

# **CONTACT**

Model  
**PSC-301**

## OWNER'S MANUAL

### 18 channel CB Transceiver

Professional Quality And Performance Standards  
Advanced Circuitry With PLL Synthesis

Manufactured Exclusively for  
Peter Shalley Communications  
554 Pacific Highway  
Killara 2071  
Australia

## TECHNICAL SPECIFICATIONS

### **Receiver section:**

Receiving system	Single conversion superheterodyne for SSB and AM
Sensitivity	AM: $0.5\mu\text{V}$ for 10dB S/N SSB: $0.3\mu\text{V}$ for 10dB S/N
Bandwidth	AM: 4 KHz @-6dB down with crystal lattice filter SSB: 2.4 KHz @-6dB down with crystal lattice filter
Image rejection	80dB
Audio Output Power	4 Watts (Ext.)
Intermediate frequency	11.2735 Mhz for SSB 11.275 Mhz for AM

### **Transmitter section:**

SSB generation	Double balance modulator with crystal lattice filter
AM modulation	High level class B
Frequency response	400 Hz to 2,400 Hz
RF output power	12 Watts PEP SSB, 4 Watts AM
Harmonic suppression	65dB down

### **General:**

Power source	13.8VDC (11.6 - 15.6)
Speaker	3" $8\Omega$
Semi-Conductors	41 transistor, 4 FET, 52 diode, 4 IC, 2 LED
Frequency control	Phase locked loop synthesizer control
Channels	18 channels
Dimensions	7-61/64" (W) x 2-7/16" (H) x 10-5/8" (D)
Weight	Main unit. . . 5 lbs Mic. . . 0.41 lbs

NOTE: Improvements may result in features or specification changes without notice.

## **GENERAL INSTRUCTIONS**

Your model Contact is an all solid-state AM/SSB transceiver for 11 metre 27 Mhz Citizen Band use. It uses a frequency synthesizing circuit to provide Phase Locked Loop controlled transmit and receive operation on all 18 channels. You can use your PSC-301 transceiver on any one of the 18 channels in the conventional AM mode, plus the same 18 channels in either the Upper Single Sideband mode or Lower Single Sideband mode. This flexibility not only doubles the effective number of channels from 18 to 36, but SSB also increases the effective range of communication because all the power is concentrated in one sideband to provide 100 percent talk-power. Single Sideband reception also adds advantages in sensitivity and selectivity, plus lower signal-to-noise. This of course also contributes to an increase in operating range.

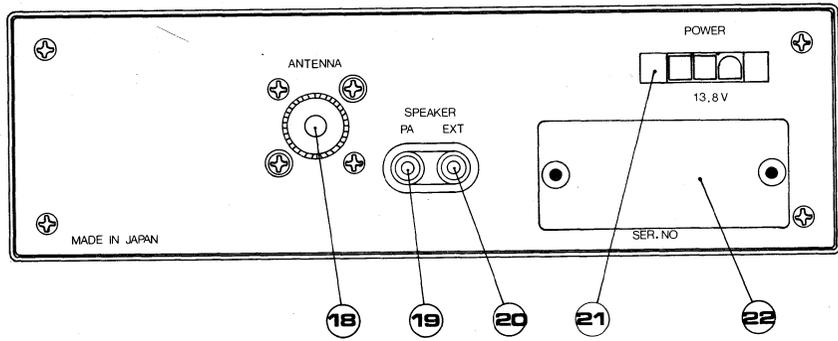
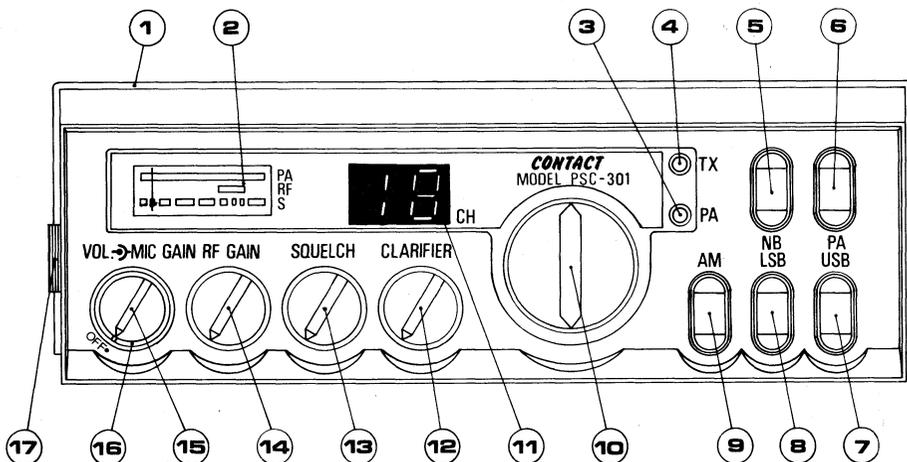
The PSC-301 has been carefully designed for ease of operation. You can select AM, Upper Sideband or Lower Sideband with the simple push of a button. Transmission is simple too just press the microphone button. Ordinarily an SSB signal will reach farther and be heard more clearly than an equivalent AM signal. SSB reception on the selected sideband is simple too....you just adjust the clarifier Control for fine tuning of the received voice transmission.

