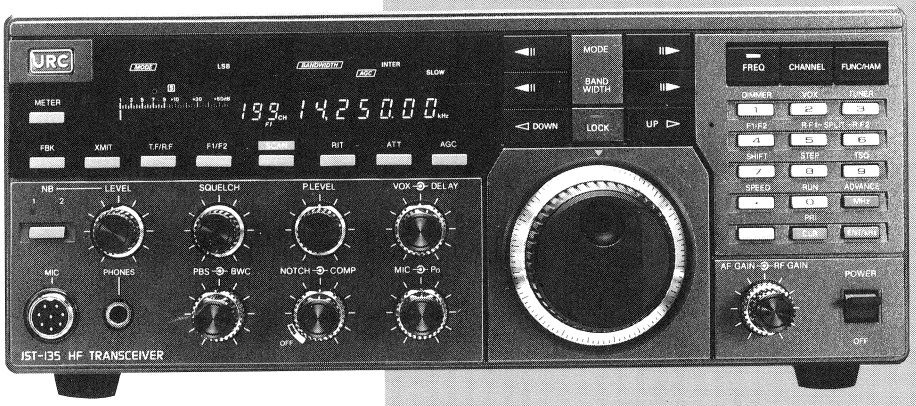
HF TRANSCEIVER

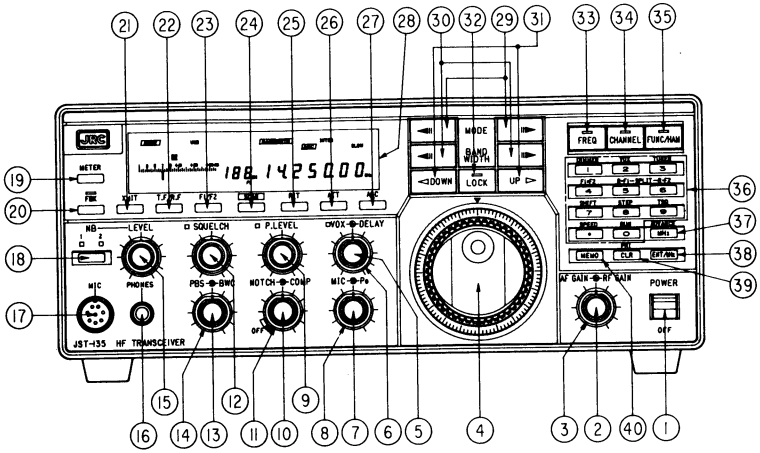
MODEL JST-135

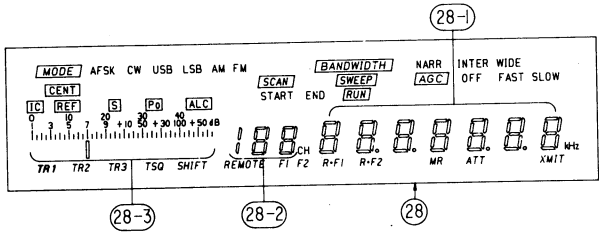
SERVICE MANUAL



JRC Japan Radio Co., Ltd.

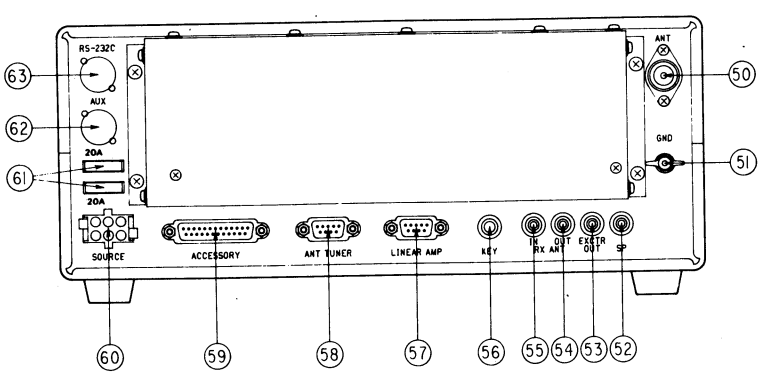
Parts Identification





Front Panel

① POWER switch
② AF GAIN control
③ RF GAIN control
④ TUNING control
⑤ VOX gain control
⑥ DELAY (VOX delay) control
⑦ MIC (microphone gain) control
⑧ Po (power) control
⑨ P LEVEL (pause level) control
⑩ NOTCH control
⑪ COMP (voice compressor) control
⑫ SQUELCH control
⑬ PBS (pass band shift) control
⑭ BWC (bandwidth) control
⑮ NB LEVEL (noise blanker level) control
⑯ POHONES (headphones) jack
⑰ MIC (microphone) connector
⑱ NB (noise blanker) control
⑲ METER switch
⑳ FBK (full-brake-in) switch
㉑ XMIT (standby) switch
㉒ T.F/R.F (transmit frequency/receive frequency) switch
㉓ F1/F2 (VFO select) switch
㉔ SCAN switch
㉕ RIT (receiver increment tuning) switch
㉖ ATT (attenuator) switch
㉗ AGC switch
㉘ Display
㉘-1 Frequency display
㉘-2 Channel display
㉘-3 Meter
㉙ MODE switch
㉚ BANDWIDTH switch
㉛ UP/DOWN switches
㉜ LOCK switch
㉝ FREQ (frequency) switch
㉞ CHANNEL switch
㉟ FUNC/HAM (function/ham band) switch
㊱ Ten keys
㊲ MHz switch
㊳ ENT/kHz (enter/kHz) switch
㊴ CLR (clear) switch
㊵ MEMO (memory) switch



Rear Panel

㊿ ANT (antenna) connector
51 GND (ground) terminal
52 SP (external speaker) jack
53 EXCTR OUT (exciter output) jack
54 RX ANT OUT (receiving antenna output) jack
55 RX ANT IN (receiving antenna input) jack
56 KEY jack
57 LINEAR AMP (linear amplifier) connector
58 ANT TUNER (antenna tuner) connector
59 ACCESSORY connector
60 SOURCE (DC power) connector
61 FUSES (DC fuse)
62 AUX (auxiliary) connector
63 RS-232C connector

Introduction

This manual contains information required for maintenance and/or repairment of the JST-135 HF Transceiver. For operating procedures, refer to the instruction manuals for JST-135 and optional equipment.

The JST-135 can be fitted with the following optional units:

TONE SQ Unit	CCL-212
BWC Unit	CFL-243
NOTCH FOLLOW Unit	CDD-366
ECSS Unit	CMF-78
RS-232C INTERFACE Unit	CMH-741
DAUGHTER BOARD Unit	CMH-742

This manual, however, describes the standard operation of the JST-135 without optional units, and the description of those optional units is followed. (excluding Daughter Board Unit CMH-742).

■ CONTENTS

1. SPECIFICATIONS

General

Transmitting frequency range:
1.8 MHz band 1.8 to 2.0 MHz
3.5 MHz band 3.5 to 4.0 MHz
7 MHz band 7.0 to 7.3 MHz
10 MHz band 10.1 to 10.15 MHz
14 MHz band 14.0 to 14.35 MHz
18 MHz band 18.068 to 18.168 MHz
21 MHz band 21.0 to 21.45 MHz
24 MHz band 24.89 to 24.99 MHz
28 MHz band 28.0 to 29.7 MHz

Receiving frequency range: 100 kHz to 30 MHz

Operating mode: SSB (LSB, USB)
CW
AME (Single Side band with full carrier)
FM
AFSK

Frequency stability: Less than ±10 PPM from 5-minute warm-up to 60 minutes
Less than ±2 PPM per hour after 60 minutes

Frequency increment: 10 Hz

Number of memory channels: 200 channels

Antenna impedance: 50Ω (unbalanced)

Input voltage: 13.8 VDC±10% (nominal 13.8V)
Negative grounded

Power consumption: Approx. 1.5A (receiving with no signal)
Approx. 33A (transmitting at 150W output)

Dimensions: 330 (330)W x 130 (142)H x 280 (391) Dmm
Dimensions written in ( ) include projecting parts and controls

Weight: Approx. 8.5 kg

Transmitter

Power output: 10 to 150W (continuously adjustable)

Carrier suppression: 50 dB or more

Undersired sideband suppression: 60 dB or more (at 1.5 kHz modulation)

Intermodulation: 3rd order: –38 dB or less

Frequency response: 400 to 2600 Hz (within 6 dB, SSB)

Microphone impedance: 600Ω

Modulation system: SSB, AME, AFSK: Balanced modulation
FM: Reactance modulation

Maximum frequency deviation (FM): ±5 kHz

Receiver

Receiving system: SSB, CW, AM, AFSK: Triple superheterodyne
FM: Double superheterodyne

Intermediate frequency:
1st IF : 70.455 MHz
2nd IF : 455 kHz
3rd IF : 98 kHz

Sensitivity:

	SSB, CW, AFSK	AM	FM
0.1-0.5 MHz	14 dBμ	24 dBμ	–
0.5-1.6 MHz	6 dBμ	16 dBμ	–
1.6-30 MHz	–10 dBμ	6 dBμ	–6 dBμ

(at 12 dB SINAD for FM, at 10 dB S/N for other modes)

Image rejection: 70 dB or more

IF rejection: 70 dB or more

Selectivity:

	– 6 dB	–60 dB
SSB, CW(W), AFSK (INTER)	2 kHz or more	6 kHz or less
FM (WIDE)	12 kHz or more	–
AM (INTER)	6 kHz or more	–40 dB, 18 kHz or less

Note: Maximum two optional filters can be mounted.

RIT range: ±20 kHz

PBS range: ±1 kHz

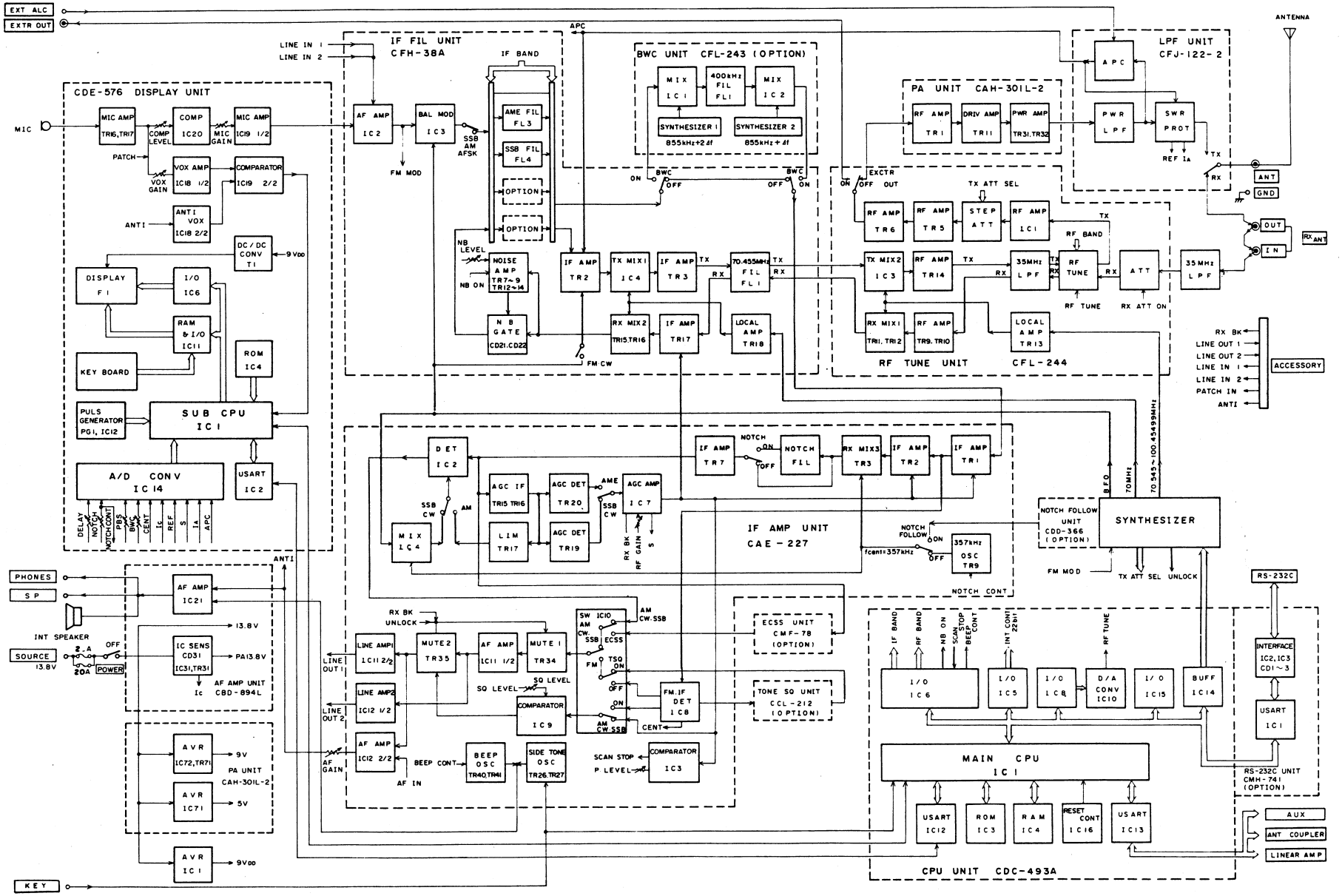
BWC minimum bandwith: Approx. 800 Hz (when mounting optional BWC unit)

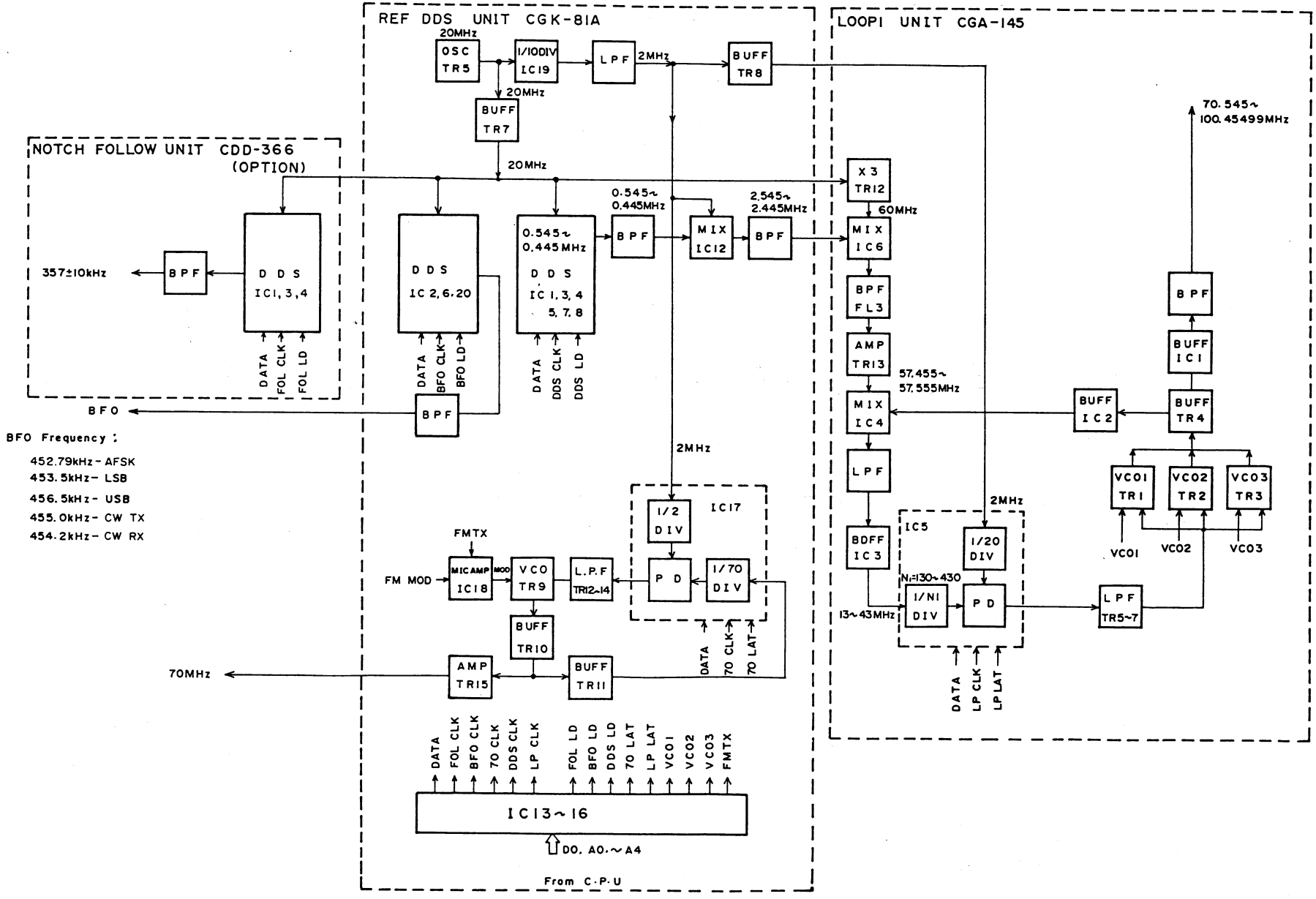
NOTCH filter attenuation: Approx. 40 dB

AF output: 1W or more (at 4Ω load and with less than 10% distortion)

