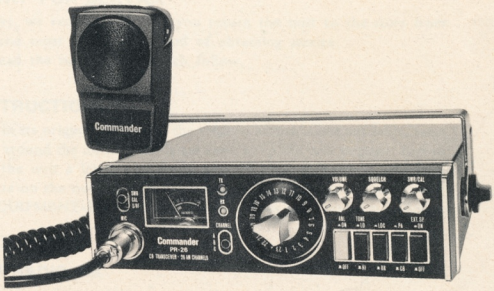
Commander radio ab

MODEL PR-26

5 WATT 26 CHANNEL AM
CITIZENS BAND TRANSCEIVER
SOLID STATE



WARRANTY POLICY

We warrants each new Commander product sold at list price to be free from defects in material and workmanship under normal use and service for a period of 360 days after delivery to the ultimate user and will replace or repair the product at our option, at no charge should it become defective and which our examination shall disclose to be defective and under warranty.

This warranty shall not apply to any Commander product which has been subject to misuse, neglect, accident, incorrect wiring not of our own installation, or to use in violation of instructions furnished by us, nor extended to units which have been repaired or altered outside of our factory.

This warranty does not cover carrying cases, earphones, batteries, antennas, broken or cracked cabinets, or any other accessory used in connection with this product.

This warranty is in lieu of all other warranties expressed or implied and no representative or person who is authorized to assume for us any other liability in connection with the sale of our products.

Sales receipt must accompany product to validate the date of purchase.

RETURNING THE UNIT FOR SERVICE

In the event that repair is necessary (either in or out of warranty), we recommend that you return the unit to the store from which it was purchased. In most cases, this will be your fastest and most efficient method of obtaining service.
If you wish to ship the unit to our main service center, please read the instructions which follow.

SHIPPING INSTRUCTIONS

Pack the unit very carefully to avoid damage in transit, preferably in its original carton. If the original carton is not available, use a sturdy carton with at least 3 inches of shredded paper or excelsior around the unit. In the latter case, wrap the unit in paper first to avoid particles of packing material getting into it. Include with the unit a letter explaining exactly what difficulties you have encountered (remember to add extra First Class postage and indicate on the outside of the carton that First Class Mail is enclosed). Ship by prepaid express if possible and mark ELECTRONIC EQUIPMENT-FRAGILE. Clearly address the carton as follows:

SERVICE DIVISION

COMMANDER RADIO AB
Box 5155
200 71 MALMO

SPECIFICATIONS

GENERAL

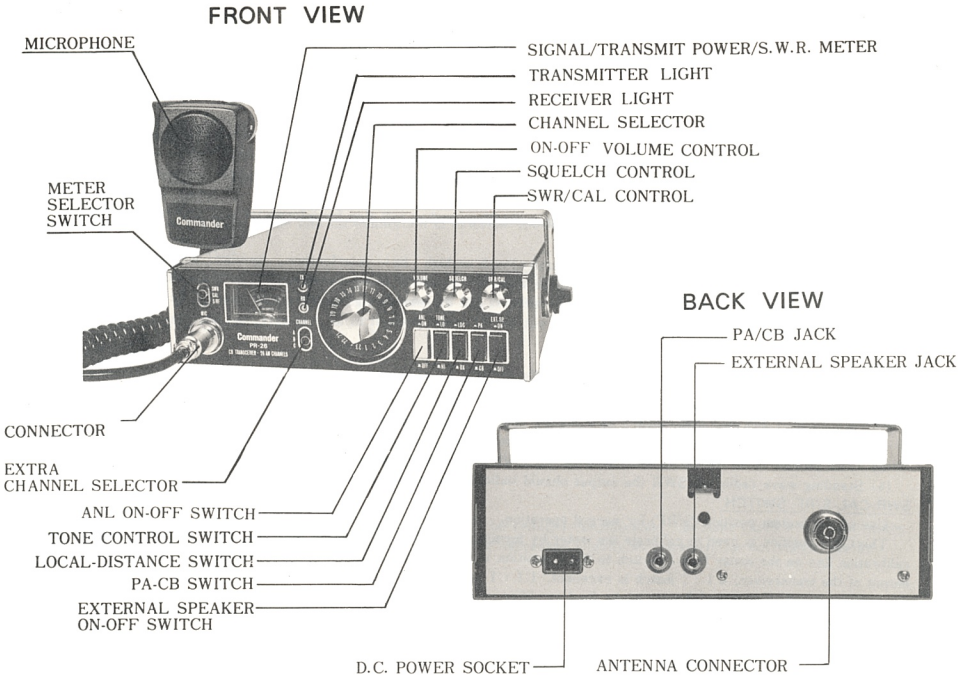
Dimensions	: 2-⅝"H × 7-¼"W × 8-½"D
Weight	: approx. 4.5 lbs.
DC Power consumption	: a) Receiver (stand-by) 200mA
	b) Transmit (100% Mod.) 1,500mA
Channels	: 26 (23 installed)
Semi-conductors	: 16 transistors, 1FET, 20 diodes, 2 LED
Operating condition	: a) Ambient temperature −10°C ~ +50°C
	b) Relative humidity +35°C 95% or less

RECEIVER

Receiving system	: Double conversion superheterodyne
Intermediate frequency	: 1st 10.595MHz ~ 10.635MHz
	2nd 455KHz
Sensitivity	: (S + N)/N 10db or more at 0.5uV input
Adjacent channel rejection	: 50db or more
Image rejection	: 50db or more
Power output (Audio)	: Not to exceed 4-watts

TRANSMITTER

Power input	: 5-watts
Power output	: 60% or more with upward modulation
Modulation	: 100%
Spurious and harmonics	: 30uW or less
Frequency tolerance	: ±0.005% or less
Antenna coupling	: 50 ohms


FRONT VIEW
MICROPHONE
SIGNAL/TRANSMIT POWER/S.W.R. METER
TRANSMITTER LIGHT
RECEIVER LIGHT
CHANNEL SELECTOR
ON-OFF VOLUME CONTROL
SQUELCH CONTROL
SWR/CAL CONTROL
METER SELECTOR SWITCH
Commander
CONNECTOR
EXTRA CHANNEL SELECTOR
ANL ON-OFF SWITCH
TONE CONTROL SWITCH
LOCAL-DISTANCE SWITCH
PA-CB SWITCH
EXTERNAL SPEAKER ON-OFF SWITCH
BACK VIEW
PA/CB JACK
EXTERNAL SPEAKER JACK
D.C. POWER SOCKET
ANTENNA CONNECTOR

CONTROLS

ON-OFF VOLUME CONTROL

Rotate the volume control clockwise. Your unit will be lighted on the meter and ready to work. Set the volume control at an adequate level. Clockwise rotation increases the volume and when the volume is rotated counter-clockwise, this reduces the volume level.

