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**Craig Models 4103, 4104 and 4201 Service Manual**

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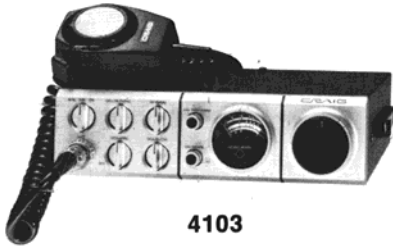
# SERVICE MANUAL

# CRAIG

4103  
4104  
4201

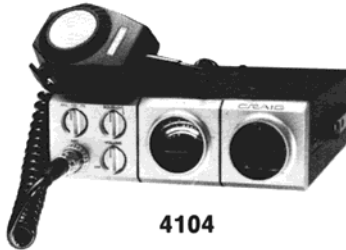
## CITIZENS BAND TRANSCEIVERS

DELUXE MOBILE  
CITIZENS BAND  
TRANSCEIVER



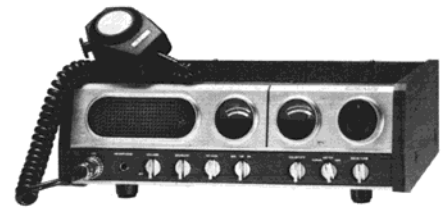
4103

CUSTOM MOBILE  
CITIZENS BAND  
TRANSCEIVER



4104

BASE  
CITIZENS BAND  
TRANSCEIVER



4201

### TECHNICAL DATA AND SPECIFICATIONS

#### GENERAL

Channels.....23  
 Frequency Range.....26.965 to 27.255 MHz  
 Frequency Tolerance..... $\pm 0.005\%$  from  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$   
 Power Source.....13.8V DC (Negative Ground)  
 or 120V AC (4201 only)

#### TRANSMITTER

RF Power Output.....4 Watts  
 Modulation Capability.....100%  
 Output Impedance.....50 Ohm  
 Spurious Attenuation.....59dB Minimum

#### RECEIVER

Sensitivity.....Better than 0.5  $\mu\text{V}$  for  
 10dB (s+n)/n  
 Adjacent Channel Rejection....Better than 60dB @  $\pm 10\text{kHz}$   
 Selectivity.....BW  $\pm 3\text{kHz}$  @ -6dB  
 Squelch.....Adjustable, threshold  
 less than 1  $\mu\text{V}$   
 RF Gain Control.....Adjustable  
 Delta Tune..... $\pm 1000$  Hz  
 Audio Output.....4 Watts  
 Automatic Noise Limiter.....Series Gate

#### PA SYSTEM

Power Output.....4 Watts

#### WARNING

FCC Rules require that ALL transmitter section adjustments, other than those supplied by CRAIG as front panel operating controls, be made by or under the supervision of the holder of an FCC First or Second Class Radio-Telephone Operator License.

Replacement or substitution of crystals, transistors, regulator diodes, or any other part of a specialized nature with parts other than recommended by CRAIG may cause the operator to be in violation of the technical regulations of Part 95 of the FCC Rules, or in violation of the Type Acceptance requirements of Part 2 of the rules.

**A PRODUCT OF CRAIG CORPORATION**

## TRANSMITTER ALIGNMENT

INSTRUMENTS REQUIRED:

- 1) RF OUTPUT POWER METER  
(50 ohm, 5 Watts)
- 2) FREQUENCY COUNTER
- 3) POWER SUPPLY
- 4) RF VTVM

GENERAL ALIGNMENT CONDITIONS:

- 1) WARM UP THE UNIT AND TEST EQUIPMENT AT LEAST 15 MINUTES BEFORE STARTING ALIGNMENT.
- 2) RF OUTPUT METER OR 50 OHM DUMMY LOAD SHOULD BE CONNECTED TO ANTENNA CONNECTOR.
- 3) COUPLING TO FREQUENCY COUNTER SHOULD BE AS LOOSE AS POSSIBLE.
- 4) ALL ADJUSTMENTS ARE MADE WITH 14.4 VOLT DC INPUT.

STEP	SET TRANSMITTER TO-	CONNECT OUTPUT INDICATOR TO -	SET CHANNEL SELECTOR TO -	ADJUST	ADJUST FOR -
1	Transmit with no modulation	RF power meter to antenna connector	Channel 13	L105,106 L107,108 L111	MAXIMUM
2				L110	4.0 Watts Output
3				R190	Needle of meter on the unit comes between 3 & 4 as calibrated on RF Power meter
4				L103	Check frequency of all channels.

CAUTION

\* Damage to other components may result if transmitter is adjusted for more than 4.0 Watts output.