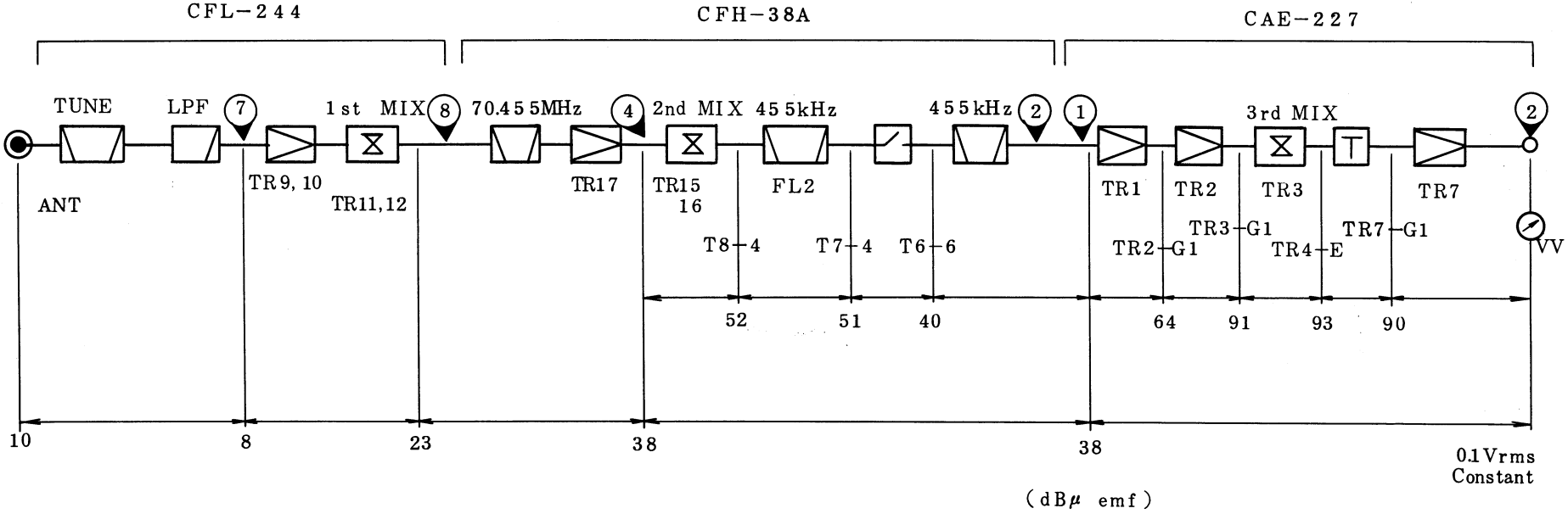
2. BLOCK DIAGRAM

2.1 Signal Flow

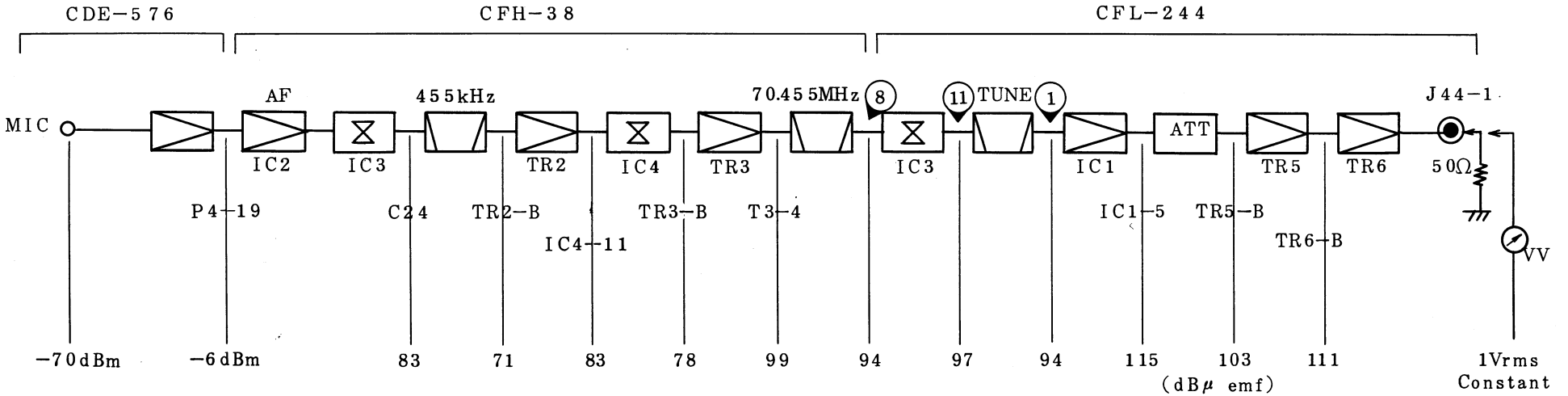


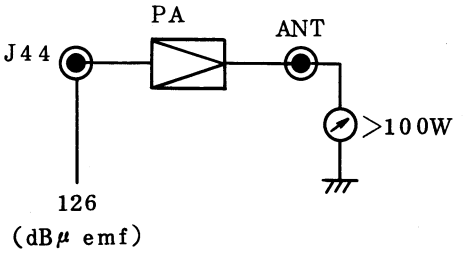

REF DDS UNIT CGK-81A
20MHz
OSC TR5
1/100DIV IC19
LPF
2MHz
BUFF TR8
20MHz
BUFF TR7
20MHz
NOTCH FOLLOW UNIT CDD-366 (OPTION)
357±10kHz
BPF
DDS IC1, 3, 4
DATA
FOL CLK
FOL LD
DDS IC 2, 6, 20
DATA
BFO CLK
BFO LD
0.545~ 0.445MHz
DDS IC 1, 3, 4 5, 7, 8
DATA
DDS CLK
DDS LD
BFO
BPF
0.545~ 0.445MHz
BPF
MIX IC12
2.545~ 2.445MHz
BPF
BFO Frequency ;
452.79kHz - AFSK
453.5kHz - LSB
456.5kHz - USB
455.0kHz - CW TX
454.2kHz - CW RX
2MHz
1/2 DIV
IC17
P D
1/70 DIV
FMTX
FM MOD
MIC AMP
MOD
IC18
VCO TR9
L.P.F TR12~14
BUFF TR10
AMP TR15
70MHz
BUFF TR11
DATA
70 CLK
70 LAT
DATA
FOL CLK
BFO CLK
70 CLK
DDS CLK
LP CLK
FOL LD
BFO LD
DDS LD
70 LAT
LP LAT
VCO1
VCO2
VCO3
FMTX
IC13~16
D0. A0.~A4
From C·P·U
LOOP1 UNIT CGA-145
X3 TRI2
60MHz
MIX IC6
BPF FL3
AMP TRI3
57.455~ 57.555MHz
MIX IC4
LPF
BDFF IC3
13~43MHz
IC5
1/20 DIV
2MHz
N=130~430
1/N1 DIV
P D
LPF TR5~7
DATA
LP CLK
LP LAT
70.545~ 100.45499MHz
BPF
BUFF IC1
BUFF TR4
BUFF IC2
VCO1 TR1
VCO2 TR2
VCO3 TR3
VCO1
VCO2
VCO3

Fr =7.1MHz
MODE : LSB
AGC : OFF



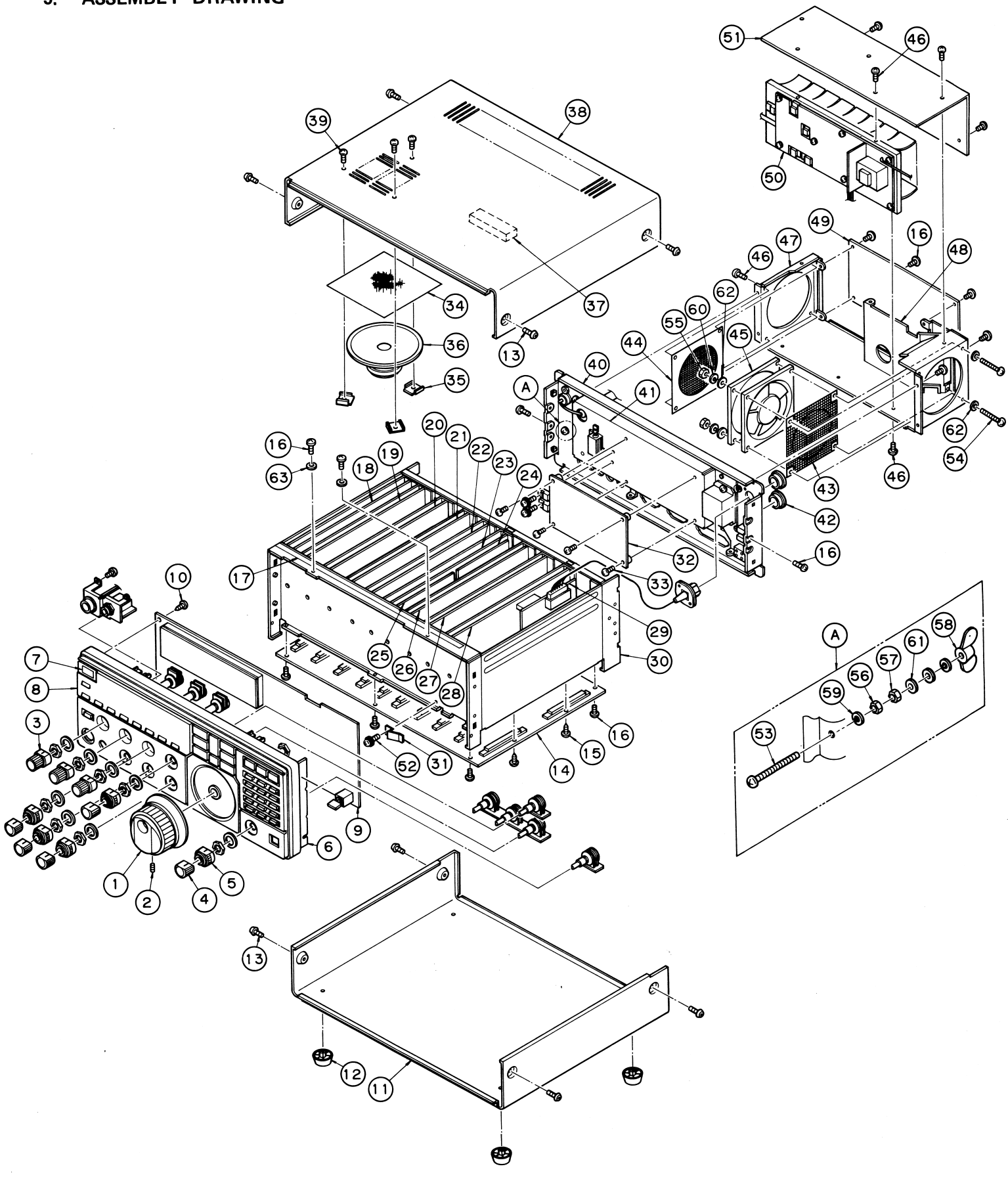
Ft = 7.05MHz
MODE : LSB
COMP : Min
MIC : Max





LOCATION	DESCRIPTION	PART NUMBER	Q'TY	REMARKS
1	Dial	MPHD01145	1	
2	Screw	BSHT03004S	1	3T3x4
3	Kneb	MPHD01135	3	
4	Kneb	MTV000317	5	
5	Kneb	MTV000318	5	
6	Panel	MPBC07727	1	
7	JRC badge	MPNL09514	1	
8	Filter	MPOL00926	1	
9	Display unit	CDE-576	1	MDLW03760
10	Screw	BRTG02970	7	M3x8 FE ZMC
11	Cover bottom	MTD004496	1	
12	Lag	BRKU00159	4	NO.1052
13	Screw	BRTG03311	8	M3x8 Bs BNM2
14	Motherboard	CFQ-2625A	1	MDYW02679
15	Screw	BRTG00970	20	M2.6x6 FE ZMC
16	Screw	BRTG01225	16	M3x6 FE ZMC
17	Label	MPNN21126A	1	
18	RF Tune unit	CFL-244	1	MDNW05951
19	IF Filter unit	CFH-38A	1	MDNW05952
20	BWC unit	CFL-243	1	MDNW05954
21	IF AMP unit	CAE-227	1	MDHW00825
22	ECSS unit	CMF-78	1	MDMW01524
23	Daughter Board unit	CMH-742	1	MDYW02680
24	Tone SQ unit	CCL-212	1	MDCW02209
25	Notch Follow unit	CDD-366	1	MDLW03761
26	REF DDS unit	CGK-81A	1	MDEW00769
27	Loop 1 unit	CGA-145	1	MDEW00768
28	CPU unit	CDC-493A	1	MDLW03759
29	RS-232C Interface unit	CMH-741	1	MDYW02681
30	Chassis assy	MPBC07977	1	
31	Accessory	5ZKAH00006	1	
32	AF AMP	CBD-894L	1	MDBW01698
33	Screw	BRTG01227	4	M3x10 FE ZMC
34	Speaker grill cloth	MTZ002537	1	
35	Mounting plate	MTB099587A	3	
36	Speaker	5USAC00028	1	
37	Rubber	MTT021775	1	
38	Cover top	MTD004495	1	
39	Screw	BRTG02145	3	MS3x8 Bs BLK
40	Back board	MTD004504	1	
41	Mounting plate	MTD004506	1	
42	Hole plug	BRNG00179	2	DP-625
43	Wire cloth	MPFM00340	1	
44	Wire cloth	MPFM00339	1	
45	Fan Motor	6BFJD00004	1	
46	Screw	BRTG02082	14	M3x6 Bs BNM2
47	Case	MTD004505	1	
48	Draft plate	MTD004508A	1	
49	LPF unit	CFJ-122	1	MDNW05950
50	PA unit(100W)	CAH-301L-2	1	MDTW00834
	PA unit(10W)	CAH-301L-1	1	MDTW00833
51	Cover	MTD004507	1	
52	Screw	BSNA03006B	1	ANK3x6 Bs
53	Screw	BSNK04020B	1	NK4x20 Bs
54	Screw	BSNK03025B	4	NK3x25 Bs
55	Nut	BSHN04000B	2	N4 Bs
56	Nut	BSHN03000B	1	N3 Bs
57	Nut	BSLN04000B	1	LN4 Bs
58	Wing Nut	BSBN04000B	1	BN4 Bs
59	Spring Lock Washer	BSSW04000S	1	SW4
60	Spring Lock Washer	BSSW03000S	2	SW3
61	Washer	BSFW04000B	2	W4 Bs
62	Washer	BSLW03000B	6	LW3 Bs
63	Washer	BSFW03000B	2	W3 Bs

