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Service Manual

For

25 NW ST
25 WX NW ST

Model 25 NW ST / 25 WX NW ST

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Issued on November 12, 1999

25 NW ST / 25 WX NW ST Theory of Operation

The COBRA models CB25LST-NW and CB25WX-NW are the Citizen band AM radio transceivers operated in the frequency range of 26.965 to 27.405 MHz (40 channels). For model CB25WX-ST, it can also receive the seven channels of 162 MHz Weather signal.

1. CB mode of operation

1.1 CB Transmitter section

When in transmit mode, TR15 and the crystal oscillator generate a fundamental frequency 10.24 MHz and send it to the Phase-Locked-Loop IC3 25LTD to produce the reference frequencies of 16.725 to 17.165 MHz. The fundamental frequency and the reference frequencies are then mixed up in IC2 TA7310P to produce the RF signal of 26.695 to 27.405 MHz. This signal, after magnified by the RF amplifiers TR8 and TR7, is fed to the antenna for transmitting.

In the mean time, the speech signal picked up by the microphone is amplified by TR13 and IC1 TA7222AP, and then applied to the collectors of TR8 and TR7 for RF amplitude modulation. Thus completes the speech signal modulation and transmitting.

A SoundTracker switch controls the speech signal path of the microphone amplifier TR13. When the ST switch is set to ON, it cuts the TR13 output and directs it to a Componder chip IC801 TA31101AP for speech signal dynamic range compressing. The output of IC801 is then fed to IC1 TA7222AP for the remaining processing. When the ST switch is set to OFF, the componder function is turned off.

1.2 CB Receiver section

When in receive mode, TR15 and the crystal oscillator generate a fundamental frequency 10.24 MHz and send it to the Phase-Locked-Loop IC3 25LTD to produce the first local oscillator frequencies 16.270 to 16.710 MHz.

In the mean time, the AM RF signal (26.695 to 27.405 MHz) picked up by the antenna is magnified by TR1 and fed to the first mixer FET1. This signal is then mixed with the first local oscillator frequencies 16.270 to 16.710 MHz. That produces the first IF frequency 10.695 MHz. The first IF signal, after passing through the ceramic filter, is fed to the second mixer FET2 for mixing with the second local oscillator frequency 10.24 MHz. That produces the second IF frequency 455 kHz. The second IF signal, after filtered by the ceramic filter and magnified by TR2, TR3, TR4, is demodulated by D6 for speech signal recovery. The recovered speech signal is then magnified by the TA7222 and fed to the speaker. Thus completes the speech signal receiving.

A SoundTracker switch controls the recovered speech signal path of the demodulation diode D6. When the ST switch is set to ON, it cuts the D6 output and directs it to a Compander chip IC801 TA31101AP for speech signal dynamic range expanding. The output of IC801 is then fed to IC1 TA7222AP for the remaining processing. When the ST switch is set to OFF, the compander function is turned off.

2. PA mode of operation

With the CB-PA switch set at PA position, the speech signal picked up by the microphone is fed to TR13 and TA7222 for magnification to a level of about 4 watts, and then via the PA terminal sent to the speaker for speech sound reproduction.

A SoundTracker switch controls the speech signal path of the microphone amplifier TR13. When the ST switch is set to ON, it cuts the TR13 output and directs it to a Compander chip IC801 TA31101AP for speech signal dynamic range compressing. The output of IC801 is then fed to IC1 TA7222AP for the remaining processing. When the ST switch is set to OFF, the compander function is turned off.

3. WX mode of operation (162 MHz Weather receiving) -- for CB25WX-ST only

3.1 With the CB-WX switch set at WX position, the 162 MHz Weather signal (frequency modulated) picked up by the antenna is magnified by Q601 and fed to the mixer Q606. In the mean time, Q602 and crystal oscillator generate a local oscillation frequency in the range of 162 MHz, also fed to Q606 for mixing. That produces the IF frequency 455 kHz. The IF signal, after magnified by Q603, Q604, Q605, is frequency discriminated by D605, D606 for audio signal recovery. The recovered WX signal is then magnified by Q703, Q801, IC TA7222 and fed to the speaker for WX signal reproduction.

