



Service Manual

AR-147 VHF FM Mobile Transceiver

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1. INTRODUCTION

The AR-147 is a VHF two way mobile transceiver with nominal a RF power output variable up to 60 watts, it has been developed and tested to stringent specifications. It's designed to operate in the frequency range of 130MHz to 180MHz with a choice of 5, 6.25, 10, 12.5, 20 or 25KHz channeling steps. Three available channel spacing, 12.5, 20 and 25KHz can meet different kinds of need. Advanced surface mount and microprocessor technologies are used to provide many additional functions and combine to make a very versatile unit.

The digitally synthesized mobile transceiver uses a single crystal for frequency control and a EEPROM for the storage of frequencies and other software definable information. The front panel of the AR-147 has three variable controls, these being a volume control knob, a squelch level control knob and a channel selector knob. A large back lit liquid crystal display (LCD) makes the reading of settings easy even at night. The LCD displays signal strength both in receive and transmit mode, which mode of operation the transceiver is in and whether it is operating on high or reduced power. Programming of the transceiver can be accomplished either by PC, or from the function key on the front panel of the unit.

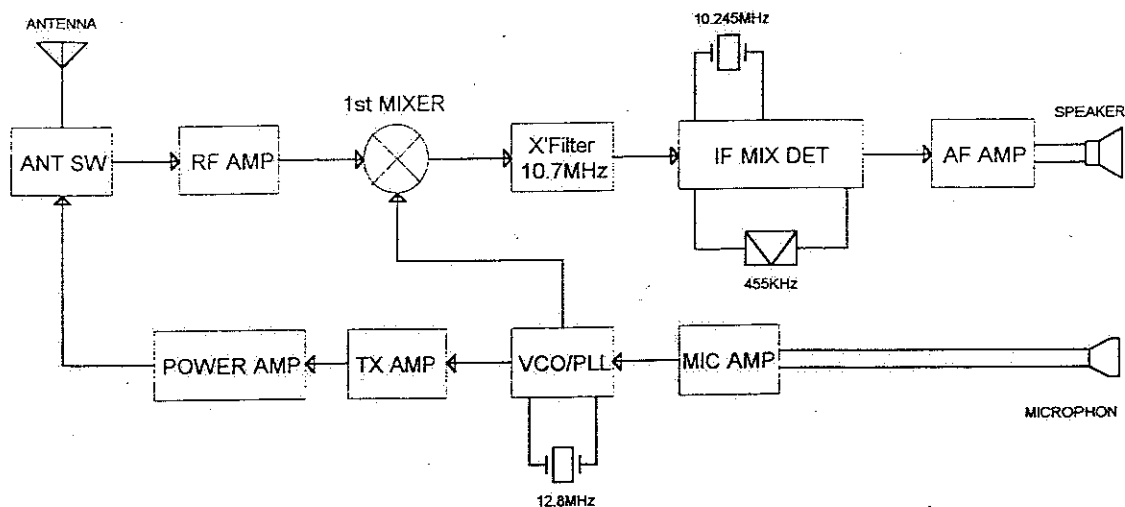


Fig. 1 System block

1.2 RECEIVING

Ensure the radio is turned OFF and the squelch knob is turned fully counterclockwise. Make sure the power supply with appropriate rating is connected properly. Check that the antenna is fitted securely. Switch the radio ON and then select the desired channel. Turn the volume control clockwise to a comfortable listening level. Turn the squelch control clockwise and continue adjusting to just beyond the point where the radio is muted.

1.1 TRANSMITTING

To transmit, connect the supplied microphone to the microphone connector. Before transmitting, momentarily turn off the squelch to listen for activity on your channel and ensure that the channel is not in use by another user. Hold the microphone in a vertical position and keeping it 5-7cm from your mouth, press the PTT switch. Speak slowly and clearly into the microphone using a normal voice level. Do not shout! Remember to release the PTT switch after you have finished talking.

2. SPECIFICATIONS

2.1 GENERAL

Frequency range	FM	144.000 ~ 147.995 MHz
	AM	118.000 ~ 135.995 MHz (only receiver)
Modulation type		F3E (FM)
Channel spacing		25 KHz
Antenna impedance		50 Ω
Operating temperature range		-20 °C ~ +60 °C (-4 °F ~ +140 °F)
Operating voltage range		13.8 VDC \pm 15 % (negative ground)
Over voltage protection		> 18 VDC
Frequency stability		\pm 5 ppm
Current consumption	Stand-by	Less than 600 mA
	Receiver	Less than 800 mA
	Transmitting	Less than 12 A
Dimension (W* H* L)		140x40x166 (mm)
Weight		1.2Kg (2.65lbs)

2.2 TRANSMITTER

Output power	HI	Approx. 60 W
	MID	Approx. 25 W
	LO	Approx. 7 W
Modulation		Reactance modulation
Spurious radiation		Less than -80 dBc
Audio frequency response		6 dB/octave pre-emphasis response
Maximum frequency deviation		\pm 5 KHz
Audio distortion at 60% modulation		\leq 3 % (300 ~ 3000Hz of audio)
Microphone impedance		2.2 K Ω

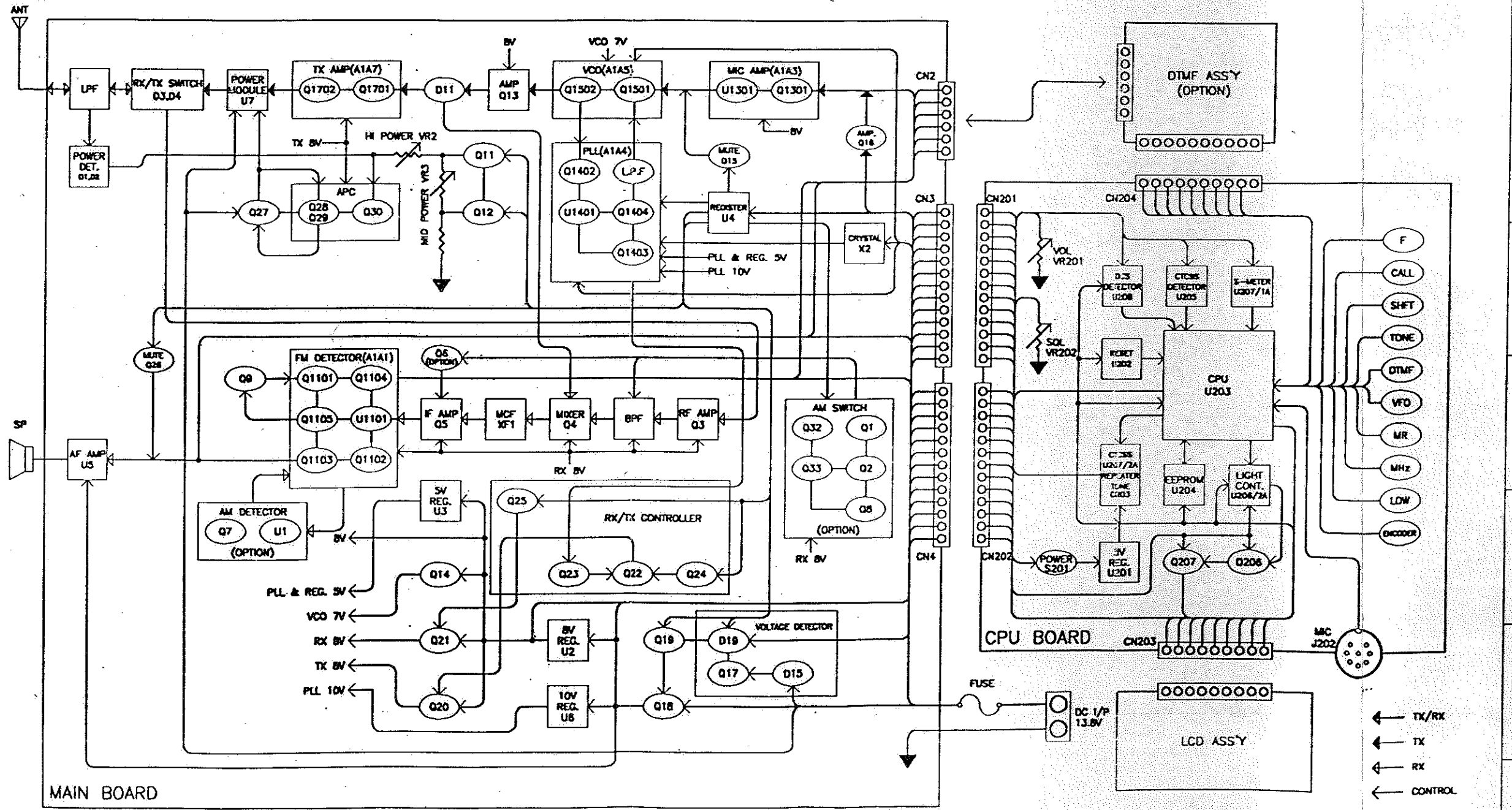
2.3 RECEIVER

Receive system		Double-conversion superheterodyne
Sensitivity(12dB SINAD)		Less than 0.18 μ V
Adjacent channel selectivity		\geq 70 dB
Spurious response rejection		\geq 70 dB
Intermodulation rejection		\geq 65 dB
Audio frequency response		6 dB/octave de-emphasis response
Audio output distortion		\leq 3 %
Audio output power		More than 2 W \leq 10% distortion
External speaker impedance		8 Ω

3. BLOCK DIAGRAM

REV.	PART NO.	DESCRIPTION	APPROVED NO.	REMARK

BLOCK DIAGRAM



FILE NO. AR-147

1. THEORY OF OPERATION

1.1 INPUT REGULATOR

The input regulator consists of Q18, Q19 and U4. (Fig.2) After the power switch is pressed the ON position, U4 control line (pin 6) switches to a high level and saturates Q19 which then conducts switching on Q18 and U2. The over voltage protection circuit consists of D15, D19 and Q17. If the input voltage is over 18V, Q17 will be switched ON and Q19 is OFF thus Q18 will shut down.

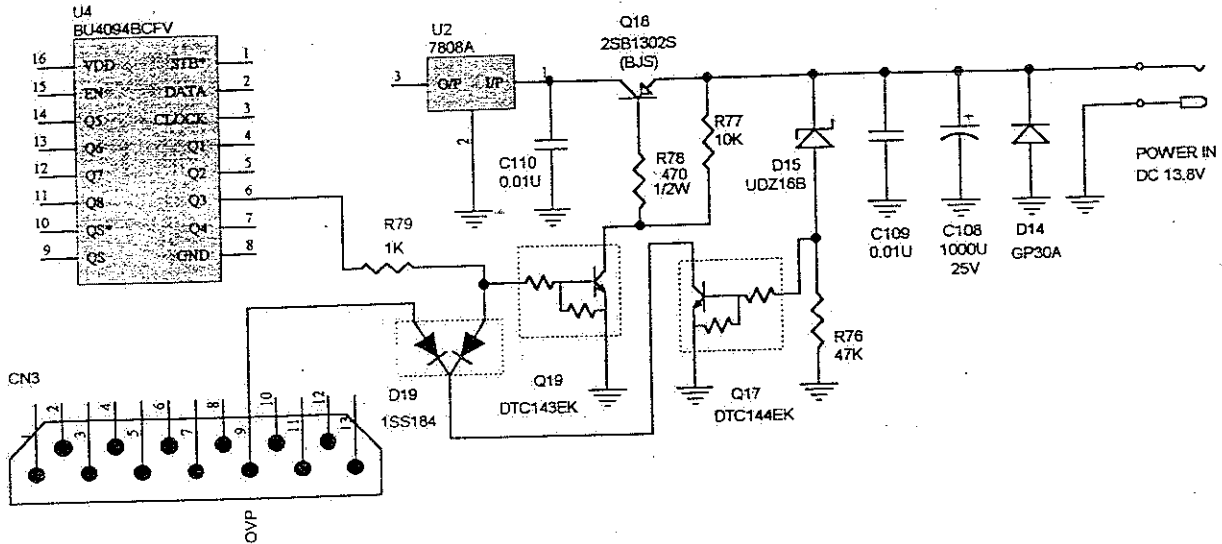


Fig. 2 Power control circuit

4.2 RF/IF AMPLIFIER

The RF signal induced from the antenna is fed to a low-pass filter, to reject any unwanted high frequency signals, and is then fed to the GaAs MESFET pre-amplifier Q3 via a receive/transmit switching diode. (Fig.3) The amplified output of Q3 is then fed to a band pass filter consisting of a three-stage tank filter employing variable diodes to tune the wanted frequency band automatically.

The output from the band-pass filter is fed to the first mixer where it is mixed with the output of the first local oscillator. The first mixer employs a GaAs MESFET which has a good two-signal mixing characteristic. The difference frequency of 10.7MHz, first intermediate frequency (1st IF), is fed via R23 to the crystal filter, XF1, which attenuates unwanted nearby signals. The 1st IF signal is when to Q5 where it is amplified before being fed into the second mixer and IF demodulating module.

In the IF module the first IF signal from Q5 is mixed with the second local oscillator to obtain a difference signal of 455KHz. (Fig.4) Which signal is called the second intermediate frequency (2nd IF). The 2nd IF is then filtered by a 455KHz ceramic filter and fed to the demodulating circuit. After quadrature detection, the resultant audio signal output appears at pin 15 of the IF module (A1A1). The noise component in the AF output is first amplified by a noise amplifier and then filtered by a rectifier. The resultant DC voltage is supplied to a squelch trigger circuit. A received signal strength indicator control voltage from the A1A1 is fed to the CPU board. An analog to digital converter (ADC) converts the DC voltage to a digital signal to operate the S-meter.

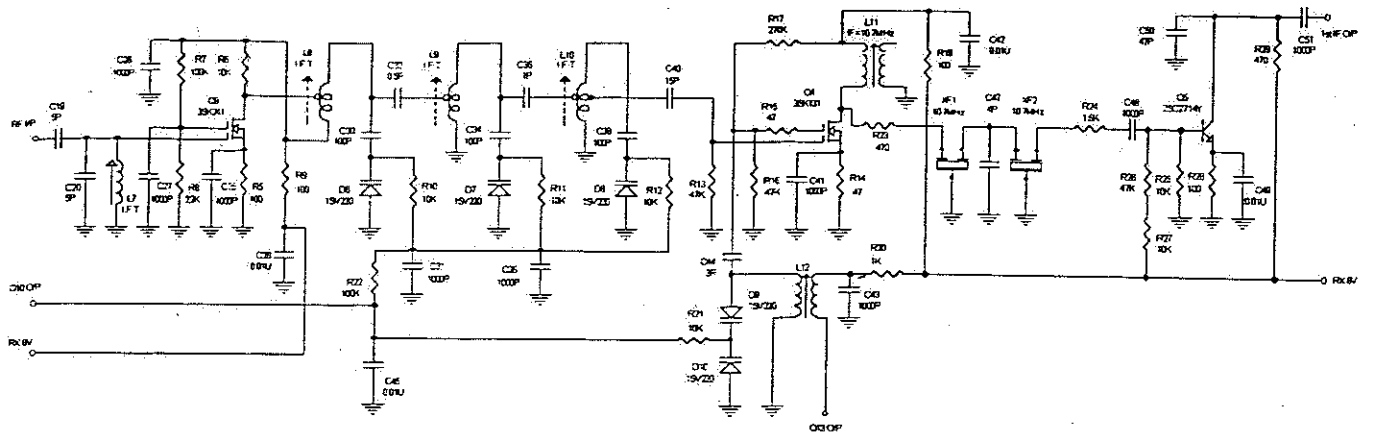


Fig. 3 RF receiver circuit

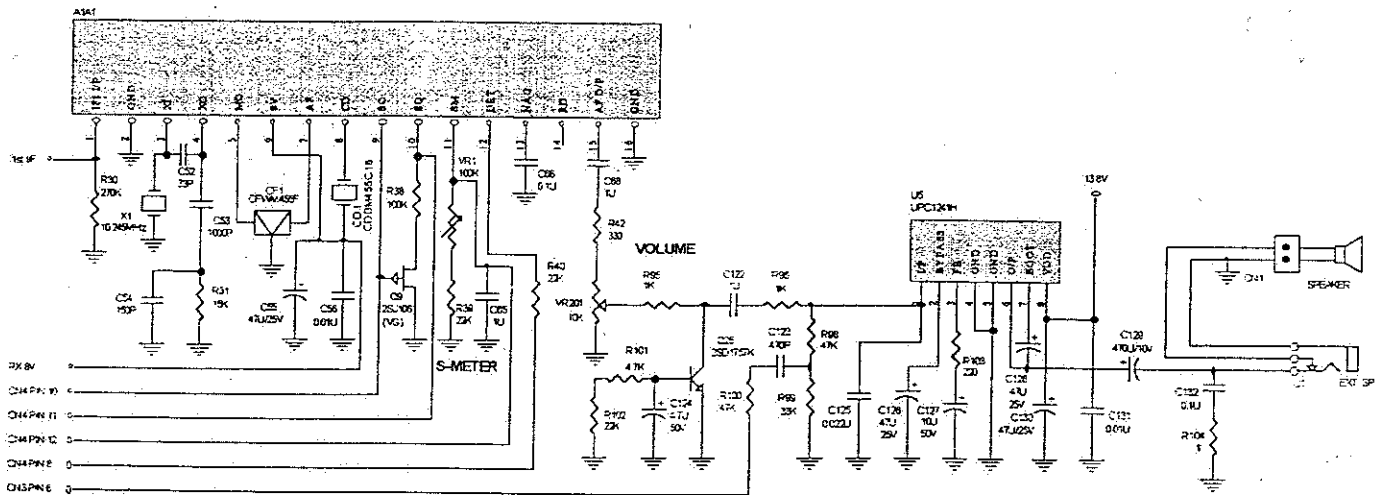


Fig. 4 A1A1 board and audio amplifier

4.3 AUDIO AMPLIFIER

The demodulated audio signal is fed via a potentiometer, which controls the receives volume output, to the audio power amplifier U5 to drive the speaker load. (Fig.4)

4.4 S-METER

The s-meter control voltage from the IF module is applied to the control unit, where CPU converts it from an analog signal to a digital signal in order to operate the signal strength meter. (Fig.4)

4.5 MICROPHONE AMPLIFIER

The microphone amplifier and pre-emphasis circuit consist of Q1301, U1301 and its associated components. The frequency response of this circuit has greater gain at the high frequency end than at the low frequency end giving a rising response of approximately 6dB per octave. The microphone amplifier also functions as a limiting amplifier to guarantee that the frequency deviation less than 5KHz. The output of U1301 directly modulates the VCO to obtain an FM modulated signal.

In TX mode, pin 14 of U4 is at "L" level. Thus Q15 will be saturated and the CTCSS sub-audio signal or the REPEATER tone will be by-passed.

