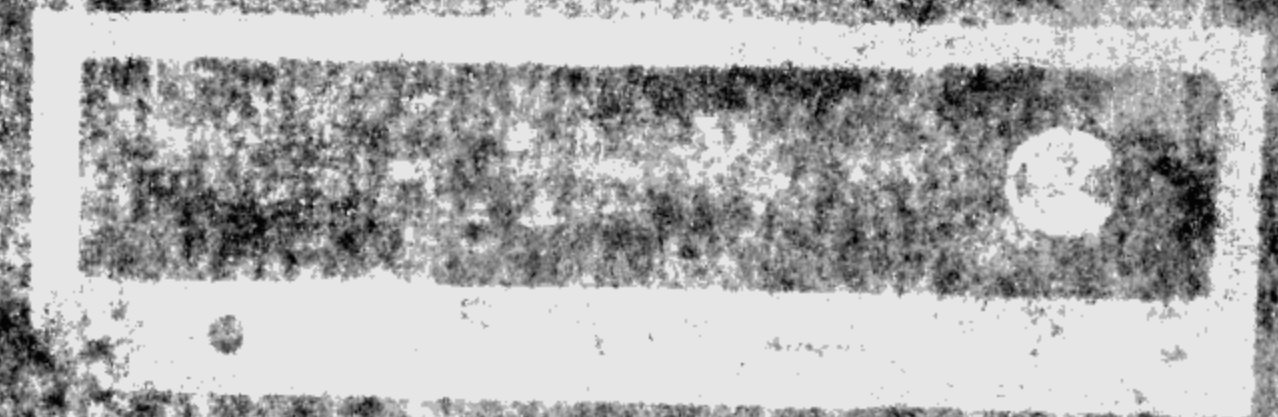


MIDLAND
ELECTRONICS COMPANY

MODEL 13-898B



FEDERAL COMMUNICATIONS COMMISSION'S REQUIREMENTS

Your new Midland 13-898B is a combination receiver-transmitter designed, built, and F. C. C. type accepted for licensed Class D operation on any of the 23 frequencies designated as citizens band channels by the Federal Communications Commission. You are required to read and understand Part 95 of the F. C. C. rules and regulations prior to operation of this unit. Part 95 regulations are available from the Superintendent of Documents, Government Printing Office, Washington D. C. 20402. You are also required to complete F. C. C. form 505 and submit it to the F. C. C. in order to receive your license to operate this unit. F. C. C. regulations will be violated if you transmit with this unit prior to receipt of your license.

NOTE: The technical information, diagrams, and charts provided in this manual are supplied for the use of a qualified holder of a first or second class radiotelephone license in servicing this transceiver. It is the user's responsibility to see that this unit is operating at all times in accordance with the F. C. C. Citizens Radio Service regulations.

If you install or service your own transceiver, do not attempt to make any transmitter tuning adjustment. Transmitter adjustments are prohibited by the F. C. C. unless you hold a first or second class radiotelephone license or are in the presence of a person holding such a license. A Citizens Band or Amateur license is not sufficient.

When service is performed by an authorized and licensed person, care must be taken in the replacement of parts to use only authorized parts, in order not to void the type acceptance of this model.

Midland Electronics Company hereby certifies that this unit has been designed, manufactured and F. C. C. type accepted in accordance with Vol. 6, Part 95 of the current F. C. C. rules and regulations as of the date of manufacture.

OWNERS GUIDE

Your 13-898B is a versatile, professional quality transceiver and we strongly suggest that you read this Owners Guide carefully before operation so that you may receive full benefit from its many features.

WARNING: To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

SINGLE SIDEBAND

SSB (Single Sideband) is relatively new in Citizens Band Communications but has been highly effective in commercial amateur and military usage for many years. It is a superior means of wireless communications allowing transmissions of greater distances with a minimum amount of interference and noise.

There are two types of single sideband transmissions, USB (Upper Sideband) and LSB (Lower Sideband). These might be described as half signals and due to the narrow band-width required, will travel over greater distances at lower power than ordinary AM signals. Figure 1 below illustrates USB and LSB signals and the reference carrier line.

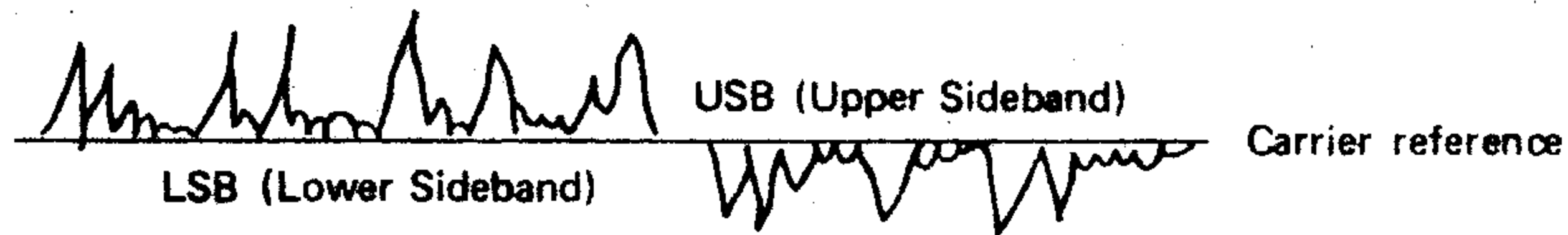


Figure 1

In the actual transmission of either USB or LSB, the carrier is removed. All of the modulation for a transmission is concentrated in either the Upper or Lower sideband. In the receiver, the carrier is reconstructed and the intelligence or modulated voice is then detected, amplified and converted into an audible sound heard at the speaker.

AM (Amplitude Modulation) has been the standard method of Citizens Band B reception and transmission for many years and most of the existing transceivers being used today are AM. Technically, Amplitude Modulation is Double Sideband (DSB). In this method of operation, a carrier is transmitted which is modulated or interrupted by voice on both positive and negative sides as represented by figure 2.

