Trinidad

MODEL SBE·11CB

SERVICE MANUAL

SBE®

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SECTION 1
GENERAL

1.1 CUSTOMER SERVICE

The SBE Technical Services Department functions as a source of information on the application, installation and use of SBE products. In addition, the Technical Services Department provides technical consultation on service problems and availability of local and factory repair facilities.

In any communications to the Technical Services Department, please include a complete description of your problems or needs, including model and serial numbers of the unit or units in question, accessories being used, any modifications or attachments in use, or any non-standard installation details.

For assistance on any of the above matters, please contact SBE, Incorporated, Technical Services Department, 220 Airport Boulevard, Watsonville, California 95076. Phone: 408/722-4177.

1.2 PARTS ORDERS

SBE original replacement parts are available from the Factory Parts Department at 1045 Main Street, Watsonville, California 95076.

When ordering parts, please supply the following information:

Model number of the unit.
Serial number of the unit.
Part number.
Description of the part.

1.3 FACTORY RETURNS

Repair services are available locally through SBE Certified Service Stations across the country. A list of these Service Stations is available upon request from the Technical Services Department. Do not return any merchandise to the Factory without authorization from the Factory.

SECTION 2

SPECIFICATIONS
SBE11-CB

2.1 GENERAL

Compliance	F.C.C. Type Accepted (Part 95, Class D)
Channels	23
Frequency Range	26.965 to 27.255 MHz
Frequency Control	Crystals, Synthesized
Frequency Tolerance	0.003%
Operating Temperature Range	0° C to +50° C
Humidity	95%
Input Voltage	117V AC – 50/60 Hz or 13.8V DC negative ground
Microphone	Dynamic
Size	5¾"H (146mm), including feet, 17¾"W (451mm), 8¾"D (222mm)
Weight	13 lbs.

2.2 RECEIVER

Sensitivity	Less than 1 microvolt for 10db S+N/N ratio
Selectivity	-6db at 5 KHz, -40db at 20 KHz and -60db at 40 KHz
IF Frequencies	10 MHz, 455 KHz
Automatic Gain Control	Less than 10db change in audio output for signal input from 10 – 100,000μV
Squelch	Threshold 1μV
Squelch Range	200μV (Minimum)
Delta Tune Range	±1.5 KHz
Audio Output Power	2.0 watts at 10% distortion at 1 KHz
Frequency Response	300 – 2500 Hz

2.3 TRANSMITTER

Power Output	4 watts (Maximum)
Modulation	100%
Modulator Response	300 – 2500 Hz
Output Impedance	50Ω unbalanced
Emission	6A3

SECTION 3
INSTALLATION

GENERAL

The first step in the installation of the SBE-11CB is to select a site which is convenient and permits accessibility to a good antenna location. The selection of an antenna system and its mounting location are the most critical factors in determining performance.

A vertical ground plane antenna will provide the most uniform horizontal coverage. This type of antenna is best suited for communications with a mobile unit. For point-to-point operation where both stations are fixed, a directional beam antenna will usually increase communication range since this type of antenna concentrates energy in one direction. Beam antennas also allow the receiver to "listen" in only one direction thus reducing interfering signals. F.C.C. regulations limit antenna height of directionals to 20 feet above ground or any formation and omnidirectionals and supporting structure to 60 feet above ground.

ANTENNA TUNING

The final step in installation is to trim the antenna for minimum S.W.R. The recommended method of antenna tuning is to use an in-line wattmeter or S.W.R. bridge to adjust the antenna for minimum reflected power on channel 11. A properly tuned antenna system will present a suitable load to the transceiver and will insure that maximum power is transfered from the radio to the antenna. If the antenna system in use presents a poor load, as indicated by a high S.W.R. reading, transmitter range will be substantially reduced and damage to the transmitter final amplifier may occur. Poor S.W.R. can usually be corrected by altering the antenna's electrical length in accordance with the manufacturer's instruction. Extremely high S.W.R. readings may be indicative of a defective transmission line, antenna, or connections.

To determine whether the antenna should be lengthened or shortened, test the S.W.R. on channels 1 and 23. If the S.W.R. is the highest on channel 23, the antenna is too long and if highest on channel 1, the antenna is too short. When the antenna system has been tuned correctly, channel 11 should have the lowest S.W.R. and channels 1 and 23 will be slightly higher.

EMERGENCY DC POWER

If it is anticipated that the unit may be used in the event of a power failure, a 12 volt storage battery may be connected to the terminal strip on the rear panel. Connect the negative and positive battery terminals to the corresponding points on the terminal strip using #14 or larger wire. In the event of AC power failure, the unit will automatically draw primary power from the battery source. When AC power is restored, the unit will automatically return to normal AC operation. It is not necessary to disconnect the emergency DC power source when the AC line is being used. It is recommended that a means to keep the storage battery fully charged be provided.

PUBLIC ADDRESS

An external 8Ω 4 watt speaker may be connected to the PA jack located on the rear panel of the unit when it is to be used as a public address system. The speaker should be directed away from the microphone to prevent accoustical feedback.

EXTERNAL SPEAKER

The external speaker jack on the rear panel is used for remote receiver monitoring. The external speaker may be 4 or 8Ω impedance and should be rated at 3 watts power dissipation. When the external speaker is plugged in, the internal speaker is disconnected. Suitable units are the model SBE-1SP Non-amplified speaker or SBE-1SP/AMP Amplified speaker.

ALTERNATE MICROPHONE INSTALLATION

A desk microphone may be installed with the unit. For best results, a low impedance dynamic type microphone or a transistorized preamplified microphone is recommended. The SBE 100X Preamplified Base Station Microphone or the SBE 200X Non-amplified Base Station Microphone may be ordered and are ready to plug into the unit. If another microphone is selected refer to the schematic diagram for the proper wiring connections to the microphone jack.

FINAL CHECKOUT

Make an operational checkout of the transceiver to insure operation of it and all the accessories installed. Contact other stations and inquire about their location and their reception of your signal. If an omni-directional antenna is used, the distance to other stations contacted should be about the same in all directions. A directional antenna should reach more distant stations in the direction in which it is beamed. Also inquire whether the stations contacted are omnidirectional or directional and if directional which way they are beamed.

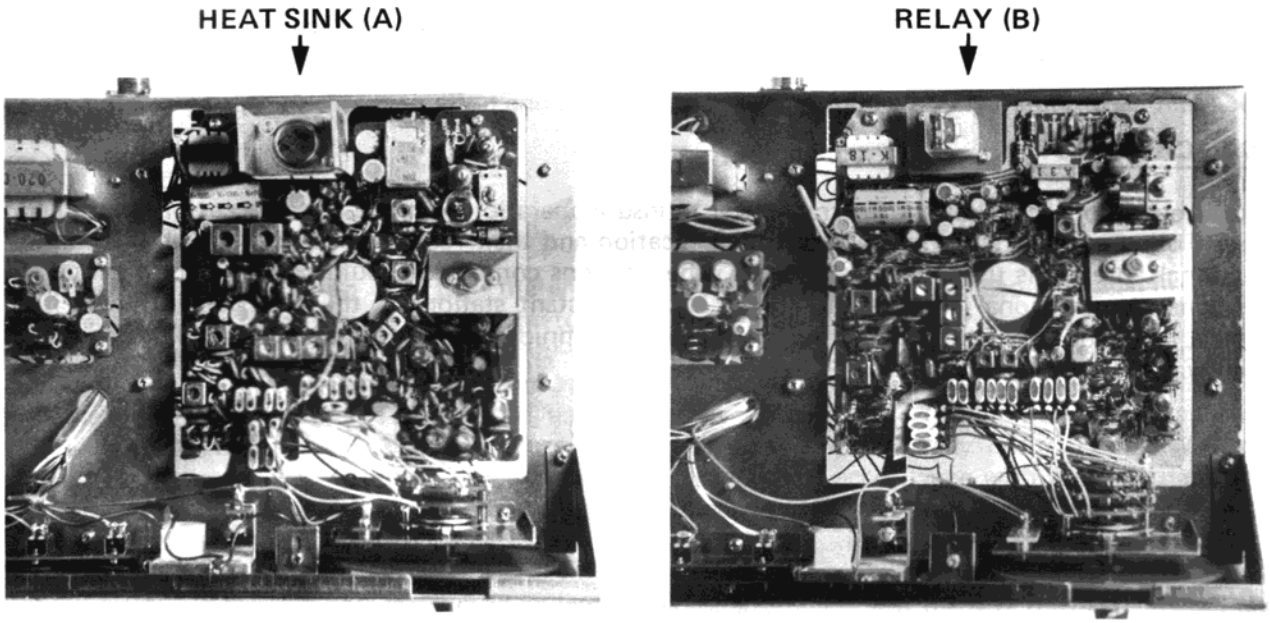
SECTION 4

SERVICING

4.1 INTRODUCTION

Read this section carefully before attempting any repair of the SBE-11CB.

IDENTIFY THE TYPE OF ELECTRONICS. There are basically two types of electronics used in SBE-11CB transceivers which are referred to as A BOARDs and B BOARDs. An A BOARD is readily distinguished from a B BOARD by its large heat sink on the AF POWER AMP Q116.



4.2 TEST SIGNALS

OSCILLOSCOPE WAVEFORMS are shown which were taken from various points in the SBE-11CB during normal operation into a dummy load. TEST POINT numbers next to the waveform pictures correspond to numbers in boxes on both the schematic diagrams and component layout drawings. Figure 5-2, A BOARD, 5-12, B BOARD, shows RF amplification through a properly aligned transmitter. Figure 5-3, A BOARD, 5-13, B BOARD, shows 50%, 100% and overmodulation respectively. Notice that the waveform at the TX MIXER contains several frequency components. Also notice that the waveform at the TX FINAL is unsymmetrical (Figure 5-2d, A BOARD, 5-12d, B BOARD). This is proper since the TX FINAL operates class C for greater efficiency. Figure 5-2e, A BOARD, 5-12e, B BOARD, shows how the output should look at the dummy load.

VOLTAGE MEASUREMENTS are shown on the schematic diagrams for normal operation. All voltages were measured with an AC VTVM having 10MΩ input impedance. Voltage measurements on high impedance RF points should be taken through a choke. While any choke about 100μH is suitable, SBE part number 8000-00011-0018 (150μH) may be ordered from the factory. Mini-test clips are very useful for making voltage measurements in hard to reach places.

RECEIVER INJECTION VOLTAGES are given in Table 5-8, A BOARD, 5-16, B BOARD, together with TEST POINT numbers which correspond to numbers in boxes on both the schematic diagrams

and component layout drawings. These tables specify the voltage level, carrier frequency and particular points in the receiver string at which a 30% – 1 KHz modulated signal injected through a .01 MFD capacitor should produce 2 VAC of audio across the speaker or 8Ω load plugged into the speaker jack, EXT SP. While the value of this capacitor is not critical, capacitive coupling of the signal generator to the circuit is necessary to prevent grounding out the transistor biases.

Before setting up to measure RECEIVER INJECTION VOLTAGES, small hand-held "all-purpose signal generators" can be used to provide a quick check of the receiver string. Basically, these devices generate pulses rich in harmonics from AF to RF to test whether a stage is working.

AGC VOLTAGES versus RF INPUT are shown in Table 5-3, A BOARD, 5-18, B BOARD. These tables should be consulted before any adjustments are made on the squelch circuit since squelch is a function of AGC.

Separate TROUBLESHOOTING CHARTs are provided for both the A and B board. (See Figure 5-2, A BOARD, 5-15, B BOARD.)

4.3 TROUBLESHOOTING

Troubleshooting the SBE-11CB transceiver is not essentially different than troubleshooting any other electronic device. Be a detective; suspect everything and everyone. Carefully inspect the unit for evidence of overheated components, cold solder joints, or tampering. Understand thoroughly the circuit descriptions and block diagrams. Try to start big and isolate the problem. Devise tests that will divide the transceiver in two and isolate the trouble to a particular half. Continue to divide into two parts until the trouble is located. For example, it is determined that a problem exists in a particular transceiver. The unit is divided into:

TRANSMITTER – RECEIVER.

Suppose that the transmitter puts out properly modulated carrier, but the receiver will not respond to a properly modulated RF signal at the channel frequency fed into the antenna jack. Since the transmitter modulates, it can be assumed that all of the audio amplifier is good. After checking the TX/RX relay and receiver B+, the receiver is then divided into:

BEFORE 1st IF – 1st IF and AFTER.

RECEIVER INJECTION VOLTAGES table shows the proper signal level to inject at the base of Q104 – the 1st IF AMP – to produce at least 2 VAC signal at the speaker. If the signal appears at the speaker, the problem is in the RF amplifier. Divide this and continue until the trouble is found.

This technique is variously called, "partitioning," "boxing-in-the-trouble," "divide and conquer," or "binary search"; it is mandatory for complex electronic systems, but can save time and energy on almost any electronic device.

A blown fuse should only be replaced by one of the proper rating and type. If the fuse blows again, replace it, but place an Ω meter at the power terminals in place of the supply. Make certain that the + side of the Ω meter is connected to the red power wire of the SBE-11CB. Some VOM's place the - side of the Ω meter out the red test jack. Observe that diodes protect the units from a reversed supply. The push-to-talk switch can be used to start isolating the short.

A fuse may blow only when a unit is connected in a vehicle because the vehicle has a positive ground

and there is a short from the PCB ground to the chassis, or a grounded speaker was plugged into the external speaker jack.

The second harmonic trap is adjusted at the Factory; field adjustment should not be attempted without proper equipment. Failure of particular channels to work or be on frequency probably indicates a defective crystal. Refer to Table 4-5, SYNTHESIZER MIXING SCHEME. Notice that the same Transmit and Receive crystals are used every fourth channel while each Master crystal is used on four adjacent channels. Check channel selector switch by swapping crystals.

TEST INSTRUMENT	REQUIRED SPECIFICATIONS	USE	RECOMMENDED INSTRUMENT TYPE
R.F. Signal Generator	Output frequency: 26.965 to 27.255 MHz. Output level calibrated from .1 microvolts to 500,000 microvolts. Internal modulation capability of 30% minimum at 1 KHz. (Calibrated)	Receiver service and alignment.	Hewlett-Packard Model 606A or B. Wavetek Model 3000.
Oscilloscope	Vertical bandwidth of 25 MHz or greater at 3db point. Triggered sweep capability.	Transmitter and receiver test and alignment.	Tektronics Model T932. Tektronics Model 465. Hewlett-Packard Model 180. Phillips Model PM3260E.
Frequency Counter	Frequency range DC to 30 MHz. Sensitivity: 10mv R.M.S. at 30 MHz. Overall timebase accuracy ±.002%, 6 digit resolution.	Transmitter frequency check and synthesizer troubleshooting.	Heath-Schlumburger Model SM128A
Wattmeter	5 watts full scale into 50 ohm load ±5% accuracy.	Measure power output and S.W.R.	Bird Model 43 with type 5A element. (May be terminated with antenna load
AC VTVM	-40 to +20db range.	Measure audio output.	Heath Model IM-21.
Audio Oscillator	400 Hz to 4000 Hz output: Adjustable level, 0-1 volt output impedence 600 ohm.	Audio and modulator tests.	Hewlett-Packard Model 204C. Heath Model SG18A.
DC Power Supply	13.8 volt DC ±10% at 2 amperes.	Primary supply voltage for servicing.	Heath Model SP2720 (SBE Model SBE-1AC may be used if available.)

