ALIGNMENT PROCEDURE

MODEL: HH38WX-ST

REVISION: _____

DATE : _____

PREPARED BY:_____

CHECKED BY: _____

APPROVED BY: _____

TOTAL PAGES:

HH38WX-ST ALIGNMENT INSTRUCTION

1.0 TEST CONDITION:

1.1. STANDARD DC POWER:	EXT.DC	13.8VDC
1.2. MEASUREMENT CHANNEL:	CB	CH19 (27.185MHz)
	WX	CH3 (162.475MHz)
1.3. STANDARD AUDIO LOADING:	CB/WX	16 Ω
1.4. ANTENNA IMPEDANCE:	CB/WX	50 Ω
1.5. STANDARD REF. MODULATION:	CB	30% (AM)
	WX	± 3KHz (FM)
1.6. STANDARD REF. AUDIO OUTPUT:	CB/WX	0.05W

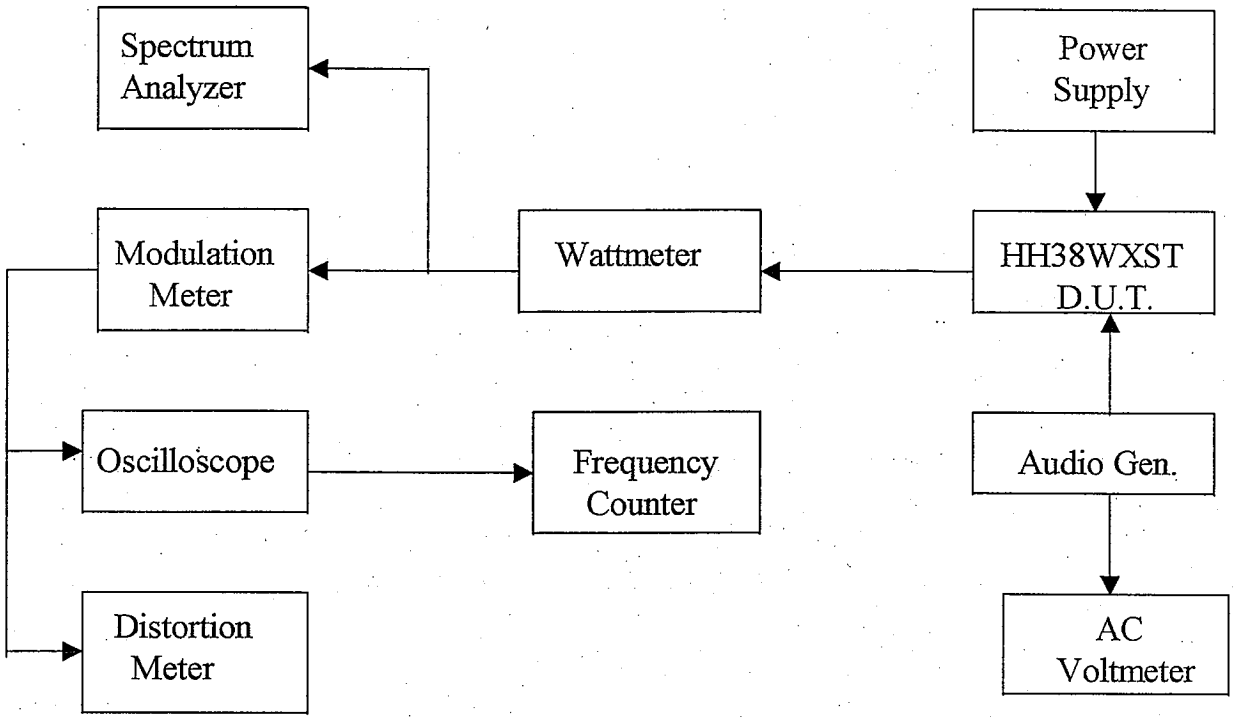
1.7. FREQUENCY TABLE

L BAND		CB BAND		U BAND		WX BAND	
CH NO.	FREQ. (MHz)	CH NO.	FREQ. (MHz)	CH NO.	FREQ. (MHz)	CH NO.	FREQ. (MHz)
01	26.515	01	26.965	01	27.415	1	162.550
02	26.525	02	26.975	02	27.425	2	162.400
03	26.535	03	26.985	03	27.435	3	162.475
04	26.555	04	27.005	04	27.455	4	162.425
05	26.565	05	27.015	05	27.465	5	162.450
06	26.575	06	27.025	06	27.475	6	162.500
07	26.585	07	27.035	07	27.485	7	162.525
08	26.605	08	27.055	08	27.505	8	161.650
09	26.615	09	27.065	09	27.515	9	161.775
10	26.625	10	27.075	10	27.525	0	163.275
11	26.635	11	27.085	11	27.535		
12	26.655	12	27.105	12	27.555		
13	26.665	13	27.115	13	27.565		
14	26.675	14	27.125	14	27.575		
15	26.685	15	27.135	15	27.585		
16	26.705	16	27.155	16	27.605		
17	26.715	17	27.165	17	27.615		
18	26.725	18	27.175	18	27.625		
19	26.735	19	27.185	19	27.635		
20	26.755	20	27.205	20	27.655		
21	26.765	21	27.215	21	27.665		
22	26.775	22	27.225	22	27.675		
23	26.805	23	27.255	23	27.705		
24	26.785	24	27.235	24	27.685		
25	26.795	25	27.245	25	27.695		
26	26.815	26	27.265	26	27.715		
27	26.825	27	27.275	27	27.725		
28	26.835	28	27.285	28	27.735		
29	26.845	29	27.295	29	27.745		
30	26.855	30	27.305	30	27.755		
31	26.865	31	27.315	31	27.765		
32	26.875	32	27.325	32	27.775		
33	26.885	33	27.335	33	27.785		
34	26.895	34	27.345	34	27.795		
35	26.905	35	27.355	35	27.805		
36	26.915	36	27.365	36	27.815		
37	26.925	37	27.375	37	27.825		
38	26.935	38	27.385	38	27.835		
39	26.945	39	27.395	39	27.845		
40	26.955	40	27.405	40	27.855		

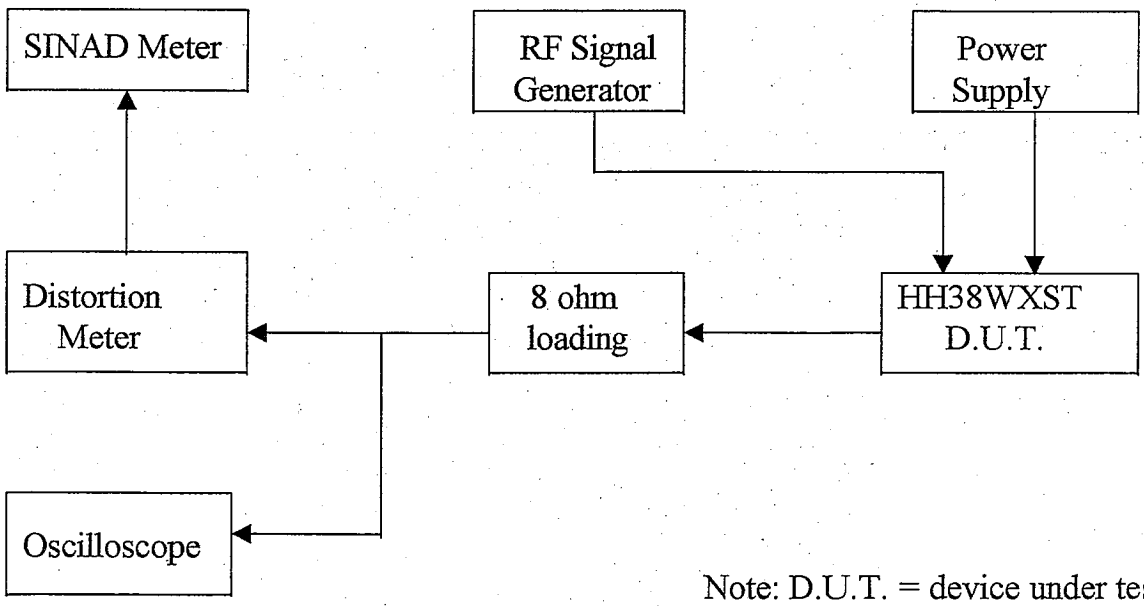
1.8. TEST MODE: Entering by simultaneously pressing the channel UP and DOWN keys, then turn on the DC power. All icons will be displayed on the LCD panel for visual checking. Following 6 CB-channel, in cycling sequence, can be directly accessed by pressing the "FUNC" and then the "LIGHT" keys:
Normal band CH1 → CH19 → CH22 → CH40 → U band CH40 → L band CH1.

