DX-70TH/EH

(HF&50MHz 100W Version)

Service Manual

CONTENTS

ALINCO, INC.

SPECIFICATIONS

1) General

Operating mode		J3E (LSB, USB), A1A (CW), F3E (FM)
Number of memory channels		100
Antenna impedance		50Ω unbalanced
Power requirement		13.8V DC ± 15% (11.7 to 15.8 V DC)
Grounding method		Negative ground
Current drain	Receive	1.0A max.
	Transmit	25A max.
Operating temperature		-10°C to +60°C
Frequency stability		± 10ppm (-10°C to +50°C)
Dimensions		178(w) x 58(h) x 228(d) mm (179 x 71x 268 mm for projections included)
Weight		Approx. 2.7kg

2) Transmitter

Transmit frequency coverage (e.g. U.S. Version)		160m band	1.8000 to 1.9999MHz
		80m band	3.5000 to 3.9999MHz
		40m band	7.0000 to 7.2999MHz
		30m band	10.1000 to 10.1499MHz
		20m band	14.0000 to 14.3499MHz
		17m band	18.0680 to 18.1679MHz
		15m band	21.0000 to 21.4499MHz
		12m band	24.8900 to 24.9899MHz
		10m band	28.0000 to 29.6999MHz
		6m band	50.0000 to 53.9999MHz
Power output	HF, 50MHz band	SSB, CW, FM	100W (high)
			Approx. 10W (low)
		AM	40W (high)
			Approx. 4W (low)
Modulation system		SSB	Balanced modulation
		AM	Low power modulation
		FM	Reactance modulation
Spurious emission		HF bands	Less than -50dB (-45dB in 10MHz band)
		50MHz band	Less than -60dB
Carrier suppression			More than 40dB
Sideband suppression			More than 50dB (at 1kHz)
Maximum FM deviation (default)		HF bands	± 2.5kHz
		50MHz band	± 5kHz
Microphone impedance			2kΩ

3) Receiver

Receiver circuitry			Double conversion superheterodyne
Receive frequency range			0.1500MHz to 30.0000MHz, 50.0000MHz to 54.0000MHz
Intermediate frequency			71.75MHz (1st), 455kHz (2nd)
Sensitivity	SSB, CW (S/N 10dB)	0.5 to 1.8MHz	0dB (1μV)
		1.8 to 30MHz	-12dB (0.25μV)
		50 to 54MHz	-16dB (0.15μV)
	AM (1kHz, 30% Mod, S/N 10dB)	0.5 to 1.8MHz	+20dB (10μV)
		1.8 to 30MHz	+6dB (2μV)
		50 to 54MHz	+6dB (2μV)
	FM (1kHz, 3.5kHz DEV SINAD 12dB)	28 to 30MHz	-6dB (0.5μV)
		50 to 54MHz	-10dB (0.3μV)
Selectivity	SSB, AM (Narrow)		2.4kHz/-6dB, 4.5kHz/-60dB
	SSB (Narrow), CW (Standard)		1.0kHz/-6dB, 3.0kHz/-60dB
	CW (Narrow)		500Hz/-6dB, 3.0kHz/-60dB
	AM (Standard), FM		9kHz/-6dB, 20kHz/-50dB
Spurious and image rejection ratio			More than 70dB
Audio output power			More than 2.0W (at 8Ω, 10% THD)
RIX/TXIT range			±1.4kHz

erformance at a high level input signal

lz to 60MHz is amplified about 10dB.
r in the Filter unit are combined, then by
one of four steps, -20, -10, 0, or +10dB

3, C104, C105, and C106, prevents the
oscillation leaking, and also prevents
ving.
and Q11 is the balanced mixer, in which
of 2SK2171.
d local oscillator of about 2V P-P is fed
ted into the first IF of 71.75MHz.
decreased in 50MHz band mode, the
07 keeps the ratio of spurious interfer-

71.75MHz. By the combination of two
e band width of 15kHz or more/3dB and
IB or more. Here the image ratio is
The first IF amplifier circuit of Q12 is
nt the loss in the front-end and mutual

e sensitivity after passing the mixer.

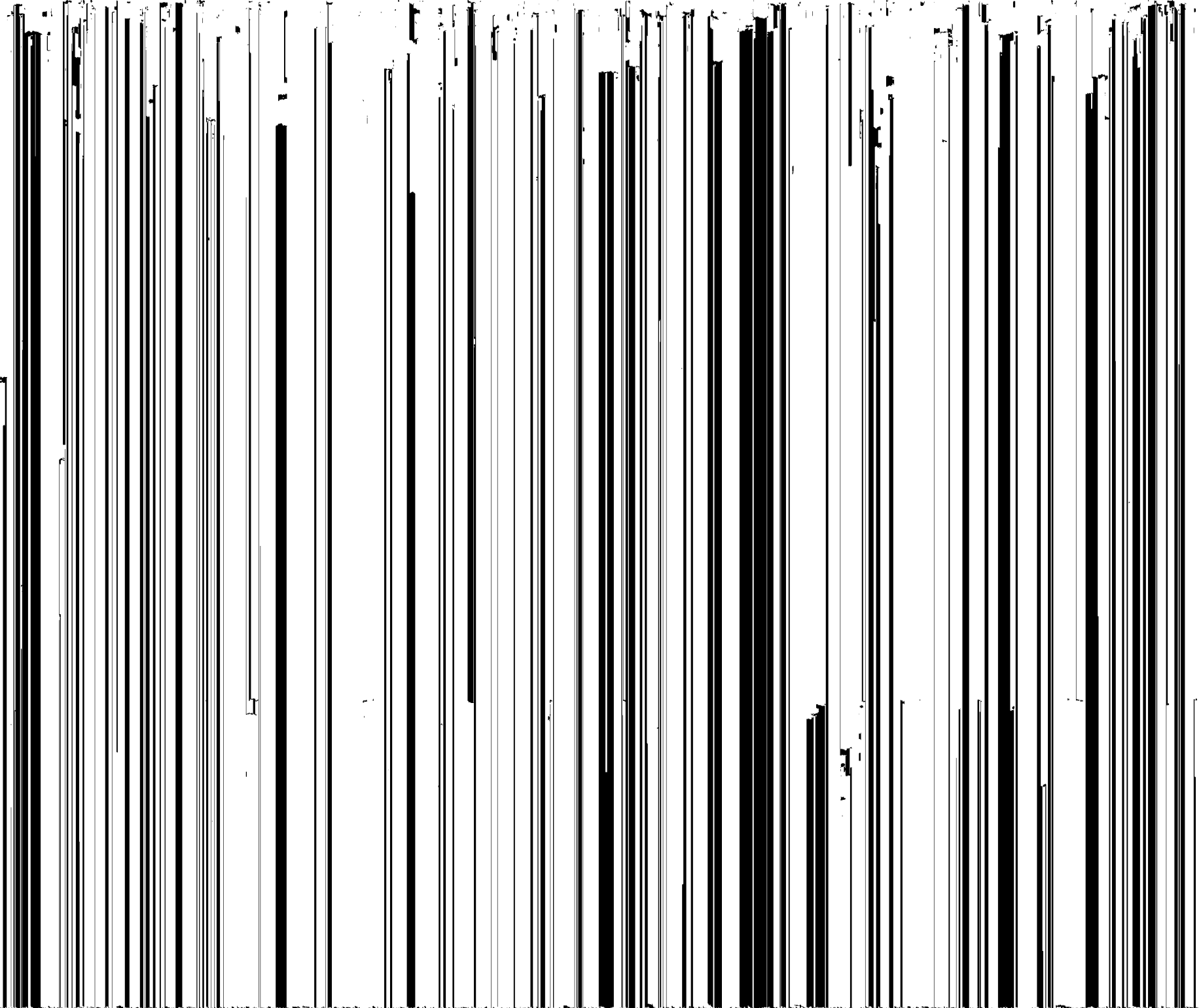
L14, D7 and L16. The signal is passed
transmitting in this DBM. Approximately
level, and the third IP is approximately

econd local oscillating frequency
al is eliminated in LPF consisting of L17,
generated. After passing through the
in Q22. The source of Q22 is controlled

eption switching diode D9, the signal is
z. The selectivity is decided here

K5)	2.4kHz/-6dB	4.5kHz/-60dB
K8)	1.0kHz/-6dB	3.0kHz/-60dB
5G)	9kHz/-6dB	20kHz/-50dB

3) in front and rear to isolate the filter.
nteed attenuation of each filter (approx.
arallel in front and rear of no used filter is



jow. The
'put voltage
f this output
o output.

is the control
ol voltage is
trol voltage is

nd the other
pne can be
is related with

A activates to
control the

beep and
re combined
nerated in IF

e level with
which can
consists of

stages to
ltage is
changed

ode is set to
oplied 2.4V.
decreases

connected
rmined in
06. The
SLOW, the
ed in parallel.
06 is con-
ge type. D110

n.

rophone is amplified by the low noise amplifier Q56
It is possible to bias (8V) the microphone terminal with
which needs the power supply. (solder bridge)
in of IC21 (approx. 15dB) is determined by R329 and

nected to R320 in parallel by Q55, then the gain is
34dB. Also the cut off frequency is risen, and the signal
erated as a limitter.
45 and R384 are conntected to the feedback circuit by
mpressor is turned ON. The gain is increased about
rated as the limitter.
ssor is ON, the low frequency is cut by C345.
isen enough, so the speech compressor has no effect.
1: B is attenuated in R326 and R325. The subaudible
lied through R325. (When the Tone is ON.)
hat is the Splutter filter in FM mode, and it is operated for

L unit as the FM modulation, and output to the balanced

d by Q54 in CW/FM mode.

r, and the carrier is suppressed in SSB mode. To get
ression, the balance adjustment of VR3 and VR4 are

in CW/FM/AM mode, so the input of Pin1 is made unbal-
voltage to obtain the carrier.
M/FM mode, or by keying in CW mode, the balance is
er wave. VR11 is used for the adjustment of carrier level.
and modulation is added simultaneously. In SSB mode,
by R317. In AM mode, D93 is DC-biased and turned ON.
listing of R317 and R393 limits the modulation.

creases the impedance in C177 and L77, it is passed
band limit IF filter. D52 is isolated highly by connecting to
eceiving. In SSB mode, the output is DSB signal. (Double

he selection of above-mentioned diode switch. The signal
lowing filer in each mode.

3(CFJ455K5)	2.4kHz/-6dB	4.5kHz/-60dB
2 (CFJ455K8)	1.0kHz/-6dB	3.0kHz/-60dB
1 (CFW455G)	9kHz/-6dB	20kHz/-50dB

nating one of side bands of DSB through the filter.

pted by the thermistor TH601, and the fan is
esistance value is decreased by the rising of
inverting input terminal of IC601A/B is de-
lied with the settled voltage. When the tem-
more and the compared inverting input voltage
g input voltage, Q607 is turned ON by the
: A. Then the fan starts turning at a low speed
).
nd the voltage becomes much lower than the
s turned ON. Then R639 is turned OFF and
ling to the value of series resistor of R640 and
C601: A.
bout 100°C and the voltage is decreased
in, then R639 and R640 are connected in
peed. Although ordinary PDWN is pulled up to
t to 50W because both cathode terminals of
rns at a high speed. Then the signal is sent to
r power down at high temperature.
B is decreased in D611 while receiving,
rature does not go up higher than it while
hich the fan turns at a middle speed or more, is
high temperature, fan's turning speed comes

amplifier, the followings are equipped:

nt
mperature detection

9 goes down to LOW by CW keying, the
output controls all of the circuit operation by

d through D95, VR11 and D93, and the
ltage to the balanced mixer to generate the
aveform of rise and fall by adjusting the carrier

o turn OFF Q6 for keying isolation. C244
t to influence the keying waveform.
5 in D95, and the output of Pin7 turns Q46 ON
the unit enters the transmitting mode. The
between Pin5 of IC17: B and the ground.
etermined according to the discharge time
e voltages for the setting of 3-bit break-in time
ed by the combination of the resistors R269,

, BK2 and BK3 are set to LOW, in the Semi
BK3 is applied the voltage.

he forward wave detection power in HF band of 100 W, the
ltage in 50MHz band of 10W is set to higher a little.
ast attack" is obtained by D63, and the release time of "slow
ed by C222 and R130. In AM mode C221 is connected in parallel
unit is operated in near the average value.

collector current which is detected in PA unit is differential-amplified
utput voltage is decreased according to the increase of the
LC line is fallen by D63 and the output power is decreased. The
t is decided in VR6.

ve is amplified in IC9: A to obtain the meter output voltage.
l in D70, R223 and C223, and the meter swings smoothly.
ltage and S meter output voltage are switched in D71 and D86

nverting voltage amplified in IC9: B.
plied to the base of Q31, then sent to front unit for the detection of
ception and lighting the transmitting LED. The LED brightness is
ling to the ALC voltage.

l frequency of the second local oscillator in PLL unit (65kHz~
d by 10 in IC714, then led to the main unit. In addition the fre-
d by 10 in IC19 of the main unit to obtain the sidetone of 650Hz~
mparison frequency of the second local oscillator is changed
CW offset setting. To relate with the sidetone, comparison
put 100 times the CW offset. IC19 Pin2 is controlled by Q65 at CW
e constant is delayed not to give the influence to waveform of the

ctive filter Q50 makes the square wave to sine wave to obtain
he rise/fall wave of the sidetone is generated by keying controlling
and emitter.

external automatic antenna tuner, this circuit controls the matching
the operation of the unit during tuner matching.
operation is started, the Tune voltage is supplied to operate the
ibrator in IC18: C, D. The voltage of about 8 V is applied to outside
through Q52 as the start signal. In the other hand, Q53 supplies
a of sink output, it becomes LOW while tuning. (For the transceiver
, KENWOOD).
tuner receives the tune start signal, the tuner provides it as the
TKEY terminal)
the TKEY terminal, and keeps the unit in TUNE mode indicating
operating while it is in the LOW level. CPU releases the TUNE
EY terminal is in LOW for 20 seconds or more. In the Tune mode
its a signal in AM mode, the microphone output is muted, then the
n outputting about 10W (adjustable).

LPF, is
ig through

RL503. It
, L508,

are

in the
before the
F in HF

the both

trans-

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g to the
ntrol the

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from the

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hesizing in

fed to
s 200

e is
it by each
counting
e number

average
d is fast,

ogrammed by turning the knob on the front
he squelch is open forcedly without any

C) lights the LED according to the change of
t be supplied as it is, so it is changed to ON/

e main unit, and it lights RX LED.

unit:
nal
d second local oscillating signal
TCSS

5V

ly as follows:
hrough the switch
ie MAIN unit
ie PLL unit
MODE comes from the main unit.
lHz is generated in X701 and Q701 according
02.
z +/- 1.5kHz is generated by the voltage of

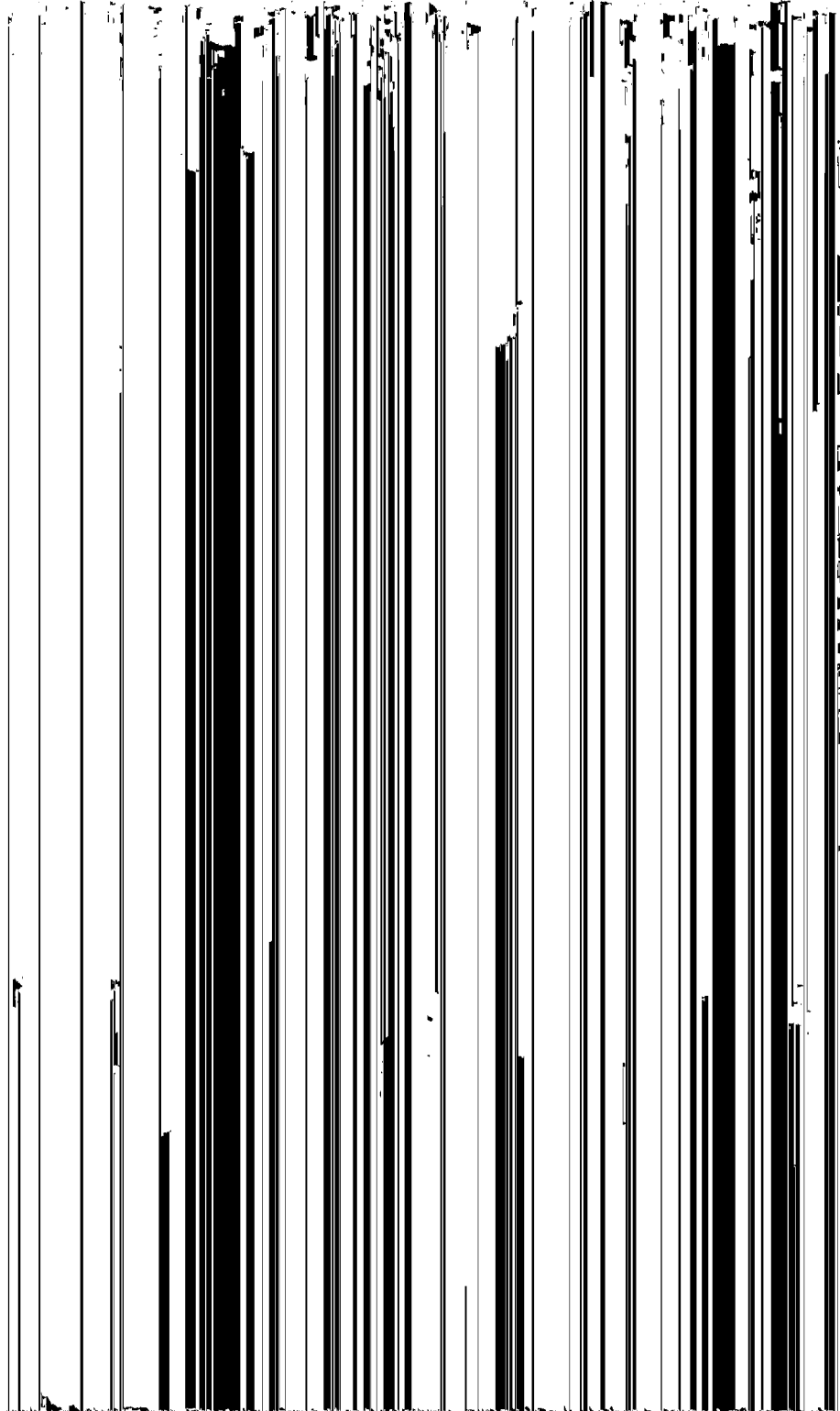
-/- 1.5kHz is generated according to the
', C809, C810, C811 and C812 in Q725 and

hanged according to the MODE, transmission/

oltage of 8V and the signal is passed through
of 9.8735MHz according to the constant of
passed through D718, and the voltage is
signal.

oltage of 8V and the signal is passed through
of 9.8765MHz according to the constant of
passed through D717, and the voltage is
signal.

(AT) is added the voltage of 8V and in the FM
D708, then results in the frequency of
t of TC703 and C811. Q723 has no voltage,



plied 0V , then Q730 is turned ON and a terminal of R767 is connected to the
ind to decrease the voltage of D706, beside the frequency of 9.42MHz is
eased about 300Hz less while receiving and about 100Hz less while transmit-
than the value in USB mode.

e same manner, in LSB mode the voltages of CN701 Pin21 (LSB) and CN701
5 (TONS) are 8V. As in LT mode TONS becomes the sink, Q735 is turned
and D729 is supplied the voltage by R767. Then voltage of D706 is in-
sed. Beside the frequency of 9.42Hz is increased about 300Hz more while
iving and about 100Hz more while transmitting than the value in LSB mode.

he Emission of 455kHz Carrier Signal
above-mentioned 9.875MHz signal is input to Mixer IC712 Pin6, and 9.42MHz
al is input to IC712 Pin8. The difference frequency of 455kHz is output from
2 Pin3 and sent to the MAIN unit from J701 after amplified in Q723. The
out level is approximately -5dB.

quency Relations depending on the Mode)

(TX RX)		9.8765MHz - 9.42MHz (**)	= 456.5kHz (**)
(TX RX)	FM(TX)	9.8735MHz - 9.42MHz (**)	= 453.5kHz (**)
J CWL AM TUNE (TX)		9.8750MHz - 9.42MHz	= 455.0kHz (*)
J(RX)		9.8758MHz - 9.42MHz (*)	= 455.8kHz (*)
L(RX)		9.8742MHz - 9.42MHz (*)	= 454.2kHz (*)
RX)		9.8765MHz - 9.4197MHz (*)	= 456.8kHz (*)
RX)		9.8735MHz - 9.4203MHz (*)	= 453.2kHz (*)
TX)		9.8765MHz - 9.4199MHz	= 456.6kHz
TX)		9.8735MHz - 9.4201MHz	= 453.4kHz

FM (RX) does not output
While receiving IF Shift Operation (+/- 1.5kHz)
IF Shift Operation (+/- 1.5kHz)

he Second Local Oscillating Signal
CO2 unit, after the frequency of 71.295MHz is oscillated in Q941 and amplified
949, Q944 and Q945, the signal of approximately 3dB is supplied to MAIN unit
ugh J702 as the second local oscillating signal.
signal for PLL loop is supplied from Q942 to PLL unit.
signal of 71.295MHz is fed to Mixer IC711 Pin7 and the signal of 9.42MHz is
o Pin3, so that the deference frequency of 61.875MHz output from Pin6 only is
ed up by Q711, L712 and L711, and fed to PLL IC707, then locked at
75MHz.
refore, by rotating the IF shift volume, 9.42MHz, and also 71.295MHz are
ged.
frequency of 30MHz is fed to IC707 through Pin1, and it is divided to get the
wing frequency as the reference frequency, and also the frequency of
75MHz is divided to get the reference frequency, then these two frequencies
compared.
reference frequency changes according to the CW sidetone frequency.

n the sidetone frequency is 650Hz, the reference frequency is 64.655kHz.
n the sidetone frequency is 750Hz, the reference frequency is 75.000kHz.
n the sidetone frequency is 850Hz, the reference frequency is 85.227kHz.

y of Q731, Q716 is turned ON. Q709 and D730 are turned
24 and D724 are turned ON, then D730 is ON and Q724 is

smitting is 5kHz/DEV, and 2.5kHz/DEV while HF/FM

s ON, and D725 and D726 are turned ON, then D735 is
lied about 0.7V so that the operation of IC710 is stopped.

is emitted from every Pin7 in PLL IC IC702, IC703 and
is supplied from the collector in Q728, and Q718 is turned
ed OFF, then the level of J703 is decreased about 30dB or

0.75MHz
te 25Hz step of the first local oscillating, Q931 is used to
f 155MHz~175MHz, the signal is passed through Q932
'04, and supplied through Q933. Then the signal is divided
frequency of 775~875kHz (25Hz step) is fed to the mixer
peration frequency of 100kHz digit or below can be

ut to PLL unit IC703 Pin8 through Q931 for the PLL loop.
ency of 155.000~174.995MHz to get 5kHz, and it is
ence frequency of 5kHz to make the loop.

n frequency	Oscillating frequency
)00(00)	155.000MHz
)00(00)	165.000MHz
)99(75)	174.995MHz

( ) is the frequency of no indication.