FIG. 4-2 TRANSMITTER TEST CONNECTION

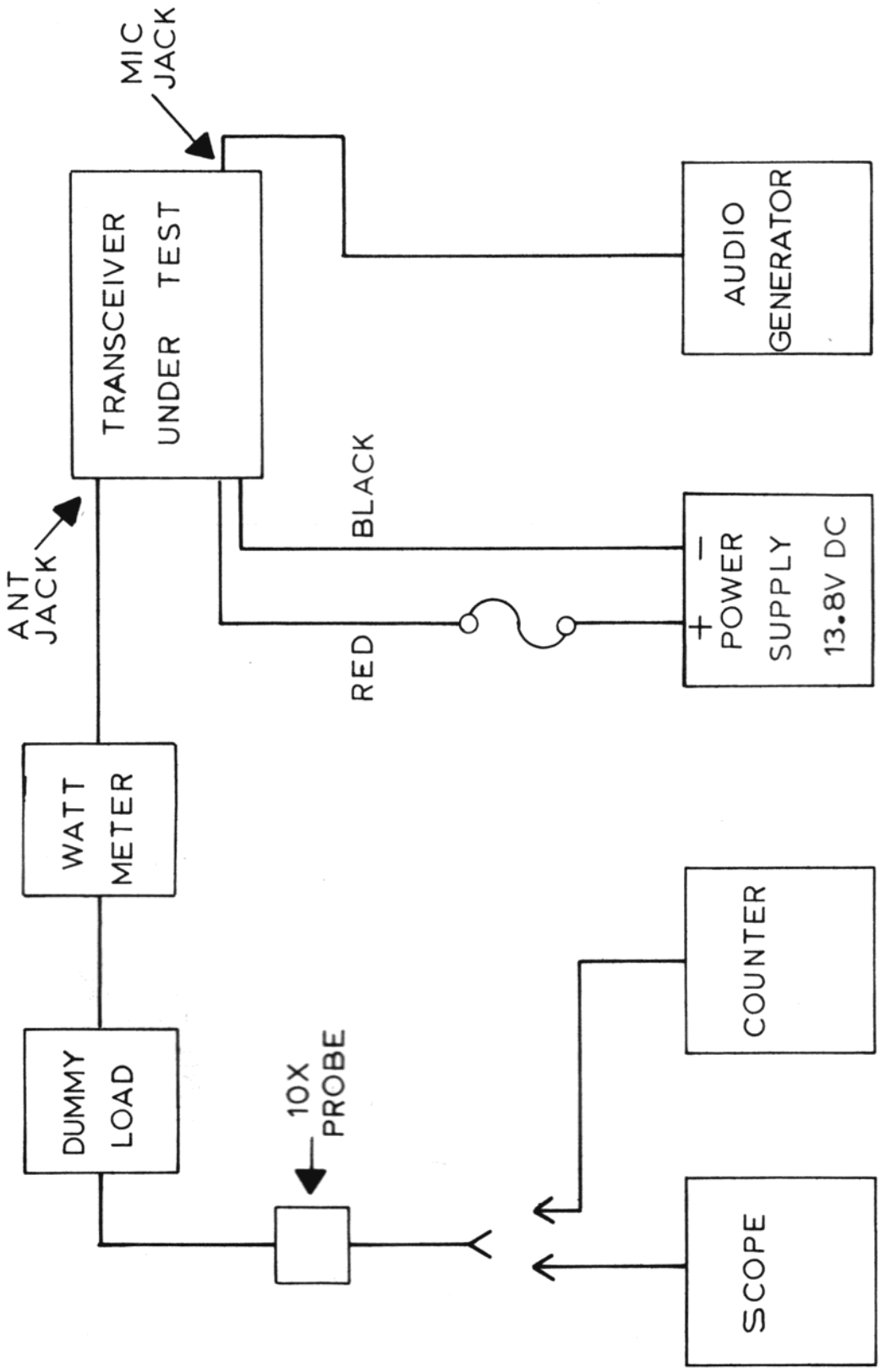


FIG. 4-3 RECEIVER TEST CONNECTION

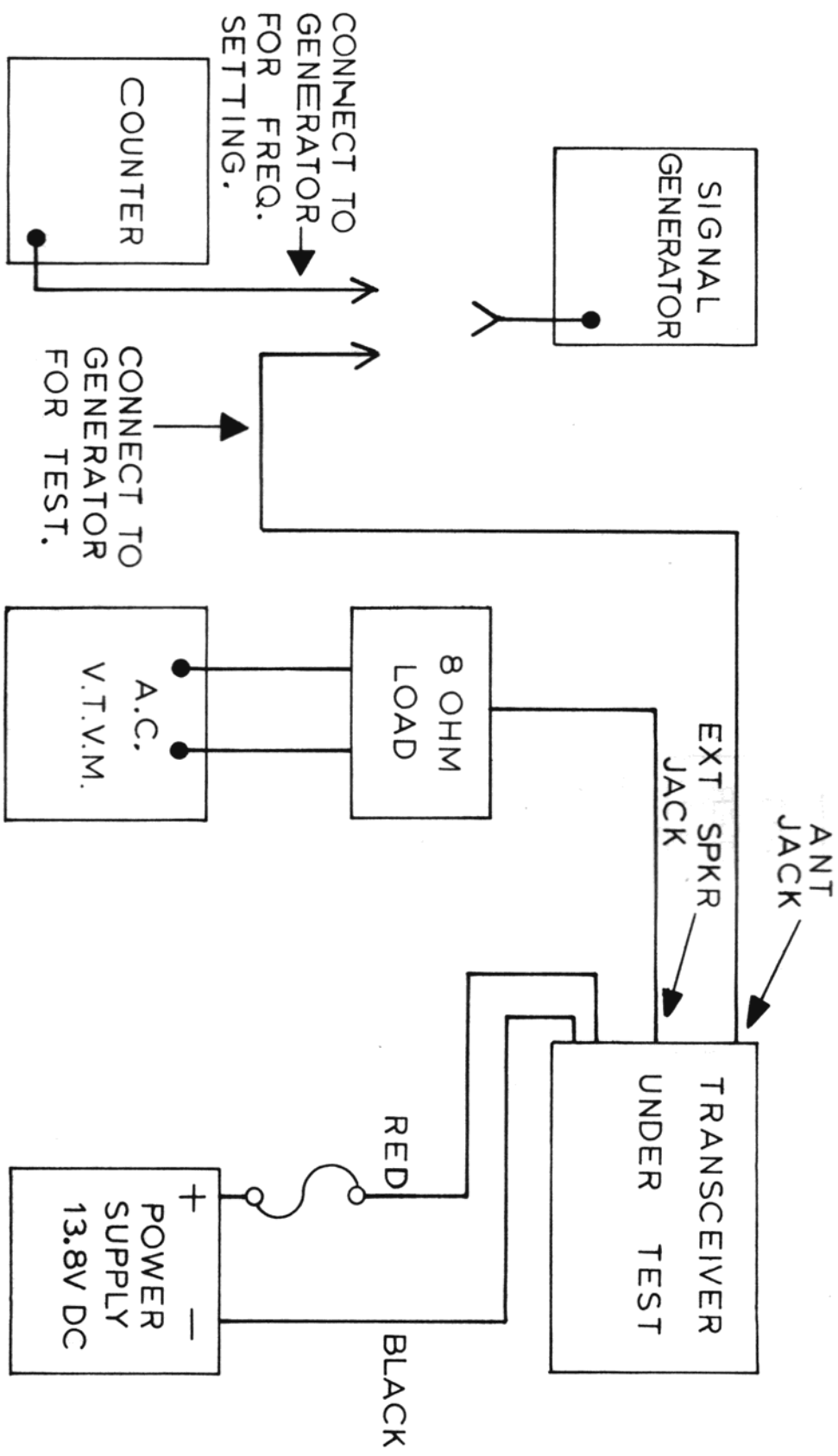


FIG. 4-4 PERFORMANCE VERIFICATION PROCEDURE

TRANSMITTER

INITIAL SET-UP
Connect the SBE-11CB to 110 VAC. Connect a wattmeter, dummy load and oscilloscope to the antenna jack.
STEP 1 Key the transmitter and observe that the wattmeter indicates an output of at least 3.2 watts and that the RFO meter indicates about the same.
STEP 2 Whistle into microphone with transmitter keyed. Check for 90-100% modulation.
STEP 3 Connect counter to dummy load and check transmit frequencies on channels 1, 2, 3, 4, 8, 12, 16, and 20. (See Table 4-5.)

RECEIVER

INITIAL SET-UP
Connect SBE-11CB to 110 VAC. Connect RF signal generator to the antenna jack and set to 27.085 MHz 30% – 1 KHz modulation. Set the unit to channel 11. Turn the volume control full clockwise and the squelch control full counterclockwise. Connect 8Ω load to external speaker jack, EXT SP, and connect AC VTVM to 8Ω load. (See Figure 4-3.)
STEP 1 Adjust signal generator for 0.7μV output. Verify that at least 2 VAC appear across the 8Ω load.
STEP 2 Increase signal generator output to 200μV. Rotate squelch knob full clockwise. Receiver should squelch.
STEP 3 Adjust signal generator for 100μV. S-METER should read about 9.

TABLE 4-5 SYNTHESIZER MIXING SCHEME
SBE-11CB

CH.	CH. FREQ.	MASTER OSC. XTAL FREQ.	TX OSC. XTAL FREQ.	RX OSC. XTAL FREQ.
1	26.965		X114 = 10.635	X110 = 10.180
2	26.975	X101 = 37.600	X113 = 10.625	X109 = 10.170
3	26.985		X112 = 10.615	X108 = 10.160
4	27.005		X111 = 10.595	X107 = 10.140
5	27.015		X114	X110
6	27.025	X102 = 37.650	X113	X109
7	27.035		X112	X108
8	27.055		X111	X107
9	27.065		X114	X110
10	27.075	X103 = 37.700	X113	X109
11	27.085		X112	X108
12	27.105		X111	X107
13	27.115		X114	X110
14	27.125	X104 = 37.750	X113	X109
15	27.135		X112	X108
16	27.155		X111	X107
17	27.165		X114	X110
18	27.175	X105 = 37.800	X113	X109
19	27.185		X112	X108
20	27.205		X111	X107
21	27.215		X114	X110
22	27.225	X106 = 37.850	X113	X109
23	27.255		X111	X107

RECEIVE:

(M.O.) - (CH FREQ) - (RX OSC) = 455 KHz

TRANSMIT:

(M.O.) - (TX OSC) = CH FREQ

SECTION 5

CIRCUIT DESCRIPTION
A BOARD

5.1 INTRODUCTION

The SBE-11CB with A electronics is an AM transceiver with a dual-conversion receiver using intermediate frequencies of 10 MHz and 455 KHz.

Refer to the block and schematic diagrams while following the circuit description.

With the PA/CB switch S104 in CB, the unit will operate as a Citizen Band transceiver.

TRANSMIT MODE is then initiated by pressing the push-to-talk switch which energizes relay RY-101 which:

DISABLES:

SPEAKER SP101,
RX RF AMP Q101,
1st RX MIXER Q102,
2nd RX MIXER Q103,
1st IF AMP Q104,
2nd IF AMP Q105,
RX OSCILLATOR Q106,
DIODE CR106,

ENABLES:

MIC AMP IC101,
TX OSCILLATOR Q108,
TX MIXER Q109,
TX BUFFER Q110,
MODULATION LIGHT DS103.

PA MODE is initiated by placing PA/CB switch S104 in PA which:

DISABLES:

transmitter RF by disabling the B+ on the TX DRIVER and FINAL, CB SPEAKER,

ENABLES:

PA speaker jack J103.

The push-to-talk switch then enables the MIC AMP.

5.2 RECEIVER

GENERAL

In the receive mode, the RF signal is fed from the antenna through the RY101-1 contacts to the 1st

RX AMP Q101. The amplified signal is then fed to Q102 – the 1st RX MIXER – where it is mixed with an injected signal from the MASTER OSCILLATOR Q107 about 10 MHz above the receive channel frequency. L116 and C207 act as a trap for any FM broadcast band frequencies that might reach the base of Q102. The filter formed by T101 and T102 selects the 10 MHz converted signal which is then fed to Q103 – the 2nd RX MIXER – where it is mixed with an injection signal from the RX OSCILLATOR Q106 which is 455 KHz below the desired signal. The 455 KHz converted signal is selected by T103, T104, T105, and T106 and then fed to the 1st IF AMP Q104. The output of Q104 is then fed to Q105 which drives the AGC DETECTOR CR102, the S-METER DETECTOR CR109 and CR110, and the AUDIO DETECTOR CR107 and CR108. After passing through the AUTOMATIC NOISE LIMITER CR103, the detected audio signal is fed through C127 to the top of potentiometer R168 – the volume control. The audio signal developed at the wiper of R168 is then fed through CR106 – which is forward biased in receive mode – to the 1st AUDIO AMP Q114. The output of Q114 is direct coupled to Q115 which drives the audio output amplifier Q116.

AUTOMATIC GAIN CONTROL

The AGC circuit reduces the gain of the receiver in response to a strong signal by lowering the bias on the RF and IF amplifiers. The AGC voltage is developed at the R179, C128 junction. With a weak receiver input signal –less than 1μV – diode CR102 is forward biased by current through R109 and R179. About 4 volts of AGC appear on the capacitor C128. As the input signal increases, the signal at the top of C186 increases. When the signal at the top of C186 swings positive, increased current flows through R109, R179, and CR102 to C186. As the signal swings negative, C185 discharges through R119. The increase in current through R109 and R179 decreases the AGC voltage. The AGC voltage is then fed to the base of Q104 – the 1st IF AMP. Q104 functions as an emitter follower at low frequencies producing a low impedance AMPLIFIED AGC at the top of R111. This AMPLIFIED AGC is then fed to the base of Q101, to the base of Q102, and to the base of Q103.

THE AUDIO DETECTOR

The AUDIO DETECTOR demodulates the received signal. The output of the 2nd IF AMP Q105 is fed through C123 to AUDIO DETECTOR diodes CR107 and CR108. When the signal on the collector of Q105 swings negative, CR107 conducts current on to C123. As the signal swings positive, C123 discharges through CR108 and charges C124. The voltage on C124 thus tends to follow the peak-to-peak voltage of the received signal and is thus the demodulated audio signal.