1.9. TEST EQUIPMENT SETUP AS BELOW:

A. TX test equipment setup:



B. RX test equipment setup:



Note: D.U.T. = device under test

2.0 ALIGNMENT

2.1 LCD BOARD

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. LCD icons checking	MCU entered test mode. Keep pressing the UP and DOWN keys together.	Check all icons displayed. See attached LCD drawing.
2. MCU clock frequency	Connect a 5pf capacitor to TP301	Adjust **VC301** to 4.5MHz ± 5Hz at the frequency counter.

2.2 MAIN BOARD

2.2.1 VCO ALIGNMENT

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. CB VCO Voltage	1. Connect a digital multi-meter to TP1. 2. CB RX mode, L BAND: CH1.	Adjust **L10** for 1.5 ± 0.1 V. Check U band:CH40 ≤ 5.0V.
	3. CB TX mode	Check L band CH1 ≥ 1.2V Check U band CH40 ≤ 5.0V.
2. WX VCO Voltage	1.Connect a digital multi-meter to TP1. 2.WX mode CH08.	Adjust **L1** TO 1.5 ± 0.1V. Check CH 0 ≤ 3.0V.

2.2.2 WX RECEIVER

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. Audio output level	1.Set WX mode, CH03. 2.Output of signal generator thru a 0.01μF to TP3. 3.RF Gen. set 10.695MHz, Fmod= 1KHz, Dev.= ± 3KHz, RF level: 1mV. 4.Set volume control to the middle position.	Adjust **L9** for maximum audio output & minimum distortion at the distortion meter.(audio o/p = 0.05W, Distortion less than 5%)
2. WX sensitivity	1.Output of signal generator to antenna input terminal. 2. RF Gen. set 162.475MHz, Fmod= 1KHz, Dev.= ± 3KHz, RF level: 1μV. 3. WX set CH03.	1.Adjust **L4** and **L3** for more than 12dB at the SINAD meter. 2.Repeat as needed. Check all channels sens. must met D.T.S.