## RECEIVER ALIGNMENT

INSTRUMENT REQUIRED:

- SIGNAL SOURCE  
1) RF SIGNAL GENERATOR
- OUTPUT INDICATORS  
1) AUDIO VTVM  
2) OSCILLOSCOPE

GENERAL ALIGNMENT CONDITIONS:

- 1) SIGNAL INPUT MUST BE KEPT AS LOW AS POSSIBLE TO AVOID OVERLOAD AND CLIPPING.
- 2) STANDARD MODULATION IS 400Hz AT 30% AMPLITUDE.
- 3) A NON-METALIC ALIGNMENT TOOL SHOULD BE USED FOR ALL ADJUSTMENTS.
- 4) SQUELCH CONTROL KNOB SHOULD BE SET AT EXTREME COUNTER-CLOCKWISE, UNLESS OTHERWISE SPECIFIED.

STEP	CONNECT SIGNAL SOURCE TO -	CONNECT OUTPUT INDICATOR TO -	SET SIGNAL TO -	SET CHANNEL SELECTOR TO -	ADJUST	ADJUST FOR -
1	RF Signal generator to base of Q104 (2nd mixer) through 0.01uF	Audio VTVM across speaker voice coil.	455 kHz (modulated)	Any channel	T3 T4 T5	MAXIMUM
2	RF Signal generator to Ant. connector		27.115 MHz (Channel 13 modulated)	Channel 13	L1 L2 T1 T2	MAXIMUM
3	RF Signal generator with output level of 300uV to Antenna Connector		Channel 13	Channel 13	VR156	Adjust for open squelch point.
4	RF Signal generator with output level of 100uV to antenna connector		Channel 13	Channel 13	VR137	Adjust for "S-9" on "S" Meter.
5	REPEAT ABOVE STEPS TO OBTAIN MAXIMUM SENSITIVITY.					

P A R T S P R I C E L I S T

SUBJECT TO CHANGE WITHOUT NOTICE, USE ALL AVAILABLE  
 NUMBERS AND COMPLETE DESCRIPTION WHEN ORDERING, INCLUDING MODEL NUMBER.  
 \* \* \* "THESE PRICES HAVE BEEN REVISED AS OF 10-20-75." \* \* \*

Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price	Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price
<u>4103 P A C K A G I N G</u>				<u>4201 P A C K A G I N G</u>			
	4103001	Individual Carton	3.60		4201001	Individual Carton	3.75
	4103002	Styrofoam (A)	1.40		4201002	Styrofoam (A)	1.60
	4103003	Styrofoam (B)	1.40		4201003	Styrofoam (B)	1.60
	4103004	Mtg Hardware Kit	.70		4103005	Microphone	16.00
	4103005	Microphone	16.00		4101004	Bkt, Mic Mtg	.65
	4101004	Bkt, Mic Mtg	.65			Polybag Set	.30
		Fuse, 2A	.35				
	C4933	Slide Mtg Bkt	12.95				
		Polybag Set	.30				
<u>4104 P A C K A G I N G</u>							
	4104001	Individual Carton	3.30		4101004	Bkt Mic Mtg	.65
	4104002	Styrofoam (A)	1.30			Fuse, 2A	.35
	4104003	Styrofoam (B)	1.30			Polybag Set	.30
	4103005	Microphone	16.00		C4934	Slide Mtg Bkt	
	4103004	Mtg Hardware Kit	.70				
<u>4103 C A B I N E T &amp; C H A S S I S</u>							
1	4103009	Knob, Channel Select	3.95	28	4103027	Speaker Screen	.25
2	4103011	Knob, Calibrate	.85	29	4103028	Rubber Cushion, Speaker	.80
3	C4933	Slide Mtg Bkt	12.95	30	4103029	Insulating Washer	.25
4	NSP	Bkt, PCB Mtg	**	103	2SC1816	Transistor (Q119)	
5	4103012	Cord Clamp	.30	105	2SC1173	Transistor (Q113,114)	
6	NSP	Plate Spr, Slide Mount	**	133	4103030	Speaker	3.60
7	NSP	Rubber Cushion, Cord Clamp	**	135	4103031	Rotary Sw, CH Select(S101)	9.16
8	4103013	Coupler, Rotary Sw	1.50	136	4103032	Rotary Sw, ANL/NB/PA(S103)	2.95
9	4103014	Ass'y, Front Escutcheon	6.10	137	4103033	Rotary Sw, CAL/SWR/S(S102)	5.70
10	4103015	Ass'y, Meter	5.95	138	4101034	Phone Jack, Ext SP/PA	1.45
11	NSP	Main Chassis	**	139	4103034	6P Connector Socket	1.65
12	4103016	Rear Panel	1.55	140	4103035	Ant. Connector So	1.85
13	4103017	Upper Cabinet	3.10	142	4101020	5P Mic Jack	4.15
14	4103018	Lower Cabinet	3.10	140	4101100	5P Mic Plug	4.95
15	4103019	Meter Holder	.65	143	4103036	Ass'y, Power Harness PCB	2.75
16	4103020	Bkt, Mic Jack Mtg	.45	145	4103037	Lamp Holder	.50
17	4103021	Bkt, SWR PCB Mtg	.85	146	4103038	Lamp No. 45, Meter	1.25
18	4103022	Bkt, PCB Connector	.50	147	4103039	Lamp No. 116, CH Indicator	1.25
19	4103023	Bkt, CH Select Sw Mtg	.30	194	4103040	Cont, Vol 50k W/Sw(VR102)	2.35
20	4103024	Lamp Holder	.60	195	4103041	Cont, Calibrate 10k(VR105)	1.50
21	NSP	Heat Sink RF	**	196	4103042	Cont, RF Gain 10k(VR101)	1.15
22	NSP	Heat Sink	**	197	4103043	Cont, Squelch 5k(VR104)	1.15
23	NSP	Scr Retainer	**	198	4103044	Cont, Delta Tune 10k(VR103)	1.45
24	4101014	Knob, Vol/Sq Etc	.95	302	4103045	Ass'y, SWR PCB W/Comp	4.95
25	3135017	Slide Rail	.60				
<u>4201 C A B I N E T &amp; C H A S S I S</u>							
1	4201010	Ass'y, Front Escutcheon	10.95	137	4201028	Speaker	4.05
2	4201011	Knob, CH Select	3.75	139	4103031	Rotary Sw, (S101) CH Select	9.16
3	4103013	Coupler, Rotary Sw	1.50	140	4201029	Rotary Sw, (S102) Meter	2.20
4	4201012	Meter, Signal Strength/CAL	6.95	141	4103032	Rotary Sw, (S103)ANL/NB/PA	2.95
5	4201013	Meter, Modulation/SWR/RF Power	6.95	142	4101034	Phone Jack, Ext SP/PA	1.45
6	NSP	Main Chassis	**	143	4201030	Jack Headphone	1.85
7	NSP	Front Chassis	**	144	4103035	Ant. Connector So.	1.85
8	4201014	Rear Panel	2.20		4101100	5P Mic Plug	4.95
9	4201015	Bkt, CH Select Sw Mtg	.75	146	4101020	5P Mic Jack	4.15
10	4201016	Bkt, Mic Jack Mtg	.40	147	4201031	AC Power Cord	2.95
11	NSP	Heat Sink	**	150	4201032	Fuse Holder	1.75
12	NSP	Heat Sink	**	151	4201033	Lamp Holder	.40
13	4201017	Top Cabinet	4.95	152	4201034	Fuse Holder	.60
14	4201018	Bottom Plate, Cabinet	3.95	153	4103038	Lamp No. 45, Meter	1.25
15	4201019	Meter Holder	.65	154	4103039	Lamp No. 116, CH Indicator	1.25
16	4201020	Cup Washer	.25	156	4201035	DC Terminal	1.05
17	NSP	Retainer	**	157	4201036	Bushing, AC Cord	.45
18	4201021	Bushing, Indicator Lamp	.40	205	4201037	Cont, Vol 50k W/Sw (VR102)	5.20
19	4201022	Wood Side Panel (L)	6.75	206	4103042	Cont, RF Gain 10k (VR101)	1.15
20	4201023	Wood Side Panel (R)	6.75	207	4103043	Cont, Squelch 5k (VR104)	1.15
21	4101014	Knob, Bottom Controls	.95	208	4103044	Cont, Delta Tune (VR103)	1.45
22	4201024	Plastic Feet	.40	209	4201038	Cont, Calibrate (VR105)	2.30
23	4201025	Cushion, Meter	.40	240	4201039	Feed-Thru Cap (C304)	.50
24	4201026	Rubber Grommet	.25	242	4201040	2L2 Lug Terminal	.45
25	4103029	Insulating Washer	.25	301	4201041	Power Supply PCB W/Comp	8.95
118	4201027	Power Transformer	10.65	303	4201042	Ass'y, SWR PCB W/Comp	3.25

Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price	Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price
<b>4104 C A B I N E T &amp; C H A S S I S</b>							
1	C4934	Slide Out Bkt		23	4101014	Knob, Vol/Sq	.95
2	NSP	Bracket, PCB Mtg	**	24	3136019	Slide Rail	.60
3	NSP	Cord Clamp	**	25	4103027	Speaker Screen	.25
4	NSP	Plate Spr, Slide Mount	**	26	4103028	Rubber Cushion, Speaker	.80
5	NSP	Rubber Pad, Cord Clamp	**	27	4103029	Insulating Washer-Jack	.25
6	4104010	Ass'y, Front Escutcheon	5.95	103	2SC1816	Transistor, (Q119)	
7	4104011	Ass'y, Meter	7.95	105	2SC1173	Transistor (Q113,114)	
8	4104012	Ass'y, Meter Knob, Ch Select	3.95	129	4103030	Speaker	3.60
9	4103013	Coupler, Rotary Sw	1.50	131	4103031	Rotary Sw, Ch Select (S101)	9.16
10	NSP	Main Chassis	**	132	4104018	Rotary Sw, ANL/NB/PA (S102)	2.95
11	4104013	Rear Panel	1.15	133	4101034	Phonejack, Ext SP/PA	1.45
12	4104014	Top Cabinet	2.95		4101100	5P Mic Plug	4.95
13	4104015	Bottom Cabinet	2.95	135	4101020	5P Mic Jack	4.15
14	NSP	Bracket, 6P Connector So	**	136	4103034	6P Connector Socket	1.65
15	4104016	Bkt, Lamp holder Mtg	.45	137	4103035	Antenna Connector So	1.85
16	NSP	Bkt, Escutcheon Mtg	**	138	4103036	Ass'y, Power Harness PCB	2.75
17	4103020	Bkt, Mic Jack Mtg	.50	140	4201033	Lamp Holder	.40
18	4103023	Bkt, Sw Mtg	.30	141	4103038	Lamp No. 45, Meter	1.25
19	4103024	Lamp Holder	.60	142	4104019	Lamp No. 118, CH IND(DS101)	1.25
20	NSP	Heat Sink, RF	**	188	4103040	Cont, Vol 50k(VR101)W/Power Sw	2.35
21	NSP	Heat Sink, AF	**	189	4103043	Cont, Squelch 5k (VR102)	1.15
22	NSP	Retainer, Heat Sink	**				

Ref. No.	Description	Mfr's Sugg Ret. Price	Ref. No.	Description	Mfr's Sugg Ret. Price
<b>C A P A C I T O R S</b>					
C301	Electrolytic, 2200uF/35V	3.25	C131,168,171,174,	Ceramic, 120pF/50V	.45
C114,124,135,191	" 10uF/16V	.60	183	" "	"
C148	" 3.3uF/25V	.65	C101,182	" 220pF/50V	.45
C159	" 100uF/16V	.65	C144,178	" 680pF/50V	.45
C156,151	" 33uF/16V	.60	C122,123,125,126,	" 0.04uF/50V	.45
C158,192	" 47uF/16V	.60	127,128,129,120,	" "	"
C161	Polyester Film, 0.01uF/50V	.65	132,194,195,196,	" "	"
C302	Electrolytic, 100uF/35V	.75	197,198,199,203,	" "	"
C134,136,150	" 1uF/50V	.65	303	" "	"
189,190,204,	" " "	"	C115,119,163,	" 0.001uF/50V	.45
207,157,212,209	" " "	"	C213	" "	"
C133,208	Polyester Film, 0.001uF/50V	.60	C102,103,104,105,	" 0.01uF/50V	.45
C153,205,135,160	" " 0.01uF/50V	.65	107,109,110,116,	" "	"
C162	" " 0.1uF/50V	.70	117,118,121,139	" "	"
C304	Feed-Thru, 1000pF	.45	142,143,146,147	" "	"
C120	Ceramic, 10pF/50V	.45	165,169,172,173	" "	"
C138,145,164,152	" 100pF/50V	.45	175,177,180,184	" "	"
C111,170,187	" 2pF/50V	.45	185,188,200,201,	" "	"
C108,179,186,210	" 22pF/50V	.45	202,204,205,206,	" "	"
C141	" 3pF/50V	.45	181,211,113	" "	"
C166,167,176	" 33pF/50V	.45	C193(4103)	Electrolytic, 470uF/16V	.85
C140	" 47pF/50V	.45	C193(4201)	" " "	"
C112,137	" 5pF/50V	.45	C193(4104)	" 1000uF/16V	.95