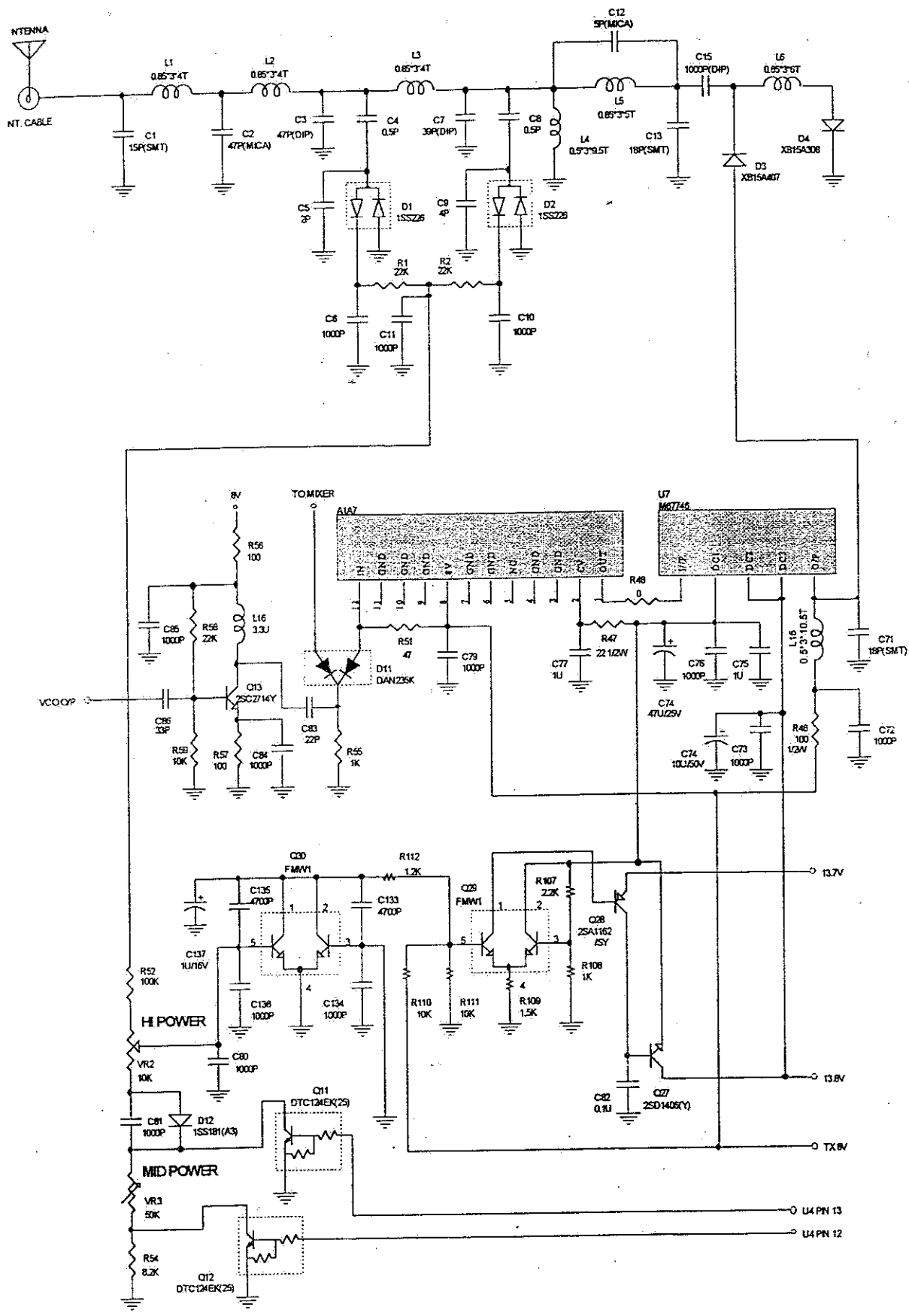


Fig. 5 Pre-amplifier, APC and power amplifier circuit

4.6 PRE-AMPLIFIER

The output from the VCO is applied to the driving amplifier A1A7 (Fig.5), which is a wide band amplifier,

operating in a linear mode so that signals can be amplified without degradation. The output of the A1A7 amplifier is fed to the power amplifier.

4.7 APC (AUTOMATIC POWER CONTROL)

The APC circuit consisting of Q27, Q28, Q29 and Q30 (Fig.5), controls the RF output power automatically. A rectified DC voltage from detection circuit D1 and D2 controls the power gain of the transmitting amplifier via the APC circuit. When the output power gets greater, the gain control voltage is lowered to reduce the output power and vice versa.

4.8 POWER AMPLIFIER

An M67746 power module is used as the RF power amplifier (Fig.5). In the AR-147, a maximum of 60W output power may be achieved when using this device. Before being applied to the input of U7, amplification of the VCO output must be made. In the AR-147, an A1A7 is used as a driving amplifier. It has a wide band, flat frequency response with low distortion characteristics.

4.9 LOCAL OSCILLATOR

In the AR-147, the local oscillator consists of PLL circuits (A1A4) and the VCO circuit (A1A5). The local oscillator is shielded to minimize the radio frequency interference. The reference signal source of the PLL is derived from a 12.8MHz crystal oscillator. After being divided by 2048 or 2560, a reference frequency of 6.25KHz or 5KHz can be obtained. In transmitting mode, the VCO directly generates the operating frequency which is set by the user. In receiving mode the VCO generates a frequency which is 10.7MHz lower than the frequency set on the display panel. The operation of the transmission VCO is the same as that of the receiving VCO.

4.10 SHIFT REGISTER

The U4 IC receives serial data from the CPU and gives a parallel output to perform the controls listed in Table 1 and Table 2.

U4	HI POWER	MID POWER	LOW POWER
PIN 12	X	H	L
PIN 13	H	L	L

Table 1

4.11 TX/RX CONTROL

In RX mode, pin 14 of U4 is "H" and drives Q24 and Q25 to saturation. Thus Q20 and Q22 are OFF and Q21 is ON. Q21 provides receiving circuits with power but provides no power to transmitting circuits. (Fig.6) When the PTT switch is pressed, pin 14 of U4 will switch to "L" and will turn off Q24 and Q25, thus Q21 will be "OFF" and Q20 will be "ON", providing associated transmitting circuits with the 8V line voltage. To avoid causing spurious signal interference if the PLL is unlocked, in unlock condition the

PLL IC will give switch an "H" level output via switching diode D16 to Q23 to turn off Q20. Thus preventing any transmission.

PIN NO.	PIN NAME	FUNCTION
1	STB*	Strobe signal input
2	DATA	Serial data input
3	CLOCK	Clock signal input
4	Q1	Back light intensity
5	Q2	Back light intensity
6	Q3	Power control
7	Q4	LED on/off
8	GND	GND
9	QS	
10	QS*	
11	Q8	AF mute: "H" when TX mode, bell, ctcss, squelch is ON
12	Q7	TX power select: "H" in HI or MID mode, "L" in LOW mode
13	Q6	TX power select: "H" in HI mode, "L" in MID or LOW mode
14	Q5	TX/RX mode select: "H" in RX mode, "L" in TX mode
15	EN	5Vdc
16	VDD	5Vdc

Table 2

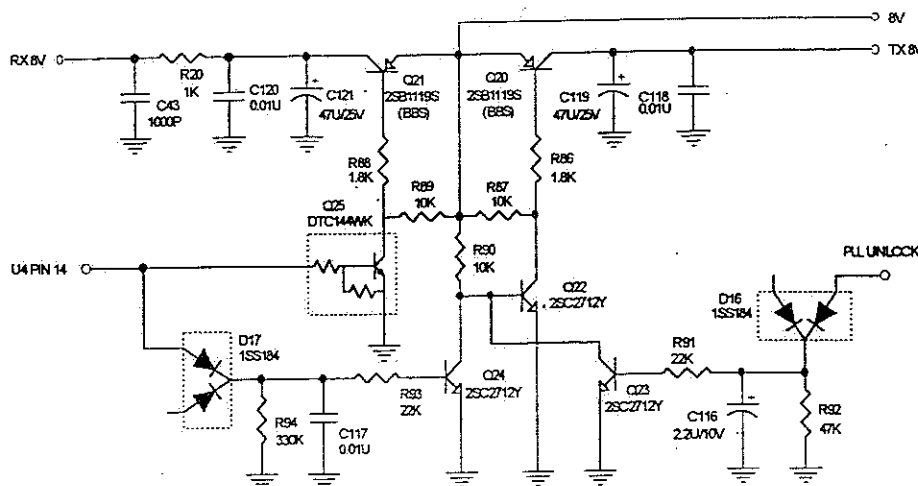


Fig. 6 TX/RX control circuit

4.12 BACK-UP

When the AR-147 is turned off, the voltage detector U202 will monitor any voltage drop of the power supply. When U202 detects a voltage range between 3.80V and 4.20V, it outputs a LOW to the CPU. This causes the CPU to enter a back-up state and save the current settings to EEPROM.

4.13 LCD DISPLAY

The display circuit is contained in the LCD assembly. It consists of an LCD driver, its peripheral circuits, lamps and an LCD display. The LCD is dynamically operated at 50% duty cycle. The LCD driver receives data from pin 1, pin 2 and pin 5 of the CPU. The lamp circuit consists of Q206, Q207 and U206. (Fig.7) Pin 4 and 5 of U4 are used to control the lamp voltage and light output.

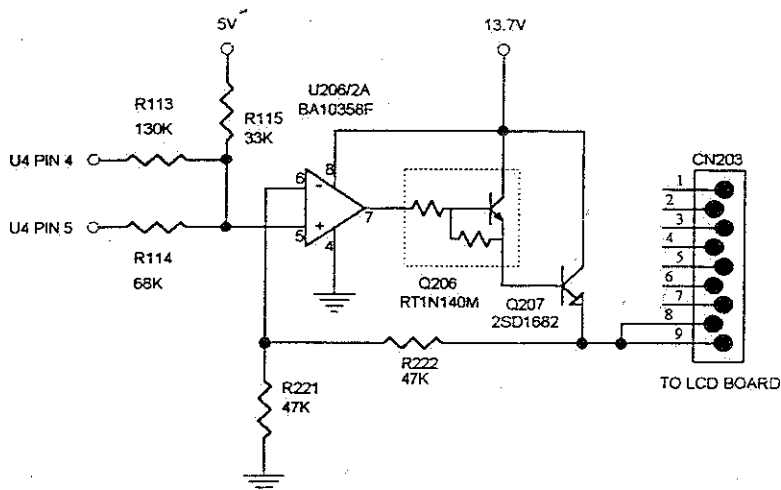


Fig. 7 Lamp control circuit

4.14 CTCSS ENCODER AND DECODER

The CTCSS tone encoder and decoder circuit is set to in tone squelch mode. (Fig. 8) In TX mode, the pin 9, 10 and 11 of U203 encode the CTCSS signal, which is sent to pin10 of CN201 via a low-pass filter (U207/2A). There are 50 different sub-audio tones which can be generated by the CTCSS encoder. The output tone passes via the coupling capacitor C95 and R63, when fed via pin 10 of CN3. The output sub-audio tone is applied to the VCO to obtain an FM modulated signal.

During reception, audio tone from pin 12 of A1A1 is fed to the CTCSS decoder circuit via pin8 of CN4. The CTCSS decoder circuit consists of U205, U206/1A and U208. When a valid tone is detected, pin 11 of U4 is "L" and Q26 is "OFF". Thus the audio signal will be by-pass.

4.15 DCS ENCODER AND DECODER

The DCS tone encoder and decoder circuit is set to in "DCS" tone squelch mode. (Fig. 8) In TX mode, the pin 33 of U203 encode the DCS signal, which is sent to VCO and PLL circuit via a summing circuit. There are 106 different DCS tones which can be generated by the DCS encoder. The output DCS tone is applied to the VCO and PLL to obtain an FM modulated signal.

In TX mode, audio tone from pin 12 of A1A1 is fed to the DCS decoder circuit via pin8 of CN4. The DCS decoder circuit consists of U205/3A, U205/4A, U206/1A and U208. When a valid tone is detected, pin 11 of U4 is "L" and Q26 is "OFF". Thus the audio signal will be by-pass.

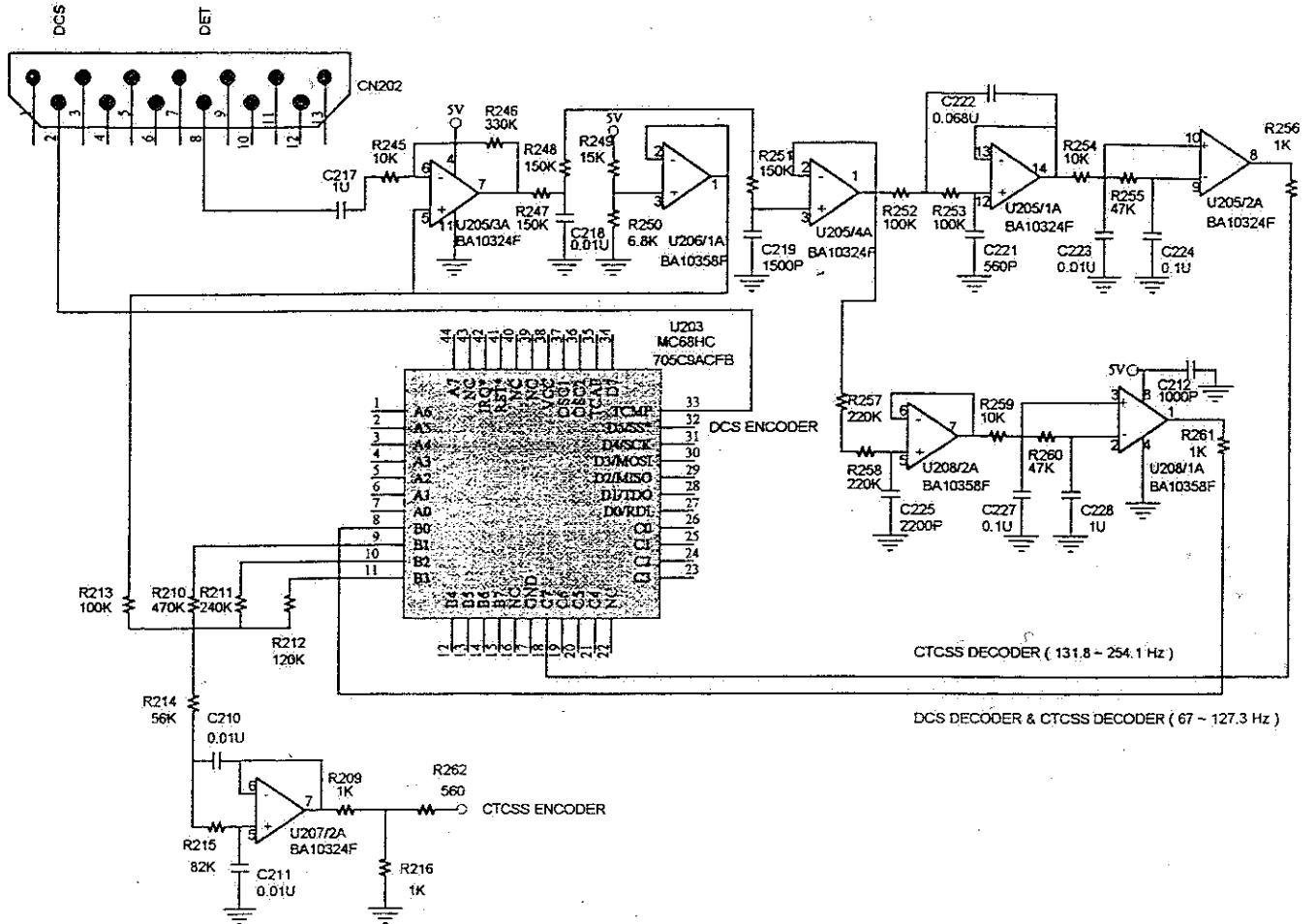


Fig. 8 CTCSS & DCS encoder and decoder circuit

4.16 PIN DESCRIPTIONS OF CPU

PIN NO.	I/O	SYMBOL	DESCRIPTION
1	O	PA6	EEPROM/Synthesizer/LCD driver data
2	O	PA5	EEPROM/Synthesizer clock
3	O	PA4	Shift register strobe
4	O	PA3	Synthesizer strobe
5	O	PA2	LCD driver strobe
6	I	PA1	S-meter detector
7	I/O	PA0	Band expansion detector/Buzzer
8	I	PB0	CTCSS decoder(131.8 ~ 254.1Hz)
9	O	PB1	CTCSS encoder D0
10	O	PB2	CTCSS encoder D1
11	O	PB3	CTCSS encoder D2
12	I	PB4	SQ from IF
13	I	PB5	PTT detector

PIN NO.	I/O	SYMBOL	DESCRIPTION
14	I	PB6	Rotary detector 1
15	I	PB7	Rotary detector 2
16		N/C	Null
17		VSS	Ground
18	I	PC7	DCS/CTCSS(67 ~ 127.3Hz) decoder
19	O	PC6	MIC mute/DTMF encoder enable
20	O	PC5	DTMF signal path selection
21	I/O	PC4	DTMF board detector/DTMF decoder data output enable
22		N/C	Null
23	I/O	PC3	DTMF decoder D3/MIC key and S-meter comparator D3
24	O	PC2	DTMF decoder D2/MIC key and S-meter comparator D2/TONE,DTMF,LOW key check
25	O	PC1	DTMF decoder D1/MIC key and S-meter comparator D1/F,CALL,SHIFT key check
26	O	PC0	DTMF decoder D0/MIC key and S-meter comparator D0/VFO,MR,MHz key check
27	I	PD0/RDI	Programming data input
28	O	PD1/TDO	Programming data output
29	I/O	PD2/MISO	VFO,F,TONE key detector/Repeater tone encoder
30	I	PD3/MOSI	MR,CALL,DTMF key detector
31	I	PD4/SCK	MHz,SHIFT,LOW key detector
32	I	PD5/SS	MR,MHz,DN MIC key detector
33	O	TCMP	DCS signal output
34	I	PD7	CALL,VFO,UP MIC key detector
35	I	TCAP	DTMF decoder reception detector
36		OSC2	4MHz oscillator
37		OSC1	4MHz oscillator
38		VDD	+5V
39		N/C	Null
40		N/C	Null
41	I	RESET*	Active low reset
42	I	IRQ*	Connected to VDD
43		N/C	Connected to VDD for OTP type
44	O	PA7	EEPROM clock

4.17 MICROPHONE UNIT

Normally, multifunction microphone unit with 16 alphanumeric keypad is supplied with AR-147. You can also purchase the microphone unit without 16 alphanumeric keypad. The difference is that there is a DTMF encoder IC (HM9187) designed in the former while no DTMF IC is built in the latter.

When lock switch S402 is set at its normal position, R427, R428, R429 and R430 are commonly grounded. UP, DN, CALL, VFO, MR and MHz keys are effective. When lock switch S402 is set to "LOCK", UP, DN, CALL, VFO, MR and MHz keys lose their function. The alphanumeric keys and PTT switch are not controlled by the LOCK switch.

4.18 DTMF FUNCTION (OPTION)

Only the DTMF encoder/decoder option is installed will the DTMF function be used. To install the DTMF unit, connect CN1 of the DTMF unit to CN203 on the CPU control board and connect CN2 to CN5 on the main board.

U1 (TC35219F) is used as a DTMF generator. The TC35219F uses a ceramic resonator reference to generate eight different audio frequencies. The eight different audio frequencies are divided into two groups. Each group holds four different audio frequencies. The two groups are mixed together to obtain 16 DTMF dialing tones.

During transmission, the CPU sends DTMF encoded data to U1 (TC35219F). The generated DTMF tone from pin14 of U1 is applied to amplifier Q1. The output is then fed to pin3 of U2. The output from pin4 of U2 is sent to pin8 of A1A3 through R73 and C103. After amplification by U1301, The DTMF tone is applied to the VCO to obtain an FM modulated RF signal. The DTMF bypassing through C4 and feeding to the buffer amplifier Q2 is used as the DTMF monitoring, which can be heard by the operator during transmission.

During reception, a detected DTMF tone from pin12 (DET) of A1A1 is sent to pin10 of U2 via pin3 (RD) of CN2. Code conversion is done in this chip after level amplification by an OP AMP built in U3 (LC7385). The converted digital codes are sent to the CPU via pin3 to pin6 of CN1.

4.19 AM FUNCTION (OPTION)

For a 118 ~ 135.995 MHz band can switching to AM reception. In AM reception mode, pin 12 and pin 13 of U4 are "H" and drives Q32 and Q33 to saturation. Q1 provides AM receiving circuits with power. After switching to AM reception, an AM signal is output from pin 7 of A1A1. This signal enters U1, causing an AM demodulation signal (AM audio) to be output. The AGC signal that is obtained by pin 6 of U1 to control the gain of Q5. (Fig.9)

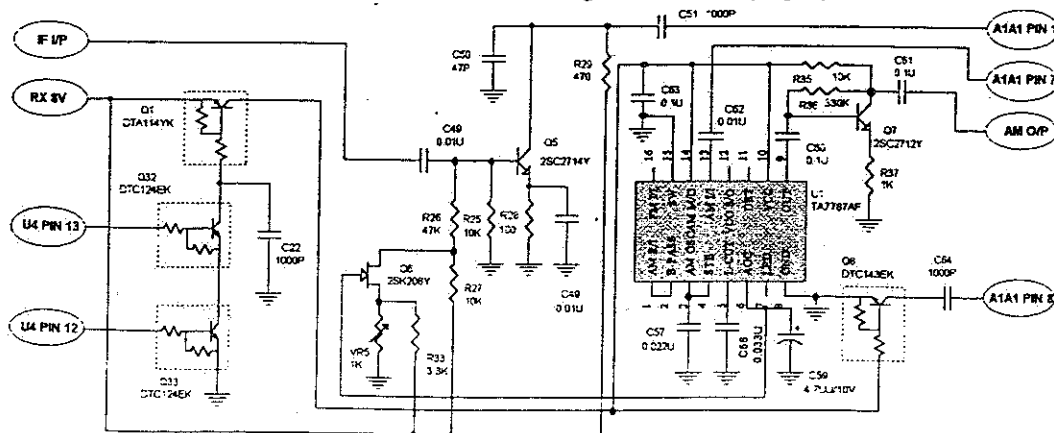


Fig. 9 AM demodulation circuit

5. ADJUSTMENT PROCEDURES

At each step when the alignment is performed, applied 13.8V to the power input is recommended if no otherwise noted. Don't use metal screw driver to adjust ferrite cores. It will cause variances in inductance and capacitance while alignments are being performed. Using wrong tools are likely to damage the cores. The bakelite or ceramic made tools with right size are strongly recommended. The adjustment points is in Fig. 11.