AUTOMATIC NOISE LIMITER

The ANL circuit prevents impulse noise, such as ignition noise, from being amplified when the ANL switch S103 is in the ANL position. The audio output voltage level from the detector diodes CR107 and CR108 is reduced to about 1/3 by voltage divider R120 and R123 and then fed to the cathode of CR103 – the ANL diode. The audio output from the detector diodes is also fed through R121 to C126 where it is filtered and then fed through R122 to the anode of CR103. Since the audio signal is positive, the signal at the anode is normally more positive than the cathode and the diode is forward biased providing a low impedance path for the audio to the first audio stage Q114. When a noise pulse appears in the output of the detector, the time constant of R121 and C126 prevents the anode of CR103 from responding as fast as the cathode. The cathode of CR103 is thus driven more positive than the anode causing CR103 to become backed biased. CR103 thus becomes a high impedance that blocks the noise.

SQUELCH

The squelch circuit shuts the audio off when the received signal is less than the threshold level as determined by the SQUELCH CONTROL. If Q113 – the SQUELCH AMP – is off, R164, R163, and R167 form a voltage divider network that provides the proper forward bias to the base of Q114 – the first audio stage – permitting it to amplify the audio signal fed from the detector. Raising the wiper on R160 – the SQUELCH CONTROL – tends to forward bias the base of Q113 which turns Q113 on. When Q113 is on, the forward bias is removed from the base of Q114 thus preventing amplification of the audio signal. As the received signal becomes stronger, however, the AGC voltage lowers the bias on Q113 which turns it off and permits Q114 to amplify audio. Thus raising the wiper on R160 increases the threshold level a signal must overcome to "break squelch" – turn Q113 off and permit Q114 to amplify audio.

S METER CIRCUIT

In receive mode, meter M101 functions as an S METER, and indicates relative strength of the received signal. When the signal on the top of the T108 secondary swings negative, current flows through CR110 on to C189. As the signal swings positive, C189 discharges through CR109, R180 – S METER ADJUST – and CR114 to METER M1.

5.3 TRANSMITTER

GENERAL

In transmit mode, the output of the MASTER OSCILLATOR Q107 and the TX OSCILLATOR Q108 are mixed in the TX MIXER Q109. The output of Q109 is then fed through BAND PASS FILTER L104 and L105 (26.965 – 27.255 MHz) to the TX BUFFER Q110. The output of the TX BUFFER feeds the TX DRIVER Q111 which in turn drives the TX FINAL Q112. The output of the TX FINAL is fed through a filter and then through stripline printed circuit transmission line to the antenna. Modulation is accomplished by enabling the MIC AMP IC101 which feeds the audio amplifier Q114, Q115 and Q116. The output of Q116 then provides modulated B+ for the TX DRIVER Q111 and TX FINAL Q112.

FREQUENCY MIXING SCHEME

Channel Selector switch S101 selects one of six crystals (X101 – X106) to set the MASTER OSCILLATOR Q107 frequency about 10 MHz above the selected channel frequency. (See Table 4-5.) The output of Q107 is fed to the 1st RX MIXER Q102 to produce the 1st IF. S101 also selects one of four crystals (X107 – X110) for the RX OSCILLATOR Q106. The output of Q106 is fed to the 2nd RX MIXER Q103 to produce the 455 KHz 2nd IF. One of four crystals (X111 – X114) is also selected by S101 for the TX OSCILLATOR Q108. The outputs of the TX and MASTER OSCILLATORS are mixed in TX MIXER Q109. The difference of the frequencies from these oscillators is selected to produce the transmitter frequency.

FIG. 5-1 TRANSCEIVER BLOCK DIAGRAM
A BOARD

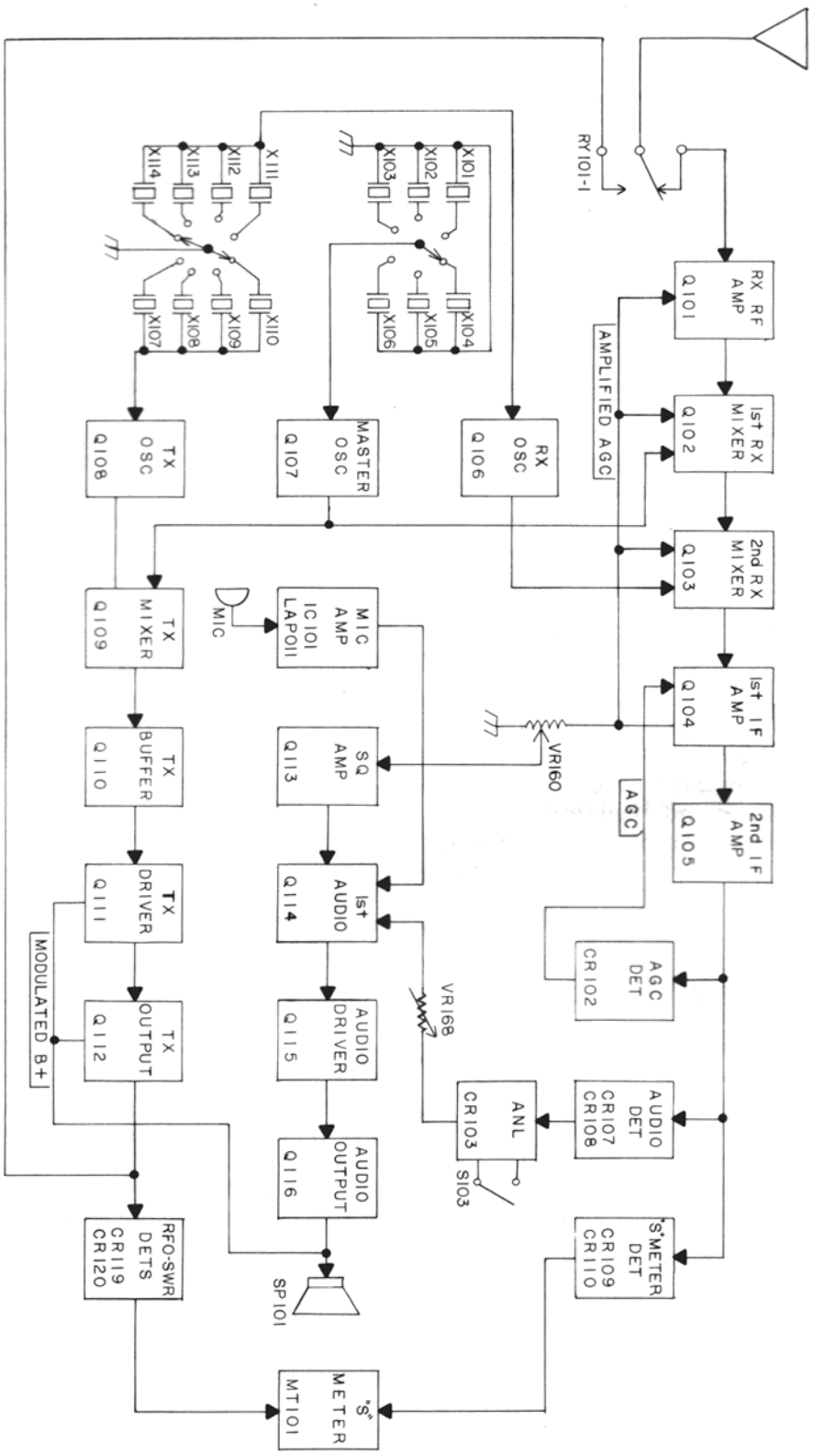


TABLE 5-2 SBE-11CB A BOARD

The following Troubleshooting Chart lists transceiver troubles and possible causes. This list is not meant to exhaust all possibilities, nor are they necessarily the most probable cause; they are the ones that stand out in repair people's minds often because they are not obvious. Also, check the back pocket of this manual for later Service Bulletins.

TROUBLESHOOTING CHART (A)

TROUBLES	REMEDY	
	CHECK	REPLACE
No B+ regulation	Q117, Q118	
No audio output	R175 (over heat)	R175, Z102, and C175
No RX after TX	Q111 for oscillation	
Low TX power		Q111, and Q112

TABLE 5-3 AGC versus RF INPUT LEVEL A BOARD

INPUT LEVEL (1)	AGC VOLTAGES (2)
OPEN ANT JACK	+4.1V
1μV	+3.3V
10μV	+2.1V
100μV	+1.6V
1000μV	+1.3V
10,000μV	+1.2V

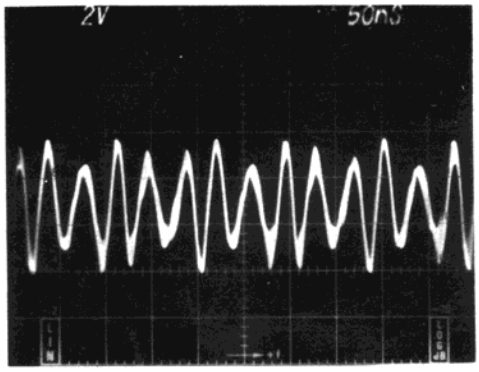
(1) Channel Frequency at Antenna Jack.

(2) Measured with 10MΩ input.

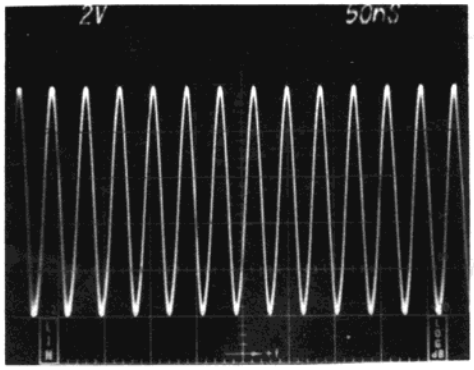
FIG. 5-4 TRANSMITTER ALIGNMENT PROCEDURE
SBE-11CB A BOARD

INITIAL SET-UP
Connect the transceiver to 110 VAC. Connect an audio oscillator to the MIC input, a wattmeter and dummy load to the antenna jack, an oscilloscope to the dummy load, set the CB/PA switch to CB, the RFO-S/SWR switch to RFO-S, the CAL/REV switch to CAL and the channel selector to channel 11. (See Figure 4-2.)
STEP 1 With no modulation, key the transmitter and adjust L104, L105, L106, L107, and C154 for maximum wattmeter indication.
STEP 2 Alternately, switch channel selector to channel 1 and 23. Adjust L104 and L105 for least change in wattmeter indication.
STEP 3 Set to channel 11. Adjust L110 and C154 for maximum wattmeter indication not to exceed 4 watts.
STEP 4 Set the audio oscillator to 1 KHz. While observing scope, adjust L110 and C154 for best modulation symmetry. (See Figure 5-6.)
STEP 5 Adjust the audio oscillator's level for 50% modulation. Read level on AC VTVM and increase level until the AC VTVM reads 8 times as great (about 18db). Adjust VR152 for 90-100% modulation.
STEP 6 Remove audio oscillator. Adjust VR182 until RFO METER reads the same as wattmeter.
STEP 7 Connect the frequency counter to the output of the dummy load. Check channels 1, 2, 3, 4, 8, 16, 20, and 23. (See Table 4-5.)

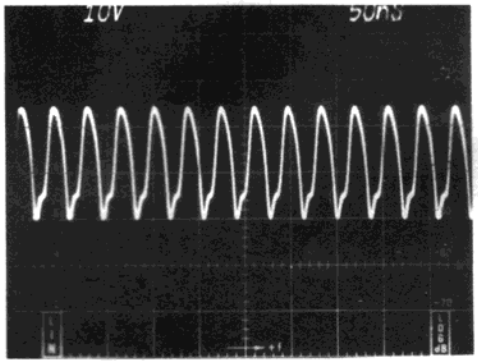
FIG. 5-5 TRANSMITTER ALIGNMENT WAVEFORMS
A BOARD



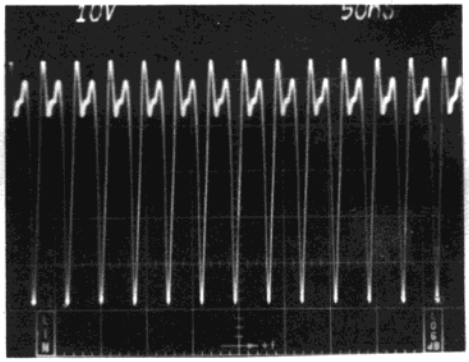
(a) TP5



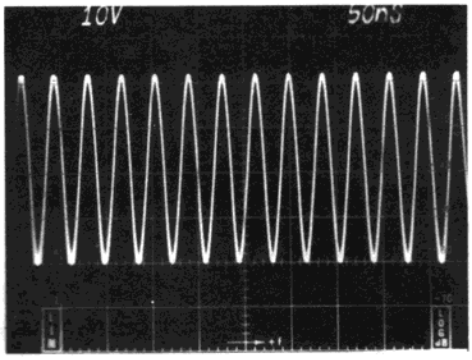
(b) TP6



(c) TP7

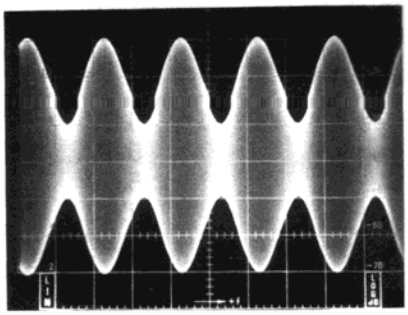


(d) TP8

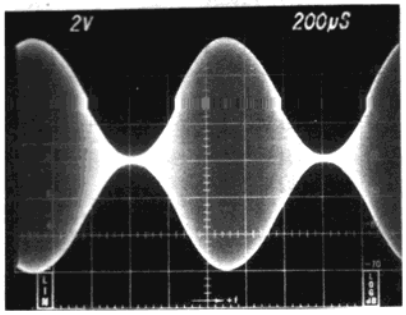


(e) TP9

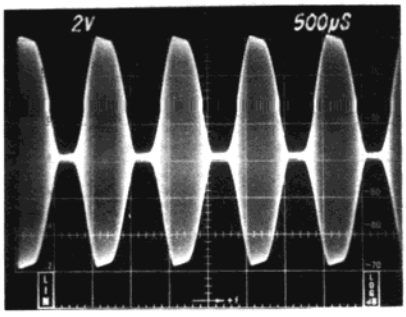
FIG. 5-6 MODULATION WAVEFORMS
A BOARD



50% MODULATION



100% MODULATION



OVERMODULATION

FIG. 5-7 RECEIVER ALIGNMENT PROCEDURE SBE-11CB A BOARD

INITIAL SET-UP
Connect the transceiver to 110 VAC. Connect an AC VTVM across the speaker or 8Ω load plugged into the EXT SP J102. Connect an RF signal generator to the antenna jack, set channel selector to channel 11, PA/CB switch to CB, RFO-S/SWR switch to RFO-S, CAL/REV switch to CAL, ANL switch OFF, DELTA TUNE control to 0, squelch control full counterclockwise, and the volume control full clockwise. (See Figure 4-3.)
STEP 1 Adjust the RF signal generator to a level sufficient to produce a slight indication on the S METER. Adjust L101, L102, T101, T102, T103, T104, T105, T106, T107 and T108 for maximum indication on S METER. Repeat adjustment until 0.7μV RF signal produces about 2 VAC on the AC VTVM.
STEP 2 Adjust T103 until DELTA TUNE + and - gives the same S METER indication.
STEP 3 Set output level of RF signal generator to 100μV. Adjust VR180 for an S-9 indication.
STEP 4 Set RF signal generator output to 300μV. Turn squelch control full clockwise. Adjust VR160 until squelch just breaks.

