TECHNICAL MANUAL

for

SIDEBAND STRIP RECEIVER MODEL STR-1

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, CANADA

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IN-3014

Issue Date: 15 MAR 1965

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NOTICE

THE TECHNICAL MATERIEL CORPORATION
COMMUNICATIONS ENGINEERS
700 FENIMORE ROAD MAMARONECK, N. Y.

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes* furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

CHANGE NO. 1

INSTRUCTION BOOK CHANGE NOTICE

Date September 19, 1966

Manual affected: Sideband Strip Receiver Model STR-1 IN -3014

Page 5-3. Paragraph 5-2 d. Steps 3 & 4

Change steps 3 and 4 to read:

3. Remove signal generator from ANT jack J1502, adjust variable resistor R1634 to obtain 1.6 vdc at terminal 9 of receiver i-f board.

4. Reconnect signal generator; Tune generator frequency for 1 KC below F1 frequency at 100,000 mv, connect Ballantine a-c voltmeter, set at 1 volt scale, across terminals 3 and 4 of TB 1501, and adjust R1669 for an indication less than 6 db.

Change the Description and Part Number of the Receiver IF Parts List for the following Reference Symbols:

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1640	CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% +150% at 120 cps. at 25°C, 15 wvdc; polarized; insulated tubular case.	CE105-200-15
R1601	RESISTOR, FIXED, COMPOSITION: 8,200 ohms ±5%; 1/2 watt.	RC20GF822J
R1602	RESISTOR, FIXED, COMPOSITION: 100 ohms ±5%; 1/2 watt.	RC20GF101J
R1634	RESISTOR, VARIABLE, COMPOSITION: 50,000 ohms, +10%; nom. power rating 0.25 watt at 70°C; linear taper.	RV111U503A
T1601	NOT USED	

CHANGE NO. 1

INSTRUCTION BOOK CHANGE NOTICE

Date September 19, 1966

Manual affected: Sideband Strip Receiver Model STR-1 IN -3014

Add the following components to the Receiver IF Parts List.

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1669	Same as R1634.	
R1670	RESISTOR, FIXED, COMPOSITION: 5,600 ohms ±5%, 1/2 watt.	RC20GF562J
	PRINTED CIRCUIT BOARD, IF ASSEMBLY. Consisting of:	A4469
	1 ea. Fixed Mica Capacitor 10 uuf.	CM111C100J5S
	1 ea. Coil, IF	CL400
	1 ea. Transistor 2N2084	2N2084
	1 ea. Resistor; 47 K ohms, 1/4 watt.	RC07GF473J

Page 7-5/7-6, Schematic diagram (Sheet 2-3) should be modified as shown in figures 1 and 2.

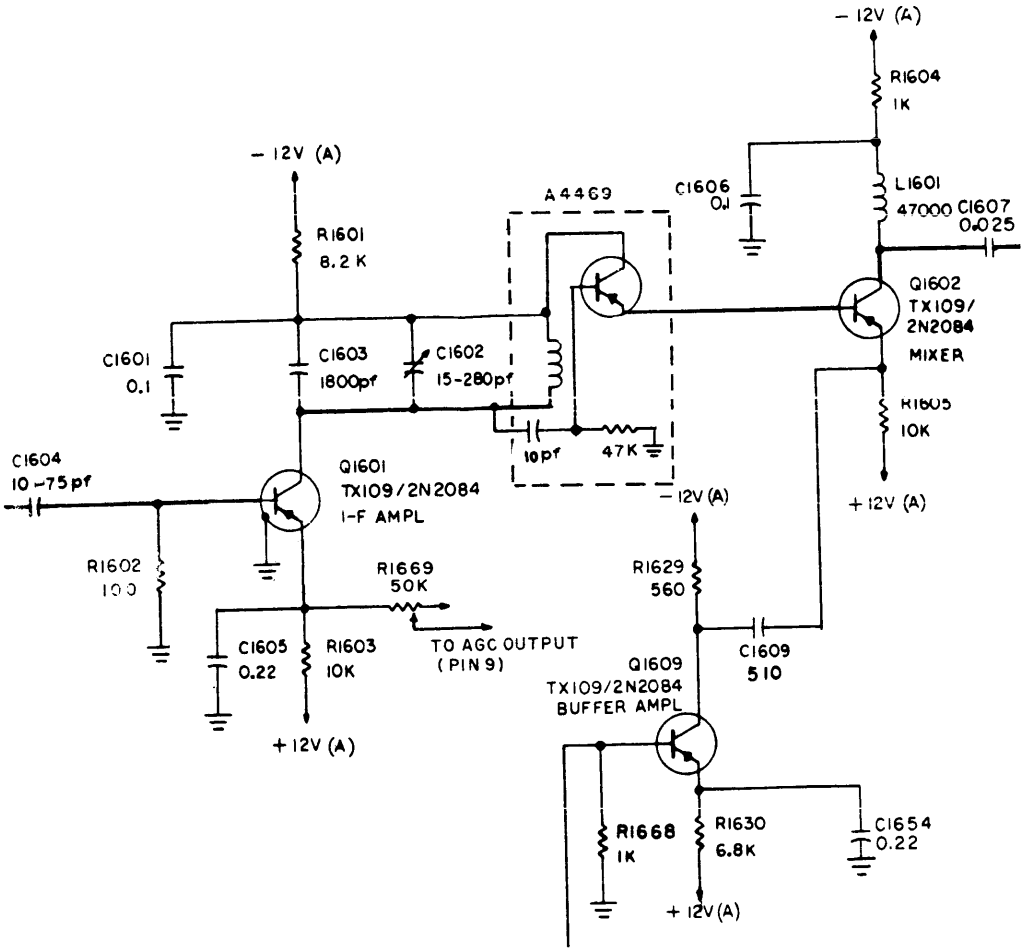
- 12V (A)
R1604
1K
L1601
47000
C1607
0.025
C1606
0.1
A4469
R1601
8.2 K
C1601
0.1
C1603
1800pf
C1602
15-280pf
10pf
47K
Q1602
TX109/
2N2084
MIXER
R1605
10K
+12V (A)
C1604
10-75pf
Q1601
TX109/2N2084
I-F AMPL
- 12V (A)
R1602
100
R1669
50K
TO AGC OUTPUT
(PIN 9)
R1629
560
C1609
510
C1605
0.22
R1603
10K
Q1609
TX109/2N2084
BUFFER AMPL
+12V (A)
R1668
1K
R1630
6.8K
C1654
0.22
+12V (A)

Figure 1.

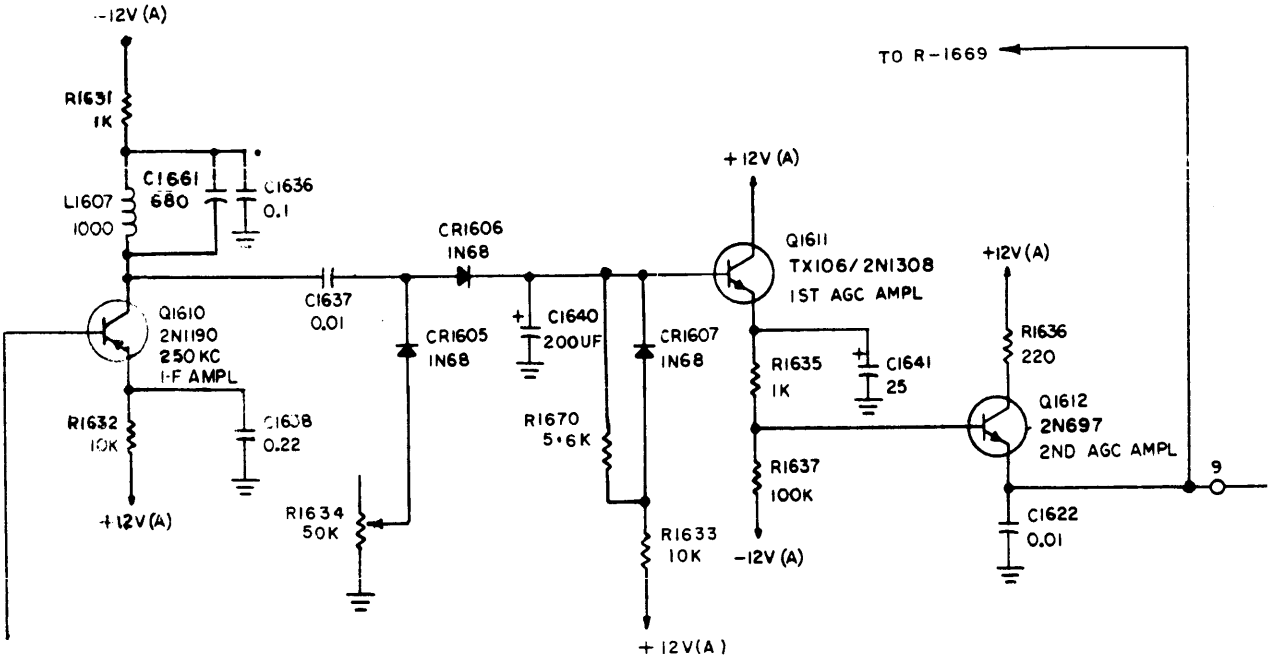
-12V (A)
R1631
1K
C1661
680
C1636
0.1
L1607
1000
Q1610
2N1190
250 KC
I-F AMPL
C1637
0.01
CR1606
IN68
CR1605
IN68
C1640
200UF
CR1607
IN68
+12V (A)
Q1611
TX106/2N1308
1ST AGC AMPL
R1635
1K
C1641
25
R1637
100K
-12V (A)
TO R-1669
+12V(A)
R1636
220
Q1612
2N697
2ND AGC AMPL
9
C1622
0.01
R1632
10K
C1638
0.22
+12V(A)
R1634
50K
R1670
5.6K
R1633
10K
+12V(A)

Figure 2.

CHAN E N . 2 STR-1

INSTRUCTION BOOK CHANGE NOTICE

Date 12-20-66

Manual affected: Sideband Strip Receiver Model STR-1 IN -3014
Revised: 1 April 1965

1. Page 1-2. Technical Specifications

Change entry for AGC to read as follows:

AGC: With 100 db change in input signal from 1 microvolt the output will not vary more than 10 db.

SHOULD ADDITIONAL COPIES OF THIS CHANGE NOTICE BE REQUIRED, PLEASE CONTACT:
THE TECHNICAL MATERIEL CORP., 700 Fenimore Road, Mamar neck, New York
Attn.: Director of Eng. Services.

RECORD OF CORRECTIONS MADE

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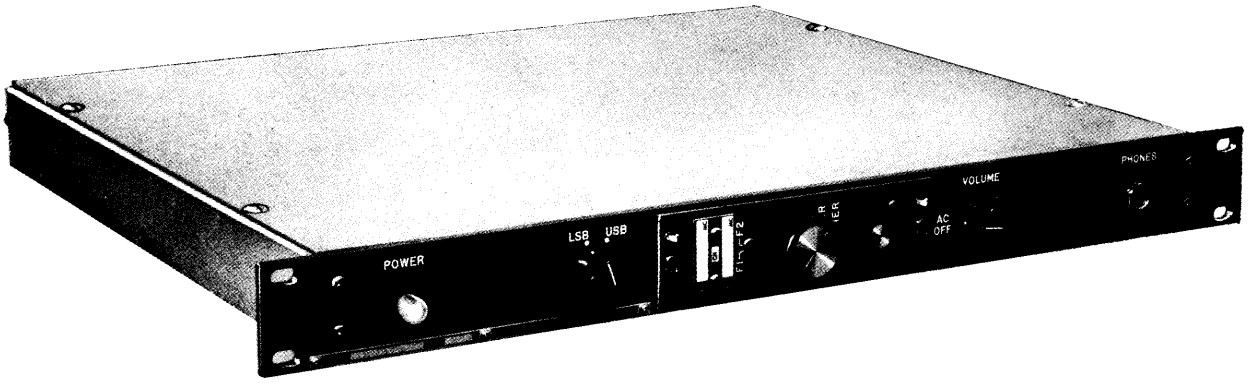


Figure 1-1. Sideband Strip Receiver, Model STR-1

SECTION 1
GENERAL INFORMATION

1-1. FUNCTIONAL DESCRIPTION.

Sideband Strip Receiver, Model STR-1 (figure 1-1) is a completely transistorized superheterodyne single-sideband communications receiver, operating in the 2- to 32-megacycle frequency range.

The STR-1 is designed for single-sideband reception of AME (amplitude modulation equivalent), CW (continuous wave), MCW (modulated continuous wave), FAX (facsimile), and FSK (frequency shift keying) signals. Further, it is capable of receiving one sideband of AM (amplitude modulation) or ISB (independent sideband) transmission.

NOTE

Converter equipment is required to process FSK and FAX signals.

The STR-1 uses one of four fixed-tuned, plug-in modules (Model TTRR) for its r-f section. This r-f module has two selectable, crystal-controled, local-oscillator frequencies that permit reception of either of two signal frequencies (F1 or F2) within the r-f bandpass of the TTRR without realignment of the tuned circuits. Other features of the STR-1 include:

a. High sensitivity for good reception under weak signal condition.

b. A sharp cutoff bandpass filter for optimum selectivity.

c. Double i-f frequency conversion for a high image ratio.

d. Manual selection of LSB or USB reception.

e. An adjustable squelch circuit that mutes the audio output (except for the 600-ohm line output) when no input signal is being received. This circuit also provides an external output (for alarm purposes) to indicate that the receiver is squelched.

f. Low voltage power supply requirement.

g. Compact, lightweight construction.

The receiver produces two separate audio outputs. These are 500 milliwatts into 4 ohms for speaker or front panel phone jack, and 1 milliwatt into a 600-ohm balanced load. The speaker and earphone output levels can be varied by means of a VOLUME control. The speaker is automatically disconnected when the phone jack is used.

Performance specifications and other reference data for the STR-1 are given in paragraph 1-3. Table 1-1 lists the equipment supplied with the STR-1.

1-2. PHYSICAL DESCRIPTION.

a. EXTERNAL. - The STR-1 is designed for mounting on a standard 19-inch rack. It has protective covers on both top and bottom. All of the operator's controls are located on the front panel. These are described in table 3-1 and illustrated in figure 3-1. A terminal board mounted to the rear panel provides for output connections. A BNC connector is provided for connecting the antenna. In addition, the rear panel contains the power input connector, the line fuse, and the SQUELCH adjustment. Figure 2-2 illustrates the rear panel components.

b. INTERNAL. - Most of the smaller components in the STR-1 are located on printed circuit boards that are mounted to the chassis. Refer to figure 5-1; there are three of these boards (i-f section, audio section, and power supply) not including those in the TTRR- modules. The larger components of the receiver are chassis mounted.

The semiconductor complement of the receiver is given in table 1-2.

1-3. TECHNICAL SPECIFICATIONS.

FREQUENCY RANGE:	2 to 32 megacycles divided into four bands using the following TTRR modules. BAND 1: 2-4 mc, TTRR-1 BAND 2: 4-8 mc, TTRR-2 BAND 3: 8-16 mc, TTRR-3 BAND 4: 16-32 mc, TTRR-4
TUNING SYSTEM:	Model TTRR fixed-tuned r-f plug-in module.
FREQUENCY CONTROL:	Crystal-controlled oscillators are employed.

1-3. TECHNICAL SPECIFICATIONS (CONT).