We've added all the other most wanted features for optimum communication - RF Gain Control, Squelch, Noise Blanker, full-time Automatic Noise Limiter to combat ignition noise and S-RF-PA level meter.

This transceiver is designed to operate from a normal 12 volt DC supply (positive or negative ground system).

## **LICENSING REQUIREMENTS AND APPLICATION PROCEDURES**

You may not use your Citizens Band transmitter without an authorization from the post & telecommunications department. Application for such authorization is made by filling out and mailing form RB13. - (Attached Citizens Band - License Application).



See the following page for complete explanations of all operating controls and connections.

## FRONT & REAR PANEL VIEW and FUNCTIONS

- 1. Mounting bracket** Specially designed bracket simplifies installation. Has "quick-release" feature for fast removal of transceiver.
- 2. S-RF-PA level meter** Illuminated meter indicates relative incoming signal strength when receiving, relative RF power output when transmitting and relative PA power output when PA operated.
- 3. PA indicator** Lamp will illuminate during PA mode of operation.
- 4. Transmit indicator** Lamp will illuminate during TRANSMIT mode of operation.
- 5. Noise blanker switch** "Depressed in" position switches in an effective noise silencer circuit.
- 6. CB-PA push switch** "PA" (depressed in) position set transceiver to function as a Public Address amplifier. With (released out) position, the transceiver operates normal receiver.
- 7. USB push switch** "USB" (depressed in) position set transceiver to function as an Upper Single Sideband transmit and receive operation.
- 8. LSB push switch** "LSB" (depressed in) position set transceiver to function as a Lower Single Sideband transmit and receive operation.
- 9. AM push switch** "AM" (depressed in) position set to AM transmitter and receiver.
- 10. Channel selector** Rotary switch selects CB channels 1-18 for transmit and receive operation.
- 11. Channel indicator** Indicates a channel selected.
- 12. Clarifier** Permits slight adjustment of receiver tuning. Used for clarify on SSB reception and fine tuning of stations on AM reception.
- 13. Squelch** This control is used to "Quiet" the receiver during "no-signal" condition. Degree of sensitivity to incoming signal is adjustable. Full clockwise provides maximum squelch; full counter-clockwise provides no squelch action.
- 14. RF gain control** Adjust as required to optimize signal. This control is functional in both AM and SSB modes and is used primarily to optimize reception in strong signal areas. Gain is reduced by counter-clockwise rotation of the control. Normal position is full clockwise.
- 15. Volume ON-OFF** Varies the sound output from the speaker. Also incorporates an "ON-OFF" power switch at the extreme counter-clockwise position.
- 16. MIC Gain control** Adjust the microphone gain of the PA/AM/SSB output level.
- 17. Microphone** 4-pin socket for attachment of push-to-talk microphone.
- 18. Antenna connector** For antenna lead-in cable with matching PL-259 connector.
- 19. PA speaker** Jack for connection of 8 ohm PA speaker when used in this mode.
- 20. EXT. speaker** Allows use of headphone for private listening, or 8 ohm external speaker. Insertion of plug automatically silences internal speaker.
- 21. Power socket** Power for the transceiver supplied through this socket, using the DC power cable supplied.
- 22. Plate** Identification detailing serial No & P & T approval.

## MOBILE INSTALLATIONS

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.

### DC POWER CONNECTION

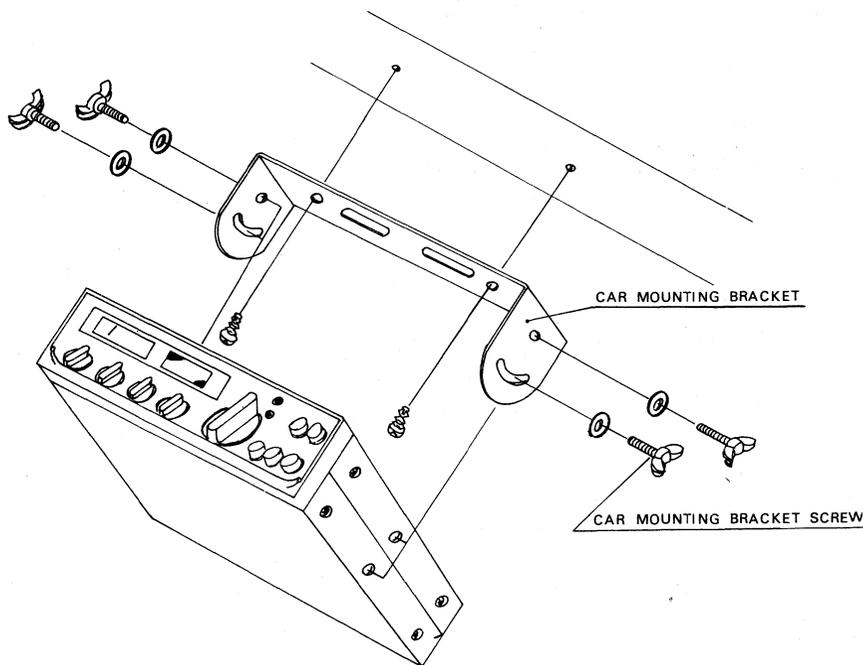
This transceiver may be operated from a 12 volts DC battery source on negative or positive ground system. It is designed to operate within an input voltage range of 11.6 to 15.6 volts DC maximum. Make sure the voltage to the transceiver does not exceed 15.6 volts DC.