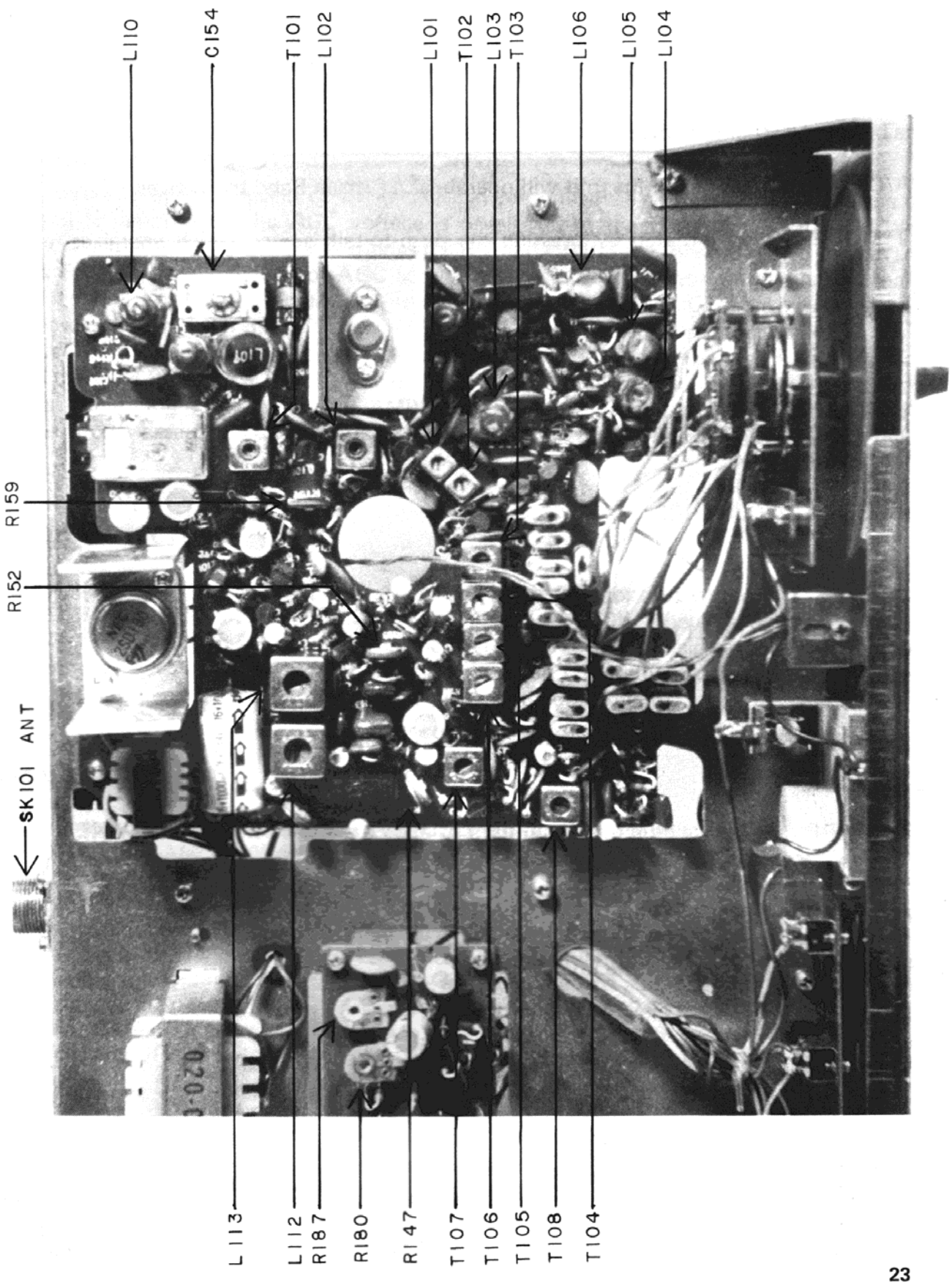
TABLE 5-8 RECEIVER INJECTION VOLTAGES A BOARD

All injection voltages are at 30% — 1 KHz modulation at the specified frequency fed through a .01 MFD capacitor, and should produce at least 2 VAC audio output measured across the speaker or across an 8Ω load connected at EXT SP J2. Typical audio output voltages are given.

INJECTION POINT	INJECTION LEVEL	FREQUENCY	AUDIO OUTPUT
ANT JACK J1	1μV	Channel Freq.	5.8V
Base of Q102 — TP1 *	3μV	Channel Freq.	5.4V
Base of Q103 — TP2	30μV	455 KHz	5.6V
Base of Q104 — TP3	30μV	455 KHz	3.5V
Base of Q105 — TP4	3000μV	455 KHz	5.2V

* TP numbers correspond to numbers in boxes on schematic diagram and component location drawing.

FIG. 5-9 ALIGNMENT LAYOUT
A BOARD



CIRCUIT DESCRIPTION
B BOARD

5.4 INTRODUCTION

The SBE-11CB with B electronics is an AM transceiver with a dual-conversion receiver using intermediate frequencies of 10 MHz and 455 KHz.

Refer to the block and schematic diagrams while following the circuit description.

With the PA/CB switch S202 in CB, the unit will operate as a Citizen Band transceiver.

TRANSMIT MODE is then initiated by pressing the push-to-talk switch which energizes relay RL-1 which:

DISABLES:

SPEAKER SP-1,
RX RF AMP Q101,
1st RX MIXER Q102,
2nd RX MIXER Q103,
1st IF AMP Q104,
2nd IF AMP Q105,
RX OSCILLATOR Q106,

ENABLES:

MIC AMP Q107,
TX OSCILLATOR Q114,
TX MIXER Q115,
TX BUFFER Q116.

PA MODE is initiated by placing PA/CB switch S202 in PA which:

DISABLES:

transmitter RF by disabling the B+ on the TX DRIVER and FINAL, CB SPEAKER,

ENABLES:

PA speaker jack J3.

The push-to-talk switch then enables the MIC AMP.

5.5 RECEIVER

GENERAL

In the receive mode, the RF signal is fed from the antenna to the 1st RX AMP Q101. The amplified signal is then fed to Q102 – the 1st RX MIXER – where it is mixed with an injected signal from the MASTER OSCILLATOR Q113 about 10 MHz above the receive channel frequency. The filter formed by T101 and T102 selects the 10 MHz converted signal which is then fed to Q103 – the 2nd RX MIXER – where it is mixed with an injection signal from the RX OSCILLATOR Q106 which is 455

KHz below the desired signal. The 455 KHz converted signal is selected by T103, T104, T105, and T106 and then fed to the 1st IF AMP Q104. The output of Q104 is then fed to Q105 which drives the AGC DETECTOR CR102 and CR103, the S-METER DETECTOR CR205 and CR206, and the AUDIO DETECTOR CR104 and CR105. After passing through the AUTOMATIC NOISE LIMITER CR106, the detected audio signal is fed to the wiper of potentiometer VR205 – the volume control. The audio signal developed across VR205 is then fed to the 1st AUDIO AMP Q109. The output of Q109 is transformer coupled to push-pull speaker driver amplifier Q111 and Q112.

AUTOMATIC GAIN CONTROL

The AGC circuit reduces the gain of the receiver in response to a strong signal by lowering the bias on the RF and IF amplifiers. The AGC voltage is developed at the R121, C128 junction. With a weak receiver input signal – less than 1μV – diodes CR102 and CR103 are forward biased by current through R112 and R121. About 2.5 volts of AGC appear on the C128 capacitor. As the input signal increases, the signal at the top of C125 increases. When the signal at the top of C125 swings negative, increased current flows through CR103, R121 and R112 to C125. As the signal swings positive, C125 discharges through CR102. The increase in current through R121 and R112 decreases the AGC voltage. The AGC voltage is then fed to the base of Q104,– the 1st IF AMP. Q104 functions as an emitter follower at low frequencies producing a low impedance AMPLIFIED AGC at the top of R113. This AMPLIFIED AGC is then fed to the base of Q101, through R105 to the base of Q102, and through R109 to the base of Q103.

THE AUDIO DETECTOR

The AUDIO DETECTOR demodulates the received signal. The output of the 2nd IF AMP Q105 is fed through C126 to AUDIO DETECTOR diodes CR104 and CR105. When the signal on the collector of Q105 swings negative, CR104 conducts current on to C126. As the signal swings positive, C126 discharges through CR105 and charges C129. The voltage on C129 thus tends to follow the peak-to-peak voltage of the received signal and is thus the demodulated audio signal.

AUTOMATIC NOISE LIMITER

The ANL circuit prevents impulse noise, such as ignition noise, from being amplified when the ANL switch S205 is in the ANL position. The audio output voltage level from the detector diodes CR104 and CR105 is reduced to about 1/3 by voltage divider R122 and R123 and then fed to the cathode of CR106 – the ANL diode. The audio output from the detector diodes is also fed through R124 to C131 where it is filtered and then fed through R125 to the anode of CR106. Since the audio signal is positive, the signal at the anode is normally more positive than the cathode and the diode is forward biased providing a low impedance path for the audio to the first audio stage Q109. When a noise pulse appears in the output of the detector, the time constant of R124 and C131 prevents the anode of CR106 from responding as fast as the cathode. The cathode of CR106 is thus driven more positive than the anode causing CR106 to become backed biased. CR106 then becomes a high impedance that blocks the noise.

SQUELCH

The squelch circuit shuts the audio off when the received signal is less than the threshold level as determined by the SQUELCH CONTROL. If Q108 – the SQUELCH AMP – is off, R159, R160 and R161 form a voltage divider network that provides the proper forward bias to the base of Q109 – the first audio stage – permitting it to amplify the audio signal fed from the detector. Raising the wiper of

R202 – the SQUELCH CONTROL – tends to forward bias the base of Q108 which turns Q108 on. When Q108 is on, the forward bias is removed from the base of Q109 thus preventing amplification of the audio signal. As the received signal becomes stronger, however, the AGC voltage lowers the bias on Q108 which turns it off and permits Q109 to amplify audio. Thus raising the wiper on R202 increases the threshold level a signal must overcome to "break squelch" – turn Q108 off and permit Q109 to amplify audio.

S METER CIRCUIT

In receive mode, meter M1 functions as an S METER, and indicates relative strength of the received signal. When the signal on the collector of Q105 – the 2nd IF AMP – swings negative, current flows through CR206 on to C206. As the signal swings positive, C206 discharges through CR205, VR202 – S METER ADJUST – and CR207 to METER M1.

5.6 TRANSMITTER

GENERAL

In transmit mode, the output of the MASTER OSCILLATOR Q113 and the TX OSCILLATOR Q114 are mixed in the TX MIXER Q115. The output of Q115 is then fed through BAND PASS FILTER L104 and L105 (26.965 – 27.255 MHz) to the TX AMP Q116. The output of the TX AMP feeds the TX DRIVER Q117 which in turn drives the TX FINAL Q118. The output of the TX FINAL is fed through a filter and then through stripline printed circuit transmission line to the antenna. Modulation is accomplished by enabling the MIC AMP Q107 which feeds the AUDIO DRIVER AMP Q110 which feeds the AUDIO OUTPUT AMP Q111, and Q112. The output of Q111 and Q112 then provides modulated B+ for the TX DRIVER Q117 and TX FINAL Q118.

FREQUENCY MIXING SCHEME

Channel Selector switch S201 selects one of six crystals (X101 – X106) to set the MASTER OSCILLATOR Q113 frequency about 10 MHz above the selected channel frequency. (See Table 4-5.) The output of Q113 is fed to the 1st RX MIXER Q102 to produce the 10 MHz 1st IF. S201 also selects one of four crystals (X107 – X110) for the RX OSCILLATOR Q106. The output of Q106 is fed to the 2nd RX MIXER Q103 to produce the 455 KHz 2nd IF. One of four crystals (X111 – X114) is also selected by S201 for the TX OSCILLATOR Q114. The outputs of the TX and MASTER OSCILLATORS are mixed in TX MIXER Q115. The difference of the frequencies from these oscillators is selected to produce the transmitter frequency.

OVERMODULATION LIMITER

The OML regulates the gain of the audio amplifier so as to accommodate a wide range of voice levels without overmodulating the carrier. The audio signal is fed from the secondary of the audio output transformer T110 through C155 to CR107 where it is rectified; it is then filtered by R143 and C167 and fed to the emitter of Q107 – the MIC AMP – through the OML adjustment R125. As the sound level into the MIC increases, the voltage at the emitter of Q107 will rise and lower the amplification of the sound input.

OSCILLATORS

Crystal oscillators Q106 and Q114 are common collector, colpitts circuits. Outputs are taken from the emitters; collectors are at AC ground. Crystal oscillator Q113 is a common emitter colpitts circuit. Output is taken from the collector; emitter is at AC ground.