SIGNAL RECEPTION:	SSB (upper or lower sideband), AME, CW, MCW, FSK and FAX. One sideband of AM or ISB also possible.
SENSITIVITY:	1 microvolt input for 15 db signal plus noise-to-noise ratio.
AUDIO BANDWIDTH:	3 kc ±2 db between 300 and 3300 cps.
INTERMEDIATE FREQUENCY:	First i-f, 1.75 mc; second i-f, 250 kc.
IMAGE REJECTION:	A minimum of 50 db from 2 to 28 mc, a minimum of 40 db from 28 to 32 mc.
INTERMODULATION:	Intermodulation products are down a minimum of 40 db from PEP of a two-tone test with 100 microvolts at the antenna.
AGC:	With a 100 db increase in the signal input from 1 microvolt, the output level will not rise more than 6 db.
HUM AND NOISE LEVEL:	At least 40 db down from full output.
ANTENNA INPUT IMPEDANCE:	50 ohms (nominal) unbalanced.
AUDIO OUTPUT:	1. 500 milliwatts into 4 ohms for speaker or earphones. 2. 1 milliwatt into 600 ohms balanced line.
PRIMARY POWER INPUT:	104, 115, 208, or 230 volts a-c ±10%, 50/60 cps, single phase, 8 watts. If crystal ovens are used in the TTRR module, an additional 6 watts is required.
TEMPERATURE RANGE:	0°C (32°F) to 50°C (122°F).
DIMENSIONS:	15 inches long x 19 inches wide x 1-3/4 inches high.
WEIGHT:	10 pounds (uncrated).

TABLE 1-1. EQUIPMENT SUPPLIED.

NAME	DESIGNATION	FUNCTION	QUANTITY
Sideband strip receiver	STR-1	Communications receiver	1
Cable assembly*	CA-555-4	Ac power cord	1
Fanning strip	TM-105-9AR	Aid for rear-panel wiring	1
RF connector plug	UG/88U	Provides for coaxial cable connection to antenna jack	1

*This cable can be ordered with terminations other than the 115V polarized plug provided.

TABLE 1-2. SEMICONDUCTOR COMPLEMENT.

REFERENCE DESIGNATION	TYPE	FUNCTION
CR910, CR911, CR913 and CR914	1N547	Rectifiers
CR912 and CR915	1N3022B	Voltage references
CR1601 through CR1604	1N34A	Audio detector
CR1605 through CR1607	1N68	AGC detector
Q901	2N350A	-12 v series regulator
Q902	2N350A	+12 v series regulator
Q1601	2N2084	I-f amplifier
Q1602	2N2084	Mixer
Q1603 and Q1604	2N1370-4	1st audio amplifier
Q1605	2N2084	Buffer amplifier
Q1606	2N2084	Beat frequency oscillator
Q1607	2N2084	Lower sideband oscillator
Q1608	2N2084	Upper sideband oscillator
Q1609	2N2084	Buffer amplifier
Q1610	2N1190	I-f amplifier
Q1611	2N1308	1st agc amplifier
Q1612	2N697	2nd agc amplifier
Q1613	2N1370-4	2nd audio amplifier
Q1614 and Q1615	2N1370-4	3rd audio amplifier
Q1616 and Q1617	2N1032	Push-pull audio power amplifier
Q1618	2N1370-7	Line amplifier
Q1619 and Q1620	2N1370-4	Bistable amplifier
Q1621	2N2001	Relay driver

SECTION 2
INSTALLATION

2-1. UNPACKING AND HANDLING.

The STR-1 is shipped from the factory in a wooden crate to ensure maximum protection from damage in transit. The inside of the crate contains additional packing material to protect the unit not only from breakage due to shock, but also from the elements. The equipment supplied with the STR-1 (table 1-2) is packed in the box as loose items.

As soon as the receiver is unpacked, it should be visually inspected to make sure that it is not damaged. This examination should include the testing of each front-panel control. All of the covers on the unit should be removed, and the inside of the unit checked carefully for damaged components and loose items. With respect to damage to the equipment for which the carrier is liable, The Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

2-2. POWER REQUIREMENT.

The STR-1 can operate with 104 volts, 115 volts, 208 volts, or 230 volts a-c power. The receiver is normally shipped for operation with 115 vac ±10%. If the receiver is to operate from a power source other than 115 vac, the wiring of power transformer T902 must be modified. Figure 2-1 illustrates the wiring of T902 for each of the four input-power possibilities. It is recommended that a . 25 ampere fuse be used with 104 and 115 volts, and a . 125 ampere fuse be used with 208 and 230 volts.

2-3. INSTALLATION LAYOUT.

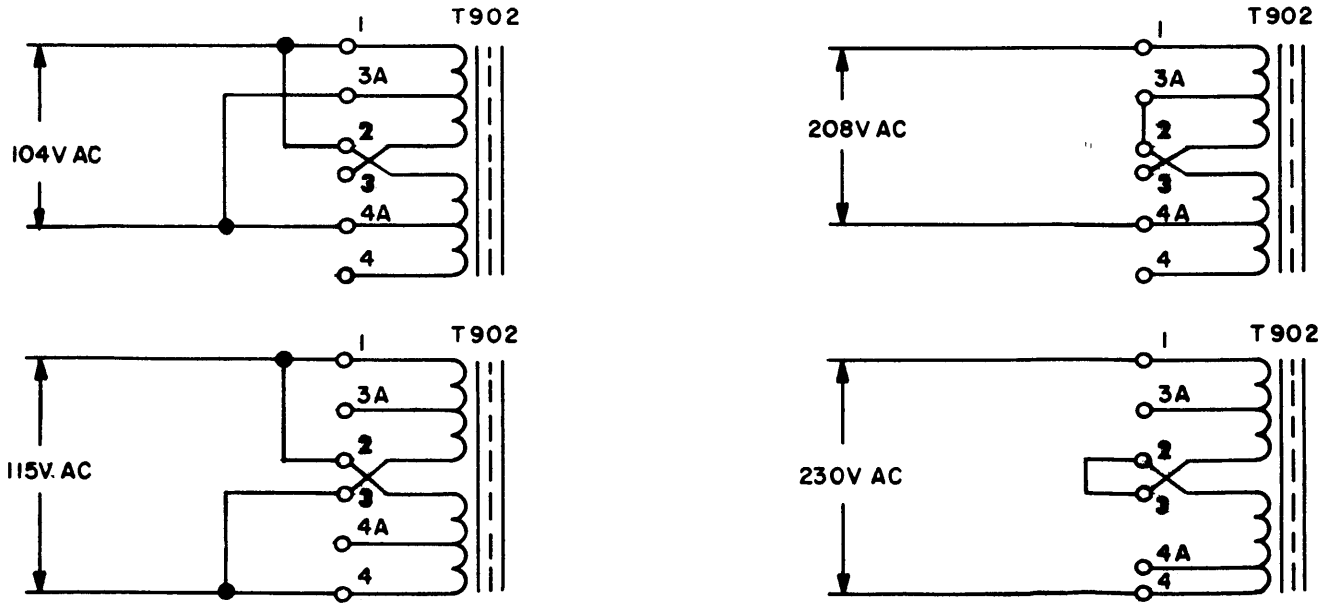
Before installing the STR-1, consideration must be given to its location. Two factors are important.

a. ACCESSIBILITY. - The STR-1 should be located so that its front-panel controls are accessible to an operator. Because its solid-state construction does not produce heat problems, several STR-1 receivers may be installed, one above the other in a stack.

b. INTERFERENCE. - To achieve the best possible operation of the STR-1 every attempt should be made to reduce rf interference from other equipment such as motor-generator sets.

2-4. INSTALLATION REQUIREMENTS.

The STR-1 requires a 50-ohm antenna with a coaxial cable lead in. The antenna is connected to the rear panel of the receiver, along with other necessary wiring. Figure 2-2 shows the input and output connections on the rear panel.



3014-2

Figure 2-1. Power Transformer Wiring

2-5. PERFORMANCE CHECK.

Immediately after the receiver has been installed it should be checked for proper operation. This test consists simply of attempting to receive a signal When a signal is received, the operation of each front panel control should be checked.

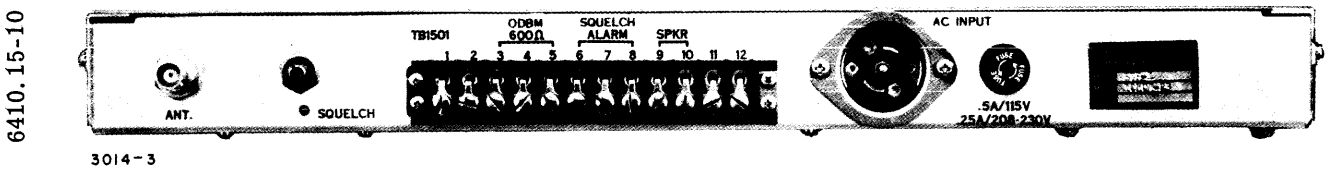


Figure 2-2. STR-1, Rear View

SECTION 3
OPERATOR'S SECTION

3-1. CONTROLS AND INDICATORS.

Before attempting to operate the STR-1, the operator should become familiar with the controls and indicators listed in table 3-1. These are shown in figure 3-1. The type and purpose of each control is described in the table. It is important to stress that these descriptions are not operating instructions. For specific operating instructions, see paragraph 3-2.

NOTE

The operating instructions for the TTRR module are included in this section as part of the overall operating procedure for the receiver.

TABLE 3-1. OPERATOR CONTROLS AND INDICATORS

CONTROL OR INDICATOR	DESCRIPTION
POWER indicator (DS1501)	A white indicator that lights when the VOLUME control is turned clockwise from AC OFF.
LSB/USB switch (S1503)	A two-position rotary switch that selects reception of either an LSB or USB signal.
F1/F2 switch (S101 in TTRR-1 S201 in TTRR-2 S301 in TTRR-3 S401 in TTRR-4)	A two-position screwdriver-controlled switch that selects appropriate local oscillator frequency for reception on either F1 frequency or F2 frequency.
RECEIVER CLARIFIER control (C121 in TTRR-1 C221 in TTRR-2 C321 in TTRR-3 C421 in TTRR-4)	A trimmer capacitor that permits fine tuning of the local oscillator in the TTRR module for optimum clarity of the audio output. This control can also be used as a pitch control for CW reception.
VOLUME control (S1512, R1546)	A SPST switch ganged to a potentiometer. The switch is the power on-off switch. The potentiometer controls the level of the audio output to the phones and speaker.
PHONES jack J1516	A standard phone jack for earphone connection. The speaker is automatically disconnected when a headset is plugged in. The line output is not affected.
SQUELCH control (R1547 at the rear of the receiver)	A potentiometer whose setting determines the point to which the rf input level must drop before the receiver is squelched. When the receiver is squelched the speaker and phone audio outputs are disconnected.

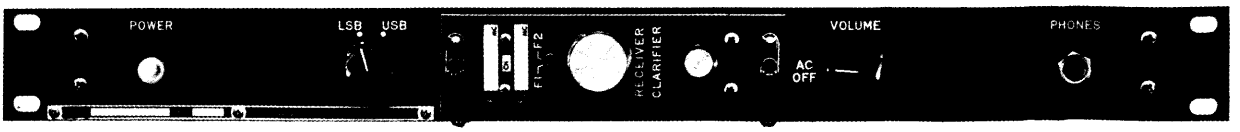


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Figure 3-1. Front View

3-2. OPERATING PROCEDURES.

a. TYPES OF RECEPTION. - The STR-1 can receive AME, CW, FSK, MCW, and SSB signals and also one sideband of AM and ISB transmission. All of the above signals are received as if they were SSB transmissions. Procedures for receiving each of the signals are given in the following paragraphs.

b. SSB RECEPTION (voice). - The following procedures describe the reception of voice signals that are transmitted as AME or SSB. It is possible also to receive any sideband of AM or ISB transmission using the same method.

NOTE

In the following procedures it is assumed that the F1 frequency of the TTRR module in the STR-1 is the same as the carrier frequency of the signal to be received.

(1) Set all operator's controls at positions given below.

CONTROL	SETTING
LSB/USB switch	Sideband to be received. If the sideband to be received is not known, set at USB.
F1/F2 switch	F1
RECEIVER CLARIFIER control	Desired setting
VOLUME control	Fully counterclockwise, but not at AC OFF.

(2) Turn VOLUME control clockwise until comfortable signal level is obtained.

NOTE

If no signal is obtained, reduce the volume and set LSB/USB switch at LSB. Repeat step (2) above.

(3) Adjust RECEIVER CLARIFIER control for maximum voice clarity.

c. SSB RECEPTION (CW and MCW). - CW and MCW signals are received in exactly the same manner as SSB (voice) signals (paragraph b.). For these signals, however, the RECEIVER CLARIFIER control is used to vary the pitch of the audio tone.

NOTE

In CW operation, the receiver channel frequency (F1 or F2) must be displaced slightly (300- to 3300-cps) from the transmitted signal.

d. SSB RECEPTION (FAX). - In receiving facsimile, the setting of the RECEIVER CLARIFIER control is critical. Follow the procedure given below to tune the receiver for FAX.

(1) Turn receiver on and set controls as given in paragraph 3-2b, steps (1) and (2).

(2) Connect audio output of receiver to vertical input of an oscilloscope.

(3) Connect an audio oscillator to horizontal input of oscilloscope.

(4) Set oscillator frequency at 1500 cps.

(5) Adjust RECEIVER CLARIFIER control to obtain a (1:1) Lissajous pattern. This corresponds to the white or black areas of the picture, depending upon positive or negative reception.

NOTE

A similar pattern, corresponding to the other limit of shift of the picture, will be obtained if the oscillator frequency is set at 2300 cps.

e. SSB RECEPTION (FSK). - In receiving frequency shift keying, the setting of the RECEIVER CLARIFIER control is critical. The procedure given below is one method of tuning the receiver for FSK reception. Most FSK converters have built-in indicating devices that allow accurate receiver tuning without the necessity for an external scope and oscillator.

(1) Turn receiver on and set controls as given in paragraph 3-2b, steps (1) and (2).

(2) Connect audio output of receiver to vertical input fo an oscilloscope.

(3) Connect an audio oscillator to horizontal input of oscilloscope.

(4) Set oscillator frequency at mark frequency. This frequency is generally 2125 cps, but another is sometimes specified.

(5) Adjust RECEIVER CLARIFIER control to obtain an intermittent, but circular (1:1) Lissajous pattern. This corresponds to a mark.

NOTE

A similar pattern can be obtained if the oscillator is set at the space frequency (generally 2975 cps).

3-3. CHANGING TTRR MODULES.

(1) Deenergize receiver.

(2) Slide catches on each end of module downward to release module.

(3) Pull module out of receiver. A knob is provided in the center of the module for this purpose.

(4) Insert new module with its nameplate facing LSB/USB switch.

(5) Slide module into receiver.

(6) Slide catches located on each end of module upward to lock module in place.

SECTION 4
PRINCIPLES OF OPERATION

4-1. GENERAL.

This section explains the principles of operation of the Sideband Strip Receiver STR-1. Accessory equipment is not described in this manual. In addition, the TTRR module is discussed only to the extent necessary to describe its operation in the STR-1. For further information concerning any of the TTRR modules, refer to the appropriate TTRR manual.

4-2. CIRCUIT ANALYSES. (See figure 4-1.)

a. COVERAGE. - Most of the circuits in the STR-1 are standard circuits that can be easily recognized on the schematic diagram (figure 7-1). For this reason, the principles of operation of the STR-1 are discussed on a block diagram level, with detailed analysis provided only for the circuits that are unusual, complex, or not immediately evident from the schematic diagram. Where detailed analysis is presented the schematic diagram is referenced.

b. THEORY.

