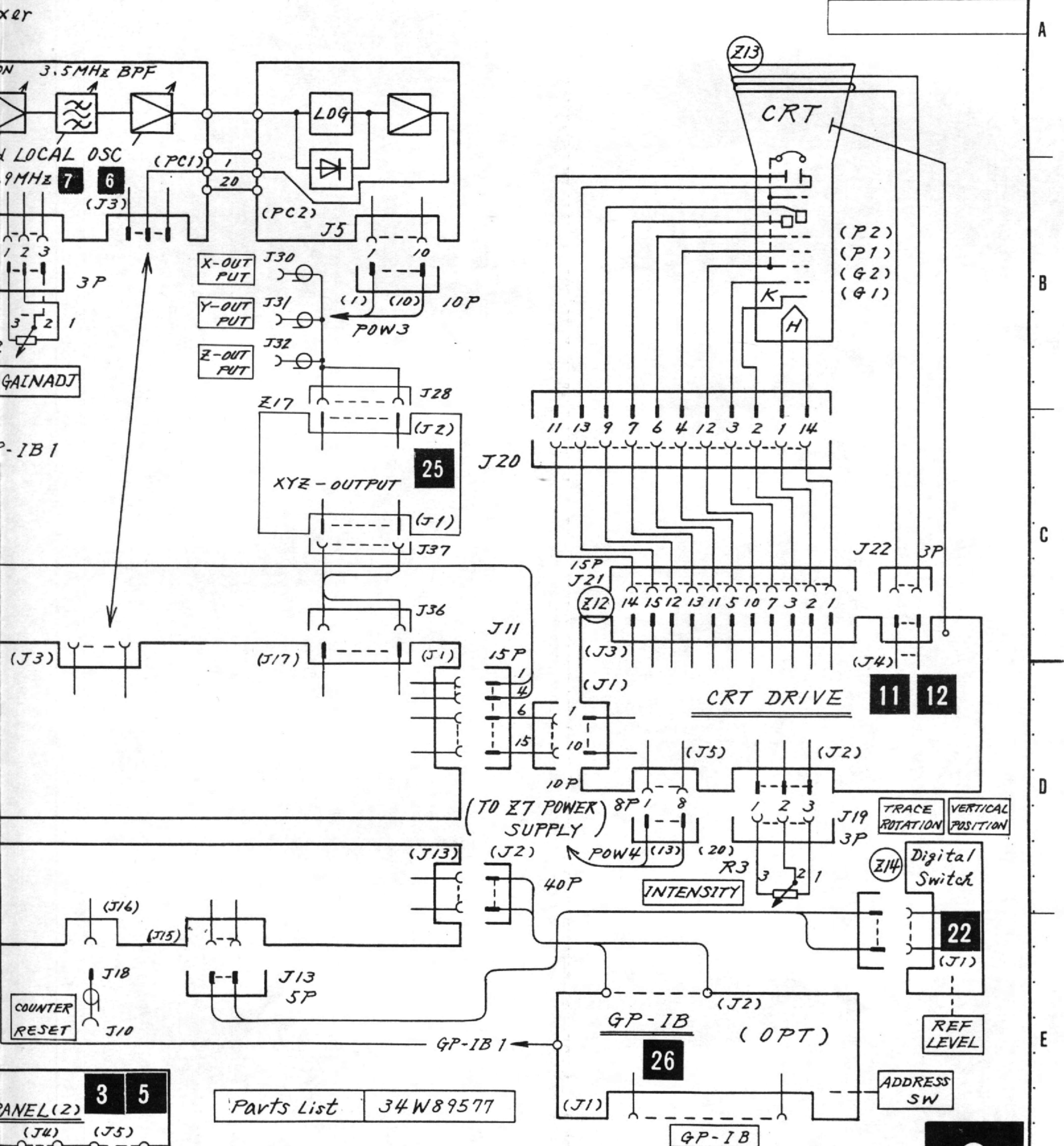
DEP



Note: When changing ac line power supply voltage rating, see p...



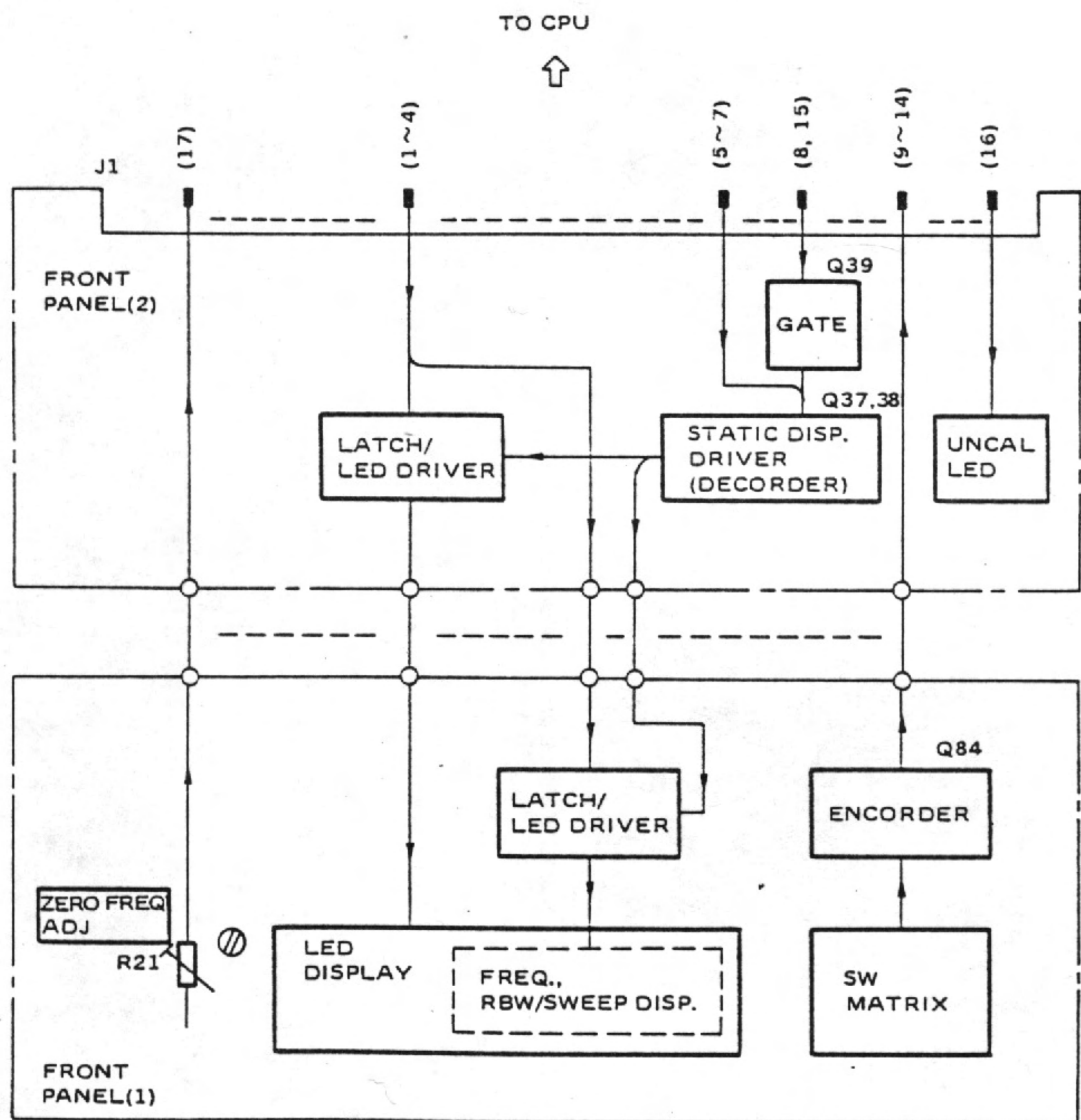
REVISIONS



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CHECKED BY			TRACED BY	SCALE	
APPROVED BY			DRAWN BY		
TITLE				DRAWING No.	
MS610 B/J/J1 SPECTRUM ANALYZER CIRCUIT DIAGRAM				33W.28091 1/1	

see paragraph 2.2.





FRONT PANEL  
Block Diagram

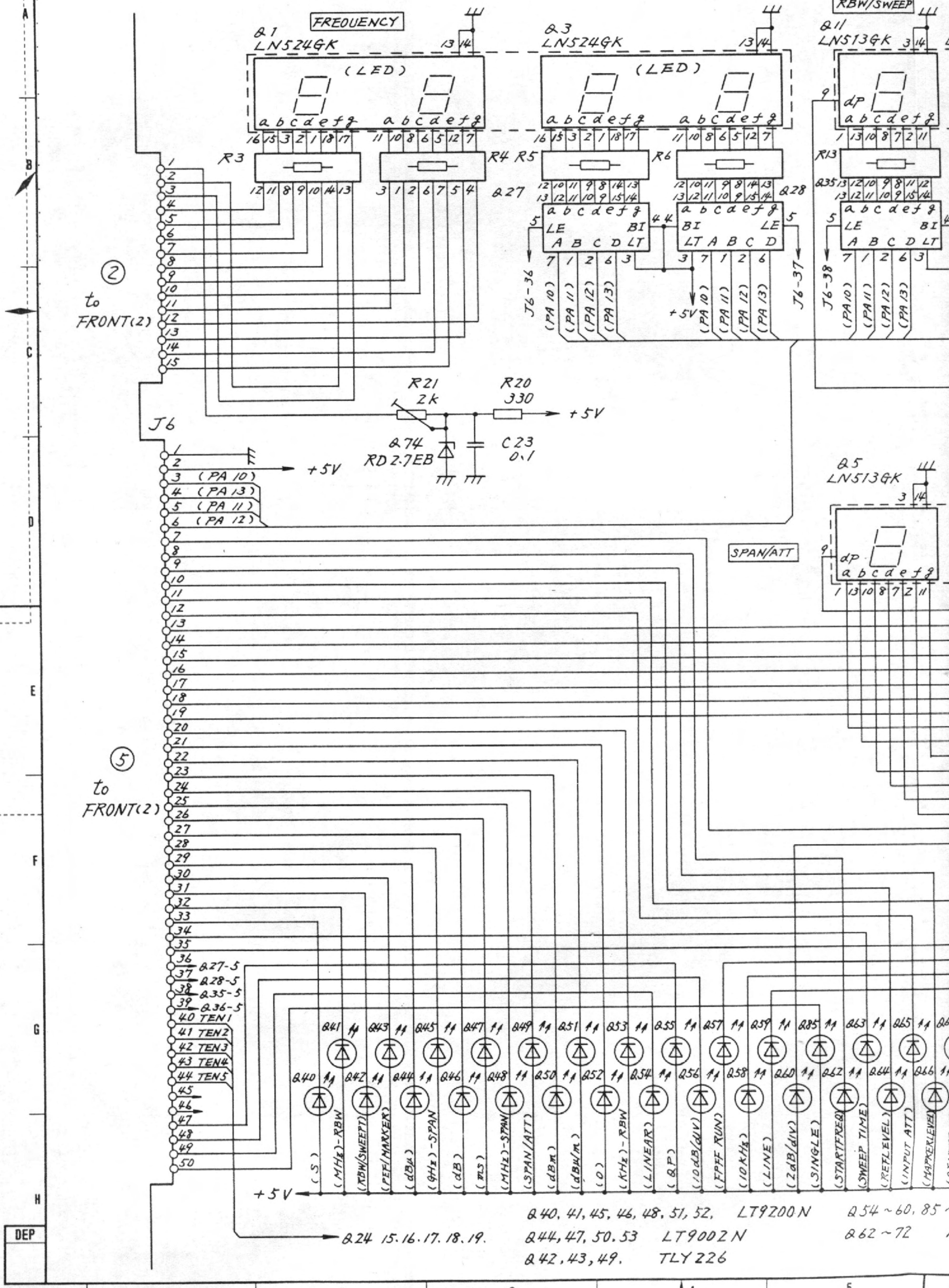


APPLICATION  
34Y83839

R3~R6  
AHR-7-561JB

Q27-28, 35, 36  
TC4511BP

R13, R14  
AHR-7-122JB



②  
to  
FRONT(2)

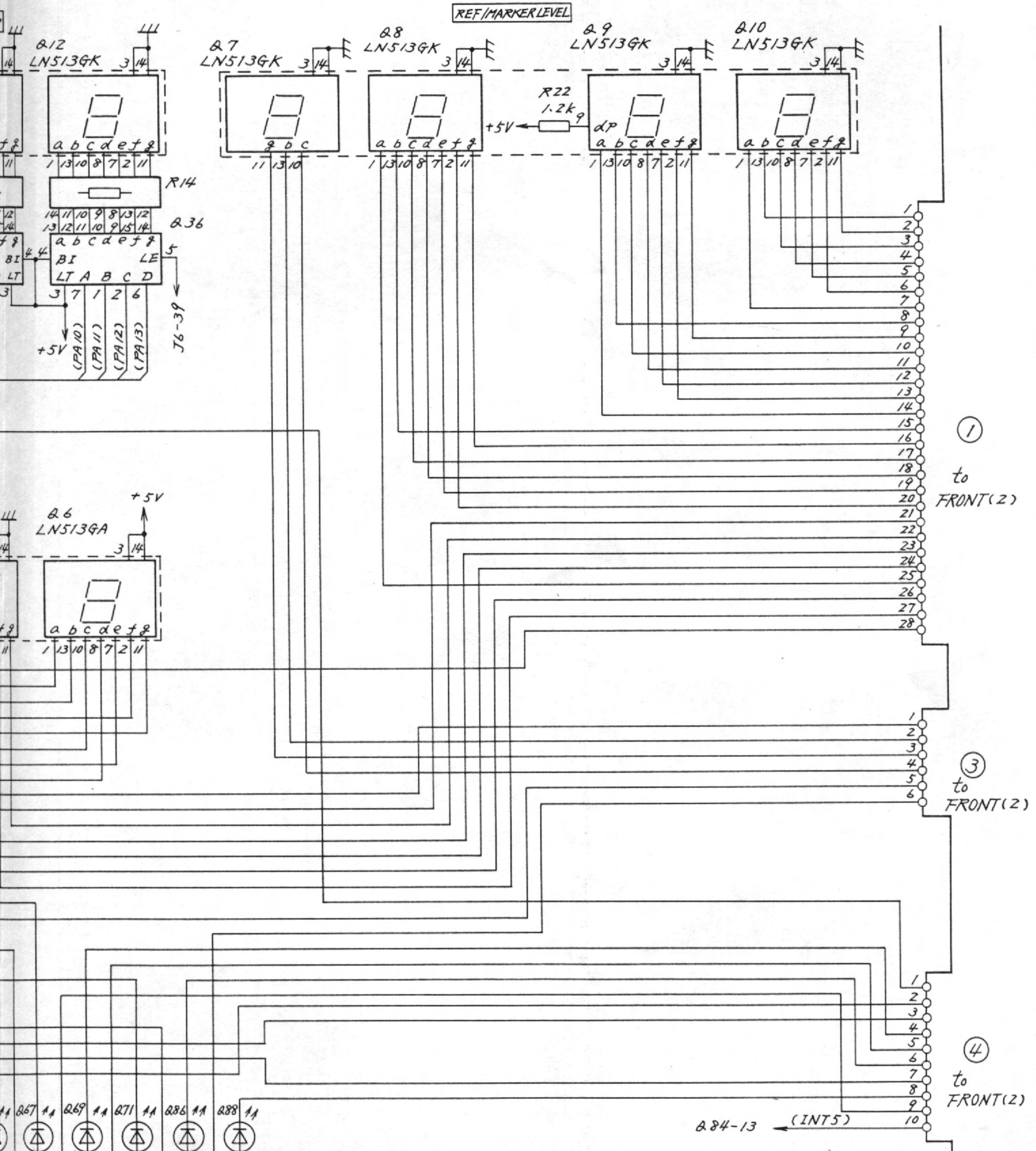
⑤  
to  
FRONT(2)

DEP

Q40, 41, 45, 46, 48, 51, 52, LT9200N  
Q44, 47, 50, 53 LT9002N  
Q42, 43, 49, TLY 226  
Q54~60, 85~  
Q62~72

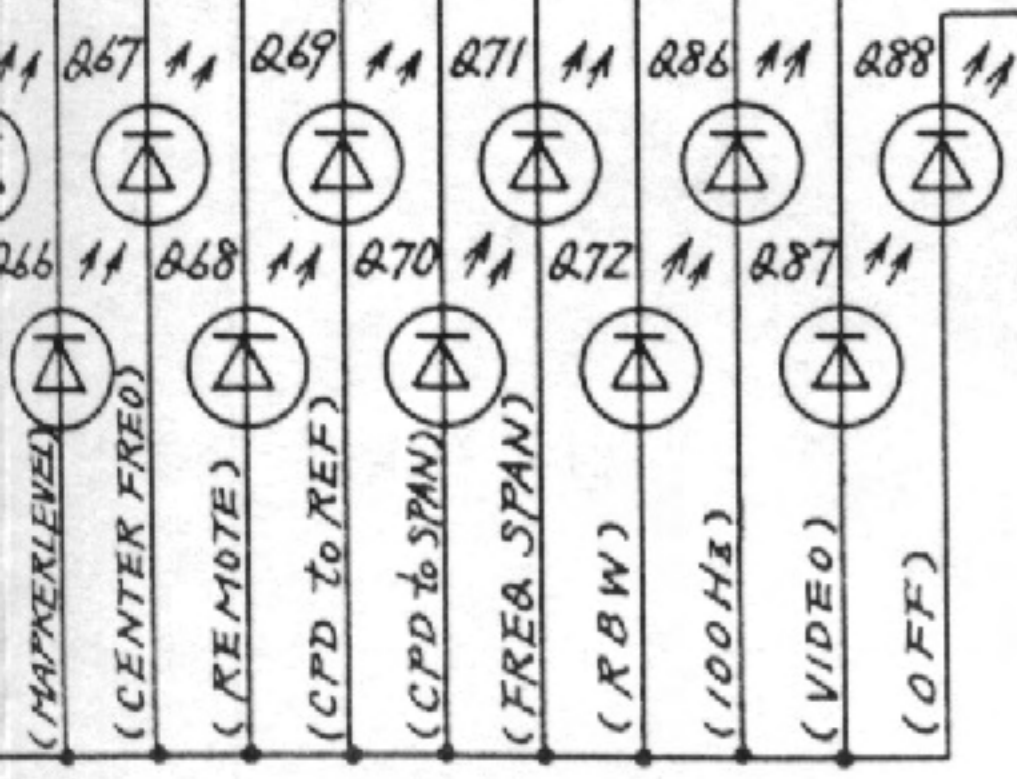


2JB



Parts List 34W85992

332U25794



85~88 TLG 226  
HL 20-LSYG

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	APPROVED BY		DRAWN BY		
TITLE				DRAWING No.	
FRONT(1) Circuit Diagram				33W26566 1/2	

4



33W26566 2/2

2

3

4

APPLICATION

34Y83839

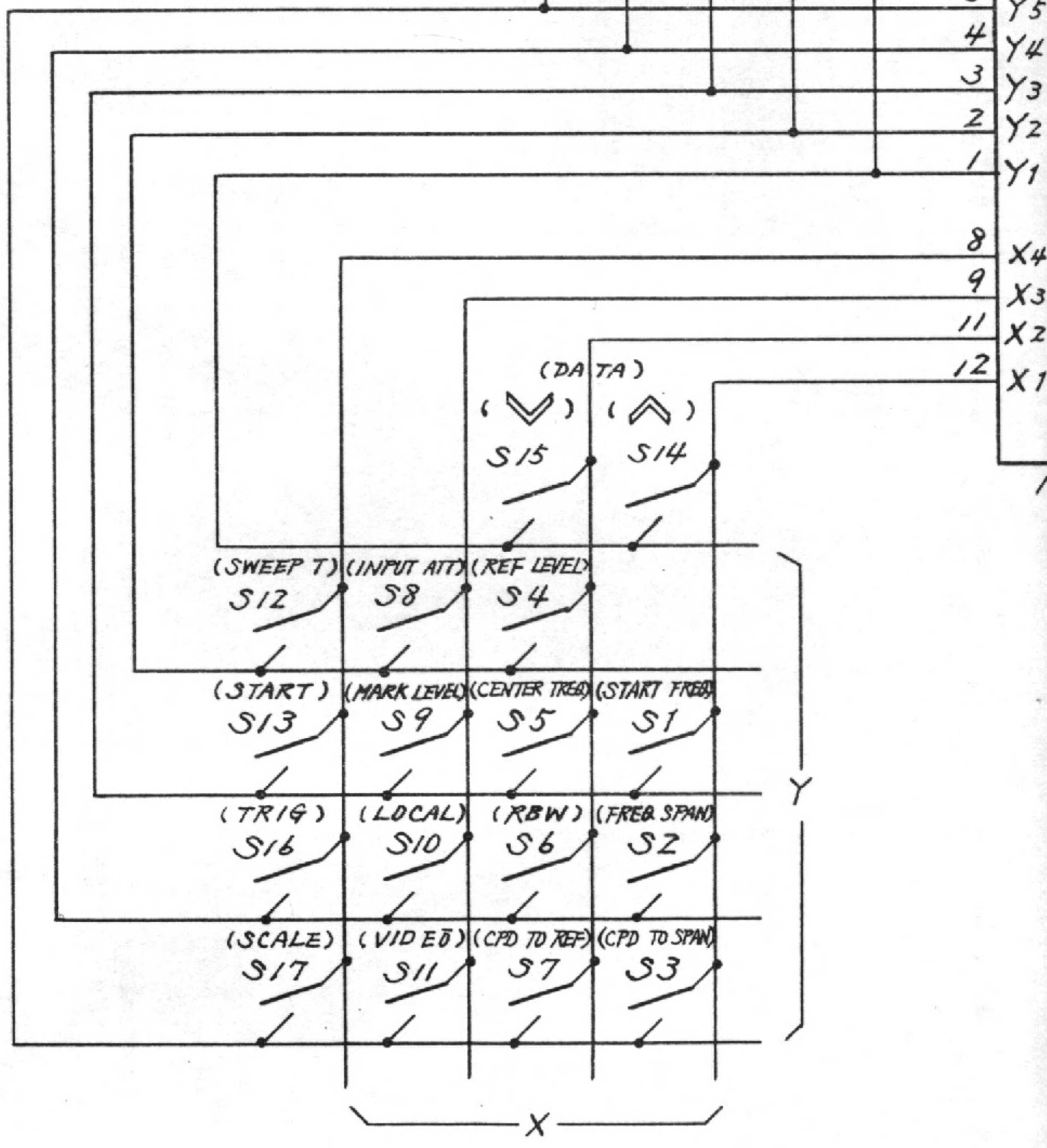
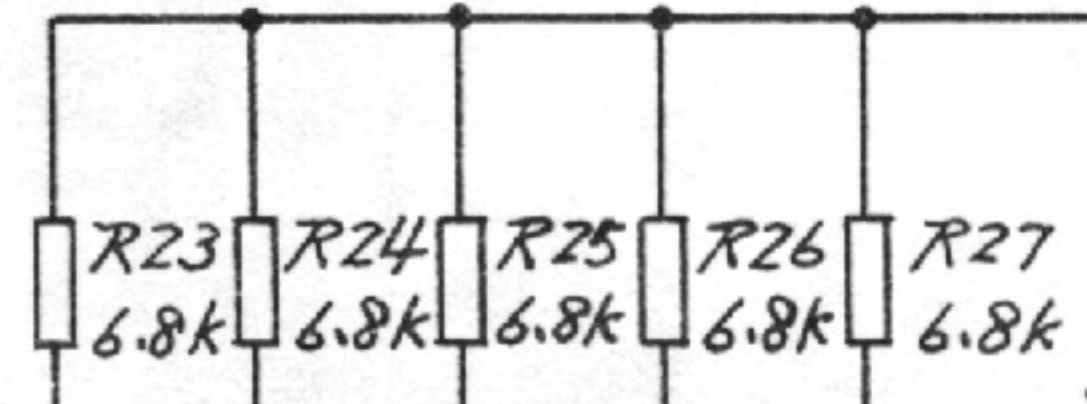
A

B

C

D

E



- 5 Y5
- 4 Y4
- 3 Y3
- 2 Y2
- 1 Y1
- 8 X4
- 9 X3
- 11 X2
- 12 X1

DEP



REVISIONS

A

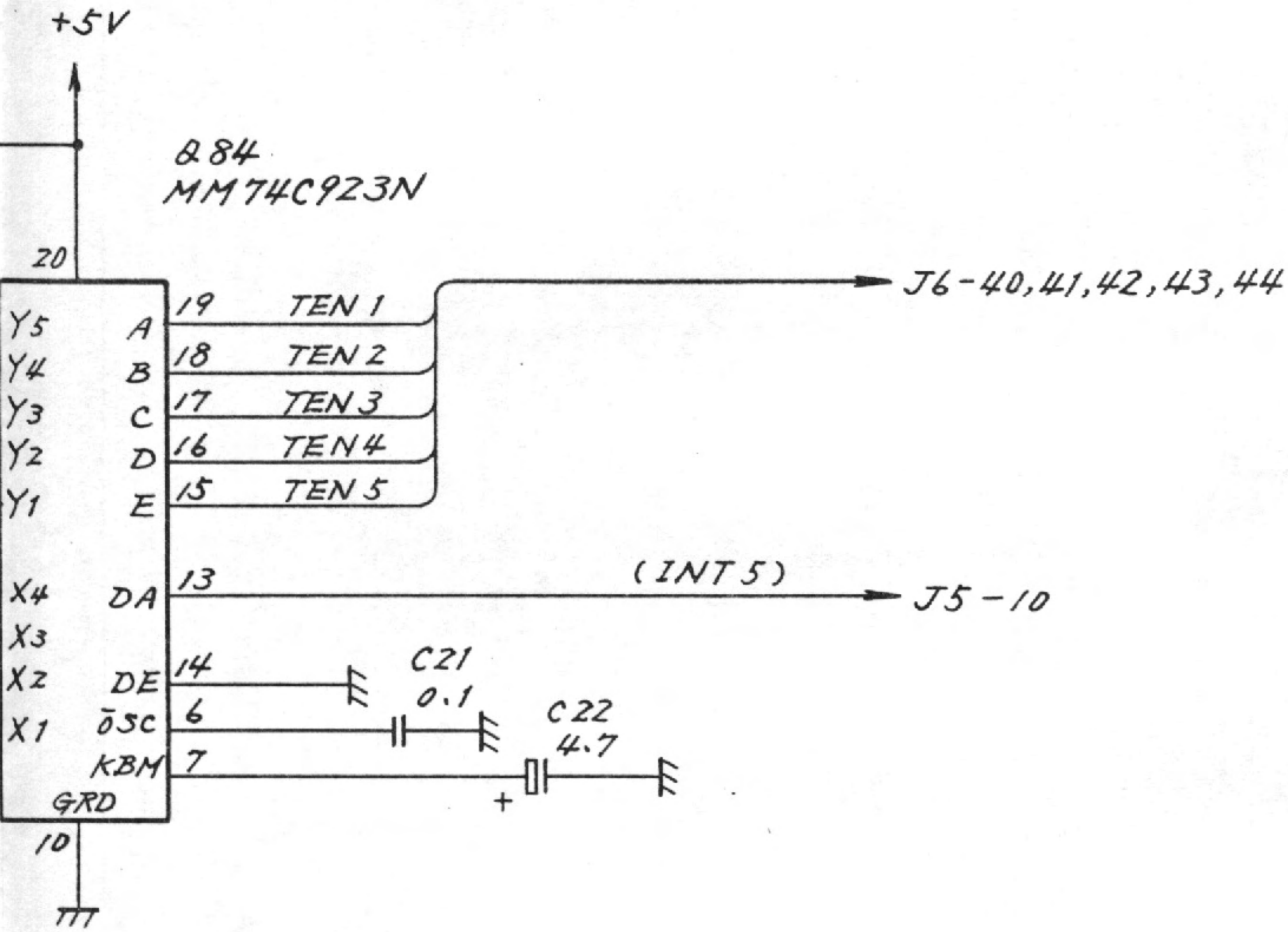
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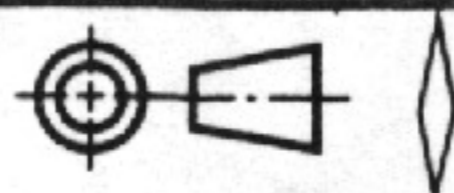
D

E

F



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					4
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APPROVED BY			DRAWN BY	:	
TITLE				DRAWING No.	
FRONT(1) Circuit Diagram				33W26566 <sup>2</sup> / <sub>2</sub>	



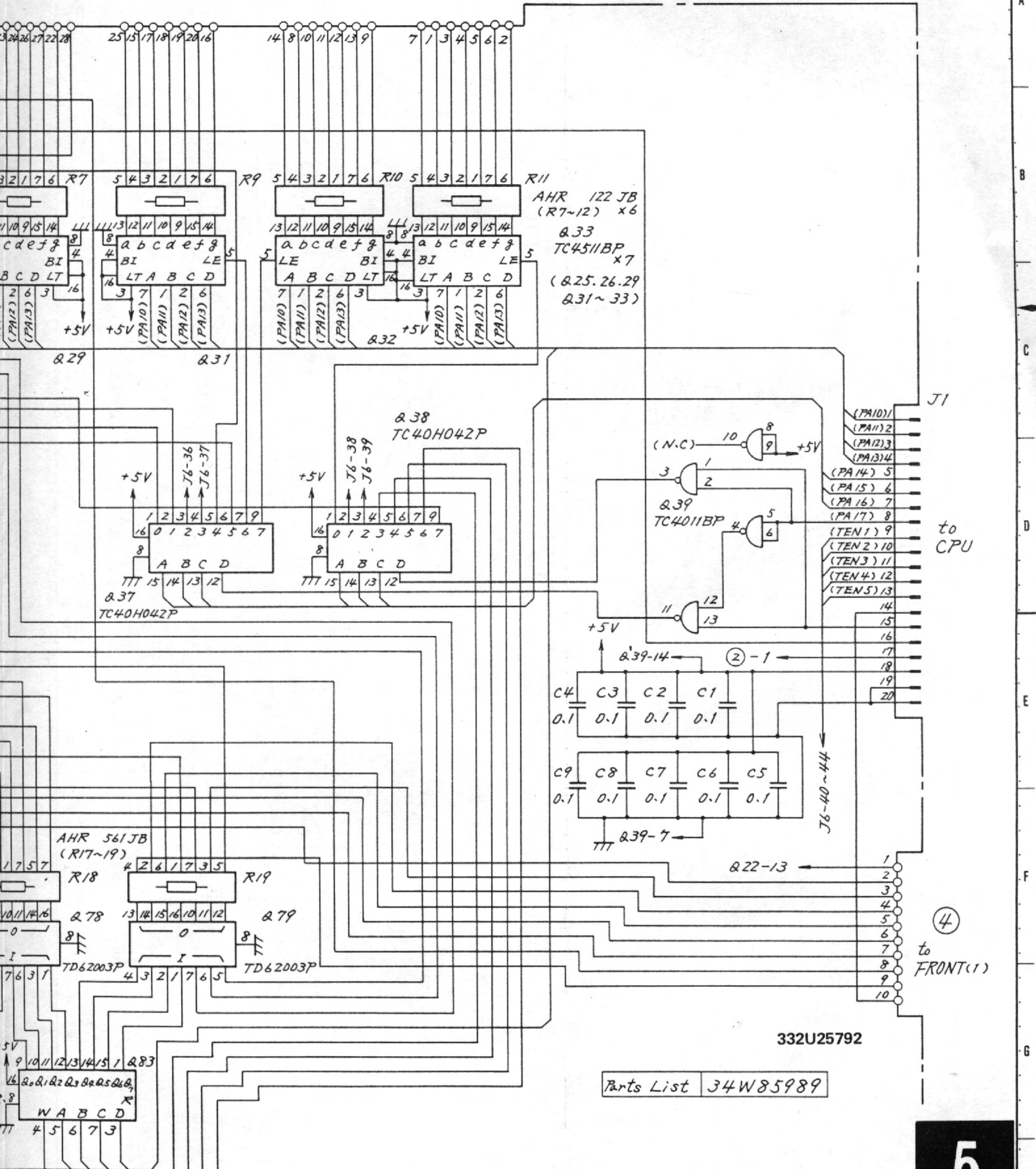






UNCAL

① to FRONT(1)



Parts List 34W85989

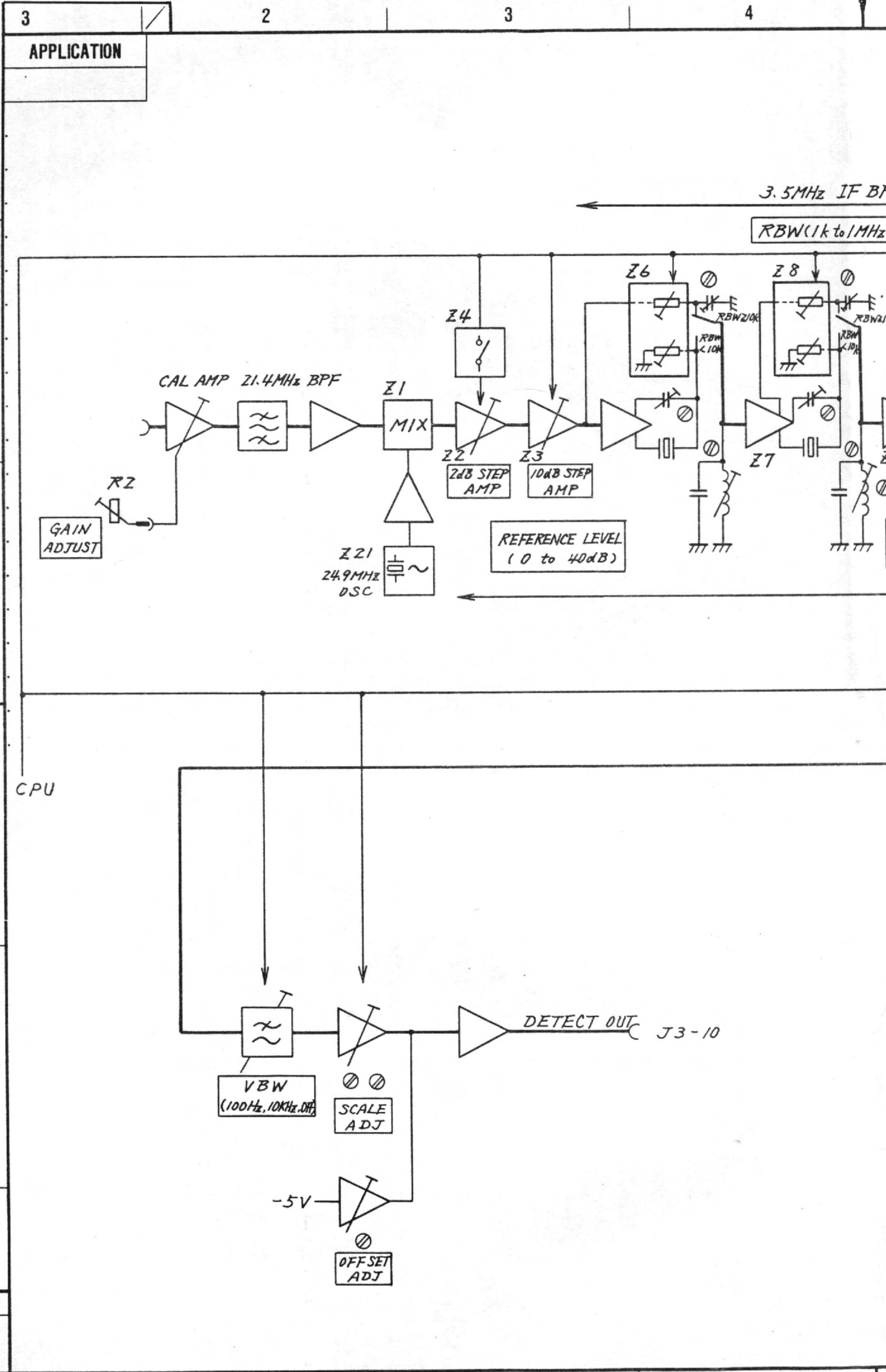
332U25792

④ to FRONT(1)

5

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TITLE				DRAWING No.	
FRONT(2) Circuit Diagram				33W26563 1/1	





3 APPLICATION

A

B

C

CPU

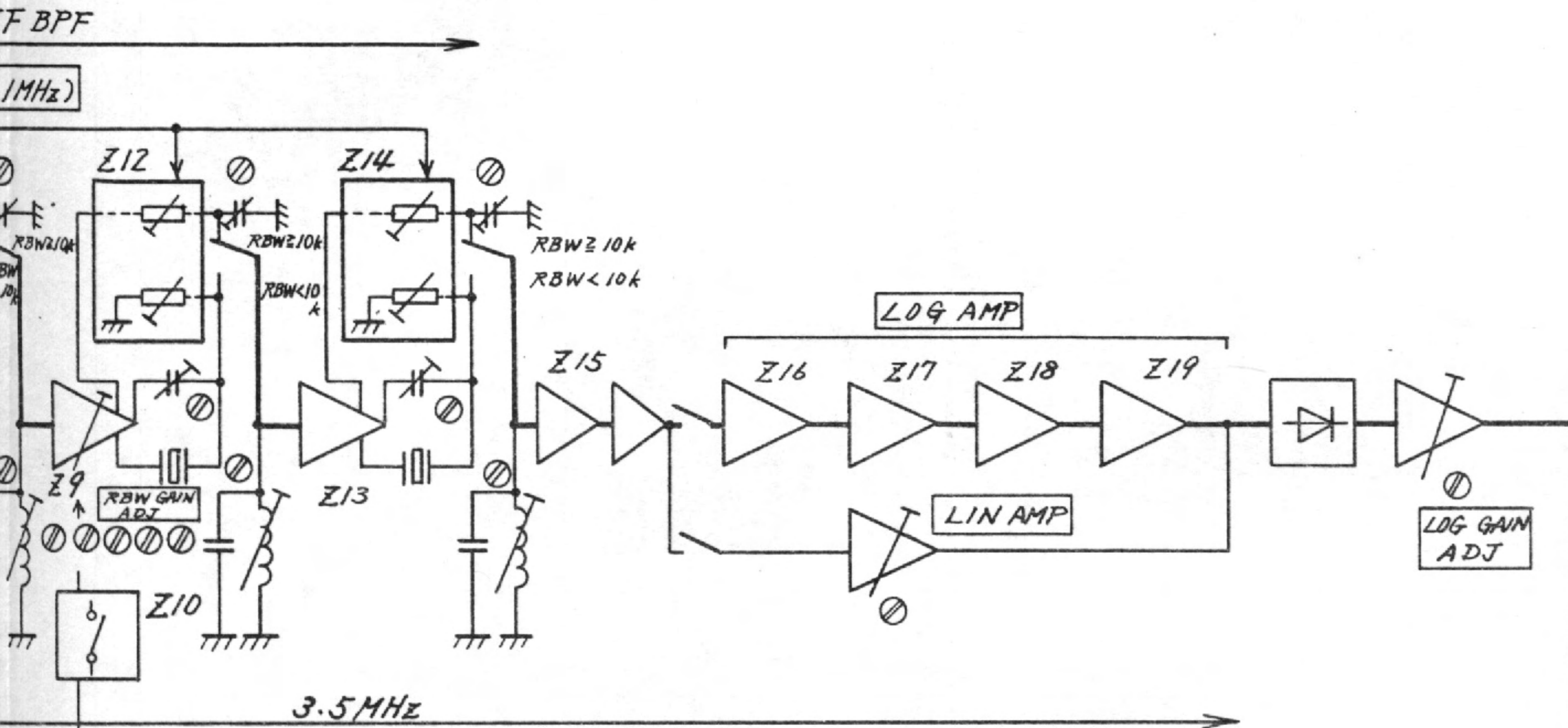
D

E

DEP



REVISIONS



6

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APPROVED BY			DRAWN BY	:		
TITLE				DRAWING No.		
IF Block				3		



33W28093 1/7

2

3

4

APPLICATION

34Y83835

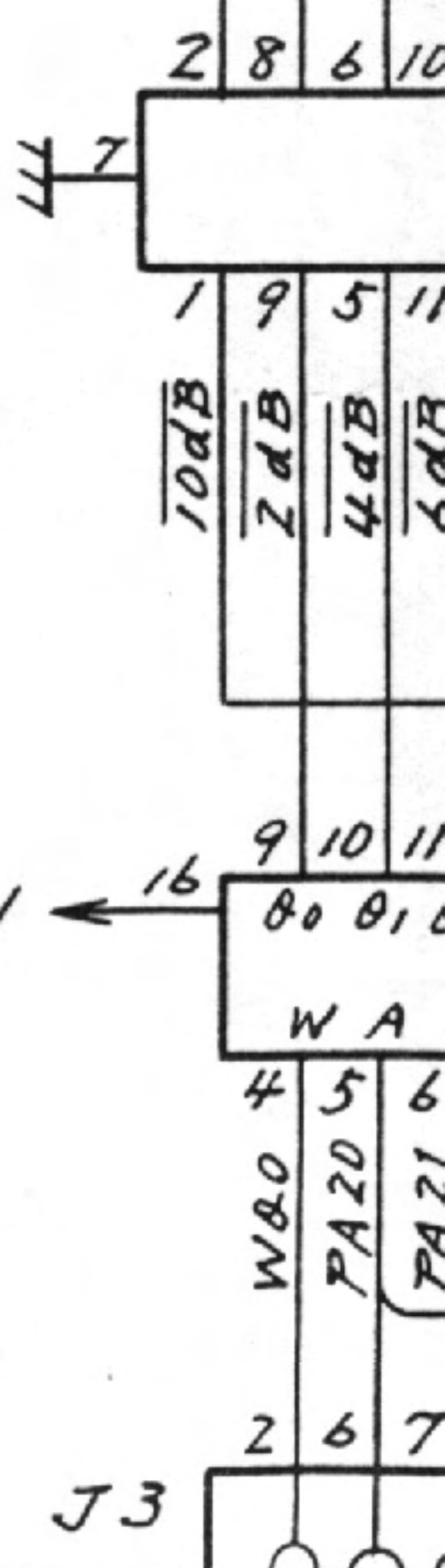
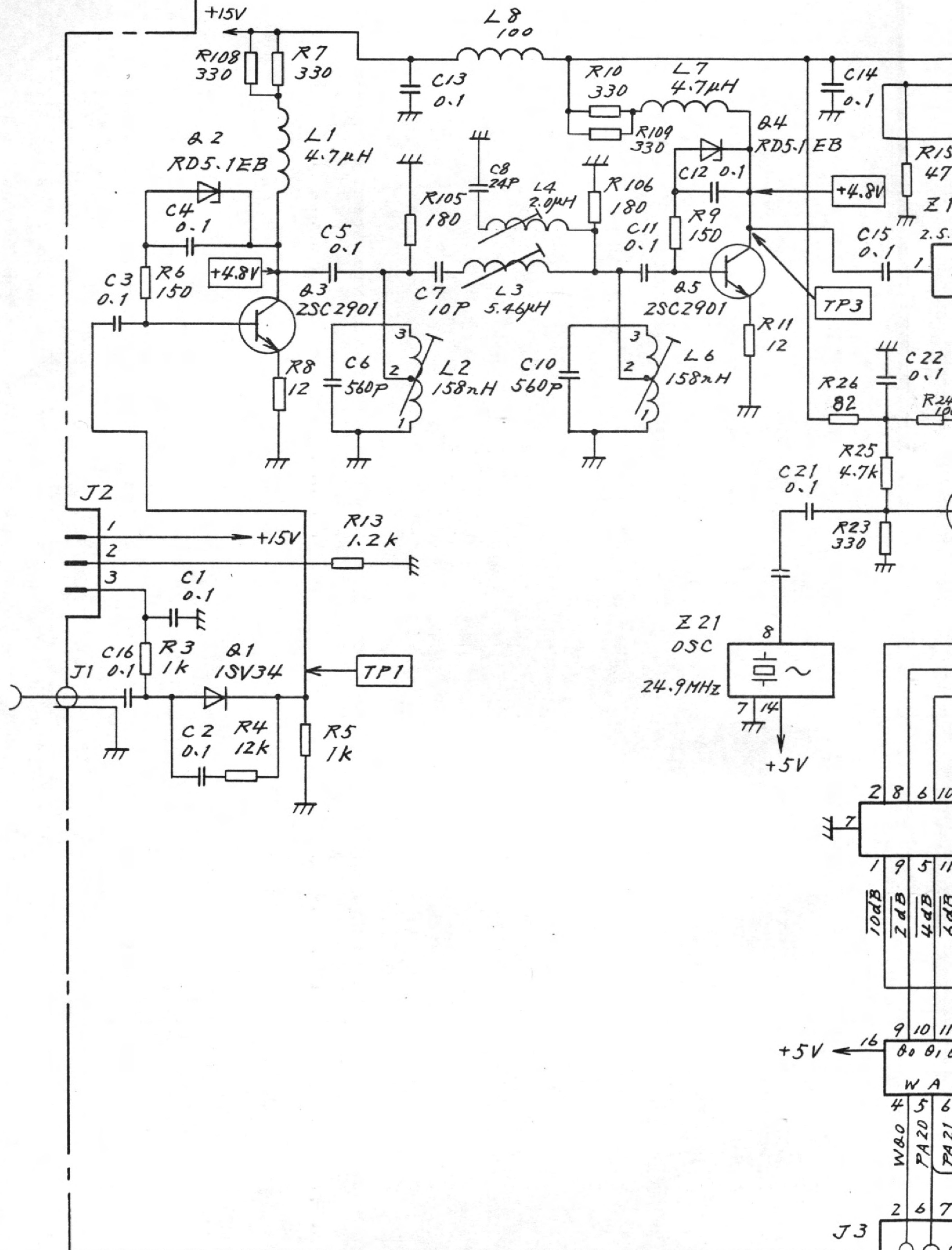
A

B

C

D

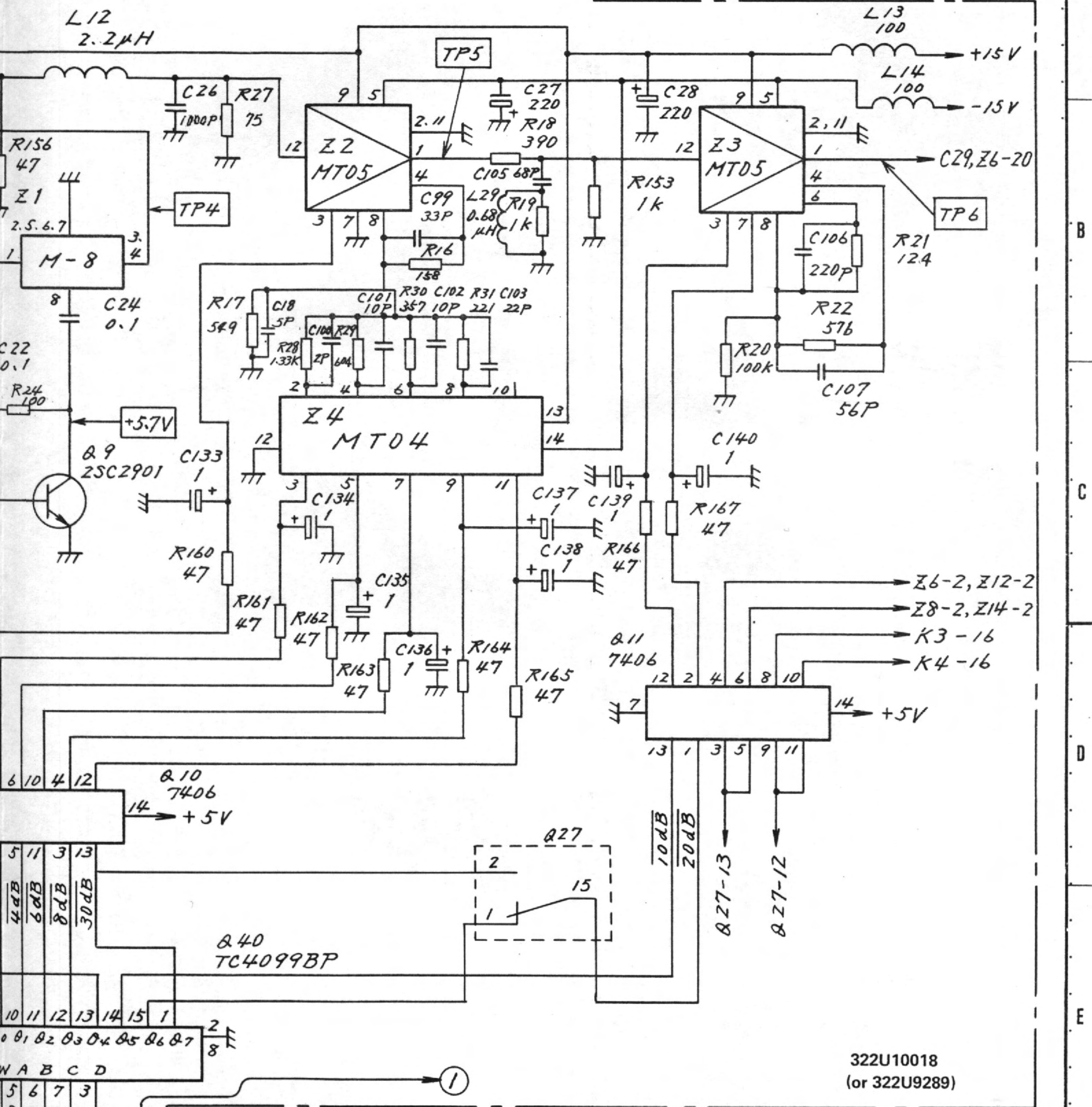
E



Parts List 34W89580



REVISIONS



322U10018  
(or 322U9289)

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APPROVED BY			DRAWN BY		
TITLE				DRAWING No.	
IF Circuit Diagram				33W28093 1/7	

7



APPLICATION

34Y83835

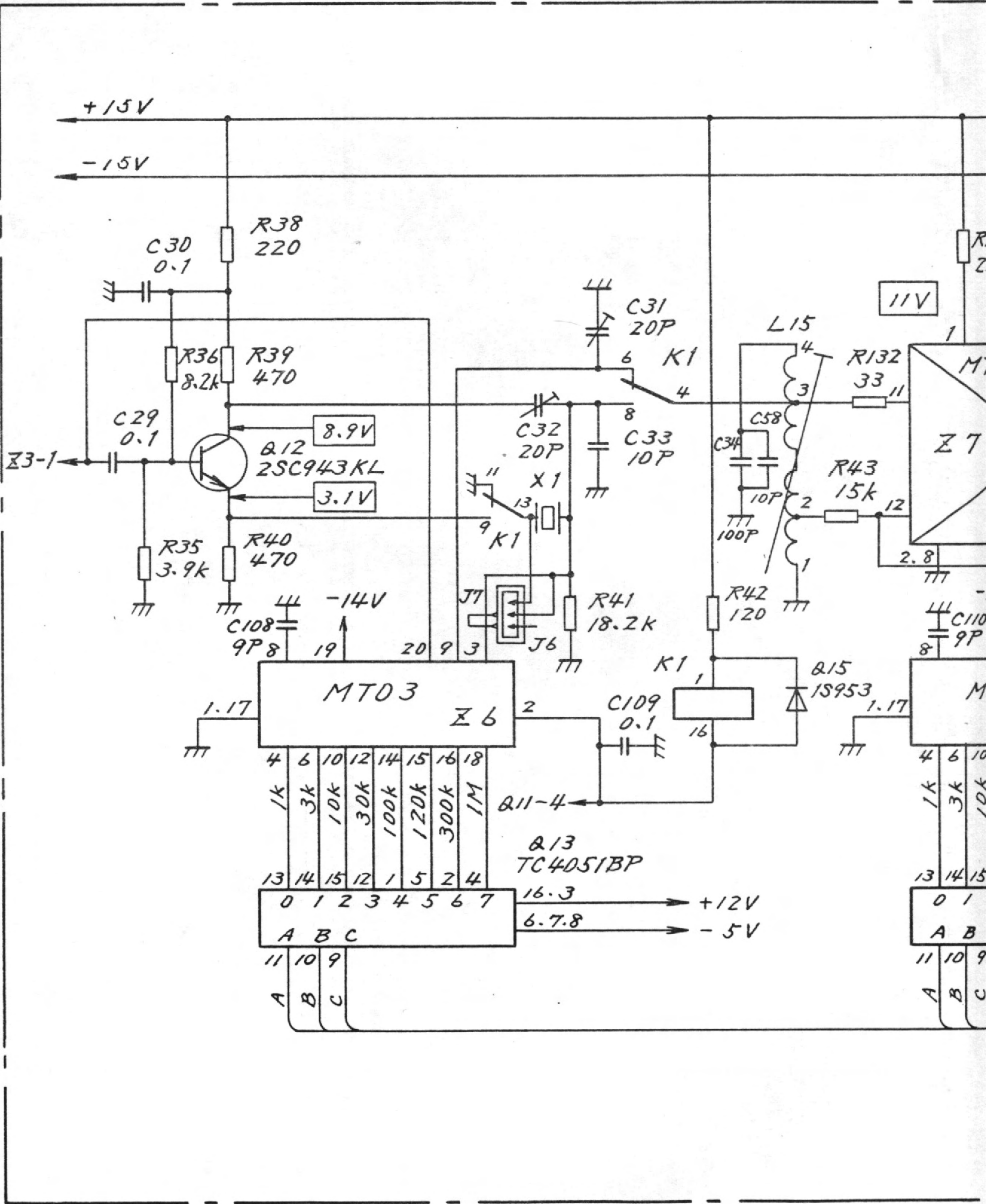
A

B

C

D

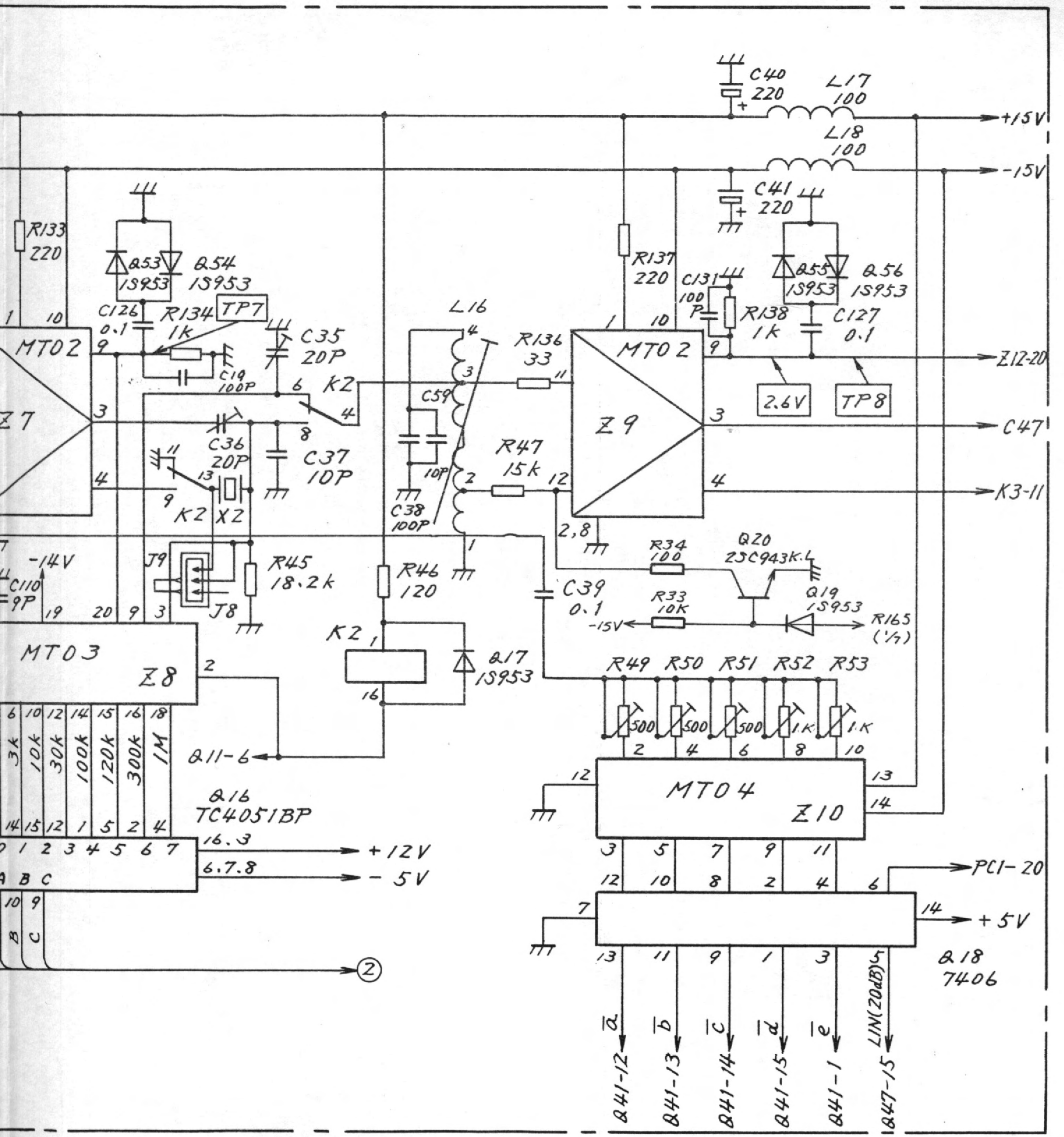
E



DEP



REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH
CHECKED BY		TRACED BY		SCALE	
APPROVED BY		DRAWN BY		:	
TITLE				DRAWING No.	
IF Circuit Diagram				33W28093 2/7	

7



33W 28093 3/7

2

3

4

APPLICATION

34Y83835

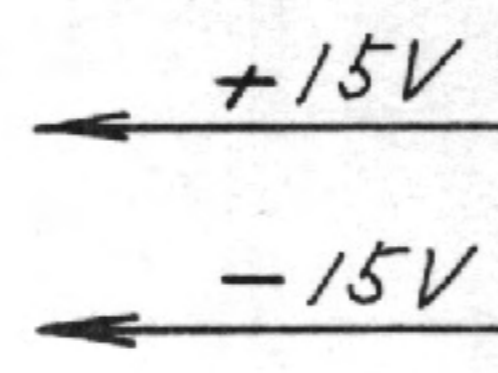
A

B

C

D

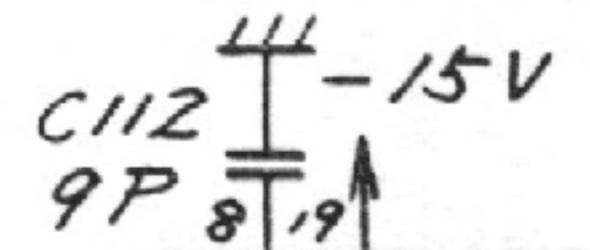
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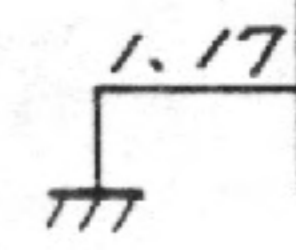
Z9-9

Z9-3

Z9-4

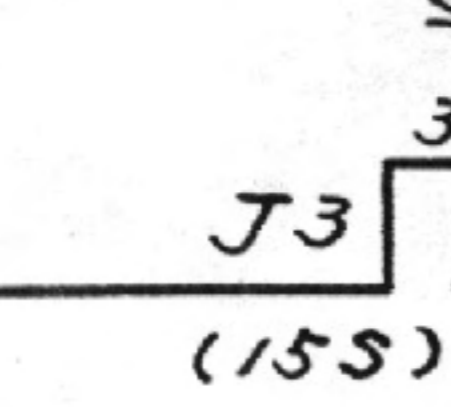
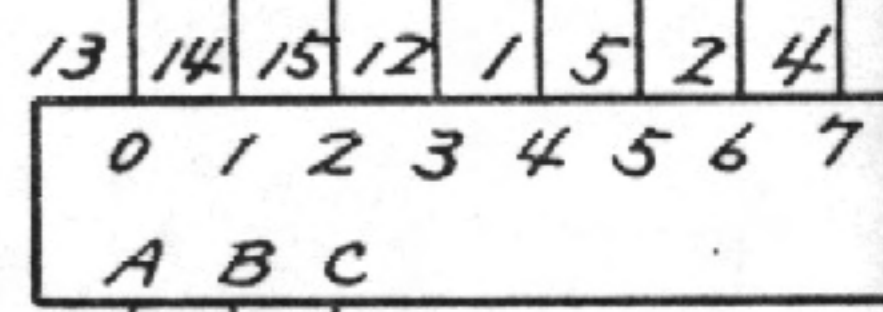
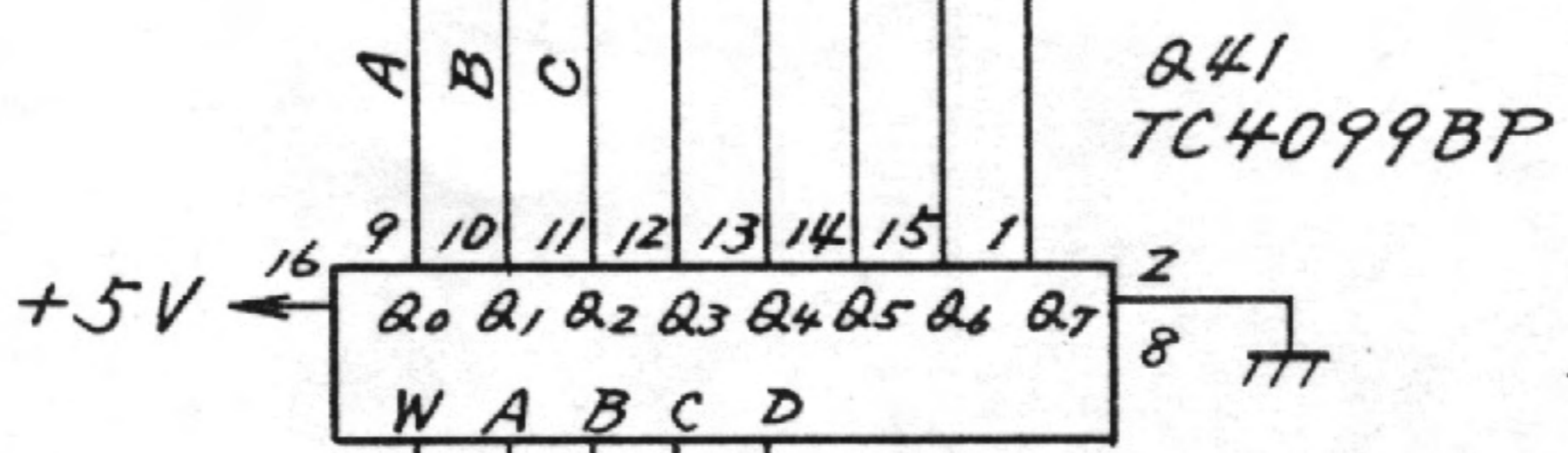
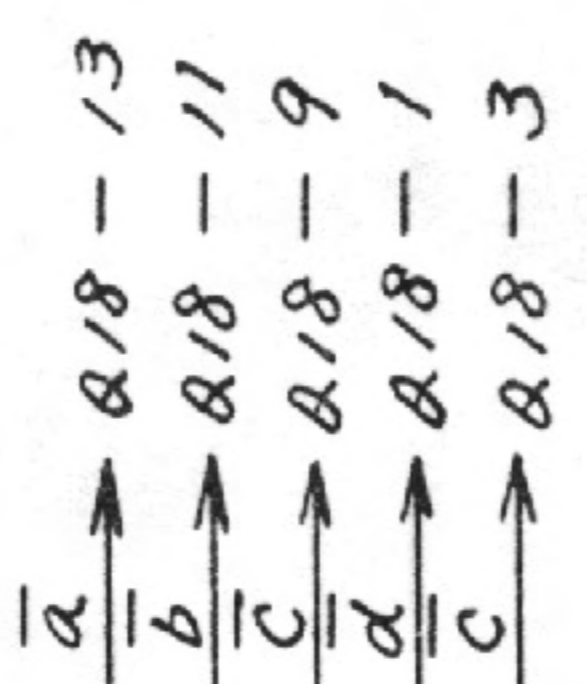