5. ASSEMBLY DRAWING



6. CIRCUIT DIAGRAM, COMPONENT LAYOUT AND PARTS LIST

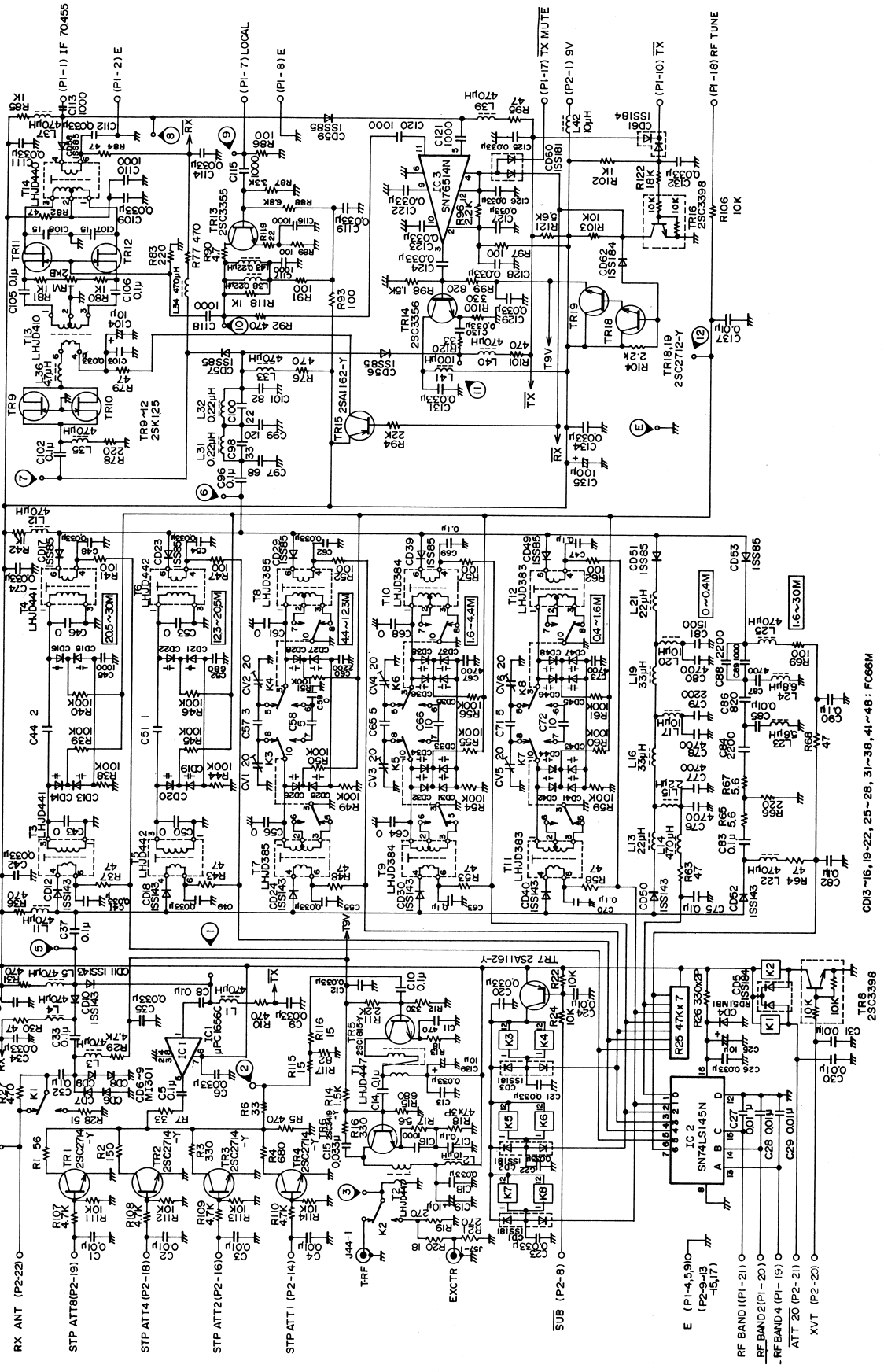


Figure 6.1.1 RF TUNE UNIT CFL-244 Circuit Diagram

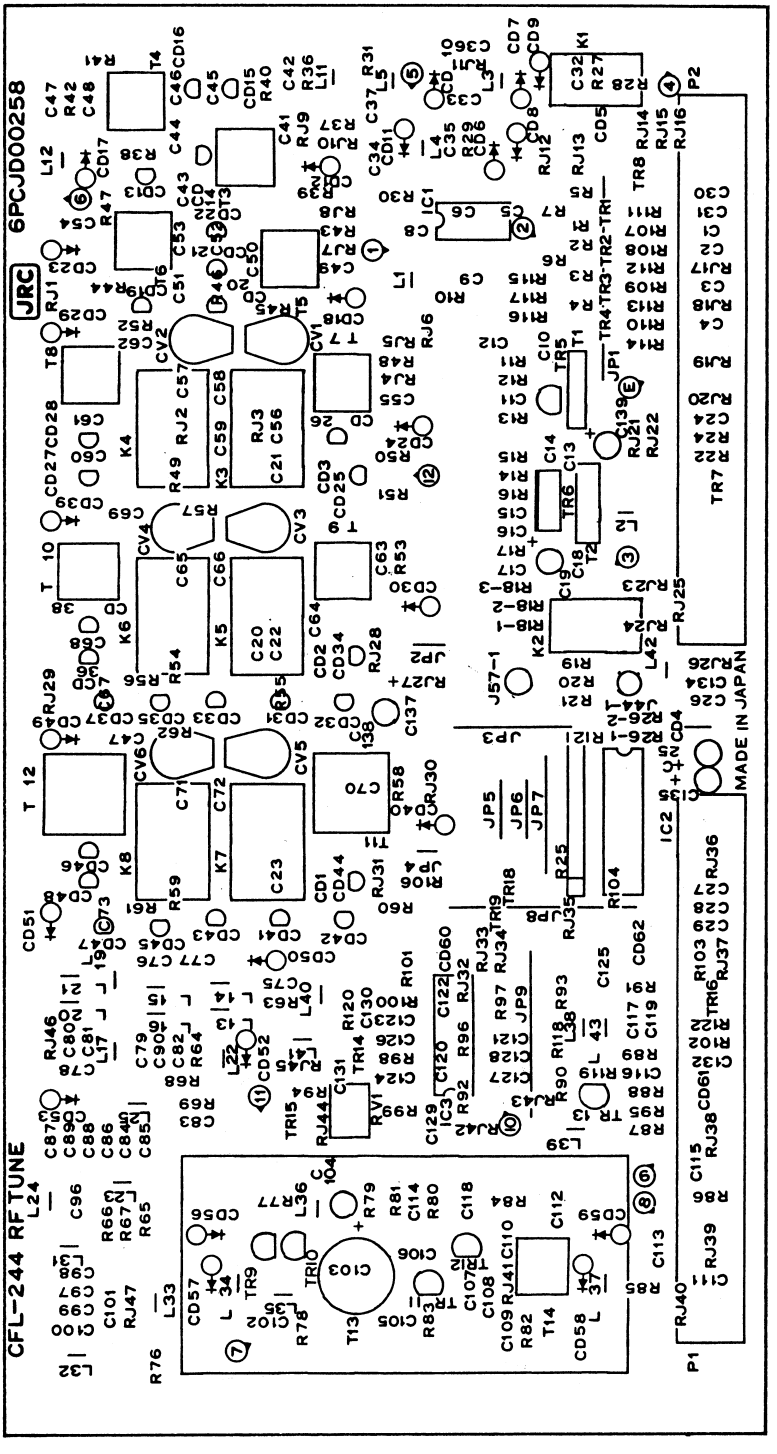


Figure 6.1.2 RF TUNE UNIT CFL-244 Component Layout

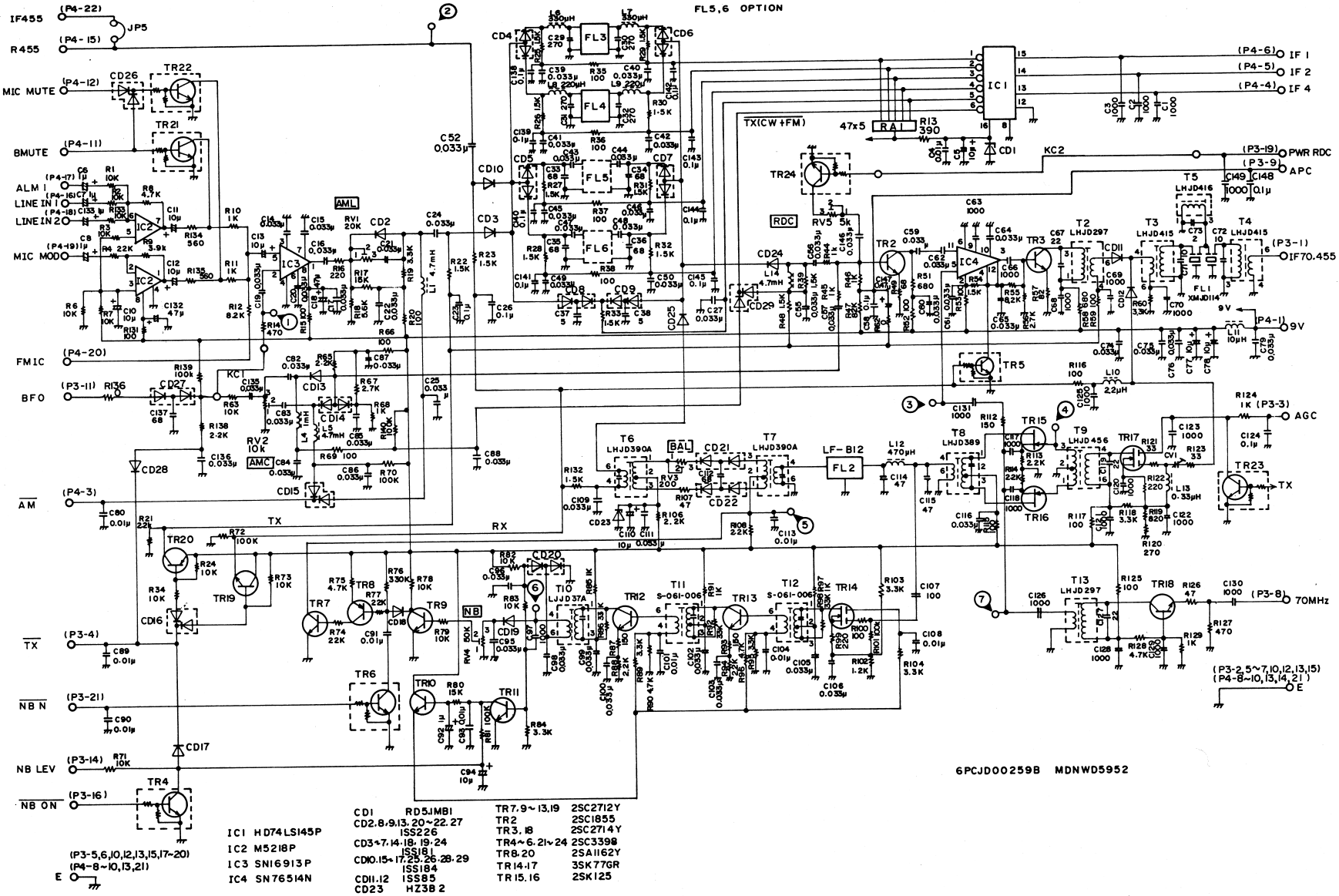


Figure 6.2.1 IF FILTER UNIT CFH-38A Circuit Diagram

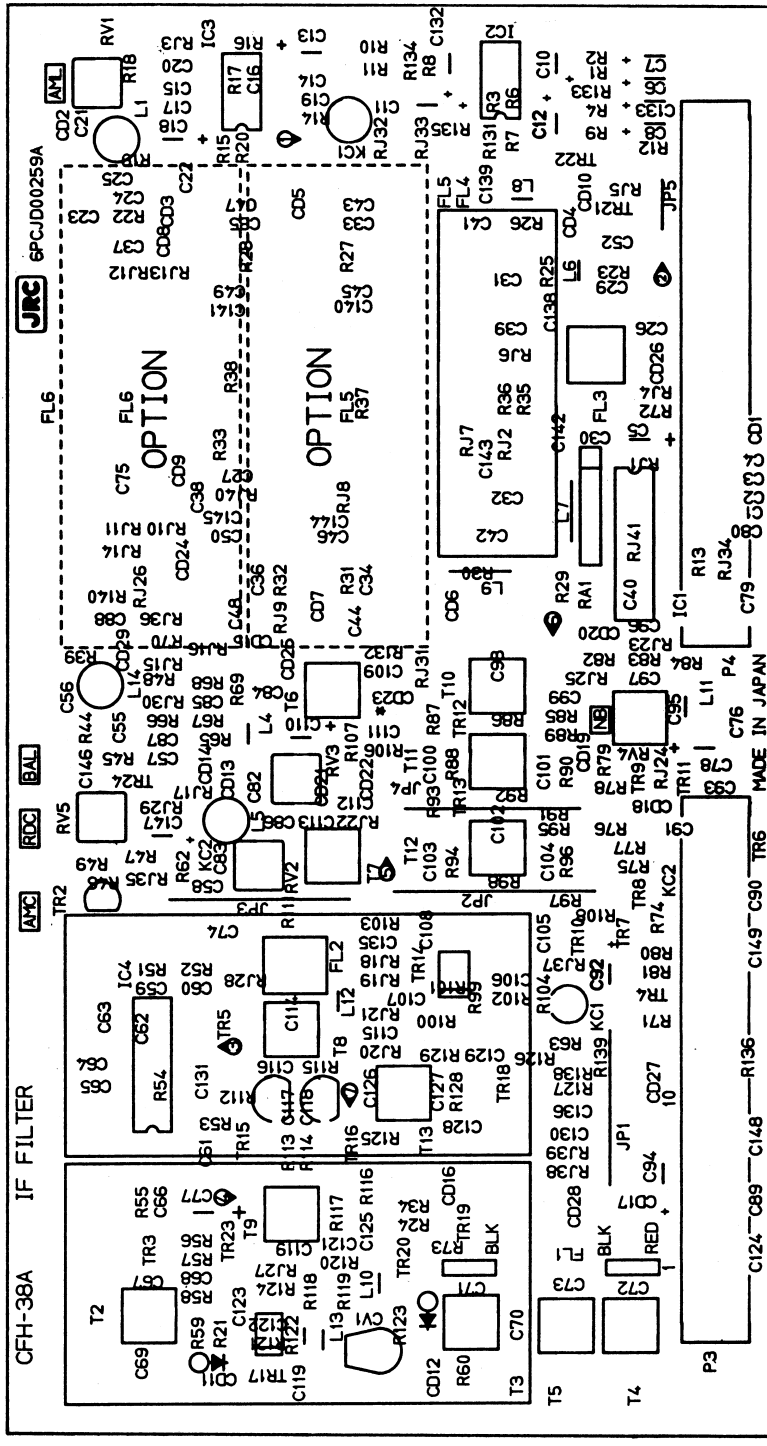
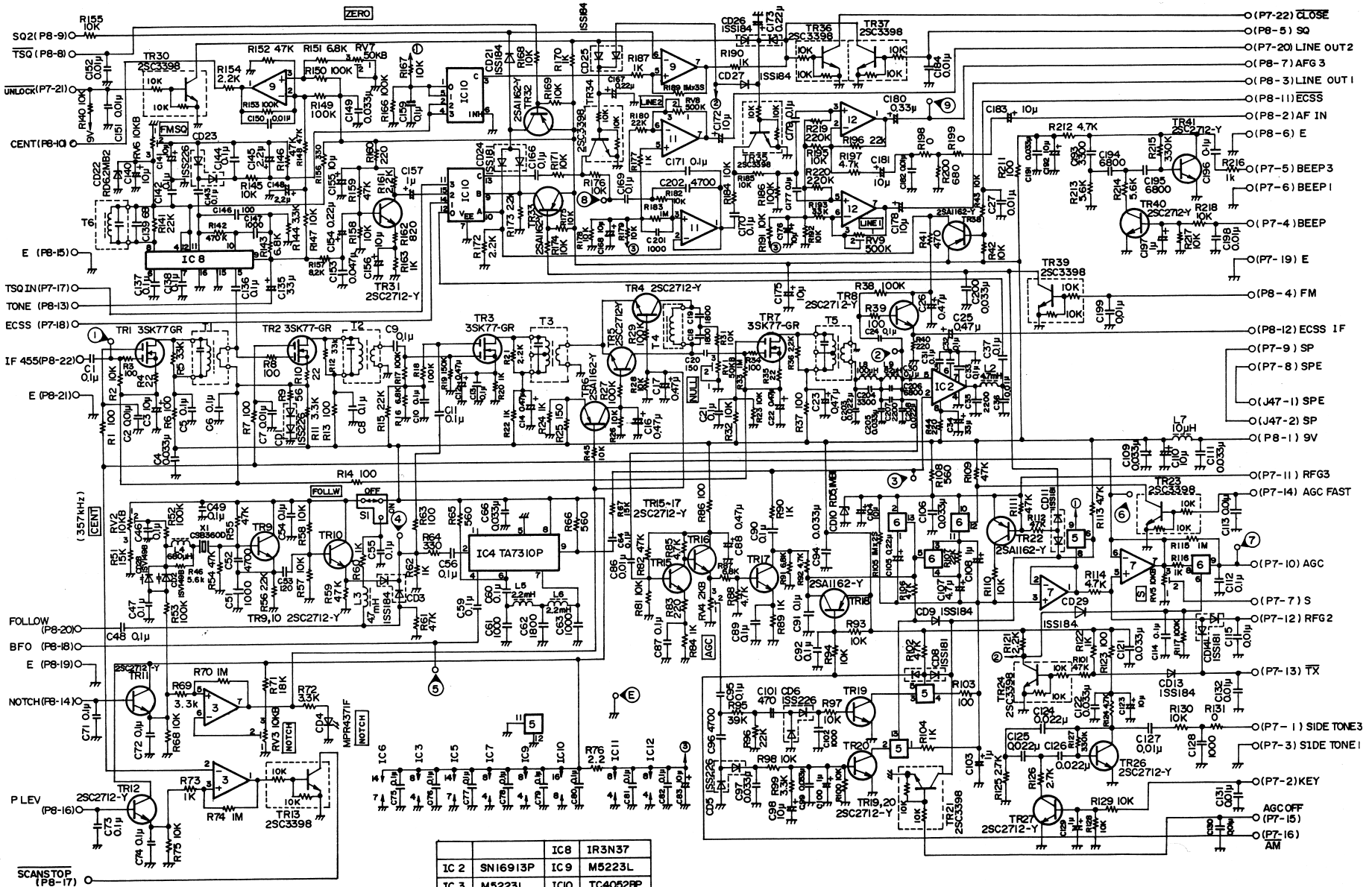


Figure 6.2.2 IF FILTER UNIT CFH-38A Component Layout



		IC8	IR3N37
IC 2	SN16913P	IC9	M5223L
IC 3	M5223L	IC10	TC4052BP
IC 4	TA7310P	IC11	M5260L
IC 5	TC4066BP	IC12	M5260L
IC 6	TC4066BP		
IC 7	M5223L		