5.1 TEST EQUIPMENT REQUIRED

- | | |
|---|---------------------------|
| a. DC Power Supply (20V/15A) | f. Frequency Counter |
| b. Digital Multimeter | g. 20dB Attenuator (100W) |
| c. Spectrum Analyzer (500MHz) with tracking generator | h. Modulation Analyzer |
| d. Oscilloscope | i. SINAD Meter |
| e. Signal Generator | j. Audio Oscillator |
- OR a suitable combined test set

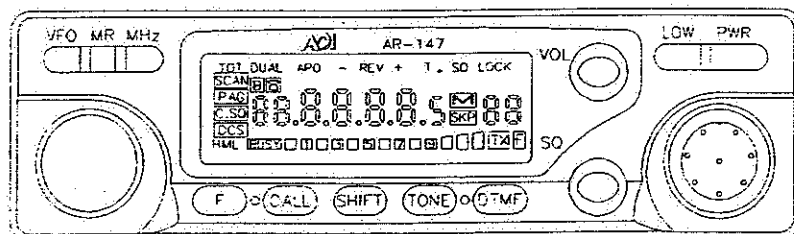


Fig. 10 Display window

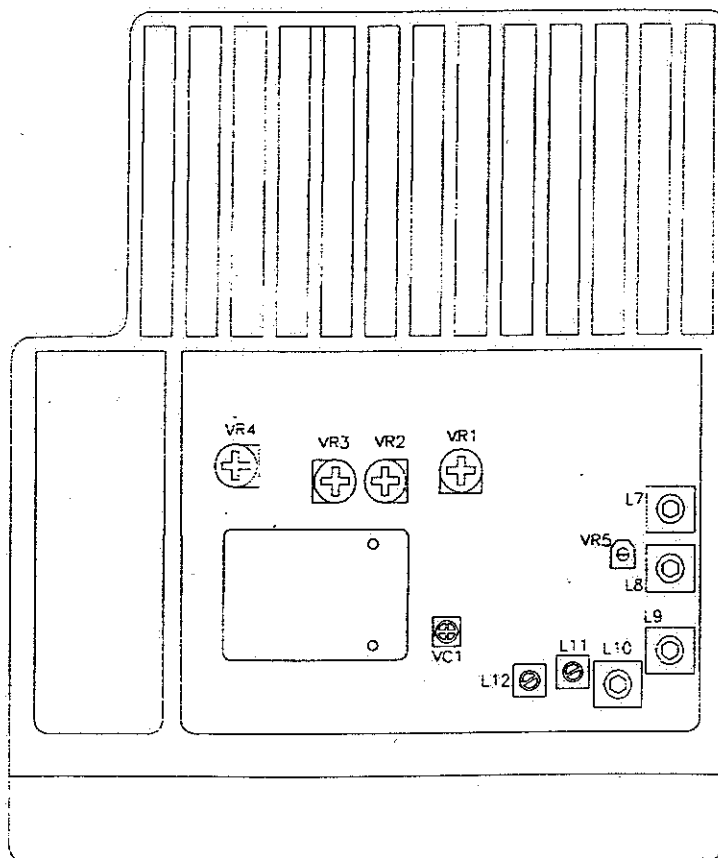


Fig. 11 Adjustment points

5.2 FREQUENCY ADJUSTMENT

ITEM	CONDITION	MEASUREMENT	VALUE	ADJUSTMENT
1.RX PLL voltage	1.Freq.:144MHz	VCO pin 5	2.5 ~ 3.5V	Check
2.TX PLL voltage	1.Freq.:144MHz	VCO pin 5	3.8 ~ 4.8V	Check
3.TX frequency	1.Freq.:144MHz	ANT.	$\pm 200\text{Hz}$	VC1

5.3 RECEIVER ADJUSTMENT

ITEM	CONDITION	MEASUREMENT	VALUE	ADJUSTMENT
1.BPF	1.Freq.:144MHz 2.Tracking generator start freq.:100MHz stop freq.:200MHz level:-20dBm 3.Connect the T.G. to ANT.	1.Connect spectrum to TP1 2.TP1 is at G1 of Q3	More then -10dBm	L7,L8,L9
2.Distortion	1.Freq.:144MHz 2.S.G. freq.:144MHz S.G. level:1mv S.G. mod.:1KHz S.G. dev.:3KHz 3.Connect the S.G. to ANT.	speaker	1.Best SINAD point 2.Less then 3%	L10,L12 L11
3.Sensitivity	1.Freq.:144MHz 2.S.G. freq.:144MHz S.G. level:-122dBm S.G. mod.:1KHz S.G. dev.:3KHz 3.Connect the S.G. to ANT. 4.Freq.:147.990MHz	speaker	SINAD more then 12dB SINAD more then 12dB	Check Check
4.S-meter	1.Freq.:145MHz 2.S.G. freq.:145MHz S.G. level:-110dBm S.G. mod.:1KHz S.G. dev.:3KHz 3.Connect the S.G. to ANT. 4.S.G. level:-118dBm	LCD S-meter display	All S-meter segments on 3 ~ 7 segments on	VR1 Check

5.4 TRANSMITTER ADJUSTMENT

ITEM	CONDITION	MEASUREMENT	VALUE	ADJUSTMENT
1.Hi power	1.Freq.:146MHz 2.Set "HI" power	ANT.	1.Max. power 60W 2.Power current $\leq 12\text{A}$ 3.All LCD segments on	VR2 Check Check
2.Mid power	1.Freq.:146MHz 2.Set "MID" power	ANT.	1.Power 25W $\pm 3\text{W}$ 2.LCD segments 7 on	VR3 Check
3.Low power	1.Freq.:146MHz 2.Set "LOW" power	ANT.	1.Power 7W $\pm 2\text{W}$ 2.LCD segments 3 on	Check Check

ITEM	CONDITION	MEASUREMENT	VALUE	ADJUSTMENT
4.Deviation	1.Freq.:144MHz Audio level:50mv Audio freq.:1KHz 2.Connect the audio to MIC. 3.Audio level:7mv	ANT.	4.3±0.1KHz 3±0.5KHz	VR4 Check
5.Distortion	1.Freq.:144MHz Audio level:7mv Audio freq.:1KHz 2.Connect the audio to MIC.	ANT.	Less then 3%	Check
6.CTCSS deviation	1.Freq.:144MHz Audio level:off 2.Set "T.SQ" on Set CTCSS :88.5Hz 3.Connect the audio to MIC.	ANT.	0.6±0.2KHz	Check
7.DCS deviation	1.Freq.:144MHz Audio level:off 2.Set "DCS T.SQ" on Set DCS :263 3.Connect the audio to MIC.	ANT.	0.6±0.2KHz	Check
8.Repeater tone deviation	1.Freq.:144MHz Audio level:off 2.Connect the audio to MIC. 3.Set Repeater tone: 1750Hz	ANT.	3.5±0.5KHz	Check
9.DTMF deviation	1.Freq.:144MHz Audio level:off 2.Press MIC "8" key 3.Connect the audio to MIC.	ANT.	3.5±0.5KHz	Check

5.5 AM ADJUSTMENT (OPTION)

ITEM	CONDITION	MEASUREMENT	VALUE	ADJUSTMENT
1.Distortion	1.Freq.:125MHz Squelch off 2.S.G. freq.:125MHz S.G. level:1mv S.G. mod.:AM 30% S.G. audio:1KHz 3.Connect the S.G. to ANT.	ANT.	Less then 5%	VR5
2.Sensitivity	1.S.G. level:-100dBm Squelch off 2.Connect the S.G. to ANT.	ANT.	SINAD more then 12dB	Check

6. PARTS LIST

REF. NO.	SUBASSEMBLY NO.	DESCRIPTION	NOTE	
	A6151S025A	MAIN BOARD SUBASSEMBLY		
REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
PCB		BC278B006M	MAIN BOARD	
CORD		AV265A108	CON. ASS'Y 2P POWER CORD	
A1A7		KM042A007U	TX DRIVER BOARD	
ANT		AK577Z126	CABLE ASS'Y, M-TYPE 50 Ω	
C1		GH150A420	CAP. MONO-SMD 15PF, 500V, NPO, 1206	
C2		CM470Q105	CAP. MICA-SMD 47PF, 500V, J	
C3		GQ470Q118	CAP. C/C-SL 47PF, 500V, J	
C4		GA508A017	CAP. MONO-SMD 0.5PF, 50V, C, NPO, 0805	
C5		GA209A017	CAP. MONO-SMD 2PF, 50V, C, NPO, 0805	
C6		GA102X515	CAP. MONO-SMD 1000PF, 50V, K, X7R, 0805	
C7		GQ390Q117	CAP. C/C-SL 39PF, 500V, J	
C8		GA508A017	CAP. MONO-SMD 0.5PF, 50V, C, NPO, 0805	
C9		GA409A011	CAP. MONO-SMD 4PF, 50V, C, NPO, 0805	
C10		GA102X515	CAP. MONO-SMD 1000PF, 50V, K, X7R, 0805	
C11		GA102X515	CAP. MONO-SMD 1000PF, 50V, K, X7R, 0805	
C12		CM509Q605	CAP. MICA-SMD 5PF, 500V, C	
C13		GH180A429	CAP. MONO-SMD 18PF, 500V, NPO, 1206	
C15		GB102Q210	CAP. C/C-B 1000PF, 500V, K	
C18		GA220A412	CAP. MONO-SMD 22PF, 50V, J, NPO, 0805	
C19		GA509A018	CAP. MONO-SMD 5PF, 50V, C, NPO, 0805	
C20		GA509A018	CAP. MONO-SMD 5PF, 50V, C, NPO, 0805	
C21		GA103X503	CAP. MONO-SMD 0.01UF, 50V, K, X7R, 0603	
C22		GA102X502	CAP. MONO-SMD 1000PF, 50V, K, X7R, 0603	
C23		GA709A106	CAP. MONO-SMD 7PF, 50V, J, NPO, 0603	
C24		GA102X502	CAP. MONO-SMD 1000PF, 50V, K, X7R, 0603	
C25		GA102X515	CAP. MONO-SMD 1000PF, 50V, K, X7R, 0805	
C26		GA102X515	CAP. MONO-SMD 1000PF, 50V, K, X7R, 0805	
C27		GA102X515	CAP. MONO-SMD 1000PF, 50V, K, X7R, 0805	
C28		GA103X516	CAP. MONO-SMD 0.01UF, 50V, K, X7R, 0805	
C30		GA101A410	CAP. MONO-SMD 100PF, 50V, J, NPO, 0805	
C31		GA102X515	CAP. MONO-SMD 1000PF, 50V, K, X7R, 0805	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
C32		GA508A017	CAP. MONO-SMD 0.5PF,50V,C,NPO,0805	
C34		GA101A410	CAP. MONO-SMD 100PF,50V,J,NPO,0805	
C35		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C36		GA109A010	CAP. MONO-SMD 1PF,50V,C,NPO,0805	
C38		GA101A410	CAP. MONO-SMD 100PF,50V,J,NPO,0805	
C40		GA150A414	CAP. MONO-SMD 15PF,50V,J,NPO,0805	
C41		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C42		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C43		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C44		GA309A014	CAP. MONO-SMD 3PF,50V,C,NPO,0805	
C45		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C46		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C47		GA409A011	CAP. MONO-SMD 4PF,50V,C,NPO,0805	
C48		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C49		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C50		GA470A411	CAP. MONO-SMD 47PF,50V,J,NPO,0805	
C51		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C52		GA330A412	CAP. MONO-SMD 33PF,50V,J,NPO,0805	
C53		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C54		GA151A415	CAP. MONO-SMD 150PF,50V,J,NPO,0805	
C55		CE470D339	CAP. E/C-S-85°C 47UF,25V,M	
C56		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C57		GA223X506	CAP. MONO-SMD 0.022UF,50V,K,X7R,0603	
C58		GA333X506	CAP. MONO-SMD 0.033UF,50V,K,X7R,0603	
C59		CT475B399	CAP. TAN-SMD 4.7UF,10V,M	
C60		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C61		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C62		GA103X503	CAP. MONO-SMD 0.01UF,50V,K,X7R,0603	
C63		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C64		GA102X502	CAP. MONO-SMD 1000PF,50V,K,X7R,0603	
C65		GA105U618	CAP. MONO-SMD 1UF,16V,M,Y5U,0805	
C66		GA104X614	CAP. MONO-SMD 0.1UF,50V,M,X7R,0805	
C68		GA105U618	CAP. MONO-SMD 1UF,16V,M,Y5U,0805	
C69		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C70		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C71		GH180A429	CAP. MONO-SMD 18PF,500V,NPO,1206	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
C72		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C73		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C74		CE100F335	CAP. E/C-S-85°C 10UF,50V,M	
C75		GA105U618	CAP. MONO-SMD 1UF,16V,M,Y5U,0805	
C76		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C77		GA105U618	CAP. MONO-SMD 1UF,16V,M,Y5U,0805	
C79		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C80		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C81		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C82		GA104X614	CAP. MONO-SMD 0.1UF,50V,M,X7R,0805	
C83		GA220A412	CAP. MONO-SMD 22PF,50V,J,NPO,0805	
C84		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C85		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C86		GA330A412	CAP. MONO-SMD 33PF,50V,J,NPO,0805	
C87		GA220A412	CAP. MONO-SMD 22PF,50V,J,NPO,0805	
C88		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C89		CE100F335	CAP. E/C-S-85°C 10UF,50V,M	
C90		CE221B333	CAP. E/C-S-85°C 220UF,10V,M	
C91		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C92		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C93		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C94		GA105U618	CAP. MONO-SMD 1UF,16V,M,Y5U,0805	
C95		GA223X519	CAP. MONO-SMD 0.022UF,50V,K,X7R,0805	
C96		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C97		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C98		CT225C399	CAP. TAN-SMD 2.2UF,16V,M	
C99		GA393X517	CAP. MONO-SMD 0.039UF,50V,K,X7R,0805	
C100		GA104X614	CAP. MONO-SMD 0.1UF,50V,M,X7R,0805	
C101		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C102		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C103		GA104X614	CAP. MONO-SMD 0.1UF,50V,M,X7R,0805	
C104		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C105		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C106		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C108		CR108D028	CAP. E/C-S-85°C 1000UF,25V,10*20,VR	
C109		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
C110		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C111		CE470D339	CAP. E/C-S-85°C 47UF,25V,M	
C112		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C113		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C114		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C115		CE470D339	CAP. E/C-S-85°C 47UF,25V,M	
C116		CT225C399	CAP. TAN-SMD 2.2UF,16V,M	
C117		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C118		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C119		CE470D339	CAP. E/C-S-85°C 47UF,25V,M	
C120		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C121		CE470D339	CAP. E/C-S-85°C 47UF,25V,M	
C122		GA105U618	CAP. MONO-SMD 1UF,16V,M,Y5U,0805	
C123		GA471A412	CAP. MONO-SMD 470PF,50V,J,NPO,0805	
C124		CE4R7F339	CAP. E/C-S-85°C 4.7UF,25V,M	
C125		GA223X519	CAP. MONO-SMD 0.022UF,50V,K,X7R,0805	
C126		CE470D339	CAP. E/C-S-85°C 47UF,25V,M	
C127		CE100F335	CAP. E/C-S-85°C 10UF,50V,M	
C128		CE470D339	CAP. E/C-S-85°C 47UF,25V,M	
C129		CE471B332	CAP. E/C-S-85°C 470UF,10V,M	
C130		CE470D339	CAP. E/C-S-85°C 47UF,25V,M	
C131		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C132		GA104X614	CAP. MONO-SMD 0.1UF,50V,M,X7R,0805	
C133		GA472X517	CAP. MONO-SMD 4700PF,50V,K,X7R,0805	
C134		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C135		GA472X517	CAP. MONO-SMD 4700PF,50V,K,X7R,0805	
C136		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C137		CT225C399	CAP. TAN-SMD 2.2UF,16V,M	
C138		CT106V398	CAP. TAN-SMD 10UF,7V,M	
C139		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C143		GA104X614	CAP. MONO-SMD 0.1UF,50V,M,X7R,0805	
C144		CT105C309	CAP. TAN-SMD 1UF,16V,M	
C145		GA333X519	CAP. MONO-SMD 0.033UF,50V,K,X7R,0805	
C147		CE470D339	CAP. E/C-S-85°C 47UF,25V,M	
CD1		LF193B007M	CERAMIC FILTER 455KHZCDBM455C16	
CF1		LF193A008M	CERAMIC FILTER 455KHZCFWM455F	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
CN1		JA003F028	BASE,2P 2421P02V000	
CN2		JA072A065X	BASE,6P B6B-ZR	
CN3		JF014A132	CON. MALE BOARD TO BOARD,13P 13PS-JE	
CN4		JF014A132	CON. MALE BOARD TO BOARD,13P 13PS-JE	
D1		DP040A063O	DIODE,1SS226(C3),SC-59	
D2		DP040A063O	DIODE,1SS226(C3),SC-59	
D3		DP075A119X	DIODE,XB15A407	
D4		DP075A012X	DIODE,XB15A308	
D5		DP041A064R	DIODE,DAN235K(M),SC-59	
D6		DP043A066E	DIODE,1SV220-T1	
D7		DP043A066E	DIODE,1SV220-T1	
D8		DP043A066E	DIODE,1SV220-T1	
D9		DP043A066E	DIODE,1SV220-T1	
D10		DP043A066E	DIODE,1SV220-T1	
D11		DP041A064R	DIODE,DAN235K(M),SC-59	
D12		DP037A067O	DIODE,1SS181(A3),SC-59	
D13		DP046A043R	DIODE,IMN10-T108	
D14		DR018G420G	DIODE,REC. 3A 200V	
D15		CZ016W107B	ZENER DIODE,16V 200mW,UDZ16B	
D16		DP038A068O	DIODE,1SS184(B3),SC-59	
D17		DP038A068O	DIODE,1SS184(B3),SC-59	
D19		DP038A068O	DIODE,1SS184(B3),SC-59	
J1		JJ014O008	JACK,EAR PHONE	
L1		LK193C001	CHOKE,COIL 0.85*3*4T-5RS	
L2		LK193C001	CHOKE,COIL 0.85*3*4T-5RS	
L3		LK193C001	CHOKE,COIL 0.85*3*4T-5RS	
L4		LK193B002	CHOKE,COIL 0.5*3*9.5T-5R	
L5		LK193D000	CHOKE,COIL 0.85*3*5T-5RS	
L6		LK193E009	CHOKE,COIL 0.65*3*6T-5RS	
L7		LJ193E000T	I.F.T. COIL 145MHz	
L8		LJ193E000T	I.F.T. COIL 145MHz	
L9		LJ193E000T	I.F.T. COIL 145MHz	
L10		LJ193E000T	I.F.T. COIL 145MHz	
L11		LJ193B003	VARIABLE COIL 47PF 10.7MHz	
L12		LJ193C002	VARIABLE COIL 16PF 100MHz	
L14		LP100X225	COIL PEAKING-SMD,10UH,M	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
L15		LK193A003	CHOKE, COIL 0.5*3*10.5T-5R	
L16		LP339X324	COIL PEAKING-SMD, 3.3UH, M	
L17		LP228X323	COIL PEAKING-SMD, 0.22UH, M	
Q1		TS080Z160O	TR. S-SIGNAL DTA114YK, SC-59	
Q2		TS130Z162O	TR. S-SIGNAL DTC123JK, SC-59	
Q3		TF134Z062F	GaAs MESFET 3SK241	
Q4		TF055Z062E	GaAs MESFET 3SK131(V12)	
Q5		TS094Y061B	TR. S-SIGNAL 2SC2714Y, SC-59	
Q6		TF058Y066B	MOSFET 2SK208Y(JY), SC-59	
Q7		TS140Y001B	TR. S-SIGNAL 2SC2712Y, SC-59	
Q8		TS131Z163O	TR. S-SIGNAL DTC143EK, SC-59	
Q9		TF057A069B	MOSFET 2SJ106-GR(VG), SC-59	
Q10		TF058Y066B	MOSFET 2SK208-Y(JY), SC-59	
Q11		TS130Z065O	TR. S-SIGNAL DTC124EK(25), SC-59	
Q12		TS130Z065O	TR. S-SIGNAL DTC124EK(25), SC-59	
Q13		TS094Y061B	TR. S-SIGNAL 2SC2714Y, SC-59	
Q14		TS140Y001B	TR. S-SIGNAL 2SC2712Y, SC-59	
Q15		TP170S067X	TR. POWER 2SD1757K(AAS), SC-59	
Q16		TS140Y001B	TR. S-SIGNAL 2SC2712Y, SC-59	
Q17		TS132Z067O	TR. S-SIGNAL DTC144EK(26), SC-59	
Q18		TP167S090A	TR. POWER 2SB1302S(BJS), SOT-89	
Q19		TS131Z163O	TR. S-SIGNAL DTC143EK, SC-59	
Q20		TS124S063A	TR. S-SIGNAL 2SB1119S(BBS), SOT-89	
Q21		TS124S063A	TR. S-SIGNAL 2SB1119S(BBS), SOT-89	
Q22		TS140Y001B	TR. S-SIGNAL 2SC2712Y, SC-59	
Q23		TS140Y001B	TR. S-SIGNAL 2SC2712Y, SC-59	
Q24		TS140Y001B	TR. S-SIGNAL 2SC2712Y, SC-59	
Q25		TS133Z068O	TR. S-SIGNAL DTC144WK(86), SC-59	
Q26		TP170S067X	TR. POWER 2SD1757K(AAS), SC-59	
Q27		TP169Y012B	TR. POWER 2SD1406Y(Y)	
Q28		TS093Y060B	TR. S-SIGNAL 2SA1162Y(SY), SC-59	
Q29		TS134Z069O	TR. S-SIGNAL FMW1(W1)	
Q30		TS134Z069O	TR. S-SIGNAL FMW1(W1)	
Q32		TS130Z065O	TR. S-SIGNAL DTC124EK(25), SC-59	
Q33		TS130Z065O	TR. S-SIGNAL DTC124EK(25), SC-59	
R1		RD223W165	RES. SMD, 22K Ω , 1/10W, J	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
R2		RD223W165	RES. SMD,22K Ω , 1/10W,J	
R3		RD103A164	RES. SMD,10K Ω , 1/16W,J	
R4		RD683A166	RES. SMD,68K Ω , 1/16W,J	
R5		RD101W160	RES. SMD,100 Ω , 1/10W,J	
R6		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R7		RD104W163	RES. SMD,100K Ω , 1/10W,J	
R8		RD223W165	RES. SMD,22K Ω , 1/10W,J	
R9		RD101W160	RES. SMD,100 Ω , 1/10W,J	
R10		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R11		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R12		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R13		RD473W164	RES. SMD,47K Ω , 1/10W,J	
R14		RD470W161	RES. SMD,47 Ω , 1/10W,J	
R15		RD470W161	RES. SMD,47 Ω , 1/10W,J	
R16		RD473W164	RES. SMD,47K Ω , 1/10W,J	
R17		RD274W161	RES. SMD,270K Ω , 1/10W,J	
R19		RD101W160	RES. SMD,100 Ω , 1/10W,J	
R20		RD102W161	RES. SMD,1K Ω , 1/10W,J	
R21		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R22		RD104W163	RES. SMD,100K Ω , 1/10W,J	
R23		RD471W162	RES. SMD,470 Ω , 1/10W,J	
R24		RD152W166	RES. SMD,1.5K Ω , 1/10W,J	
R25		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R26		RD473W164	RES. SMD,47K Ω , 1/10W,J	
R27		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R28		RD101W160	RES. SMD,100 Ω , 1/10W,J	
R29		RD471W162	RES. SMD,470 Ω , 1/10W,J	
R30		RD274W161	RES. SMD,270K Ω , 1/10W,J	
R31		RD153W167	RES. SMD,15K Ω , 1/10W,J	
R32		RD151W165	RES. SMD,150 Ω , 1/10W,J	
R33		RD332A166	RES. SMD,3.3K Ω , 1/16W,J	
R35		RD103A164	RES. SMD,10K Ω , 1/16W,J	
R36		RD334A168	RES. SMD,330K Ω , 1/16W,J	
R37		RD102A163	RES. SMD,1K Ω , 1/16W,J	
R38		RD104W163	RES. SMD,100K Ω , 1/10W,J	
R39		RD223W165	RES. SMD,22K Ω , 1/10W,J	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
R40		RD273W160	RES. SMD,27K Ω ,1/10W,J	
R41		RD273W160	RES. SMD,27K Ω ,1/10W,J	
R42		RD331W163	RES. SMD,330 Ω ,1/10W,J	
R43		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R44		RD471W162	RES. SMD,470 Ω ,1/10W,J	
R45		RD105W164	RES. SMD,1M Ω ,1/10W,J	
R46		RD101E168	RES. SMD,100 Ω ,1/2W,J	
R47		RD220E160	RES. SMD,22 Ω ,1/2W,J	
R48		RD000W162	RES. SMD,0 Ω ,1/10W,J	
R51		RD470W161	RES. SMD,47 Ω ,1/10W,J	
R52		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R54		RD822W166	RES. SMD,8.2K Ω ,1/10W,J	
R55		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R56		RD101W160	RES. SMD,100 Ω ,1/10W,J	
R57		RD101W160	RES. SMD,100 Ω ,1/10W,J	
R58		RD223W165	RES. SMD,22K Ω ,1/10W,J	
R59		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R60		RD220W162	RES. SMD,22 Ω ,1/10W,J	
R61		RD122W167	RES. SMD,1.2K Ω ,1/10W,J	
R62		RD273W160	RES. SMD,27K Ω ,1/10W,J	
R63		RD223W165	RES. SMD,22K Ω ,1/10W,J	
R64		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R65		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R66		RD220W162	RES. SMD,22 Ω ,1/10W,J	
R67		RD472W163	RES. SMD,4.7K Ω ,1/10W,J	
R68		RD101W160	RES. SMD,100 Ω ,1/10W,J	
R69		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R70		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R71		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R72		RD472W163	RES. SMD,4.7K Ω ,1/10W,J	
R73		RD153W167	RES. SMD,1.5K Ω ,1/10W,J	
R74		RD220W162	RES. SMD,22 Ω ,1/10W,J	
R76		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R77		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R78		RD471E160	RES. SMD,470 Ω ,1/2W,J	
R79		RD102W161	RES. SMD,1K Ω ,1/10W,J	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
R81		RD220W162	RES. SMD,22 Ω , 1/10W,J	
R82		RD472W163	RES. SMD,4.7K Ω , 1/10W,J	
R83		RD472W163	RES. SMD,4.7K Ω , 1/10W,J	
R84		RD472W163	RES. SMD,4.7K Ω , 1/10W,J	
R85		RD472W163	RES. SMD,4.7K Ω , 1/10W,J	
R86		RD182W165	RES. SMD,1.8K Ω , 1/10W,J	
R87		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R88		RD182W165	RES. SMD,1.8K Ω , 1/10W,J	
R89		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R90		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R91		RD223W165	RES. SMD,22K Ω , 1/10W,J	
R92		RD473W164	RES. SMD,47K Ω , 1/10W,J	
R93		RD223W165	RES. SMD,22K Ω , 1/10W,J	
R94		RD334W166	RES. SMD,330K Ω , 1/10W,J	
R95		RD102W161	RES. SMD,1K Ω , 1/10W,J	
R96		RD102W161	RES. SMD,1K Ω , 1/10W,J	
R97		RD273W160	RES. SMD,27K Ω , 1/10W,J	
R98		RD473W164	RES. SMD,47K Ω , 1/10W,J	
R99		RD333W165	RES. SMD,33K Ω , 1/10W,J	
R100		RD473W164	RES. SMD,47K Ω , 1/10W,J	
R101		RD472W163	RES. SMD,4.7K Ω , 1/10W,J	
R102		RD223W165	RES. SMD,22K Ω , 1/10W,J	
R103		RD221W163	RES. SMD,220 Ω , 1/10W,J	
R104		RD109W168	RES. SMD,1 Ω , 1/10W,J	
R107		RD222W164	RES. SMD,2.2k Ω , 1/10W,J	
R108		RD102W161	RES. SMD,1K Ω , 1/10W,J	
R109		RD152W166	RES. SMD,1.5K Ω , 1/10W,J	
R110		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R111		RD103W162	RES. SMD,10K Ω , 1/10W,J	
R112		RD152W166	RES. SMD,1.5K Ω , 1/10W,J	
R113		RD134W162	RES. SMD,130K Ω , 1/10W,J	
R114		RD683W161	RES. SMD,68K Ω , 1/10W,J	
R115		RD333W165	RES. SMD,33K Ω , 1/10W,J	
R116		RD473W164	RES. SMD,47K Ω , 1/10W,J	
R117		RD683W161	RES. SMD,68K Ω , 1/10W,J	
R118		RD473W164	RES. SMD,47K Ω , 1/10W,J	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
R119		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R120		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R121		RD223W165	RES. SMD,22K Ω ,1/10W,J	
R122		RD154W168	RES. SMD,150K Ω ,1/10W,J	
R123		RD000W162	RES. SMD,0 Ω ,1/10W,J	
R125		RD000W162	RES. SMD,0 Ω ,1/10W,J	
R126		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R129		RD000W162	RES. SMD,0 Ω ,1/10W,J	
U1		UA332A078B	IC TA7787AF	
U2		UA147A030	IC NJM7808A,TO-220	
U3		UA148A073J	IC NJM78L05UA,SOT-89	
U4		UU064A036B	IC INTERFACE,BU4094BCFV	
U5		UA152A038E	IC UPC1241H,7W,AF POWER	
U6		UA153A013A	IC LA5010M	
U7		UA250A033U	IC POWER MODULE,M67746	
VC1		CA220A014	CAP. TRIMMER,20P	
VR1		VL104A310	SVR H-M-S,100K Ω	
VR2		VL103A319	SVR H-M-S,10K Ω	
VR3		VL103A319	SVR H-M-S,10K Ω	
VR4		VL503A317	SVR H-M-S,50K Ω	
VR5		VN102A015	SFVR SMT,3@,1K Ω	
X1		XS102B008G	CRYSTAL,10.245MHz	
X2		XS128H004S	CRYSTAL,12.8MHz	
XF1		XS107B003G	CRYSTAL FILTER,10.7MHz	
XF2		XS107B003G	CRYSTAL FILTER,10.7MHz	