FIG. 5-10 TRANSCEIVER BLOCK DIAGRAM
B BOARD

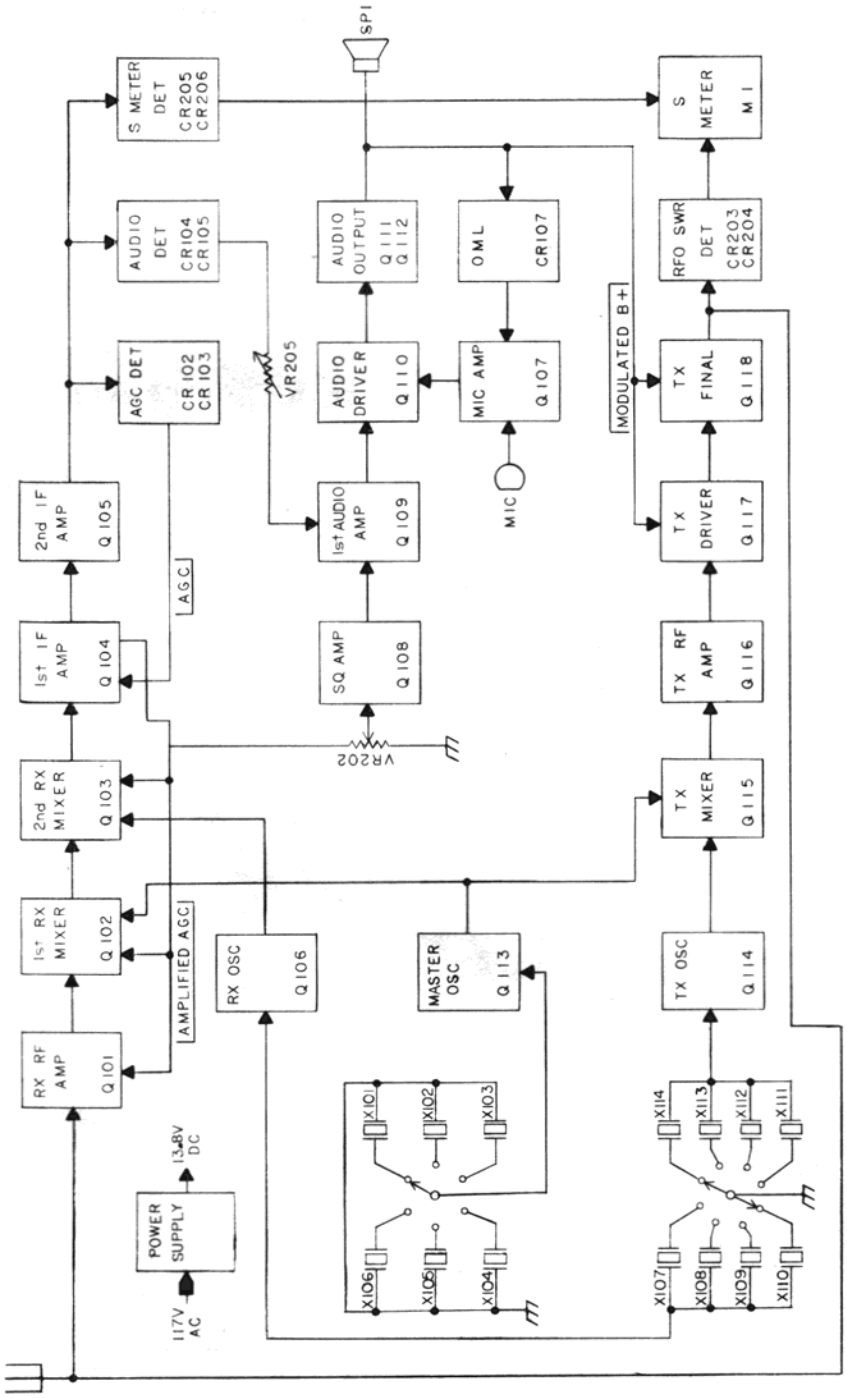
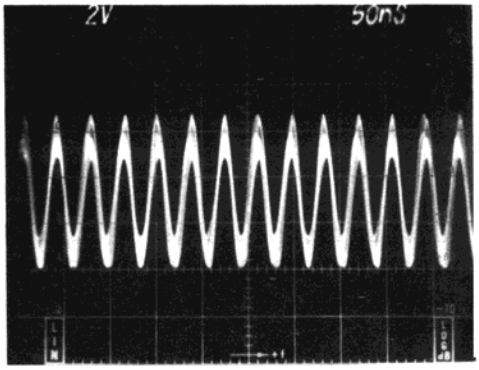


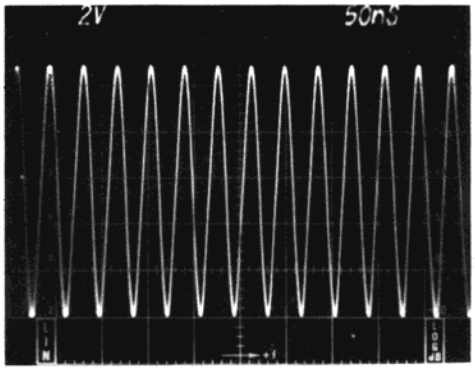
FIG. 5-11 TRANSMITTER ALIGNMENT PROCEDURE SBE-11CB B BOARD

INITIAL SET-UP
Connect the transceiver to 110 VAC. Connect an audio oscillator to the MIC input, a wattmeter and dummy load to the antenna jack, an oscilloscope to the dummy load, set the CB/PA switch to CB, the RFO-S/SWR switch to RFO-S, the CAL/REV switch to CAL and the channel selector to channel 11. (See Figure 4-2.)
STEP 1 With no modulation, key the transmitter and adjust L104, L105, L106, L107, and C162 for maximum wattmeter indication.
STEP 2 Alternately, switch channel selector to channel 1 and 23. Adjust L104 and L105 for least change in wattmeter indication.
STEP 3 Set to channel 11. Adjust L111 and C162 for maximum wattmeter indication not to exceed 4 watts.
STEP 4 Set the audio oscillator to 1 KHz. Adjust output level for about 80% modulation. While observing scope, adjust L111 and C162 for best modulation symmetry. (See Figure 5-13.)
STEP 5 Adjust the audio oscillator's level for 50% modulation. Read level on AC VTVM and increase level until the AC VTVM reads 8 times as great (about 18db). Adjust VR152 for 100% modulation.
STEP 6 Remove audio oscillator. Adjust VR201 until RFO METER reads the same as wattmeter.
STEP 7 Connect the frequency counter to the output of the dummy load. Check channels 1, 2, 3, 4, 8, 16, 20, and 23. (See Table 4-5.)

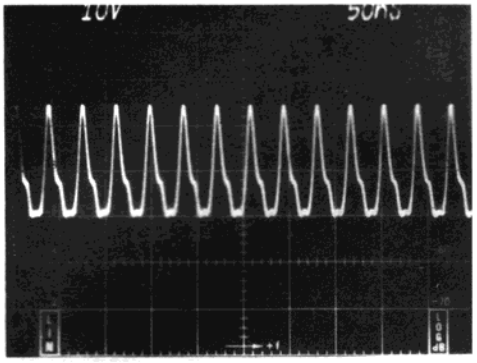
FIG. 5-12 TRANSMITTER ALIGNMENT WAVEFORMS
B BOARD



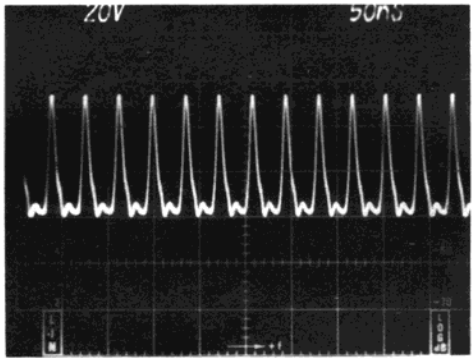
(a) TP5



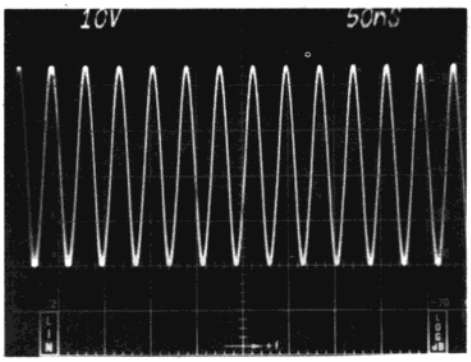
(b) TP6



(c) TP7

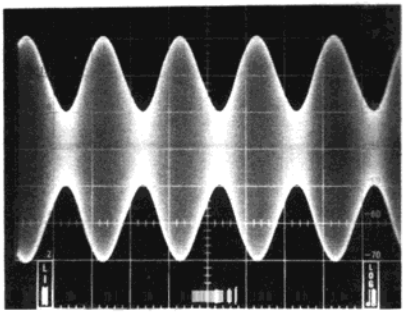


(d) TP8

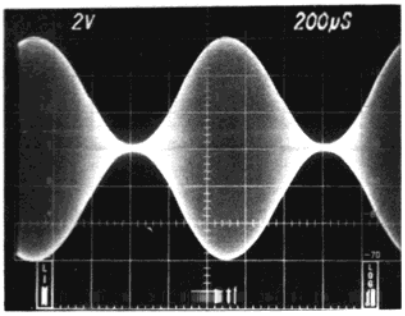


(e) TP9

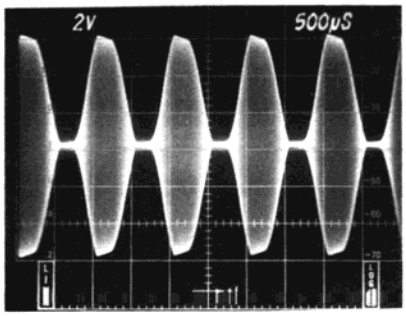
FIG. 5-13 MODULATION WAVEFORMS
B BOARD



50% MODULATION



100% MODULATION



OVERMODULATION

FIG. 5-14 RECEIVER ALIGNMENT PROCEDURE
SBE-11CB B BOARD

INITIAL SET-UP

Connect the transceiver to 110 VAC. Connect an AC VTVM across the speaker or 8Ω load plugged into the EXT SP J2. Connect an RF signal generator to the antenna jack, set channel selector to channel 11, PA/CB switch to CB, RFO-S/SWR switch to RFO-S, CAL/REV switch to CAL, ANL switch OFF, DELTA TUNE control to 0, squelch control full counterclockwise, and the volume control full clockwise. (See Figure 4-3.)

STEP 1

Set AGC adjust for maximum background noise.

STEP 2

Connect RF signal generator to the antenna jack, set to 27.085 MHz 30% – 1 KHz modulation. Adjust the RF output level of the signal generator to a level sufficient to produce a slight indication on the S METER. Adjust L101, L102, T101, T102, T103, T104, T105, and T106 for maximum indication on the S METER. Repeat adjustment until 0.7μV RF signal produces about 2 VAC on the AC VTVM.

STEP 3

Adjust T103 until DELTA TUNE + and - gives the same S METER INDICATION.

STEP 4

Disconnect RF signal generator, adjust AGC potentiometer on bottom of board for 2.6 VDC of AGC measured at junction of R121 and C128.

STEP 5

Connect RF signal generator and set output to 100μV. Adjust VR–202 for an S–9 indication.

STEP 6

Set RF signal generator output to 300μV. Turn squelch control full clockwise. Adjust VR–155 until squelch just breaks.

FIG. 5-15 ALIGNMENT LAYOUT
B BOARD

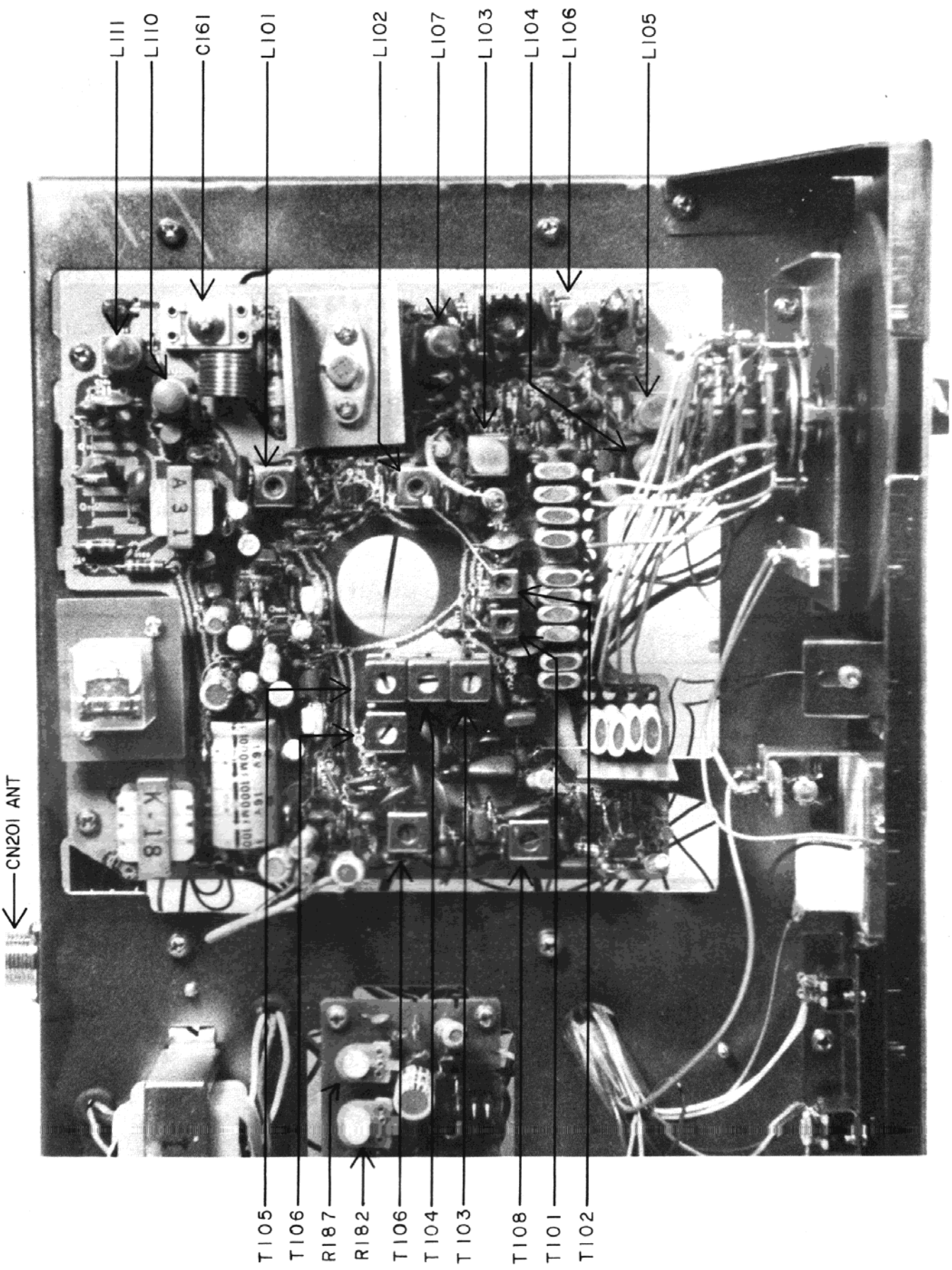


TABLE 5-16 RECEIVER INJECTION VOLTAGES B BOARD

All injection voltages are at 30% – 1 KHz modulation at the specified frequency fed through a .01 MFD capacitor, and should produce at least 2 VAC audio output measured across the speaker or across an 8Ω load connected at EXT SP J102. Typical audio output voltages are given.

INJECTION POINT	INJECTION LEVEL	FREQUENCY	AUDIO OUTPUT
ANT JACK J1	1μV	Channel Freq.	6.0V
Q101 Collector – TP1*	30μV	Channel Freq.	5.0V
Q103 Base – TP2	30μV	455 KHz	2.2V
Q104 Base – TP3	100μV	455 KHz	5.2V
Q105 Base – TP4	3000μV	455 KHz	2.8V

*TP numbers correspond to numbers in boxes on schematic diagram and component location drawing.

TABLE 5-17 SBE-11CB B BOARD

The following Troubleshooting Chart lists transceiver troubles and possible causes. This list is not meant to exhaust all possibilities, nor are they necessarily the most probable cause; they are the ones that stand out in repair people's minds often because they are not obvious. Also, check the back pocket of this manual for later Service Bulletins.