#### NOTE:

Before making any power connections, you must determine whether the vehicle or boat has a negative or positive ground electrical system, then make the following connections:

1. Connect the two-pin female connector on one end of the DC Power cable to the "Power" socket at the rear of the transceiver.

2. Using the other end of the DC power cable, connect the fused Red lead to the "+" (positive) side of the electrical system, and the black lead to the "-" (negative) side of the electrical system. In case of the negative ground system, the Red lead should be connected to the accessory post on the ignition switch, the voltage regulator side of the ammeter or the accessory side of the fuse block. The black lead should be connected to the metal firewall or any other point that is connected to the vehicle chassis (ground).
3. In case of the positive ground system, the black lead should be connected to the accessory post on the ignition switch, the voltage regulator side of the ammeter or the accessory side of the fuse block. The Red lead should be connected to the metal firewall or any other point that is connected to the vehicle chassis (ground).



**FIG. 1**

### **TRANSCEIVER MOUNTING**

Before installing the transceiver in a car, truck, etc., be sure to choose a location which is convenient to the operating controls, and will not interfere with the normal functions of the driver. The transceiver may be mounted to the underside of the instrument panel or dashboard of a car, truck, etc., by means of the special bracket that is supplied with the transceiver. Attach the bracket to the underside of the instrument panel using self-threading screws (See Fig. 1).

Secure the transceiver to the bracket by means of the large knurled thumbscrews. Tilt the transceiver to a position which provides the operator with the best view of the front panel, then tighten knurled thumbscrews securely.

### **ANTENNA CONNECTION**

The antenna lead-in cable (RG-58U or RG8/U) should be terminated with a PL-259 type male coaxial connector which should then be attached to the matching SO-239 connector at the rear of the transceiver.

### **MICROPHONE CONNECTION**

Insert the 4-pin plug at the end of the coiled cord into the microphone socket at the side of the transceiver.

### **IGNITION INTERFERENCE**

Your transceiver is equipped with a special RF Noise Silencer that is designed to provide outstanding reduction of ignition noise. Ignition interference should not therefore be a problem in most cases. However, sufficient noise may be generated by some vehicle to make it necessary to install additional suppression. Several noise suppressor kits are available which include all necessary parts and instructions. Take your vehicle to a skilled auto radio technician who will be able to carry out the suppression for you.

## **MOBILE ANTENNAS**

The antenna system include the transmission line, and it is very important that you use the correct type of transmission line. The transmission line should be the coaxial type and should have an impedance equal to the antenna impedance, which must be 50 ohms. Generally speaking, you should keep the length of the transmission line minimum. Remember that line losses increase with frequency. Use foam-insulation coax for best results. The above discussion is as important for reception as it is for transmission. If a mismatch exists between the antenna and the receiver, the excellent sensitivity and signal-to-noise ratio of the receiver circuitry will be defeated.

## **FIXED STATION ANTENNA**

The most popular fixed station antenna is a 5/8 wave type for omnidirectional operation and various beam antennas for directional operation. The directivity can be a disadvantage unless a rotar is used. Since the beam antenna is directional, it generally reduces noise and interference from all other directions. This can be a decided advantage on the CB bands where man-made noise is a problem. The antenna system should be adequately grounded and extreme care should be exercised to prevent contact with power line during installation.

## **USING YOUR TRANSCEIVER**

Do not transmit without a suitable antenna or load to the antenna connector. For installation, refer to that section.

### **TO RECEIVE AM SIGNALS**

1. Set RF gain control maximum clockwise.
2. Set Squelch control maximum counter-clockwise.
3. Set mode to AM.
4. Turn power "ON" by rotating volume clockwise.
5. Set channel selector to desired channel.
6. Adjust Squelch to cutout annoying background noise when no signal is being received. To do this, set Channel Selector to a channel where no signals are present (or wait till signals cease on your channel) Then, rotate Squelch in a clockwise direction to the point where the background noise just stops. Now, when a signal is present, you will hear it, but will not be disturbed by noise on the channel in between signals. When properly set, Squelch will keep the receiver "dead" until a signal comes in on that channel. Do not set Squelch too high or weak signals will not be able to "open" the Squelch circuit. To receive weak signals, it is best to leave Squelch set to the minimum position (maximum counter-clockwise).
7. Use Clarifier to tune in slightly off-frequency stations.
8. Adjust Volume for suitable listening level.