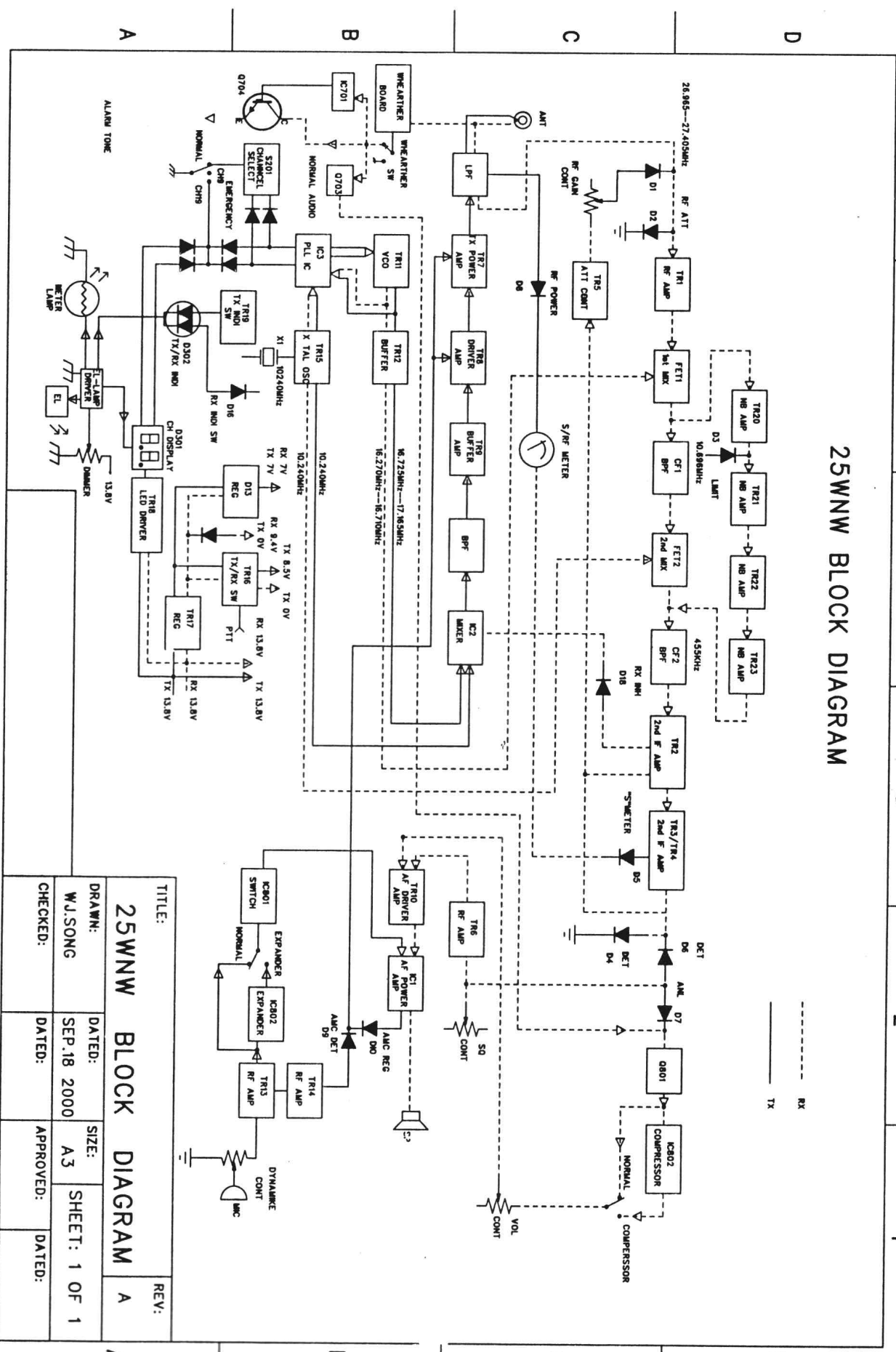
A SoundTracker switch controls the recovered WX signal path of Q801. When the SF switch is set to ON, it cuts the Q801 output and directs it to a Compander chip IC801 TA31101AP for speech signal dynamic range expanding. The output of IC801 is then fed to IC1 TA7222AP for the remaining processing. When the ST switch is set to OFF, the compander function is turned off.

3.2 Before the Weather message is broadcasted, there will be a 10-second alert tone (at 1050 Hz) sending out from the Weather station. When received the 1050 Hz alert tone signal, the tone decoder IC701 NJM567D sends out a control signal that turns on the power supply for the CB transceiver. It also turns on Q704 and sends the 1050 Hz signal to IC1 for amplification and to be produced at the speaker output for alerting.

