

● SPECIFICATIONS

- 1) General.....2
- 2) Transmitter .....2
- 3) Receiver.....2

● CIRCUIT DESCRIPTION

- 1) Frequency Configuration.....3
- 2) Receiver Sytem .....3-4
- 3) Power Supply Circuit.....4
- 4) AF Signal Circuit.....5
- 5) Transmitter System.....5-6
- 6) PLL Circuit.....6
- 7) Front CPU and Peripheral Circuit.....7
- 8) Cross Band Repeater Circuit.....7
- 9) Tone Burst Output Circuit.....7

● PARTS LIST

- VHF MAIN Unit.....22-23
- UHF MAIN Unit.....24-26
- FRONT CPU Unit.....26-27
- VHF VCO Unit.....27-28
- UHF VCO Unit.....28
- TCXO Unit.....28
- Mechanical Parts.....28
- PCB Unit.....28
- SP Unit.....28
- Packing.....28

● ADJUSTMENT

- 1) Required Test Equipment.....29-30
- 2) UHF PLL Adjustment .....30

- 11) CTCSS Tone Decoder Circuit.....8
- 12) 9600bps Packet Circuit.....8
- 13) Clone Circuit .....8
- 14) CPU/I/O Port.....9-10

● SEMICONDUCTOR DATA

- 1) AK2341 .....11
- 2) AN78L05M .....12
- 3) AN8010M .....12
- 4) AT24C16N-10SI-2.7 .....12
- 5) LA4425A .....12
- 6) M64076GP .....13
- 7) M57788 .....14
- 8) M67746 .....14
- 9) M68702H .....14
- 10) MC3372VM .....15
- 11) MC7808CT .....15
- 12) NJM4558 .....16
- 13) RH5VA60AA .....16
- 14) RN5VL25AA-T1 .....16
- 15) TC4W53FU .....17
- 16) Transistor, Diode and LED Outline Drawings .....17
- 17) LCD Connection .....18

● EXPLODED VIEW

- 1) LCD Assembly.....19
- 2) VHF Unit Assembly.....20
- 3) UHF Unit Assembly.....21

- 4) UHF TX Adjustment .....32
- 5) VHF PLL Adjustment .....33
- 6) VHF RX Adjustment.....33
- 7) VHF TX Adjustment .....34
- 8) Adjustment Points.....35

● PC BOARD VIEW

- 1) VHF Main Unit Side A.....36
- 2) VHF VCO Unit Side A.....36
- 3) UHF Main Unit Side A.....37
- 4) UHF VCO Unit Side A.....37
- 5) VHF Main Unit Side B.....38
- 6) VHF VCO Unit Side B.....38
- 7) UHF Main Unit Side B.....39
- 8) UHF VCO Unit Side B.....39
- 9) Front Unit Side A .....40
- 10) Front Unit Side B .....40
- 11) TCXO Unit .....40

● SCHEMATIC DIAGRAM

- 1) CPU Unit.....41-42
- 2) VHF Main Unit T/E.....43-44
- 3) VHF Main Unit TE1/TE2.....45-46
- 4) UHF Main Unit T/E.....47-49
- 5) UHF Main Unit TE1/TE2 .....49-50
- 6) VHF PLL-VCO Unit.....51-52
- 7) UHF PLL-VCO Unit.....51-52
- 8) TCXO Unit .....51-52

● BLOCK DIAGRAM .....53-54

**ALINCO, INC.**

# SPECIFICATIONS

## 1) General

### Frequency Range:

(Version T)	VHF BAND	136.000 ~ 173.995MHz (RX)
		144.000 ~ 147.995MHz (TX)
	UHF BAND	420.000 ~ 470.000MHz (RX)
		430.000 ~ 449.995MHz (TX)
(Version E)	VHF BAND	144.000 ~ 145.995MHz (RX/TX)
	UHF BAND	430.000 ~ 439.995MHz (RX/TX)
(Version TE1)	VHF BAND	136.000 ~ 173.995MHz (RX/TX)
	UHF BAND	400.000 ~ 420.000MHz (RX/TX)
(Version TE2)	VHF BAND	136.000 ~ 173.995MHz (RX/TX)
	UHF BAND	450.000 ~ 470.000MHz (RX/TX)

### Modulation:

F3E (FM)

### Antenna Impedance:

50Ω

### Supply Voltage:

13.8 Volts DC

### Ground:

Negative

### Current Consumption

VHF TX 50W: 11.5A max. (T/E), 35W: 11.0A max. (TE1/TE2)  
UHF TX 35W: 10.0A max.  
RX 1.2A max.

### Frequency Stability:

±10ppm max.

### Dimensions (Body only):

140(W)mm x 40(H)mm x 176(D)mm

### Weight:

1.1kg

### Cannel

VHF: 51 / UHF: 51 total 102

## 2) Transmitter

### Output Power:

VHF BAND High: 50W / Low: approx. 5W (T/E)  
High: 35W / Low: approx. 5W (TE1/TE2)  
UHF BAND High: 35W / Low: approx. 5W

### Modulator:

Reactance modulation

### Spurious Emission:

-60dB max.

### Max. Deviation:

±5kHz

### Mod. Distortion (@60% mod.):

3% max. (300 to 3000Hz)

### Microphone Impedance:

2kΩ

## 3) Receiver

### Rx System:

Double Superheterodyne

### Intermediate Frequency:

VHF: First: 21.7MHz / Second: 450kHz  
UHF: First: 30.85MHz / Second: 455kHz

### Sensitivity (12dB SINAD):

Main band: -16dBμ (0.16μV) or less

### Selectivity:

-6dB: 12kHz min., -60dB: 28kHz max.

### Squelch Sensitivity:

-20dBμ (0.1μV) or less

### AF Output (@5% distortion):

2W or more (8Ω load)

### Speaker Output Impedance:

8Ω

Note: Specifications are subject to change without notice or obligation.

Specifications guaranteed in the amateur band only. (T/E)

# CIRCUIT DESCRIPTION

## 1) Frequency Configuration

- VHF and UHF bands have each PLL independently, and 2 IF systems are provided. Therefore 2 bands can be received simultaneously.
- The received signal of VHF band is mixed with the first local oscillator signal and converted into the first IF of 21.70MHz. Then the resulting signal is mixed with the second local oscillator signal of 21.25MHz and converted into 450kHz.
- The received signal of UHF band is mixed with the first local oscillator signal and converted into the first IF of 30.85kHz. Then the resulting signal is mixed with the second local oscillator signal of 30.395MHz and converted into 455kHz.

## 2) Receiver System

### 1. Receiver Circuit

The received signal from the antenna is passed through the duplexer (the circuit consists of low-pass filter for VHF and high-pass filter for UHF), and divided into the signals of VHF and UHF.

#### 1-1 144M Band Receiver Circuit

After the received signal from the duplexer is passed through the band-pass filter via the antenna switch (D5, D6), the signal is amplified at RF amplifier Q11. The unwanted signal of the amplified signal is eliminated by the band-pass filter consisting of 3 varicaps. Next the signal is mixed with the first local oscillator signal at the first mixer Q12, and converted to the first IF. The unwanted signal is attenuated by the crystal filter circuit. Then the signal is fed to IC2 Pin16 after being amplified at IF amplifier Q7. In this IC2 the signal is mixed with the second oscillator signal and converted to the second IF, then it is output from Pin3. The output signal is attenuated the unwanted signal by the ceramic filter, and input again from IC2 Pin5. Next the signal is passed through the limiter amplifier and demodulated in the quadrature detection circuit of IC2 to be output from Pin9 as AF signal.

#### 1-2 430M Band Receiver Circuit

The received signal from the duplexer is passed through the antenna switch (D206, D207), and amplified in the RF amplifier Q211. The amplified signal is attenuated the unwanted signal by the helical filter L218. The signal is amplified in RF amplifier Q212 and attenuated the unwanted signal again by the helical filter L219, then it is mixed with the first local oscillator signal at the first mixer Q213 and converted to the first IF. The unwanted signal is attenuated by the crystal filter circuit. Then the signal is fed to IC202 Pin16 after being amplified at IF amplifier Q214. In this IC202 the signal is mixed with the second oscillator signal and converted to the second IF, then it is output from Pin3. The output signal is attenuated the unwanted signal by the ceramic filter, and input again from IC202 Pin5. Next the signal is passed through the limiter amplifier and demodulated in the quadrature detection circuit of IC202 to be output from Pin9 as AF signal.

**UHF Squelch Circuit:**

The AF signal output from IC202 Pin9 is input to Pin10. Only the noise is amplified by the active filter in IC2 and output from Pin11, then amplified by the noise amplifier Q206. The amplified noise is rectified to DC voltage by D202 and input to CPU IC401 Pin5 via Trim. pot VR201. In the IC the input voltage and the settled voltage by the squelch knob are compared to work the squelch ON/OFF. When the squelch is open, the squelch signal "H" is output from IC401 Pin13 and LED D402 (green) lights.

### 3) Power Supply Circuit

#### 1. VHF Power Supply Switch Circuit and Unlock Circuit

In the receiving mode, "H" is output from PLL shift register IC501 Pin16 according to the serial data from CPU, and Q17 and Q16 are turned ON, then 8V is added to 8RV line. In the transmitting mode, just same as the receiving mode, "H" is output from IC501 Pin17, and Q19 and Q18 are turned ON, then 8V is added to 8TV line. When PLL is unlocked, the unlock switch Q21 is turned ON because "H" is output from UL terminal of PLL-VCO unit. Then 8TV switch Q19 is turned OFF. Consequently, as 8TV line does not work, the unit does not transmit when PLL is unlocked.

#### 2. UHF Power Supply Switch Circuit and Unlock Circuit

In the receiving mode, "H" is output from PLL shift register IC601 Pin16 according

to 8RV line. In the transmitting mode, just same as the receiving mode, "H" is output from IC601 Pin17, and Q220 and Q219 are turned ON, then 8V is added to 8TV line. When PLL is unlocked, the unlock switch Q222 is turned ON because "H" is output from UL terminal of PLL-VCO unit. Then 8TV switch Q220 is turned

the pre-emphasis circuit. The amplified video signals are added to the video circuit of operational amplifier IC203 and limited the band width. Each frequency

varicap of VHF/UHF VCO unit for reactance modulation.

and converted to DC. The detection voltage is passed through the APC circuit of UHF side (Q229, Q228, Q227), then it controls the APC voltage supplied to the younger amplifier Q210 and the power module IC201 to fix the output power.

## 6) PLL Circuit

### 1. PLL Synthesizer Circuit

VHF and UHF bands have their own units isolatedly. The sub unit is packed in a hard shield case so as not to be influenced by the circumstances. The crystal X2: 21.25MHz is oscillated in IC501 (VHF), and the output is fed to IC601 (UHF) via buffer Q13. The reference oscillating frequency (X2) is divided inside IC501 and IC601 to gain the reference frequency of 5kHz or 6.25kHz. The comparison frequency is divided by the pulse swallow system PLL IC501 and IC601 after VCO output is amplified in Q505 (VHF) and Q604 (UHF). In the result, the PLL synthesizer which has 5, 10, 12.5, 15, 20, 25, 30 and 50kHz steps is obtained.

The reference frequency of 21.25MHz is passed through the buffer of IC501 and output from Pin1 XBO, then input to IC2 Pin1 as VHF (144MHz band) 2nd local oscillator.

\*As for TE1 and TE2, reference frequency of 21.25MHz is oscillated in X901: TCXO unit and fed to IC501(VHF).

D407 is supplied to LMP401 and LMP402 to turn ON the lamp.

### 3. Reset and Backup Circuit

When the power is turned ON, "L" level of approximately  $2\mu\text{s}$  or more is output

from IC405 (equipped with reset function), then IC405 becomes "L" level to reset the CPU IC401. When the power is turned OFF, IC405 output (BU) becomes "L" level and the transceiver goes into the backup mode. The contents of the memory is written on E2PROM IC402 in the backup mode. Then IC403 (equipped with reset function) becomes "L" level to reset the CPU.

### 4. Beep Sound Output Circuit

The square pulse is output from CPU IC401 Pin23 (BEEP), then it is integrated by CR and input to AF amplifier without passing through Volume VR.

### 8) Cross Band Repeater Circuit (T, TE1, TE2)

When the Squelch of VHF side is opened in the Cross Band Repeater mode, the AF signal ROV (VHF) is unmuted and amplified by IC203. The amplified modulation signal is added to modulation varicap of UHF VCO and transmitted from UHF side. When the Squelch of UHF side is opened in the Cross Band Repeater mode, the AF signal ROU (UHF) is unmuted and amplified by IC203. The amplified modulation signal is added to modulation varicap of VHF VCO and transmitted from VHF side.

output to IC401, Pin32 and Pin33, then the squelch is opened. When the tone signal is not accordance with the settled frequency, "H" level is output to the TDV (VHF) or TDU (UHF) terminal. The "H" level signal is input to IC401, Pin32 and Pin33, then the squelch is closed.

## 12) 9600bps Packet Circuit

In the 9600 packet mode, PTT is provided through the UART terminal of JK1 to IC401 Pin22, then it is transmitted in "L" level. The modulation signal from TNC is

unmuted in Q26 and Q27, and the VCO is modulated, then transmitted. The detection output of IF IC2 or IC202 is input to the signal switch IC4 via butter Q23 or Q235. The input V/U signal switches the input signal of IC4 according to the signal from CPU IC401 Pin33. Then the MAIN band signal is output from Pin1 to JK2.

## 13) Clone Circuit

In the Clone mode, the data which is output from IC401 Pin21 of Master unit is fed to the IC401 Pin22 of the Slave unit through the UART terminal JK1 and connecting cable.