### **TO RECEIVE SSB**

1. Set RF gain control maximum clockwise.
2. Set Squelch control maximum counter-clockwise.
3. Set Mode switch either LSB or USB, depending on which sideband is being used by the transmitting station.
4. Turn power "ON" by rotating volume clockwise.
5. Set Channel selector to the desired channel.
6. Adjust Squelch as noted above.
7. Use Clarifier to tune in the SSB signal. SSB tuning takes practice; it is not difficult, it just takes a little experience. When first listening to an SSB signal, it probably will not be understandable; the noise may sound like "Donald Duck", or just a low guttural sound. In either case, very slowly adjust Fine Tuning to bring the signal into its natural voice level range.

If the signal is Donald Duck type, tune so the signal tones becomes lower in tone; careful tuning will make the noise sound natural. If the signal is low and guttural, tune for higher tones. If you try above procedure and are not able to make the signal intelligible, it may be an SSB signal operating on the other sideband-try the other SSB Mode (LSB or USB as the case may be).

8. Adjust Volume for a suitable listening level.

## **NOTES ON RECEIVING**

An SSB signal will produce a fluttering, unintelligible sound when receiving in the AM mode; in such a case, use either the LSB or USB mode and adjust Clarifier for intelligibility.

You can tune AM signals when the Mode switch is in the USB or LSB position; tune Clarifier control to eliminate the steady tone caused by the AM carrier ("zero-beat" the tone so it disappears). When receiving an extremely strong signal, you will find it best to use the RF Gain Control to vary the Volume (rather than using Volume).

## **GENERAL TRANSMITTING INSTRUCTIONS**

Before operating this transceiver, you are required by law to read and understand RB 14 of the P & T rules and regulations, to have complete form RB-13 and received your licence.

Make sure the proper corrections have been made on the power cable, antenna system and microphones, and that the correct cable have been used. Be sure that the transceiver is properly grounded (if not mounted directly to a metal surface).

To transmit, (after all controls are preset for receive), press and hold the microphone "push-to-talk switch" Hold the microphone about 2-3 inches from your mouth and speak in a normal tone of voice. Release the "push-to-talk" switch to receive.

The mike gain control acts as a power mike gain control and should be adjusted with the help of another station several miles away to provide best voice sounds. Usually best performance will be had when adjusted between 10 o'clock and 2 o'clock positions, rarely will full gain be needed and extreme distortion is the usual result.

## **NOTE**

Channel 5 has been designated by the P&T as an emergency channel, Use channel 6 for general calling. Use is restricted to communications involving the immediate safety of people or protection of property and, to the assistance of a motorist. Emergency calls on this or on any other channel MUST be given priority. You must not use Channel 5 for any other purpose.

## **ALIGNMENT PROCEDURE**

The transceiver has been fully aligned at the factory before shipment to you and require no further adjustment. When necessary, however, the receiver and transmitter may be aligned as indicated.

### **WARNING:**

DO NOT OPEN UP THE TRANSCEIVER TO MAKE ANY INTERNAL ADJUSTMENTS. ANY THE UNIT MUST BE RETURNED TO YOUR DEALER UNAUTHORISED SERVICE OR INSPECTION VOIDS GUARANTEE

## **1. SYNTHESIZER ALIGNMENT**

### **A. PLL Reference Oscillator (10.240Mhz) Adjustment**

- 1) Set Channel Selector Switch to any position.
- 2) Connect 50 ohm Dummy load to ANT Connector.
- 3) Supply 13.8V DC through the Power Socket of the unit.
- 4) Connect Frequency Counter between IC201 pin-9 and PC Board Ground.
- 5) Rotate Trimmer Capacitor TC201 until Frequency Counter indicates 5120Khz.

### **B. PLL Voltage Controlled Oscillator Adjustment**

- 1) Set Channel Selector Switch to CH-10 position.
- 2) Connect 50 ohm Dummy load to ANT Connector.
- 3) Supply 13.8V DC through the Power Socket of the unit.
- 4) Connect Frequency Counter between PLL Output Terminals of T201 and PC Board Ground.
- 5) Rotate Core of L202 Counter clockwise until off Phase Locked Loop. Then turn the Core clockwise until starts again. Further turn the Core half turn clockwise.

### **C. L204 Oscillator Output Coil Adjustment**

- 1) Set Channel Selector Switch and Mode Switch to any position.
- 2) Connect 50 ohm Dummy load to ANT Connector.
- 3) Supply 13.8V DC through the Power Socket of the unit.
- 4) Connect VTVM between Q207 Collector and PC Board Ground.
- 5) Rotate Core of L204 until maximum output level.

### **D. 36.960Mhz Oscillator Adjustment**

- 1) Set Channel Selector Switch to CH-1 position.
- 2) Set Mode Switch to USB position.
- 3) Connect 50 ohm Dummy load to ANT Connector.
- 4) Supply 13.8V DC through the Power Socket of the unit.
- 5) Connect Frequency Counter between PLL Output Terminals of T201 and PC Board Ground.
- 6) Depress Microphone PUSH-TO-TALK button.
- 7) Rotate Trimmer Capacitor TC202 until Further turn the Core half turn clockwise.