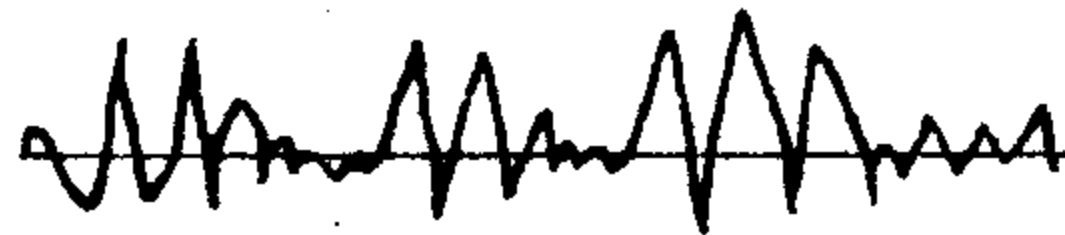
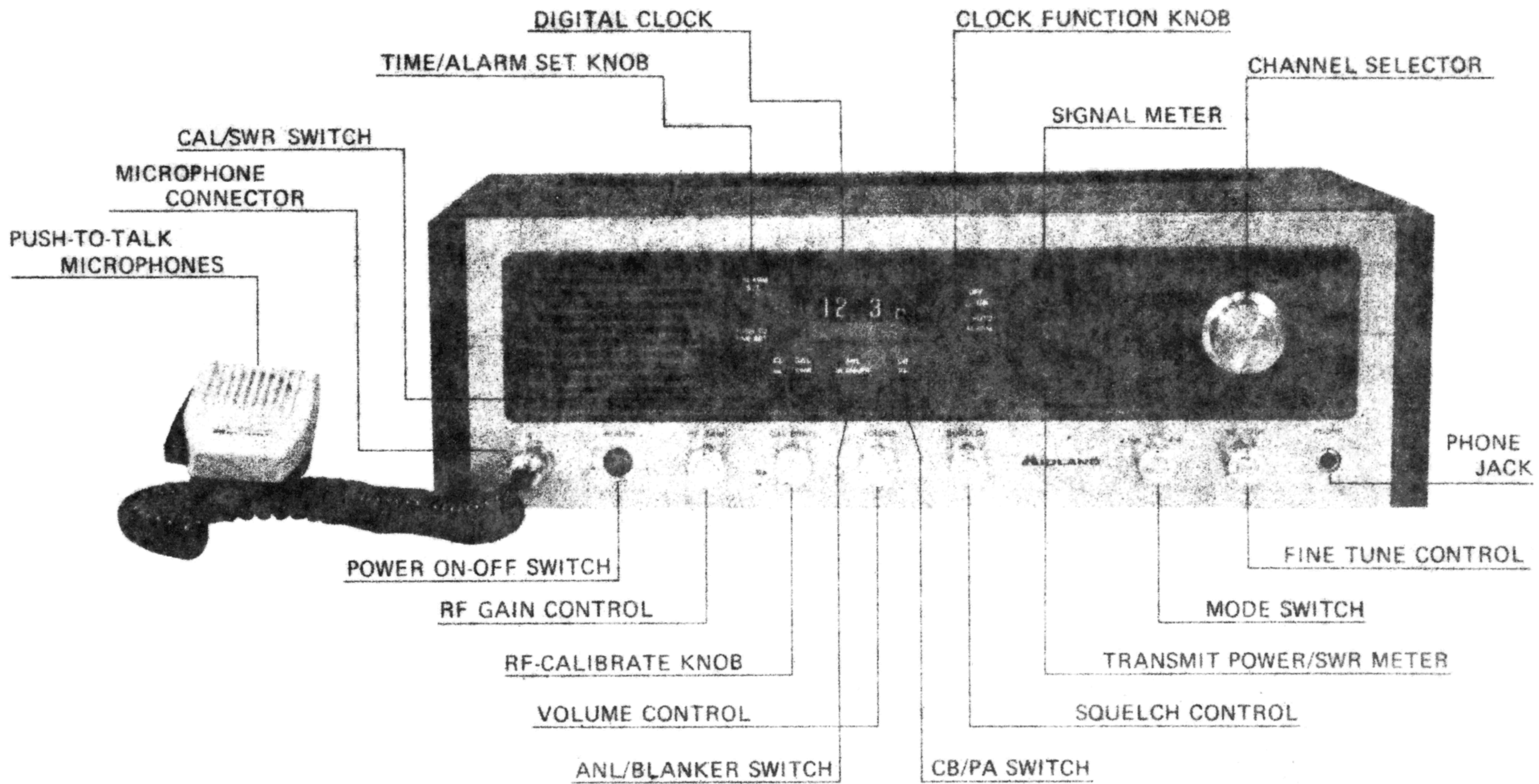


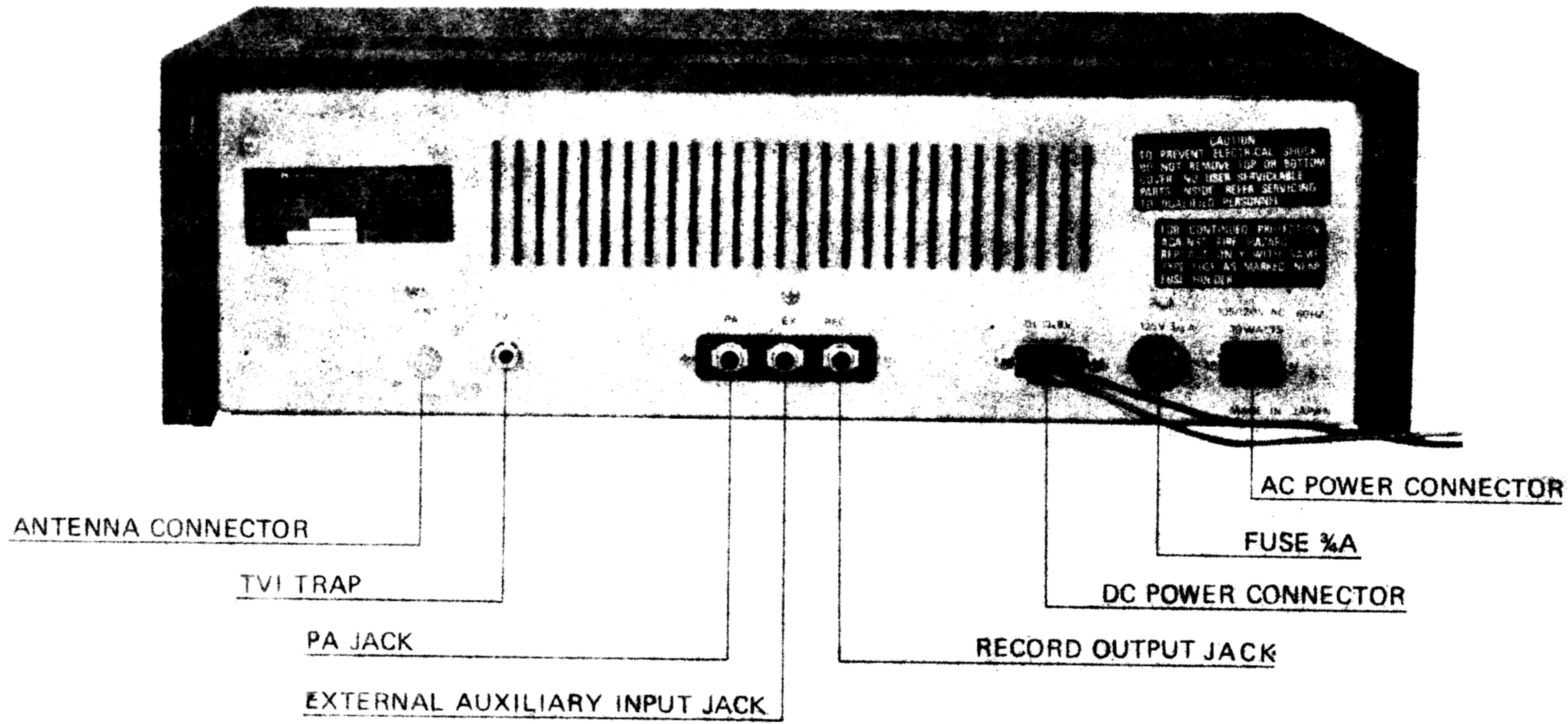
Figure 2.

COMPATIBILITY

The 13-898B is designed to be completely compatible with all current modes of Class D operation, including single sideband, (upper or lower), double sideband, or conventional AM and is equipped with separate transmitter circuitry to provide high level AM (Amplitude Modulated) transmissions and True SSB (Single Sideband) transmissions. The receiver section is also capable of receiving AM and SSB. The mode of operation for both receiver and transmitter sections is automatically selected by the mode selector switch.

OPERATION OF CONTROLS





OPERATING CONTROLS, CONNECTORS AND THEIR FUNCTIONS

CHANNEL SELECTOR SWITCH

Controls both transmitter and receiver frequencies simultaneously and may be set to any of the 23 or EX positions indicated. All necessary crystals are supplied for full 23 channel operation.