(1) GENERAL. - The STR-1 is primarily a single sideband receiver, and all signals received by it are treated as SSB transmissions. The STR-1 is designed to receive AME, CW, FAX, FSK, MCW, and SSB. However, it can also receive either one of the sidebands of AM and ISB.

(2) TTRR PLUG-IN MODULE. - The r-f signals received by the antenna are supplied to the TTRR module through J1502. The TTRR module is fixed-tuned to a preselected frequency. The module contains three r-f amplifiers, a mixer, and a local oscillator that amplify the r-f signal and convert it to the first i-f frequency.

Figure 4-2 shows the input and the output of the TTRR module. Both sidebands are shown although only one might be received in actual practice. The bandwidth of the rf amplifiers is sufficient to pass both sidebands of a received signal (if both are present). The local oscillator is tuned 1.75 mc above the carrier frequency of the received signal. Thus, the spectrum of the received frequencies is inverted (the highest frequencies in the sideband(s) produce the lowest difference frequency) as shown in the illustration. The carrier frequency of the i-f output from the TTRR module is 1.75 mc.

(3) I-F AND MIXER STAGES. - The output of the TTRR module is the first of the two i-f frequencies used in the receiver. This signal is supplied through i-f amplifier Q1601 to mixer Q1602. The mixer is also supplied with the output of either the LSB oscillator (1.5 mc) or the USB oscillator (2.00 mc) depending upon the setting of the LSB/USB switch. Figure 4-2 shows the input and the two possible outputs of the mixer. If the LSB oscillator output is supplied to the mixer (250 kc below the carrier frequency of the i-f signal), the frequency spectrum of the input signal is not inverted. If the USB oscillator output is supplied to the mixer (250 kc above the carrier frequency of the i-f signal), the frequency spectrum of the input signal is inverted. Because the crystal filter passes only a band of frequencies above 250 kc, the selection of the desired sideband depends upon which oscillator output is supplied to the mixer.

LSB oscillator Q1607 (figure 7-1 sheet 2) and USB oscillator Q1608 are modified Colpitts oscillators. The LSB oscillator is tuned to exactly 1.5 mc by C1629. The USB oscillator is tuned to exactly 2.0 mc by C1631. The output of each oscillator is taken from its base. Only one oscillator is activated at a time depending upon the position of LSB/USB switch S1503. In the LSB position, +12 v is applied across LSB ADJ R1554. The positive voltage supplied by R1554 to the emitter of Q1607 forward biases Q1607. The USB oscillator transistor is not forward biased and is cutoff. The magnitude of the voltage determines the magnitude of the oscillator output; maximum output occurs when the oscillator is biased at its maximum gain point. In the USB position, Q1608 is forward biased, and the LSB oscillator is cutoff.

The output of the selected oscillator is supplied to mixer Q1602 through buffer amplifier Q1609, which minimizes the loading of the oscillator so that its frequency and output magnitude are stable. The output of the mixer is the second i-f frequency. It is supplied to crystal bandpass filter FL1601. This is a highly selective filter with a bandpass of 2.75 kc, which rejects frequencies below 250.25 kc and above 253.0 kc. Thus, only the sideband whose frequency range is above 250 kc will be passed by the filter, while all noise and signal frequencies outside of the selected sideband are eliminated. The output of the filter is supplied to two stages: detector CR1601-CR1604 and i-f amplifier Q1610 in the AGC circuit.

(4) DETECTOR AND BFO. - The detector receives the selected sideband and the output of bfo Q1606 (250 kc). Buffer amplifier Q1605 minimizes the loading of the bfo so that its frequency and output magnitude are stable. The i-f signal and the bfo output beat together in the detector to derive the audio information from the i-f signal. Note that since the carrier and bfo frequencies are 250 kc, any carrier

frequency that passes through the filter will be eliminated at the detector.

Bfo Q1606 (figure 7-1 sheet 2) is a modified Colpitts oscillator whose frequency is 250 kc. Its output is supplied through buffer amplifier Q1605 to potentiometer R1663. This adjustment is used to provide equal magnitudes of the bfo signal at the anodes of CR1601 and CR1604, which are the two input points to the detector. The detector consists of diode network CR1601 through CR1604.

The bfo signal controls the switching of the diode network. For positive half-cycles of the bfo signal, CR1601 and CR1604 are forward biased and CR1602 and CR1603 are reverse biased. For negative half-cycles of the bfo signal, CR1601 and CR1604 are reverse biased and CR1602 and CR1603 are forward biased. The balanced i-f signal from FL1601 is supplied to the detector through C1610 and C1611. The amplitude of the i-f signal is small compared to the bfo signal so that the bfo signal does not lose control of the diode switching.

Figure 4-3 shows idealized waveforms for the detector. For this illustration, the i-f signal is a constant frequency in the passband of the filter. The output shown is one of the two detector outputs that are 180° out-of-phase. Assume that the output shown is taken from the cathode of CR1601. Also, remember that the two i-f inputs to the detector are 180° out-of-phase. During the period between t1, and t2, the i-f input at the anode of CR1601 passes through CR1601 to the output. In this time, the i-f and bfo signals are in phase so that the entire positive half-cycle of the i-f signal plus a negligible portion of the negative half-cycle is passed by CR1601. The average value of the detector output is at its maximum positive value. Between t2 and t3, CR1602 passes the second half-cycle of the other i-f input, which is also positive. Because of the difference in frequencies, the i-f signal is slightly out-of-phase with the bfo signal. Slightly more of the negative half-cycle of the i-f is passed through CR1602 than was passed through CR1601. Thus, the average value of the output is less than it was during t1 to t2. In subsequent half-cycles of the bfo signal, the average value of the detector output decreases to zero (between t4 and t5) and rises toward a negative maximum. This maximum occurs during t7 and t8 where the bfo and i-f signals are exactly 180° out-of-phase and the i-f signal is negative. After t8, the average value of the output decreases to zero and then rises to another positive maximum. This maximum occurs between t14 and t15 where the bfo and i-f signals are in phase again. The variation of the average value of the output produces an audio output whose frequency is the difference between the i-f frequency and the bfo frequency.

The bfo signal does not contribute to the output of the detector because it appears at the output as a sine wave whose average value is always zero. The detector output is filtered by C1613 and C1614 to remove the i-f and bfo components from the audio signal. The output of the detector is supplied to the first audio amplifier.

(5) AUDIO AMPLIFIERS. - First audio amplifier Q1603 and Q1604 converts the balanced input from the detector to a single-ended signal, and amplifies it. This signal is developed across VOLUME control R1546, and is also supplied to line amplifier Q1618. The line amplifier supplies the balanced 600-ohm line output. The signal level determined by the setting of the VOLUME control is further amplified by second audio amplifier Q1613, third audio amplifier Q1614 and Q1615, and push-pull audio power amplifier Q1616 and Q1617. The third audio amplifier is a differential amplifier that converts the single ended signal to a balanced signal for the push-pull amplifier. The output of the push-pull amplifier is supplied through a contact of squelch relay K1601 (when K1601 is energized) to the 4-ohm speaker terminals and to the phone jack. The phone jack is wired so that if phones are used, the speaker terminals are disconnected from the audio amplifiers.

(6) AGC AND SQUELCH CIRCUITS. - I-f amplifier Q1610 amplifies the output of crystal filter FL1601. Agc detector CR1605-CR1609 produces a delayed agc voltage, which is supplied through first and second agc amplifiers Q1611 and Q1612 to the TTRR module and to the squelch circuit.

Bistable amplifier Q1619 and Q1620 controls relay driver Q1621, which in turn controls squelch relay K1601. When a signal is being received by the STR-1, the bistable amplifier is held in its unsquelched state (Q1619 is on*, Q1620 is off*) by the agc voltage and the relay driver is on. When the signal level decreases, the agc voltage drops. At a point selected by SQUELCH control R1547, the bistable amplifier changes to its squelched state and the relay driver turns off.

When the relay driver is on, K1601 is energized, and the output of the audio power amplifier is connected to the phone jack and speaker. When the relay driver is off, K1601 is deenergized, and the output of the audio power amplifier is disconnected from the speaker and phone jack and is connected instead to dummy load R1660. Thus, the receiver output is muted when a received signal is not present and only noise is being generated by the receiver. The other set of contacts of K1601 can be used to provide squelched and non-squelched indications for external alarm circuitry.

(7) POWER SUPPLY. - The power supply produces regulated +12 vdc and -12 vdc outputs for the operation of the STR-1. It also produces an unregulated 115-vac output for the operation of a crystal oven in the TTRR module if an oven is used. The power supply is energized by switch S1512, which is ganged to VOLUME control R1546.

*"on" - transistor conducts
"off" - transistor does not conduct

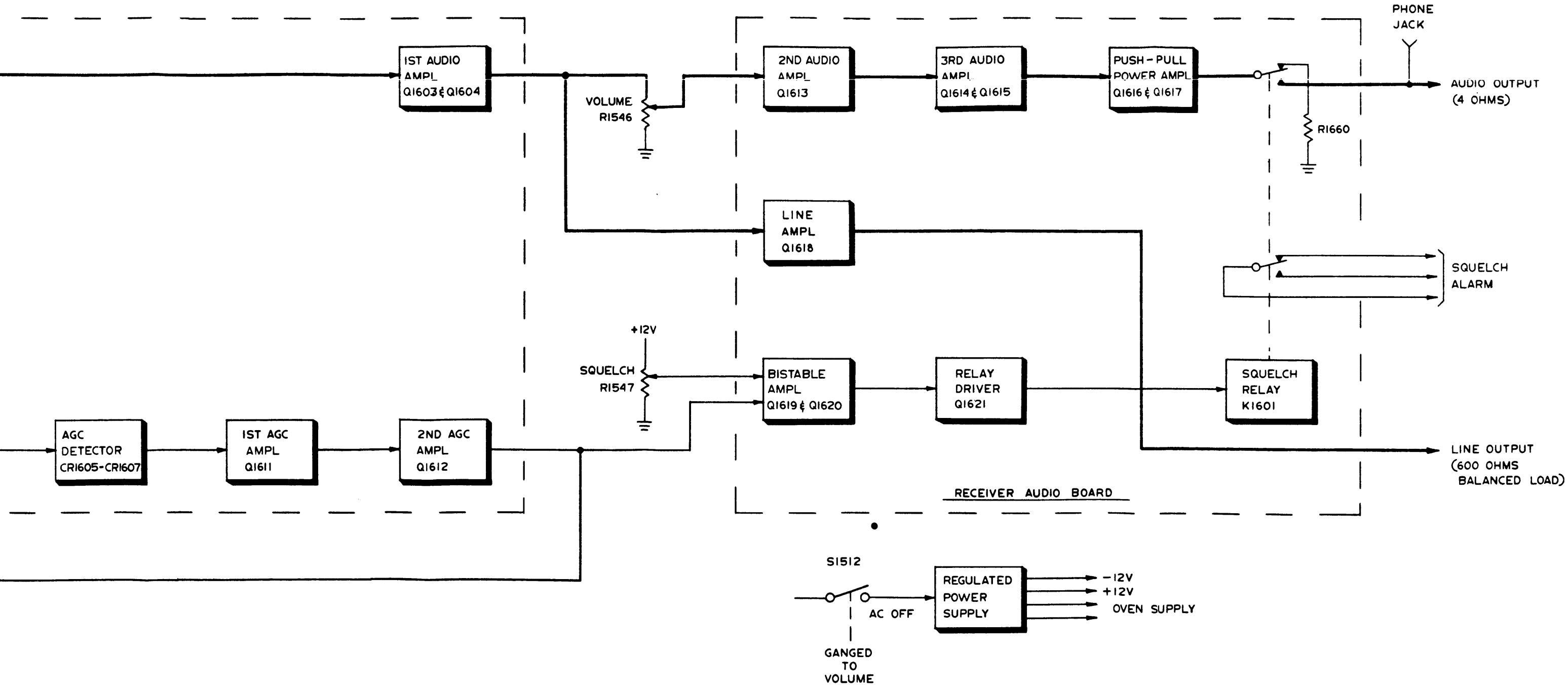
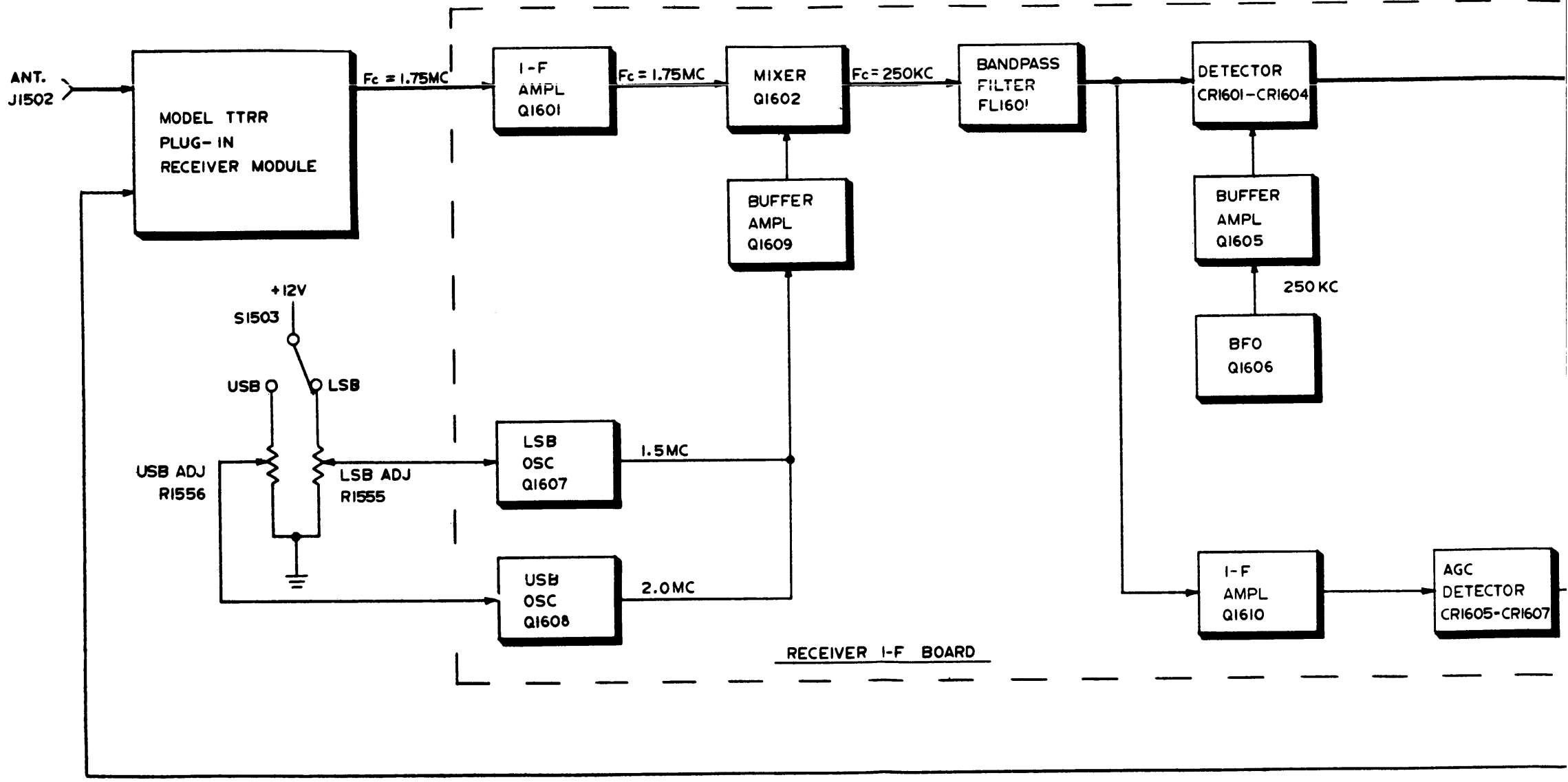