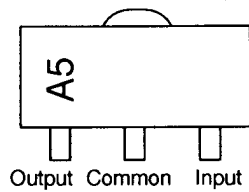


39	Xout	XOU1	U	-	CPU clock output (4.1945MHz)
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No.	Pin Name	Function	I/O	Logic	Description
40	Vss	GND	-	-	GND
41	P27	SDV	O	H	VHF squelch signal output (when squelch is open = "H")
42	P26	MUTV	-	-	VHF AF signal mute control output (H=Mute is ON)
43	P25	STPV	O	Pulse	VHF PLL reset output
44	P24	DATV	O	Pulse	VHF PLL/CTCSS data output
45	P23	CKV	O	Pulse	VHF PLL/CTCSS clock output
46	P22	SCL	O	Pulse	EEPROM clock output
47	P21	SDA	I/O	Pulse	EEPROM data input/output
48	P20	LOW	O	H	Transmitting output switch ("H"=Low output)
49	P17	STB2	O	Pulse	CTCSS UHF strobe signal output
50	P16	TID	I/O	Pulse	CTCSS board detection/CTCSS VHF strobe signal output
51	P15/SEG39	SEG39	O	H	Segment output for LCD
↓	↓	↓	↓	↓	↓
90	SEG0	SEG0	O	H	Segment output for LCD
91	Vcc	VCC	-	-	5V Power supply
92	Vref	AVCC	-	-	Reference power supply for A/D conversion
93	AVss	GND	-	-	GND
94	COM3	COM3	-	-	NC
95	COM2	COM2	O	-	Common output 2 for LCD
96	COM1	COM1	O	-	Common output 1 for LCD
97	COM0	COM0	O	-	Common output 0 for LCD
98	VL3	V3	-	-	Power supply for LCD
99	VL2	V2	-	-	Power supply for LCD
100	C2	C2	-	-	NC



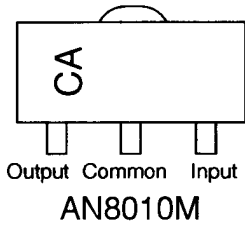
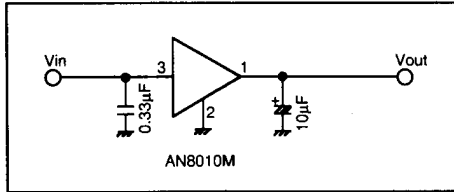
**2) AN78L05M (XA0238)**  
5V Voltage Regulator



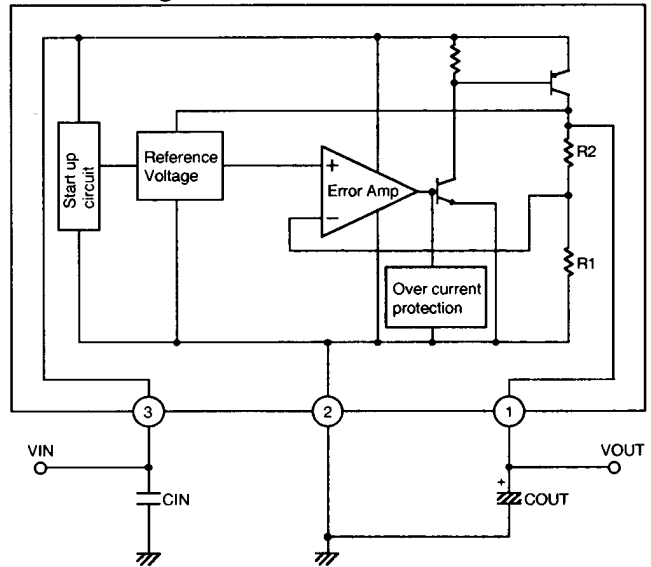
AN78L05M

**3) AN8010M (XA0119)**  
Voltage Regulator

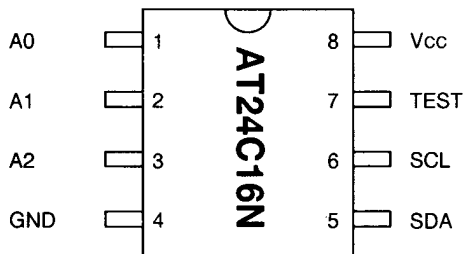
**Test Circuit**



**Block Diagram**



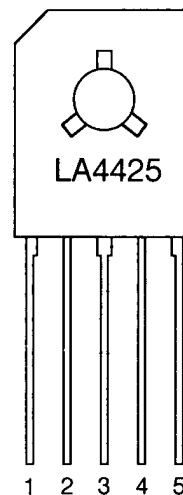
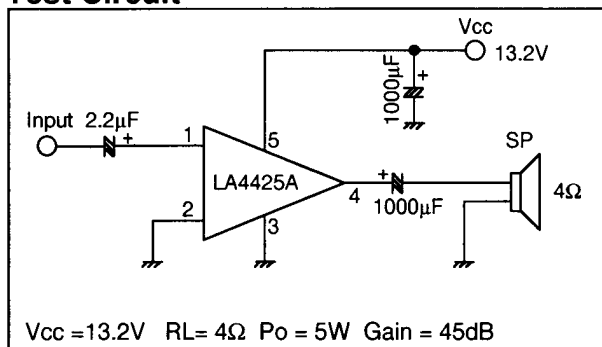
**4) AT24C16N-10SI-2.7 (XA0368)**  
16K bits CMOS Serial EEPROM



Pin Name	Function
A0 to A2	Address inputs
SDA	Serial Data
SCL	Serial Clock
Test	Test Input (GND or Vcc)
NC	No connection

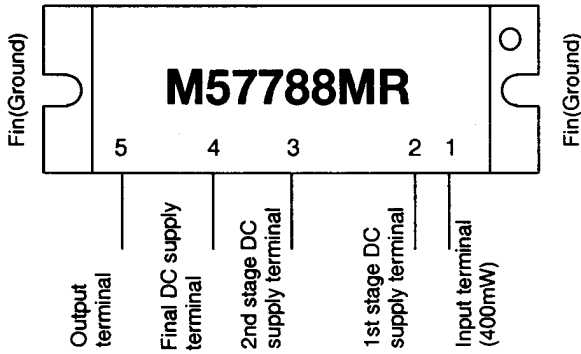
**5) LA4425A (XA0410)**  
5W Audio Power Amplifiers

**Test Circuit**





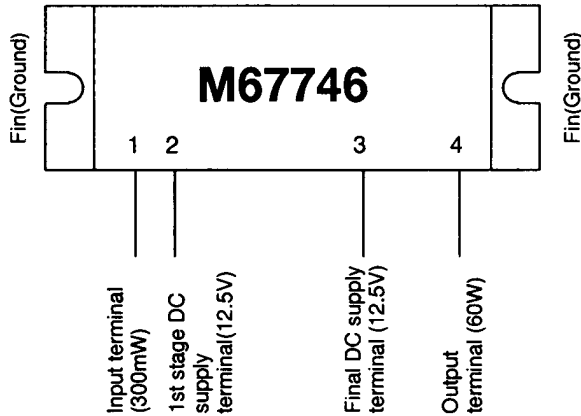
**7) M5778LR (XA0447)  
M57788MR (XA0313)  
M57788HR (XA0448)**  
UHF FM 35W RF Power Module



Ratings	Symbol	Ratings	Unit
Supply voltage	Vcc	17.0	V
Total current	Icc	12	A
Input power	Pin	0.8	W
Output power	Po	50	W
Operation case temperature	Tc(op)	-30~+110	°C
Storage temperature	Tstg	-40~+110	°C

f=430~450MHz, Vcc1 ≤ 13.5V, Zg=Zl=50Ω

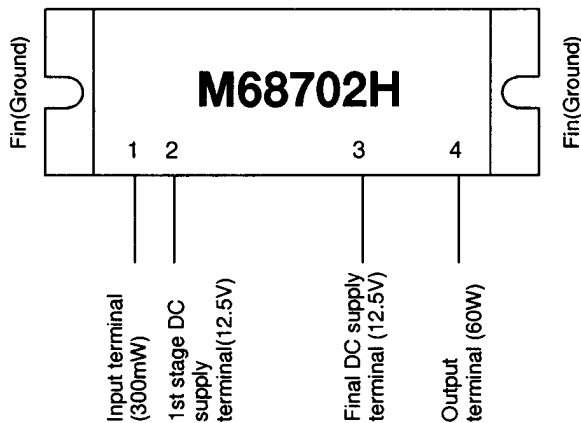
**8) M67746 (XA0412)**  
144 ~ 148MHz 60W  
RF Power Module



Ratings	Symbol	Ratings	Unit
Supply voltage	Vcc	17	V
Total current	Icc	20	A
Input power	Pin(max)	600	mW
Output power	Po(max)	70	W
Operation case temperature	Tc(op)	-30 to +110	°C
Storage temperature	Tstg	-40 to +110	°C

Zg=Zl=50Ω

**9) M68702H (XA0444)**  
150 ~ 175MHz 60W  
RF Power Module



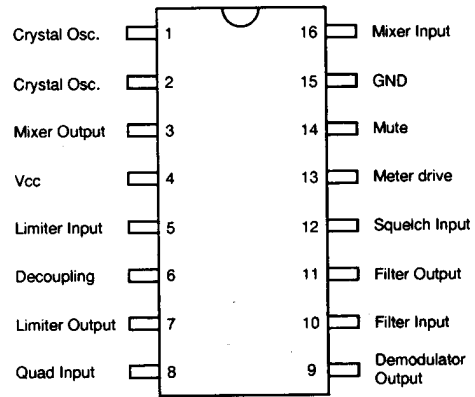
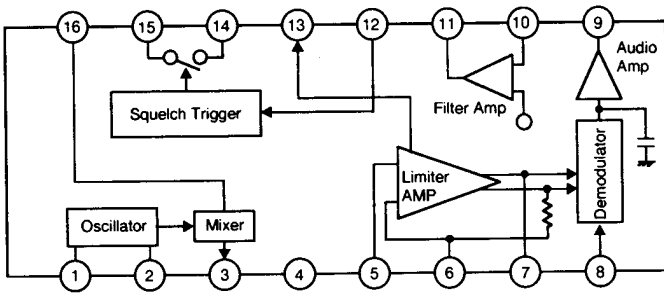
Ratings	Symbol	Ratings	Unit
Supply voltage	Vcc	17	V
Total current	Icc	20	A
Input power	Pin(max)	600	mW
Output power	Po(max)	75	W
Operation case temperature	Tc(op)	-30 to +110	°C
Storage temperature	Tstg	-40 to +110	°C

Zg=Zl=50Ω

# 10) MC3372VM (XA0343)

## Low Power FM IF

### Equivalent Circuit



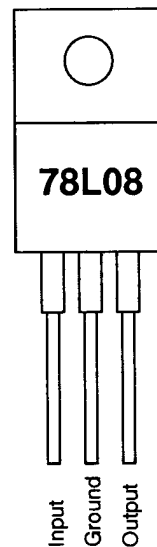
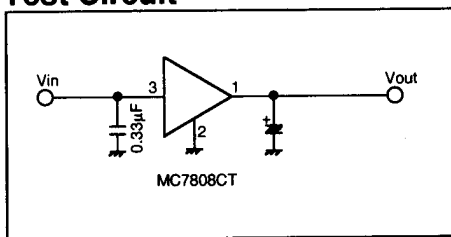
Ta=25°C

Parameter	Pin No.	Symbol	Ratings	Unit
Max. supply voltage	4	Vcc	2.4~9.0	Vdc
RF input voltage	16	Vrf	0.005~10	mVrms
RF input frequency	16	Frf	0.1~100	MHz
Oscillator input voltage	1	Vlocal	80~400	mVrms
IF frequency	-	Fif	455	kHz
Limiter amplifier input voltage	5	Vif	0~400	mVrms
Filter amplifier input voltage	10	Vfa	0.1~300	mVrms
Squelch input voltage	12	Vsq	0 or 2	Vdc
Mute sink current	14	Isq	0.1~30	mA
Temperature range	-	TA	-30~+75	°C

# 11) MC7808CT (XA0082)

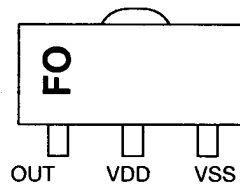
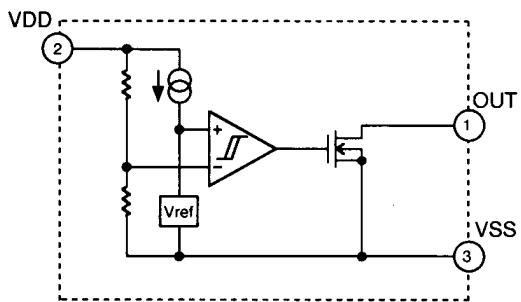
## 8V Voltage Regulator

### Test Circuit



### CMOS Voltage Detector

#### Equivalent Circuit

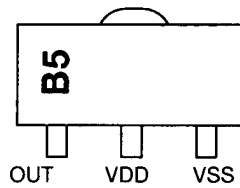
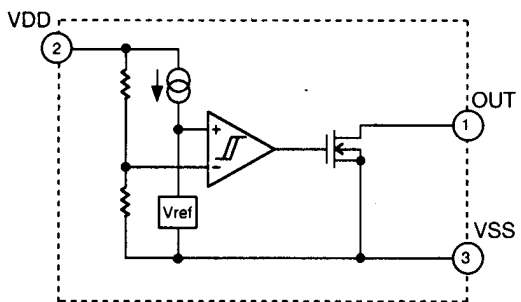