POWER PUSH SWITCH

Turns the power on or off (for AC operation OFF-ON-AUTO-ALARM switch must be placed in ON position, refer to "DIGITAL CLOCK" in this manual).

VOLUME

Controls the sound output from the speaker when receiving. The volume control does not affect transmitting output.

RF GAIN

Controls RF gain when receiving. To increase RF gain (reception sensitivity) turn the knob to the clockwise direction and to decrease counter-clockwise direction.

SQUELCH

Quiets the receiver when signals are not being received and allows a quiet standby operation. It functions only in the receive mode and does not affect the receiver volume when signals are being received. To adjust: When no signals are present, rotate the squelch control clockwise until the receiver is quieted. Incoming signals will automatically release the squelch. The squelch circuit is effective for both AM and SSB reception.

RF-CALIBRATE CONTROL

For usual operation place this control in the "RF" position (full counterclockwise position).

This control, placed in the RF position, switches in the "RF meter" and your transmitting power will be indicated on the RF meter scale (1 10), while the push-to-talk switch is depressed.

Another use of this control is to check for SWR (Standing Wave Ratio) of your antenna system. See "SWR Check" in this manual.

MODE SWITCH (LSB, USB & AM)

Controls the mode of operation for the transmitter and receiver simultaneously and allows selection of conventional AM operation or SSB operation on either upper or lower side band. In order to communicate with another transceiver, you must use the same operating mode.

FINE TUNE

When receiving SSB signals, adjust the FINE TUNE knob carefully and fix it at such a position where the incoming signal can be heard most clearly. Because of the characteristics of an SSB signal, it is extremely important to adjust this control. With improper FINE TUNING adjustment, the signal will not be intelligible. The sound will be distorted. SSB tuning will become easy as you acquaint yourself with the operation of this control. After adjusting it to clarify once, no adjustment is needed if you stay on the same mode and channel, receiving the same station.

CAL-SWR PUSH SWITCH

This switch will be used to check the SWR (Standing Wave Ratio) of your antenna system.

SWR CHECK

1. Connect your antenna system to the antenna connector on the rear panel.
2. Place the mode switch in the AM position and the CB/PA switch in the CB position.
3. Place the CAL/SWR switch in the released out position.
4. Press the push-to-talk button on the microphone and rotate the RF-CALIBRATE knob so that the SWR meter pointer reads maximum or SET. Release the push-to-talk switch.
5. Depress the CAL/SWR push switch and again press the push-to-talk button. The SWR of your antenna system will be indicated on the lower scale.

SWR readings of less than 1.5 are desirable, and usually obtainable with modern factory-made antennas in good condition.

Readings up to 2.5 may be acceptable, but readings over 3.5 should definitely be reduced by adjustment of the antenna system.

NOTE: After completion of SWR CHECK, always place the RF-CALIBRATE Knob in the RF (full counter-clockwise position) position.

ANL-BLANKER PUSH SWITCH

With this switch placed in the released ANL position undesirable noise will be considerably reduced in AM reception. When in the depressed BLANKER position annoying impulse noise will be blanked out. This noise blanker circuit is effective for both AM and SSB reception.

CB-PA PUSH SWITCH

This transceiver may also be used as a PA (Public address) amplifier. Connect a suitable 4 - 32 ohms PA speaker to the "PA" jack on the rear panel. Depress CB-PA push switch and press the Push-to-talk button on the microphone. For regular 2-way communications, the switch must be placed in released out [CB] position.

PHONE JACK

When a headphone is inserted, it automatically disconnects the internal speaker.

REC JACK

Both transmitting and receiving signals are supplied to the REC jack and can be recorded if a tape recorder is connected to the jack. This jack is not affected by the setting of the Volume control on the front panel. Therefore the record level must be adjusted by the record-level control of the tape recorder connected.

EX JACK

This transceiver can be operated as a simple audio amplifier if you place the channel selector switch in the "EX" position and connect an audio source to this EX jack provided on the rear panel. The sound output from the speaker can be adjusted by turning the front panel Volume control knob.

PA JACK

This will be used for connection of PA speaker, see "CB-PA" push switch" in this manual.

TVI TRAP COIL

Minimizes TV interference. It is preset at the factory and usually does not require readjustment. However if necessary, it may be adjusted for minimum TV interference.

ANTENNA LOADING COIL AND TRIMMER

These should be adjusted for maximum transmitter power output while transmitting with mode switch placed in AM position, observing RF power meter.

ANTENNA CONNECTOR

Used for antenna connection, matches PL-259 standard type.

DC POWER SUPPLY CONNECTOR

Used for connection of DC Power cord.

AC POWER SUPPLY CONNECTOR

Used for connection of AC power cord. When the AC power cord is connected to the connector the DC power supply circuit is automatically cut off. Therefore always remove the AC cord when operating the transceiver with DC power connected.

S METER

This gives the relative strength of incoming signals when receiving.

DIGITAL CLOCK

When the AC power cord is inserted in the AC outlet, the clock starts operating regardless of whether the POWER switch (on the front panel) is turned on or off.

To operate the transceiver on AC power, place the OFF-ON-AUTO-ALARM switch in the ON position and depress the POWER push switch on the front panel. To turn the power off simply depress the POWER push switch again to release it or place the OFF-ON-AUTO-ALARM switch in the OFF position.

NOTE: In case of DC operation the power of the transceiver is controlled by the POWER push switch only regardless of the OFF-ON-AUTO-ALARM switch.

To turn on the transceiver automatically at the desired time, tune in a desired channel in advance and adjust the volume control for proper sound level, and set the OFF-ON-AUTO-ALARM switch in the AUTO position, then set the time you desire by rotating the ALARM SET knob. At the same time, depress the POWER PUSH SWITCH and the transceiver will automatically be switched on at the preset time.

Alarm Set:

Turn the ALARM SET knob clockwise to the time you desire, and set the OFF-ON-AUTO-ALARM switch to the ALARM position. Then, both the transceiver and alarm buzzer will be turned on automatically at the preset time. If you want to activate only the buzzer tone, set the POWER push switch to the released out position.

Time Setting:

Push the TIME SET knob and adjust the time.

ANTENNA CONNECTION

Any Citizens Band beam, dipole, ground plane or vertical antenna may be used. A ground plane type antenna will provide good 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 conditions. The range of the transceiver also depends on the height of the antenna so whenever possible, select the highest location within F.C.C. limits.

Whatever the type of antenna selected, it is important that it be properly adjusted and matched and the connecting transmission line be in good condition so as to avoid a high VSWR (voltage standing wave ratio). A VSWR over 2.5 results in reduced radiated power and may cause instability and damage to the final output stage of the transceiver. The VSWR may be measured with the built-in SWR meter.

OPERATING INSTRUCTIONS

1. Insert the MIC plug in the MIC Jack.
2. Make sure your antenna is securely connected to the ANT connector.
3. Turn the Power on as stated in this manual.
4. Set RF GAIN to maximum temporarily.
5. Turn the SQUELCH knob counter-clockwise fully.
6. Place the FINE TUNE knob at center position.
7. Place the CB-PA push switch in the CB position.
8. Place the ANL-BLANKER push switch in either position.
9. Place the channel selector switch to a desired channel.
10. Place the mode selector switch in a desired mode position.
11. Adjust the VOLUME control for proper sound level.
12. To transmit press the Push-to-talk button on the microphone and to receive release the button.