4. Front panel illumination

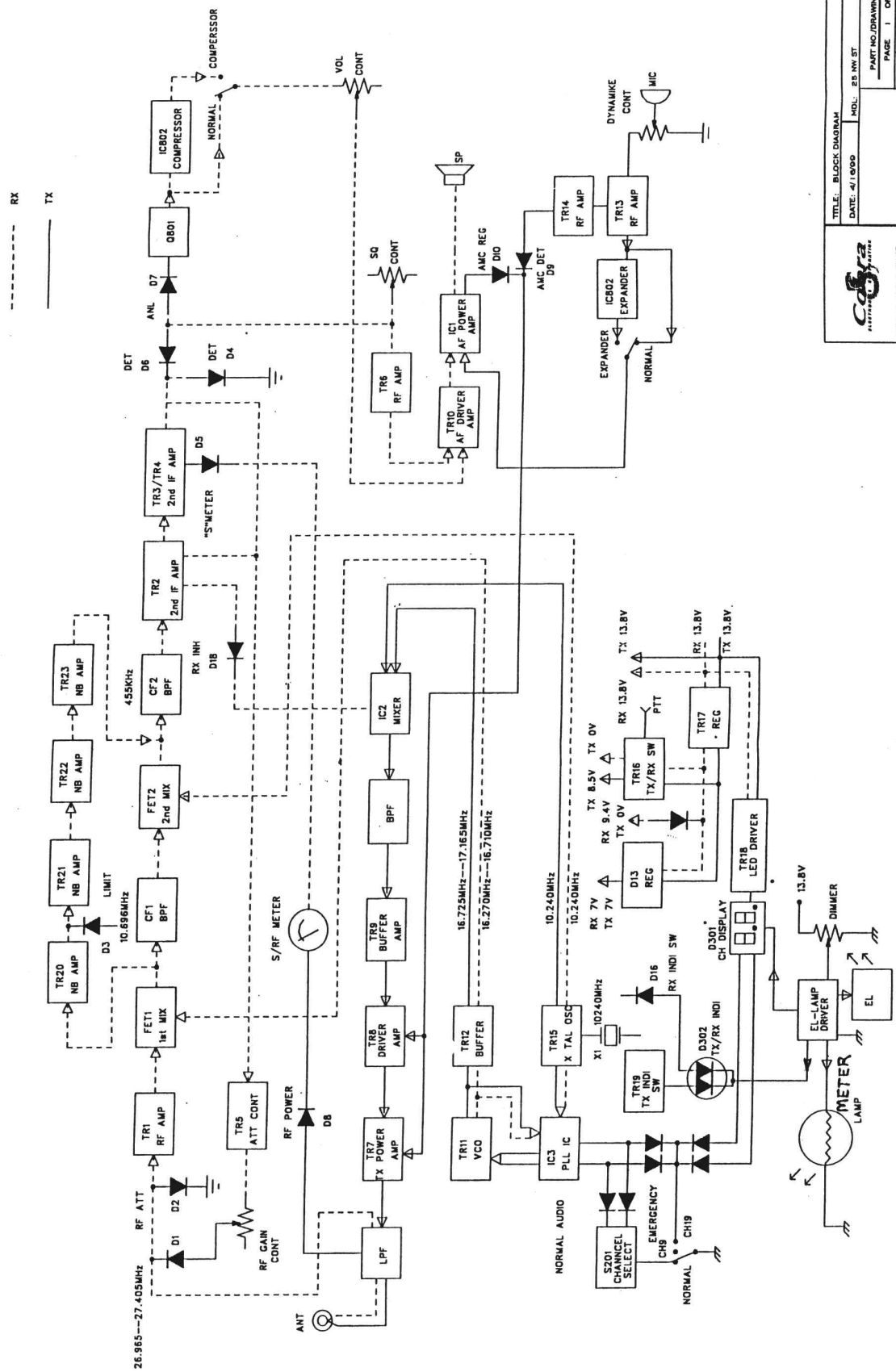
The front panel is illuminated by an Electroluminescent (EL) lamp. Which is a flat panel light source driven by 180 Vp-p, 400 Hz AC voltage. This AC voltage is generated by a high-voltage EL lamp driver IMP803. The brightness of the light sources on the front panel (including the EL lamp, the LED channel display, the meter lamp, etc.) is controlled by a light dimmer VR 404.

25W11W BLOCK DIAGRAM



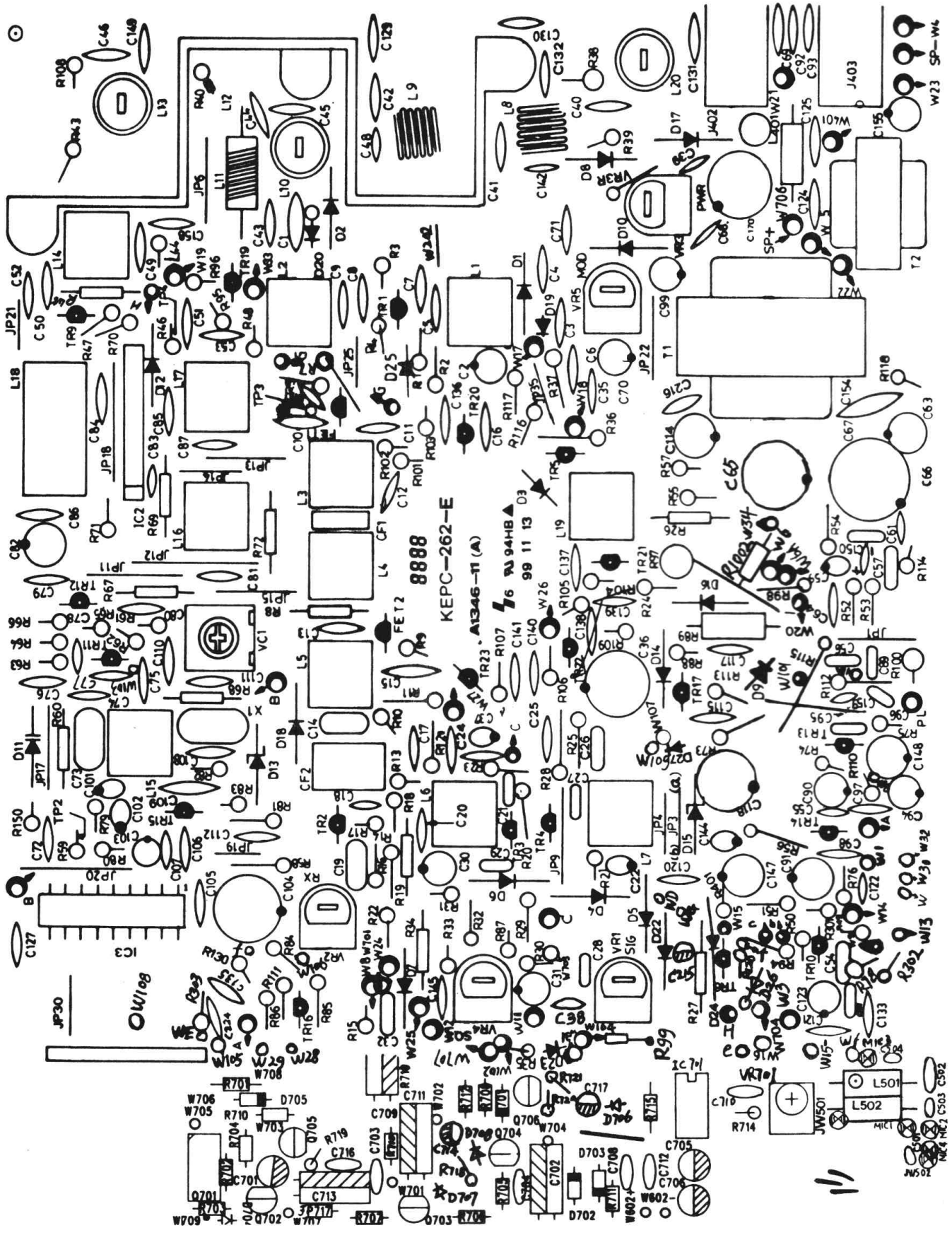
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DRAWN: W.J. SONG	DATED: SEP. 18 2000	SIZE: A3	SHEET: 1 OF 1	
CHECKED:	DATED:	APPROVED:	DATED:	

