STANDARD®

CPB58

VHF LINEAR POWER AMP

INSTRUCTION / MANUAL

STANDARD COMMUNICATIONS CORP.

The Model CPB58 VHF Linear Power Amp is designed exclusively for its Model C58 144 MHz Band All-mode Transceiver.
Each amp is manufactured and shipped under conditions of strict quality control and inspection. Should your power amp malfuction, immediately contact the dealer from which you purchased it or the nearest authorized service station.
To obtain maximum performance and extended service life from your CPB58 Power Amp, study these instruction carefully.

1. GENERAL INFORMATION

The CPB58 is a 25-watt VHF Linear Power Amp with a built-in 144 MHz band reception power amp. It is designed exclusively for the C58 144 MHz All-mode Transceiver to extend its range of application into mobile and base-station operations.

ACCESSORIES

After unpacking, check the supplied accessory parts against the following list:

DC power cord (with a 6A fuse) 1
DC connection cord with conversion plug
(This cord is used for connecting the CPB58 booster and the C58 transceiver.) 1
Self tapping screw 4
Instructions manual 1

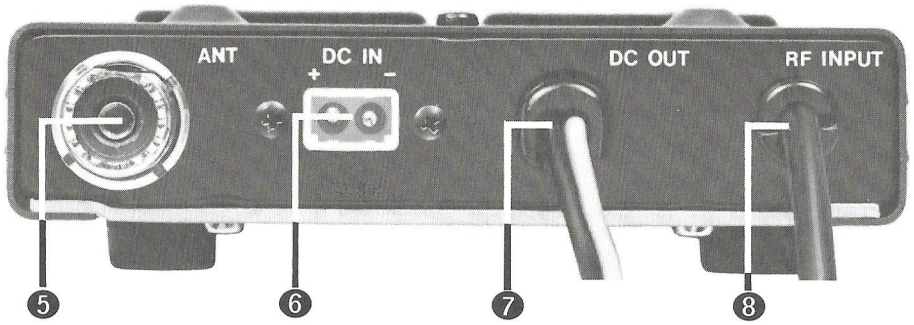
2. CONTROLS AND CONNECTIONS

❶ POWER SWITCH
Switches the power booster on/off.
In the on position, power is supplied to C58.

❷ POWER INDICATOR
Glows when the booster is turned on.

❸ 25W/THRU
The 25W position of this switch amplifies the power (1.0W) from the C58 into maximum 25W. The THRU position of this switch passes the output of the C58 to the antenna without providing amplification.

❹ TX HIGH
When the transmission mode is activated with the 25W/THRU switch set at the 25W position, this indicator goes on to indicate high power operation.



❺ ANT RECEPTACLE
Provides for the connection of an external antenna with an impedance of 50Ω.

❻ DC IN JACK
Provides for the connection of an external DC power source via the supplied DC power cord.

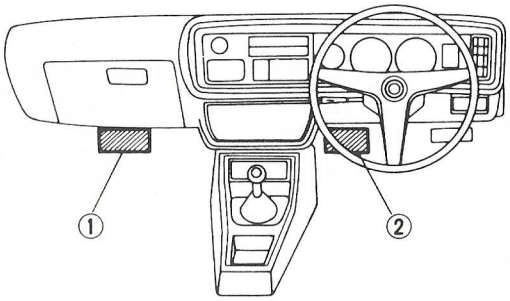
❼ DC OUT
When connecting the DC OUT cable to your C58 Transceiver, attach the supplied plug conversion cord to the end.
When mobile bracket (CMB8) is used, connect the DC OUT cable to the bracket.
When the CMB8 Mobile Bracket is used with a transceiver and power booster, connect the DC OUT cable to the CMB8 bracket.

❽ RF INPUT
* Connect the RF input cable to the external antenna jack on your C58 Transceiver.
* When the CMB8 Mobile Bracket is used, connect the cable to the antenna jack on the rear of the bracket.