### **E. 36.957Mhz Oscillator Adjustment**

- 1) Set Channel Selector Switch CH-1 position.
- 2) Set Mode Switch to LSB position.
- 3) Connect 50 ohm Dummy load to ANT Connector.
- 4) Supply 13.8V DC through the Power Socket of the unit.
- 5) Connect Frequency Counter between PLL Output Terminals of T201 and PC Board Ground.
- 6) Depress Microphone PUSH-TO-TALK button.
- 7) Rotate Trimmer Capacitor TC203 until Frequency Counter indicates 38.237Mhz.

### **F. Q701 Oscillator Adjustment**

- 1) Set Mode Switch to USB position.
- 2) Connect Frequency Counter high impedance input between Q702 Collector to PC Board Ground.
- 3) Rotate Trimmer Capacitor TC701 until Frequency Counter indicates 11.275Mhz.
- 4) Next, Set Mode Switch to LSB position.
- 5) Rotate Trimmer Capacitor TC702 until Frequency Counter indicates 11.272Mhz.

### **G. PLL Output Coil Adjustment**

- 1) Set Mode Switch any position.
- 2) Connect 50 ohm Dummy load to ANT Connector.
- 3) Supply 13.8V DC through the Power Socket of the unit.
- 4) Connect RF VTVM between PLL Output Terminals of T201 and PC Board Ground.
- 5) Rotate Core of L201 until same output level on CH-3 and CH-15.

## **2. TRANSMITTER ALIGNMENT**

### **A. RF Power Output Adjustment**

- 1) Connect 50 ohm Dummy load Watt Meter and Spectrum Analyzer to ANT Connector.
- 2) Set Mode Switch to AM position.
- 3) Adjust the power source voltage to 13.8V.
- 4) Set Channel Selector Switch to CH-10. Then Depress Microphone PUSH-TO-TALK button and Adjust T103, L107 and L110 for maximum indication on Watt Meter.
- 5) Set Channel Selector Switch to CH-1. Then adjust T104 for maximum indication on Watt Meter.
- 6) Set Channel Selector Switch to CH-18. Then Depress Microphone PUSH-TO-TALK button and Adjust T102 for maximum indication on Watt Meter.
- 7) Depress Microphone PUSH-TO-TALK button and Adjust L106 for minimum spurious of 2nd and 3rd harmonics on Spectrum Analyzer at all Channels.

## **B. SSB Transmission Adjustment**

- 1) Set Mode Switch to USB position.
- 2) Connect 50 ohm Dummy load to ANT Connector, Connect a Watt Meter also to the ANT Connector.
- 3) Connect a single tone Generator to the input of CN-2 pin 4 Microphone jack. And adjust T105 for maximum RF Power Output.
- 4) Adjust DC Power source to 13.8V and Connect a Spectrum Analyzer to ANT Connector.
- 5) Connect two tone (500Hz and 2400Hz) Generator to the input of CN-2 pin 4 Microphone jack.
- 6) Microphone Gain Control VR-2 Set to fully clockwise.
- 7) Set output of two tone Generator to 1mV.
- 8) Set Channel Selector Switch to CH-10. Then Depress Microphone PUSH-TO-TALK button and Adjust VR103 and VR104 for Distortion less than below value indicate Spectrum Analyzer.  
(3rd and 5th distortion  $-25\text{dB}$ , 7th and 9th distortion  $-35\text{dB}$  and 11th to 15th distortion  $-60\text{dB}$ ).
- 9) Adjust DC Power source to 15.9V.
- 10) Adjust VR102 to obtain maximum RF Power Output of 12W.

## **C. AM Transmission Adjustment**

- 1) Set Mode Switch to AM position.
- 2) Adjust DC Power Supply 13.8V, dummy load and modulation meter to ANT Connector.
- 3) Connect the single tone Generator to the input of CN-2 pin 4 Microphone jack.
- 4) Set output of single tone Generator to 100mV. (maximum modulation frequency).
- 5) Adjust VR802 to obtain 100 percent Modulation.

## **3. RECEIVER ADJUSTMENT**

### **A. AM RF and IF Alignment**

- 1) Connect an RF Signal Generator to the ANT Connector.
- 2) Connect an VTVM across Speaker Terminals.
- 3) Rotate Volume Control to the 12 o'clock position.
- 4) Rotate CLARIFIER Control to 12 o'clock position.
- 5) Rotate SQUELCH Control full Counter-clockwise.
- 6) Set RF Signal Generator to 27.125 Mhz (CH-10) for 30 percent Modulation with 1Khz tone Adjust its output level to  $10\mu\text{V}$ .
- 7) Set Channel Selector Switch to CH-10 and Signal Generator frequency to approximately 27.125Mhz for a maximum indication on AC VTVM.
- 8) Adjust T301, T302 and T303 for a maximum output indication on AC VTVM.
- 9) Decrease RF Signal Generator output to approximately  $1\mu\text{V}$ .
- 10) Adjust T301, T302, T303, T401 and T501 for maximum indication on AC VTVM. Re-adjust all coils no further improvement is obtainable.
- 11) Increase RF Signal Generator output level to  $100\mu\text{V}$ .
- 12) Adjust variable Resistor VR502 until S Meter scale indicate S-9.