**R E S I S T O R S, CARBON, OHMS, ± 10%, 1/4W, 0.25¢ EACH, OR NOTED**

Ref. No.	Description	Ref. No.	Description	Ref. No.	Description	Ref. No.	Description
R184	10 Ohm	R128	220 Ohm	R171,175,	470 Ohm	R116(4103)	Semi-Fixed, 500 Ohm
R183,194	100 "	R126,129,	2.2k "	R180	" "	R116(4201)	Semi-Fixed, 500 Ohm
R112,164,	1k "	R157,124,	" "	R107,158,	4.7k "	R116(4104)	330 Ohm
R154,155,	" "	R196	" "	R162,188,	" "	R137,190	Semi-Fixed, 20k, .75¢
R163,301,	" "	R111,165,	22k "	R191	" "	R128(4103)	220 Ohm
R302,303,	" "	R201	" "	R101,108,	47k "	R128(4201)	220 "
R305	" "	R106,168,	270 "	R119,121,	" "	R128(4104)	470 "
R186	" " 1/2W	R189	" "	R130,141,	" "	R117(4103)	2.7k "
R196	10k "	R117,133	2.7k "	R142,143	" "	R117(4201)	2.7k "
R109,135,	100k "	R167,169,	33 "	R192	Semi-Fixed, 20k, .75¢	R117(4104)	Semi-Fixed, 10k Ohm
R139,140,	" "	R179	" "	R132	15k Ohm	R156(4103)	Semi-Fixed, 10k Ohm
R153	" "	R176	330 "	R150,199,	47k "	R156(4201)	Semi-Fixed, 10k Ohm
R114,115,	1M "	R145,174,	3.3k "	R200,202	" "	R156(4104)	Semi-Fixed, 20k Ohm
R198	" "	R187	" "	R170	560 " 1/2W	R151,156	Semi-Fixed, 10k, .75¢
R102,105,	12k "	R116	Semi-Fixed, 500 Ohm	R152	56k "		
R132,144,	" "	R110,123	330k Ohm	R185,193	68 " 1/2W		
R148,149	" "	R178,182	3.9 "	R160,161,	6.8k "		
R204	10 " 1/2W	R177	39k "	R166	" "		
R173,181,	12k "	R104,113,	470 "	R138	68k "		
R197	" "	R125,131,	" "	R103	560 "		
R118,120,	1.5k "	R134,136,	" "	R172	Metal Oxide Film, 1 Ohm 1 Watt		
R127	" "	R146,147,	" "	R304	Semi-Fixed, 10k, .75¢		
R122,159	82k "	R195	Semi-Fixed, 10k, .75¢				

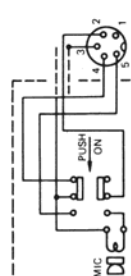
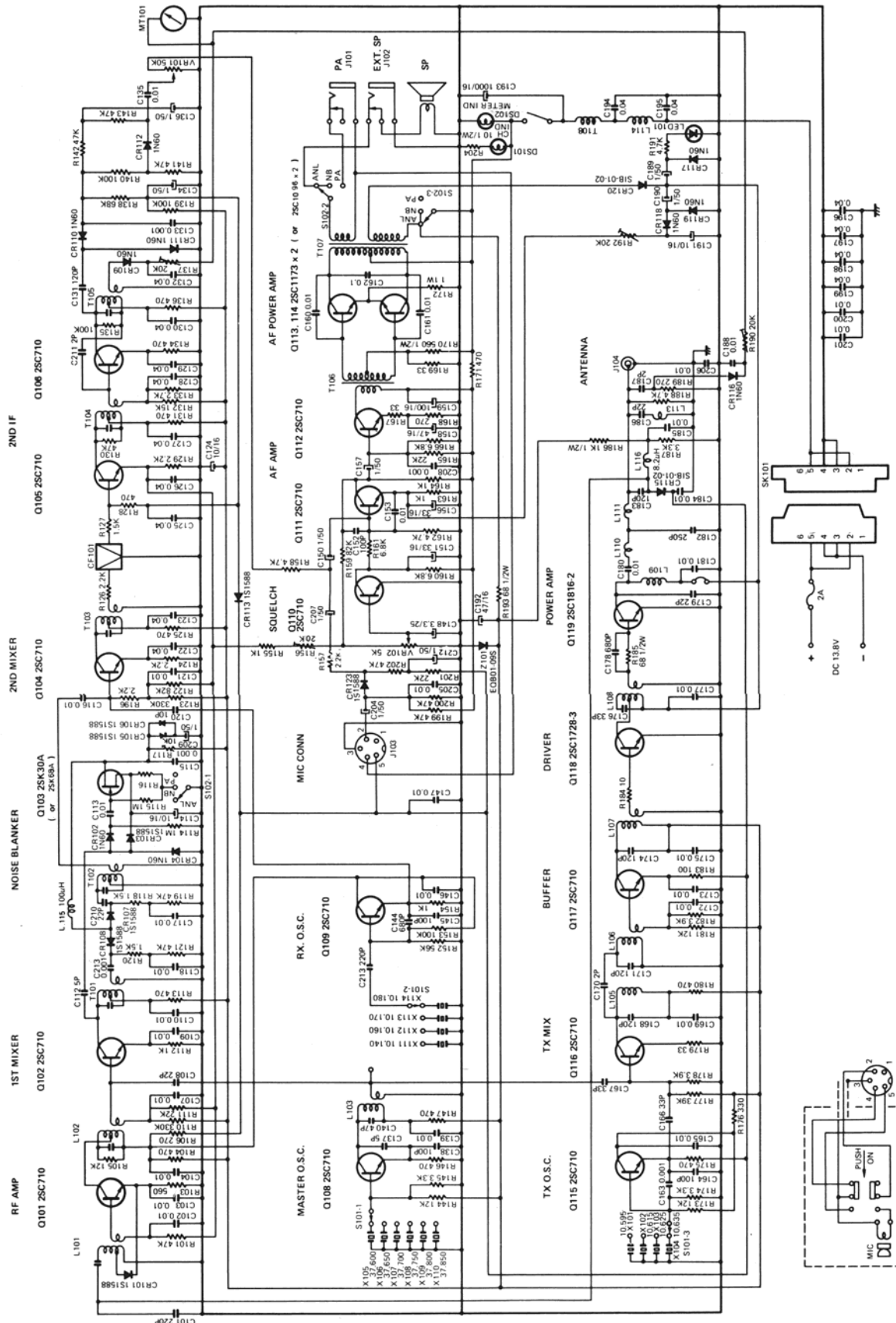