Z12 MT03



Q11-4

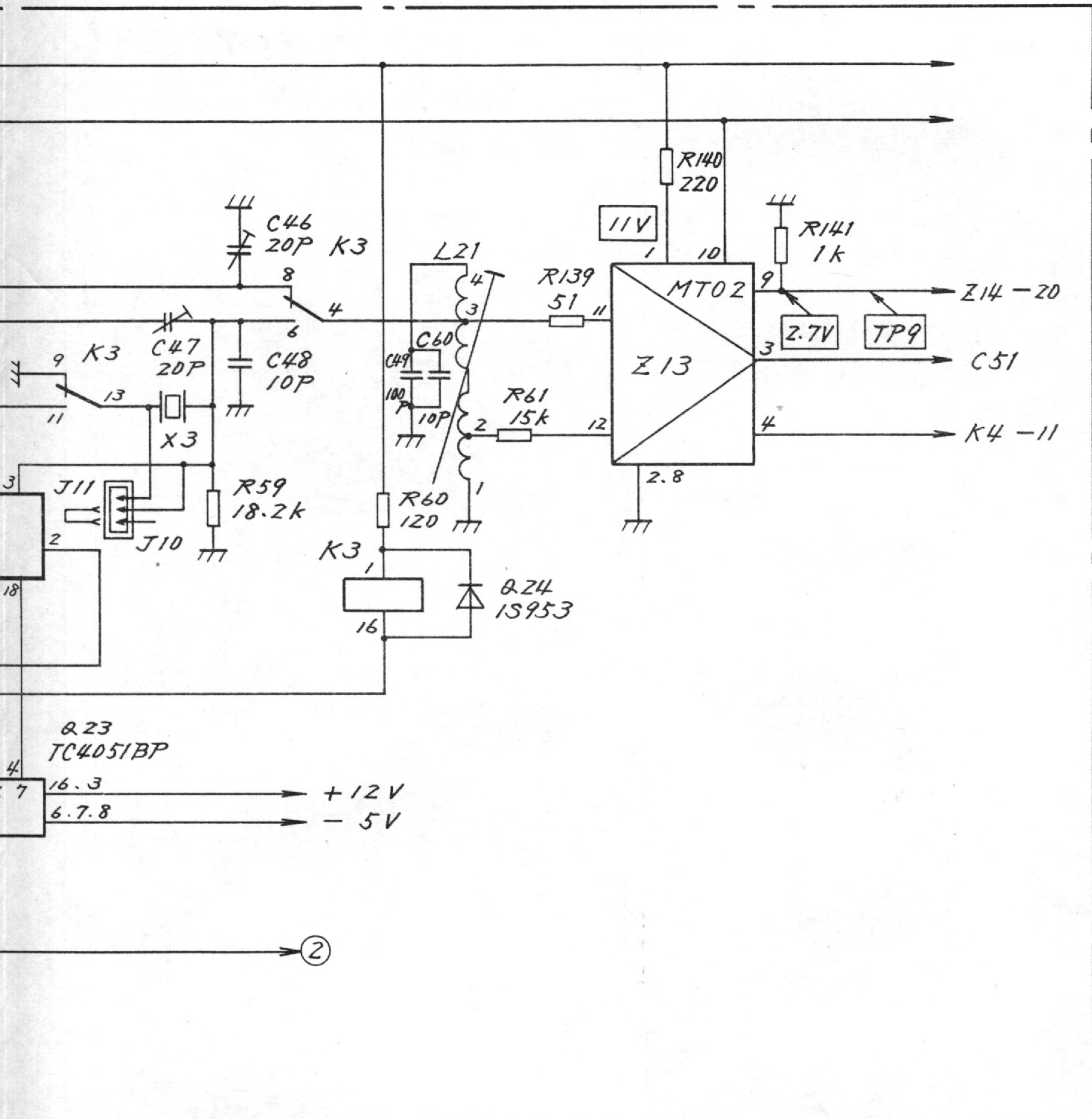
Q11-8



DEP



REVISIONS



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APPROVED BY		DRAWN BY		:	
TITLE				DRAWING No.	
IF Circuit Diagram				33W 28093 3/7	

7



33W 28093 4/7

APPLICATION

34Y83835

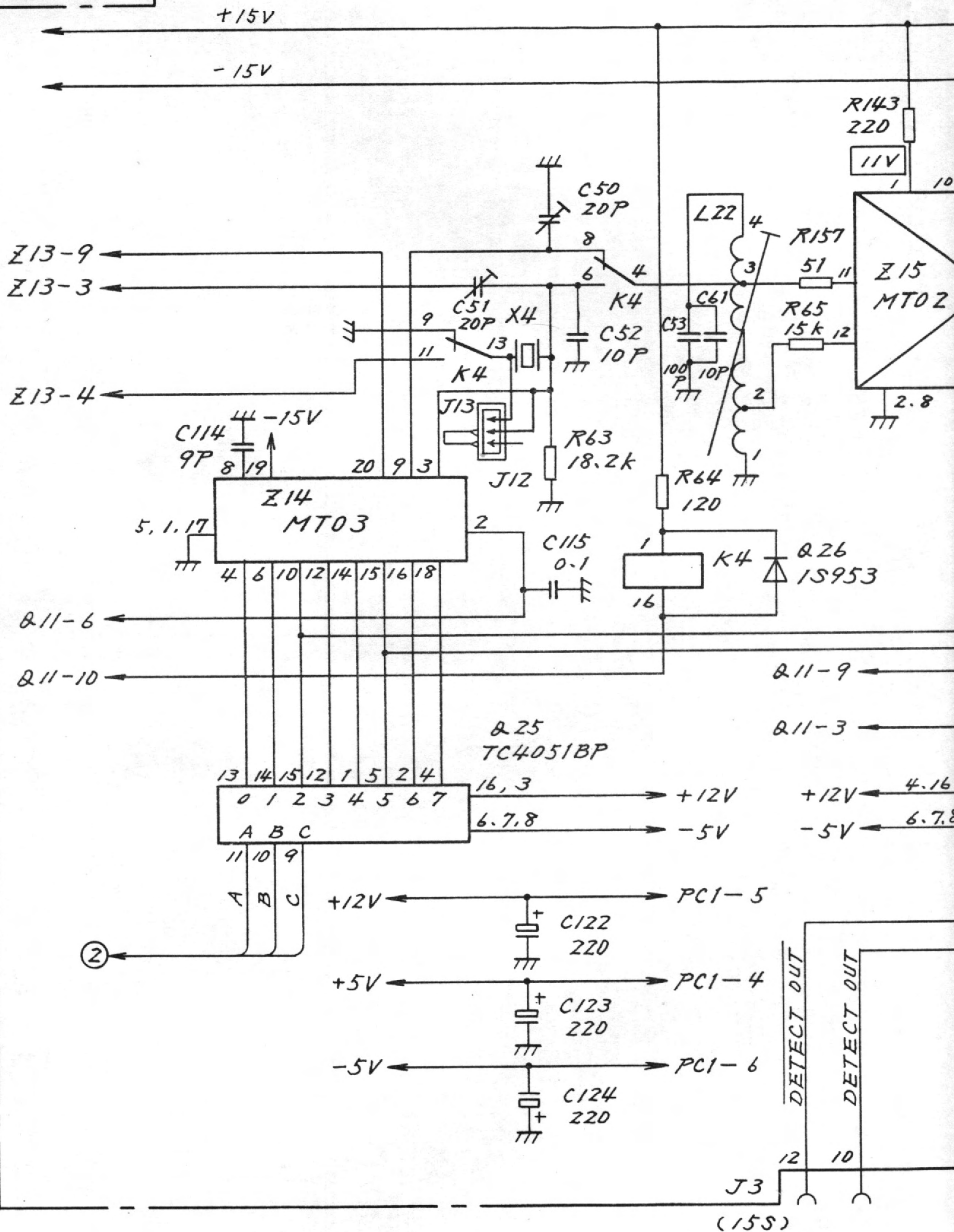
A

B

C

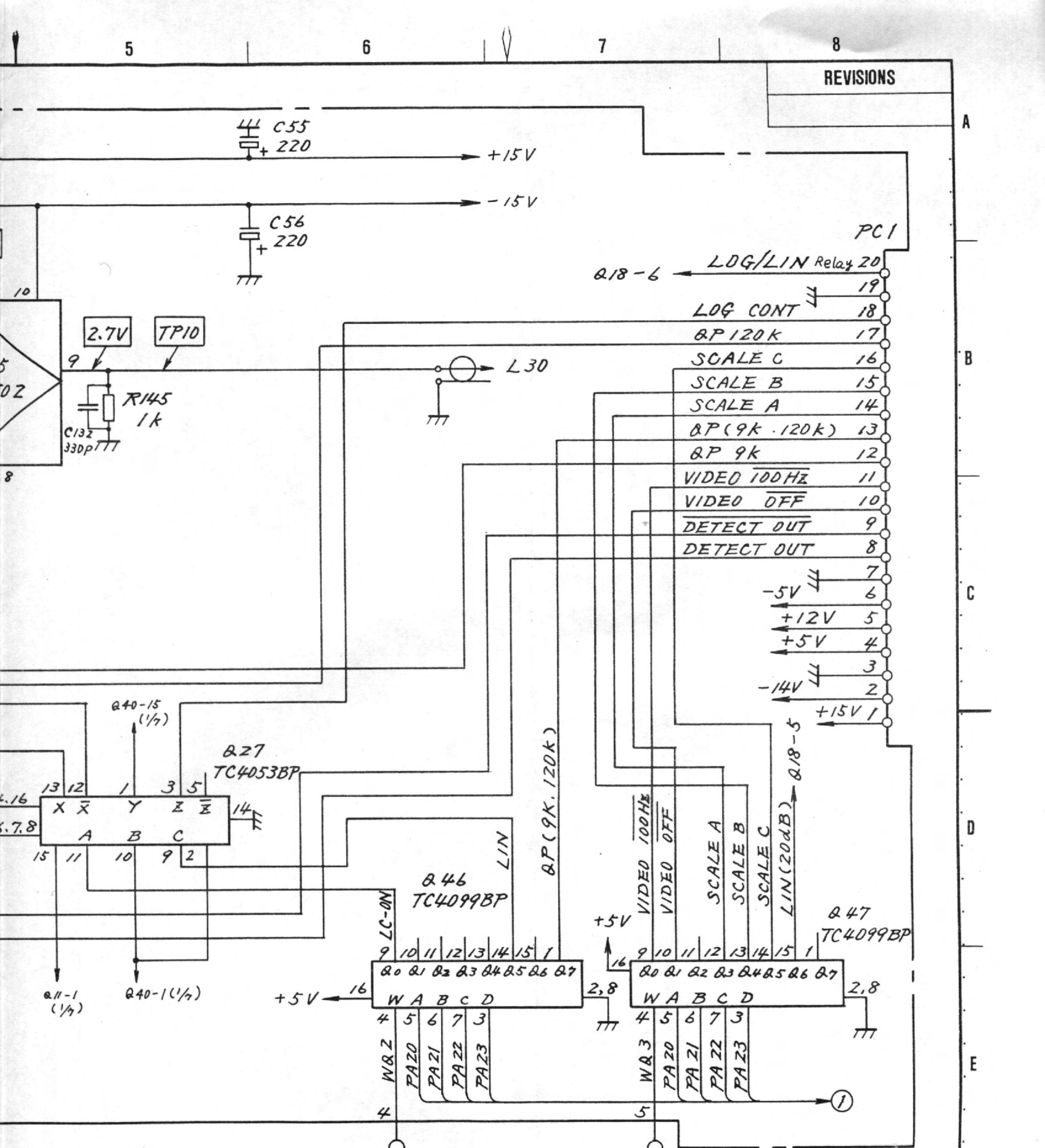
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E



DEP





REVISIONS	

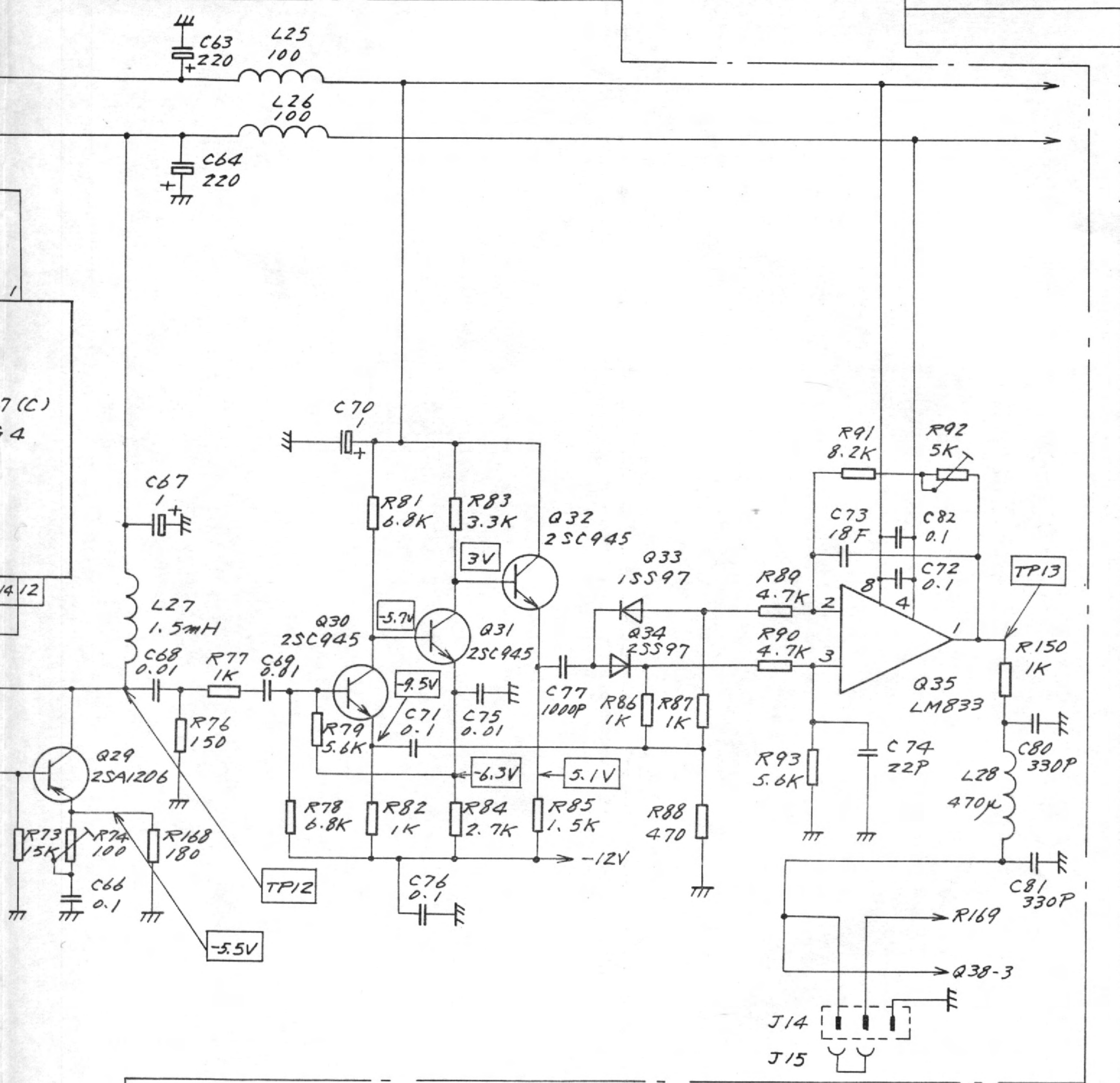
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TITLE				DRAWING No.	
IF Circuit Diagram				33W28093 4/7	
ANRITSU CORP.				4-23/4-24	







REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH
CHECKED BY		TRACED BY		SCALE	<b>7</b>
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TITLE				DRAWING No.	
IF Circuit Diagram				33W28093 5/7	



APPLICATION

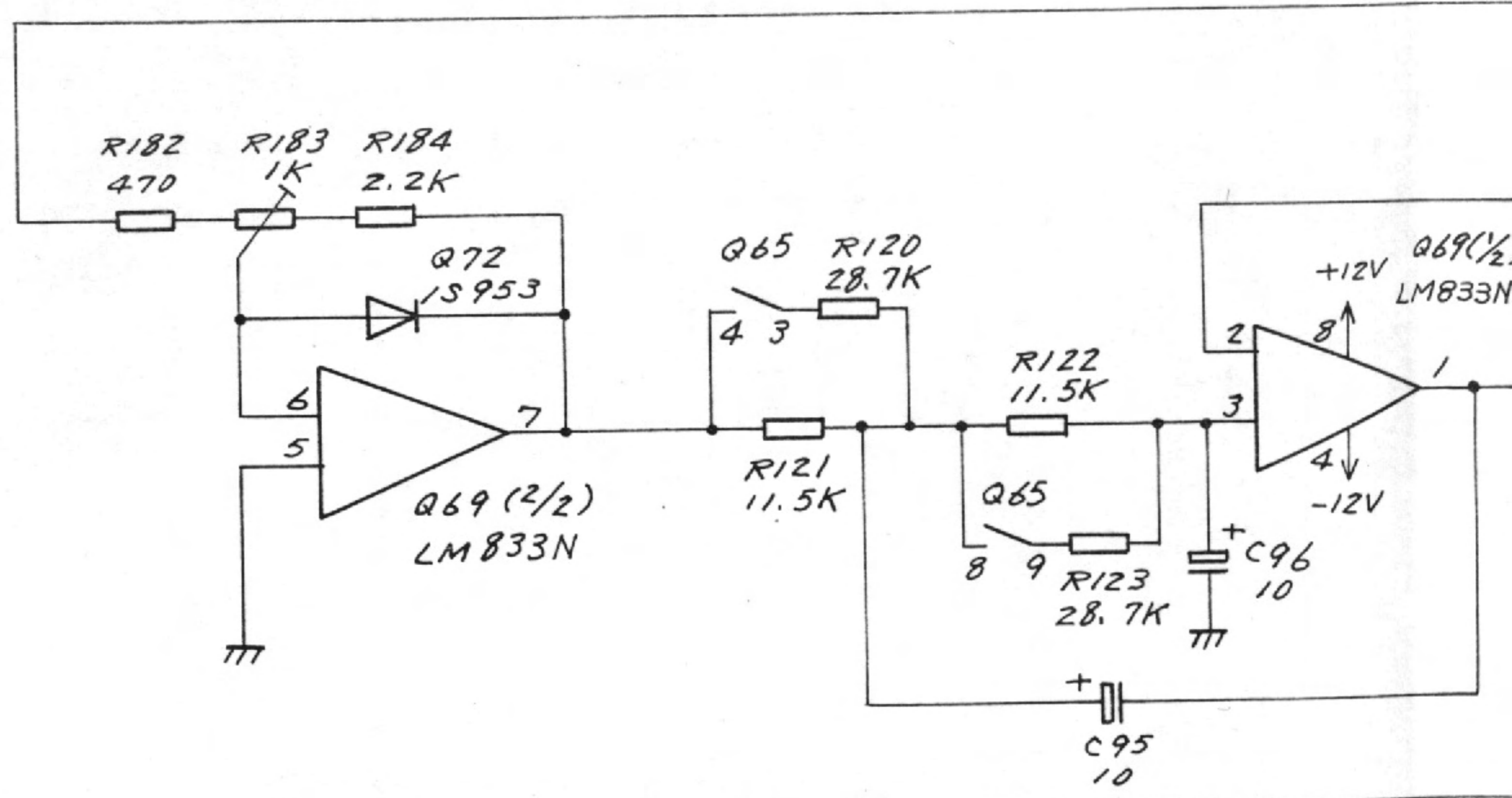
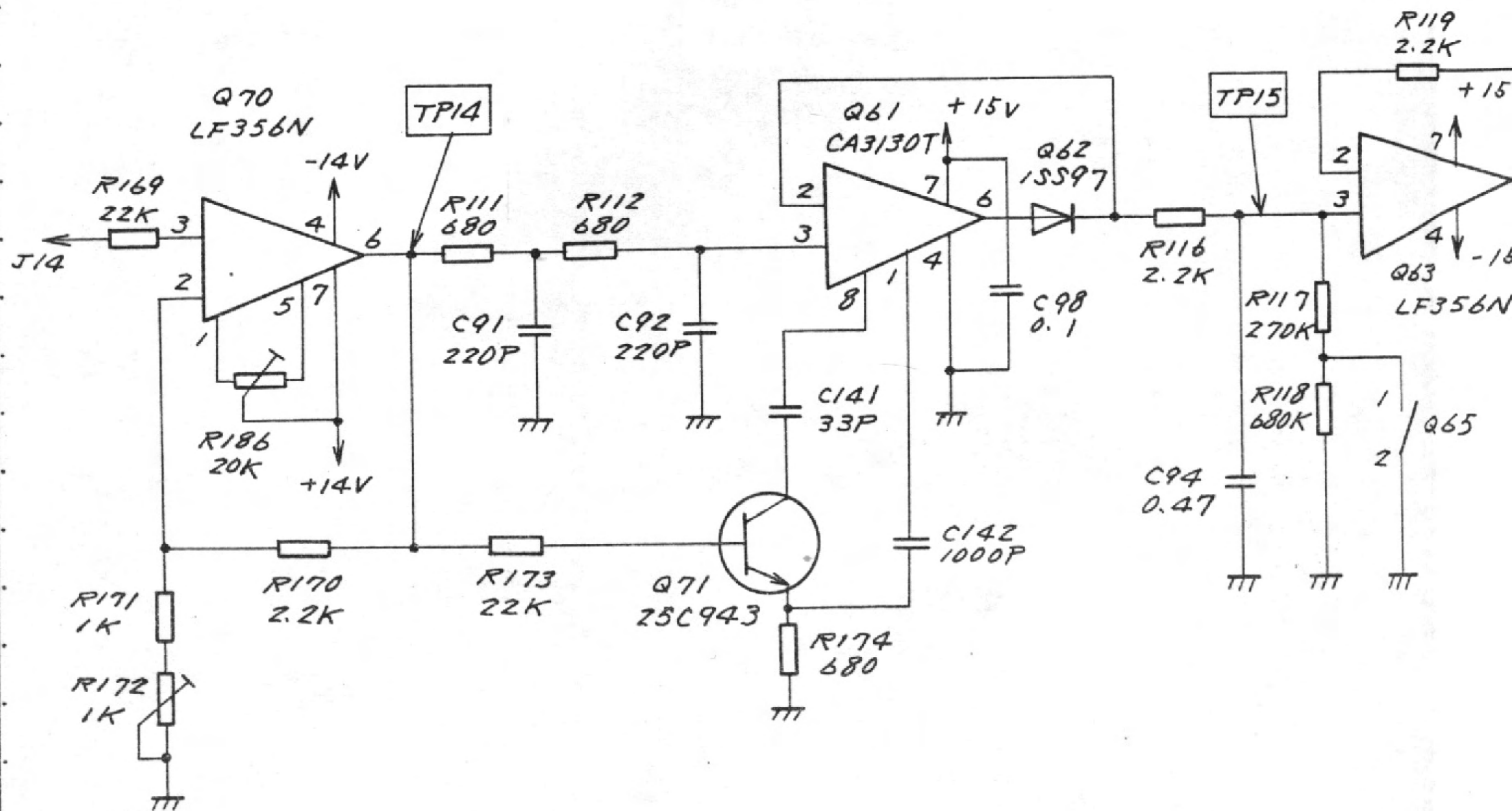
A

B

C

D

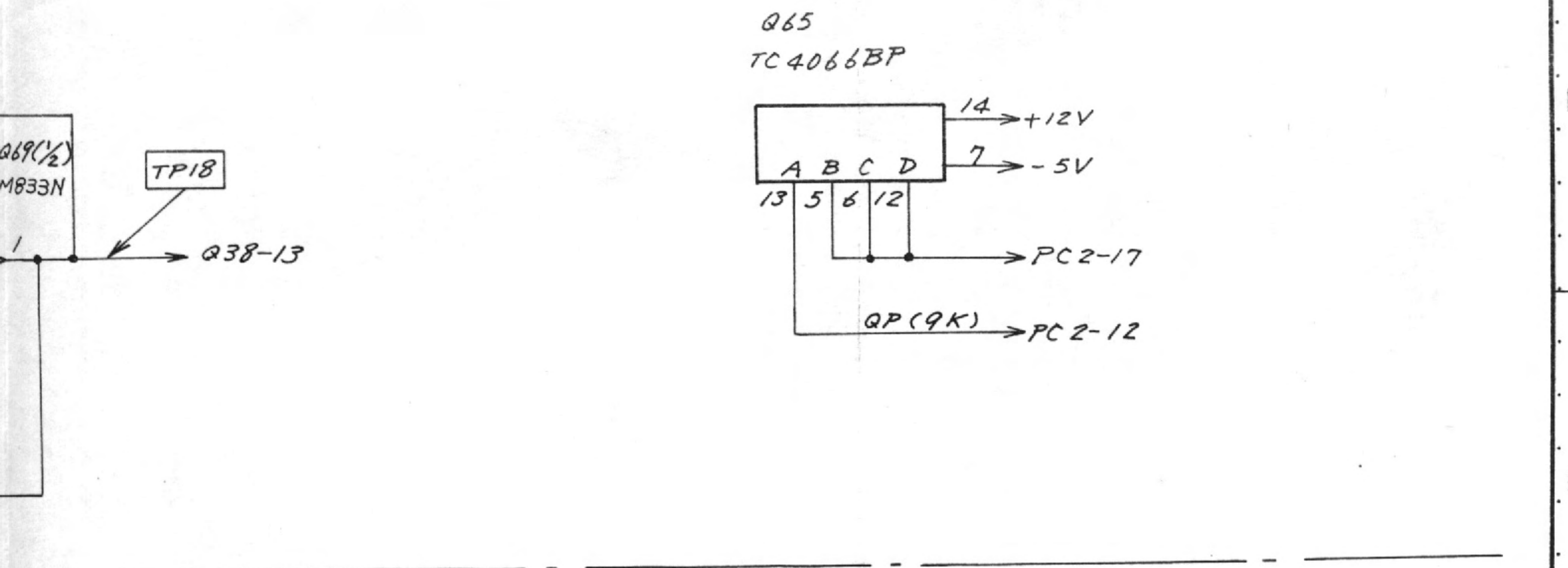
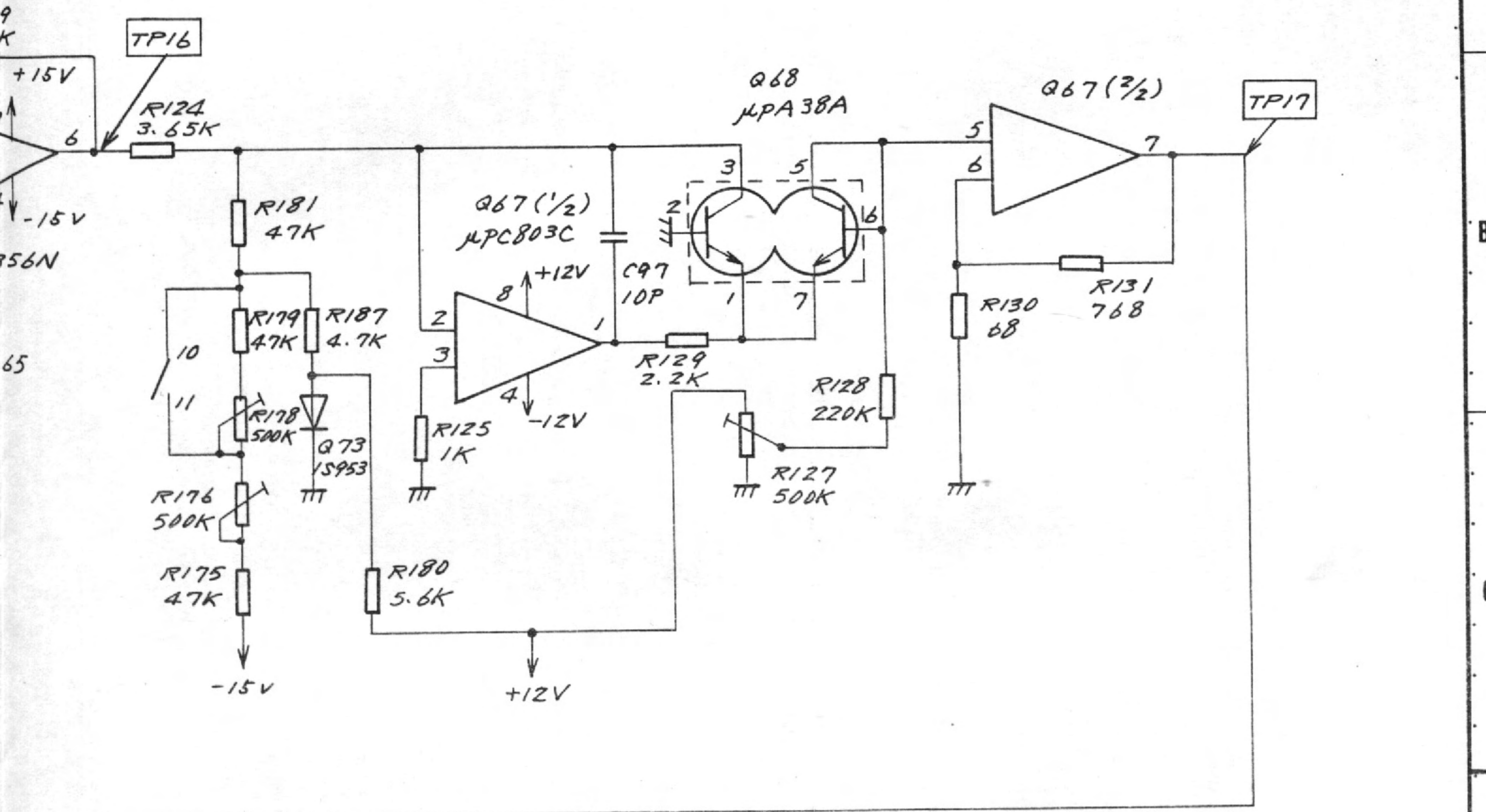
E



DEP



REVISIONS



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APPROVED BY			DRAWN BY	:	
TITLE				DRAWING No.	
IF (QP detector) Circuit Diagram				33W28093 6/7	



33W 28093 7/7

2

3

4

APPLICATION

34Y83835

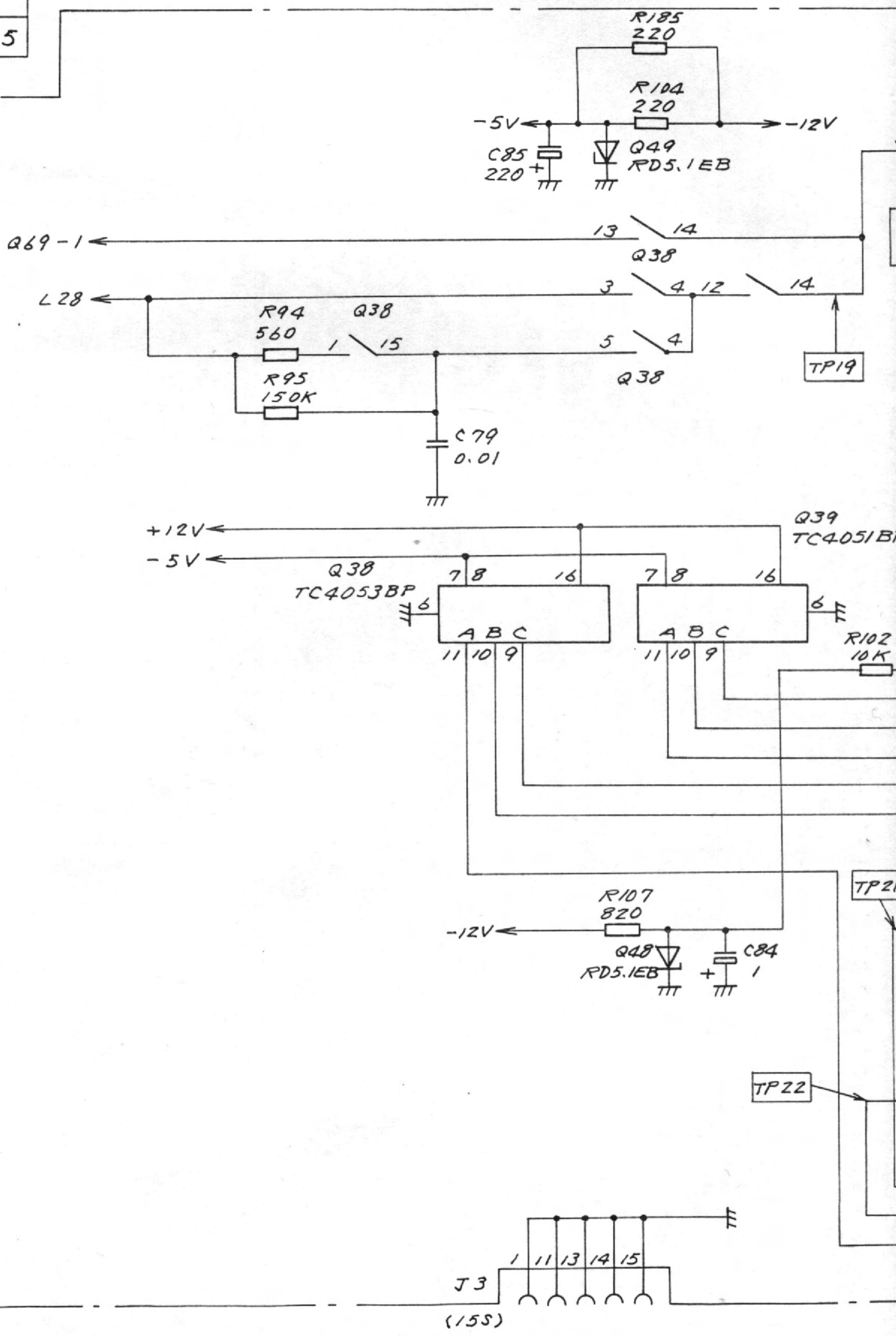
A

B

C

D

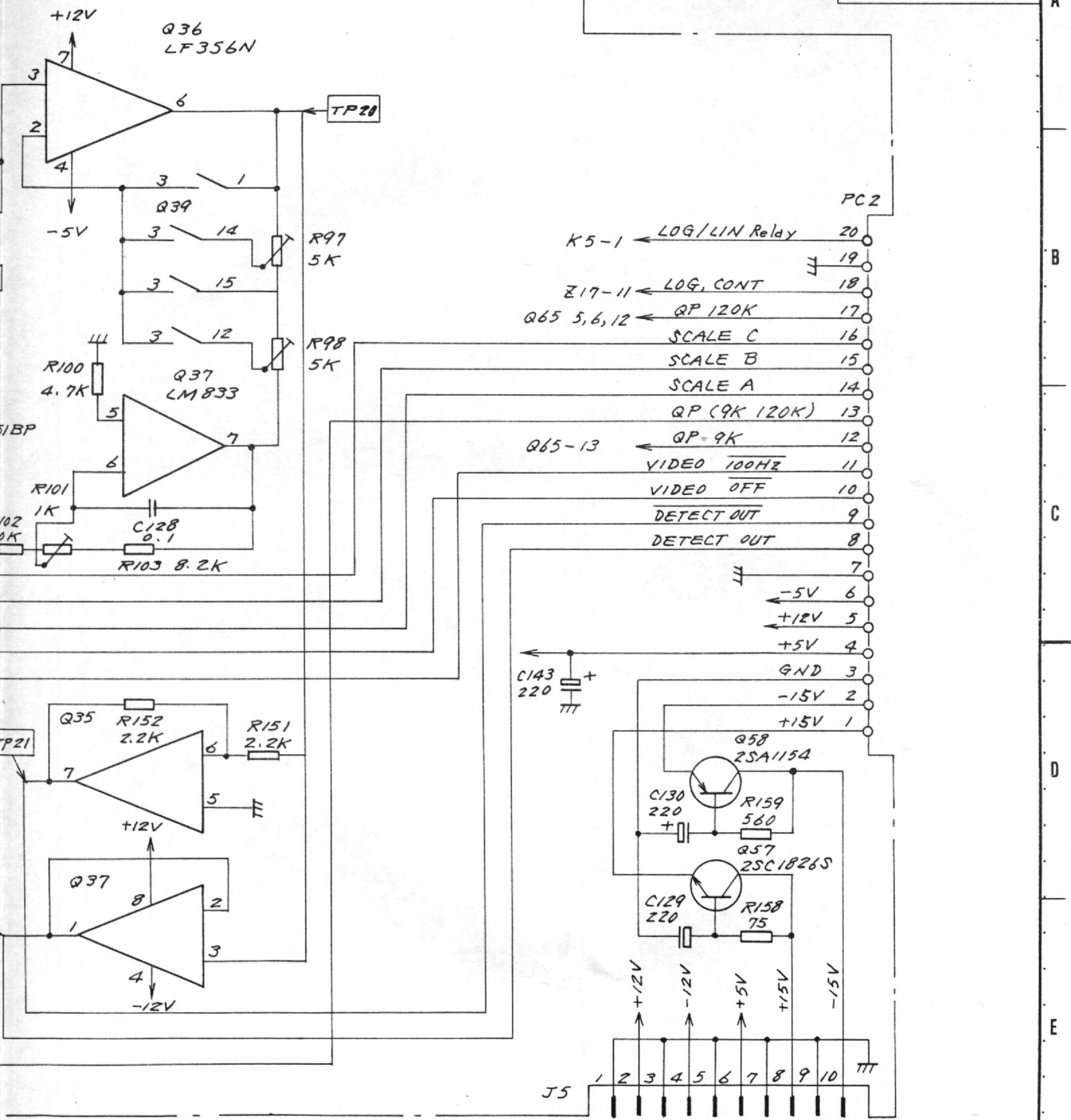
E



DEP

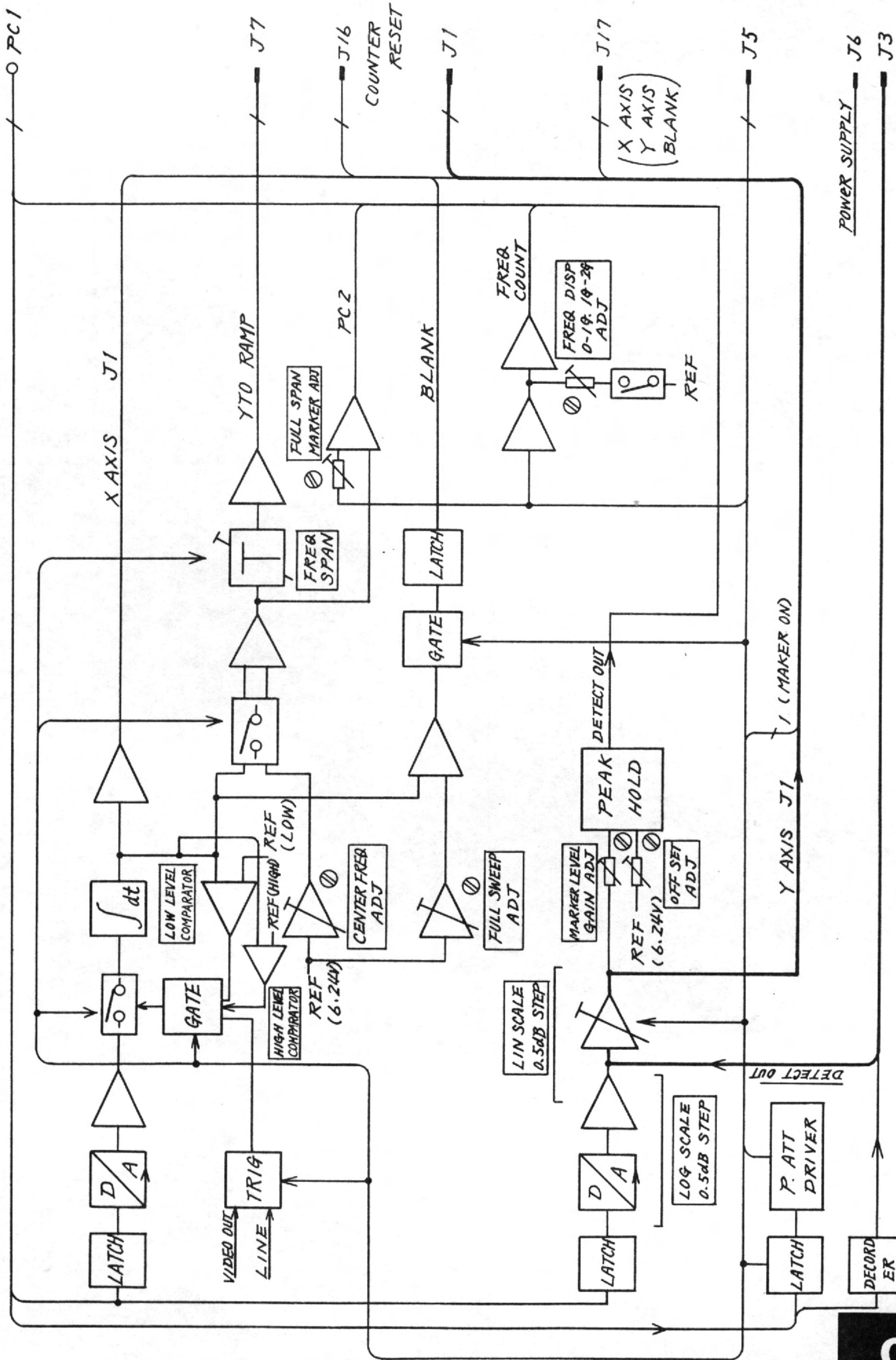


REVISIONS

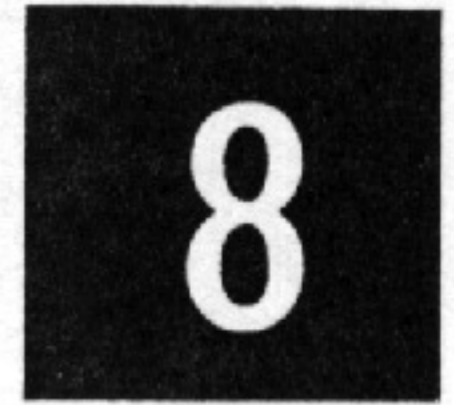


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TITLE			DRAWING No.		
1 F			Circuit Diagram		33W28093 7/7

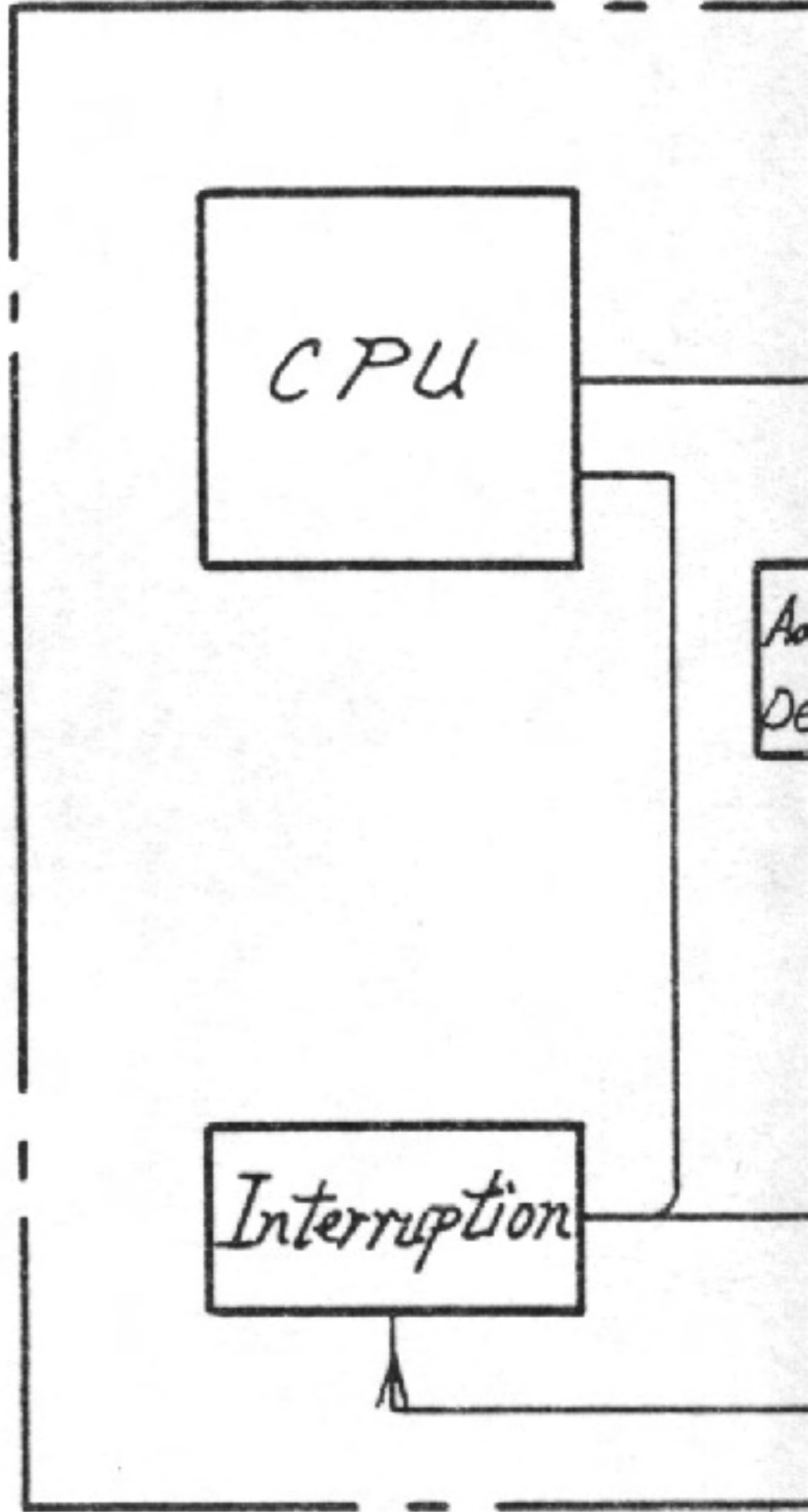




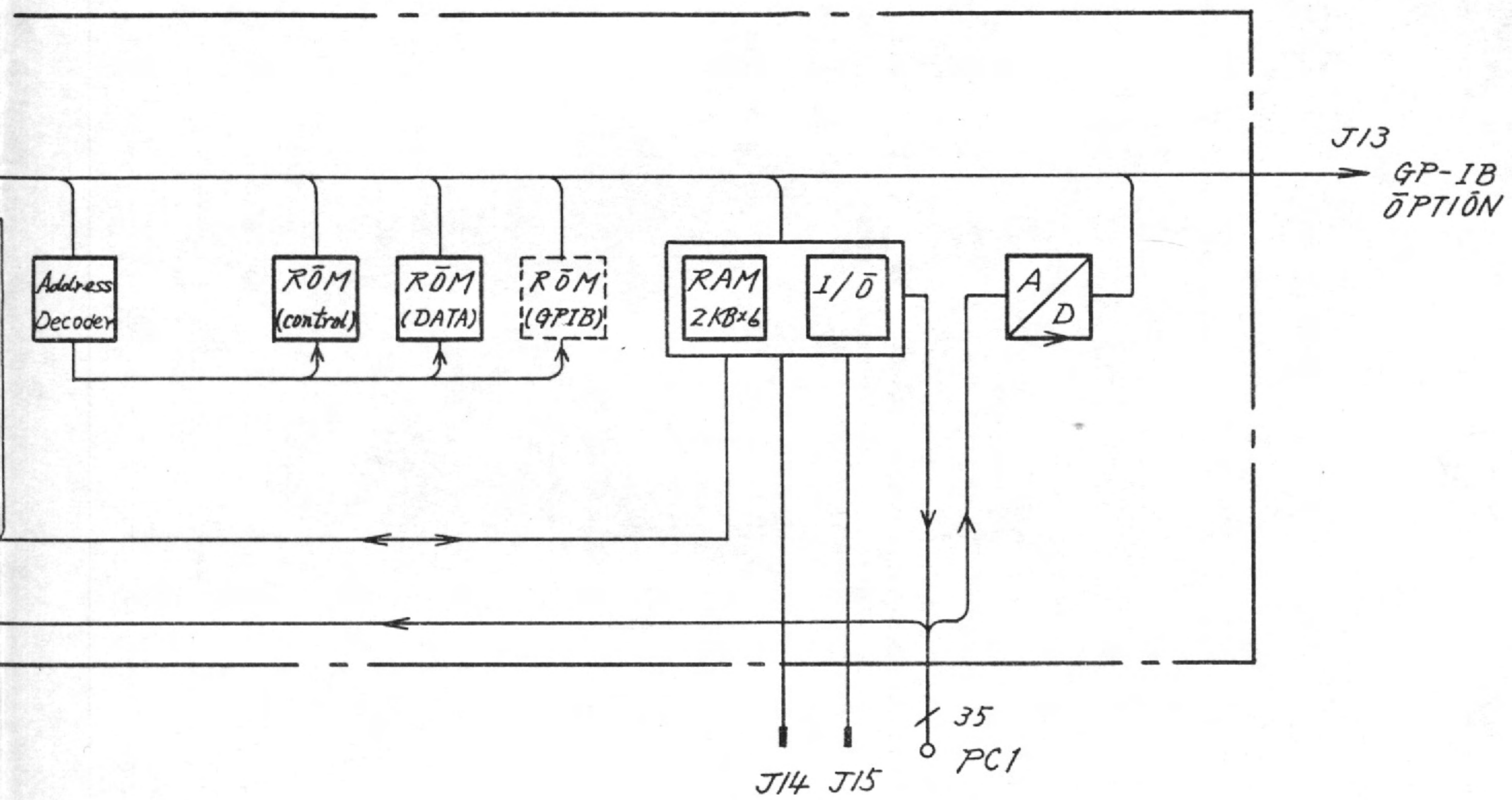
SCAN & CPU Block  
(SCAN) Diagram











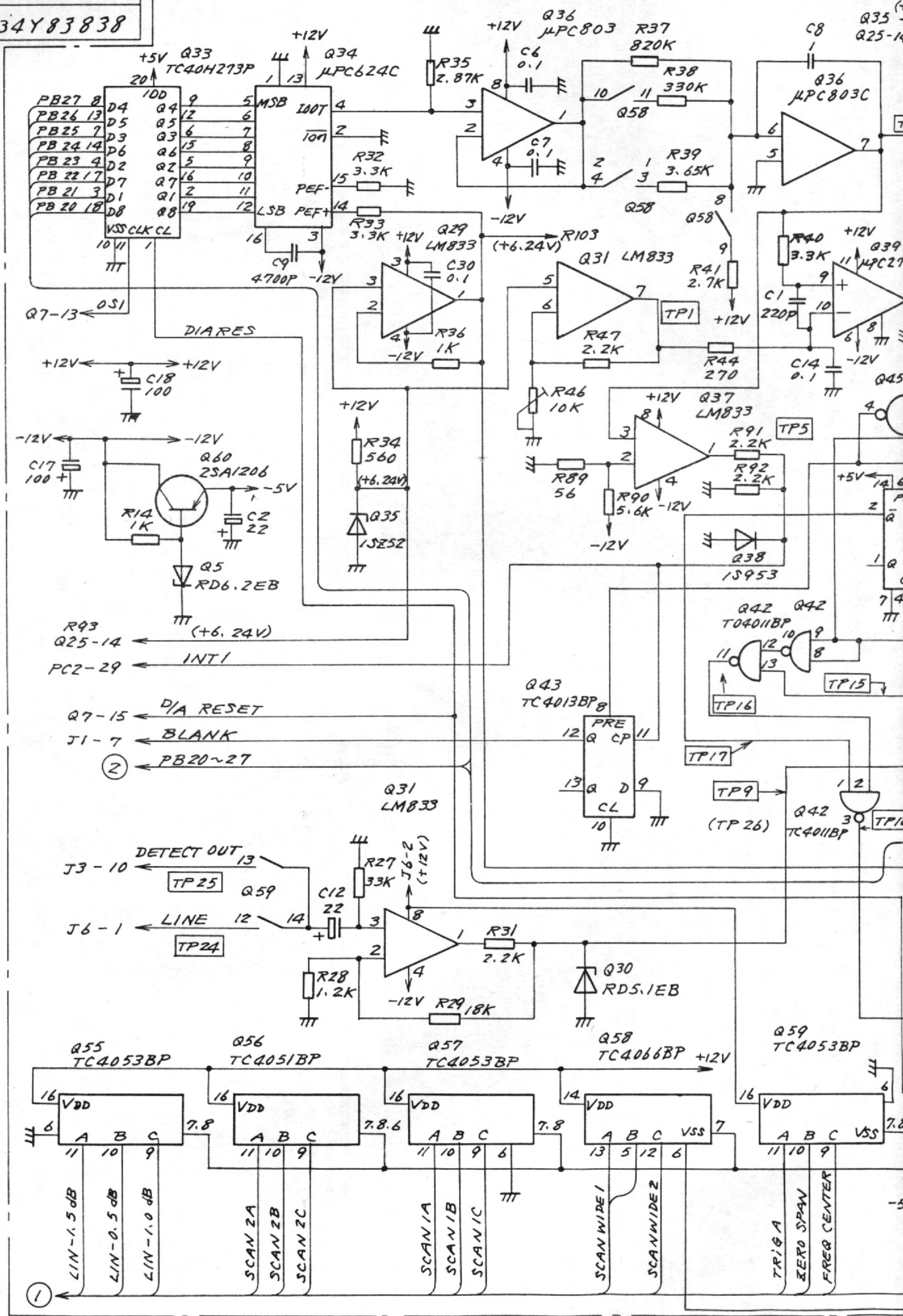
SCAN & CPU  
(CPU)  
Block Diagram



APPLICATION

34Y83838

A  
B  
C  
D  
E

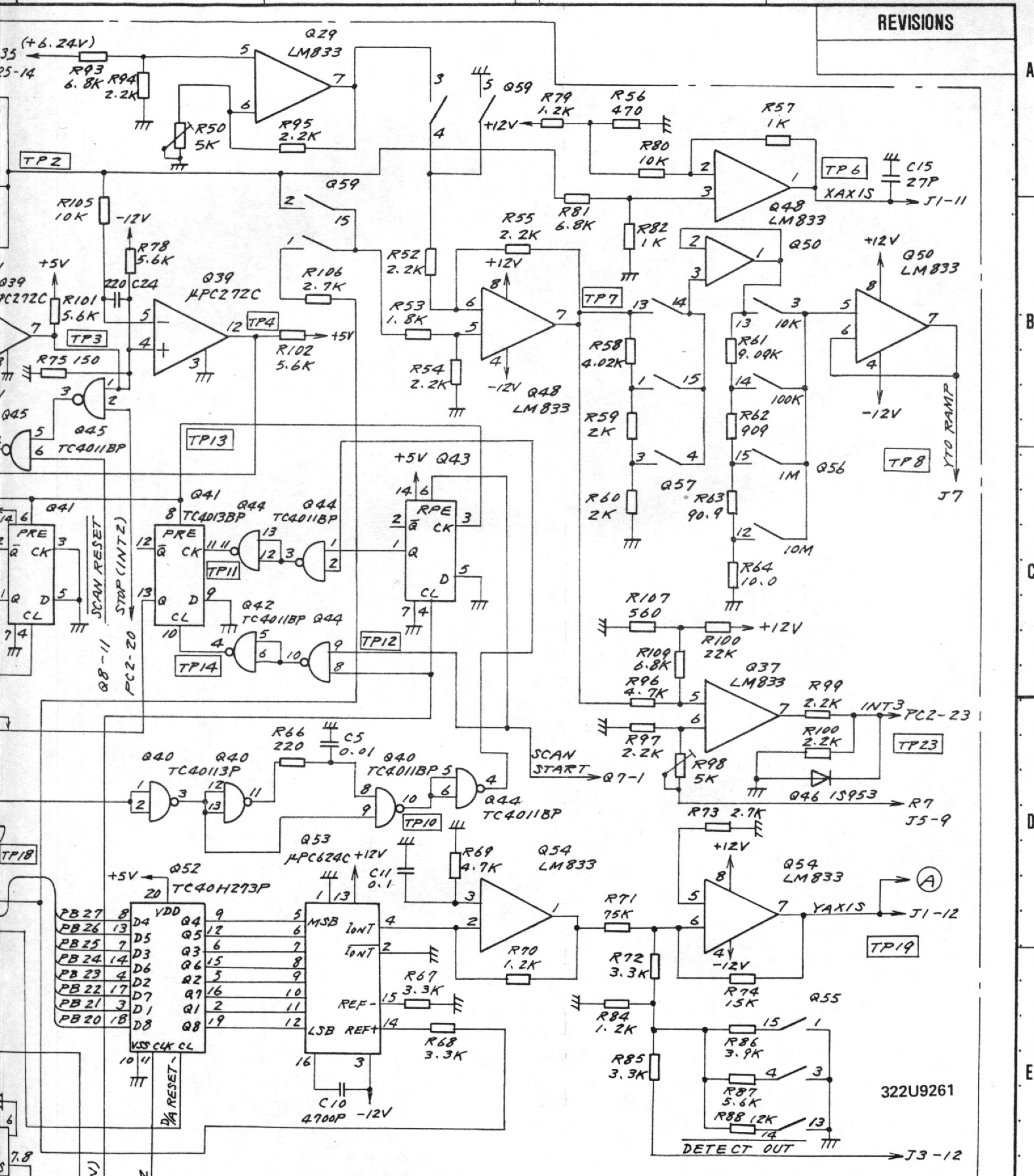


DEP

Parts List 34



REVISIONS



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APPROVED BY		DRAWN BY		:	
TITLE				DRAWING No.	
SCAN & CPU Circuit Diagram (SCAN)				33W28095 1/5	