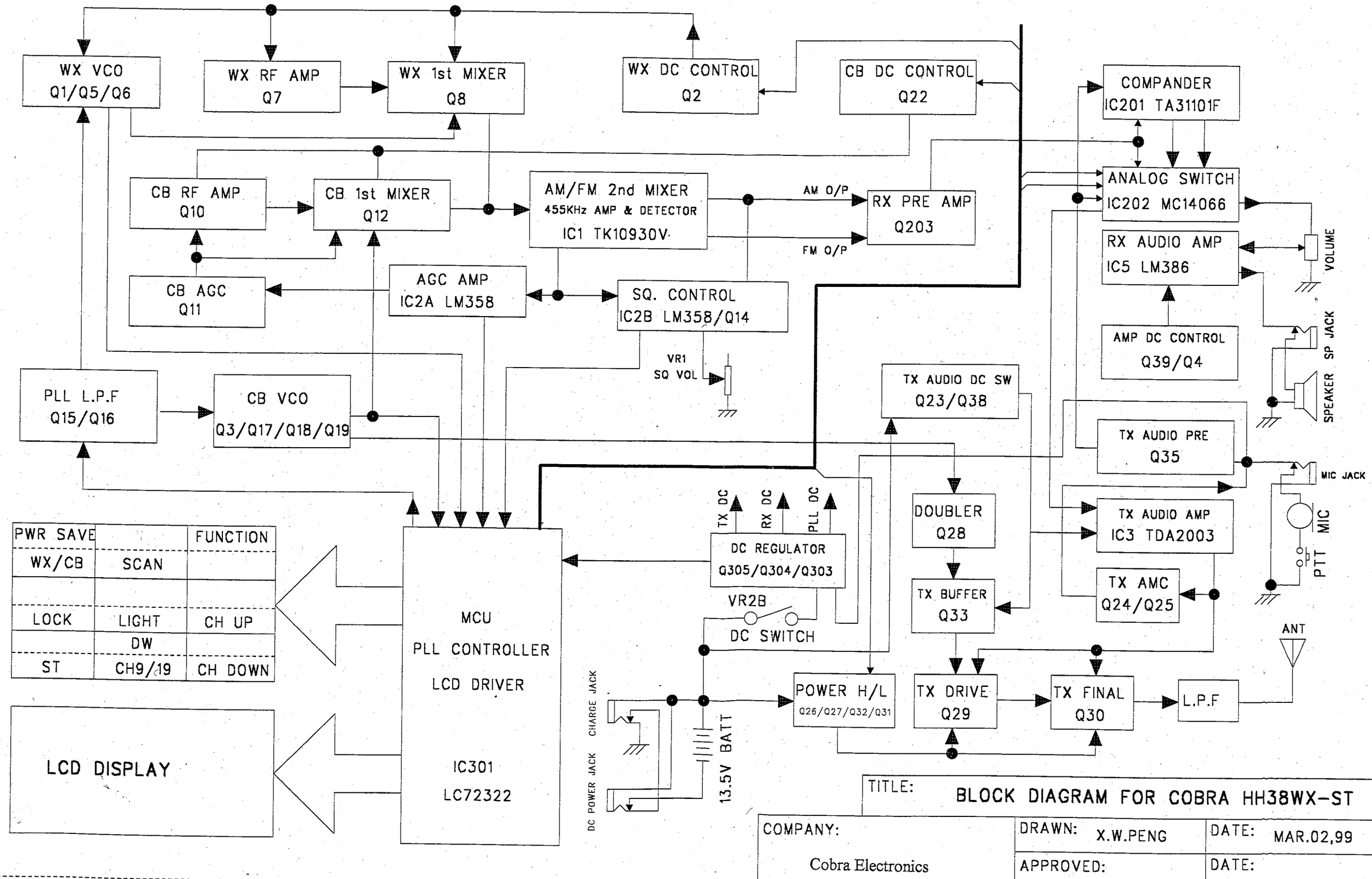
2.2.3 CB Receiver Alignment

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. Audio output level	1. CB RX mode. 2. ST to OFF 3. Output of signal generator thru 0.01uF to TP3. 4. RF Gen. set 10.695MHz, Fmod= 1KHz, AM= 30%, level: 1mV.	1. Set volume control to maximum position. 2. Audio power output shall be more than 0.4 Watts. 3. Set audio o/p for 0.05W, Distortion less than 3.0%.
2. RX sensitivity	1. Set normal band CH19. 2. Output of signal generator to antenna input terminal. 3. RF Gen. set 27.185MHz, fm: 1kHz, AM= 30%, RF level: 1μV.	1. Adjust **L8, L6** and **L5** for more than 12dB at the SINAD meter. 2. Repeat as needed. 3. Check **L** band CH1 and **U** band CH40.
3. SQUELCH control (Tight Squelch)	1. Set normal band CH19. 2.Output of signal generator to the antenna input terminal. 3. RF Gen. set 27.185 MHz , Fmod= 1KHz, AM= 30%, RF level: 2500 μV. 4. Rotate the Squelch control to fully clockwise position	1.Slowly turn **VR3** to a position that the audio output waveform at the oscilloscope just appears from no output. 2.Must open at 3500uV. 3.Must not open at 1000uV.
4. Signal meter display	1. Set normal band CH19. 2. Output of signal generator to antenna input terminal. RF Gen. set 27.185MHz, no modulation, RF level: 100 μV.	1. Adjust **VR7** for "9" displayed on the signal meter of LCD panel. 2. Increase RF level by 30dB. The signal meter should be displayed at "+30" position.
5. Sound Tracker (ST must be on) a) S/N b) Audio Gain	1. Set normal band CH19. 2. RF Gen. set 27.185MHz,30% modulation 3. S/N @ RF level 1.0uV @ RF level 1000uV 4. Audio Gain @ 100uV 50% Mod.	1. S/N: 1.0uV ≥ 15dB. 1000uV ≥ 50dB. 2. ST audio output change 2-8dB from OFF to ON.

2.2.4 CB Transmitter Alignment

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. TP4 Alignment	1. Channel set normal band CH 19. 2. Set TX PWR SAVE mode. Connect the TP4 (Q33 C) thru a 10pF capacitor to the oscilloscope. 3. L15 (C97) short to ground.	1. Adjust **L11** and **L12** for maximum RF output waveform at the scope. (Freq. = 27.185MHz) 2. Repeat as needed.
2. TX Carrier output power	1. Channel set normal band CH 19. 2. Set TX to High power mode. 3. Connect an RF wattmeter to the antenna socket.	1. Adjust **VR5** for 3.8-4.0 watts RF output power. 2. Check U & L band TX power: ≥3.5 Watts. 3. Set TX to Low power mode. 4. Check TX power output for 1.0 ± 0.3W.
3. TX Carrier frequency	1. Channel set CH 19. 2. Set TX Hi power mode.	Check TX frequency for 27.185MHz ± 200Hz at the frequency counter.
4. TX Signal meter	1. Connect an RF wattmeter to the antenna socket 2. . No modulation. 3. Set TX Low power mode.	Adjust **VR6** for "1" displayed at the TX signal meter of the LCD panel.
	4. Set TX High power mode.	Check signal meter should be displayed at "4" position.
5. MAXIMUM Modulation (AMC control)	1. Set TX High power mode. Output of AF generator to MIC jack, @ 1000Hz, 80mV .	1. Adjust **VR4** for 84-86% modulation. 2. Distortion less than 5.0% at 80% modulation. 3. Check CH1,CH40.
6. Occupied band width, (OBW)	1. Set TX High power mode 2. Set modulation frequency 2500 Hz.	The frequency spectrum of the harmonics should be at least 2 dB better than the limits of the FCC specification.

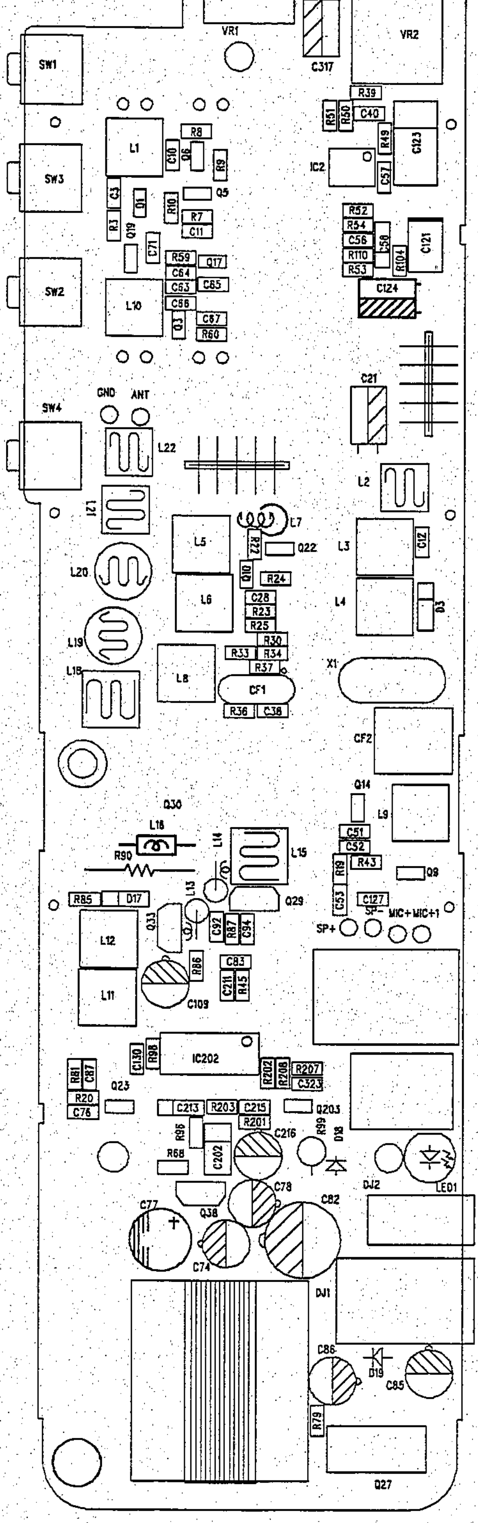
BLOCK DIAGRAM FOR COBRA HH38WX-ST



PWR SAVE		FUNCTION
WX/CB	SCAN	
LOCK	LIGHT	CH UP
	DW	
ST	CH9/19	CH DOWN

TITLE: BLOCK DIAGRAM FOR COBRA HH38WX-ST		
COMPANY: Cobra Electronics	DRAWN: X.W.PENG	DATE: MAR.02,99
	APPROVED:	DATE:

HH 38



VR1
C317
VR2
SW1
R39
R51
R50
C40
C123
R49
L1
R8
C10
Q6
R9
IC2
C57
SW3
C3
Q1
R10
Q5
R3
Q19
R7
C11
R52
R54
C56
C58
R110
R104
C121
R53
C71
R59
Q17
C64
C63
C65
C124
SW2
L10
C66
Q3
C67
R60
C21
GND
ANT
SW4
L22
L2
L21
L7
R22
Q22
L5
L3
C12
L20
Q10
R24
L6
C28
R23
L4
D3
R25
L19
R30
R33
R34
L18
L8
R37
X1
CF1
R36
C38
CF2
Q14
Q30
L9
L16
L14
C51
L15
R90
C52
R43
R19
Q9
R85
D17
L13
Q29
C53
C127
SP-
MIC+
MIC+1
SP+
Q31
C92
R87
C94
L12
R86
C83
C211
R45
L11
C109
C130
R98
IC202
R202
R208
R207
R81
C87
C323
Q23
R20
C76
C213
R203
C215
Q203
R201
R96
C216
R99
D18
R68
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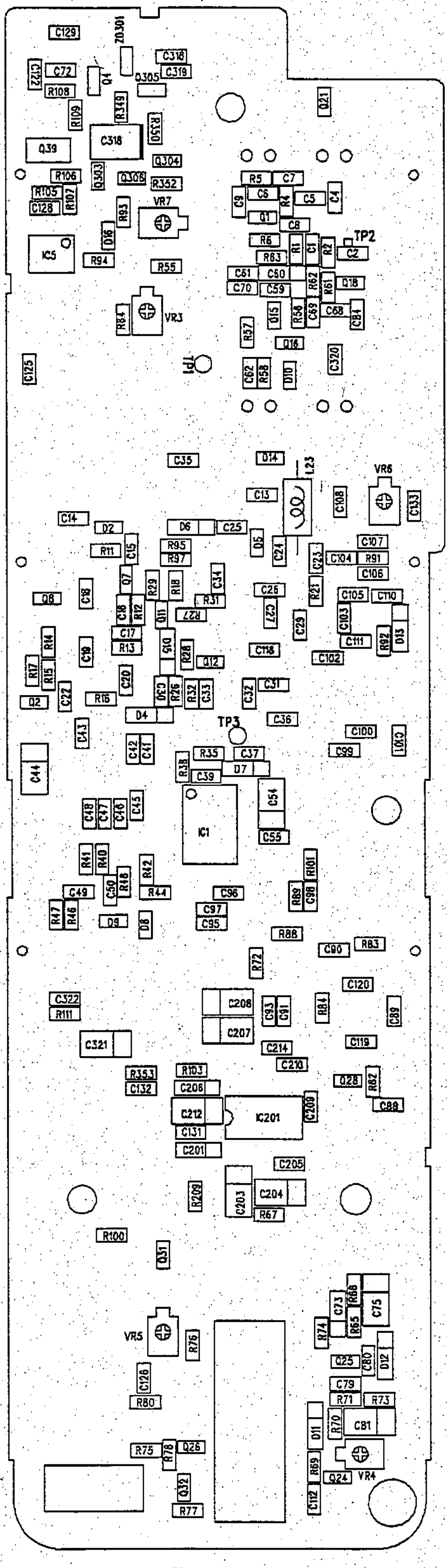
C78
C77
C82
Q38
C74
DJ1
C86
D19
C85
R79
Q27