Figure 4-1. STR-1, Block Diagram


ANT.
J1502
MODEL TTRR
PLUG-IN
RECEIVER MODULE
Fc = 1.75MC
I-F
AMPL
Q1601
Fc = 1.75MC
MIXER
Q1602
Fc = 250KC
BANDPASS
FILTER
FL1601
DETECTOR
CR1601-CR1604
BUFFER
AMPL
Q1609
BUFFER
AMPL
Q1605
250 KC
BFO
Q1606
+12V
S1503
USB
LSB
USB ADJ
R1556
LSB ADJ
R1555
LSB
OSC
Q1607
1.5MC
USB
OSC
Q1608
2.0MC
I-F
AMPL
Q1610
AGC
DETECTOR
CR1605-CR1607
RECEIVER I-F BOARD

3014-5

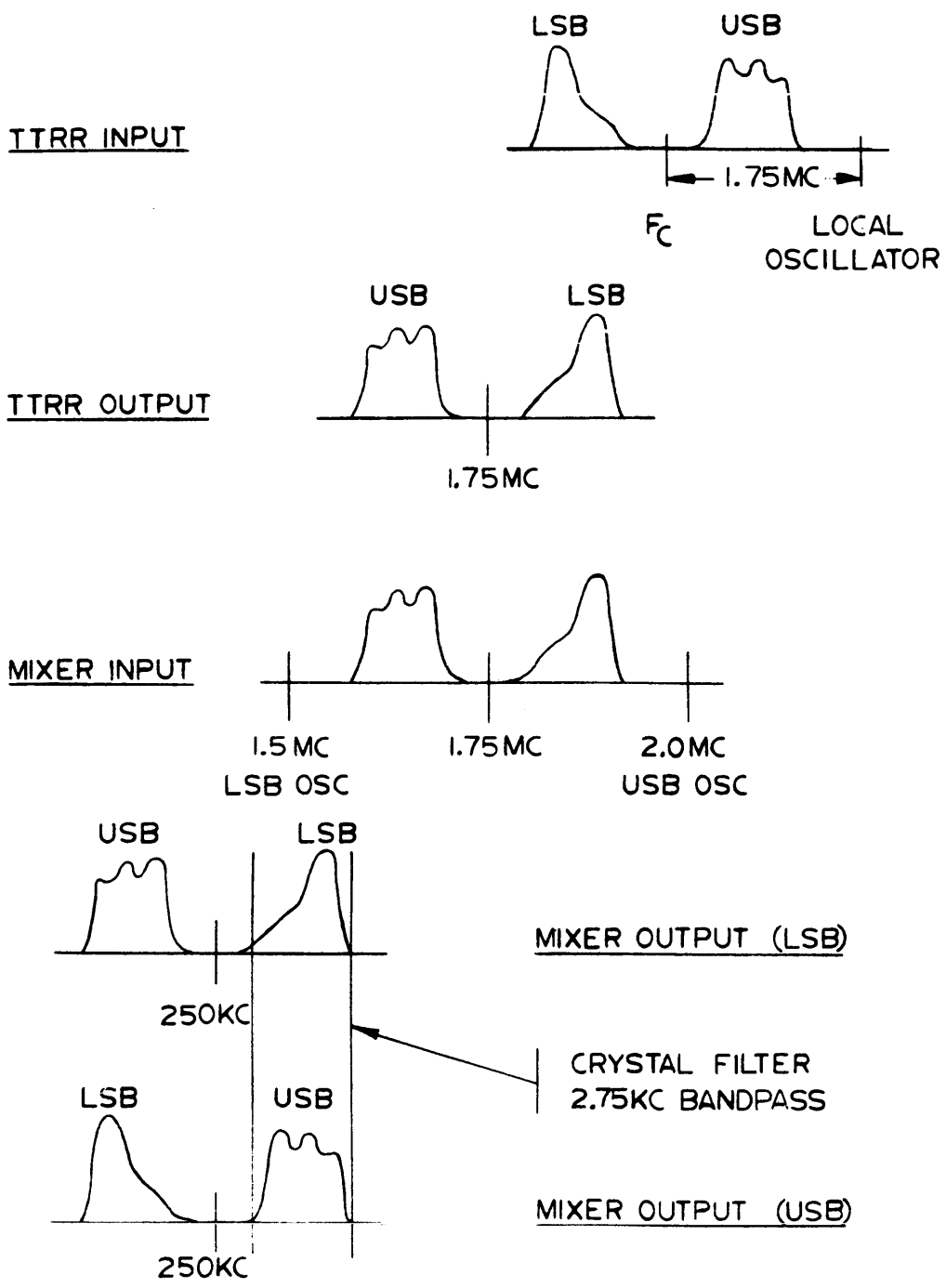


Figure 4-2. Frequency Inversion in SSB Reception

NOTES

1. THE I-F SIGNAL HAS BEEN ENLARGED FOR CLARITY.
2. ONLY ONE HALF OF THE OUTPUT IS SHOWN.

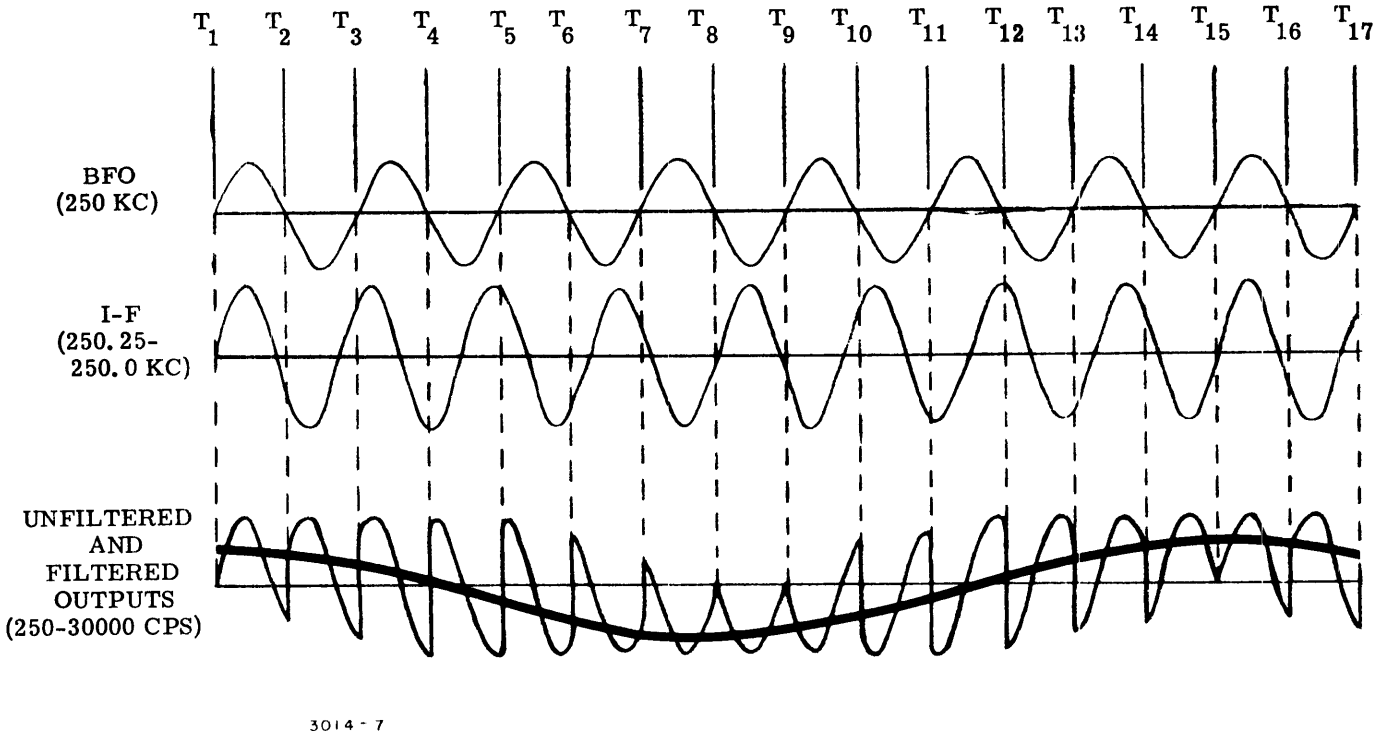


Figure 4-3. Demodulator, Idealized Forms

SECTION 5
MAINTENANCE

5-1. PREVENTIVE MAINTENANCE.

Preventive maintenance of the STR-1 consists of routine visual inspection and cleaning. Cleaning is necessary, because dust may accumulate on certain components and not only reduce the efficiency of the receiver, but also increase component wear. Either a vacuum cleaner or a compressed air hose is the quickest and most effective method of cleaning the unit.

Visually checking the unit when it is opened for cleaning can prevent downtime due to component failure. Often a deteriorating component will look bad before it actually affects the operation of the unit. Some indications of trouble are: discolored components, leaking transformers and capacitors, dirty or pitted switch and relay contacts, warped printed circuit boards, and damaged wiring. Any components found in this condition should be replaced. In addition, all hardware should be checked for tightness.

5-2. CORRECTIVE MAINTENANCE.

Corrective maintenance consists of procedures designed to correct problems that have resulted in the failure of the receiver to operate properly. Sometimes, corrective maintenance will consist only of the replacement of a defective component. Generally, however, it will include troubleshooting, repair, and alignment. These three phases of corrective maintenance are discussed individually in the following paragraphs. Figures 5-1, 5-2, and 5-3 show the location of each of the transistor stages and adjustments in the receiver.

a. TROUBLESHOOTING.

(1) GENERAL TROUBLESHOOTING NOTES. - The troubleshooting procedures given below are intended only to indicate a logical approach to locating sources of trouble in the receiver. This general procedure is supported by specific troubleshooting data to permit pinpointing a faulty component.

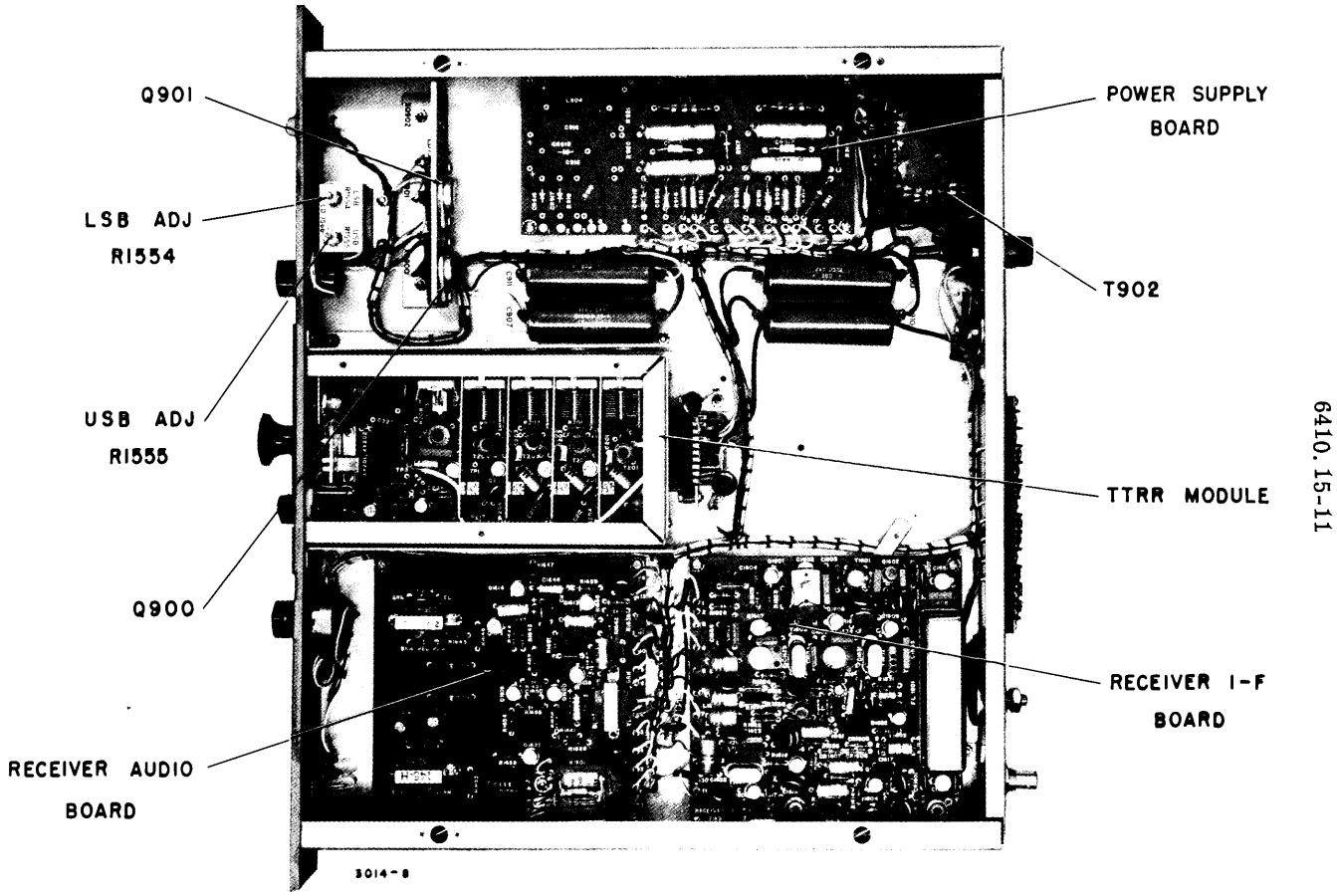
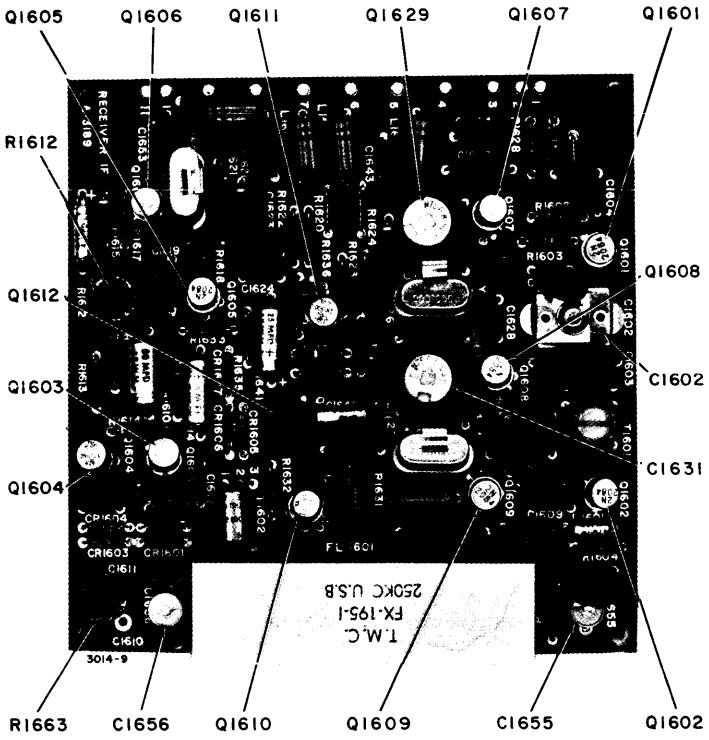


Figure 5-1. Top View of Chassis, Parts Location



6412.16-6

Figure 5-2. Receiver I-F Board, Top View

NOTE

Specific troubleshooting data for TTRR modules are not contained in this manual. Such data is provided in the manual of the particular r-f module in use.