/ of 30MHz is divided to get 5kHz (25Hz x 200), and used
ncy in IC703. Because the signal of 9.875MHz is input to
he frequencies, 10.65~10.75MHz is supplied from IC703
gh the ceramic filter of 10.7MHz, then fed to IC706 Pin6.

s of reference frequency of 30MHz are generated in Q708,
y are fed to IC706 Pin8. The sum of the frequency of
plied from IC703 Pin3, passed through the band-pass filter
, and fed to IC709 Pin8. Then the signal is ncluded in a
st local oscillating signal.

transmission
trols the frequency with the DIP Switch SW901 Pin3 - 8,
een 67~251Hz, amplified in Q901 and passed through
MAIN unit from CN701 Pin16.
ion is performed when TONS is the sink and IC901 Pin4
d 8V and tone unit power supply is ON.
ed with the DIP switch SW901 Pin1 and Pin2 to adjust the

ın of CPU

Pin Name	Remarks	I/O	Description	L	H
GND		-			
GND		-			
XTAL, LOSC		-			
XTAL		-			
GND		-			
XTAL		-			
XTAL		-			
/RST		I			
5V?		I			
DCK	DIAL CLOCK	I	Main dial rotation detection and pulse number	Rise edge detection	
PCONT	POWER ON	O	Power control output	Power OFF	Power ON
PSDET	POWER DET	I	Condition detection when power switch is turned ON.	During power OFF	During power ON
TKEY	TUNE KEY	I	Detection of working external antenna tuner	At work	Waiting
UNLK	PLL UNLOCK	I	PLL unlock detection	Unlock	Lock
MCK	EEPROM CK	O	Clock for data transmission/reception to EEPROM		
MDAT	EEPROM DATA	I/O	Data Transmission/Reception to EEPROM		
EXTIN	EXT IN	I	External EEPROM transmission acceptance	EEPROM	Acceptance
CK1	SERIAL1 CK	O	HPL, LPL data transmission clock		
DAT1	SERIAL1 DATA	O	HPL, LPL data transmission		
ENH	HPLL ENABLE	O	HPL data transmission enable		Enable
ENL	LPLL ENABLE	O	LPL data transmission enable		Enable
CK2	SERIAL2 CK	O	MODE, BPF, etc. transmission clock		
DAT2	SERIAL2 DATA	O	MODE, BPF, etc. data transmission		
ENA	SERIAL SELECT	O	MODE, BPF, etc. data enable selection		Enable 1
ENB	SERIAL SELECT	O	MODE, BPF, etc. data enable selection		Enable 2
GND		-			
		-			
		-			
		-			
5V		-			
COM4		O	LCD COMMON		
COM4		O	LCD COMMON		
COM3		O	LCD COMMON		
COM3		O	LCD COMMON		
DB0		I	SW, initial setting detection		Detection
DB1		I	SW, initial setting detection		Detection
DB2		I	SW, initial setting detection		Detection
DB3		I	SW, initial setting detection		Detection
DB4		I	SW, initial setting detection		Detection
DB5		I	SW, initial setting detection		Detection
DB6		I	SW, initial setting detection		Detection
		O			Detection
Y0		O	Panel SW for ON detection		At detecting
Y1		O	Panel SW for ON detection		At detecting
Y2		O	Output for initial condition setting detection		
Y3		O	Output for initial condition setting detection		
GND		O			
LCDEN		O	LCD driver enable		
LCDCK		O	LCD driver clock		
LCDATA		O	LCD driver data		

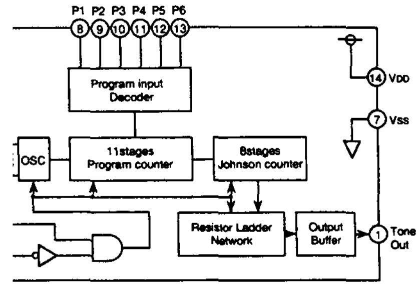
L	H
	Squelch open forcedly
Put out the light forcedly	During lighting
Pulse output	
Squelch close	Squelch open
Duty control of pulse output	
Transmission	Reception
Dunng counting	Reset
Power OFF	Power OK
	Up
	Down
The voltage according to the speed of rotation.	
0~5V	
2~3V down	0~2V up
0~5V	

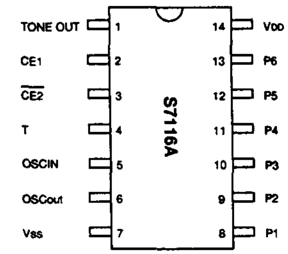
ICONDUCTOR DATA

16A (XA0052)

Generator

Diagram



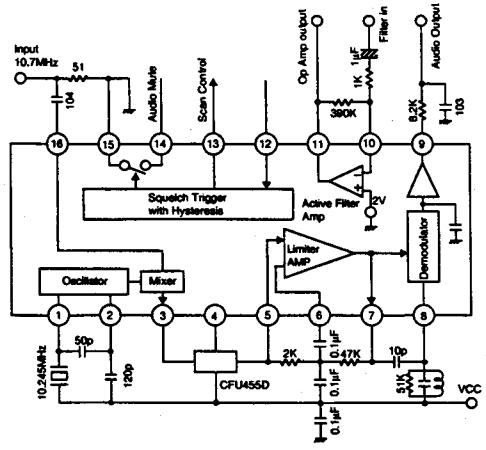


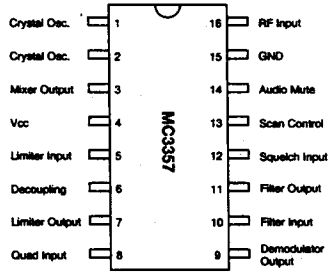
Parameter	Symbol	Condition	Min	Typ	Max	Unit
upply voltage	VDD		3.0	-	10	V
upply current	IDDO	VDD=5.0V, CE1=VDD, $\overline{CE2}$=Vss, CG=CD=10pF	-	0.4	1.0	mA
tand by current	IDDS	VDD=5.0V, input: open, RL=50kΩ	-	20	60	µA
one output level	VOT	VDD=5.0V, RL=50kΩ	240	340	440	mV rms

Freq.	P1	P2	P3	P4	P5	P6	Freq.	P1	P2	P3	P4	P5	P6
67.0	1						186.2		1	1	1	1	
71.9		1					192.8	1	1	1	1	1	
74.4	1	1					203.5						1
77.0			1				210.7	1					1
79.7	1		1				218.1		1				1
82.5		1	1				225.7	1	1				1
85.4	1	1	1				233.6			1			1
88.5				1			241.8	1		1			1
91.5	1			1			250.3		1	1			1
94.8		1		1			500	1	1	1			1
97.4	1	1		1			600				1		1
100.0			1	1			700	1			1		1
103.5	1		1	1			800		1		1		1
107.2		1	1	1			900	1	1		1		1
110.9	1	1	1	1			1000			1	1		1
114.8					1		1600	1		1	1		1
118.8	1				1		1700		1	1	1		1
123.0		1			1		1750	1	1	1	1		1
127.3	1	1			1		1800					1	1
131.8			1		1		1300	1				1	1
136.5	1		1		1		2000		1			1	1
141.3		1	1		1		2200	1	1			1	1
146.2	1	1	1		1		2975			1		1	1
151.4				1	1		2550	1		1		1	1
156.7	1			1	1		2295		1	1		1	1
162.2		1		1	1		2125	1	1	1		1	1
167.9	1	1		1	1		1275				1	1	1
173.8			1	1	1		1445	1			1	1	1
179.9	1		1	1	1								

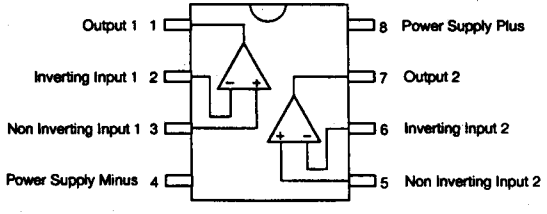
2) MC3357 (XA0063)
Low Power FM IF

Vcc=6V
F=10.7MHz
Icc 3mA
Limit 5μV -3dB
Vo 350mV Dev=+/-3KHz

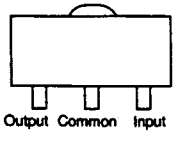




3) M5218FP (XA0068)
Dual Low Noise
Operational Amplifiers

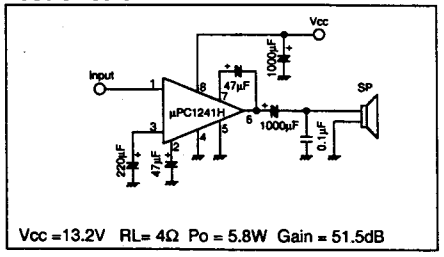


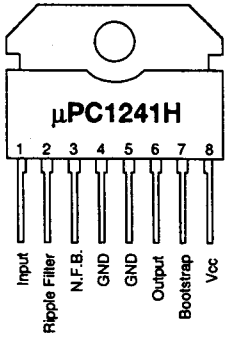
4) NJM78L08UA (XA0075)
8V Voltage Regulator



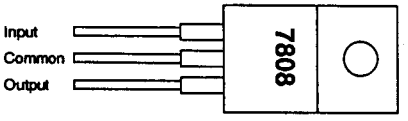
5) μPC1241H (XA0079)
Audio Power Amplifiers

Test Circuit



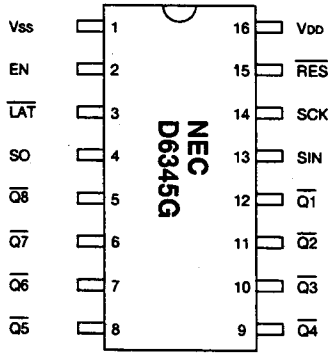


6) MC7808CT (XA0082)
8V Voltage Regulator



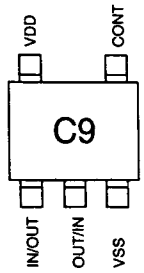
7) μPD6345GS (XA0114)
8bit Serial in Parallel Out Driver

No.	Pin Name	Description
1	GND	GND terminal
2	EN	Enable terminal
3	$\overline{LAT}$	Latch terminal
4	SO	Serial data output terminal
5-12	$\overline{Q8}$-Q1	Data output terminal
13	SIN	Serial data input terminal
14	SCK	Serial clock input terminal
15	$\overline{RES}$	Reset input terminal
16	VDD	Power supply terminal



5 VDD

4 CONT



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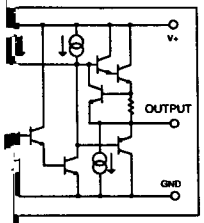
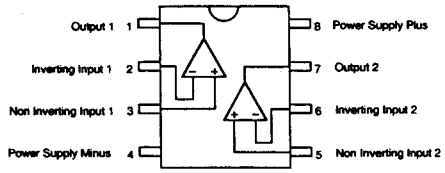
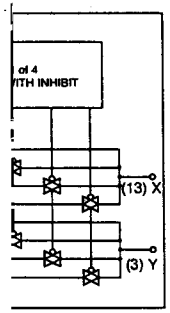
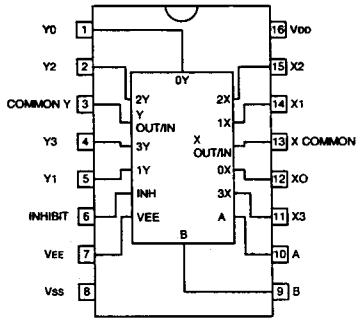




emultiplexer





	ON SWITCH
	X0 Y0
	X1 Y1
	X2 Y2
	X3 Y3
	NONE

11) BU4094BF (XA0246)

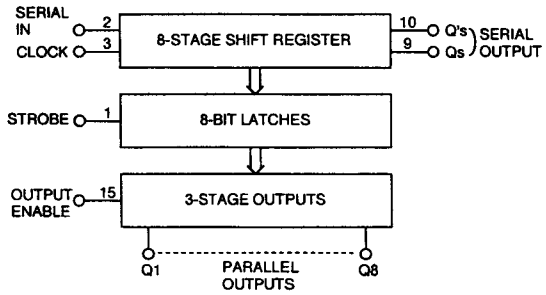
8-Stage Shift Register

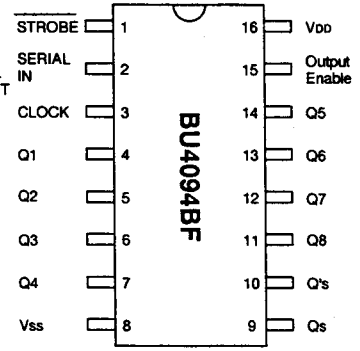
Truth Table

Clock	Output enable	Strobe	Data	Parallel outputs Q1	Parallel outputs Qn	Serial outputs Qs	Serial outputs Q's
↑	L	X	X	Z	Z	Q7	No Chg.
↓	L	X	X	Z	Z	No Chg.	Qs
↑	H	L	X	No Chg.	No Chg.	Q7	No Chg.
↑	H	H	L	L	Qn-1	Q7	No Chg.
↑	H	H	H	H	Qn-1	Q7	No Chg.
↓	H	X	X	No Chg.	No Chg.	No Chg.	Qs

Z=High Impedance
X=Don't Care

Block Diagram

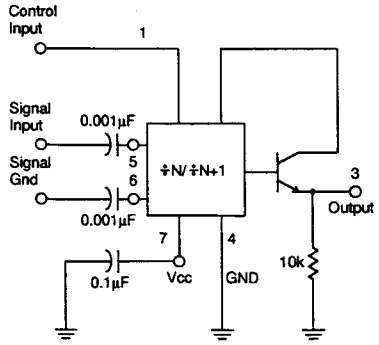




12) MC12019D (XA0292)

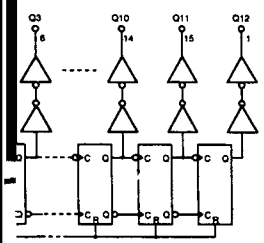
Two-Modulus Prescaler

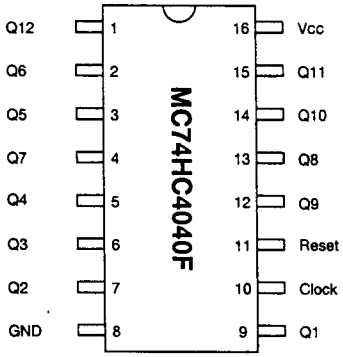
Block Diagram



Characteristics	Symbol	Min.	Typ	Max	Unit
Toggle frequency (Sine wave input)	fmax fmin	225 -	- -	- 20	MHz
Supply current	Icc	-	-	7.5	mA
Control input High (1/20)	VIH	2.0	-	-	V
Control input Low (1/21)	VIL	-	-	0.8	V
Output voltage swing	Vout	600	-	1200	mVpp
Input voltage sensitivity	Vin	200	-	800	mVpp
PLL response time	tPLL	-	-	tout-70	ns

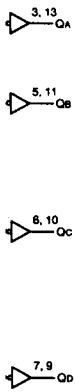
293)
e Counter

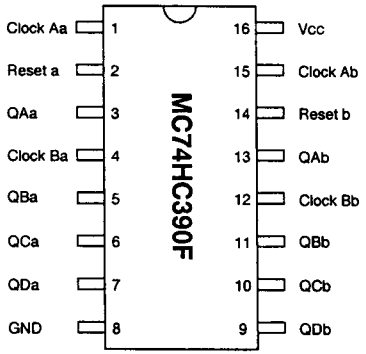




t State
harge
o next stage
its are low

294)
Ripple Counter 1/2 and 1/5 Sections

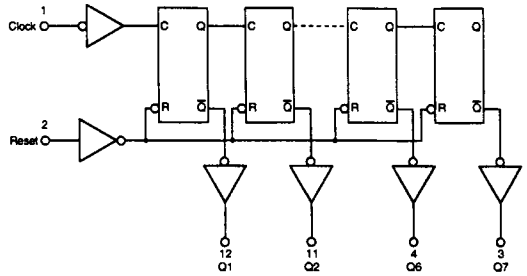


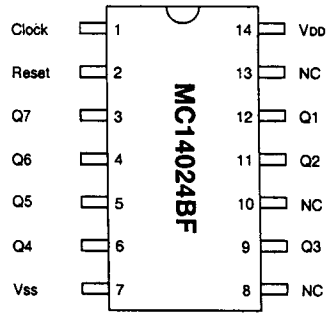


Truth Table

Clock		Reset	Action
A	B		
X	X	H	Reset 1/2 and 1/5
↓	X	L	Increment 1/2
X	↓	L	Increment 1/5

15) MC14024BF (XA0295)
7-Stage Binary Counter





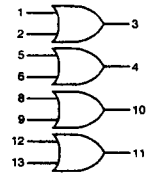
Truth Table

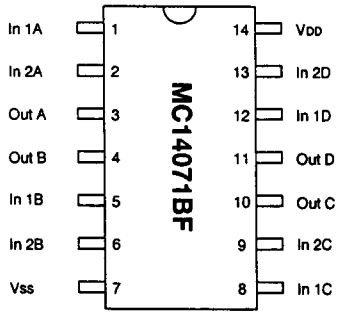
Clock	Clear	Output State
Don't care	H	All Output="L"
↑	L	No Change
↓	L	Advance to next stage

16) MC14071BF (XA0296)
Quad 2-Input OR Gate

Truth Table

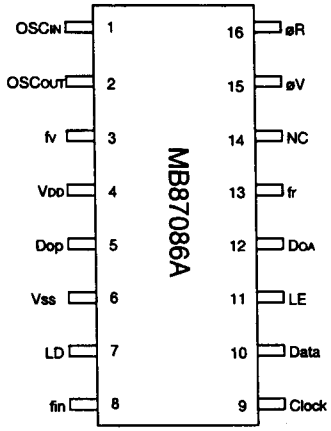
Input		Output
A	B	X
L	L	L
L	H	H
H	L	H
H	H	H