IMPORTANT: Do not short circuit the antenna or do not try to transmit without an antenna connected to the Antenna connector on the rear panel. This may cause damage to the output power transistors. Transmit only after carefully checking the installation of connector and coaxial cable.

SERVICING YOUR TRANSCEIVER

The technical information, diagrams and charts provided in this manual are supplied for the use of a qualified holder of a first or second class radiotelephone license in servicing this transceiver. It is the users responsibility to see that this unit is operating at all times in accordance with the F. C. C. citizens radio service regulations.

If you install your own transceiver, do not attempt to make any transmitter tuning adjustments. All transmitter adjustments and servicing are prohibited by the F. C. C. unless you hold a first or second class radiotelephone license or are in the presence of a person holding such a license. A Citizens Band or Amateur license is not sufficient.

When service is performed by an authorized and licensed person, care must be taken in the replacement of parts to use only authorized parts, in order not to void the type acceptance of this unit.

13-898 B SPECIFICATIONS

GENERAL

Circuitry:	2 ICs, 40 Transistors, 1 FET, 63 Diodes
Frequency Control:	Crystals
Channels:	23
Modes of Operations:	AM, Lower Sideband-Upper Sideband
Controls:	RF gain control, Calibrate, Volume, Squelch, mode switch Fine Tune, Channel selector, CAL/SWR switch, ANL-BLANKER switch, CB-PA switch, Time/Alarm set switch. Clock Function switch.
Jacks and Corrections:	Microphone, Phone, Antenna, PA speaker, Recording output, External speaker, AC and DC power connectors.
Power Source:	DC 13.8V, AC 220 240V 50 Hz.
Speaker:	3" dynamic, 16 ohms
Microphone:	Dynamic CB mike
PA Audio Output:	More than 3 W
Size:	5" (H) x 16" (W) x 10" (D).
Weight:	13 lbs
Accessories:	DC and AC Power cords, Microphone
Receiving system:	Dual conversion superheterodyne

Sensitivity: More than $0.5\mu\text{V}$ (S/N 10dB)
Selectivity: More than 50 dB
Fine Tune: More than $\pm 800\text{Hz}$
Audio output power: More than 3 W
Squelch range: $0.5\mu\text{V} \sim 100\mu\text{V}$ (AM). $0.25\mu\text{V} \sim 100\mu\text{V}$ (SSB)
Intermediate Frequency: 1st, 11.275 MHz. 2nd 455 KHz

SSB TRANSMITTER

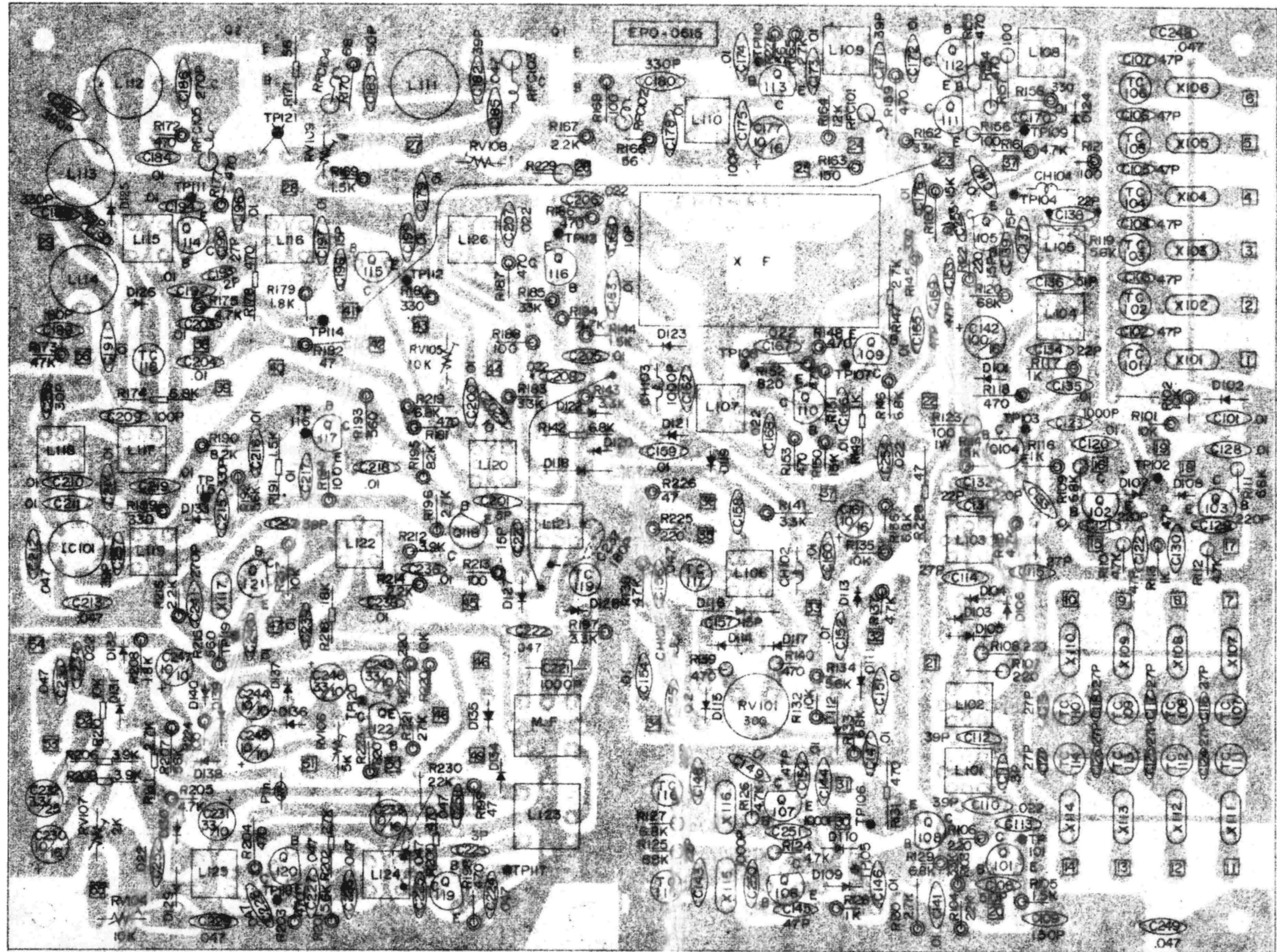
SSB Generation: Balance Modulation
Frequency Response: 300 ~ 2700 Hz
RF Output Power: 12 Watts PEP
Carrier Suppression: More than 40dB
Unwanted Sideband Suppression: More than 50dB
Harmonic Suppression: More than 50dB