H-6PCJD00260A MDHW00825

Figure 6.3.1 IF AMP UNIT CAE-227 Circuit Diagram

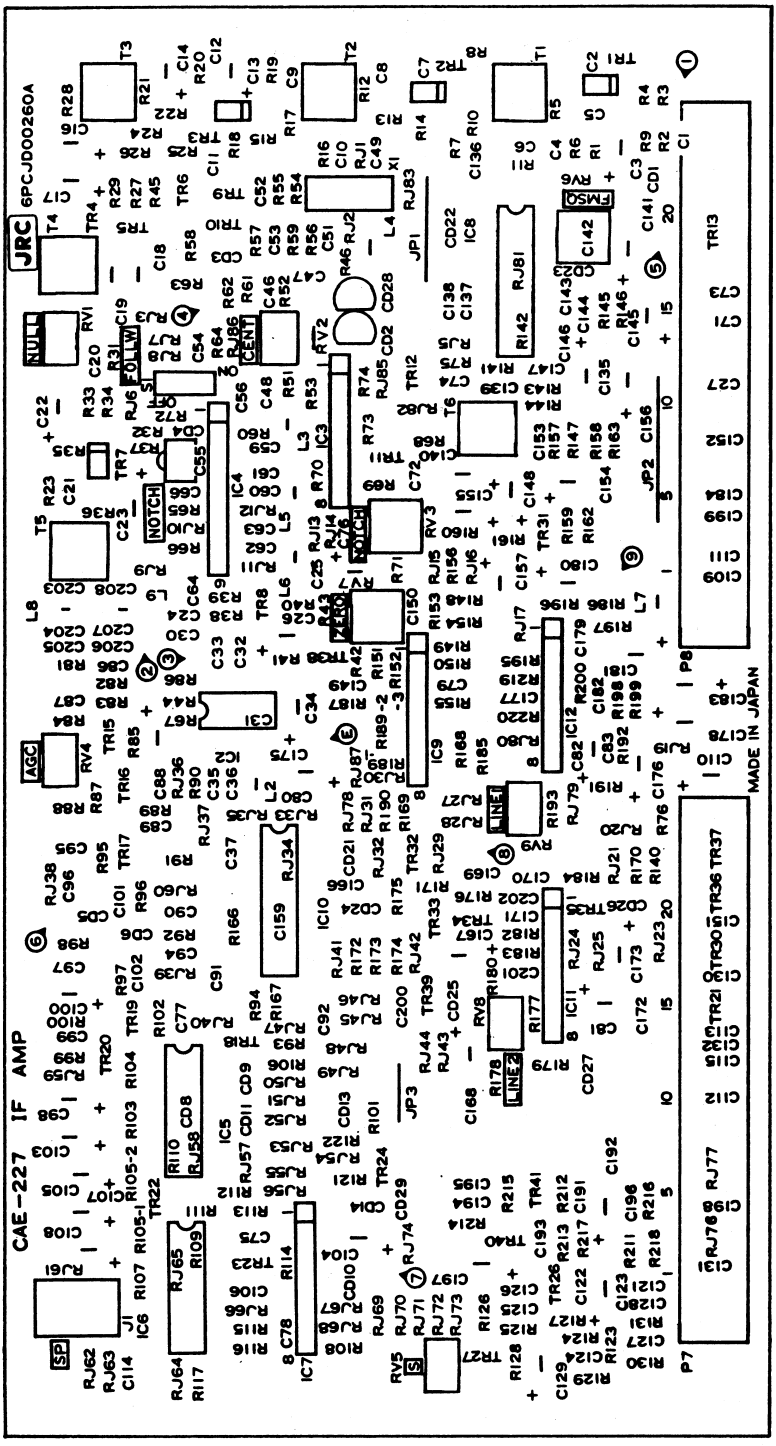


Figure 6.3.2 IF AMP UNIT CAE-227 Component Layout

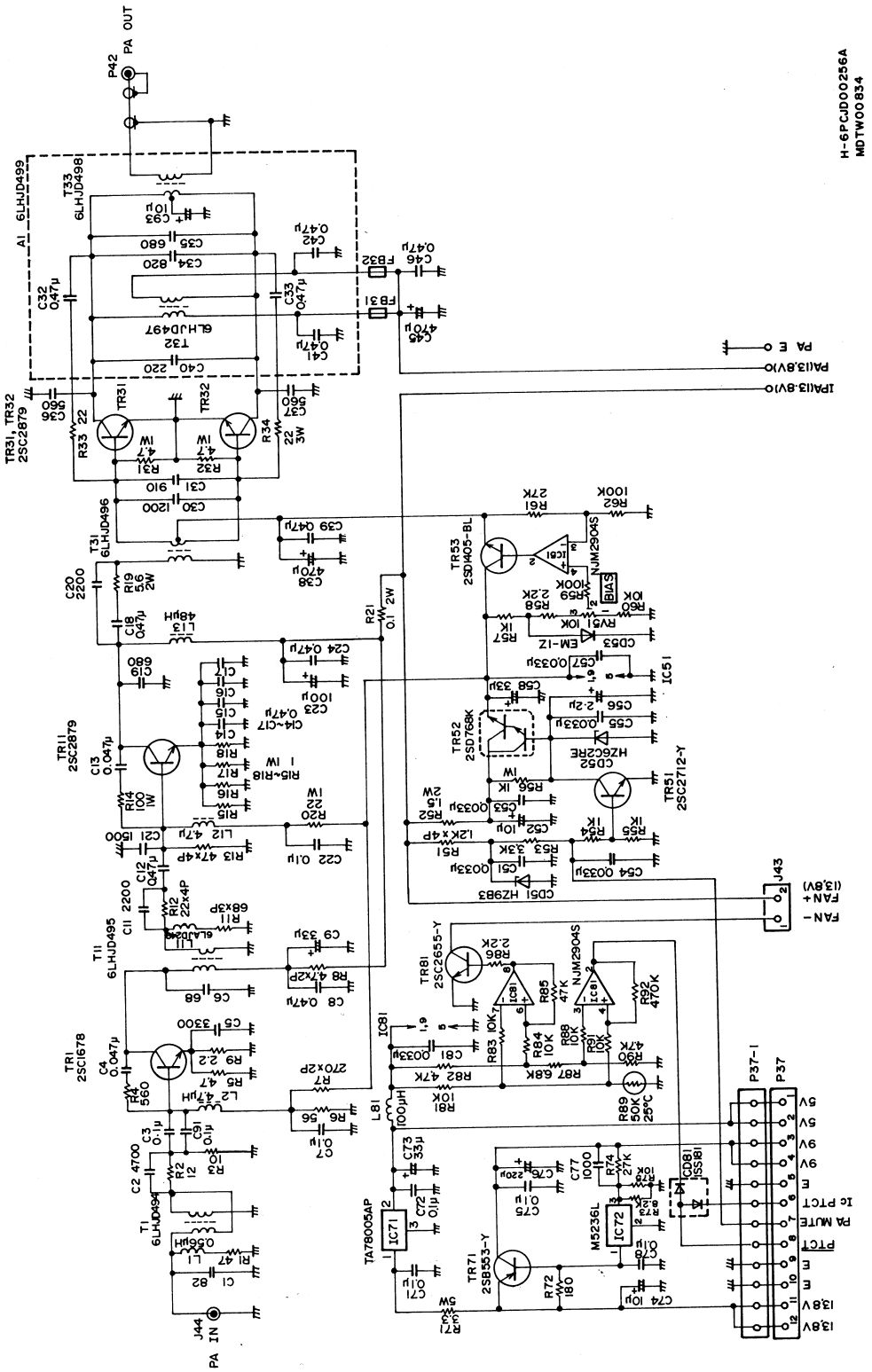


Figure 6.4.1 12 V PA UNIT CAH-301L-2 Circuit Diagram

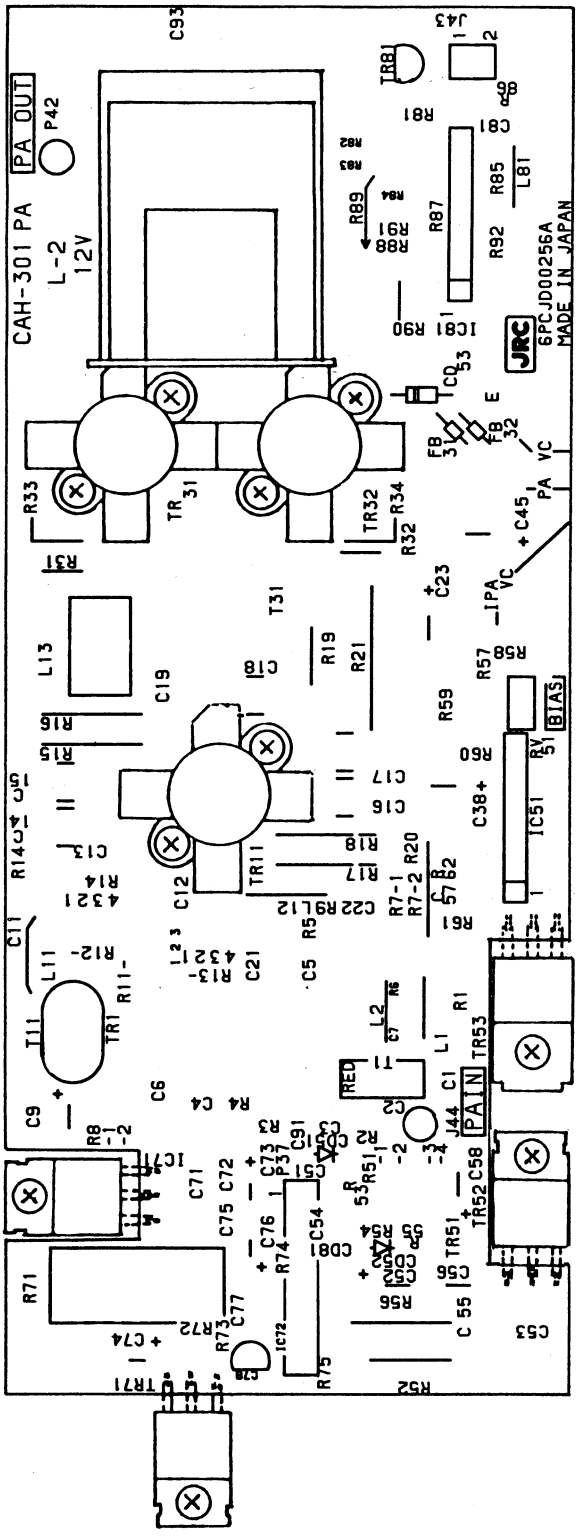


Figure 6.4.2 12 V PA UNIT CAH-301L-2 Component Layout

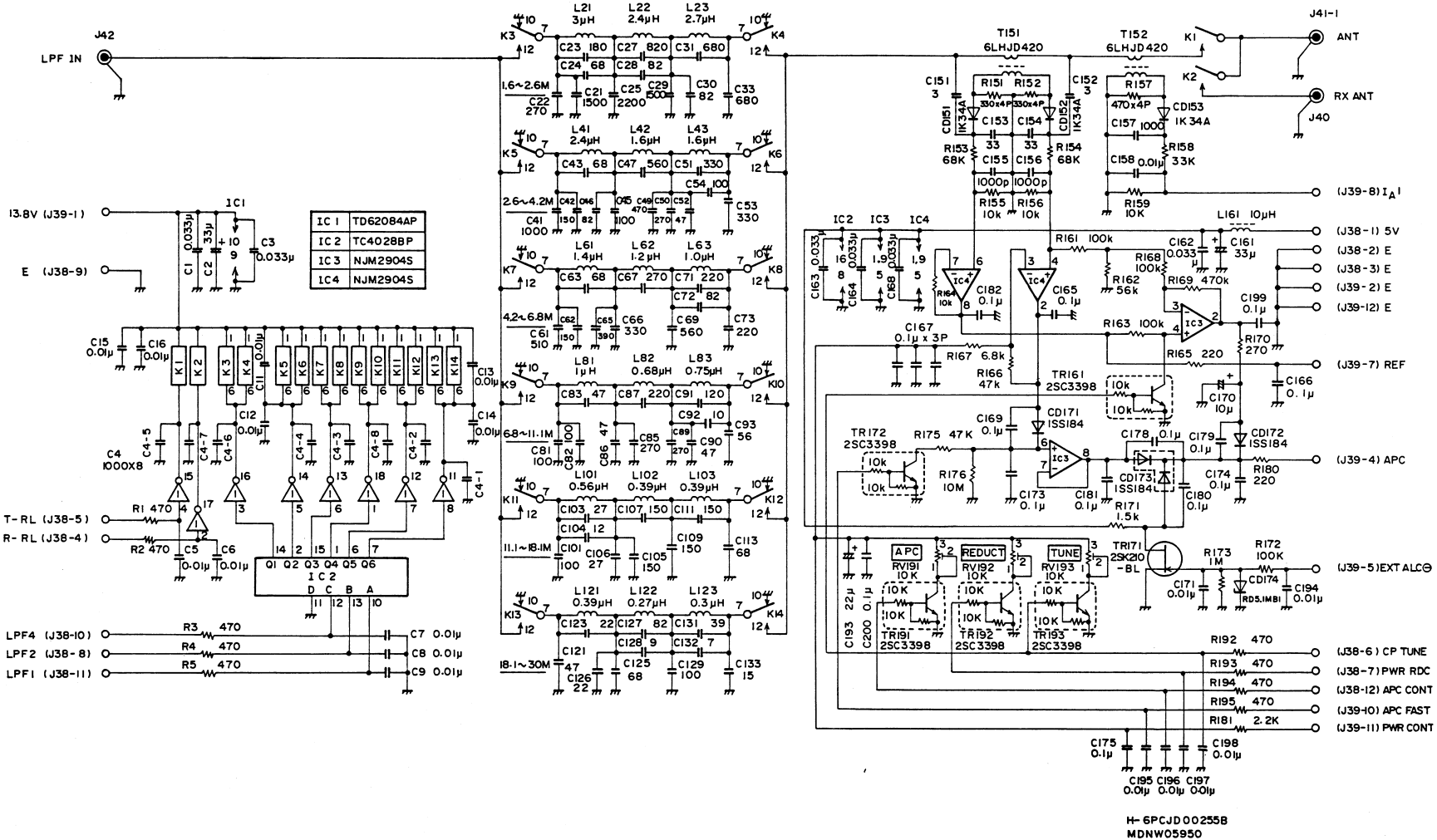


Figure 6.5.1 LPF UNIT CFJ-122-2 Circuit Diagram

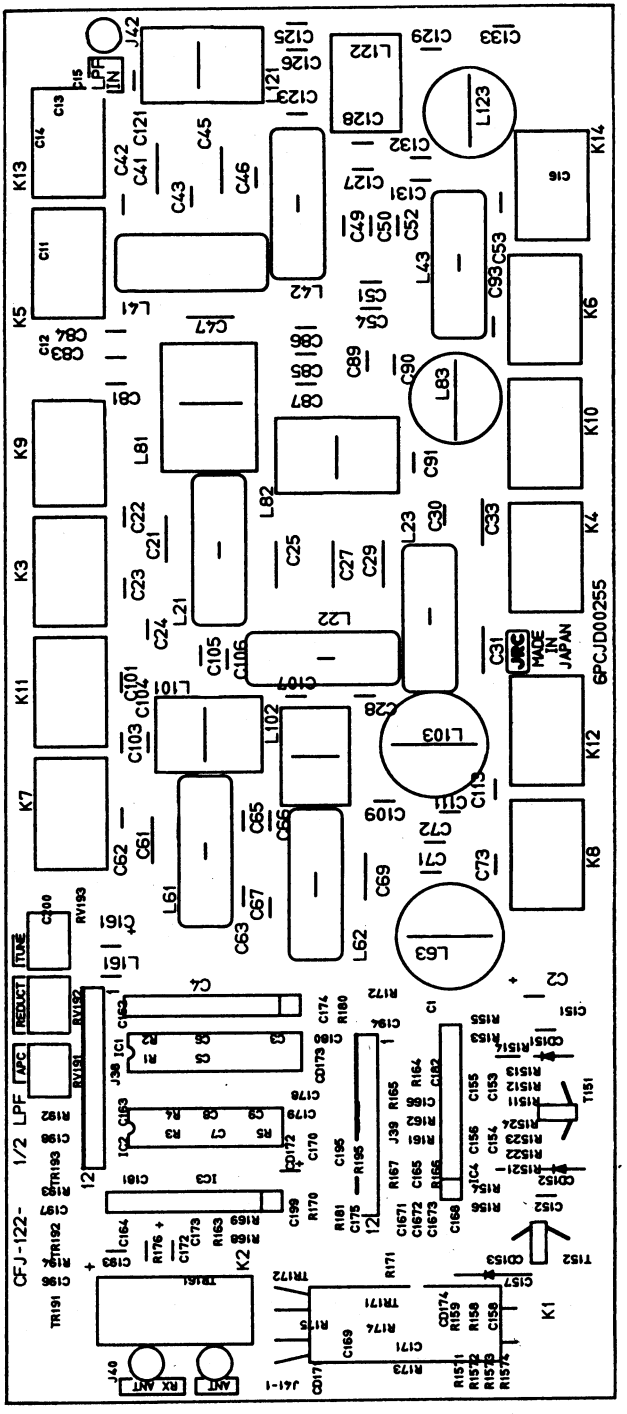
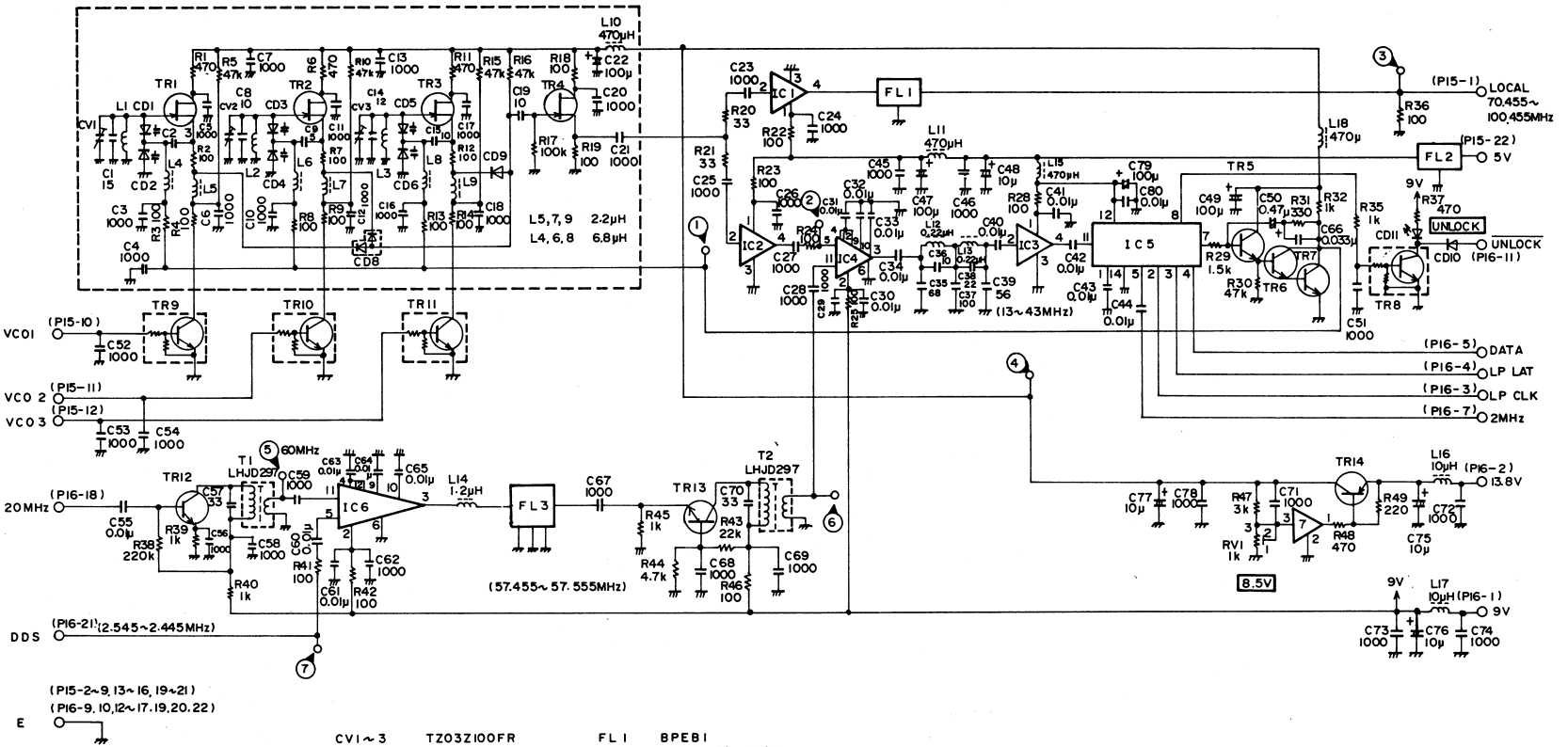


Figure 6.5.2 LPF UNIT CFJ-122-2 Component Layout



CV1~3	TZ03Z100FR	FL1	BPEB1
CD1~6	1SV203	FL2	DS310-55B222M
CD8, 9	HSM2694	FL3	SAF58MH70Z
CD10	1SS226	IC1~3	µPC1651G
CD11	MPR4371F	IC4, 6	SN76514N
TR1~4	2SK210-BL	IC5	CX7925B
TR5~7	2SC3324-GR	IC7	M5236L
TR8~11	2SC3398	L1	SC2-55T
TR12, 13	2SC2714-Y	L2	SC2-45T
TR14	2SA1015-Y	L3	SC2-35T

6PCJD00261A MDEW00768

Figure 6.6.1 LOOP1 UNIT CGA-145 Circuit Diagram

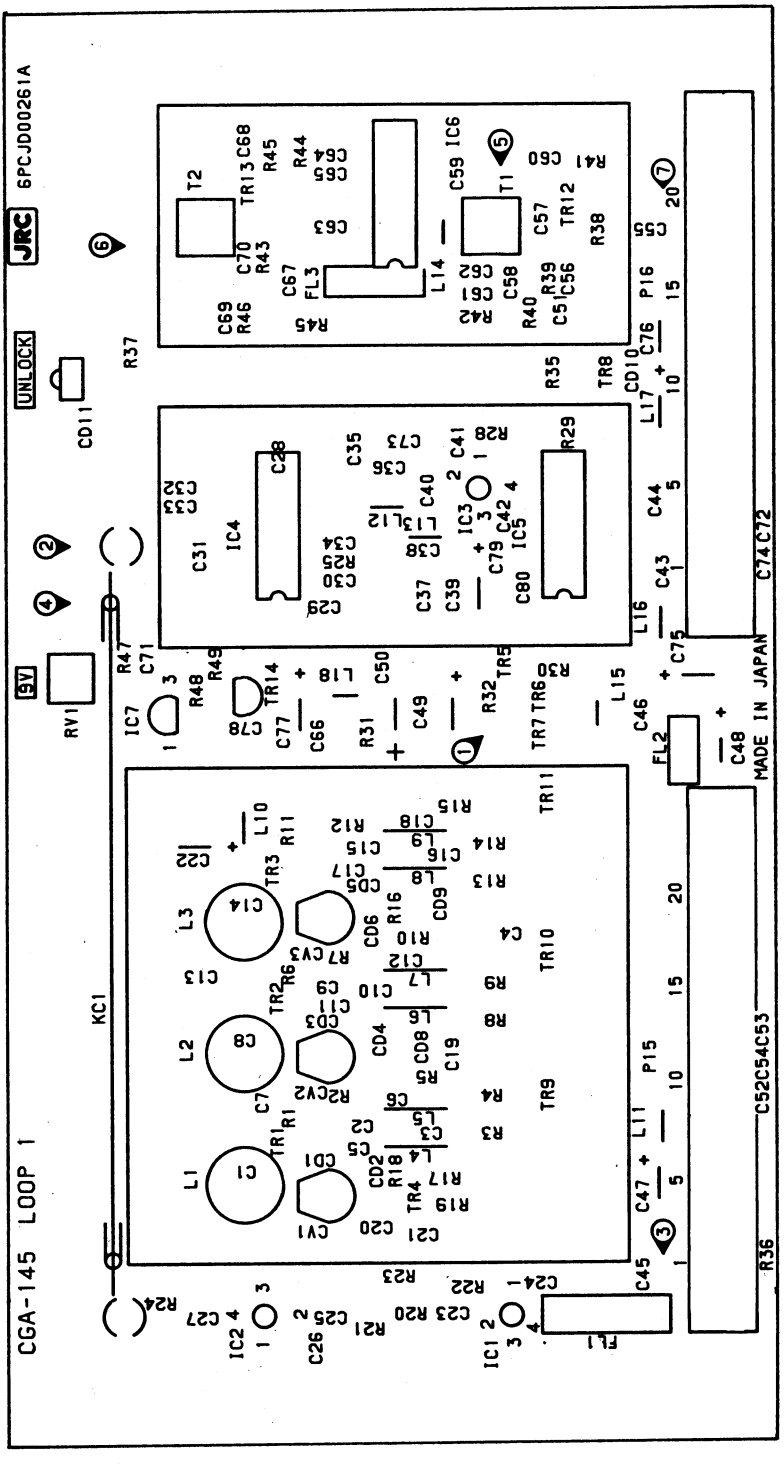
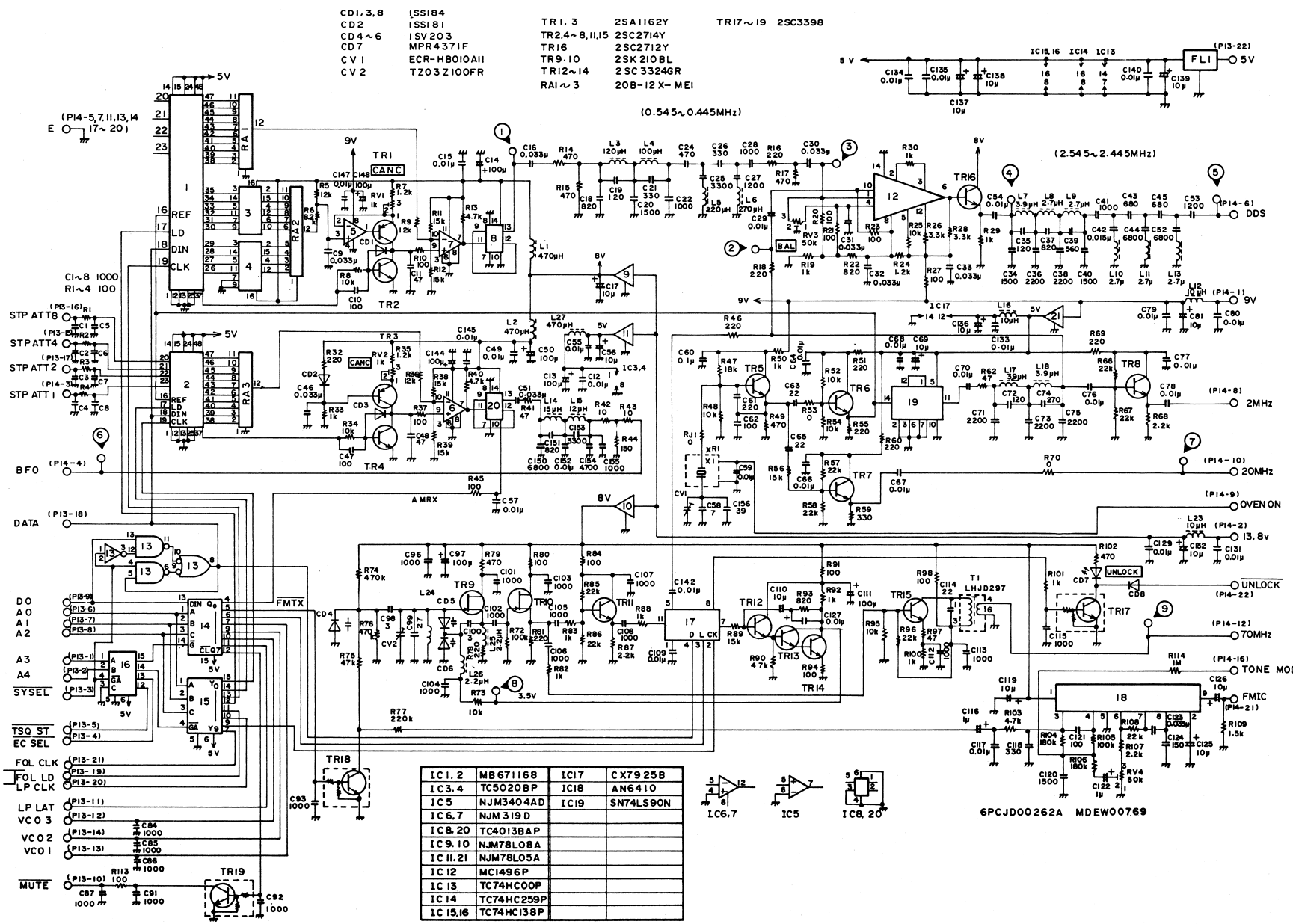