The following steps should be taken when the STR-1 fails to operate properly.

(a) Check +12 v and -12 v outputs of the power supply.

NOTE

If the POWER indicator on the front panel does not light, check the fuse first.

(b) Supply simulated LSB signal to receiver as follows:

1. Disconnect antenna from J1502 and external wiring from TB1501.

2. Connect 4-ohm speaker across terminals 9 and 10 of TB1501.

3. Connect 600-ohm, 1-watt resistor across terminals 3 and 5 of TB1501.

4. Connect rf signal generator, Hewlett Packard Model 606A or equivalent, to ANT. jack J1502.

5. Set generator frequency at 1 kc below F1 frequency given on nameplate of TTRR module. This signal input corresponds to a lower sideband tone of 1 kc.

6. Set generator output at 1 millivolt.

(c) Select LSB operation of receiver.

(d) Check for signals at key points in receiver. Use Hewlett Packard Model 524C frequency counter or equivalent in parallel with Tektronix Model 545 oscilloscope or equivalent for ac measurements. Use Simpson Model 260 multimeter or equivalent for dc measurements. Use standard troubleshooting techniques and data given in paragraphs (2), (3) and (4) to isolate defective components.

1. Check input to receiver i-f board on terminal 1. The frequency of the signal at this point should be approximately 1.751 mc. Its amplitude should be approximately .07 volts peak-to-peak. If these readings are not obtained, either the TTRR module is defective or the agc voltage is incorrect. Check agc voltage as in step 3 below. If the agc voltage is low and the signal is high or the agc voltage is high and the signal is low, the agc circuit on the receiver i-f board is defective. If the signal level is low and the agc voltage is also low, the TTRR module is defective.

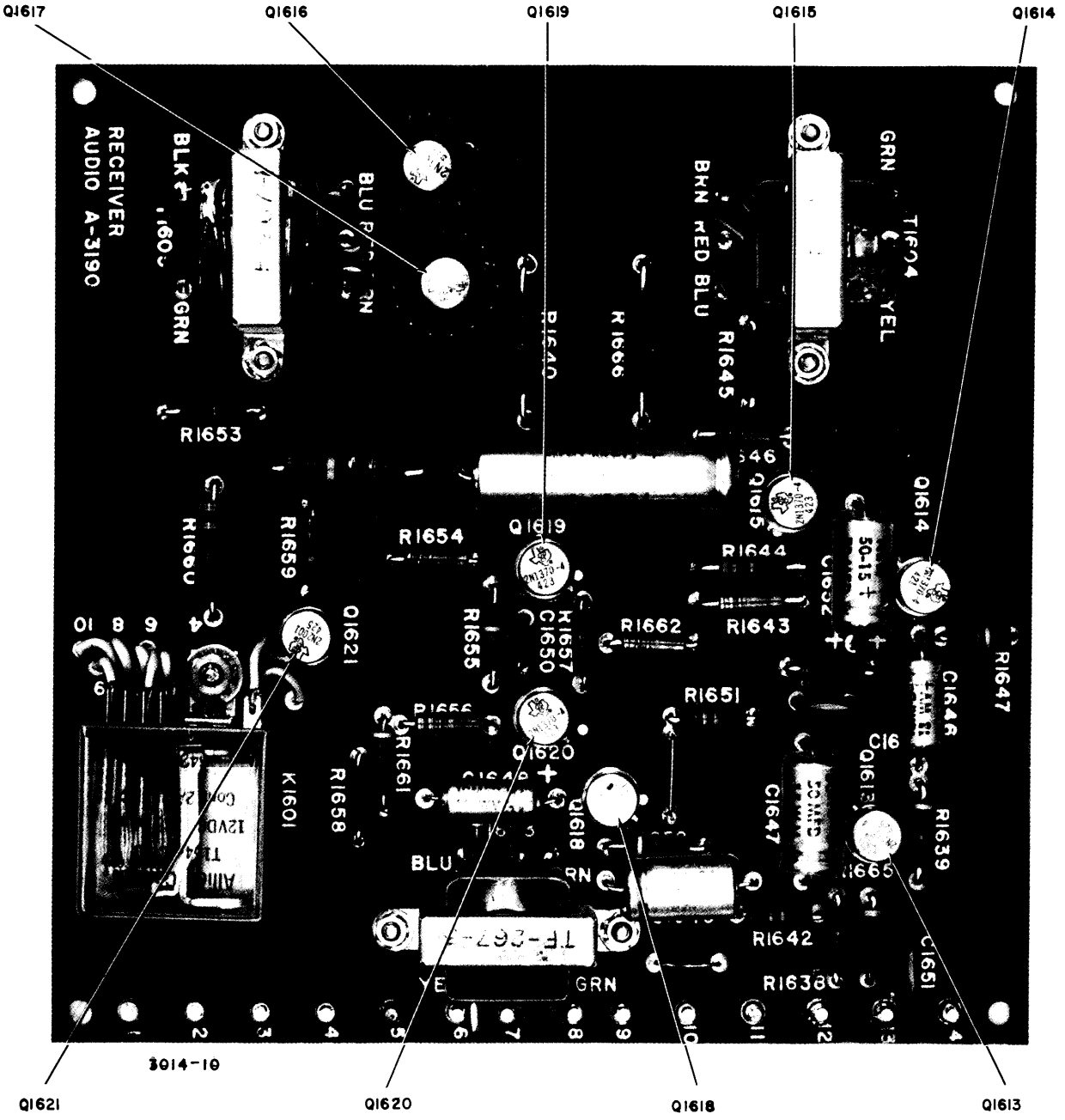


Figure 5-3. Receiver Audio Board, Top View

6412.16-3

2. Check output of receiver i-f board on terminal 11. The frequency of the signal at this point should be approximately 1 kc. Its amplitude should be approximately .16 volts peak-to-peak. If these readings are not obtained, set the generator frequency 1 kc above F1 and select USB operation of receiver. If the output of the receiver i-f board is now correct, the LSB oscillator is defective. If the output is not correct, another circuit on the receiver i-f board is defective.

3. Check agc voltage on terminal 9 of receiver i-f board. It should be approximately 1.8 vdc. If this reading is not obtained, the agc circuit on the receiver i-f board is defective.

4. Check output of receiver audio board at terminal 5. The frequency at this point should be approximately 1 kc. The amplitude of the waveform (with the VOLUME control fully clockwise) should be approximately 8.4 volts peak-to-peak. If these readings are not obtained, the receiver audio board is defective.

(2) VOLTAGE MEASUREMENTS. - Table 5-1 gives voltage readings for all of the transistor stages in the receiver, except for the TTRR module. These readings were taken with a Hewlett Packard vacuum tube voltmeter Model 410B. All of the readings were taken with respect to ground.

NOTE

No resistance measurements are provided, because the use of an ohmmeter on transistorized circuits might damage the components.

(3) I-F GAIN MEASUREMENTS. - For i-f stage gain measurements, connect a Hewlett Packard Model 606A rf signal generator to terminal 1 of the receiver i-f board. Set the generator frequency at 1.751 mc and its output at 260 microvolts. Remove the TTRR module from the receiver. Set the LSB/USB switch at LSB. The gain measurements are taken with a Ballantine Model 314 ac vacuum tube voltmeter. The gain of Q1601 is approximately 50 db. The gain of Q1610 is approximately 38 db.

(4) AF GAIN MEASUREMENTS. - For the audio stage gain measurements connect a Hewlett Packard Model 606A rf signal generator to terminal 1 of the receiver i-f board. Set the generator frequency at 1.751 mc and its output at 260 microvolts. Remove the TTRR module from the receiver. Set the LSB/USB switch at LSB, and the VOLUME control fully clockwise. The gain measurements are taken with a Ballantine Model 314 ac vacuum tube voltmeter. The following are the approximate stage gains:

Q1604	7 db
Q1613	40 db
Q1614	12 db
Q1615	16 db
Q1616	16 db
Q1616	1 db
Q1617	16 db
Q1618	28 db

TABLE 5-1. VOLTAGE MEASUREMENTS

SECTION	TRANSISTOR NO.	TYPE	PURPOSE	BASE	EMITTER	COLLECTOR
	Q1601	2N2084(PNP)	IF AMP	0	+.4	-11
	Q1602	2N2084(PNP)	Mixer	0	+.2	-11
I-F	Q1603	2N1370-4(PNP)	Bal Mod	0	+.25	-11
	Q1604	2N1370-4(PNP)	Bal Mod	0	+.25	-6
	Q1605	2N2084(PNP)	Buffer	+.2	+.5	-7
	Q1606	2N2084(PNP)	250KC OSC	+.2	+.4	-5.5
	Q1607	2N2084(PNP)	LSB OSC	0	+.3	-11
	Q1608	2N2084(PNP)	USB OSC	0	+.3	-11
	Q1609	2N2084(PNP)	Buffer	0	+.32	-11
	Q1610	2N1190(PNP)	250KC AMP	0	+.2	-11
	Q1611	2N1308(NPN)	1st AGC	0	+4.5	+12
	Q1612	2N697(NPN)	2nd AGC	0	+4.2	+12
	Q1613	2N1370-4(PNP)	Phase Inv	+.2	+.35	-6.5
Audio	Q1614	2N1370-4(PNP)	Push-Pull	+.15	+.25	-12
	Q1615	2N1370-4(PNP)	2nd Audio	0	+25	-12
	Q1616	2N1039(PNP)	Push-Pull	+12	+12	-12
	Q1617	2N1039(PNP)	Output	+12	+12	-12
	Q1618	2N1370-4(PNP)	Line Amp	+.1	+.25	-10
	Q1619	2N1370-4(PNP)	Squelch Trig	+1.7/+2.5	+5.8/+9.5	-6.5/+12
	Q1620	2N1370-4(PNP)	Amp	+12	+12	-12
	Q1621	2N2001(PNP)	Relay Pr	+12	+12	-12
Power	Q900	2N350A(PNP)	Pos	-.18	0	-5
	Q901	2N350A)PNP)	Neg	-12	-12	-17

b. REPAIR. - In most cases, the repair of the STR-1 will consist of the replacement of an electrical component. Although no special instruction is required to accomplish this, the following hints are provided to ensure that the repairs are completed properly.

(1) Always replace a defective component with its exact duplicate.

(2) Always place a new component in the same position as the one it replaces. In general, never change the existing chassis layout, whether in the routing of wiring or component placement.

(3) Never use a soldering iron with a power rating of more than 100 watts. Use a pair of long nose pliers as a heat sink to protect components while soldering.

(4) Be extremely careful when replacing components on printed circuit boards. Excessive heat applied to a board might cause the printed wiring to lift off.

(5) Always double check any solder joints made. Cold or loose solder connections can cause trouble at a later time.

(6) When replacing a chassis mounted power transistor, always apply a coat of silicon grease to both sides of the mica washer that fits between the chassis and the body of the transistor.

c. ALIGNMENT.

(1) WHEN ALIGNMENT IS REQUIRED. - The receiver should be aligned whenever a general decline in its performance is observed. Alignment is also required when a component in an adjustable circuit is replaced. In general, alignment should be checked whenever repairs are made.

NOTE

Alignment of the TTRR plug-in module is not within the scope of this manual. Refer to the manual for the particular model TTRR used in your STR-1 if alignment is necessary.

(2) SEQUENCE OF ALIGNMENT PROCEDURES. - The alignment procedures given in paragraphs (5) through (10) are arranged to compensate for the interaction of adjustments. The alignment procedures must be performed in the order given. However, when a component is replaced in an adjustable circuit, it is necessary to perform the alignment only for that circuit and any of the procedures that depend upon the correct alignment of that circuit.

(3) TEST EQUIPMENT REQUIRED FOR ALIGNMENT. - The equipment listed below (or equivalent equipment) is required for alignment.

(a) Ac Vacuum Tube Voltmeter, Ballantine Model 314.

(b) Frequency Counter, Hewlett Packard Model 524C.

(c) Rf Signal Generator, Hewlett Packard 606A.

(d) A 4-ohm speaker.

(e) A 600-ohm, 1-watt resistor.

(4) PRELIMINARY OPERATIONS. - Follow the steps listed below before beginning to align the STR-1.

(a) Disconnect antenna from J1502.

(b) Disconnect all external wiring from TB1501.

(c) Connect 4-ohm speaker across terminals 9 and 10 of TB1501.

(d) Connect 600-ohm resistor across terminals 3 and 5 of TB1501.

(e) Remove TTRR module.

(f) Energize receiver. Allow it to warm up for 30 minutes before starting alignment.

(g) Set operator's controls at following positions before starting alignment.

NOTE

Because the operator's controls are preset in the same way before each alignment, individual procedures can be performed without referring to any others for previous control settings. Deviations from the preliminary settings are given in each procedure.

CONTROL	SETTING
LSB/USB	LSB
VOLUME	Fully clockwise
SQUELCH	Fully clockwise
F1/F2	F1
RECEIVER CLARIFIER	Any

(5) LSB OSCILLATOR FREQUENCY ADJUSTMENT.

NOTE

The operating controls of the TTRR module should be set at positions given below even though it is not in the receiver. The TTRR module is plugged in in the latter part of the alignment.

(a) Set receiver controls as in paragraph (4) step (g).

(b) Turn R1554 fully clockwise.

(c) Connect frequency counter to emitter of Q1602.

(d) Set C1629 so that counter reads 1.5 mc ±2 cps.

(6) USB OSCILLATOR FREQUENCY ADJUSTMENT.

(a) Set receiver controls as in paragraph (4) step (g).

(b) Turn R1555 fully clockwise.

(c) Set LSB/USB switch at USB.

(d) Connect frequency counter to emitter of Q1602.

(e) Adjust C1631 so that counter reads 2.0 mc ±2 cps.

(f) Set LSB/USB switch at LSB.

(7) DETECTOR BALANCE ADJUSTMENT.

(a) Set receiver controls as in paragraph (4) step (g).

(b) Connect vtvm between collector of Q1610 and ground.

(c) Adjust R1663 for a minimum reading (null) on the vtvm.

(8) I-F ALIGNMENT.

(a) Set receiver controls as in paragraph (4) step (g).

(b) Remove Y1603.

(c) Connect vtvm between base of Q1602 and ground.

(d) Turn R1612 fully counterclockwise.

(e) Connect rf generator between terminals 1 and 2 (generator output to terminal 1) on receiver i-f board.

(f) Set generator frequency at 1.75 mc. Use frequency counter to measure frequency accurately.

(g) Set generator output at 1.0 millivolt.

(h) Adjust C1602 to provide maximum vtvm reading obtainable.

(i) Set generator output at zero.

(j) Connect vtvm between terminals 10 and 11 (terminal 10 is ground) on the receiver i-f board.

(k) Insert Y1603.

(l) Set generator frequency at approximately 1.751 mc.