10

34W89584



APPLICATION

34Y83838

A

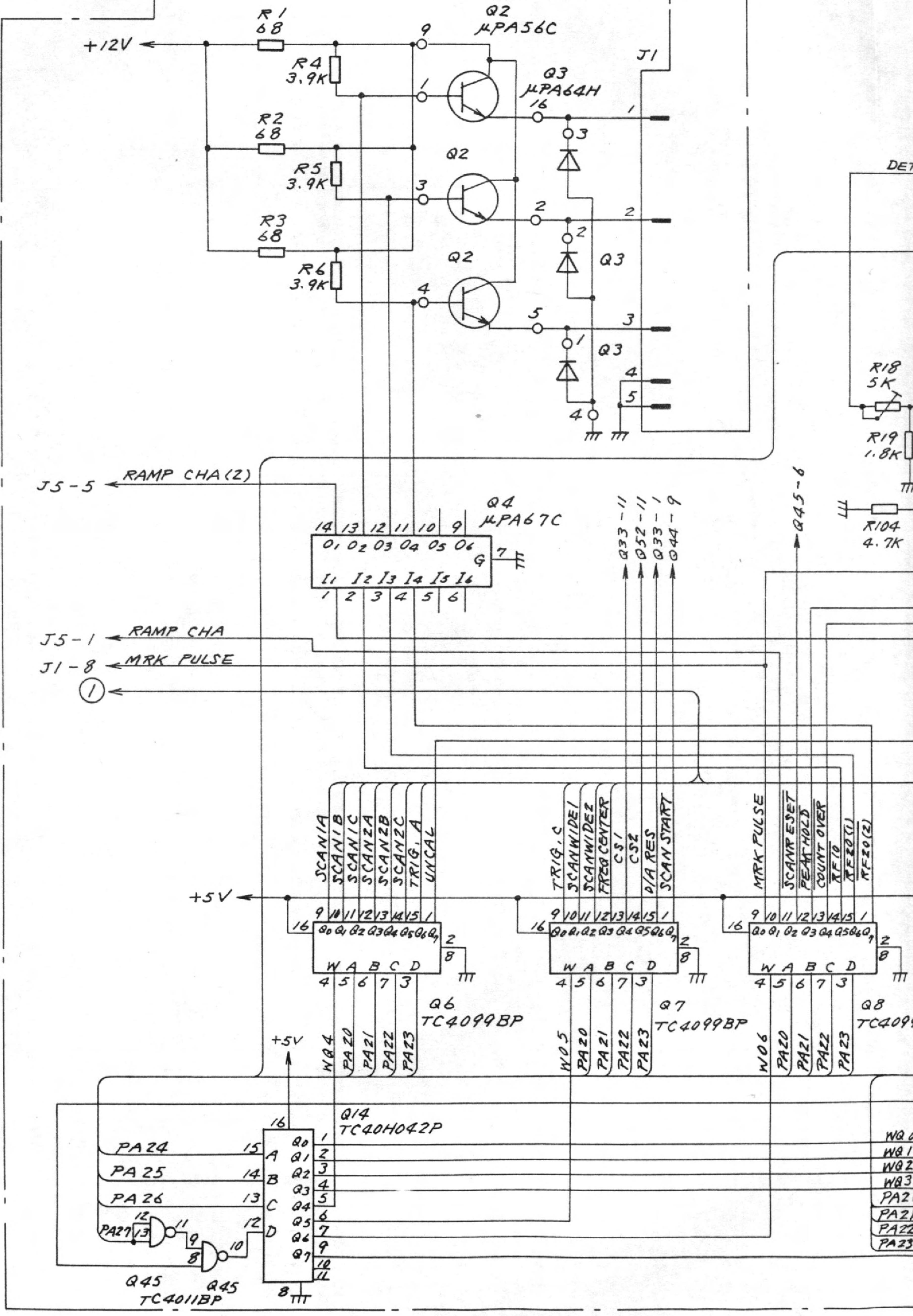
B

C

D

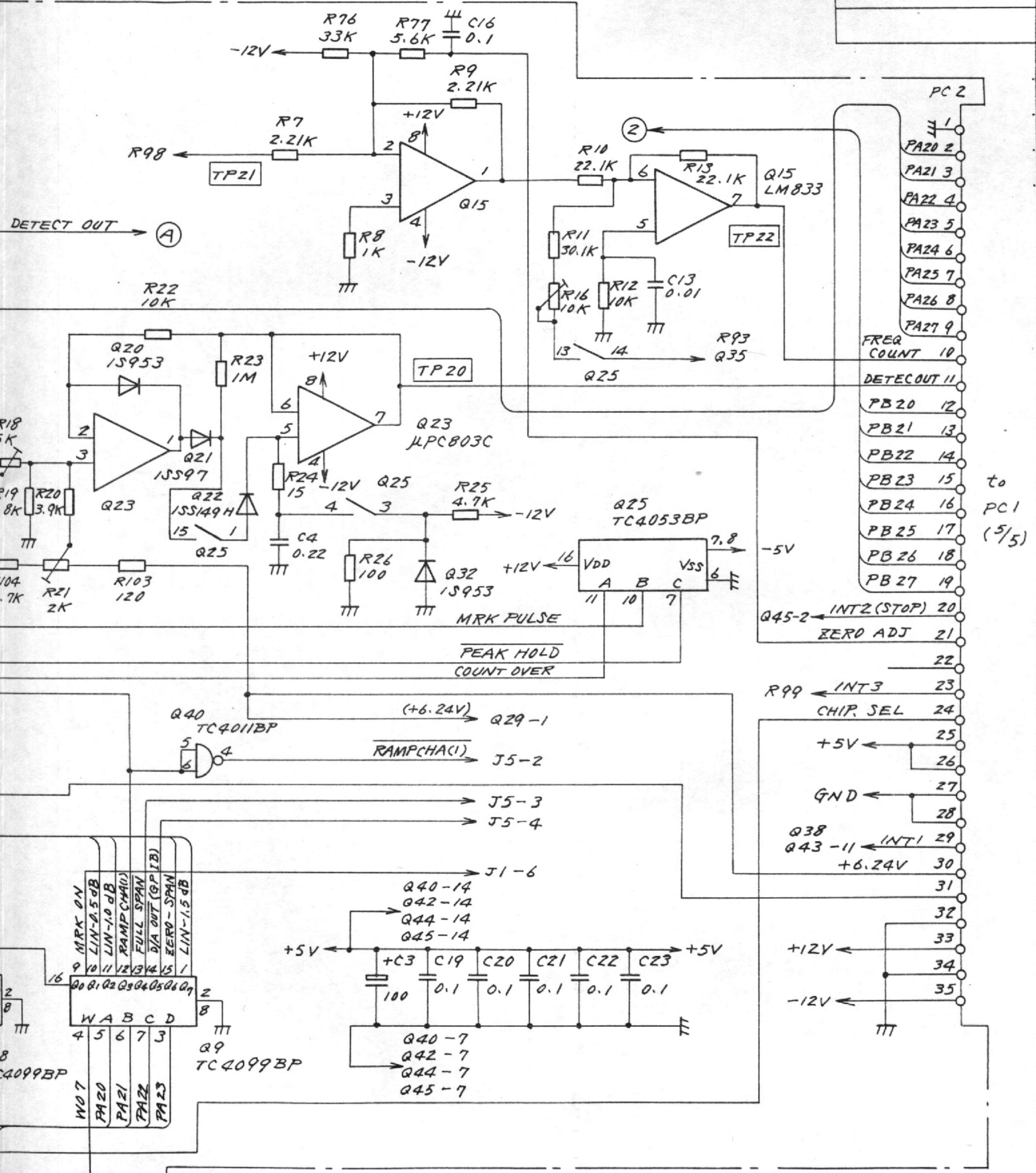
E

DEP





REVISIONS



- WQ 0 → J3-2
- WQ 1 → J3-3
- WQ 2 → J3-4
- WQ 3 → J3-5
- PA20 → J3-6
- PA21 → J3-7
- PA22 → J3-8
- PA23 → J3-9

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH
CHECKED BY		TRACED BY		SCALE	
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TITLE				DRAWING No.	
SCAN & CPU Circuit Diagram (SCAN)				33W 28095 2/5	

10



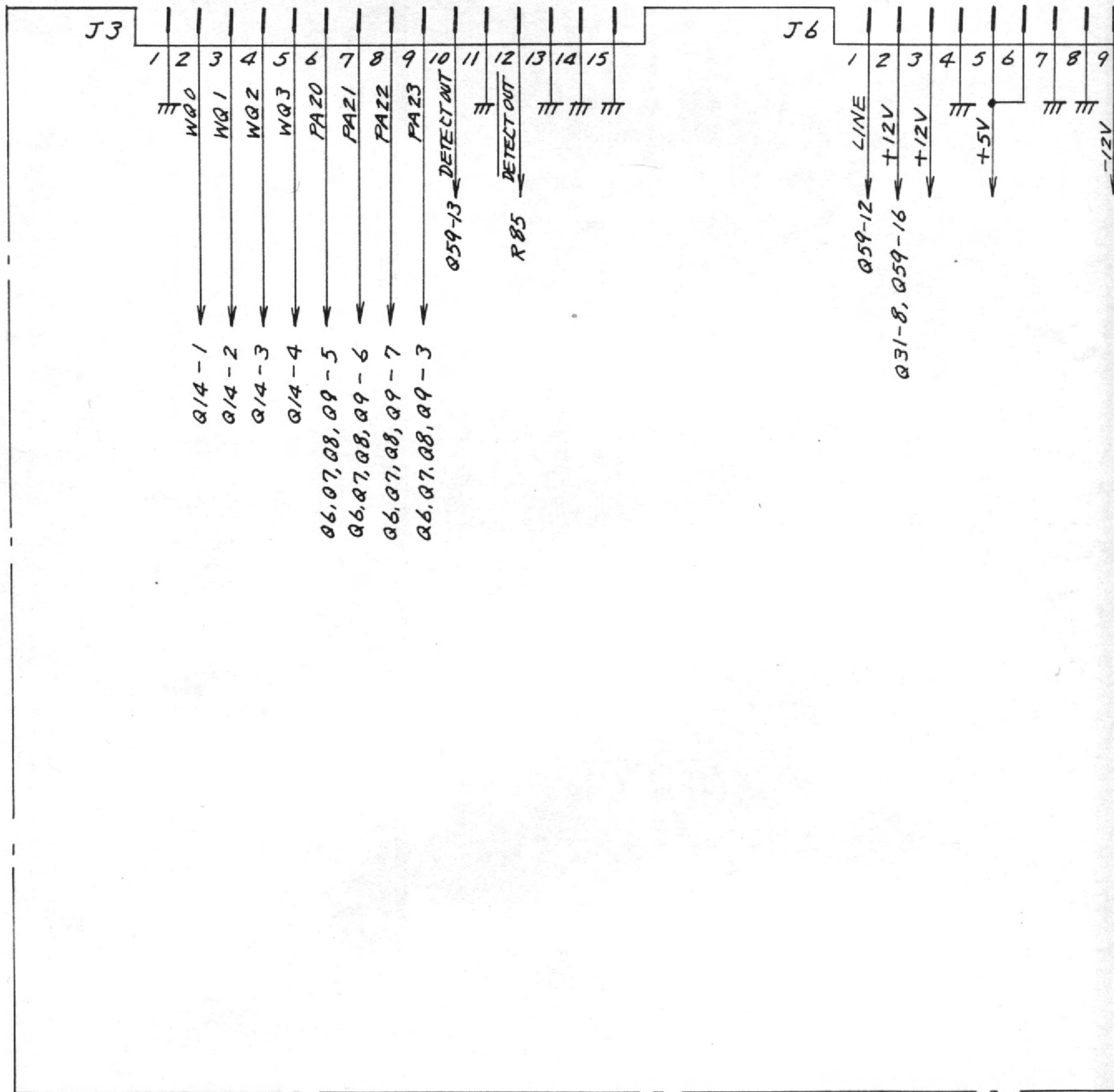
APPLICATION

34Y83838

A

to IF

to PWR



B

C

D

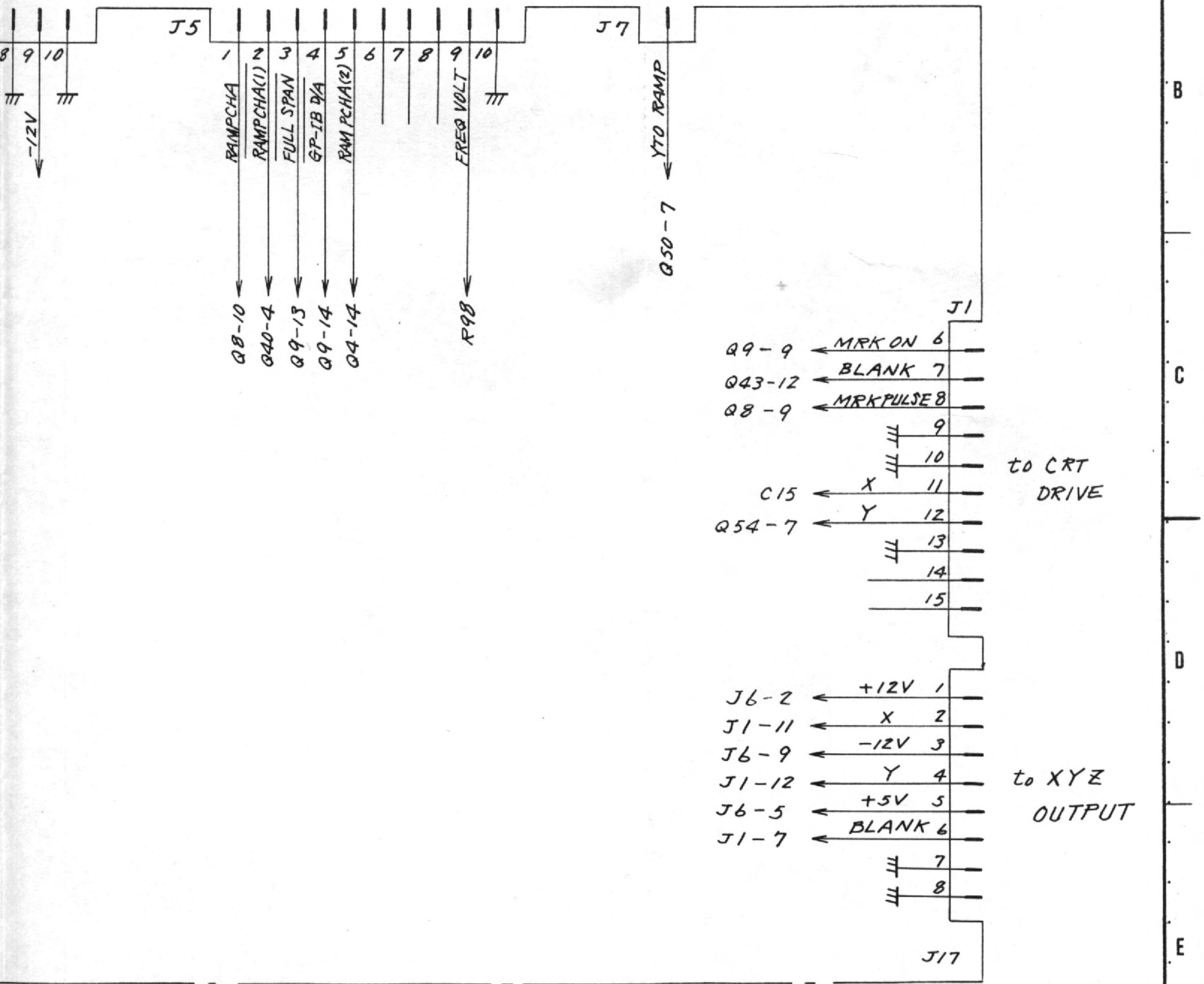
E

DEP



REVISIONS

to YTO DRIVE



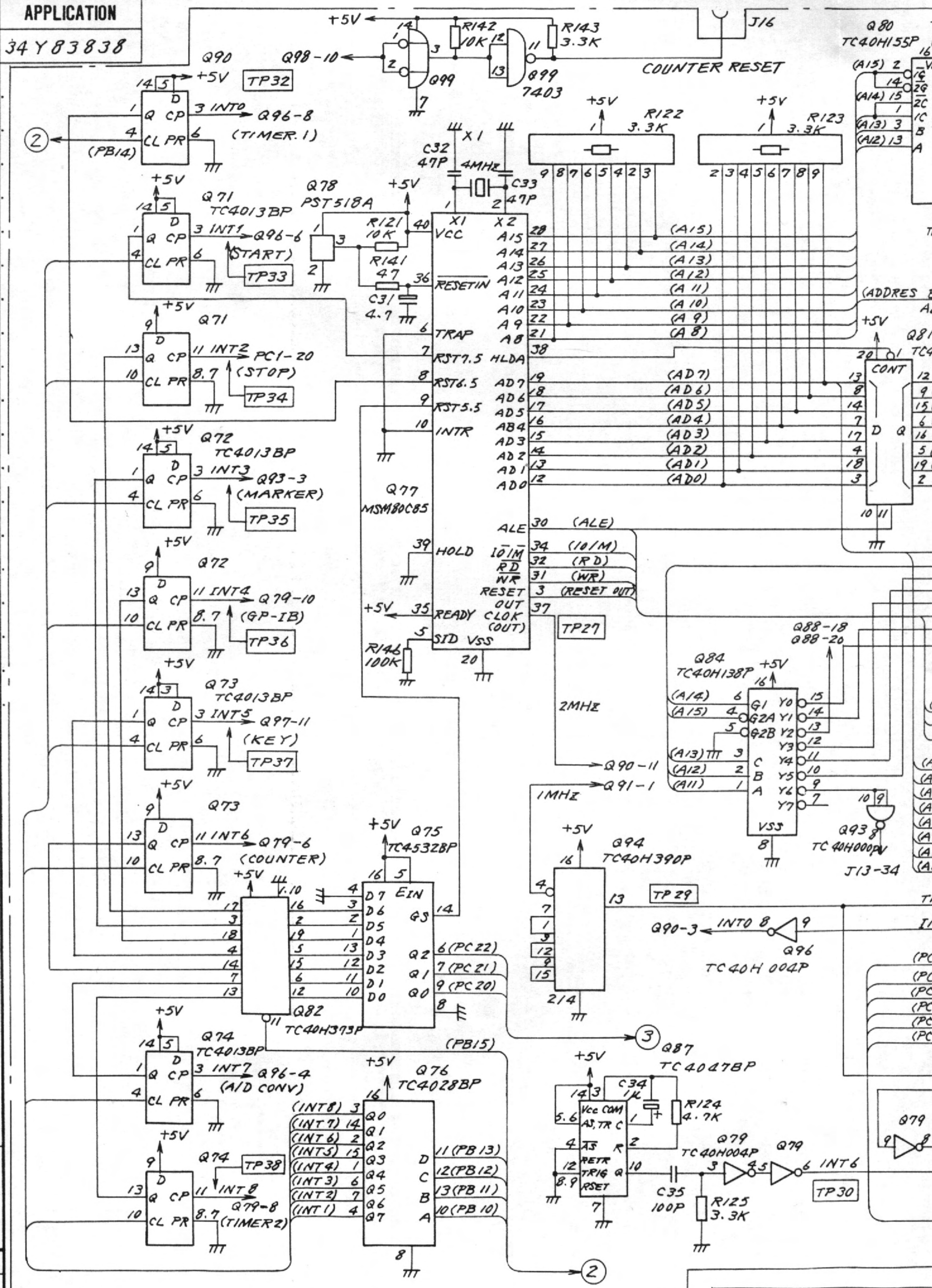
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CHECKED BY		TRACED BY		SCALE	<b>10</b>
APPROVED BY		DRAWN BY		:	
TITLE SCAN & CPU Circuit Diagram (SCAN)				DRAWING No. 33W 28095 3/5	



APPLICATION

34Y83838

A  
B  
C  
D  
E



Part List 34W89







APPLICATION

34Y83888

A

B

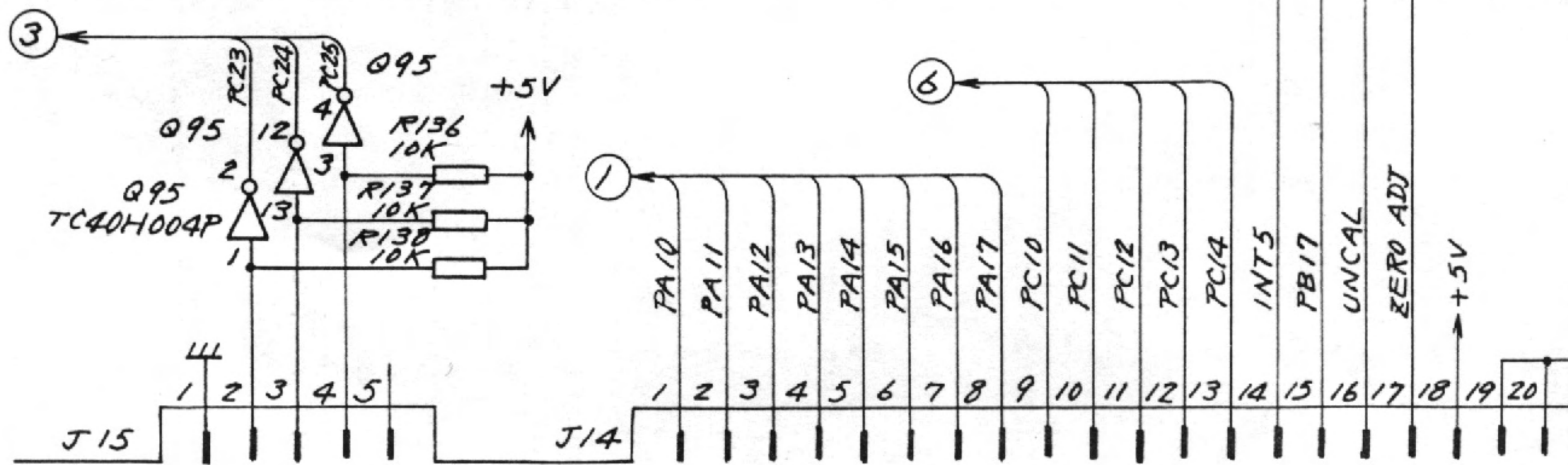
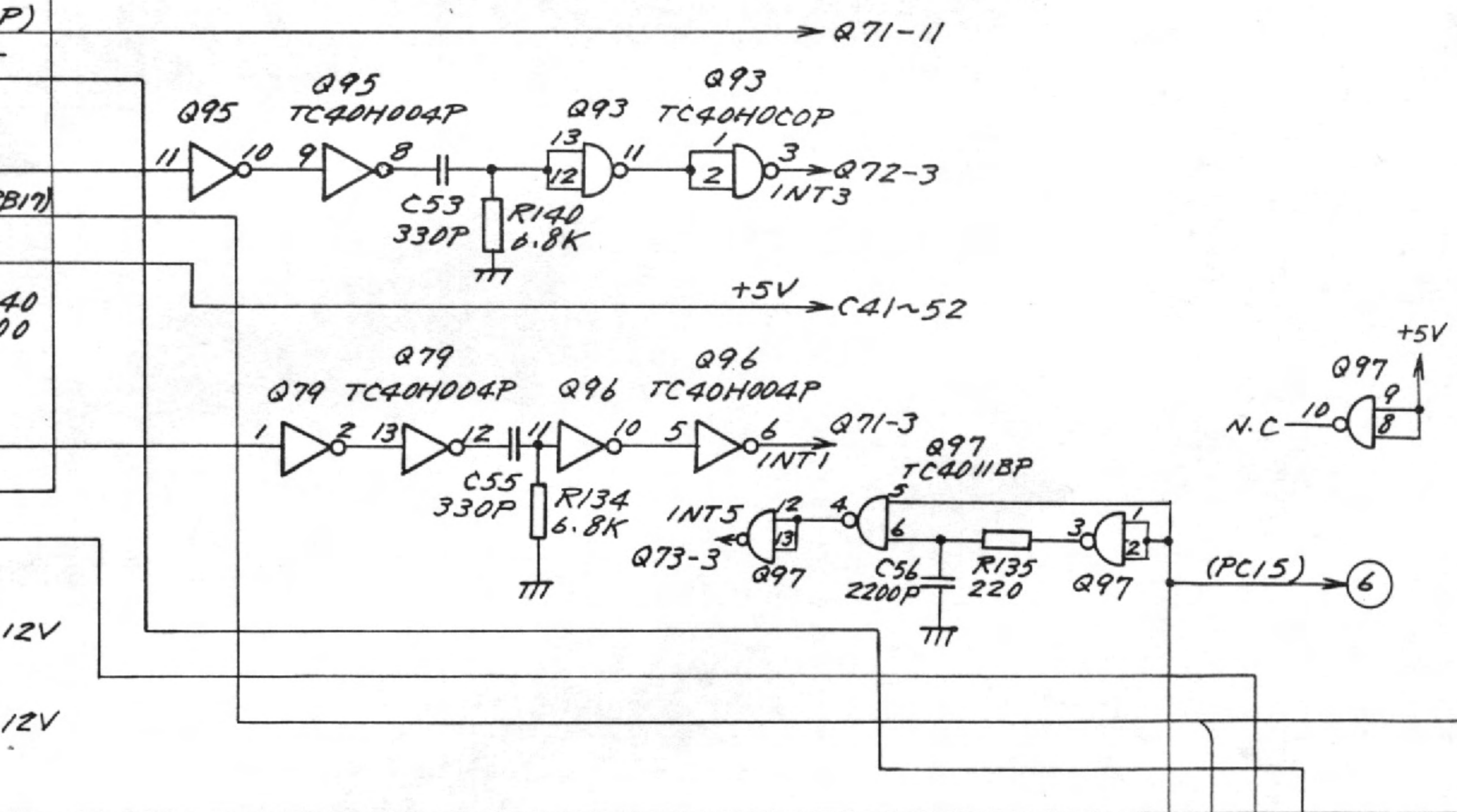
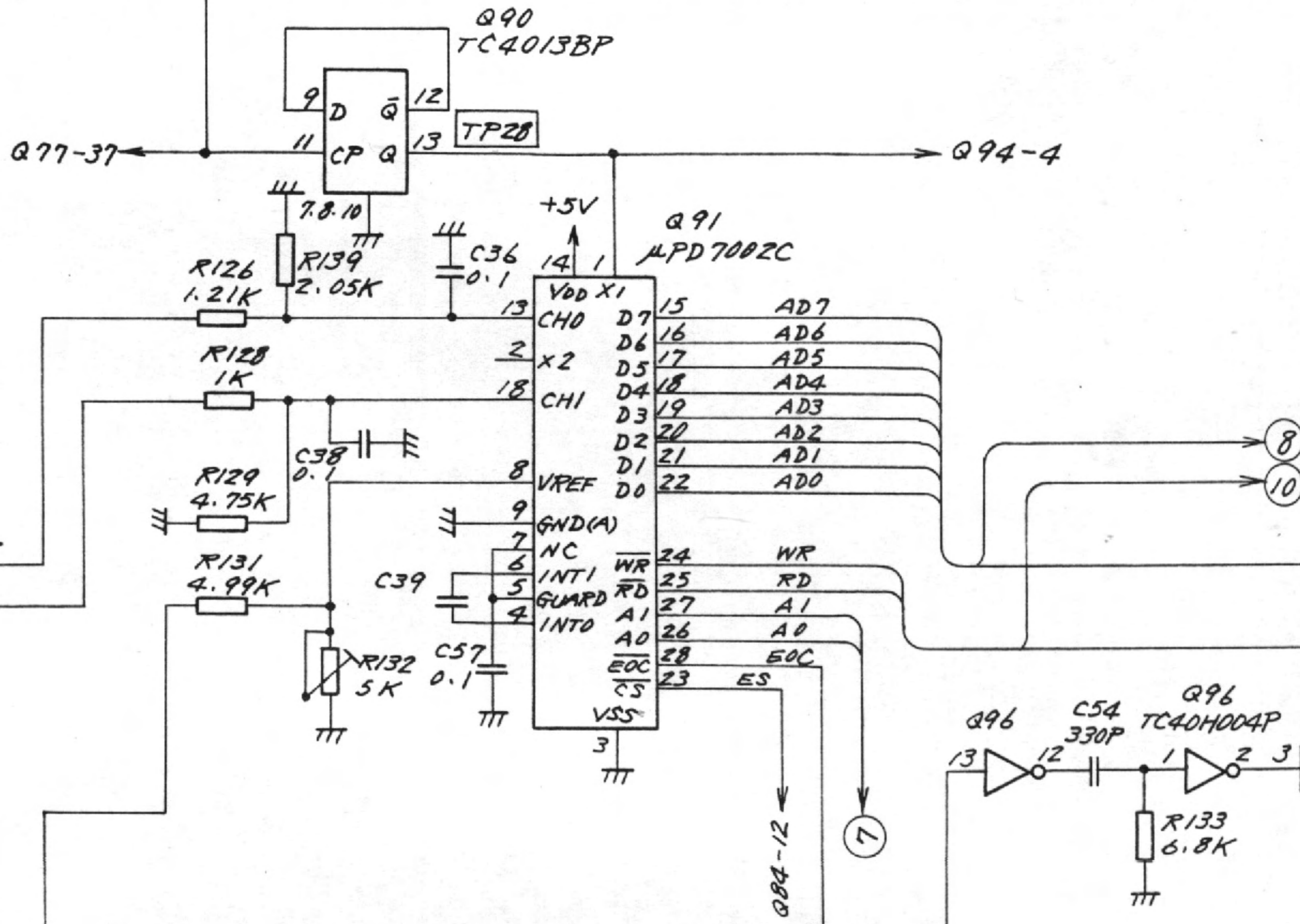
C

D

E

PC1

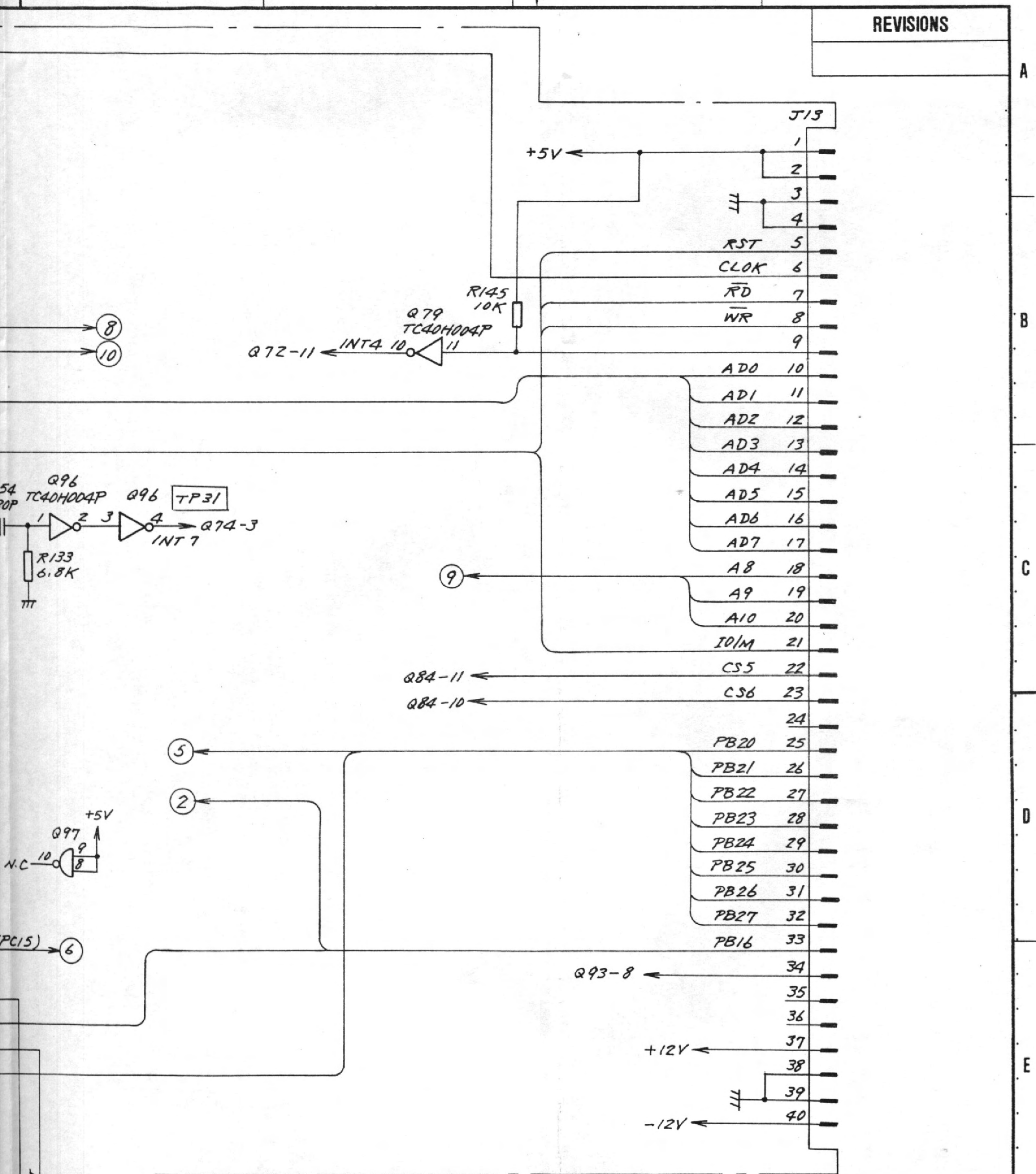
- 1 PA20
- 2 PA21
- 3 PA22
- 4 PA23
- 5 PA24
- 6 PA25
- 7 PA26
- 8 PA27
- 9 FREQ COUNT
- 10 DETEC OUT
- 11 PB20
- 12 PB21
- 13 PB22
- 14 PB23
- 15 PB24
- 16 PB25
- 17 PB26
- 18 PB27
- 19 INT2 (STOP)
- 20 ZERO ADJ
- 21 CHIP SEL (PB17)
- 22
- 23
- 24 INT 1
- 25 (+6.24V)
- 26
- 27
- 28
- 29
- 30
- 31
- 32
- 33
- 34
- 35



DEP



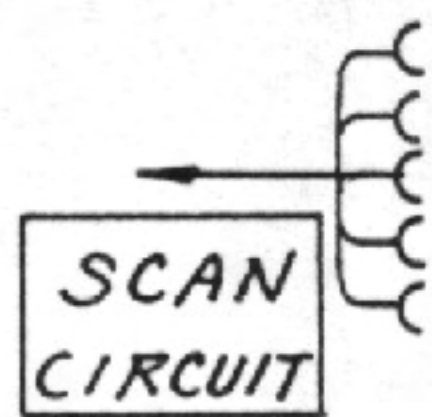
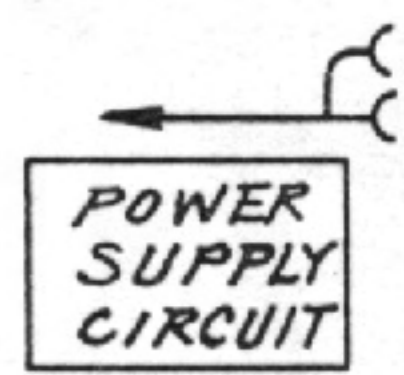
REVISIONS



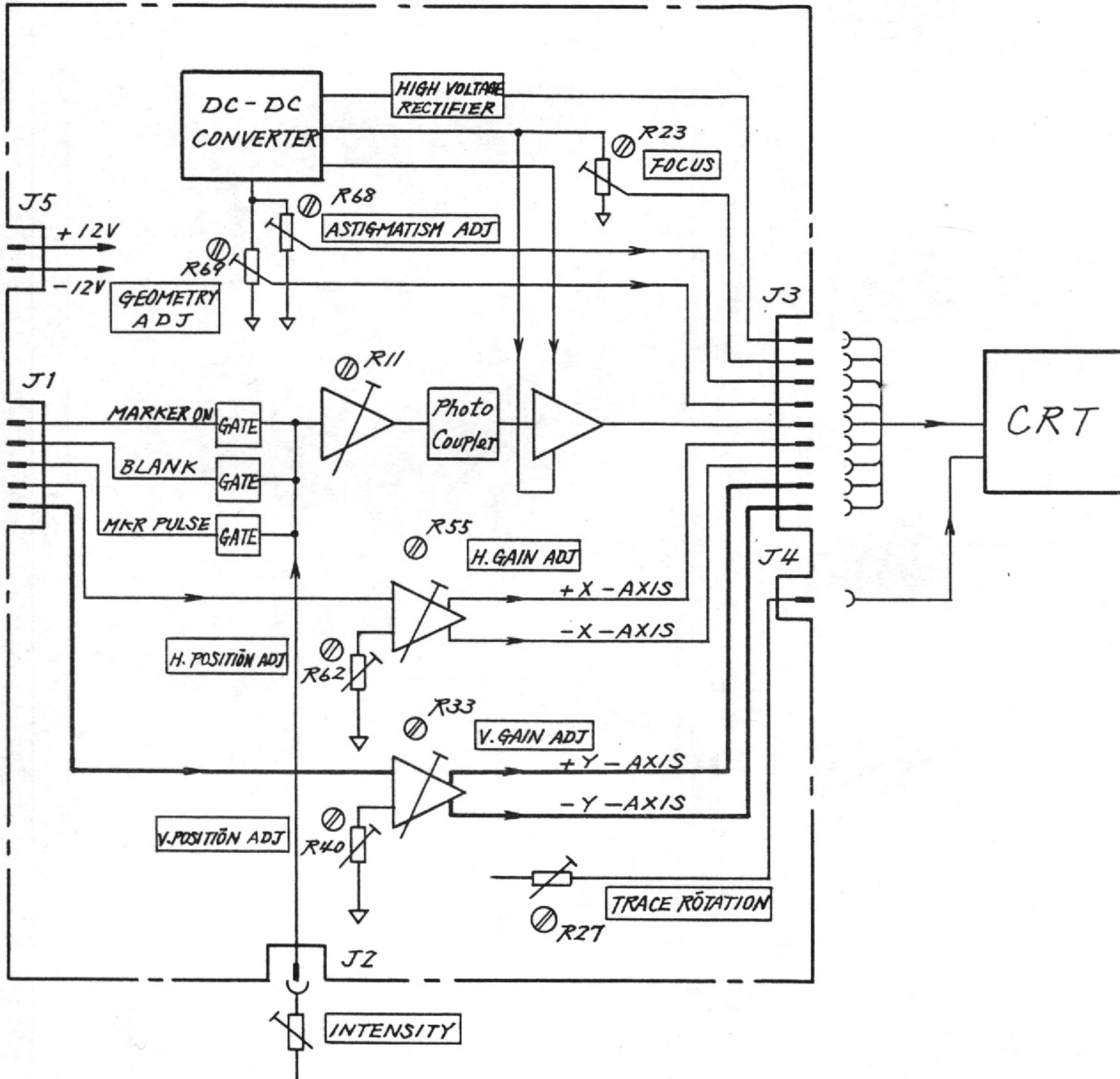
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APPROVED BY		DRAWN BY		:	
TITLE				DRAWING No.	
SCAN & CPU Circuit Diagram (CPU)				33W28095 5/5	

10









CRT DRIVE  
Block Diagram



33W26568 1/2

2

3

4

APPLICATION

34Y83841

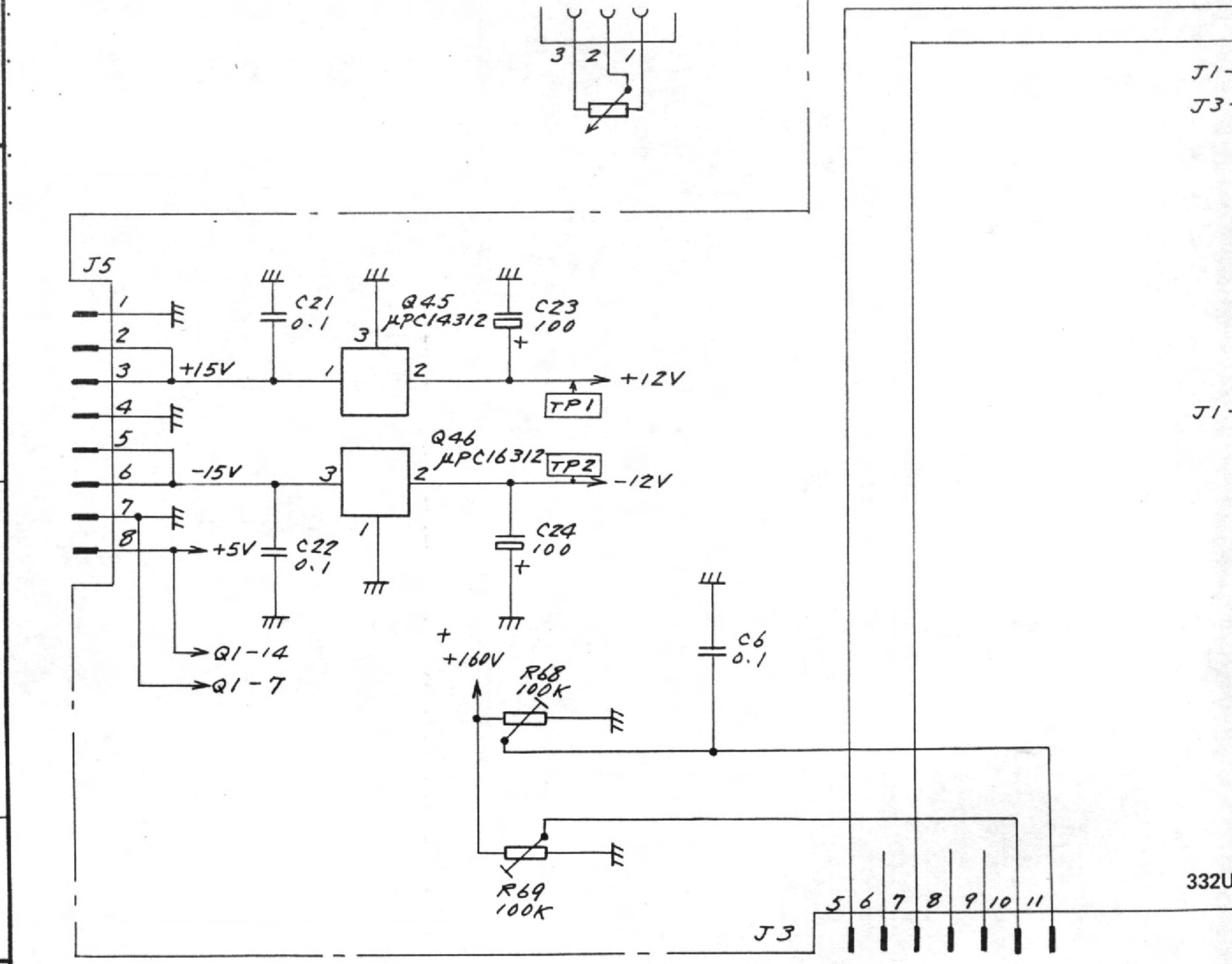
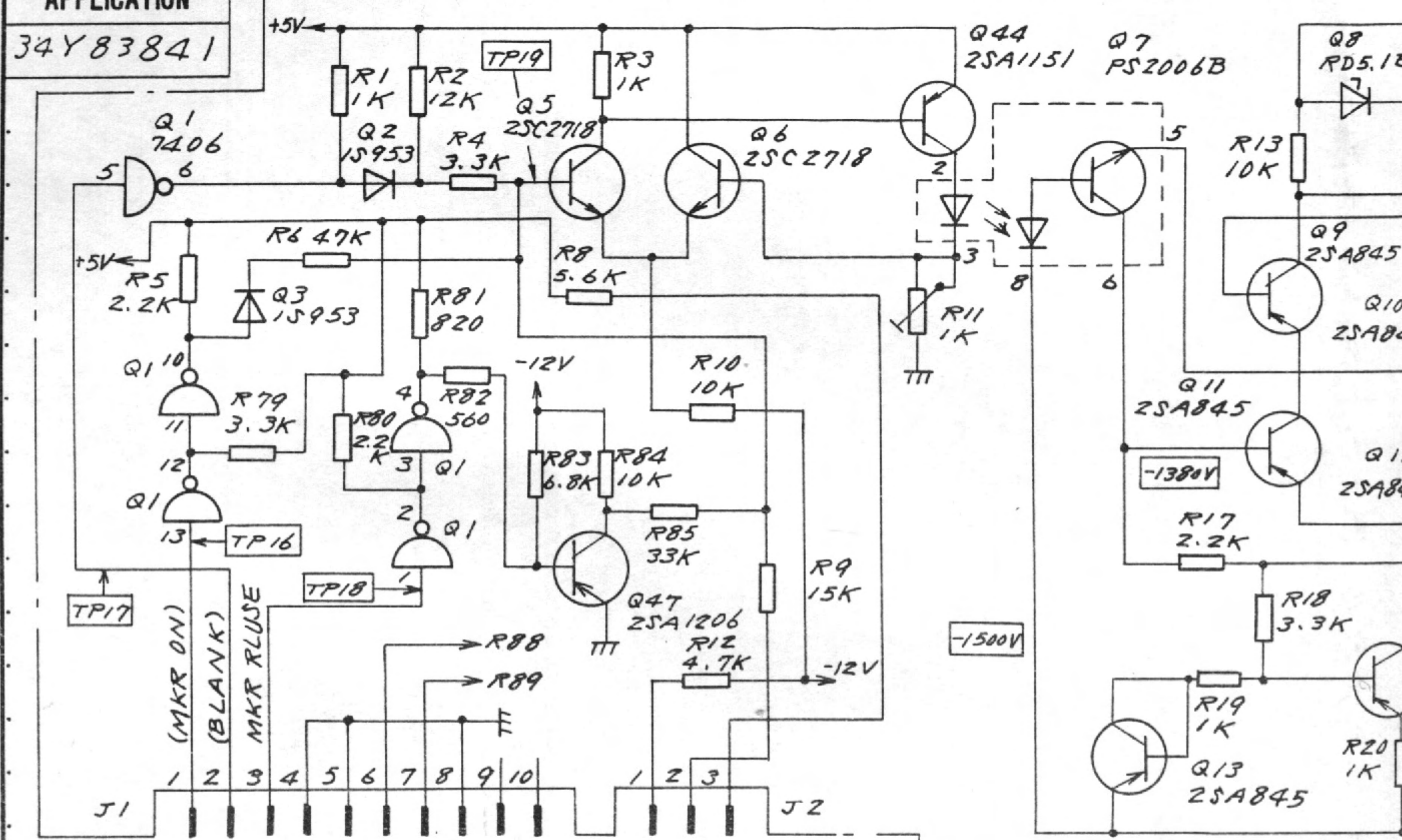
A

B

C

D

E



DEP

Parts List 34

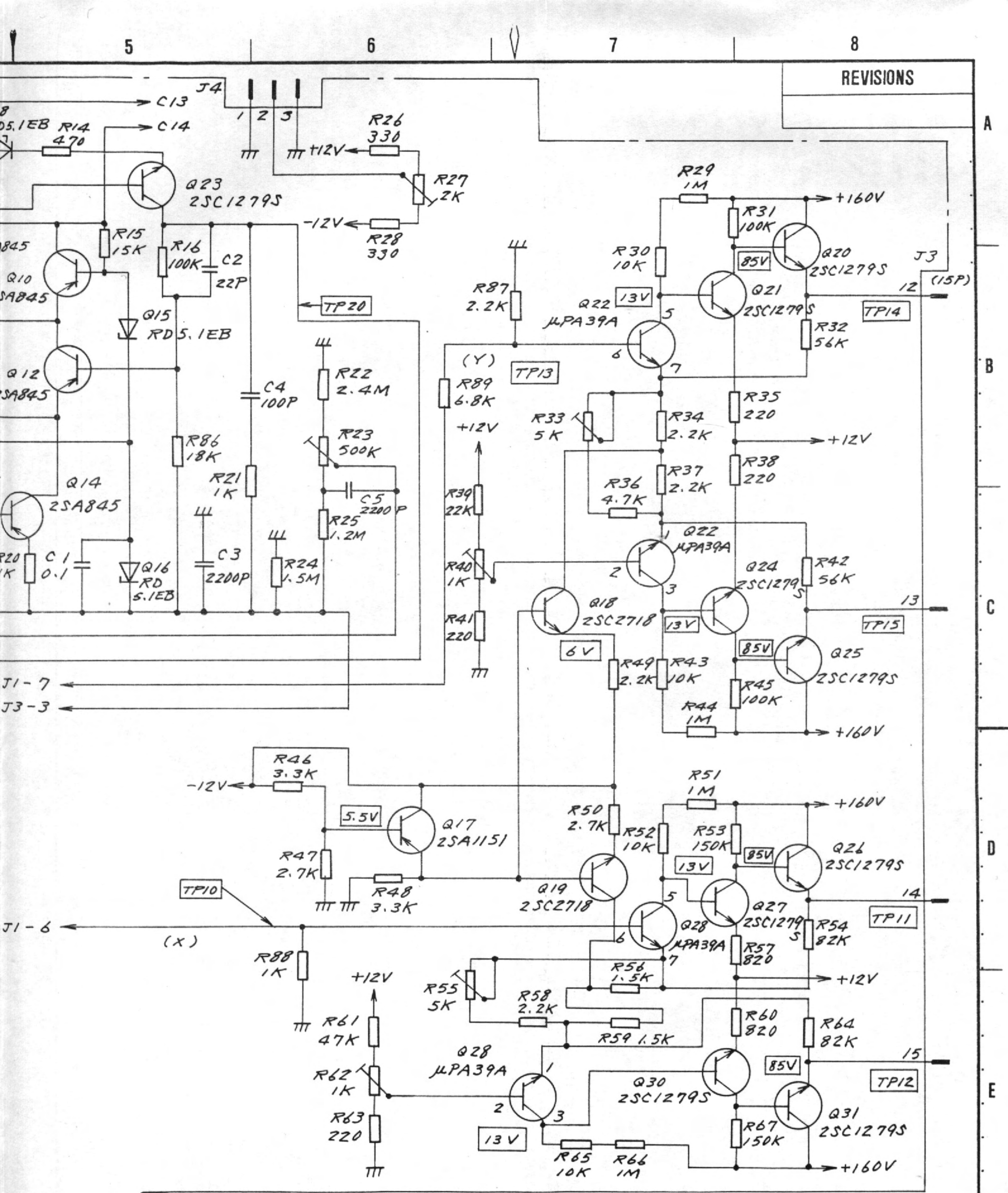
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2

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4





REVISIONS

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CRT DRIVE Circuit Diagram				33W 26568 1/2	

12

332U25790

34W85994



APPLICATION

34Y83841

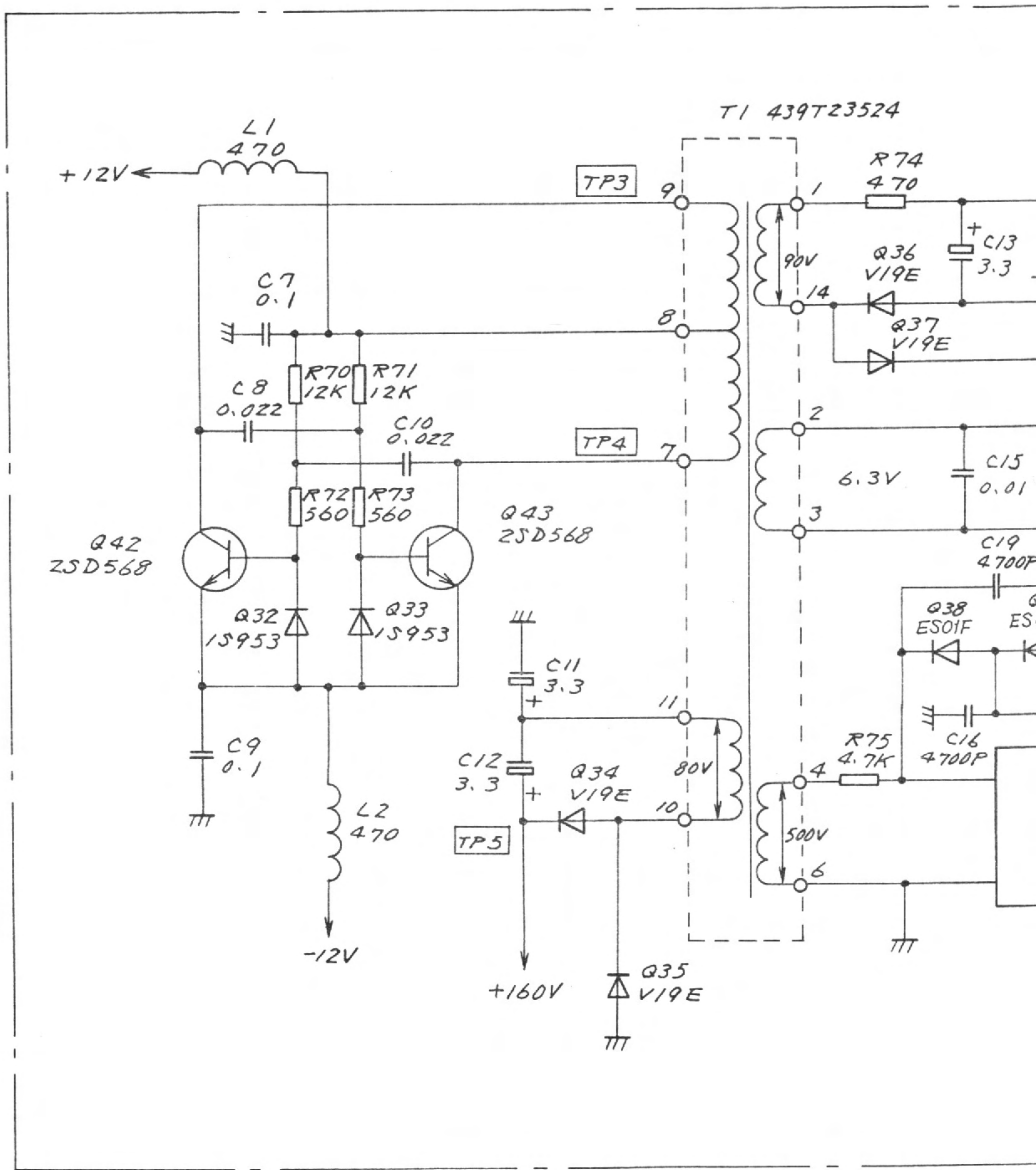
A

B

C

D

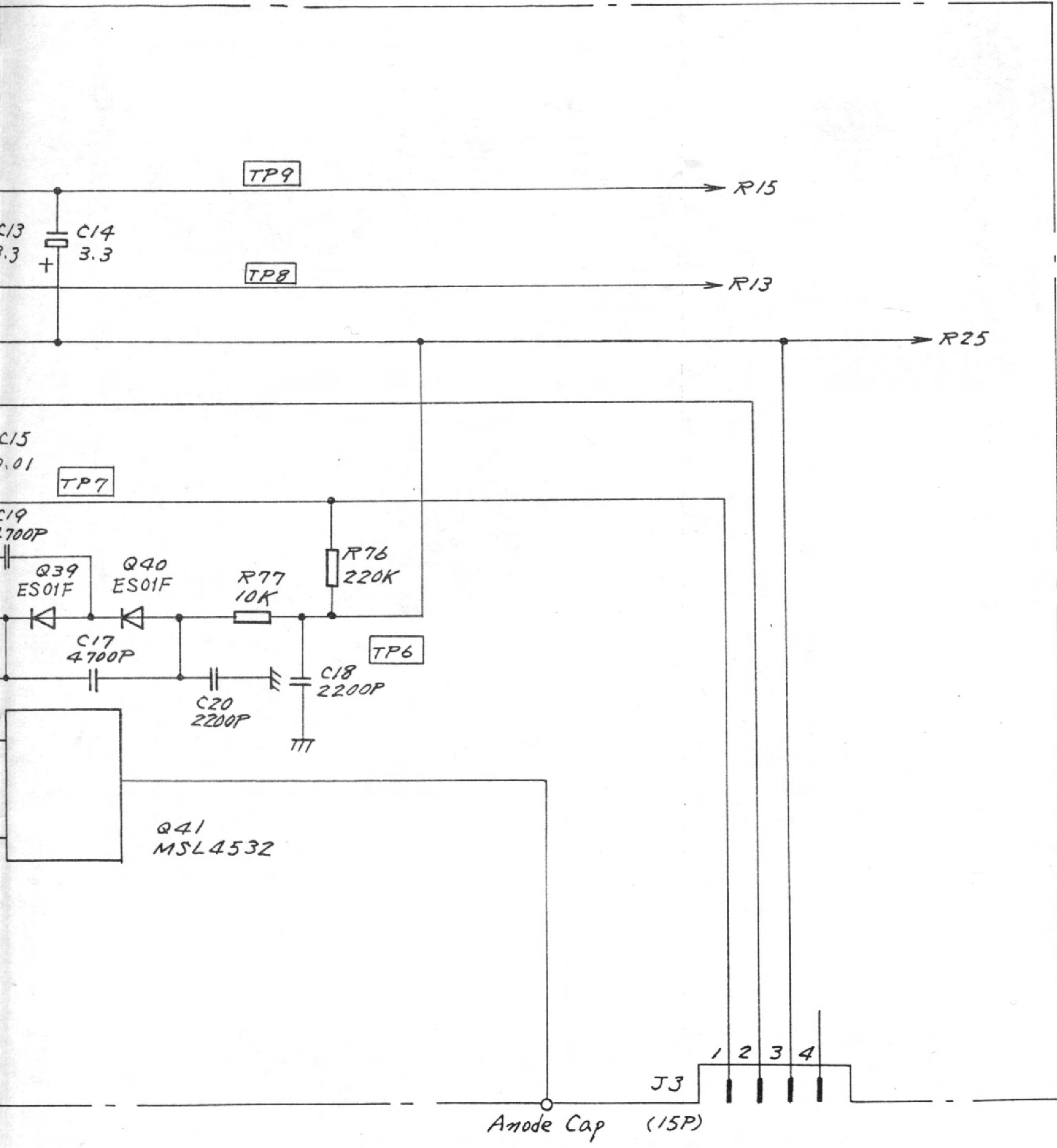
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DEP

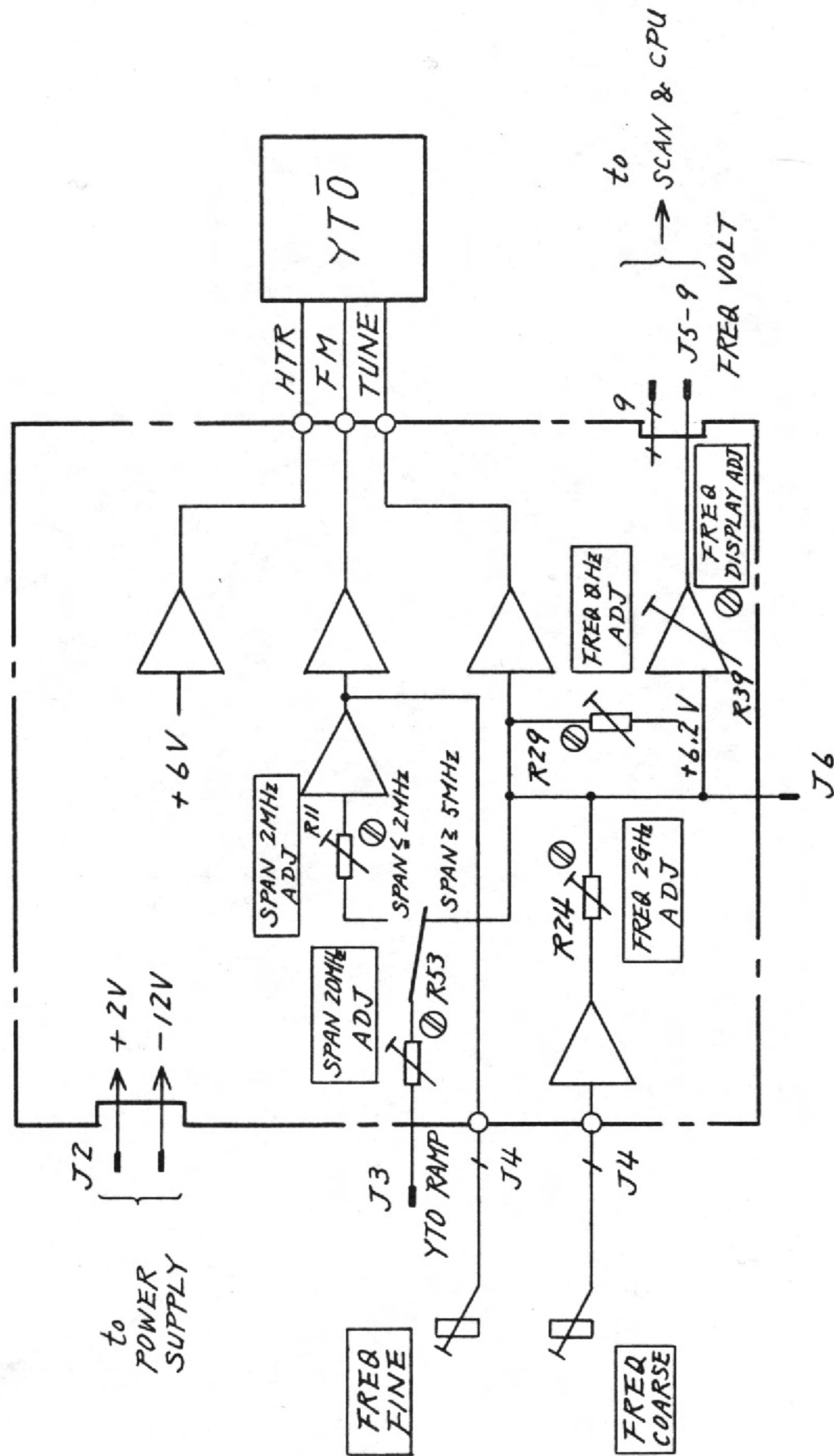


REVISIONS



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TITLE CRT DRIVE Circuit Diagram				DRAWING No. 33W 26568 2/2	





YTO DRIVE  
Block Diagram



33W26569 1/2

2

3

4

APPLICATION

34Y83848

A

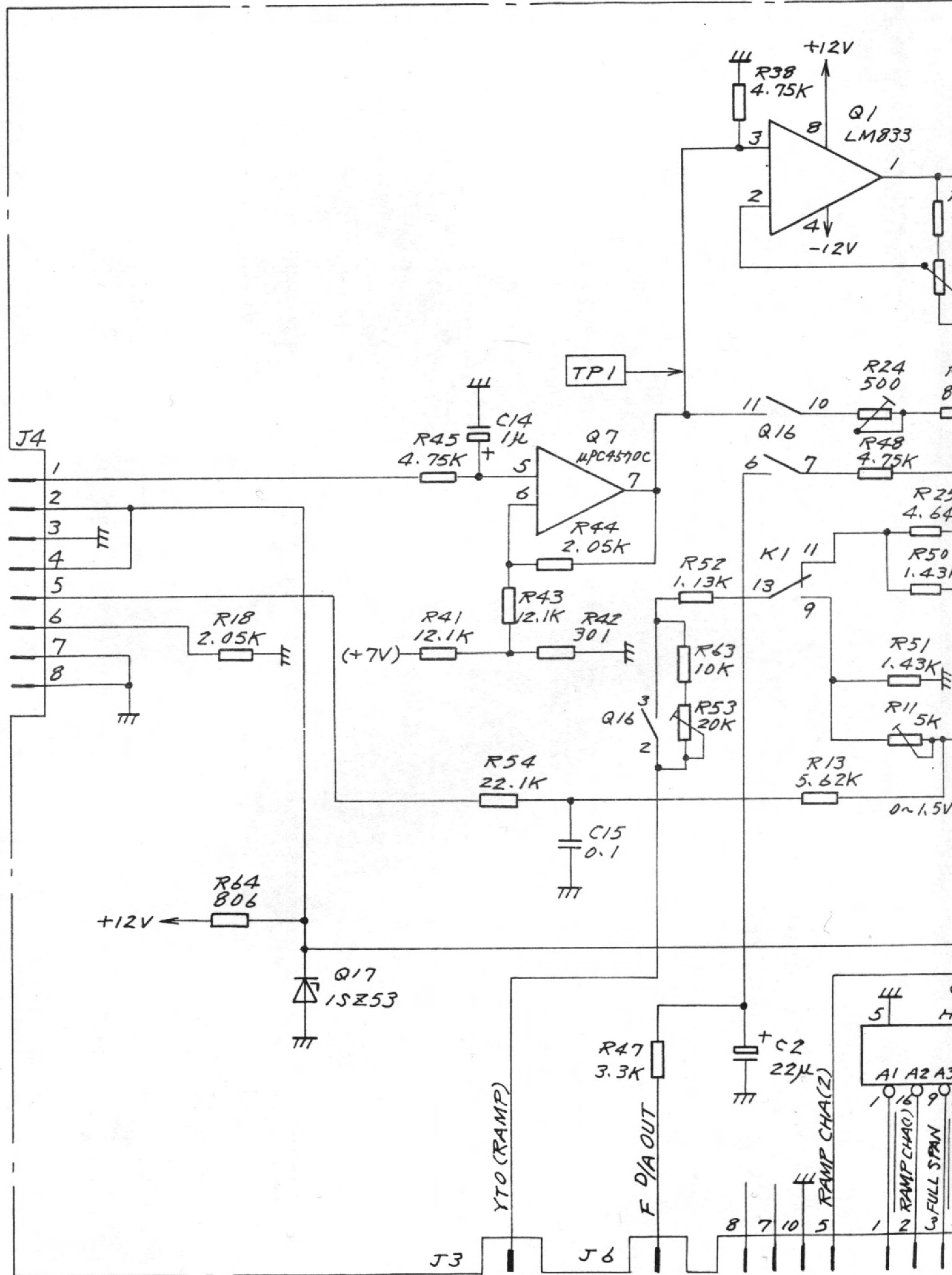
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D