C129
ZD301
C318
C319
C122
C72
Q4
Q305
R108
R109
R349
Q21
C318
R350
Q39
Q304
R106
Q303
Q306
R352
R105
R107
C128
VR7
R5
C7
C9
C6
R4
C5
C4
R93
Q1
C8
IC5
D16
R6
R1
C1
R2
TP2
C2
R94
R55
R63
C61
C60
R62
R61
Q18
C70
C59
R84
VR3
Q15
R56
C69
C68
C84
R57
Q16
C125
TP1
C62
R58
D10
C320
C35
D14
L23
VR6
C13
C108
C133
C14
D2
D6
C25
D5
C24
C23
C107
R11
C15
R95
R97
C104
R91
C106
Q7
R29
R18
C34
R21
C8
Q8
C18
C38
R12
R31
C26
C105
C110
Q11
R27
C27
C103
C29
C17
D15
C111
R92
D13
R14
R13
C19
R28
C118
C102
R17
R15
C20
Q12
C22
R16
C30
R26
R32
C33
C32
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Q2
D4
C36
TP3
C43
C100
C101
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C44
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C54
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C47
C46
C45
IC1
C55
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R44
C49
C96
R89
C98
R47
R46
C97
D9
D8
C95
R88
C90
R83
R72
C120
C322
C208
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C80
D12
Q25
C126
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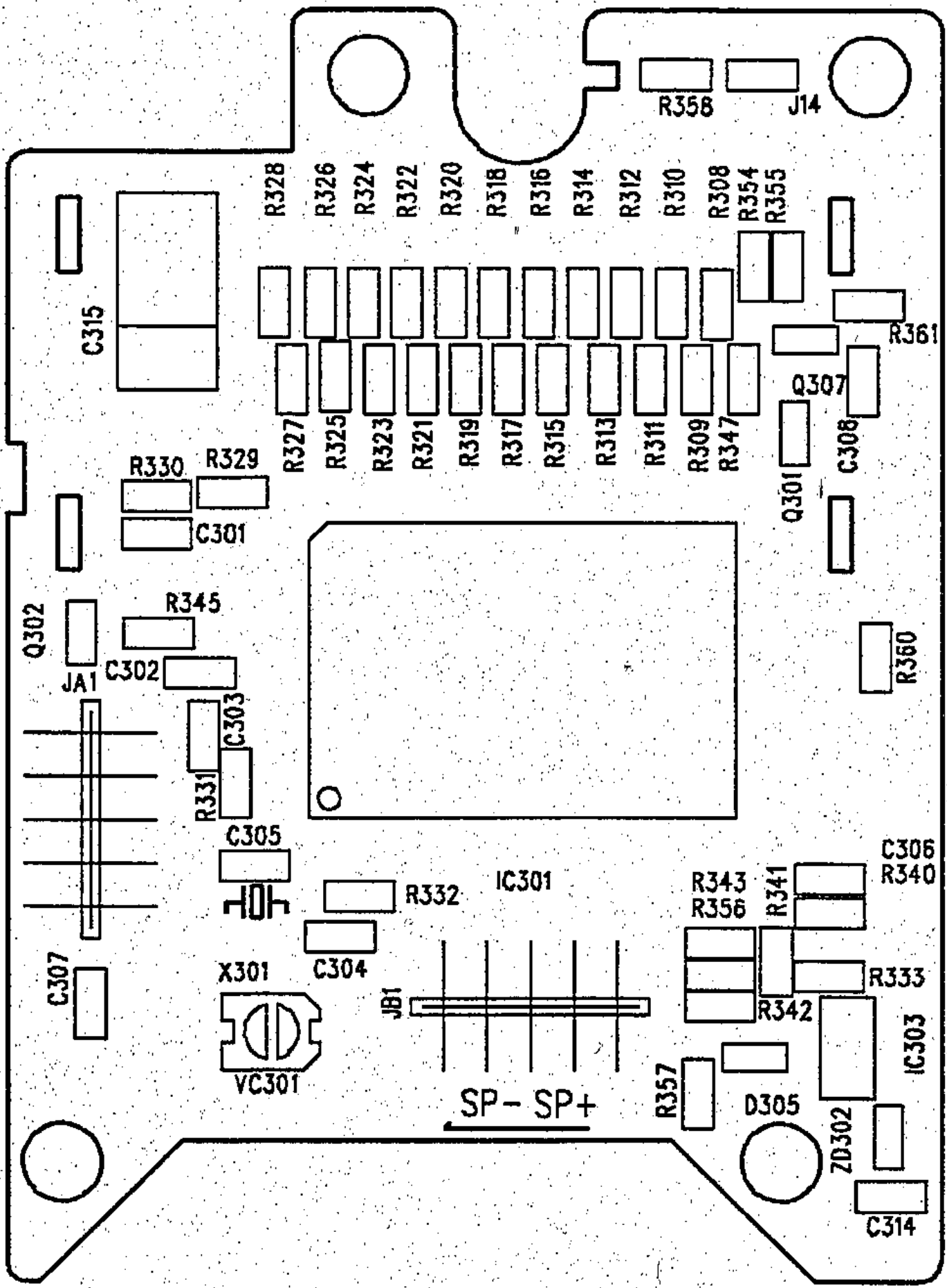
VR4
R69
Q32
Q24
C112
R77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J14
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R314
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R361
Q307
R327
R325
R323
R321
R319
R317
R315
R313
R311
R309
R347
C308
Q301
R330
R329
C301
Q302
R345
C302
JA1
C303
R360
R331
C305
C306
R340
IC301
R343
R356
R341
R332
C304
X301
JB1
R333
R342
C307
IC303
VC301
SP- SP+
R357
D305
ZD302
C314

WX VCO AREA

HH38WX-ST CIRCUIT DIAGRAM FOR COBRA -------- SHEETS 1 OF 2

WX RF AMP. AND FIRST MIXER AREA

WX MODE VCO FREQUENCY: 150MHz955 ~ 152MHz580

WX VCO ADJ

WX-IN

162-MHz WX-ANT

10MHz7

WX DC CTL

SOUND-TRACK SYSTEM

CB-RX

RF AMP.