(m) Adjust generator output to obtain low reading on 10-mv scale of vtvm.

(n) Use the frequency counter to measure the frequency accurately, and adjust generator frequency to 1.751 mc.

(o) Adjust C1655 and C1656 (in that order) to provide maximum vtvm reading obtainable. If necessary, decrease generator output to keep vtvm reading on 10-mv scale.

(9) AUDIO GAIN ADJUSTMENT.

(a) Set receiver control as in paragraph (4) step (g).

(b) Connect rf generator between terminals 1 and 2 (generator output to terminal 1) on receiver i-f board.

(c) Set generator frequency at 1.751 mc. Use frequency counter to measure frequency accurately.

(d) Set generator output at 260 microvolts.

(e) Connect vtvm across 600-ohm resistor on TB1501.

(f) Adjust R1612 so that vtvm reads 780 millivolts.

NOTE

The TTRR module must be plugged in before either of the next two alignment procedures is started. Allow the module to warm up for 30 minutes before continuing with the alignment of the receiver.

(10) LSB OSCILLATOR OUTPUT ADJUSTMENT.

(a) Set receiver controls as in paragraph (4) step (g).

(b) Connect rf signal generator to ANT. jack J1502.

(c) Note F1 frequency that is given on nameplate of TTRR module. Subtract 1 kc from this frequency.

(d) Set generator frequency at value found in (c). Use frequency counter to measure frequency accurately.

(e) Connect frequency counter between terminals 1 and 2 (terminal 2 is ground) on receiver i-f board.

(f) Adjust RECEIVER CLARIFIER control so that counter reads 1.751 mc.

(g) Adjust generator output so that audio tone from speaker barely exceeds noise level.

(h) Adjust VOLUME control for comfortable listening level.

(i) Connect vtvm between terminals 9 and 10 (terminal 9 is ground) of TB1501.

(j) Turn R1554 fully counterclockwise.

(k) Rotate R1554 slowly clockwise until the vtvm reading is a maximum.

NOTE

If the F1 frequency is within 3 kc of being a multiple of 1.5 mc, beat notes might be heard from the speaker. If this is the case, continue to rotate R1554 clockwise; additional maximum points will be encountered. Set R1554 to achieve the maximum reading with minimum beat note interference.

(l) Turn VOLUME control fully clockwise.

(11) USB OSCILLATOR OUTPUT ADJUSTMENT.

(a) Set receiver controls as in paragraph (4) step (g).

(b) Connect rf signal generator to ANT jack J1502.

(c) Note F1 frequency that is given on the nameplate of TTRR module. Add 1 kc to this frequency.

(d) Set generator frequency at value found in step (c). Use frequency counter to measure frequency accurately.

(e) Connect frequency counter between terminals 1 and 2 (terminal 2 is ground) on receiver i-f board.

(f) Adjust RECEIVER CLARIFIER control so that counter reads 1.749 mc.

(g) Set LSB/USB switch at USB.

(h) Adjust generator output so that audio tone from speaker barely exceeds noise level.

(i) Adjust VOLUME control for comfortable listening level.

(j) Connect vtvm between terminals 9 and 10 (terminal 9 is ground) of TB1501.

(k) Turn R1555 fully counterclockwise.

(l) Rotate R1555 slowly clockwise until the vtvm reading is a maximum.

NOTE

If the F1 frequency is within 3 kc of being a multiple of 2.0 mc, beat notes might be heard from the speaker. If this is the case, continue to rotate R1555 clockwise; additional maximum points will be encountered. Set R1555 to achieve the maximum reading with minimum beat note interference.

(m) Turn VOLUME control fully clockwise.

(n) Set LSB/USB switch at LSB.

(12) SQUELCH ADJUSTMENT.

(a) Connect antenna to J1502.

(b) Select LSB or USB operation so that no signal will be received.

(c) Turn SQUELCH control R1547 slowly counterclockwise until noise in audio output abruptly disappears.

(d) Tighten locking nut.

NOTE

The alignment is now complete. Connect external wiring to TB1501.

SECTION 6
PARTS LIST

Reference designations have been assigned to identify all electrical parts of the equipment. These designations are used for marking the equipment (adjacent to the part they identify) and are included on drawings, diagrams and the parts list. The letters of a reference designation indicate the kind of part (generic group), such as resistor, capacitor, transistor, etc. The number differentiates between parts of the same generic group. Sockets associated with a particular plug-in device, such as transistor or fuse, are identified by a reference designation which includes the reference designation of the plug-in device. For example, the socket for fuse F907 is designated XF907. To expedite delivery, when ordering replacement parts, specify the TMC part number and the model number of the equipment.

MAIN CHASSIS ASSEMBLY AND FRONT PANEL

REF SYM	DESCRIPTION	TMC PART NO.
C900	Not used	
C901	Not used	
C902	Not used	
C903	Not used	
C904	Not used	
C905	Not used	
C906	Not used	
C907	CAPACITOR, FIXED, ELECTROLYTIC: 2,000 uf, 25 wvdc; polarized; hermetically sealed aluminum case with clear vinyl plastic sleeve.	CE116-5VN
C908	Refer to Power Supply Assembly.	
C909	Refer to Power Supply Assembly.	
C910	Same as C907.	
C911	Same as C907.	
C1500	Same as C907.	
C1501 thru C1545	Not used	
C1546	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10,000 uuf, gmv; 500 wvdc.	CC100-16
C1547	Same as C1546.	
C1548	Same as C1546.	
DS1500	Not used	
DS1501	LAMP, INCANDESCENT: single contact; rated for 28.0 vac/vdc, .04 amps; miniature T-3-1/4 bulb.	BI110-7

MAIN CHASSIS ASSEMBLY AND FRONT PANEL (CONT)

REF SYM	DESCRIPTION	TMC PART NO.
F900 thur F906	Not used	
F907	FUSE, CARTRIDGE: 1/4 amp; time lag; 1-1/4" lg. x 1/4" dia.; slow blow. (For 115 vac operation.)	FU102-.250
F907	FUSE, CARTRIDGE: 1/8 amp; time lag; 1-1/4" lg. x 1/4" dia.; slow blow. (For 208, 230 vac operation.)	FU102-.125
J900 thru J903	Not used	
J904	CONNECTOR, RECEPTACLE, ELECTRICAL: male; polarized; rated for 10 amps, 250 v or 5 amps, 125 v; midget size, twist lock.	JJ299
J1500	Not used	
J1501	Not used	
J1502	CONNECTOR, RECEPTACLE, ELECTRICAL: 1 round female contact; straight type; series BNC to BNC.	JJ172
J1503 thru J1510	Not used	
J1511	CONNECTOR, RECEPTACLE, ELECTRICAL: PC board; 20 female contacts, 5 amps continuous current rating; 600 vac rms.	JJ287-20
J1512 thru J1515	Not used	
J1516	JACK: phone.	JJ315-1
Q900	TRANSISTOR: geranium; base 50 v, emitter 40 v, dissipation 90 watts at 25°C; normal operating temperature -65°C to +100°C; load resistance 2.2 ohms, collector current 3 amps, base current 013 amps; 1.56" lg. x 1.05" wide x .32" high; male plug-in type.	2N350A
Q901	Same as Q900.	
R1500 thru R1518	Not used	
R1519	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, ±5%; 1/2 watt.	RC20GF102J
R1520 thru R1533	Not used	
R1534	RESISTOR, FIXED, COMPOSITION: 4,700 ohms, ±5%; 1/2 watt.	RC20GF472J

MAIN CHASSIS ASSEMBLY AND FRONT PANEL (CONT)

REF SYM	DESCRIPTION	TMC PART NO.
R1535 thru R1544	Not used	
R1545	RESISTOR, FIXED, COMPOSITION: 3.3 ohms, ±5%; 1 watt.	RC32GF3R3J
R1546	RESISTOR, VARIABLE, COMPOSITION: 5,000 ohms, ±10%; 2 watts; taper A; consists of a SPST, normally open switch, symbol no. S1512.	RV4NBYSA502AYY
R1547	RESISTOR, VARIABLE, COMPOSITION: 5,000 ohms, ±20%; 2 watts; taper A.	RV4LAYSA502B
R1548 thru R1553	Not used	
R1554	RESISTOR, VARIABLE, COMPOSITION: 50,000 ohms, ±10%; continuous power rating 0.5 watts at 70°; 350 v rms; linear taper.	RV106UX8B503A
R1555	Same as R1554.	
S1500 thru S1502	Not used	
S1503	SWITCH, ROTARY: tap; 1 deck, 2 non-shorting type contacts; AC current type; max. voltage 115 v; max. current switching capacity 1 amp resistive; 10 amps continuous current rating; solder lug type terminals.	SW336-1
S1504 thru S1511	Not used	
S1512	See R1548.	
T900	Not used	
T901	Not used	
T902	TRANSFORMER, POWER, STEP-DOWN: primary input 1 104-115v/208-230 vac; secondary (#1, 2) 24 volts at 300 ma, (#3) 80 volts at 100 ma, CT; 15 solder lug type terminals; open frame case.	TF298
TB1501	TERMINAL BOARD: barrier type; 12 terminals; 6-32 thd. x 1/4" lg. binder head screws; phenolic black bakelite.	TM100-12
XDS1500	Not used	
XDS1501	LIGHT, INDICATOR: with white translucent lens; sub-miniature type.	TS153-5
XF900 thru XF906	Not used	
XF907	FUSEHOLDER: extractor post type, movable end terminals.	FH100-1
XQ900	SOCKET, SEMICONDUCTOR DEVICE: 2 pin contact accommodation, .040 or .050 dia.; polarized; 1 terminal lug grounding strap; o/a dimensions 1-37/64" x 1" max.	TS166-S1
XQ901	Same as XQ900.	

RECEIVER IF

REF SYM	DESCRIPTION	TMC PART NO.
C1600	Not used	
C1601	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80%, -20%; 100 wvdc.	CC100-28
C1602	CAPACITOR, VARIABLE MICA DIELECTRIC: 280 uuf max. when tight, 25 uuf max. at 3 turns; 175 wvdc.	CV114-1
C1603	CAPACITOR, FIXED, MICA DIELECTRIC: 1,800 uuf, ±2%; 500 wvdc.	CM100-13
C1604	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: 10-75 uuf; operating temperature range -55°C to +85°C; 350 WVDC.	CV109-8
C1605	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 200,000 uuf, +80% -20%; 25 wvdc.	CC100-33
C1606	Same as C1601.	
C1607	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 25,000 uuf, +80% -20%; 500 wvdc.	CC100-25
C1608	CAPACITOR, FIXED, MICA DIELECTRIC: 68 uuf, ±5%; 500 wvdc; char. C.	CM15C680J
C1609	CAPACITOR, FIXED, MICA DIELECTRIC: 510 uuf, ±5%; 500 wvdc; char. B.	CM15B511J
C1610	CAPACITOR, FIXED, MICA DIELECTRIC: 180 uuf, ±2%; 500 wvdc; straight wire leads.	CM111D181G5S
C1611	Same as C1610.	
C1612	Same as C1607.	
C1613	Same as C1607.	
C1614	CAPACITOR, FIXED, ELECTROLYTIC: 25 uf, -10% +150% at 120 cps at 25°C; 15 wvdc; polarized; insulated tubular case.	CE105-25-15
C1615	CAPACITOR, FIXED, ELECTROLYTIC: 50 uf, -10% +150% at 120 cps at 25°C; 15 wvdc; polarized; insulated tubular case.	CE105-50-15
C1616	CAPACITOR, FIXED, ELECTROLYTIC: 4 uf, -10% +150% at 120 cps at 25°C; 15 wvdc; polarized; insulated tubular case.	CE105-4-15
C1617	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10,000 uuf, GMV, 500 wvdc.	CC100-16
C1618	Same as C1605.	
C1619	Same as C1605.	
C1620	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 5,000 uuf, gmv; 500 wvdc.	CC100-15
C1621	CAPACITOR, FIXED, MICA DIELECTRIC: 270 uuf, ±5%; 500 wvdc; char. C.	CM15C271J
C1622	Same as C1617.	

REF SYM	DESCRIPTION	TMC PART NO.
C1623	CAPACITOR, FIXED, MICA DIELECTRIC: 47 uuf, ±5%; 500 wvdc; char. C.	CM15C470J
C1624	Same as C1601.	
C1625	Same as C1601.	
C1626	Same as C1601.	
C1627	Same as C1621.	
C1628	Same as C1605.	
C1629	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: 8-50 uuf; operating temperature range -55°C to +85°C; 350 wvdc.	CV109-6
C1630	CAPACITOR, FIXED, MICA DIELECTRIC: 24 uuf, ±5%; 500 wvdc; char. C.	CM15C240J
C1631	Same as C1629.	
C1632	Same as C1630.	
C1633	Same as C1621.	
C1634	Same as C1605.	
C1635	Same as C1601.	
C1636	Same as C1601.	
C1637	Same as C1617.	
C1638	Same as C1605.	
C1639	Refer to Audio Frequency Receiver Assembly.	
C1640	CAPACITOR, FIXED, ELECTROLYTIC: 6 uf, -10% +150% at 120 cps at 25°C; 15 wvdc; polarized; insulated tubular case.	CE105-6-15
C1641	Same as C1614.	
C1642	Same as C1617.	
C1643	Same as C1601.	
C1644	Same as C1601.	
C1645	CAPACITOR, FIXED, MICA DIELECTRIC: 1,000 uuf, ±5%; 500 wvdc; char. F.	CM20F102J
C1646 thru C1652	Refer to Audio Frequency Receiver Assembly.	
C1653	Same as C1601.	
C1654	Same as C1605.	