CHANNEL SELECTOR

Tuning the receiver and transmitter is simultaneous by rotating the 23-channel selector switch. Set the switch to a desired channel from 1 to 23 as indicated directly on the top window of the knob. Channel 9 is reserved for use only in times of emergency such as car trouble, being lost or needing help of some sort.

Channel 11 is the most commonly used channel for contacting another call sign for information and general conversation.

SQUELCH CONTROL

Squelch control is designed to reduce excessive noise (such as high line interference, ignition noise, etc.). Adjust the "squelch" clockwise to eliminate the back ground noise when no signal is being received. The more clockwise the "squelch" control is turned the less sensitive and the receiver becomes and the weaker signals will not be heard. The most common setting for squelch is to turn clockwise just enough to cut out the RF noise present in all AM sets, but not too far to cut down the sensitivity.

METER

A combination meter on the front panel provides:

(1) Constant visual monitoring of incoming "signal strength" when receiving.

(2) On transmit, with the meter switch in the down position-S/RF, the meter indicates the relative output power when the microphone button is pushed.

(3) "Talk Power" level indicating modulation strength when speaking into the microphone.

(4) Standing wave radio, on SWR the output should indicate a minimum reading.

SWR-CAL-S/RF SWITCH

Use on the bottom position (S/RF) for normal operation.

The CAL position is used to calibrate the meter by turning the SWR/CAL control until the meter needle is aligned with the calibration line on the meter face. Switch to SWR position to determine if the antenna and feed line are matched to the 50 ohm output of the transceiver, a 1 : 1 match is excellent, 1.1 : 1 good, and 1.2 : 1 acceptable. If SWR reads more than 2 : 1, the antenna match is poor and danger to the final amplifier exists due to mismatch.

TONE CONTROL

Push tone control switch (knob at lower level) to get bass tone. Push the switch again and the knob will be returned to original higher level position where you will get treble tone.

LOC-DX SWITCH

Local-Distance switch should be in the local position(button is pushed and knob at lower level) to attenuate strong undesired signals. For weaker signals, keep the switch knob to DX (distance) position.

PA-CB SWITCH

In the PA position, your transceiver is converted to a public address system. A convenient jack is provided on the back of the unit for connection to any standard 8 ohm PA speaker. For usual communication as CB set, set this push button switch to CB position. When you use external speaker in CB operation, push front Ext. Speaker switch to on position.

EXTERNAL SPEAKER JACK

A jack is provided on the back of the unit for connection to external speaker.

EXTRA CHANNEL SELECTOR

This unit has extra 3 channels in addition to 23 channels. Install additional plug-in type crystals in crystal sockets. Set rotary channel selector at the open channel between channel 22 and channel 23, and then, set slide switch for Extra Channel to a channel position A, B or C.

TX and RX LIGHTS

Lighted indicators for transmit (red) and receive (green) keep you visually informed.

MICROPHONE

Connect dynamic microphone with curl cord to the mike connector on the front. Push and hold the push-to-talk switch for transmission and release it for receiving incoming voice. Mike gain control knob on the microphone regulates the sensitivity of the mike from 0 to 100 percent. Adjust this to adequate level to reduce background noise, such as air noise commonly found in trucks and cars with open windows.

ANL ON-OFF SWITCH

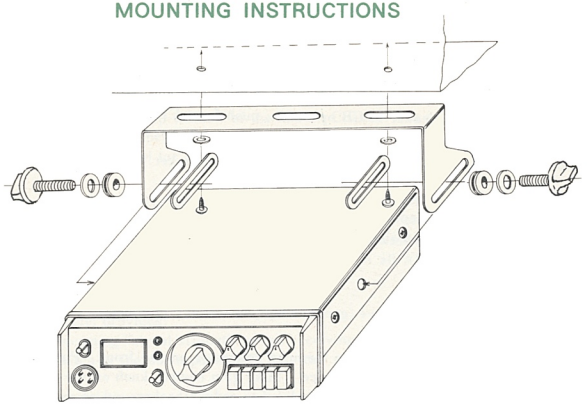
In normal use, this switch will be pushed on. Motor noise will be reduced considerably. In some cases when your motor is not running, this switch can be pushed off. Sensitivity will be increased slightly so extremely far out station can be heard.

POWER SUPPLY

This unit is designed to operate on 12 volts DC or (13.8V DC). Any 12-volt (positive or negative ground) electrical system is adequate.

(Special Note – Always connect red wire to positive side of the battery and black wire goes to negative side.)

MOUNTING INSTRUCTIONS



A location in the car or truck should be chosen carefully for convenience of operation and non-interference with normal driving functions. Mounting may be under the dash or instrument panel or any place a secure installation can be made. The carrying handle again serves as the mounting bracket or additional perforated straps or brackets may be used as desired. The 12-volt cable may be connected to any convenient terminal but preferably to the ignition switch to prevent unauthorized person from operation of your unit. With this method the unit will only operate when your key is turned on. Engine ignition interference should not be a problem and vehicles equipped with standard broadcast radios will have enough suppression to eliminate ignition interference. If interference is present, any skilled auto radio repairman should be able to eliminate it for you.

ANTENNA INSTALLATION

BASE STATION:

When the Transceiver is used as a base station, any Citizens Band beam, dipole, ground plane or vertical antenna may be used. A ground plane type will provide greater coverage and, since it is essentially non-directional, it is ideal in base station to mobile operation. From base station to base station, or point to point operation, a directional beam will give greater distance even under adverse condition. The range of the transceiver depends basically on the height of the antenna and, whenever possible, select the highest location.

Generally a maximum of 26 feet of lead-in cable should be used due to line losses. However, a desirable antenna location may justify the loss in extra lead-in length.