FIRST MIXER

AGC

SQ. CONTROL

WX CTL

CB RX DC CTL

ADD

VOLUME

EAR PHONE JACK

SPEAKER 16 ohm

S-METER

CB-IN

SQ ADJ

SQUELCH VOL

TX AUDIO DC SW CTL

CB VCO ADJ

PD-CB/WX

L.P.F

CABLE

VCC2
SCAN-IN
CB-RF-B+
MIC
RX_B+
ST-ON
ST-OFF
BEEP
PS-MUTE
POW-LOW
TX-INHIBIT
TX-B+
WX-RF-B+
13.8V
VCC1-13.8V

VR2B 20KA WITH VOLUME

AMC SYSTEM

MOD. ADJ

TX METER DETECTOR

SNAP-ON BATTERY SYSTEM

TX DRIVER

TX FINAL

TX BUFFER

CB-RX

WX-ANT

CABLE

BNC JACK

ANTENNA

DJ2 CHARGE JACK KEJ-042

DJ1 DC POWER JACK KEJ-164

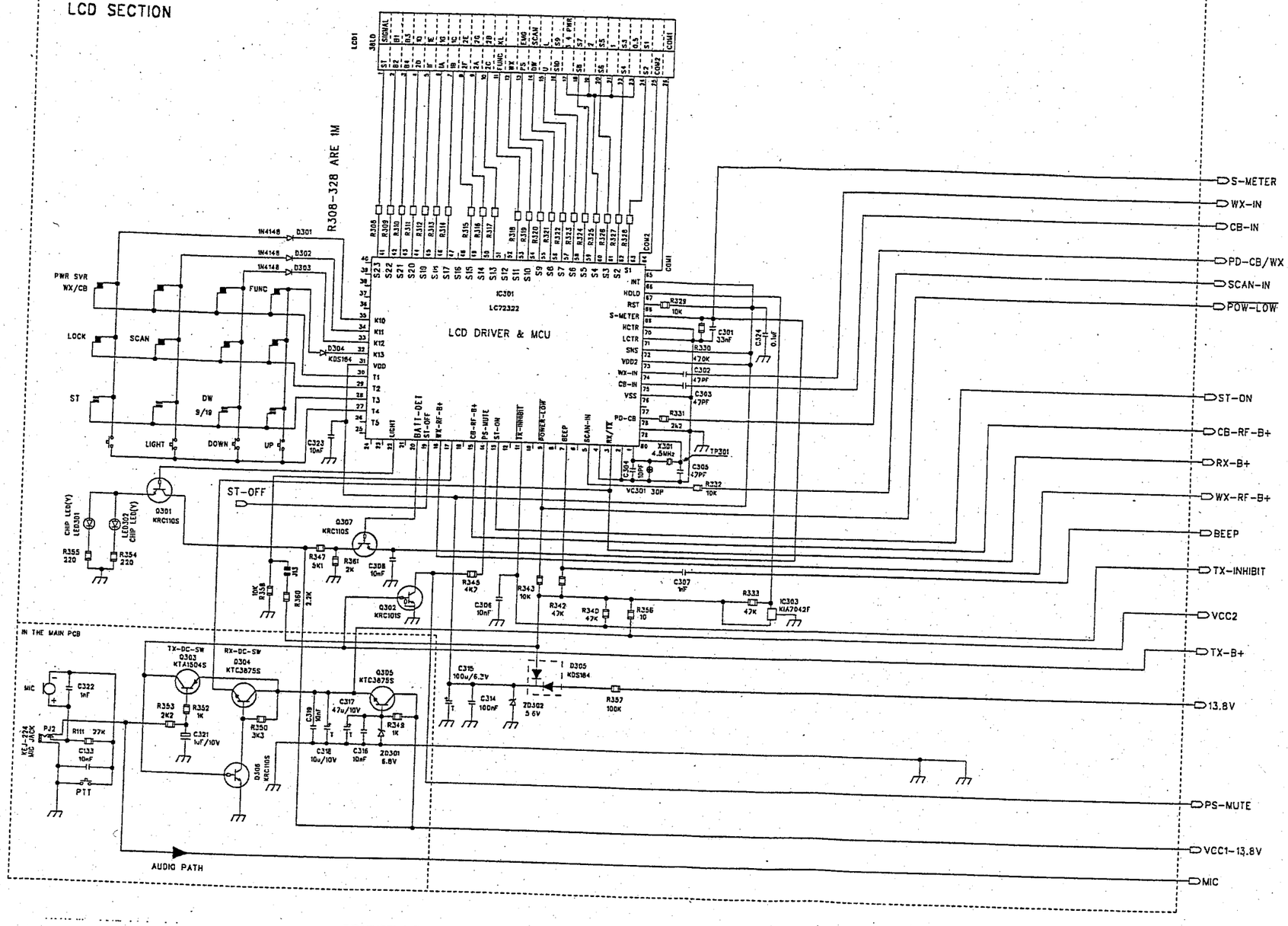
FOR CHARGE INDICATOR

TITLE: CIRCUIT DIAGRAM FOR COBRA HH38WX-ST				ES1	ES2	P.P	PILOT	FINAL
Cobra Electronics	DRAWN: XW PENG	DATE: AUG-26-98	SHEET: 1 OF 2	VER: B				
	APPROVED BY:	DATE:	UPDATE: DEC.08.1999	FILE NAME: HH3810.SCH				

HH38WX-ST CIRCUIT DIAGRAM FOR COBRA -------- SHEETS 2 OF 2

ANSISTOR MARK:
TC3880S:AQG
TC3875S:ALG
TA1504S:ASY
RA105S:PE
RC110S:NK
RC101S:NA

LCD SECTION



HH38WX-ST THEORY OF OPERATION

A. PLL, the Phase-Locked-Loop frequency synthesizer

See Frequency synthesizer block diagram and schematic.

1. Introduction

The synthesizer consists of the following.
Components: PLL IC (IC301)
CRYSTAL (X301)
VARICAP DIODE (D10)
TRANSISTOR (Q15, Q16, Q3, Q17, Q18)
LCD DISPLAY (LCD1)

IC301 is a CMOS LSI that includes most of the PLL block.
The VCO with varicap-diode D10 as part of the tank circuit.
Q3 is a switching transistor to connect or disconnect the tuning capacitor in the VCO oscillator tank circuit for transmitter or receiver.

2. Reference Frequency

The crystal X301 (4.5 MHz) and other components at pin 1 and pin 80 of IC301 form a clock frequency oscillator. The oscillator output is internally fed to a divide-by-1800 to produce a 2.5 kHz signal. That is the reference input for the phase detector.

3. VCO, the voltage-controlled-oscillator

Q17 is the oscillator with the varicap-diode D10 as part of the tank circuit. With the control voltage applied to D10, the VCO oscillates over the required range of 13.4825 MHz to 16.710 MHz.

4. Programmable Divider and its Control Function

The programmable inputs for each channel are set inside IC 301. The input signal of IC 301 is obtained by the key matrix which is formed by T1 (pin 30) to T4 (pin 27) and K10 (pin 35) to K13 (pin32). For any key matrix input, the internal code generator provides an appropriate binary control data for the programmable divider of that channel frequency. Since the binary data is necessary to change under transmit mode and receive mode, one additional bit is required at pin 3 of IC 301 to allow the ROM to recognize the mode is Tx or Rx. During transmit the tact switch makes Q304 base grounded by transistor Q306. The PLL IC works under transmit mode. The programmable divider output is fed to the phase detector for comparison with the 2.5 kHz reference frequency.