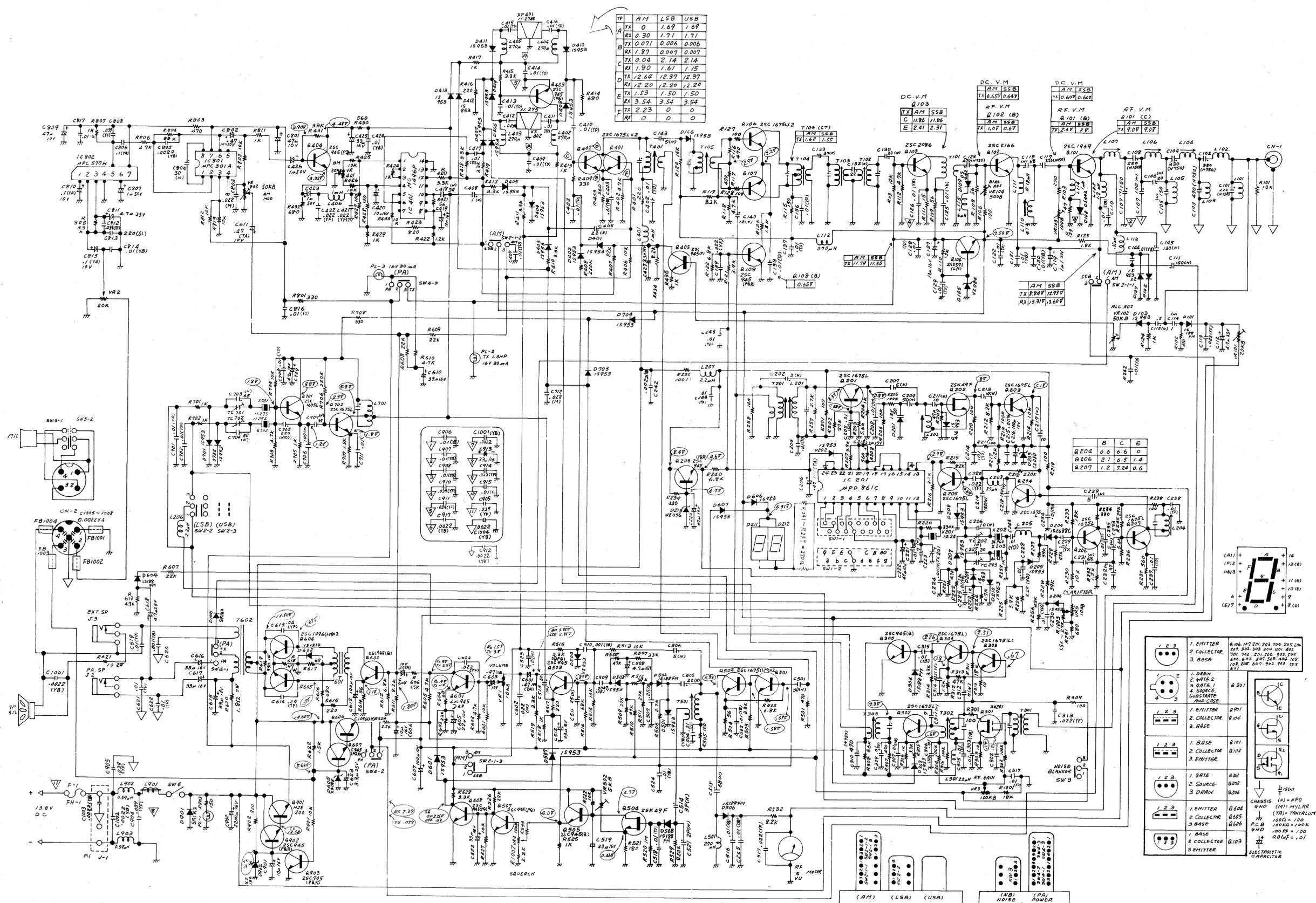
### **B. SSB Reception Adjustment**

- 1) Sensitivity check for SSB reception.
- 2) Connect RF Signal Generator to ANT Connector.
- 3) Connect AC VTVM, and Oscilloscope across Speaker Terminals.
- 4) Set Mode Switch to LSB position.
- 5) Rotate VOLUME Control to 12 o'clock position.
- 6) Rotate SQUELCH Control fully counter-clockwise.
- 7) Set RF Signal Generator for 27.125Mhz (CH-10). Do not modulate.
- 8) Set RF Signal Generator output level at  $10\mu\text{V}$ .
- 9) Set Transceiver to CH-10 and vary RF Signal Generator Frequency to approximately 27.125Mhz for maximum indication on AC VTVM.
- 10) Rotate CLARIFIER Control until an audio output of about 1Khz (beat frequency) is obtained on Oscilloscope.
- 11) Switch to CH-11 and adjust the volume control for a convenient reference noise level.
- 12) Return to CH-10 and adjust signal generator output level to produce a reading 10dB higher than the noise level on the AC VTVM. The signal generator output level is the SSB sensitivity of the radio.