3. INSTALLATION

Mobile Installation

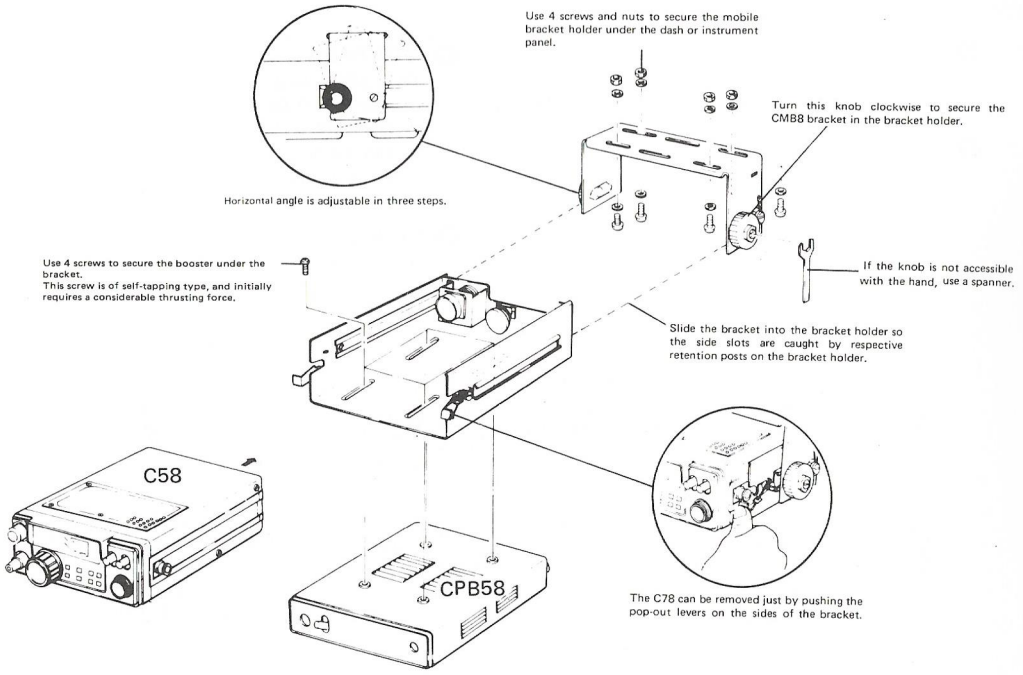
Installing the CPB58 Power Booster in your car requires the use of an optional Mobile Bracket (CMB8).



1) Location

① Under the dash
② Under the instrument panel

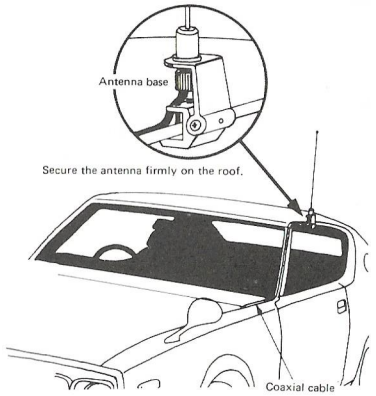
2) Installation



3) Antenna installation

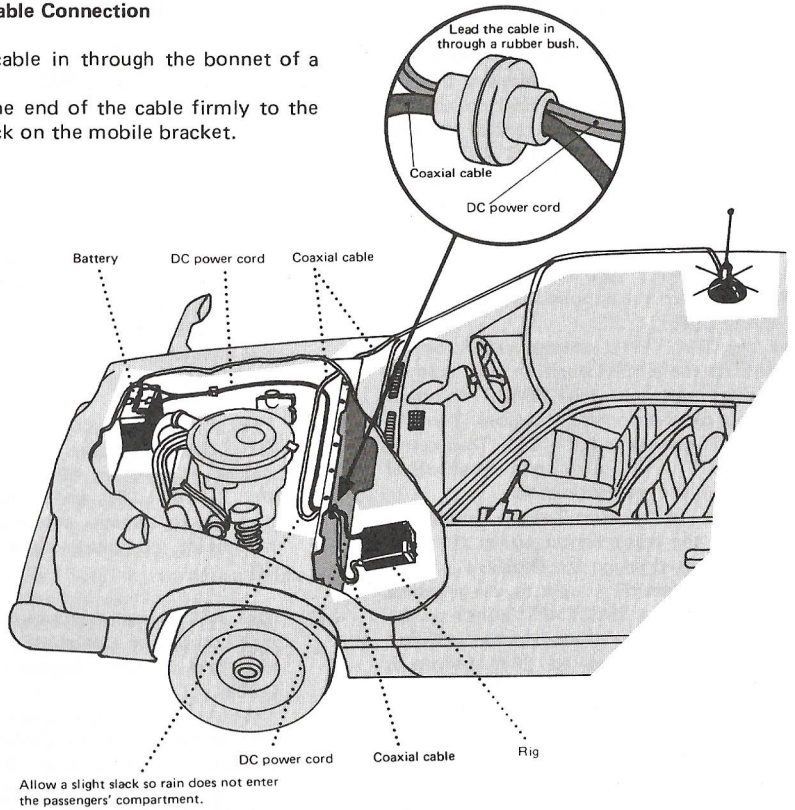
Use a mobile antenna with an impedance of 50Ω, and connect it to the booster via a coaxial cable of 5D-2V. A 1/4λ or 5/8λ antenna is generally used.

* Roof antenna



4) Antenna Cable Connection

* Lead the cable in through the bonnet of a car.
* Connect the end of the cable firmly to the antenna jack on the mobile bracket.