MOBILE ANTENNAS:

A vertical whip antenna is best suited for mobile use. A non-directional antenna must be used for best results in any case. The base loaded whip antenna will normally provide effective communication. For greater range and more reliable operation, a full quarter-wave whip should be used. Either of these antennas use the metal car body as a ground plane and the shield of the base lead as well as the metal case of the transceiver should be grounded. A standard antenna connector (type SO 239) is provided on the transceiver for easy connection to a standerd PL 259 cable termination.

GENERAL OPERATING INSTRUCTIONS

Check to see if the proper connections have been made on power cable, antenna system and microphone and that the correct cables have been used. Be sure that the transceiver is adequately grounded (if not mounted directly to a metal surface).

Select the channel on which you wish to operate by rotating the Channel Selector Switch to the desired channel.

To transmit, press the push-to-talk switch and hold it down. Speak directly into microphone. Release this switch to receive. Actual receive and transmitting power should be visually monitored by watching the lighted meter on the front.

When using squelch at the right side of front panel, the squelch will not work if the knob were turned counter-clockwise all the way; and a noise will be emitted from speaker when there is no input signal received.

By gradually turning the knob clockwise, noise will disappear and the squelch will start to work. Kept at this stage, the squelch will automatically be disengaged as signal comes in, and the receiver will restore its regular receiving condition while receiving the signal.

When the signal ceases, the receiver will be driven into squelch and the noise will disappear. Do not turn the knob too much clockwise, as a weak received signal can not be heard by over engagement. You have to adjust the control to fit the strength and weakness of the squelch when only a weak input signal is received.

FREQUENCY SYNTHESIZING SYSTEM

This transceiver employs a method whereby 14 crystals are used in various arrangements to produce 23 fundamental oscillator frequencies (see Table A). This arrangement, known as frequency synthesis, permits full 23 channel crystal-controlled operation on both transmit and receive using relatively few crystals.

TRANSMITTER TABLE A

CHANNEL NO.	CHANNEL FREQUENCY	CRYSTAL COMBINATION	SYNTHESIZED FREQUENCY
1.	26.965 MHz	$X_1 - X_7$	26.965 MHz
2.	26.975	$X_1 - X_8$	26.975
3.	26.985	$X_1 - X_9$	26.985
4.	27.005	$X_1 - X_{10}$	27.005
5.	27.015	$X_2 - X_7$	27.015
6.	27.025	$X_2 - X_8$	27.025
7.	27.035	$X_2 - X_9$	27.035
8.	27.055	$X_2 - X_{10}$	27.055
9.	27.065	$X_3 - X_7$	27.065
10.	27.075	$X_3 - X_8$	27.075
11.	27.085	$X_3 - X_9$	27.085
12.	27.105	$X_3 - X_{10}$	27.105
13.	27.115	$X_4 - X_7$	27.115
14.	27.125	$X_4 - X_8$	27.125
15.	27.135	$X_4 - X_9$	27.135
16.	27.155	$X_4 - X_{10}$	27.155
17.	27.165	$X_5 - X_7$	27.165
18.	27.175	$X_5 - X_8$	27.175
19.	27.185	$X_5 - X_9$	27.185
20.	27.205	$X_5 - X_{10}$	27.205
21.	27.215	$X_6 - X_7$	27.215
22.	27.225	$X_6 - X_8$	27.225
23.	27.255	$X_6 - X_{10}$	27.255

RECEIVER TABLE B

CHANNEL NO.	CHANNEL FREQUENCY	1st LOCAL Osc XTAL	2nd LOCAL Osc XTAL	2nd LOCAL Osc XTAL FREQ.	IF-2 FREQ.
1.	26.965 MHz	X_1	X_{11}	10.180 MHz	455 KHz
2.	26.975	X_1	X_{12}	10.170	455
3.	26.985	X_1	X_{13}	10.160	455
4.	27.005	X_1	X_{14}	10.140	455
5.	27.015	X_2	X_{11}	10.180	455
6.	27.025	X_2	X_{12}	10.170	455
7.	27.035	X_2	X_{13}	10.160	455
8.	27.055	X_2	X_{14}	10.140	455
9.	27.065	X_3	X_{11}	10.180	455
10.	27.075	X_3	X_{12}	10.170	455
11.	27.085	X_3	X_{13}	10.160	455
12.	27.105	X_3	X_{14}	10.140	455
13.	27.115	X_4	X_{11}	10.180	455
14.	27.125	X_4	X_{12}	10.170	455
15.	27.135	X_4	X_{13}	10.160	455
16.	27.155	X_4	X_{14}	10.140	455
17.	27.165	X_5	X_{11}	10.180	455
18.	27.175	X_5	X_{12}	10.170	455
19.	27.185	X_5	X_{13}	10.160	455
20.	27.205	X_5	X_{14}	10.140	455
21.	27.215	X_6	X_{11}	10.180	455
22.	27.225	X_6	X_{12}	10.170	455
23.	27.255	X_6	X_{14}	10.140	455

The frequency tables show the particular crystals used for each channel. It should be noted that failure of one crystal will lead to malfunction on a number of channels-not just one. If a malfunction on a number of channels is experienced therefore, refer to Table A,B,C, which will offer a quick means of determining which crystal may have failed.

FOR EXAMPLE;

If you would not be able to operate this frequency synthesis transceiver on channel 1 position only, you might see that Table A shows CH-1 (26.965MHz) frequency being mixed X-1 (37.600MHz) with X-7 (10.635MHz) in case of transmitting, and the Table B shows CH-1 frequency being mixed X-1 with X-11 in case of receiving. Thus you will find out that one or more crystals of X-1, X-7, X-11 will be defective for operation on channel 1.

TABLE C

CRYSTAL NO.	Osc. FREQUENCY	CHANNELS USED
X-1	37.600MHz	1 2 3 4
X-2	37.650	5 6 7 8
X-3	37.700	9 10 11 12
X-4	37.750	13 14 15 16
X-5	37.800	17 18 19 20
X-6	37.850	21 22 23
X-7	10.635	1 5 9 13 17 21
X-8	10.625	2 6 10 14 18 22
X-9	10.615	3 7 11 15 19
X-10	10.595	4 8 12 16 20 23
X-11	10.180	1 5 9 13 17 21
X-12	10.170	2 6 10 14 18 22
X-13	10.160	3 7 11 15 19
X-14	10.140	4 8 12 16 20 23

This unit embodies the latest in compact high performance transceiver design techniques. Only the most advanced solid state devices are used throughout. All receiver voltages are zener regulated. Maximum flexibility is obtained with an adjustable squelch action. Extreme sensitivity is provided by use of the highest frequency transistor available in the receiver RF stage.