5. Phase Detector and VCO Control

The phase detector is a digital phase comparator which compares the leading edge of the reference frequency with the programmable divider output square wave and produces a series of pulses whose DC level depends on whether the phase error is leading or lagging. The phase detector output (pin 78 of IC301) is fed to a charge pump and then fed to pin 78 of IC301. The low pass filter output at pin 78 of IC301 is filtered and fed to varicap diode D10 to control the VCO frequency. The result is that the second order component of the PLL frequency and the loop dynamic characteristics are essentially controlled by the active low pass filter.

6. TRANSMIT/ RECEIVE Buffer Amplifier

The VCO output is fed to the buffer transistor Q18, from the secondary tap of IFT coil L7.

7. Transmit Frequency Doubler

The output of Q17 is obtained at its emitter and is fed to the base of transistor Q28, which is a

frequency doubler. The output frequency of Q28 is doubled in relation to its input frequency. The output tank circuit of Q28 is a double-tuned circuit (27 MHz). It is consisted of L11 and L12, in order to stop the fundamental frequency 13.5 MHz.

8. Switching of Tuning Capacitor in VCO oscillator tank circuit

The VCO circuit must be tuned in a wide range of frequencies.
In Receive mode, Q3 is Off, thus C66 is open. The VCO tuning circuit is consisted of L10, C63, C64, C65, C67 and the varicap diode D10. It operates in the frequency range of 16.270 MHz to 16.710 MHz.
In Transmit mode, Q3 is On, thus C66 is added in parallel to L10. The frequency range is then step down to 13.4825 MHz – 13.7025 MHz.

9. Fault Protection

IC301 included a phase detector which functions as a lock detector. If the frequency lock is lost, then pin 11 becomes low and the base of Q33 is cut off, to prohibit transmission. Transmission cannot be made if a code other then those for 40 channel is input to IC301.

10. Frequency Stability

Let: F0 = Crystal Oscillator Frequency
FR = Phase Detector Reference Frequency
FVCO = VCO Frequency
FT = Transmit Frequency
Then = FR = F0/1800, and under locked conditions:

$$FR = \frac{FVCO}{N}$$

Where N is the programmable divider dividing ratio

From which it can be seen that the percentage error in FT is the same as the percentage error in F0. The stability of the crystal oscillator is determined primarily by the crystal and to a lesser extent by the active and passive components of the oscillator. The choice of crystal and components is such that the required frequency stability is maintained within the required voltage and temperature range.

B. Tx, Transmitter Section

1. RF Amplification

The output of the frequency doublee Q28 is fed through double-tuned coils (27 MHz) L11, L12 to the base of Tx pre-amplifier Q33. The output is then passed through the tuning circuit L13 to Tx driver Q29. The Q29 output is coupling through L14 and C95 to the base of final Tx amplifier Q30. Finally, the output of Q30 is supplied to the antenna through L-C tuning circuit.

2. Circuit for Suppression of Spurious Radiation

The tuning circuit between the frequency synthesizer and the Tx pre-amplifier Q33, plus the 3-section "PI"-type band pass filtering network: C99, C100, C102, C105, C103, C106, C104 in the Q30 output circuit, served to suppress spurious radiation. The filtering network also works as the impedance matching network between Q30 and the antenna.

3. Circuit for Power Limiting

After finished all alignment, the constant voltage supply circuit limits the available power to 4W. The VR5 and transistors Q26, Q27, Q32 control the supply voltage of Tx amplifier and other RF meter. Tune all the trimming parts for maximum indication of Tx power meter and adjust VR7 for 4.0 W indication of Tx meter.

4. Modulation

The microphone input is sent to the audio power amplifier IC3, then fed to the modulation transformer T1. The audio output at the secondary of T1 is fed in series with the B+ supply voltage to the collectors of Tx driver Q29 and Tx final Q30. Thus achieves the collector modulation for these two stages.

5. Circuit for Modulation Limiting

A portion of the modulating voltage is rectified by D11 then turns on Q24, Q25. Which attenuate the microphone input to mic amplifier IC3. The resulting feedback loop keeps the modulation from exceeding 95 percent when the input signal is increased 40 dB above the original level required to produce a 50 percent modulation.

C. Rx, CB Receiver Section, 40 channels

The CB receiver is a double conversion superheterodyne with the first IF at 10.695MHz and the second IF at 455kHz. The synthesizer supplies the first local oscillator 10.695MHz below the received frequency and the second local oscillator at 10.240MHz. The detector output provides reverse AGC to the previous stages of Q10 and Q12. The AGC voltage is also amplified by Q13 and used to drive the RF attenuator D5.

D. Wx, Weather Band Receiver Section, 10 channels

The Weather receiver is a dual conversion super-heterodyne type with the first IF 10.695 MHz and the second IF 455 kHz. The PLL synthesizer supplies the local oscillation frequencies at 10.695 MHz below the RF frequency to produce a first IF signal of 10.695MHz. Q7 amplifies the incoming weather signals. Q8 mixes the incoming weather signal and the local oscillator signal to generate the IF frequency possessing audio information. The 455KHz amplifier circuit inside IC1 amplifies the 455KHz signal to make enough level for discriminating the audio signal. IFT L9 and R41 are working as a FM detector.

E. Compander circuit

IC201 TA31101F is the Compander which acts for compressing the dynamic range of the audio signal in the transmitting path, and expanding the dynamic range of the audio signal in the receiving path. This will result in an improved signal to noise ratio.

HH38WX-ST IC PIN & TRANSISTOR PIN VOLTAGE

prepared by:

checked by:

approved by:

March 30, 1999

HH38WX-ST IC PIN & TRANSISTOR PIN VOLTAGE

ITEM	PART NAME	LOCATION	PIN	CB RX MODE (V)		CB TX MODE (V)		WX MODE (V)	
				ST ON	ST OFF	ST 0N	ST OFF	ST ON	ST OFF
1	KTC3880	Q1	B	0	0	0	0	2.55	2.55
			C	0	0	0	0	4	4
			E	0	0	0	0	1.86	1.9
2	KTC3880	Q5	B	0	0	0	0	0.7	0.65
			C	0	0	0	0	2.8	2.8
			E	0	0	0	0	0	0
3	KTC3880	Q6	B	0	0	0	0	0.68	0.66
			C	0	0	0	0	3.67	3.18
			E	0	0	0	0	0	0
4	KTC3880	Q7	B	0	0	0	0	1.24	1.24
			C	0	0	0	0	4.15	4.1
			E	0	0	0	0	0.57	0.6
5	KTC3880	Q8	B	0	0	0	0	0.68	0.68
			C	0	0	0	0	2.28	2.28
			E	0	0	0	0	0	0
6	KTC3880	Q10	B	1	1	0	0	0	0
			C	4.5	4.5	0	0	0	0
			E	0.3	0.3	0	0	0	0
7	KTC3880	Q12	B	0.45	1.2	0	0	0	0
			C	4.14	4.2	0	0	0	0
			E	1.14	0.45	0	0	0	0
8	KTC3880	Q17	B	4	4	0	4	0	0
			C	6.23	6.2	0	6.2	0	0
			E	3.31	3.3	0	3.3	0	0
9	KTC3880	Q18	B	0.74	0.76	0	0.6	0	0
			C	1.78	1.76	0	1.6	0	0
			E	0	0	0	0	0	0
10	KTC3880	Q28	B	0	0	1.44	1.4	0	0
			C	0	0	6.1	6	0	0
			E	0	0	0.9	0.9	0	0
11	KTC3875	Q11	B	0.5	0.5	0	0	0	0
			C	3.25	3.2	0	0	0	0
			E	0	0	0	0	0	0
12	KTC3875	Q15	B	1.08	1.1	1.15	1.2	1.08	1.08
			C	1.83	1.8	0.86	0.85	1.93	1.9
			E	0.6	0.6	0.2	0.25	0.6	0.6