5) Power Connection

Use the supplied DC power cord for power connection. It is recommended that your transceiver be powered directly from the car battery. Connect the red lead to the positive terminal of the battery, and the black lead to the negative terminal.

NOTE:
When using a power cord other than that supplied, place a fuse (6A) between the CPB58 power booster and your battery.

6) Power Supply to the Base Station

Base station operation requires a regulated DC power supply of 13.8V, 6A or more.

4. OPERATION INSTRUCTIONS

1. Check that the power to the CPB58 Power Booster is switched off. Connect the RF INPUT cable from the CPB58 to the external antenna jack on the rear of the C58 Transceiver. Connect the DC OUT cable from the CPB58 to the DC IN receptacle on the C58 via the supplied plug conversion cord.
   Connect the 50 ohm antenna transmission line to the ANT jack on the CPB58 and finally connect the supplied DC power cord to the CPB58.
2. Set the 25W/THRU selector switch on the CPB58 to the THRU position, and turn on the power switch on the CPB58. The power indicator on the booster will glow. Turn the VOL/OFF control on the C58 Transceiver clockwise. This will turn on the transceiver and set it in the reception mode.
3. When the C58's Press-To-Talk switch is depressed, the transmission power from the C58 bypasses through the CPB58's internal circuitry to directly couple to the antenna. When you set the 25W/THRU switch on the CPB58 to the 25W position, the transmission power is boosted up to 25W before it couples to the antenna. In this case, the HIGH POWER indicator LED goes on.
4. If the antenna used matches worsely with the cable, the power transistor undergoes excessive stress. This could cause the CPB58 to damage. The SWR of the antenna therefore should be adjusted below 1.5.

5.THEORY OF OPERATION

The C58 is a linear amplifier which can output 25W RF power with the input of 0.8 to 1.5W. It can operate stably in the FM, SSB, or CW mode of operation. The following describes the principles of operation of the C58 functional circuits in some detail.

(1) Transmission and reception switching is achieved by two circuits: a switching circuit consisting of diodes Q101 and Q102 and a relay drive circuit consisting of Q201, Q202, and L201. Input switching in the C58 is made by the diodes Q101 and Q102 and output switching by the relay.

(2) The amplifier section uses a hybric IC Q103 (M57727). The IC is capable of producing as much as 40W PEP with 12.5V Vcc. L105, L106, and L107 form a low-pass filter, which eliminates undesired harmonics, or reduces them less than -60 dB.

(3) The APC (automatic power control) circuit consists of a delector made of a strip line, and an amp. formed by Q206 and Q205.
The traveling wave is detected by Q104. The signal output of Q104 is magnified through the APC amp. (Q205, Q206). The amplified signal controls the base voltage of Q204. The transistor also controls the collector voltage of the driver in the hybrid IC. This keeps the RF output level constant, assuring stable operation with little distortion.
A regulated power supply Q105 applies a regulated bias voltage to the hybrid IC Q103, thereby assuring stable amplification.

Standard Adjustment Condition

Power Supply Voltage	13.8V
Input Level	1.3W
Input·Output Impedance	50Ω
Transmit Frequency	146.20 MHz

6. ADJUSTMENT PROCEDURES

(1) Interconnect the C58 main body with the CPB58 as illustrated in Fig. 2.
(2) Use 146.20 MHz as the adjustment frequency.
(3) Turn the Power switch to the ON position.
(4) Set the 25W/THRU switch to the 25W position.
(5) Turn R207 fully counterclockwise.
(6) Set C120 to the mechanical center.
(7) Set up the C58 in the transmission mode (FM mode) of operation.
(8) Adjust C120 until the highest output power is obtained (around 30W)
(9) In turn, adjust R207 by turning clockwise until the output power is 27 W.
(10) Make certain that no spurious nor undesired abnormal oscillation is found as seen on the spectrum analyzer.
(11) Similarly, check for the output power, spurious and abnormal oscillation at 144.00, 145.00, 147.00 and 147.995 MHz each.
(12) Make certain that the needle of the Meter used as RF output power meter deflects normally.
(13) Also, make certain that the through loss in the reception mode of operation is less than 1.5 dB.