The latest high frequency transistors provide a transmitter with maximum power output and full modulation. This unit "Three-Pi" transmitter network provides maximum protection against spurious radiations, instability and harmonic radiation resulting in transmitter performance.

ALIGNMENT PROCEDURE

1. Synthesizer alignment.

Alignment	Connections	Adjustment	Nominal bias level respect to ground	Vc	Vb	Ve
37MHz Oscillator TR9	Frequency counter to secondary terminal of L9	Top of L9 for keeping output frequency within tolerance of 0.003% at channel 1, 5, 9, 13, 17, 21.	No crystal	13.2	1.8	1.2
			With crystal	13	1.8	1.8
Mixer TR15	HF millivoltmeter to secondary terminal	Top of L15 and L16 for peak output at HF millivoltmeter.		Vc	Vb	Ve
			No input carrier	13.8	0.72	0.1
			With input carrier	13.5	2.2	3.8
10MHz Oscillator TR14	Frequency counter to secondary terminal of L16	Top of L13 for keeping output frequency (27MHz) within tolerance of 0.003% at each channel.		Vc	Vb	Ve
			No crystal	13.5	0.8	1.6
			With crystal	13.5	0.8	1.8

2. Receiver alignment.

Alignment	Connections	Adjustment	Nominal bias level respect to ground (no signal)	Vc	Vb	Ve
455KHz IF transformer	Signal generator to 2nd mixer through 0.01μF capacitor generator frequency 455KHz ±0.2% channel selector to vacant channel.	Top of I.F.T L6 I.F.T2 L7 IFT3 L8 keep reducing the generator output to maintain the output level below 0.5 watt.	TR3	8.8	1.2	0.6
			TR4	7.4	1.2	0.06
			TR5	7.4	1.4	0.8

Alignment	Connections	Adjustment	Nominal bias level respect to ground (no signal)			
2nd local oscillator TR8	Frequency counter to TR8 emitter through 5pF capacitor	Check frequency Ch. 1, 5, 9, 13, 17, 21 (10.180MHz) Ch. 2, 6, 10, 14, 18, 22 (10.170MHz) Ch. 3, 7, 11, 15, 19 (10.160MHz) Ch. 4, 8, 12, 16, 20, 23 (10.595MHz).		Vc	Vb	Ve
			No crystal	6	1.2	0.8
			With crystal	6	1.2	0.8
10.6MHz IF transformer	Signal generator to lst mixer TR2 base. Signal generator frequency 10.635MHz channel selector to any working.	Top of L4 L5 with a low level signal generator input for maximum output.		Vc	Vb	Ve
			TR2	7	1.25	1.2
RF coil	Channel setting to 13 signal generator to antenna connector.	Signal generator for peak at 27.115MHz top of L2 L3 with a low level signal generator input for maximum output.		Vc	Vb	Ve
			TR1	6	0.1	0.6

3. Transmitter Alignment

Alignment	Connections	Adjustment	Nominal bias level respect to ground			
Driver	Dummy load antenna socket power output indicator across load milliammeter (500mA) between 13V and L19 check final collector current.	Top of L17 maximum final collector current, and top of L18 minimum final collector current.		Vc	Vb	Ve
			TR16	13.5	2.2	2
			TR17	10.0	—	—

4. Alignment Output

Alignment	Connections	Adjustment	Nominal bias level respect to ground			
				Vc	Vb	Ve
Output	Dummy load antenna socket power output indicator across load milliammeter (500mA) between 13V and L19 (T.P.) for check final collector current.	Top of L22 for maximum output and minimum collector current. Collector current must be less than 390mA at any channel.	TR18	13.0	—	0

5. Modulation Alignment

Connections

Audio oscillator to microphone terminal thru 600 ohms resistor.
Dummy load to antenna socket power output indicator across load synthesized osciroscope to dummy load.

Adjustment

Decrease audio oscillator output down to 5mA or less carrier enverope must be 50% modulation or more.

6. Audio and squelch Section

Normal bias level respect to ground. Measured at no signal.

		Vc	Vb	Ve
TR7	Unsquelch	5.1	0	0
	Squelch	0.01	0.65	0
TR6	Unsquelch	9.2	1.4	0.8
	Squelch	13.5	0.005	0
TR10		6.0	0.7	0.5
TR11		11.8	1.8	1.0
TR12		13.0	0.7	0.07
TR13		13.0	0.7	0.07

PARTS LIST

No.	Parts number	Description		Quantity
1	TR2,3,4,5,8,9,14	Transistor	2SC839 (H)	7
2	TR6,7,10	〃	2SC945(R)	3
3	TR11	〃	2SC815 (L)	1
4	TR12,13	〃	2SC1096 (L)	2
5	TR18	〃	2SC756 (2−3)	1
6	TR15	〃	2SC710 (C)	1
7	TR16	〃	2SC620 (D)	1
8	TR17	〃	2SC1018	1
9	TR1	FET	2SK33 (E)	1
10	D13	Zener diode	MZ209	1
11	D10	Diode	MC-301	1
12	D5,6,7,8,9,11,12,17,19,20,21	〃	IS188AM	12
13	D14	〃	KB162	1
14	D1,2,3,4	〃	IS953	4
15	D18	〃	HiFi Special	1
16	TX	LED	GL31AR (Red)	1
17	RX	〃	GL30PG (Green)	1
18	L14,15	FL Coil	#1745	2
19	L16	〃	#1800	1
21	L3	RF Coil	#1889	1
22	L2	ANT Coil	#1804	1
23	L17	TX 〃	#1801	1
24	L13	〃 〃	#1870	1
25	L10	OSC Coil	#1806	1
26	L18	DR Coil	#1807B	1
27	L19	CHO 〃	#1726	1
28	L11	〃 〃	#1799	1
29	L20,21,22	〃 〃	#1752	3