RH5VA60AA

### 14) RN5VL25AA-T1 (XA0309)

#### C-MOS Voltage Detector

#### Equivalent Circuit



RL5VL25AA

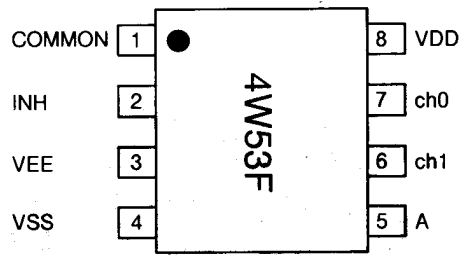


## 15) TC4W53FU (XA0348) Multiplexer/Demultiplexer

**Function Table**

Control input		ON channel
INH	A	
L	L	ch 0
L	H	ch 1
H	*	NONE

\* Don't Care



## 16) Transistor, Diode and LED Outline Drawings

Top View

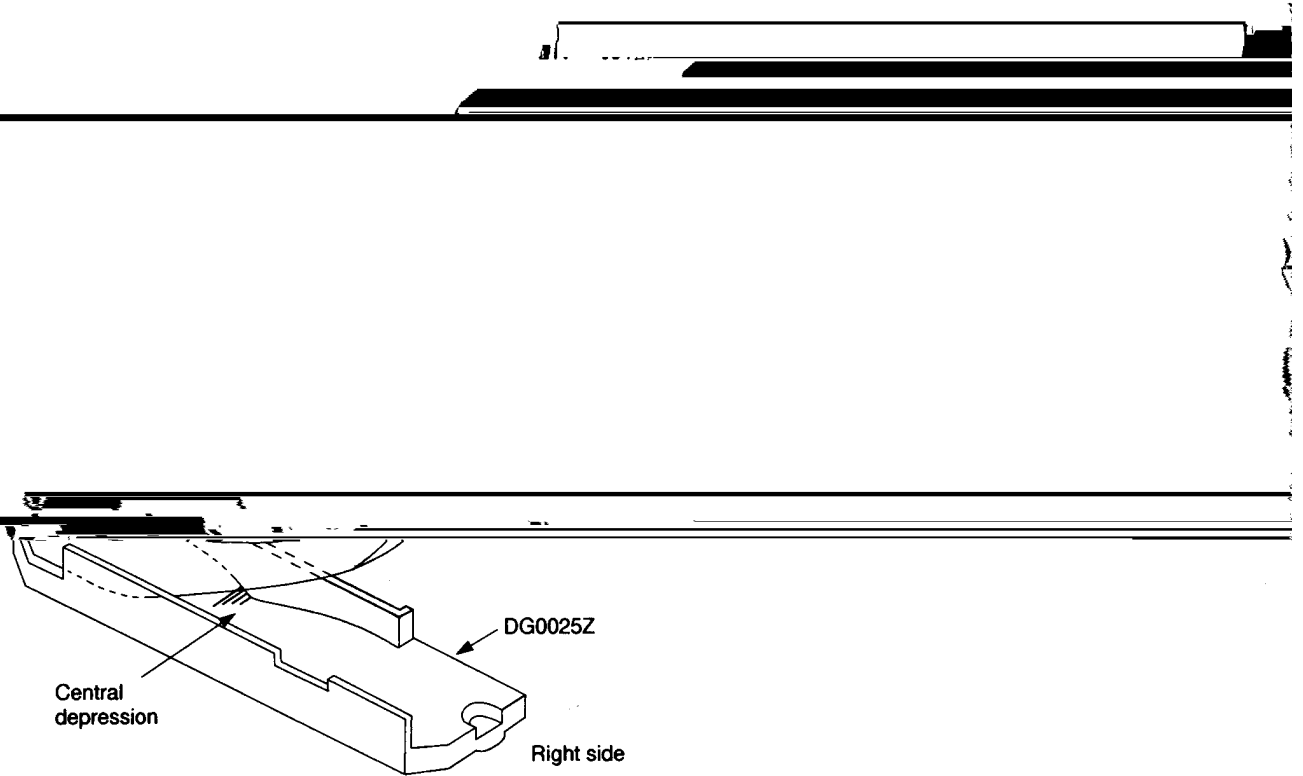
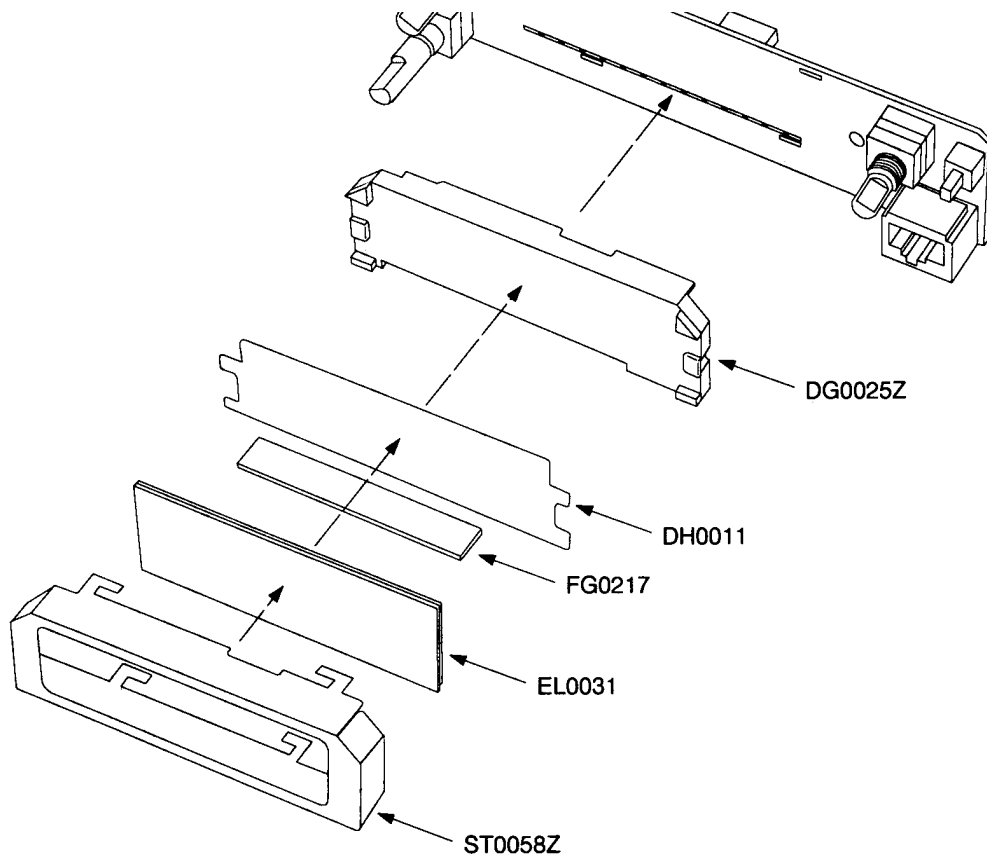
1SS355 XD0254	1SS356 XD0272	1SV214 XD0131	1SV215 XD0132	1SV237 XD0141	1SV262 XD0300	1SV268 XD0301	DA204U XD0130
DAN202U XD0230	DAN235U XD0246	DTZ5.1A XD0136	DTZ11B XD0187	DSA3AI XD0274	MA729 XD0291	MA742 XD0250	MA8110H XD0255
MI407 XD0013	RN731V XD0257	UDZ3.0B XD0304	LT1EP53A XL0039	2SK1577 XE0022	2SK508 XE0010	2SK880GR XE0021	3SK131V12 XE0028
3SK177 XE0024	3SK184S XE0013	2SA1162Y XT0017	2SA1576 XT0094	2SB1132 XT0061	2SB1292 XT0112	2SB1302 XT0126	2SC2412K XT0037
2SC2873 XT0113	2SC2954 XT0084	2SC3357 XT0048	2SC4081 XT0095	2SC4215 XT0124	2SC4245 XT0125	2SC5226 XT0146	DTC363EK XU0160
FMC2 XU0028	UN5112 XU0174	UN5114 XU0179	UN5211 XU0061	UN5213 XU0180	XN111M XU0046	XN1213 XU0054	XP1215 XU0178



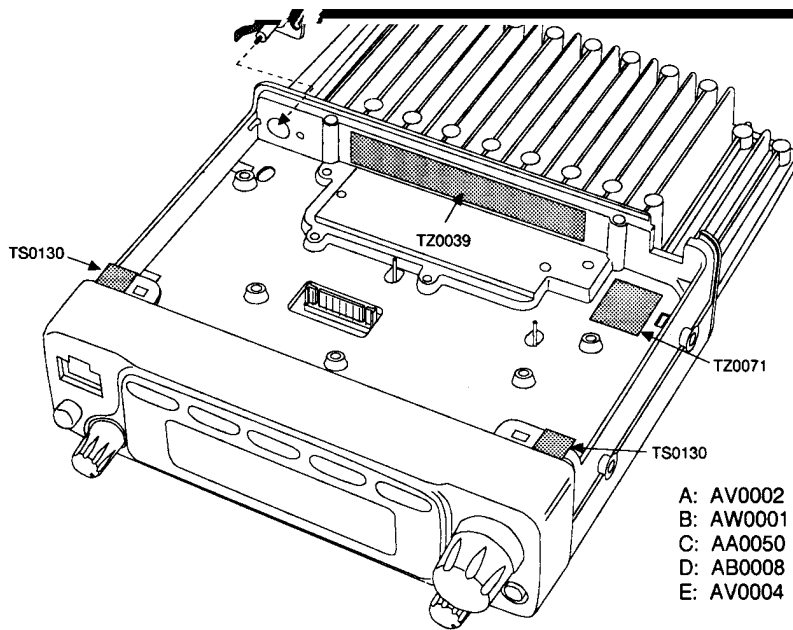
NO. 43

NO. 1

No.	COM.3	COM.2	COM.1	No.	COM.3	COM.2	COM.1
1	COM.3			26	5c	5b	(C) <b>///</b>
2		COM.2		27	5g	5a	5d
3			COM.1	28	5e	5f	② •
4	(R) <b>[SQL]</b>	(R) <b>[T]</b>	(H) <b>///</b>	29	4c	4b	(B) <b>///</b>
5	(R) 50	(R) 75	(R) 25	30	4g	4a	4d
6	10c	10b	(G) <b>///</b>	31	4e	4f	① •
7	10g	10a	10d	32	3c	3b	(A) <b>///</b>
8	10e	10f	④ •	33	3g	3a	3d
9	9c	9b	(F) <b>///</b>	34	3e	3f	(L) <b>[SQL]</b>
10	9g	9a	9d	35	2c	2b	(L) <b>[T]</b>
11	9e	9f	③ •	36	2g	2a	2d
12	8c	8b	(E) <b>///</b>	37	2e	2f	(L) <b>[ ]</b>
13	8g	8a	8d	38	12c	12b	(L) <b>[+]</b>
14	8e	8f	(R) <b>[ ]</b>	39	12g	12a	12d
15	7c	7b	(R) <b>[+]</b>	40	12e	12f	1bc
16	7g	7a	7d	41	11c	11b	1fg
17	7e	7f	7a	42	11g	11a	11d
18	14c	14b	6bcg	43	11e	11f	(L) <b>[MAIN]</b>
19	14g	14a	14d				
20	14e	14f	6e				
21	13c	13b	6f				
22	13g	13a	13d				
23	13e	13f	(R) <b>[MAIN]</b>				
24	LOW	F	(D) <b>///</b>				
25	(L) 50	(L) 75	(L) 25				







- A: AV0002 Torque=4kg·f·cm
- B: AW0001 Torque=4kg·f·cm
- C: AA0050 Torque=4kg·f·cm
- D: AB0008 Torque=4kg·f·cm
- E: AV0004 Torque=4kg·f·cm

VHF MAIN Unit

arts Name	Ver.
1A TT11	
2-TX	
36UT106	
35 TE-17	
38	
2-TX	
2-TX	
4UT106	
15 TPH4	
15 TPH4	
15 TPH4	
15 TPH4	
35 TE-17	
9-TX	12
150E	
14Z D21715BA3	
46	T,E
02H	12
7ZVM-EL	
35A	
453FU(TTE12L)	
493-01-010	
102-01-540	
02-020-02	12
2522T-R10J	
2522T-047J	
2522T-047J	
2522T-047J	
2522T-047J	
0 3.5T 0.6	
0 9.5T 0.6	
0 10.5T 0.6	
0 5.5T 0.8	T,E
0 4.5T 0.8	
0 9.5T 0.6	
0 3.5T 0.8	
0 3.5T 0.8	
0 3.5T 0.8	
0 3.5T 0.8	
SHS-0630DA0	
SHS-0630DA0	
SHS-0630DA0	
SHS-0630DA0	
2522T-100J	
2522T-100J	
2522T-82J	

VHF MAIN UNIT

No.	Description	Parts Name	Ver.	Ref. No.	Parts No.	Description	Parts Name	Ver.
1	Chip R.	ERJ3G5YJ102V		R137	RK3018	Chip R.	ERJ3G5YJ220V	
2	Chip R.	ERJ3G5YJ103V		R138	RK3046	Chip R.	ERJ3G5YJ472V	
3	Chip R.	ERJ3G5YJ104V		R139	RK3050	Chip R.	ERJ3G5YJ103V	
4	Chip R.	ERJ3G5Y0R00V	TE	R141	RK3054	Chip R.	ERJ3G5YJ223V	
5	Chip R.	ERJ3G5YJ101V	1,2	R142	RK3048	Chip R.	ERJ3G5YJ682V	TE
6	Chip R.	ERJ3G5YJ223V	TE	R143	RK1998	Chip R.	MCR60JZLH2R2E	1,2
7	Chip R.	ERJ3G5YJ473V		R144	RK1942	Chip R.	ERJ3G5YJ183V	1,2
8	Chip R.	ERJ3G5YJ471V		R145	RK3054	Chip R.	ERJ3G5YJ222V	1,2
9	Chip R.	ERJ3G5YJ104V		R146	RK3054	Chip R.	ERJ3G5YJ223V	1,2
10	Chip R.	ERJ3G5YJ101V		R147	RK1107	Chip R.	ERJ3G5YJ393V	1,2
11	Chip R.	ERJ3G5YJ105V	TE				ERJ3G5Y0R00V	1,2
12	Chip R.	ERJ3G5YJ101V	TE	TC1	CT0012	Trim. C.	CTZ104W	TE
13	Chip R.	ERJ3G5YJ102V						
14	Chip R.	ERJ3G5YJ102V		TH1	XS0030	Thermister	NTCCM16094LH223KC	TE
15	Chip R.	ERJ3G5YJ102V						
16	Chip R.	ERJ3G5YJ102V		VR1	RH0108	Trim. Pot	EMM1YSX50B15	
17	Chip R.	ERJ3G5YJ104V	1,2	VR2	RH0104	Trim. Pot	EMM1YSX50B04	
18	Chip R.	ERJ3G5YJ473V		VR3	RH0106	Trim. Pot	EMM1YSX50B04	
19	Chip R.	ERJ3G5YJ102V		VR4	RH0104	Trim. Pot	EMM1YSX50B04	
20	Chip R.	ERJ3G5YJ103V						
21	Chip R.	ERJ3G5YJ101V		X1	XK0003	Discriminator	CDBM450C7	TE
22	Chip R.	ERJ3G5YJ101V	E,1,2	X2	XK0081	Crystal	38CMT 21.25MHz	
23	Chip R.	ERJ3G5YJ473V						
24	Chip R.	ERJ3G5YJ223V	1,2	SD0034		Spring	Earth Spring DR130	
25	Chip R.	ERJ3G5YJ473V		TZ0049			Silicon Dumper	
26	Chip R.	ERJ3G5YJ102V		TZ0049				
27	Chip R.	ERJ3G5YJ103V		Y1				
28	Chip R.	ERJ3G5YJ101V		Y2				
29	Chip R.	ERJ3G5Y0R00V	TE					
30	Chip R.	ERJ3G5Y0R00V	TE					
31	Chip R.	ERJ3G5YJ103V	1,2					
32	Chip R.	ERJ3G5YJ103V						
33	Chip R.	ERJ3G5YJ103V						
34	Chip R.	ERJ3G5YJ103V						
35	Chip R.	ERJ3G5YJ103V						
36	Chip R.	ERJ3G5YJ122V						
37	Chip R.	ERJ3G5YJ473V						
38	Chip R.	ERJ3G5YJ223V						
39	Chip R.	ERJ3G5YJ223V						
40	Chip R.	ERJ3G5YJ271V						
41	Chip R.	ERJ3G5YJ271V						
42	Chip R.	ERJ3G5YJ394V						
43	Chip R.	ERJ3G5YJ332V						
44	Chip R.	ERJ3G5YJ101V						
45	Chip R.	ERJ3G5YJ123V						
46	Chip R.	ERJ3G5YJ123V	TE					
47	Chip R.	ERJ3G5YJ101V	TE					
48	Chip R.	ERJ3G5YJ105V	1,2					
49	Chip R.	ERJ3G5YJ105V						
50	Chip R.	ERJ3G5YJ103V						

Note: Version1=TE1, Version2=TE2

UHF MAIN UNIT

Parts Name	Qty	Unit
UY985R		
UB1H102KT-A		
XCH1H01OCT-A	12	
ICA100R		
UB1H471KT-A		
UB1H102KT-A		
UB1H102KT-A		
UB1H102KT-A		
UB1E104ZTA		
AA1A475MTR		
UB1C105MT-N		
UB1H102KT-A		
UB1H102KT-A		
UB1H102KT-A		
UB1A106MTR		
SSL010C-L46AE	TE2	
SSL020C-L46AE	1	
3CH1H180LT-A	TE	
3CH1H470LT-A	12	
UB1H102KT-A		
UB1H102KT-A		
UB1H102KT-A		
ICA 470P		
UB1H102KT-A		
SA1V104MTR	TE	
JE		
94 009 000 808		
402M		
.1A TT11		
2-TX		
37 TE85R		
1V TE-17	E	
55 TE-17		
7		
88		
2-TX		
2-TX		
202U T106		
202U T106		
202U T106		
AA1		
55 TE-17		
55 TE-17		
55 TE-17		
S455E		
30MHZ 30M15B9A		
88MR	TE	
88LR	1	
88HR	2	