AM TRANSMITTER

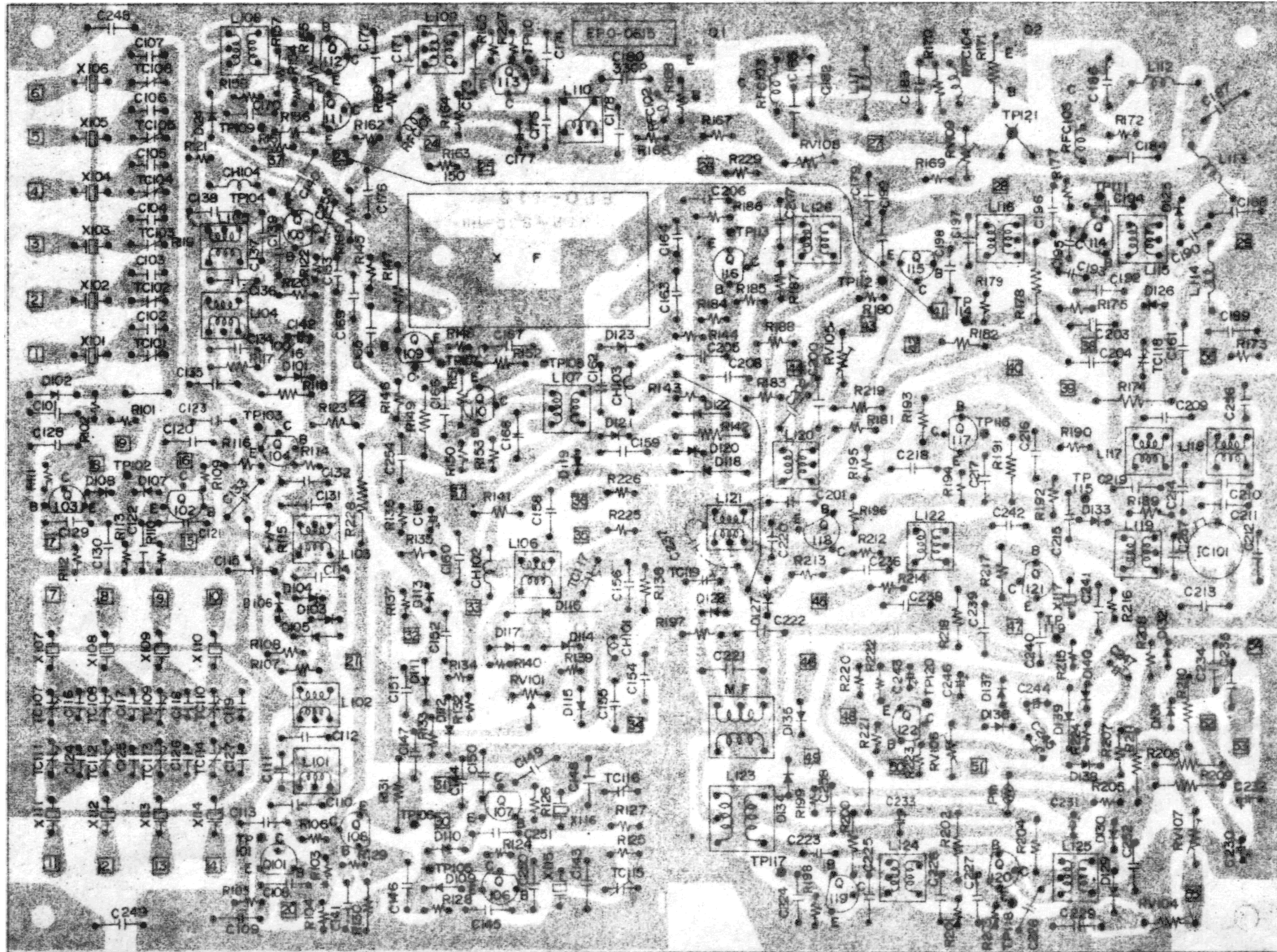
Modulation: High Level Class B
RF Output Power: Nominal 4.0 watts (F. C. C. Maximum)
Harmonic Suppression: More than 50dB