RECEIVER IF (CONT)

REF SYM	DESCRIPTION	TMC PART NO.
C1655	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: 9-35 uuf; operating temperature range -55°C to +125°C; 100 wvdc.	CV112-2
C1656	Same as C1655.	
C1657	Same as C1601.	
C1658	CAPACITOR, FIXED, MICA DIELECTRIC: 10 uuf, ±5%; 500 wvdc; char. C.	CM15C100J
C1659	Refer to Audio Frequency Receiver Assembly.	
C1660	Refer to Audio Frequency Receiver Assembly.	
C1661	CAPACITOR, FIXED, MICA DIELECTRIC: 680 uuf, ±5%; 500 wvdc; straight wire leads.	CM111E681J5S
CR1600	Not used	
CR1601	SEMICONDUCTOR DEVICE, DIODE: germanium; max. peak inverse voltage 60 v; continuous average forward current 50 ma; max. peak forward current 150 ma; max. surge current 500 ma; max. inverse current 500 ua at 50 volts or 30 ua at 10 volts.	1N34A
CR1602 thru CR1604	Same as CR1601.	
CR1605	SEMICONDUCTOR DEVICE, DIODE: silicon; forward current 5 ma at 1 volt; reverse current 625 ua at 100 volts, 25°C.	1N68
CR1606	Same as CR1605.	
CR1607	Same as CR1605.	
FL1600	Not used	
FL1601	FILTER, BANDPASS: operating frequency 250 kc; bandwidth, 250.350-253.350 kc; input and output impedance 100K ohms nom.; hermetically sealed brass case.	FX195-1
L1600	Not used	
L1601	COIL, RADIO FREQUENCY: fixed; 47,000 uh, ±5%; 452 ohms DC resistance; current rating 27 ma; molded case.	CL275-473
L1602	COIL, RADIO FREQUENCY: fixed; .220 uh, ±10%; current rating 200 ma; molded case.	CL140-6
L1603	Not used	
L1604	Same as L1602.	
L1605	Same as L1602.	
L1606	Not used	

RECEIVER IF (CONT)

REF SYM	DESCRIPTION	TMC PART NO.
L1607	COIL, RADIO FREQUENCY: fixed; 1,000 uh, ±5%; 16.0 ohms DC resistance; current rating 140 ma; molded case.	CL275-102
L1608	Same as L1602.	
L1609	Not used	
L1610	COIL, RADIO FREQUENCY: fixed; 150 uh, ±5%; 3.3 ohms DC resistance; current rating 315 ma; molded case.	CL275-151
Q1600	Not used	
Q1601	TRANSISTOR, germanium; PNP; JEDEC type 2N2084 transistor with a controlled hfe limit of 100-150; JEDEC type T033 case.	TX109
Q1602	Same as Q1601.	
Q1603	TRANSISTOR: germanium; PNP; JEDEC type 2N1370 transistor with a controlled hfe limit of 60-75; JEDEC type T09 case.	TX107
Q1604	Same as Q1603.	
Q1605	Same as Q1601.	
Q1606	Same as Q1601.	
Q1607	Same as Q1601.	
Q1608	Same as Q1601.	
Q1609	Same as Q1601.	
Q1610	TRANSISTOR: germanium; PNP; collector to base voltage 45 v; collector to emitter voltage 30 v; emitter to base voltage 15 v; collector current (continuous) 500 ma DC; collector dissipation 200 mw; junction, storage temperature -65°C to +100°C.	2N1190
Q1611	TRANSISTOR: germanium; NPN; JEDEC type 2N1308 transistor with a controlled hfe limit of 80-150; JEDEC type T05 case.	TX106
Q1612	TRANSISTOR: NPN; silicon mesa; collector to base voltage 60 v; collector to emitter voltage 40 v; emitter to base voltage 5 v; collector current 175 ma; power dissipation 2 watts at 25°C; junction temperature 175°C; hermetically sealed metal case.	2N697
R1600	Not used	
R1601	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, ±5%; 1/2 watt.	RC20GF102J
R1602	RESISTOR, FIXED, COMPOSITION: 220 ohms, ±5%; 1/2 watt.	RC20GF221J
R1603	RESISTOR, FIXED, COMPOSITION: 10,000 ohms, ±5%; 1/2 watt.	RC20GF103J
R1604	Same as R1601.	

RECEIVER IF (CONT)

REF SYM	DESCRIPTION	TMC PART NO.
R1605	Same as R1603.	
R1606	Not used	
R1607	Not used	
R1608	Same as R1601.	
R1609	Same as R1601.	
R1610	RESISTOR, FIXED, COMPOSITION: 470 ohms, ±5%; 1/2 watt.	RC20GF471J
R1611	Same as R1603.	
R1612	RESISTOR, VARIABLE, COMPOSITION: 500 ohms, ±10%; nom. power rating 0.25 watt at 70°C; linear taper.	RV111V501A
R1613	Same as R1603.	
R1614	RESISTOR, FIXED, COMPOSITION: 4,700 ohms, ±5%; 1/2 watt.	RC20GF472J
R1615	Same as R1614.	
R1616	RESISTOR, FIXED, COMPOSITION: 22 ohms, ±5%; 1/2 watt.	RC20GF220J
R1617	Same as R1603.	
R1618	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, ±5%; 1/2 watt.	RC20GF332J
R1619	Same as R1601.	
R1620	Same as R1601.	
R1621	Same as R1614.	
R1622	Same as R1601.	
R1623	Same as R1601.	
R1624	Same as R1614.	
R1625	Same as R1603.	
R1626	Same as R1601.	
R1627	Same as R1614.	
R1628	Same as R1603.	
R1629	RESISTOR, FIXED, COMPOSITION: 560 ohms, ±5%; 1/2 watt.	RC20GF561J
R1630	RESISTOR, FIXED, COMPOSITION: 6,800 ohms, ±5%; 1/2 watt.	RC20GF682J
R1631	Same as R1601.	
R1632	Same as R1603.	
R1633	Same as R1603.	
R1634	RESISTOR, FIXED, COMPOSITION: 2,700 ohms, ±5%; 1/2 watt.	RC20GF272J
R1635	Same as R1601.	
R1636	Same as R1602.	
R1637	RESISTOR, FIXED, COMPOSITION: 100,000 ohms, ±5%; 1/2 watt.	RC20GF104J

RECEIVER IF (CONT)

REF SYM	DESCRIPTION	TMC PART NO.
R1638 thu R1647	Refer to Audio Frequency Receiver Assembly.	
R1648 thru R1650	Not used	
R1651 thru R1662	Refer to Audio Frequency Receiver Assembly.	
R1663	Same as R1612.	
R1664	Not used	
R1665 thru R1667	Refer to Audio Frequency Receiver Assembly.	
R1668	Same as R1601.	
T1600	Not used	
T1601	TRANSFORMER, INTERMEDIATE FREQUENCY: fixed; operating frequency 1.75 mc; nom. primary inductance 4.5 uhy, ±.200 uhy; 4 terminals, wire lead type.	TZ126
T1602	TRANSFORMER, PULSE: 3 windings; winding no. one, 4.7 mh; turns ratio 5:5:1.	TF228K15
XY1600	Not used	
XY1601	SOCKET, CRYSTAL: 2 cadmium plated phosphor bronze contacts; for crystals having a .050 pin dia. and .486 spacing between pins.	TS104-1
XY1602	Same as XY1601.	
XY1603	Same as XY1601.	
Y1600	Not used	
Y1601	CRYSTAL UNIT, QUARTZ: 250 KC, ±.002%; operating temperature range 75°C, +5°C; parallel resonance; load capacitance 20 uuf, ±0.5 uuf; HC-6/U type holder.	CR47A/U 250, 0000KC
Y1602	CRYSTAL UNIT, QUARTZ: 2 MC, ±.005%; operating temperature range -55°C to +30°C; max. capacitance 7.0 uuf; parallel resonance; load capacitance 32.0 uuf, ±0.5 uuf; HC-6/U type holder.	CR18A/U 2.00 0000MC
Y1603	CRYSTAL UNIT, QUARTZ: 1.5 MC, ±.005%; operating temperature range -55°C to +30°C; max. capacitance 7.0 uuf; parallel resonance; load capacitance 32.0 uuf, ±0.5 uuf; HC-6/U type holder.	CR18A/U 1.500 000MC

RECEIVER AUDIO FREQUENCY

REF SYM	DESCRIPTION	TMC PART NO.
C1600	Not used	
C1601 thru C1638	Refer to Intermediate Frequency Receiver Assembly.	
C1639	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10,000 uuf, gmv; 500 wvdc.	CC100-16
C1640 thru C1645	Refer to Intermediate Frequency Receiver Assembly.	
C1646	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, -10% +150% at 120 cps at 25°C; 15 wvdc; polarized, insulated tubular case.	CE105-10-15
C1647	CAPACITOR, FIXED, ELECTROLYTIC: 50 uf, -10% +150% at 120 cps at 25°C; 15 wvdc; polarized, insulated tubular case.	CE105-50-15
C1648	Same as C1646.	
C1649	Same as C1647.	
C1650	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1,000 uuf, gmv; 500 wvdc.	CC100-29
C1651	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80% -20%; 100 wvdc.	CC100-28
C1652	Same as C1647.	
C1653 thru C1658	Refer to Intermediate Frequency Receiver Assembly.	
C1659	Same as C1639.	
C1660	CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% +150% at 120 cps at 25°C; 15 wvdc; polarized, insulated tubular case.	CE105-200-15
EQ1616	HEAT SINK: transistor heat dissipating element.	HD101
EQ1617	Same as EQ1616.	
K1600	Not used	
K1601	RELAY ARMATURE: 4PDT; 185 ohms, ±10% DC resistance; operating voltage 12 vdc; current rating 60 ma; 700 mu at 25°C; 14 contacts rated for 2 amps at 20 vdc resistance; clear high impact styrene dust cover case.	RL156-2
Q1600	Not used	
Q1601 thru Q1612	Refer to Intermediate Frequency Receiver Assembly.	

REF SYM	DESCRIPTION	TMC PART NO.
Q1613	TRANSISTOR: germanium; PNP; JEDEC type 2N1370 transistor with a controlled hfe limit of 60-75; JEDEC type T09 case.	TX107
Q1614	Same as Q1613.	
Q1615	Same as Q1613.	
Q1616	TRANSISTOR: germanium; PNP; collector to base and collector to emitter voltage 60 volts; emitter to base voltage 20 volts; collector current 3 amps, base current 1 amp; junction and storage temperature -55°C to +100°C; power dissipation 20 watts at 25°C.	2N1039
Q1617	Same as Q1616.	
Q1618	TRANSISTOR: germanium; PNP; JEDEC type 2N1370-7 transistor with a controlled hfe limit of 120-150; JEDEC type T05 case.	TX108
Q1619	Same as Q1613.	
Q1620	Same as Q1613.	
Q1621	TRANSISTOR: germanium; PNP; germanium; PNP; max. collector dissipation 300 mw; Fab. equals 6 mc; collector current 1 ma; collector cut-off current 100 ua; hfe limit 80.	2N2001
R1600	Not used	
R1601 thru R1605	Refer to Intermediate Frequency Receiver Assembly.	
R1606	Not used	
R1607	Not used	
R1608 thru R1637	Refer to Intermediate Frequency Receiver Assembly.	
R1638	RESISTOR, FIXED, COMPOSITION: 10,000 ohms, ±5%; 1/2 watt.	RC20GF103J
R1639	RESISTOR, FIXED, COMPOSITION: 4,700 ohms, ±5%; 1/2 watt.	RC20GF472J
R1640	RESISTOR, FIXED, COMPOSITION: 22 ohms, ±5%; 2 watts.	RC42GF220J
R1641	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, ±5%; 1/2 watt.	RC20GF332J
R1642	Same as R1638.	
R1643	Same as R1641.	
R1644	Same as R1641.	

RECEIVER AUDIO FREQUENCY (CONT)

REF SYM	DESCRIPTION	TMC PART NO.
R1645	RESISTOR, FIXED, COMPOSITION: 680 ohms, ±5%; 1/2 watt.	RC20GF681J
R1645	RESISTOR, FIXED, COMPOSITION: 10 ohms, ±5%; 1/2 watt.	RC20GF100J
R1647	RESISTOR, FIXED, COMPOSITION: 100, 000 ohms, ±5%; 1/2 watt.	RC20GF104J
R1648 thru R1650	Not used	
R1651	Same as R1638.	
R1652	RESISTOR, FIXED, COMPOSITION: 3, 900 ohms, ±5%; 1/2 watt.	RC20GF392J
R1653	RESISTOR, FIXED, COMPOSITION: 2, 200 ohms, ±5%; 1/2 watt.	RC20GF222J
R1654	RESISTOR, FIXED, COMPOSITION: 1, 000 ohms, ±5%; 1/2 watt.	RC20GF102J
R1655	Same as R1647.	
R1656	Same as R1641.	
R1657	RESISTOR, FIXED, COMPOSITION: 22, 000 ohms, ±5%: 1/2 watt.	RC20GF223J
R1658	Same as R1653.	
R1659	RESISTOR, FIXED, COMPOSITION: 33 ohms, ±5%; 1/2 watt.	RC20GF330J
R1660	RESISTOR, FIXED, COMPOSITION: 3.3 ohms, ±5%; 1 watt.	RC32GF3R3J
R1661	RESISTOR, FIXED, COMPOSITION: 470 ohms, ±5%; 1/2 watt.	RC20GF471J
R1662	RESISTOR, FIXED, COMPOSITION: 1, 800 ohms, ±5%; 1/2 watt.	RC20GF182J
R1663	Refer to Intermediate Frequency Receiver Assembly.	
R1664	Not used	
R1665	Same as R1639.	
R1666	Same as R1640.	

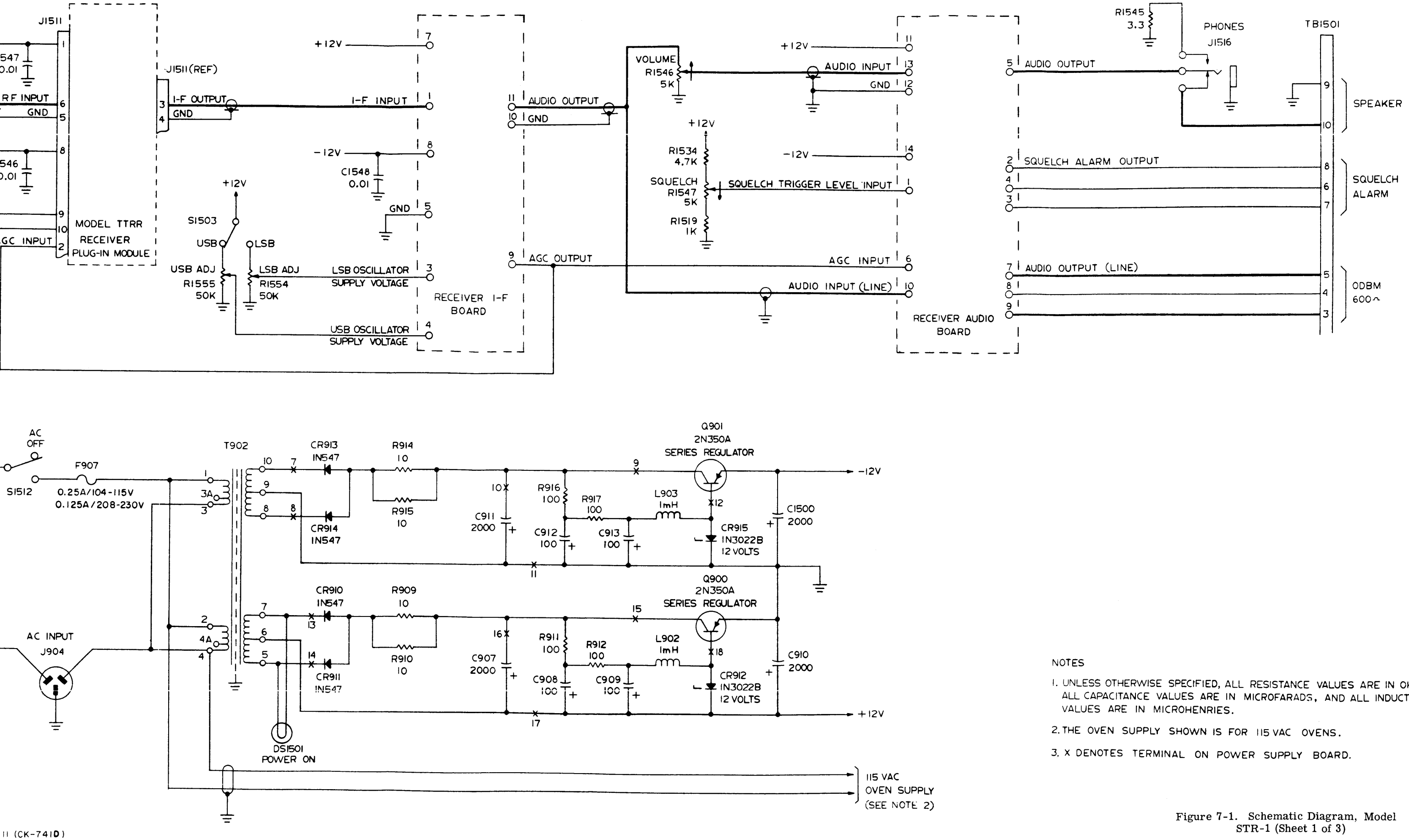
RECEIVER AUDIO FREQUENCY (CONT)