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to P.M

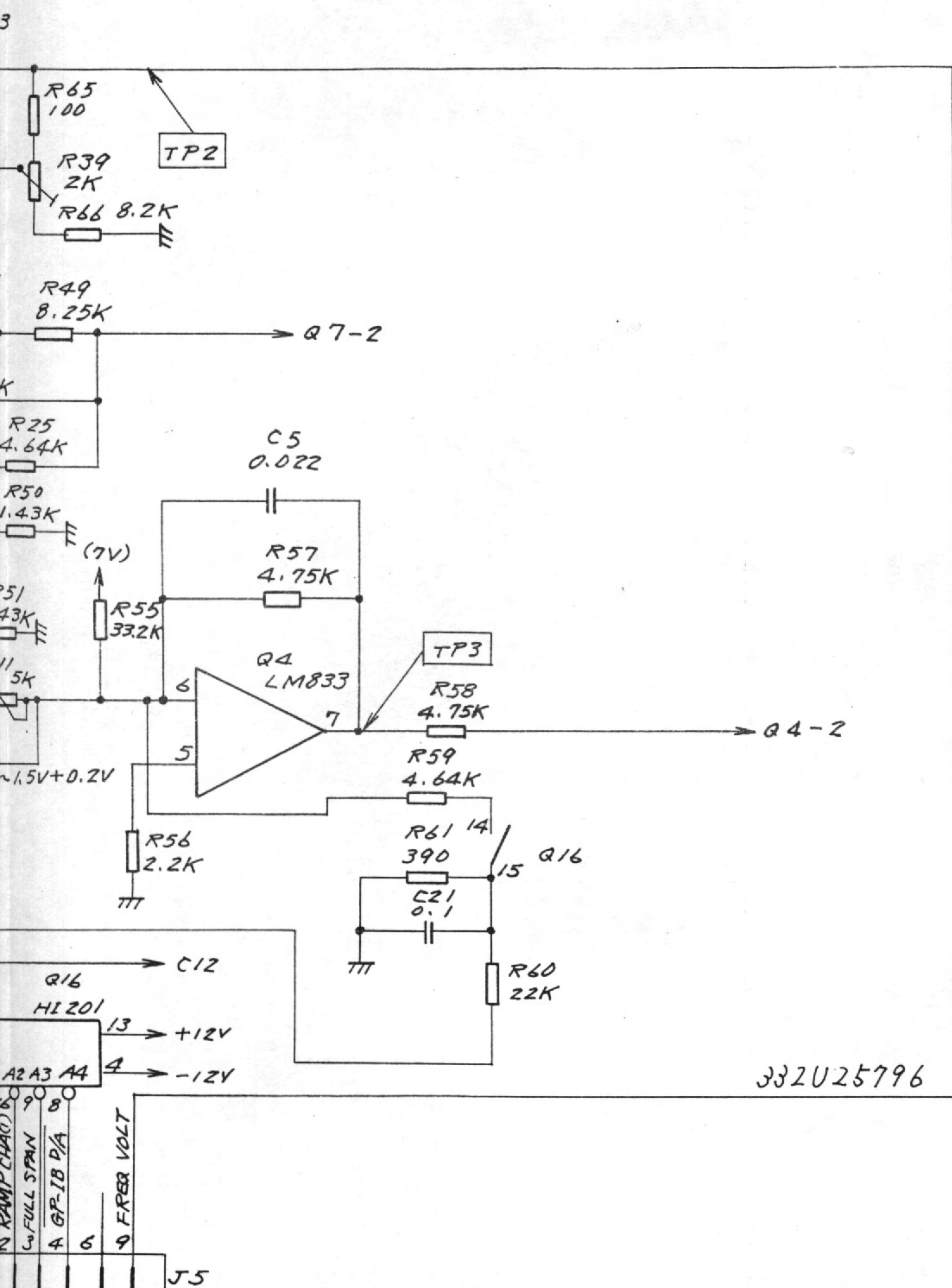


DEP

Parts List 34W



REVISIONS



332U25796

332U25796

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YTO DRIVE Circuit Diagram				33W26569 1/2	

34W85995



33W26569 2/2

2

3

4

APPLICATION

34Y83848

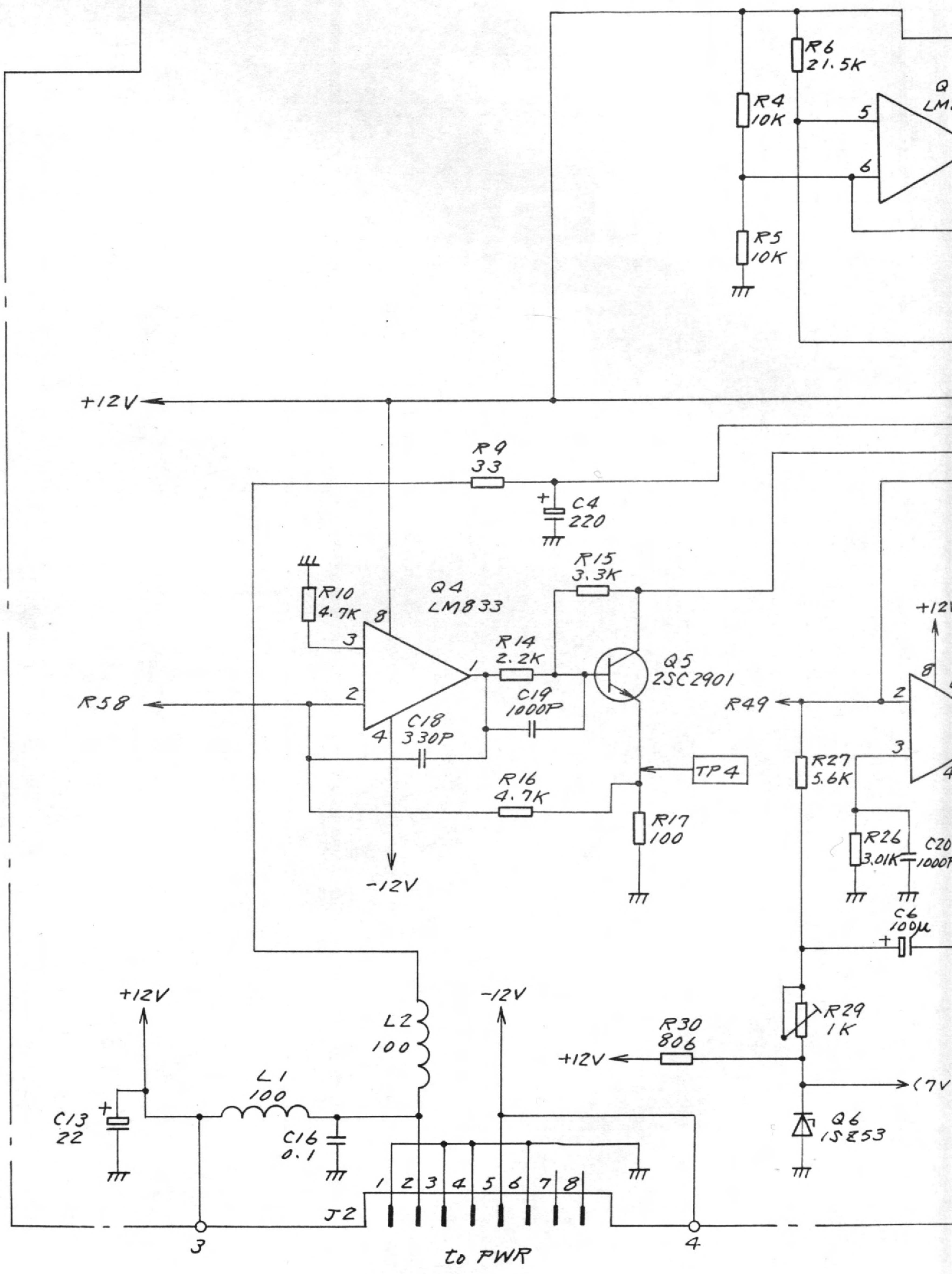
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B

C

D

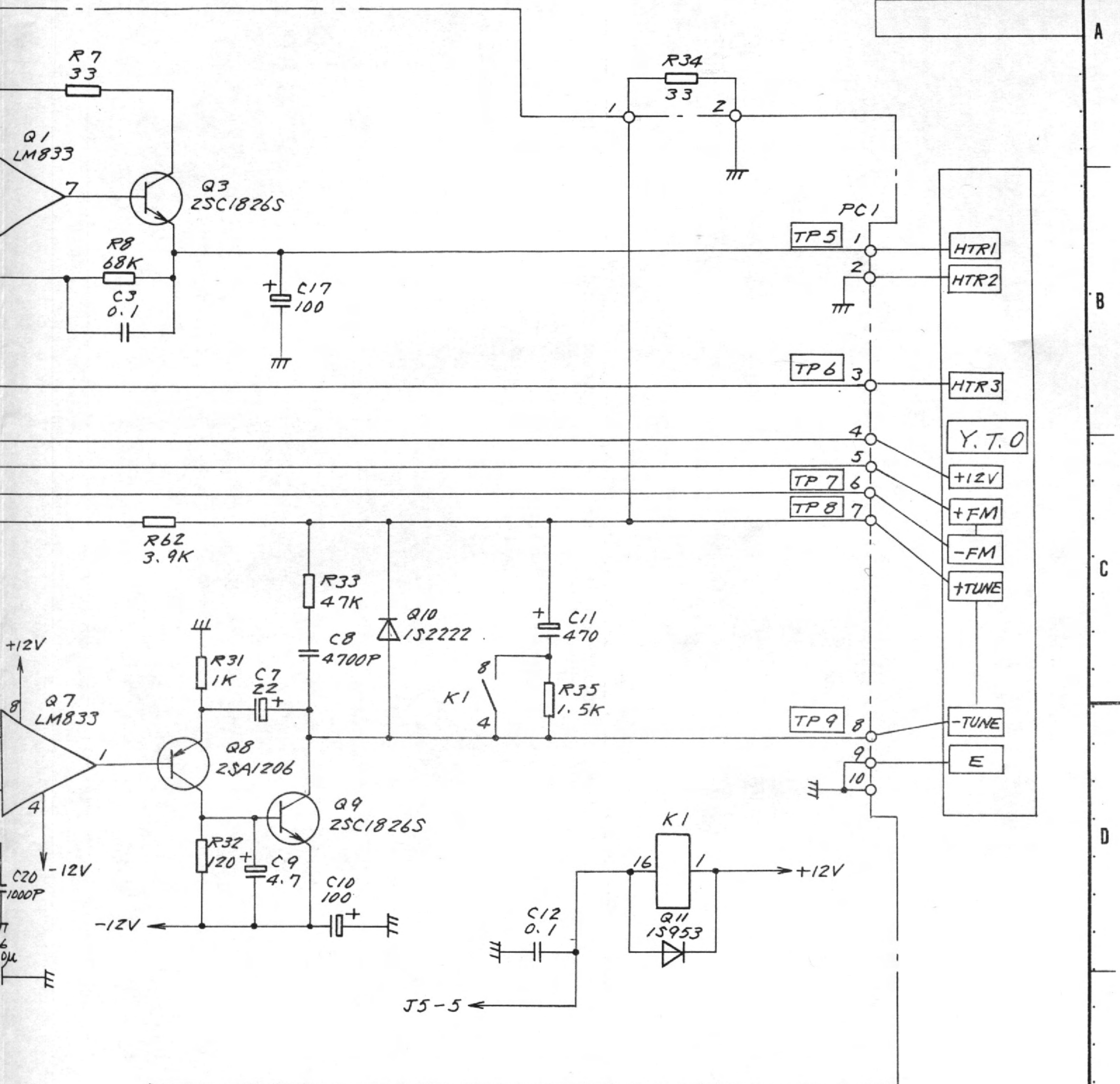
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DEP



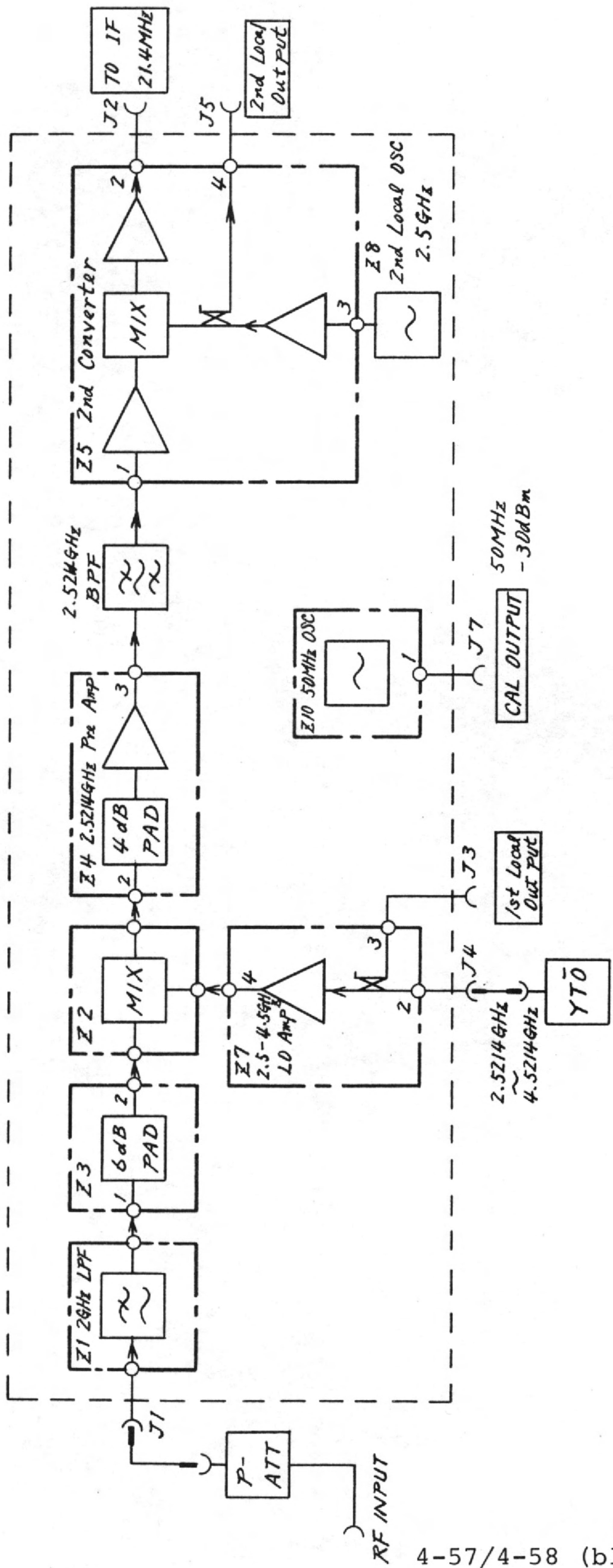
REVISIONS



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YTO DRIVE Circuit Diagram				33W26569 2/2	

14





RF Block  
Block Diagram



33W26562 1/1

2

3

4

APPLICATION

34Y83846

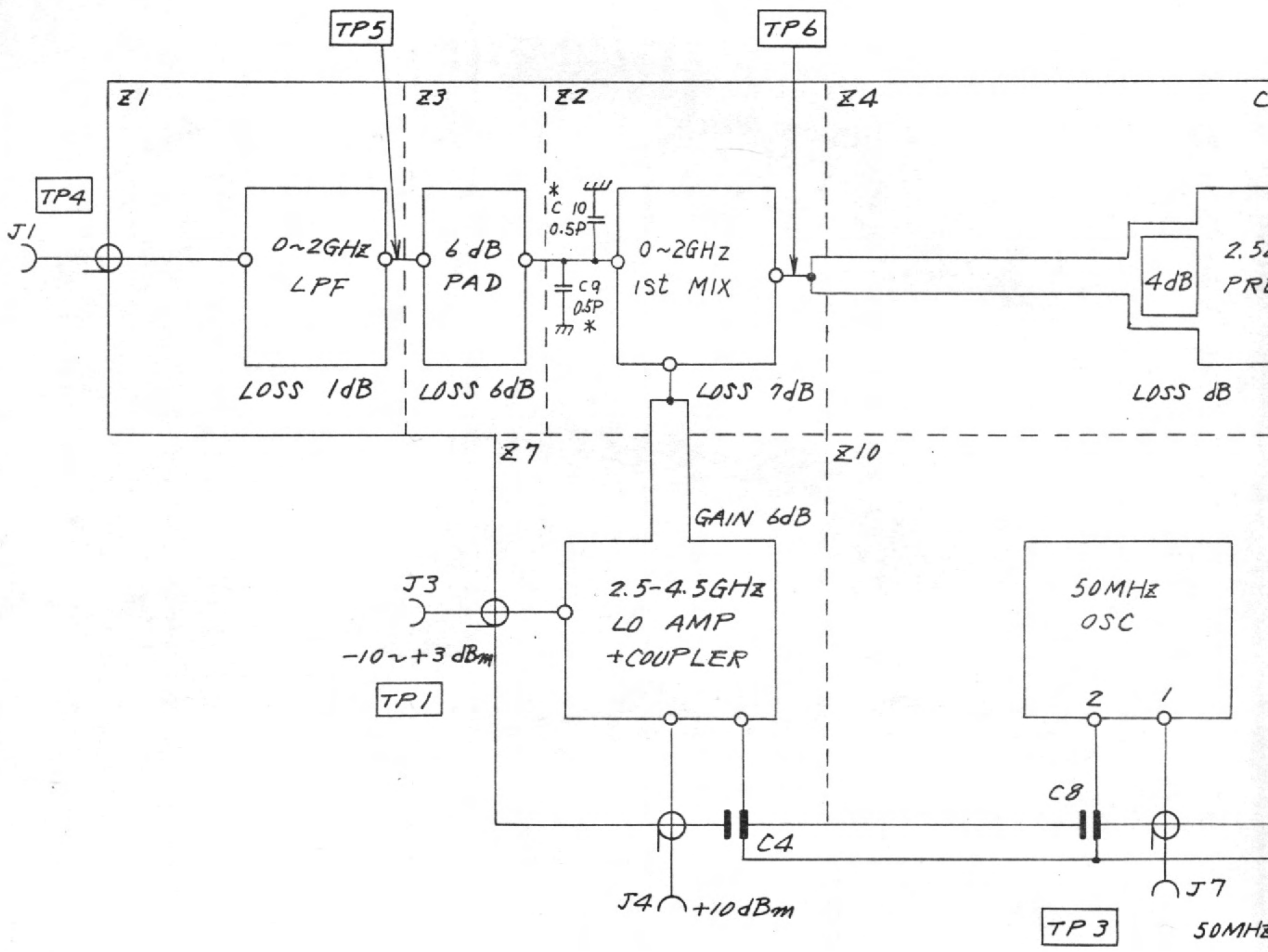
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D

E



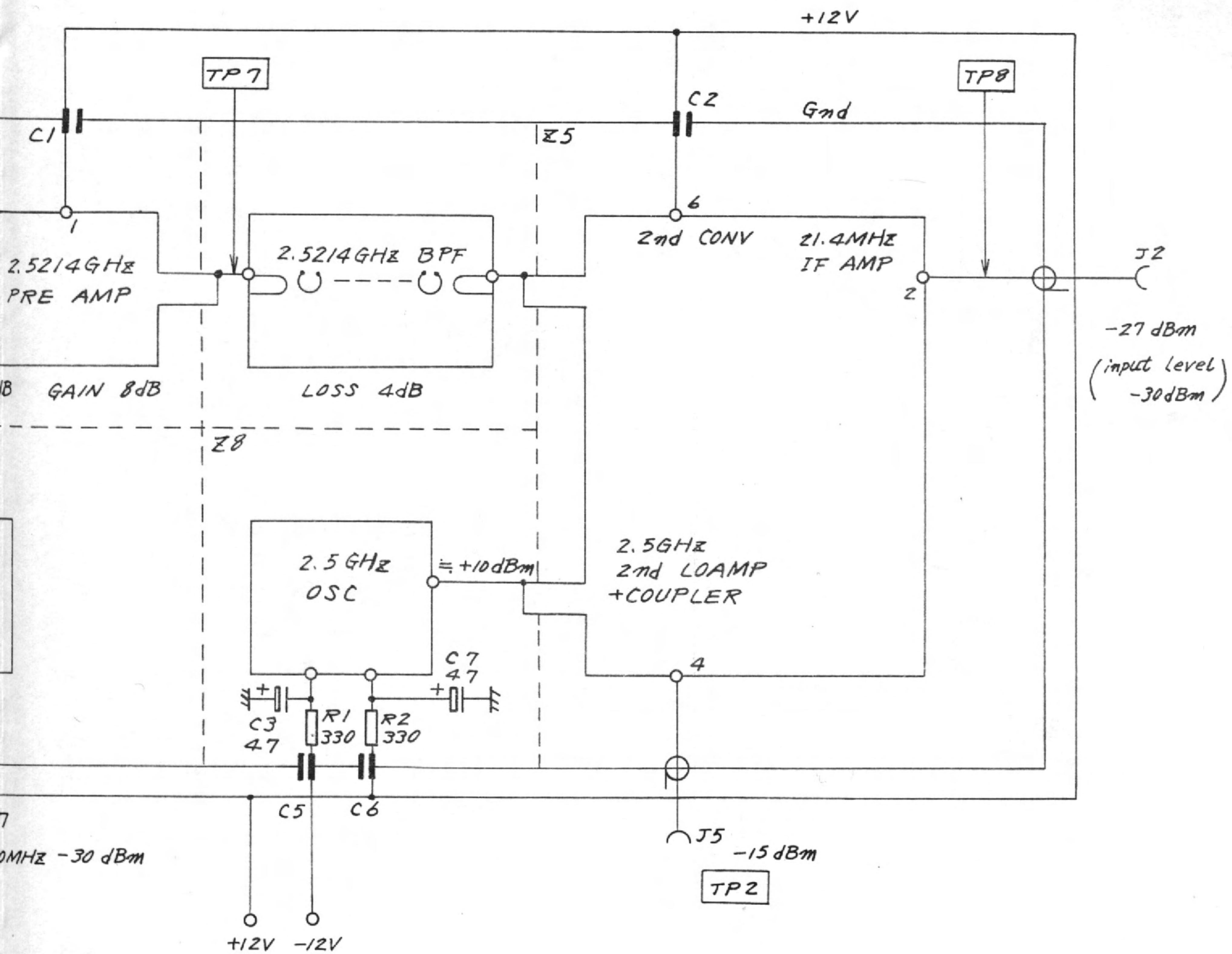
Parts List 34W85987

\*Note: C9 and C10 are built only into the MS610A for adjustment use.

DEP

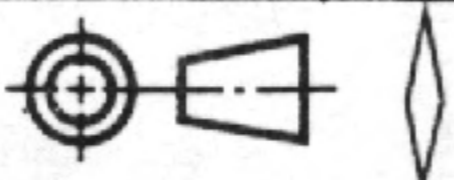


REVISIONS



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RF CONV Circuit Diagram				33W26562 1/1	

16





APPLICATION

34Y83846

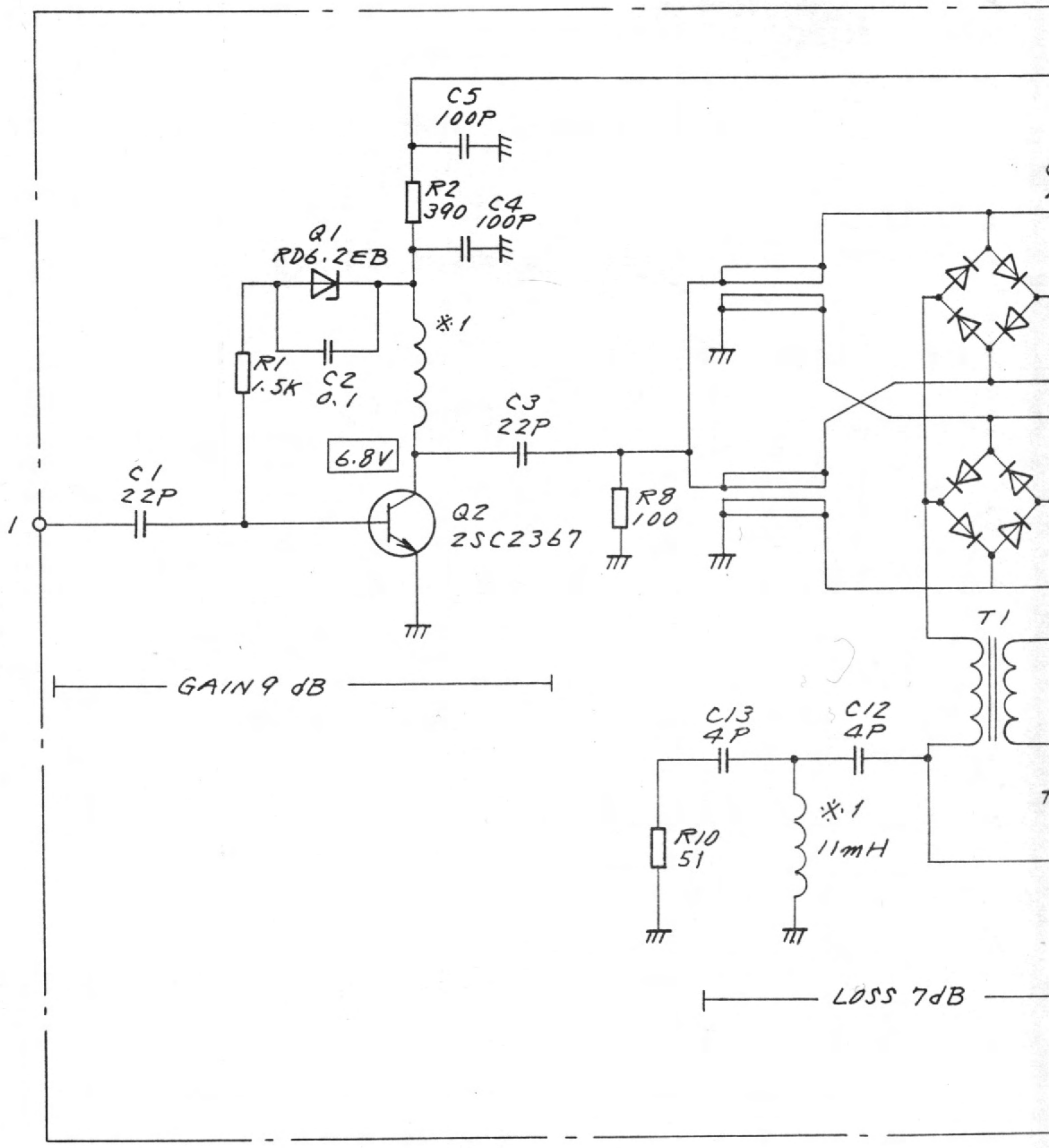
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C

D

E

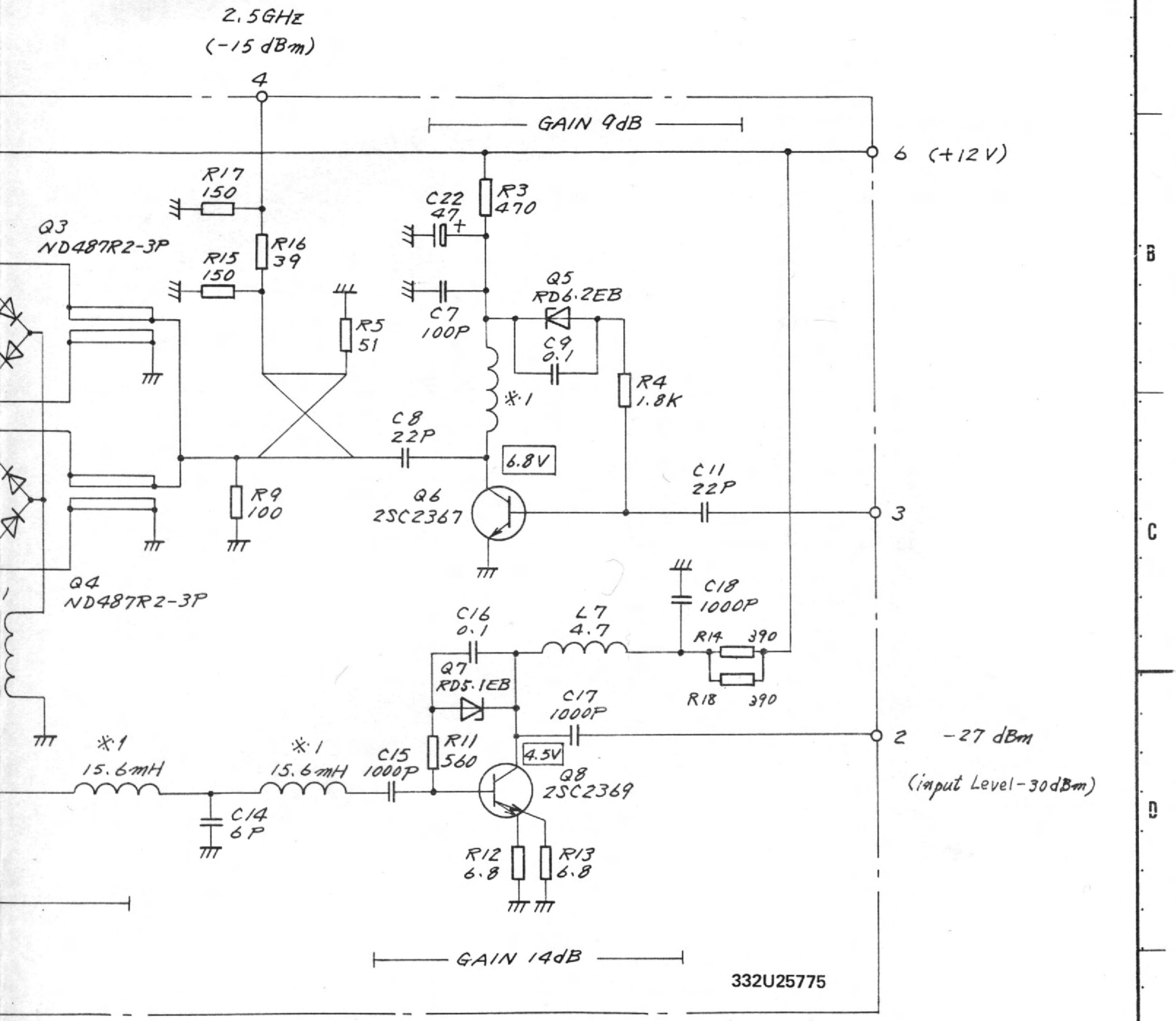


DEP

Parts List 34



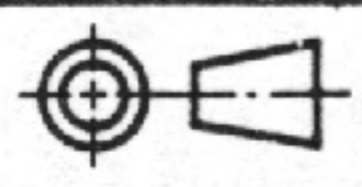
REVISIONS



\* 1 Printed Coil Pattern

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2nd Converter Circuit Diagram				33W28092 1/1	

17



34W89581



33W26564 1/1

2

3

4

APPLICATION

34Y83846

A

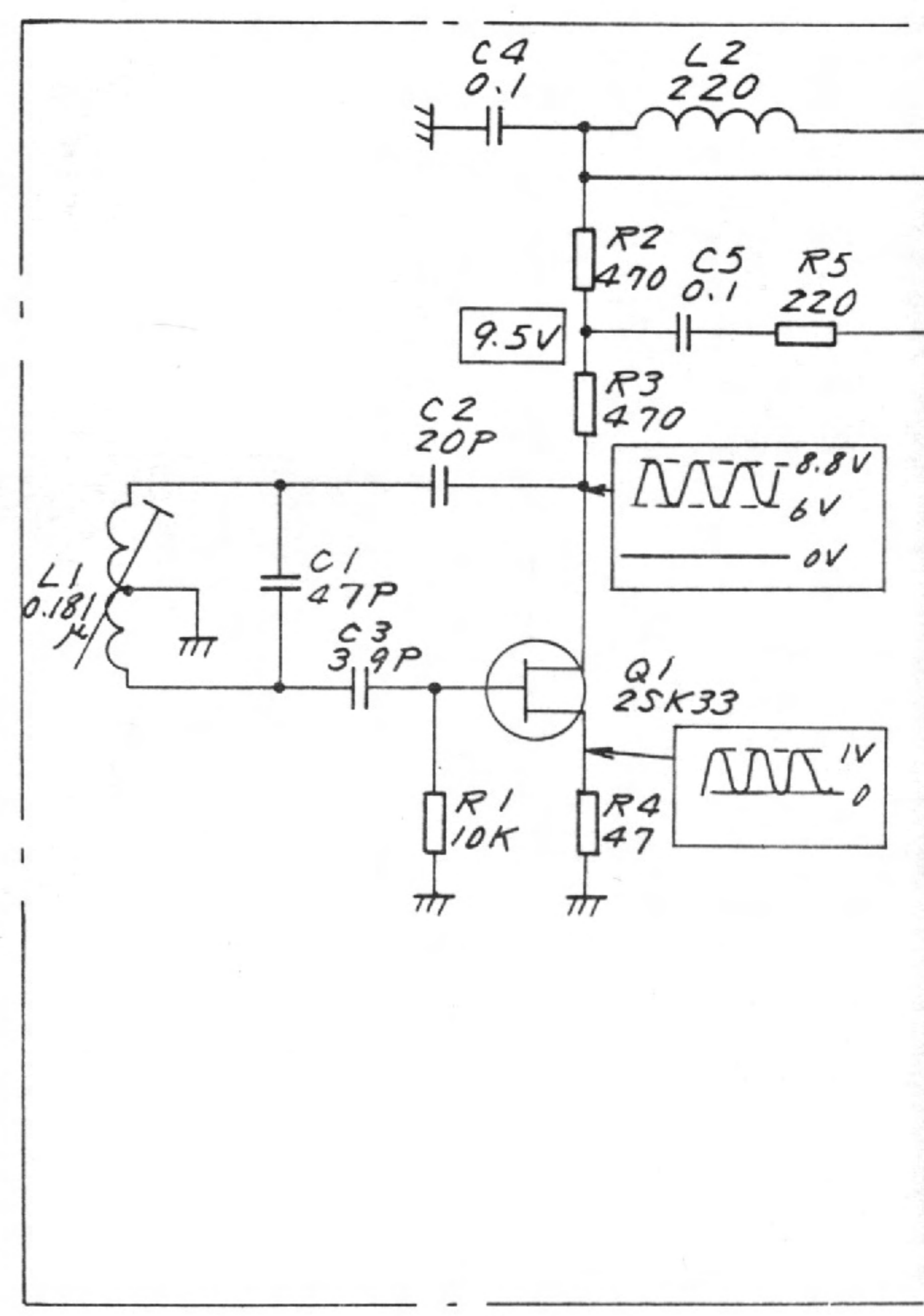
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DEP



Parts List	34W85990
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REVISIONS

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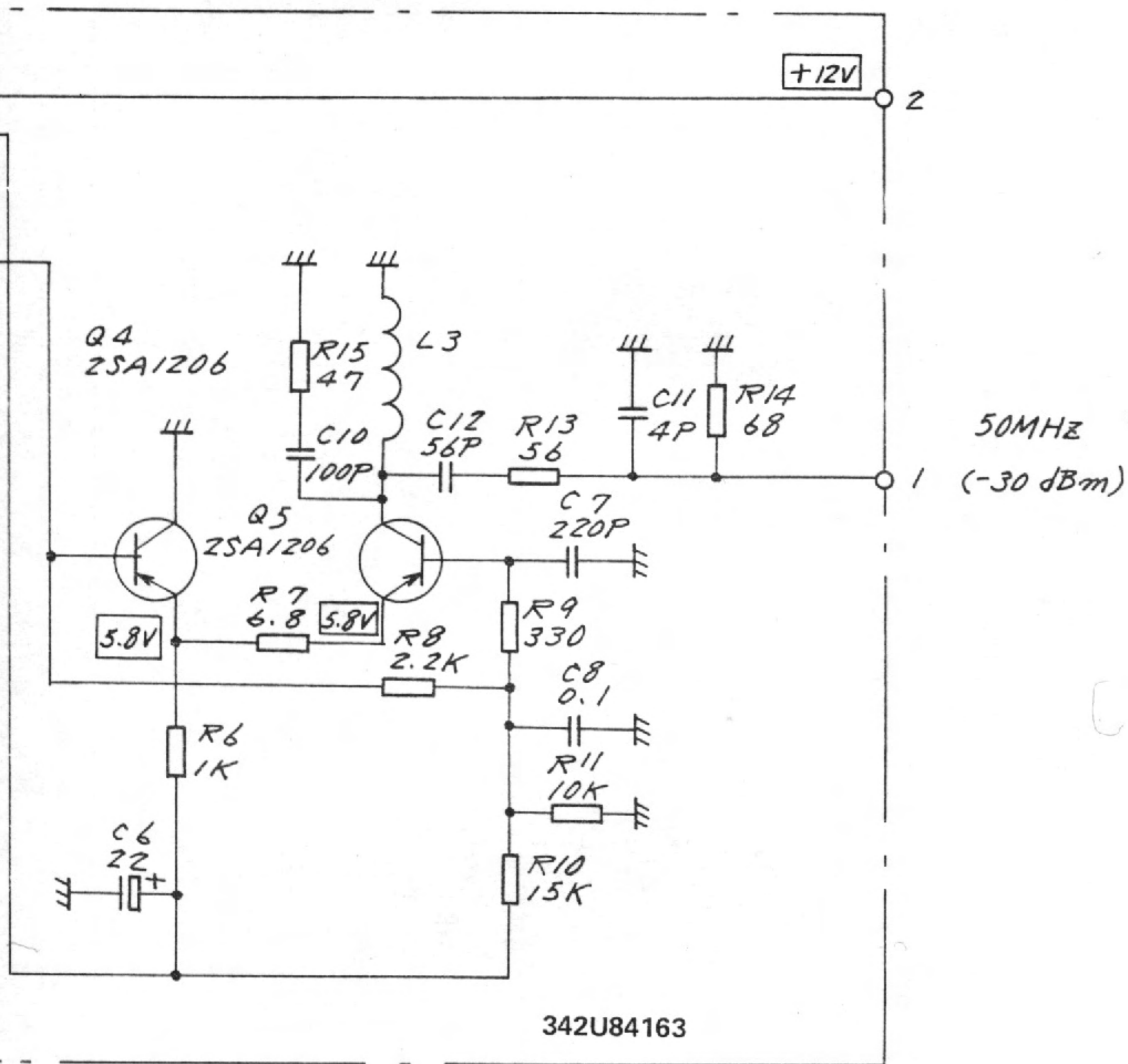
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C

D

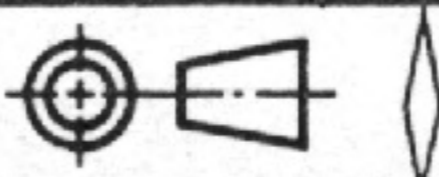
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F



342U84163

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50MHz OSC Circuit Diagram				33W26564 1/1	





34W87923 1/1

APPLICATION

34Y83859

REVISIONS

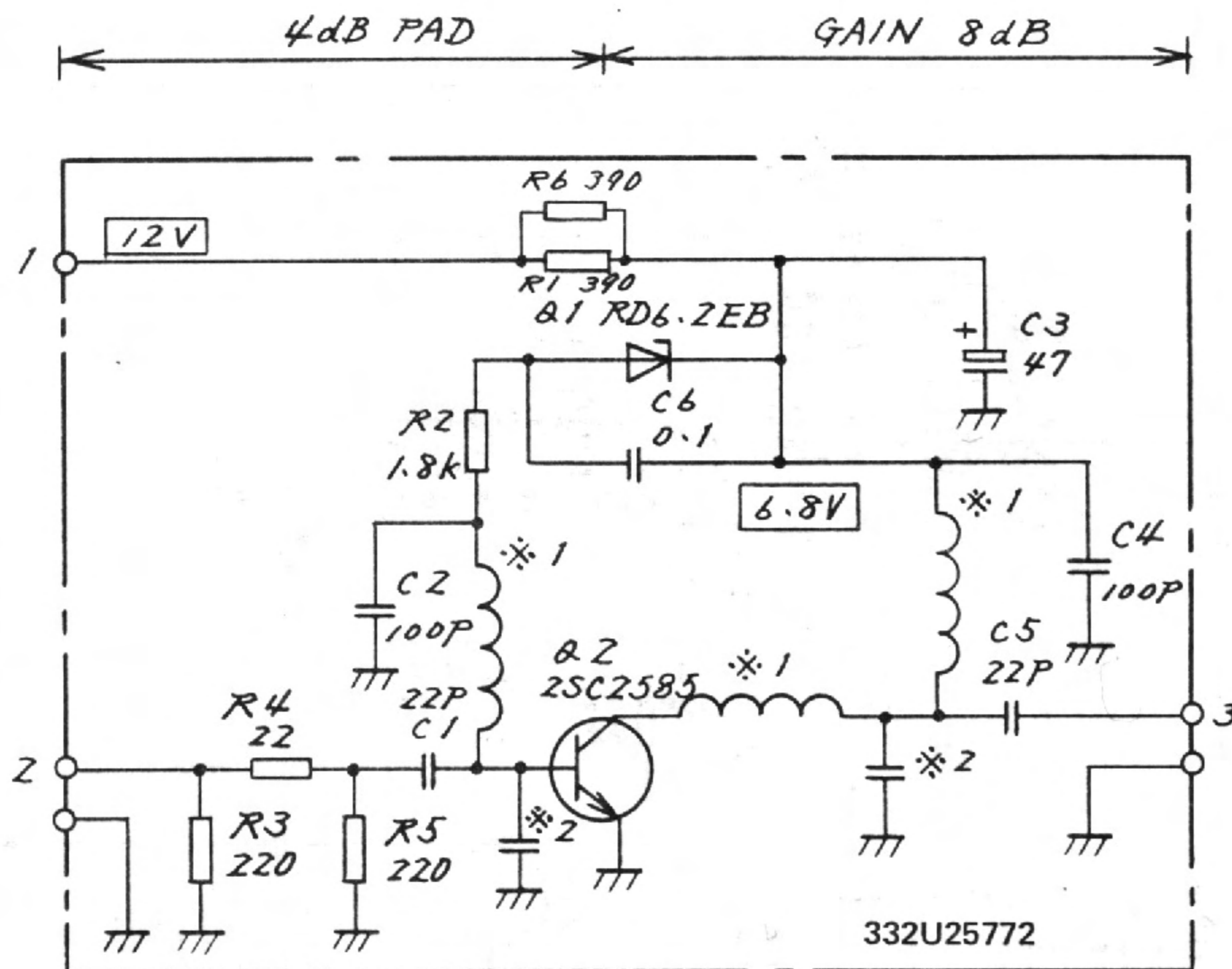
A

B

C

D

E

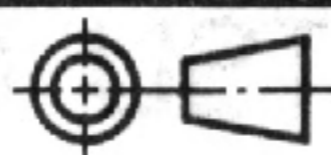


\* 1 Printed Coil Pattern

\* 2 Printed Condenser Pattern

Parts List 34W89578

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	2.5214 GHz PRE AMP Circuit Diagram			34W89579 1/1	





34W89427 1/1

APPLICATION

REVISIONS

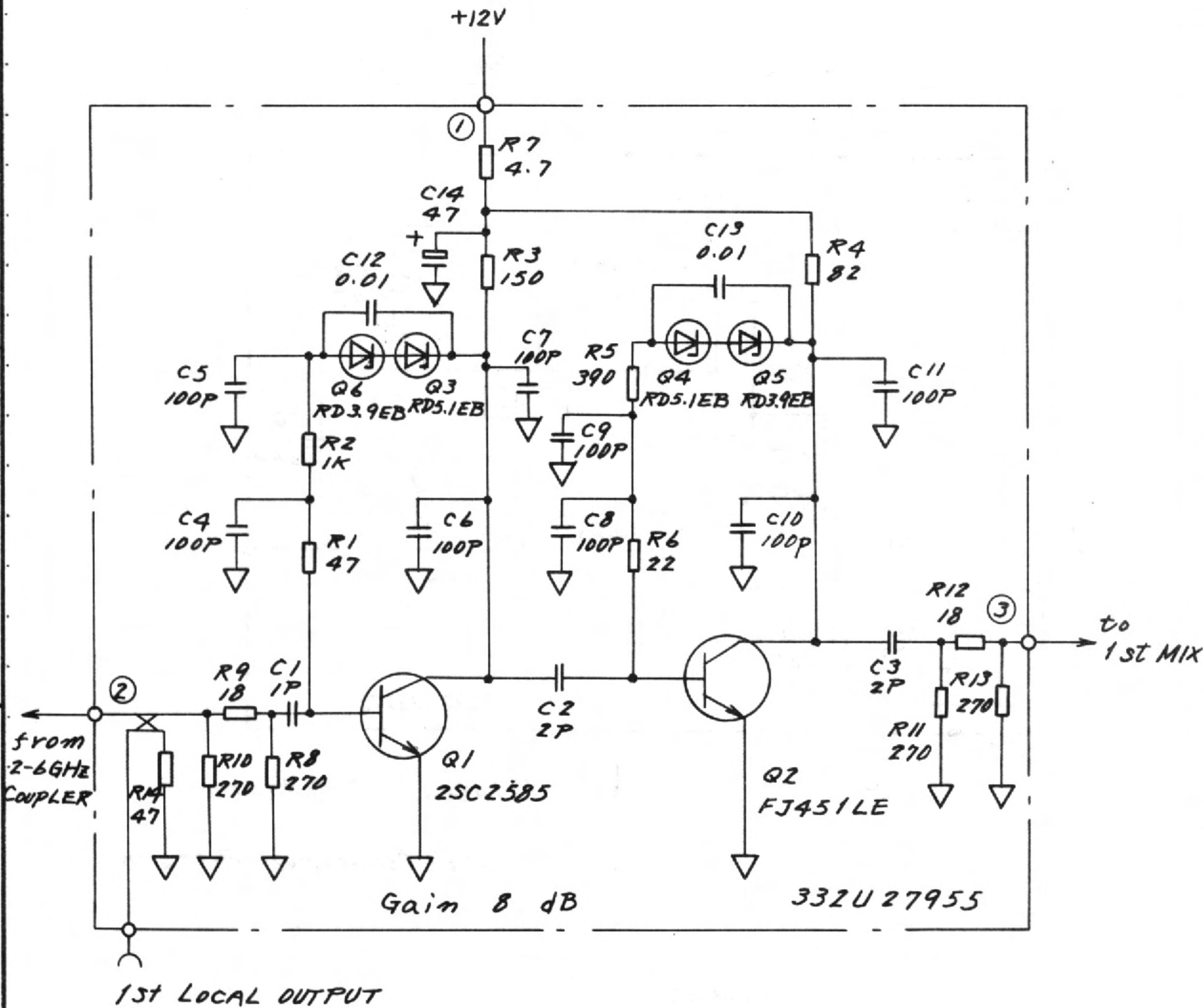
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B

C

D

E



Parts List 34W89426

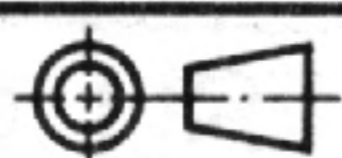
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APPROVED BY \_\_\_\_\_ DRAWN BY \_\_\_\_\_

TITLE 2.5-4.5 GHz LO-AMP Circuit Diagram DRAWING No. 34W89427 1/1





34W89429 1/1

APPLICATION

REVISIONS

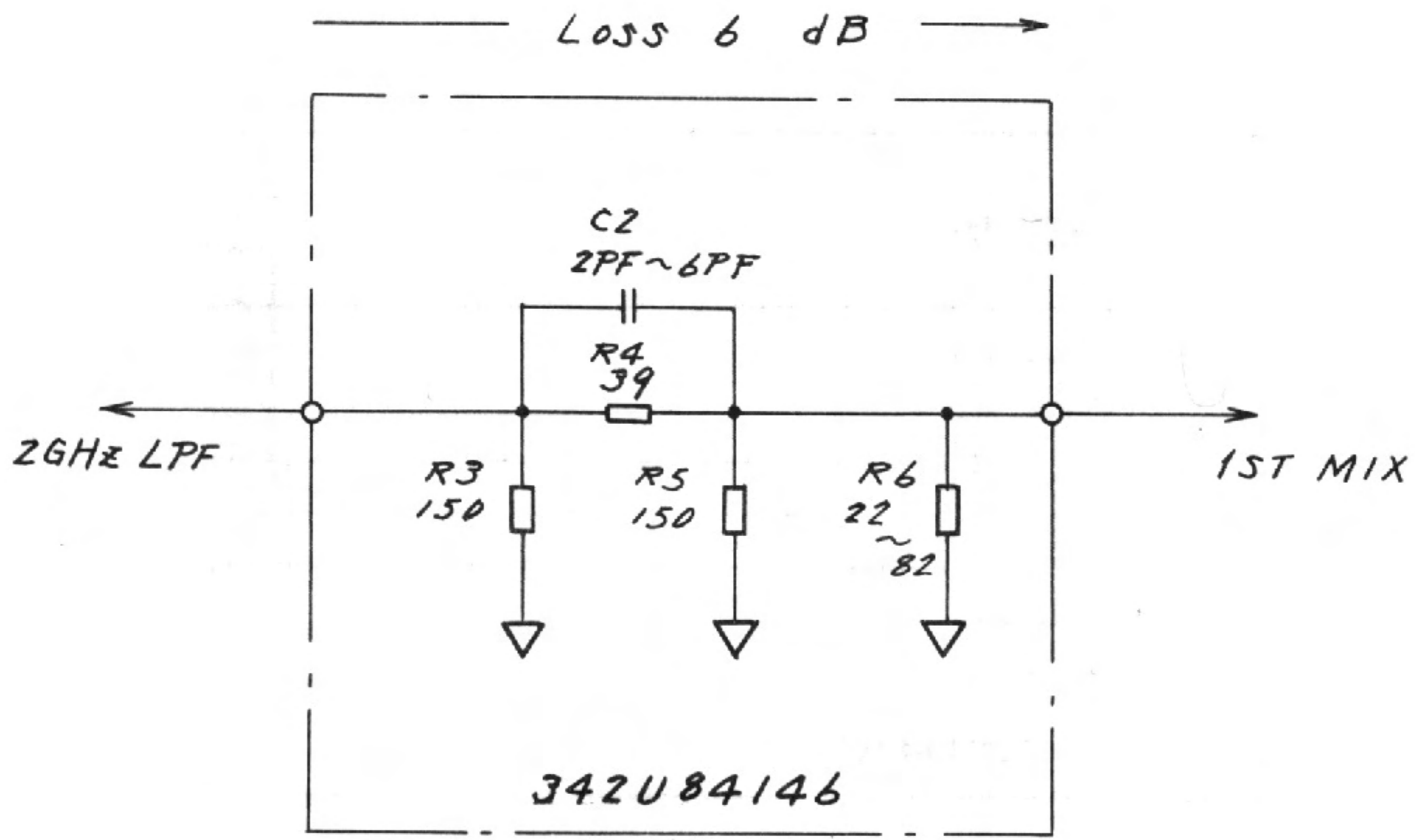
A

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Parts List 34W89428

21

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APPROVED BY	DRAWN BY	
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	6 dB PAD Circuit Diagram	34W89429 1/1





34W85998 //1

APPLICATION

34Y86001

REVISIONS

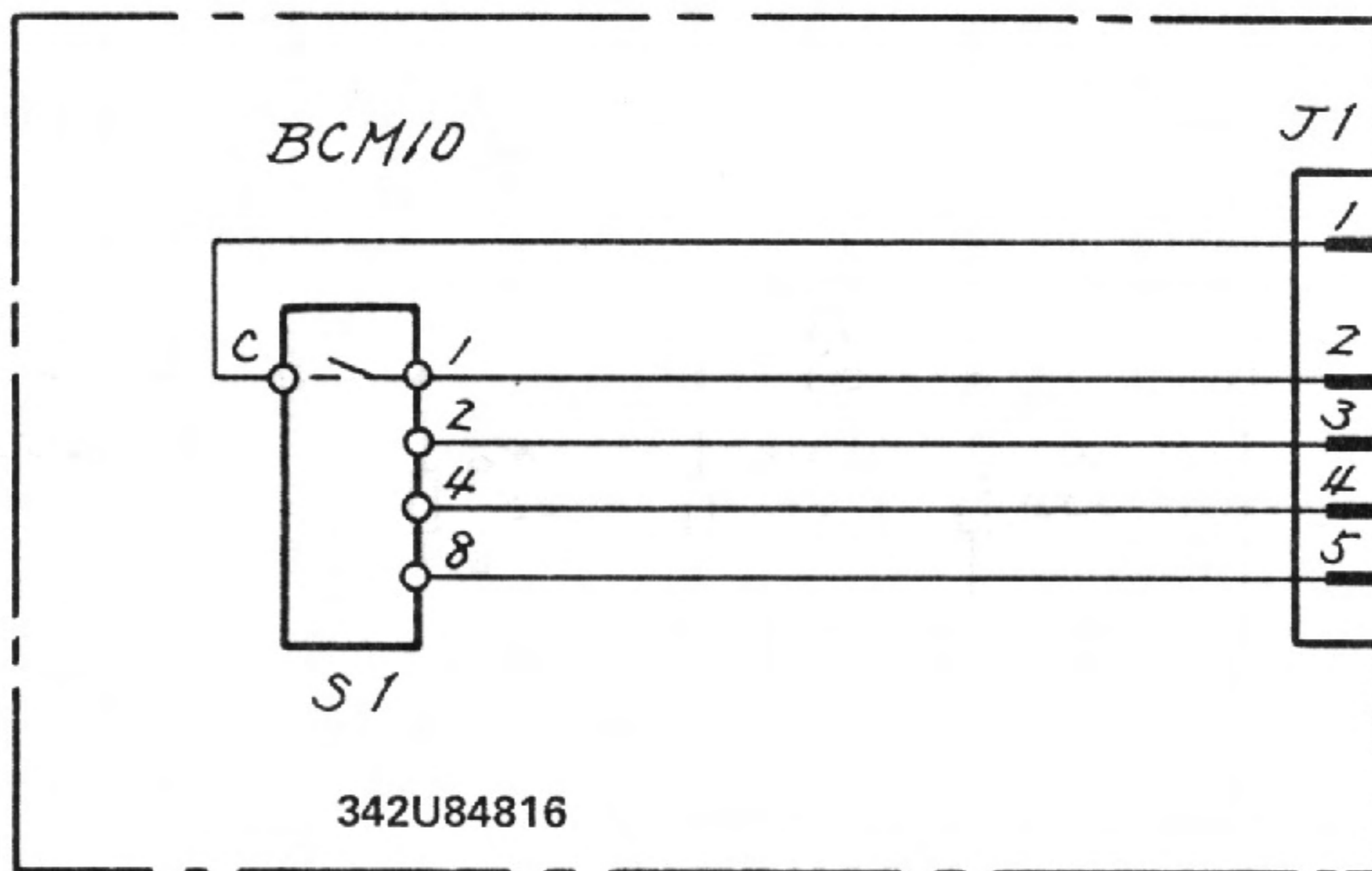
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E



Parts List 34W86018

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TRACED BY

SCALE

APPROVED BY

DRAWN BY

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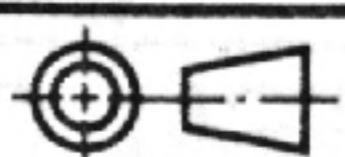
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TITLE

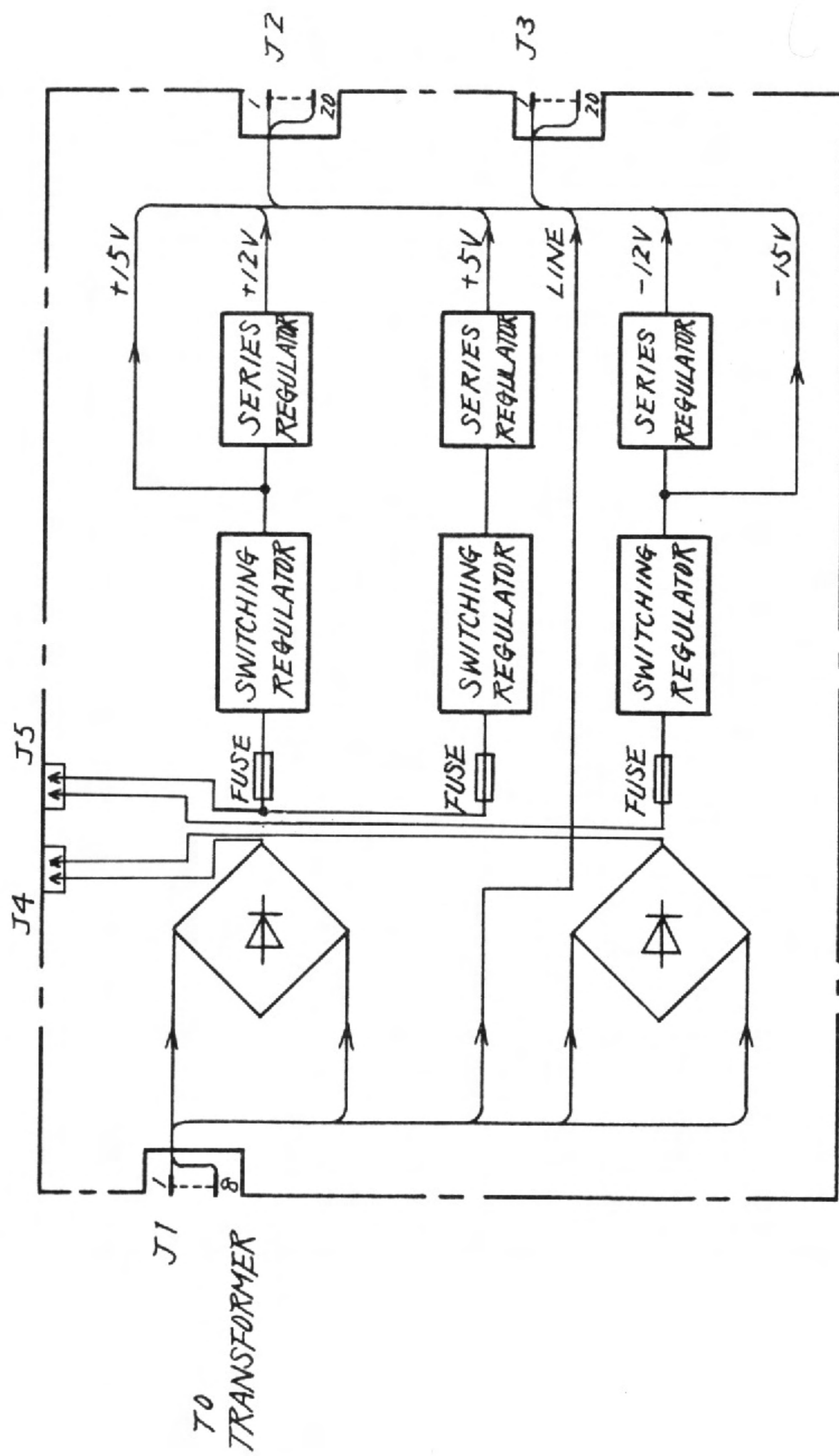
DRAWING No.

DIGITAL SW Circuit Diagram

34W85998 //1







POWER SUPPLY  
Block Diagram



APPLICATION

A

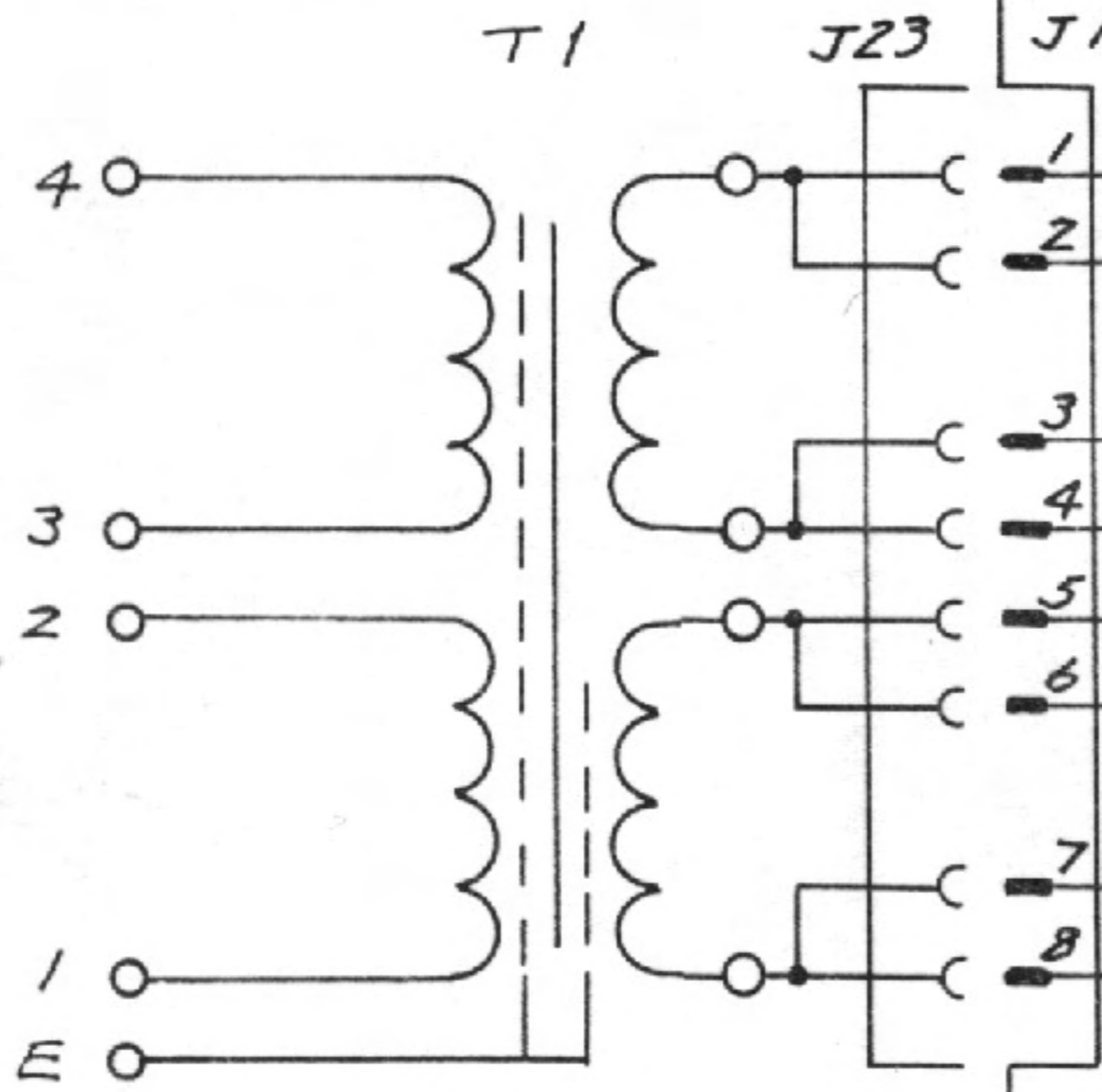
B

C

D

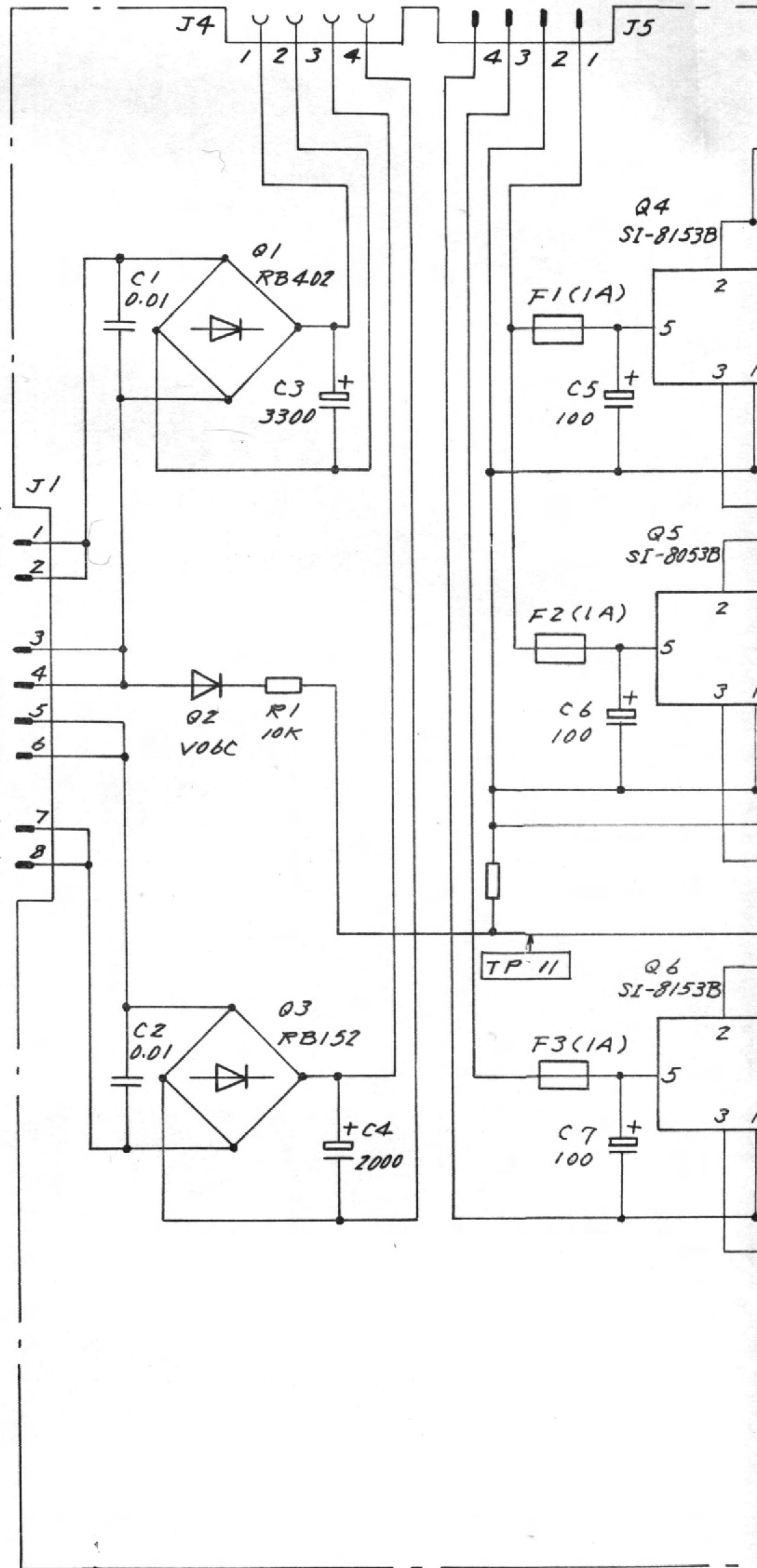
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Power transformer



Note:

See paragraph 2.2 for power transformer wiring.