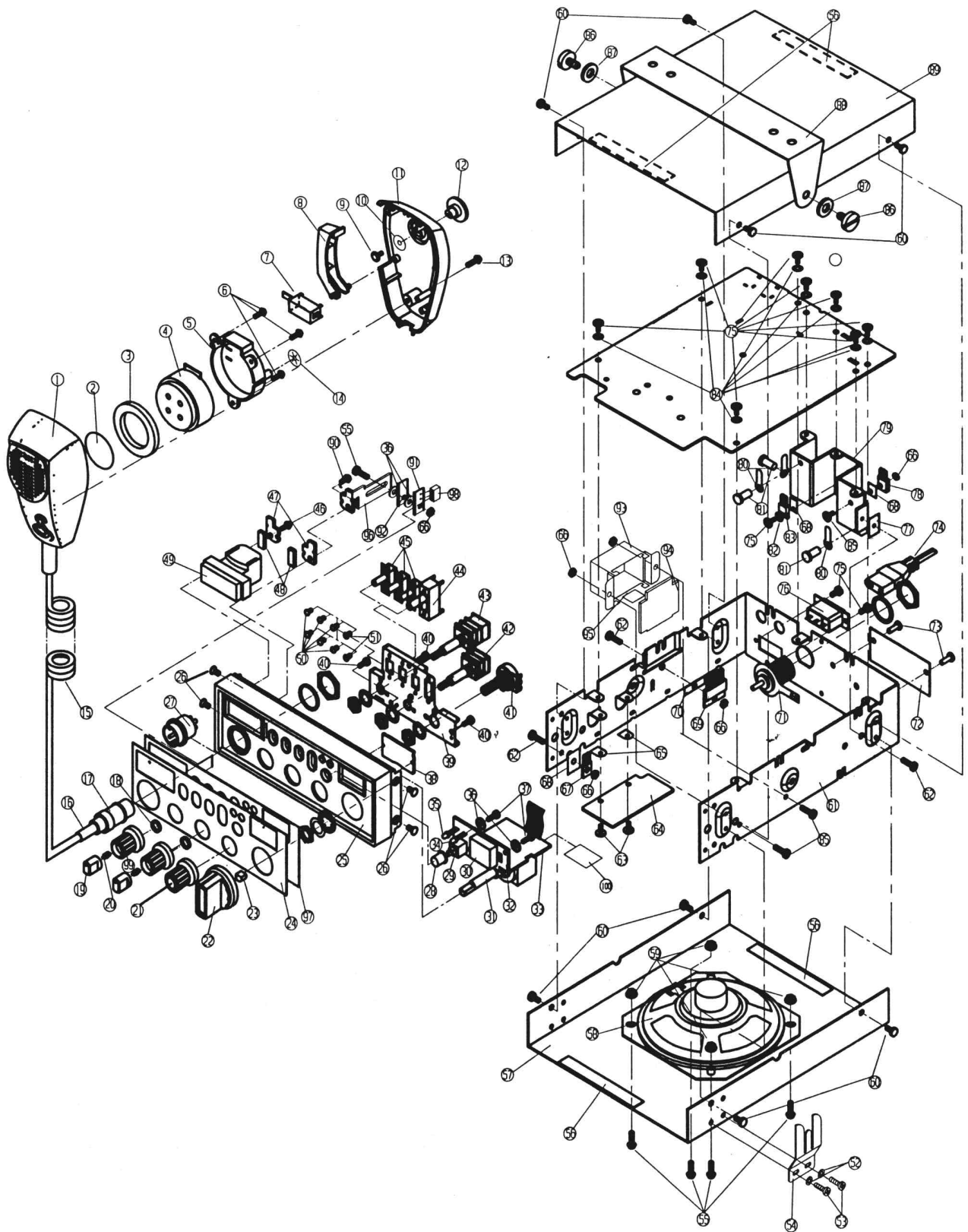
6 5 4 3 2 1



COBRA
 8800 W. CORTLAND ST.
 CHICAGO, ILLINOIS 60670