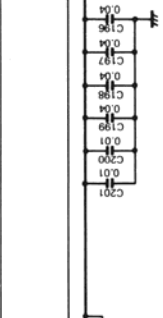




# CRAIG MODEL 4104 SCHEMATIC CIRCUIT DIAGRAM

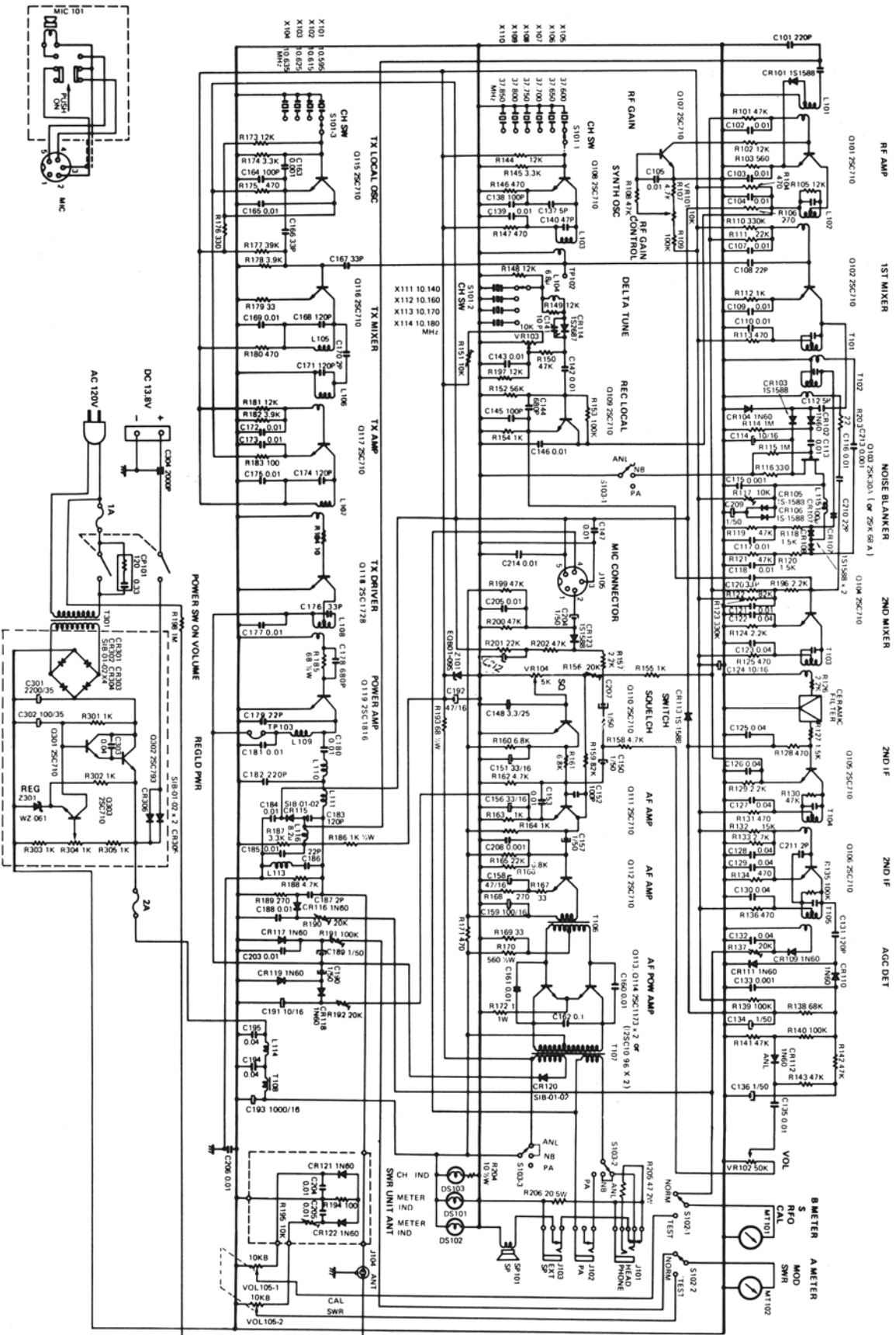


DC 13.8V