Adjustment Locations

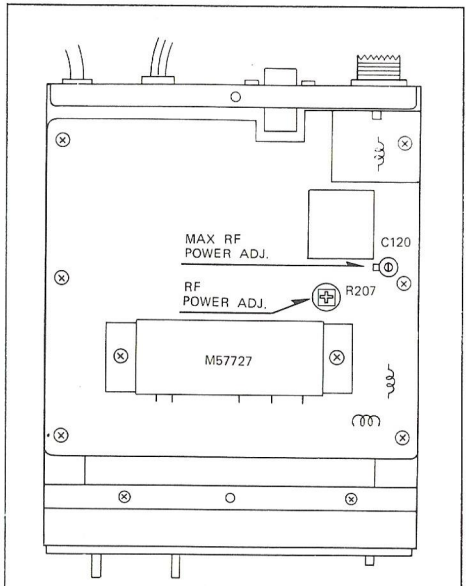
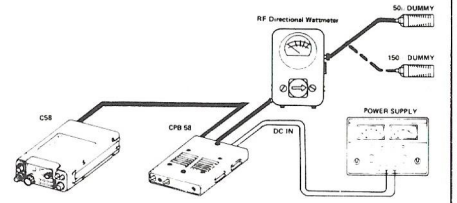


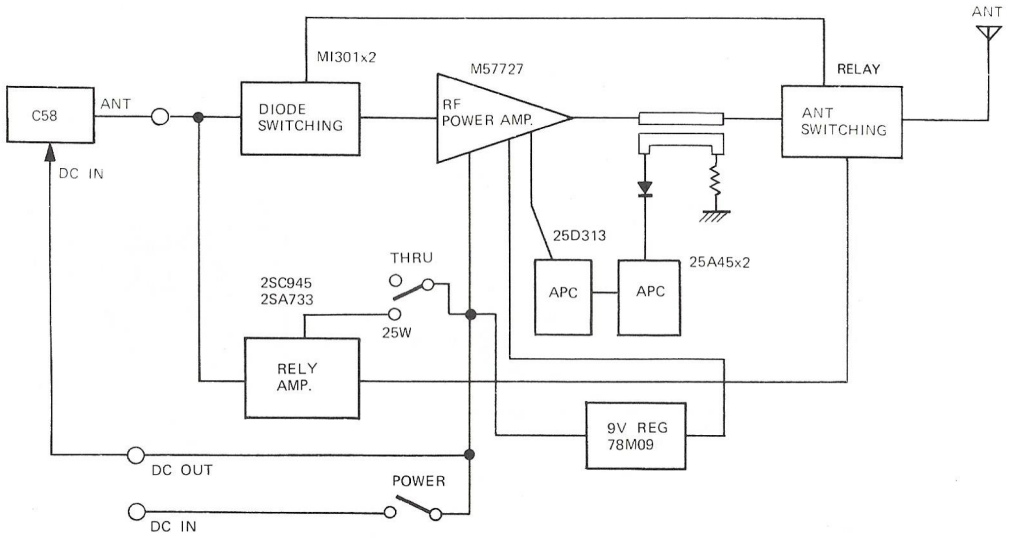
Fig. 1

Adjustment Set-Up



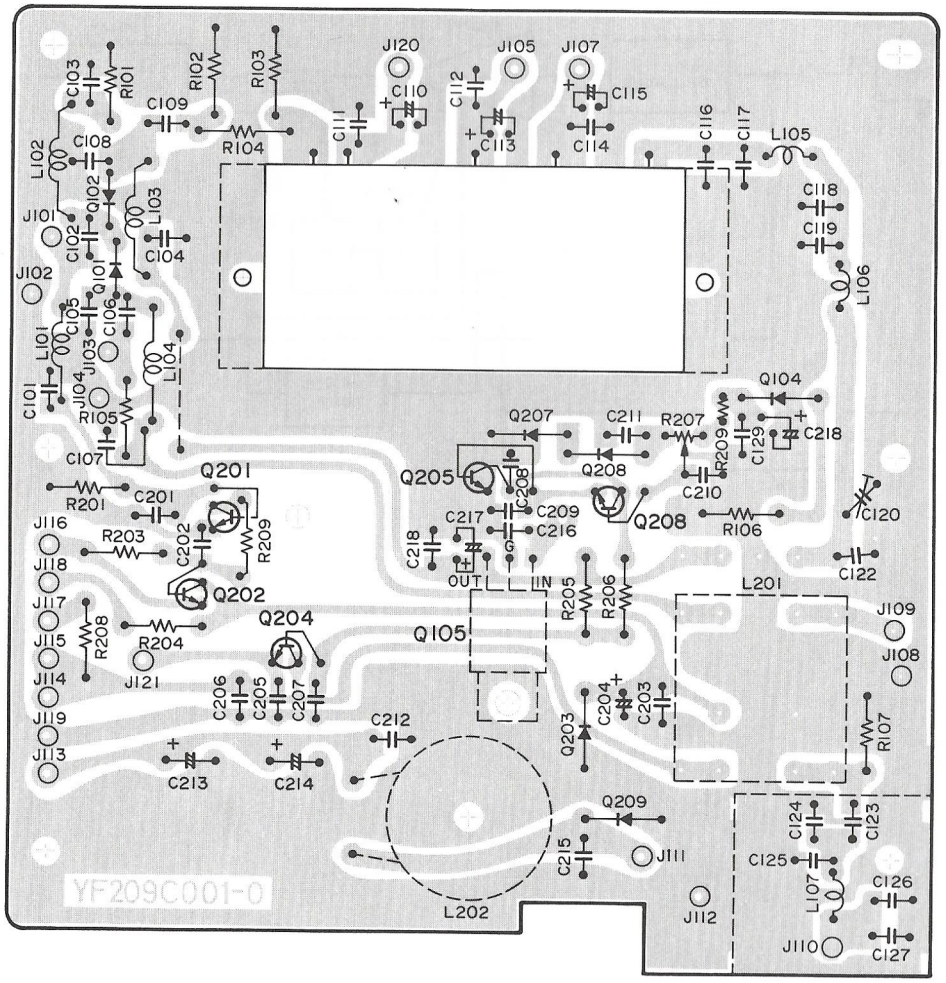
TX adjustment set-up
Fig. 2

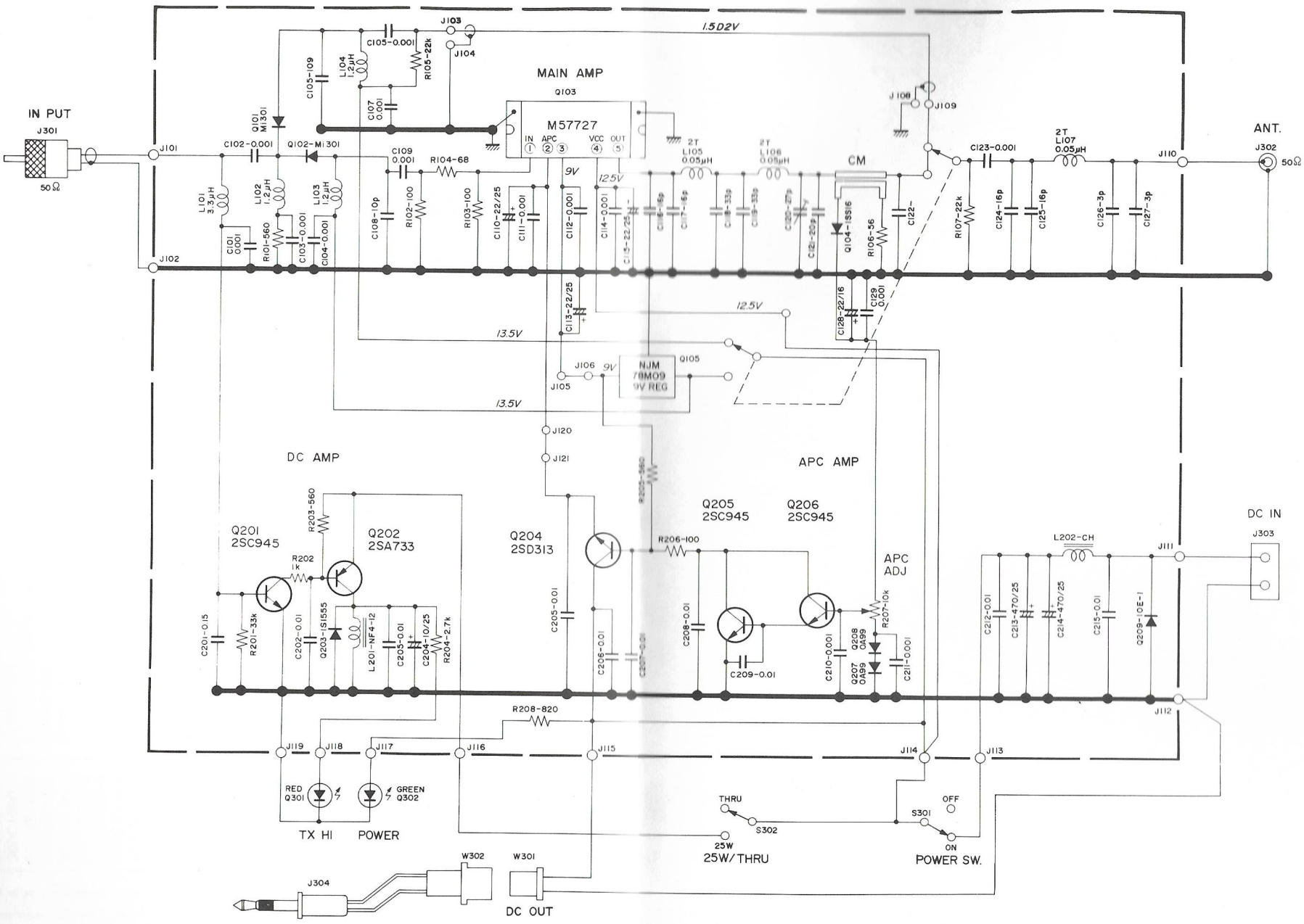
7. BLOCK DIAGRAM



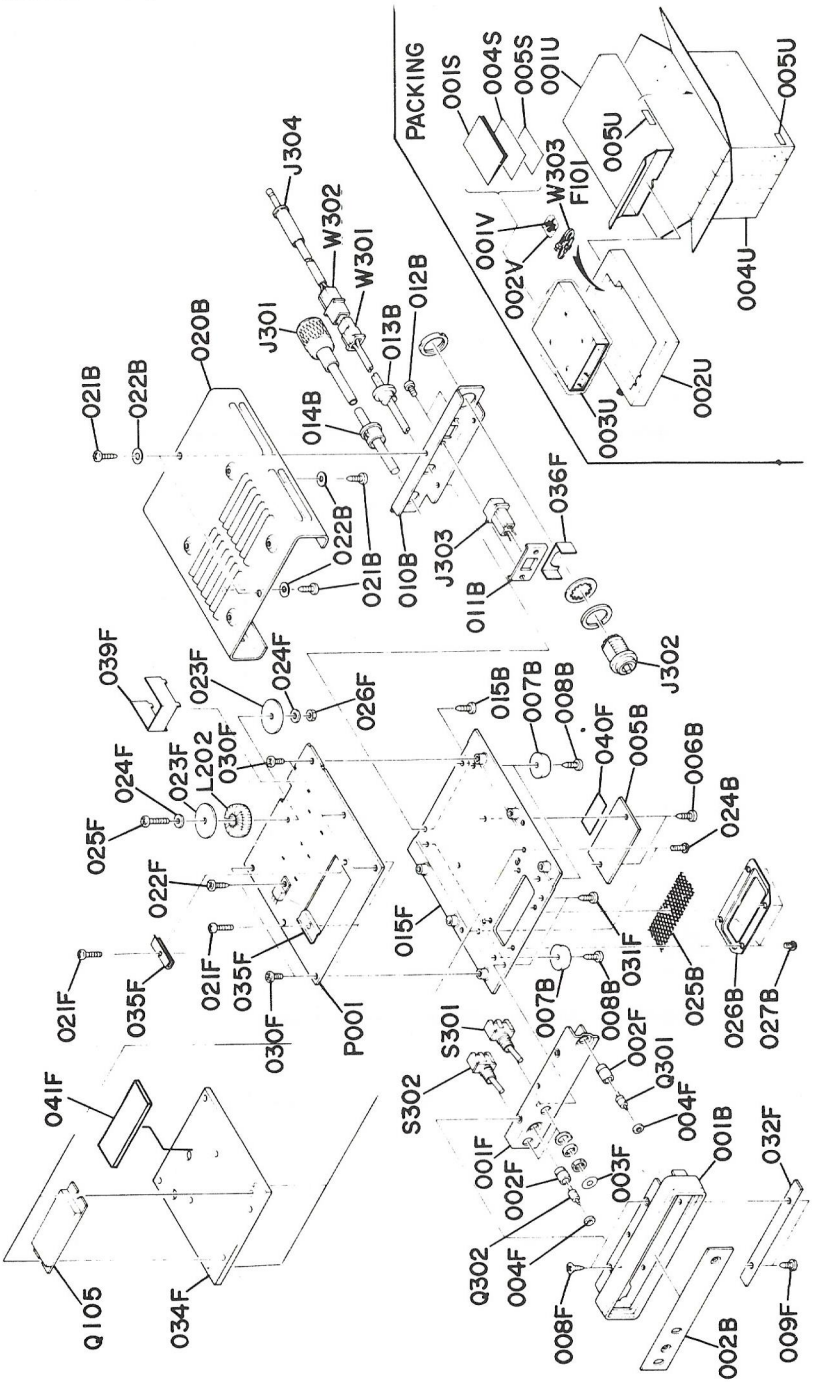
8. COMPONENT LOCATIONS

P001





9. EXPLODED VIEW/PARTS LIST



REF. DESIG.	Q'TY F	PART NO.	DESCRIPTION
001B	1	201C401010	Frame, Front
002B	1	201C063310	Escutcheon, Front Indicator
005B	1	201C265320	Indicator, Model Plate
006B	2	51280308B0	B.H. Tapped Screw B3 x 8
007B	4	3501056010	Buffer, Leg
008B	4	51280308B0	B.H. Tapped Screw B3 x 8
010B	1	201C160030	Bracket, Rear Panel
011B	1	3667005010	Clamper, DC Input
012B	2	51102606S0	B.H.M. Screw B2.6 x 6
013B	1	1455259070	Bushing, DC Output
014B	1	201C259010	Bushing, Input
015B	2	51280306B0	B.H. Tapped Screw B3 x 6
020B	1	201C257110	Lid, Top Cover