REF. NO.	SUBASSEMBLY NO.	DESCRIPTION	NOTE
	A6152S026A	CPU BOARD SUBASSEMBLY	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
PCB		BC273F007M	CPU BOARD	
C201		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C202		CR470C010	CAP. E/C-MINI 47UF,16V	
C203		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C204		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C205		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
C206		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C207		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C208		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C209		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C210		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C211		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C212		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C213		GA680A418	CAP. MONO-SMD 680PF,50V,J,NPO,0805	
C214		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C215		GA330A412	CAP. MONO-SMD 33PF,50V,J,NPO,0805	
C216		GA330A412	CAP. MONO-SMD 33PF,50V,J,NPO,0805	
C217		GA105U618	CAP. MONO-SMD 1UF,16V,M,Y5U,0805	
C218		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C219		GA152X510	CAP. MONO-SMD 1500PF,50V,K,X7R,0805	
C221		GA561X510	CAP. MONO-SMD 560PF,50V,K,X7R,0805	
C222		GA683X515	CAP. MONO-SMD 0.068UF,50V,K,X7R,0805	
C223		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C224		GA104X516	CAP. MONO-SMD 0.1UF,50V,M,X7R,0805	
C225		GA222X411	CAP. MONO-SMD 2200PF,50V,K,X7R,0805	
C227		GA104X516	CAP. MONO-SMD 0.1UF,50V,M,X7R,0805	
C228		GA105U618	CAP. MONO-SMD 1UF,16V,M,Y5U,0805	
C229		GA680A418	CAP. MONO-SMD 680PF,50V,J,NPO,0805	
C230		GA680A418	CAP. MONO-SMD 680PF,50V,J,NPO,0805	
C231		GA680A418	CAP. MONO-SMD 680PF,50V,J,NPO,0805	
CN201		JF014B131X	CON. FEMALE BOARD TO BOARD,13P 13R-JE	
CN202		JF014B131X	CON. FEMALE BOARD TO BOARD,13P 13R-JE	
CN203		JF015B093K	CON. SMD BOARD TO BOARD,9P DF9-9S-1V	
CN204		JA072A104X	BASE,10P B10B-ZR	
D201		DL033R015	LED,RED,3D,EL264RD	
D202		DP038A0680	DIODE,1SS184(B3),SC-59	
D203		DP035A065B	DIODE,LFB01	
J201		AW003X207H	WIRE,AWG28,RED.L=65mm	
J202		JJ013O104	JACK,MIC	
L201		KB061A003	CORE 3.5*6*0.8	
Q201		TP140D092E	TR. POWER 2SB798(DL),SOT-89	
Q202		TS133Z0680	TR. S-SIGNAL DTC144WK(86),SC-59	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
Q203		TS080Z1600	TR. S-SIGNAL DTA114YK,SC-59	
Q204		TS089Z062I	TR. S-SIGNAL RT1N140M,SC-70	
Q205		TP170S067X	TR. POWER 2SD1757K(AAS),SC-59	
Q206		TS089Z062I	TR. S-SIGNAL RT1N140M,SC-70	
Q207		TP168Z036I	TR. POWER 2SD1682	
Q208		TS090Z066I	TR. S-SIGNAL RT1N441M,SC-70	
R201		RD224W166	RES. SMD,220K Ω ,1/10W,J	
R202		RD561W166	RES. SMD,560 Ω ,1/10W,J	
R203		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R204		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R205		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R206		RD561W166	RES. SMD,560 Ω ,1/10W,J	
R207		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R208		RD333W162	RES. SMD,33K Ω ,1/10W,J	
R209		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R210		RD474W165	RES. SMD,470K Ω ,1/10W,J	
R211		RD244W162	RES. SMD,240K Ω ,1/10W,J	
R212		RD124W169	RES. SMD,120K Ω ,1/10W,J	
R213		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R214		RD563W168	RES. SMD,56K Ω ,1/10W,J	
R215		RD823W167	RES. SMD,82K Ω ,1/10W,J	
R216		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R217		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R218		RD472W163	RES. SMD,4.7K Ω ,1/10W,J	
R219		RD472W163	RES. SMD,4.7K Ω ,1/10W,J	
R220		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R221		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R222		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R223		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R224		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R225		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R226		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R227		RD333W162	RES. SMD,33K Ω ,1/10W,J	
R228		RD393W163	RES. SMD,39K Ω ,1/10W,J	
R229		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R230		RD473W164	RES. SMD,47K Ω ,1/10W,J	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
R231		RD563W168	RES. SMD,56K Ω ,1/10W,J	
R232		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R233		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R234		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R235		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R236		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R237		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R238		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R239		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R240		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R241		RD274W161	RES. SMD,270K Ω ,1/10W,J	
R242		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R243		RD274W161	RES. SMD,270K Ω ,1/10W,J	
R244		RD105W164	RES. SMD,1M Ω ,1/10W,J	
R245		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R246		RD334W166	RES. SMD,330K Ω ,1/10W,J	
R247		RD154W168	RES. SMD,150K Ω ,1/10W,J	
R248		RD154W168	RES. SMD,150K Ω ,1/10W,J	
R249		RD153W167	RES. SMD,15K Ω ,1/10W,J	
R250		RD682W160	RES. SMD,6.8K Ω ,1/10W,J	
R251		RD154W168	RES. SMD,150K Ω ,1/10W,J	
R252		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R253		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R254		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R255		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R256		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R257		RD224W166	RES. SMD,220K Ω ,1/10W,J	
R258		RD224W166	RES. SMD,220K Ω ,1/10W,J	
R259		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R260		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R261		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R262		RD561W166	RES. SMD,560 Ω ,1/10W,J	
S201		BP015C502Z	SW. PUSH,D.P.S.T.	
S202		BR009S505Z	SW. ROTARY EVQ-WQ5-F15-24B	
S203		BN016A507	SW. LIGHT TOUCH EVQ-PJB-05K	
S204		BN016A507	SW. LIGHT TOUCH EVQ-PJB-05K	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
S205		BN016A507	SW. LIGHT TOUCH EVQ-PJB-05K	
S206		BN016A507	SW. LIGHT TOUCH EVQ-PJB-05K	
S207		BN016A507	SW. LIGHT TOUCH EVQ-PJB-05K	
S208		BN016A507	SW. LIGHT TOUCH EVQ-PJB-05K	
S209		BN016A507	SW. LIGHT TOUCH EVQ-PJB-05K	
S210		BN016A507	SW. LIGHT TOUCH EVQ-PJB-05K	
S211		BN016A507	SW. LIGHT TOUCH EVQ-PJB-05K	
U201		UA148A073J	IC NJM78L05UA,SOT-89	
U202		UR180Z169F	IC VOLTAGE DETECTOE, S-8054HN-CB,SOT-89	
U203		UQ056Z270M	IC CPU,MC68HC705C9ACFB	
U204		UM007A068X	IC EEPROM,AT24C16N-10SC8PIN	
U205		UA264A072X	IC LINEAR,BA10324F	
U206		UA122A071X	IC LINEAR,BA10358F	
U207		UA264A072X	IC LINEAR,BA10324F	
U208		UA122A071X	IC LINEAR,BA10358F	
VR201		VF103H415	VR H-P.C.B. TYPE,10KA	
VR202		VF503B419	VR H-P.C.B. TYPE,50KB	
X201		XS040C000	CRYSTAL CSA-309,4MHz	

REF. NO.	SUBASSEMBLY NO.	DESCRIPTION	NOTE
	A6153S001A	LCD BOARD SUBASSEMBLY	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
PCB		BC217G002M	LCD BOARD	
C301		GA681A419	CAP. MONO-SMD 680PF,50V,J,NPO,0805	
C302		GA393X520	CAP. MONO-SMD 0.039UF,50V,K,X7R,0805	
C303		GA105Z927	CAP. MONO-SMD 1UF,50V,Z,Z5U,1206	
C304		GA105Z927	CAP. MONO-SMD 1UF,50V,Z,Z5U,1206	
CN301		JF015A094K	CON. SMD BOARD TO BOARD,9P DF9-9P-1V	
D301		DP035A065B	DIODE,LFB01	
LCD		KM032X001Z	UNIT,LCD,E-30352	
PL1		BL004W010K	PILOT LAMP,10V 60mA ,0.15CP 25%	
PL2		BL004W010K	PILOT LAMP,10V 60mA ,0.15CP 25%	
PL3		BL004W010K	PILOT LAMP,10V 60mA ,0.15CP 25%	
PL4		BL004W010K	PILOT LAMP,10V 60mA ,0.15CP 25%	
PL5		BL004W010K	PILOT LAMP,10V 60mA ,0.15CP 25%	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
PL6		DL033R015	LED,RED,3D,EL264RD	
R301		RD393B164	RES. SMD,39K Ω ,1/8W,J	
R302		RD272B160	RES. SMD,2.7K Ω ,1/8W,J	
R303		RD101B161	RES. SMD,100 Ω ,1/8W,J	
R304		RD101E168	RES. SMD,100 Ω ,1/2W,J	
R305		RD101E168	RES. SMD,100 Ω ,1/2W,J	
R306		RD270F164	RES. SMD,27 Ω ,1W,J	
R307		RD270F164	RES. SMD,27 Ω ,1W,J	
R308		RD270F164	RES. SMD,27 Ω ,1W,J	
R309		RD270F164	RES. SMD,27 Ω ,1W,J	
R310		RD824W168	RES. SMD,820K Ω ,1/10W,J	
U301		UU043A042E	IC.LC7582,3057-Q64AIC,QIP64A	