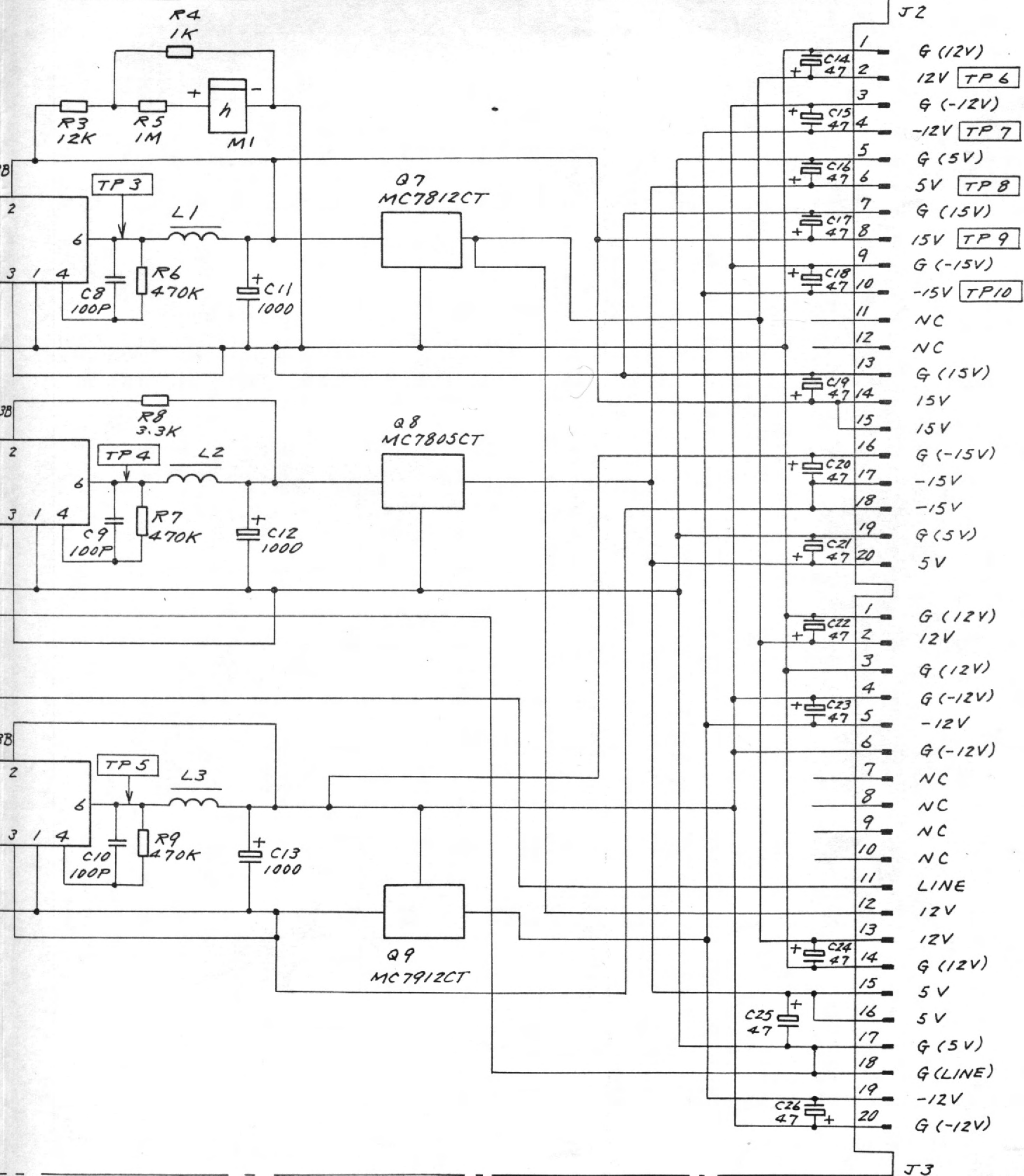


Parts List 3

DEP



REVISIONS



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APPROVED BY		DRAWN BY			
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Z7 POWER SUPPLY Circuit Diagram				33W 27379 1/1	

24



34W89300 1/1

APPLICATION

REVISIONS

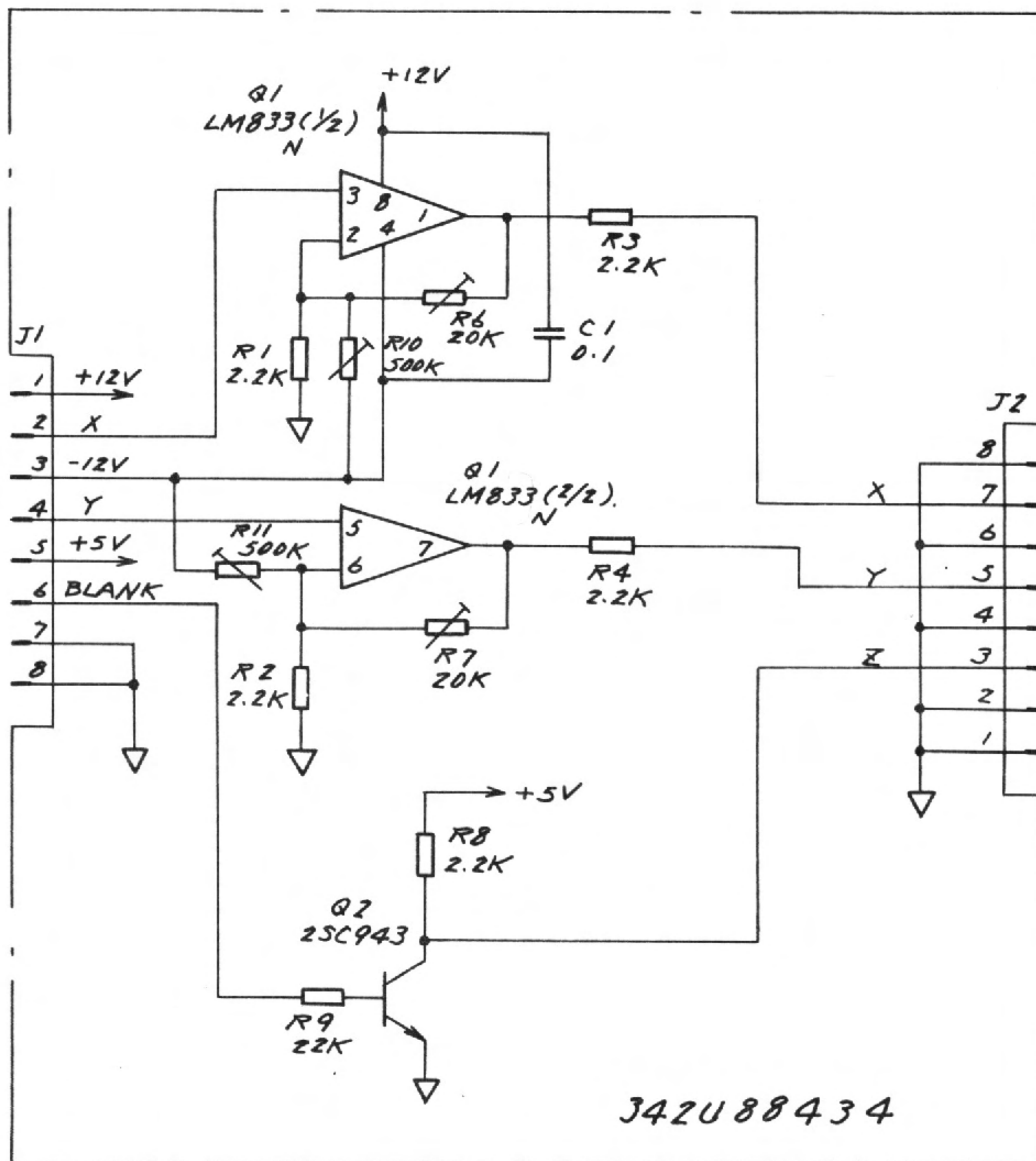
A

B

C

D

E



342U88434

Parts List 34W89299

25

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	XYZ-OUTPUT Circuit Diagram			34W89300 1/1		





APPLICATION

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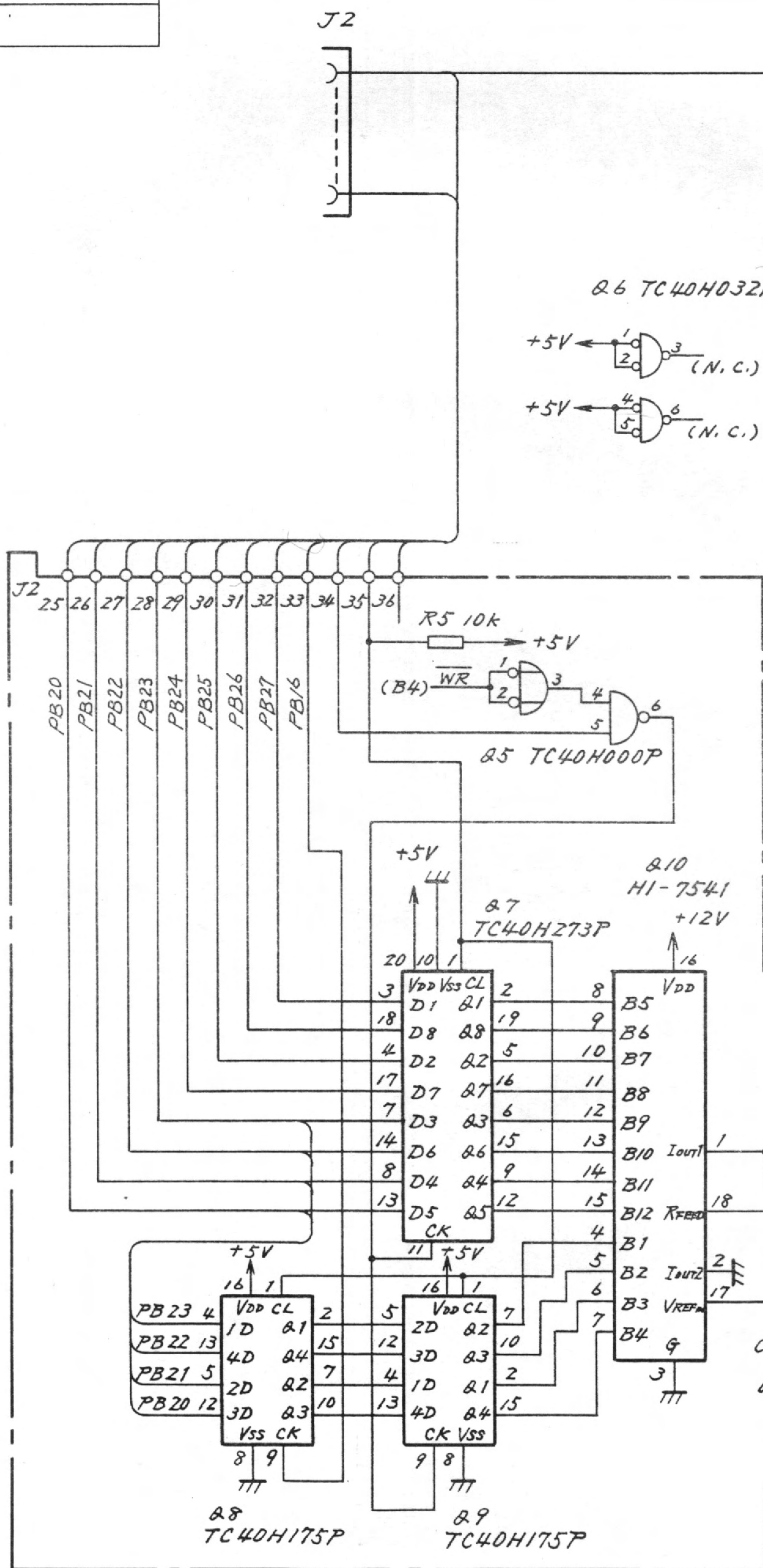
B

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E

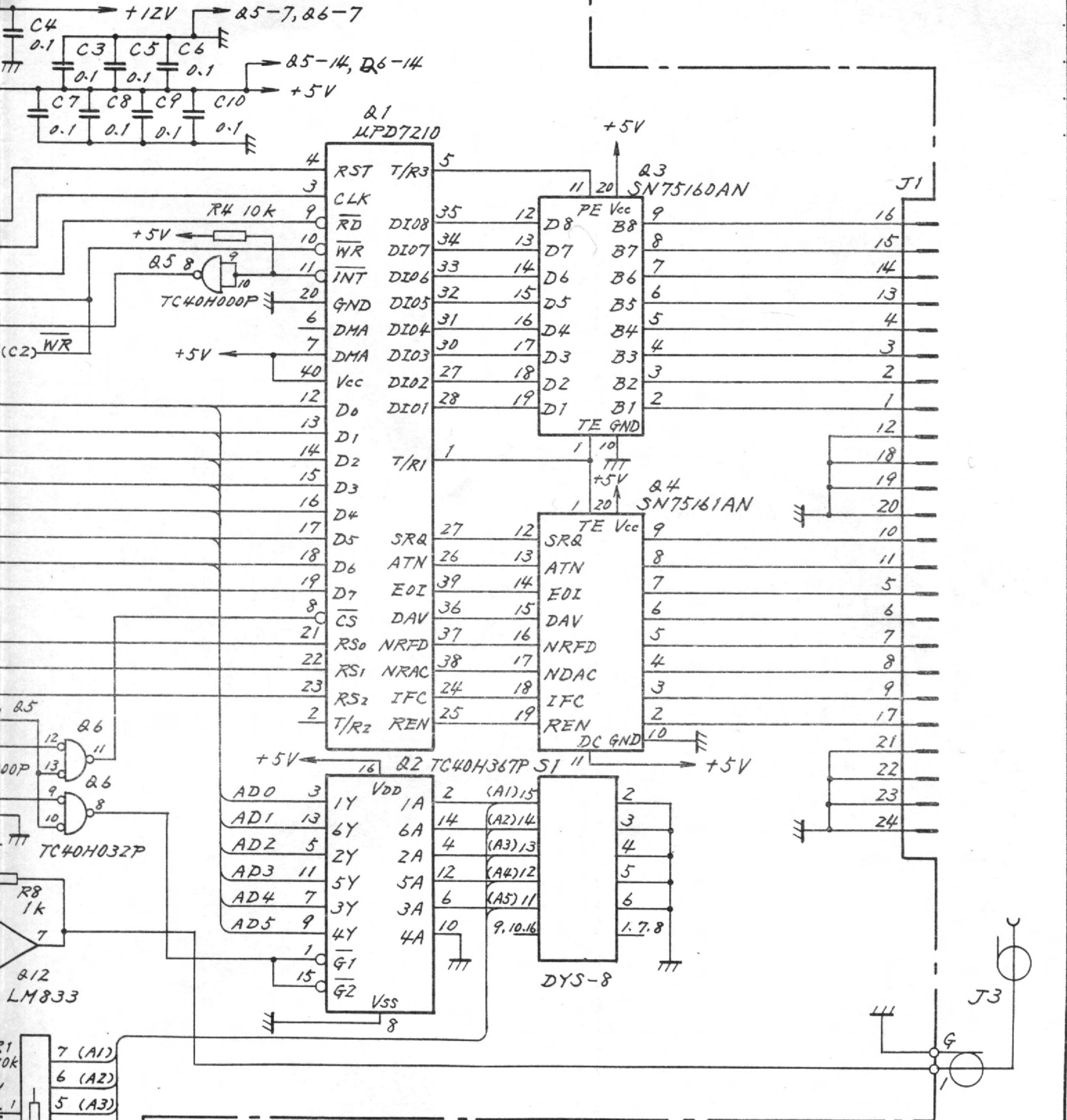
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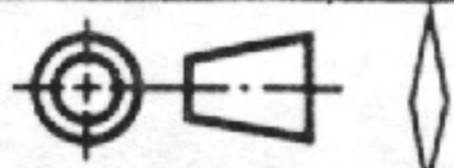
Parts List 34W



REVISIONS



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APPROVED BY			DRAWN BY		
TITLE				DRAWING No.	
GP-IB Circuit Diagram (Option 01)				33W 26565 1/1	





SECTION 5  
ADJUSTMENT

5.1 Introduction

This section describes how to adjust the test instrument, after repairs have been completed, to maintain the instrument performance within the specifications.

When two or more units are adjusted, the adjustments must be made in the sequence shown below. If this sequence is reversed, previous adjustments will be disturbed.

Step	Adjustment
1	POWER SUPPLY Z7 Adjustment
2	CRT DRIVE Z12 Adjustment
3	RF Unit: RF Conv. Z2, YTO DRIVE Z5 Adjustment
	3.1 50 MHz Osc (CAL OUTPUT) Z2-Z10 Adjustment
	3.2 2.5 GHz Osc (2nd LOCAL OUTPUT) Z2-Z8 Adjustment
	3.3 2.5214 GHz BPF Adjustment
	3.4 1st Mixer Z2-Z2, Z2 Unit Adjustment
4	IF Unit Z3 Adjustment
5	Overall Adjustment
	5.1 Horizontal Display Adjustment
	5.2 Frequency Display Adjustment
	5.3 Vertical Display Adjustment
	5.4 Overall Gain Adjustment
	5.5 XYZ Output Adjustment



Adjust only the necessary items. If correctly calibrated equipment required for adjustment is not available, do not attempt adjustment.

---

CAUTION

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Before disassembling/reassembling the MS610B/J/J1, turn off the power switch on the front panel and disconnect the power supply cord from the ac outlet.

---



## 5.2 Internal View Under Covers

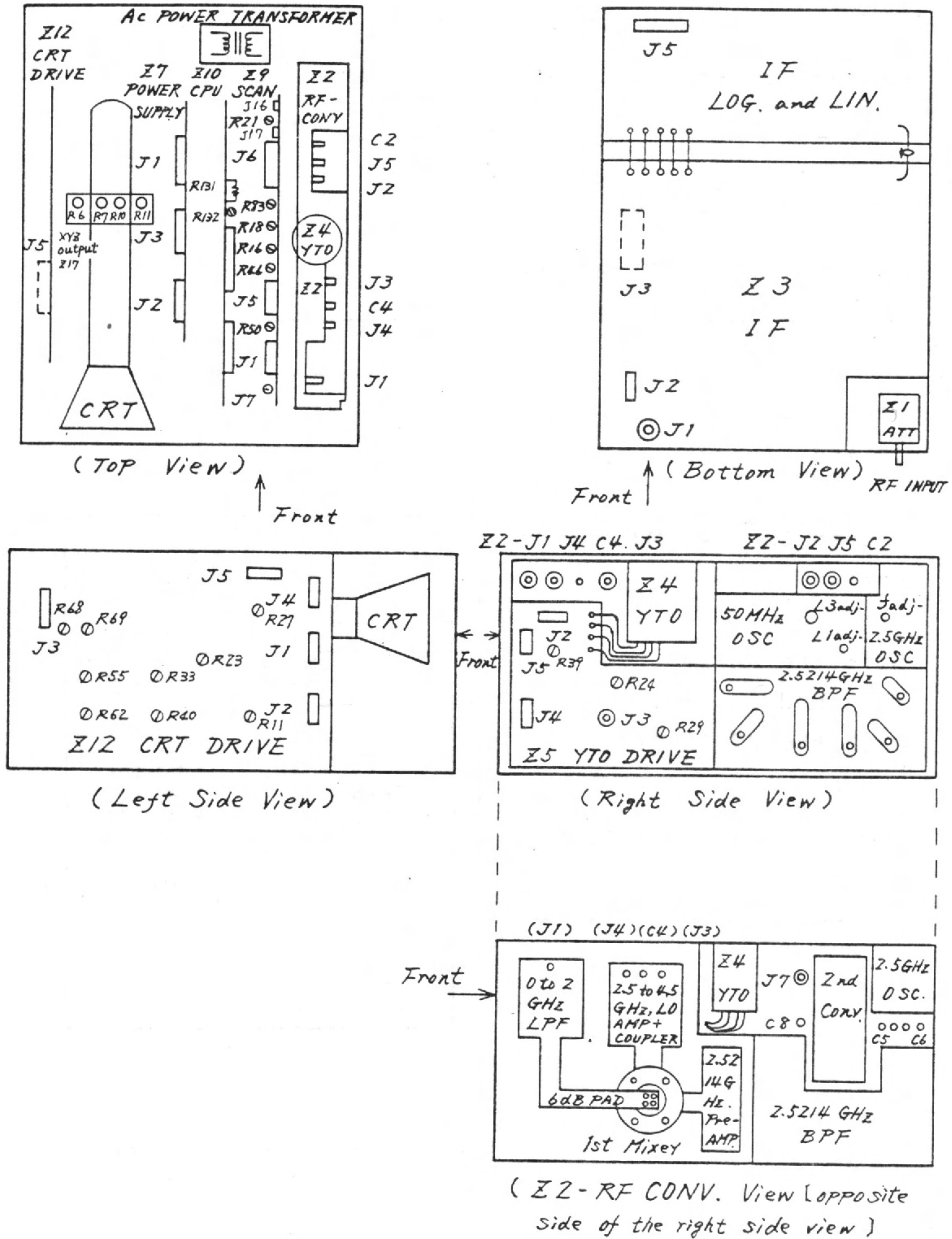


Fig. 5-1 Internal Views Under Outside Covers



### 5.3 Power Supply Secondary Fuse Replacement

If the dc power supply circuit is shorted to ground or overloaded, the power supply secondary fuse will blow.

Current rating of the fuses are shown below.

+15 V (+12 V)	Fuse 1	1 A
+5 V	Fuse 2	1 A
-15 V (-12 V)	Fuse 3	1 A

Replace fuses as follows:

Step	Procedure
1	Disconnect the Z7-J1, J2 and J3 connectors.
2	Loosen the two M3 screws.
3	Lift the angle (hatched in Fig. 5-2) with the Z7 POWER SUPPLY unit.  The fuses are on the Z7 PC board.

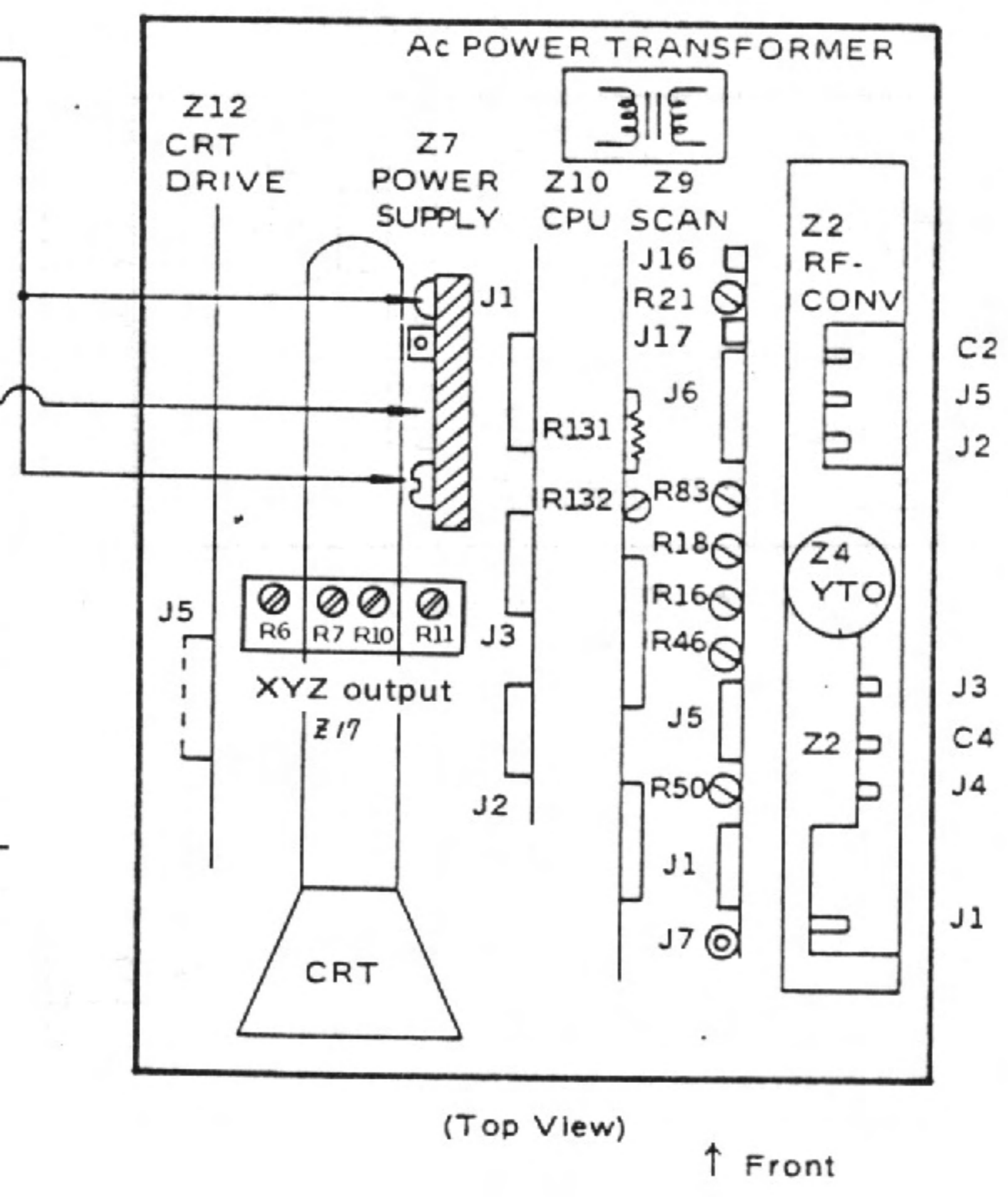


Fig. 5-2 Secondary Fuse Replacement



## 5.4 Equipment Required for Adjustment

Table 5-1 Equipment Required for Adjustment

No.	Required Equipment	Performance
Signal Generator:		
1	MG724A1	1.7 to 2.3 GHz, 50 $\Omega$
2	MG655A	100 kHz to 1.3 GHz, 50 $\Omega$
3	MG443B	10 Hz to 30 MHz, 50 $\Omega$ /75 $\Omega$
Spectrum Analyzer:		
4	MS68B	10 kHz to 4.4 GHz, 50 $\Omega$
5	MS420B	10 Hz to 30 MHz, 75 $\Omega$
6	Digital Voltmeter (DVM)	$\pm 15$ V, 10 mV resolution
Frequency Counter:		
7	MF76A	10 Hz to 18 GHz
8	Low Pass Filter	$f_c = 100$ kHz to 2 GHz
9	Tracking Generator: MH680B	100 kHz to 2 GHz
10	Power Meter	50 $\Omega$ /75 $\Omega$ , 100 kHz to 2 GHz
11	Oscilloscope	
12	50 $\rightarrow$ 75 $\Omega$ Impedance Converter	100 kHz to 2 GHz

## 5.5 Adjustment Procedure


### 5.5.1 POWER SUPPLY Z7 adjustment

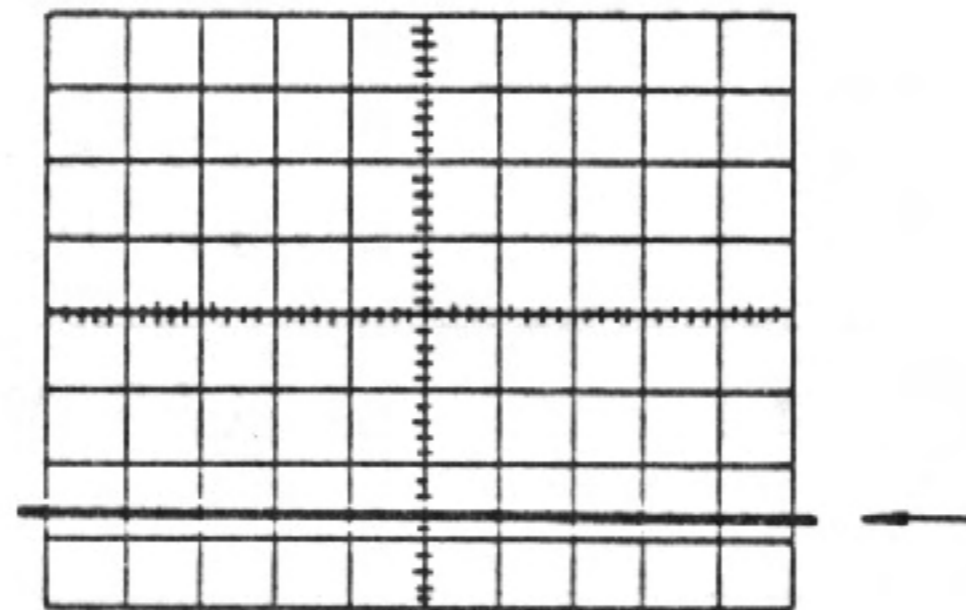
No adjustment is necessary. Confirm the dc voltages below.

Z7-J2-#1	GND	#7	GND
2	+12 V	8	+15 V
3	GND	9	GND
4	-12 V	10	-15 V
5	GND		
6	+5 V		



### 5.5.2 CRT DRIVE Z12 adjustment

Item	Adj. Position	Adjustment	Setting
Intensity Adj.	Z12-R11	Screen display disappears	(MS610B/J/J1)  INTENSITY 12 o'clock
Geometry Adj.	Z12-R69		(MS610B/J) Linear scale

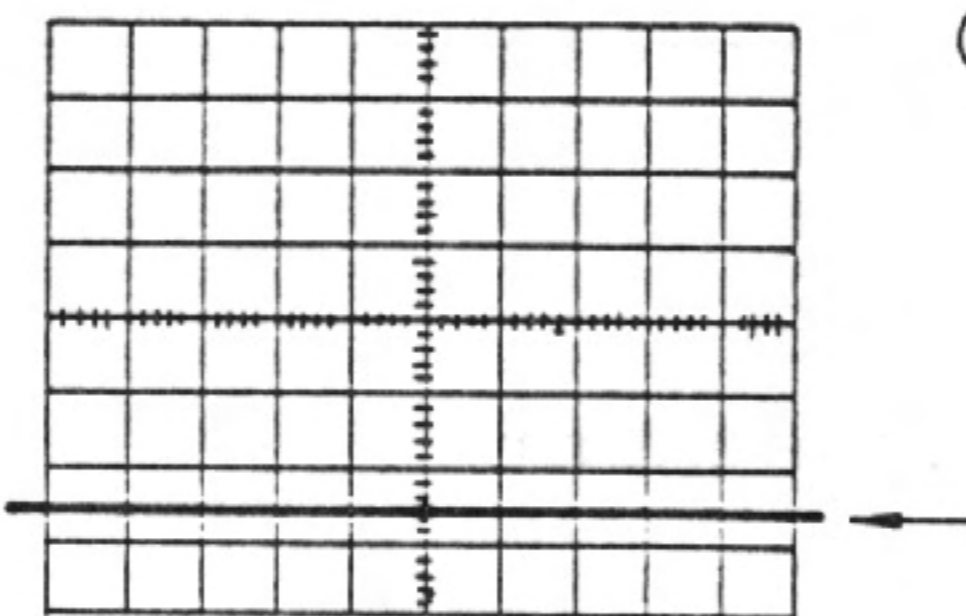


Straight horizontal  
bottom line  
(Not bending)

Astigmatism Adj.	Z12-R68	Best focus
------------------	---------	------------

Focus Adj.	Z12-R23	Best focus
------------	---------	------------

Trace-Rotation Adj.	Z12-R27	
---------------------	---------	--



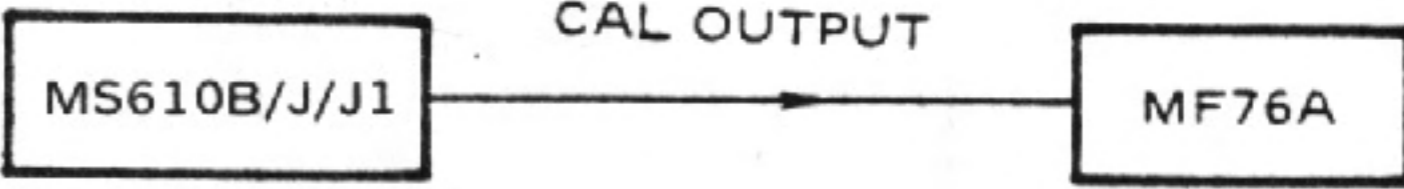
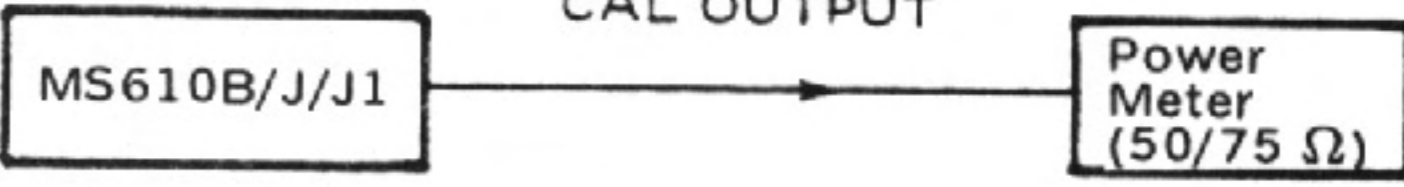
(MS610B/J/J1)  
Linear Scale

Straight horizontal  
bottom line  
(Not inclined)



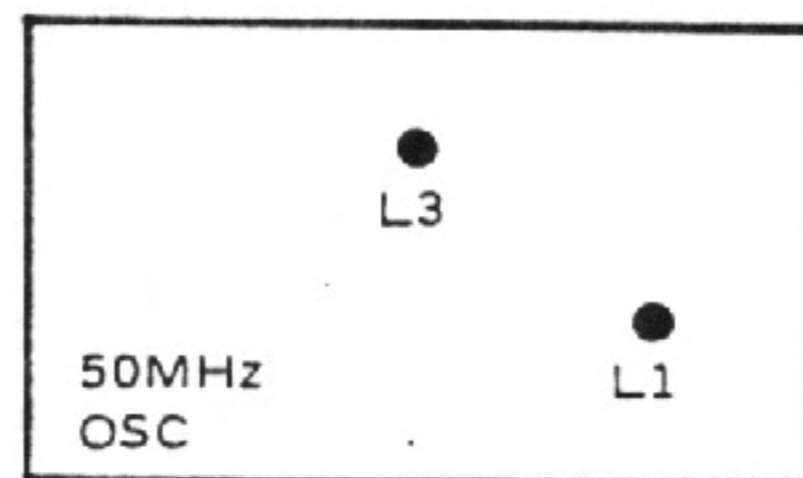
5.5.3 RF Unit: RF CONV. Z2, YTO DRIVE Z5 adjustments

(1) 50 MHz OSC (CAL OUTPUT) Z2-Z10 adjustment

Item	Adj. Position	Adjustment	Setting
Frequency Adj.	Z2-Z10-L1	50.000 MHz	
Level Adj.	Z2-Z10-L3	-30 dBm	

Note:

Adjustments can be made through the hole in the shielded case without opening the case.

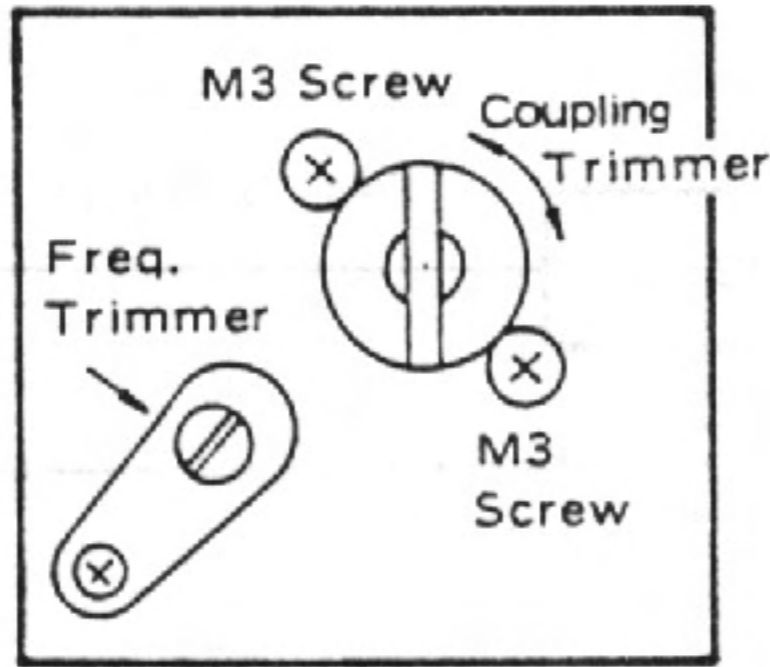




(2) 2.5 GHz OSC (2nd LOCAL OUTPUT) Z2-Z8 adjustment

Item	Adj. Position	Adjustment	Setting
------	---------------	------------	---------

Preparation



Open the 2.5 GHz Osc case cover.

Coupling Adj.

Coupling trimmer



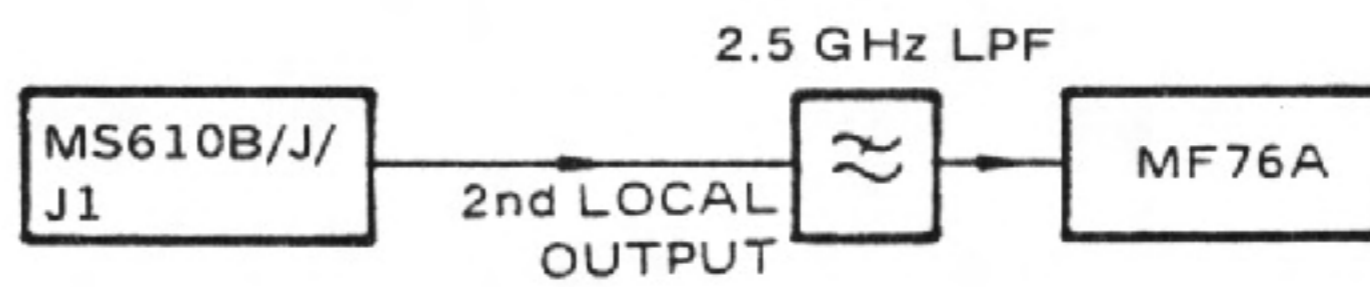
Step	Procedure
------	-----------

- 1 Loosen the M3 screws.
- 2 Turn the coupling trimmer clockwise to stop the oscillation.
- 3 Then, turn the trimmer counter-clockwise to restart the oscillation.
- 4 Turn the trimmer clockwise to decrease the frequency by 5 MHz.
- 5 Tighten down the M3 screws.

Frequency Adj.

Frequency trimmer

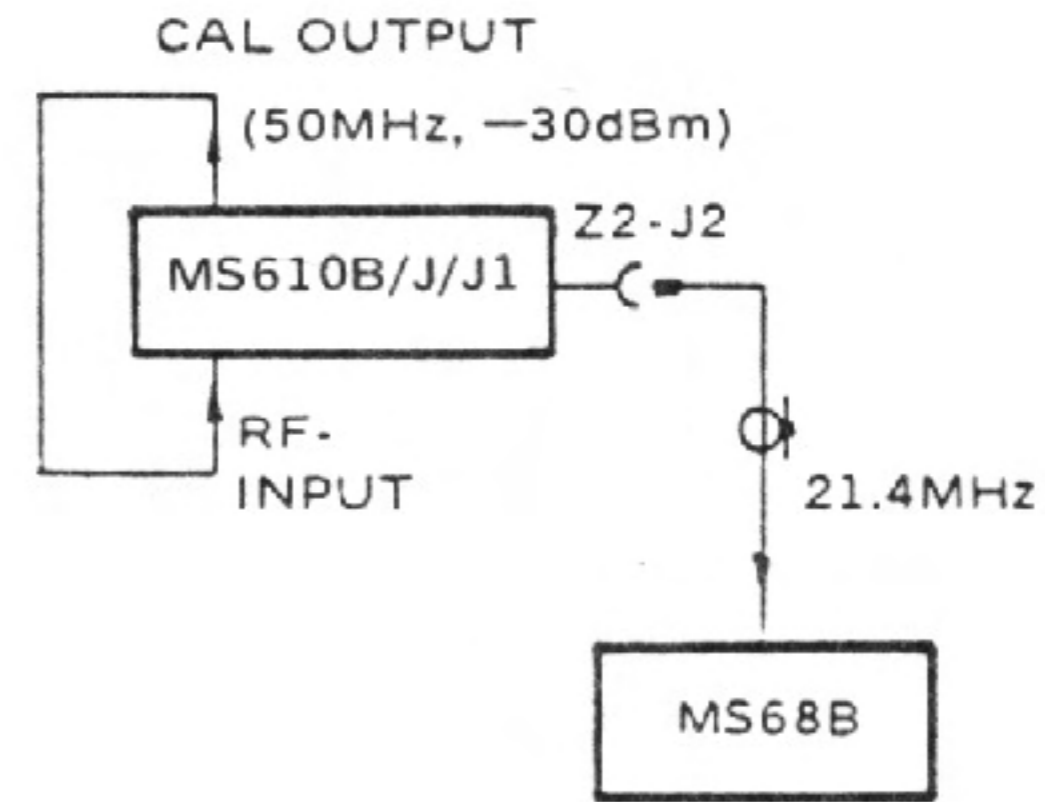
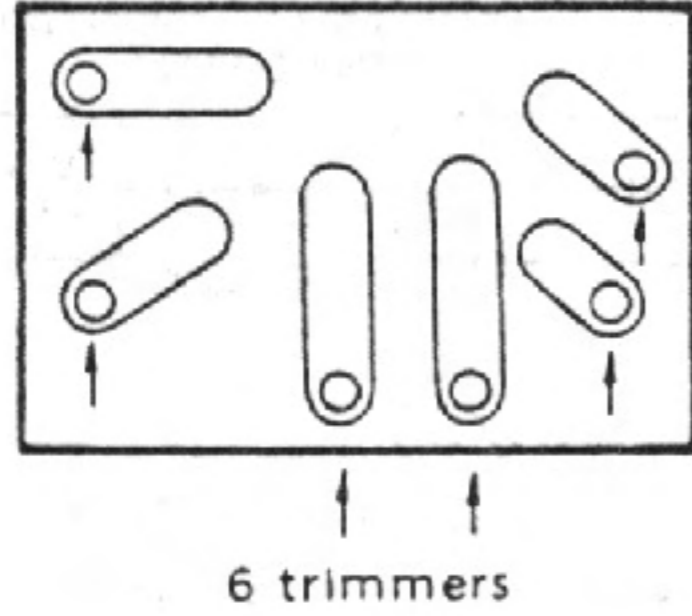
2.50000 GHz



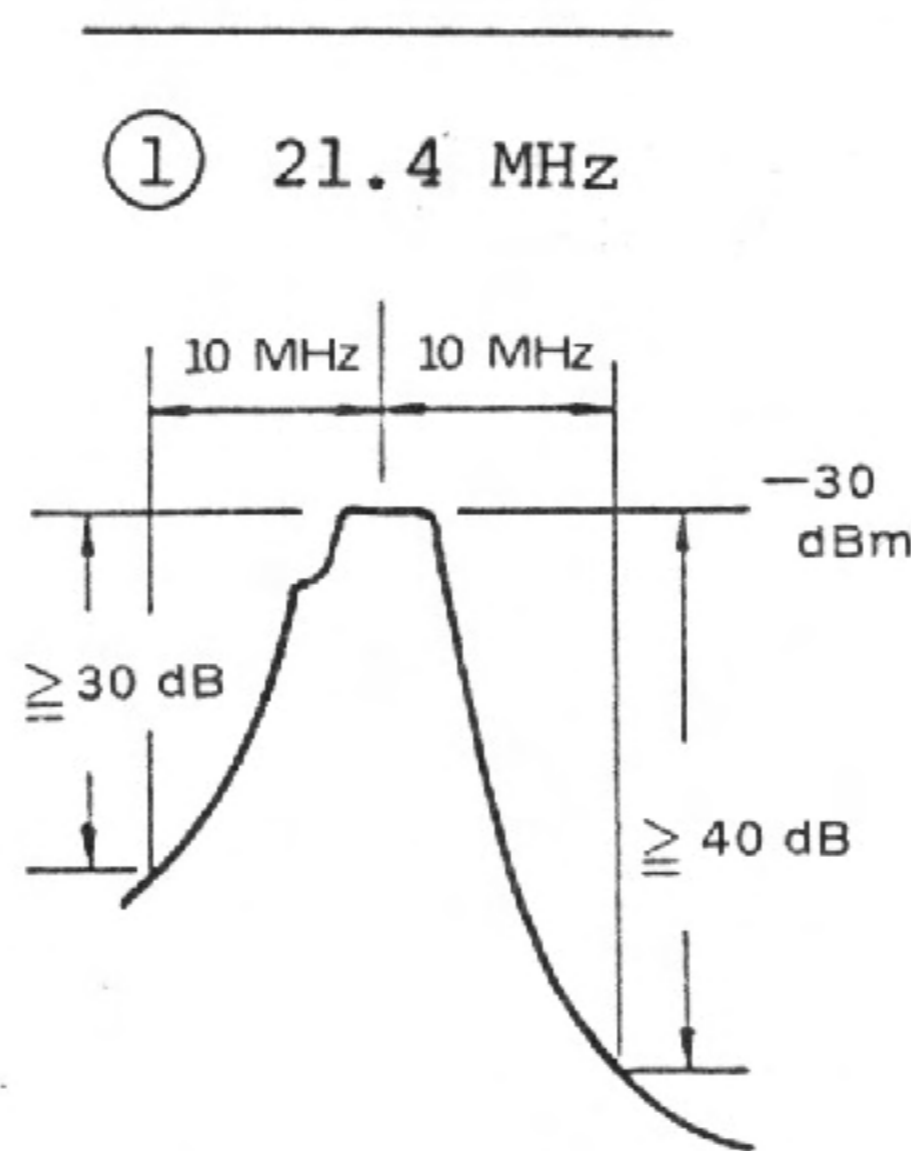


(3) 2.5214 GHz BPF adjustment

Item	Adj. Position	Adjustment	Setting
------	---------------	------------	---------



BPF  
Slope  
Adj.



(MS610B/J/J1)	(MS68B)
Center Freq.	Center Freq.
50 MHz	21.4 MHz
Sweep Time	Scan Time
2 s	1 ms/div
Ref. Level	Ref. Level
-30 dBm	-30 dBm
Freq. Span	Scale
20 MHz	10 dB/div or 1 dB/div

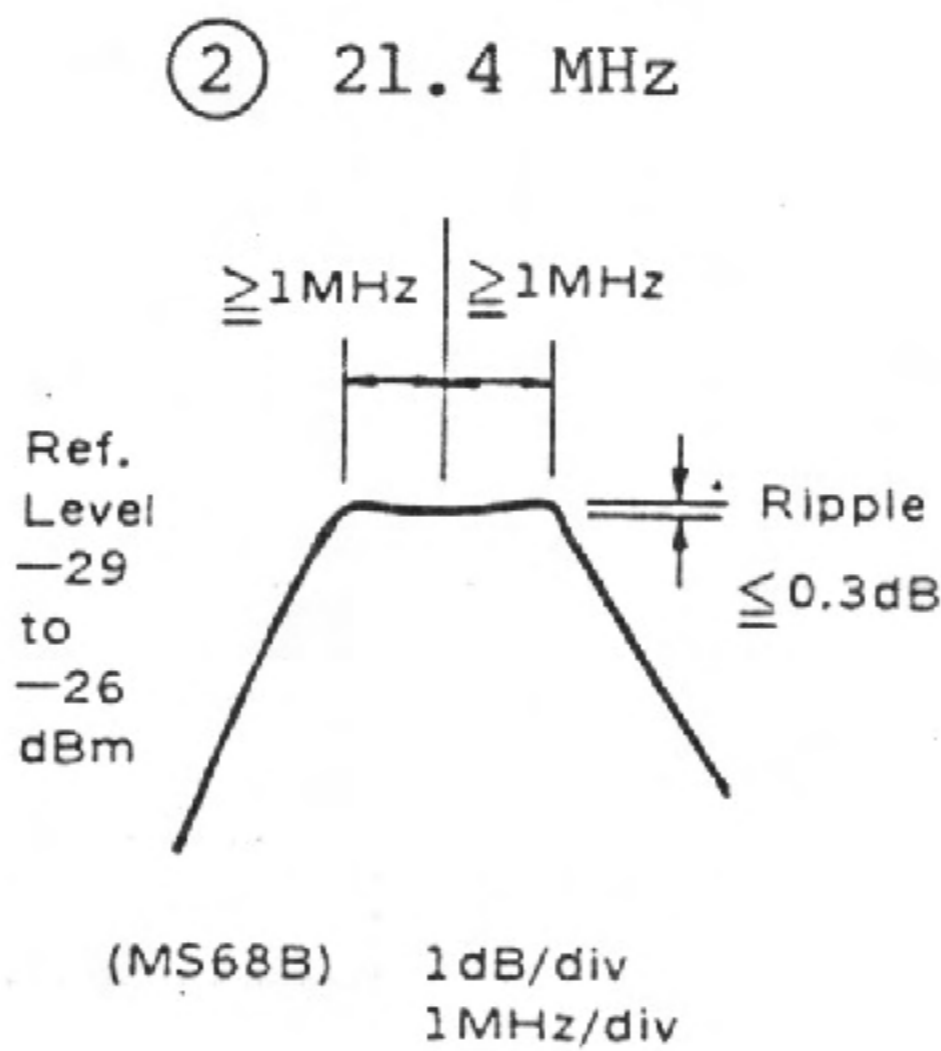
Adjust

① → ②  
(not ② → ①)

(MS68B) 10 dB/div  
5 MHz/div

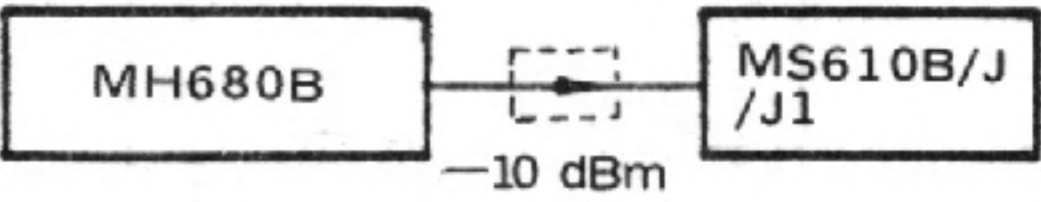
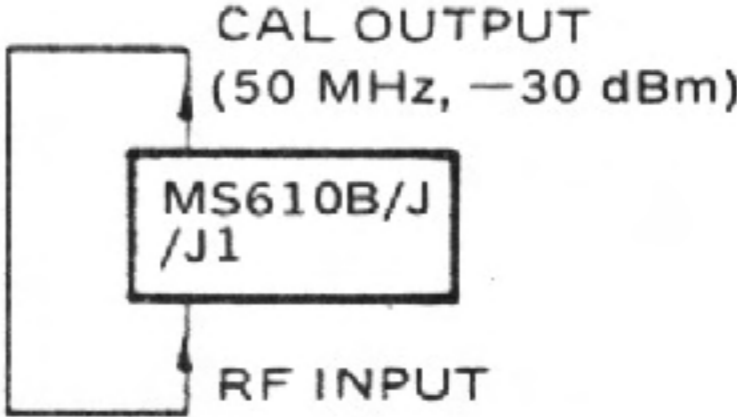
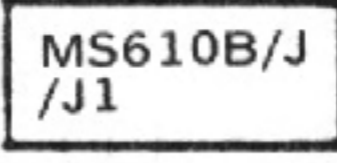
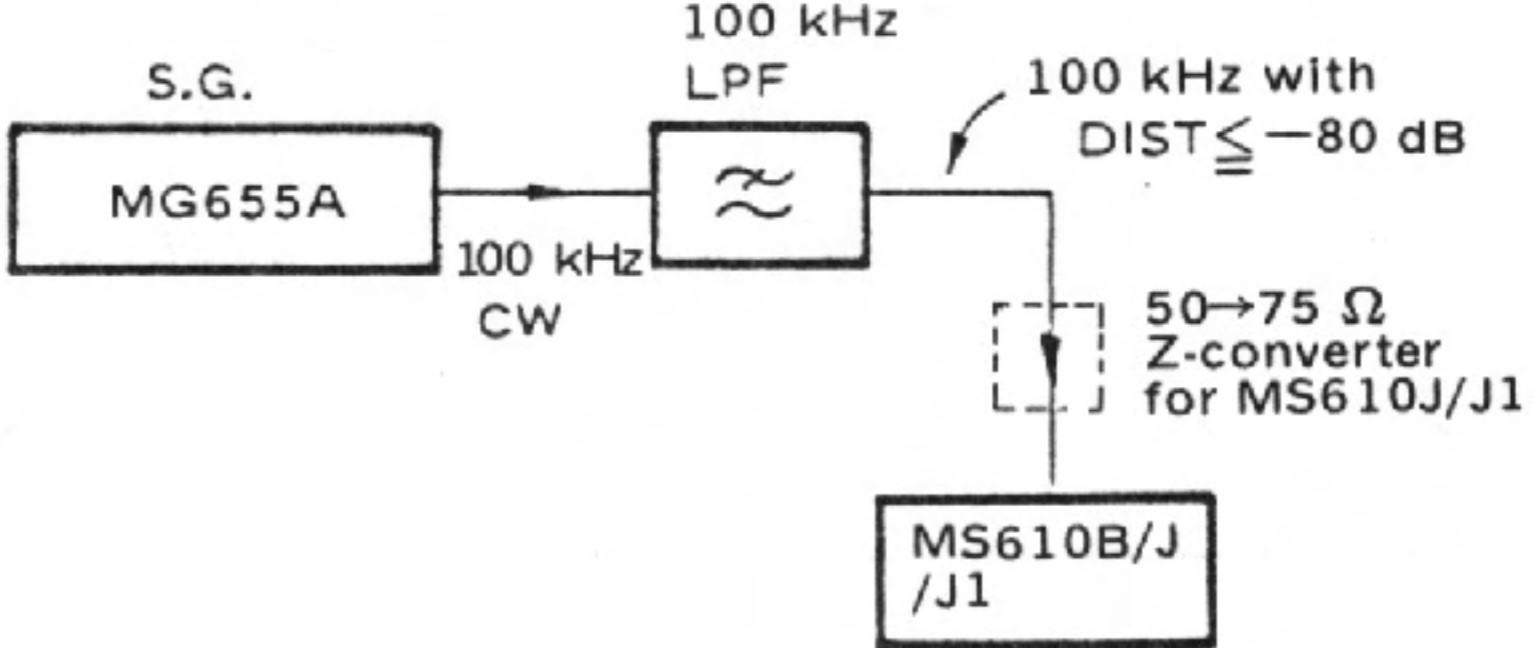
Scan Width  
5 MHz/div  
or 1 MHz/div

BPF  
Top  
Adj.





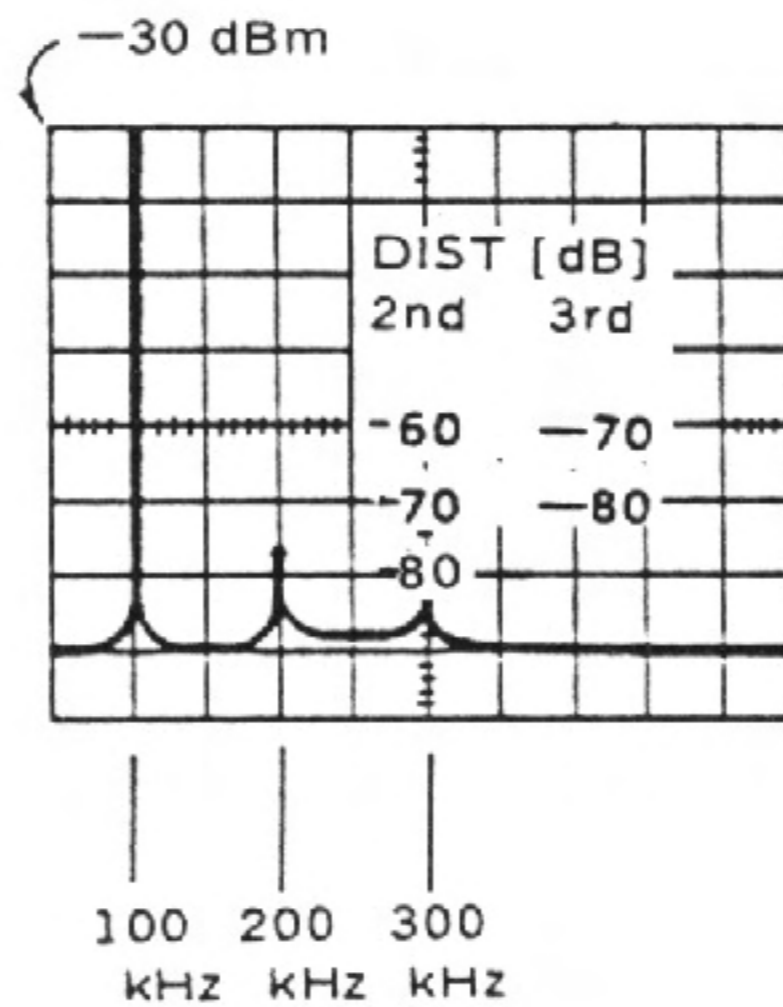
(4) 1st Mixer Z2-Z2, Z2 Unit adjustment

Item	Adj. Position	Adjustment	Setting.
RF unit Freq.- Level Charac- teristic Check		Screen Display: $\leq \pm 1.2$ dB at 100 kHz to 1.5 GHz (Reference 50 MHz) +1.5 to -2.5 dB at 1.5 to 2 GHz	Tracking Generator  50→75 Ω Z-converter for MS610J/J1   (MS610B/J) Freq. Span 2 GHz Scale 2 dB/div Ref. Level 0 dBm Input Att. 0 to 50 dB (ref. level varies.)
1st Mixer Balance Adj.	① Gain Adj. (on front panel)	Screen display -30 dBm	  (MS610B/J/J1) Center Freq. 50 MHz Freq. Span 10 MHz Ref. Level -10 dBm Input Att. 0 dB
	Adjust ① → ② (not ② → ①)		
	② 1st Mixer Balance Adj. 4 screws	Best Zero $\leq -15$ dBm	  (MS610B/J/J1) Center Freq. 0 MHz Freq. Span 10 MHz Ref. Level -10 dBm Input Att. 0 dB
2nd, 3rd Harmonic Distors- tion -100 kHz Check			



(4) (continued)

Item	Adj. Position	Adjustment	Setting
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(MS610B/J/J1)  
 Center Freq 300 kHz  
 Freq. Span 500 kHz  
 Input Att. 0 dB  
 Ref. Level -30 dBm

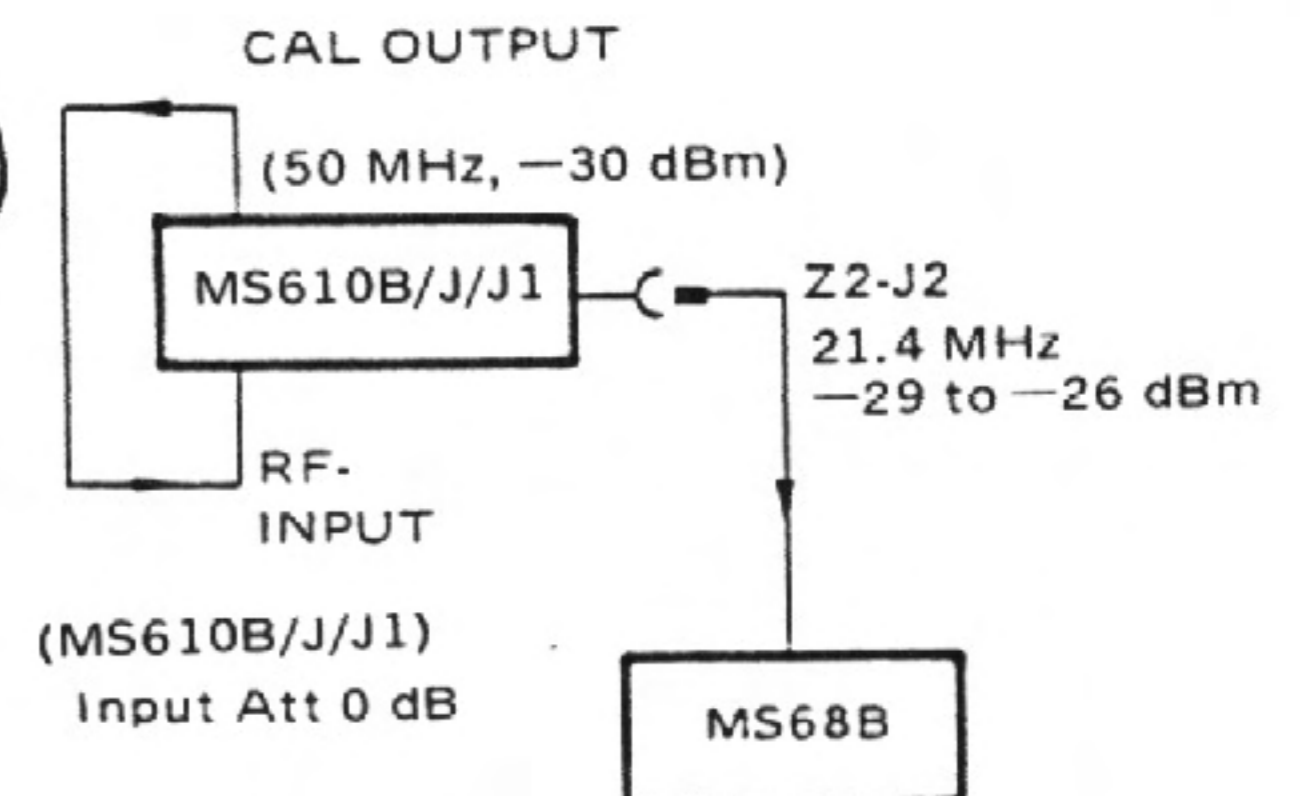
Step	Procedure
1	Receive -30 dBm, and adjust the SG level to set the display on the reference level scale.
2	Change the SG level by +10 dB. (-20 dBm)
3	Then confirm: 2nd harmonics $\leq$ -70 dB 3rd harmonics $\leq$ -70 dB

2nd, 3rd  
 Harmonic  
 Distortion  
 : 100 kHz  
 to 1 GHz

(Similar to at 100 kHz except that LPF output dist. is  $\leq$  -90 dB at frequency range of 5 to 800 MHz.)