TROUBLESHOOTING CHART (B)

TROUBLES	REMEDY	
	CHECK	REPLACE
No B+ or regulation	Q202, Q203	C209
Poor sensitivity	C117, C109	
Overload on strong signal	C127	
Transmission, no modulation	C155	
Delta tune	C110, C133 and C134	
Bad audio response	C131, VR205 wiper	

TABLE 5-18 AGC versus RF INPUT LEVEL B BOARD

INPUT LEVEL (1)	AGC VOLTAGES (2)
OPEN ANT JACK	+2.6V
1μV	+2.2V
10μV	+1.8V
100μV	+1.6V
1000μV	+1.5V
10,000μV	+1.3V

(1) Channel Frequency at Antenna Jack.

(2) Measured with 10MΩ input.

FIG. 5-19 COMPONENT LOCATION
A BOARD

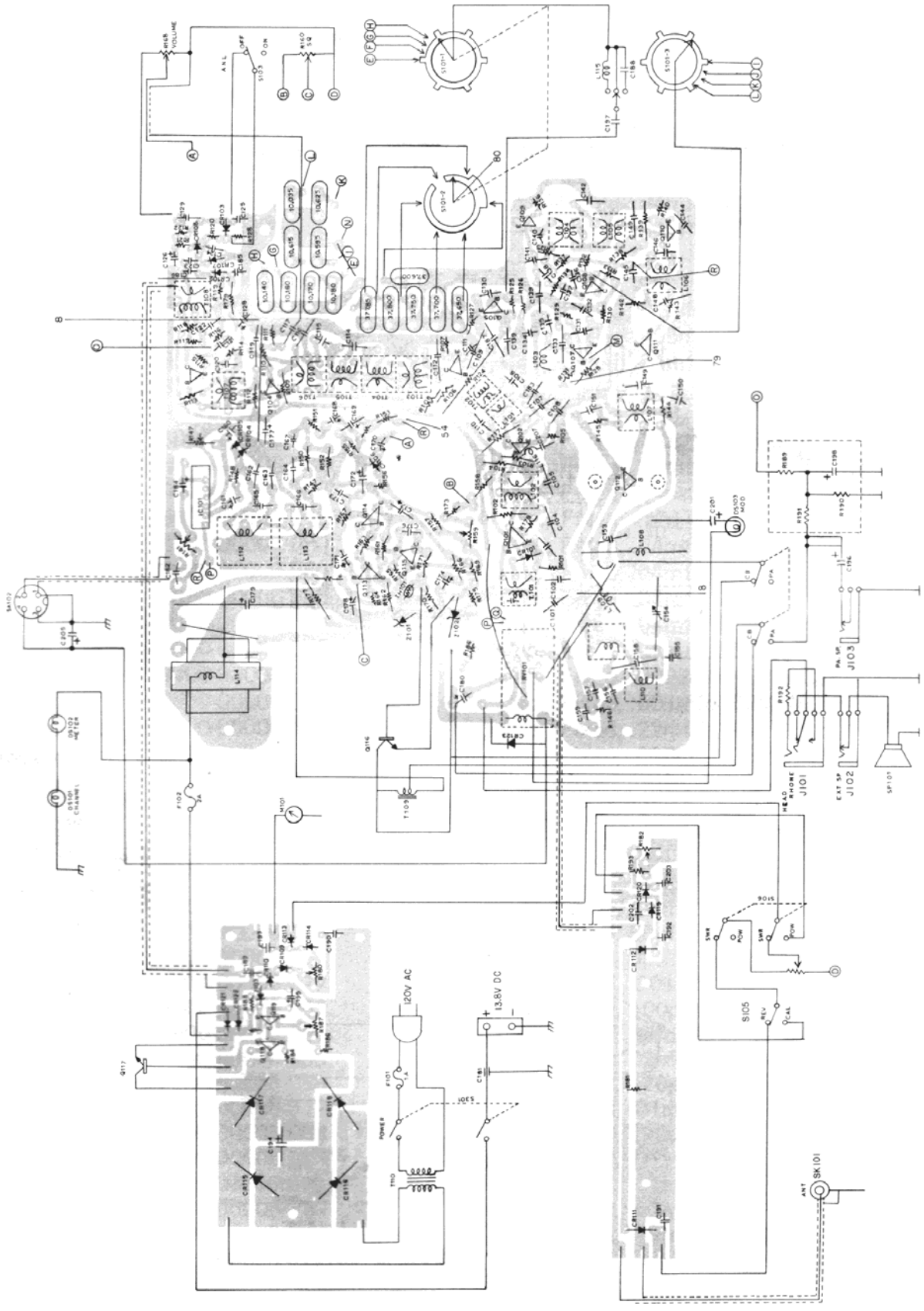
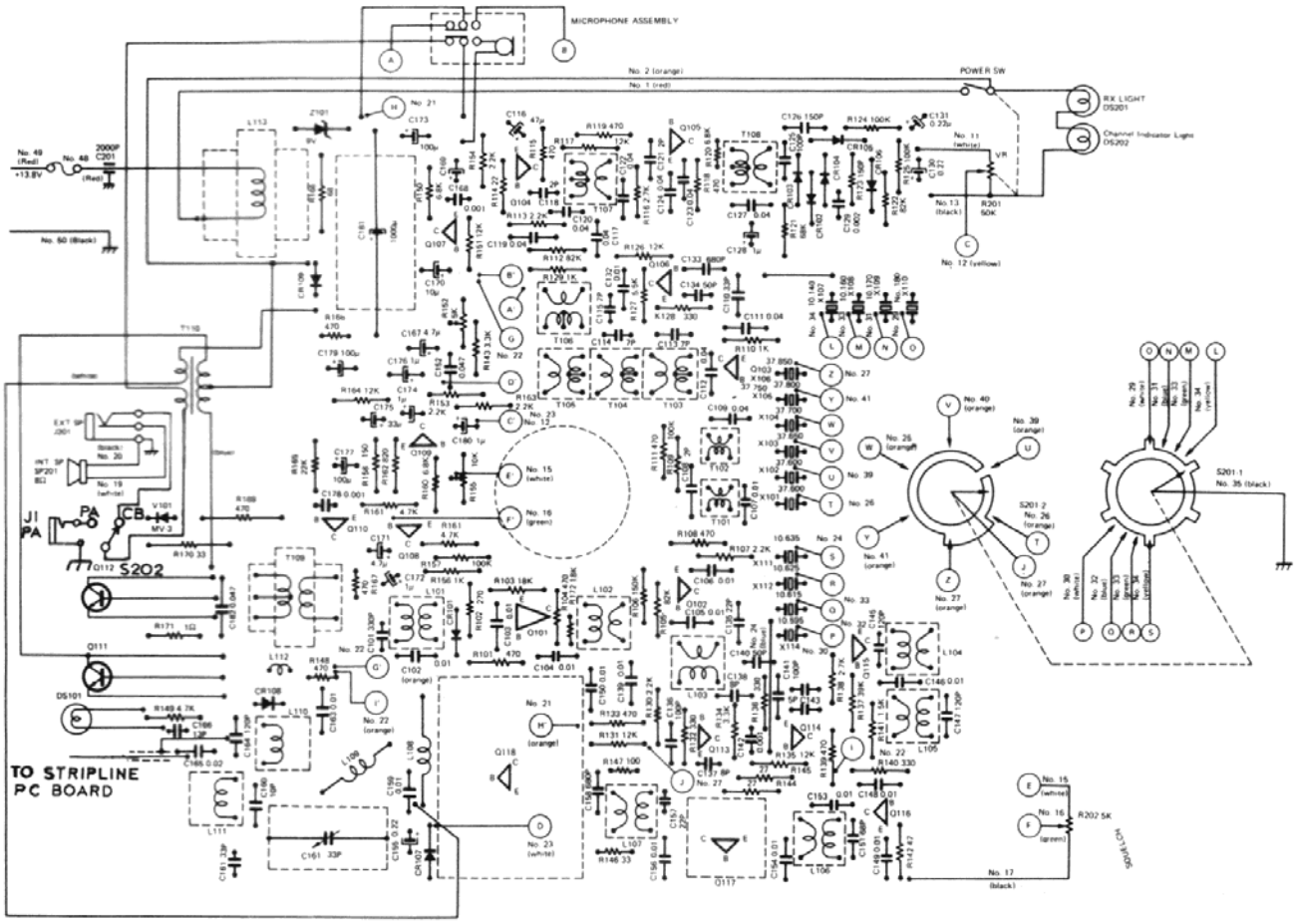
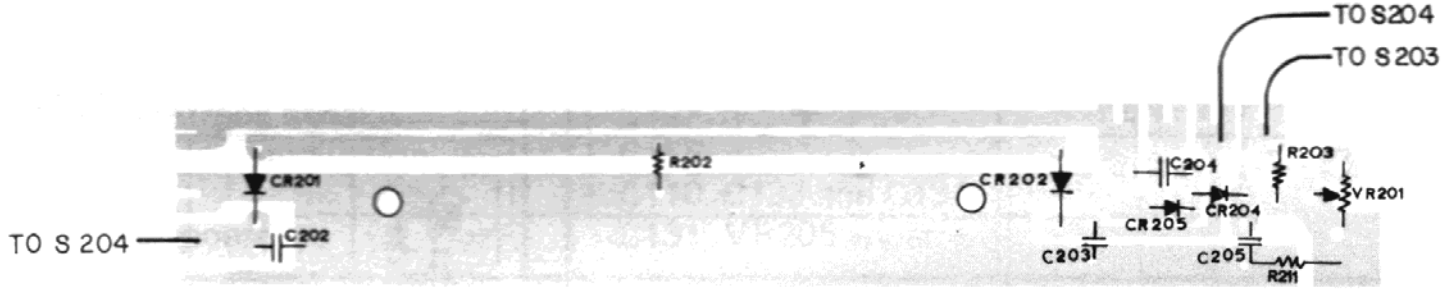
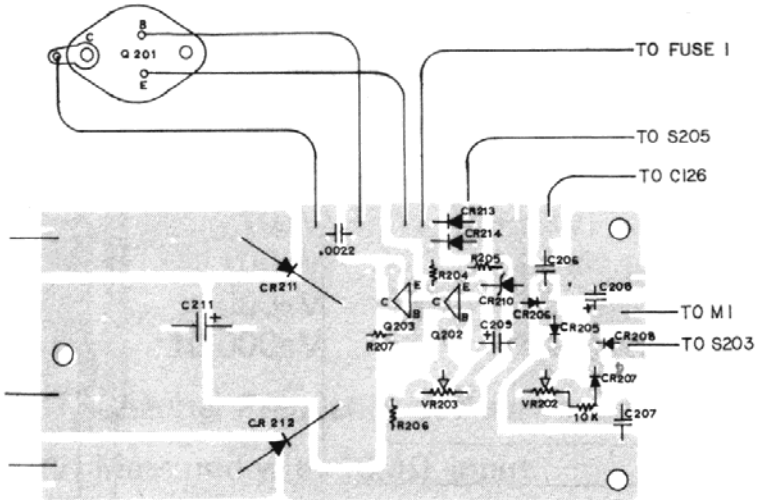


FIG. 5-20 COMPONENT LOCATION
B BOARD







SBE-11CB TRINIDAD PARTS LIST
A BOARD

SYMBOL #	PART #	DESCRIPTION
C101	8000-00006-061	Cap., Fixed, 330pfd, 50V, Mica
C102	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C103	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C104	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C105	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C106	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C107	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C108	8000-00006-060	Cap., Fixed, 220pfd, 50V, Mica
C109	8000-00006-054	Cap., Fixed, 33pfd, 50V, Mica
C110	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C111	8000-00006-076	Cap., Fixed, .005mfd, 50V, Cer.
C112	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C113	8000-00006-051	Cap., Fixed, 8pfd, 50V, Mica
C114	8000-00006-051	Cap., Fixed, 8pfd, 50V, Mica
C115	8000-00006-051	Cap., Fixed, 8pfd, 50V, Mica
C116	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C117	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C118	8000-00006-049	Cap., Fixed, 2pfd, 50V, Mica
C119	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C120	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C121	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C122	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C123	8000-00006-059	Cap., Fixed, 150pfd, 50V, Mica
C124	8000-00006-078	Cap., Fixed, .0022mfd, 50V, Cer.
C125	8000-00006-068	Cap., Fixed, .001mfd, 52V, Mylar
C126	8000-00006-169	Cap., Fixed, .22mfd, 25V, Elect.
C127	8000-00006-073	Cap., Fixed, .068mfd, 25V, Mylar
C128	8000-00006-063	Cap., Fixed, 1mfd, 16V, Elect.
C129	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C130	8000-00006-075	Cap., Fixed, 680pfd, 50V, Cer.
C131	8000-00006-053	Cap., Fixed, 22pfd, 50V, Mica
C132	8000-00006-060	Cap., Fixed, 220pfd, 50V, Mica
C133	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C134	8000-00006-062	Cap., Fixed, 50pfd, 50V, Mica
C135	8000-00006-051	Cap., Fixed, 0pfd, 50V, Mica
C136	8000-00006-077	Cap., Fixed, .001mfd, 50V, Cer.
C137	8000-00006-057	Cap., Fixed, 100pfd, 50V, Mica
C138	8000-00006-050	Cap., Fixed, 5pfd, 50V, Mica
C139	8000-00006-053	Cap., Fixed, 22pfd, 50V, Mica
C140	8000-00006-058	Cap., Fixed, 120pfd, 50V, Mica
C141	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C142	8000-00006-058	Cap., Fixed, 120pfd, 50V, Mica
C143	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C144	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C145	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C146	8000-00006-059	Cap., Fixed, 150pfd, 50V, Mica
C147	8000-00006-049	Cap., Fixed, 2pfd, 50V, Mica
C148	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.