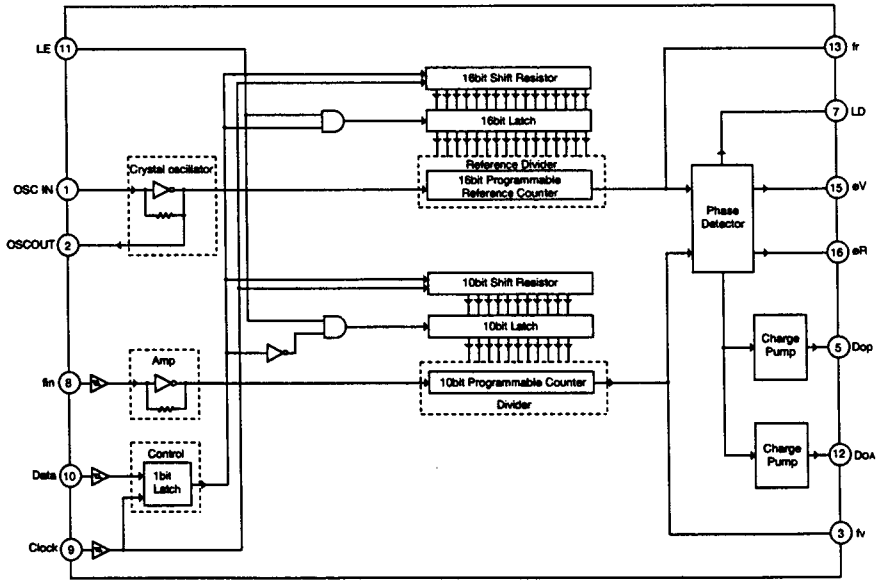




17) MB87086A (XA0297)
PLL Frequency Synthesizer

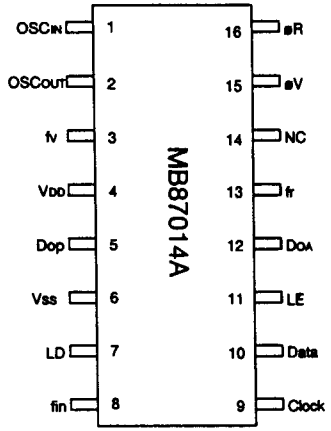
No.	Pin Name	I/O	Description
1	OSC_{IN}	I	Crystal connection terminal
2	OSC_{OUT}	O	Crystal connection terminal
3	fv	O	Phase comparator input monitor terminal Comparator divider output terminal
4	V_{DD}	-	Power supply
5	Dop	O	Passive LPF connection terminal fr>fv: Drive mode, Dop="H" fr=fv: High impedance fr<fv: Sink mode, Dop="L"
6	Vss	-	GND terminal
7	LD	O	Phase detector output terminal Lock="H", Unlock=negative pulse
8	fin	I	Comparator divider input terminal
9	Clock	I	Serial clock input terminal
10	Data	I	Serial data input terminal
11	LE	I	Load enable input terminal
12	D_{OA}	O	Active LPF connection terminal fr>fv: Drive mode, D_{OA}="L" fr=fv: High impedance fr<fv: Sink mode, D_{OA}="H"
13	fr	O	Phase comparator input monitor terminal Reference divider output terminal
14	NC	-	No connection
15	øV	O	Differential LPF connection terminal fr>fv: øV="H", øR="L" fr=fv: øV="H", øR="H" fr<fv: øV="L", øR="H"
16	øR	O	

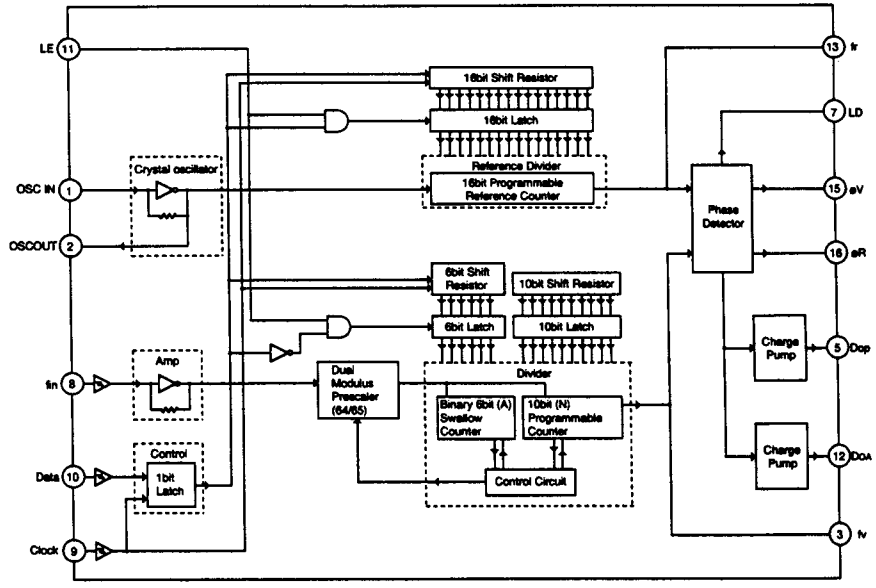




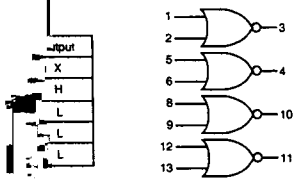
18) MB87014A (XA0298)
PLL Frequency Synthesizer

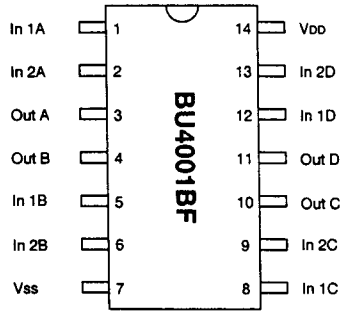
No.	Pin Name	I/O	Description
1	OSC_{IN}	I	Crystal connection terminal
2	OSC_{OUT}	O	Crystal connection terminal
3	fv	O	Phase comparator input monitor terminal Comparator divider output terminal
4	V_{DD}	-	Power supply
5	Dop	O	Passive LPF connection terminal fr>fv: Drive mode, Dop="H" fr=fv: High impedance fr<fv: Sink mode, Dop="L"
6	Vss	-	GND terminal
7	LD	O	Phase detector output terminal Lock="H", Unlock=negative pulse
8	fin	I	Prescaler input terminal
9	Clock	I	Serial clock input terminal
10	Data	I	Serial data input terminal
11	LE	I	Load enable input terminal
12	D_{OA}	O	Active LPF connection terminal fr>fv: Sink mode, D_{OA}="L" fr=fv: High impedance fr<fv: Drive mode, D_{OA}="H"
13	fr	O	Phase comparator input monitor terminal Reference divider output terminal
14	NC	-	No connection
15	øV	O	Differential LPF connection terminal fr>fv: øV="H", øR="L" fr=fv: øV="H", øR="H" fr<fv: øV="L", øR="H"
16	øR	O	





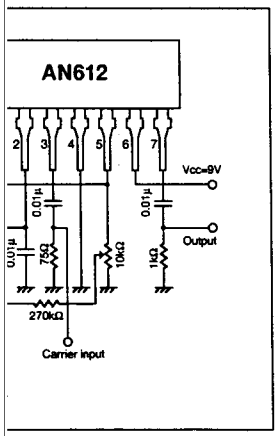
XA0299)
NOR Gate

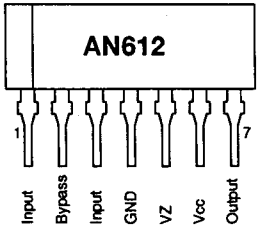




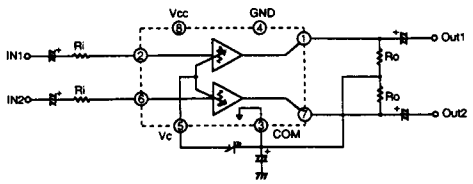
'300)
odulator Circuit

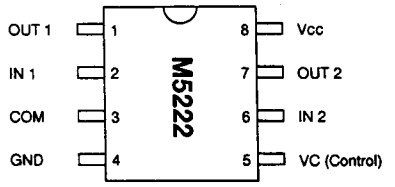
	Symbol	Condition	Ratings	Unit
	Vcc		14.4	V
	Icc		15	mA
	PD		220	mW
	Itot	V6=12.0V	9.5	mA
	V5-4		6.15	V
voltage	V1-4		3.1	V
voltage	V3-4		3.4	V
ge	V7-4		8.6	V
C)	Vo(BM)	V6=9.0V	-3	dBm
	SC		50	dB





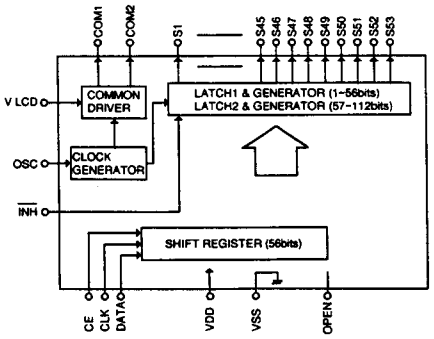
21) M5222FP (XA0385)
Low Voltage Dual VCA

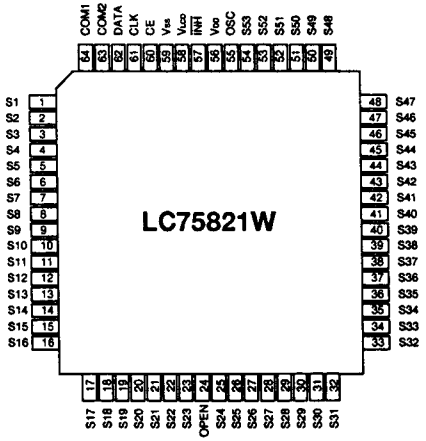




Parameter	Symbol	Condition	Vcc	Min	Typ	Max	Unit
Supply current	Icc	Vi=0, Vc=0	3V	2.5	3.6	5.5	mA
Max. input voltage	ViM1	f=1kHz, Vc=0, THD=1%, RI=10kΩ, RO=20kΩ	3V	0.7	1.0	-	Vrms
	ViM2	f=1kHz, Vc=0, THD=1%, RI=50kΩ, RO=100kΩ	9V	2.3	3.4	-	Vrms
Max. attenuation level	ATTM	Vc=-270mV, RI=10kΩ, RO=20kΩ	3V	80	90	-	dB
Noise output voltage	VNO1	Vc=0 (ATT=-1.4dB) RI=10kΩ, RO=20kΩ, BW=20Hz~20kHz	3V	-	30	60	μVrms
Noise output voltage	VNO2	Vc=-40dB RI=10kΩ, RO=20kΩ, BW=20Hz~20kHz	3V	-	5	-	μVrms

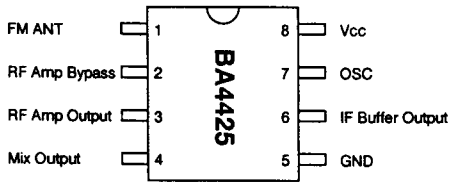
22) LC75821W (XA0303)
LCD Driver





Pin Name	Description
S1~S53	Segment output terminal
COM1, 2	Common output terminal
V LCD	LCD Bias voltage setting terminal
OSC	Oscillator terminal
CE, CLK, DATA	Serial data transmission terminal
VSS, VDD	Power supply terminal
$\overline{INH}$	Display turn off input terminal $\overline{INH}$="L" Vss, turn off (S1~S53, COM1,2="L") $\overline{INH}$="H" Vdd, turn on
OPEN	No connection

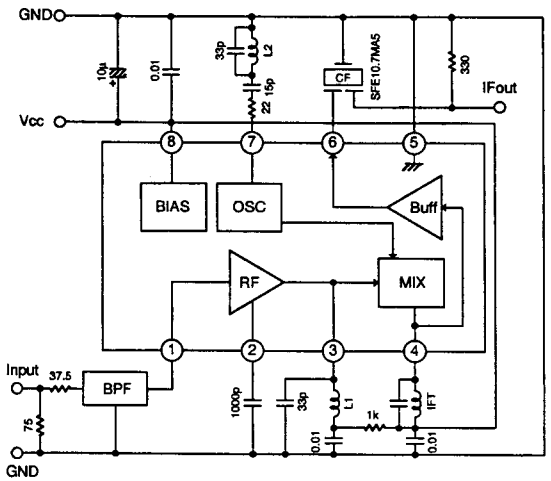
23) BA4425F (XA0304)
FM Front End IC



Vcc=4V

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Current	Io	No signal	2.6	4.5	7.2	mA
Saturated output voltage	Vo	fd=98MHz, 80dBμV	30	50	72	mV rms
Local oscillator voltage	Vosc	fosc=108MHz	200	400	630	mV rms
Conversion gain	Gvc	fd=98MHz, 55dBμV	31	36	42	dB
Local oscillator stop voltage	OSC STOP		-	-	1.2	V

Test Circuit

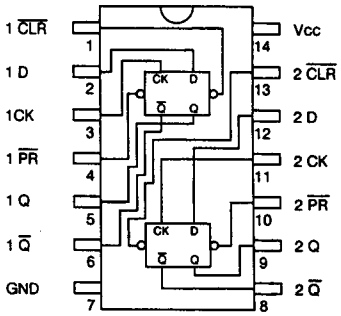


24) TC74AC74F (XA0305)
Dual D-Type Flip Flop

Truth Table

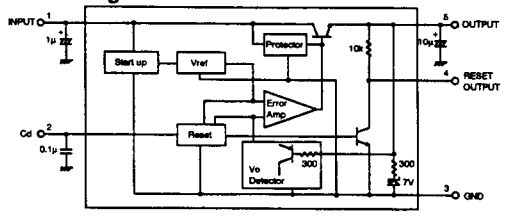
INPUTS				OUTPUTS		FUNCTION
$\overline{CLR}$	$\overline{PR}$	D	CK	Q	$\overline{Q}$	
L	H	X	X	L	H	CLEAR
H	L	X	X	H	L	PRESET
L	L	X	X	H	H	-
H	H	L	↑	L	H	-
H	H	H	↑	H	L	-
H	H	X	↓	Qn	$\overline{Qn}$	NO CHARGE

X=Don't Care

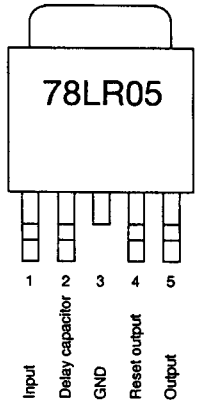


25) L78LR05B (XA0338)
Voltage Regulator

Block Diagram



Parameter	Symbol	Ratings	Unit
Input voltage	Vin	7.5~20	V
Output current	Iout	1~150	mA
Output voltage	Vout	5.0	V



[redacted]tor

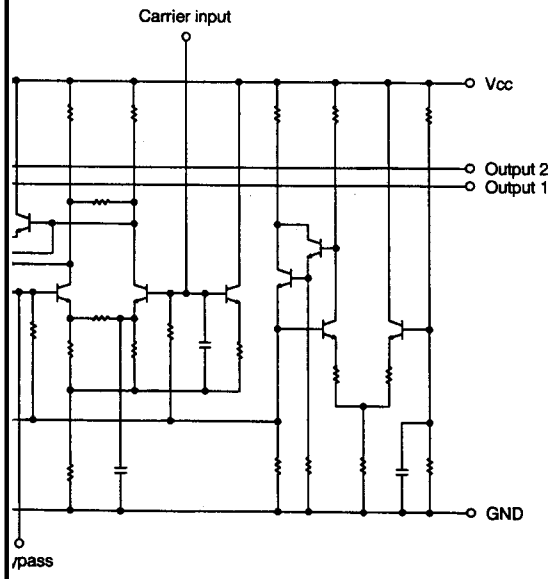
arrier Input

ypass

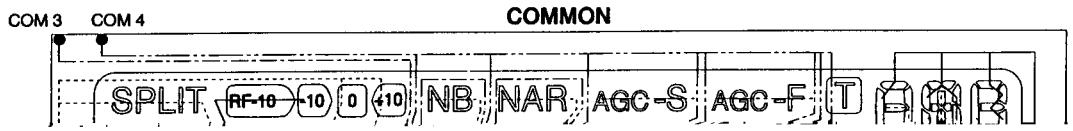
Signal Input

GND

Condition	Min.	Typ.	Max.	Unit
lo signal	-	12	16	mA
ignal: 70mV r.m.s. 1.75MHz	-2	0	+2	dB
arrier: 100mV r.m.s. 28.25MHz	-	-40	-20	dB
utput: 30MHz	-	-32	-20	dB
ignal 1: 42.5mV r.m.s. 1.75MHz ignal 2: 42.5mV r.m.s. 2.00MHz arrier: 100mV r.m.s. 28.25MHz utput: 29.75MHz	-	-45	-35	dB
	-	500//9	-	Ω//pF
	-	1.0//9	-	kΩ//pF
utput 1	-	350//7	-	Ω//pF