Ref. No.	Parts No.	Description	Parts Name	Ver.
R354	RK3058	Chip R.	ERJ3G5YJ473V	
R355	RK3050	Chip R.	ERJ3G5Y1033V	
R357	RK1107	Chip R.	ERJ8GEY0R00V	
R359	RK3050	Chip R.	ERJ3G5Y1033V	T,1,2
R361	RK3001	Chip R.	ERJ3G5Y0R00V	
R363	RK3001	Chip R.	ERJ3G5Y0R00V	E
R366	RK3001	Chip R.	ERJ3G5Y0R00V	E
R367	RK3026	Chip R.	ERJ3G5Y1011V	
R368	RK3048	Chip R.	ERJ3G5Y1682V	
R369	RK3046	Chip R.	ERJ3G5YJ472V	
R370	RK1107	Chip R.	ERJ8GEY0R00V	1,2
TC201	CT0012	Thm. C	CTZ10AW	
TC202	CT0012	Thm. C	CTZ10AW	
TH201	XS0031	Thermister	NTCCM16084BH682KC	
TH202	XS0031	Thermister	NTCCM16084BH682KC	
VR201	RH0104	Tim. Pot	EXM1YSX50BE4	
VR202	RH0108	Tim. Pot	EXM1YSX50B15	
VR203	RH0104	Tim. Pot	EXM1YSX50BE4	
VR204	RH0106	Tim. Pot	EXM1YSX50B04	
VR205	RH0106	Tim. Pot	EXM1YSX50B04	
X201	XK0002	Discriminator	CDBM455C7	
X202	XQ0058A	Crystal	UM-5-30.395MHz	
	S00034	Spring	Earth Spring DR130	
Y201	TZ0049			
Y202	TZ0049		Silicon Dumper	

Ref. No.	Parts No.	Description	Parts Name	Ver.
C401	CU3035	Chip C.	C16084BH102KT-A	
C402	CU3035	Chip C.	C16084BH102KT-A	
C403	CU3035	Chip C.	C16084BH102KT-A	
C404	CU8040	Chip C.	C2012B1E473KT	
C405	CU3035	Chip C.	C16084BH102KT-A	
C406	CS0237	ChipTantal	TMCCM1A475MTR	
C407	CU9018	Chip C.	C3216T1C105MT-N	
C408	CU3035	Chip C.	C16084BH102KT-A	
C409	CU3035	Chip C.	C16084BH102KT-A	
C410	CE0374	Chip C.	Electolytic C. 16CV 100B5	
C411	CU3035	Chip C.	C16084BH102KT-A	
C412	CU3042	Chip C.	C16084BH102KT-A	
C413	CU3059	Chip C.	C16084BH102KT-A	
C414	CU9042	Chip C.	C2012B1C104KT-A	
C415	CU3047	Chip C.	C16084BH102KT-A	
C416	CU9047	Chip C.	C16084BH102KT-A	
C417	CU3014	Chip C.	C16084BH102KT-A	
C418	CU3014	Chip C.	C16084BH102KT-A	
C419	CU3047	Chip C.	C16084BH102KT-A	
C420	CU3035	Chip C.	TMCCM4U106MTR	
C421	CU3035	Chip C.	C16084BH102KT-A	
C422	CE0372	ChipTantal	TMCCM1C106MTR	
C423	CU9051	Chip C.	C16084BH102KT-A	
C424	CU9032	Chip C.	C2012B1E223KT	
C425	CU9032	Chip C.	C2012B1E223KT	
C426	CE0372	ChipTantal	TMCCM1C106MTR	
C427	CU3023	Chip C.	C16084BH102KT-A	
C428	CU3023	Chip C.	C16084BH102KT-A	
C429	CU3035	Chip C.	C16084BH102KT-A	
C430	CU3035	Chip C.	C16084BH102KT-A	
C431	CU3023	Chip C.	C16084BH102KT-A	
C432	CU3023	Chip C.	C16084BH102KT-A	
C433	CU3035	Chip C.	C16084BH102KT-A	
C434	CU3035	Chip C.	C16084BH102KT-A	
C435	CU3035	Chip C.	C16084BH102KT-A	
C436	CU3023	Chip C.	C16084BH102KT-A	
C437	CU3023	Chip C.	C16084BH102KT-A	
C439	CU3023	Chip C.	C16084BH102KT-A	
C440	CU3035	Chip C.	C16084BH102KT-A	
C441	CU3035	Chip C.	C16084BH102KT-A	
C442	CU3023	Chip C.	C16084BH102KT-A	
C443	CU3023	Chip C.	C16084BH102KT-A	
C444	CU3023	Chip C.	C16084BH102KT-A	
C445	CU3035	Chip C.	C16084BH102KT-A	
C446	CU3035	Chip C.	C16084BH102KT-A	
C447	CU3035	Chip C.	C16084BH102KT-A	
C448	CU3047	Chip C.	C16084BH102KT-A	
C449	CU3059	Chip C.	C16084BH102KT-A	
C450	CU3035	Chip C.	C16084BH102KT-A	
C451	CU3035	Chip C.	C16084BH102KT-A	
C452	CS0049	ChipTantal	TMCCSA1C105MTR	

Ref. No.	Parts No.	Description	Parts Name	Ver.
CM401	UW0035	Connector	HUC0272-010022	
CM402	UE0173	Connector	B12B-ZR	
CM403	UE0291	Connector	17R-UE	
CM404	UE0225	Connector	19R-UE	
CM405	UE0292	Connector	B07B-ZR	1,2
DL01	XLU0039	Chip LED	L1TEP33A	
DL02	XLU0039	Chip LED	L1TEP33A	
DL03	XD0291	Diode	MA729-TX	
DL04	XD0291	Diode	MA729-TX	
DL05	XA0250	Diode	MA742 TX	
DL06	XKD0254	Diode	1SS355 TE17	
DL07	XKD0255	Diode	MA8110H-TX	
DL08	XKD0187	Diode	DTZ118 TT11	
DL09	XKD0230	Diode	DAN202U TT106	
EL401	ELU0031	LCD	HL08792-012300	1,2
IC401	XA0420	IC	M88287M8L-107FP	
IC402	XA0368	IC	AT24C16N-10SH-2.7	
IC403	XA0309	IC	RMSV125AA-11	
IC404	XA0238	IC	AV7BL05M-E1	
IC405	XA0315	IC	RHSV460AA	
JP401	MAQLO2AA	Wire	Wire #02 Blue	T
JP402	MPAL05AA	Wire	#30P2-050-02	1,2
JP403	MPAL05AA	Wire	#30P2-050-02	1,2
JP404	MPAL02AA	Wire	Wire #02 Red	1,2
LP401	EP0003	Lightbulb	B0031-30403A	
LP402	EP0003	Lightbulb	B0031-30403A	
Q401	XT0095	Transistor	2SC4081TT106R	
Q402	XU0178	Transistor	XP1215	
Q403	XU0178	Transistor	XP1215	
Q404	XU0061	Transistor	UNS211-TX (T)	1,2
Q405	XT0113	Transistor	2SC2837YTE12L	
Q406	XU0179	Transistor	UNS114-TX	
Q407	XU0061	Transistor	UNS211-TX	
RA01	RK3060	Chip R.	ERJ3G5YJ683V	
RA02	RK3066	Chip R.	ERJ3G5YJ333V	
RA03	RK3026	Chip R.	ERJ3G5YJ101V	
RA04	RK3072	Chip R.	ERJ3G5YJ684V	
RA05	RK3043	Chip R.	ERJ3G5YJ272V	
RA06	RK3026	Chip R.	ERJ3G5YJ101V	
RA07	RK3030	Chip R.	ERJ3G5YJ221V	
RA08	RK3001	Chip R.	ERJ3G5Y0R00V	
RA09	RK3057	Chip R.	ERJ3G5YJ993V	
RA10	RK3060	Chip R.	ERJ3G5YJ683V	
RA11	RK3056	Chip R.	ERJ3G5YJ333V	
RA12	RK3046	Chip R.	ERJ3G5YJ472V	
RA13	RK3058	Chip R.	ERJ3G5YJ473V	E

Ref. No.	Parts No.	Description	Parts Name	Ver.
RA14	RK3060	Chip R.	ERJ3G5YJ683V	
RA15	RK3067	Chip R.	ERJ3G5YJ993V	
RA16	RK3057	Chip R.	ERJ3G5YJ993V	
RA17	RK3060	Chip R.	ERJ3G5YJ683V	
RA19	RK3001	Chip R.	ERJ3G5Y0R00V	E
RA20	RK3001	Chip R.	ERJ3G5Y0R00V	E
RA21	RK3038	Chip R.	ERJ3G5YJ102V	
RA22	RK3046	Chip R.	ERJ3G5YJ472V	
RA23	RK3046	Chip R.	ERJ3G5YJ472V	
RA24	RK3046	Chip R.	ERJ3G5YJ472V	
RA25	RA0008	Chip R.	EXBV4V1021V	
RA26	RA0008	Chip R.	EXBV4V1021V	
RA27	RA0009	Chip R.	EXBV4V1021V	
RA28	RK3038	Chip R.	ERJ3G5YJ102V	
RA29	RK3038	Chip R.	ERJ3G5YJ102V	
RA30	RA0008	Chip R.	EXBV4V1021V	
RA31	RK3057	Chip R.	ERJ3G5YJ993V	
RA32	RK3054	Chip R.	ERJ3G5YJ223V	
RA33	RK3038	Chip R.	ERJ3G5YJ102V	
RA34	RK3050	Chip R.	ERJ3G5YJ103V	
RA35	RA0009	Chip R.	EXBV4V1021V	
RA36	RA0009	Chip R.	EXBV4V1021V	
RA37	RK3043	Chip R.	ERJ3G5YJ472V	
RA38	RK3074	Chip R.	ERJ3G5YJ105V	
RA39	RK3058	Chip R.	ERJ3G5YJ473V	
RA40	RK3050	Chip R.	ERJ3G5YJ103V	
RA41	RK3038	Chip R.	ERJ3G5YJ102V	
RA42	RK3058	Chip R.	ERJ3G5YJ473V	
RA43	RK3070	Chip R.	ERJ3G5YJ474V	
RA44	RK3058	Chip R.	ERJ3G5YJ473V	
RA45	RK3070	Chip R.	ERJ3G5YJ474V	
RA46	RK0005	Chip R.	ERJ8GEYJ220V	
RA47	RK3034	Chip R.	ERJ3G5YJ471V	
RA48	RK3034	Chip R.	ERJ3G5YJ471V	
RA49	RK3034	Chip R.	ERJ3G5YJ471V	
RA50	RK3034	Chip R.	ERJ3G5YJ471V	
RA51	RK3034	Chip R.	ERJ3G5YJ471V	
RA52	RK3050	Chip R.	ERJ3G5YJ103V	
RA53	RK3050	Chip R.	ERJ3G5YJ103V	
RA54	RK3046	Chip R.	ERJ3G5YJ472V	
RA55	RK3046	Chip R.	ERJ3G5YJ472V	
RA56	RK3042	Chip R.	ERJ3G5YJ222V	
RA57	RK3058	Chip R.	ERJ3G5YJ473V	
RA58	RK3001	Chip R.	ERJ3G5Y0R00V	
RA59	RK3001	Chip R.	ERJ3G5Y0R00V	
RA60	RK3001	Chip R.	ERJ3G5Y0R00V	
RA61	RK3050	Chip R.	ERJ3G5YJ102V	
RA62	RK3050	Chip R.	ERJ3G5YJ103V	
RA63	RK3062	Chip R.	ERJ3G5YJ104V	
RA64	RK3046	Chip R.	ERJ3G5YJ472V	
RA65	RK3050	Chip R.	ERJ3G5YJ103V	
RA66	RA0008	Chip R.	EXBV4V1021V	
RA67	RA0008	Chip R.	EXBV4V1021V	
RA68	RK3038	Chip R.	ERJ3G5YJ102V	

Note: Version1=TE1, Version2=TE2

Note: Version1=TE1, Version2=TE2



1 / SP Unit / Packing

Parts Name	Ver.
Home	T,1,2
Phone	E
Cable	
Set	
ringer	
Card	E,1,2
#	
lardon DR605	
lardon Bag (radio)	
#	
DR605	
atic Diagram	
ation Card	
umber Seal	
MARTIS Seal	T
ation (Export)	T

# ADJUSTMENT

## 1) Required Test Equipment

### 1. Digital Multimeter

### 2. Regulated Power Supply

Supply voltage: 13.8VDC  
Current: 15A or more

### 3. Oscilloscope

Measurable frequency: Audio Frequency

### 4. Spectrum Analyzer

Measuring range: Up to 2GHz or more

### 5. Tracking Generator

Output frequency: Up to 2GHz or more

### 6. Dummy Load

Measurable frequency: Up to 500MHz  
Impedance: 50Ω  
Power: 50W or more

### 7. Speaker

Impedance: 8Ω

### 8. SSG

Output frequency: Up to 1GHz  
Output level: -20dB/0.1μV to 120dB/1V  
Modulation: AM/FM

### 9. Transceiver Tester

Up to 500MHz

#### a. Frequency Counter

#### b. Power Meter

Impedance: 50Ω  
Measuring range: 50W or more

#### c. Audio Voltmeter

Measurable frequency: 50Hz ~ 10kHz  
Sensitivity: 1mV ~ 10V

#### d. Distortion Meter

Measurable frequency: 1kHz  
Input level: Up to 40dB  
Distortion level: 1% ~ 100%

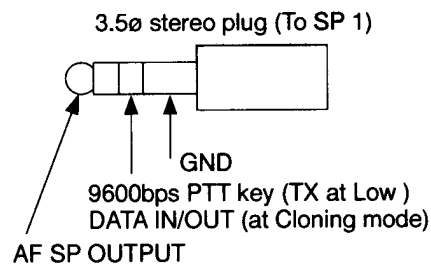
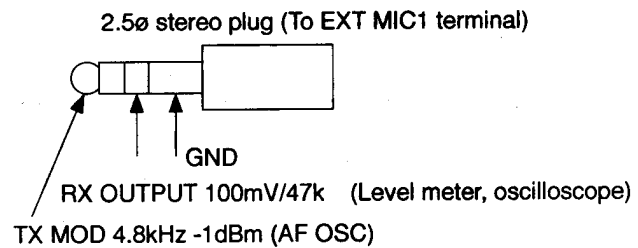
#### e. Audio Generator

Output frequency: 1kHz ~ 10kHz  
Output impedance: 600Ω

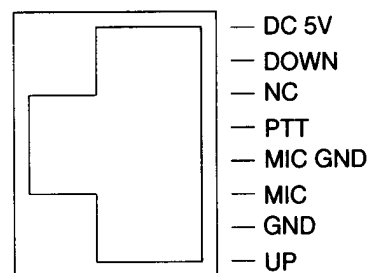
#### f. Linear Detector

## 10. 9600bps Hi-Speed Packet Testing

While holding the FUNC key down, press the VHF knob. "9600" is shown on the sub-band frequency display.



Mic terminal



## Test Equipment

1. All SSG output is indicated by EMF.
2. AG output level connecting with the load is measured.
3. Standard Modulation: 1kHz  $\pm$ 3.5kHz/DEV
4. Audio Output level: 50mW~100mW at 8 $\Omega$
5. Test Equipment level filter: HPF (30Hz~50Hz), LPF (10kHz~15kHz)
6. Coaxial cable: 5D2W 1m

## Note:

1. Power supply voltage is 13.8V.  
Power switch is off.
2. Turn the volume knobs counterclockwise.
3. SQ volume (press VHF or UHF after pressing FUNC key) S0=squelch is open. S9=tight is closed.
4. Press and hold the "F" key, then turn the power switch on.  
The display lights full.