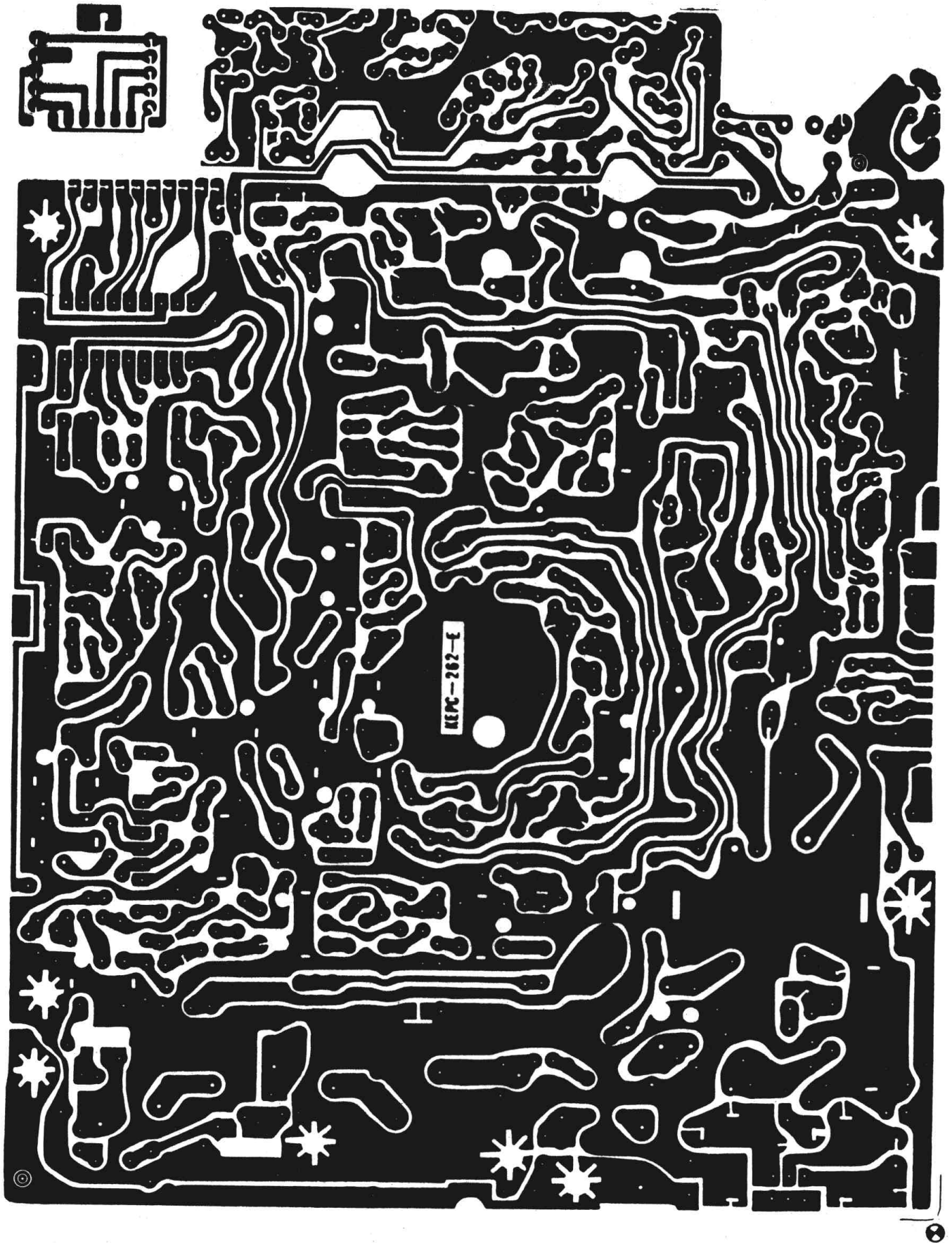
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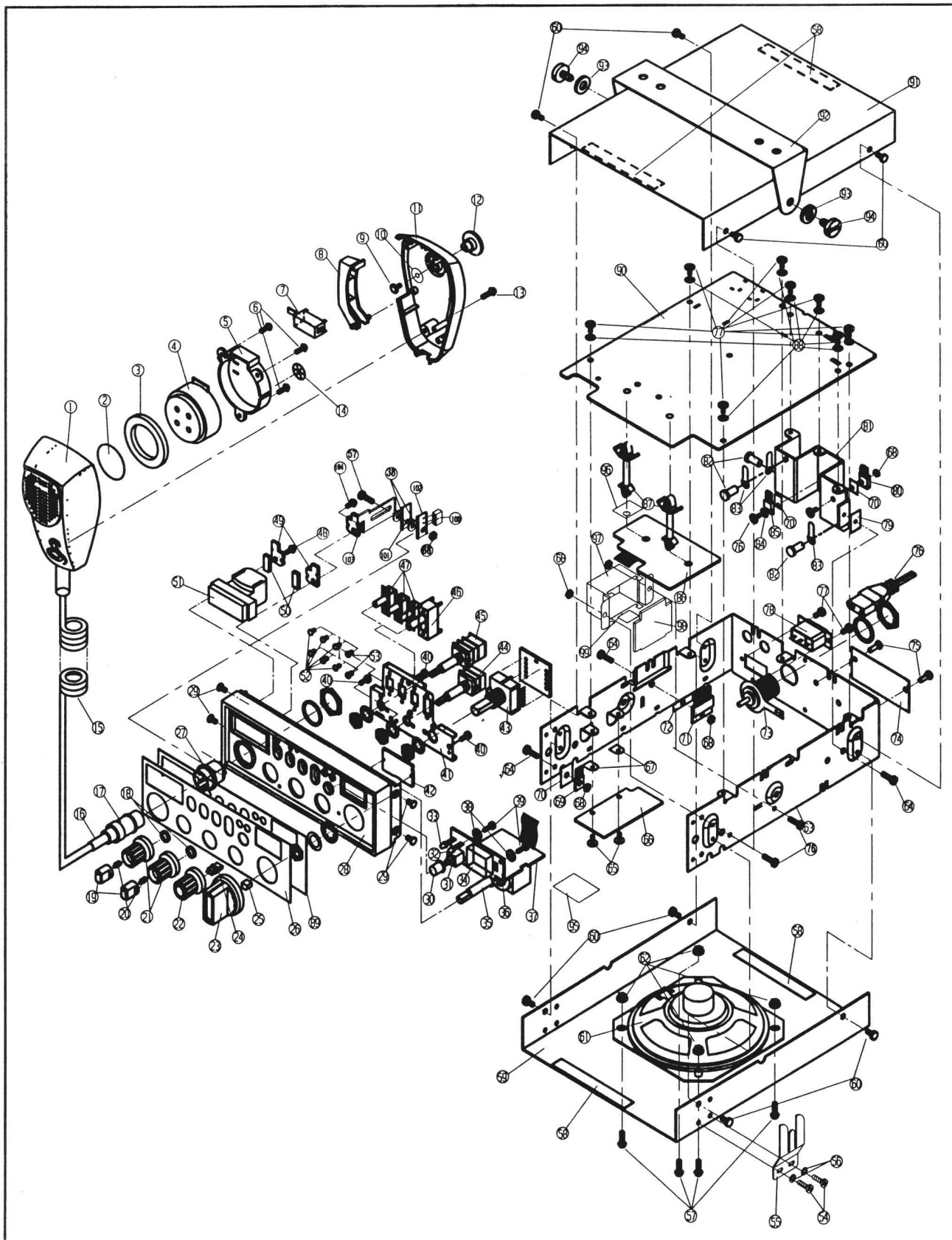