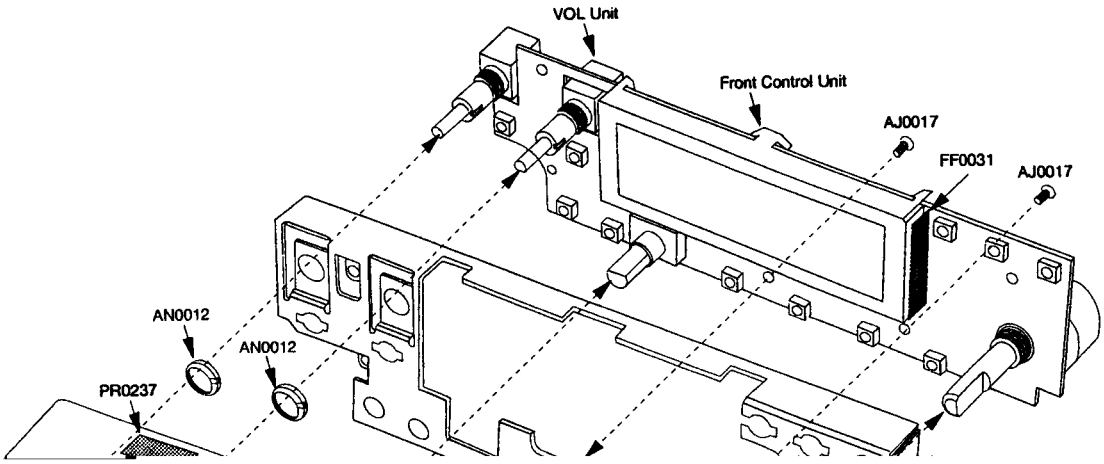


31) LCD Connection

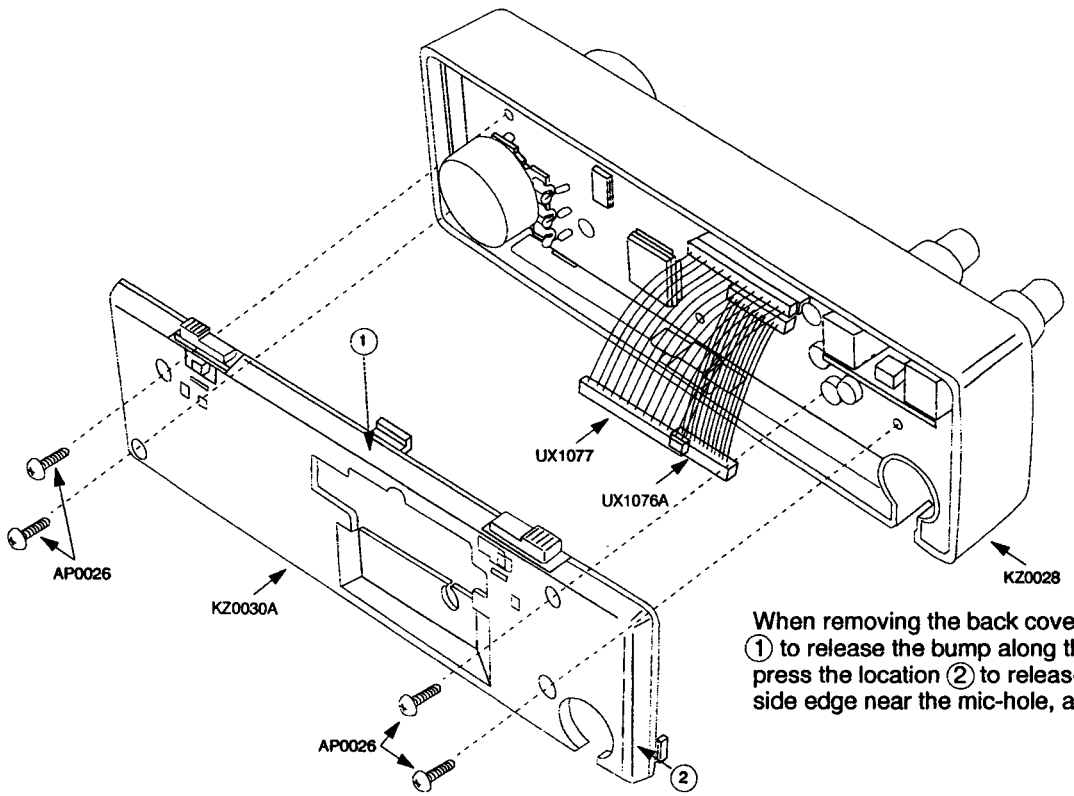


EXPLODED VIEW

1) Front Control Unit 1

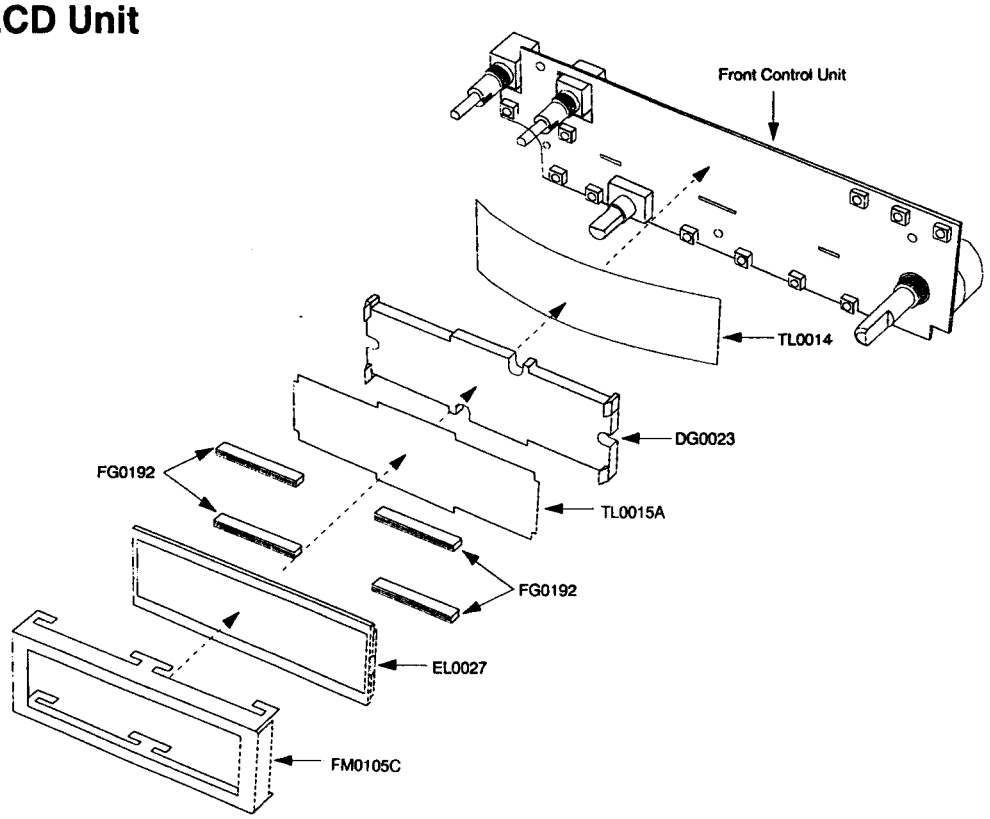


2) Front Control Unit 2

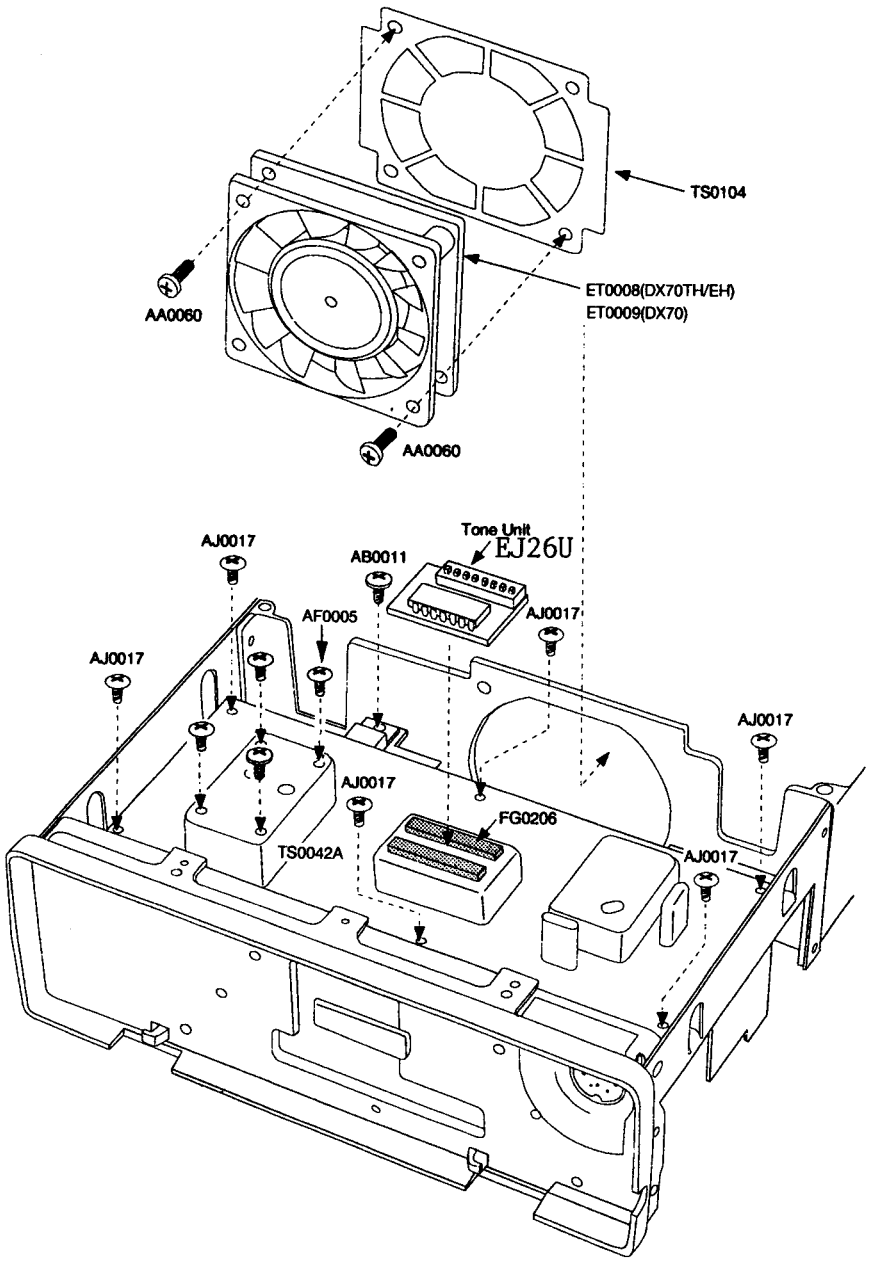


When removing the back cover, press the location ① to release the bump along the top edge, then press the location ② to release the bump along the side edge near the mic-hole, and open.

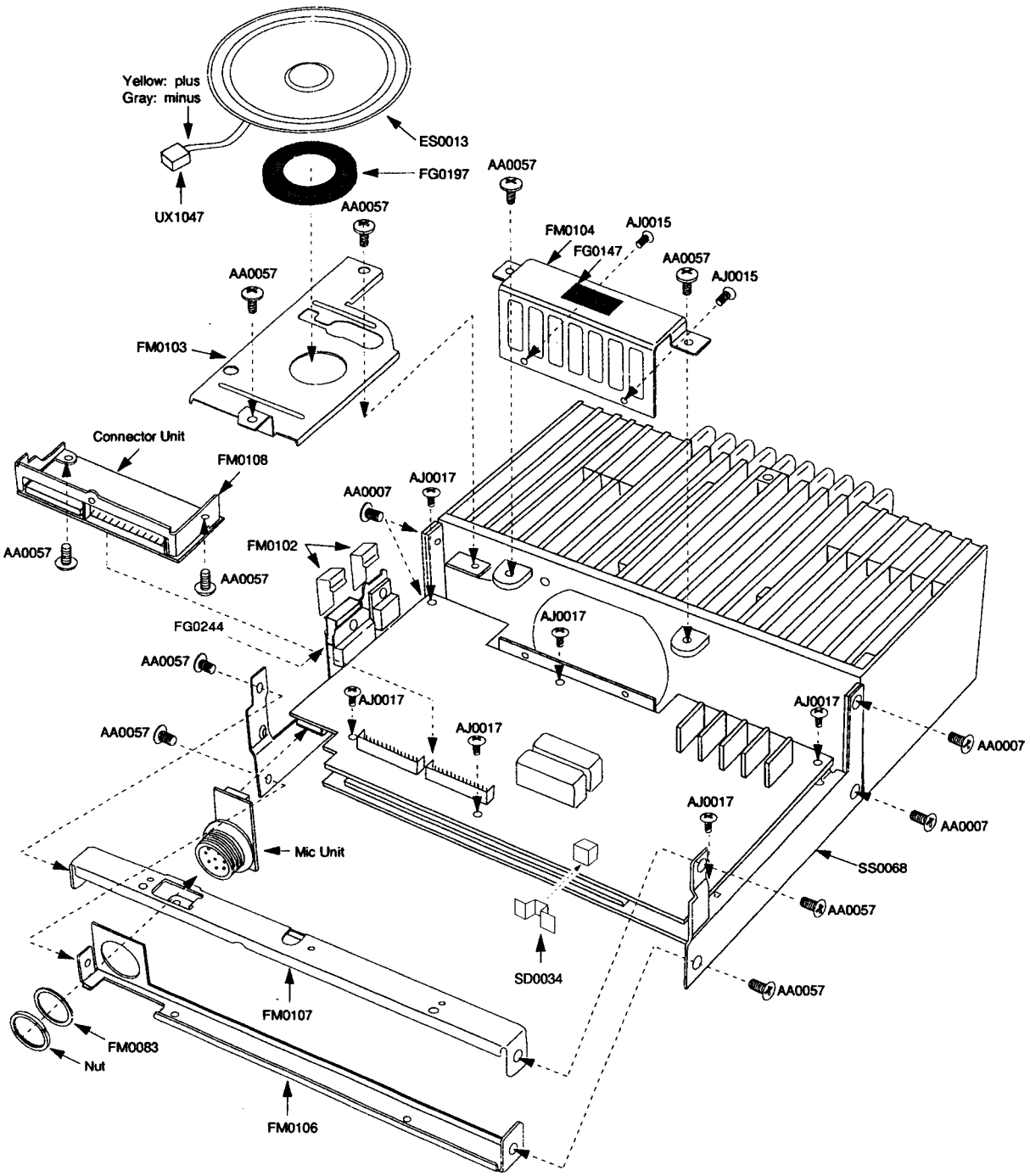
3) LCD Unit



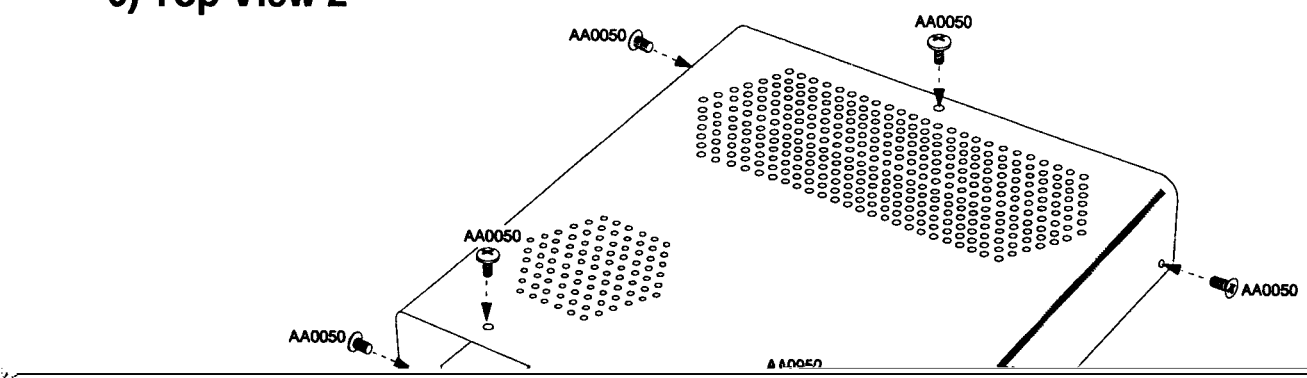
4) PLL Unit and Fan



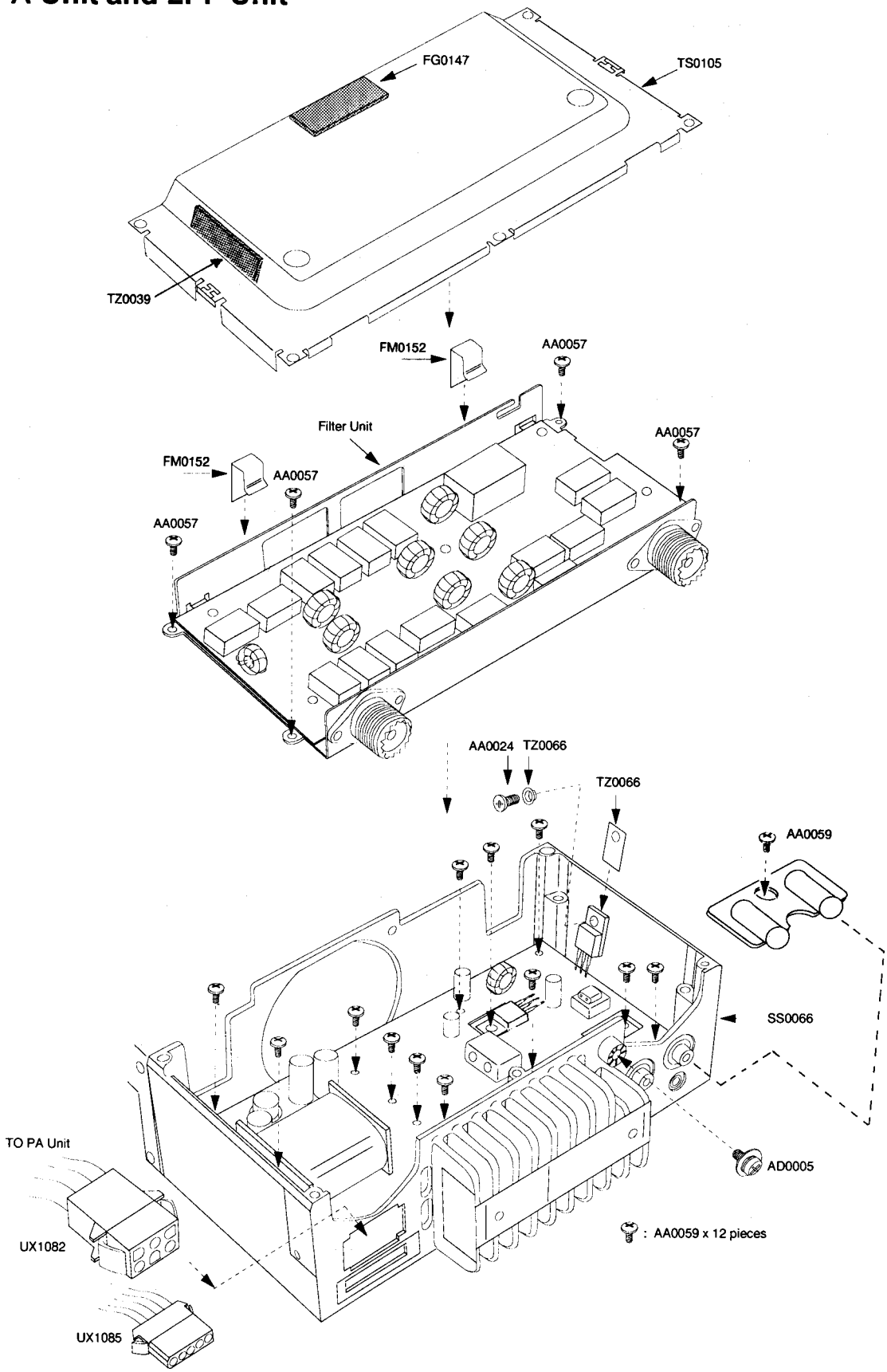
5) Top View 1


Yellow: plus
Gray: minus
UX1047
ES0013
FG0197
AA0057
AA0057
AA0057
FM0104
AJ0015
FG0147
AA0057
AJ0015
FM0103
Connector Unit
FM0108
AA0057
AA0057
AA0007
AJ0017
FM0102
FG0244
AA0057
AJ0017
AJ0017
AJ0017
AA0057
AJ0017
AJ0017
AA0007
AA0007
Mic Unit
SS0068
AA0057
SD0034
AA0057
FM0107
FM0083
Nut
FM0106

6) Top View 2



8) PA Unit and LPF Unit



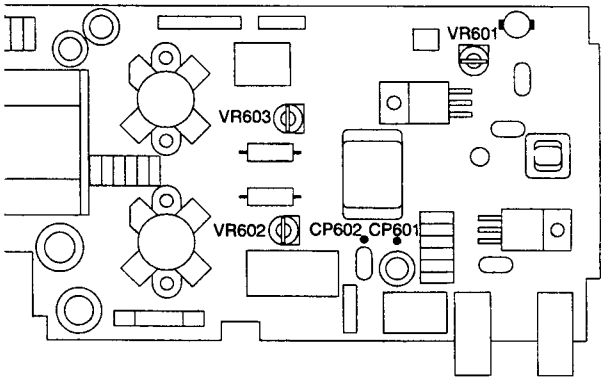
STMENT

djustment

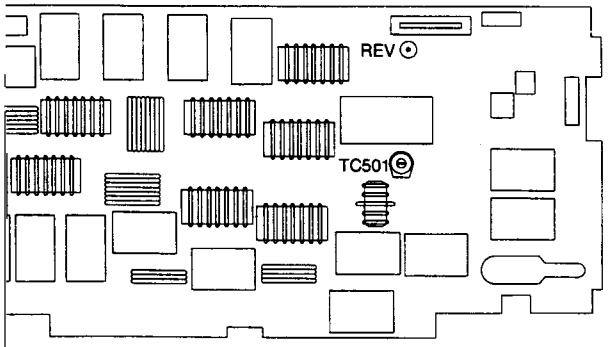
t Equipment

age meter	
t meter	300~500mA
	3A
ted power supply	13.80V 25A or more
	(should be equipped with 20~25A current limit and current meter)
ter	100W (1.9~60MHz)
ector	
generator	1.9~60MHz, -10~+10dBm

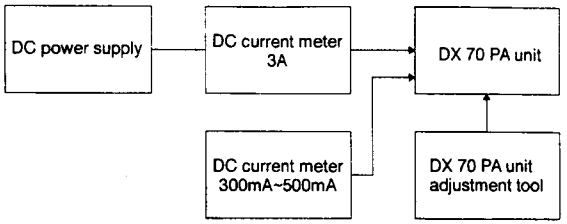
stment Points



djustment Points

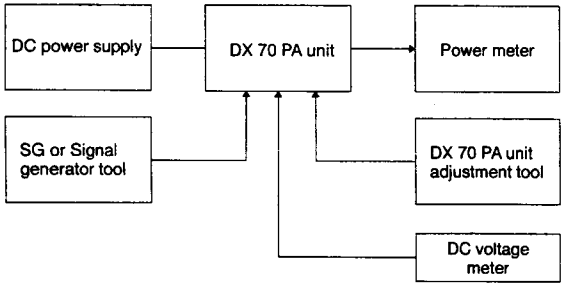


Idle Current Adjustment Setting



Adjustment the idle current without input signal.

SWR Adjustment Setting



Adjust SWR at approximately 50W.

PA Adjustment

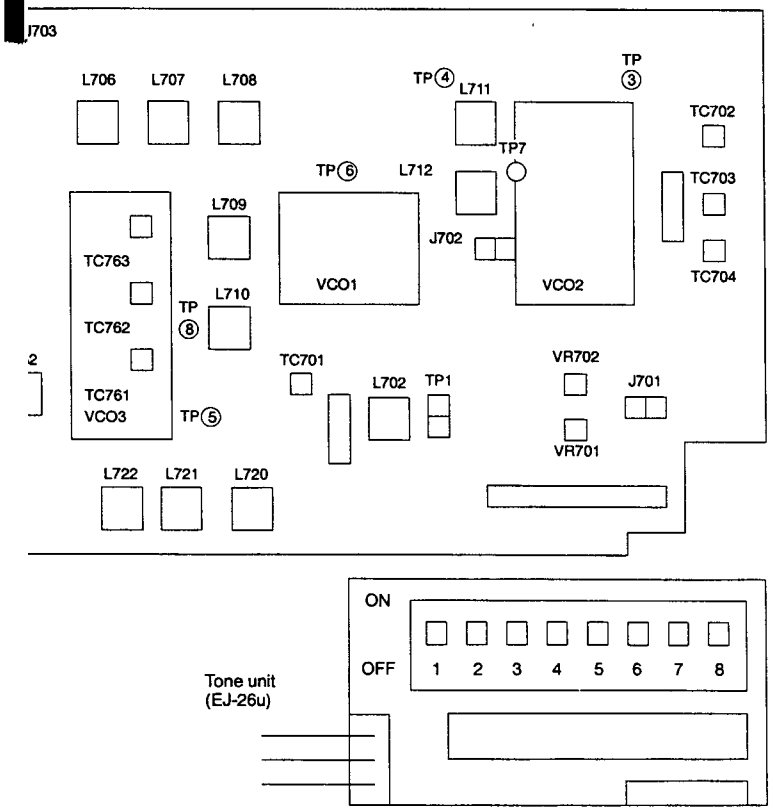
Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Idling current 2SC1972 x 2	SSG: OFF Mode: USB VR601, 602, 603: min.	Current Meter 300~500mA	CP601 ⊖ CP602 ⊕	PA	VR601	Connect the current meter between CP601 and CP602, then adjust VR601 to 100mA.
Idling current MRF255 x 2	SSG: OFF Mode: USB	Current Meter 3A	CN605 unit total current		VR602 VR603	Turn VR602 and VR603 counterclockwise fully, check the total current in transmission mode. Turn VR602 clockwise slowly so that the total current increases 400mA. Then turn VR603 clockwise slowly so that the total current increases 400mA. As a result, the total current increases 800mA.
Connect TP1and TP2 by soldering after adjusting.						
SWR detection	f=1.9MHz SG >>PA unit	Voltage Meter	REV	Filter	TC501	Adjust the output power to 50W, then adjust the TC501 so that REV voltage is min.
	When you adjust the finished goods, set the mode to SSB, adjust the input level of microphone, and set the output power to about 50W.					

justment

est Equipment

oltage meter	
ulated power supply	13.80V 5A or more
ncy counter	500MHz or more
m Analyzer	1GHz or more
cope	100MHz or more

djustment Points



Item	Condition	Measurement			Adjustment		
		Equipment	Unit	Terminal	Unit	Parts	Method
VCO1 Frequency	PD1=1.2V	Freq. Counter	VCO1	CN90 1~3			175MHz or above
	PD1=4.3V						155MHz or below
VCO2 Frequency	PD1=1.5~4V	Freq. Counter	VCO2	CN90 2~4			VCO2 freq.: 71MHz
Attach the VCO to PLL, then adjust the unit after installing the PLL to the unit.							
VCO2 Lock range	f=7.100MHz	Digital tester	PLL	TP7		Check	1.5V~4V
VCO1 Lock range	f=7.0999MHz			TP6			1V~3V
	f=7.1000MHz						3V~4.3V
VCO3 Lock range	f=0.1500MHz			TP8	VCO3	TC961	2.5V
	f=10.4999MHz					TC961	When the voltage is 6.45V or below, adjust the unit to 6.5V again. (6.45V~7.0V)
	f=10.5000MHz					TC962	2.5V
	f=21.4999MHz					TC962	When the voltage is 6.45V or below, adjust the unit to 6.5V again. (6.45V~7.0V)
	f=21.5000MHz					TC963	2.5V
	f=29.9999MHz					Check	6.5V or below
2nd LO Level	f=7.100MHz	Oscilloscope		TP4	PLL	L711 L712	Turn the coils to the max. repeatedly.
1st LO Level	f=7.100MHz			TP5		L709 L710	Turn the coils to the max. repeatedly.
	f=7.100MHz					L706 L707 L708	Turn the coils to the max. repeatedly.