021B	4	51280306U0	B.H. Tapped Screw B3 x 6
022B	4	54020301S0	Flat Washer, P.
024B	2	51280306B0	B.H. Tapped Screw B3 x 6
025B	1	205C202010	Net
026B	1	205C053010	Cover
027B	4	51402605P0	B.H. Tapped Screw B2.6 x 5
001F	1	201C160010	Bracket, Front Bracket
002F	2	4748259010	Bushing, LED
003F	2	4622303010	Mask, Toggle Switch
004F	2	201C118010	Spacer, LED
008F	2	51342605P0	F.H. Tapped Screw F2.6 x 5
009F	2	51280308B0	B.H. Tapped Screw B3 x 8
015F	1	205C105010	Chassis, Main
021F	2	51280310B0	B.H. Tapped Screw B3 x 10
022F	1	51402606P0	B.H. Tapped Screw B2.6 x 6
023F	2	4618118040	Spacer
024F	2	54110149A0	Flat Washer, L.
025F	1	51100318B9	B.H.M. Screw B3 x 18
026F	1	53110303B9	Hexagon Nut

REF. DESIG.	Q'TY F	PART NO.	DESCRIPTION
Q105	1	HC10015210	IC MS7272
030F	6	51100305B9	B.H.M. Screw B3 x 5
031F	2	51280306B0	B.H. Tapped Screw B3 x 6
032F	1	201C053010	Cover
034F	1	205C267010	Heatsink
035F	2	205C118010	Spacer
036F	1	205C109010	Shield
039F	1	205C109020	Shield
040F	1	205C861020	Label