MODEL: 25 NW ST

NOV 06, 99





MODEL: 25WX NW ST

25WNW PART LIST

ITEM	P/N	DESCRIPTION	QTY
1	KEM-P7001A	FRONT CABINET	1
2	KEM-OT7001	FELT DIA. 28	1
3	KEM-OT0702	SPONGY 38 OD X26 ID X 5 THK.	1
4	KESP-016	MIC DYNAMIC	1
5	KEM-P7003A	MIC BRACKET	1
6	KEM-TS2608B1N	TAPPING SCREW B/HD T2.6X8	3
7	KESW-079	PUSH BUTTON SWITCH 4P2T	1
8	KEM-P7103E	PTT SWITCH KNOB	1
9	KEM-TS2606B1N	TAPPING SCREW B/HD T2.6X6	1
10	KEM-WP0952805N	M2.8 PLAIN WASHER 103J-1	1
11	KEM-P7002A	REAR CABINET	1
12	KEM-P7107B	HANGING KNOB	1
13	KEM-TS3010P1B	TAPPING SCREW P/HD T3X10	1
14	KEM-WI1003903X	SELF LOCKING WASHER DIA. 4	1
15	KETC-036-5	CURL CORD 4 CORES 3.05M	1
16	KEM-OT9005	PVC SLEEVE-CURL CORD	0.03
17	KEJ-163	MIC	1
18	KEM-M8407A	LOCK SPRING	2
19	KEM-P8406	OUTER KNOB	2
20	KEM-M8403	INSERT 1	2
21	KEM-P8407	INNER KNOB	2
22	KEM-P8501D	SW KNOB	1
23	KEM-P0708B	BAND SELECT KNOB	1
24	KEM-M8501	INSERT	1
25	KEM-M0610-01	INSERT KNOB	1
26	KEM-OT8602	OVERLAY	1
27	KEJ-032-1	MIC SOCKET 4P1N PLT-164-R	1
28	KEM-P8601E-01	FRONT CABINET	1
29	KEM-MS3006C2N	SCREW-MACHINE F/H M3X6MM	4
30	KEM-P8405B	PUSH COVER	1
31	KESW-064	PUSH BUTTON SWITCH 4P2T	1
32	KED-L204R	DIODE LED EL204HD RED	1
33	KED-L64GR	DIODE LED ET 0362-25-063 RED-GREEN	1
34	KED-BDC402NI-L9	DIODE LED 7 SEGS 2DIGITS	1
35	KESW-047	CHANNEL SELECTOR 40CH	1
36	KEPC-261-C	PCB LED 54X25X1.6MM	1
37	KEPC-260-A	PCB CH SWITCH	1
38	KEM-WF0703308X	FIBRE WASHER 7.0ODX3.3IDX0.8TH(1103-2)	4
39	KEM-TS2306B2N	TAPPING SCREW B/HD T2.3X6	2
40	KEM-TS26045B2N	TAPPING SCREW B/HD T 2.6X4.5	3
41	KEM-M8601B-01	BRACKET	1
42	KEM-P9003B	FILTER DISPLAY	1