Item	Condition	Measurement			Adjustment		
		Equipment	Unit	Terminal	Unit	Parts	Method
Frequency (Mode)	RX LSB	Freq. Counter	PLL	TP3	PLL	TC702	9873.60kHz +/- 0.02kHz
	RX USB					TC704	9876.40kHz +/- 0.02kHz
	RX AM and FM					TC703	9875.00kHz +/- 0.02kHz
	RX CWU					Check	9875.80kHz +/- 0.3kHz
	RX CWL						9874.20kHz +/- 0.3kHz
Frequency (IF Shift)	RX LSB			J701		VR702	453.60kHz +/- 0.1kHz
	TX LSB					VR701	453.60kHz +/- 0.01kHz
	RX LT, (IF Shift center)					Check	453.30kHz +/- 0.2kHz
	TX LT, (IF Shift center)						453.50kHz +/- 0.2kHz
	RX UT, (IF Shift center)						456.70kHz +/- 0.2kHz
	TX UT, (IF Shift center)						456.50kHz +/- 0.2kHz
Frequency	f=7.1000MHz, FM			J703		TC701 L702	78850.00kHz Adjust TC701 at first, then L702 when TC701 can not be adjusted.
Level	f=7.100MHz, USB	Spectrum Analyzer		J701		Check	-6~0dBm f=456.4kHz
Level	f=7.100MHz, USB			J702			1~6dBm f=71.295MHz
Level	f=53.9999MHz			J703		L720 L721 L722	Turn the coils to the max. repeatedly. f=123.75MHz
Level	f=53.9999MHz					L732 L733 L734 L745	Turn the coils to the max. repeatedly f=123.75MHz 1~6dBm
Spurious	f=53.9999MHz					TC705	Spurious min. (60dB or more)
Level	f=150kHz f=10.400MHz f=10.500MHz f=21.400MHz f=21.500MHz f=29.9999MHz					Check	Level: 2~6dBm +/-2dB

3) Tone Unit Adjustment

1 Attach EJ26U to DX70.
2 When the subaudible Tone is ON in FM mode, adjust the unit according to following table.
3 When the subaudible Tone is OFF in FM mode, the tone should not be emitted.

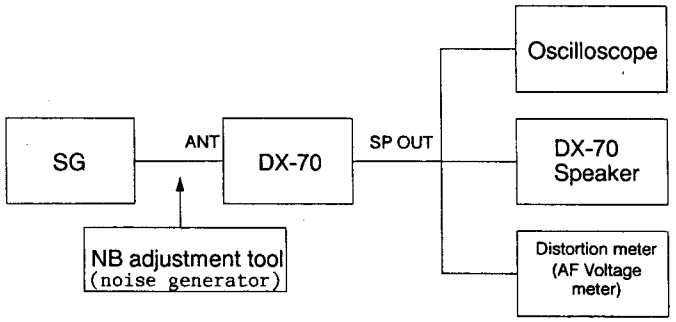
Item	Condition	Measurement			Adjustment		
		Equipment	Unit	Terminal	Unit	Parts	Method
Tone Frequency	250.3Hz 1 2 3 4 5 6 7 8 * * *	Freq. Counter	EJ26 u	CN99 1~1			249.6~251.0Hz
Tone Frequency	156.3Hz 1 2 3 4 5 6 7 8 * * *	Freq. Counter	EJ26 u	CN99 1~1			156.2~157.2Hz
Tone Level	156.3Hz 1 2 3 4 5 6 7 8 * * *	Oscilloscope	EJ26 u	CN99 1~1			1.8~3.0V p-p
Tone Level	156.3Hz 1 2 3 4 5 6 7 8 * * * *	Oscilloscope	EJ26 u	CN99 1~1			2.8~3.8V p-p
Tone Level	156.3Hz 1 2 3 4 5 6 7 8 * * * * *	Oscilloscope	EJ26 u	CN99 1~1			3.8~4.8V p-p
Final Setting	88.5Hz 1 2 3 4 5 6 7 8 * *						Attach to the DX70T after the tone level obtains 88.5Hz.

* indicates the number is ON.

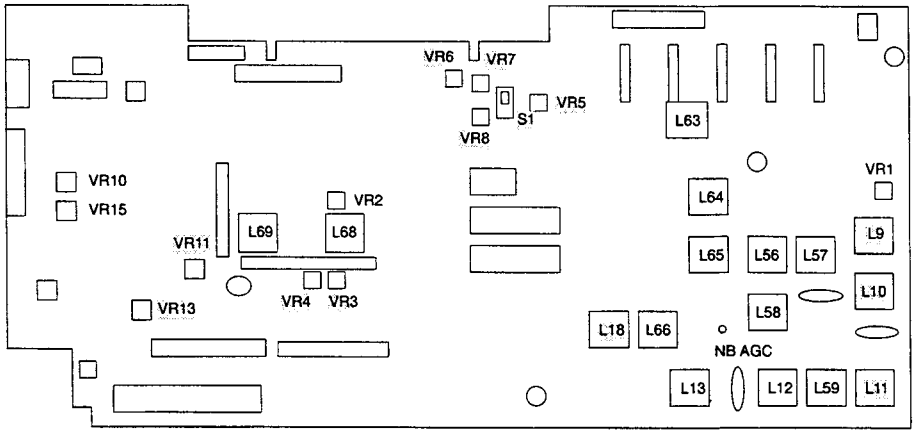
Required Test Equipment

1. Digital voltage meter
2. DC regulated power supply — 13.80V 3A or more
3. SG — about 200MHz
4. Distortion meter, AF voltage meter
5. 8Ω speaker
6. Oscilloscope
7. (NB adjustment tool)

Main Unit Adjustment Setting



Main Unit Adjustment Points



TX Adjustment

4) Sensitivity Adjustment

SG Output Frequency: 14.1000MHz — Connect to HF Antenna Terminal.
Frequency: 14.0993MHz — Mode: USB — RIT: OFF — AGC: FAST — NB: OFF
RF Gain: +10dB — ΔIF: Center — Squelch VR: Turn the knob counterclockwise fully.
Filter: Wide

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Tuning	SG output: 0dBμ Mod: OFF AF output: 300mV	Audio Voltmeter	SP	Main	L56 L57 L58 L59 L12 L13 L66 L68 L69	Adjust every following group repeatedly to obtain the maximum receiving signal; L56, 57, 58 L59, 12, 13 L66 L68, L69
	Mode: FM f=14.1000MHz SG output: 0dBμ Mod: 1kHz, 3.5kHzDEV	Distortion Meter			L59 L12 L13	Adjust repeatedly to obtain the maximum SINAD. SINAD should be 13dB or more.
	SG output: 60dBμ 1kHz, 3.5kHzDEV				Check	SINAD should be 30dB or more. If SINAD is below 30dB, adjust L59, L12 and L13 again.
	SG output: -6dBμ Mod: OFF Mode: USB f=14.0993MHz AF output: 300mV	Audio Voltmeter			Check	Make sure that S/N is 10.5dB or more by turning ON/OFF SG output.
	SG output: 10dBμ Mod: 1kHz, 30% Mode: AM f=14.1000MHz				Check	Make sure S/N is 10dB or more by turning ON/OFF SG modulation.

5) Noise Blanker Adjustment

SG Output Frequency: 14.1000MHz
Frequency: 14.0993MHz Mode: USB
RF Gain: +10dB ΔIF: Center
Filter: Wide

Connect to HF Antenna Terminal.
RIT: OFF AGC: FAST NB: OFF
Squelch VR: Turn the knob counterclockwise fully.

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Tuning	SG output: 0dBμ Mod: OFF Mode: USB f=14.0993MHz NB: ON RF Gain: +10dB	Oscilloscope	NB AGC (MAIN)	Main	L63 L64 L65	Adjust the coils, and set DC voltage of the terminal to the minimum with the oscilloscope.

6) S Meter Adjustment

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
RX Total Gain	SG output: 40dBμ Mod: OFF Mode: USB f=14.0993MHz RF Gain: 0dB	AF Voltmeter	SP	Main	VR2	Adjust SP output by setting the AF gain to about 1V. The output level should be 0dB. Adjust only the noise output to -28dB by turning OFF SG output.
S Meter	SG output: 20dBμ Mod: OFF SG output: 40dBμ	S Meter	S Meter		VR10 VR15	The indicator between first and second digits is turned ON. The 9th digit starts flashing. Adjust VR10 and VR15 repeatedly.
	SG: OFF				Check	S Meter is not turned ON.
Squelch	SG: OFF		BUSY RX LED (Green) AF output		Check	Turn the Squelch VR to make sure that the squelch closes at about 10 o'clock.

7) Receiving Function Adjustment

SG Output Frequency: 14.1000MHz
Frequency: 14.0993MHz Mode: USB
RF Gain: +10dB ΔIF: Center
Filter: Wide

Connect to HF Antenna Terminal.
RIT: OFF AGC: FAST NB: OFF
Squelch VR: Turn the knob counterclockwise fully.

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
AGC	SG output: 40dBμ Output: ON/OFF Mod: OFF		S Meter		Check	Switch AGC. When SG is turned OFF, the meter moves slowly in SLOW, and fast in FAST.
RF GAIN	SG output: 40dBμ		S Meter		Check	Switch the RF GAIN from +10dB orderly, the meter swings shorter and shorter.
FILTER Switching	Output: OFF Mode: USB, AM, CW				Check	Switch the FILTER in every mode (except FM), the noise sound should be changed.
Band Sensitivity	SG output: -6dBμ f=1.9000MHz f=3.6000MHz f=7.0000MHz f=10.1000MHz f=21.1000MHz f=28.1000MHz Mode: USB or LSB	Audio Voltmeter	SP		Check	In USB mode, SG frequency is -700Hz. In LSB mode, SG frequency is +700Hz. Make sure that S/N is 10dB or more.
50MHz Sensitivity	Connect SG to 50MHz antenna terminal. SG output: -10dBμ SG freq.: 52.1000MHz Mode: USB f=52.0993MHz				Check	S/N is 10.5dB or more when turning ON/OFF SG output.
	SG output: -4dBμ Mod: 1kHz, 3.5kHzDev Mode: FM f=52.0000MHz	Distortion Meter			Check	SINAD: 13dB or more

5) Noise Blanker Adjustment

SG Output Frequency: 14.1000MHz
Frequency: 14.0993MHz Mode: USB
RF Gain: +10dB ΔIF: Center
Filter: Wide

Connect to HF Antenna Terminal.
RIT: OFF AGC: FAST NB: OFF
Squelch VR: Turn the knob counterclockwise fully.

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Tuning	SG output: 0dBμ Mod: OFF Mode: USB f=14.0993MHz NB: ON RF Gain: +10dB	Oscilloscope	NB AGC (MAIN)	Main	L63 L64 L65	Adjust the coils, and set DC voltage of the terminal to the minimum with the oscilloscope.

6) S Meter Adjustment

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
RX Total Gain	SG output: 40dBμ Mod: OFF Mode: USB f=14.0993MHz RF Gain: 0dB	AF Voltmeter	SP	Main	VR2	Adjust SP output by setting the AF gain to about 1V. The output level should be 0dB. Adjust only the noise output to -28dB by turning OFF SG output.
S Meter	SG output: 20dBμ Mod: OFF SG output: 40dBμ	S Meter	S Meter		VR10 VR15	The indicator between first and second digits is turned ON. The 9th digit starts flashing. Adjust VR10 and VR15 repeatedly.
	SG: OFF				Check	S Meter is not turned ON.
Squelch	SG: OFF		BUSY RX LED (Green) AF output		Check	Turn the Squelch VR to make sure that the squelch closes at about 10 o'clock.

7) Receiving Function Adjustment

SG Output Frequency: 14.1000MHz
Frequency: 14.0993MHz Mode: USB
RF Gain: +10dB ΔIF: Center
Filter: Wide

Connect to HF Antenna Terminal.
RIT: OFF AGC: FAST NB: OFF
Squelch VR: Turn the knob counterclockwise fully.

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
AGC	SG output: 40dBμ Output: ON/OFF Mod: OFF		S Meter		Check	Switch AGC. When SG is turned OFF, the meter moves slowly in SLOW, and fast in FAST.
RF GAIN	SG output: 40dBμ		S Meter		Check	Switch the RF GAIN from +10dB orderly, the meter swings shorter and shorter.
FILTER Switching	Output: OFF Mode: USB, AM, CW				Check	Switch the FILTER in every mode (except FM), the noise sound should be changed.
Band Sensitivity	SG output: -6dBμ f=1.9000MHz f=3.6000MHz f=7.0000MHz f=10.1000MHz f=21.1000MHz f=28.1000MHz Mode: USB or LSB	Audio Voltmeter	SP		Check	In USB mode, SG frequency is -700Hz. In LSB mode, SG frequency is +700Hz. Make sure that S/N is 10dB or more.
50MHz Sensitivity	Connect SG to 50MHz antenna terminal. SG output: -10dBμ SG freq.: 52.1000MHz Mode: USB f=52.0993MHz				Check	S/N is 10.5dB or more when turning ON/OFF SG output.
	SG output: -4dBμ Mod: 1kHz, 3.5kHzDev Mode: FM f=52.0000MHz	Distortion Meter			Check	SINAD: 13dB or more

Connect the power meter to 50MHz antenna terminal.
Frequency: 52.000MHz Mode: USB Power: High
Speech Compressor (SET mode): OFF FM-TONE: OFF

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Filter Tuning	AG output: -30dBm Mode: FM FM-TONE: OFF	Oscilloscope (Linear Detector)	50MHz Antenna Terminal	Main	L11 L10 L9	Set the AM modulation factor to the minimum. It should be 5% or below.
Carrier Balance	AG output: OFF f: 7.1000MHz Mode: LSB/USB	Oscilloscope	HF Antenna Terminal		VR3 VR4	Adjust VR3 and VR4 so that the carrier suppression is 50dB (1/300) or below at 100W. The carrier suppression should be decreased in both USB and LSB.
CW Wave Form	Mode: CW-L/CW-U Electronic-keyer (dot): approx. 20mS				VR11 Check	Make sure of the wave form. The wave form of rise and fall should be symmetry. (The inclination is approx. 3mS.) The side tone of CW is should be heard from speaker.
Low Power	Mode: FM Power: Low	Power Meter			Check	Within 10~20W
AM Power	AG output: OFF Mode: AM Power: High				Check	35~50W
Band Power	Mode: FM Band (MHz): 1.9, 3.5, 10, 14,18,21,24,28,50				Check	Make sure that the power is 90~110W.

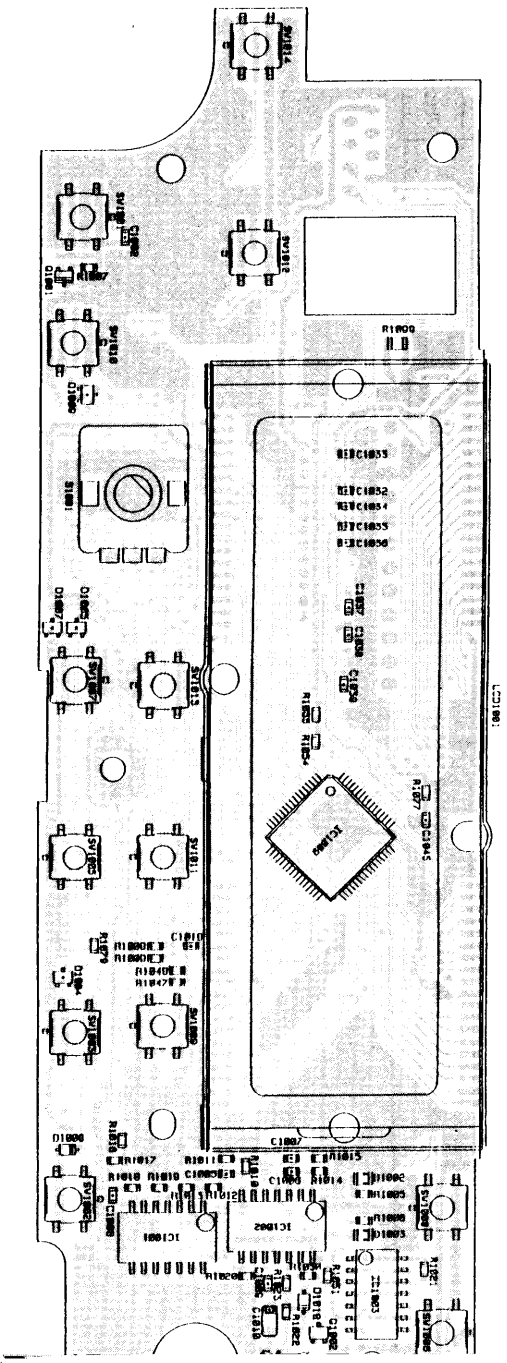
9) Spurious Adjustment

Connect the power meter to HF or 50MHz antenna terminal.
Frequency: 52.000MHz Mode: FM Power: High
Speech Compressor (SET mode): OFF FM-TONE: OFF

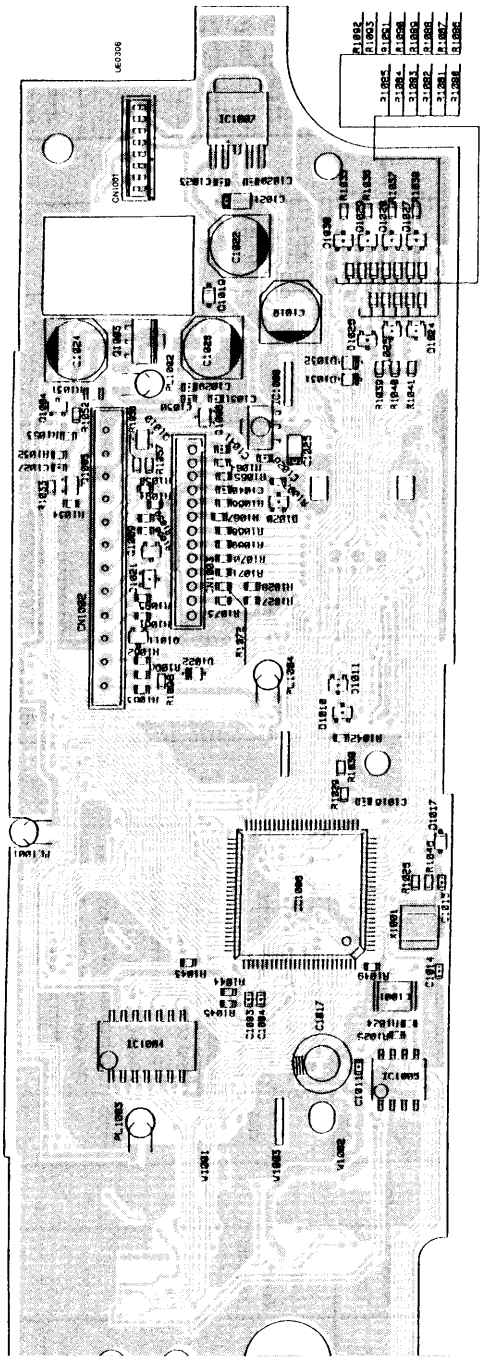
Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Spurious Balance	AG output: OFF Mode: FM FM-TONE: OFF (f: 52.0000MHz)	ATT + spectrum Analyzer	50MHz Antenna Terminal	Main	VR1	Balance the spurious to obtain the minimum value. -60dB or below
Spurious	AG output: OFF Mode: FM Band (MHz): 1.9, 3.5, 10, 14, 18, 21, 24, 28		HF Antenna Terminal		Check	-52dB or below (-47dB or below in 10MHz band only)
					L9	Adjust so that the value is within the regulation. (Adjust L9 when the spurious is not -52dB or below in 24/28MHz band.)
Carrier Balance	AG output: OFF Mode: LSB/USB				Check (VR3 VR4)	-50dB or below (Adjust VR3 and VR4 when the carrier suppression is not -50dB or below.)
Modulation	Mode: CW Keying: OFF f: 53.99MHz				Check	-60dB or below
	Mode: FM, AM, USB/LSB Connect the microphone.	Monitor Transceiver			Check	Make sure the modulation sound in every mode.