Figure 6.6.2 LOOP1 UNIT CGA-145 Component Layout



IC1, 2	MB671168	IC17	CX7925B
IC3, 4	TC5020BP	IC18	AN6410
IC5	NJM3404AD	IC19	SN74LS90N
IC6, 7	NJM319D		
IC8, 20	TC4013BAP		
IC9, 10	NJM78L08A		
IC11, 21	NJM78L05A		
IC12	MC1496P		
IC13	TC74HC00P		
IC14	TC74HC259P		
IC15, 16	TC74HC138P		

IC6, 7 IC5 IC8, 20

Figure 6.7.1 REF DDS UNIT CGK-81A Circuit Diagram

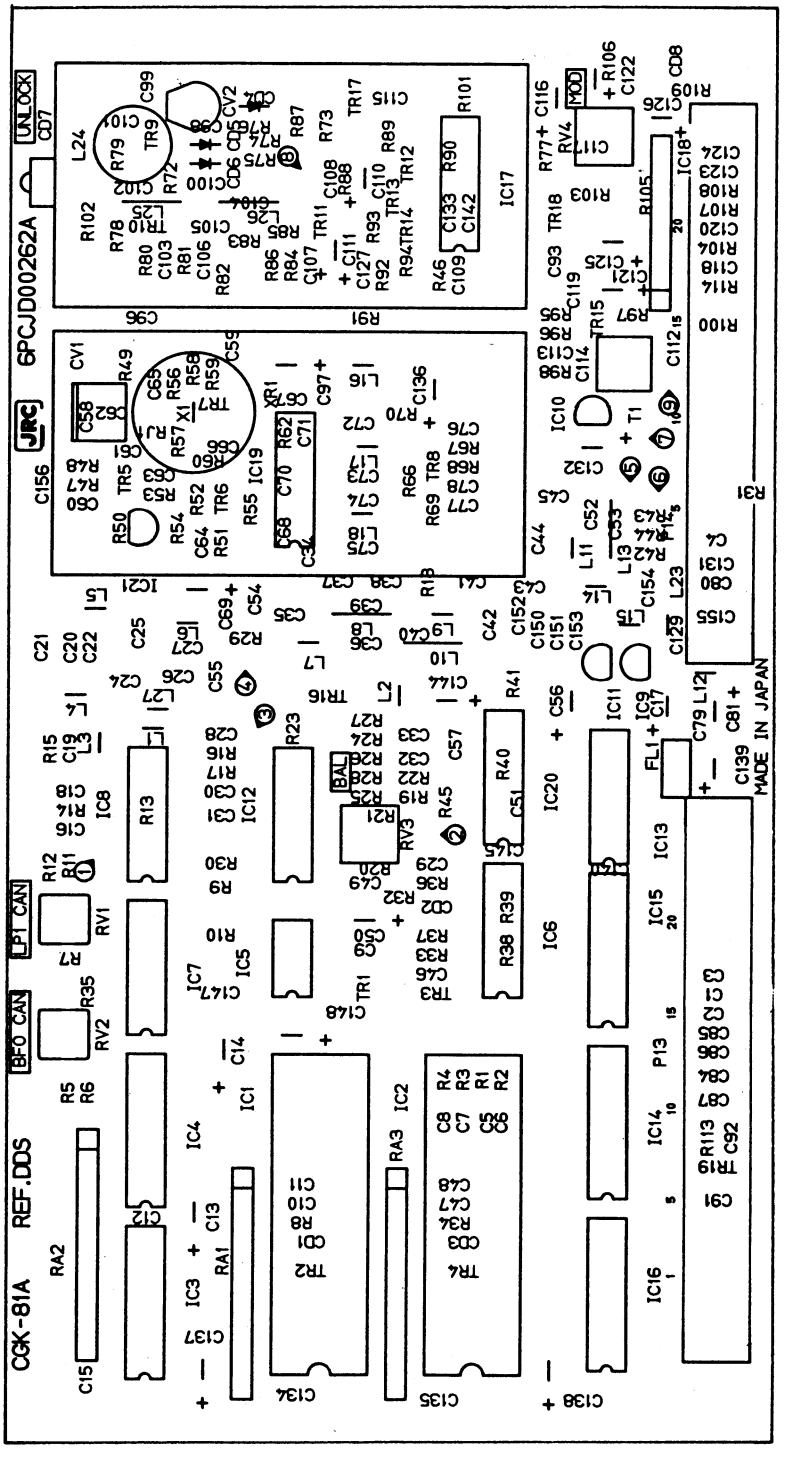
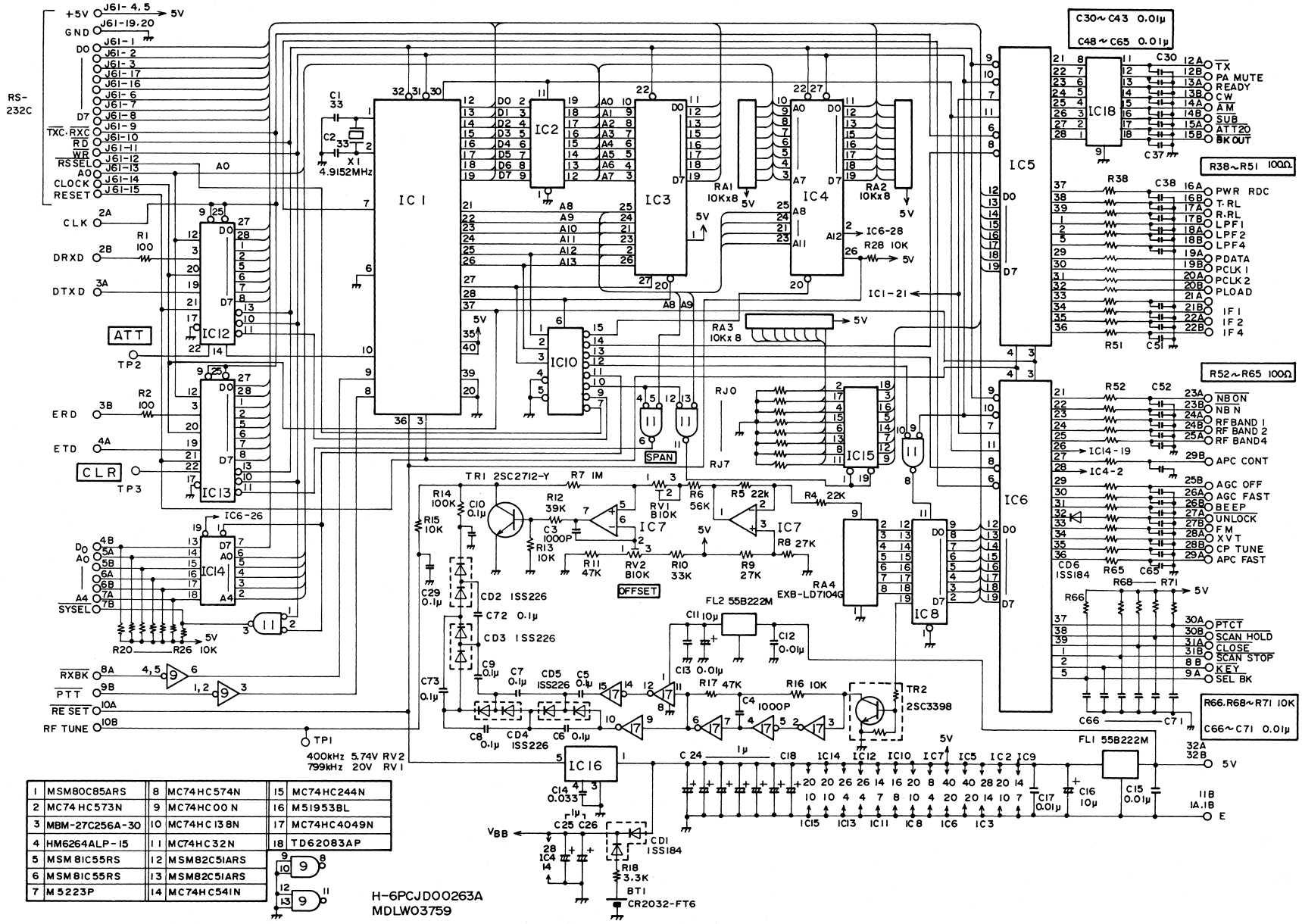


Figure 6.7.2 REF DDS UNIT CGK-81A Component Layout



1	MSM80C85ARS	8	MC74HC574N	15	MC74HC244N
2	MC74HC573N	9	MC74HC00N	16	M51953BL
3	MBM-27C256A-30	10	MC74HC138N	17	MC74HC4049N
4	HM6264ALP-15	11	MC74HC32N	18	TD62083AP
5	MSM81C55RS	12	MSM82C51ARS		
6	MSM81C55RS	13	MSM82C51ARS		
7	M5223P	14	MC74HC541N		

Figure 6.8.1 CPU UNIT CDC-493A Circuit Diagram

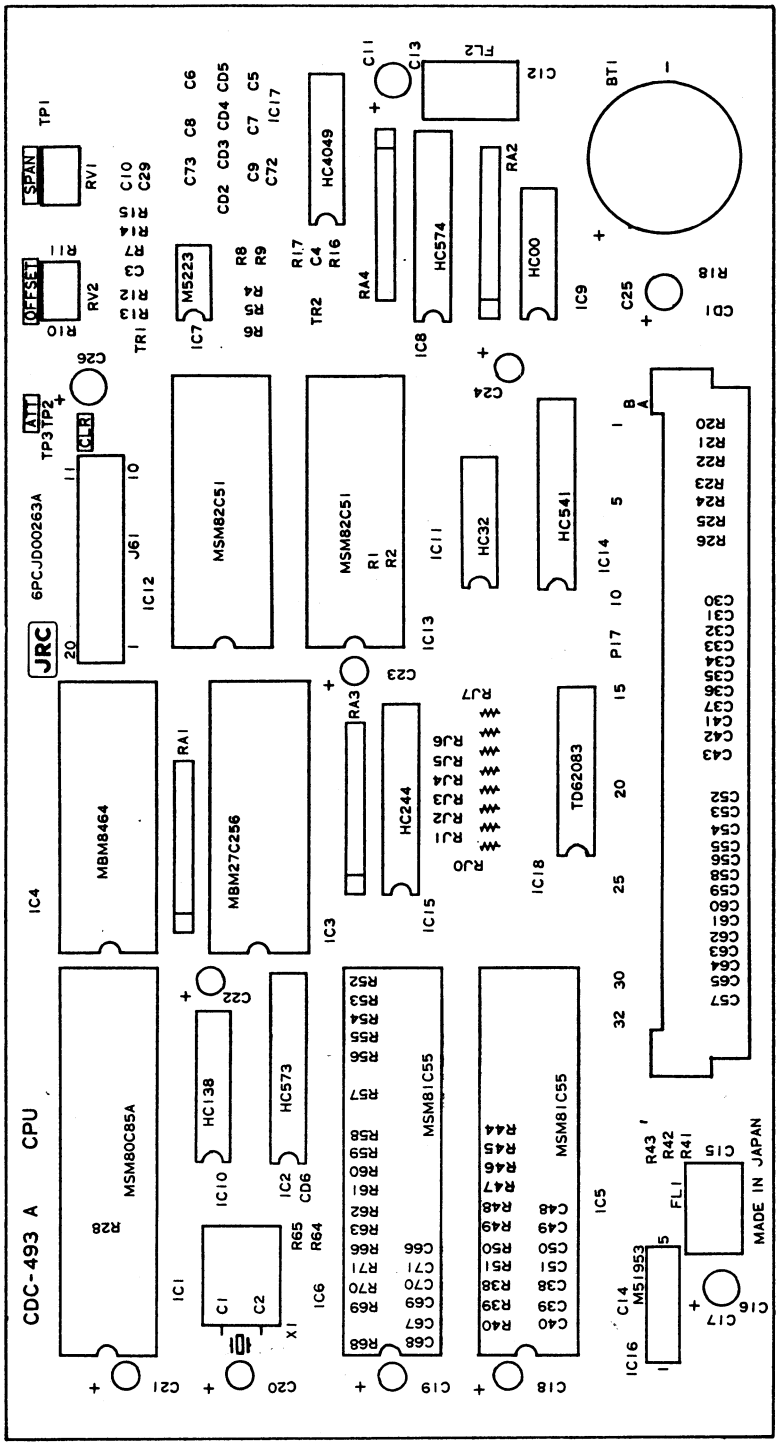
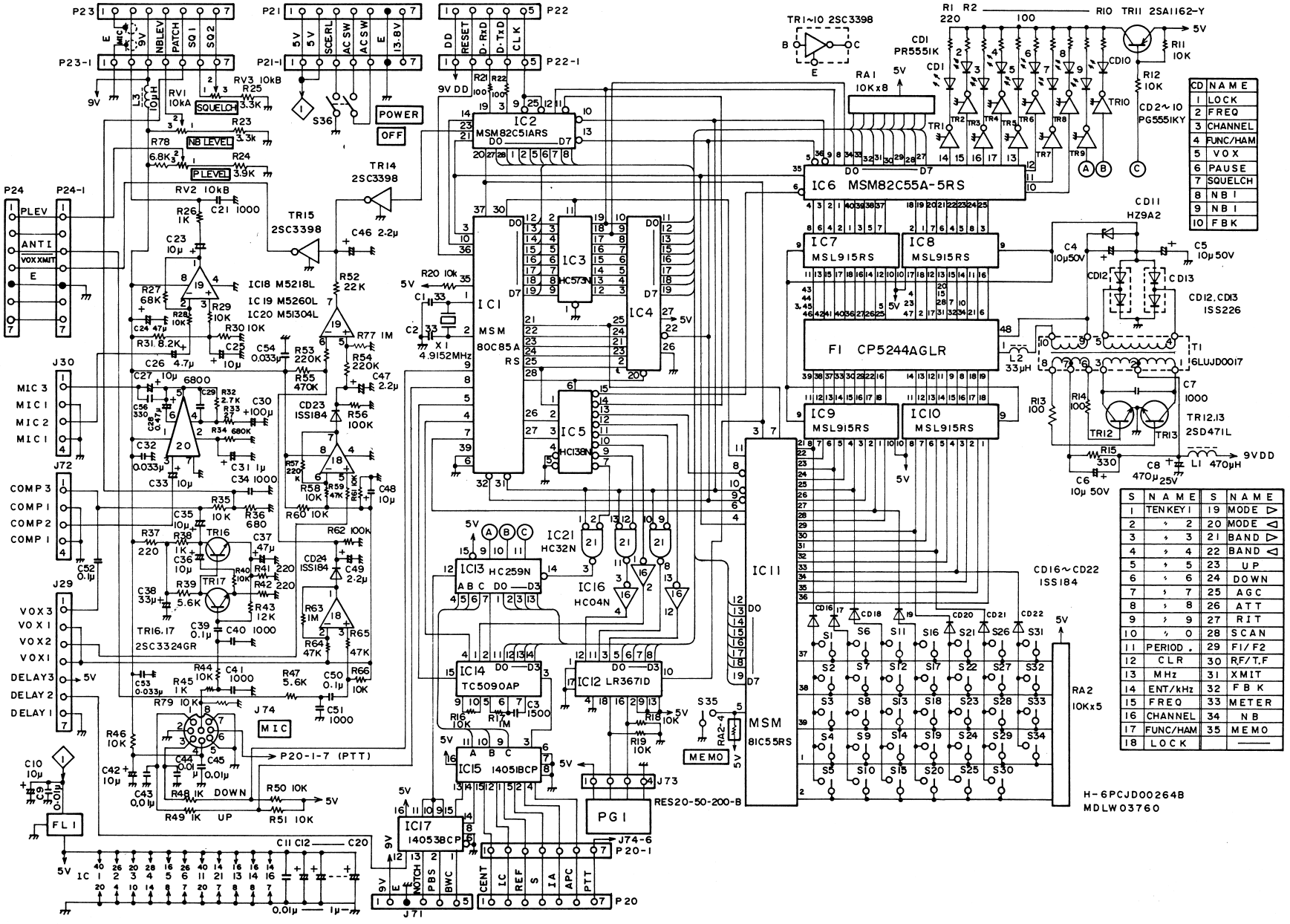