PARTS LAYOUT

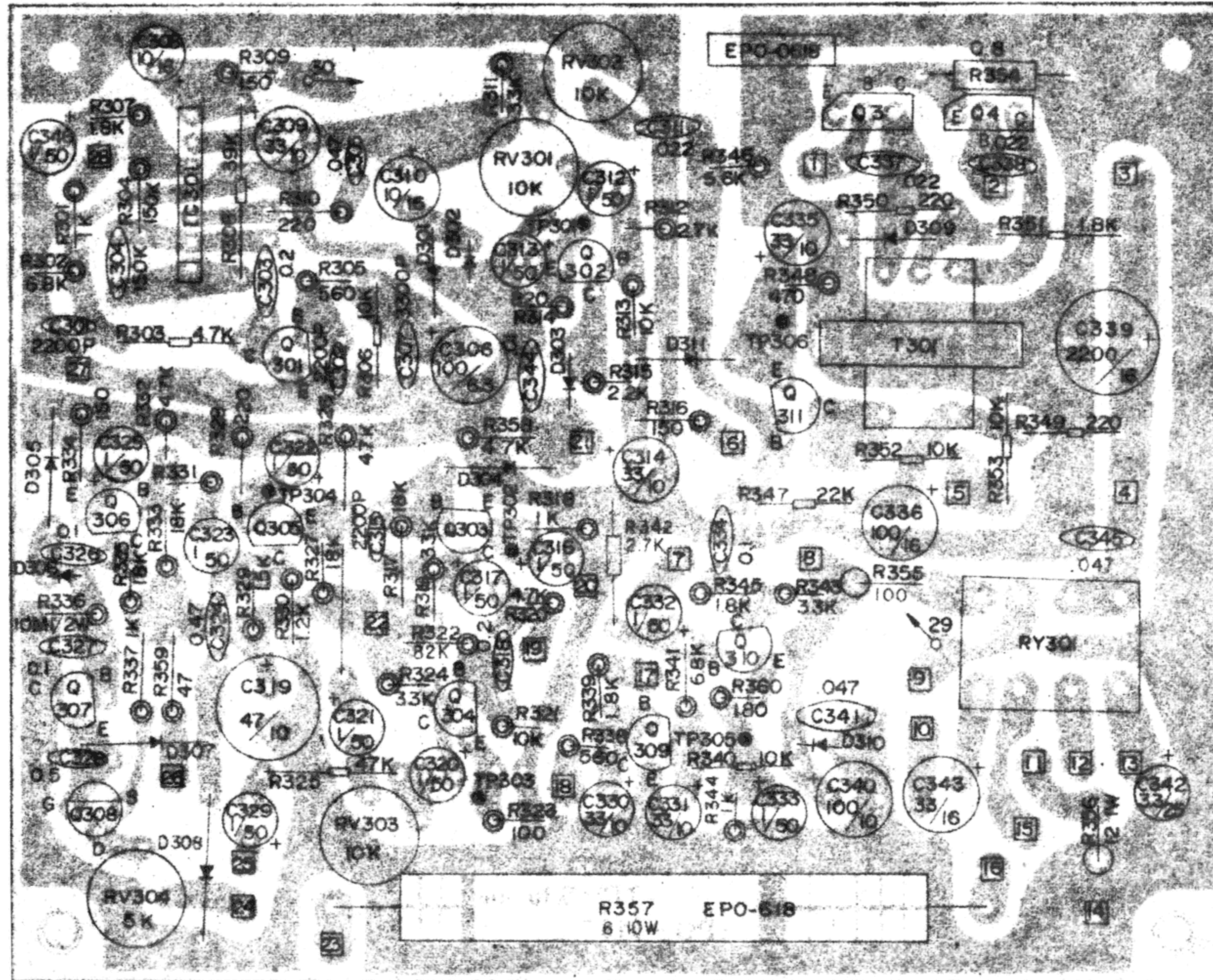
FRONT VIEW



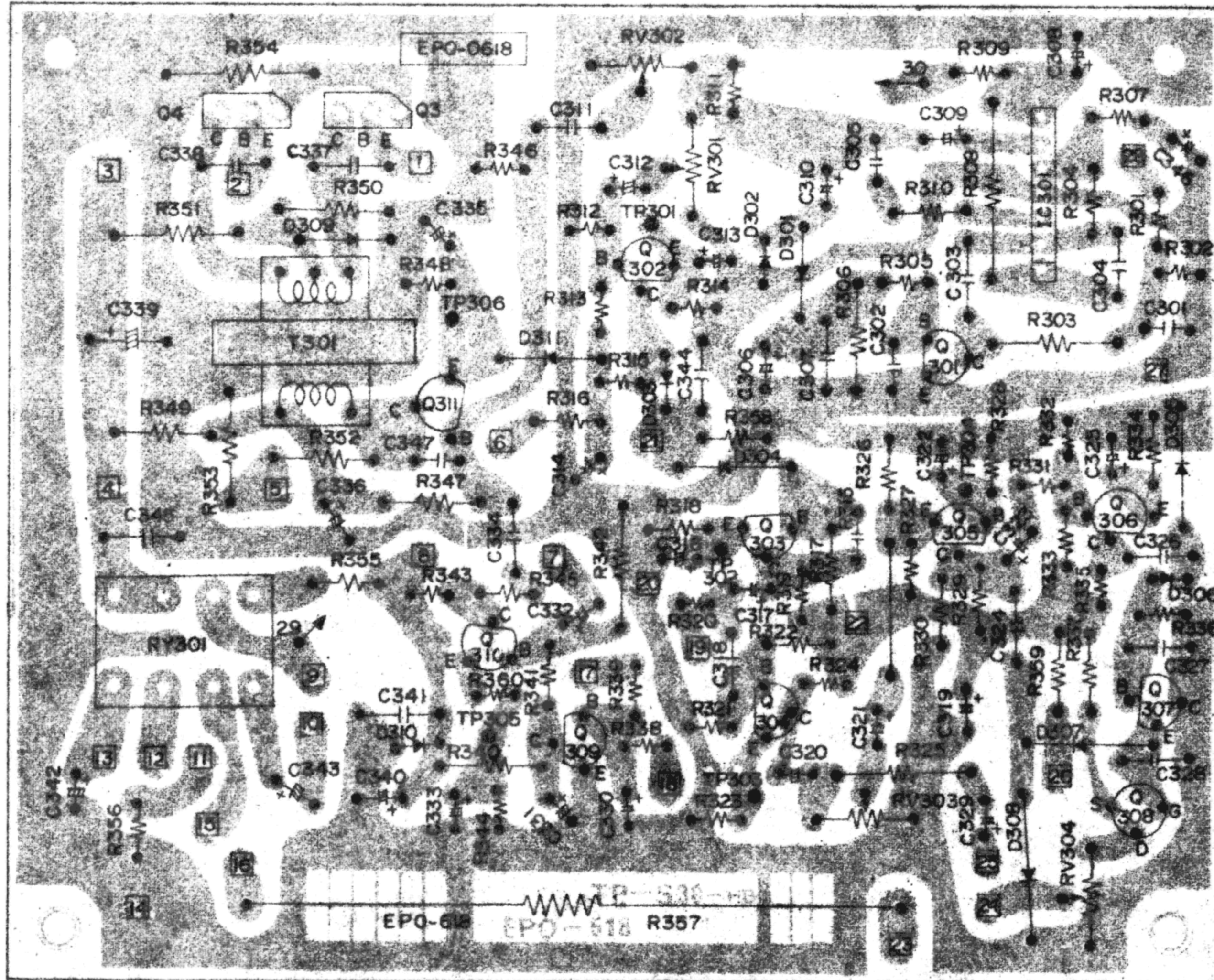
BACK VIEW



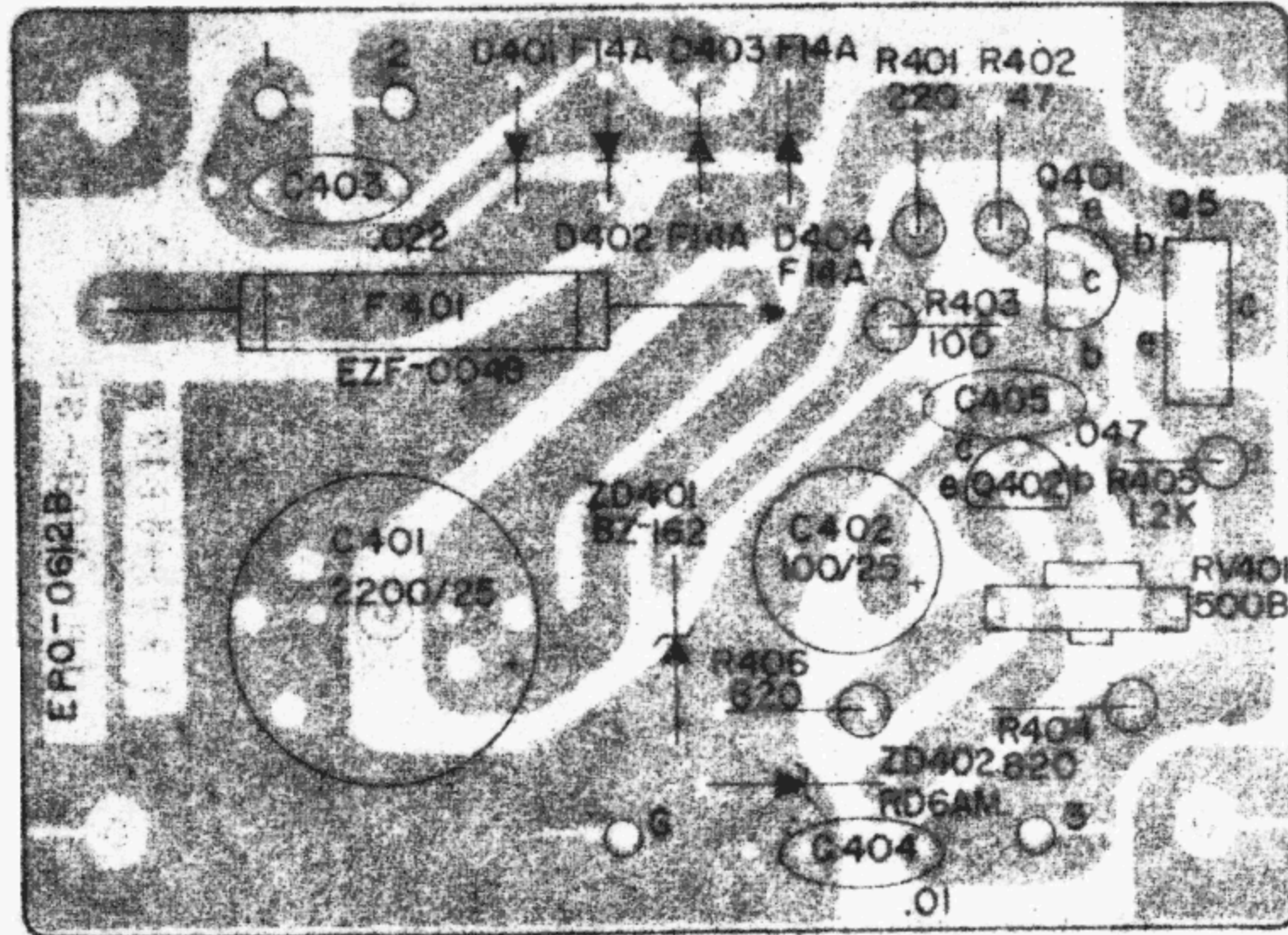