HH38WX-ST IC PIN & TRANSISTOR PIN VOLTAGE

ITEM	PART NAME	LOCATION	PIN	CB RX MODE (V)		CB TX MODE (V)		WX MODE (V)	
				ST ON	ST OFF	ST 0N	ST OFF	ST ON	ST OFF
13	KTC3875	Q16	B	0.6	0.6	0.22	0.16	0.6	0.6
			C	1.83	1.8	0.85	0.82	1.94	1.94
			E	0	0	0	0	0	0
14	KTC3875	Q32	B	0	0	4.91	4.9	0	0
			C	13.8	13.8	12.07	12.14	13.8	13.8
			E	0	0	4.34	4.35	0	0
15	KTC3875	Q25	B	0	0	0	0	0	0
			C	0	0	0	0	0	0
			E	0	0	0	0	0	0
16	KTC3875	Q203	B	2.1	2.08	2.3	2.3	2.12	2.12
			C	2.7	2.7	3.16	3.15	2.76	2.77
			E	1.42	1.43	1.66	1.66	1.48	1.49
17	KTC3875	Q304	B	0	0	0	0	0	0
			C	0	0	0	0	0	0
			E	0	0	0	0	0	0
18	KTC3875	Q305	B	6.83	6.83	6.86	6.85	6.83	6.82
			C	13.78	13.78	13.50	13.52	13.78	13.78
			E	6.19	6.19	6.22	6.32	6.21	6.21
19	KTA1504	Q24	B	0	0	3.3	3.3	0	0
			C	0	0	0	0	0	0
			E	0	0	3.83	3.83	0	0
20	KTA1504	Q26	B	0	0	12.2	12.14	0	0
			C	0	0	10.68	10.68	0	0
			E	0	0	12.74	12.74	0	0
21	KTA1504	Q303	B	6.2	6.2	5,56	5.56	0	0
			C	0	0	6.02	6.01	0	0
			E	6.22	6.23	6.27	6.26	0	0
22	KRC101	Q4	B	3.14	3.14	0	0	0	0
			C	0	0	13.5	13.5	0	0
			E	0	0	0	0	0	0
23	KRC101	Q23	B	0	0	5.95	5,95	0	0
			C	13.77	13.76	0	0	0	0
			E	0	0	0	0	0	0
24	KRC101	Q3	B	0	0	6	6	0	0
			C	0	0	0	0	0	0
			E	0	0	0	0	0	0

HH38WX-ST IC PIN & TRANSISTOR PIN VOLTAGE

ITEM	PART NAME	LOCATION	PIN	CB RX MODE (V)		CB TX MODE (V)		WX MODE (V)	
				ST ON	ST OFF	ST 0N	ST OFF	ST ON	ST OFF
25	KRC101	Q31	B	0	0	3.84	3.86	0	0
			C	0	0	0	0	0	0
			E	0	0	0	0	0	0
26	KRC101	Q302	B	0	0	5.98	5.98	0	0
			C	3.14	3.14	0	0	3	3
			E	0	0	0	0	0	0
27	KRC110	Q2	B	0	0	0	0	4.88	4.89
			C	0	0	0	0	6.15	6.18
			E	0	0	0	0	4.12	4.15
28	KRC110	Q9	B	0	0	0	0	4.89	4.9
			C	2.84	2.84	0.7	0.7	0	0
			E	0	0	0	0	0	0
29	KRC110	Q14	B	0	0	0	0	0	0
			C	1.6	1.6	0	0	1.6	1.6
			E	0	0	0	0	0	0
30	KRC110	Q21	B	0	0	0	0	0	0
			C	0	0	0	0	0	0
			E	0	0	0	0	0	0
31	KRC110	Q22	B	5.41	5.41	5.32	5.32	0	0
			C	5.18	5.2	1.04	1.04	0	0
			E	4.72	4.74	1.04	1.04	0	0
32	KRC110	Q19	B	0	0	0	0	4.92	4.92
			C	0	0	0	0	0	0
			E	0	0	0	0	0	0
33	KRC110	Q20	B	0	0	0	0	0	0
			C	3.87	3.86	3.8	3.81	3.86	3.86
			E	0	0	0.2	0.2	0	0
34	KRC110	Q301	B	0	0	0	0	0	0
			C	13.8	13.8	0	0	0	0
			E	0	0	0	0	0	0
35	KTA1663	Q39	B	13.78	0	1.62	1.61	1.6	1.6
			C	13.8	0	13.54	13.58	13.8	13.8
			E	13.12	0	13.52	13.2	13.2	13.2
36	KTA1241	Q38	B	0	0	12.83	12.8	0	0
			C	0	0	13.52	13.5	0	0
			E	0	0	13.55	13.55	0	0

HH38WX-ST IC PIN & TRANSISTOR PIN VOLTAGE

ITEM	PART NAME	LOCATION	PIN	CB RX MODE (V)		CB TX MODE (V)		WX MODE (V)	
				ST ON	ST OFF	ST 0N	ST OFF	ST ON	ST OFF
37	KTA1276	Q27	B	13.27	13.28	12.5	12.74	13.3	13.3
			C	0	0	10.6	10.70	0	0
			E	13.8	13.8	13.5	13.55	13.8	13.8
38	LC1674	Q33	B	0	0	0.76	0.78	0	0
			C	0	0	14.26	14.22	0	0
			E	0	0	0.53	0.53	0	0
39	KTC1006	Q29	B	0	0	0	0	0	0
			C	0	0	16.75	15.88	0	0
			E	0	0	0	0	0	0
40	KTC2078	Q30	B	0	0	0.32	0.32	0	0
			C	0	0	16.75	16.75	0	0
			E	0	0	0	0	0	0
41	TDA2003	IC3	1	1.45	1.44	0	0	0	0
			2	0.84	0.84	0	0	0	0
			3	0	0	0	0	0	0
			4	6.26	6.24	0	0	0	0
			5	13.54	13.53	0	0	0	0
42	LM386	IC5	1	1.34	1.35	0	0	0	0
			2	0	0	0	0	0	0
			3	0	0	0	0	0	0
			4	0	0	0	0	0	0
			5	7.06	7.06	0	0	0	0
			6	13.8	13.8	0	0	0	0
			7	7	7	0	0	0	0
			8	1.35	1.34	0	0	0	0
43	KIA358	IC2	1	0.1	0.1	0	0	0	0
			2	0.1	0.1	0	0	0	0
			3	0.1	0.1	0	0	0	0
			4	0	0	0	0	0	0
			5	0	0	0	0	0	0
			6	0.14	0.14	0	0	0	0
			7	0	0	0	0	0	0
			8	5.24	5.24	0	0	0	0

HH38WX-ST IC PIN & TRANSISTOR PIN VOLTAGE

ITEM	PART NAME	LOCATION	PIN	CB RX MODE (V)		CB TX MODE (V)		WX MODE (V)	
				ST ON	ST OFF	ST 0N	ST OFF	ST ON	ST OFF
44	MC14066	IC202	1	0	0	0	0	0	0
			2	0	0	0	0	0	0
			3	0	0	0	0	0	0
			4	0	0	0	0	0	0
			5	4.5	0	4.5	0	4.3	0
			6	4.5	0	4.5	0	4.3	0
			7	0	0	0	0	0	0
			8	0	0	0	0	0	0
			9	0	0	0	0	0	0
			10	0	0	0	0	0	0
			11	0	0	0	0	0	0
			12	0	4.5	0	4.5	0	4.3
			13	0	4.5	0	4.5	0	4.3
			14	4.6	4.6	5.35	5.3	4.7	4.7
45	TA31101F	IC201	1	0.6	0.6	0.5	0.5	0.6	0.7
			2	0.83	0.83	0.82	0.82	0	0.8
			3	1.2	1.2	1.2	1.2	0.8	1.2
			4	0	0	0	0	0	0
			5	1.2	1.2	1.2	1.2	0.6	1.2
			6	1.2	1.2	1.2	1.2	0.6	1.2
			7	1.2	1.2	1.2	1.2	0.6	0.6
			8	1.3	1.3	1.03	1.03	0.6	0.6
			9	1.3	1.3	1.03	1.03	0.6	0.6
			10	1.2	1.2	1.2	1.2	0.6	0.6
			11	1.2	1.2	1.2	1.2	0.6	0.6
			12	1.2	1.2	1.2	1.2	0.6	0.6
			13	4.28	4.28	5	5	0.6	0.6
			14	1.2	1.2	1.2	1.2	0.6	0.6
			15	0.83	0.83	0.82	0.82	0.6	0.6
			16	0.5	0.5	0.5	0.5	0.6	0.6