## 2) UHF PLL Adjustment

Item	Condition	Measurement			Adjustment			Specifications
		Equipment	Unit	Terminal	Unit	Parts	Method	
Reference Frequency	f=435.00 TX	Freq. Counter Power Meter	Back	UHF ANT	VHF Main	TC1	435.0000MHz	$\pm$ 100Hz
PLL VCO	f=440.00 RX(T, E)	Digital Multimeter	UHF Main	TP3	UHF VCO	L606	3.40V (Adjust)	3.4V $\pm$ 0.2V
	f=410.00 RX(TE1)						2.50V (Adjust)	2.5V $\pm$ 0.2V
	f=460.00 RX(TE2)						3.20V (Adjust)	3.2V $\pm$ 0.2V
	f=440.00 TX(T, E)						5.50V (Check)	5.0V~6.0V
	f=410.00 TX(TE1)						4.50V (Check)	3.8V~5.2V
	f=460.00 TX(TE2)						5.30V (Check)	4.7V~6.0V

	SSG OUT: 60.0dB $\mu$	Oscilloscope						
9600bps Packet Out	f=445.00 (*) SSG OUT: 20.0dB $\mu$ f=4.8kHz 2.5kHz/DEV	SSG Level Meter Oscilloscope	Back	MIC1				100mV $\pm$ 50mVrms /47k $\Omega$

## 4) UHF TX Adjustment

(\*): f=445.00 (T), f=435.00 (E), f=410.00 (TE1), f=460.00 (TE2)

Item	Condition	Measurement			Adjustment			Specifications
		Equipment	Unit	Terminal	Unit	Parts	Method	
High Power	f=445.00 (T) f=435.00 (E) f=410.00 (TE1) f=460.00 (TE2)	Power Meter Current Meter	Back	UHF ANT	UHF Main	VR203	Max	36W or more
	VR203					35W	±1.0W 11A or below	
Low Power	f=445.00 (*)					Check	5±2W	
DEV	f=445.00 (*) AG: 1kHz -30dBm	Linear Det. Oscilloscope Power Meter AG				VR204	4.5kHz /DEV	4.5kHz ±0.2kHz /DEV
MIC Gain	f=445.00 (*) AG: 1kHz -46dBm						VR205	Adjust
CTCSS Tone Level	f=445.00 (*) AG=0 TONE SW ENC 88.5Hz	Linear Det. Oscilloscope Power Meter					Check	0.5~1.3kHz /DEV
Tone Burst Level	f=445.00 (*) AG=0 PTT+DOWN key						Check	3.0kHz ±0.5kHz /DEV
9600bps Packet IN	f=445.00 (*) AG: 4.8kHz -1dBm FUNC+VHF key	Linear Det. Oscilloscope AG					Check	2.0kHz ±0.5kHz /DEV



		Equipment	Unit	Terminal	Unit	Parts	Method	
Gain	f=145.00 (T,E) f=165.00 (TE1) f=165.00 (TE2)	SSG Distortion Meter Oscilloscope Level Meter	Back	VHF SP1	VHF Main	L14 L15 L16 L17	Adjust the SSG output level around 0dB $\mu$ , and turn L14~L17 to make the wave form max.	SINAD is 12dB or more.
Sensitivity	f=144.00 (T) f=147.99 (T) f=144.00 (E) f=145.99 (E) f=150.00 (TE1,2) f=162.00 (TE1,2) f=173.99 (TE1,2) SSG OUT: -9.0dB $\mu$	SSG Distortion Meter Oscilloscope Level Meter	Back	VHF SP1	VHF Main	L14~ L17	Adjust the SINAD sensitivity and wave form to the best.	SINAD is 12dB or more.
	f=136.00 SSG OUT: 0dB $\mu$							
S Meter	f=145.00 (T,E) f=165.00 (TE1,2) SSG OUT: 18dB $\mu$	SSG LCD VHF S Meter	Front Panel		VHF Main	VR1	Starts lighting "Full."	
	SSG OFF							
SQL level	f=145.00 (T,E) f=165.00 (TE1,2) SSG OFF SQL Level 1	Digital Multimeter	VHF Main	TP4	VHF Main	VR2	2.05V (Adjust)	2.05V $\pm$ 0.1V The squelch is closed.

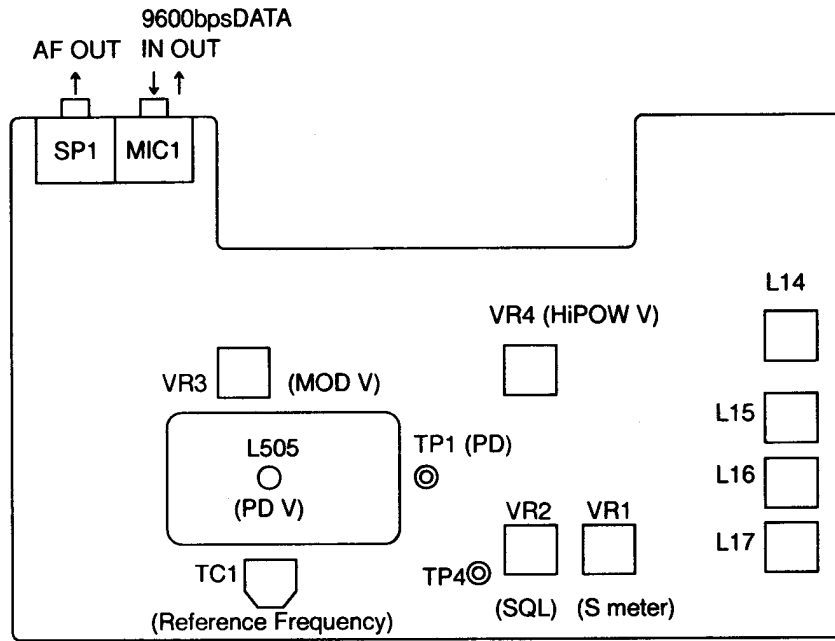
## 7) VHF TX Adjustment

(frequency) = TE1, TE2

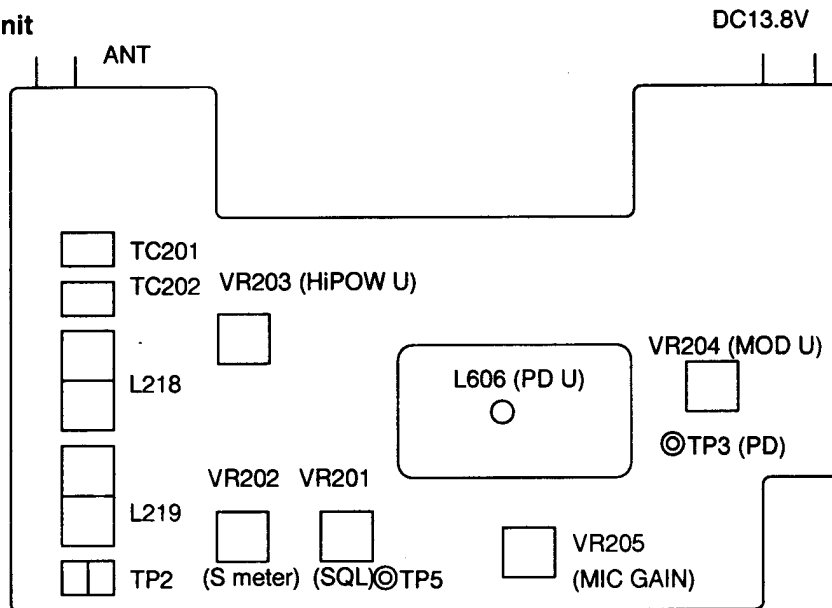
Item	Condition	Measurement			Adjustment			Specifications	
		Equipment	Unit	Terminal	Unit	Parts	Method		
High Power	f=145.00 (165.00)	Power Meter Current Meter	Back	VHF ANT	VHF Main	VR4	Max	55W or more (T,E) 45W or more (TE1,TE2)	
	f=144.00 (150.00) f=145.99 (173.99)						VR4	52W (T,E) 35W (TE1,TE2)	±1.0W 11A or below
	f=173.99 (136.00)						Check	48~55W 7A (T,E) 32~40W 11A (TE1,TE2)	Power is output.
	Low Power						f=145.00 (160.00)	Check	3~7W
DEV	f=145.00 (160.00) AG: 1kHz -30dBm	Linear Det. Oscilloscope Power Meter	Back	VHF ANT	VHF Main	VR3	4.5kHz /DEV	4.5kHz ±0.2kHz /DEV	
MIC Gain	f=145.00 (160.00) AG: 1kHz -46dBm						Check	4.0 kHz ±0.3kHz /DEV	
CTCSS Tone Level	f=145.00 (160.00) AG=0 TONE SW ENC 88.5Hz						0.5~1.3kHz /DEV		
Tone Burst Level	f=145.00 (160.00) PTT+DOWN key						3.0kHz ±0.5kHz /DEV		
9600bps Packet IN	f=445.00 (*) AG: 4.8kHz -1dBm FUNC+VHF key						Check	2.0kHz ±0.5kHz /DEV	
X-BAND Repeater	f=145.00 f=445.00 (T) f=145.00 f=430.00 (E) f=160.00 f=410.00 (TE1) f=160.00 f=460.00 (TE2) XBR ON (VHF+PWR ON)						Check	3.5kHz ±0.5kHz /DEV	

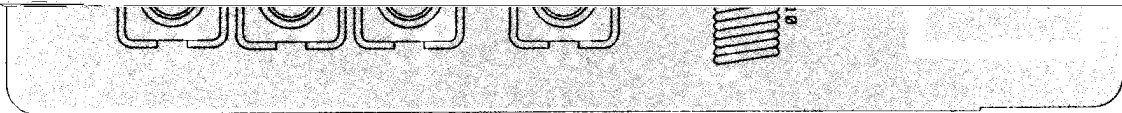
# 8) Adjustment Points

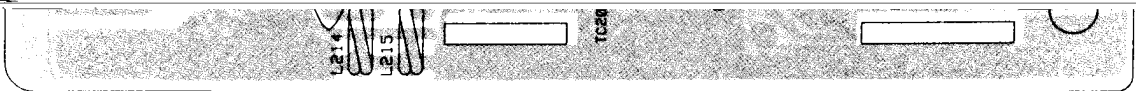
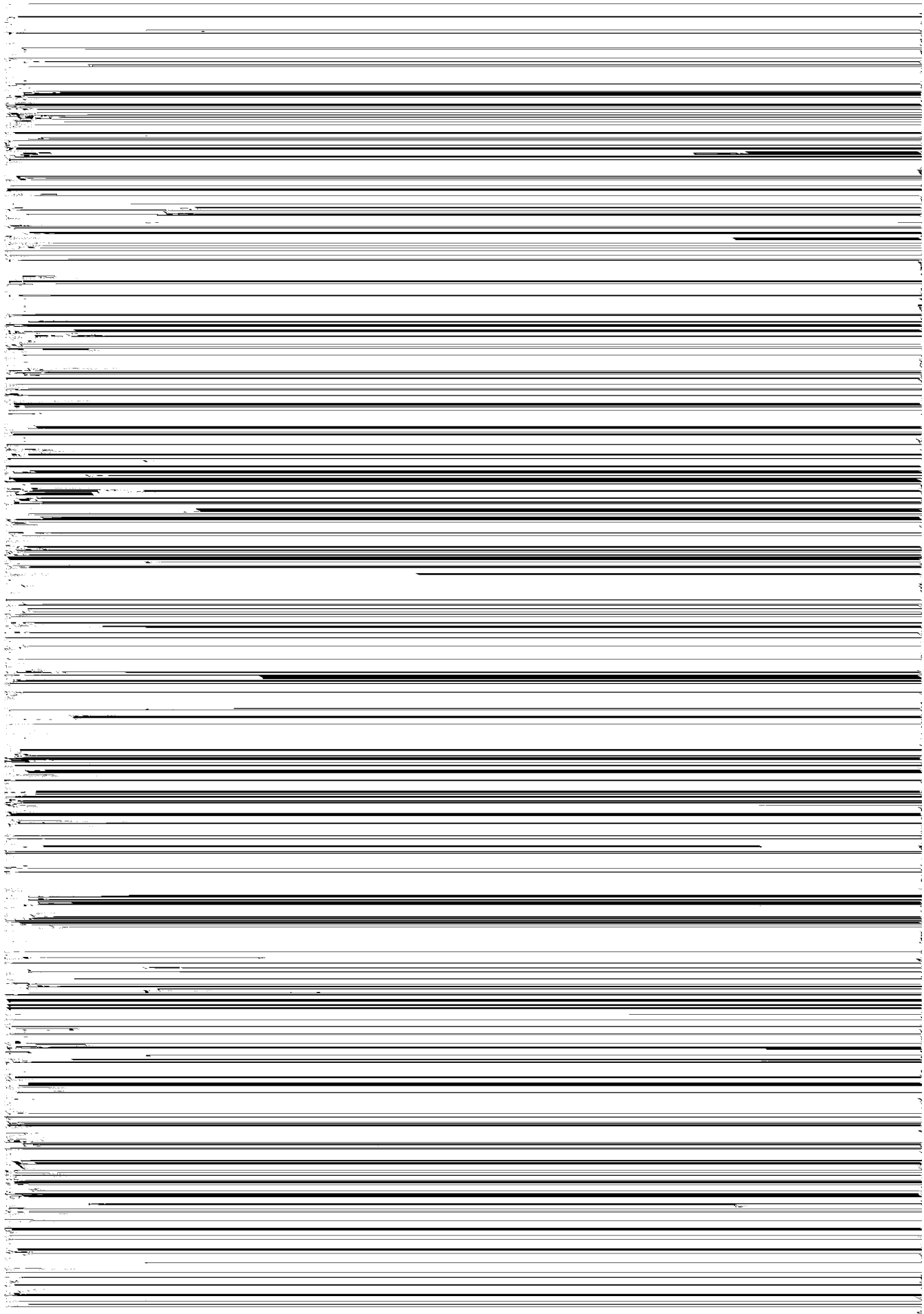
## VHF Main Unit

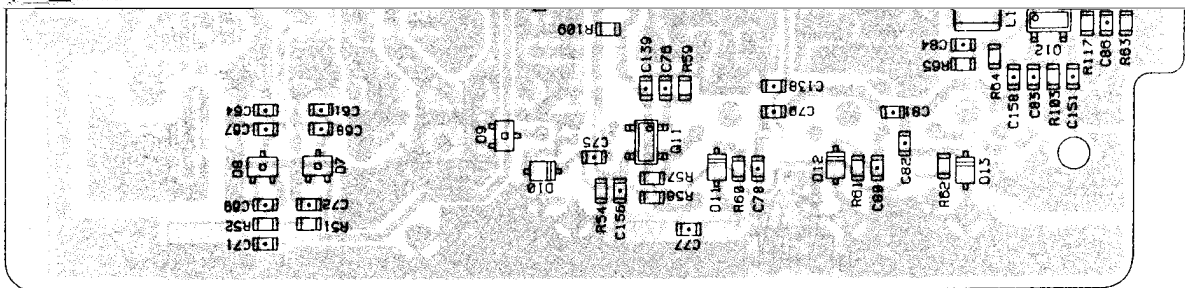


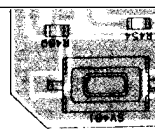
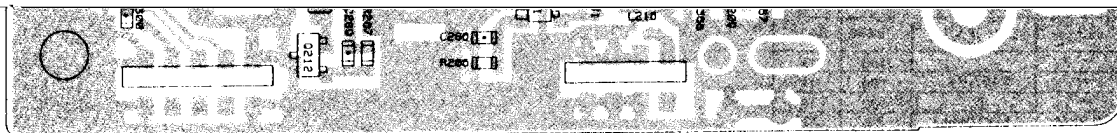
## UHF Main Unit