PC BORD VIEW

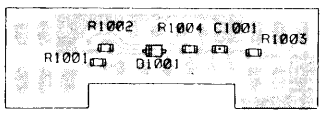
CPU Unit Side A (Later)



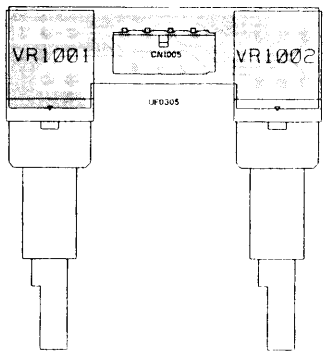
CPU Unit Side B (Later)



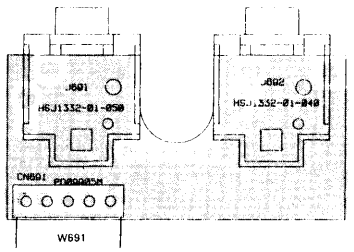
Vol. Unit Side A (Later)



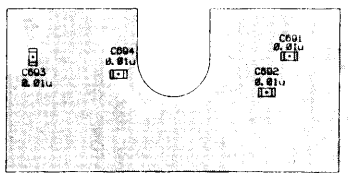
Vol. Unit Side B (Later)



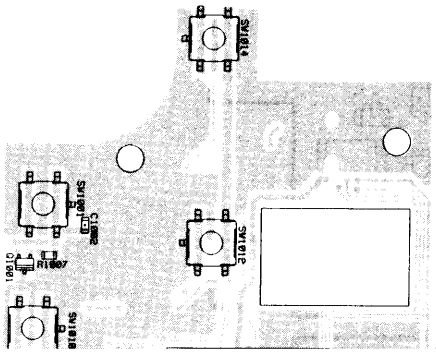
Jack Unit Side A



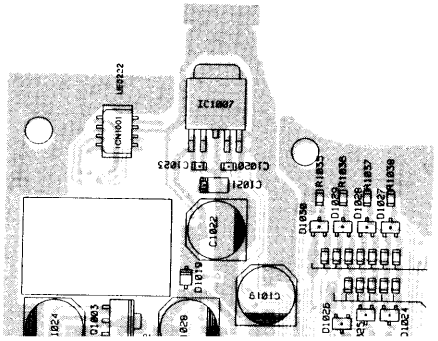
Jack Unit Side B



CPU Unit Side A (Early)

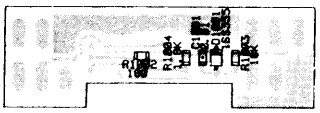


CPU Unit Side B (Early)

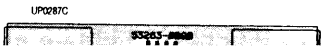


Vol. Unit Side A (Early)

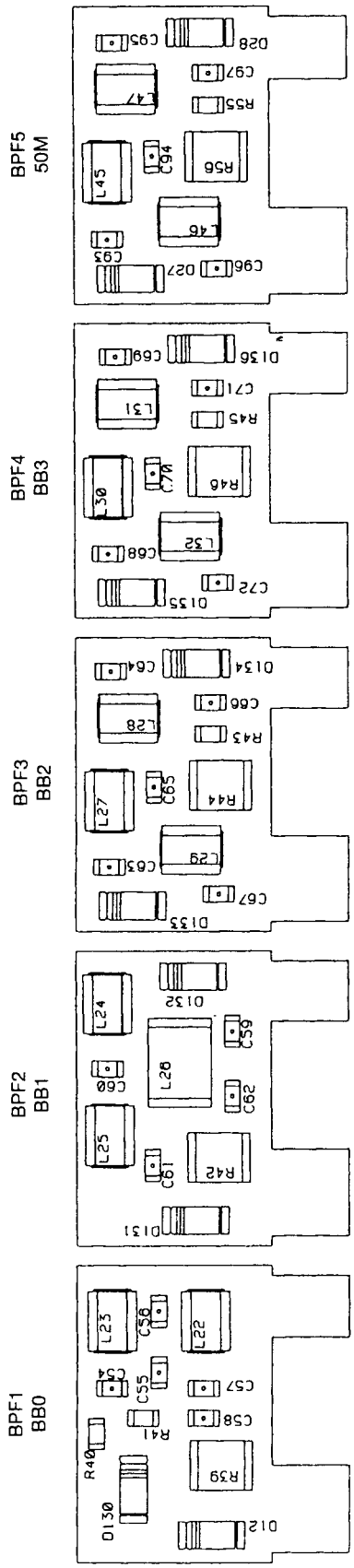
3) Vol. Unit Side A



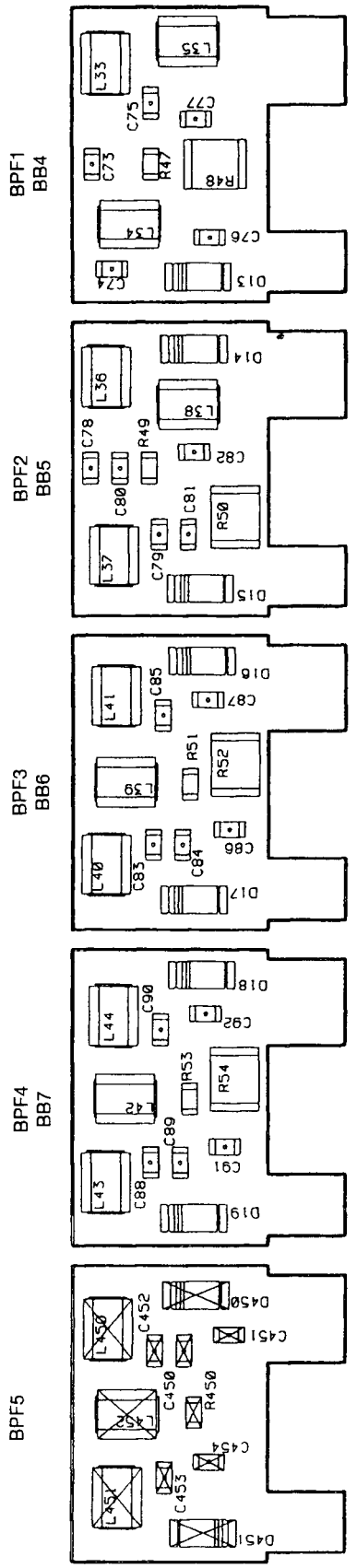
Vol. Unit Side B (Early)



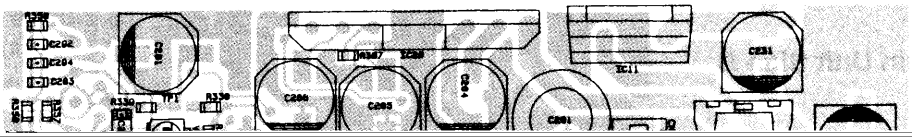
BPF UNIT Side A



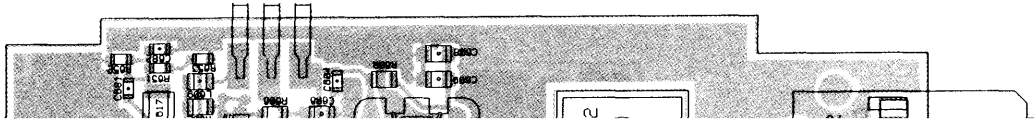
BPF UNIT Side B



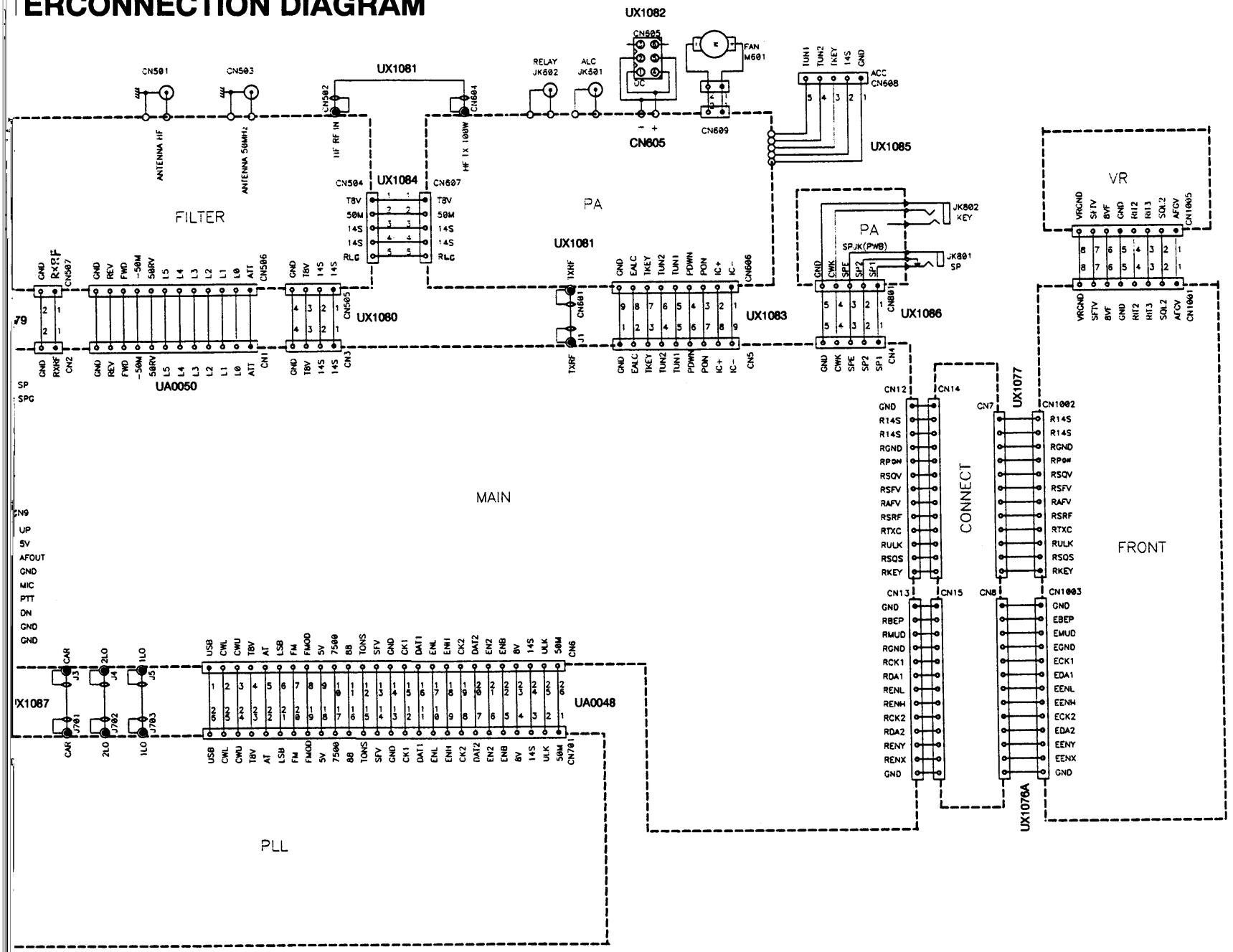
Main Unit Side A

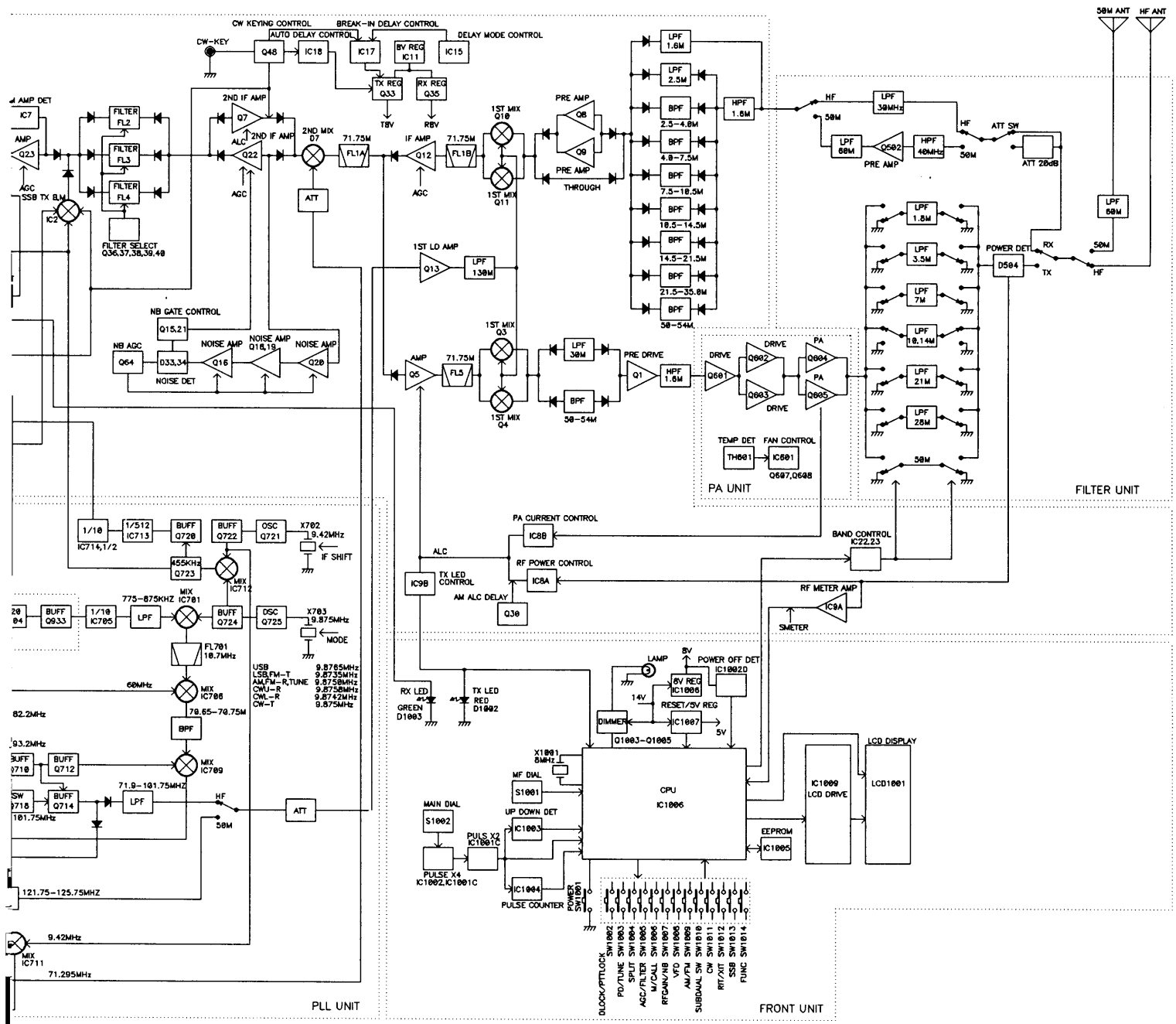


PA Unit Side A

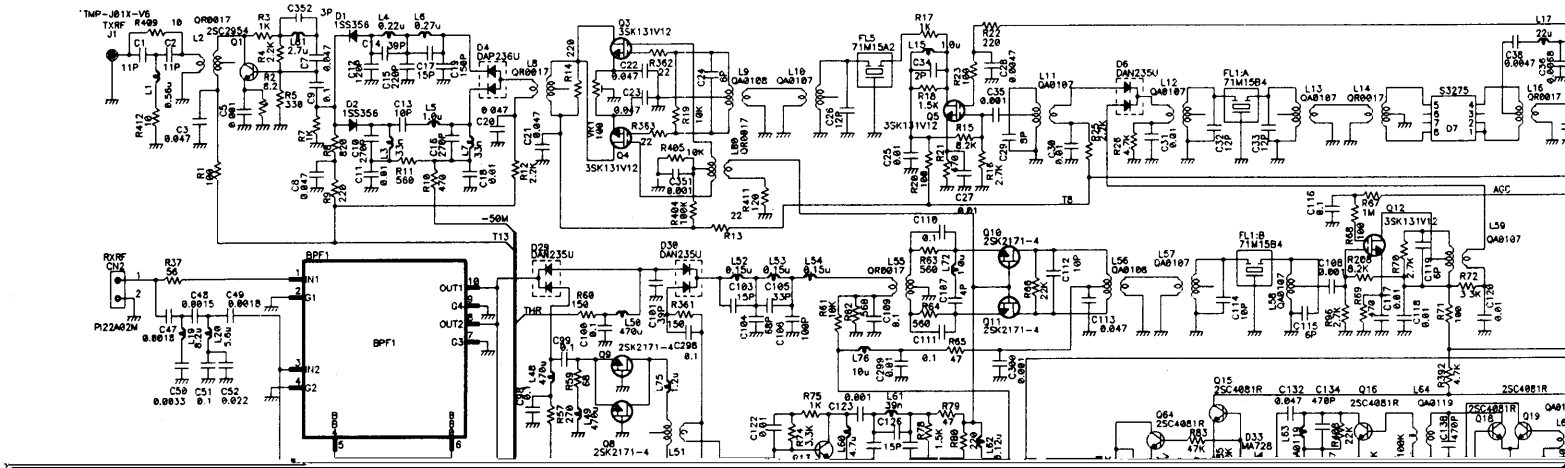


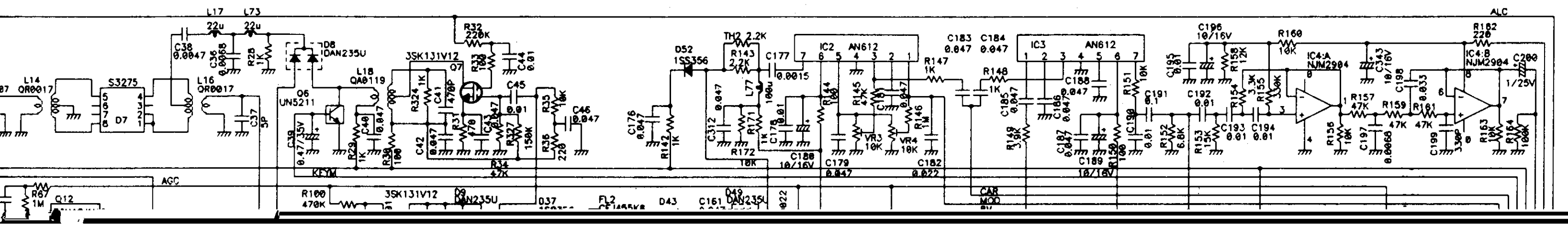
TERCONNECTION DIAGRAM

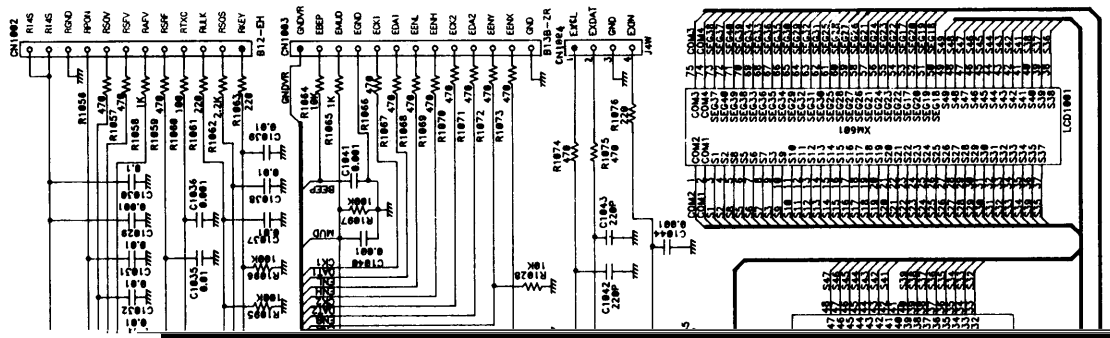



CW KEYING CONTROL
BREAK-IN DELAY CONTROL
AUTO DELAY CONTROL
DELAY MODE CONTROL
CW-KEY
Q48
IC18
IC17
8V REG IC11
IC15
TX REG Q33
RX REG Q35
T8V
R8V
2ND IF AMP
2ND MIX D7
71.75M
IF AMP
1ST MIX Q10
1ST MIX Q11
PRE AMP
THROUGH
LPF 1.6M
LPF 2.5M
BPF 2.5-4.0M
BPF 4.0-7.5M
BPF 7.5-10.5M
BPF 10.5-14.5M
BPF 14.5-21.5M
BPF 21.5-35.0M
BPF 50-54M
HPF 1.6M
HF
50M ANT
HF ANT
LPF 30MHz
LPF 50M
PRE AMP
HPF 40MHz
ATT SW
ATT 20dB
POWER DET
D504
RX
TX
LPF 1.8M
LPF 3.5M
LPF 7M
LPF 10.14M
LPF 21M
LPF 28M
FILTER UNIT
FILTER FL2
FILTER FL3
FILTER FL4
FILTER SELECT Q36,37,38,39,40
AGC
SSB TX BAL
IC2
ATT
1ST LO AMP
Q13
LPF 130M
NB GATE CONTROL
Q15,21
NB AGC
Q64
D33,34
NOISE DET
NOISE AMP Q16
NOISE AMP Q18,19
NOISE AMP Q20
1ST MIX Q3
1ST MIX Q4
AMP Q5
FL5
LPF 30M
BPF 50-54M
PRE DRIVE
Q1
HPF 1.6M
DRIVE Q601
DRIVE Q602
DRIVE Q603
PA Q604
PA Q605
TEMP DET
FAN CONTROL
TH601
IC601
Q607,Q608
PA UNIT
1/10 IC714,1/2
1/512 IC713
BUFF Q720
BUFF Q722
OSC Q721
X702 9.42MHz
IF SHIFT
455KHz Q723
MIX IC712
BUFF Q933
1/10 IC705
LPF
MIX IC701
775-875KHZ
BUFF Q724
DSC Q725
X703 9.875MHz
MODE
FL701 10.7MHz
60MHz
MIX IC706
78.65-70.75M
BPF
82.2MHz
93.2MHz
BUFF Q710
BUFF Q712
BUFF Q714
LPF
71.9-101.75MHz
MIX IC709
101.75MHz
HF
50M
ATT
121.75-125.75MHz
9.42MHz
MIX IC711
71.295MHz
USB LSB,FM-T AM,FM-R,TUNE CWU-R CWL-R CW-T
9.8765MHz 9.8735MHz 9.8758MHz 9.8758MHz 9.8742MHz 9.875MHz
PLL UNIT
PA CURRENT CONTROL
IC8B
BAND CONTROL IC22,23
ALC
IC9B
TX LED CONTROL
RF POWER CONTROL
IC8A
AM ALC DELAY
Q30
RF METER AMP
IC9A
SMETER
LAMP
5V
POWER OFF DET
IC1002D
8V REG IC1008
14V
RESET/5V REG
IC1007
5V
DIMMER
Q1003-Q1005
RX LED GREEN D1003
TX LED RED D1002
X1001 8MHz
MF DIAL
S1001
MAIN DIAL
S1002
UP DOWN DET
IC1003
PULS X2 IC1001C
PULSE X4 IC1002,IC1001C
IC1004
PULSE COUNTER
POWER SW1001
CPU IC1006
EEPROM IC1005
IC1009 LCD DRIVE
LCD DISPLAY
LCD1001
BLOCK/PTTLOCK SW1002
PD/TUNE SW1003
SPLIT SW1004
AGC/FILTER SW1005
M/CALL SW1006
RFGAIN/NB SW1007
VFO SW1008
AM/FM SW1009
SUBDUAL SW SW1010
CW SW1011
RIT/XIT SW1012
SSB SW1013
FUNC SW1014
FRONT UNIT