25WNW PART LIST

43	KESW-063	CHAN SELECTOR	1
44	KER-D502A502B	VR DUAL SHAFT W/SW	1
45	KER-D503B503A-7	VR DUAL SHAFT W/SW	1
46	KESW-027-2	SLIDE SW 2P3T	1
47	KESW-028-2	SLIDE SW 2P2T	3
48	KEM-TS2605B2N	TAPPING SCREW B/HD T2.6X5	1
49	KEM-M8603	METER CLAMP	2
50	KEM-OT0608	CLAMP CUSHION	2
51	KEOE-OT123	METER ANALOG	1
52	KEM-MS2005B2N	SCREW-MACHINE B/HD M2.0X5	6
53	KEM-MS2604P2N	SCREW-MACHINE P/HD SCREW	2
54	KEM-TS3506P5N	TAPPING SCREW T3.5X6 P/HD	2
55	KEM-M9014	BRACKET-MIC BONY	1
56	KEM-WI0643304N	INNER TOOTH LOCK DIA 3.0	2
57	KEM-MS3008B2N	SCREW-MACHINE M3X8	4
58	KEM-OT0706	FELT STRIP 75X10	4
59	KEM-M8605A	BOTTOM COVER	1
60	KEM-MS3006B2N	M3X6 B.HD SCREW	8
61	KESP-056	SPEAKER 8 OHM 5 W	1
62	KEM-NH0553040Z	FLANGE NUT M3.0X0.5X2.2T(3504-1)	4
63	KEM-M8606A	FRAME	1
64	KEM-MS3008P2PN	PLASTIC SCREW P/HD M3X8(NYLON)	3
65	KEM-TS3006B5Z	TAPPING SCREW B/HD M3X6	2
66	KEPC-264-B1	COMPANDER PCB 31X61X1.6MM	1
67	KEM-OT8601	INSULATION SHEET 2	2
68	KEM-NH0553022G	HEX NUT M3.0X0.5X2.2	6
69	KET-2SC1957Q	TRANSISTOR NPN 2SC1957Q	1
70	KEOE-OT125-1	MICA SHEET	2
71	KEIC-TA7222AP	IC TA7222AP POWER AMP	1
72	KEOE-OT124	MICA SHEET FOR HEAT SINK INSULATION	1
73	KEJ-010	ANTENNA RELEPTACLE	1
74	KEM-M0608-02	NAME PLATE	1
75	KEM-OT9002	BLIND RIVET DIA 3.2X6	2
76	KEM-MS3008P2N	M3X8 B/HD SCREW	3
77	KEM-MS3006B2N	MACHINE SCREW M3X6	11
78	KEJ-060	JACK DC POWER	1
79	KEOE-OT127	MICA SHEET FOR HEAT SINK INSULATION	1
80	KET-2SC1957Q	TRANSISTOR NPN 2SC1957Q	1
81	KEM-M0708A	HEAT SINK	1
82	KEM-OT9002	BLIND RIVET DIA 3.2X6	3
83	KEM-AN3314003YB	M3.0 ANT TERMINAL	3
84	KEOE-OT128	BUSHING	1
85	KET-C2078E	TRANSISTOR NPN 2SC2078E	1

25WNW PART LIST

86	KEPC-145-01	PCB WX 74X50X1.6MM	1
87	KEM-OT8501	PC SUPPORT	2
88	KEM-WI0643304N	INNER TOOTH LOCK WASHER DIA 3.0	8
89	KEOE-OT408	EL LAMP	1
90	KEPC-262-C	PCB MAIN 187X150X1.6MM	1
91	KEM-M8604A	TOP COVER	1
92	KEM-M0601	MOUNTING PLATE	1
93	KEM-OT0704	RUBBER RING 15ODX7IDX2 THK.	2
94	KEM-M0702	MOUNTING PLATE SCREW	2
95	KEM-OT8502	INSULATION SHEET	0.5
96	KEM-OT8404	INSULATION SHEET 1	1
97	KEM-M8411A	SHIELD CASING	1
98	KEPC-388-C	PCB EL 26X30X1.6MM	1
99	KEM-OT8407	CUSHION	1
100	KEJ-264	PCB EL 26X30X1.6MM	1
101	KEM-OT8403	CUSHION FOR CONTACT PCB	1
102	KEPC-397-A	PCB FOR EL CONNECTOR	1
103	KEM-M8412	BRACKET	1
104	KEM-TS2610B2N	TAPPING SCREW B/HD 2.6X10	1

Cobra Electronics

IC & TRANSISTOR VOLTAGE TABLE

Model: 25 WX NW ST

Date: 10/16/99

The Level of Transistor's pin (Main pcb)

(UNIT:volt)