REF. NO.	SUBASSEMBLY NO.	DESCRIPTION	NOTE
	A6154S002A	MIC ASS'Y SUBASSEMBLY	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
PCB		BC278S009	MIC BOARD	
WM1		AK237F042	PHONE CORD ASS'Y,MIC 8P	
W401		AX002B003H	WIRE,PARALLEL,3P	
C401		CC475D336	CAP. E/C-SMD 4.7UF,25V,M	
C402		CC106C336	CAP. E/C-SMD 10UF,16V,M	
C403		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C404		CC106C336	CAP. E/C-SMD 10UF,16V,M	
C405		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C406		GA390A410	CAP. MONO-SMD 39PF,50V,J,NPO,0805	
C407		GA390A410	CAP. MONO-SMD 39PF,50V,J,NPO,0805	
C408		CC475D336	CAP. E/C-SMD 4.7UF,25V,M	
C409		GA221A413	CAP. MONO-SMD 220PF,50V,J,NPO,0805	
C410		GA101A410	CAP. MONO-SMD 100PF,50V,J,NPO,0805	
C411		GA333X519	CAP. MONO-SMD 0.033UF,50V,K,X7R,0805	
C412		GA473X518	CAP. MONO-SMD 0.047UF,50V,K,X7R,0805	
CN401		JA067B079	BASE,7P A2001WR2-7P	
CN402		JA043B367	HEADER,36P	
CN403		JA043B367	HEADER,36P	
CN404		JB028A065	CON. 6P 2100S06VU00	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
CN405		JB028A065	CON. 6P 2100S06VU00	
D401		DP039A0690	DIODE,1SS193(G3),SC-59	
D402		DP017A0611	DIODE,M2846,SC-70	
D403		DP038A0680	DIODE,1SS184(B3),SC-59	
D404		DL062G001	LED,SMD GREEN,KPA-3010SGC	
D405		DL062G001	LED,SMD GREEN,KPA-3010SGC	
D406		DL061G000	LED,SMD GREEN,KP-3015SGC	
D407		DL061G000	LED,SMD GREEN,KP-3015SGC	
D408		DL061G000	LED,SMD GREEN,KP-3015SGC	
D409		DL061G000	LED,SMD GREEN,KP-3015SGC	
D410		DL061G000	LED,SMD GREEN,KP-3015SGC	
D411		DL061G000	LED,SMD GREEN,KP-3015SGC	
M401		KL087A212J	MICROPHONE,JL-063B	
Q401		TS140Y001B	TR. S-SIGNAL 2SC2712Y,SC-59	
Q402		TS140Y001B	TR. S-SIGNAL 2SC2712Y,SC-59	
Q403		TS140Y001B	TR. S-SIGNAL 2SC2712Y,SC-59	
Q404		TS140Y001B	TR. S-SIGNAL 2SC2712Y,SC-59	
R401		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R402		RD681W169	RES. SMD,680 Ω ,1/10W,J	
R403		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R404		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R405		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R406		RD222W164	RES. SMD,2.2K Ω ,1/10W,J	
R407		RD471W162	RES. SMD,470 Ω ,1/10W,J	
R408		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R409		RD473W164	RES. SMD,47K Ω ,1/10W,J	
R410		RD223W165	RES. SMD,22K Ω ,1/10W,J	
R411		RD471W162	RES. SMD,470 Ω ,1/10W,J	
R412		RD223W165	RES. SMD,22K Ω ,1/10W,J	
R413		RD102W161	RES. SMD,1K Ω ,1/10W,J	
R414		RD471W162	RES. SMD,470 Ω ,1/10W,J	
R415		RD472W163	RES. SMD,4.7K Ω ,1/10W,J	
R416		RD222W164	RES. SMD,2.2K Ω ,1/10W,J	
R417		RD181W164	RES. SMD,180 Ω ,1/10W,J	
R418		RD223W165	RES. SMD,22K Ω ,1/10W,J	
R419		RD104W163	RES. SMD,100K Ω ,1/10W,J	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
R420		RD223W165	RES. SMD,22K Ω ,1/10W,J	
R421		RD104W163	RES. SMD,100K Ω ,1/10W,J	
R422		RD221W163	RES. SMD,220 Ω ,1/10W,J	
R423		RD680W168	RES. SMD,68 Ω ,1/10W,J	
R424		RD680W168	RES. SMD,68 Ω ,1/10W,J	
S401		BN012A503F	SW. TACT,S.P.D.T. SKHHLN1520-DC	
S402		BS029D505	SLIDE SW. D.P.D.T.,00220867	
S403		BN021A550	SW. TACT,S.P.S.T. EVQGGU02W	
S404		BN021A550	SW. TACT,S.P.S.T. EVQGGU02W	
U401		UR197Q016G	IC HM9187,TONE DIALER	
VR402		VN102A015	SFVR SMT,3@,1K Ω	
X401		XS036Z000J	CERAMIC RESONATOR,SMD,3.58MHz	

REF. NO.	SUBASSEMBLY NO.	DESCRIPTION	NOTE
	E6111S001A	ELECTRICAL PARTS	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
POWER		AV265A001	CON. ASS'Y,2P EXTENSION POWER CORD	
SPK		BY101B216	SPEAKER,8 Ω ,57mm	
FUSE		FZ004A009B	FUSE,FAST,32V 15A	

REF. NO.	SUBASSEMBLY NO.	DESCRIPTION	NOTE
	G6111S003A	MIC AMP SUBASSEMBLY	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
PCB		BC217I301Q	MIC AMP BOARD	
C1301		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C1302		GA102X502	CAP. MONO-SMD 1000PF,50V,K,X7R,0603	
C1303		GA333X519	CAP. MONO-SMD 0.033UF,50V,K,X7R,0805	
C1304		GA270A404	CAP. MONO-SMD 27PF,50V,J,NPO,0603	
C1305		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C1306		CT105C309	CAP. TAN-SMD 1UF,16V,M	
C1307		GA561X507	CAP. MONO-SMD 560PF,50V,K,X7R,0603	
C1308		GA332X505	CAP. MONO-SMD 3300PF,50V,K,X7R,0603	
C1309		GA820A401	CAP. MONO-SMD 82PF,50V,J,NPO,0603	
C1310		GA102X502	CAP. MONO-SMD 1000PF,50V,K,X7R,0603	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
C1311		GA101A407	CAP. MONO-SMD 100PF,50V,J,NPO,0603	
PIN		JT013P006	PIN,LEADFRAM	
Q1301		TS160G063B	TR. S-SIGNAL 2SC4116,SC-70	
R1301		RD104A165	RES. SMD,100K Ω ,1/16W,J	
R1302		RD223A167	RES. SMD,22K Ω ,1/16W,J	
R1303		RD102A163	RES. SMD,1K Ω ,1/16W,J	
R1304		RD101A162	RES. SMD,100 Ω ,1/16W,J	
R1305		RD332A166	RES. SMD,3.3K Ω ,1/16W,J	
R1306		RD000A164	RES. SMD,0 Ω ,1/16W,J	
R1307		RD184A169	RES. SMD,180K Ω ,1/16W,J	
R1308		RD333A167	RES. SMD,33K Ω ,1/16W,J	
R1309		RD224A168	RES. SMD,220K Ω ,1/16W,J	
R1310		RD473A166	RES. SMD,47K Ω ,1/16W,J	
R1311		RD184A169	RES. SMD,180K Ω ,1/16W,J	
R1312		RD224A168	RES. SMD,220K Ω ,1/16W,J	
R1313		RD823A169	RES. SMD,82K Ω ,1/16W,J	
R1314		RD823A169	RES. SMD,82K Ω ,1/16W,J	
R1315		RD823A169	RES. SMD,82K Ω ,1/16W,J	
U1301		UA122A071X	IC LINEAR,BA10358F	

REF. NO.	SUBASSEMBLY NO.	DESCRIPTION	NOTE
	G6151S005A	PLL SUBASSEMBLY	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
PCB		BC278I009Q	PLL BOARD	
C1401		GA608A112	CAP. MONO-SMD 6PF,50V,D,NPO,0805	
C1402		GA100A118	CAP. MONO-SMD 10PF,50V,D,NPO,0805	
C1403		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C1404		CT225C399	CAP. TAN-SMD 2.2UF,16V,M	
C1405		GA103X516	CAP. MONO-SMD 0.01UF,50V,K,X7R,0805	
C1406		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C1407		GA409A011	CAP. MONO-SMD 4PF,50V,C,NPO,0805	
C1408		GA102X502	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C1409		GA102X502	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C1410		GA223X519	CAP. MONO-SMD 0.022UF,50V,K,X7R,0805	
C1411		CT475B399	CAP. TAN-SMD 4.7UF,10V,M	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
C1412		GA223X519	CAP. MONO-SMD 0.022UF,50V,K,X7R,0805	
C1413		GA220A412	CAP. MONO-SMD 22PF,50V,J,NPO,0805	
D1401		DZ082Z004C	ZENER DIODE,8.2V 200mW	
D1402		TS106Z062O	DIODE,DA204K,SC-59	
D1403		TS106Z062O	DIODE,DA204K,SC-59	
D1404		DP049A062O	DIODE,1SV230	
J1401		JA043B367	HEADER,36P	
L1401		LK217B009O	CHIP COIL 3.3UH \pm 10%,LQH3N3R3K04	
Q1401		TS092Z068I	TR. S-SIGNAL RT1P441M,SC-70	
Q1402		TS094Y061B	TR. S-SIGNAL 2SC2714Y,SC-59	
Q1403		TS153Z064I	TR. S-SIGNAL 2SA1235,SC-59	
Q1404		TS160G063B	TR. S-SIGNAL 2SC4116,SC-70	
R1401		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R1402		RD101W160	RES. SMD,100 Ω ,1/10W,J	
R1403		RD223W165	RES. SMD,22K Ω ,1/10W,J	
R1404		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R1405		RD183W166	RES. SMD,18K Ω ,1/10W,J	
R1406		RD183W166	RES. SMD,18K Ω ,1/10W,J	
R1407		RD183W166	RES. SMD,18K Ω ,1/10W,J	
R1408		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R1409		RD103W162	RES. SMD,10K Ω ,1/10W,J	
R1410		RD473A166	RES. SMD,47K Ω ,1/16W,J	
R1411		RD103A164	RES. SMD,10K Ω ,1/16W,J	
R1412		RD101W160	RES. SMD,100 Ω ,1/10W,J	
R1413		RD332W164	RES. SMD,3.3K Ω ,1/10W,J	
R1414		RD332W164	RES. SMD,3.3K Ω ,1/10W,J	
R1415		RD223W165	RES. SMD,22K Ω ,1/10W,J	
U1401		UA128A077F	IC LINEAR,MB1504PF	
W1401		AW003X207H	WIRE,AWG28,RED,L=65mm	

REF. NO.	SUBASSEMBLY NO.	DESCRIPTION	NOTE
	G6153S007A	VCO SUBASSEMBLY	

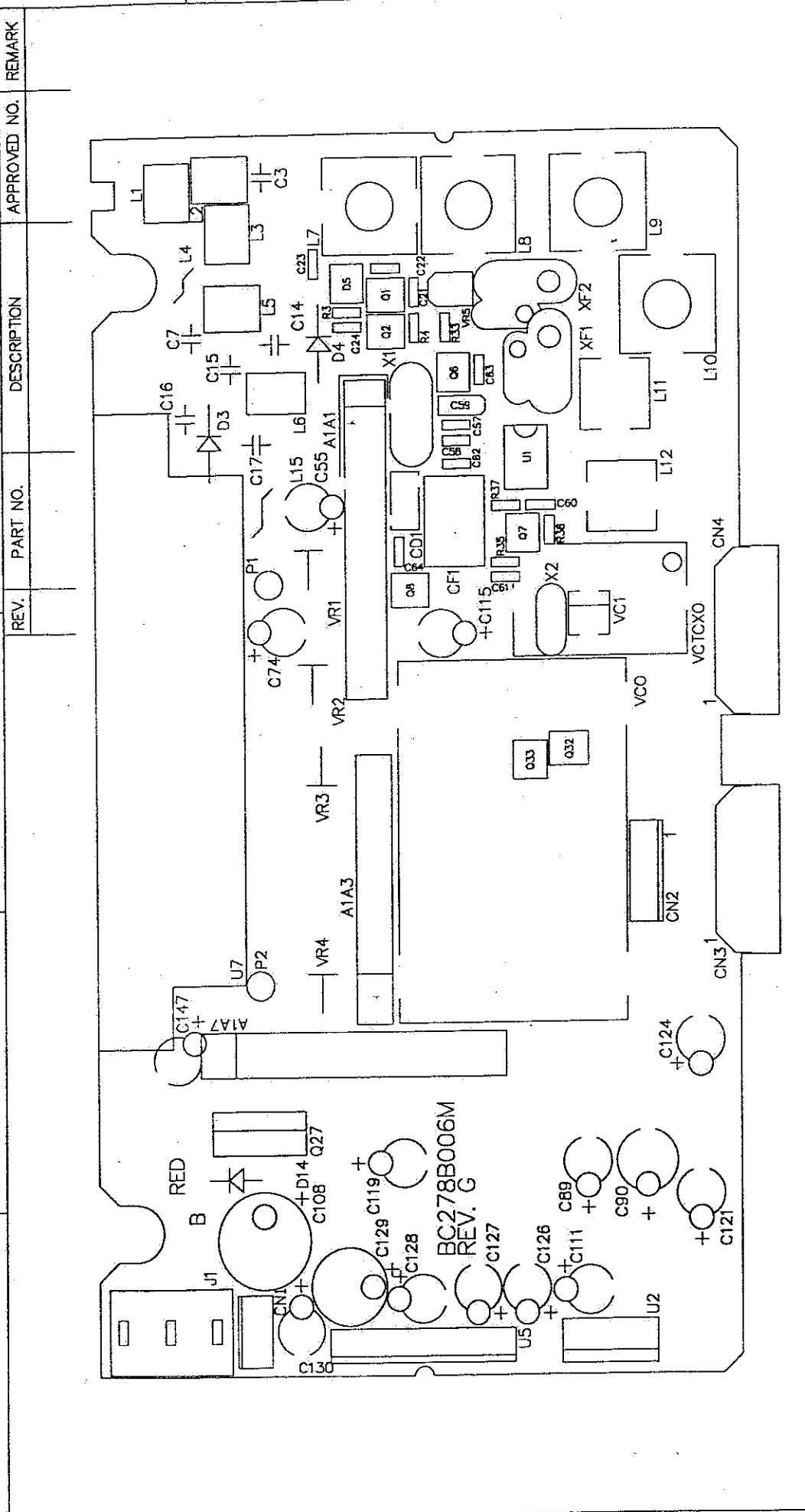
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PCB		BC278F002Q	VCO BOARD	
C1501		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
C1503		GA101A410	CAP. MONO-SMD 100PF,50V,J,NPO,0805	
C1505		GA508A017	CAP. MONO-SMD 0.5PF,50V,C,NPO,0805	
C1506		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C1507		GA472X517	CAP. MONO-SMD 4700PF,50V,K,X7R,0805	
C1508		GA472X517	CAP. MONO-SMD 4700PF,50V,K,X7R,0805	
C1509		CT225C399	CAP. TAN-SMD 2.2UF,16V,M	
C1510		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C1511		GA472X517	CAP. MONO-SMD 4700PF,50V,K,X7R,0805	
C1512		GA109A010	CAP. MONO-SMD 1PF,50V,C,NPO,0805	
C1513		GA102X515	CAP. MONO-SMD 1000PF,50V,K,X7R,0805	
C1514		GA220A412	CAP. MONO-SMD 22PF,50V,J,NPO,0805	
C1515		GA150A414	CAP. MONO-SMD 15PF,50V,J,NPO,0805	
D1501		DP050A066O	DIODE,1SV231	
D1502		DP050A066O	DIODE,1SV231	
D1503		DP050A066O	DIODE,1SV231	
J1501		JA043B367	HEADER,36P	
J1502		JA043B367	HEADER,36P	
L1501		LP339X324	COIL PEAKING-SMD,3.3UH,M	
L1502		LP109X321	COIL PEAKING-SMD,1UH,M	
L1503		LP339X324	COIL PEAKING-SMD,3.3UH,M	
L1504		LJ193A004T	VARIABLE COIL,F=145MHZ,5CBM	
L1506		LK217A000O	CHIP COIL 150NH±10%,LQN2AR15K04	
Q1501		TF043B061O	MOSFET 2SK508(K52),SC-59	
Q1502		TS095Z061B	TR. S-SIGNAL 2SC3120,SC-59	
R1501		RD101W160	RES. SMD,100Ω,1/16W,J	
R1502		RD103W162	RES. SMD,10KΩ,1/10W,J	
R1503		RD680W168	RES. SMD,68Ω,1/10W,J	
R1504		RD103W162	RES. SMD,10KΩ,1/10W,J	
R1505		RD470W161	RES. SMD,47Ω,1/10W,J	
R1506		RD000W162	RES. SMD,0Ω,1/10W,J	
R1507		RD121W166	RES. SMD,120Ω,1/10W,J	
R1508		RD101W160	RES. SMD,100Ω,1/10W,J	
R1509		RD472W163	RES. SMD,4.7KΩ,1/10W,J	
R1510		RD561W166	RES. SMD,560Ω,1/10W,J	

REF. NO.	SUBASSEMBLY NO.	DESCRIPTION	NOTE	
	G6114S006A	IF SUBASSEMBLY		
REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
PCB		BC2411003Q	IF BOARD	
C1101		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C1102		GA220A409	CAP. MONO-SMD 22PF,50V,J,NPO,0603	
C1103		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C1104		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C1105		GA102X502	CAP. MONO-SMD 1000PF,50V,K,X7R,0603	
C1106		GA683X515	CAP. MONO-SMD 0.068UF,50V,K,X7R,0805	
C1107		GA103X503	CAP. MONO-SMD 0.01UF,50V,K,X7R,0603	
C1108		GA103X503	CAP. MONO-SMD 0.01UF,50V,K,X7R,0603	
C1109		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C1110		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C1111		GA103X503	CAP. MONO-SMD 0.01UF,50V,K,X7R,0603	
C1112		GA103X503	CAP. MONO-SMD 0.01UF,50V,K,X7R,0603	
C1113		GA102X502	CAP. MONO-SMD 1000PF,50V,K,X7R,0603	
C1114		GA101A407	CAP. MONO-SMD 100PF,50V,J,NPO,0603	
C1115		GA101A407	CAP. MONO-SMD 100PF,50V,J,NPO,0603	
C1116		GA102X502	CAP. MONO-SMD 1000PF,50V,K,X7R,0603	
C1117		GA103X503	CAP. MONO-SMD 0.01UF,50V,K,X7R,0603	
C1118		GA102X502	CAP. MONO-SMD 1000PF,50V,K,X7R,0603	
C1119		GA104Y901	CAP. MONO-SMD 0.1UF,50V,Z,Y5V,0603	
C1120		CT105C309	CAP. TAN-SMD 1UF,16V,M	
C1121		CT105C309	CAP. TAN-SMD 1UF,16V,M	
C1122		CT104C308	CAP. TAN-SMD 0.1UF,16V,M	
C1123		GA103X503	CAP. MONO-SMD 0.01UF,50V,K,X7R,0603	
D1101		DD017F068H	DIODE,HSM88AS(C1),SC-59	
D1102		DD029B065R	DIODE ARRAY,DAN202U,SC-70	
PIN		JT013P103	PIN,LEADFRAM	
Q1101		TS128R068O	TR. S-SIGNAL 2SC4081(BR),SC-70	
Q1102		TS128R068O	TR. S-SIGNAL 2SC4081(BR),SC-70	
Q1103		TS128R068O	TR. S-SIGNAL 2SC4081(BR),SC-70	
Q1104		TS128R068O	TR. S-SIGNAL 2SC4081(BR),SC-70	
Q1105		TS131Z066O	TR. S-SIGNAL DTC143XU(43),SC-70	
R1101		RD472A165	RES. SMD,4.7KΩ,1/16W,J	

REF. NO.	ADDRESS	PART NO.	DESCRIPTION	NOTE
R1102		RD473A166	RES. SMD,47K Ω ,1/16W,J	
R1103		RD182A167	RES. SMD,1.8K Ω ,1/16W,J	
R1104		RD272A161	RES. SMD,2.7K Ω ,1/16W,J	
R1105		RD273A162	RES. SMD,27K Ω ,1/16W,J	
R1106		RD684A164	RES. SMD,680K Ω ,1/16W,J	
R1107		RD102A163	RES. SMD,1K Ω ,1/16W,J	
R1108		RD102A163	RES. SMD,1K Ω ,1/16W,J	
R1110		RD273A162	RES. SMD,27K Ω ,1/16W,J	
R1111		RD333A167	RES. SMD,33K Ω ,1/16W,J	
R1112		RD222A166	RES. SMD,2.2K Ω ,1/16W,J	
R1113		RD222A166	RES. SMD,2.2K Ω ,1/16W,J	
R1114		RD473A166	RES. SMD,47K Ω ,1/16W,J	
R1115		RD223A167	RES. SMD,22K Ω ,1/16W,J	
R1116		RD564A161	RES. SMD,560K Ω ,1/16W,J	
R1117		RD222A166	RES. SMD,2.2K Ω ,1/16W,J	
R1118		RD332A166	RES. SMD,3.3K Ω ,1/16W,J	
R1119		RD331A165	RES. SMD,330 Ω ,1/16W,J	
R1120		RD102A163	RES. SMD,1K Ω ,1/16W,J	
R1121		RD474A167	RES. SMD,470K Ω ,1/16W,J	
R1122		RD334A168	RES. SMD,330K Ω ,1/16W,J	
R1123		RD332A166	RES. SMD,3.3K Ω ,1/16W,J	
R1124		RD101A162	RES. SMD,100 Ω ,1/16W,J	
R1125		RD152A168	RES. SMD,1.5K Ω ,1/16W,J	
R1126		RD101A162	RES. SMD,100 Ω ,1/16W,J	
R1127		RD104A165	RES. SMD,100K Ω ,1/16W,J	
R1128		RD104A165	RES. SMD,100K Ω ,1/16W,J	
R1129		RD334A168	RES. SMD,330K Ω ,1/16W,J	
R1130		RD000A164	RES. SMD,0 Ω ,1/16W,J	
U1101		UA150A078M	IC MC3372D	