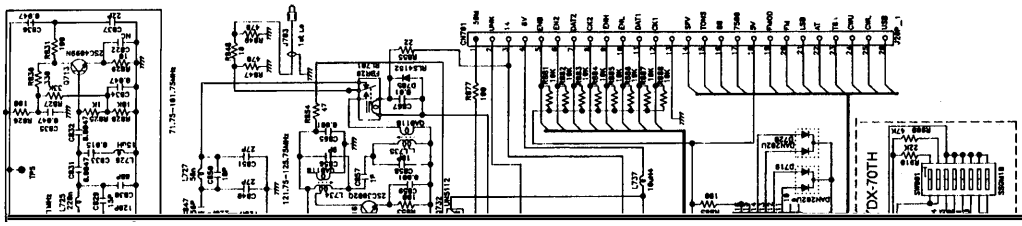
CIRCUIT DIAGRAM MAIN UNIT



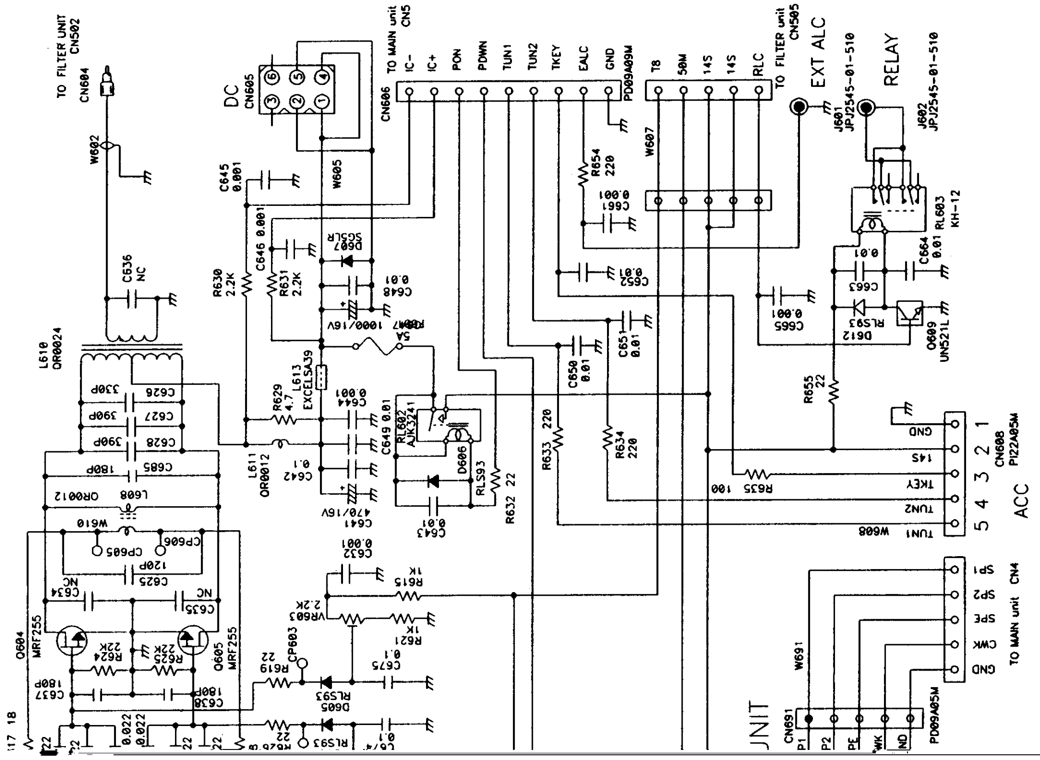

ALC
L17 22u
L73 22u
C38 0.0047
C36 0.0068
R28 1K
D8 DAN235U
L14 QR0017
S3275
D7
L16 QR0017
C37 5P
Q6 UN5211
L18 QA0119
3SK131V12
Q7
R32 220K
R33 100
C44 0.01
C45 0.01
R35 10K
C46 0.047
R36 220
R34 47K
C39 0.47/35V
R29 1K
C40 0.047
R30 100
C42 0.047
R31 470
R327 150K
R324 1K
C41 470P
KEYM
AGC
R67 1M
Q12
R100 470K
D52 1SS356
TH2 2.2K
R143 2.2K
C177 0.0015
L77 100u
C176 0.047
R142 1K
C312 0.047
R171 1K
R172 10K
C178 0.01
C180 10/16V
IC2 AN612
R144 100
R145 47K
VR3 10K
VR4 10K
R146 1M
C179 0.047
C182 0.022
C181
C183 0.047
C184 0.047
R147 1K
R148 1K
IC3 AN612
C185 0.047
R149 39K
C186 0.047
C188 0.047
C187 0.047
C189 10/16V
R151 10K
R150 100
C190 0.01
C191 0.1
R152 6.8K
C192 0.01
R153 15K
C193 0.01
C194 0.01
C195 0.01
C196 10/16V
R158 12K
R160 10K
R154 3K
R155 30K
IC4:A NJM2904
R156 10K
C143 10/16V
R157 47K
R159 47K
R161 47K
C197 0.0068
C198 0.033
C199 330P
R182 220
IC4:B NJM2904
C200 1/25V
R163 10K
R164 100K
CAR
MOD
FL2
D43
C161
D49 DAN235U
D37



PLL UNIT

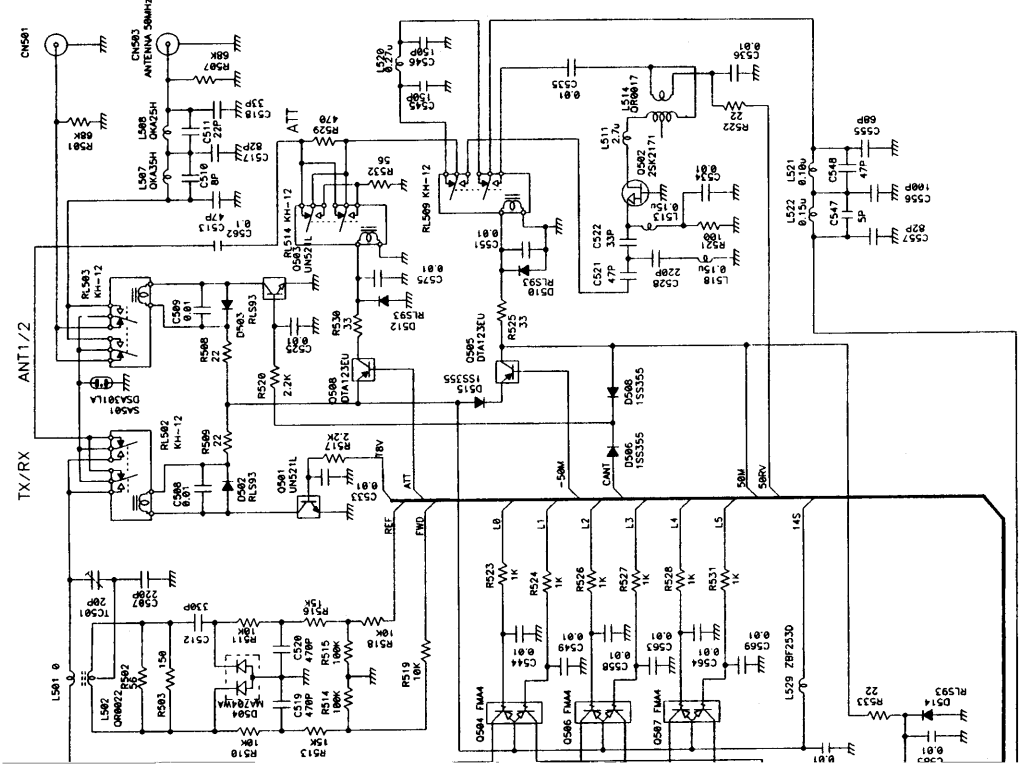


PA UNIT

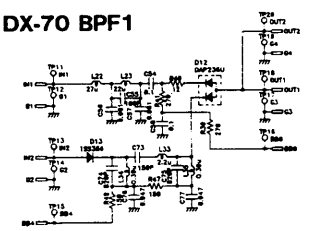


TO FILTER UNIT CN502
TO MAIN unit CN5
TO FILTER unit CN505
DC
EXT ALC
RELAY
ACC
TO MAIN unit CN4

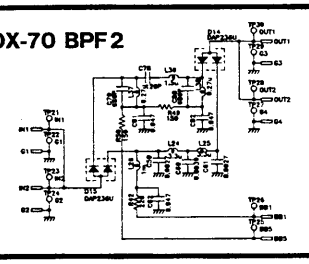
FILTER UNIT



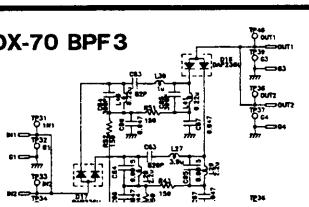
DX-70 BPF1

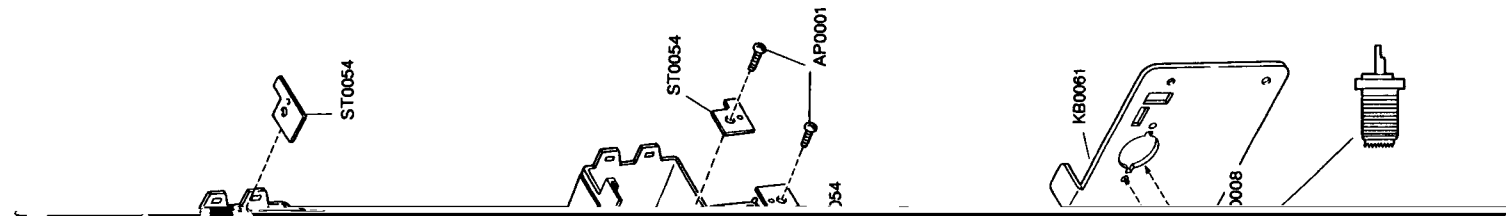


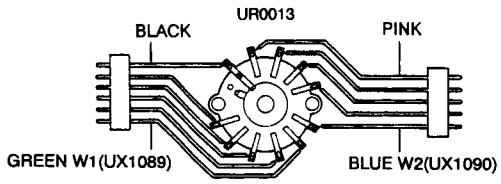
DX-70 BPF2

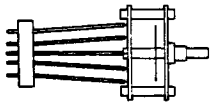


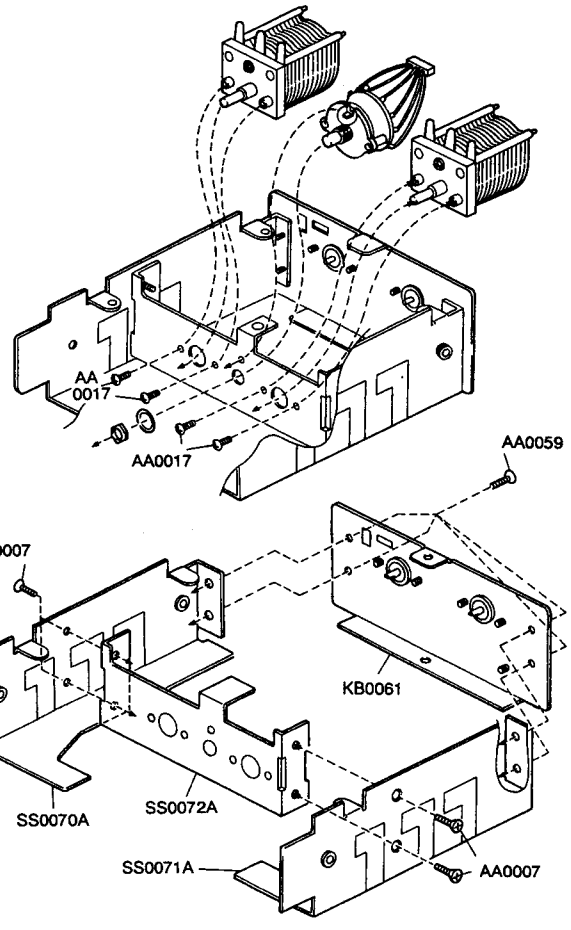
DX-70 BPF3

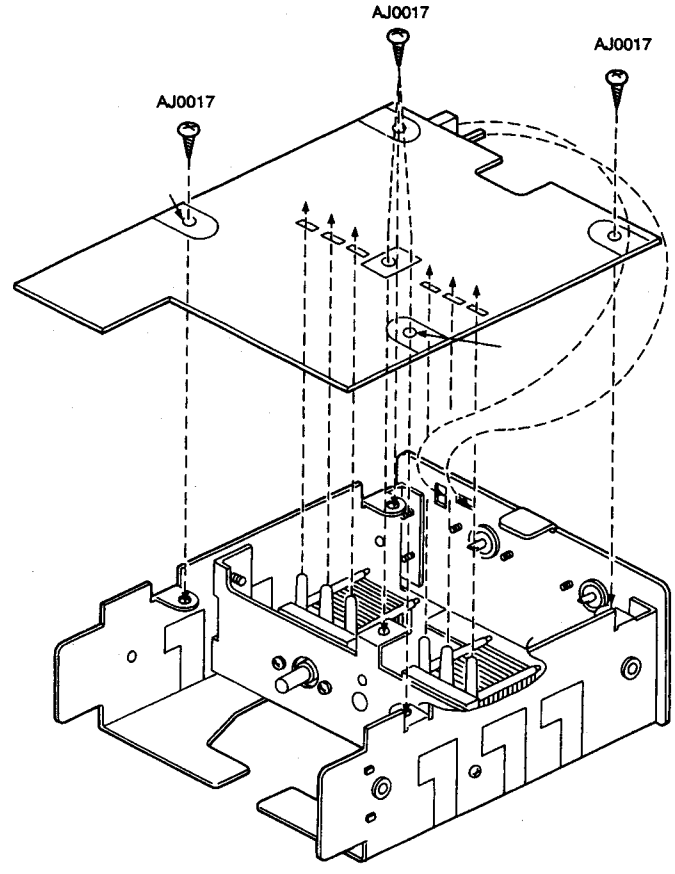


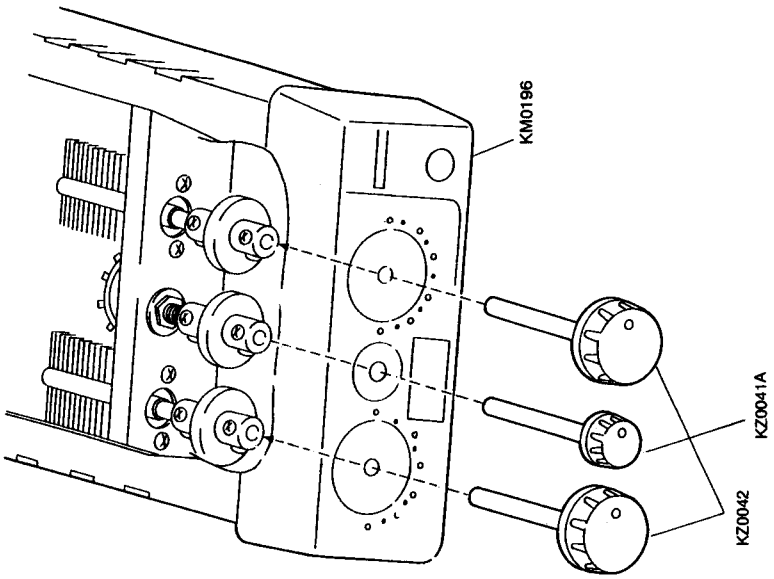

ST0054
ST0054
AP0001
KB0061

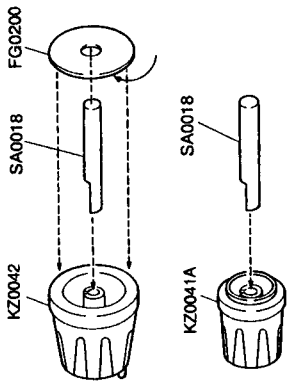

UR0013
BLACK
PINK
GREEN W1(UX1089)
BLUE W2(UX1090)