TR. NO.	TX			RX			REMARKS
	C	B	E	C	B	E	
TR1	0	0	0	8.7	1.9	1.2	
TR2	0	0	0	8.3	1.6	0.9	
TR3	0	0	0	1.7	0.7	0	
TR4	0	0	0	12	1.7	1	
TR5	0	0	0	0	0.7	0	
TR6	0	0	0	1(sq off)	0(sq off)	0	
				0(sq off)	0.6(sq off)	0	
TR7	13	0	0	0	0	0	
TR8	11	0	0	0	0	0	
TR9	12	1.2	1.4	0	0	0	
TR10	0	0	0	10.5	0(sq off)	0(sq off)	
				10.5	1(sq off)	0.4(sq off)	
TR11	6.6	3.6	3	6.6	3.6	3.4	
TR12	2.9	2.2	1.6	2.9	2.2	1.6	
TR13	3	1.3	0.7	0	0	1.7	
TR14	0	0	0	0	0	0	
TR15	7.9	6.7	6	7.9	6.7	0	
TR16	9	0	9	9	0	6	
TR17	12.4	9.6	9	12.4	9.6	9	
TR18	13	7.8	7.1	13	7.8	7.1	
TR19	1.7	0.7	0	0	0.7	0	
*TR20	0	0	0	12.3	3	2.4	
*TR21	0	0	0	6.4	0.6	0	
*TR22	0	0	0	0	12.3	12.3	
*TR23	0	0	0	0	0	0	
**FET1	0	0	0	7.8	0.7	0	
**FET2	0	0	0	12	1.1	0	
Q801	5.3	3.1	2.4	5.3	3.1	2.4	
TP2	3.5+/-0.2			3.5+/-0.2			

TP3(Vpp)		>0.35		
TP4(Vpp)	>1.2			

MARKER:

1. Marker '*' -----the voltages of TR20,TR21,TR22,TR23 ismeasured in NB ON.
2. Marker '**' ----- the 'c' means 'D' ,the 'b' means 'G', the 'e' means 'S'.

The Level of IC1,IC2,IC3

(UNIT:volt)

IC NO.	PIN NO.							
	1	2	3	4	5	6	7	8
IC1 RX	8	4.4	0	7.5	3.74	3.74	1.94	0
TX	8	4.4	0	7.4	3.65	3.65	2.9	7.16
IC2 RX	0	0	0	0	0	0	0	0
TX	2.59	1.9	1.2	2.6	0	8.7	0	0
IC3 RX	13.2	6.32	0	0	0.97	0.97	0	0
TX	12.85	6.16	0	0	1.13	1.14	0	0
	PIN NO.							
	9	10	11	12	13	14	15	16
IC1 RX	0	6.4	6.4	6.4	0	0	0	0
TX	0	0	6.4	6.4	0	0	0	0
IC2 RX	0							
TX	8.5							
IC3 RX	6.55	12.3						
TX	6.55	12.3						
	PIN NO.							
	17	18						
IC1 RX	0	0						
TX	0	0						

The Level of IC801,IC802

(UNIT:volt)

IC NO.	PIN NO.							
	1	2	3	4	5	6	7	8
IC801ST/OFF	0.9	0	0	0	1.21	1.18	1.18	1.35
(RX) ST/ON	0.9	0.84	1.2	0	1.21	1.18	1.18	1.35
IC802ST/OFF	0	0	0	0	0	0	0	0
(RX) ST/ON	0.16	0	0	0	6.44	6.44	0	0
	PIN NO.							
	9	10	11	12	13	14	15	16
IC801ST/OFF	1.66	0.02	6.73	0	6.97	1.21	0.85	0.53
(RX) ST/ON	1.66	0.02	6.73	1.09	6.45	1.21	0.85	0.53
IC802ST/OFF	0	0	0	6.97	6.97	6.97		
(RX) ST/ON	0	0	0	0	0	6.44		
IC NO.	PIN NO.							
	1	2	3	4	5	6	7	8
IC801ST/OFF	0.53	0.84	1.2	0	1.2	1.18	1.18	1.33
(TX) ST/ON	0.53	0.84	1.2	0	1.2	1.18	1.18	1.33
IC802ST/OFF	0	0	0	0	0	0	0	0
(TX) ST/ON	0	0	0	0	6.76	6.76	0	0
	PIN NO.							
	9	10	11	12	13	14	15	16
IC801ST/OFF	1.33	1.17	1.2	1.18	6.77	1.2	0.84	0.53
(TX) ST/ON	1.33	1.17	1.2	1.18	7.32	1.2	0.84	0.53
IC802ST/OFF	0	0	0	7.34	7.34	7.34		
(TX) ST/ON	0	0	0	0	0	6.76		

The Level of Transistor's pin (wx)

(UNIT:volt)

TR. NO.	Q601	Q602	Q603	Q604	Q605	Q606		
E	0.3	1.1	0	0	0	0		
C	3.6	4.6	0.63	0.6	1.25	1.8		
B	1	1.7	0.63	0.63	0.6	0.65		

The Level of Transistor's pin (auto alarm)

(UNIT:volt)

TR. NO.	WX			AUTO TURN ON				
	E	C	B	E	C	B		
Q701	13.8	13.8	13.7	13.8	13.8	13.8		
Q702	0	13.7	0	0	0.4	0.7		
Q703	1.1	1.1	1.6	1.4	1.4	1.9		
Q704	1.1	0	0	1.4	1.4	2		
Q705	0	0	0	0	0	0.6		
Q706	0	0	0.6	0	4.3	0		

The level of IC701 pin

(UNIT:volt)

PIN NO.	1	2	3	4	5	6	7	8
WX	4.5	4.3	2.1	5.6	2.7	2.7	0	0
AUTO TURN ON	4.5	4.3	2.1	5.6	2.7	2.7	0	0

The level of IC901 pin (EL)

(UNIT:volt)

	PIN NO.							
	1	2	3	4	5	6	7	8
LEVEL	5.3	2.8	90	12.4	0	41	41	2.6