SYMBOL #	PART #	DESCRIPTION
C149	8000-00006-056	Cap., Fixed, 82pfd, 50V, Mica
C150	8000-00006-079	Cap., Fixed, .01mfd, 50V, Mica
C151	8000-00006-075	Cap., Fixed, 680pfd, 50V, Cer.
C153	8000-00006-079	Cap., Fixed, .01mfd, 50V, Mica
C154	8000-00006-082	Cap., Fixed, 150pfd, Trimmer
C155	8000-00006-054	Cap., Fixed, 33pfd, 50V, Mica
C156	8000-00006-058	Cap., Fixed, 120pfd, 50V, Mica
C157	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C158	8000-00006-052	Cap., Fixed, 10pfd, 50V, Mica
C160	8000-00006-064	Cap., Fixed, 4.7mfd, 16V, Elect.
C161	8000-00006-065	Cap., Fixed, 10mfd, 10V, Elect.
C162	8000-00006-066	Cap., Fixed, .0047mfd, 25V, Mylar
C163	8000-00006-074	Cap., Fixed, .1mfd, 25V, Mylar
C164	8000-00006-166	Cap., Fixed, .0047mfd, 25V, Mylar
C165	8000-00006-071	Cap., Fixed, .015mfd, 25V, Mylar
C166	8000-00006-070	Cap., Fixed, .01mfd, 50V, Mylar
C167	8000-00006-068	Cap., Fixed, .001mfd, 25V, Mylar
C168	8000-00006-064	Cap., Fixed, 4.7mfd, 16V, Elect.
C169	8000-00006-065	Cap., Fixed, 10mfd, 10V, Elect.
C170	8000-00006-065	Cap., Fixed, 10mfd, 10V, Elect.
C171	8000-00006-064	Cap., Fixed, .47mfd, 16V, Elect.
C172	8000-00006-074	Cap., Fixed, .1mfd, 25V, Mylar
C173	8000-00006-068	Cap., Fixed, .001mfd, 25V, Mylar
C174	8000-00006-080	Cap., Fixed, .04mfd, 50V, Cer.
C175	8000-00006-066	Cap., Fixed, 33mfd, 6V, Elect.
C176	8000-00006-057	Cap., Fixed, 100pfd, 50V, Mica
C178	8000-00006-067	Cap., Fixed, 100mfd, 16V, Elect.
C179	8000-00006-068	Cap., Fixed, 1000mfd, 16V, Elect.
C180	8000-00006-067	Cap., Fixed, 100mfd, 16V, Elect.
C181	8000-00006-081	Cap., Fixed, 2000pfd, Feed-Thru
C182	8000-00006-077	Cap., Fixed, .001mfd, 50V, Cer.
C183	8000-00006-053	Cap., Fixed, 22pfd, 50V, Mica
C184	8000-00006-063	Cap., Fixed, 1mfd, 16V, Elect.
C185	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C186	8000-00006-061	Cap., Fixed, 330pfd, 50V, Mica
C187	8000-00006-051	Cap., Fixed, 8pfd, 50V, Mica
C188	8000-00006-191	Cap., Fixed, 20pfd, 50V, Mica
C189	8000-00006-061	Cap., Fixed, 330pfd, 50V, Mica
C190	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C191	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C192	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.
C193	8000-00006-066	Cap., Fixed, 33mfd, 6V, Elect.
C194	8000-00006-163	Cap., Fixed, 220mfd, 35V, Elect.
C195	8000-00006-165	Cap., Fixed, 100mfd, 25V, Elect.
C196	8000-00006-078	Cap., Fixed, .0022mfd, 50V, Cer.
C197	8000-00006-057	Cap., Fixed, 100pfd, 50V, Mica
C198	8000-00006-067	Cap., Fixed, 100mfd, 16V, Elect.
C199	8000-00006-164	Cap., Fixed, 220mfd, 16V, Elect.
C200	8000-00006-164	Cap., Fixed, 220mfd, 16V, Elect.
C201	8000-00006-067	Cap., Fixed, 100mfd, 16V, Elect.
C202	8000-00006-049	Cap., Fixed, 2pfd, 50V, Mica
C203	8000-00006-079	Cap., Fixed, .01mfd, 50V, Cer.

SYMBOL #	PART #	DESCRIPTION
C204	8000-00006-165	Cap., Fixed, 100mfd, 25V, Elect.
C207	8000-00006-055	Cap., Fixed, 13pfd, 50V, Mica
CR101	8000-00006-007	Diode, 1N60
CR102	8000-00006-007	Diode, 1N60
CR103	8000-00006-008	Diode, WG1021
CR104	8000-00006-008	Diode, WG1021
CR105	8000-00006-008	Diode, WG1021
CR106	8000-00006-008	Diode, WG1021
CR107	8000-00006-007	Diode, 1N60
CR108	8000-00006-007	Diode, 1N60
CR109	8000-00006-007	Diode, 1N60
CR110	8000-00006-007	Diode, 1N60
CR111	8000-00006-007	Diode, 1N60
CR112	8000-00006-007	Diode, 1N60
CR113	8000-00006-007	Diode, 1N60
CR114	8000-00006-007	Diode, 1N60
CR115	8000-00006-147	Diode, FR2-02
CR116	8000-00006-147	Diode, FR2-02
CR117	8000-00006-147	Diode, FR2-02
CR118	8000-00006-147	Diode, FR2-02
CR119	8000-00006-007	Diode, 1N60
CR120	8000-00006-007	Diode, 1N60
CR121	8000-00006-147	Diode, FR2-02
CR122	8000-00006-147	Diode, FR2-02
CR123	8000-00006-147	Diode, FR2-02
DS101	8000-00006-202	Lamp, #46
DS102	8000-00006-202	Lamp, #46
DS103	8000-00006-093	Lamp, #20, 3V
F101	8000-00006-158	Fuse, 1 amp
F102	8000-00006-091	Fuse, 2 amp
IC101	8000-00006-011	Integrated Circuit, LAP011
J101	8000-00006-155	Jack, Phone
J102	8000-00006-088	Jack, External Speaker
J103	8000-00006-088	Jack, External Speaker
L101	8000-00006-015	Coil, Antenna
L102	8000-00006-016	Coil, RF Amp
L103	8000-00006-023	Coil, Oscillator
L104	8000-00006-024	Coil, Mixer
L105	8000-00006-024	Coil, Mixer
L106	8000-00006-025	Coil, Buffer Amplifier
L107	8000-00006-026	Coil, Driver Amplifier
L108	8000-00006-014	Coil, RF
L109	8000-00006-021	Coil, Filter (B)
L110	8000-00006-020	Coil, Filter (A)
L111	8000-00006-020	Coil, Filter (A)
L112	8000-00006-027	Coil, Filter

SYMBOL #	PART #	DESCRIPTION
L113	8000-00006-027	Coil, Filter
L114	8000-00006-013	Choke, Line Filter
L115	8000-00006-151	Coil, RF
L116	8000-00006-149	Coil, Trap
MT101	8000-00006-156	Meter
Q101	8000-00006-003	Transistor, 2SC710
Q102	8000-00006-003	Transistor, 2SC710
Q103	8000-00006-003	Transistor, 2SC710
Q104	8000-00006-003	Transistor, 2SC710
Q105	8000-00006-003	Transistor, 2SC710
Q106	8000-00006-003	Transistor, 2SC710
Q107	8000-00006-003	Transistor, 2SC710
Q108	8000-00006-003	Transistor, 2SC710
Q109	8000-00006-003	Transistor, 2SC710
Q110	8000-00006-005	Transistor, 2SC738
Q111	8000-00006-001	Transistor, 2SC775
Q112	8000-00006-002	Transistor, 2SC778
Q113	8000-00006-003	Transistor, 2SC710
Q114	8000-00006-003	Transistor, 2SC710
Q115	8000-00006-004	Transistor, CS9012
Q116	8000-00006-006	Transistor, 2SD180
Q117	8000-00006-190	Transistor, 2SD81
Q118	8000-00006-003	Transistor, 2SC710
Q119	8000-00006-003	Transistor, 2SC710
R141	8000-00006-045	Resistor, 20K Ω, Variable
R147	8000-00006-046	Resistor, 5K Ω, Variable
R152	8000-00006-047	Resistor, 10K Ω, Variable
R159	8000-00006-045	Resistor, 20K Ω, Variable
R160	8000-00006-044	Resistor, 5K Ω, Variable
R168	8000-00006-199	Resistor, 50K Ω, w/Switch Variable
R175	8000-00006-042	Resistor, 1 Ω, 1 watt, Fixed
R180	8000-00006-160	Resistor, 20K Ω, Variable
R182	8000-00006-161	Resistor, 50K Ω, Variable
R183	8000-00006-044	Resistor, 5K Ω, Variable
R187	8000-00006-159	Resistor, 1K Ω, Variable
RY101	8000-00006-095	Relay, 12V
S101	8000-00006-206	Switch, Rotary, 24T
S102	8000-00006-153	Switch, Rotary, 3T
S103	8000-00006-154	Switch, 2P2T
S104	8000-00006-154	Switch, 2P2T
S105	8000-00006-154	Switch, 2P2T
S106	8000-00006-154	Switch, 2P2T
SK101	8000-00006-090	Connector, Antenna
SK102	8000-00004-070	Connector, Microphone
SP101	8000-00006-152	Speaker, 8 Ω

SYMBOL #	PART #	DESCRIPTION
T101	8000-00006-022	Transformer, 10.7 MHz
T102	8000-00006-022	Transformer, 10.7 MHz
T103	8000-00006-017	Transformer, IF, 455 KHz
T104	8000-00006-018	Transformer, IF, 455 KHz
T105	8000-00006-018	Transformer, IF, 455 KHz
T106	8000-00006-018	Transformer, IF, 455 KHz
T107	8000-00006-019	Transformer, IF, 455 KHz
T108	8000-00006-019	Transformer, IF, 455 KHz
T109	8000-00006-012	Transformer, Modulator
T110	8000-00006-148	Transformer, AC
X101	8000-00006-028	Crystal, 37.600 MHz
X102	8000-00006-029	Crystal, 37.650 MHz
X103	8000-00006-030	Crystal, 37.700 MHz
X104	8000-00006-031	Crystal, 37.750 MHz
X105	8000-00006-032	Crystal, 37.800 MHz
X106	8000-00006-033	Crystal, 37.850 MHz
X107	8000-00006-034	Crystal, 10.140 MHz
X108	8000-00006-035	Crystal, 10.160 MHz
X109	8000-00006-036	Crystal, 10.170 MHz
X110	8000-00006-037	Crystal, 10.180 MHz
X111	8000-00006-038	Crystal, 10.595 MHz
X112	8000-00006-039	Crystal, 10.615 MHz
X113	8000-00006-040	Crystal, 10.625 MHz
X114	8000-00006-041	Crystal, 10.635 MHz
Z101	8000-00006-009	Diode, Zener, ZB1-9
Z102	8000-00006-010	Diode, Zener, ZB1-35
Z103	8000-00006-146	Diode, Zener, 1S331
	8000-00006-170	Front Panel
	8000-00006-171	Bottom Cover
	8000-00006-177	Heat Sink
	8000-00006-098	Microphone Hanger
	8000-00006-178	Cabinet
	8000-00006-189	Back Plate
	8000-00006-119	Knob, Volume/Squelch
	8000-00006-115	Knob, Channel
	8000-00006-197	Channel Indicator
	8000-00006-180	F. C. C. Label
	8000-00006-181	Grill, Speaker
	8000-00006-116	Channel Window
	8000-00006-183	Lamp Screen, Amber
	8000-00004-164	Microphone Connector, Female
	8000-00004-153	Microphone, Complete
	8000-00004-157	AC Line
	8000-00006-174	Bracket, Switch
	8000-00006-176	Holder, Lamp Busling
	8000-00006-189	Holder, Fuse
	8000-00006-185	Washer, Speaker
	8000-00006-184	Holder, Lamp
	8000-00006-175	Holder, Meter
	8000-00006-188	Styrofoam, Side

SYMBOL #	PART #	DESCRIPTION
	8000-00006-194	Plastic Bag, Radio
	8000-00006-187	Styrofoam, Bottom
	8000-00006-186	Styrofoam, Top
	8000-00006-206	Display Box

SBE-11CB TRINIDAD PARTS LIST

B BOARD

SYMBOL #	PART #	DESCRIPTION
C101	8000-00006-259	Cap., Fixed, 130pfd, 50V, Mica
C102	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C103	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C104	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer
C105	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C106	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C107	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C108	8000-00006-049	Cap., Fixed, 2pfd, 50V, Mica
C109	8000-00006-080	Cap., Fixed, 0.04mfd, 50V, Cer.
C110	8000-00006-054	Cap., Fixed, 33pfd, 50V, Mica
C111	8000-00006-072	Cap., Fixed, 0.047mfd, 50V, Cer.
C112	8000-00006-080	Cap., Fixed, 0.04mfd, 50V, Cer.
C113	8000-00006-223	Cap., Fixed, 7pfd, 50V, Mica
C114	8000-00006-223	Cap., Fixed, 7pfd, 50V, Mica
C115	8000-00006-223	Cap., Fixed, 7pfd, 50V, Mica
C116	8000-00004-009	Cap., Fixed, 47mfd, 16V, Elect.
C117	8000-00006-080	Cap., Fixed, 0.04mfd, 50V, Cer.
C118	8000-00006-049	Cap., Fixed, 2pfd, 50V, Mica
C119	8000-00006-080	Cap., Fixed, 0.04mfd, 50V, Cer.
C120	8000-00006-080	Cap., Fixed, 0.04mfd, 50V, Cer.
C121	8000-00006-049	Cap., Fixed, 2pfd, 50V, mica
C122	8000-00006-080	Cap., Fixed, 0.04mfd, 50V, Cer.
C123	8000-00006-080	Cap., Fixed, 0.04mfd, 50V, Cer.
C124	8000-00006-080	Cap., Fixed, 0.04mfd, 50V, Cer.
C125	8000-00006-057	Cap., Fixed, 100pfd, 50V, Mica
C126	8000-00006-059	Cap., Fixed, 150pfd, 50V, Mica
C127	8000-00006-080	Cap., Fixed, 0.04mfd, 50V, Cer.
C128	8000-00006-063	Cap., Fixed, 1mfd, 16V, Elect.
C129	8000-00006-078	Cap., Fixed, 0.0022mfd, 50V, Cer.
C130	8000-00004-043	Cap., Fixed, 0.22mfd, 25V, Elect.
C131	8000-00004-043	Cap., Fixed, 0.22mfd, 25V, Elect.
C132	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C133	8000-00006-075	Cap., Fixed, 680pfd, 50V, Mica
C134	8000-00006-062	Cap., Fixed, 50pfd, 50V, Mica
C135	8000-00006-053	Cap., Fixed, 22pfd, 50V, Mica
C136	8000-00006-057	Cap., Fixed, 100pfd, 50V, Mica
C137	8000-00006-222	Cap., Fixed, 8pfd, 50V, Mica
C138	8000-00006-222	Cap., Fixed, 8pfd, 50V, Mica
C139	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C140	8000-00006-062	Cap., Fixed, 50pfd, 50V, Mica
C141	8000-00006-057	Cap., Fixed, 100pfd, 50V, Mica
C142	8000-00006-077	Cap., Fixed, 0.001mfd, 50V, Cer.
C143	8000-00006-052	Cap., Fixed, 10pfd, 50V, Mica
C144	8000-00006-053	Cap., Fixed, 22pfd, 50V, Mica
C145	8000-00006-058	Cap., Fixed, 120pfd, 50V, Mica
C146	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C147	8000-00006-058	Cap., Fixed, 120pfd, 50V, Mica
C148	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C149	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.