		Quantity
30	L12,23	
31	L1	
32	L4	
33	L5	
34	L6	
35	L7	
36	L8	
37		
38		
39		
40	VR8	
41	VR6	
42	VR3	
43	VR5	
44	VR9	
45	VR7	
46	VR2	
47		
48		
49		
50		
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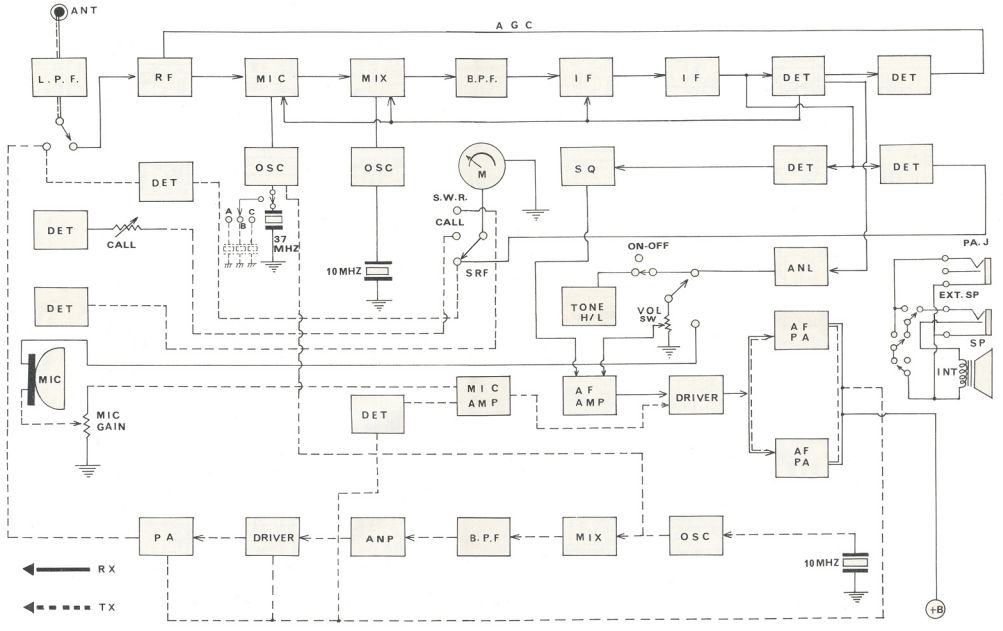
58		
59		

CHO Coil	#1724S	2
RF Coil	#1865	1
FM IFT	#1721	1
FM IFT	#1722	1
AM IFT	#1723	1
〃	#1278	1
〃	#1756G	1
Crystal HC-25u 23CH (27MHz)		14
Ceramic filter CFU 455H		1
Speaker SR-92-02		1
Variable Resistor 10KAN		1
〃 〃	50KBN	1
〃 〃	50KBS	1
Semi fixed resistor 20KB		1
〃 〃	30KB	1
〃 〃	50KB	2
〃 〃	100KB	1
Rotary switch	S32C RL-2424	1
Slide switch	SL2-2-3-04	2
Push switch	MU-5-5345	1
Meter lamp	14V80mA	1
Pilot lamp	14V80mA	2
Relay	MH4P-14	1
3.5ø Jack		2
Mike connector	SM144S	1
Antenna 〃	MRU	1
Crystal socket	HC-25U	17
Power socket		1
In-Line fuse holder		1
Power assy Tube type fuse		1

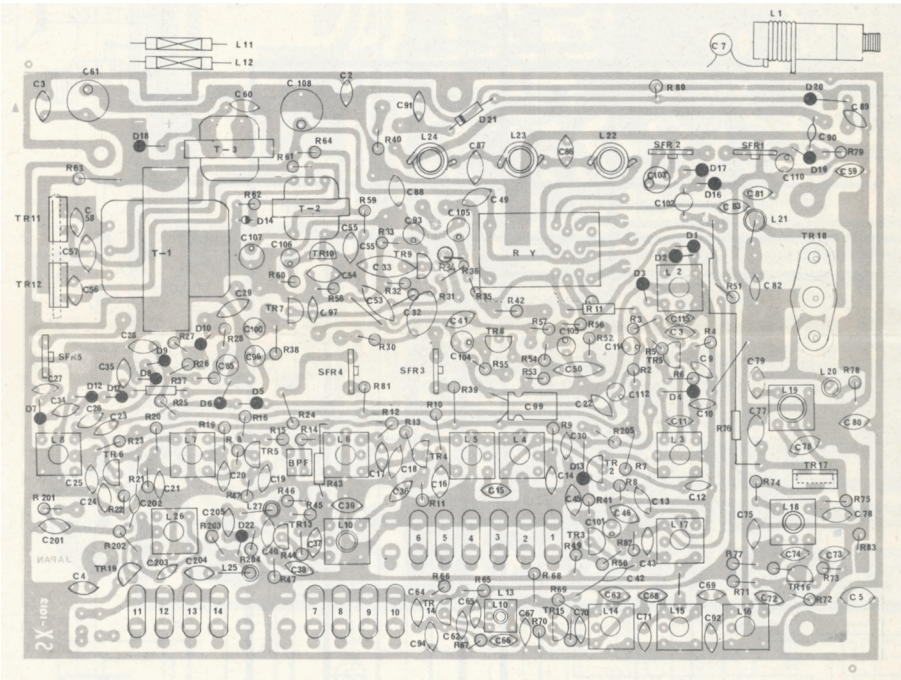
No.	Parts number	Description		Quantity
60		Power assy	Power plug	1
61		Microphone		1
62		Meter	YR-36	1
63		Transformer	IPT. E-19	1
64		〃	OPT E-35	1
65		〃	CHT E-19	1
66	R74.84	Carbon resistor	¼WF 10Ω Ⓚ	2
67	R78	〃	〃 56Ω 〃	1
68	R62	〃	〃 68Ω 〃	1
69	R4.35.51.60.73.64	〃	〃 100Ω 〃	6
70	R19.23	〃	〃 150Ω 〃	2
71	R6.48.52.70.41	〃	〃 330Ω 〃	5
72	R52.70	〃	〃 470Ω 〃	2
73	R9.12	〃	〃 560Ω 〃	2
74	R17.22	〃	〃 680Ω 〃	2
75	R11.33.47.55.61.82.56.79.85	〃	〃 1K 〃	9
75	R8.44	〃	〃 1.5K 〃	2
77	R5	〃	〃 2.2K 〃	1
78	R14.15.38.66.68	〃	〃 3.3K 〃	5
79	R16.27.32.34.46.57.72	〃	〃 4.7K 〃	7
80	R21.36.40.49.53.58	〃	〃 5.6K 〃	6
81	R7.10.39.30	〃	〃 6.8K 〃	4
82	R2	〃	〃 10K 〃	1
83	R65	〃	〃 15K 〃	1
84	R31.71	〃	〃 18K 〃	2
85	R45.54	〃	〃 22K 〃	2
86	R20.59	〃	〃 27K 〃	2
87	R50.24.25	〃	〃 33K 〃	3
88	R69.26	〃	〃 47K 〃	2
89	R13.18.3	〃	〃 100K 〃	3
90	R29	〃	〃 120K 〃	1
91	R28	Carbon resistor	¼WF 220K Ⓚ	1
92	R80	〃	¼WP 47 〃	1
93	R41	〃	〃 330 〃	1
94	R43	〃	〃 2.2K 〃	1
95	R37	〃	〃 5.6K 〃	1
96	R63	〃	½W 0.5 Ⓙ	1
97	R76	〃	〃 10 Ⓚ	1
98	R83. 42	〃	〃 1K 〃	2
99	C90	Ceramic capacitor	2P Ⓓ	1
100	C68.69	〃	5P Ⓙ	2
101	C42	〃	15P 〃	1
102	105	〃	20P 〃	2
103	C7.66.43	〃	30P 〃	3
104	C116	〃	50P 〃	1
105	C37.64.45.40.38.79	〃	100P Ⓚ	6
106	C72	〃	200P 〃	1
107	C94.34.55.	〃	500P 〃	3
108	C84	〃	0.001μ Ⓩ	1
109	C51	〃	0.005μ 〃	21
110	C1.2.3.4.5.9.10.29.52.54.35.6.63.67.73.75.12.46. 39.62.27.78.89.91.28	〃	0.01μ 〃	21
111	C12.46.39.62	〃	0.02μ 〃	4
112	C44.14.16.18.19.20.21.22.24.25.30.60.47.	〃	0.04μ 〃	14
113	C32.33.31.53.50	〃	0.1μ 〃	5
114	C100	Tantalcum solid electrolytic capacitor		
		〃	OS15E 25V-1μ Ⓚ	1
115		〃	30V-0.47μ 〃	1
116	C15	Silvered mica capacitor		
		〃	2P Ⓓ	1
117	C78.23	〃	30P Ⓚ	2
118	C81	〃	50P 〃	1