J301	1	YP90000190	Plug
J302	1	YJ10001560	Jack
J303	1	YB00090040	Connective Cord
J304	1	YP01000310	Plug
L202	1	LC21240010	Choke Coil, Toroidal Trans
Q301	1	HI10003320	L.E.D., GL2PR1
Q302	1	HI10004320	L.E.D., GL2PG1
S301	1	SC02020400	Switch, Toggle
S302	1	SC01020370	Switch, Toggle
W301	1	YC00250020	DC Power Cord
W302	1	YB00090040	Connective Cord
041F	1	205P120010	Insulator
			PACKING
001S	1	209C851010	Instructions
004S	1	3657854010	Guarantee Card
005S	1	9650000040	S. Station Card
001U	1	206C801020	Packing Case
002U	1	201C809010	Cushion
003U	1	9012025010	Polyethylene Bag
004U	1	206C805020	Master Carton
005U	3	9523019010	Serial No. Card
001V	4	51280308U0	B.H. Tapped Screw B3 x 8
002V	1	9010510010	Polyethylene Bag
F101	1	FS10600010	Fuse
W303	1	YC02500090	AC Power Cord

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			P101-MAIN CIRCUIT BOARD
P101	1	YF209C0010	P.W. Board, Main
			P101-CAPACITORS
C101	1	DK46102300	Ceramic 0.001μF ±10%