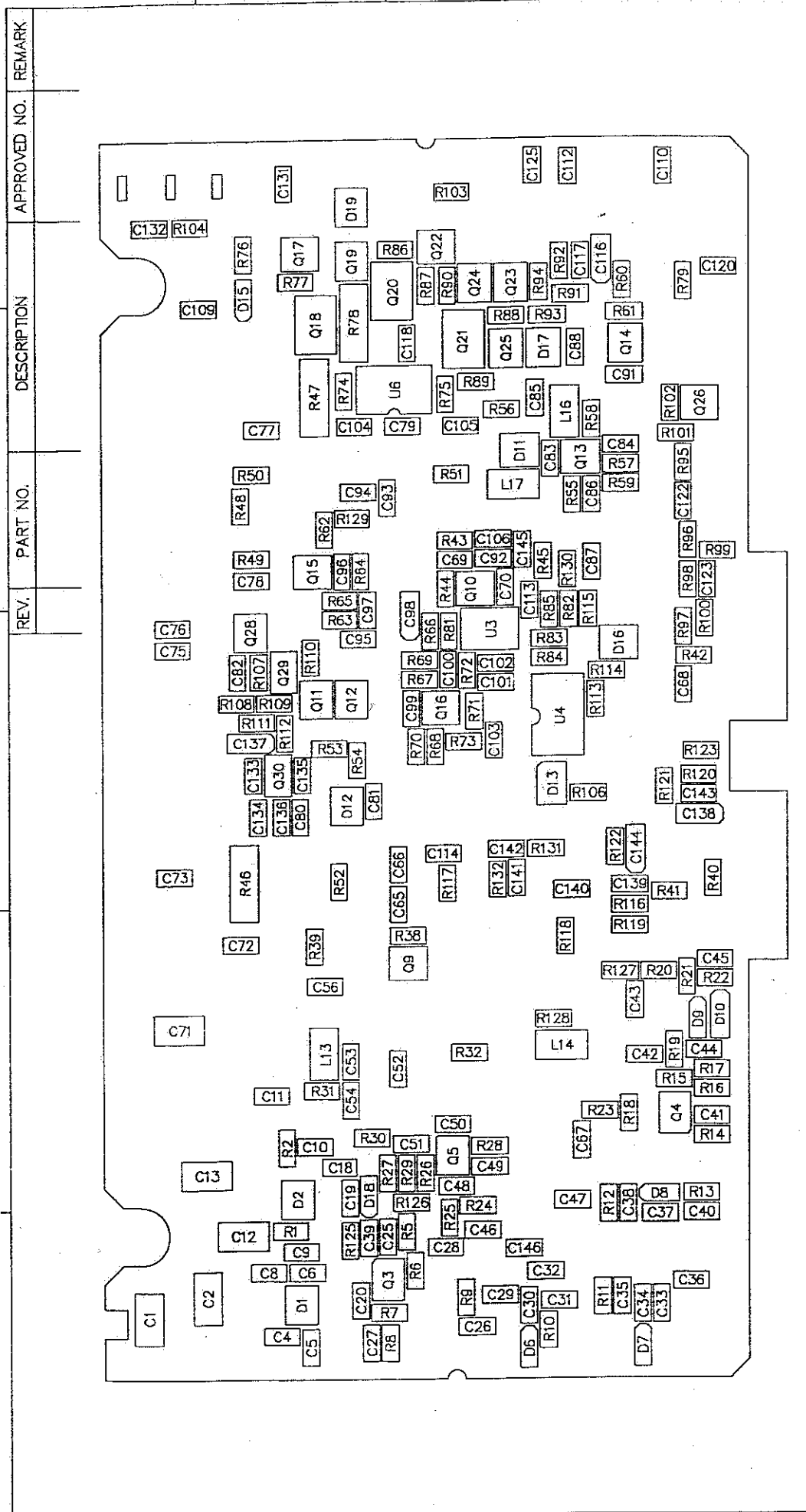
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Size	Number	Revision	G
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Date:	Sheet 1 of 1	Drawn By: WELLO CHEN	
File:			

TOP LAYER

5 4 3 2 1



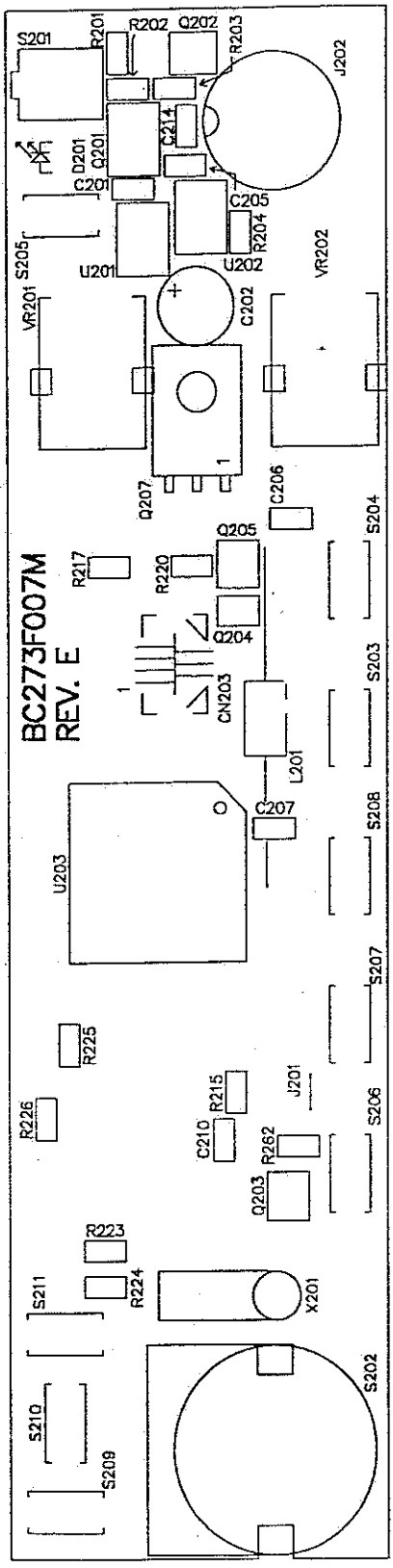
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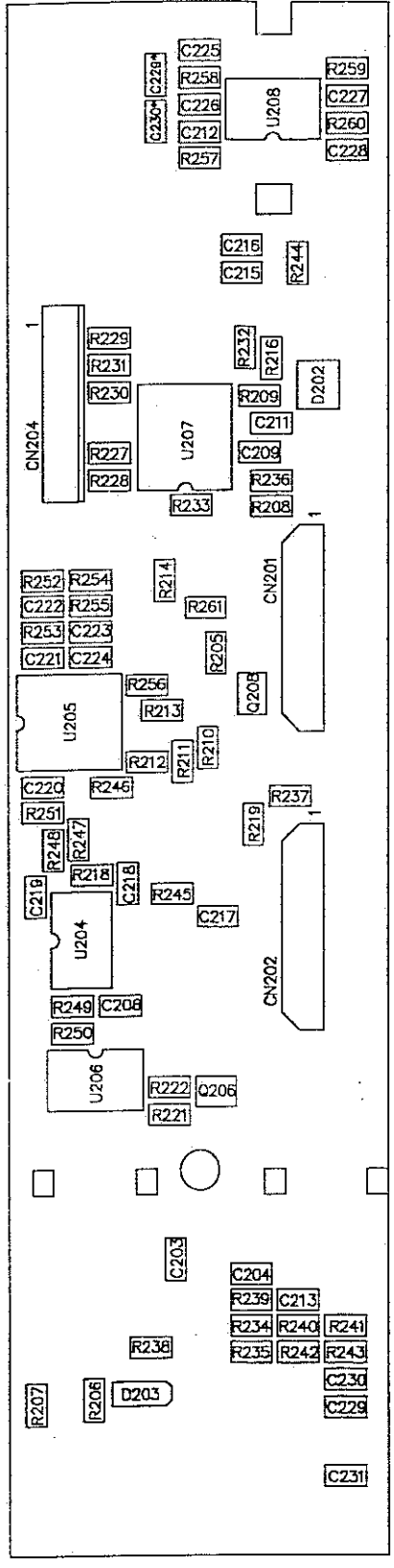
BOTTOM LAYER

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TOP LAYER

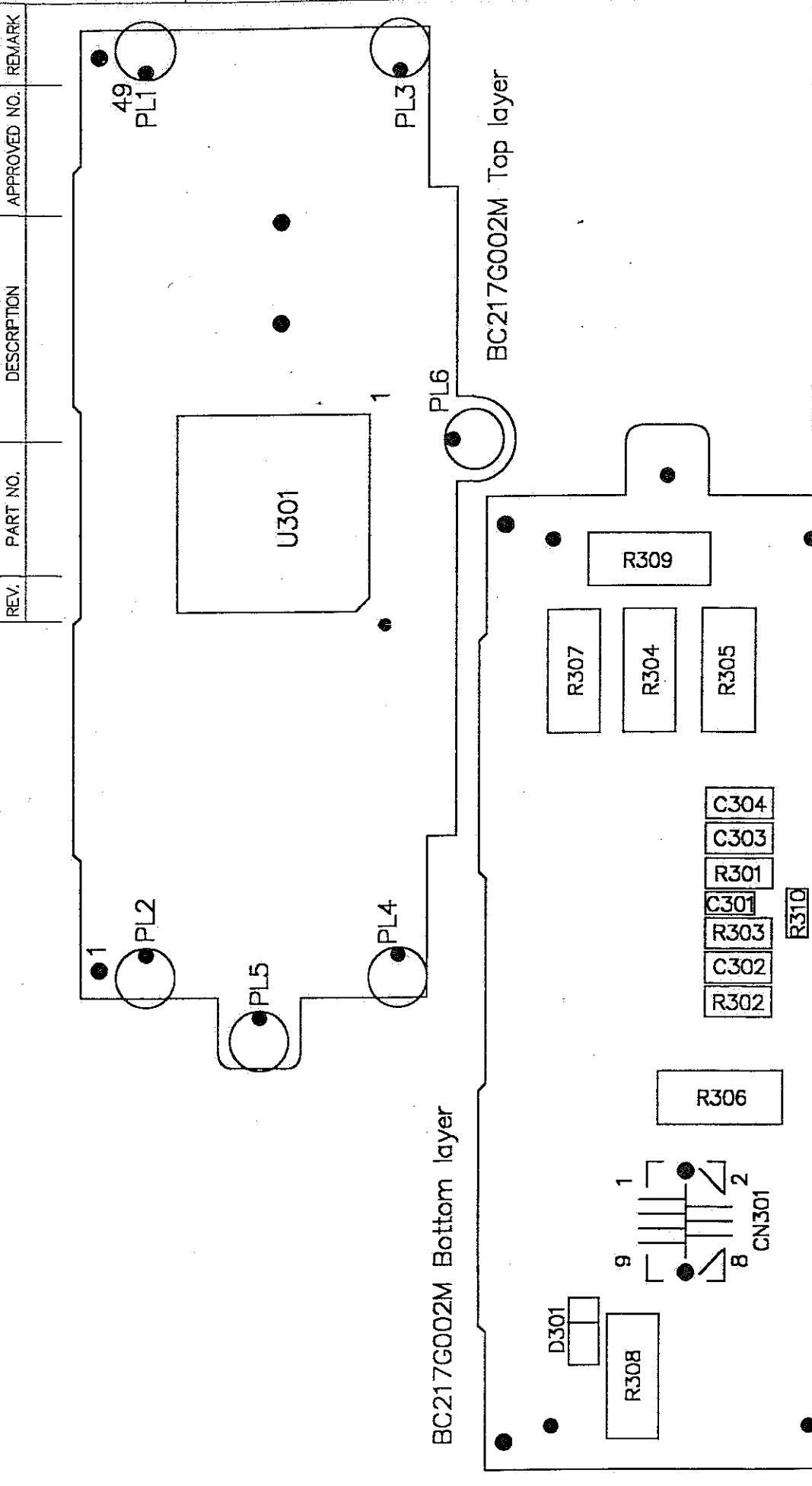


BOTTOM LAYER

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File:			

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E D C B A



Title		AR-147 LCD BOARD	
Size	Number	REVISION	A
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File:	Drawn By	WELLO CHEN	

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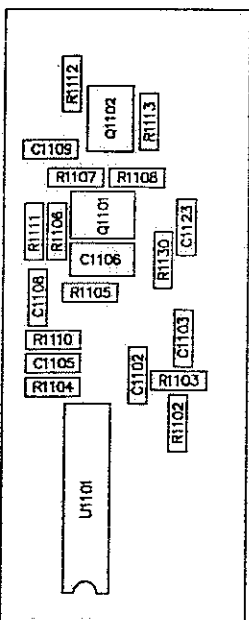
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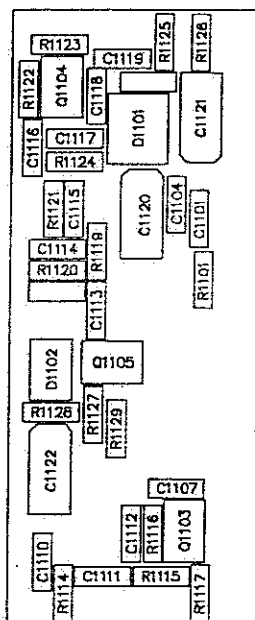
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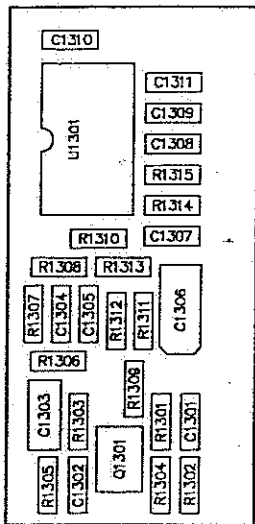
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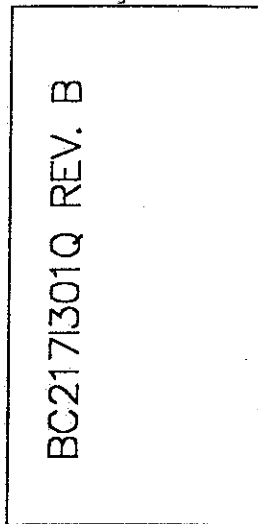
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BC241003Q BOTTOM LAYER



BC2171301Q TOP LAYER

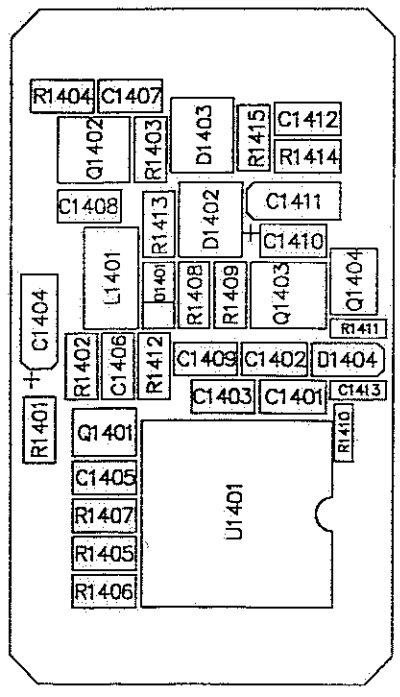


BC2171301Q BOTTOM LAYER

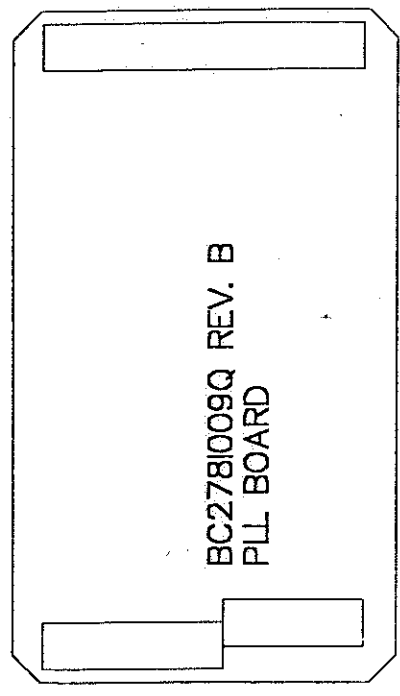
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Size		Number		REVISION
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Date:		Sheet 1 of 1		Drawn By: WELLO C-K-N
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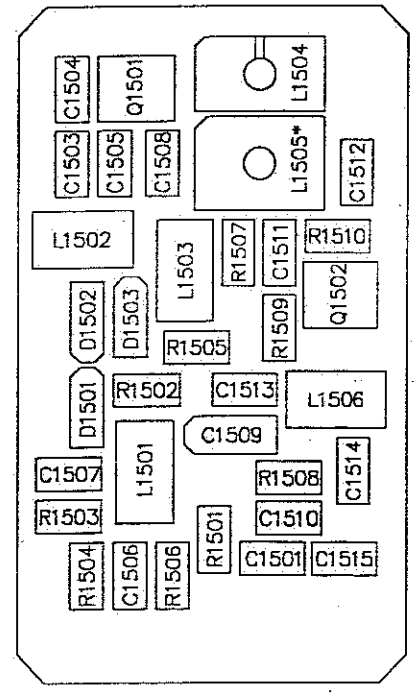
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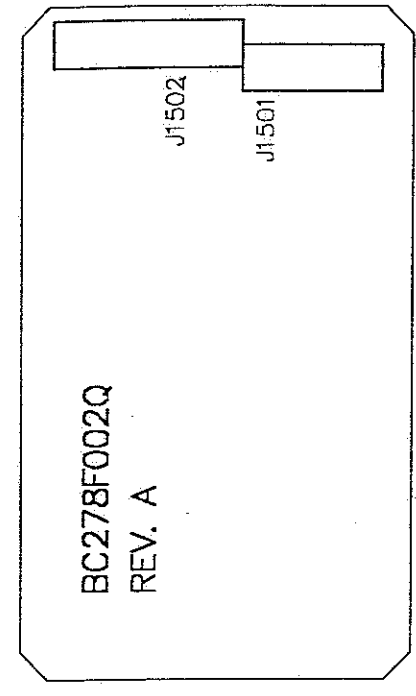
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BC278I009Q Bottom layer



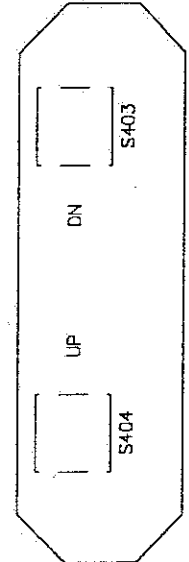
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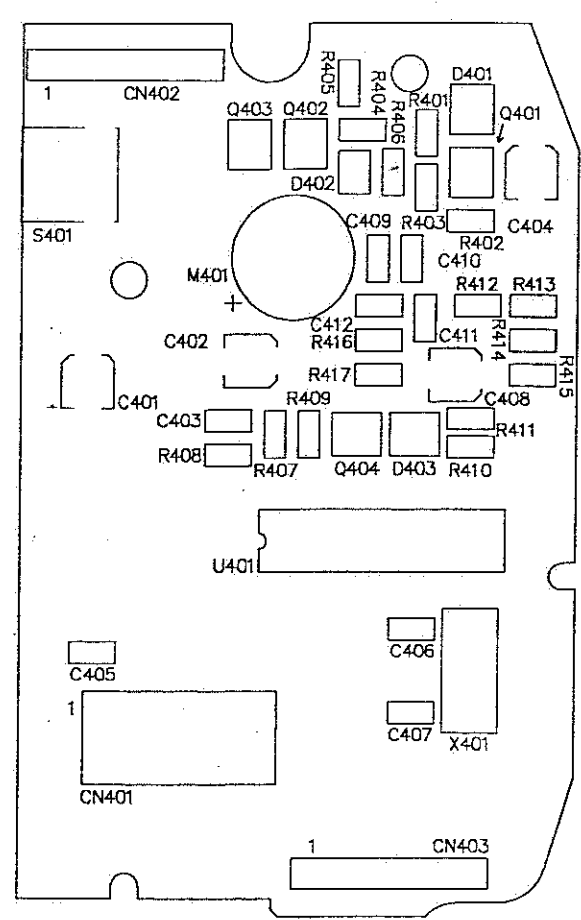
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AR-147 VCO BOARD			
Size	Number	BC278I009Q	REVISION B
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File:		Drawn By:	WELLO CEN