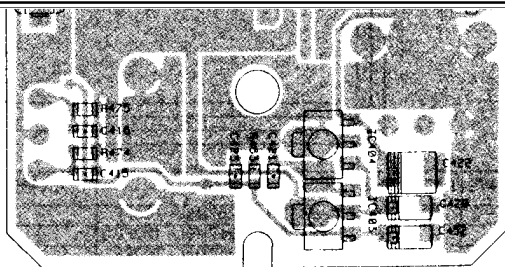
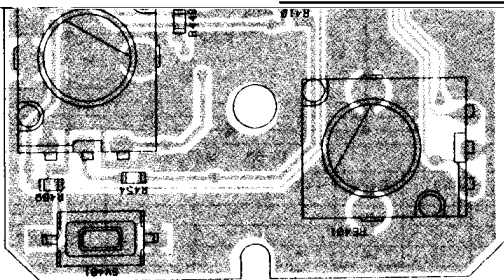








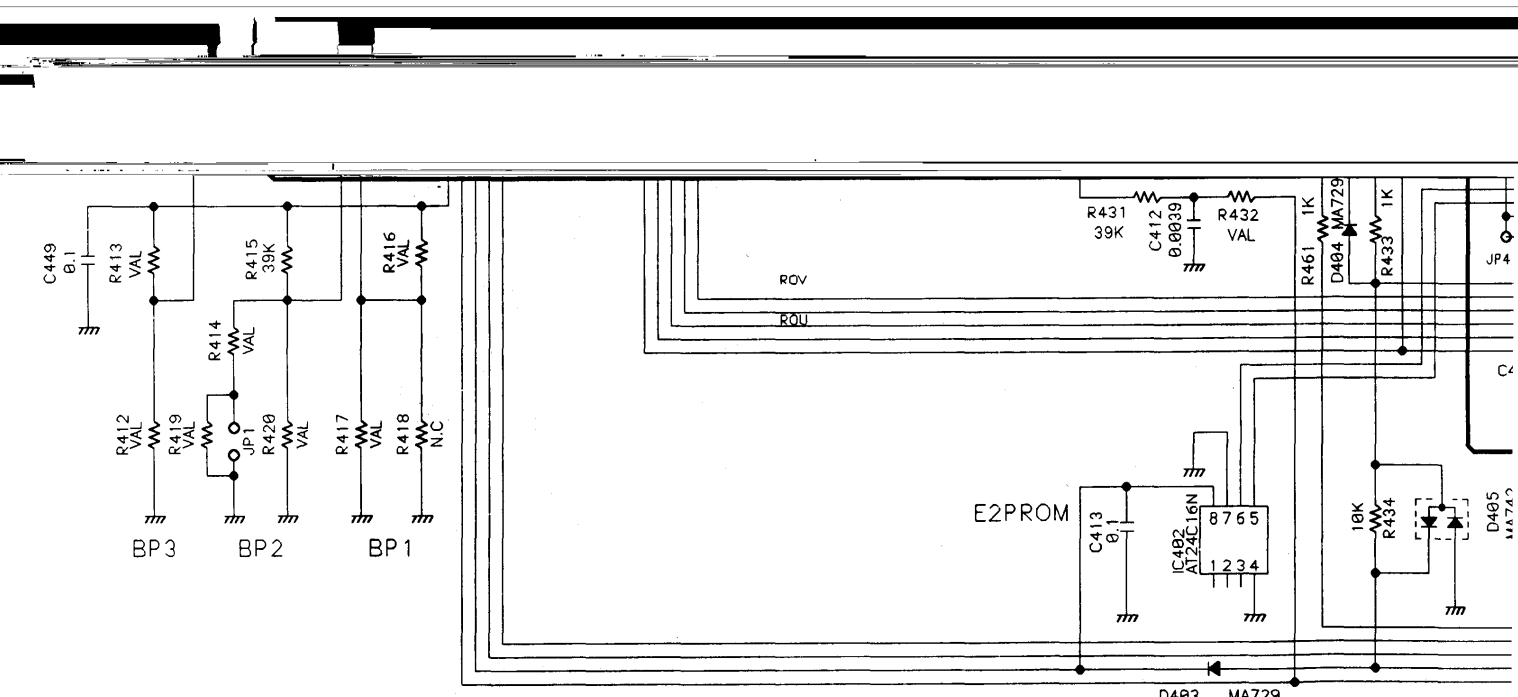
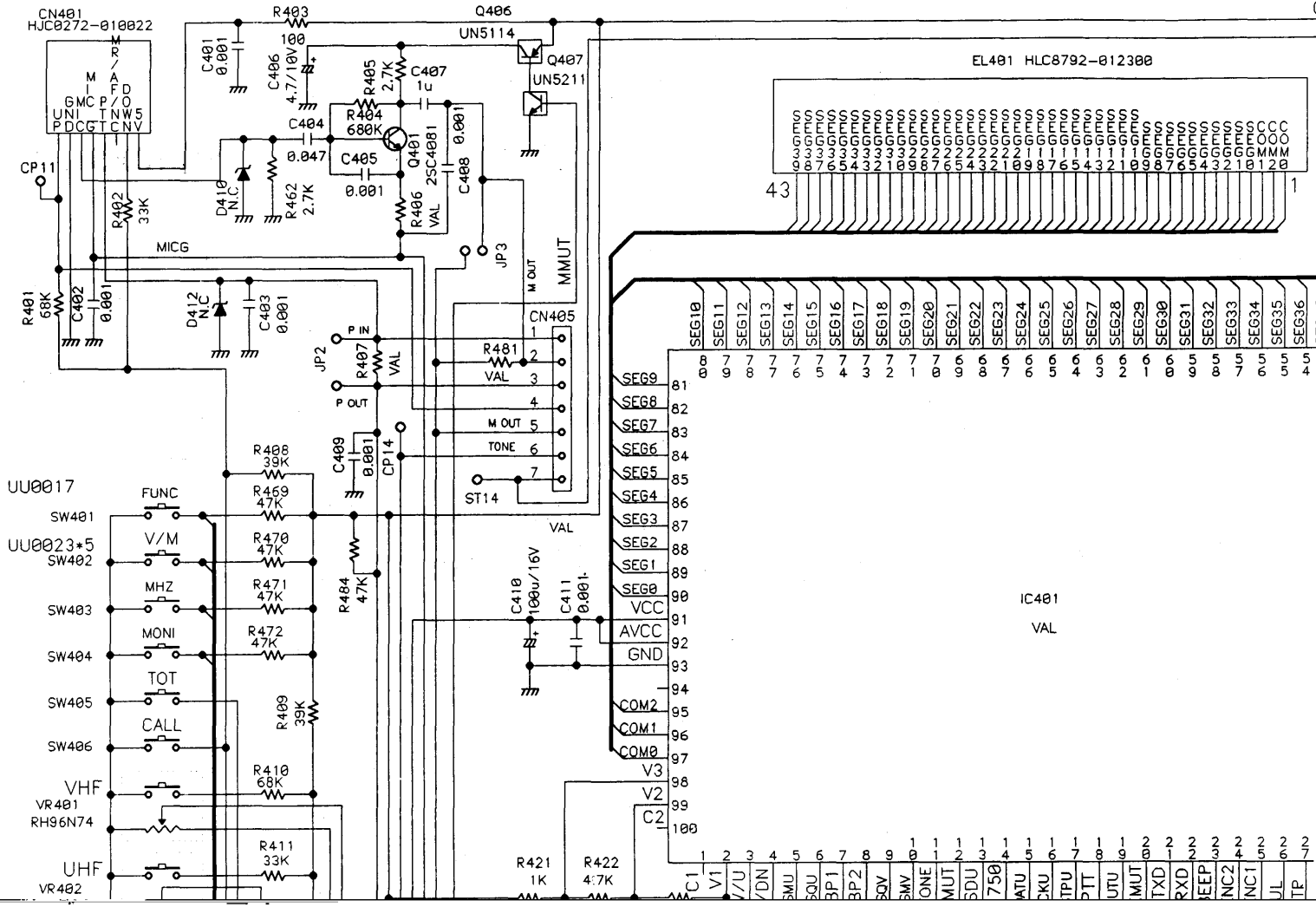
VR401



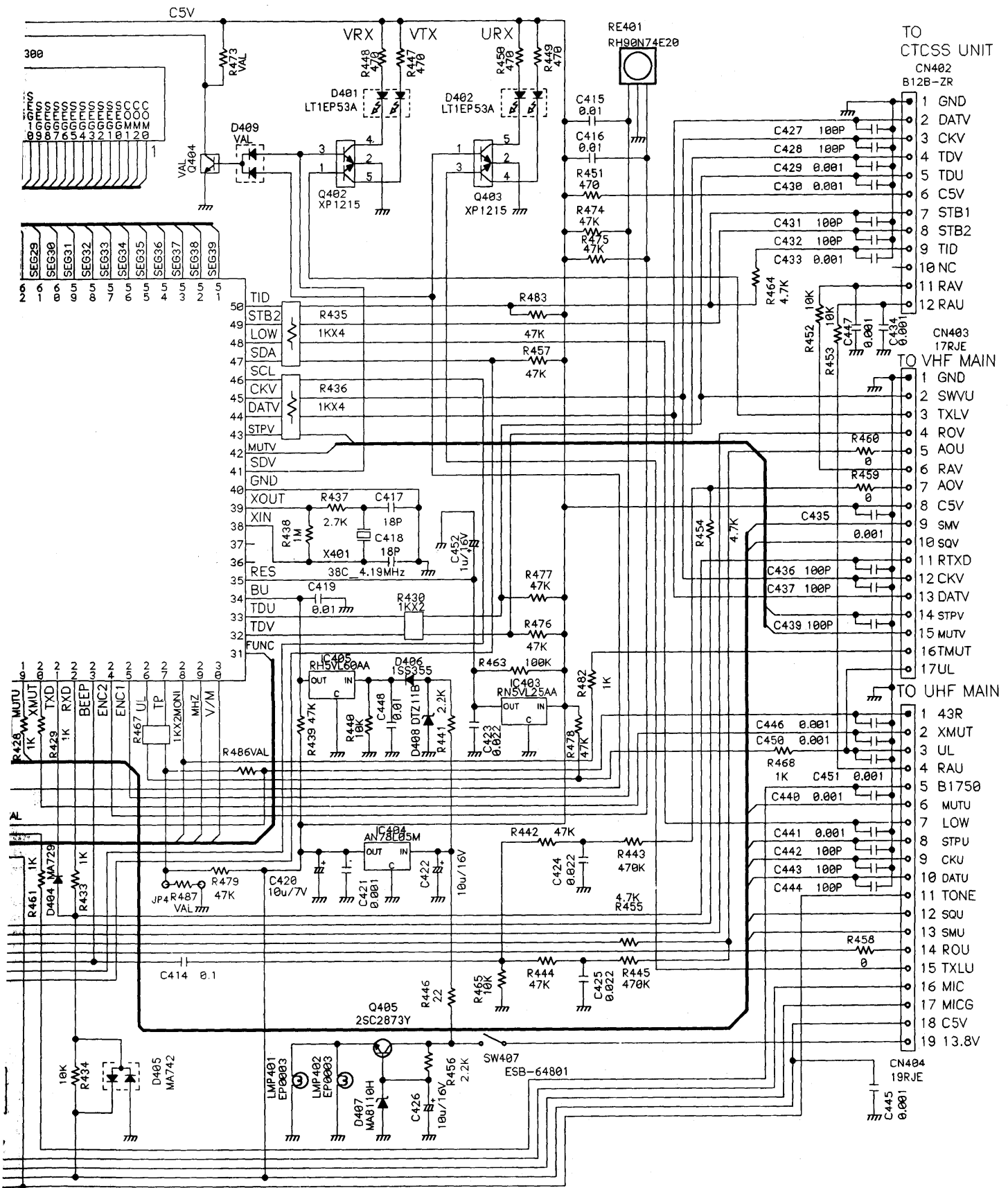


# SCHEMATIC DIAGRAM

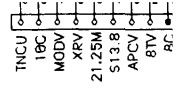
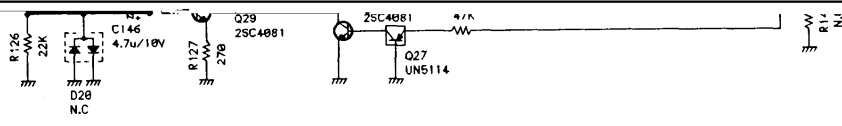
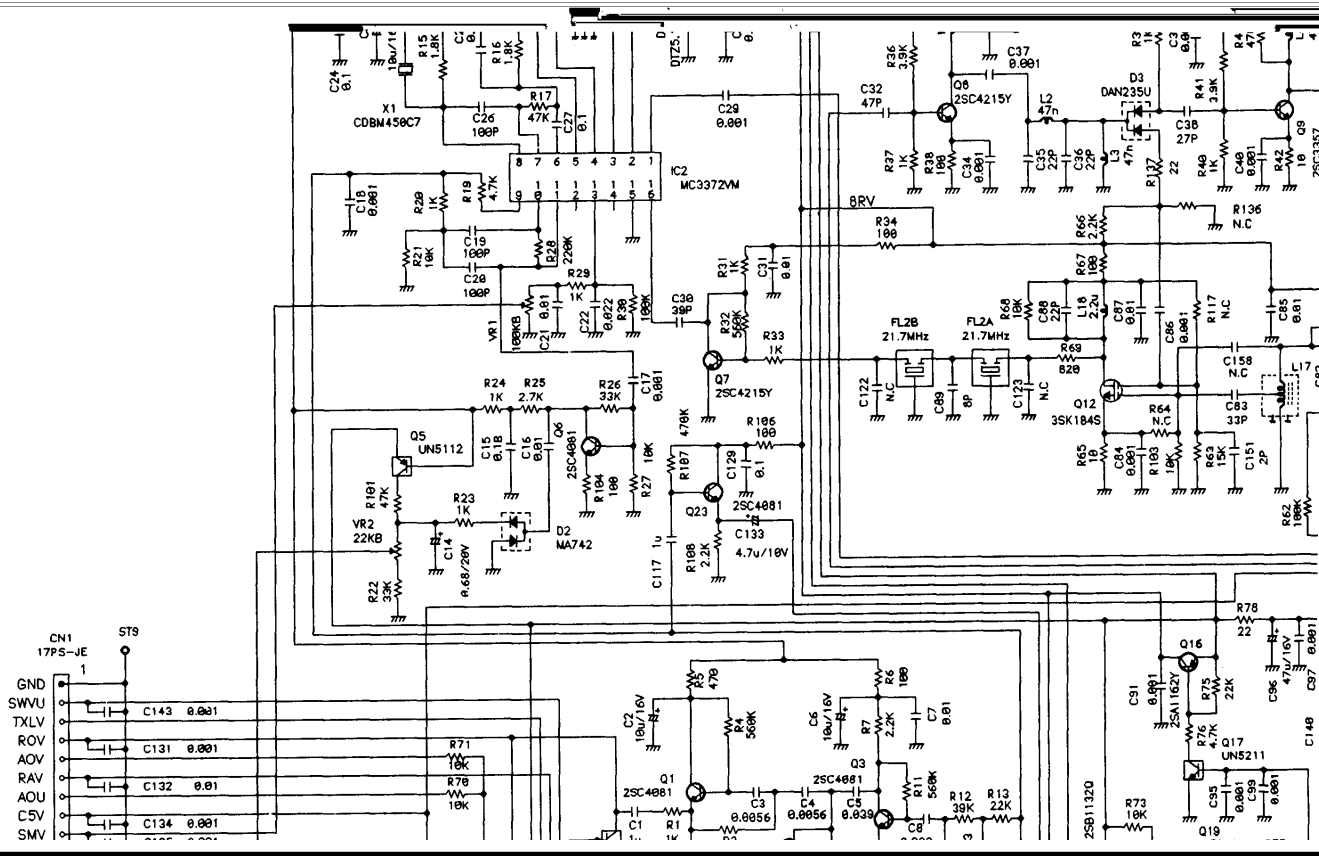
## 1) CPU Unit