RF Unit  
 Gain

Gain +1 to +4 dB  
 approximately  
 $\left( \frac{-29 \text{ to } -26 \text{ dBm}}{-30 \text{ dBm}} \right)$

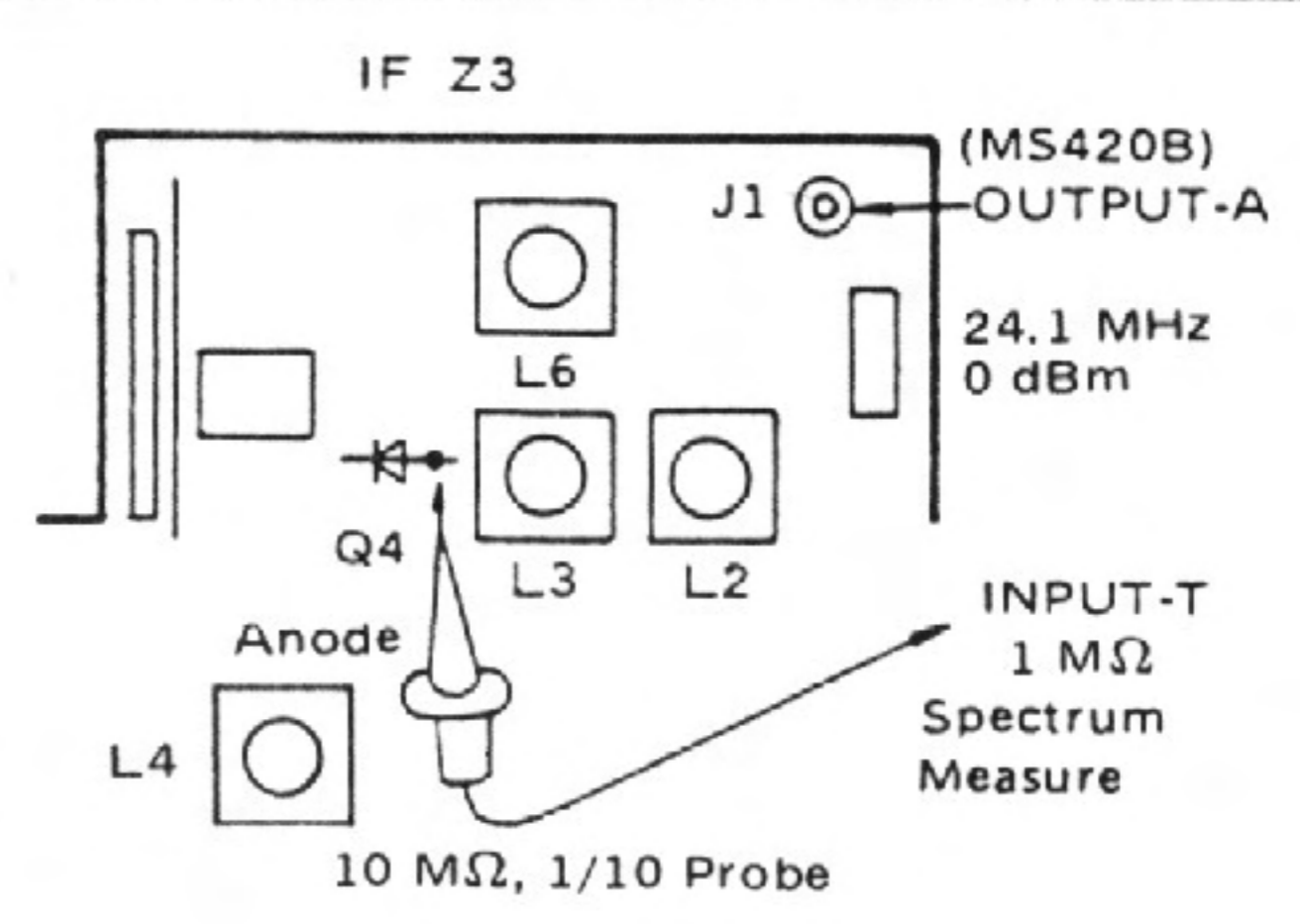
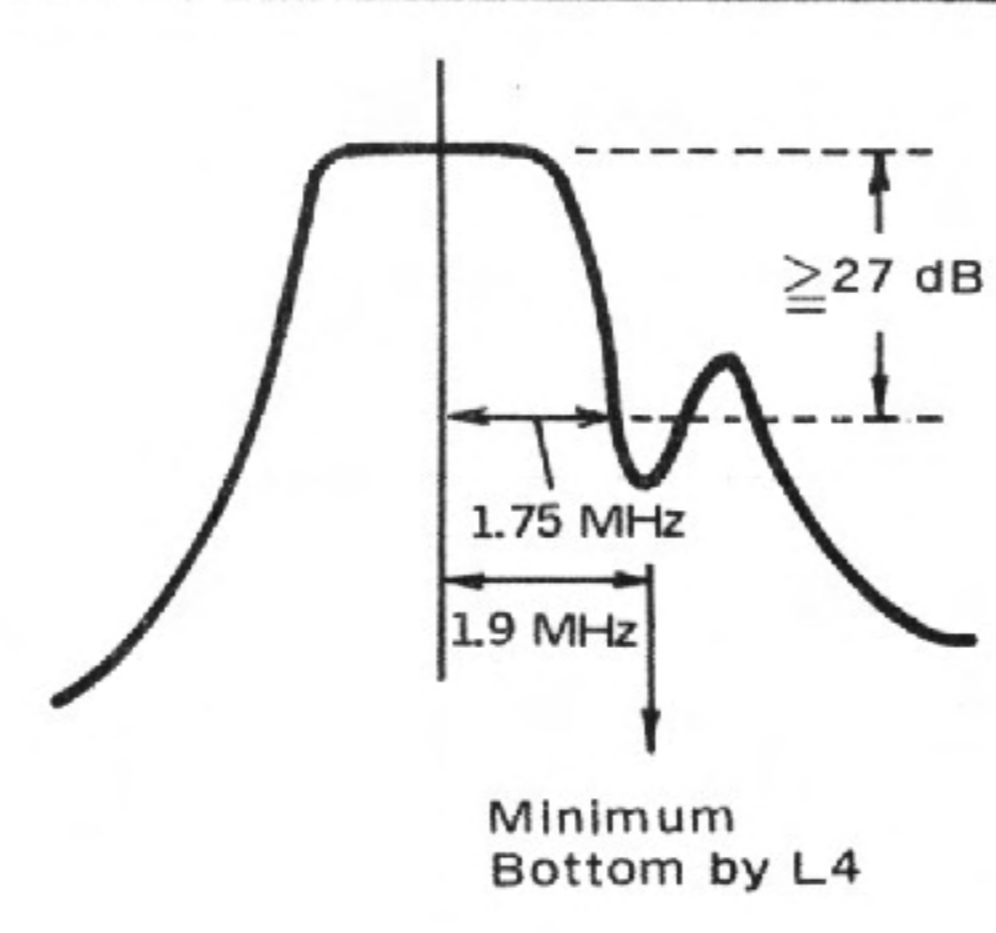
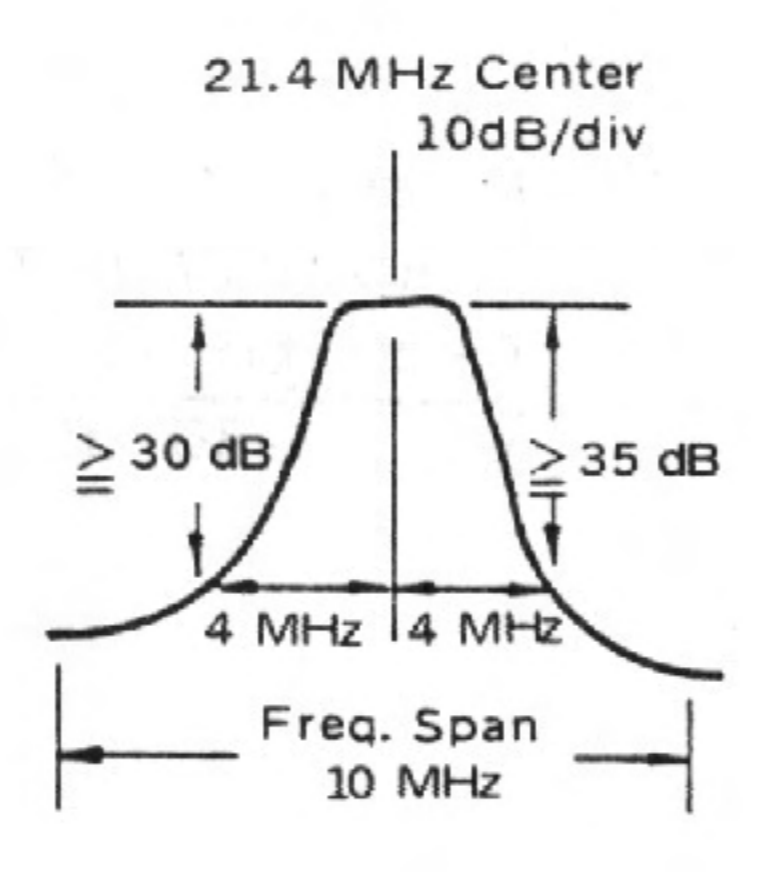
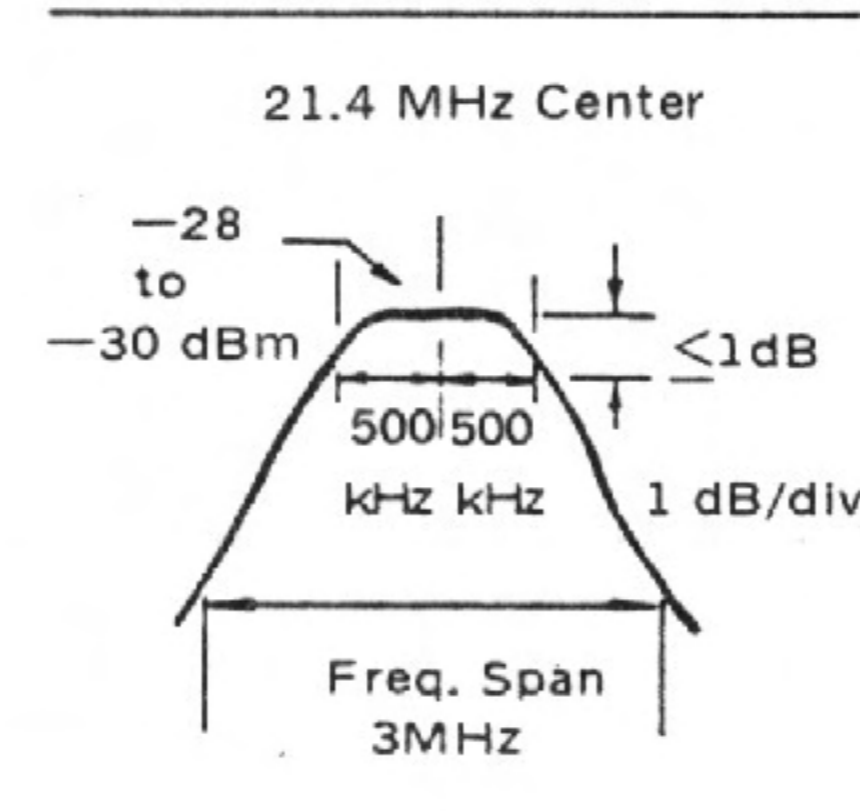


(MS610B/J/J1)  
 Input Att.  
 0 dB

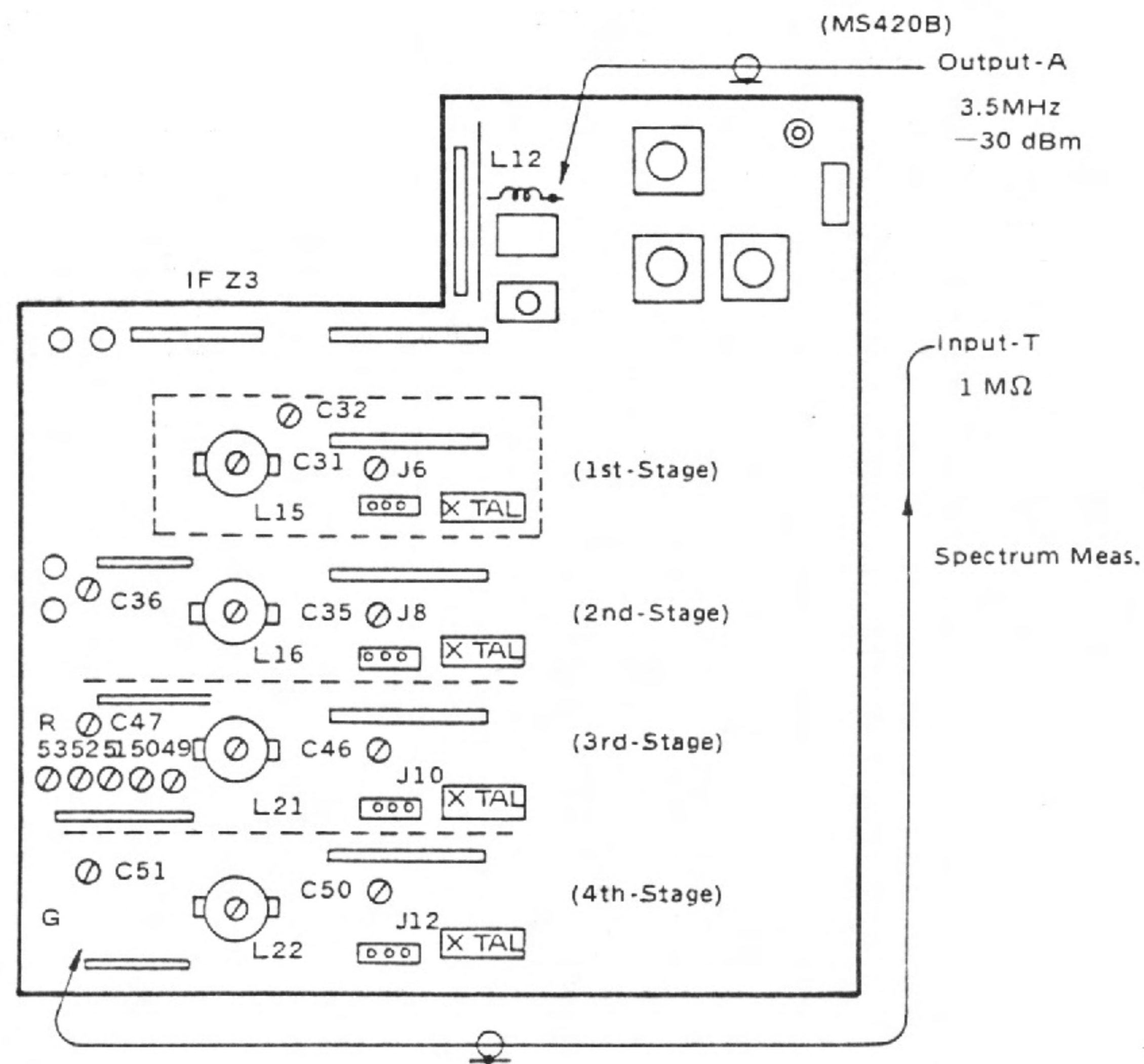


### 5.5.4 IF UNIT Z3 adjustment

#### (1) Filter and Step Amplifier adjustment

Item	Adj. Position	Adjustment	Setting
21.4 MHz BPF Adj.			 <p>(MS610B/J/J1) Gain Adj. (on front panel) Max. counterclockwise</p>
Z3-L4			 <p>(MS420B) Scale 10 dB/div Freq. Span 10 MHz</p>
Z3-L2, L3, L6			 <p>(MS420B) Scale 1 dB/div Freq. Span 3 MHz</p>
			





(MS610B/J/J1)

Ref. Level -10 dBm, Input Att. 10 dB,

Reference Level Unit Selector Switch (Rear panel)

"7" and RBW 9 kHz

Fig. 5-3 CRYSTAL Filter Adjustment (Z3 IF)



(1) (continued)

Item	Adj. Position	Adjustment	Setting
Crystal Filter Adj.	J6-left side strapped.		<p>Meas. Circuit: Refer to Fig. 5-3</p> <p>(MS420B) Scale 10 dB/div Freq. span 200 kHz</p> <hr/> <p>(MS420B) Scale 1 dB/div Freq. Span 50 kHz</p>
	J8, J10, J12 -right side strapped		
	Z3-C32		
	Z3-L15		
(1st stage)	Z3-L15		
	Z3-L15		
(2nd Stage)	J8-left side strapped.	(Similar to 1st stage.)	
	J6, J10, J12-right side strapped.		
	Z3-C36, L16		



(1) (continued)

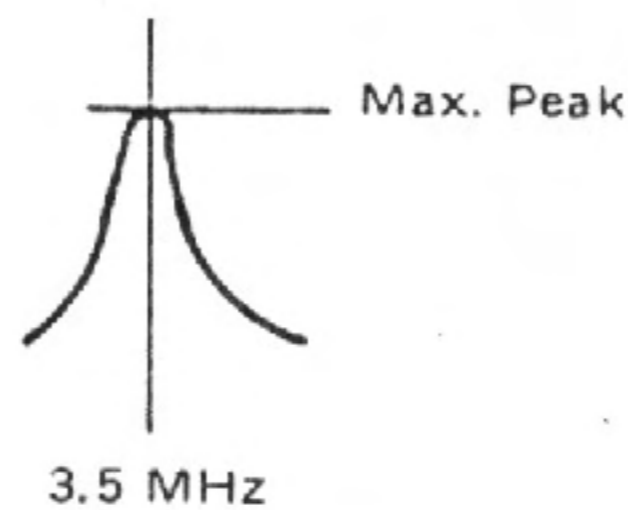
Item	Adj. Position	Adjustment	Setting
3rd Stage	J10-left side strapped. J6,J8,J12-right side strapped. Z3-C47,L21	(Similar to 1st stage.)	
4th stage	J12-left side strapped. J6,J8,J10-right side strapped. Z3-C51,L22	(Similar to 1st stage.)	

Note:

When Crystal Filter has been adjusted, J6,J8,J10 and J12 are strapped on the left side.

LC Filter Adj.

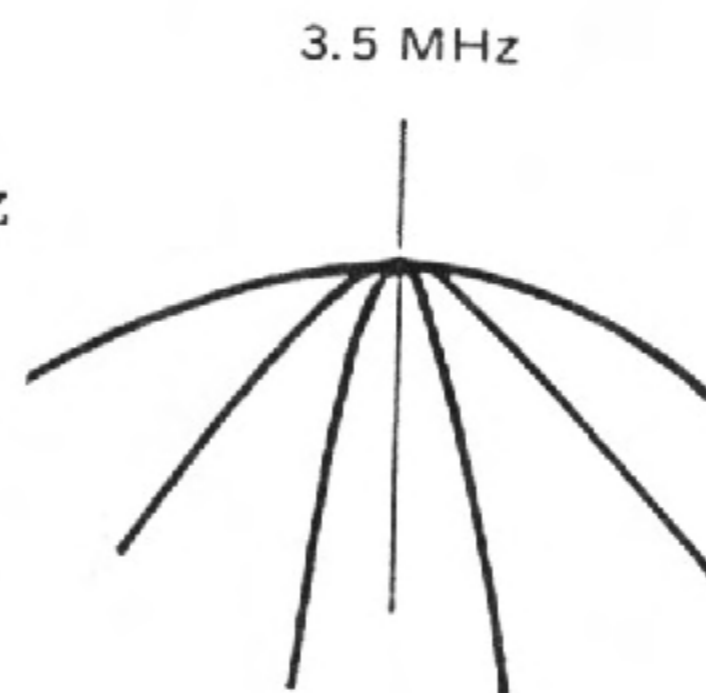
Z3-C31,C35  
C46,C50



Setting is the same as crystal filter adj. except that:  
(MS610B/J/J1) RBW 10 kHz  
(MS420B) Scale 1 dB/div

RBW Gain Deviation Adj.

RBW	RBW
R53	120 kHz, 1 MHz
R52	100 kHz, 300 kHz
R51	10 kHz
R50	3 kHz, 9 kHz
R49	1 kHz



Setting is similar to crystal filter adj.  
Adjust each level of 3.5 MHz at RBW = 1 MHz, 300 kHz, 100 kHz, 10 kHz, 3 kHz, and 1 kHz equal to the level (approx. -33 dBm) of 3.5 MHz at RBW = 30 kHz.

Step Amplifier Check

Setting is similar to crystal filter adj.

Step	Procedure
1	Change the MS610B/J/J1 Input Atten up or down by 10 dB steps.



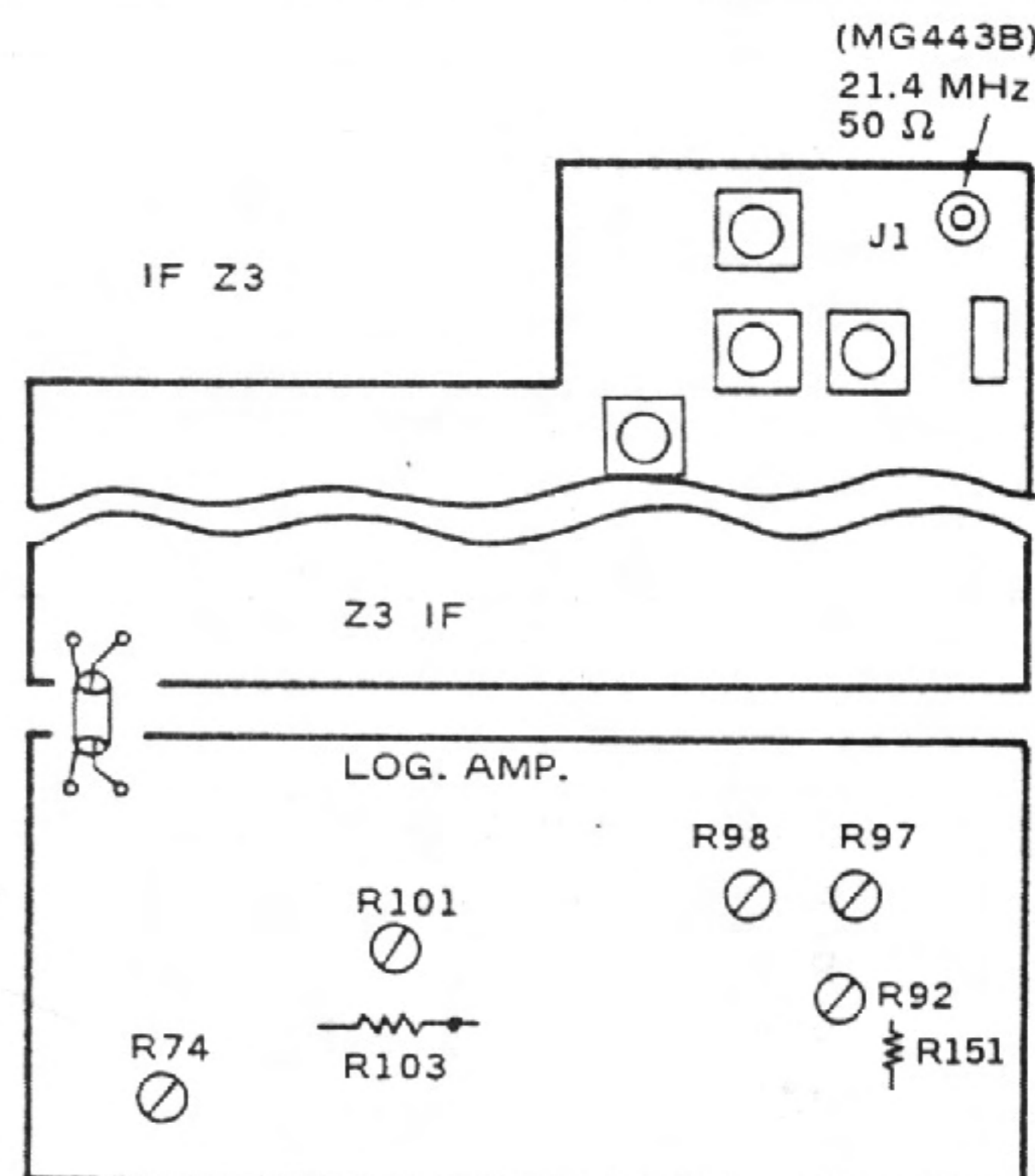
(1) (continued)

Item	Adj. Position	Adjustment	Setting						
Step Amplifier Check (cont.)			<table border="1"> <thead> <tr> <th>Step</th> <th>Procedure (cont.)</th> </tr> </thead> <tbody> <tr> <td></td> <td>Then check that MS420B level changes by the same amount. (Error <math>\leq \pm 0.3</math> dB)</td> </tr> <tr> <td>2</td> <td>Change the MS610B/J/J1 reference level up or down in 2 dB steps. Then check that the MS420B level changes by the same amount. (Error <math>\leq \pm 0.2</math> dB)</td> </tr> </tbody> </table>	Step	Procedure (cont.)		Then check that MS420B level changes by the same amount. (Error $\leq \pm 0.3$ dB)	2	Change the MS610B/J/J1 reference level up or down in 2 dB steps. Then check that the MS420B level changes by the same amount. (Error $\leq \pm 0.2$ dB)
Step	Procedure (cont.)								
	Then check that MS420B level changes by the same amount. (Error $\leq \pm 0.3$ dB)								
2	Change the MS610B/J/J1 reference level up or down in 2 dB steps. Then check that the MS420B level changes by the same amount. (Error $\leq \pm 0.2$ dB)								

(2) LOG. Amplifier adjustment

Item	Adj. Position	Adjustment	Setting
------	---------------	------------	---------

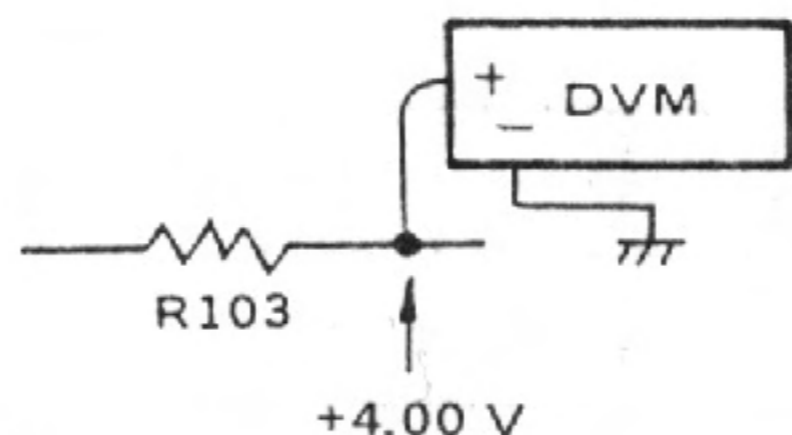
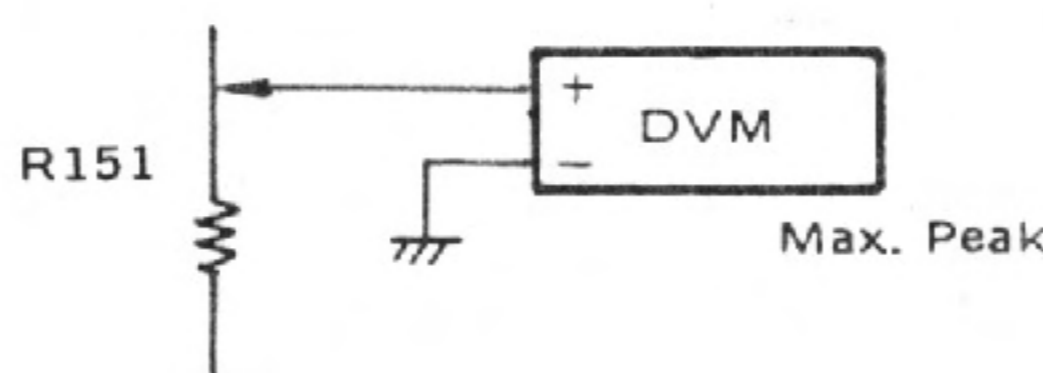
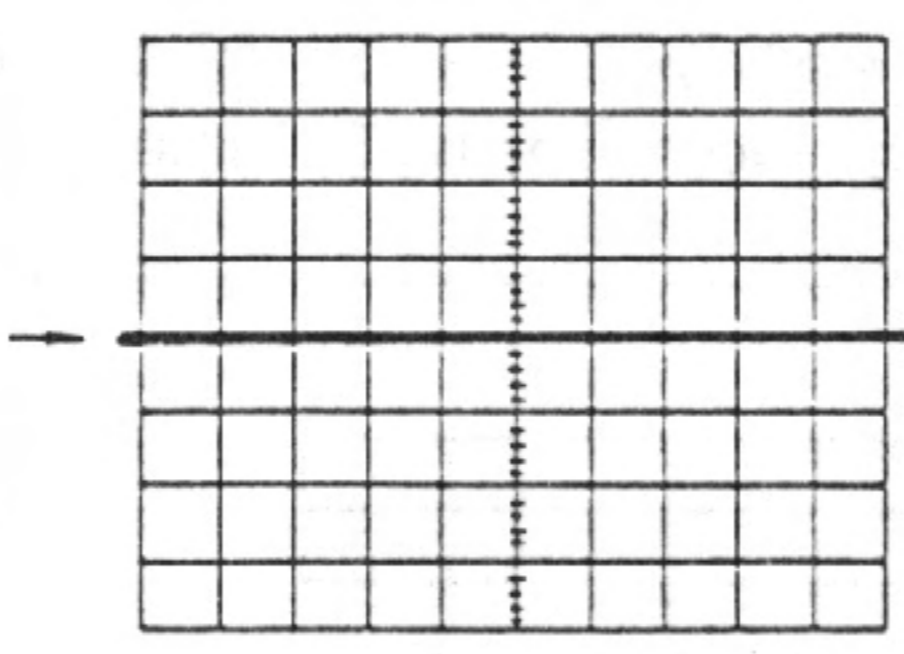
(Pre-  
paration)



(MS610B/J/J1)  
 Ref. Level -10 dBm  
 Input Att. 10 dB  
 Gain Adj.  
 center ( $\pm 4$  dB)  
 RBW 1 kHz  
 Adjust TRACE ROTATION  
 at Linear Scale with  
 no input level.  
 Set INTENSITY knob at  
 2 o'clock.

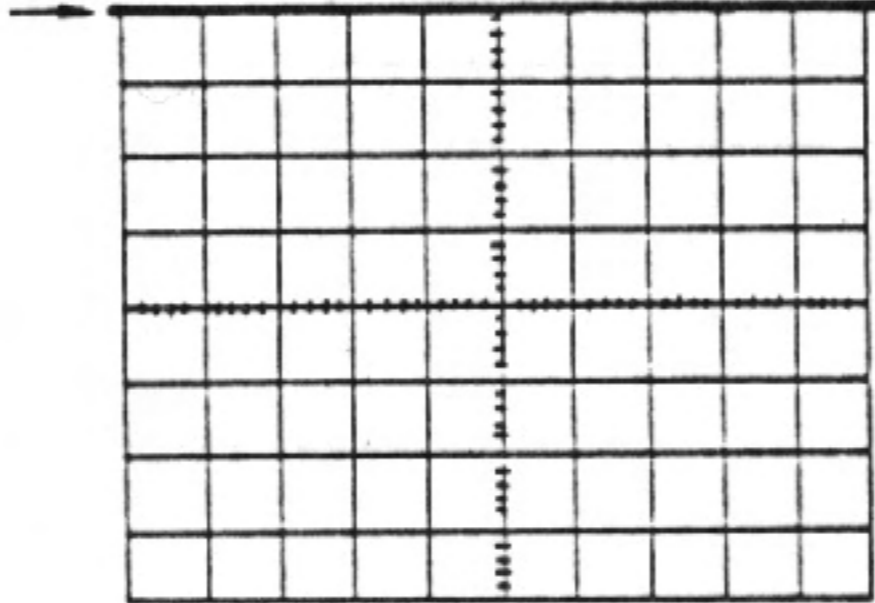
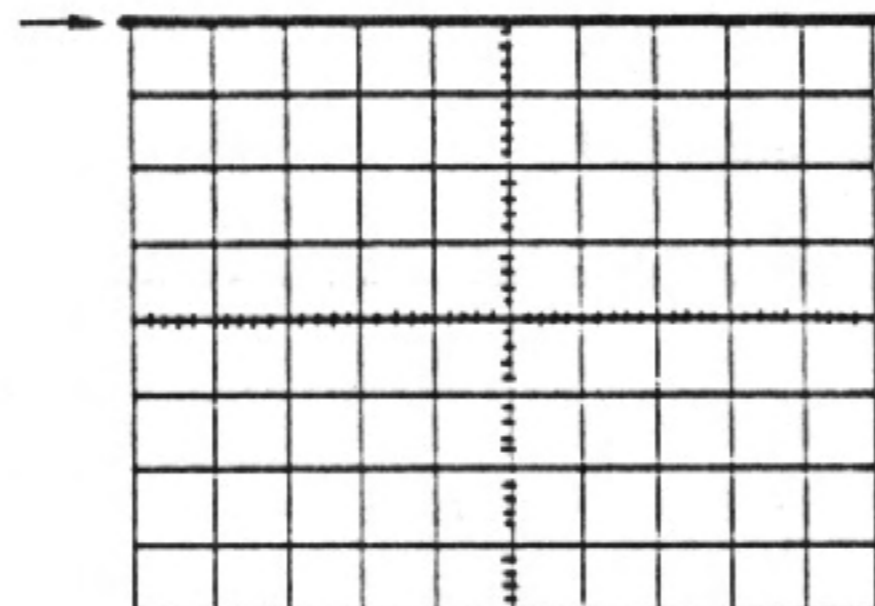
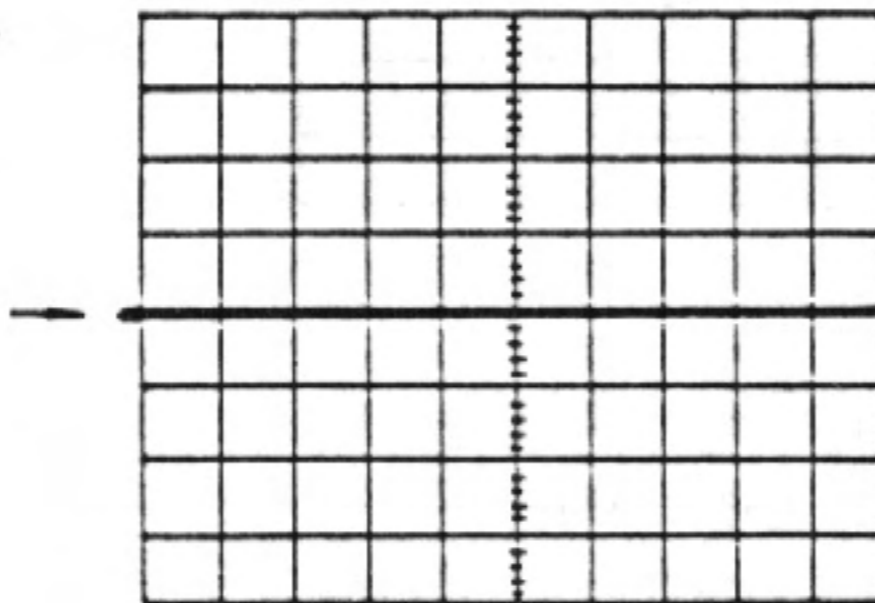


(2) (continued)

Item	Adj. Position	Adjustment	Setting
Reference +4 V Adj.	R101		(MG443B) -20 dBm (MS610B/J/J1) 10 dB/div
Linearity of 10 dB/ div Adj. (1)		 <p>Vary the frequency of MG443B in 10 Hz steps to get max. peak voltage on the DVM.</p>	(MG443B) -20 dBm (MS610B/J/J1) 10 dB/div
(2)	R92	Adjust for DVM +4.000 V	
(3)	R97	Adjust for DVM +2.000 V	(MS610B/J/J1) 10 dB/div (MG443B) -60 dBm
(4)	CRT DRIVE Z12-R40	 <p>Display line on the center horizontal line.</p>	(MS610B/J/J1) 10 dB/div (MG443B) -60 dBm

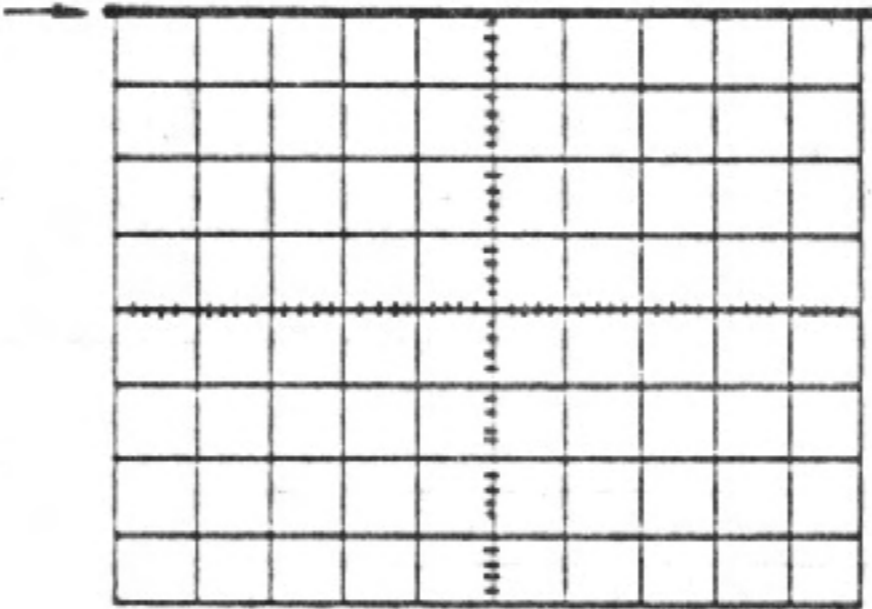
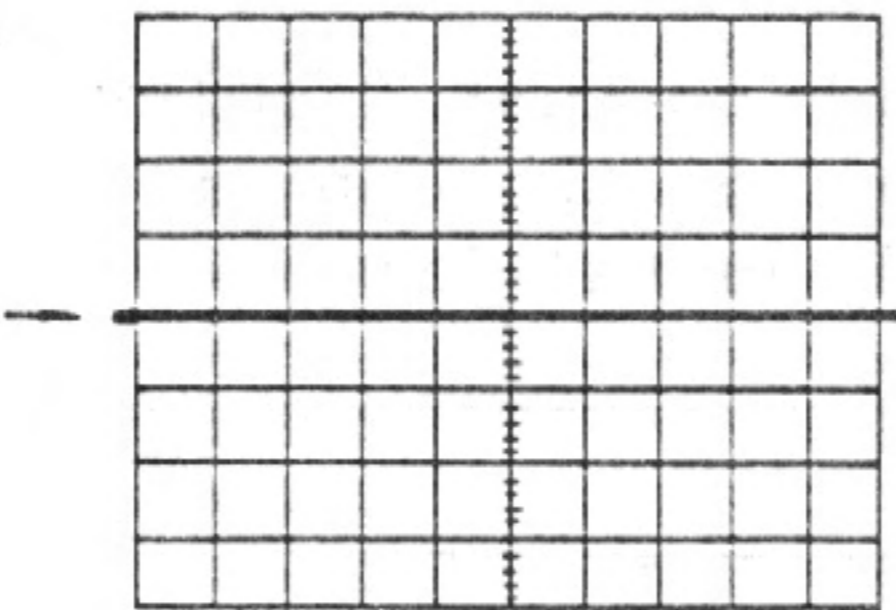


(2) (continued)

Item	Adj. Position	Adjustment	Setting
(5) Linearity of 10 dB/ div Adj. (cont.)	CRT DRIVE Z12-R33		(MG443B) -20 dBm (MS610B/J/J1) 10 dB/div
Display line on the top horizontal line.			
-----			
(6)	Measure the level difference (a). $a = ([\text{level at 10 dB/div scale}] - [\text{level at linear scale}])$ with no MG443B output level.		
-----			
(7)	R92		(MG443B) -20+a dBm (MS610B/J/J1) 10dB/div
Display line on the top horizontal line.			
-----			
(8)	R97		(MS610B/J/J1) 10 dB/div (MG443B) -60+a dBm
Display line on the center horizontal line.			
-----			
(9)	Repeat the Items (6) (7) (8) to get a = 0.		

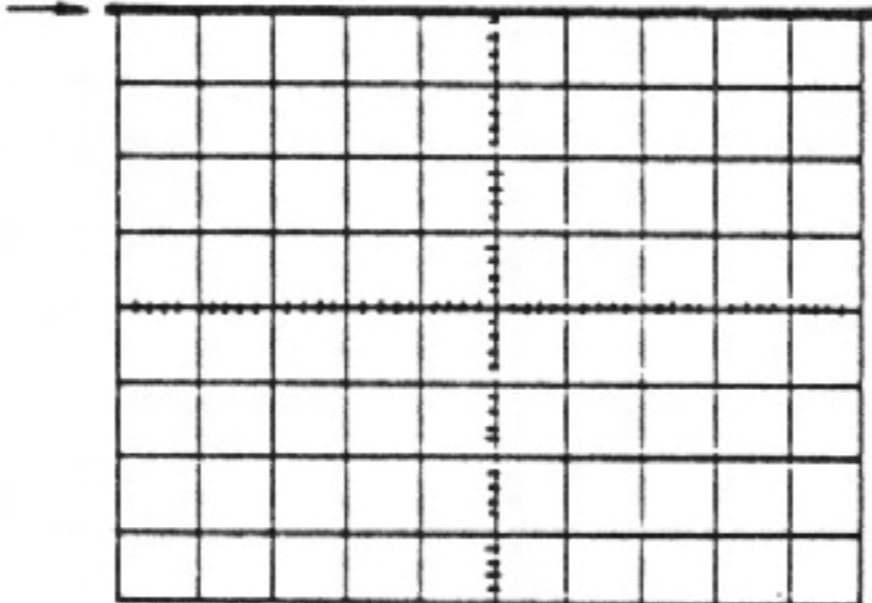
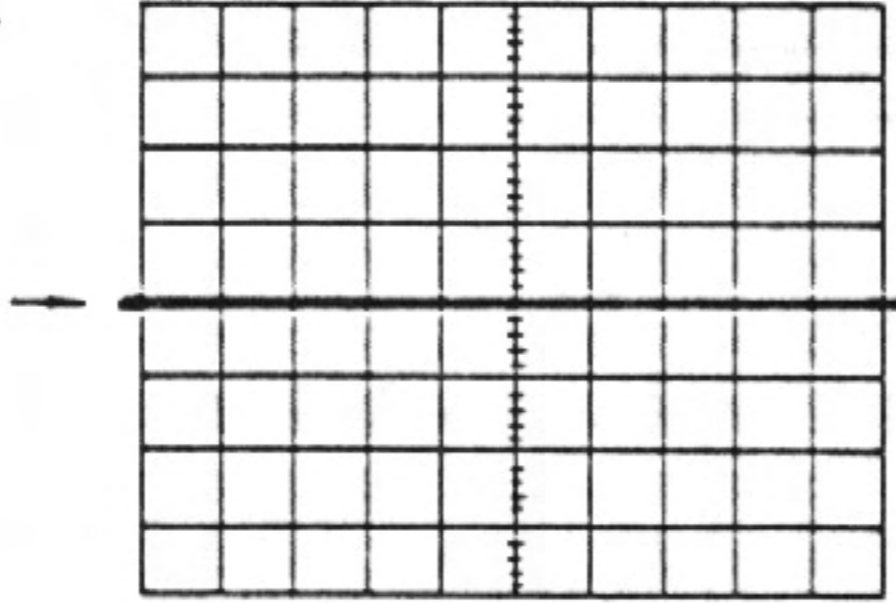
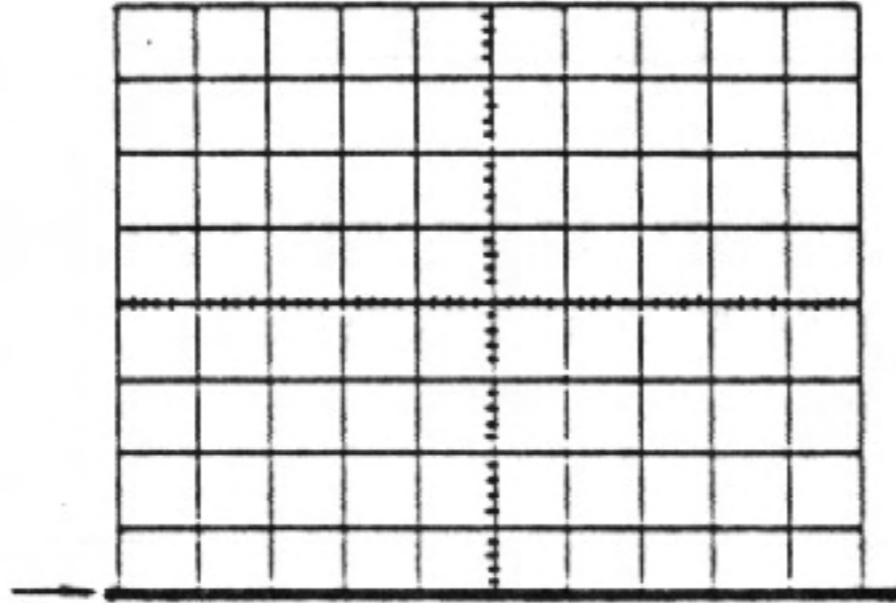


(2) (continued)

Item	Adj. Position	Adjustment	Setting
(10) Linearity of 10 dB/ div Adj. (cont.)			(MS610B/J/J1) 10 dB/div Vary the level of MG443B by 10 dB steps. Check that the display line variations are 10 ±1.5 dB.
Linearity of 2 dB/ div Adj. (1)	R101		(MG443B) -20 dBm (MS610B/J/J1) 2 dB/div
Display line on the top horizontal line.			
(2)	R98		(MS610B/J/J1) 2 dB/div (MG443B) -28 dBm
Display line on the center horizontal line.			
(3)			(MS610B/J/J1) 2 dB/div Vary the level of MG443B by 2 dB steps. Check that the display line variations are 2 ±1.0 dB.



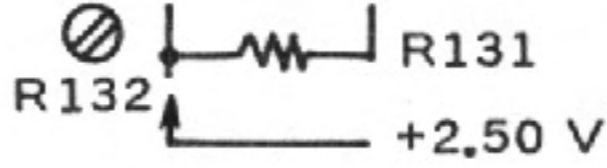
(2) (continued)

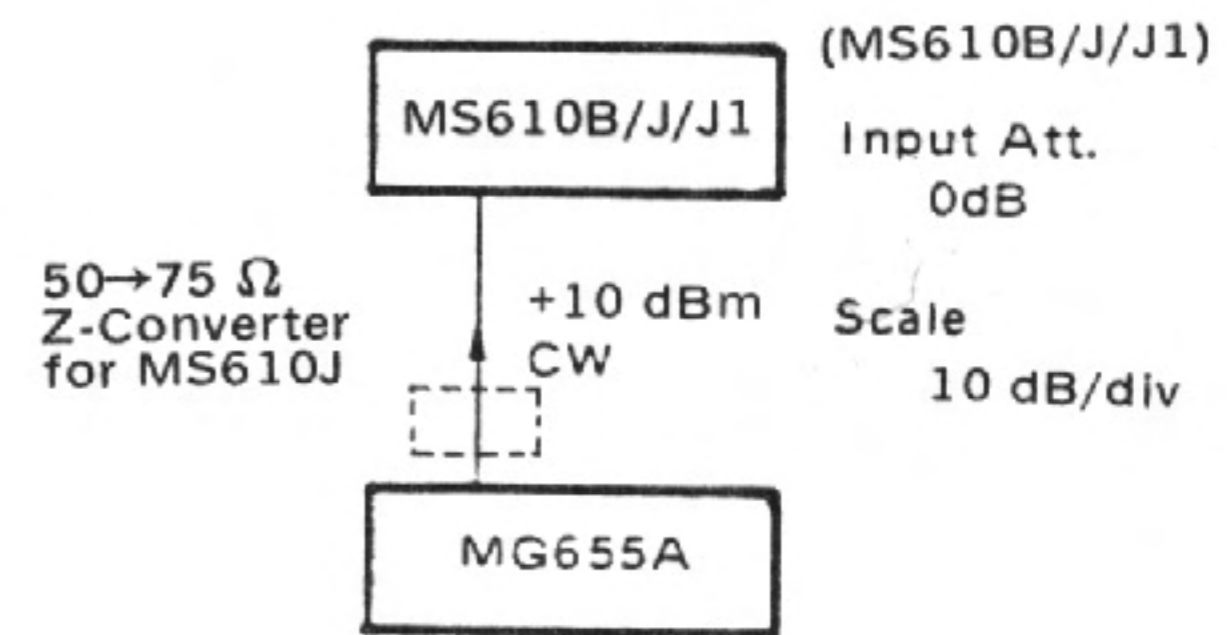
Item	Adj. Position	Adjustment	Setting
Linear Scale Linearity Adj. (1)	R74		(MG443B) -20 dBm (MS610B/J/J1) Linear Scale
Display line on the top horizontal line.			
(2)			(MS610B/J/J1) Linear Scale (MG443B) -26 dBm
Confirm that display line on the center horizontal line.			
(3)			(MG443B) OFF (MS610B/J/J1) Linear Scale
Confirm that display line on the bottom horizontal line.			



### 5.5.5 Overall adjustment

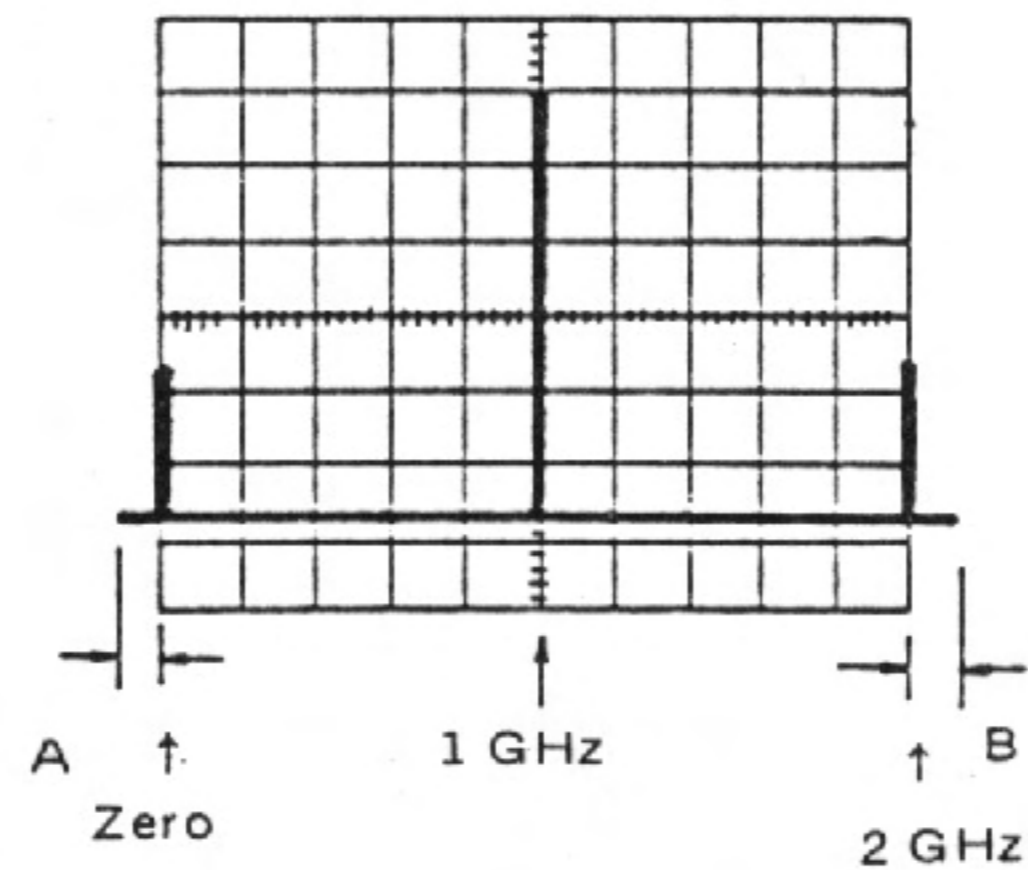
#### (1) Horizontal display adjustment

Item	Adj. Position	Adjustment	Setting
CPU Ref. Level Adj.	CPU Z10-R132		



1 GHz Display at 2 GHz Span (Horizontal Position) Adj.

CRT DRIVE Z12-R62

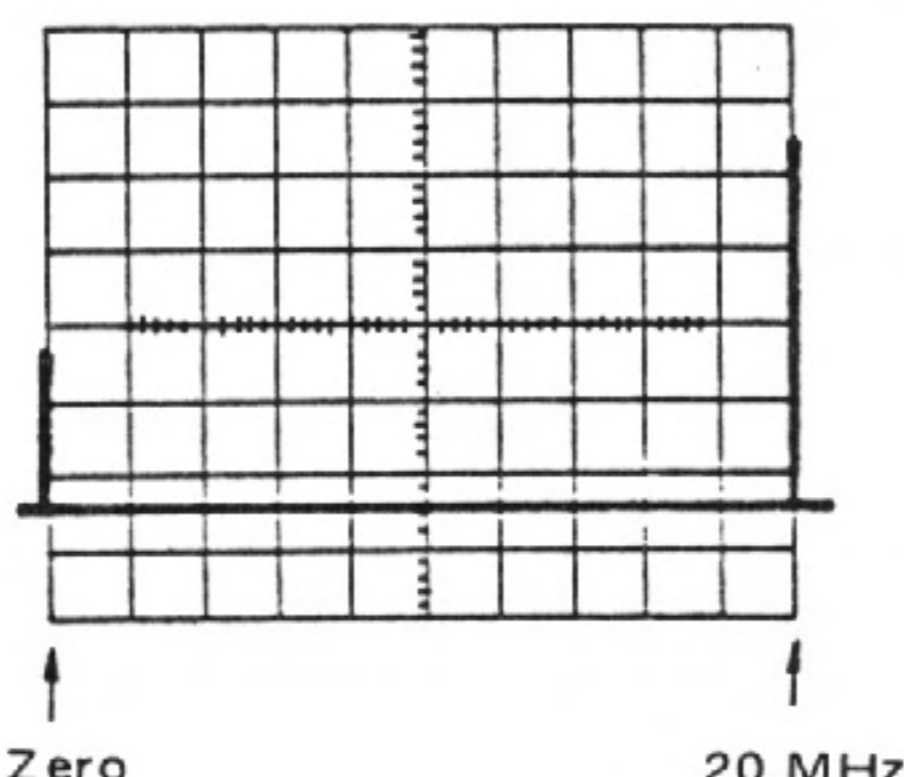


(MS610B/J/J1) Freq. Span 2 GHz (Full)  
(MG655A) 1 GHz

1 GHz spectrum on center scale line



(1) (continued)

Item	Adj. Position	Adjustment	Setting
Zero Beat Display at 2 GHz Span (Horizontal Gain) Adj.	CRT DRIVE Z12-R55	Zero beat display on the left side scale line. 2 GHz spectrum on the right side scale line.	
Full-scan Voltage Adj.	SCAN Z9-R46	A = B (starting bottom line length A is equal to ending bottom line length B.)	
Zero Beat Display at 1 GHz Span Adj.			(MS610B/J/J1) Freq. Span 1 GHz Start Freq. ON Adjust the Freq. Coarse dial to set the zero beat display on the left side scale line.
	SCAN Z9-R50	Zero beat display on the center scale line.	(MS610B/J/J1) Center Freq. ON
20 MHz Span Adj.	YTO DRIVE Z5-R53	 <p>Zero 20 MHz</p> <p>20 MHz spectrum on the right side scale line</p>	(MS610B/J/J1) Freq. Span 20 MHz Start Freq. ON Adjust the Freq. Coarse dial to set the zero beat display on the left side scale line.  (MG655A) 20 MHz



(1) (continued)

Item	Adj. Position	Adjustment	Setting
2 MHz Span Adj.	YTO DRIVE Z5-R11	<p>2 MHz spectrum on the right side scale line</p>	(MS610B/J/J1) Freq. Span 2 MHz Start Freq. ON Adjust the Freq. Coarse dial to set the zero beat display on the left side scale line.  (MG655A) 2 MHz

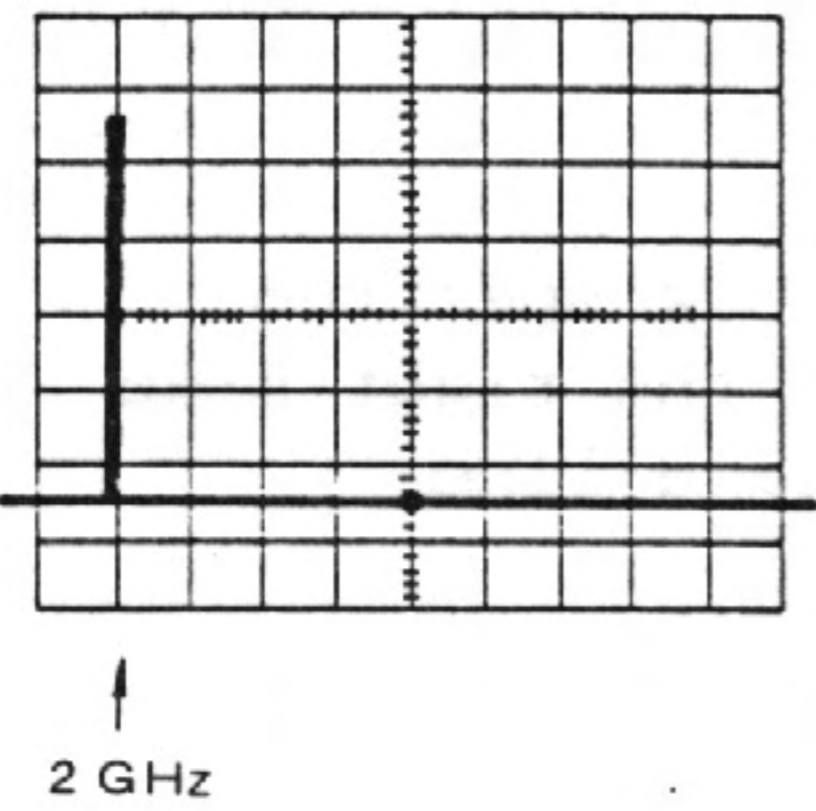
(2) Frequency display adjustment

Item	Adj. Position	Adjustment	Setting
			<p>Freq. Span 50 MHz</p>

Zero Beat at 50 MHz Span Adj.	YTO DRIVE Z5-R29	<p>Zero beat display on the 3rd line from right side scale line</p>	(MS610B/J/J1) Freq. Coarse max. counterclockwise Freq. Fine 5 complete turns from either end.
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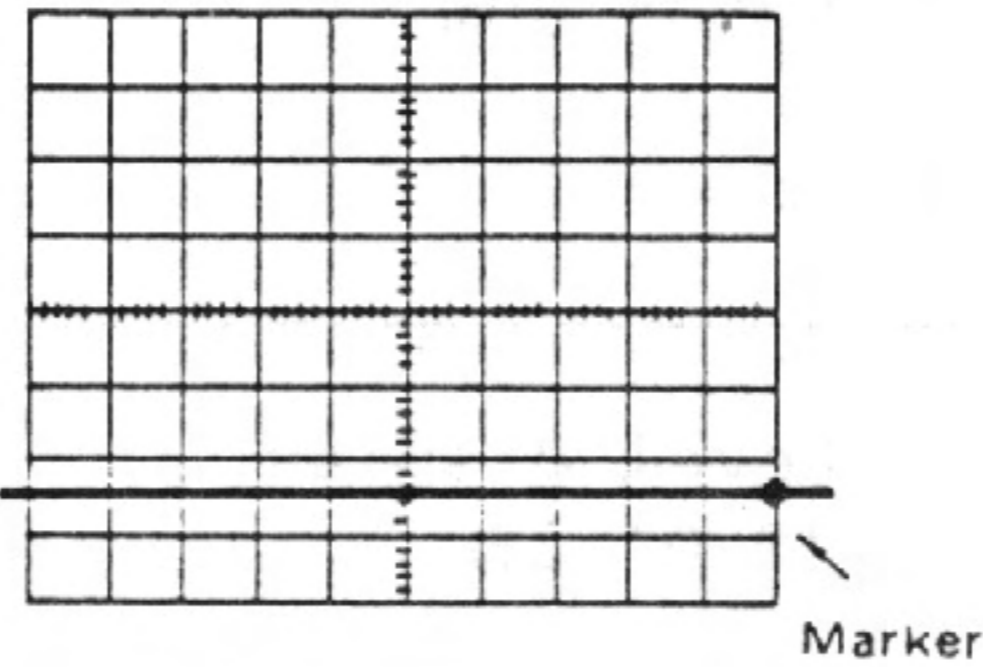


(2) (continued)

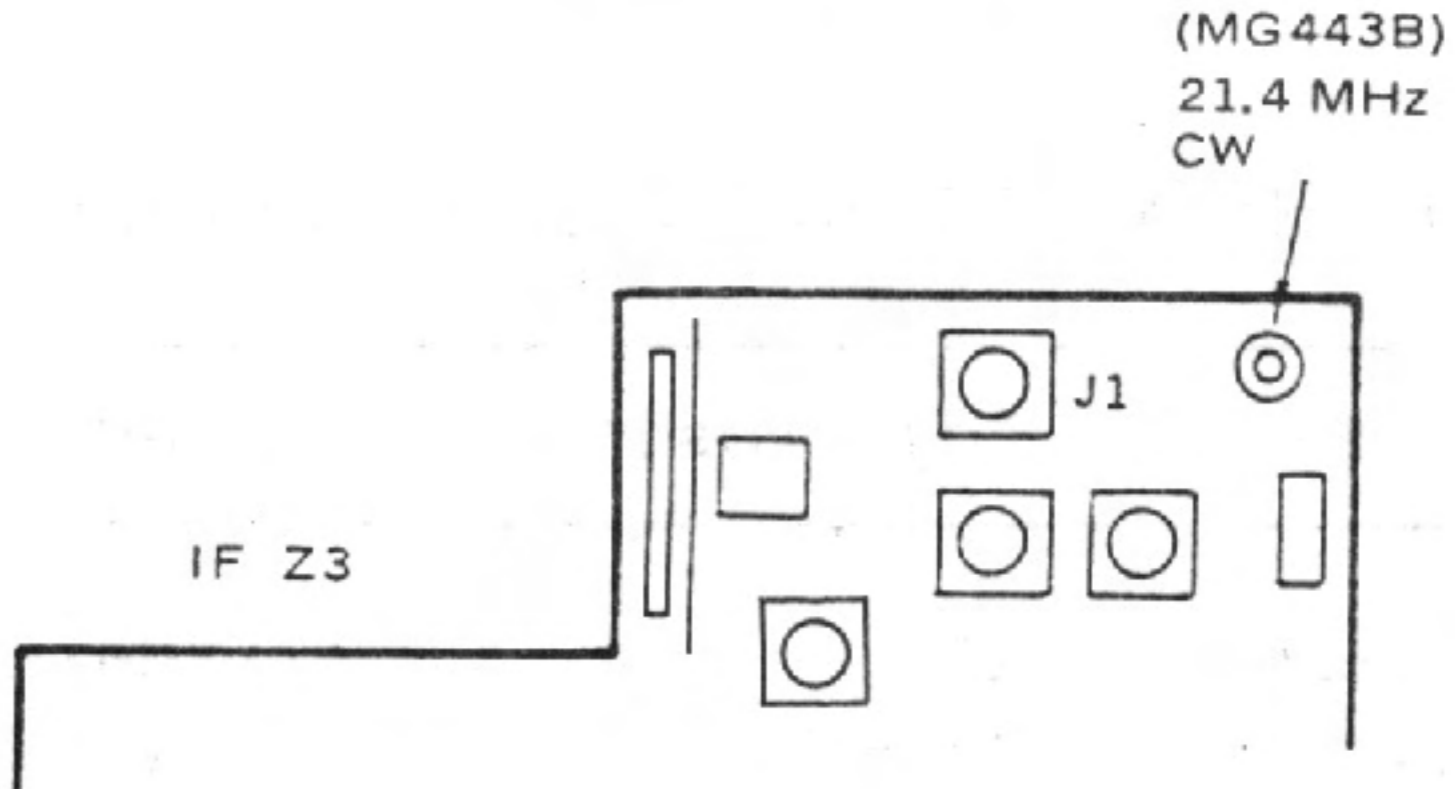
Item	Adj. Position	Adjustment	Setting
Freq. Display "0" Adj.	Freq. Zero Adj. (on the front panel)	Frequency display between "0" and "1"	(MS610B/J/J1) Adjust the Freq. Coarse dial to set the zero beat display on the center scale line.
2 GHz Display Adj.	YTO DRIVE Z5-R24	 <p>2 GHz display on the 2nd line from the left side scale line.</p>	(SG(MG724A1)) 2 GHz (MS610B/J/J1) Freq. Coarse-max. clockwise
Freq. Display "1000" Adj.	YTO DRIVE Z5-R39	Frequency display "1000"	(SG(MG655A)) 1 GHz (MS610B/J/J1) Adjust the Freq. Coarse dial to set the 1 GHz display on the center scale line.
Freq. Display "1100" Adj.	SCAN Z9-R16	Frequency display "1100"	(SG(MG655A)) 1.1 GHz (MS610B/J/J1) Adjust the Freq. Coarse dial to set the 1.1 GHz display on the center scale line.
Freq. Display "2000" Adj.	YTO DRIVE Z5-R39	Frequency display "2000" ±2	(SG(MG724A1)) 2 GHz (MS610B/J/J1) Adjust the Freq. Coarse dial to set the 2 GHz display on the center scale line.