No.	Parts number	Description	Quantity
119	C74	Silvered mica capacitor 70P Ⓚ	1
120	C70,71,92,26	〃 〃 100P 〃	4
121	C88	〃 〃 200P 〃	1
122	C83,86,87,	〃 〃 300P 〃	3
123	C17	Styrol capacitor 500P Ⓙ	1
124	C13	Myler capacitor 0.001μ Ⓜ	1
125	C36	〃 〃 0.01μ 〃	1
126	C56,58,48,77	〃 〃 0.02μ 〃	4
127	C80,95	〃 〃 0.04μ 〃	2
128	C57	〃 〃 0.1μ 〃	1
129	C110,102	Electrolytic capacitor 50V-1μ	2
130	C97	〃 〃 16V-1μ	1
131	C101,105,114,112	〃 〃 16V-10μ	4
132	C96,93,104,106,98,103	〃 〃 16V-33μ	6
133	C99	〃 〃 10V-100μ	1
134	C107	〃 〃 16V-100μ	1
135	C108,61	〃 〃 16V-1000μ	2
136		Front plate	1
137		Serial No.	1
138		Vinyle washer	2
139		Speaker net	1
140		Soft packing	4
141		Wool paper	1
142		〃	2
143		Front panel	1
144		Channel knob	1
145		Volume knob	3
146		Channel dial plate	1
147		Channel plate	1
148		Case assy.	1
149		Case top	1
150		Case bottom	1
151		Lamp holder	1
152		Bracket	1
153		Mike hangar	1
154		Mike hold metal	1
155		Heat sink (A)	1
156		〃 (B)	1
157		Screw M5	2
158		Crystal holder (A) SWP	1
169		〃 (B) SWP	2
160		Foam box	1 Set
161		Display box	1
162		Owner's Guide	1
163		Carton box	1/10
164		Poly bag for mike	1
165		〃 for mike	1
166		〃 for cord	1
167		〃 for accessories	1
168		Screw/solt ⊕M 3×6	5
169		3×6	4
170		3×8	2
171		3×8	5
172		2.6×5	6
173		2.6×5	1
174		2.6×4	4
175		Tapping screw 2.6×6	2
176		2.6×4	1
177		Tapping screw 2.6×5	4
178		〃 FW. 6×13×1t	2
179		〃 ⊕ 3×6	4
180		〃 〃 3×4	2
181		〃 〃 5×10	3
182		〃 W5	3
183		〃 N3	11
184		〃 SW3	11
185		W3	11