Figure 6.8.2 CPU UNIT CDC-493A Component Layout



CD	NAME
1	LOCK
2	FREQ
3	CHANNEL
4	FUNC/HAM
5	VOX
6	PAUSE
7	SQUELCH
8	NB I
9	NB I
10	FBK

S	NAME	S	NAME
1	TENKEY 1	19	MODE ▷
2	〃 2	20	MODE ◁
3	〃 3	21	BAND ▷
4	〃 4	22	BAND ◁
5	〃 5	23	UP
6	〃 6	24	DOWN
7	〃 7	25	AGC
8	〃 8	26	ATT
9	〃 9	27	RIT
10	〃 0	28	SCAN
11	PERIOD .	29	F1/F2
12	CLR	30	R.F/T.F
13	MHz	31	XMIT
14	ENT/kHz	32	F B K
15	FREQ	33	METER
16	CHANNEL	34	NB
17	FUNC/HAM	35	MEMO
18	LOCK		

Figure 6.9.1 DISPLAY UNIT CDE-576 Circuit Diagram

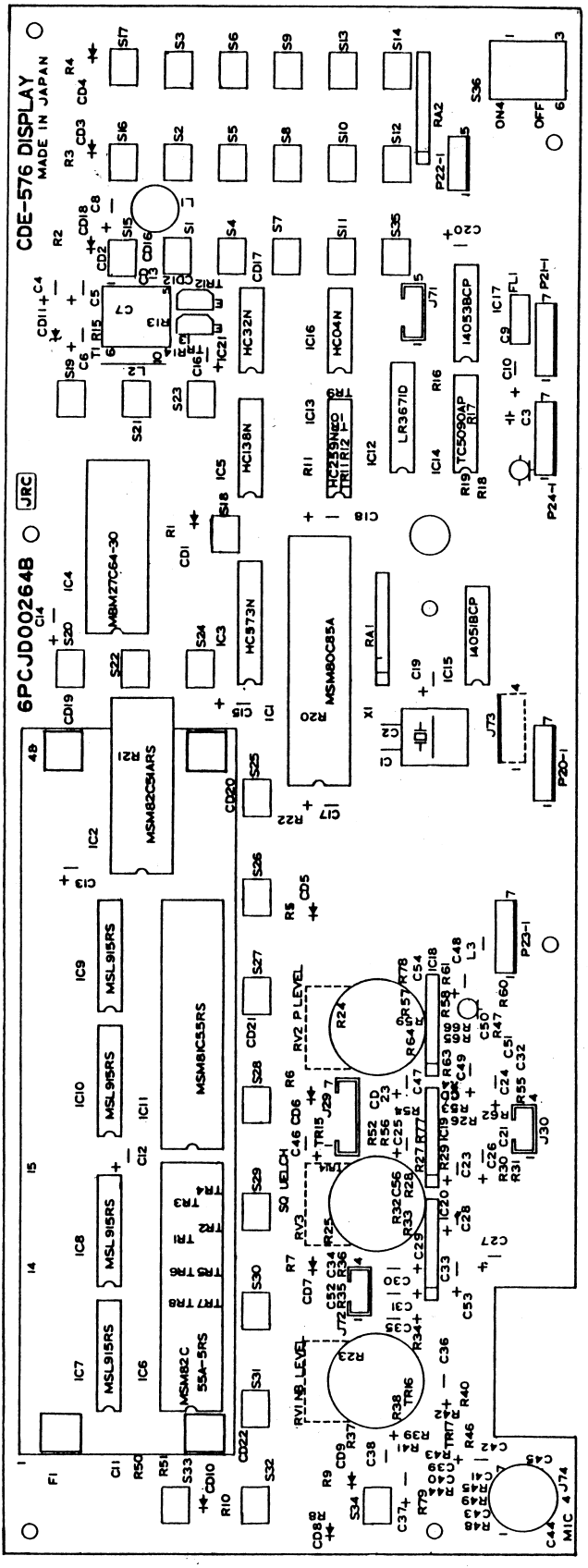


Figure 6.9.2 DISPLAY UNIT CDE-576 Component Layout

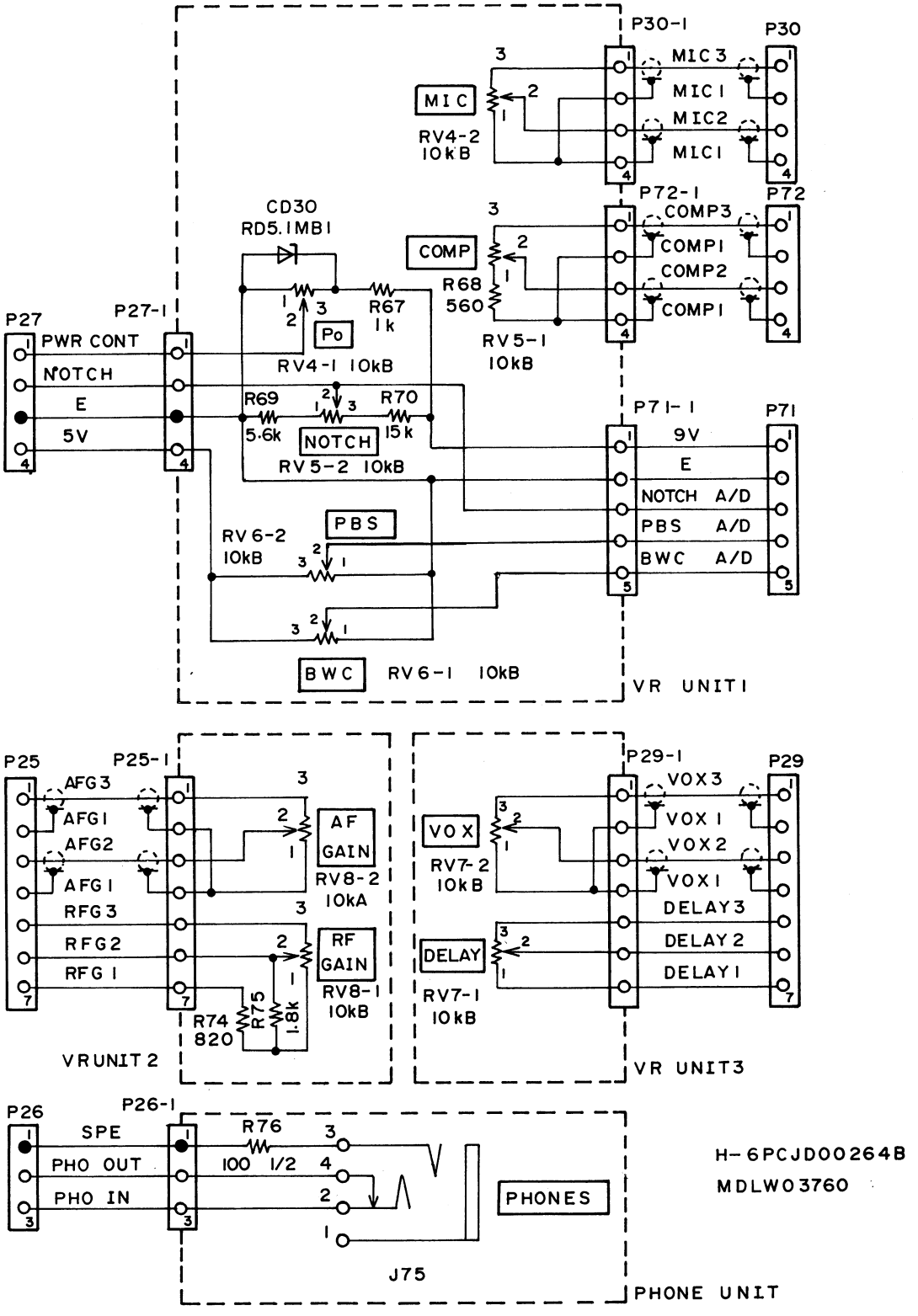
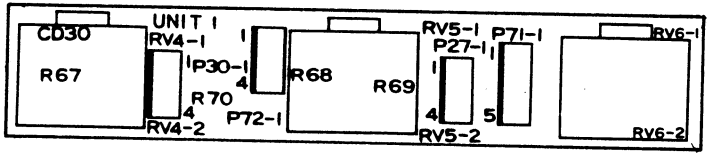
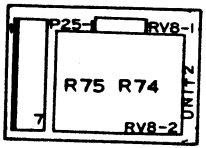