# CONTACT MODEL PSC-301 SCHEMATIC DIAGRAM



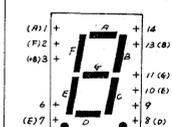
	AM	LSB	USB
A TX	0	1.69	1.69
A RX	0.30	1.71	1.71
B TX	0.071	0.006	0.006
B RX	1.97	0.007	0.007
C TX	0.04	2.14	2.14
C RX	1.90	1.61	1.15
D TX	12.64	12.37	12.37
D RX	12.20	12.20	12.20
E TX	1.53	1.50	1.50
E RX	3.54	3.54	3.54
F TX	2.23	0	0
F RX	0	0	0

DC. V.M	
A	0.103
B	0.102 (B)
C	0.102 (B)
D	0.102 (B)
E	0.102 (B)
F	0.102 (B)

DC. V.M	
A	0.103
B	0.102 (B)
C	0.102 (B)
D	0.102 (B)
E	0.102 (B)
F	0.102 (B)

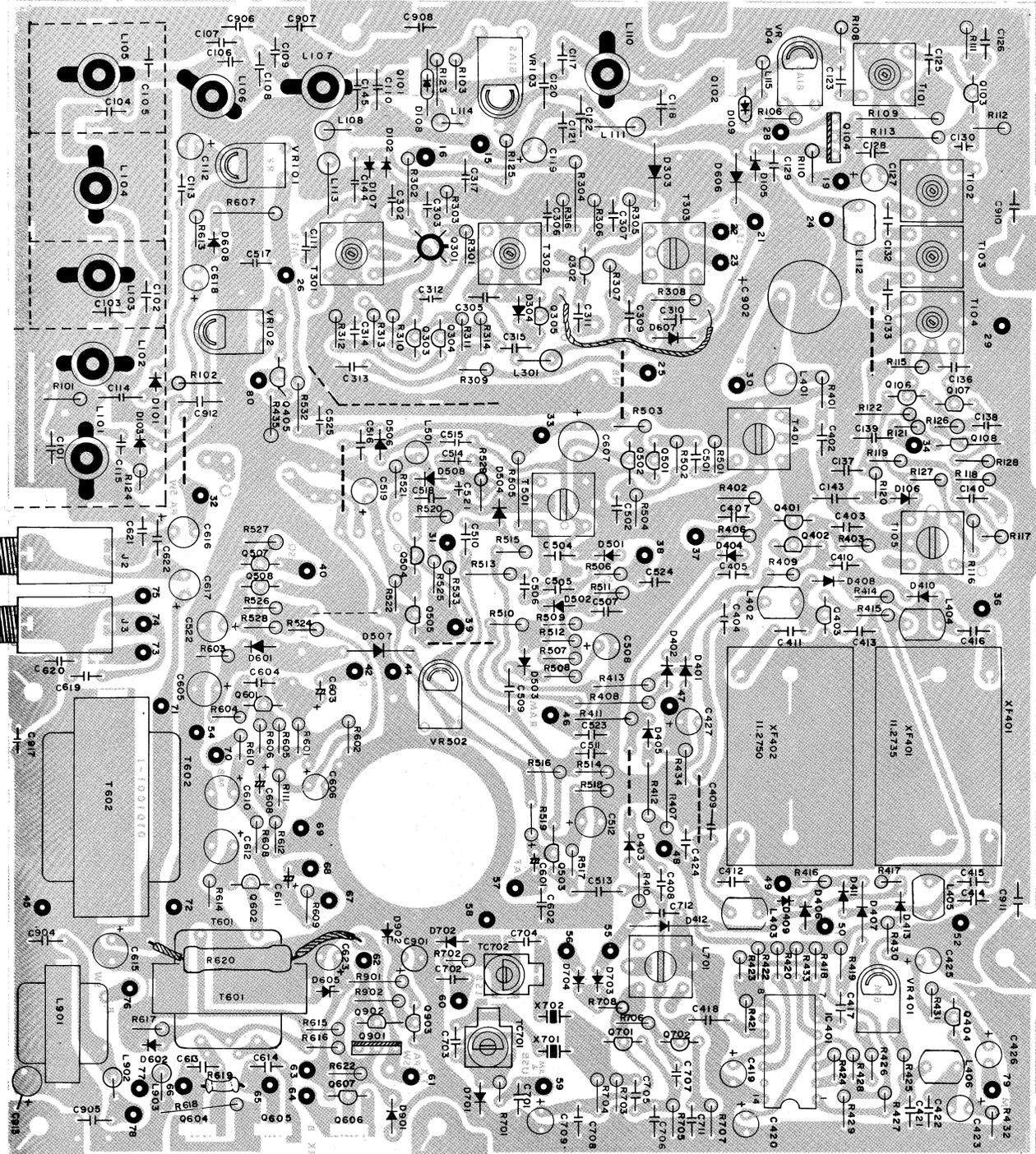
DC. V.M	
A	0.103
B	0.102 (B)
C	0.102 (B)
D	0.102 (B)
E	0.102 (B)
F	0.102 (B)