	R412	R413	R416	R417	R419	R420	R466	IC401	CN405	R414	R407	R401	R486	R473	Q404	D409	JP1	JP2
D,H	-	-	-	-	-	0	1K	XA0419 M38267M8L-106FP	-	-	0	0	-	-	-	-	-	-
T	-	47K	39K	-	-	-	-	XA0420 M38267M8L-107FP	-	68K	0	0	-	-	-	-	MACLB4AA	-
E	4.7K	47K	39K	68K	0	0	-	XA0420 M38267M8L-107FP	-	68K	0	0	1K	-	-	-	-	-
TE1,TE2	-	47K	39K	-	-	-	-	XA0420 M38267M8L-107FP	B7B-ZR	-	-	-	-	47K	UN5211	DAN202U	-	MPAL01

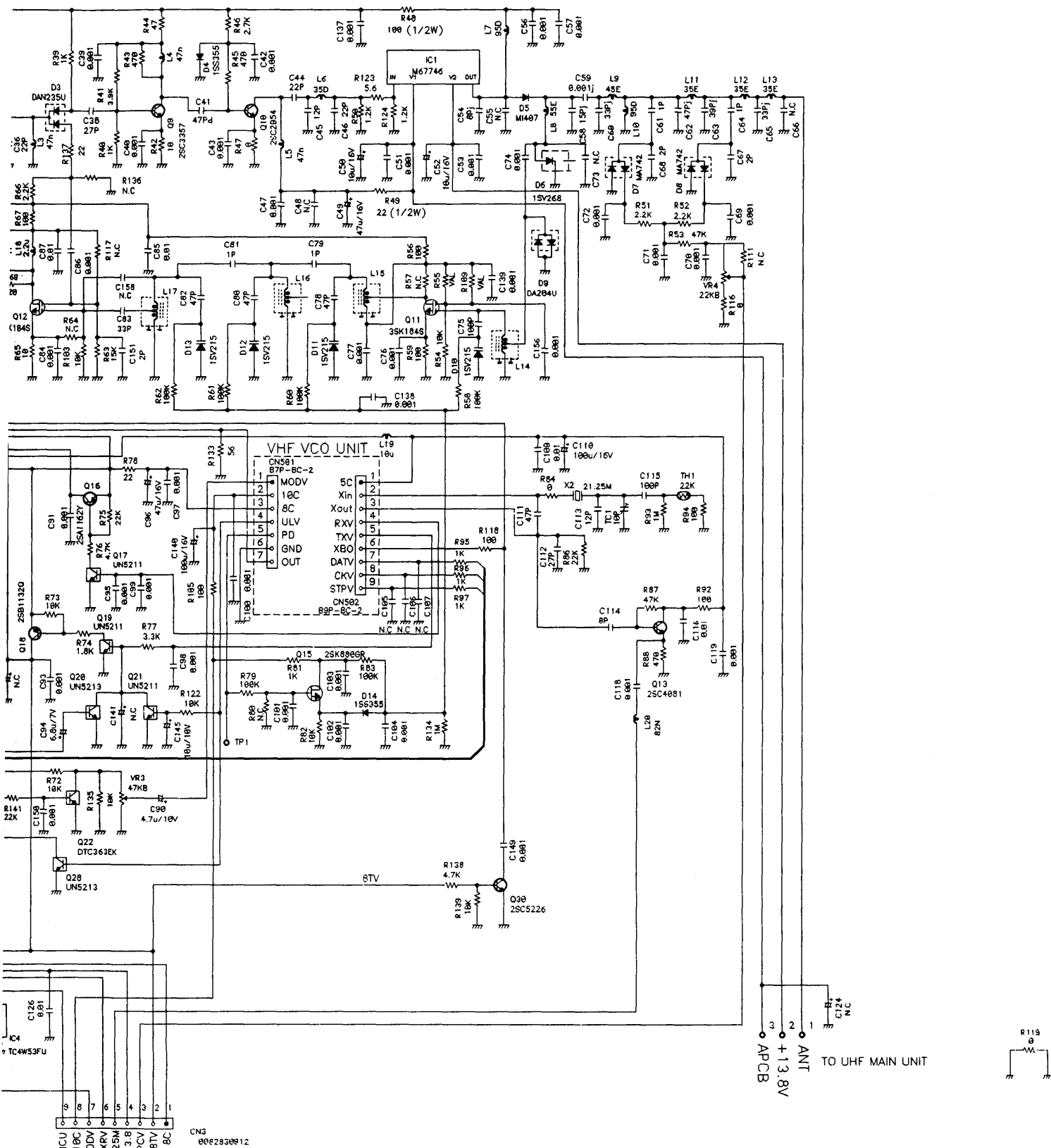


D409	JP1	JP2	JP3	JP4	R406	R432
-	-	-	-	-	100	1K
-	MACL04AA	-	-	R487(0)	100	1K
-	-	-	-	-	100	1K
DAN202U	-	MPAL05AA	MPAL05AA	MFLC04AA	220	22K



TNCU  
 18C  
 MODY  
 XEV  
 21.25M  
 513.8  
 APCV  
 8TV  
 RC

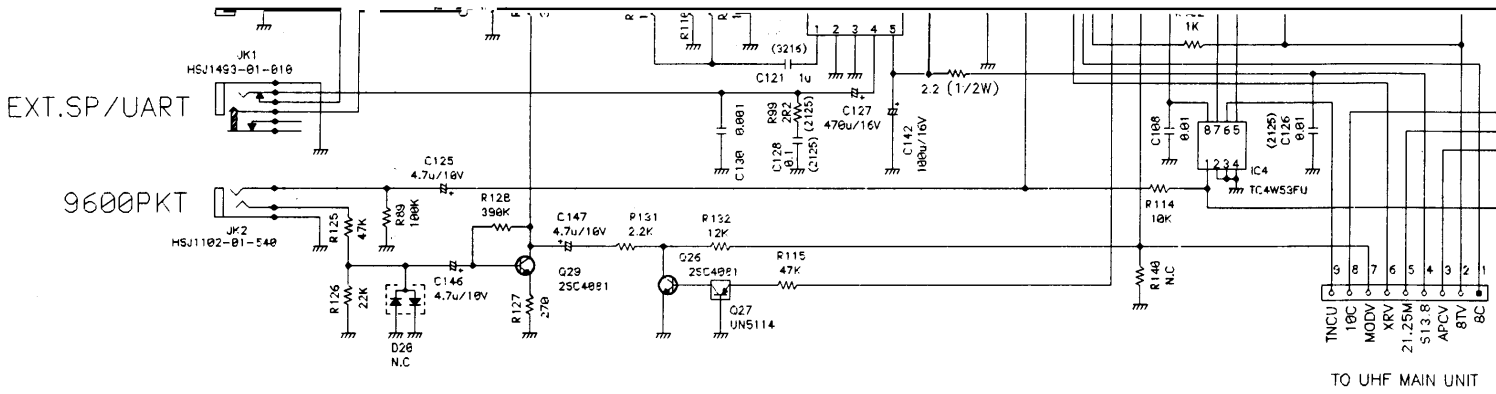
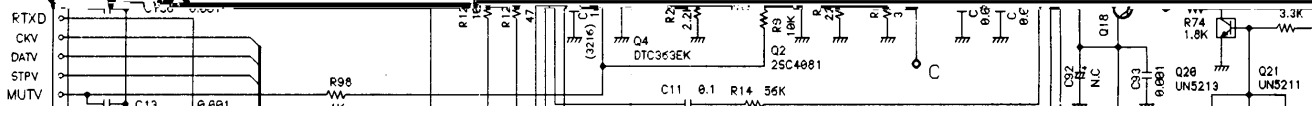
TO UHF MAIN UNIT  
 43

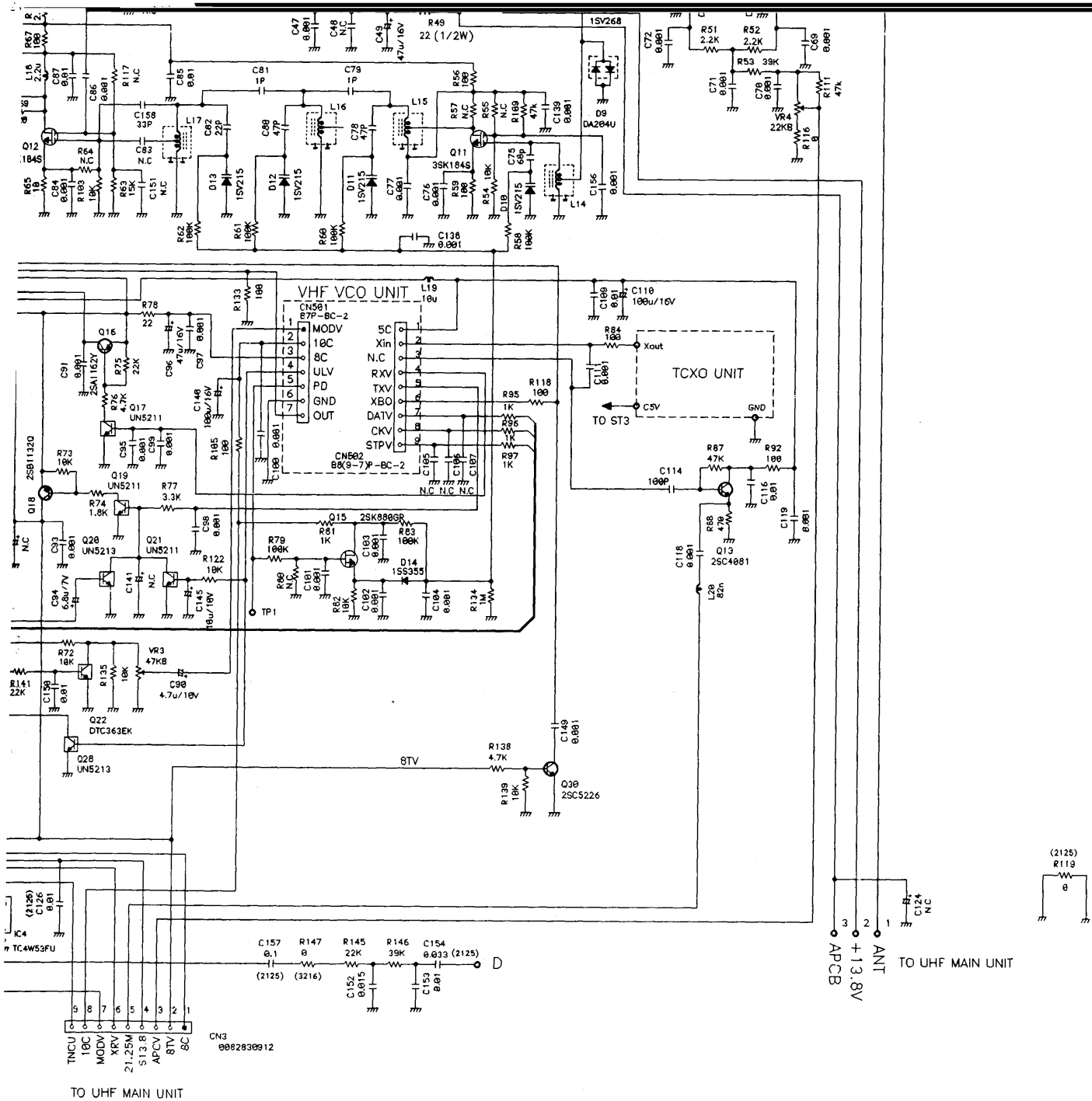


TO UHF MAIN UNIT

CN3  
0082330012

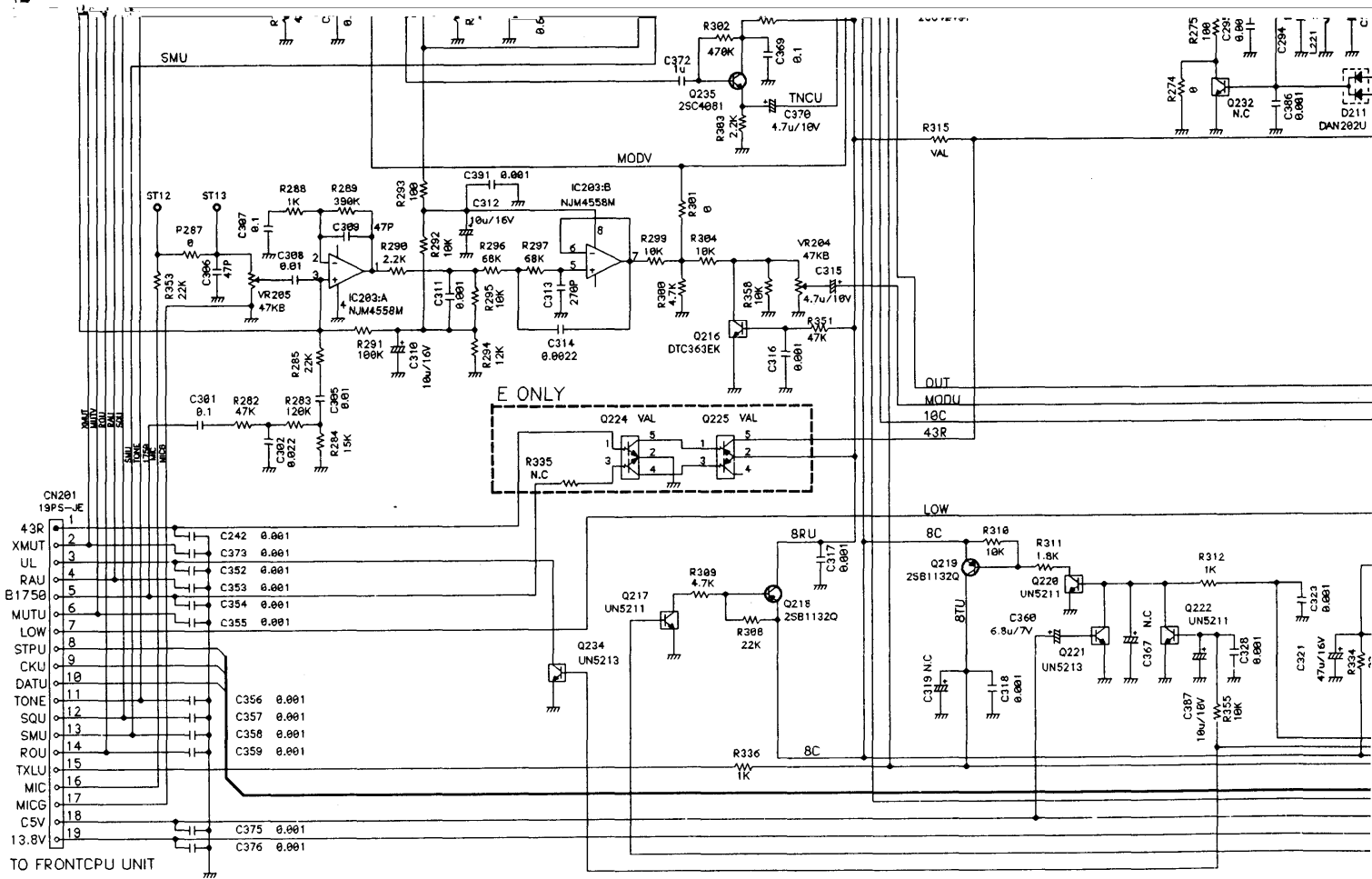
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ANT  
+13.8V  
APCB