FRONT VIEW



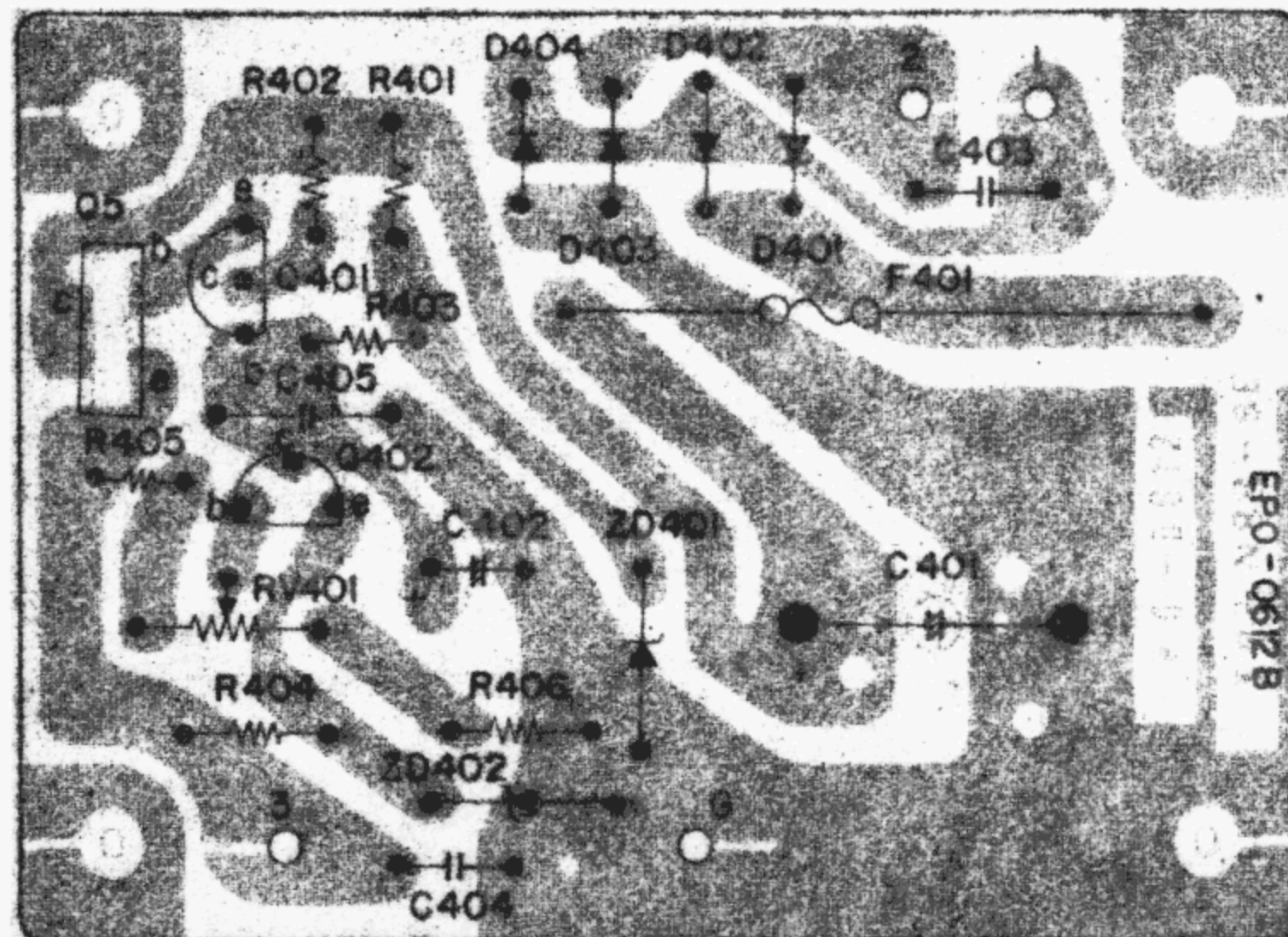
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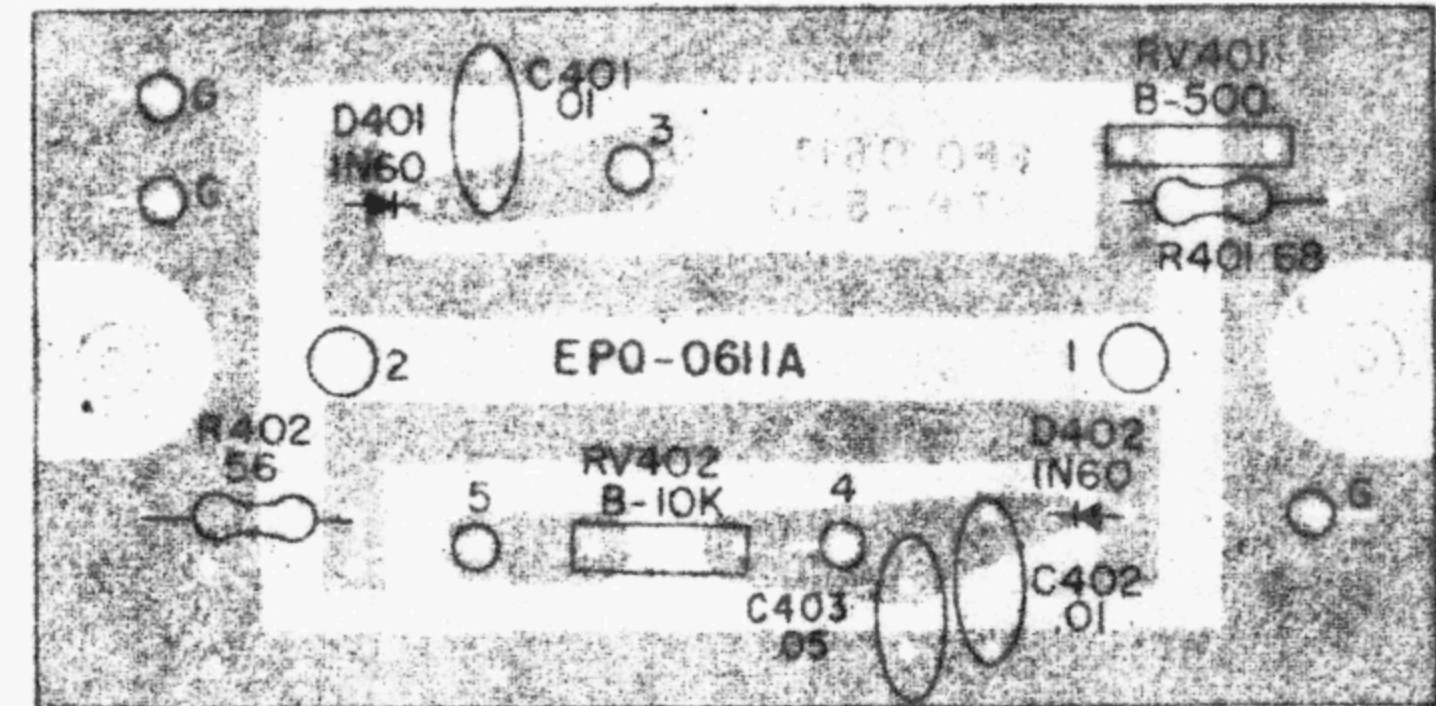
FRONT VIEW