REV.	PART NO.	DESCRIPTION	APPROVED NO.	REMARK



BC278S0093

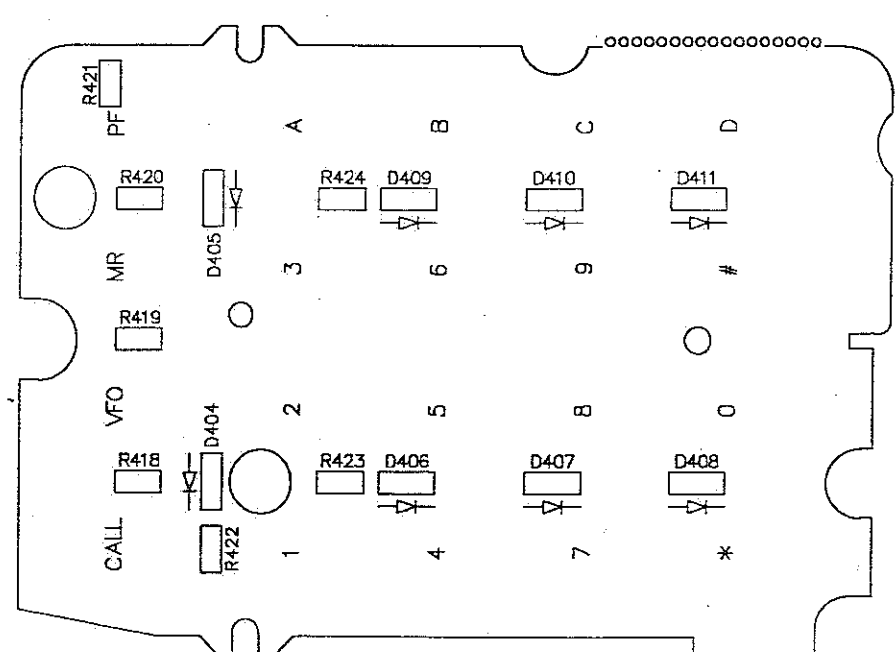


BC278S0092

AR-147 MIC. ASS'Y

Title	AR-147 MIC. ASS'Y	
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Number	BC278S009J	REVISION
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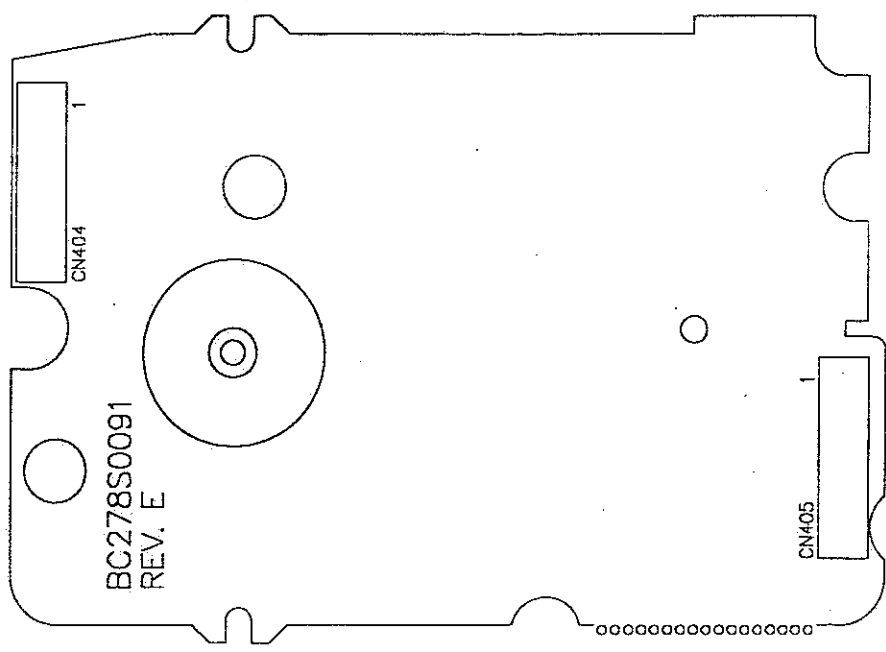
TOP LAYER



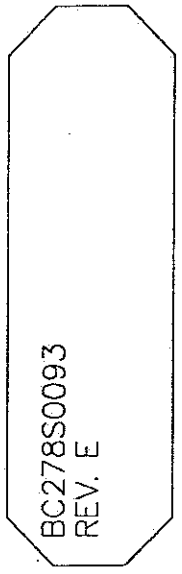
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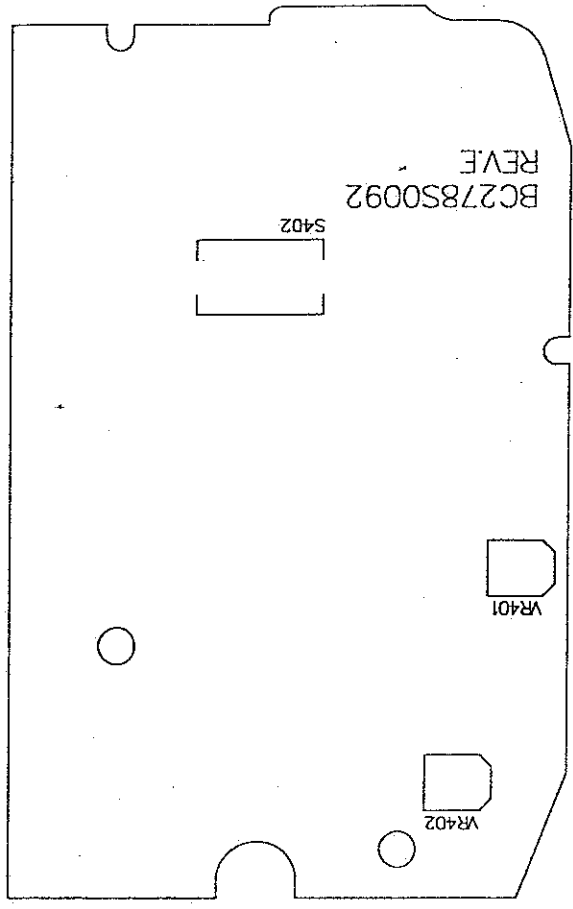
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BC278S0091



BC278S0093



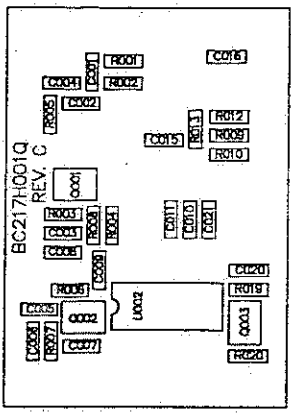
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Title		AR-147 MIC. ASS'Y	
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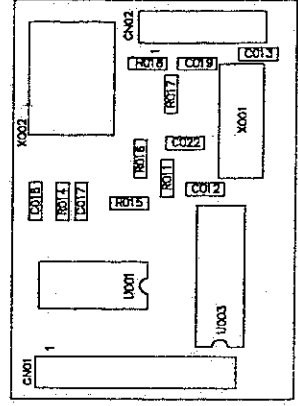
BOTTOM LAYER

5 4 3 2 1

REV.	PART NO.	DESCRIPTION	APPROVED NO.	REMARK

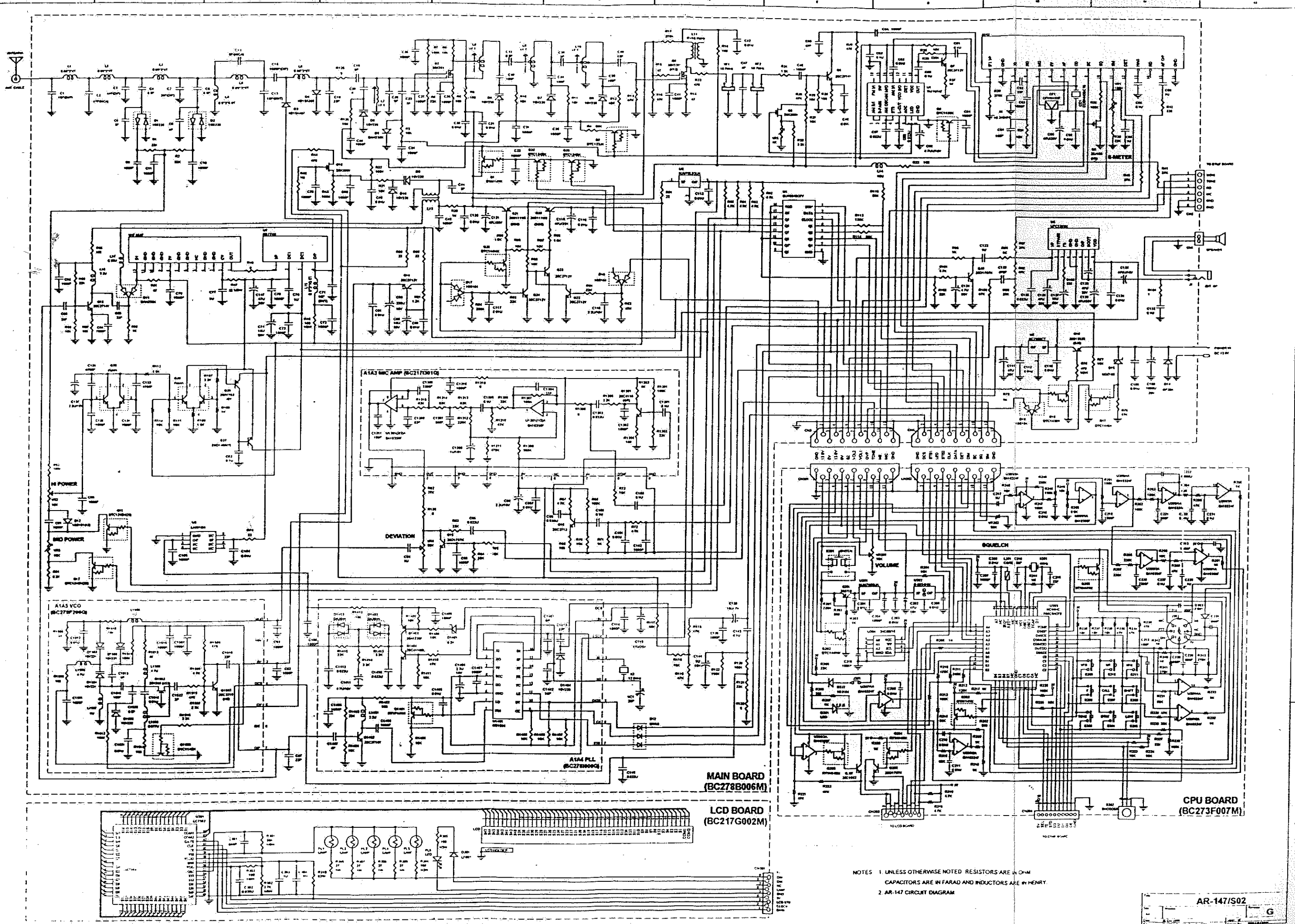


BC217H001Q TOP LAYER



BC217H001Q BOTTOM LAYER

Title		AR-147 DTMF BOARD	
Size	Number	REVISION	C
A4	BC217H001Q		
Date:	Sheet 1 of 1	Drawn By:	WELLO CHEN
File:			



MAIN BOARD
(BC278B006M)

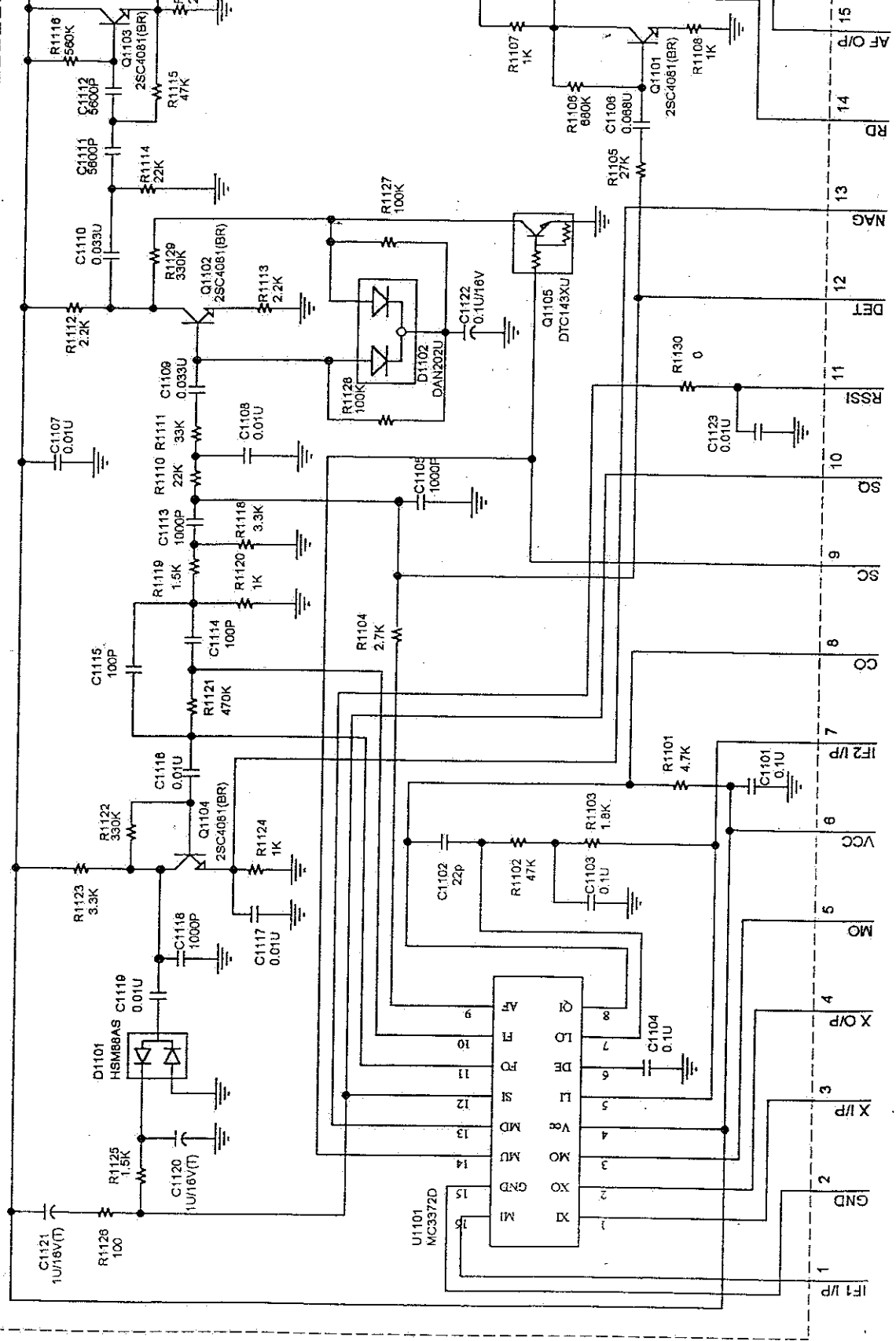
LCD BOARD
(BC217G002M)

CPU BOARD
(BC273F007M)

NOTES 1. UNLESS OTHERWISE NOTED RESISTORS ARE IN OHM
CAPACITORS ARE IN FARAD AND INDUCTORS ARE IN HENRY.
2. AR-147 CIRCUIT DIAGRAM

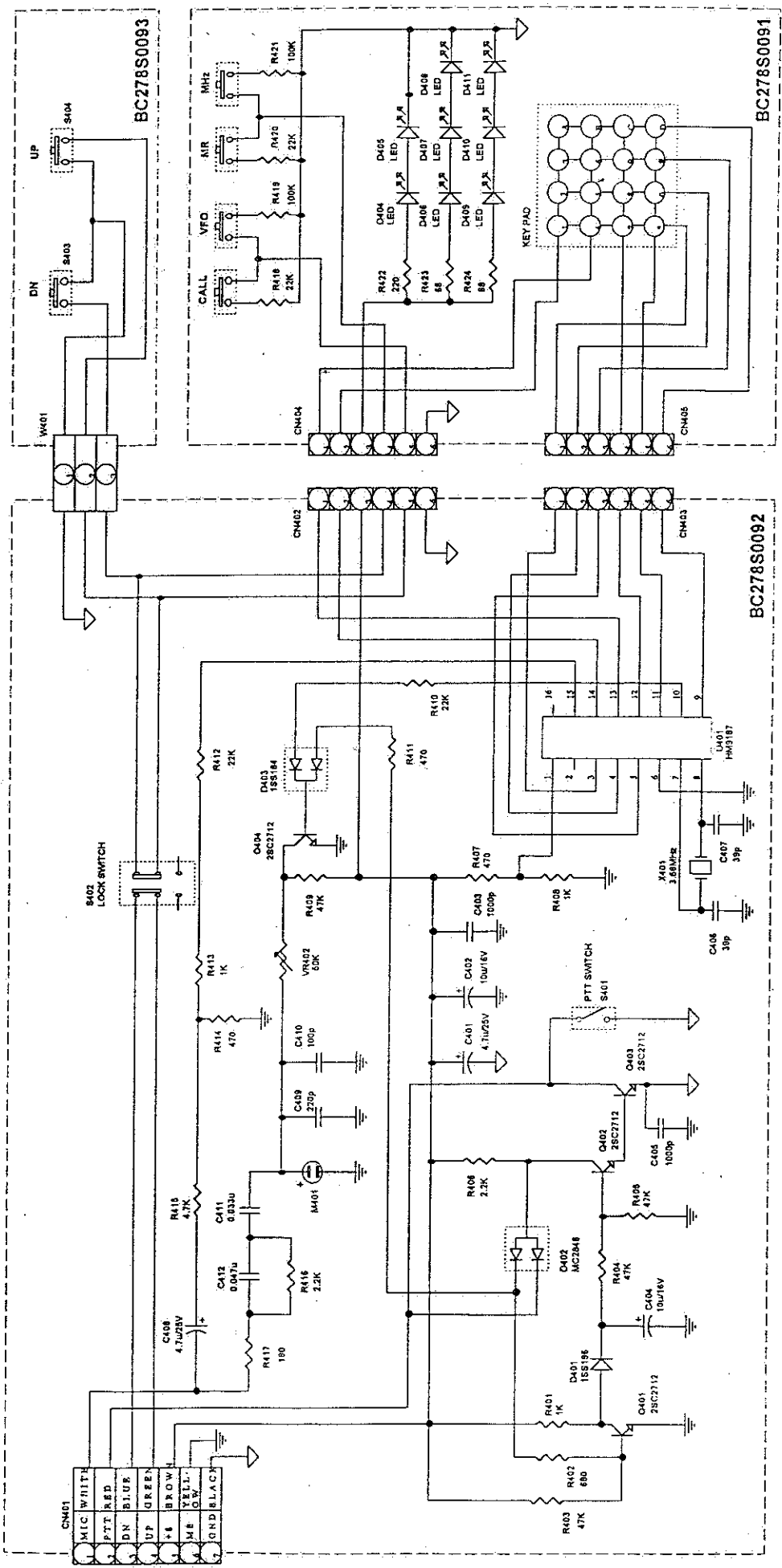
AR-147/S02
G

(BC2411003Q)