HH38WX-ST IC PIN & TRANSISTOR PIN VOLTAGE

ITEM	PART NAME	LOCATION	PIN	CB RX MODE (V)		CB TX MODE (V)		WX MODE (V)	
				ST ON	ST OFF	ST 0N	ST OFF	ST ON	ST OFF
46	TA10930V	IC1	1	5.12	5.16	0	0	5.26	5.26
			2	5	4.6	0	0	4.7	4.7
			3	5	4.6	0	0	4.7	4.7
			4	5.18	5.2	0	0	5.3	5.3
			5	1.24	1.24	0	0	1.24	1.24
			6	1.24	1.24	0	0	1.24	1.24
			7	1.3	1.3	0	0	1.3	1.3
			8	1.3	1.3	0	0	1.3	1.3
			9	1.3	1.3	0	0	1.3	1.3
			10	5.12	5.12	0	0	5.26	5.26
			11	5.2	5.2	0	0	5.3	5.3
			12	2.2	2.2	0	0	2.3	2.3
			13	1.6	1.6	0	0	1.6	1.6
			14	0	0	0	0	0	0
			15	0	0	0	0	0	0
			16	0	0	0	0	0.38	0.38
			17	1.36	1.36	0	0	1.4	1.4
			18	1.36	1.36	0	0	1.4	1.4
			19	2.6	2.6	0	0	2.66	2.66
			20	0	0	0	0	0	0
			21	0	0	0	0	0	0
			22	0	0	0	0	0	0
			23	0	0	0	0	0	0
			24	1.4	1.4	0	0	1.4	1.4

HH38WX-ST IC PIN & TRANSISTOR PIN VOLTAGE

ITEM	PART NAME	LOCATION	PIN	CB RX MODE (V)		CB TX MODE (V)		WX MODE (V)	
				ST ON	ST OFF	ST 0N	ST OFF	ST ON	ST OFF
47	LC72322	IC301	1	2.35	2.35	2.34	2.34	2.22	2.25
			2	0	0	0	0	0	0
			3	5.4	5.4	5.4	5.4	5.45	5.6
			4	0	0	0	0	0	0
			5	0	0	0	0	0	0
			6	6.12	6.12	6.12	6.12	6.12	6.12
			7	0	0	0	0	0	0
			8	0	0	0	0	0	0
			9	2.44	2.44	3.9	2.4	2.4	2.4
			10	0	0	0	0	0	0
			11	0	0	5.4	0	0	0
			12	5.4	5.4	5.4	5.4	0	5.12
			13	0	0	0	0	0	0
			14	5.4	5.4	5.4	5.4	0	5.4
			15	0	5.4	5.4	5.4	0	0
			16	0	0	0	0	0	0
			17	5.4	5.4	5.4	5.4	5.2	5.2
			18	0	0	0	0	4.9	4.9
			19	0	5.45	0	5.45	0	5.2
			20	0	0	0	0	0	0
			21	0	0	0	0	0	5.2
			22	0	0	0	0	0	5.2
			23	0	0	0	0	0	5.2
			24	5.45	5.45	0	0	0	5.2
			25	0	0	0	0	0	5.2
			26	5.45	5.45	0	0	0	5.2
			27	5.45	5.45	5.45	5.45	5.2	5.2
			28	5.45	5.45	5.45	5.45	5.2	5.2
			29	5.45	5.45	5.45	5.45	5.2	5.2
			30	5.45	5.45	5.45	5.45	5.2	5.2
			31	5.45	5.45	5.45	5.45	5.2	5.2
			32	0	0	0	0	0	0
			33	0	0	0	0	0	0
			34	0	0	0	0	0	0
			35	0	0	0	0	0	0
			36	2.72	2.72	2.72	2.72	2.6	2.6
			37	2.72	2.72	2.72	2.72	2.6	2.6
			38	2.72	2.72	2.72	2.72	2.6	2.6
			39	2.72	2.72	2.72	2.72	2.6	2.6
			40	2.72	2.72	2.72	2.72	2.6	2.6

HH38WX-ST IC PIN & TRANSISTOR PIN VOLTAGE

ITEM	PART NAME	LOCATION	PIN	CB RX MODE (V)		CB TX MODE (V)		WX MODE (V)	
				ST ON	ST OFF	ST 0N	ST OFF	ST ON	ST OFF
47	LC72322	IC301	41	2.72	2.72	2.72	2.72	2.6	2.6
			42	2.72	2.72	2.72	2.72	2.6	2.6
			43	0	2.72	2.72	2.72	2.6	2.6
			44	2.72	2.72	2.72	2.72	2.6	2.6
			45	2.72	2.72	2.72	2.72	2.6	2.6
			46	2.72	2.72	2.72	2.72	2.6	2.6
			47	2.72	2.72	2.72	2.72	2.6	2.6
			48	2.72	2.72	2.72	2.72	2.6	2.6
			49	2.72	2.72	2.72	2.72	2.6	2.6
			50	2.72	2.72	2.72	2.72	2.6	2.6
			51	2.72	0	2.72	2.72	2.6	2.6
			52	2.72	2.72	2.72	2.72	2.6	2.6
			53	2.72	2.72	2.72	2.72	2.6	2.6
			54	0	2.72	2.72	2.72	2.6	2.6
			55	2.72	2.72	2.72	2.72	2.6	2.6
			56	2.72	2.72	2.72	2.72	2.6	2.6
			57	2.72	2.72	2.72	2.72	2.6	2.6
			58	2.72	2.72	2.72	2.72	2.6	2.6
			59	2.72	2.72	2.72	2.72	2.6	2.6
			60	2.72	2.72	2.72	2.72	2.6	2.6
			61	2.72	2.72	2.72	2.72	2.6	2.6
			62	2.72	2.72	2.72	2.72	2.6	2.6
			63	2.72	2.72	2.72	2.72	2.6	2.6
			64	2.72	2.72	2.72	2.72	2.6	2.6
			65	2.72	2.72	2.72	2.72	2.6	2.6
			66	5.47	5.47	5.47	5.47	5.25	5.25
			67	6.2	6.2	6.2	6.2	6	6
			68	5.45	5.45	5.45	5.45	5.24	5.24
			69	0	0	2.74	0	0	0
			70	0	0	0	0	0	0
			71	0	0	0	0	0	0
			72	5.45	5.45	5.45	5.45	5.5	5.25
			73	5.45	5.45	5.45	5.45	5.25	5.25
			74	0	0	0	0	2.54	2.54
			75	2.6	2.6	5.6	2.6	0	0
			76	0	0	0	0	0	0
			77	0.5	0.5	3	0.5	0.7	0.8
			78	1.1	1.1	1.1	1.1	1.1	1.1
			79	0	0	0	0	0	0
			80	2.56	2.56	0	2.56	2.5	2.5