(2) (continued)

Item	Adj. Position	Adjustment	Setting
Full Span Marker Adj.	SCAN Z9-R98	 <p>Center position of the Marker on the right side scale line.</p>	(MS610B/J/J1) Frequency display "2000" Freq. Span 2 GHz (Full)

(3) Vertical display adjustment

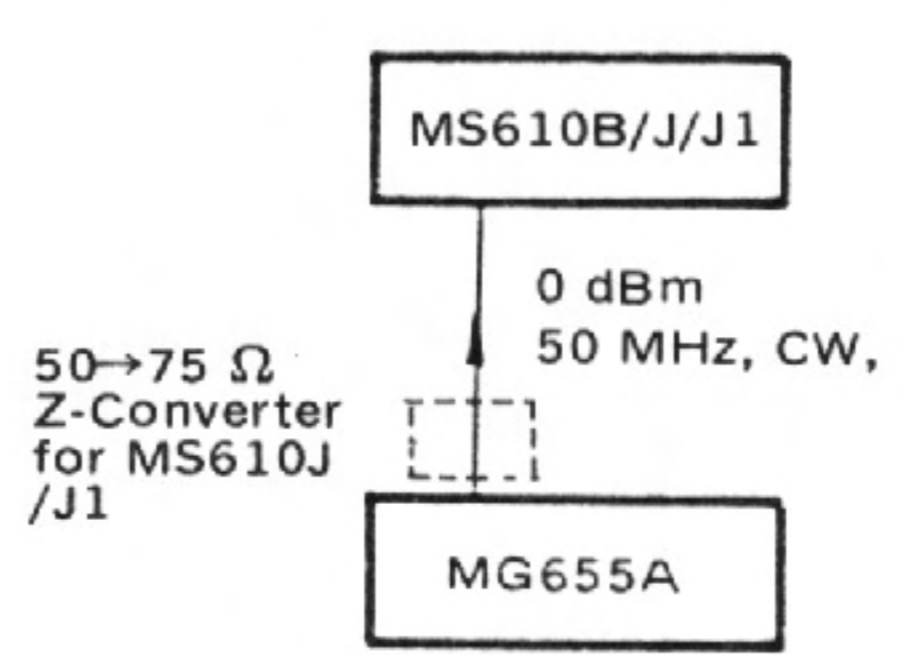
Item	Adj. Position	Adjustment	Setting
			(MS610B/J/J1) Ref. Level -10 dBm Input Att. 10 dB RBW 1 kHz GAIN ADJ Center ( $\pm 4$ dB)



(3) (continued)

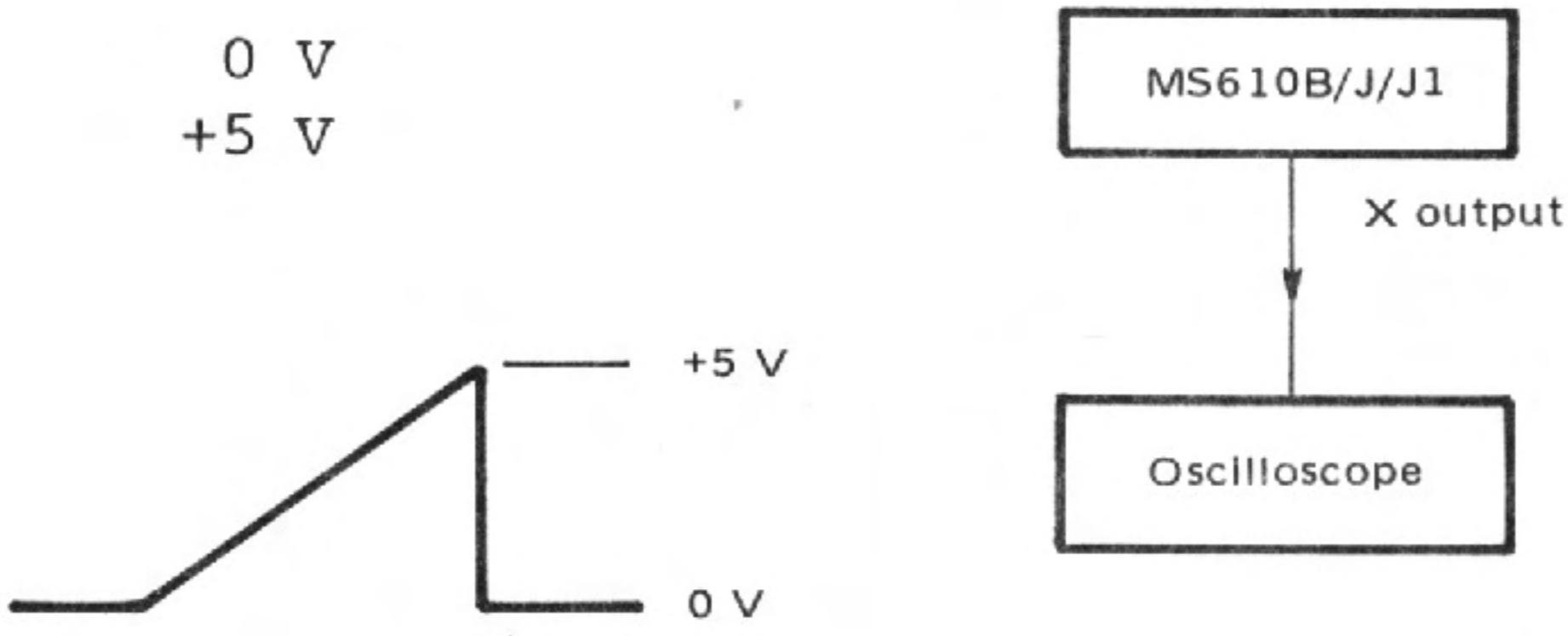
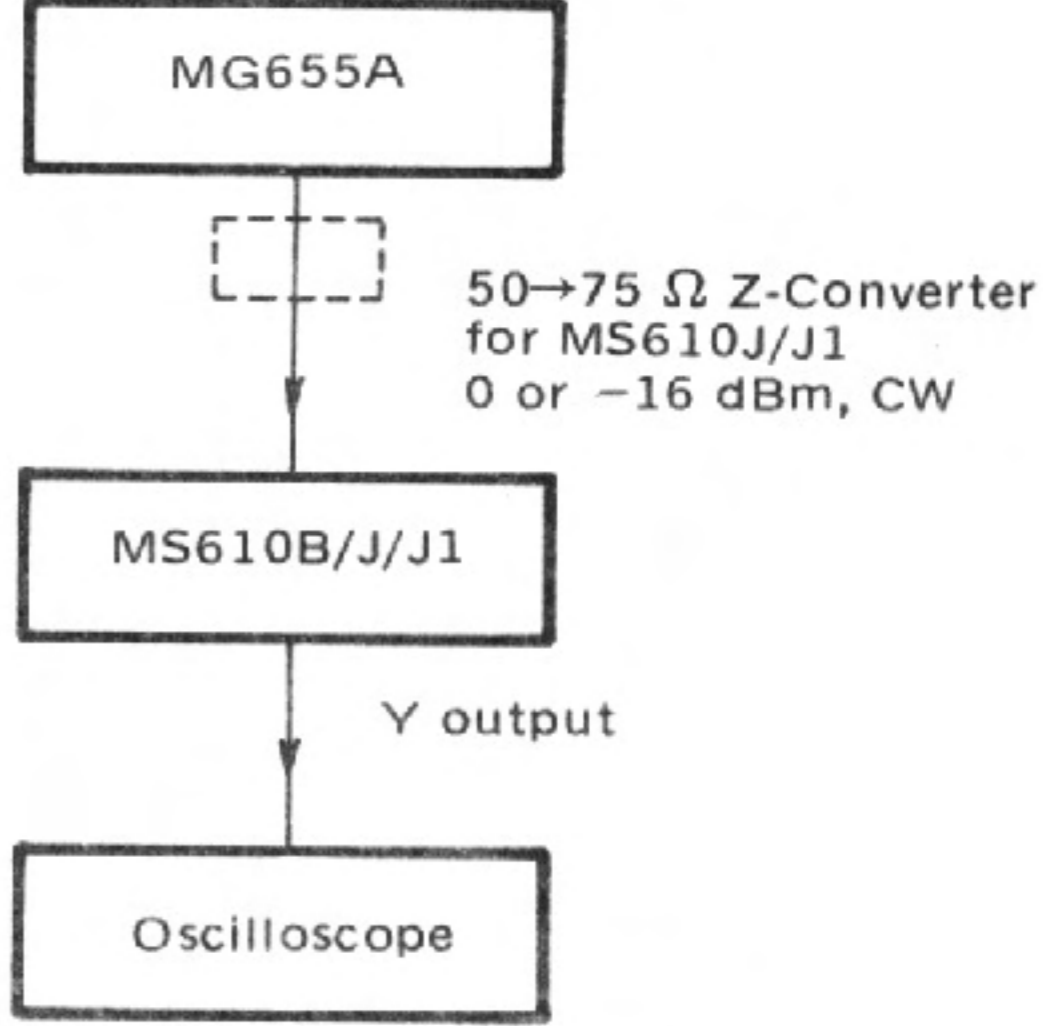
Item	Adj. Position	Adjustment	Setting
Marker Level Offset Adj.	SCAN Z9-R21	Level display "-50" dBm	(MG443B) -70 dBm (MS610B/J/J1) Marker Level ON Scale 10 dB/div
Marker Level Gain Adj.	Scan Z9-R18  Adjust Simultaneously	Level display "0.0" dBm	(MG443B) -20 dBm (MS610B/J/J1) Marker Level ON Scale 10 dB/div
Marker Level Linearity Check			(MS610B/J/J1) Marker Level ON Scale 10 dB/div  Vary the level of MG443B by 10 dB steps. Check that the marker level display varies by 10 dB.

(4) Overall gain adjustment

Item	Adj. Position	Adjustment	Setting
IF Gain Adj.	IF Z3,-R6,R9	Gain Adj. knob (on front panel) can vary display by $\pm 3$ dB or more.	 <p>(MS610B/J/J1) Ref. Level 0 dBm Freq. Span 50 MHz</p>



(5) XYZ output adjustment

Item	Adj. Position	Adjustment	Setting
X output Adj.	XYZ Output Z17-R10 Z17-R6	0 V +5 V	 <p>(MS610B/J/J1) Sweep time 0.5 s</p>
Y output Adj.			
	XYZ Output Z17-R11	0 V	<p>(MS610B/J/J1)</p> <p>RBW 300 kHz            Freq. Span 0 MHz            Ref. Level 0 dBm            Scale 2 dB/div            Set the display line on the bottom horizontal line by adjusting GAIN ADJ.</p> <p>(MG655A)            Output level -16 dBm</p>
	XYZ Output Z17-R7	+5 V	<p>(MS610B/J/J1)</p> <p>Set the display line on the top horizontal line by adjusting GAIN ADJ.</p> <p>(MG655A)            Output level 0 dBm</p>



## SECTION 6

### REPLACEABLE PARTS

#### 6.1 Introduction

This section contains information about ordering replacement parts or components. The following tables (Tables 6-2 and 6-3) shows circuit references (hereafter: CKT REF) and abbreviations used for items in the Parts Lists. The quantity of each item in the Parts List is "one" unless a quantitative description is given in the "NOTE" column.

#### 6.2 Ordering Information

When ordering parts, please supply the following descriptions from the PARTS LIST.

Table 6-1 Ordering Information

No.	Item	Example
1	Instrument name	MS610B Spectrum Analyzer
2	Part location	Part of MS610B/J/J1 Spectrum Analyzer
3	CKT REF	F1
4	Part name	T1A250V
	Note:	Part name is given in parentheses ( ) in the Parts List. Parts with asterisks* require factory adjustment upon repair. When ordering part(s) marked with asterisk, give full description of the part(s).
5	Quantity	1
6	Instrument serial no.	M31257



When ordering PC boards with parts mounted, please include the Z-number under item (2) above instead of items (3) and (4). (See Table 4-1 for PC board number.)



Table 6-2 Circuit References

AT: Attenuator	K: Relay	Q: Transistor, diode, IC, rectifier	V: Neon lamp, vacuum tube
C: Capacitor	L: Coil, microinductor	R: Resistor	X: Crystal OSC
F: Fuse	M: Meter, timer	S: Switch	Z: Unit
J: Jack, plug, connector	P: Lamp	T: Transformer	

Table 6-3 Abbreviations

A: amperes	Multi: multiplying
Att, R var: variable attenuator using film elements	N-ch: N-channel
BL: boundary layer	non-lin: non-linear taper
Cer: ceramic	Non-pol: non polarity
CF: carbon film	NPN: negative-positive-negative
Comp: composition	$\Omega$ : ohms
CRT: cathode-ray tube	p: pico ( $\times 10^{-12}$ )
Di: diode	Plast: plastic film
DIP: dual in-line package	PMTR: potentiometer
Elect: electrolytic aluminum	PNP: positive-negative-positive
F: farad	p-p: peak-to-peak value
FET: field-effect transistor	RFC: RF choke
G: ground	R-lamp: resistor lamp
Ge: germanium	rms: effective value (root-mean-square)
H: henry	SBD: Schottky barrier diode
Hz: hertz	SCR: silicon-controlled rectifier
IC: integrated circuit	Si: silicon
IEC: Conforms to IEC Safety Standards.	SRD: step-recovery diode
J-FET: junction FET	Tant: tantalum
k: kilo ( $\times 10^3$ )	TM: time-lag
LED: light-emitting diode	Tr: transistor
M: mega ( $\times 10^6$ )	Trans: transformer
m: milli ( $\times 10^{-3}$ )	$\mu$ : micro ( $\times 10^{-6}$ )
MF: metallized film	V: volt
MOS-FET: metal-oxide semiconductor FET	Var: variable
M paper: metallized paper	WW: wire-wound
M plast: metallized plastic film	XTAL: crystal



## 6.3 Reading Resistance/Capacitance

### 6.3.1 Resistance

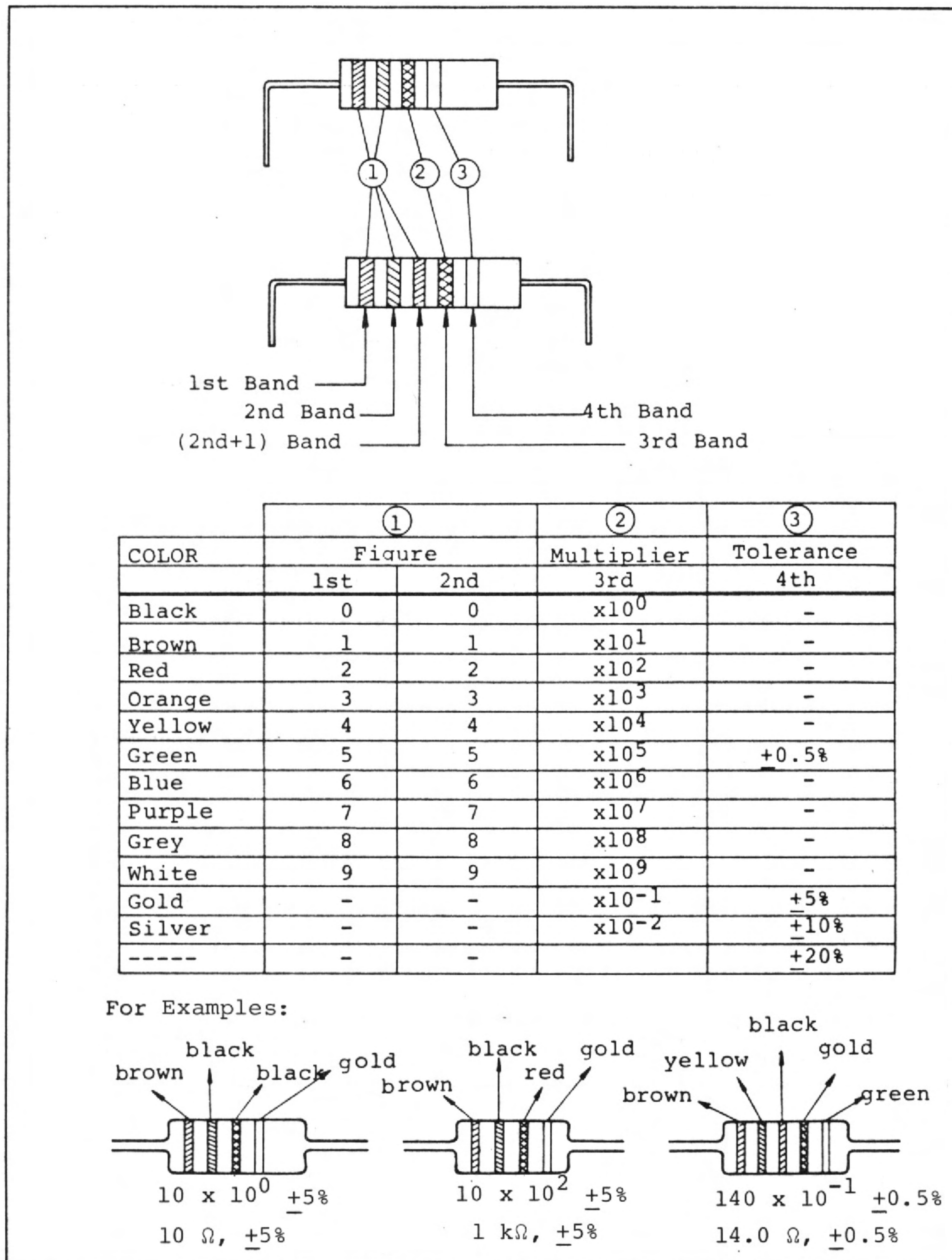


Fig. 6-1 Reading Resistance



### 6.3.2 Capacitance

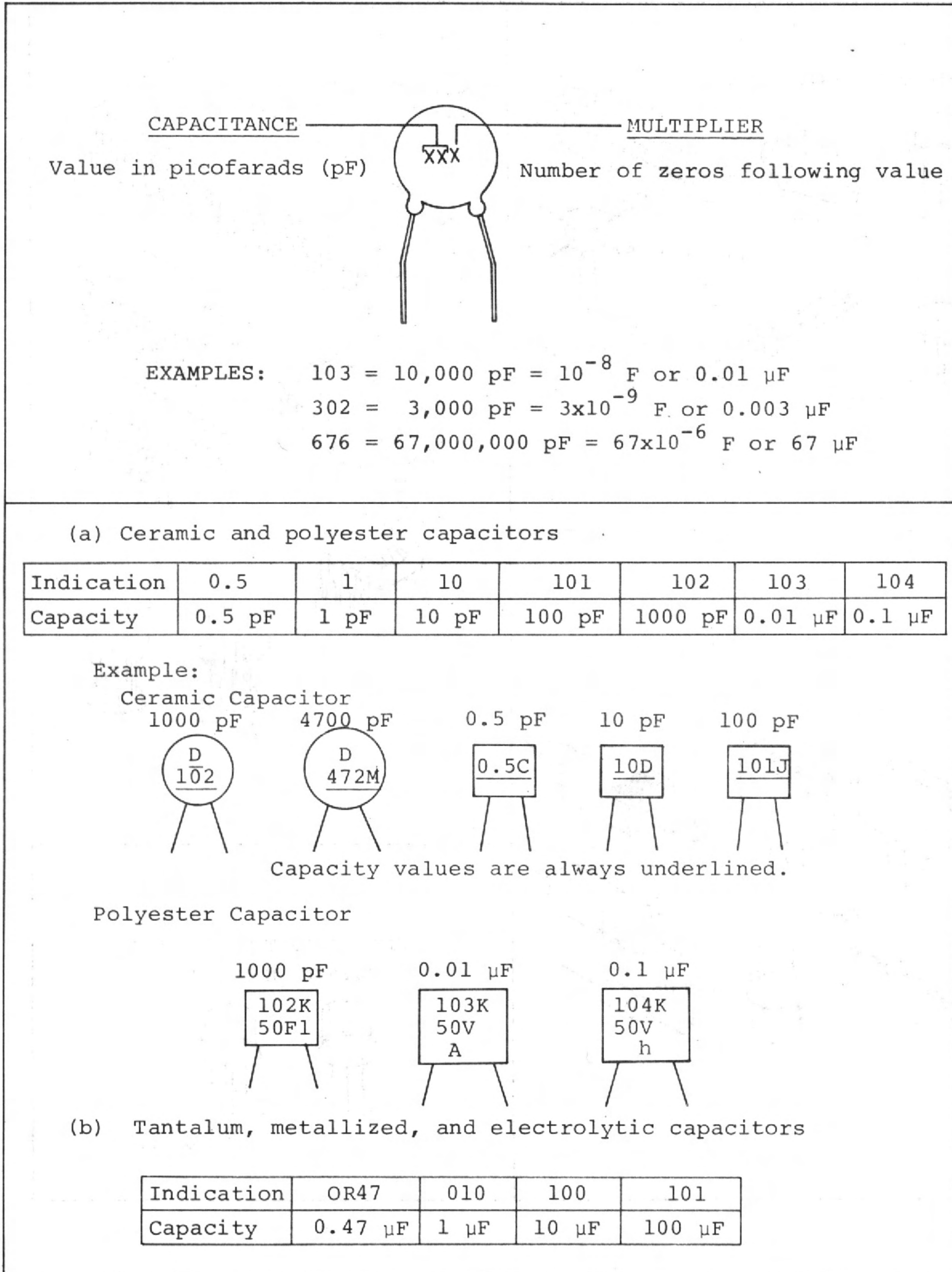


Fig. 6-2 Reading Capacitance



## 6.4 Semiconductor Markings

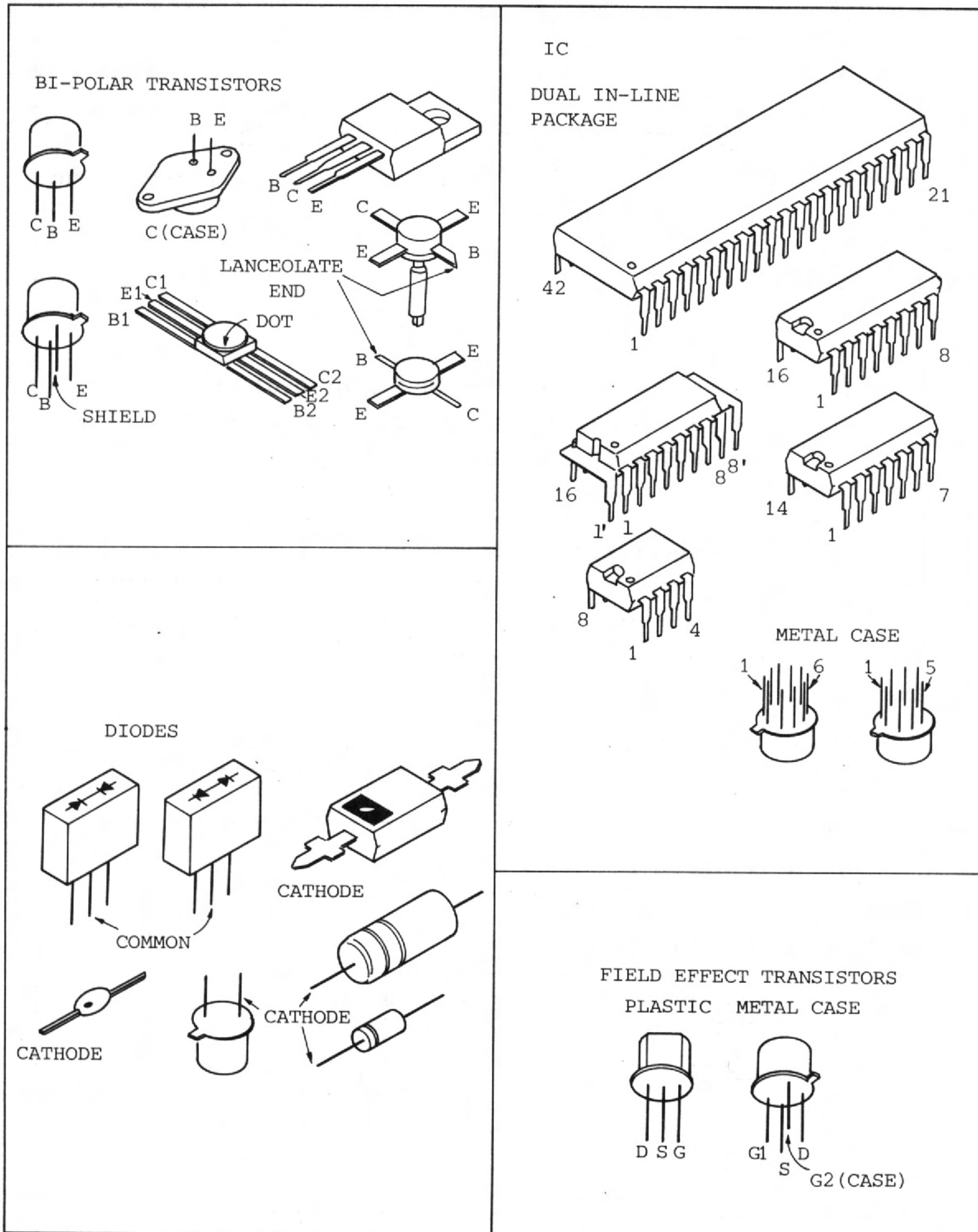


Fig. 6-3 Semiconductor Markings



## 6.5 Parts List

Circuit Diagram No.	Z No.	Name	Parts List No.
2	-	MS610B/J/J1 Spectrum Analyzer	34W 89577
4	Z11	FRONT PANEL (I)	34W 85992
5	Z11	FRONT PANEL (II)	34W 85989
7	Z3	IF	34W 89580
10	Z9 & Z10	SCAN & CPU	34W 89584
12	Z12	CRT DRIVE	34W 85994
14	Z5	YTO DRIVE	34W 85995
16	Z2	RF CONVERTER	34W 85987
17	-	2nd CONVERTER	34W 89581
18	-	50 MHz OSC	34W 85990
19	-	2.5214 GHz PRE AMP	34W 89578
20	-	2.5 to 4.5 GHz LO AMP	34W 89426
21	-	6 dB PAD	34W 89428
22	Z14	DIGITAL SW	34W 86018
24	Z7	POWER SUPPLY	34W 87893
25	Z17	XYZ OUTPUT	34W 89299
26	Z16	GP-IB (Option-1)	34W 85991



Parts List : MS610B/J/J1 Spectrum Analyzer 2

CKT REF	DESCRIPTION	RATING	NOTE
F 1	Fuse, TM, (T***A250V)	***A, 250V	6KA643
F 2	Fuse, TM, (T***A250V)	***A, 250V	
J 1	Connector, (NM11-2F)		
J 2	Connector, (NM11-2F)		
J 3	Connector, (27DP-LP-1.5)		
J 4	Connector, (27DP-P-1.5)		
J 5	Connector, (NM11-2F)		
J 6	Connector, (NM11-2F)		
J 7	Connector, (27DP-LP-1.5)		
J 8	Connector, (27DP-P-1.5)		
J 9	Connector, (DF1-20S-2.5R24-30D)		
J10	Not assigned		
J11	Connector, (DF1-15S-2.5R24-30A)		
J12	Connector, (DF1-20S-2.5R24-30D)		
J13	Connector, (DF1-5S-2.5R24-30C)		
J14	Connector, (BNC-PJ-1.5)		
J15	Connector, (DF1-10S-2.5R24-20C)		
J16	Connector, (DF1-3S-2.5R24-30A)		
J17	Connector, (DF1-20S-2.5R24-10C)		
J18	Not assigned		
J19	Connector, (DF1-3S-2.5R24-30A)		
J20	Socket, (CRT)		
J21	Connector, (DF1-15S-2.5R24-20A)		
J22	Connector, (DF1-3S-2.5R24-15A)		
J23	Not assigned		
J24	Terminal, (A12)		
J25	Inlet, (8843-2SP FL4/364)		
J26	Not assigned		

( ): Manufacturer's part number 34W89577 1/3  
 \* : Selected at factory

Parts List : MS610B/J/J1 Spectrum Analyzer 2

CKT REF	DESCRIPTION	RATING	NOTE
J27	Connector, (27DP-LP-1.5W)		
J28	Connector, (DF1-8S2.5R24)		
J29	Connector, (DF1-8S2.5R24-30A)		
J30	Connector, (BNC-R)		
J31	Connector, (BNC-R)		
J32	Connector, (BNC-R)		
J33	Connector, (P-1306-DB)		
J34	Connector, (1625-4R)		
J35	Connector, (1625-4P-1)		
J36	Connector, (DF1-8S-2.5R24)		
J37	Connector, (DF1-8S-2.5R24)		
K 1	Relay, (HC4-TM-DC24V)		
R 1	CF, (ARD25T105J)	1M $\Omega$ , $\pm$ 5%, 1/4W	
R 2	Var, MF, (RG161N15SB 10k $\Omega$ M)	10k $\Omega$ , 1/2W	
R 3	Var, MF, (RG161N15SB 10k $\Omega$ M)	10k $\Omega$ , 1/2W	
S 1	Switch, (1852)		Japan Hz
T 1	Power trans, (63HA80)		
Z 1	Block, (PATT)		
Z 2	RF Converter		
Z 3	IF PKG		
Z 4	YTO		
Z 5	YTO Drive PKG		
Z 6	Potentiometer, (20HHP-10S-10k $\Omega$ J)		
Z 7	Power Unit		
Z 8	Noise Filter, (ZCB2203-11)		

( ): Manufacturer's part number 34W89577 2/3  
 \* : Selected at factory

Parts List : MS610B/J/J1 Spectrum Analyzer 2

CKT REF	DESCRIPTION	RATING	NOTE
Z 9	Scan & CPU (Scan) PKG		
Z10	Scan & CPU (CPU) PKG		
Z11	Front Panel (1) (2) PKG		
Z12	CRT Drive PKG		
Z13	CRT, (150CUB39)		
Z14	Digital SW PKG		
Z15	Potentiometer, (20HP-10S-10k $\Omega$ H)		
Z16	GP-IB PKG		(Option)
Z17	XYZ-Output PKG		

( ): Manufacturer's part number 34W89577 3/3  
 \* : Selected at factory

Parts List : FRONT PANEL (1) 4

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Not assigned		
C20			
C21	Cer, (CK924F1H104Z)	0.1 $\mu$ F, $\pm$ 80/-20%, 50V	
C22	Tant, (CS-ELV4R7M)	4.7 $\mu$ F, $\pm$ 20%, 35V	
C23	Cer, (CK924F1H104Z)	0.1 $\mu$ F, $\pm$ 80/-20%, 50V	
Q 1	LED, (LN524CK)		
Q 2	Not assigned		
Q 3	LED, (LN524CK)		
Q 4	Not assigned		
Q 5	LED, (LN513GK)		
Q 6	LED, (LN513GA)		
Q 7	LED, (LN513GK)		
Q 8	LED, (LN513GK)		
Q 9	LED, (LN513GK)		
Q10	LED, (LN513CK)		
Q11	LED, (LN513GK)		
Q12	LED, (LN513GK)		
Q13	Not assigned		
Q26	Not assigned		
Q27	IC, (TC4511BP)		
Q28	IC, (TC4511BP)		
Q29	Not assigned		
Q30	Not assigned		
Q31	Not assigned		
Q32	Not assigned		
Q33	Not assigned		
Q34	Not assigned		
Q35	IC, (TC4511BP)		
Q36	IC, (TC4511BP)		
Q37	Not assigned		
Q38	Not assigned		
Q39	Not assigned		
Q40	LED, (LT9200N)		
Q41	LED, (LT9200N)		
Q42	LED, (TLY226)		
Q43	LED, (TLY226)		
Q44	LED, (LT9002N)		
Q45	LED, (LT9200N)		
Q46	LED, (LT9200N)		
Q47	LED, (LT9002N)		
Q48	LED, (LT9200N)		

( ): Manufacturer's part number 34W89592 1/3  
 \* : Selected at factory



Parts List : FRONT PANEL (1) 4

CKT REF	DESCRIPTION	RATING	NOTE
Q49	LED, (TLY226)		
Q50	LED, (LT9002N)		
Q51	LED, (LT9200N)		
Q52	LED, (LT9200N)		
Q53	LED, (LT9002N)		
Q54	LED, (TLG226)		
Q55	LED, (TLG226)		
Q56	LED, (TLG226)		
Q57	LED, (TLG226)		
Q58	LED, (TLG226)		
Q59	LED, (TLG226)		
Q60	LED, (TLG226)		
Q61	Not assigned		
Q62 to Q72	LED, (HL20-LSYG)		
Q73	Not assigned		
Q74	Di, breakdown, (RD2.7EB)	2.5 to 2.9V, 400mW	
Q75	Not assigned		
Q76	Not assigned		
Q77	Not assigned		
Q78	Not assigned		
Q79	Not assigned		
Q80	Not assigned		
Q81	Not assigned		
Q82	Not assigned		
Q83	Not assigned		
Q84	IC, (MM74C923N)		
Q85	LED, (TLG226)		
Q86	LED, (TLG226)		
Q87	LED, (TLG226)		
Q88	LED, (TLG226)		
R 1	Not assigned		
R 2	Not assigned		
R 3	Dual in-line array, (AHR-561JB)	560Ω, 1/8W	
R 4	Dual in-line array, (AHR-561JB)	560Ω, 1/8W	
R 5	Dual in-line array, (AHR-561JB)	560Ω, 1/8W	
R 6	Dual in-line array, (AHR-561JB)	560Ω, 1/8W	
R 7	Not assigned		
R 8	Not assigned		

( ): Manufacturer's part number 34W85992 2/3  
 \* : Selected at factory

Parts List : FRONT PANEL (1) 4

CKT REF	DESCRIPTION	RATING	NOTE
R 9	Not assigned		
R10	Not assigned		
R11	Not assigned		
R12	Not assigned		
R13	Dual in-line array, (AHR-122JB)	1.2kΩ, 1/8W	
R14	Dual in-line array, (AHR-122JB)	1.2kΩ, 1/8W	
R15	Not assigned		
R16	Not assigned		
R17	Not assigned		
R18	Not assigned		
R19	Not assigned		
R20	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R21	Var, MF, (RJ-13P 2kΩ)	2kΩ, 1/2W	
R22	CF, (ARD25T122J)	1.2kΩ, ±5%, 1/4W	
R23	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R24	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R25	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R26	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R27	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
S 1	Switch, (HL20-LSYG)		
S 2	Switch, (HL20-LSYG)		
S 3	Switch, (HL20-LSYG)		
S 4	Switch, (HL20-LSYG)		
S 5	Switch, (HL20-LSYG)		
S 6	Switch, (HL20-LSYG)		
S 7	Switch, (HL20-LSYG)		
S 8	Switch, (HL20-LSYG)		
S 9	Switch, (HL20-LSYG)		
S10	Switch, (HL20-LSYG)		
S11	Switch, (HL20-NS)		
S12	Switch, (HL20-LSYG)		
S13	Switch, (KEG10901)		
S14	Switch, (HL20-NS)		
S15	Switch, (HL20-NS)		
S16	Switch, (HL20-NS)		
S17	Switch, (HL20-NS)		

( ): Manufacturer's part number 34W85992 3/3  
 \* : Selected at factory

Parts List : FRONT PANEL (2) 5

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 2	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 3	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 4	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 5	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 6	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 7	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 8	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 9	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
J 1	Connector, (DF1-20P-2.5DSA)		
J 2	Not assigned		
J 3	Not assigned		
J 4	Not assigned		
J 5	Not assigned		
J 6	Connector, (HIF2-50D-AB15S)		
Q 1 to Q21	Not assigned		
Q22	IC, (TD62003P)		
Q23	IC, (TD62003P)		
Q24	Not assigned		
Q25	IC, (TC4511BP)		
Q26	IC, (TC4511BP)		
Q27	Not assigned		
Q28	Not assigned		
Q29	IC, (TC4511BP)		
Q30	IC, (TC4099BP)		
Q31	IC, (TC4511BP)		
Q32	IC, (TC4511BP)		
Q33	IC, (TC4511BP)		
Q34	IC, (TC4099BP)		
Q35	Not assigned		
Q36	Not assigned		
Q37	IC, (TC40H042P)		
Q38	IC, (TC40H042P)		
Q39	IC, (TC4011BP)		
Q40 to Q74	Not assigned		

( ): Manufacturer's part number 34W85989 1/2  
 \* : Selected at factory

Parts List : FRONT PANEL (2) 5

CKT REF	DESCRIPTION	RATING	NOTE
Q75	IC, (TD62003P)		
Q76	IC, (TD62003P)		
Q77	IC, (TD62003P)		
Q78	IC, (TD62003P)		
Q79	IC, (TD62003P)		
Q80	IC, (TC4099BP)		
Q81	IC, (TC4099BP)		
Q82	IC, (TC4099BP)		
Q83	IC, (TC4099BP)		
Q84	Not assigned		
Q85	Not assigned		
Q86	Not assigned		
Q87	Not assigned		
Q88	Not assigned		
Q89	LED, (TLR226)		
R 1	Not assigned		
R 2	CF, (ARD25T122J)	1.2kΩ, ±5%, 1/4W	
R 3	Not assigned		
R 4	Not assigned		
R 5	Not assigned		
R 6	Not assigned		
R 7	Dual in-line array, (AHR-122JB)	1.2kΩ, 1/8W	
R 8	Dual in-line array, (AHR-122JB)	1.2kΩ, 1/8W	
R 9	Dual in-line array, (AHR-122JB)	1.2kΩ, 1/8W	
R10	Dual in-line array, (AHR-122JB)	1.2kΩ, 1/8W	
R11	Dual in-line array, (AHR-122JB)	1.2kΩ, 1/8W	
R12	Dual in-line array, (AHR-122JB)	1.2kΩ, 1/8W	
R13	Not assigned		
R14	Not assigned		
R15	Dual in-line array, (AHR-331JB)	330Ω, 1/8W	
R16	Dual in-line array, (AHR-331JB)	330Ω, 1/8W	
R17	Dual in-line array, (AHR-561JB)	560Ω, 1/8W	
R18	Dual in-line array, (AHR-561JB)	560Ω, 1/8W	
R19	Dual in-line array, (AHR-561JB)	560Ω, 1/8W	

( ): Manufacturer's part number 34W85989 2/2  
 \* : Selected at factory



Parts List : IF 7

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 2	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 3	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 4	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 5	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 6	Cer, (CC924CH1H561J)	560pF, ±5%, 50V	
C 7	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C 8	Cer, (CC45CH1H240JY)	24pF, ±5%, 50V	
C 9	Not assigned		
C10	Cer, (CC924CH1H561J)	560pF, ±5%, 50V	
C11	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C12	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C13	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C14	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C15	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C16	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C17	Not assigned		
C18	Cer, (CC45CH1H050CY)	5pF, ±0.25pF, 50V	
C19	Cer, (CC45CH1H101JY)	100pF, ±5%, 50V	
C20	Not assigned		
C21	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C22	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C23	Not assigned		
C24	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C25	Not assigned		
C26	Cer, (CK45B1H102KY)	1000pF, ±10%, 50V	
C27	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C28	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C29	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C30	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C31	Var, Cer, (TZ03R200A)	20pF, ±0.05pF, 100V	
C32	Var, Cer, (TZ03R200A)	20pF, ±0.05pF, 100V	
C33	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C34	Cer, (CC92PH1H101JY)	100pF, ±5%, 50V	
C35	Var, Cer, (TZ03R200A)	20pF, ±0.05pF, 100V	
C36	Var, Cer, (TZ03R200A)	20pF, ±0.05pF, 100V	
C37	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C38	Cer, (CC92PH1H101JY)	100pF, ±5%, 50V	
C39	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C40	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C41	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C42	Not assigned		
C43	Not assigned		
C44	Not assigned		
C45	Not assigned		

( ): Manufacturer's part number 34W89580 1/12  
 \* : Selected at factory

Parts List : IF 7

CKT REF	DESCRIPTION	RATING	NOTE
C91	Cer, (CC924CH1H221J)	220pF, ±5%, 50V	QP Equipment
C92	Cer, (CC924CH1H221J)	220pF, ±5%, 50V	
C93	Not assigned		
C94	Plast, (ECCQ-V1H474JW)	0.47µF, ±5%, 50V	QP Equipment
C95	Elect, (CE04C1J100)	10µF, ±20%, 63V	QP Equipment
C96	Elect, (CE04C1J100)	10µF, ±20%, 63V	QP Equipment
C97	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	QP Equipment
C98	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	QP Equipment
C99	Cer, (CC45CH1H330JY)	33pF, ±5%, 50V	
C100	Cer, (CC45CK1H020C)	2pF, ±0.25pF, 50V	
C101	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C102	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C103	Cer, (CC45CH1H220JY)	22pF, ±5%, 50V	
C104	Not assigned		
C105	Cer, (CC45CH1H680JY)	68pF, ±5%, 50V	
C106	Cer, (CC924CH1H221J)	220pF, ±5%, 50V	
C107	Cer, (CC45CH1H560JY)	56pF, ±5%, 50V	
C108	Cer, (CC45CH1H090JY)	9pF, ±5%, 50V	
C109	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C110	Cer, (CC45CH1H090JY)	9pF, ±5%, 50V	
C111	Not assigned		
C112	Cer, (CC45CH1H090JY)	9pF, ±5%, 50V	
C113	Not assigned		
C114	Cer, (CC45CH1H090JY)	9pF, ±5%, 50V	
C115	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C116	Cer, (CC45CH1H560JY)	56pF, ±5%, 50V	
C117	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C118	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C119	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C120	Cer, (CC45CH1H300JY)	30pF, ±5%, 50V	
C121	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C122	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C123	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C124	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C125	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C126	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C127	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C128	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C129	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C130	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C131	Cer, (CC45CH1H101JY)	100pF, ±5%, 50V	
C132	Cer, (CC924CH1H331J)	330pF, ±5%, 50V	
C133	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C134	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C135	Elect, (CE04W1J010)	1µF, ±20%, 63V	

( ): Manufacturer's part number 34W89580 3/12  
 \* : Selected at factory

Parts List : IF 7

CKT REF	DESCRIPTION	RATING	NOTE
C46	Var, Cer, (TZ03R200A)	20pF, ±0.05pF, 100V	
C47	Var, Cer, (TZ03R200A)	20pF, ±0.05pF, 100V	
C48	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C49	Cer, (CC92PH1H101JY)	100pF, ±5%, 50V	
C50	Var, Cer, (TZ03R200A)	20pF, ±0.05pF, 100V	
C51	Var, Cer, (TZ03R200A)	20pF, ±0.05pF, 100V	
C52	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C53	Cer, (CC92PH1H101JY)	100pF, ±5%, 50V	
C54	Not assigned		
C55	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C56	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C57	Not assigned		
C58	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C59	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C60	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C61	Cer, (CC45CH1H100DY)	10pF, ±0.5pF, 50V	
C62	Not assigned		
C63	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C64	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C65	Not assigned		
C66	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C67	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C68	Cer, (CK924C1H103M)	0.01µF, ±20%, 50V	
C69	Cer, (CK924C1H103M)	0.01µF, ±20%, 50V	
C70	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C71	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C72	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C73	Cer, (CC45CH1H180JY)	18pF, ±5%, 50V	
C74	Cer, (CC45CH1H220JY)	22pF, ±5%, 50V	
C75	Cer, (CK924C1H103M)	0.01µF, ±20%, 50V	
C76	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C77	Cer, (CK45B1H102KY)	1000pF, ±10%, 50V	
C78	Not assigned		
C79	Cer, (CK924C1H103M)	0.01µF, ±20%, 50V	
C80	Cer, (CC924CH1H331J)	330pF, ±5%, 50V	
C81	Cer, (CC924CH1H331J)	330pF, ±5%, 50V	
C82	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C83	Not assigned		
C84	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C85	Elect, (CE04W1E221)	220µF, ±20%, 25V	
C86	Not assigned		
C87	Not assigned		
C88	Not assigned		
C89	Not assigned		
C90	Not assigned		

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CKT REF	DESCRIPTION	RATING	NOTE
C136	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C137	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C138	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C139	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C140	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C141	Cer, (CC45CH1H330JY)	33pF, ±5%, 50V	QP Equipment
C142	Cer, (CK45B1H102KY)	1000pF, ±10%, 50V	
C143	Elect, (CE04W1E221)	220µF, ±20%, 25V	
J 1	Connector, (27DP-LR-PC)		
J 2	Connector, (DF1-3P-2.5DSA)		
J 3	Connector, (U-SA1501)		
J 4	Not assigned		
J 5	Connector, (DF1-10P-2.5DSA)		
J 6	Plug, (008261-024200-870)		
J 7	Connector, (008261-033311-852)		
J 8	Plug, (008261-024200-870)		
J 9	Connector, (008261-033311-852)		
J 10	Plug, (008261-024200-870)		
J 11	Connector, (008261-033311-852)		
J 12	Plug, (008261-024200-870)		
J 13	Connector, (008261-033311-852)		
J 14	Plug, (008261-024200-870)		
J 15	Connector, (008261-033311-852)		
K 1	Relay, (SZ-2103)		
K 2	Relay, (SZ-2103)		
K 3	Relay, (SZ-2103)		
K 4	Relay, (SZ-2103)		
K 5	Relay, (SZ-2103)		

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CKT REF	DESCRIPTION	RATING	NOTE
L 1	Coil, (SP0408-4R7K)	4.7uH	
L 2	Coil, (10K17-45T)	158mH	
L 3	Coil, (10K)	5.46uH	
L 4	Coil, (10K)	2.0uH	(439T22960B)
L 5	Not assigned		
L 6	Coil, (10K17-45T)	158mH	
L 7	Coil, (SP0408-4R7K)	4.7uH	
L 8	Coil, (LF8-101K)	100uH	
L 9	Not assigned		
L10	Not assigned		
L11	Not assigned		
L12	Coil, (SP0408-2R2K)	2.2uH	
L13	Coil, (LF8-101K)	100uH	
L14	Coil, (LF8-101K)	100uH	
L15	Coil, (1)		
L16	Coil, (1)		
L17	Coil, (LF8-101K)	100uH	
L18	Coil, (LF8-101K)	100uH	
L19	Not assigned		
L20	Not assigned		
L21	Coil, (1)		
L22	Coil, (1)		
L23	Not assigned		
L24	Not assigned		
L25	Coil, (LF8-101K)	100uH	
L26	Coil, (LF8-101K)	100uH	
L27	Coil, (FS1012S-152K)	1.5mH	
L28	Coil, (LH1-471K)	470uH	
L29	Coil, (SP0408-R68K)	0.68uH	
L30	Coil, (SP0408-3R3K)	3.3uH	
Q 1	Di, (1S953)		
Q 2	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q 3	Tr, (2SC2901)		
Q 4	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q 5	Tr, (2SC2901)		
Q 6	Di, (1S953)		
Q 7	Not assigned		
Q 8	Not assigned		
Q 9	Tr, (2SC2901)		
Q10	IC, (7406)		
Q11	IC, (7406)		
Q12	Tr, (2SC943KL)		
Q13	IC, (TC4051BP)		

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CKT REF	DESCRIPTION	RATING	NOTE
Q14	Not assigned		
Q15	Di, (1S953)		
Q16	IC, (TC4051BP)		
Q17	Di, (1S953)		
Q18	IC, (7406)		
Q19	Di, (1S953)		
Q20	Tr, (2SC943K.L)		
Q21	Not assigned		
Q22	Not assigned		
Q23	IC, (TC4051BP)		
Q24	Di, (1S953)		
Q25	IC, (TC4051BP)		
Q26	Di, (1S953)		
Q27	IC, (TC4053BP)		
Q28	Not assigned		
Q29	Tr, (2SA1206)		
Q30	Tr, (2SC945)		
Q31	Tr, (2SC945)		
Q32	Tr, (2SC945)		
Q33	Di, (1S953)		
Q34	Di, (1S953)		
Q35	IC, (LM833N)		
Q36	IC, (LF356N)		
Q37	IC, (LM833N)		
Q38	IC, (TC4053BP)		
Q39	IC, (TC4051BP)		
Q40	IC, (TC4099BP)		
Q41	IC, (TC4099BP)		
Q42	Not assigned		
Q43	Not assigned		
Q44	Not assigned		
Q45	Not assigned		
Q46	IC, (TC4099BP)		
Q47	IC, (TC4099BP)		
Q48	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q49	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q50	Not assigned		
Q51	Tr, (2SC943KL)		
Q52	Tr, (2SA1206)		
Q53	Di, (1S953)		
Q54	Di, (1S953)		
Q55	Di, (1S953)		
Q56	Di, (1S953)		
Q57	Tr, (2SC1826S)		
Q58	Tr, (2SA1154)		

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CKT REF	DESCRIPTION	RATING	NOTE
Q59	Not assigned		
Q60	Not assigned		
Q61	IC, (CA3130T)		QP Equipment
Q62	Di, (1S953)		QP Equipment
Q63	IC, (LF356N)		QP Equipment
Q64	Not assigned		
Q65	IC, (TO4066BP)		QP Equipment
Q66	Not assigned		
Q67	IC, (uPC803C)		QP Equipment
Q68	IC, (uPA38A)		QP Equipment
Q69	IC, (LM833N)		QP Equipment
Q70	IC, (LF356N)		QP Equipment
Q71	Tr, (2SC943)		QP Equipment
Q72	Di, (1S953)		QP Equipment
Q73	Di, (1S953)		QP Equipment
R 1	Not assigned		
R 2	Not assigned		
R 3	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R 4	CF, (ARD25T123J)	12kΩ, ±5%, 1/4W	
R 5	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R 6	CF, (ARD25T151J)	150Ω, ±5%, 1/4W	
R 7	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R 8	CF, (ARD25T120J)	12Ω, ±5%, 1/4W	
R 9	CF, (ARD25T151J)	150Ω, ±5%, 1/4W	
R10	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R11	CF, (ARD25T120J)	12Ω, ±5%, 1/4W	
R12	Not assigned		
R13	CF, (ARD25T122J)	1.2kΩ, ±5%, 1/4W	
R14	Not assigned		
R15	Not assigned		
R16	MF, (RN14K2E1580D)	158Ω, ±0.5%, 1/4W	
R17	MF, (RN14K2E5490D)	549Ω, ±0.5%, 1/4W	
R18	CF, (ARD25T391J)	390Ω, ±5%, 1/4W	
R19	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R20	CF, (ARD25T104J)	100kΩ, ±5%, 1/4W	
R21	MF, (RN14K2E1240D)	124Ω, ±0.5%, 1/4W	
R22	MF, (RN14K2E5760D)	576Ω, ±0.5%, 1/4W	
R23	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R24	CF, (ARD25T101J)	100Ω, ±5%, 1/4W	
R25	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R26	CF, (ARD25T820J)	82Ω, ±5%, 1/4W	
R27	CF, (ARD25T750J)	75Ω, ±5%, 1/4W	
R28	MF, (RN14K2E1331D)	1.33kΩ, ±0.5%, 1/4W	
R29	MF, (RN14K2E6040D)	604Ω, ±0.5%, 1/4W	
R30	MF, (RN14K2E3570D)	357Ω, ±0.5%, 1/4W	

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CKT REF	DESCRIPTION	RATING	NOTE
R31	MF, (RN14K2E2210D)	220Ω, ±0.5%, 1/4W	
R32	Not assigned		
R33	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R34	MF, (RN14K2E1000D)	1000Ω, ±0.5%, 1/4W	
R35	CF, (ARD25T392J)	3.9kΩ, ±5%, 1/4W	
R36	CF, (ARD25T822J)	8.2kΩ, ±5%, 1/4W	
R37	Not assigned		
R38	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R39	CF, (ARD25T471J)	470Ω, ±5%, 1/4W	
R40	CF, (ARD25T471J)	470Ω, ±5%, 1/4W	
R41	MF, (RN14K2E1822D)	18.2kΩ, ±0.5%, 1/4W	
R42	CF, (ARD25T121J)	120Ω, ±5%, 1/4W	
R43	CF, (ARD25T153J)	15kΩ, ±5%, 1/4W	
R44	Not assigned		
R45	MF, (RN14K2E1822D)	18.2kΩ, ±0.5%, 1/4W	
R46	CF, (ARD25T121J)	120Ω, ±5%, 1/4W	
R47	CF, (ARD25T153J)	15kΩ, ±5%, 1/4W	
R48	Not assigned		
R49	Var, MF, (RJ-6P 500Ω)	500Ω, 1/2W	
R50	Var, MF, (RJ-6P 500Ω)	500Ω, 1/2W	
R51	Var, MF, (RJ-6P 500Ω)	500Ω, 1/2W	
R52	Var, MF, (RJ-6P 1kΩ)	1kΩ, 1/2W	
R53	Var, MF, (RJ-6P 1kΩ)	1kΩ, 1/2W	
R54	Not assigned		
R55	Not assigned		
R56	Not assigned		
R57	Not assigned		
R58	Not assigned		
R59	MF, (RN14K2E1822D)	18.2kΩ, ±0.5%, 1/4W	
R60	CF, (ARD25T121J)	120Ω, ±5%, 1/4W	
R61	CF, (ARD25T153J)	15kΩ, ±5%, 1/4W	
R62	Not assigned		
R63	MF, (RN14K2E1822D)	18.2kΩ, ±0.5%, 1/4W	
R64	CF, (ARD25T121J)	120Ω, ±5%, 1/4W	
R65	CF, (ARD25T153J)	15kΩ, ±5%, 1/4W	
R66	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R67	Not assigned		
R68	Not assigned		
R69	Not assigned		
R70	Not assigned		
R71	Not assigned		
R72	CF, (ARD25T822J)	8.2kΩ, ±5%, 1/4W	
R73	CF, (ARD25T153J)	15kΩ, ±5%, 1/4W	
R74	Var, MF, (RJ-6P 100Ω)	100Ω, 1/2W	
R75	Not assigned		

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CKT REF	DESCRIPTION	RATING	NOTE
R76	MF, (RN14K2E1500D)	150Ω, ±0.5%, 1/4W	
R77	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R78	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R79	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R80	Not assigned		
R81	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R82	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R83	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R84	CF, (ARD25T272J)	2.7kΩ, ±5%, 1/4W	
R85	CF, (ARD25T152J)	1.5kΩ, ±5%, 1/4W	
R86	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R87	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R88	CF, (ARD25T471J)	470Ω, ±5%, 1/4W	
R89	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R90	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R91	CF, (ARD25T822J)	8.2kΩ, ±5%, 1/4W	
R92	Var, MF, (RJ-6P 5kΩ)	5kΩ, 1/2W	
R93	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R94	CF, (ARD25T561J)	560Ω, ±5%, 1/4W	
R95	CF, (ARD25T154J)	150kΩ, ±5%, 1/4W	
R96	Not assigned		
R97	Var, MF, (RJ-6P 5kΩ)	5kΩ, 1/2W	
R98	Var, MF, (RJ-6P 5kΩ)	5kΩ, 1/2W	
R99	Not assigned		
R100	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R101	Var, MF, (RJ-6P 1kΩ)	1kΩ, 1/2W	
R102	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R103	CF, (ARD25T822J)	8.2kΩ, ±5%, 1/4W	
R104	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R105	CF, (ARD25T181J)	180Ω, ±5%, 1/4W	
R106	CF, (ARD25T181J)	180Ω, ±5%, 1/4W	
R107	CF, (ARD25T821J)	820Ω, ±5%, 1/4W	
R108	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R109	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R110	Not assigned		
R111	CF, (ARD25T681J)	680Ω, ±5%, 1/4W	QP Equipment
R112	CF, (ARD25T681J)	680Ω, ±5%, 1/4W	QP Equipment
R113	Not assigned		
R114	Not assigned		
R115	Not assigned		
R116	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	QP Equipment
R117	CF, (ARD25T274J)	270kΩ, ±5%, 1/4W	QP Equipment
R118	CF, (ARD25T684J)	680kΩ, ±5%, 1/4W	QP Equipment
R119	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	QP Equipment
R120	MF, (RN14K2E2872D)	28.7kΩ, ±0.5%, 1/4W	QP Equipment

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CKT REF	DESCRIPTION	RATING	NOTE
R121	MF, (RN14K2E1152D)	11.5kΩ, ±0.5%, 1/4W	
R122	MF, (RN14K2E1152D)	11.5kΩ, ±0.5%, 1/4W	
R123	MF, (RN14K2E2872D)	28.7kΩ, ±0.5%, 1/4W	
R124	MF, (RN14K2E3651D)	3.65kΩ, ±0.5%, 1/4W	QP Equipment
R125	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	QP Equipment
R126	Not assigned		
R127	Var, MF, (RJ-6P 500kΩ)	500kΩ, 1/2W	QP Equipment
R128	CF, (ARD25T224J)	220kΩ, ±5%, 1/4W	QP Equipment
R129	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	QP Equipment
R130	MF, (LPI/8 68ΩT54)	68Ω, ±5%, 1/8W	QP Equipment
R131	MF, (RN14K2E7680D)	768Ω, ±0.5%, 1/4W	QP Equipment
R132	CF, (ARD25T330J)	33Ω, ±5%, 1/4W	
R133	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R134	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R135	Not assigned		
R136	CF, (ARD25T330J)	33Ω, ±5%, 1/4W	
R137	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R138	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R139	CF, (ARD25T510J)	51Ω, ±5%, 1/4W	
R140	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R141	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R142	Not assigned		
R143	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R144	Not assigned		
R145	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R146	CF, (ARD25T391J)	390Ω, ±5%, 1/4W	
R147	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R148	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R149	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R150	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R151	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R152	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R153	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R154	CF, (ARD25T152J)	1.5kΩ, ±5%, 1/4W	
R155	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R156	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R157	CF, (ARD25T510J)	51Ω, ±5%, 1/4W	
R158	CF, (ARD25T750J)	75Ω, ±5%, 1/4W	
R159	CF, (ARD25T561J)	560Ω, ±5%, 1/4W	
R160	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R161	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R162	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R163	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R164	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R165	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	