C102	1	DK46102300	Ceramic 0.001μF ±10%
C103	1	DK46102300	Ceramic 0.001μF ±10%
C104	1	DK46102300	Ceramic 0.001μF ±10%
C105	1	DD41100300	Ceramic 10pF ±5pF
C106	1	DK46102300	Ceramic 0.001μF ±10%
C107	1	DK46102300	Ceramic 0.001μF ±10%
C108	1	DD41100300	Ceramic 10pF ±5pF
C109	1	DK46102300	Ceramic 0.001μF ±10%
C110	1	EA22602530	Elect 22μF 25V
C111	1	DK46102300	Ceramic 0.001μF ±10%
C112	1	DK46102300	Ceramic 0.001μF ±10%
C113	1	EA22602530	Elect 22μF 25V
C114	1	DK46102300	Ceramic 0.001μF ±10%
C115	1	EA22602530	Elect 22μF 25V
C116	1	DD45160300	Ceramic 16pF ±5%
C117	1	DD45160300	Ceramic 16pF ±5%
C118	1	DD45330309	Ceramic 33pF ±5%
C119	1	DD45330309	Ceramic 33pF ±5%
C120	1	CT12700010	Trimming 27pF
C121	1	DD45200300	Ceramic 20pF ±5%
C123	1	DK46102300	Ceramic 0.001μF ±10%
C124	1	DD45160300	Ceramic 16pF ±5%
C125	1	DD45160300	Ceramic 16pF ±5%
C126	1	DD45110300	Ceramic 11pF ±5%
C127	1	DD45110300	Ceramic 11pF ±5%
C128	1	EA22601630	Elect 22μF 16V
C129	1	DK46102300	Ceramic 0.001μF ±10%