Figure 6.10.1 DISPLAY (VR) UNIT CDE-576 Circuit Diagram





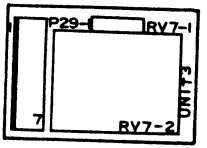


Figure 6.10.2 DISPLAY (VR) UNIT CDE-576 Component Layout

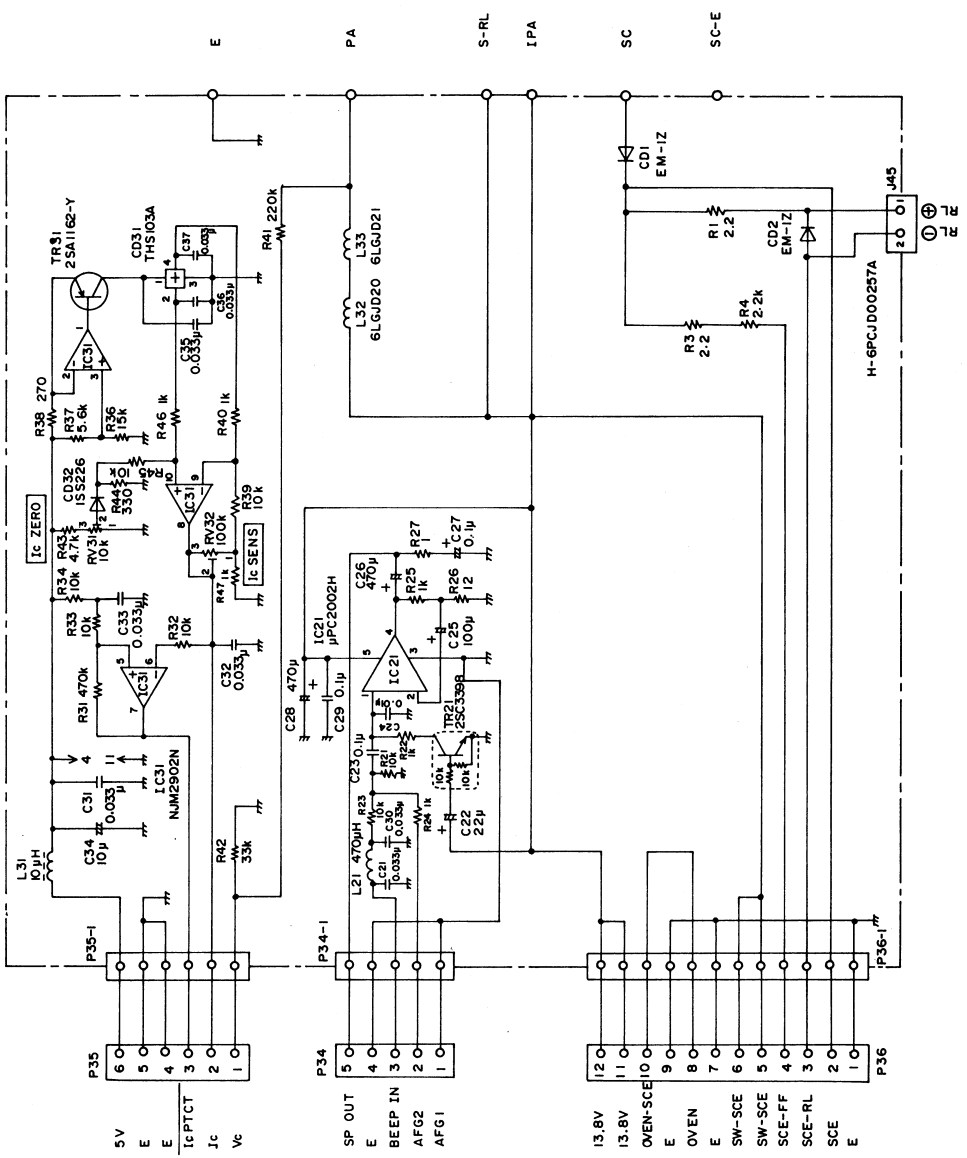


Figure 6.11.1 AF AMP UNIT CBD-894L Circuit Diagram

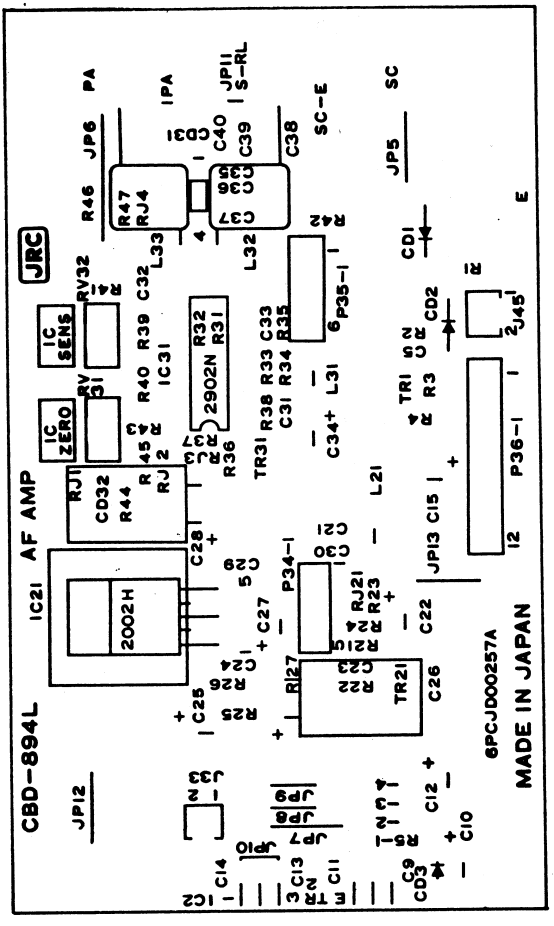


Figure 6.11.2 AF AMP UNIT CBD-894L Component Layout

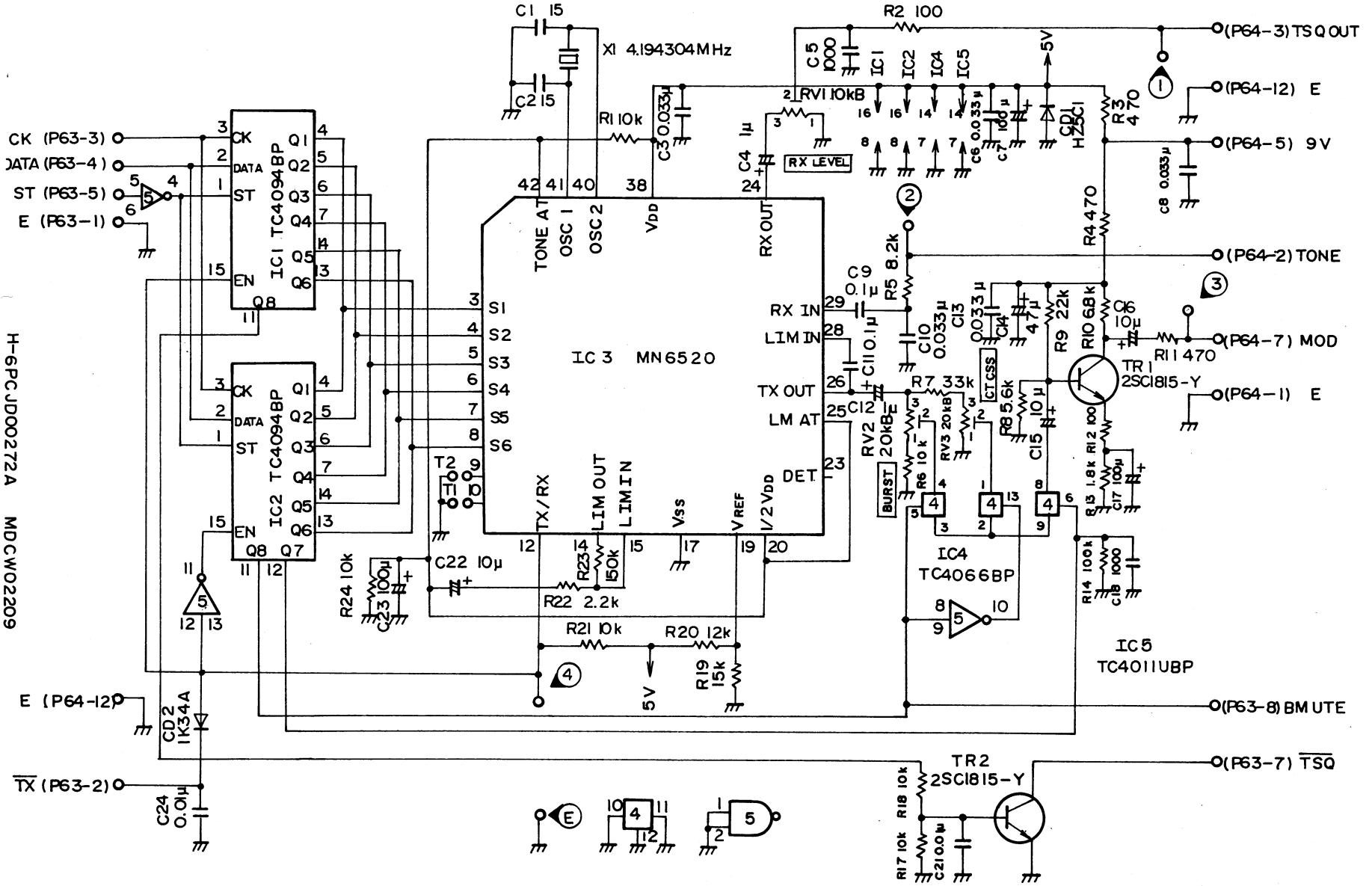


Figure 6.12.1 TONE SQ UNIT CCL-212 Circuit Diagram

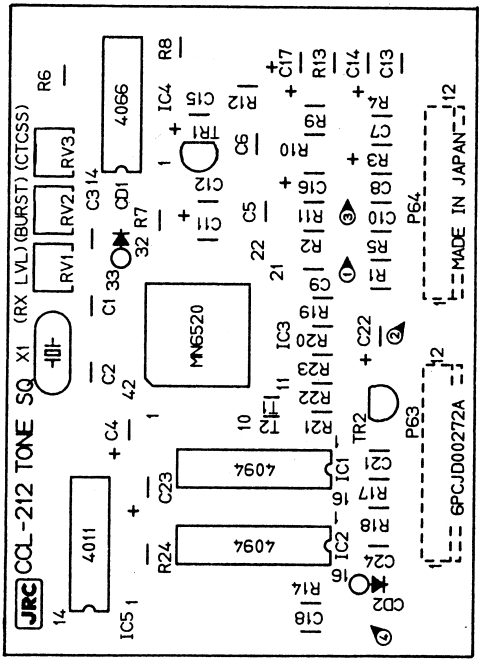


Figure 6.12.2 TONE SQ UNIT CCL-212 Component Layout

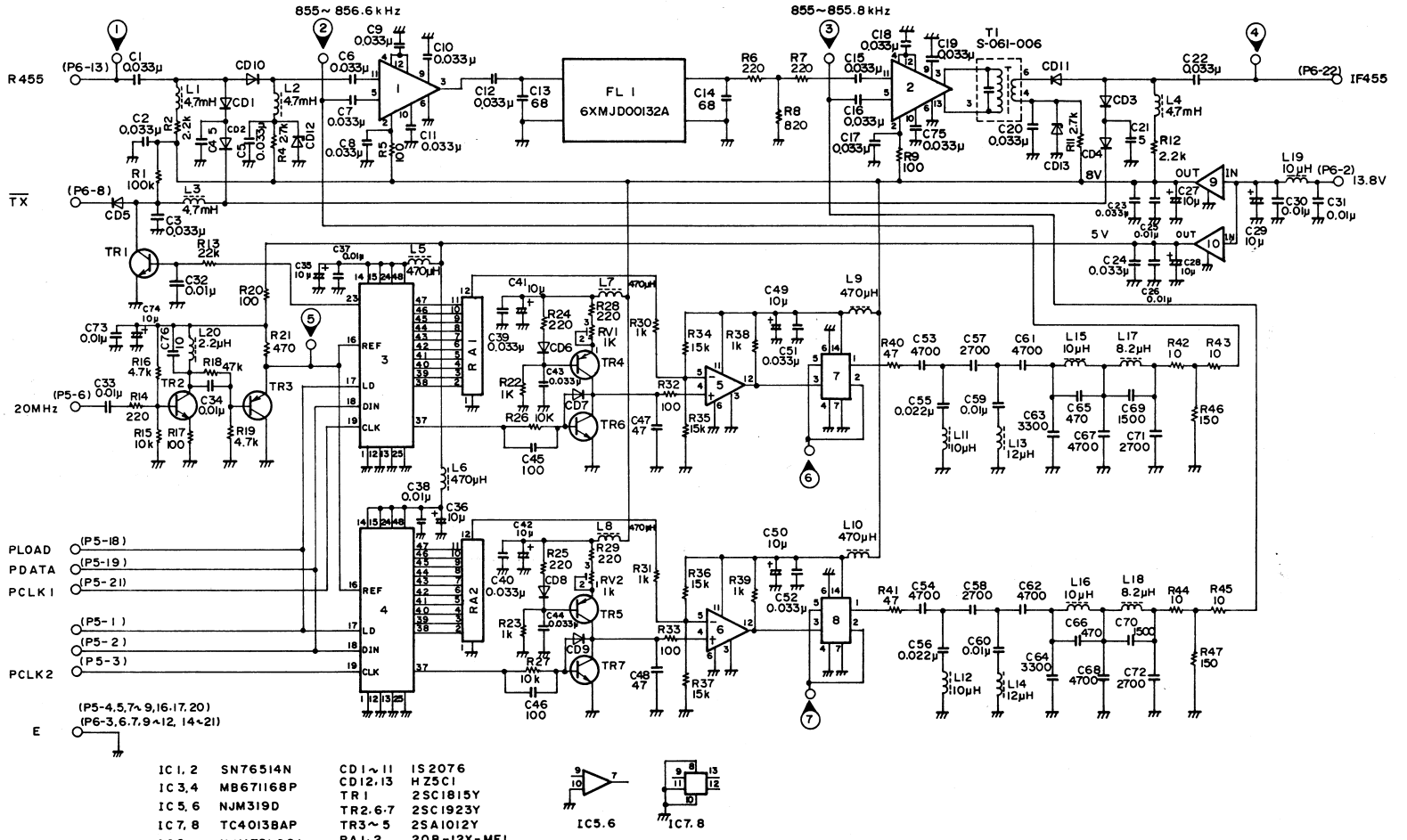


Figure 6.13.1 BWC UNIT CFL-243 Circuit Diagram

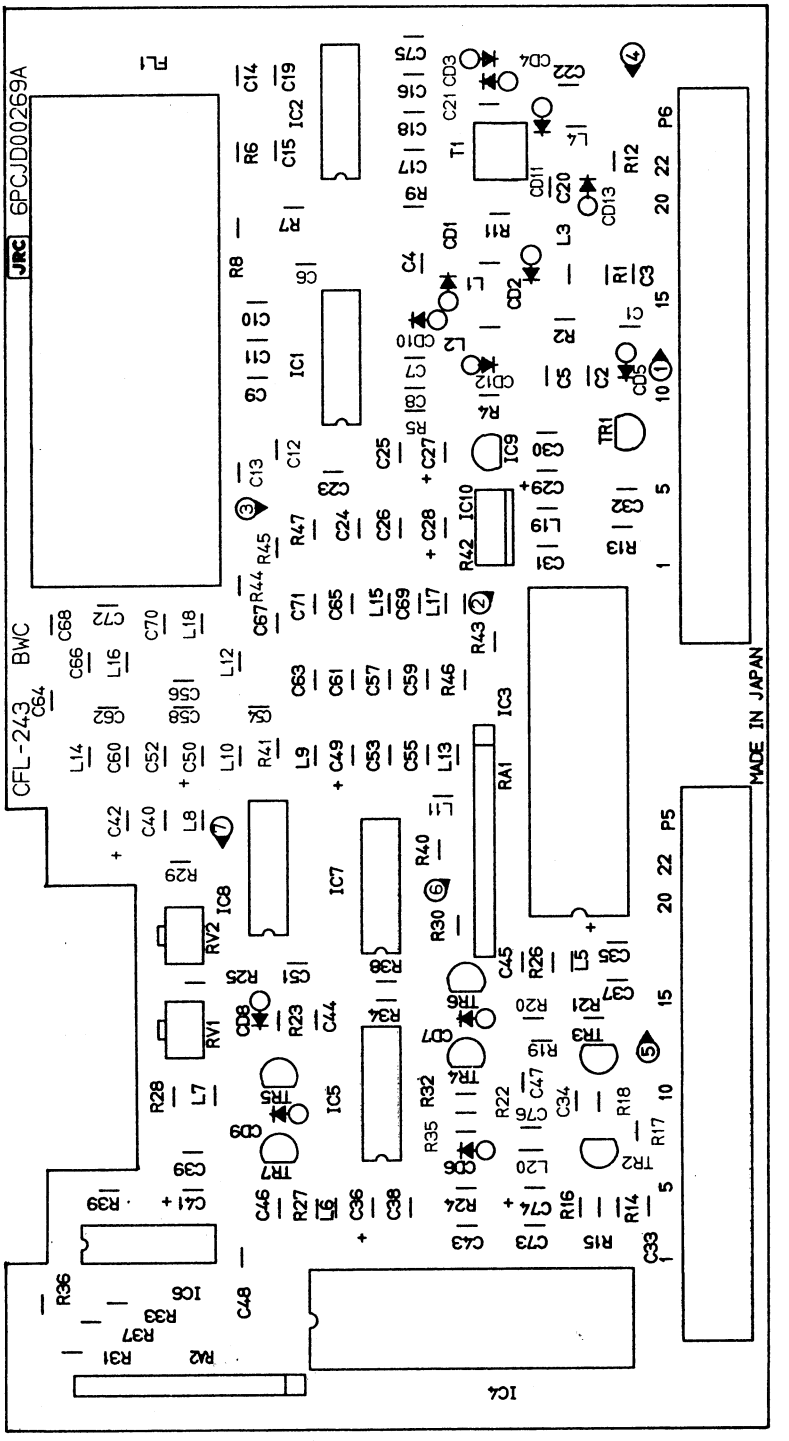
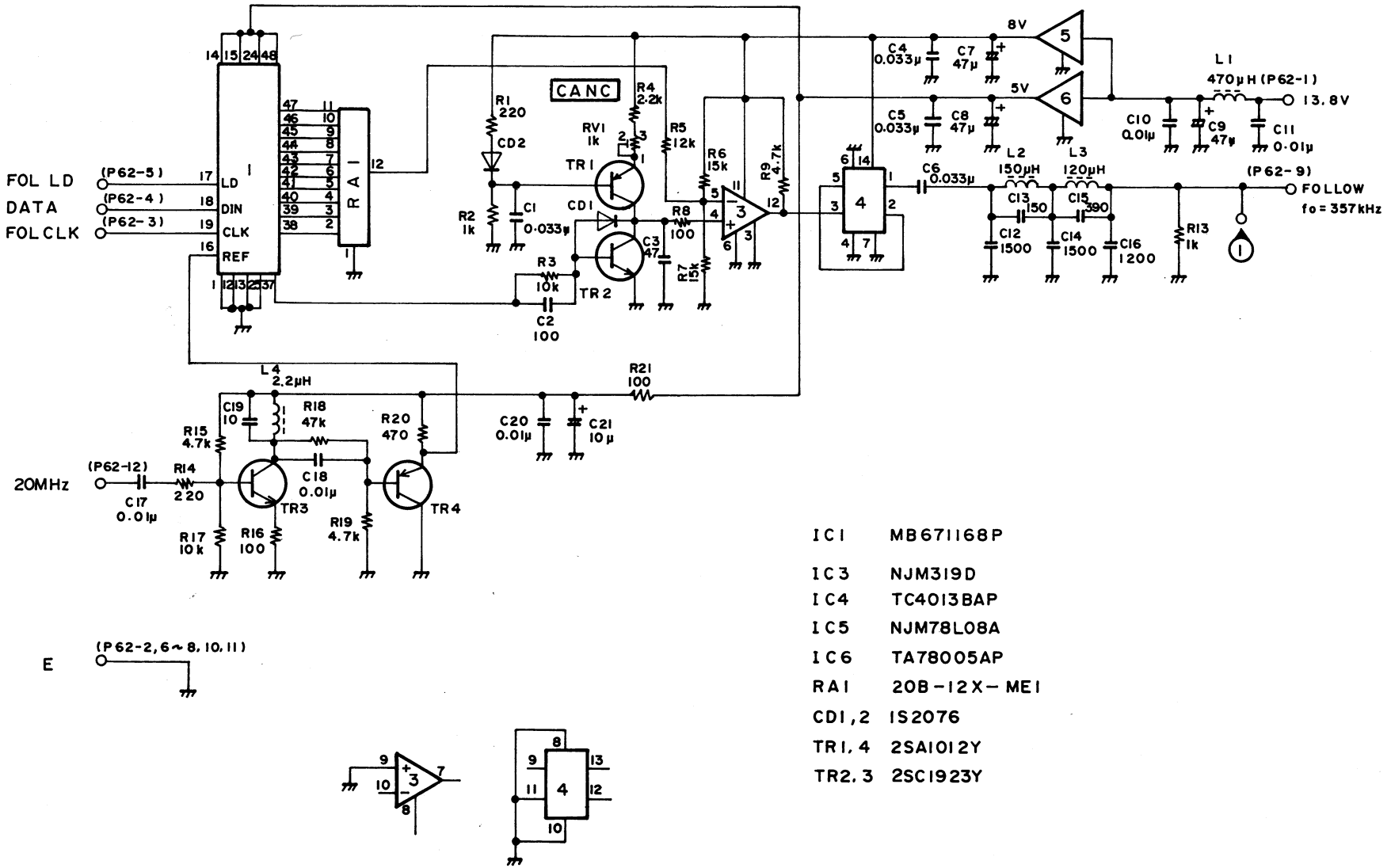


Figure 6.13.2 BWC UNIT CFL-243 Component Layout



IC1	MB671168P
IC3	NJM319D
IC4	TC4013BAP
IC5	NJM78L08A
IC6	TA78005AP
RA1	20B-12X-ME1
CD1,2	1S2076
TR1,4	2SA1012Y
TR2,3	2SC1923Y