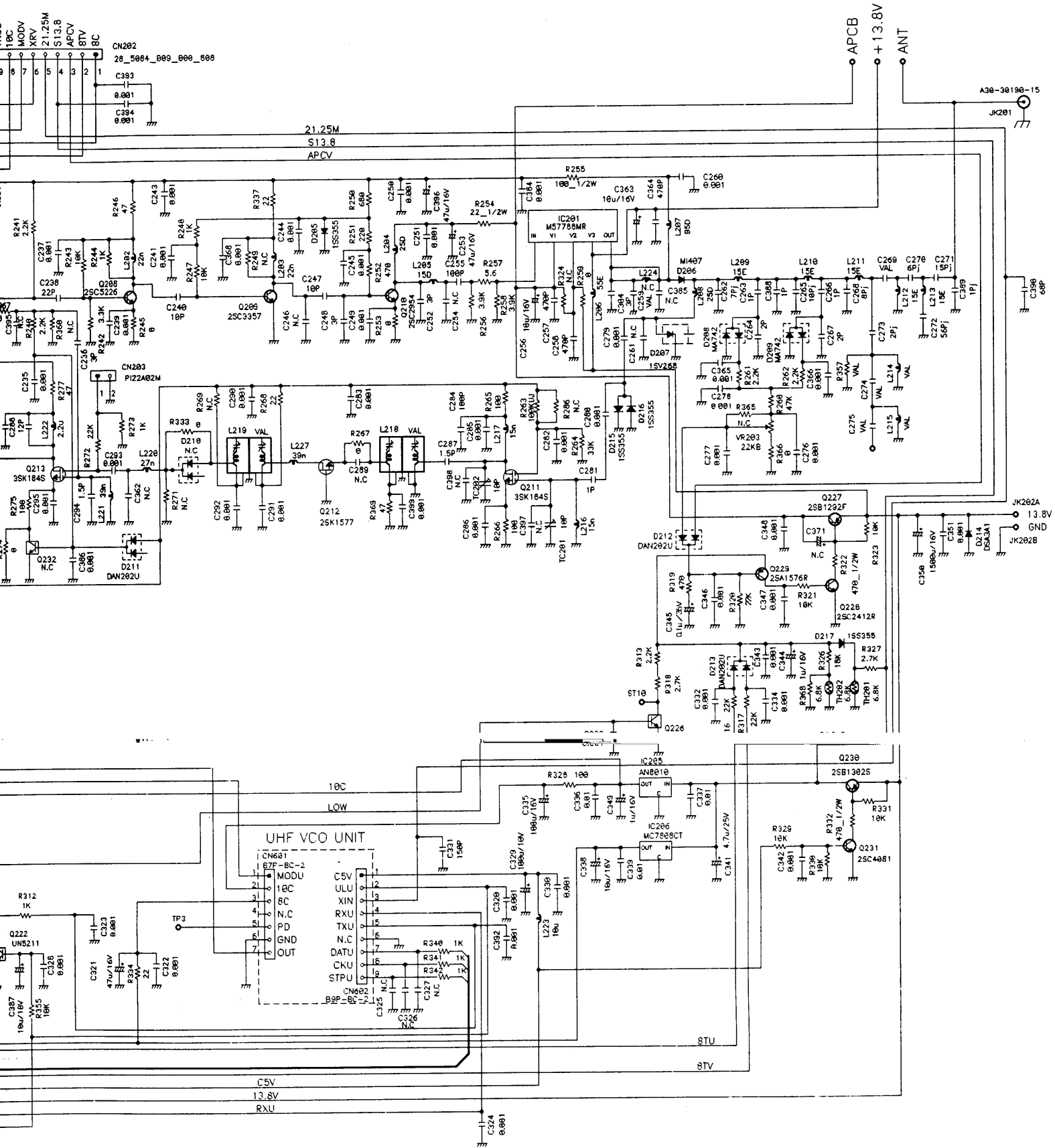


TO UHF MAIN UNIT

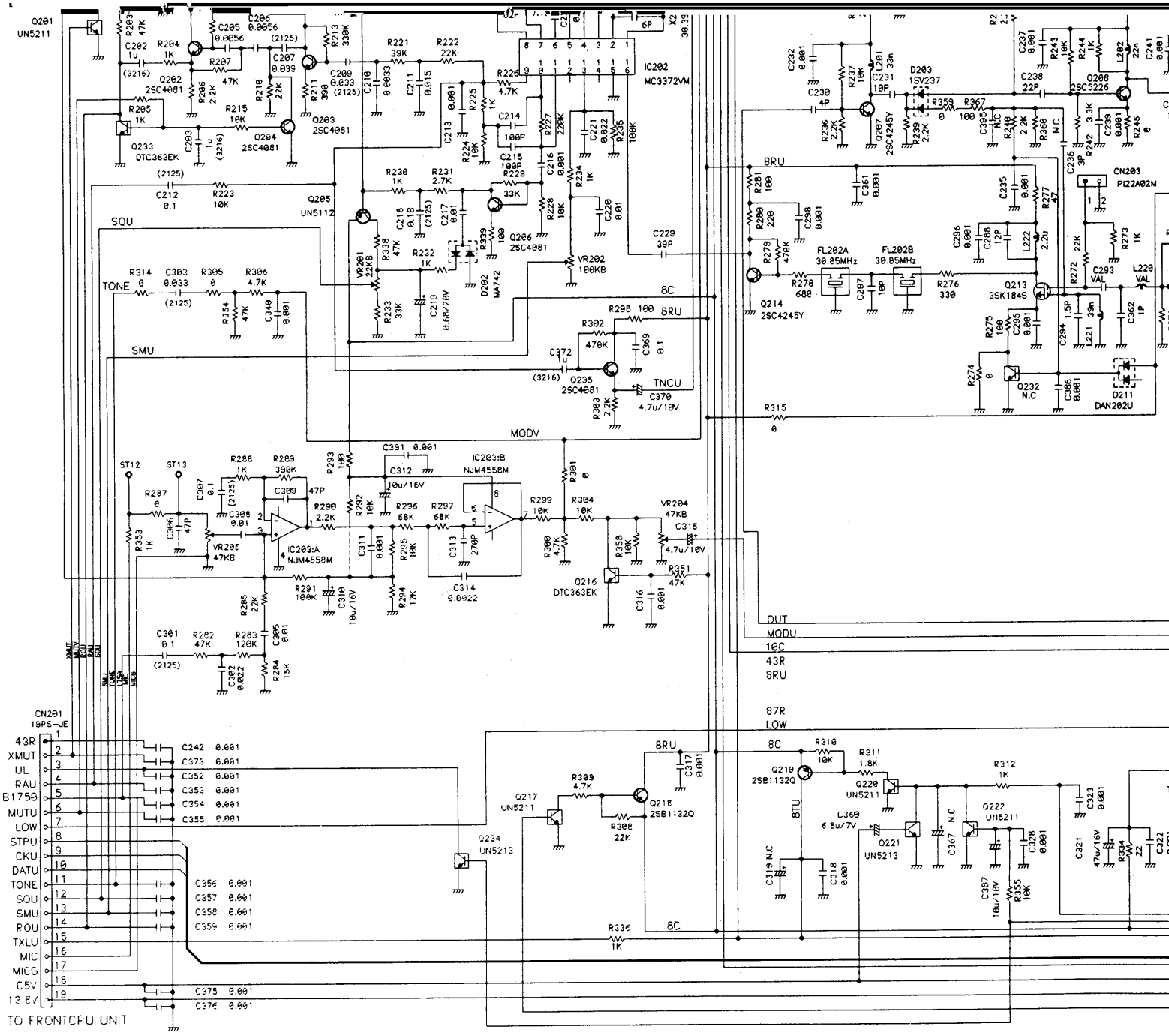
TO UHF MAIN UNIT



PART	L218	L219	R315	R357	C269	C274	C275	C300	Q224	Q225	D204	L214	L215	C259
T	QAB113	QAB113	0	0	7Pj	-	-	-	-	-	-	-	-	3P
E	QAB114	QAB114	-	-	8Pj	3P	3P	0.001	XN1213	XN111M	RN731V	QKA12E	QKA12E	2P



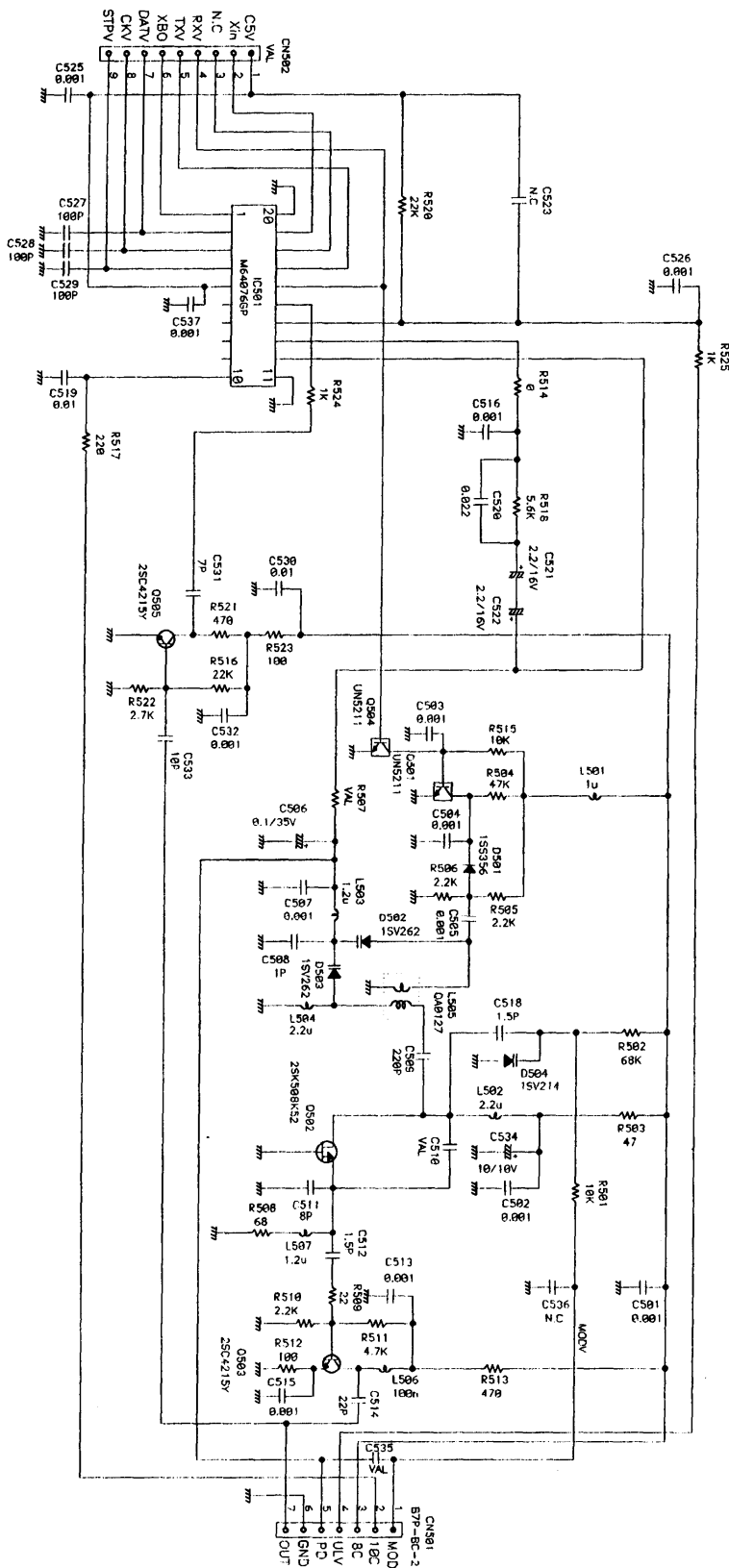




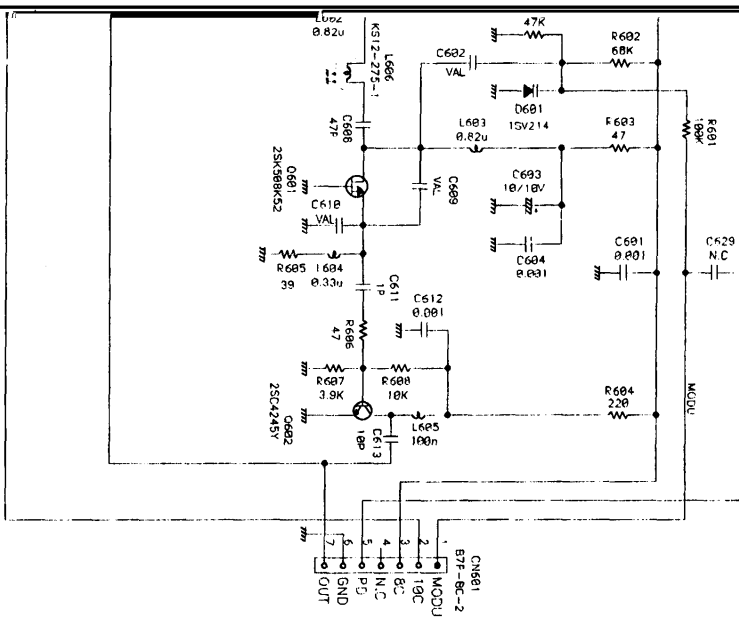
	C269	C267	C293	C304	L220	L218	L219	IC201	C252	C265	C369
TE1	8Pj	2P	33P	3P(3216)	22N	0A0128	0A0128	M57788LR	3P	12Pj	2Pj
TE2	6Pj	1P	10P	N.C.	15N	0A0129	0A0129	M57788HR	2P	10Pj	1Pj



# 6) VHF PLL-VCO Unit



	C510	CN502	R507	C535
TE1,TE2	8P	B8(9-7)P-BC-2	15K	0.001
T,E	10P	B9P-BC-2	22K	-



	C602	C609	R611
TE1	2P	8P	18K
TE2	1.5P	5P	18K
T.E	2P	7P	22K

# BLOCK DIAGRAM