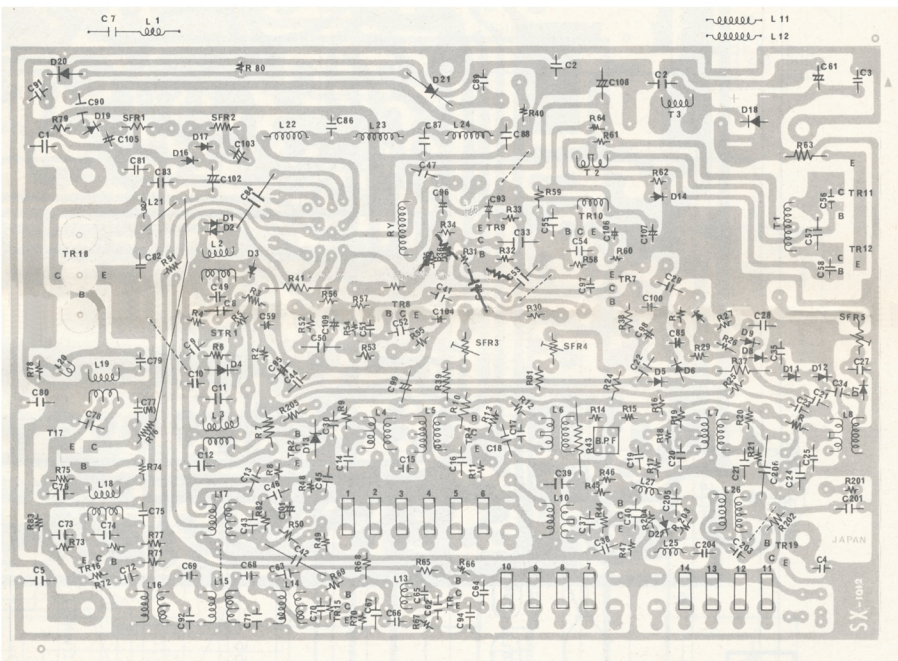
BLOCK DIAGRAM



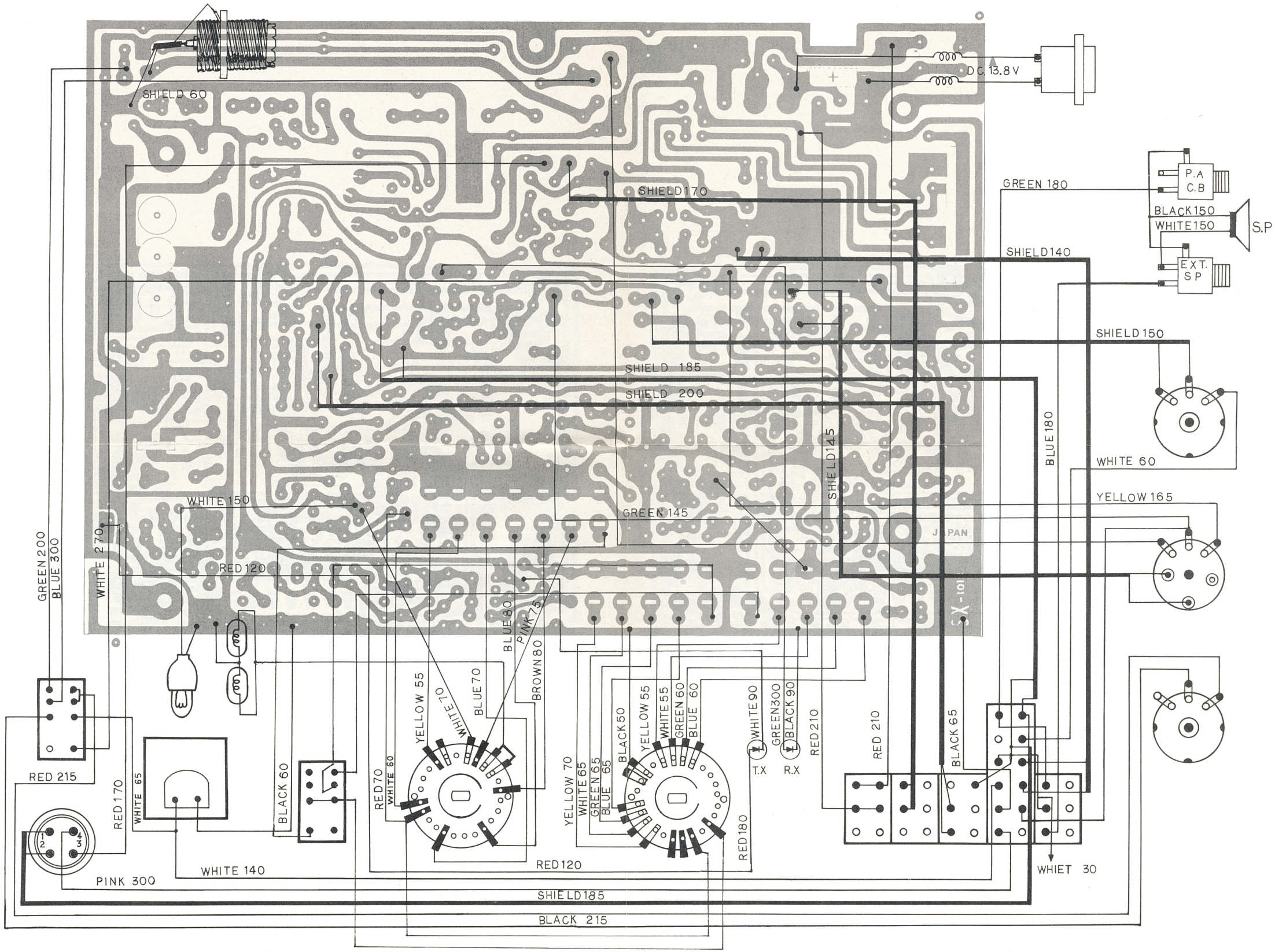
FRONT VIEW



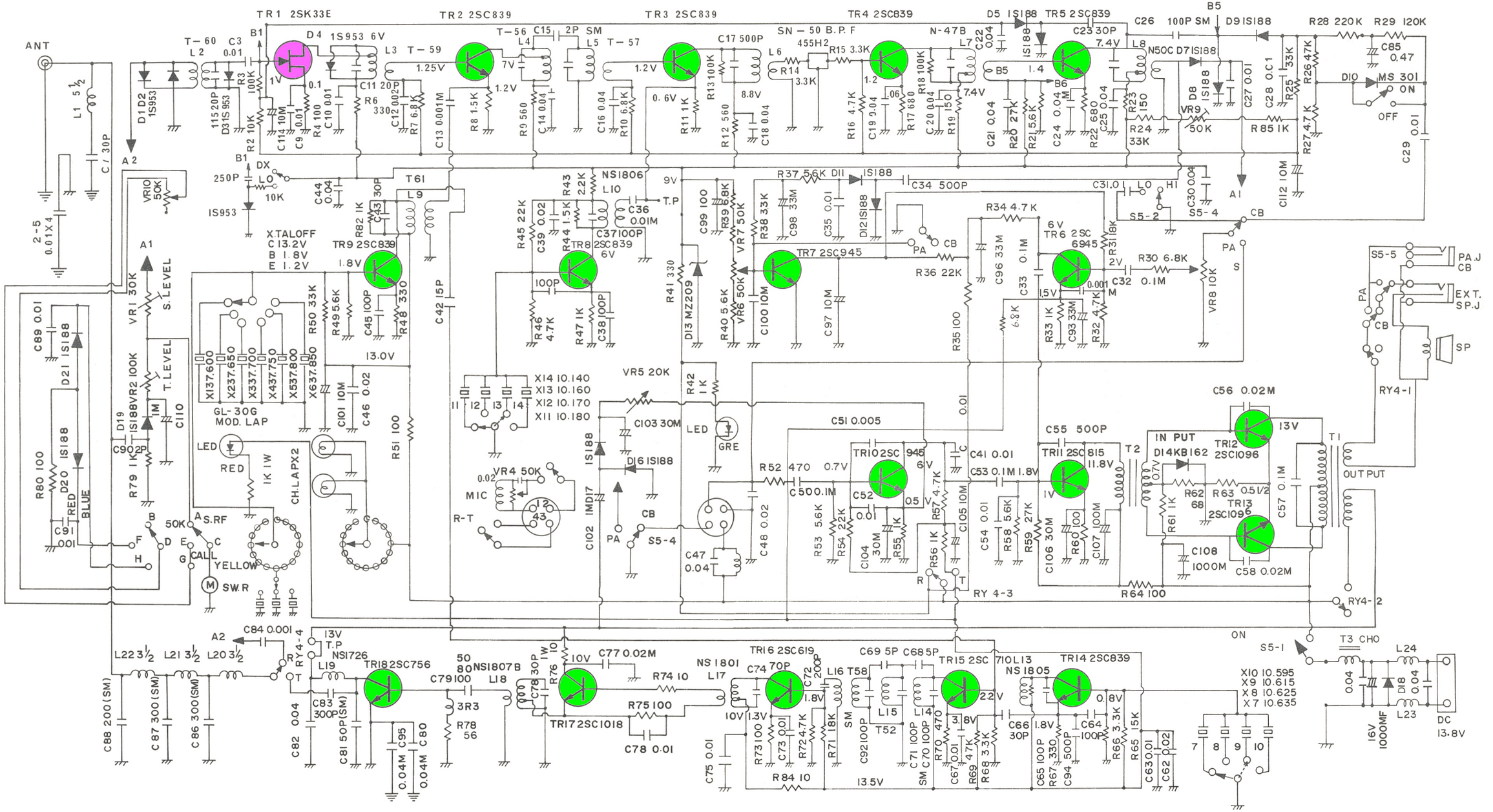
BACK VIEW



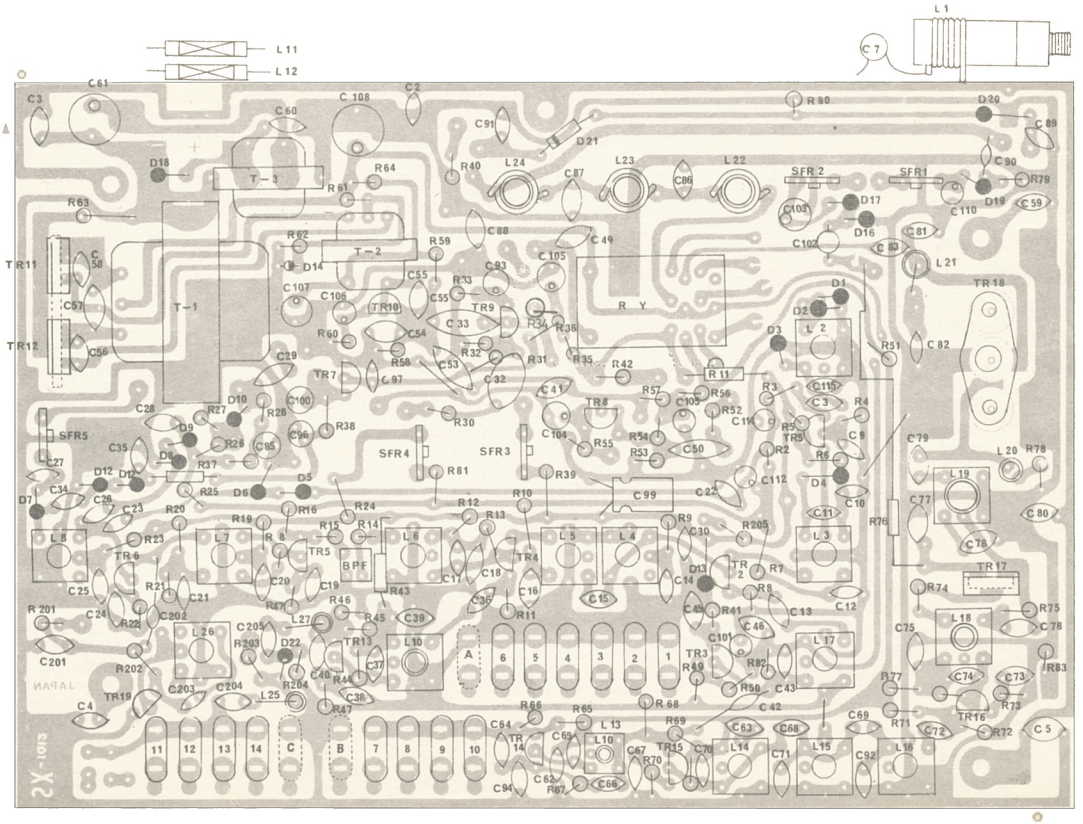
WIRING DIAGRAM



SCHEMATIC DIAGRAM.



FRONT VIEW



Extra channel A, B and C.

When you use extra channel A, B and C, you are required to put crystal additionally.

For example:

Channel A .....If you want to use for 27.095MHz (Ch.11A), put 37.710MHz crystal in crystal socket "A".

27.095MHz + 10.615MHz = 37.710MHz

Channel B .....If you want to use for 27.235MHz (Ch.24), put 37.850MHz crystal in crystal socket "B".

27.235MHz + 10.615MHz = 37.850MHz.

Channel C .....If you want to use for 27.275MHz (Ch. 27), put 37.890MHz crystal in crystal socket "C".

27.275MHz + 10.615 MHz = 37.890MHz.

Commander Radio AB
Box 5155
200 71 MALMÖ