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
C201	1	DS17154010	Semicon 0.15μF ±10%
C202	1	DK46103300	Ceramic 0.01μF ±10%
C203	1	DK46103300	Ceramic 0.01μF ±10%
C204	1	EA10602530	Elect 10μF 25V
C205	1	DK46103300	Ceramic 0.01μF ±10%
C206	1	DK46103300	Ceramic 0.01μF ±10%
C207	1	DK46103300	Ceramic 0.01μF ±10%
C208	1	DK46103300	Ceramic 0.01μF ±10%
C209	1	DK46103300	Ceramic 0.01μF ±10%
C210	1	DK46102300	Ceramic 0.001μF ±10%
C211	1	DK46102300	Ceramic 0.001μF ±10%
C212	1	DK46103300	Ceramic 0.01μF ±10%
C213	1	EA47702530	Elect 470μF 25V
C214	1	EA47702530	Elect 470μF 25V
C215	1	DK46103300	Ceramic 0.01μF ±10%
			P101-RESISTORS
			(All Resistors are ±5% and ¼W)
R101	1	CD05561140	560Ω ¼W
R102	1	GU05101120	100Ω ½W
R103	1	GU05101120	100Ω ½W
R104	1	GU05680120	56Ω ½W
R105	1	GD05223140	22KΩ
R106	1	GD05560140	56Ω
R107	1	GD05223140	22KΩ
R201	1	GD05333140	33KΩ
R202	1	GD05102140	1KΩ
R203	1	GD05561140	560Ω
R204	1	GD05272140	2.2KΩ
R205	1	GD05561140	560Ω
R206	1	GD05101140	100Ω
R207	1	RA01030070	Trimming 10KΩ(B)
R208	1	GD05821140	820Ω

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			P101-SEMICONDUCTORS
Q101	1	HD20001200	Diode MI301
Q102	1	HD20001200	Diode MI301
Q103	1	HC10015210	IC M57727
Q104	1	HD20005060	Diode 1SS16
Q105	1	HC10011100	IC NJM78M09
Q201	1	HT309451Q0	Transistor 2SC945-Q
Q202	1	HT107331Q0	Transistor 2SA733-Q
Q203	1	HD20011050	Diode 1S1555
Q204	1	HD403132A0	Transistor 2SD313
Q205	1	HT309451Q0	Transistor 2SC945-Q
Q206	1	HT309451Q0	Transistor 2SC945-Q
Q207	1	HD10002050	Diode OA99
Q208	1	HD10002050	Diode OA99
Q209	1	HD20022100	Diode 10E1 LF
Q301	1	HI10003320	LED sharp GL2PR1 (RED)
Q302	1	HI10004320	LED sharp GL2PG1 (GREEN)
			P101- MISCELLANEOUS
L101	1	LC13320070	Choke coil 3.3μH
L102	1	LC11220020	Choke coil 1.2μH
L103	1	LC11220020	Choke coil 1.2μH
L104	1	LC11220020	Choke coil 1.2μH
L105	1	LC13600010	Choke coil 2T
L106	1	LC13600010	Choke coil 2T
L107	1	LC13600010	Choke coil 2T
L201	1	LY40120010	Relay NF4-12
L202	1	LC21240010	Choke Coil, Toroidal Trans
F101	1	FS10600010	Fuse 6A

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
J301	1	YP90000190	Flug
J302	1	YJ10001560	Jack
J303	1	YB00090040	Connective cord DC connecter
J304	1	YP01000310	Flug non short plug
S301	1	SC02020400	Toggle switch
S302	1	SC01020370	Toggle switch
W301	1	YC00250020	DC Cable
W302	1	YB00090040	DC Cable
W303	1	YC02500090	DC Cable

SPECIFICATIONS

Transmission frequency range . . . . . 144 ~ 148 MHz
Type of emission . . . . . A_1, A_3J, F_3
Output power 25W
Supply voltage . . . . . 13.8V DC
Drive input . . . . . 0.8 ~ 1.5W
Input impedance . . . . . 50 ohms
Antenna impedance . . . . . 50 ohms
Spurious attenuation . . . . Not more than −60dB (with C58 connected)
3rd cross modulation distortion . . . . . 25dB (at PEP 25W)
Drain current . . . . . Not more than 5.5A (with HIGH POWER position and the C58 connected)
Grounding system . . . . . Negative ground
Dimensions . . . . . 125(W) x 28(H) x 164 (D) mm
Weight 850g

These specifications are subject to change without notice in accordance with improvements.