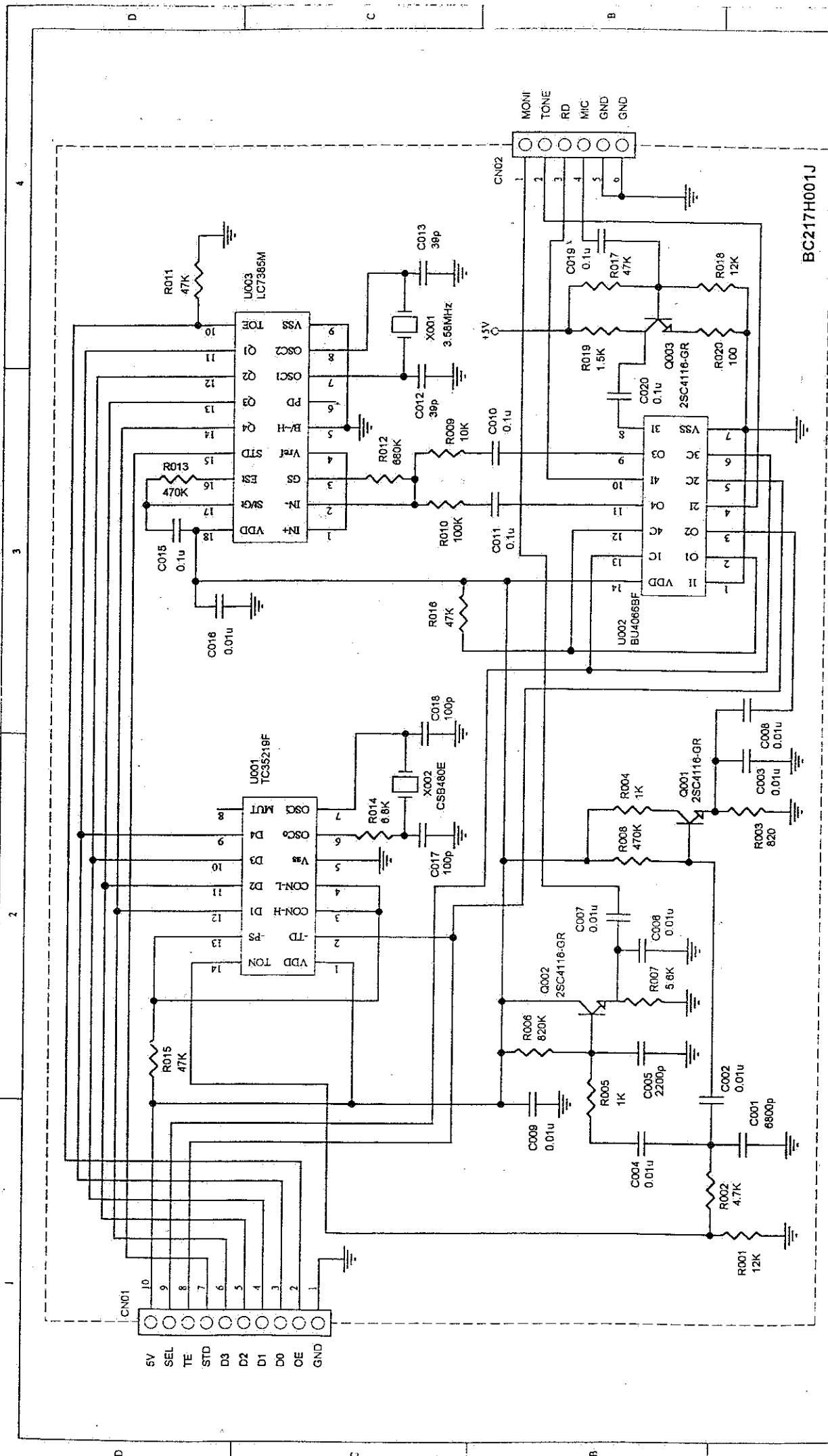
NOTES: 1. UNLESS OTHERWISE NOTED, RESISTORS ARE IN OHM.
 2. CAPACITORS ARE IN FARAD AND INDUCTORS ARE IN HENRY.
 3. AR-147 A1A1 IF BOARD CIRCUIT DIAGRAM.

Title		Revision	
Size	Number	Revision	
A4		A	
Date:	30 Dec 1999	Sheet 1 of	1
File:	DAWELLOSCHIP.SCH	Drawn By:	WELLO CHEN



NOTE: 1. UNLESS OTHERWISE NOTED, RESISTORS ARE IN OHM.
 CAPACITORS ARE IN FARAD AND INDUCTORS ARE IN HENRY.
 2. AR-147 MICROPHONE CIRCUIT.

Title		AR-147 MIC. ASS'Y	
Size	Number	Revision	E
A3			
Date	Subst: 1985	Sheet 1 of 1	WHL/SJH
File	D:\WHL\SCHEM\AR147\SCH	Printed At:	



NOTE: 1. UNLESS OTHERWISE NOTED, RESISTORS ARE IN OHM.
 CAPACITORS ARE IN FARAD, AND INDUCTORS ARE IN HENRY.
 2. AR-147 DTMF CIRCUIT DIAGRAM.

Title		AR-147 DTMF BOARD	
Size	Number	Revision	C
A4			
Date:	30 Dec-1999	Sheet 1 of	1
File:	C:\WELLOSCH\DTMF SCH	Drawn By:	WELLO CHEN

5

4

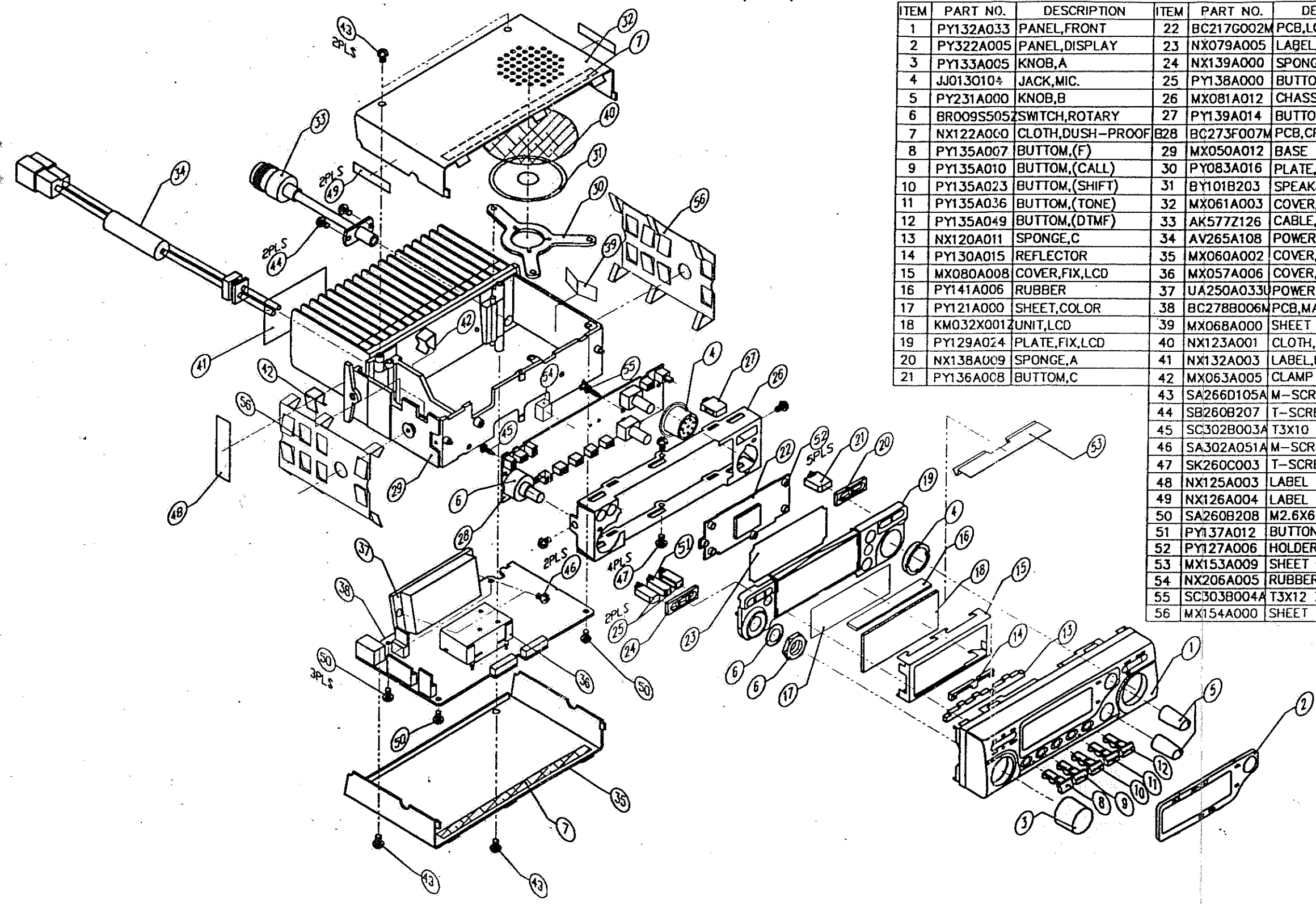
3

2

1

REV.	PART NO.	DESCRIPTION	APPROVED NO.	REMARK
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ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	PY132A033	PANEL,FRONT	22	BC217G002M	PCB,LCD
2	PY322A005	PANEL,DISPLAY	23	NX079A005	LABEL,SHIELD
3	PY133A005	KNOB,A	24	NX139A000	SPONGE,B
4	JJ0130104	JACK,MIC.	25	PY138A000	BUTTON,A
5	PY231A000	KNOB,B	26	MX081A012	CHASSIS,FRONT
6	BR009S505	SWITCH,ROTARY	27	PY139A014	BUTTON,POWER
7	NX122A000	CLOTH,DUSH-PROOF	28	BC273F007M	PCB,CPU
8	PY135A007	BUTTON,(F)	29	MX050A012	BASE
9	PY135A010	BUTTON,(CALL)	30	PY083A016	PLATE,FIX,SPEAKER
10	PY135A023	BUTTON,(SHIFT)	31	BY101B203	SPEAKER,8 OHM
11	PY135A036	BUTTON,(TONE)	32	MX061A003	COVER,TOP
12	PY135A049	BUTTON,(DTMF)	33	AK577Z126	CABLE,ANT,50 OHM
13	NX120A011	SPONGE,C	34	AV265A108	POWER CORD
14	PY130A015	REFLECTOR	35	MX060A002	COVER,BASE
15	MX080A008	COVER,FIX,LCD	36	MX057A006	COVER,SHIELD A
16	PY141A006	RUBBER	37	UA250A033U	POWER MODULE
17	PY121A000	SHEET,COLOR	38	BC278B006M	PCB,MAIN
18	KM032X001Z	UNIT,LCD	39	MX068A000	SHEET , GND(A)
19	PY129A024	PLATE,FIX,LCD	40	NX123A001	CLOTH,DUSH-PROOF
20	NX138A009	SPONGE,A	41	NX132A003	LABEL,LOGO
21	PY136A008	BUTTON,C	42	MX063A005	CLAMP
			43	SA266D105A	M-SCREW,CBS,NI
			44	SB260B207	T-SCREW,CBTA"A",N
			45	SC302B003A	T3X10 ZN
			46	SA302A051A	M-SCREW,Zn-Cc
			47	SK260C003	T-SCREW,"S",Zn-Cc
			48	NX125A003	LABEL A
			49	NX126A004	LABEL B
			50	SA260B208	M2.6X6 CBS,NI
			51	PY137A012	BUTTON,B
			52	PY127A006	HOLDER,LAMP
			53	MX153A009	SHEET GND (B)
			54	NX206A005	RUBBER SPONGE
			55	SC303B004A	T3X12 ZN
			56	MX154A000	SHEET GND (A)

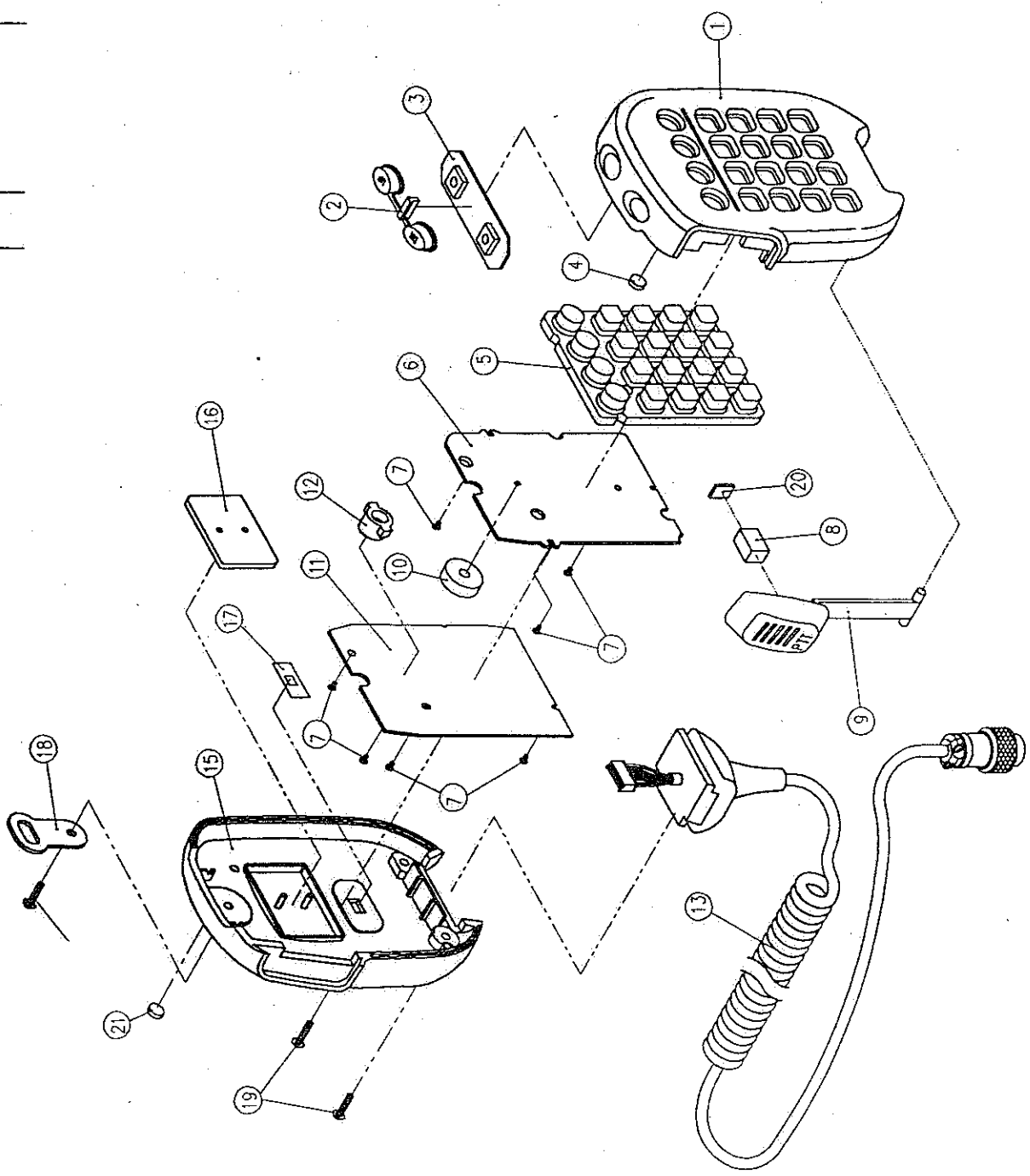


EXPLODED VIEW

FILE NO. AR-147

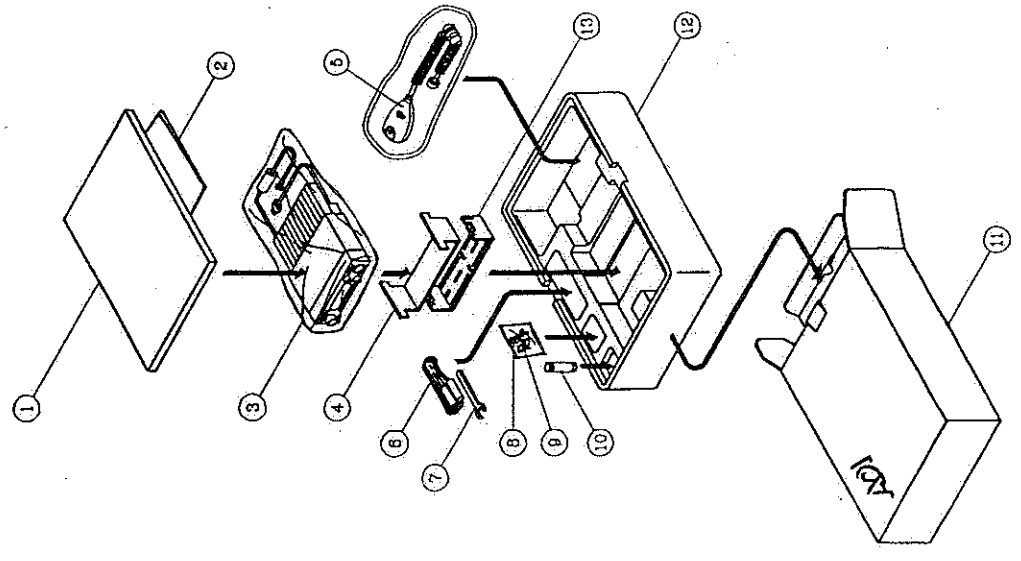
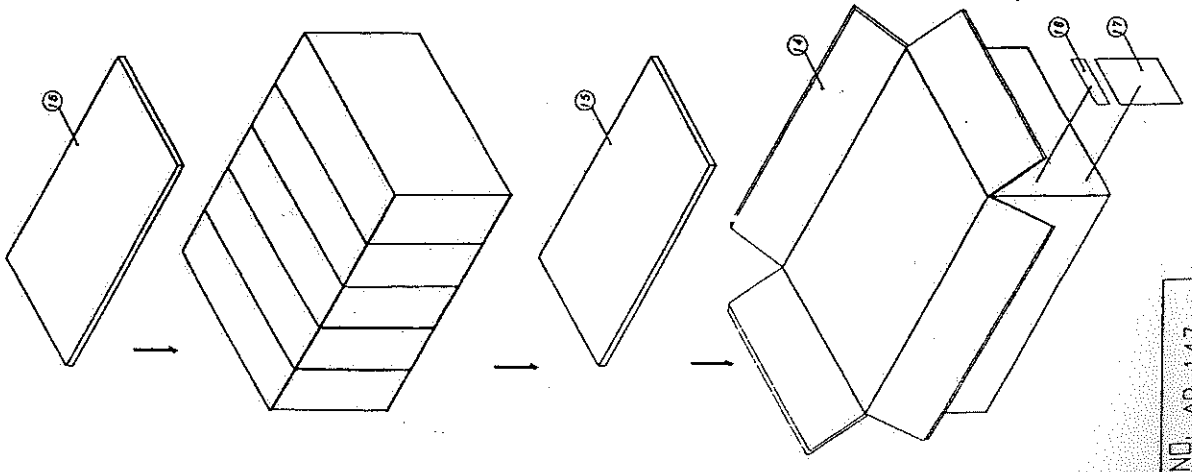
REV.	PART NO.	DESCRIPTION	APPROVED NO.	REMARK

NO.	PART NO.	DESCRIPTION	QTY
1	PY357A009	COVER, FRONT	1
2	PY362A007	KEY UP DN	1
3	BC278S0093	UP DN PCB	1
4	NX115A013	CLOTH DUST PROOF	1
5	PY363A008	KEYPAD 20KEY	1
6	BC278S0091	KEYPAD PCB	1
7	SM206A205	SCREW 12.0*5	7
8	NX113A011	RUBBER SPONGE PTT	1
9	PY359A001	KEY PTT	1
10	NX190A012	SPONGE MIC	1
11	BC278S0092	PTT PCB	1
12	PY360A005	HOLDER MIC	1
13	AK237F042	PHONECORD ASSY.MIC. 8P	1
14	SM305B200	SCREW 13.0*10	1
15	PY358A013	COVER BACK	1
16	MX089A001	PLATE MIC	1
17	NX124A002	PROOF C	1
18	MX248A008	PLATE MIC HANG	1
19	SM300A109	SCREW M3.0*10	2
20	NX290A006	SPONGE PTT	1
21	NX277A007	SPONGE	1



FILE NO. AR-147

5 4 3 2 1



ITEM	PART NO.	DESCRIPTION
1	WX035A008	SHEET,POLYFOAM
2	NX255A038	MANUAL
3	PY117A003	BAG,PE(350*205mm)
4	WX037A000	BOARD,PAPER
5	A6154S002A	MIC. ASS'Y
6	AV265A001	EXT. POWER CORD
7	MX064A006	SPANNER,OPEN
8	SA400M151A	M-SCREW,M4*L10
9	SD501A239	T-SCREW,@6*L14
10	FZ004A009B	FUSE 15A/32V
11	WX045A056	BOX,GIFT
12	WX034A010	BASE,POLYFOAM
13	MX059A011	FRAME,FIX
14	WX046A028	CARTON
15	WX052A014	BOARD KRAFT
16	ZV029A004	LABEL CARTON S/N
17	ZV085A066	LABEL CARTON

REMARK

APPROVED NO.

DESCRIPTION

PART NO.

REV.

FILE NO. AR-147