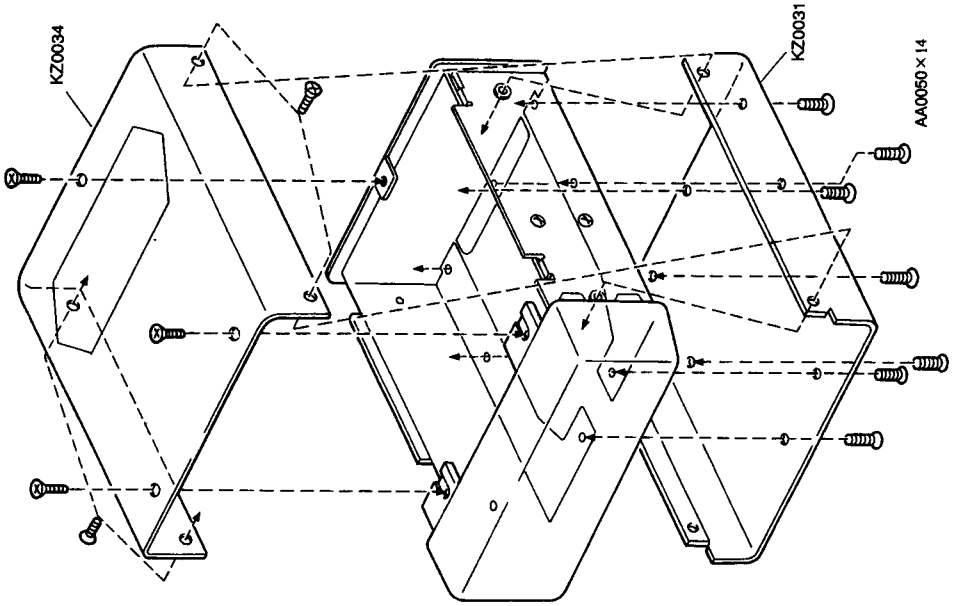


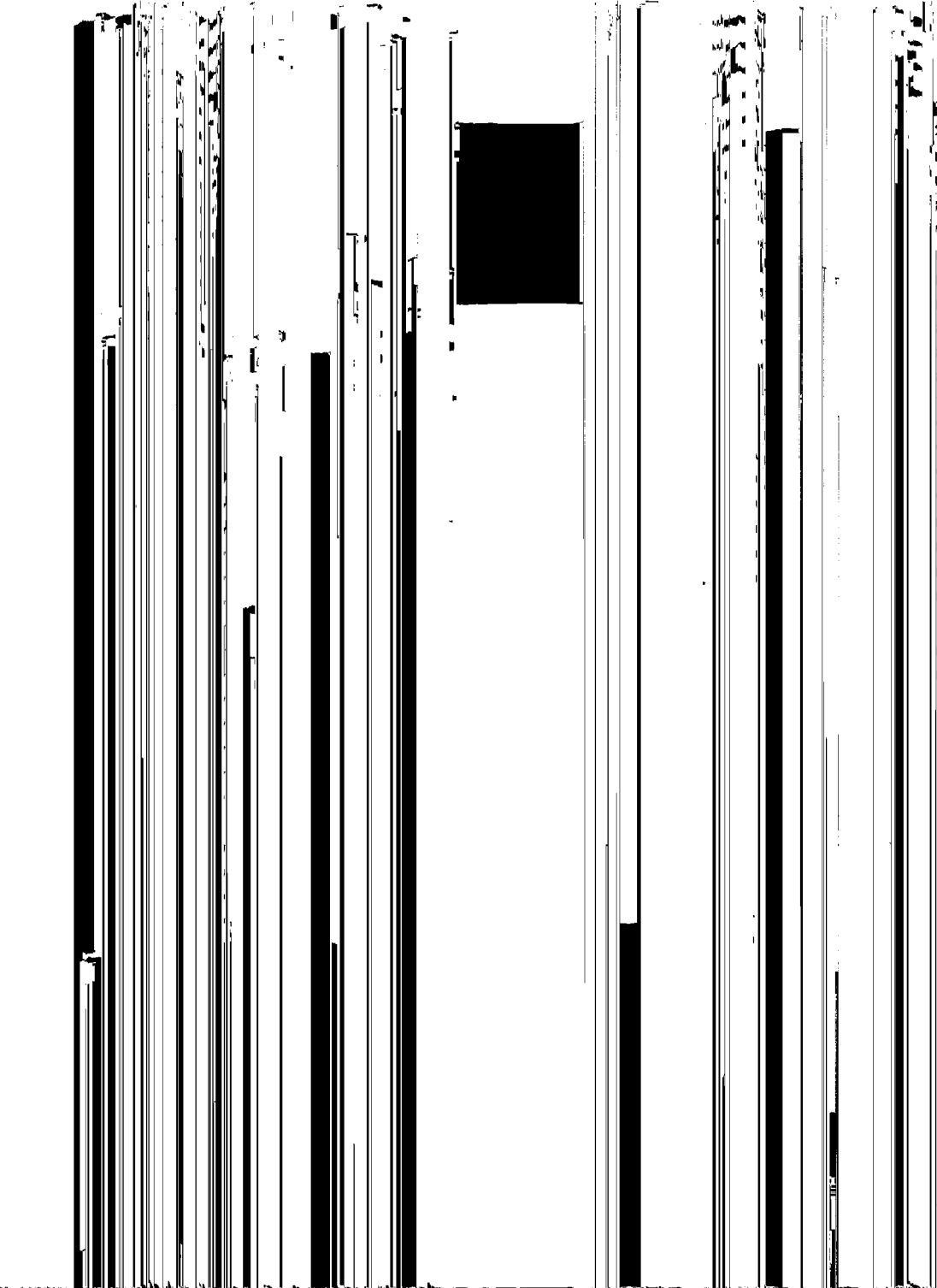

AA
0017
AA0017
AA0059
AA0007
KB0061
SS0070A
SS0072A
SS0071A
AA0007


AJ0017
AJ0017
AJ0017


KM0196
KZ0041A
KZ0042


FG0200
SA0018
KZ0042
SA0018
KZ0041A


KZ0034
KZ0031
AA0050×14

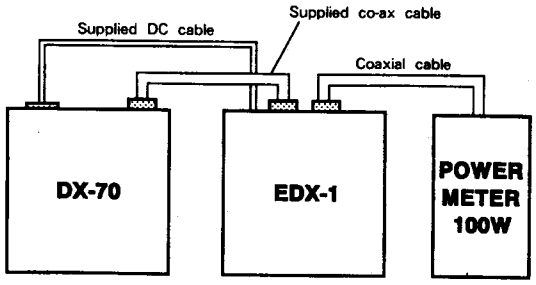


Ref. No.	Parts No.	Parts Name	Loc
R27	RK3050	ERJ3GSYJ103V	A
R28	RK0001	ERJ6GEYJ100V	A
R29	RK3026	ERJ3GSYJ101V	A
R30	RK3070	ERJ3GSYJ474V	A
R31	RK3026	ERJ3GSYJ101V	A
RL1	UL0015	SVR-12	M
RL2	UL0015	SVR-12	M
SW1	UQ0015	SPPJ22727A	M
SW2	UR0013	SRRY101AN-R15	H
SW3	US0020	ESD1522209	M
VC1	CT0036	ECV1ZW20X64T	M
VC1	CV0001	UV44B 300P	H
VC2	CV0001	UV44B 300P	H
VR1	RH0105	EVM1YSX50BY4	A
VR2	RH0106	EVM1YSX50BQ4	A
W1	UX1089	Wires EDX-1 1	H
W2	UX1090	Wires EDX-1 2	H
W3	UX1091	Wires EDX-1 3	H
W4	UX1091	Wires EDX-1 3	H
	UP0291	EDX-1 PC Board	T
X33	RK3046	ERJ3GSYJ472V	A
X32	RK1011	ERJ8GEYJ470V 1 A	A

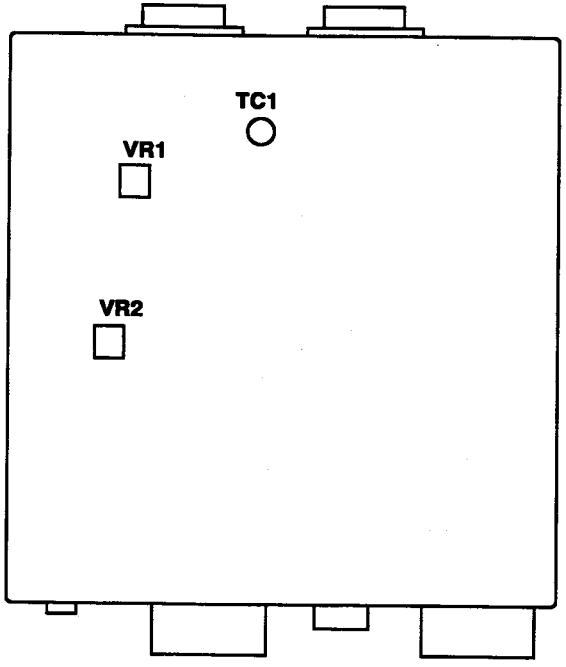
Packing	
Parts No.	**Parts Name**
HK0386A	PACKAGE EDX-1
HP0009	Protect. Bag (5×125×250)
HP00039	Protect. Bag (65×250×400)
HU0080	P.MTL/CARTON(A)DX70
HU0082	P.MTL/CARTON(A)DX70
HU0087	P.MTL/CARTON(A)DX70
PS0229	INSTRUCTION MANUAL EDX1
PT0004A	SERIAL NO. FOR CARTON
UA0049	EDX1 DC CODE
UE0264	M-M CABLE EDX1

Mechanical Parts	
Parts No.	**Parts Name**
PR0288	LABEL(SCREW STKR DX-70)
DS03898A	Serial No. PLATE(NEW)
AA0007	SCREW FH M2.6+6 Fe/Zn
AA0017	SCREW PH M3+8 Fe/Zn
AA50	SCREW OH M2.6+6 Fe/B.Zn
AA0059	SCREW BH M2.6+6 Fe/Ni
AD0005	SCREW PH/D M4+10 Fe/Zn
AJ0017	SCREW TH T2.6+6 Fe/N
AJ0029	SCREW PH T3+6 Fe/Zn
AP0001	SCREW PH M2.6+8 Fe/Zn
AZ0018	WASHER PW 4×10×0.8 Fe/Zn
EM0029	METER KL284A55
FG0200	DIAL PAT
KB0061	REAR CASE
KM0196	FRONTCASE
KZ0031	BOTTOM COVER DX-70
KZ0034	UPPERCASE EDX-1
KZ0041A	SUBDIAL EDX-1
KZ0042	DIAL DX-701
NS0005	SW KNOB(PS) CIRCLE
PR0292	LABEL (KNOB)
SA0018	STAY D6×60
SP0008	TERMINAL(GND DX-70)
SS0070A	CHASSIS(LEFT)
SS0071A	CHASSIS(RIGHT)
SS0072A	CHASSIS(CENTER)
ST0054	FIX METER
TZ0065	CUP RING C
UE0258	FM-M.D.R-(4)
UR0013	CONNECTOR SRRY101AN-R15
UX1089	WIRE EDX-1 W1
UX1090	WIRE EDX-1 W2

Connection Example



Adjustment Point



Required Test Equipment for EDX-1

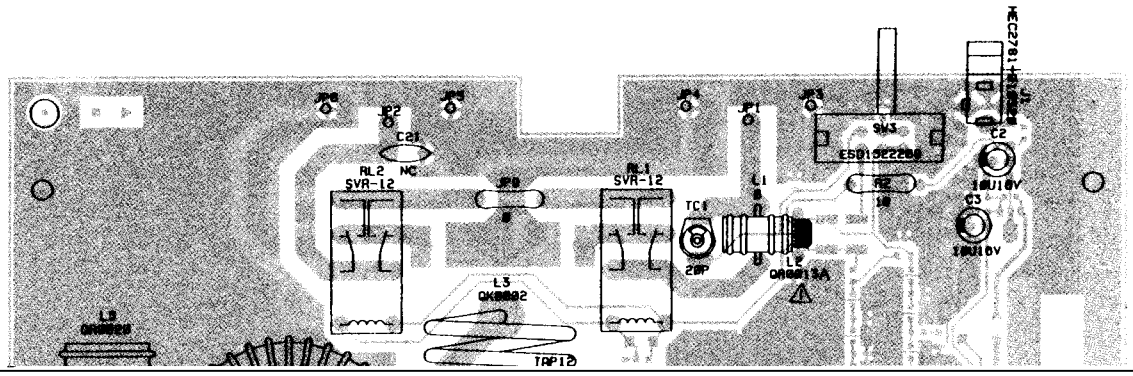
TX ON	BAND	SWR	METER	TX TUNE	ANT TUNE	METER READING	UNIT
14.1MHz 100W	1.8	ON	H	10	10	∞	SWR
14.1MHz 100W	THRU	OFF	H	–	–	100W	PWR
14.1MHz 10W	THRU	OFF	L	–	–	10W (100W on scale)	PWR
1.9MHz 100W	1.8	ON	H	4	4	1.5max.	SWR
3.6MHz 100W	3.5	ON	H	7	7	1.5max.	SWR
7.1MHz 100W	7	ON	H	6	6	1.5max.	SWR
10.1MHz 100W	10	ON	H	7.5	7.5	1.5max.	SWR
14.1MHz 100W	14	ON	H	8	8	1.5max.	SWR
18.1MHz 100W	18	ON	H	8.5	8.5	1.5max.	SWR
21.1MHz 100W	21	ON	H	9	9	1.5max.	SWR
24.9MHz 100W	24	ON	H	9	9	1.5max.	SWR
28.1MHz 100W	28	ON	H	9	9	1.5max.	SWR

Adjustment for EDX-1

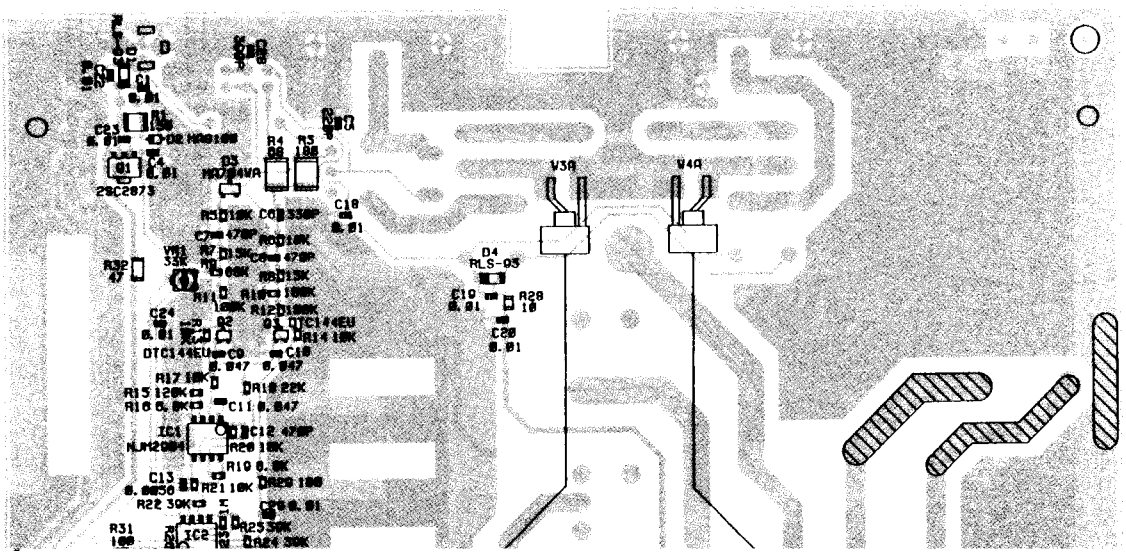
DX-70 TX FREQ. 14.1MHz TX POWER 100W						
BAND	SWR	METER	TX TUNE	ANT TUNE	ADJUST POINT	METER READING
THRU	ON	H	–	–	TC 1	MIN
1.8	ON	H	10	10	VR 2	∞
THRU	OFF	H	–	–	VR1	100W

PC Bord View for EDX-1

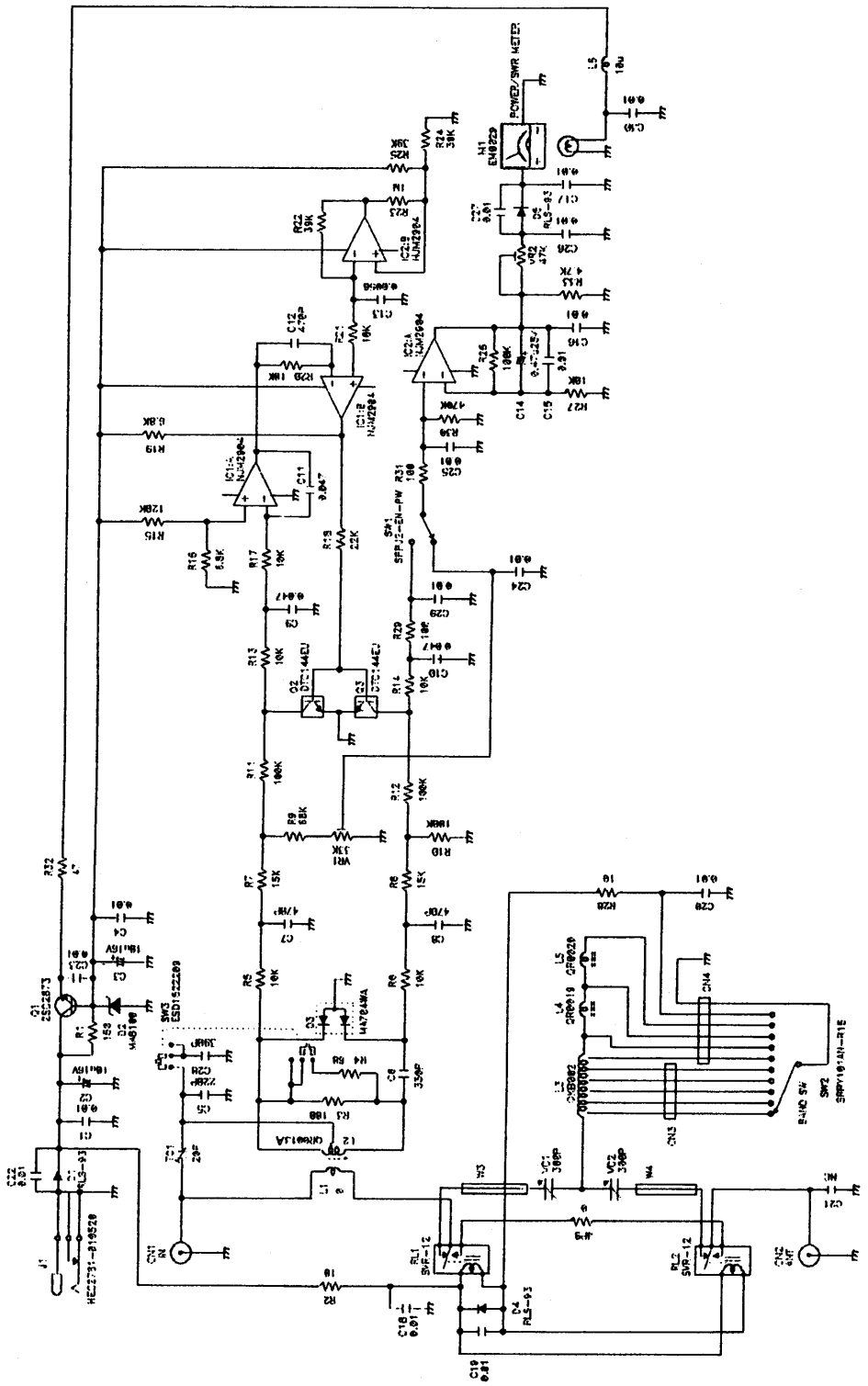
Side A

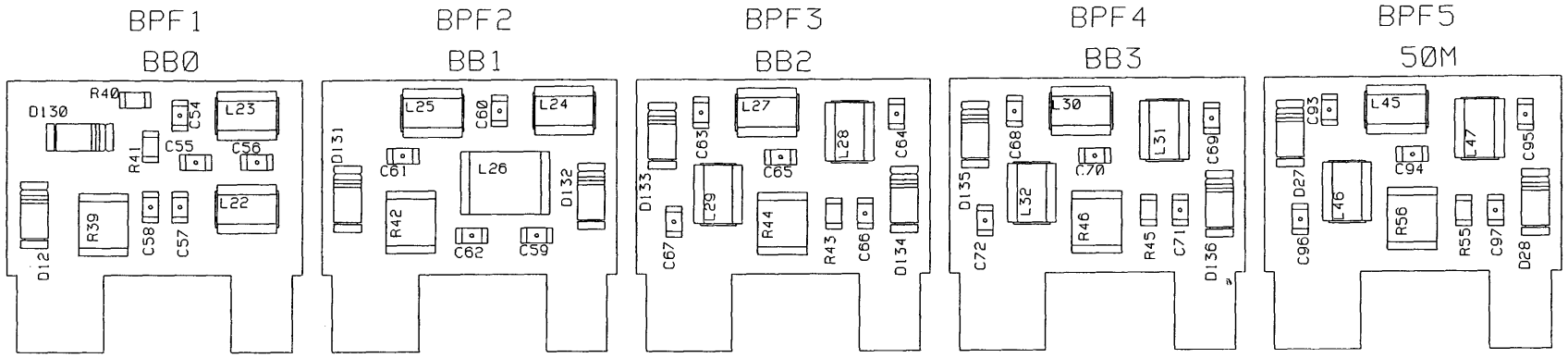


Side B


V3B
V4B
D4
RLS-05
C19
R28
10
C20
0.01
R32
47
C24
0.01
DTC144EU
R17 10K
R15 120K
R16 5.6K
C11 0.047
IC1
NJM2904
C12 47PF
R20 10K
R19 0.6K
C13
0.0056
R21 10K
R22 30K
C14 0.01
R31
100
IC2
R25 30K
R24 30K

Schematic Diagram for EDX-1

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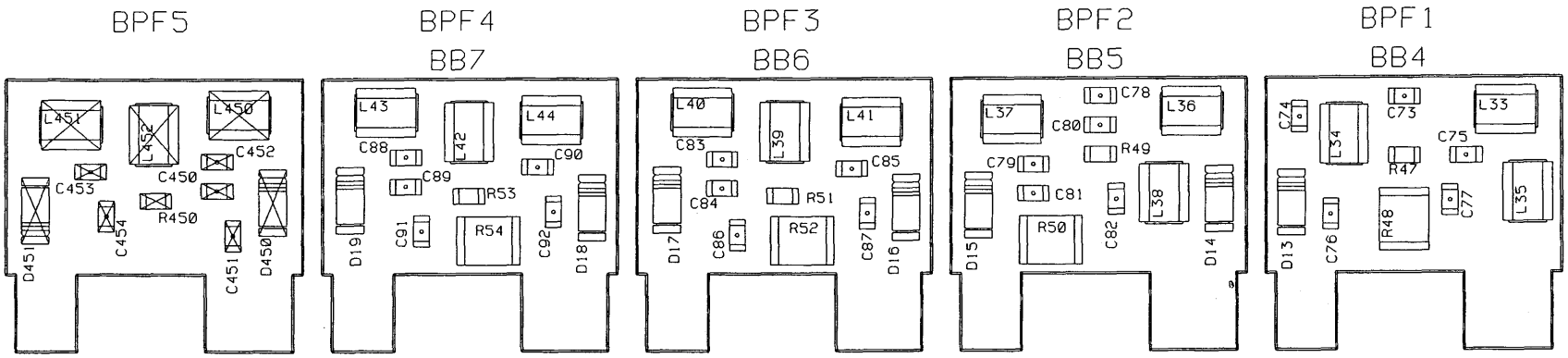
D130
C54
L23
C55
C56
R41
L22
R39
C58
C57
D12
BPF2
BB1
L25
C60
L24
D131
C61
L26
D132
R42
C62
C59
BPF3
BB2
D133
C63
L27
L28
C64
C65
L29
R44
R43
C66
C67
D134
BPF4
BB3
D135
C68
L30
L31
C69
C70
L32
R46
R45
C71
C72
D136
BPF5
50M
C93
L45
L47
C95
C94
D27
L46
R56
R55
C97
C96
D28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BPF4
BB7
BPF3
BB6
BPF2
BB5
BPF1
BB4
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L452
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C452
C450
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C454
R450
D451
C451
D450
L43
C88
L42
L44
C90
C89
R53
D19
C91
R54
C92
D18
L40
C83
L39
L41
C85
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R51
D17
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D16
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R49
C79
C81
L38
D15
R50
C82
D14
C74
L34
C73
L33
C75
R47
C77
L35
D13
C76
R48