SYMBOL #	PART #	DESCRIPTION
C150	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C151	8000-00006-075	Cap., Fixed, 680pfd, 50V, Mica
C152	8000-00006-072	Cap., Fixed, 0.047mfd, 25V, Mylar
C153	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C154	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C155	8000-00004-043	Cap., Fixed, 0.22mfd, 25V, Elect.
C156	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C157	8000-00006-053	Cap., Fixed, 22pfd, 50V, Mica
C158	8000-00006-075	Cap., Fixed, 680pfd, 50V, Mica
C159	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C160	8000-00006-052	Cap., Fixed, 10pfd, 50V, Mica
C161	8000-00006-054	Cap., Fixed, 33pfd, 50V, Mica
C162	8000-00006-082	Cap., Var., 150pfd, Trimmer
C163	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C164	8000-00006-058	Cap., Fixed, 120pfd, 50V, Mica
C165	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C166	8000-00006-058	Cap., Fixed, 120pfd, 50V, Mica
C168	8000-00006-077	Cap., Fixed, 0.001mfd, 25V, Mylar
C169	8000-00006-063	Cap., Fixed, 1mfd, 16V, Elect.
C170	8000-00006-047	Cap., Fixed, 10mfd, 16V, Elect.
C171	8000-00006-064	Cap., Fixed, 4.7mfd, 16V, Elect.
C172	8000-00006-063	Cap., Fixed, 1mfd, 16V, Elect.
C173	8000-00006-067	Cap., Fixed, 100mfd, 16V, Elect.
C174	8000-00006-063	Cap., Fixed, 1mfd, 16V, Elect.
C175	8000-00006-066	Cap., Fixed, 33mfd, 16V, Elect.
C176	8000-00006-063	Cap., Fixed, 1mfd, 16V, Elect.
C177	8000-00006-067	Cap., Fixed,100mfd, 16V, Elect.
C178	8000-00006-077	Cap., Fixed, 0.001mfd, 25V, Mylar
C179	8000-00006-067	Cap., Fixed, 100mfd, 16V, Elect.
C180	8000-00006-063	Cap., Fixed, 1mfd, 16V, Elect.
C181	8000-00006-068	Cap., Fixed, 1000mfd, 16V, Elect.
C182	8000-00006-072	Cap., Fixed, 0.04mfd, 25V, Mylar
C201	8000-00004-048	Cap., Fixed, Feed-Thru, 1000mfd
C202	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C203	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C204	8000-00006-049	Cap., Fixed, 2pfd, 50V, Mica
C205	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C206	8000-00006-057	Cap., Fixed, 100pfd, 50V, Mica
C207	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.
C208	8000-00006-066	Cap., Fixed, 33mfd, 16V, Elect.
C209	8000-00006-067	Cap., Fixed, 100mfd, 16V, Elect.
C210	8000-00006-078	Cap., Fixed, 0.0022mfd, 50V, Cer.
C211	8000-00006-163	Cap., Fixed, 2200mfd, 35V, Elect.
C214	8000-00006-047	Cap., Fixed, 10mfd, 16V, Elect.
C215	8000-00006-067	Cap., Fixed, 100mfd, 16V, Elect.
C216	8000-00006-066	Cap., Fixed, 33mfd, 16V, Elect.
C217	8000-00004-021	Cap., Fixed, 47pfd, 50V, Mica
C218	8000-00004-204	Cap., Var., 10pfd, Trimmer
C302	8000-00006-077	Cap., Fixed, 0.001mfd, 50V, Cer.
C303	8000-00006-079	Cap., Fixed, 0.01mfd, 50V, Cer.

SYMBOL #	PART #	DESCRIPTION
CR101	8000-00006-007	Diode, 1N60
CR102	8000-00006-007	Diode, 1N60
CR103	8000-00006-007	Diode, 1N60
CR104	8000-00006-007	Diode, 1N60
CR105	8000-00006-007	Diode, 1N60
CR106	8000-00006-008	Diode, WG1012
CR107	8000-00006-008	Diode, WG1012
CR108	8000-00004-068	Diode, 10D4
CR109	8000-00004-068	Diode, 10D4
CR201	8000-00006-007	Diode, 1N60
CR202	8000-00006-007	Diode, 1N60
CR203	8000-00006-007	Diode, 1N60
CR204	8000-00006-007	Diode, 1N60
CR205	8000-00006-007	Diode, 1N60
CR206	8000-00006-007	Diode, 1N60
CR207	8000-00006-007	Diode, 1N60
CR208	8000-00006-007	Diode, 1N60
CR210	8000-00004-239	Diode, 1S331
CR211	8000-00004-068	Diode, 10D4
CR212	8000-00004-068	Diode, 10D4
CR213	8000-00004-068	Diode, 10D4
CR214	8000-00004-068	Diode, 10D4
J2	8000-00006-088	Jack, Ext.
J3	8000-00006-088	Jack, Ext.
L101	8000-00006-015	Coil, Antenna
L102	8000-00006-016	Coil, RF Amp.
L103	8000-00006-224	Coil, 37MHz, Osc.
L104	8000-00006-024	Coil, Mixer
L105	8000-00006-024	Coil, Mixer
L106	8000-00006-025	Coil, Buffer Amp.
L107	8000-00006-026	Coil, Driver Amp.
L108	8000-00006-226	Choke Coil, .65 μh
L109	8000-00006-021	Coil, Filter
L110	8000-00006-020	Coil, Filter
L111	8000-00006-020	Coil, Filter
L112	8000-00006-262	Choke, 220 μh
L113	8000-00006-013	Coil, Line Filter
L114	8000-00006-261	Choke Coil, 3.3 μh
L115	8000-00006-263	Choke, 4.7 μh
L116	8000-00006-264	Choke, 0.3 μh
L117	8000-00004-263	Choke Coil, 0.22 μh
L302	8000-00006-264	Choke, 3.3 μh
M1	8000-00006-156	Meter
Q101	8000-00006-003	Transistor, 2SC710
Q102	8000-00006-003	Transistor, 2SC710
Q103	8000-00006-003	Transistor, 2SC710
Q104	8000-00006-003	Transistor, 2SC710
Q105	8000-00006-003	Transistor, 2SC710

SYMBOL #	PART #	DESCRIPTION
Q106	8000-00006-003	Transistor, 2SC710
Q107	8000-00006-003	Transistor, 2SC710
Q108	8000-00006-003	Transistor, 2SC710
Q109	8000-00006-003	Transistor, 2SC710
Q110	8000-00006-003	Transistor, 2SC710
Q111	8000-00004-087	Transistor, 2SC1014
Q112	8000-00004-087	Transistor, 2SC1014
Q113	8000-00006-003	Transistor, 2SC710
Q114	8000-00006-003	Transistor, 2SC710
Q115	8000-00006-003	Transistor, 2SC710
Q116	8000-00006-005	Transistor, 2SC738
Q117	8000-00006-001	Transistor, 2SC775
Q118	8000-00006-230	Transistor, 2SC756
Q201	8000-00006-003	Transistor, 2SC710
Q202	8000-00006-190	Transistor, 2SD81
RL1	8000-00006-256	Relay
S201	8000-00006-255	Switch, Rotary
S202	8000-00006-154	Switch, Lever
S203	8000-00006-154	Switch, Lever
S204	8000-00006-154	Switch, Lever
S206	8000-00006-153	Switch, Rotary
S301	8000-00006-153	Switch, Rotary, 3T
SP1	8000-00006-152	Speaker, 8 Ω
T101	8000-00006-259	Transformer, RF Mixer
T102	8000-00006-259	Transformer, RF Mixer
T103	8000-00006-017	Transformer, 455 KHz
T104	8000-00006-018	Transformer, 455 KHz
T105	8000-00006-018	Transformer, 455 KHz
T106	8000-00006-018	Transformer, 455 KHz
T107	8000-00006-019	Transformer, 455 KHz, IF
T108	8000-00006-019	Transformer, 455 KHz, IF
T109	8000-00006-228	Transformer, In-put
T110	8000-00006-229	Transformer, Output
T201	8000-00006-266	AC Power Supply Transformer, PT-1215
V101	8000-00004-067	Diode, MV-3
VR152	8000-00006-046	Resistor, Var., 5K Ω
VR155	8000-00006-047	Resistor, Var., 10K Ω
VR171	8000-00006-042	Resistor, Fixed, 1 Ω, 1W
VR201	8000-00006-161	Resistor, Var., 50K Ω
VR202	8000-00006-160	Resistor, Var., 20K Ω
VR203	8000-00006-159	Resistor, Var., 1K Ω
VR204	8000-00006-044	Resistor, Var., 5K Ω
VR205	8000-00006-199	Resistor, Var., 50K Ω
VR302	8000-00006-341	Resistor, Var., 500K Ω

SYMBOL #	PART #	DESCRIPTION
X101	8000-00006-243	Crystal, 37.600 MHz
X102	8000-00006-244	Crystal, 37.650 MHz
X103	8000-00006-245	Crystal, 37.700 MHz
X104	8000-00006-246	Crystal, 37.750 MHz
X105	8000-00006-247	Crystal, 37.800 MHz
X106	8000-00006-248	Crystal, 37.850 MHz
X107	8000-00006-234	Crystal, 10.140 MHz
X108	8000-00006-235	Crystal, 10.160 MHz
X109	8000-00006-236	Crystal, 10.170 MHz
X110	8000-00006-237	Crystal, 10.180 MHz
X111	8000-00006-249	Crystal, 10.595 MHz
X112	8000-00006-250	Crystal, 10.615 MHz
X113	8000-00006-251	Crystal, 10.625 MHz
X114	8000-00006-252	Crystal, 10.635 MHz
Z101	8000-00006-232	Diode, Zener
Z301	8000-00004-239	Diode, Zener, 1S331
	8000-00006-155	Jack, Phone
	8000-00006-202	Lamp, Meter, 6.3V
	8000-00006-202	Lamp, Channel Indicator, 6.3V
	8000-00006-094	Lamp, 14V
	8000-00006-091	Fuse, 2A
	8000-00006-158	Fuse, 1A
	8000-00006-115	Knob, Channel Selector
	8000-00006-204	Knob, Volume & Squelch
	8000-00006-204	Knob, Delta Tune
	8000-00004-070	Microphone Connector, Chassis Mount
	8000-00006-178	Wood Cabinet
	8000-00006-171	Bottom Cover
	8000-00004-153	Microphone
	8000-00006-098	Microphone Hanger
	8000-00006-106	Heat Sink, Final Amp.
	8000-00006-083	Heat Sink, Driver Amp.
	8000-00008-010	Fuse Holder, In Line
	8000-00006-090	Antenna Connector
	8000-00006-192	Fuse Holder
	8000-00006-170	Front Plate
	8000-00006-181	Grill, Speaker
	8000-00006-197	Channel Indicator
	8000-00006-180	F.C.C. Label
	8000-00006-184	Holder, Lamp
	8000-00006-198	Channel Window
	8000-00006-207	Display Box
	8000-00006-157	AC Cord
	8000-00006-162	Power Supply P.C. Board (bare)
	8000-00006-172	Cabinet Back, Wood
	8000-00006-182	VSWR P.C. Board (bare)
	8000-00006-185	Speaker Insulator

SBE, INC.
220 AIRPORT BLVD.
WATSONVILLE, CA 95076

PRINTED IN U.S.A.

PART NO. 9101-00123

RF AMP
Q101
2SC710

1st MIXER
Q102
2SC710

2nd MIXER
Q103
2SC710

1st IF
Q104
2SC710

2nd IF
Q105
2SC710

'S' METER DET

AGC DET

AUDIO DET

ANL

L101 L102 T101 T102 T103 T104 T105 T106 T107 T108

TP-1 TP-2

RX TX RY101-1

SK101 ANT

AMPLIFIED AGC

AGC

ANL

S103 ON OFF

'S' METER ADJ

RX OSC
Q106
2SC710

L115 5.6μH

S102 DELTA TUNE

MIC
SK102

MIC AMP
IC101
LAP011

SQ AMP
Q113
2SC710

SQUELCH

VOLUME

AUDIO AMP
Q114
2SC710

AUDIO DRIVER
Q115
2SA696
orCS9012

AUDIO OUTPUT
Q116
2SD180

T109

J101 HEADPHONE

J102 EXT SP

SP101

CHANNEL S101

MASTER OSC
Q107
2SC710

TX OSC
Q108
2SC710

TX MIXER
Q109
2SC710

TX BUFFER
Q110
2SC738

TX DRIVER
Q111
2SC775

TX OUTPUT
Q112
2SC778

MODULATED B+

RELAY RY101

CR123

RY101-2

RY101-3

RY101-4

DS103 MOD LAMP

S104 CB PA

PA SP J103

SWR SENS

S105 REV CAL

S106 SWR POW

MT101

ELECTRONICS

RFO DET

RFO ADJ

POWER

13.8 V DC

120V AC

S301

F101 1A

T110

Q117
2SD61

Q118
2SC710

Q119
2SC710

F102 2A

METER

DS102

DS101

CHANNEL

RF OUTPUT ADJ

Z103 6V

IC 101
LAP011
1 2 3 4 5 6 7

Q101 thru Q109
Q113, Q114, Q118
Q119
B C E

Q110
B C E

Q111, Q112
E B C

Q115
E B C

Q116, Q117
E B C

SB-3 MIC
PTT SWITCH
MIC ELEMENT

( ) FULL SQUELCHED VOLTAGE
[ ] TX MODE VOLTAGE

RF AMP Q101 2SC710C
1st RX MIXER Q102 2SC710C
2nd RX MIXER Q103 2SC710C
1st IF AMP Q104 2SC710C
2nd IF AMP Q105 2SC710C
AGC DET
AUDIO DET
MIC AMP Q107 2SC710C
SQ AMP Q108 2SC710C
AUDIO AMP Q109 2SC710C
AUDIO DRIVER Q110 2SC710C
AUDIO OUTPUT Q111, Q112 2SC1014 X 2
RX OSC Q106 2SC710C
MASTER OSC Q113 2SC710C
TX OSC Q114 2SC710C
TX MIXER Q115 2SC710C
TX RF AMP Q116 2SC738
TX DRIVER Q117 2SC775
TX FINAL Q118 2SC756
Q201 2SD81
Q202 2SC710
Q203 2SC710
CHANNEL S201
DELTA TUNE
TIGHT SQ ADJ
SQUELCH
MOD LIMIT ADJ
AGC ADJ.
VOLUME
S METER ADJ
REG ADJ.
AMPLIFIED AGC
AGC
MODULATED B+
TX
RX
CB
PA
ANL
OFF
POWER
ON
OFF
CAPACITOR-RESISTOR SARK KILLER
117V AC
13.8V DC
SWR SENS
STRIPLINE ON PC BOARD
(REAR VIEW)
PTT SWITCH
MIC ELEMENT
SB3 MIC
(FRONT VIEW)
J4 MIC
J1 HEAD PHONE
J2 EXT. SP
SP1
J3 PA SP
J5 ANT
TRANSISTOR CASE DIAGRAMS BOTTOM VIEW
Q101 thru Q110
Q111, Q112
Q117 Q118
Q201
ELECTRONICS