DC. V.M	
A	0.103
B	0.102 (B)
C	0.102 (B)
D	0.102 (B)
E	0.102 (B)
F	0.102 (B)

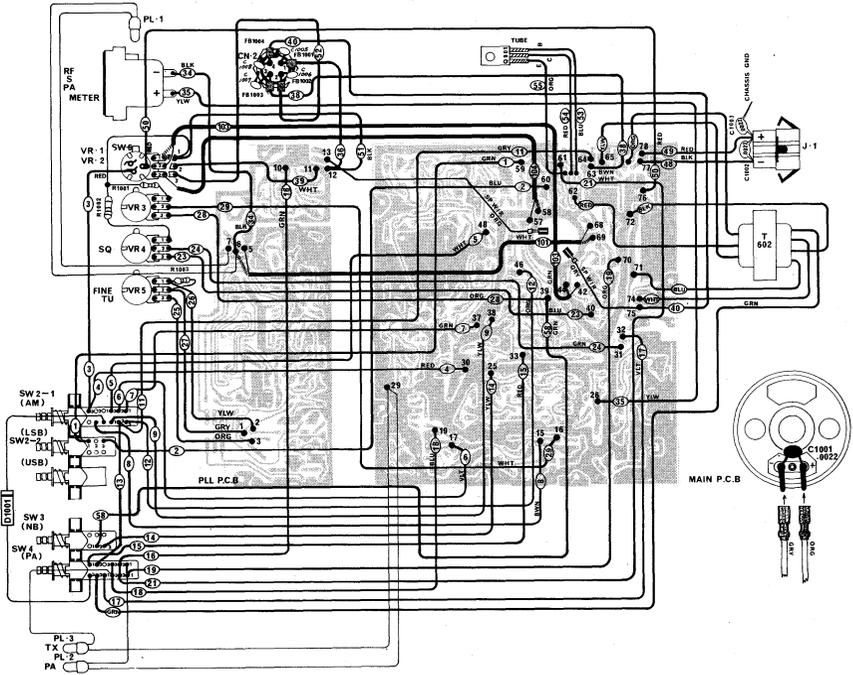


- 1. EMITTER
- 2. COLLECTOR
- 3. BASE
- 1. GATE 2
- 2. GATE 1
- 3. SOURCE
- 1. BASE
- 2. COLLECTOR
- 3. EMITTER
- 1. GATE
- 2. SOURCE
- 3. DRAIN
- 1. EMITTER
- 2. COLLECTOR
- 3. BASE
- 1. EMITTER
- 2. COLLECTOR
- 3. BASE

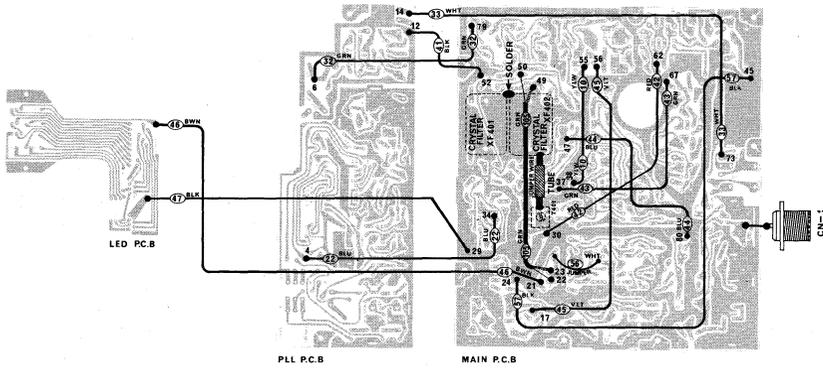
# MAIN P.C.B (PARTS VIEW)



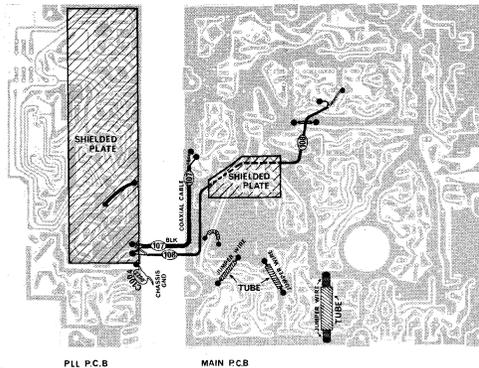
CHASSIS WIRING



P.C.B WIRING (TOP VIEW)



P.C.B WIRING (BOTTOM VIEW)



# BLOCK DIAGRAM