Figure 6.14.1 NOTCH FOLLOW UNIT CDD-366 Circuit Diagram

6PCJD00273A

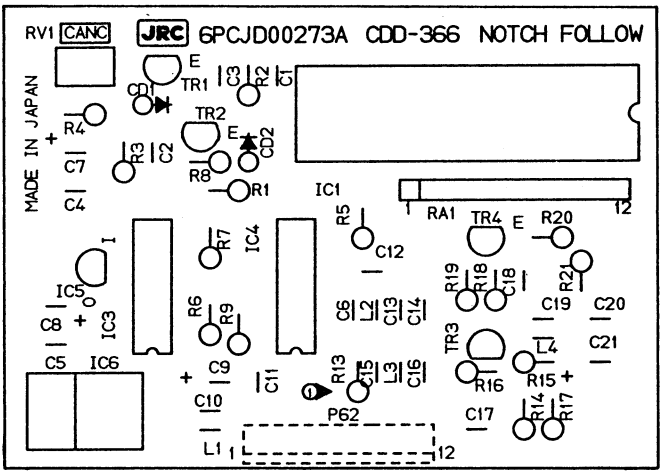


Figure 6.14.2 NOTCH FOLLOW UNIT CDD-366 Component Layout

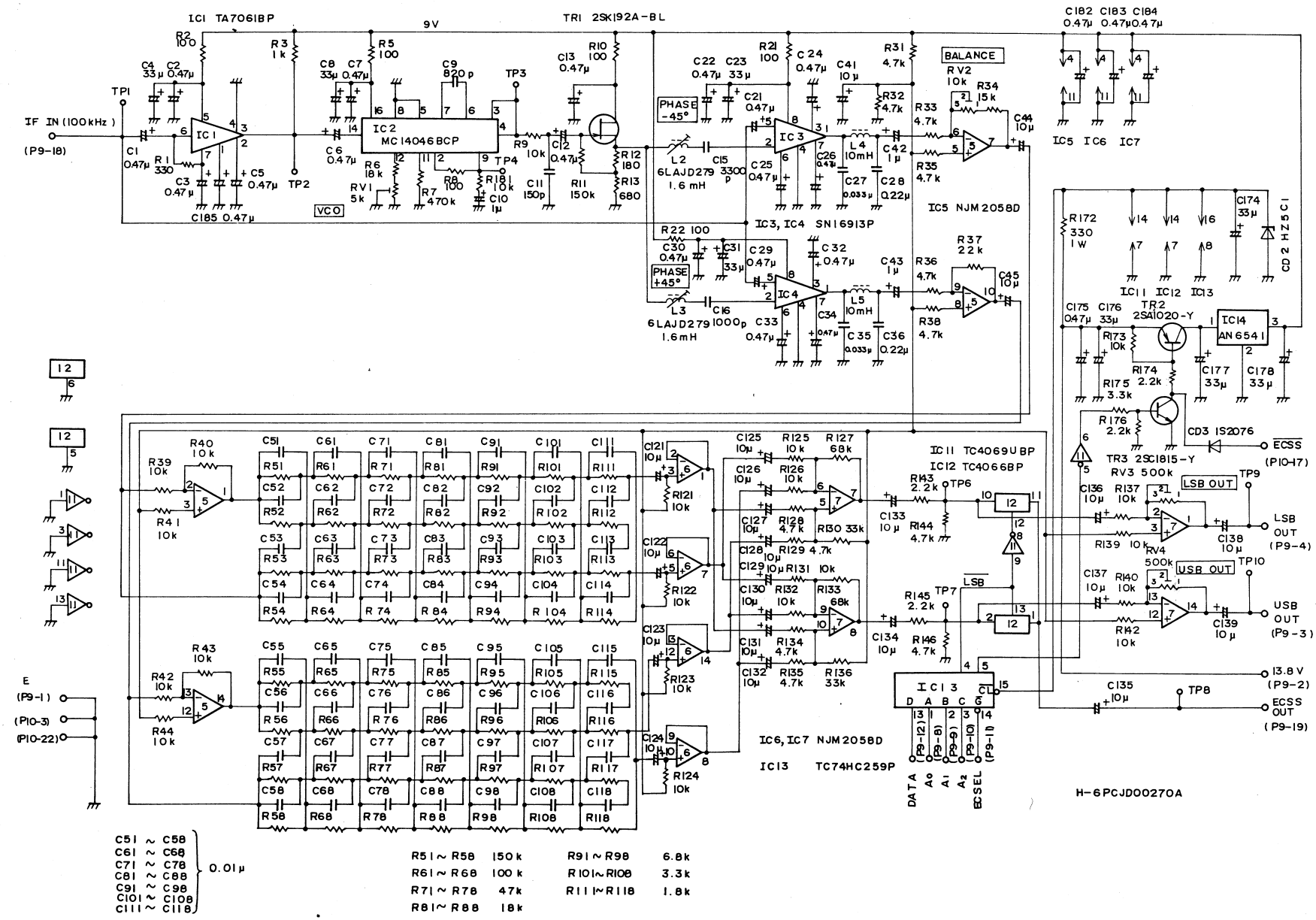


Figure 6.15.1 ECSS UNIT CMF-78 Circuit Diagram

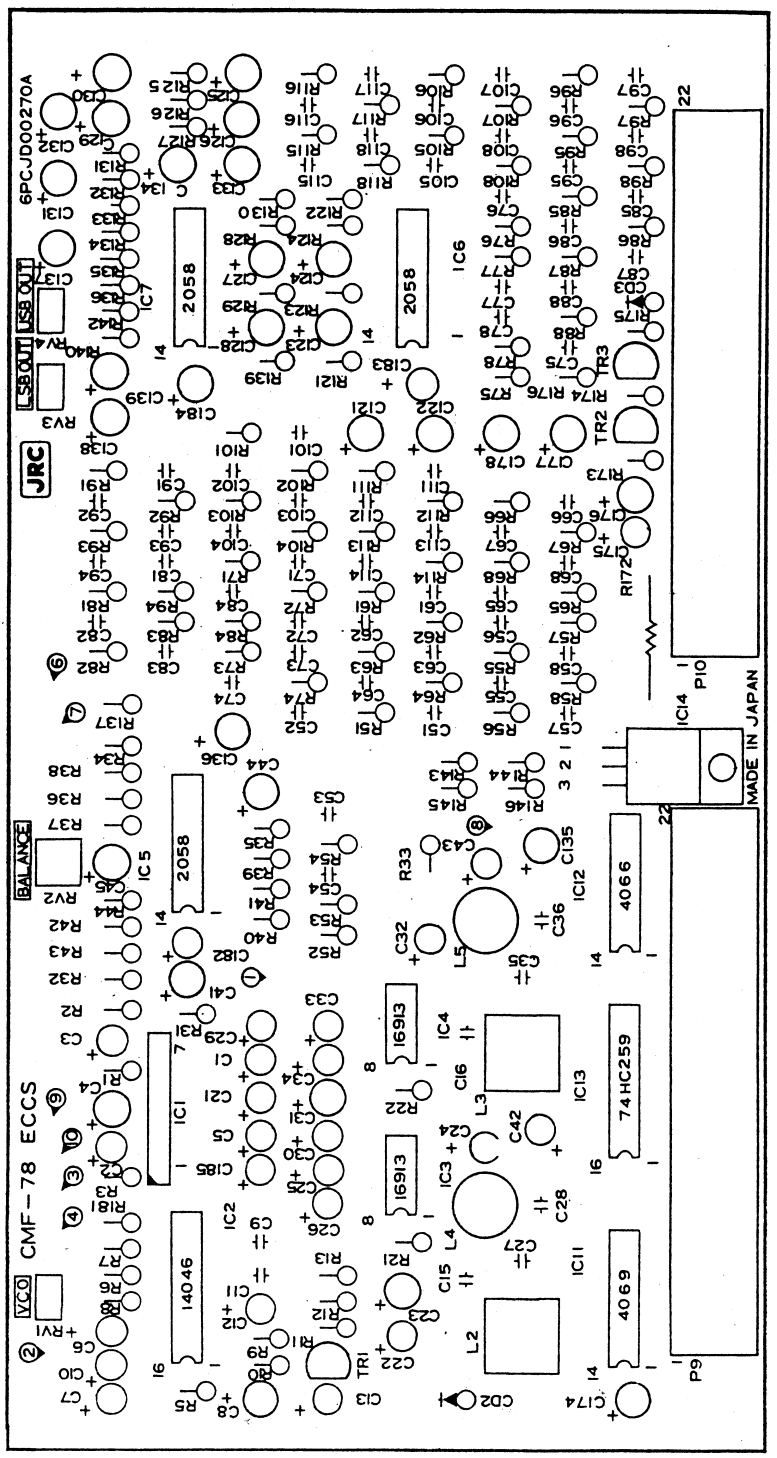


Figure 6.15.2 ECSS UNIT CMF-78 Component Layout

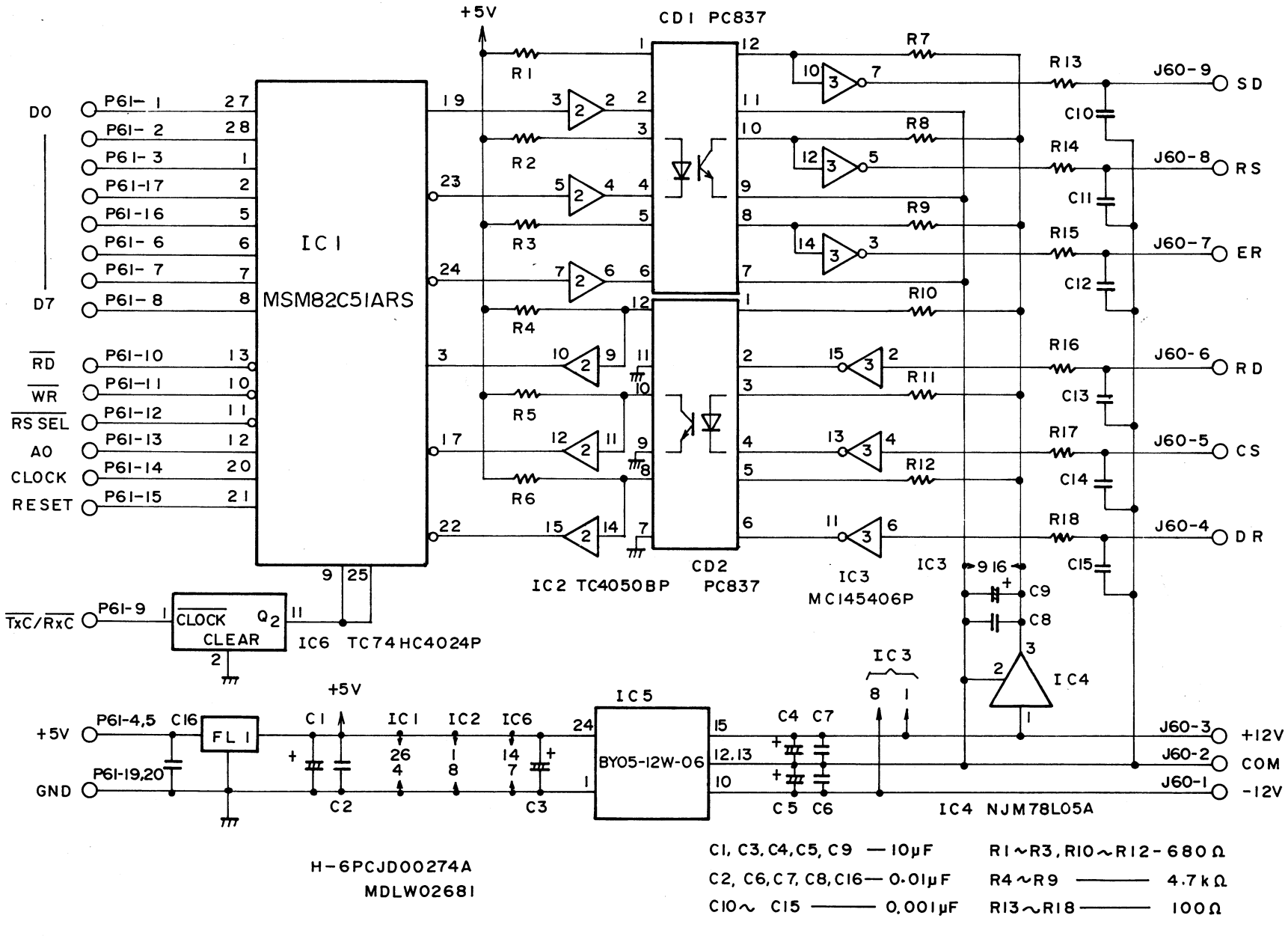


Figure 6.16.1 RS-232C INTERFACE UNIT CMH-741 Circuit Diagram

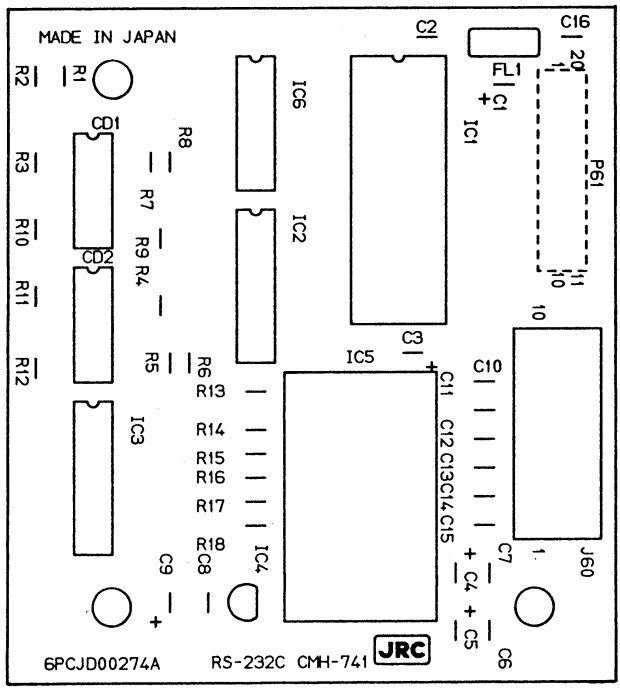


Figure 6.16.2 RS-232C INTERFACE UNIT CMH-741 Component Layout

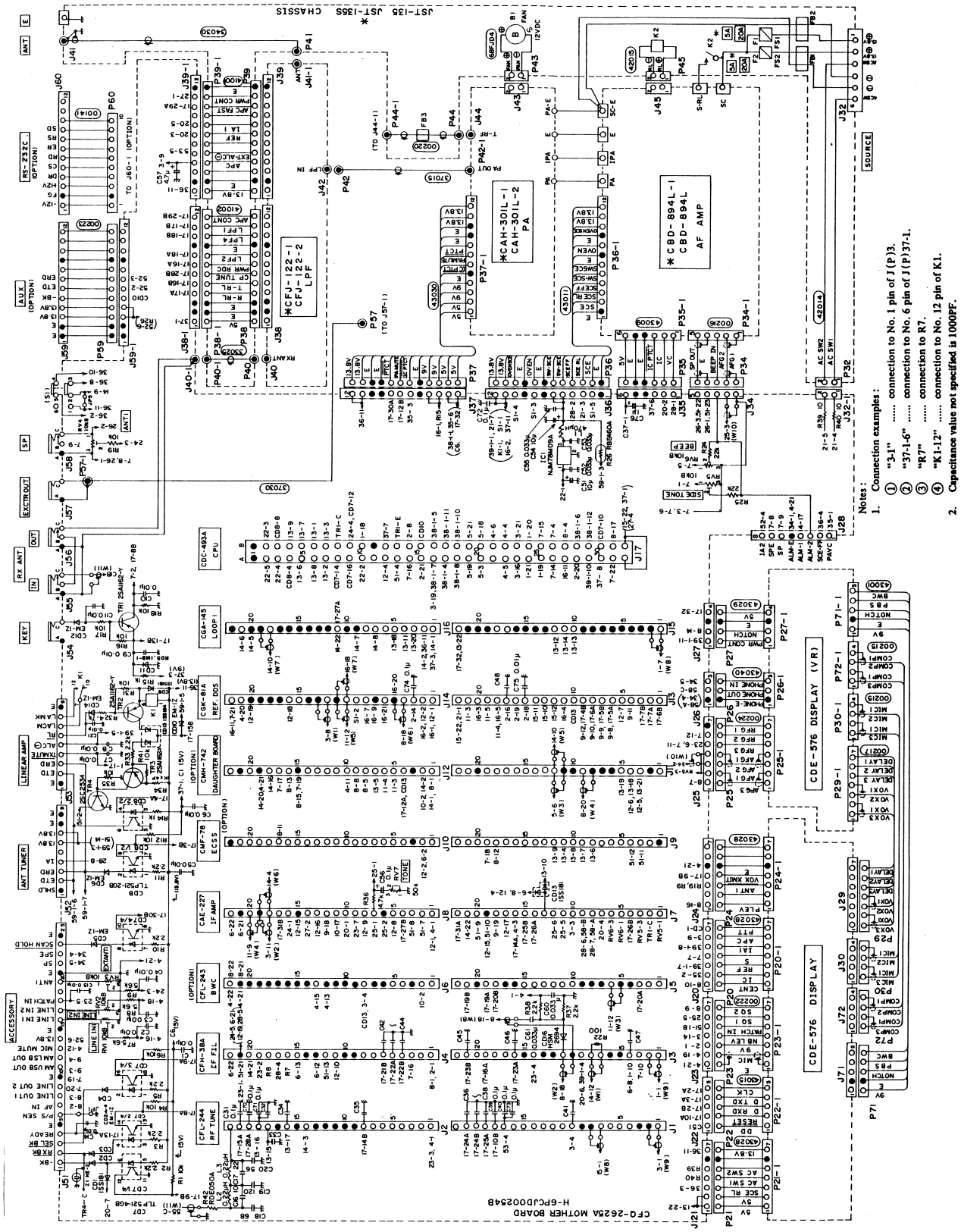


Figure 6.17.1 MOTHER BOARD CFQ-2625A Circuit Diagram

CHASSIS JST-135 Circuit Diagram

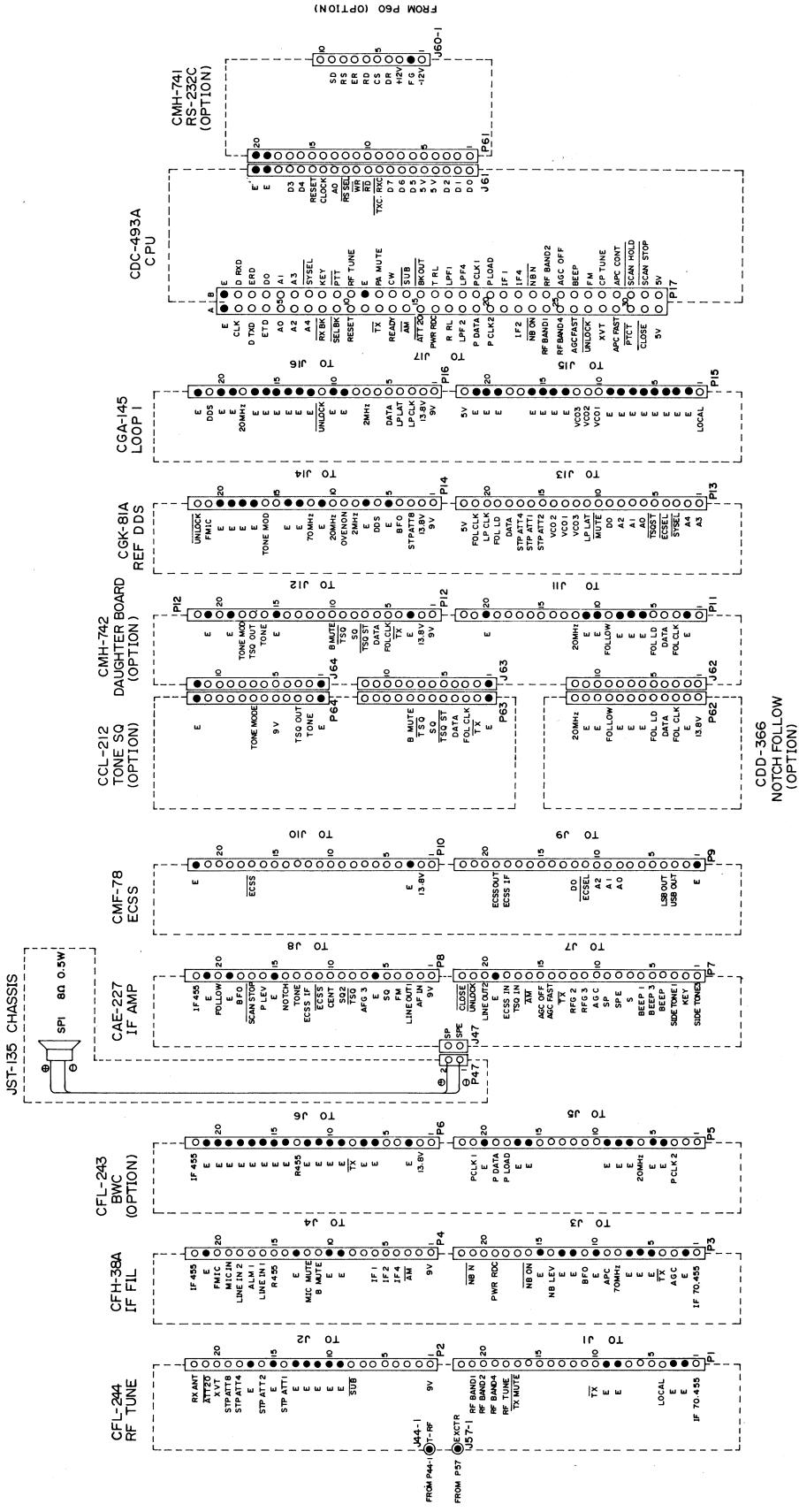


Figure 6.17.2 Signal Nomenclature of Units

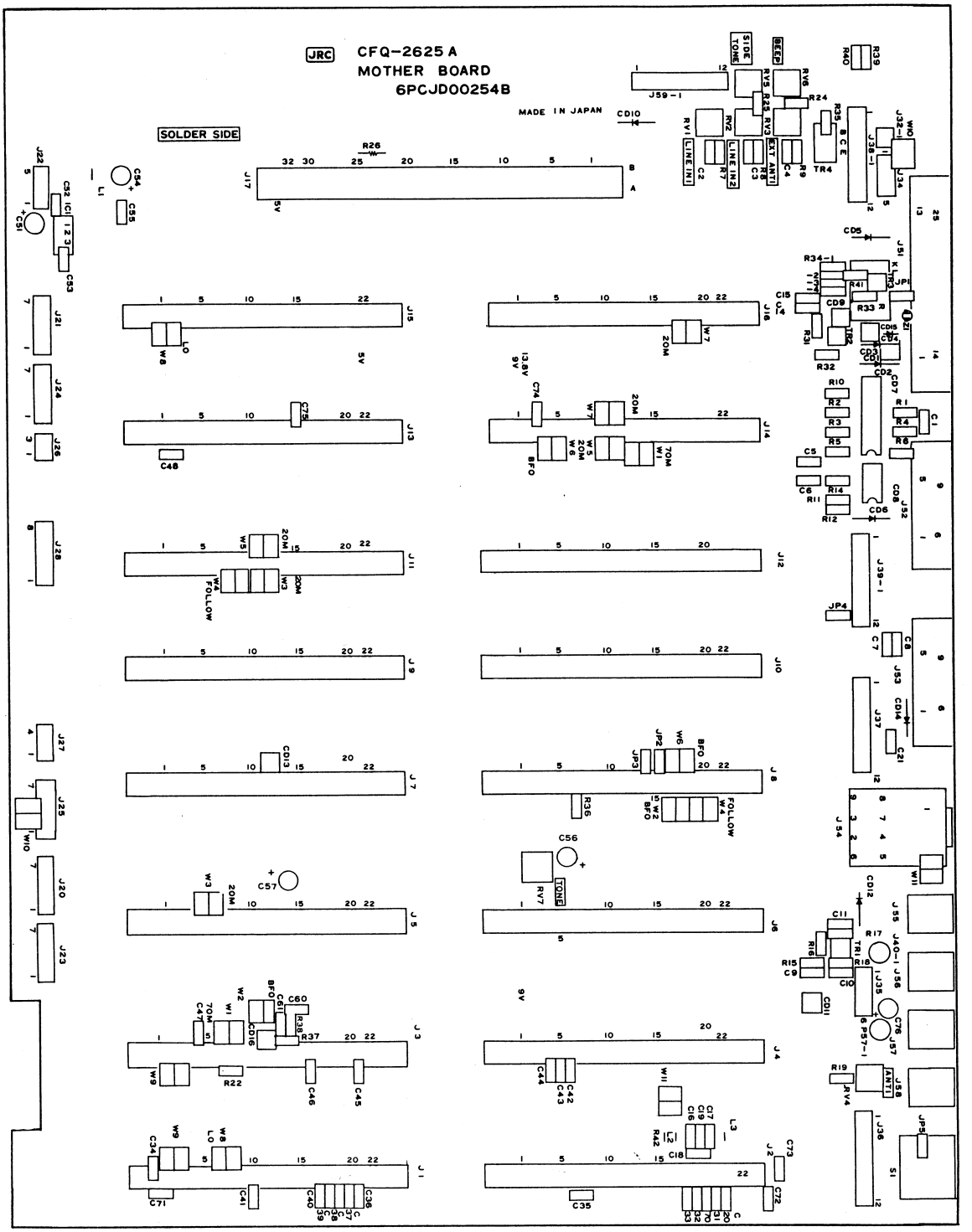


Figure 6.17.3 MOTHER BOARD CFQ-2625A Component Layout

For further information contact:

JRC Japan Radio Co., Ltd.

Since 1915

HEAD OFFICE & SALES DEPT.
17-22, Akasaka 2-chome, Minato-ku, Tokyo.
Telephone : Tokyo(03)584-8750
Telex : 0242-5420 JRCTOK J
Cable Address : "JAPAN RADIO TOKYO"

SALES OFFICE
4-28, Dojima Hama 1-chome, Kita-ku, Osaka.
Telephone : Osaka(06)344-1631
Telex : 0523-6605 JRCOSA J

MAIN FACTORY
1-1, Shimorenjaku 5chome, Mitaka-shi, Tokyo.
Telephone : Musashino(0422)45-9111
Telex : 02822-351 JRCMTK J

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