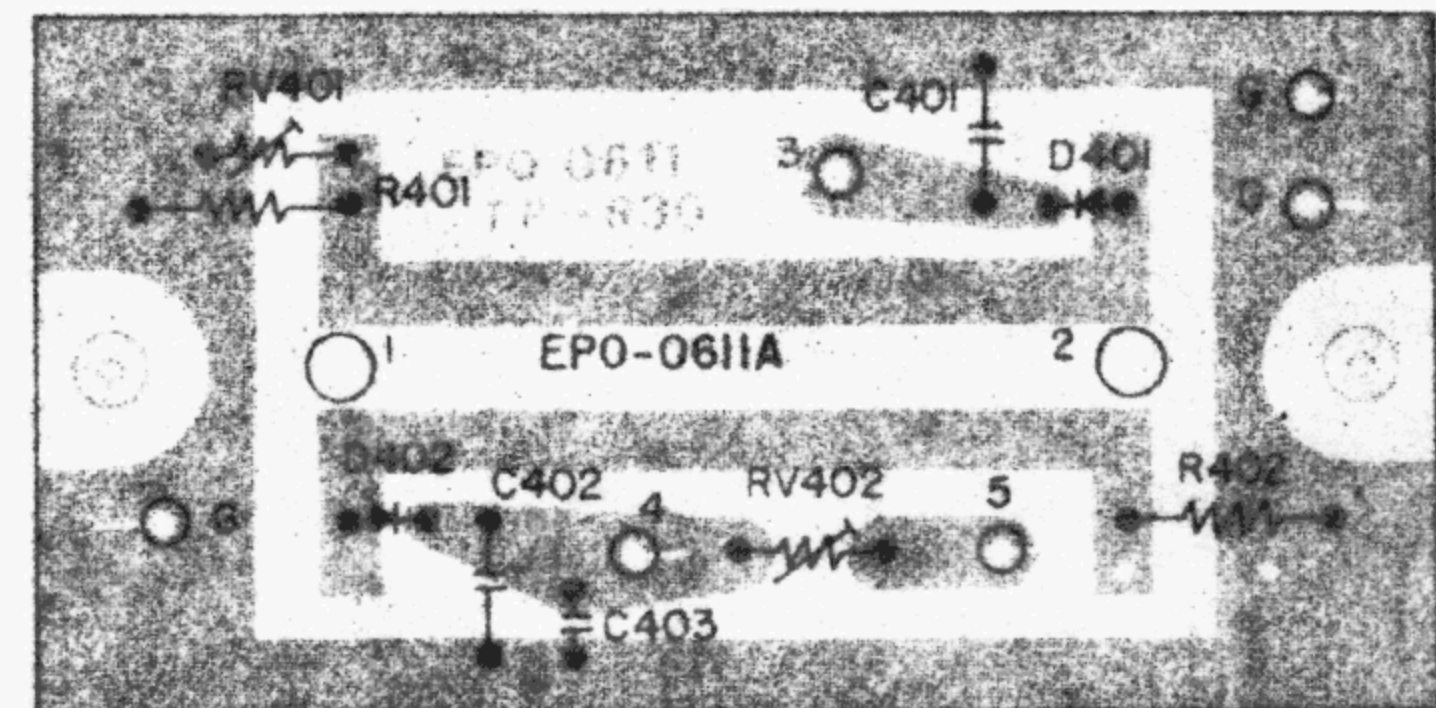
BACK VIEW



FRONT VIEW



BACK VIEW



WARRANTY POLICY

Midland Electronics Company warrants each new Midland product to be free from defects in material and workmanship under normal use and service for a period of 90 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 Midland 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, antenna, 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 is authorized to assume for us any other liability in connection with the sale of our products.

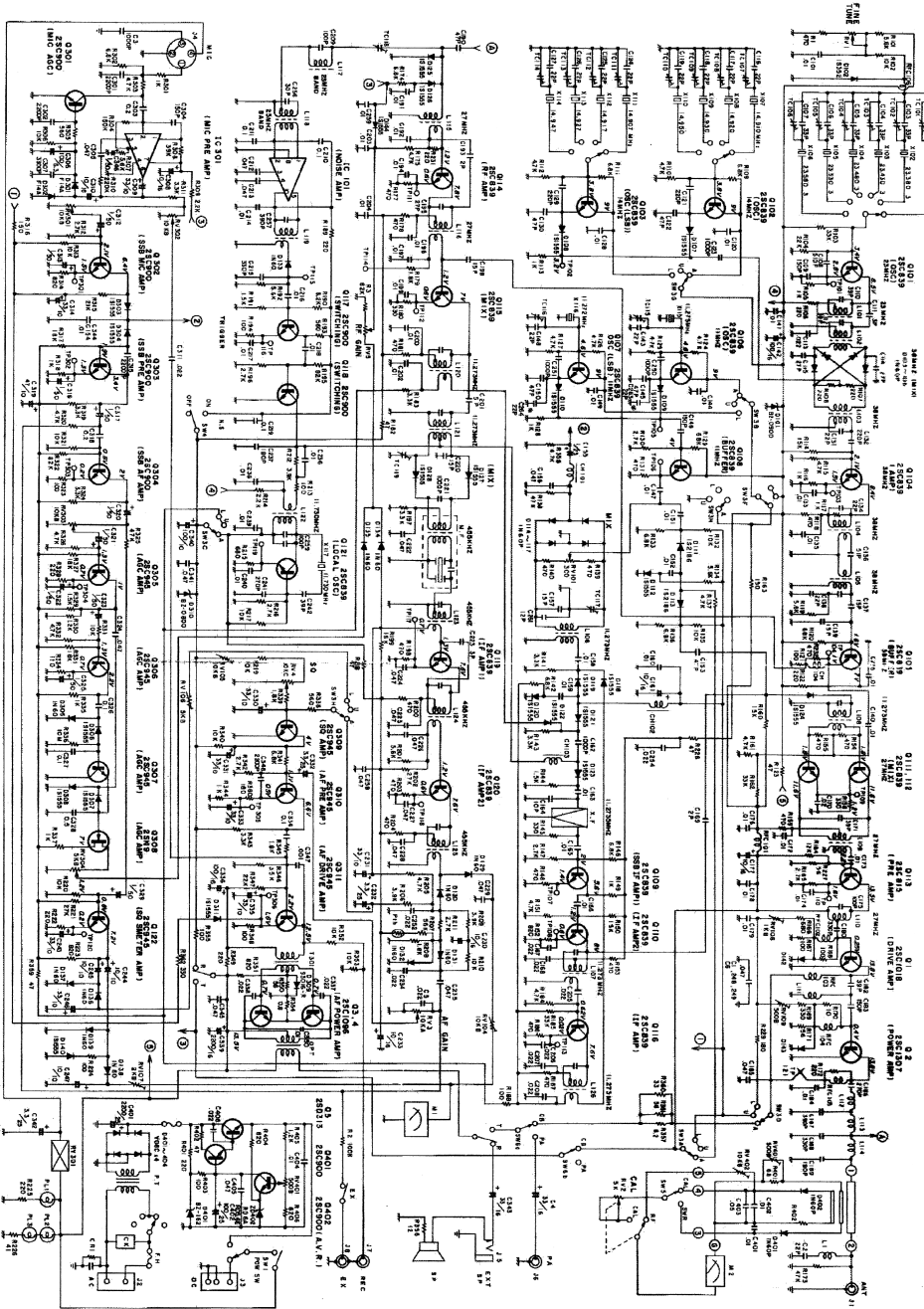
Sales receipt must accompany product to validate the date of purchase.

Midland Electronics Company

110 W. 12th Avenue

North Kansas City, Missouri 64116

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SCHEMATIC DIAGRAM OF 13-898B