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CKT REF	DESCRIPTION	RATING	NOTE
R166	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R167	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R168	CF, (ARD25T181J)	180Ω, ±5%, 1/4W	
R169	CF, (ARD25T223J)	22kΩ, ±5%, 1/4W	QP Equipment
R170	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	QP Equipment
R171	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	QP Equipment
R172	Var, MF, (RJ-6P 1kΩ)	1kΩ, 1/2W	QP Equipment
R173	CF, (ARD25T223J)	22kΩ, ±5%, 1/4W	QP Equipment
R174	CF, (ARD25T681J)	680Ω, ±5%, 1/4W	QP Equipment
R175	CF, (ARD25T473J)	47kΩ, ±5%, 1/4W	QP Equipment
R176	Var, MF, (RJ-6P 500kΩ)	500kΩ, 1/2W	QP Equipment
R177	Not assigned		
R178	Var, MF, (RJ-6P 500kΩ)	500kΩ, 1/2W	QP Equipment
R179	CF, (ARD25T473J)	47kΩ, ±5%, 1/4W	QP Equipment
R180	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	QP Equipment
R181	CF, (ARD25T473J)	47kΩ, ±5%, 1/4W	QP Equipment
R182	CF, (ARD25T471J)	470Ω, ±5%, 1/4W	QP Equipment
R183	Var, MF, (RJ-6P 1kΩ)	1kΩ, 1/2W	QP Equipment
R184	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	QP Equipment
R185	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	QP Equipment
R186	Var, MF, (RJ-6P 20kΩ)	20kΩ, 1/2W	QP Equipment
R187	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	QP Equipment
X 1	XTAL OSC, (3.5MHz)		
X 2	XTAL OSC, (3.5MHz)		
X 3	XTAL OSC, (3.5MHz)		
X 4	XTAL OSC, (3.5MHz)		
Z 1	MIXER, (M-8)		
Z 2	HYB, (MT05)		
Z 3	HYB, (MT05)		
Z 4	HYB, (MT04)		
Z 5	Not assigned		
Z 6	HYB, (MT03)		
Z 7	HYB, (MT02)		
Z 8	HYB, (MT03)		
Z 9	HYB, (MT02)		
Z 10	HYB, (MT04)		
Z 11	Not assigned		
Z 12	HYB, (MT03)		
Z 13	HYB, (MT02)		
Z 14	HYB, (MT03)		
Z 15	HYB, (MT02)		

( ): Manufacturer's part number 34W89580 11/12  
 \* : Selected at factory

Parts List : IF 7

CKT REF	DESCRIPTION	RATING	NOTE
Z16	HYB, (MT06)		
Z17	HYB, (MT07A)		
Z18	HYB, (MT07B)		
Z19	HYB, (MT07C)		
Z20	Not assigned		
Z21	TD308A, (24.9MHz)		

( ): Manufacturer's part number 34W89580 12/12  
 \* : Selected at factory



Parts List : SCAN & CPU 10

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (CC924CH1H221J)	220pF, ±5%, 50V	
C 2	Elect, (CE04W1J220)	22µF, ±20%, 63V	
C 3	Elect, (CE04W1E101)	100µF, ±20%, 25V	
C 4	M Plast, (CF922N2A224K)	0.22µF, ±10%, 100V	
C 5	Cer, (CK924C1H103M)	0.01µF, ±20%, 50V	
C 6	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 7	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 8	M Plast, (CF922N2A105K)	1µF, ±10%, 100V	
C 9	Cer, (CK45D1H472MY)	4700pF, ±20%, 50V	
C10	Cer, (CK45D1H472MY)	4700pF, ±20%, 50V	
C11	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C12	Elect, (CE04W1J220)	22µF, ±20%, 63V	
C13	Cer, (CK924C1H103M)	0.01µF, ±20%, 50V	
C14	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C15	Cer, (CC45CH1H270JY)	27pF, ±5%, 50V	
C16	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C17	Elect, (CE04W1E101)	100µF, ±20%, 25V	
C18	Elect, (BE04W1E101)	100µF, ±20%, 25V	
C19	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C20	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C21	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C22	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C23	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C24	Cer, (CC924CH1H221J)	220pF, ±5%, 50V	
C25	Not assigned		
C26	Not assigned		
C27	Not assigned		
C28	Not assigned		
C29	Not assigned		
C30	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C31	Elect, (CE04W1J4R7)	4.7µF, ±20%, 63V	
C32	Cer, (CC45CH1H470JY)	47pF, ±5%, 50V	
C33	Cer, (CC45CH1H470JY)	47pF, ±5%, 50V	
C34	Elect, (CE04W1J010)	1µF, ±20%, 63V	
C35	Cer, (CC45CH1H101JY)	100pF, ±5%, 50V	
C36	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C37	Not assigned		
C38	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C39	Cer, (RPE131C333K50)	0.033µF, ±10%, 50V	
C40	Elect, (CE04W1E101)	100µF, ±20%, 25V	
C41 to C52	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	

( ): Manufacturer's part number 34W89584 1/8  
\* : Selected at factory

Parts List : SCAN & CPU 10

CKT REF	DESCRIPTION	RATING	NOTE
C53	Cer, (CC924CH1H331J)	330pF, ±5%, 50V	
C54	Cer, (CC924CH1H331J)	330pF, ±5%, 50V	
C55	Cer, (CC924CH1H331J)	330pF, ±5%, 50V	
C56	Cer, (CK924C1H222M)	2200pF, ±20%, 50V	
C57	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C58	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C59	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C60	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
J 1	Connector, (DF1-15P2.5DS)		
J 2	Not assigned		
J 3	Connector, (U-PA1519)		
J 4	Not assigned		
J 5	Connector, (DF1-10P2.5DS)		
J 6	Connector, (DF1-10P2.5DS)		
J 7	Connector, (27DP-LR-PC)		
J 8	Not assigned		
J 9	Not assigned		
J10	Not assigned		
J11	Not assigned		
J12	Not assigned		
J13	Connector, (HIF3-40P-2.54DS)		
J14	Connector, (DF1-20P2.5DS)		
J15	Connector, (DF1-5P2.5DS)		
J16	Connector, (27DP-LR-PC)		
J17	Connector, (DF1-8P2.5DS)		
Q 1	Not assigned		
Q 2	IC, (µPA56C)		
Q 3	IC, (µPA64H)		
Q 4	IC, (µPA67C)		
Q 5	Di, breakdown, (RD6.2EB)	5.8 to 6.6V, 400mW	
Q 6	IC, (TC4099BP)		
Q 7	IC, (TC4099BP)		
Q 8	IC, (TC4099BP)		
Q 9	IC, (TC4099BP)		
Q10	Not assigned		

( ): Manufacturer's part number 34W89584 2/8  
\* : Selected at factory

Parts List : SCAN & CPU 10

CKT REF	DESCRIPTION	RATING	NOTE
Q11	Not assigned		
Q12	Not assigned		
Q13	Not assigned		
Q14	IC, (TC40H042P)		
Q15	IC, (LM833N)		
Q16	Not assigned		
Q17	Not assigned		
Q18	Not assigned		
Q19	Not assigned		
Q20	Di, (1S953)		
Q21	Di, (1SS97)		
Q22	Di, (1SS149 (H))		
Q23	IC, (µPC803C)		
Q24	Not assigned		
Q25	IC, (TC4053BP)		
Q26	Not assigned		
Q27	Not assigned		
Q28	Not assigned		
Q29	IC, (LM833N)		
Q30	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q31	IC, (LM833N)		
Q32	Di, (1S953)		
Q33	IC, (TC40H273P)		
Q34	IC, (µPC624C)		
Q35	Di, breakdown, (1S252)	5.9 to 6.5V, 250mW	
Q36	IC, (µPC803C)		
Q37	IC, (LM833N)		
Q38	Di, (1S953)		
Q39	IC, (µPC272C)		
Q40	IC, (TC4011BP)		
Q41	IC, (TC4013BP)		
Q42	IC, (TC4011BP)		
Q43	IC, (TC4013BP)		
Q44	IC, (TC4011BP)		
Q45	IC, (TC4011BP)		
Q46	Di, (1S953)		
Q47	Not assigned		
Q48	IC, (LM833N)		
Q49	Not assigned		
Q50	IC, (LM833N)		
Q51	Not assigned		
Q52	IC, (TC40H273P)		
Q53	IC, (µPC624C)		
Q54	IC, (LM833N)		
Q55	IC, (TC4053BP)		
Q56	IC, (TC4051BP)		
Q57	IC, (TC4053BP)		
Q58	IC, (TC4066BP)		
Q59	IC, (TC4053BP)		

( ): Manufacturer's part number 34W89584 3/8  
\* : Selected at factory

Parts List : SCAN & CPU 10

CKT REF	DESCRIPTION	RATING	NOTE
Q60	Tr, (2SA1206)		
Q61	Not assigned		
Q62	Not assigned		
Q63	Not assigned		
Q64	Not assigned		
Q65	Not assigned		
Q66	Not assigned		
Q67	Not assigned		
Q68	Not assigned		
Q69	Not assigned		
Q70	Not assigned		
Q71	IC, (TC4013BP)		
Q72	IC, (TC4013BP)		
Q73	IC, (TC4013BP)		
Q74	IC, (TC4013BP)		
Q75	IC, (TC4532BP)		
Q76	IC, (TC4028BP)		
Q77	IC, (MSM80C85)		
Q78	IC, (PST518A)		
Q79	IC, (TC40H004P)		
Q80	IC, (TC40H155P)		
Q81	IC, (TC40H373P)		
Q82	IC, (TC40H373P)		
Q83	IC, (HN482764)		
Q84	IC, (TC40H138P)		
Q85	IC, (MSM81C55RS)		
Q86	IC, (MSM81C55RS)		
Q87	IC, (TC4047BP)		
Q88	IC, (HN462732G)		
Q89	IC, (HN462732G)		
Q90	IC, (TC4013BP)		
Q91	IC, (µPD7002C)		
Q92	Not assigned		
Q93	IC, (TC40H000P)		
Q94	IC, (TC40H390P)		
Q95	IC, (TC40H004P)		
Q96	IC, (TC40H004P)		
Q97	IC, (TC4011BP)		
Q98	IC, (MSM82C53RS)		
Q99	IC, (7403)		
R 1	CF, (ARD25T680J)	68Ω, ±5%, 1/4W	
R 2	CF, (ARD25T680J)	68Ω, ±5%, 1/4W	
R 3	CF, (ARD25T680J)	68Ω, ±5%, 1/4W	
R 4	CF, (ARD25T392J)	3.9kΩ, ±5%, 1/4W	
R 5	CF, (ARD25T392J)	3.9kΩ, ±5%, 1/4W	

( ): Manufacturer's part number 34W89584 4/8  
\* : Selected at factory



CKT REF	DESCRIPTION	RATING	NOTE
R 6	CF, (ARD25T392J)	3.9kΩ, ±5%, 1/4W	
R 7	MF, (RN14K2E2211D)	2.21kΩ, ±0.5%, 1/4W	
R 8	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R 9	MF, (RN14K2E2211D)	2.21kΩ, ±0.5%, 1/4W	
R10	MF, (RN14K2E2212D)	22.1kΩ, ±0.5%, 1/4W	
R11	MF, (RN14K2E3012D)	30.1kΩ, ±0.5%, 1/4W	
R12	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R13	MF, (RN14K2E2212D)	22.1kΩ, ±0.5%, 1/4W	
R14	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R15	Not assigned		
R16	Var, MF, (RJ-6S 10kΩ)	10kΩ, 1/2W	
R17	Not assigned		
R18	Var, MF, (RJ-6S 5kΩ)	5kΩ, 1/2W	
R19	CF, (ARD25T182J)	1.8kΩ, ±5%, 1/4W	
R20	CF, (ARD25T392J)	3.9kΩ, ±5%, 1/4W	
R21	Var, MF, (RJ-6S 2kΩ)	2kΩ, 1/2W	
R22	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R23	CF, (ARD25T105J)	1MΩ, ±5%, 1/4W	
R24	CF, (ARD25T150J)	150Ω, ±5%, 1/4W	
R25	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R26	CF, (ARD25T101J)	100Ω, ±5%, 1/4W	
R27	CF, (ARD25T333J)	33kΩ, ±5%, 1/4W	
R28	CF, (ARD25T122J)	1.2kΩ, ±5%, 1/4W	
R29	CF, (ARD25T183J)	18kΩ, ±5%, 1/4W	
R30	Not assigned		
R31	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R32	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R33	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R34	CF, (ARD25T561J)	560Ω, ±5%, 1/4W	
R35	MF, (RN14K2E2871D)	2.87kΩ, ±0.5%, 1/4W	
R36	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R37	CF, (ARD25T824J)	820kΩ, ±5%, 1/4W	
R38	CF, (ARD25T334J)	330kΩ, ±5%, 1/4W	
R39	MF, (RN14K2E3651D)	3.65kΩ, ±0.5%, 1/4W	
R40	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R41	CF, (ARD25T272J)	2.7kΩ, ±5%, 1/4W	
R42	Not assigned		
R43	Not assigned		
R44	CF, (ARD25T271J)	270Ω, ±5%, 1/4W	
R45	Not assigned		
R46	Var, MF, (RJ-6S 10kΩ)	10kΩ, 1/2W	
R47	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R48	Not assigned		
R49	Not assigned		
R50	Var, MF, (RJ-6S 5kΩ)	5kΩ, 1/2W	

( ): Manufacturer's part number 34W89584 5/8  
 \* : Selected at factory

CKT REF	DESCRIPTION	RATING	NOTE
R51	Not assigned		
R52	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R53	CF, (ARD25T182J)	1.8kΩ, ±5%, 1/4W	
R54	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R55	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R56	CF, (ARD25T471J)	470Ω, ±5%, 1/4W	
R57	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R58	MF, (RN14K2E4021D)	4.02kΩ, ±0.5%, 1/4W	
R59	MF, (RN14K2E2001D)	2.00kΩ, ±0.5%, 1/4W	
R60	MF, (RN14K2E2001D)	2.00kΩ, ±0.5%, 1/4W	
R61	MF, (RN14K2E9091D)	9.09kΩ, ±0.5%, 1/4W	
R62	MF, (RN14K2E9090D)	909Ω, ±0.5%, 1/4W	
R63	MF, (RN14K2E9099D)	90.9Ω, ±0.5%, 1/4W	
R64	MF, (RN14K2E10R0D)	10.0Ω, ±0.5%, 1/4W	
R65	Not assigned		
R66	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R67	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R68	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R69	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R70	CF, (ARD25T122J)	1.2kΩ, ±5%, 1/4W	
R71	CF, (ARD25T753J)	75kΩ, ±5%, 1/4W	
R72	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R73	CF, (ARD25T272J)	2.7kΩ, ±5%, 1/4W	
R74	CF, (ARD25T153J)	15kΩ, ±5%, 1/4W	
R75	CF, (ARD25T151J)	150Ω, ±5%, 1/4W	
R76	CF, (ARD25T333J)	33kΩ, ±5%, 1/4W	
R77	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R78	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R79	CF, (ARD25T122J)	1.2kΩ, ±5%, 1/4W	
R80	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R81	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R82	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R83	Not assigned		
R84	CF, (ARD25T122J)	1.2kΩ, ±5%, 1/4W	
R85	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R86	CF, (ARD25T392J)	3.9kΩ, ±5%, 1/4W	
R87	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R88	CF, (ARD25T123J)	12kΩ, ±5%, 1/4W	
R89	CF, (ARD25T560J)	56Ω, ±5%, 1/4W	
R90	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R91	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R92	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R93	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R94	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R95	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	

( ): Manufacturer's part number 34W89584 6/8  
 \* : Selected at factory

CKT REF	DESCRIPTION	RATING	NOTE
R96	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R97	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R98	Var, MF, (RJ-6S 5kΩ)	5kΩ, 1/2W	
R99	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R100	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R101	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R102	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R103	CF, (ARD25T121J)	120Ω, ±5%, 1/4W	
R104	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R105	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R106	CF, (ARD25T272J)	2.7kΩ, ±5%, 1/4W	
R107	CF, (ARD25T561J)	560Ω, ±5%, 1/4W	
R108	CF, (ARD25T223J)	22kΩ, ±5%, 1/4W	
R109	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R110 to R120	Not assigned		
R121	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R122	Single in-line array, (IHR-8-332JA)	3.3kΩ x 8, 1/8W	
R123	Single in-line array, (IHR-8-332JA)	3.3kΩ x 8, 1/8W	
R124	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R125	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R126	MF, (RN14K2E1211D)	1.21kΩ, ±0.5%, 1/4W	
R127	Not assigned		
R128	MF, (RN14K2E1001D)	1.00kΩ, ±0.5%, 1/4W	
R129	MF, (RN14K2E4751D)	4.75kΩ, ±0.5%, 1/4W	
R130	Not assigned		
R131	MF, (RN14K2E4991D)	4.99kΩ, ±0.5%, 1/4W	
R132	Var, MF, (RJ-6S 5kΩ)	5kΩ, 1/2W	
R133	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R134	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R135	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R136	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R137	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R138	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R139	MF, (RN14K2E2051D)	2.05kΩ, ±0.5%, 1/4W	
R140	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R141	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R142	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R143	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R144	Not assigned		
R145	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R146	CF, (ARD25T104J)	100kΩ, ±5%, 1/4W	

( ): Manufacturer's part number 34W89584 7/8  
 \* : Selected at factory

CKT REF	DESCRIPTION	RATING	NOTE
X 1	LN-X-0008, (4.000MHz)		

( ): Manufacturer's part number 34W89584 8/8  
 \* : Selected at factory



CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 2	Cer, (CC45CH1H220JY)	22pF, ±5%, 50V	
C 3	Cer, (DE-1710R222K3KV)	2200pF, ±10%, 3KV	
C 4	Cer, (CC45CH1H101JY)	100pF, ±5%, 50V	
C 5	Cer, (DE-1710R222K3KV)	2200pF, ±10%, 3KV	
C 6	M Plast, (CF922N2E104K)	0.1µF, ±10%, 100V	
C 7	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 8	Cer, (CK924C1H223M)	0.022µF, ±20%, 50V	
C 9	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C10	Cer, (CK924C1H223M)	0.022µF, ±20%, 50V	
C11	Elect, (KX100VB3R3)	3.3µF, ±20%, 100V	
C12	Elect, (KX100VB3R3)	3.3µF, ±20%, 100V	
C13	Elect, (KX100VB3R3)	3.3µF, ±20%, 100V	
C14	Elect, (KX100VB3R3)	3.3µF, ±20%, 100V	
C15	Plast, (ECQ-M1H103KZ)	0.01µF, ±10%, 50V	
C16	Cer, (DE1710R472K1KV)	4700pF, ±10%, 1KV	
C17	Cer, (DE1710R472K1KV)	4700pF, ±10%, 1KV	
C18	Cer, (DE1710R222K3KV)	2200pF, ±10%, 3KV	
C19	Cer, (DE1710R472K1KV)	4700pF, ±10%, 1KV	
C20	Cer, (DE1710R222K3KV)	2200pF, ±10%, 3KV	
C21	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C22	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C23	Elect, (CE04W1E101)	100µF, ±20%, 25V	
C24	Elect, (CE04W1E101)	100µF, ±20%, 25V	
J 1	Connector, (DF1-10P-2.5DSA)		
J 2	Connector, (DF1-3P-2.5DSA)		
J 3	Connector, (DF1-15P-2.5DSA)		
J 4	Connector, (DF1-3P-2.5DSA)		
J 5	Connector, (DF1-8P-2.5DSA)		
L 1	Coil, (LH1-471K)	470µH	
L 2	Coil, (LH1-471K)	470µH	

( ): Manufacturer's part number  
\* : Selected at factory

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CKT REF	DESCRIPTION	RATING	NOTE
Q 1	IC, (7406)		
Q 2	Di, (1S953)		
Q 3	Di, (1S953)		
Q 4	Not assigned		
Q 5	Tr, (2SC2718)		
Q 6	Tr, (2SC2718)		
Q 7	Photo coupler, (PS2006B)		
Q 8	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q 9	Tr, (2SA845H)		
Q10	Tr, (2SA845H)		
Q11	Tr, (2SA845H)		
Q12	Tr, (2SA845H)		
Q13	Tr, (2SA845H)		
Q14	Tr, (2SA845H)		
Q15	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q16	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q17	Tr, (2SA1151)		
Q18	Tr, (2SC2718)		
Q19	Tr, (2SC2718)		
Q20	Tr, (2SC1279S)		
Q21	Tr, (2SC1279S)		
Q22	IC, (µPA39A)		
Q23	Tr, (2SC1279S)		
Q24	Tr, (2SC1279S)		
Q25	Tr, (2SC1279S)		
Q26	Tr, (2SC1279S)		
Q27	Tr, (2SC1279S)		
Q28	IC, (µPA39A)		
Q29	Not assigned		
Q30	Tr, (2SC1279S)		
Q31	Tr, (2SC1279S)		
Q32	Di, (1S953)		
Q33	Di, (1S953)		
Q34	Di, (V19E)		
Q35	Di, (V19E)		
Q36	Di, (V19E)		
Q37	Di, (V19E)		
Q38	Di, (ES01F)		
Q39	Di, (ES01F)		
Q40	Di, (ES01F)		
Q41	Rectifier, (MSL4532)		
Q42	Tr, (2SD568)		
Q43	Tr, (2SD568)		
Q44	Tr, (2SA1151)		
Q45	IC, (µPCL4312)	+12V	

( ): Manufacturer's part number  
\* : Selected at factory

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CKT REF	DESCRIPTION	RATING	NOTE
Q46	IC, (µPC16312)	-12V	
Q47	Tr, (2SA1206)		
R 1	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R 2	CF, (ARD25T123J)	12kΩ, ±5%, 1/4W	
R 3	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R 4	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R 5	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R 6	CF, (ARD25T473J)	47kΩ, ±5%, 1/4W	
R 7	Not assigned		
R 8	CF, (ARD25T562J)	5.6kΩ, ±5%, 1/4W	
R 9	CF, (ARD25T153J)	15kΩ, ±5%, 1/4W	
R10	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R11	Var, MF, (RJ-6P 1kΩ)	1kΩ, 1/2W	
R12	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R13	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R14	CF, (ARD25T471J)	470Ω, ±5%, 1/4W	
R15	CF, (ARD25T153J)	15kΩ, ±5%, 1/4W	
R16	CF, (ARD25T104J)	100kΩ, ±5%, 1/4W	
R17	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R18	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R19	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R20	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R21	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R22	MF, (RH1HVS 2.4MΩ)	2.4MΩ, ±5%, 1W	
R23	Var, MF, (RJ-6P 500kΩ)	500kΩ, 1/2W	
R24	MF, (RH2HVS 1.5MΩ)	1.5MΩ, ±5%, 2W	
R25	MF, (RH1HVS 1.2MΩ)	1.2MΩ, ±5%, 1W	
R26	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R27	Var, MF, (RJ-6P 2kΩ)	2kΩ, 1/2W	
R28	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R29	CF, (ARD25T105J)	1MΩ, ±5%, 1/4W	
R30	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R31	CF, (ARD25T104J)	100kΩ, ±5%, 1/4W	
R32	CF, (ARD25T563J)	56kΩ, ±5%, 1/4W	
R33	Var, MF, (RJ-6P 5kΩ)	5kΩ, 1/2W	
R34	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R35	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R36	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R37	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R38	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R39	CF, (ARD25T223J)	22kΩ, ±5%, 1/4W	
R40	Var, MF, (RJ-6P 1kΩ)	1kΩ, 1/2W	

( ): Manufacturer's part number  
\* : Selected at factory

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CKT REF	DESCRIPTION	RATING	NOTE
R41	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R42	CF, (ARD25T563J)	56kΩ, ±5%, 1/4W	
R43	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R44	CF, (ARD25T105J)	1MΩ, ±5%, 1/4W	
R45	CF, (ARD25T104J)	100kΩ, ±5%, 1/4W	
R46	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R47	CF, (ARD25T272J)	2.7kΩ, ±5%, 1/4W	
R48	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R49	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R50	CF, (ARD25T272J)	2.7kΩ, ±5%, 1/4W	
R51	CF, (ARD25T105J)	1MΩ, ±5%, 1/4W	
R52	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R53	CF, (ARD25T154J)	150kΩ, ±5%, 1/4W	
R54	CF, (ARD25T823J)	82kΩ, ±5%, 1/4W	
R55	Var, MF, (RJ-6P 5kΩ)	5kΩ, 1/2W	
R56	CF, (ARD25T152J)	1.5kΩ, ±5%, 1/4W	
R57	CF, (ARD25T821J)	820Ω, ±5%, 1/4W	
R58	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R59	CF, (ARD25T152J)	1.5kΩ, ±5%, 1/4W	
R60	CF, (ARD25T821J)	820Ω, ±5%, 1/4W	
R61	CF, (ARD25T473J)	47kΩ, ±5%, 1/4W	
R62	Var, MF, (RJ-6P 1kΩ)	1kΩ, 1/2W	
R63	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R64	CF, (ARD25T823J)	82kΩ, ±5%, 1/4W	
R65	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R66	CF, (ARD25T105J)	1MΩ, ±5%, 1/4W	
R67	CF, (ARD25T154J)	150kΩ, ±5%, 1/4W	
R68	Var, MF, (RJ-6P 100kΩ)	100kΩ, 1/2W	
R69	Var, MF, (RJ-6P 100kΩ)	100kΩ, 1/2W	
R70	CF, (ARD25T123J)	12kΩ, ±5%, 1/4W	
R71	CF, (ARD25T123J)	12kΩ, ±5%, 1/4W	
R72	MF, (RS1FB 560Ω)	560Ω, ±5%, 1W	
R73	MF, (RS1FB 560Ω)	560Ω, ±5%, 1W	
R74	CF, (ARD25T471J)	470Ω, ±5%, 1/4W	
R75	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R76	CF, (ARD25T224J)	220kΩ, ±5%, 1/4W	
R77	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R78	Not assigned		
R79	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R80	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R81	CF, (ARD25T821J)	820Ω, ±5%, 1/4W	
R82	CF, (ARD25T561J)	560Ω, ±5%, 1/4W	
R83	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
R84	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R85	CF, (ARD25T333J)	33kΩ, ±5%, 1/4W	

( ): Manufacturer's part number  
\* : Selected at factory

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Parts List : CRT DRIVE 12

CKT REF	DESCRIPTION	RATING	NOTE
R86	CF, (ARD25T183J)	18kΩ, ±5%, 1/4W	
R87	CF, (ARD222J)	2.2kΩ, ±5%, 1/4W	
R88	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R89	CF, (ARD25T682J)	6.8kΩ, ±5%, 1/4W	
T 1	Trans, (439T23524)		

( ): Manufacturer's part number  
 \* : Selected at factory

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Parts List : YTO DRIVE 14

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Not assigned		
C 2	Elect, (CE04W1J220)	22μF, ±20%, 63V	
C 3	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 4	Elect, (SM16VB220)	220μF, ±20%, 16V	
C 5	Cer, (CK924C1H223M)	0.022μF, ±20%, 50V	
C 6	Elect, (CE04W1E101)	100μF, ±20%, 25V	
C 7	Tant, (CS-E1C220M)	22μF, ±20%, 16V	
C 8	Cer, (CK45D1H472MY)	4700pF, ±20%, 50V	
C 9	Tant, (CS-E1A4R7M)	4.7μF, ±20%, 10V	
C10	Elect, (CE04W1E101)	100μF, ±20%, 25V	
C11	Elect, (CE02W1E471)	470μF, ±20%, 25V	
C12	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C13	Elect, (CE04W1J220)	22μF, ±20%, 63V	
C14	Elect, (CE04W1J010)	1μF, ±20%, 63V	
C15	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C16	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C17	Elect, (CE04W1E101)	100μF, ±20%, 25V	
C18	Cer, (CC924CH1H331J)	330pF, ±5%, 50V	
C19	Cer, (CK45B1H102KY)	1000pF, ±10%, 50V	
C20	Cer, (CK45B1H102KY)	1000pF, ±10%, 50V	
C21	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
J 1	Not assigned		
J 2	Connector, (DF1-8P-2.5DSA)		
J 3	Connector, (27DP-LR-PC)		
J 4	Connector, (DF1-8P-2.5DSA)		
J 5	Connector, (DF1-10P-2.5DSA)		
J 6	Connector, (27DP-LR-PC)		
K 1	Relay, (SZ-2103)		
L 1	Coil, (LP8-101K)	100LH	
L 2	Coil, (LP8-101K)	100LH	

( ): Manufacturer's part number  
 \* : Selected at factory

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Parts List YTO DRIVE 14

CKT REF	DESCRIPTION	RATING	NOTE
Q 1	IC, (LM833N)		
Q 2	Not assigned		
Q 3	Tr, (2SC1826S)		
Q 4	IC, (LM833N)		
Q 5	Tr, (2SC2901)		
Q 6	Di, breakdown, (1S253)		
Q 7	IC, (uPC4570C)		
Q 8	Tr, (2SA1206)		
Q 9	Tr, (2SC1826S)		
Q10	Di, (1S2222)		
Q11	Di, (1S953)		
Q12	Not assigned		
Q13	Not assigned		
Q14	Not assigned		
Q15	Not assigned		
Q16	IC, (HI201)		
Q17	Di, breakdown, (1S253)		
R 1	Not assigned		
R 2	Not assigned		
R 3	Not assigned		
R 4	MF, (RN14K2E1002D)	10kΩ, ±0.5%, 1/4W	
R 5	MF, (RN14K2E1002D)	10kΩ, ±0.5%, 1/4W	
R 6	MF, (RN14K2E2152D)	21.5kΩ, ±0.5%, 1/4W	
R 7	CF, (ARD25T330J)	33nΩ, ±5%, 1/4W	
R 8	CF, (ARD25T683J)	68kΩ, ±5%, 1/4W	
R 9	CF, (ARD25T330J)	33nΩ, ±5%, 1/4W	
R10	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R11	Var, MF, (RJ-6P 5kΩ)	5kΩ, 1/2W	
R12	Not assigned		
R13	MF, (RN14K2E5621D)	5.62kΩ, ±0.5%, 1/4W	
R14	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R15	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R16	CF, (ARD25T472J)	4.7kΩ, ±5%, 1/4W	
R17	MF, (RN14K2E1000D)	100Ω, ±0.5%, 1/4W	
R18	MF, (RN14K2E2051D)	2.05kΩ, ±0.5%, 1/4W	
R19	Not assigned		
R20	Not assigned		
R21	Not assigned		
R22	Not assigned		
R23	Not assigned		
R24	Var, MF, (RJ-6P 500Ω)	500Ω, 1/2W	
R25	MF, (RN14K2E4641D)	4.64kΩ, ±0.5%, 1/4W	

( ): Manufacturer's part number  
 \* : Selected at factory

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Parts List : YTO DRIVE 14

CKT REF	DESCRIPTION	RATING	NOTE
R26	MF, (RN14K2E3011D)	3.01kΩ, ±0.5%, 1/4W	
R27	MF, (RN05E2B5601B)	5.6kΩ, ±0.1%, 1/8W	
R28	Not assigned		
R29	Var, MF, (RJ-6P 1kΩ)	1kΩ, 1/2W	
R30	MF, (RN14K2E8060D)	806Ω, ±0.5%, 1/4W	
R31	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R32	CF, (ARD25T121J)	120Ω, ±5%, 1/4W	
R33	CF, (ARD25T473J)	47kΩ, ±5%, 1/4W	
R34	MF, (RHF-10 33μF)	33μF, ±1%, 10V	
R35	CF, (ARD25T152J)	1.5kΩ, ±5%, 1/4W	
R36	Not assigned		
R37	Not assigned		
R38	MF, (RN14K2E4751D)	4.75kΩ, ±0.5%, 1/4W	
R39	Var, MF, (RJ-6P 2kΩ)	2kΩ, 1/2W	
R40	Not assigned		
R41	MF, (RN14K2E1212D)	12.1kΩ, ±0.5%, 1/4W	
R42	MF, (RN14K2E3010D)	301Ω, ±0.5%, 1/4W	
R43	MF, (RN14K2E1212D)	12.1kΩ, ±0.5%, 1/4W	
R44	MF, (RN14K2E2051D)	2.05kΩ, ±0.5%, 1/4W	
R45	MF, (RN14K2E4751D)	4.75kΩ, ±0.5%, 1/4W	
R46	Not assigned		
R47	CF, (ARD25T332J)	3.3kΩ, ±5%, 1/4W	
R48	MF, (RN14K2E4751D)	4.75kΩ, ±0.5%, 1/4W	
R49	MF, (RN14K2E8251D)	8.25kΩ, ±0.5%, 1/4W	
R50	MF, (RN14K2E1431D)	1.43kΩ, ±0.5%, 1/4W	
R51	MF, (RN14K2E1431D)	1.43kΩ, ±0.5%, 1/4W	
R52	MF, (RN14K2E1131D)	1.13kΩ, ±0.5%, 1/4W	
R53	Var, MF, (RJ-6P 20kΩ)	20kΩ, 1/2W	
R54	MF, (RN14K2E2212D)	22.1kΩ, ±0.5%, 1/4W	
R55	MF, (RN14K2E3322D)	33.2kΩ, ±0.5%, 1/4W	
R56	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R57	MF, (RN14K2E4751D)	4.75kΩ, ±0.5%, 1/4W	
R58	MF, (RN14K2E4751D)	4.75kΩ, ±0.5%, 1/4W	
R59	MF, (RN14K2E4641D)	4.64kΩ, ±0.5%, 1/4W	
R60	CF, (ARD25T223J)	22kΩ, ±5%, 1/4W	
R61	CF, (ARD25T391J)	390Ω, ±5%, 1/4W	
R62	MF, (RN05E2B3901B)	3.9kΩ, ±0.1%, 1/8W	
R63	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R64	MF, (RN14K2E8060D)	806Ω, ±0.5%, 1/4W	
R65	CF, (ARD25T101J)	100Ω, ±5%, 1/4W	
R66	CF, (ARD25T822J)	8.2kΩ, ±5%, 1/4W	

( ): Manufacturer's part number  
 \* : Selected at factory

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Parts List : RF CONVERTER

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CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (DF553F102PY50)	1000pF, +100/-0%, 50V	
C 2	Cer, (DF553F102PY50)	1000pF, +100/-0%, 50V	
C 3	Elect, (CE04W1E470)	47µF, ±20%, 25V	
C 4	Cer, (DF553F102PY50)	1000pF, +100/-0%, 50V	Q'ty 2
C 5	Cer, (DF553F102PY50)	1000pF, +100/-0%, 50V	Q'ty 2
C 6	Cer, (DF553F102PY50)	1000pF, +100/-0%, 50V	
C 7	Elect, (CE04W1E470)	47µF, ±20%, 25V	
C 8	Cer, (DF553F102PY50)	1000pF, +100/-0%, 50V	
C 9	Cer, (CC45CK1H0R5CY)	0.5pF, ±0.25pF, 50V	(Adjustment)
C10	Cer, (CC45CK1H0R5CY)	0.5pF, ±0.25pF, 50V	(Adjustment)
J 1	Connector, (HRM304B)		
J 2	Connector, (27DP-BR)		
J 3	Connector, (HRM304B)		
J 4	Connector, (HRM304B)		
J 5	Connector, (HRM304B)		
J 6	Not assigned		
J 7	Connector, (27DP-BR)		
R 1	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R 2	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
Z 1	LPF, (0 to 2GHz)		
Z 2	1st MIX, (0 to 2GHz)		
Z 3	PAD, (6dB)		
Z 4	PRE AMP, (2.5214GHz)		
Z 5	2nd CONVERTER		
Z 6	Not assigned		
Z 7	LO AMP, (2.5 to 4.5GHz)		
Z 8	OSC, (2.5GHz)		
Z 9	Not assigned		
Z10	OSC, (50MHz)		

( ): Manufacturer's part number  
\* : Selected at factory

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Parts List : 2nd CONVERTER

17

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (CC732CH1H220J)	22pF, ±5%, 50V	
C 2	Cer, (CK734B1H104K)	0.1µF, ±10%, 50V	
C 3	Cer, (CC732CH1H220J)	22pF, ±5%, 50V	
C 4	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 5	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 6	Not assigned		
C 7	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 8	Cer, (CC732CH1H220J)	22pF, ±5%, 50V	
C 9	Cer, (CK734B1H104K)	0.1µF, ±10%, 50V	
C10	Not assigned		
C11	Cer, (CC732CH1H220J)	22pF, ±5%, 50V	
C12	Cer, (CC732CH1H040D)	4pF, ±0.5pF, 50V	
C13	Cer, (CC732CH1H040D)	4pF, ±0.5pF, 50V	
C14	Cer, (CC732CH1H060D)	6pF, ±0.5pF, 50V	
C15	Cer, (CK45B1H102KY)	1000pF, ±10%, 50V	
C16	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C17	Cer, (CK45B1H102KY)	1000pF, ±10%, 50V	
C18	Cer, (CK45B1H102KY)	1000pF, ±10%, 50V	
C19	Not assigned		
C20	Not assigned		
C21	Not assigned		
C22	Elect, (CE04W1E470)	47µF, ±20%, 25V	
L 1	Not assigned		
L 2	Not assigned		
L 3	Not assigned		
L 4	Not assigned		
L 5	Not assigned		
L 6	Not assigned		
L 7	Coil, (SP04084R7K)	4.7µH	
L 8	Not assigned		
Q 1	Di, breakdown, (RD6.2EB)	5.8 to 6.6V, 400mW	
Q 2	Tr, (2SC2367)		
Q 3	Di, (ND487R2-3P)		
Q 4	Di, (ND487R2-3P)		
Q 5	Di, breakdown, (RD6.2EB)	5.8 to 6.6V, 400mW	
Q 6	Tr, (2SC2367)		
Q 7	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q 8	Tr, (2SC2369)		

( ): Manufacturer's part number  
\* : Selected at factory

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Parts List : 2nd CONVERTER

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CKT REF	DESCRIPTION	RATING	NOTE
R 1	MF, (RM73B2B152JD)	1.5kΩ, ±5%, 1/8W	
R 2	MF, (RM73B2B391JD)	390Ω, ±5%, 1/8W	
R 3	MF, (RM73B2B471JD)	470Ω, ±5%, 1/8W	
R 4	MF, (RM73B2B182JD)	1.8kΩ, ±5%, 1/8W	
R 5	MF, (RM73B2B510JD)	51Ω, ±5%, 1/8W	
R 6	Not assigned		
R 7	Not assigned		
R 8	MF, (RM73B2B101JD)	100Ω, ±5%, 1/8W	
R 9	MF, (RM74B2B101JD)	100Ω, ±5%, 1/8W	
R10	MF, (RM73B2B510JD)	51Ω, ±5%, 1/8W	
R11	CF, (ARD25T561J)	560Ω, ±5%, 1/4W	
R12	MF, (RM73B2B688JD)	6.8Ω, ±5%, 1/8W	
R13	MF, (RM73B2B688JD)	6.8Ω, ±5%, 1/8W	
R14	CF, (ARD25T391J)	390Ω, ±5%, 1/4W	
R15	MF, (RM73B2B151JD)	150Ω, ±5%, 1/8W	
R16	MF, (RM73B2B390JD)	39Ω, ±5%, 1/8W	
R17	MF, (RM73B2B151JD)	150Ω, ±5%, 1/8W	
R18	CF, (ARD25T391J)	390Ω, ±5%, 1/4W	
T 1	Trans, (342T74443)		

( ): Manufacturer's part number  
\* : Selected at factory

34W85981 2/2

Parts List : 50MHz OSC

18

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (CC45CH1H470JY)	47pF, ±5%, 50V	
C 2	Cer, (CC45CH1H200JY)	20pF, ±5%, 50V	
C 3	Cer, (CC45CH1H390JY)	39pF, ±5%, 50V	
C 4	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 5	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 6	Elect, (CE04W1V220)	22µF, ±20%, 35V	
C 7	Cer, (CC924CH1H221J)	220pF, ±5%, 50V	
C 8	Cer, (CK924F1H104Z)	0.1µF, +80/-20%, 50V	
C 9	Not assigned		
C10	Cer, (CC45CH1H101JY)	100pF, ±5%, 50V	
C11	Cer, (CC45CH1H040CY)	4pF, ±0.25pF, 50V	
C12	Cer, (CC45CH1H560JY)	56pF, ±5%, 50V	
L 1	Coil, (10K17-55T)	181mH	
L 2	Coil, (LF8-221K)	220µH	
L 3	Coil, (34L74431L)		
Q 1	FET, (2SK13)		
Q 2	Not assigned		
Q 3	Not assigned		
Q 4	Tr, (2SA1206)		
Q 5	Tr, (2SA1206)		
R 1	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R 2	CF, (ARD25T471J)	470Ω, ±5%, 1/4W	
R 3	CF, (ARD25T471J)	470Ω, ±5%, 1/4W	
R 4	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	
R 5	CF, (ARD25T221J)	220Ω, ±5%, 1/4W	
R 6	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R 7	CF, (ARD25T688J)	6.8Ω, ±5%, 1/4W	
R 8	CF, (ARD25T222J)	2.2kΩ, ±5%, 1/4W	
R 9	CF, (ARD25T331J)	330Ω, ±5%, 1/4W	
R10	CF, (ARD25T153J)	15kΩ, ±5%, 1/4W	
R11	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R12	Not assigned		
R13	CF, (ARD25T560J)	56Ω, ±5%, 1/4W	
R14	CF, (ARD25T680J)	68Ω, ±5%, 1/4W	
R15	CF, (ARD25T470J)	47Ω, ±5%, 1/4W	

( ): Manufacturer's part number  
\* : Selected at factory

34W85990 1/1



Parts List : 2.5214 GHz PRE AMP

19

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (CC732CH1H220J)	22pF, ±5%, 50V	
C 2	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 3	Elect, (CE04W1E470)	47μF, ±20%, 25V	
C 4	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 5	Cer, (CC732CH1H220J)	22pF, ±5%, 50V	
C 6	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
Q 1	Di, breakdown, (RD6.2EB)	5.8 to 6.6V, 400mW	
Q 2	Tr, (2SC2585)		
R 1	CF, (ARD25T391J)	390Ω, ±5%, 1/4W	
R 2	CF, (ARD25T182J)	1.8kΩ, ±5%, 1/4W	
R 3	MF, (RM73B2B221JD)	220Ω, ±5%, 1/8W	
R 4	MF, (RM73B2B220JD)	22Ω, ±5%, 1/8W	
R 5	MF, (RM73B2B221JD)	220Ω, ±5%, 1/8W	
R 6	CF, (ARD25T391J)	390Ω, ±5%, 1/4W	

( ): Manufacturer's part number  
\* : Selected at factory

34W89578 1/1

Parts List : 2.5 to 4.5 GHz LO-AMP

20

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (CC732CK1H010C)	1pF, ±0.25pF, 50V	
C 2	Cer, (CC732CK1H020C)	2pF, ±0.25pF, 50V	
C 3	Cer, (CC732CK1H020C)	2pF, ±0.25pF, 50V	
C 4	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 5	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 6	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 7	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 8	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 9	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 10	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 11	Cer, (CC732CH1H101J)	100pF, ±5%, 50V	
C 12	Cer, (CK924C1H103M)	0.01μF, ±20%, 50V	
C 13	Cer, (CK924C1H103M)	0.01μF, ±20%, 50V	
C 14	Elect, (CE04W1E470)	47μF, ±20%, 25V	
Q 1	Tr, (2SC2585)		
Q 2	Tr, (FJ451LE)		
Q 3	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q 4	Di, breakdown, (RD5.1EB)	4.8 to 5.4V, 400mW	
Q 5	Di, breakdown, (RD3.9EB)	3.7 to 4.1V, 400mW	
Q 6	Di, breakdown, (RD3.9EB)	3.7 to 4.1V, 400mW	
R 1	CF, (RM73B2B470JD)	47Ω, ±5%, 1/8W	
R 2	CF, (RM73B2B102JD)	1kΩ, ±5%, 1/8W	
R 3	CF, (RM73B2B151JD)	150Ω, ±5%, 1/8W	
R 4	CF, (RM73B2B202JD)	82Ω, ±5%, 1/8W	
R 5	CF, (RM73B2B391JD)	390Ω, ±5%, 1/8W	
R 6	CF, (RM73B2B220JD)	22Ω, ±5%, 1/8W	
R 7	CF, (ARD25T4R7J)	4.7Ω, ±5%, 1/4W	
R 8	CF, (RM73B2B271JD)	270Ω, ±5%, 1/8W	
R 9	CF, (RM73B2B180JD)	18Ω, ±5%, 1/8W	
R 10	CF, (RM73B2B271JD)	270Ω, ±5%, 1/8W	
R 11	CF, (RM73B2B271JD)	270Ω, ±5%, 1/8W	
R 12	CF, (RM73B2B180JD)	18Ω, ±5%, 1/8W	
R 13	CF, (RM73B2B271JD)	270Ω, ±5%, 1/8W	
R 14	CF, (RM73B2B470JD)	47Ω, ±5%, 1/8W	

( ): Manufacturer's part number  
\* : Selected at factory

34W89426 1/1

Parts List : 6 dB PAD

21

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Not assigned		
C 2	Cer, (HCC73CH2D * C)	2 to 6pF, ±0.25pF, 50V	*
R 1	Not assigned		
R 2	Not assigned		
R 3	CF, (RM73B2B151JD)	150Ω, ±5%, 1/8W	
R 4	CF, (RM73B2B390JD)	39Ω, ±5%, 1/8W	
R 5	CF, (RM73B2B151JD)	150Ω, ±5%, 1/8W	
R 6	CF, (RM73B2B * JD)	22 to 82Ω, ±5%, 1/8W	*

( ): Manufacturer's part number  
\* : Selected at factory

34W89428 1/1

Parts List : DIGITAL SW

22

CKT REF	DESCRIPTION	RATING	NOTE
J 1	Connector, (DF1-5P-2.5DS)		
S 1	Switch, (BCH10-V111)		

( ): Manufacturer's part number  
\* : Selected at factory

34W86018 1/1



CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (ECK-D2H103PE)	0.01 $\mu$ F,+100/-0%,500V	
C 2	Cer, (ECK-D2H103PE)	0.01 $\mu$ F,+100/-0%,500V	
C 3	Elect, (KM63VNSN3300)	3300 $\mu$ F, $\pm$ 20%,63V	
C 4	Elect, (KM63VNSN2200)	2200 $\mu$ F, $\pm$ 20%,63V	
C 5	Elect, (KM63VB-100)	100 $\mu$ F, $\pm$ 20%,63V	
C 6	Elect, (KM63VB-100)	100 $\mu$ F, $\pm$ 20%,63V	
C 7	Elect, (KM63VB-100)	100 $\mu$ F, $\pm$ 20%,63V	
C 8	Cer, (ECK-D2H101KB2)	100pF, $\pm$ 10%,500V	
C 9	Cer, (ECK-D2H101KB2)	100pF, $\pm$ 10%,500V	
C10	Cer, (ECK-D2H101KB2)	100pF, $\pm$ 10%,500V	
C11	Elect, (ECEA1EG102S)	1000 $\mu$ F,+50/-20%,25V	
C12	Elect, (ECEA1EG102S)	1000 $\mu$ F,+50/-20%,25V	
C13	Elect, (ECEA1EG102S)	1000 $\mu$ F,+50/-20%,25V	
C14 to C26	Elect, (ECEA1EG470S)	47 $\mu$ F,+50/-20%,25V	
F 1	Fuse	1A, AC125V	
F 2	Fuse	1A, AC125V	
F 3	Fuse	1A, AC125V	
J 1	Connector, (DF1-8P-2.5DS)		
J 2	Connector, (DF1-20P-2.5DS)		
J 3	Connector, (DF1-20P-2.5DS)		
J 4	Connector, (1625-4R)		
J 5	Connector, (1625-4P-1)		
J 6 to J22	Not assigned		
J23	Connector, (DF1-8S-2.5R24)		
L 1	Choke coil, (HP-023)		
L 2	Choke coil, (SR-02-025)		
L 3	Choke coil, (HP-023)		
M 1	Timer		

( ): Manufacturer's part number 34W87893 1/2  
 \* : Selected at factory

CKT REF	DESCRIPTION	RATING	NOTE
Q 1	Rectifier, (RB402)		
Q 2	Di, (V06C)		
Q 3	Rectifier, (RB152)		
Q 4	IC, (SI-8153B)		
Q 5	IC, (SI-8053B)		
Q 6	IC, (SI-8153B)		
Q 7	IC, (MC7812CT)		or same grade
Q 8	IC, (MC7805CT)		or same grade
Q 9	IC, (MC7912CT)		
R 1	CF, (RD25S 10k $\Omega$ J)	10k $\Omega$ , $\pm$ 5%,1/4W	
R 2	CF, (RD25S 1k $\Omega$ J)	1k $\Omega$ , $\pm$ 5%,1/4W	
R 3	CF, (RD25S 12k $\Omega$ J)	12k $\Omega$ , $\pm$ 5%,1/4W	
R 4	CF, (RD25S 1k $\Omega$ J)	1k $\Omega$ , $\pm$ 5%,1/4W	
R 5	CF, (RD25S 1M $\Omega$ J)	1M $\Omega$ , $\pm$ 5%,1/4W	
R 6	CF, (RD25S 470k $\Omega$ J)	470k $\Omega$ , $\pm$ 5%,1/4W	
R 7	CF, (RD25S 470k $\Omega$ J)	470k $\Omega$ , $\pm$ 5%,1/4W	
R 8	CF, (RD25S 3.3k $\Omega$ J)	3.3k $\Omega$ , $\pm$ 5%,1/4W	
R 9	CF, (RD25S 470k $\Omega$ J)	470k $\Omega$ , $\pm$ 5%,1/4W	
T 1	Trans		

( ): Manufacturer's part number 34W87893 2/2  
 \* : Selected at factory

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer, (CK924F1H104Z)	0.1 $\mu$ F,+80/-20%,50V	
J 1	Connector, (DF1-8P-2.5DS)		
J 2	Connector, (DF1-8P-2.5DS)		
Q 1	IC, (LM833N)		
Q 2	Tr, (2SC943KL)		
R 1	CF, (ARD25T222J)	2.2k $\Omega$ , $\pm$ 5%,1/4W	
R 2	CF, (ARD25T222J)	2.2k $\Omega$ , $\pm$ 5%,1/4W	
R 3	CF, (ARD25T222J)	2.2k $\Omega$ , $\pm$ 5%,1/4W	
R 4	CF, (ARD25T222J)	2.2k $\Omega$ , $\pm$ 5%,1/4W	
R 5	Not assigned		
R 6	Var, MF, (RJ-6P 20k $\Omega$ )	20k $\Omega$ ,1/2W	
R 7	Var, MF, (RJ-6P 20k $\Omega$ )	20k $\Omega$ ,1/2W	
R 8	CF, (ARD25T222J)	2.2k $\Omega$ , $\pm$ 5%,1/4W	
R 9	CF, (ARD25T223J)	22k $\Omega$ , $\pm$ 5%,1/4W	
R10	Var, MF, (RJ-6P 500k $\Omega$ )	500k $\Omega$ ,1/2W	
R11	Var, MF, (RJ-6P 500k $\Omega$ )	500k $\Omega$ ,1/2W	

( ): Manufacturer's part number 34W89299 1/1  
 \* : Selected at factory

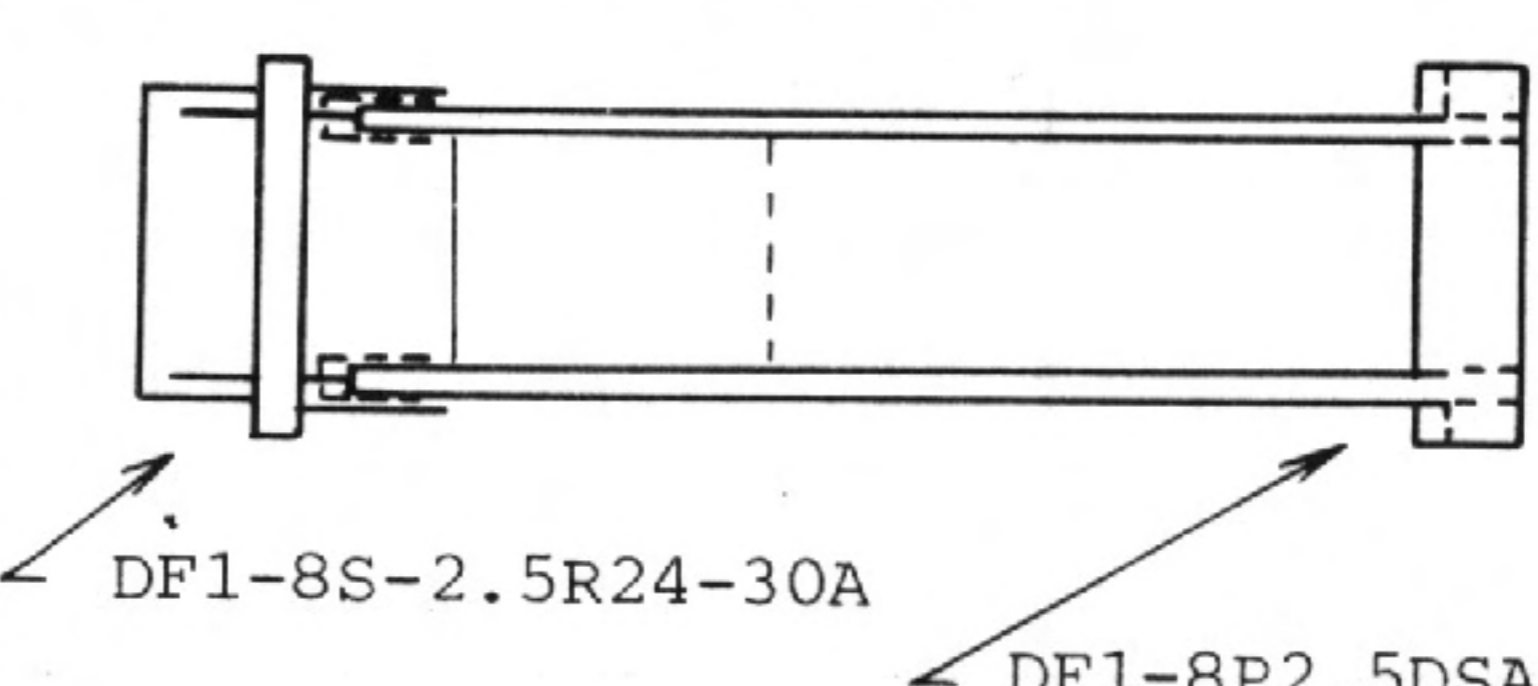
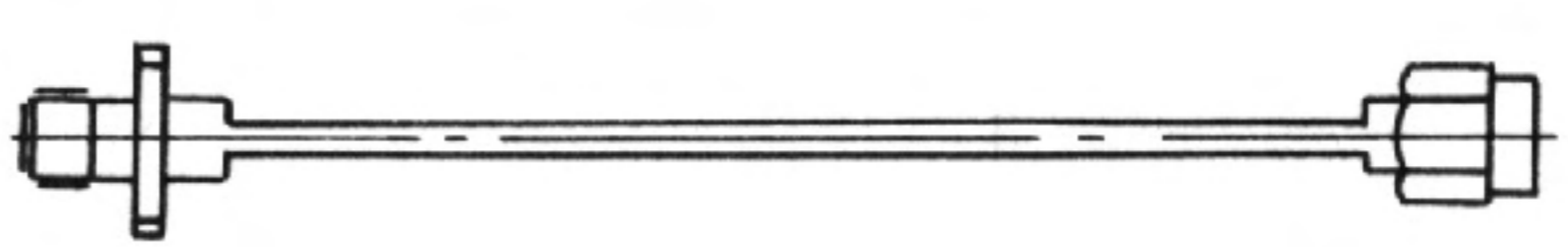
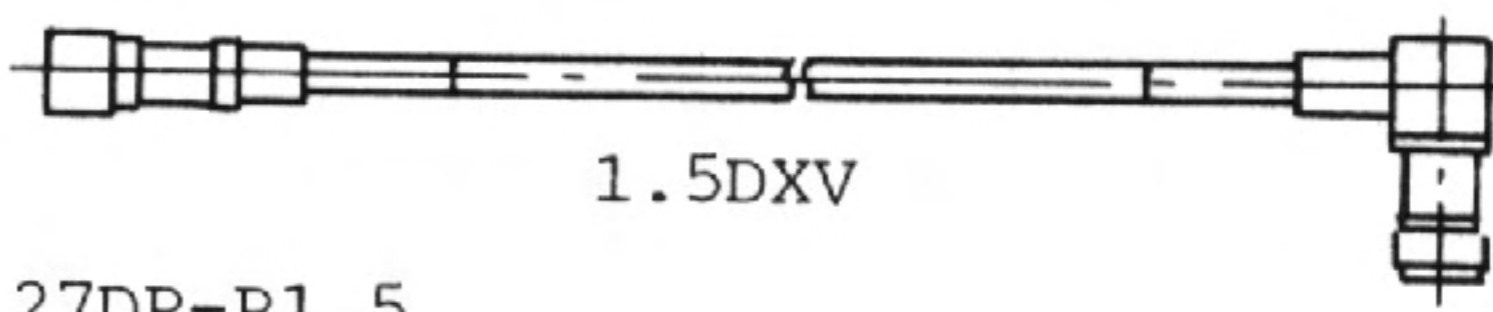
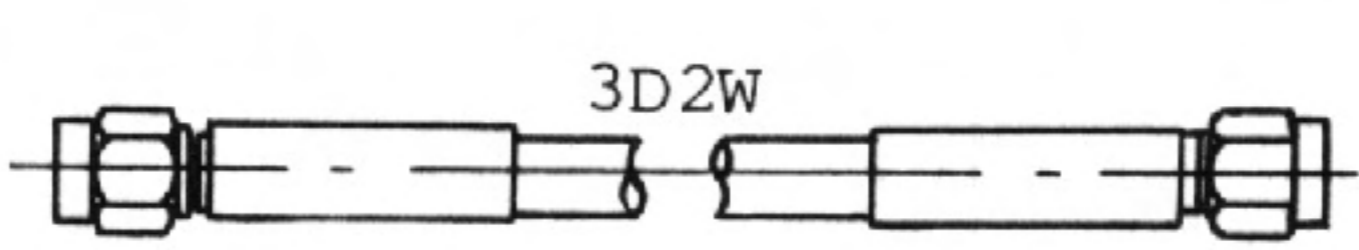
CKT REF	DESCRIPTION	RATING	NOTE
C 1 to C11	Cer, (CK924F1H104Z)	0.1 $\mu$ F,+80/-20%,50V	
C12	Cer, (CK924C1H222M)	2200pF, $\pm$ 20%,50V	
J 1	Connector, (57LE-20240-27COD35)		
J 2	Connector, (HIF23A-40D-BA-20S)		
J 3	Terminal cable, (27DP-PC)		349J79737M
Q 1	IC, (uPD7210)		
Q 2	IC, (TC40H367P)		
Q 3	IC, (SN75160N)		
Q 4	IC, (SN75161N)		
Q 5	IC, (TC40H000P)		
Q 6	IC, (TC40H032P)		
Q 7	IC, (TC40H273P)		
Q 8	IC, (TC40H175P)		
Q 9	IC, (TC40H175P)		
Q10	IC, (HI-7541JN)		
Q11	Di, breakdown, (1SZ52)	5.9 to 6.5V,250mW	
Q12	IC, (LM833)		
R 1	Single in-line array, (IHR-6-103JA)	10k $\Omega$ x 6,1/8W	
R 2	Var, MF, (RJ-6P-2k $\Omega$ )	2k $\Omega$ ,1/2W	
R 3	Var, MF, (RJ-6P-2k $\Omega$ )	2k $\Omega$ ,1/2W	
R 4	CF, (ARD25T103J)	10k $\Omega$ , $\pm$ 5%,1/4W	
R 5	CF, (ARD25T103J)	10k $\Omega$ , $\pm$ 5%,1/4W	
R 6	Not assigned		
R 7	CF, (ARD25T681J)	680 $\Omega$ , $\pm$ 5%,1/4W	
R 8	CF, (ARD25T102J)	1k $\Omega$ , $\pm$ 5%,1/4W	
R 9	CF, (ARD25T223J)	22k $\Omega$ , $\pm$ 5%,1/4W	
R10	CF, (ARD25T683J)	68k $\Omega$ , $\pm$ 5%,1/4W	
S 1	Switch, (DYS-8)		(No Label)

( ): Manufacturer's part number 34W85991 1/1  
 \* : Selected at factory

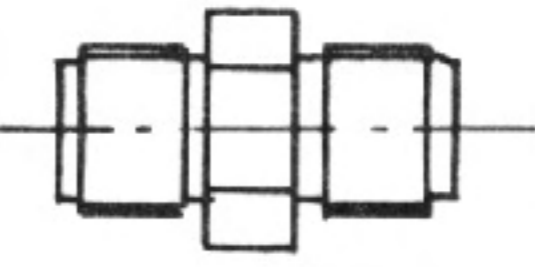
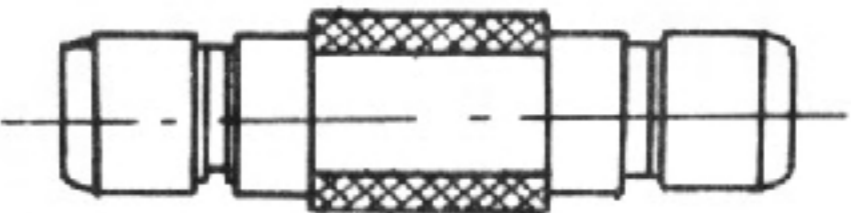






SPEC NO.	ACCESSORY NAME	QTY.	REMARKS
449J81722C	Extender Cable	2	<p style="text-align: center;">← 30 cm → TFC-COS24-30C</p>  <p style="text-align: center;">DF1-8S-2.5R24-30A      DF1-8P2.5DSA</p>
349J89075	Extender Cable	2	<p style="text-align: center;">← 50 cm → UT-85</p>  <p style="text-align: center;">NM15-2F      NM11-2F</p> <p style="text-align: center;">50Ω type 2mm</p>
339J24362	Extender Cable	2	<p style="text-align: center;">← 50 cm →</p>  <p style="text-align: center;">1.5DXV</p> <p style="text-align: center;">27DP-P1.5      27DP-LP-1.5</p>
449J25501F	Extender Cable	2	<p style="text-align: center;">← 50 cm →</p>  <p style="text-align: center;">3D2W</p> <p style="text-align: center;">HRM202B      HRM202B</p>



SPEC NO.	ACCESSORY NAME	QTY.	REMARKS
NO.1305	HRM501 Adapter	2	 <p data-bbox="1385 776 1513 811">HRM501</p>
NO.1289	NS-A009 Adapter-1	2	 <p data-bbox="1151 1384 1385 1420">27DP-BJ-1.5</p> <p data-bbox="1570 1384 1804 1420">27DP-BJ-1.5</p>

**Note:**

Service kit is sold separately.

When ordering, please include the Spec No., accessory name, and quantity.