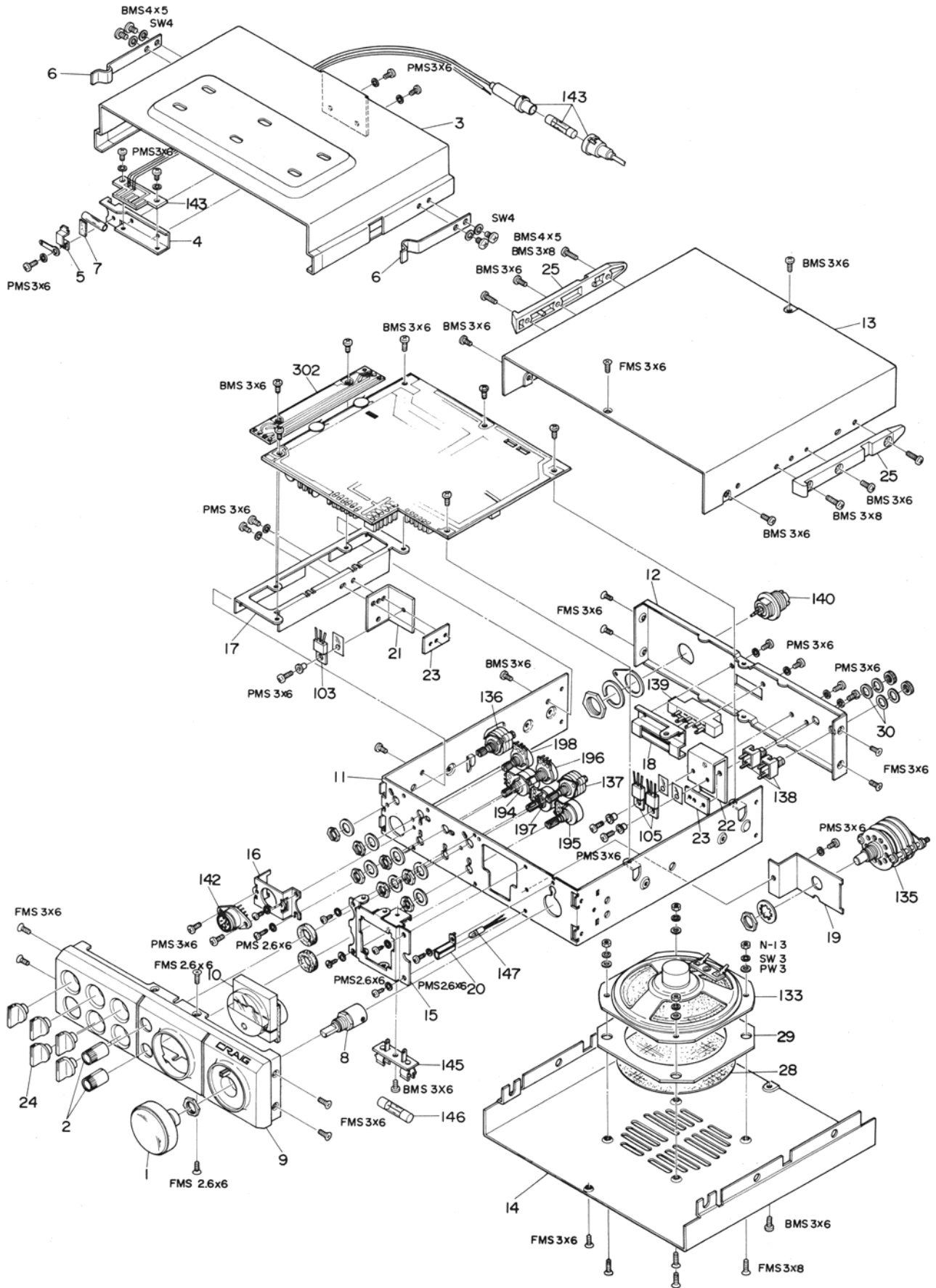




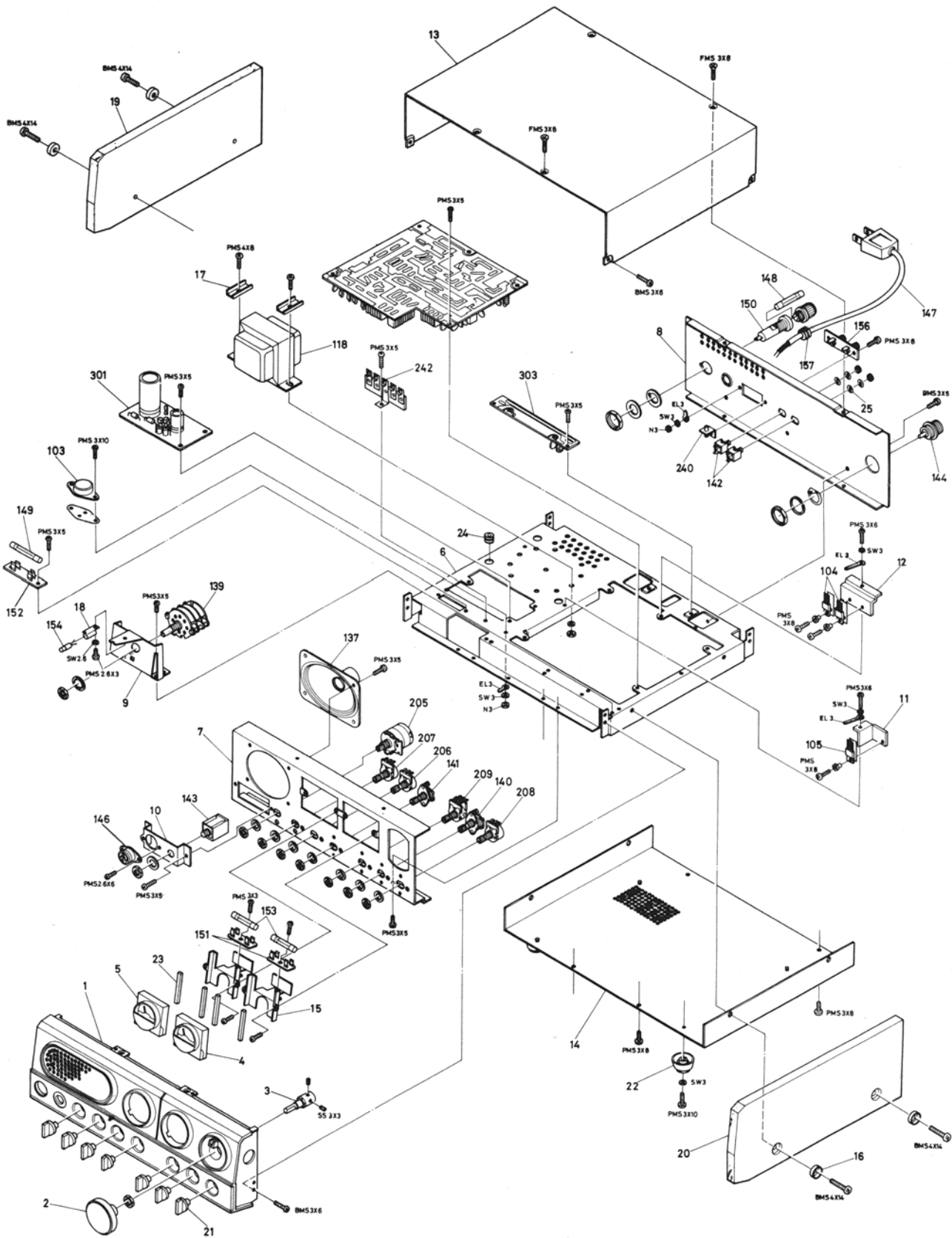
# CRAIG MODEL 4201 SCHEMATIC CIRCUIT DIAGRAM



# 4103 CABINET AND CHASSIS



# 4201 CABINET AND CHASSIS



PRODUCT OF CRAIG CORPORATION, COMPTON, CALIFORNIA 90220

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