REF SYM	DESCRIPTION	TMC PART NO.
R1667	RESISTOR, FIXED, COMPOSITION: 27 ohms, ±5%; 2 watts.	RC42GF270J
T1600	Not used	
T1601	Refer to Intermediate Frequency Receiver Assembly.	
T1602	Refer to Intermediate Frequency Receiver Assembly.	
T1603	TRANSFORMER, AUDIO FREQUENCY: fixed; primary impedance 4, 000 ohms, CT; DC resistance 370 ohms, ±20%; secondary impedance 600 ohms, CT; DC resistance 60 ohms, ±20%; operating frequency range 200-15, 000 cps; frequency response ±3 db at 250 to 3, 500 cps.	TF267-3
T1604	TRANSFORMER, AUDIO FREQUENCY: fixed; primary impedance 3, 000 ohms, CT; DC resistance 260 ohms, ±20%; secondary impedance 1, 000 ohms, CT; DC resistance 105 ohms, ±20%; operating frequency range 200-15, 000 cps; frequency response ±3 db at 250 to 3, 500 cps.	TF267-2
T1605	TRANSFORMER, AUDIO FREQUENCY: fixed; primary impedance 500 ohms, CT: DC resistance 26 ohms, ±20%; secondary impedance 3.2 ohms: DC resistance 0.3 ohms, ±20%; operating frequency range 150-45, 000 cps, frequency response +0.2 db at 1, 000 cps, ref; 150-45, 000 cps.	TF267-5

POWER SUPPLY ASSEMBLY

REF SYM	DESCRIPTION	TMC PART NO.
C900 thru C906	Not used	
C907	Refer to Main Chassis Assembly.	
C908	CAPACITOR, FIXED, ELECTROLYTIC: 100 uf, 25 wvdc; polarized; insulated tubular case.	CE105-100-25
C909	Same as C908.	
C910	Refer to Main Chassis Assembly.	
C911	Refer to Main Chassis Assembly.	
C912	Same as C908.	
C913	Same as C908.	
CR900 thru CR909	Not used	
CR910	SEMICONDUCTOR DEVICE, DIODE: silicon; 600 v max. peak inverse voltage; 0.75 max. DC forward amperes at 150°C.	1N547
CR911	Same as CR910.	
CR912	SEMICONDUCTOR DEVICE, DIODE: silicon; nom. ref. voltage 12 volts; max. dissipation 1 watt at 25°C; current rating 21 ma; max. impedance 9 ohms; hermetically sealed metal case.	1N3022B
CR913	Same as CR910.	
CR914	Same as CR910.	
CR915	Same as CR912.	
L900	Not used	
L901	Not used	
L902	COIL, RADIO FREQUENCY: fixed; 3 PI; 1 mh inductance; 23 ohms, ±10% resistance; current rating 75-100 ma max.	CL101-2
L903	Same as L902.	
R900 thru R908	Not used	
R909	RESISTOR, FIXED, WIREWOUND: 10 ohms, ±5%; 3 watts.	RW123-100J
R910	Same as R909.	
R911	RESISTOR, FIXED, COMPOSITION: 100 ohms, ±10%; 1 watt.	RC32GF101K
R912	Same as R911.	
R913	Not used	
R914	Same as R909.	
R915	Same as R909.	
R916	Same as R911.	
R917	Same as R911.	

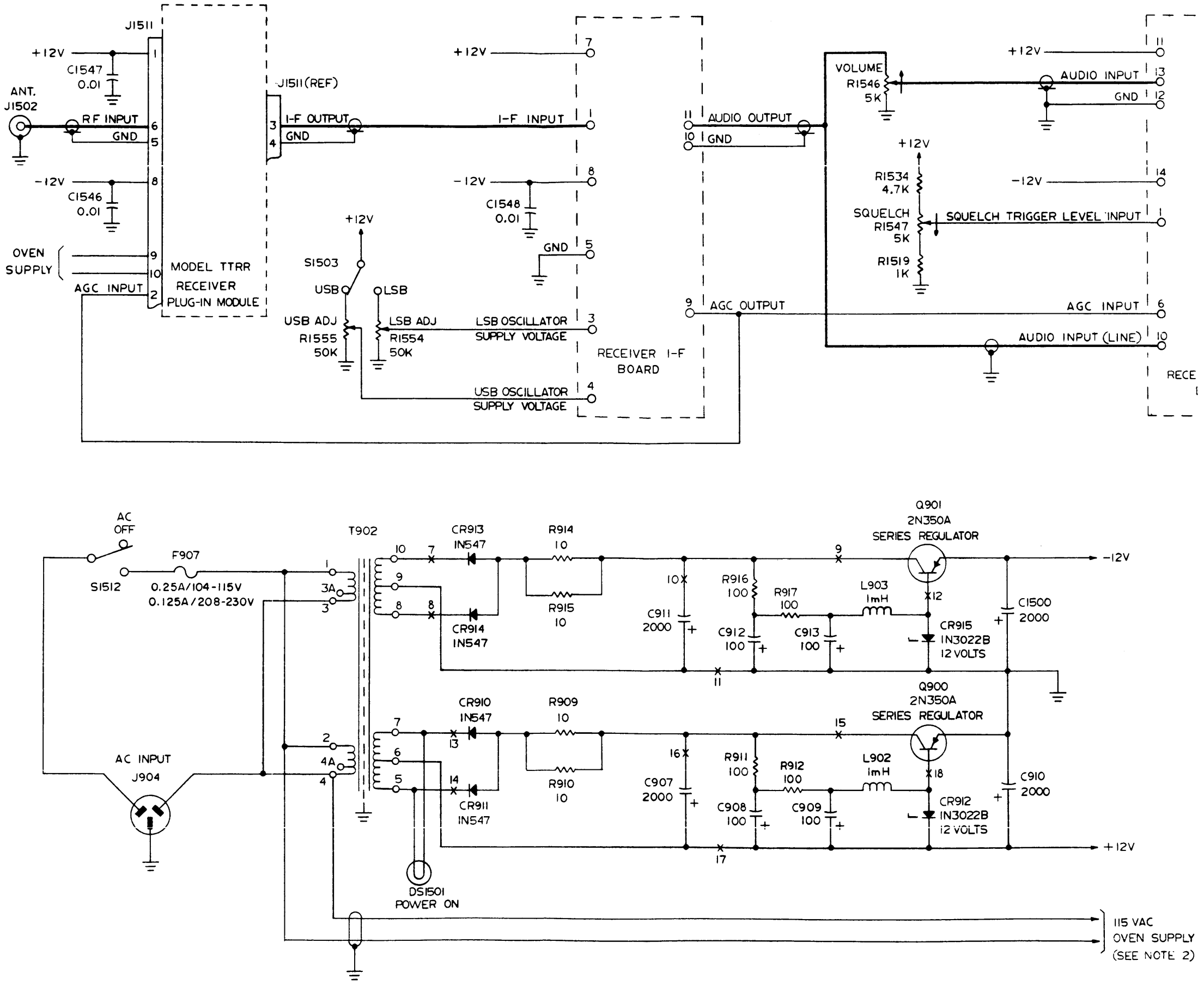
SECTION 7
SCHEMATIC DIAGRAMS



NOTES

1. UNLESS OTHERWISE SPECIFIED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN MICROFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRIES.
2. THE OVEN SUPPLY SHOWN IS FOR 115 VAC OVENS.
3. X DENOTES TERMINAL ON POWER SUPPLY BOARD.

Figure 7-1. Schematic Diagram, Model STR-1 (Sheet 1 of 3)



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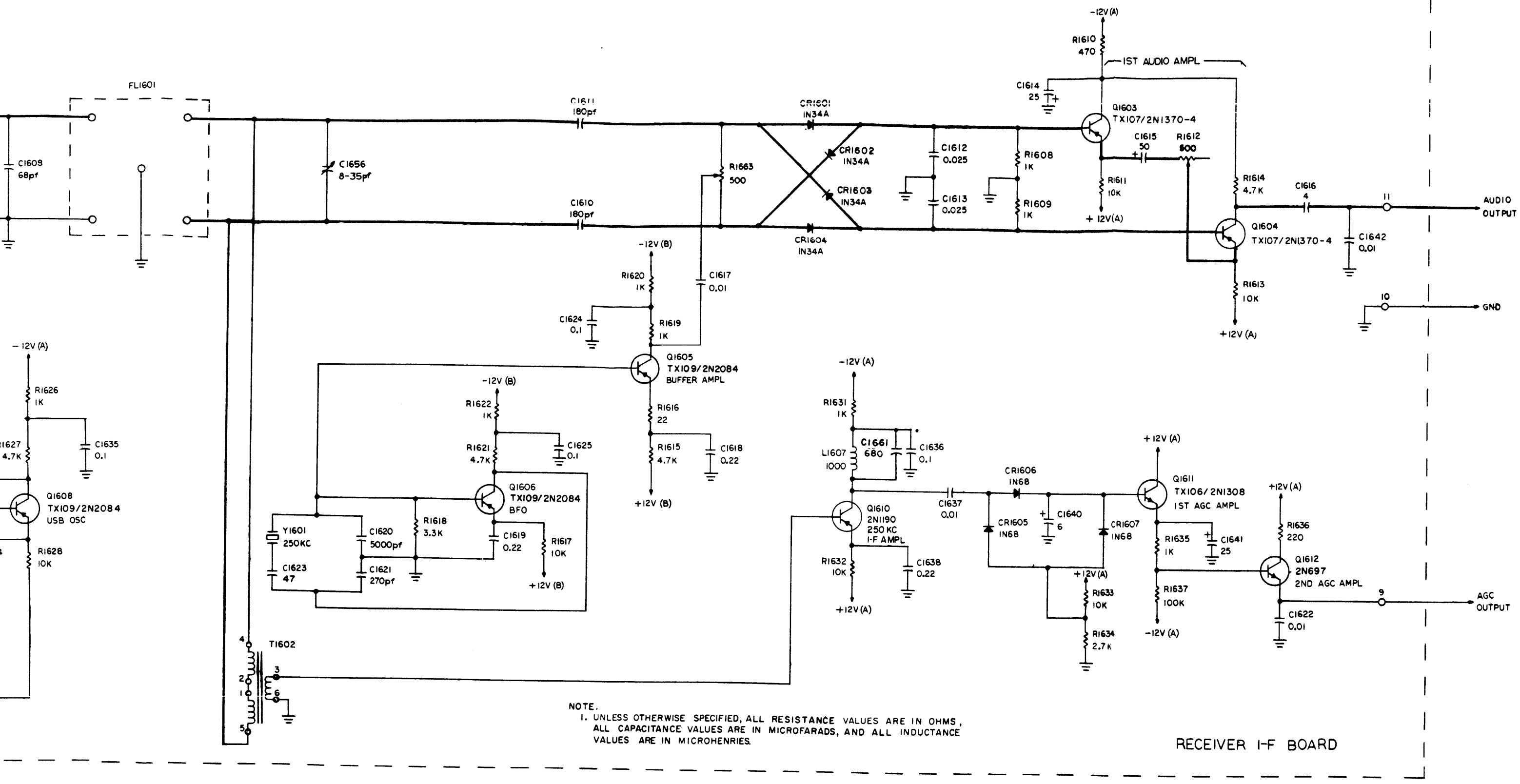
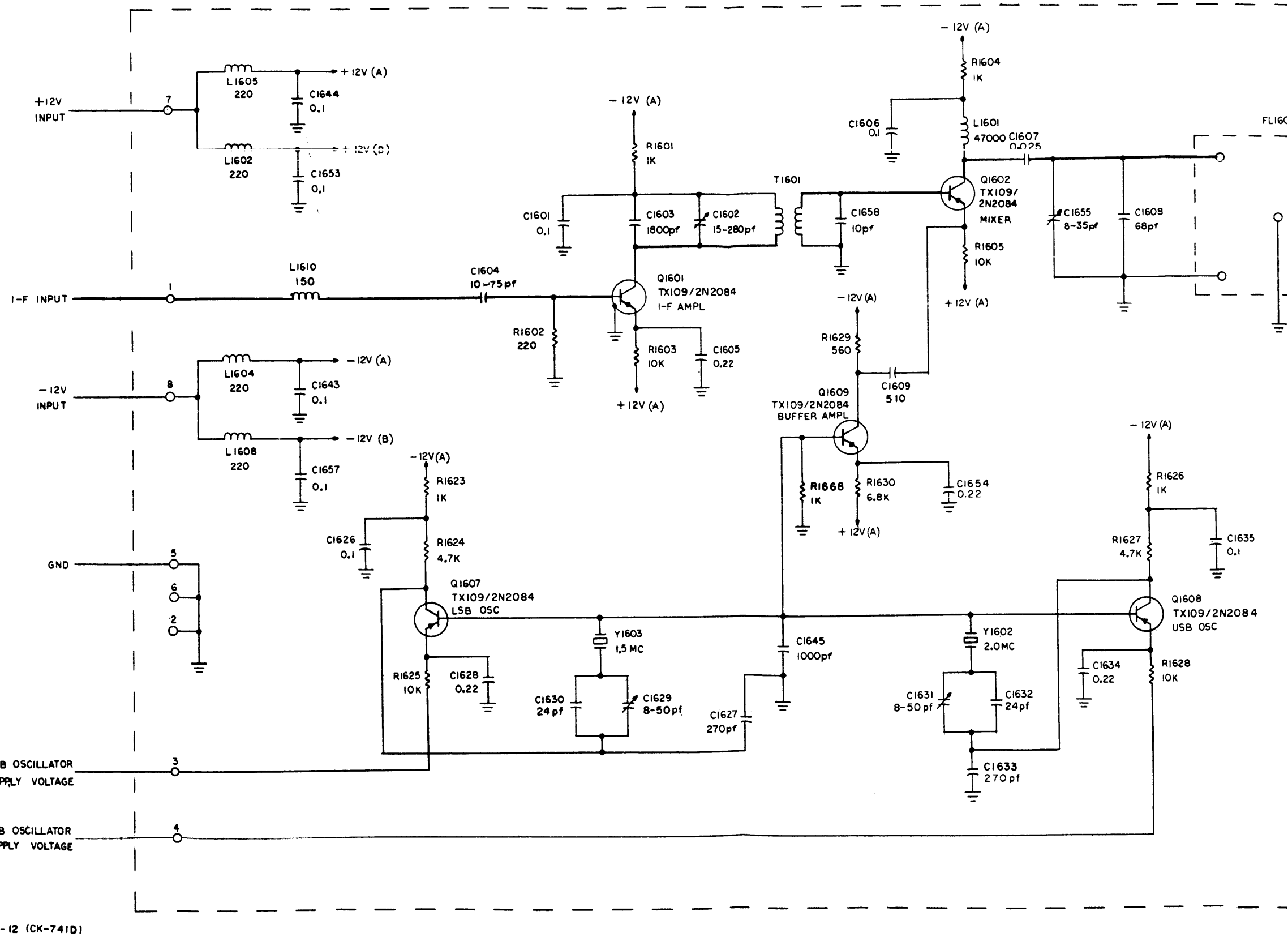


Figure 7-1. Schematic Diagram, Model STR-1 (Sheet 2 of 3)



3014-12 (CK-7410)

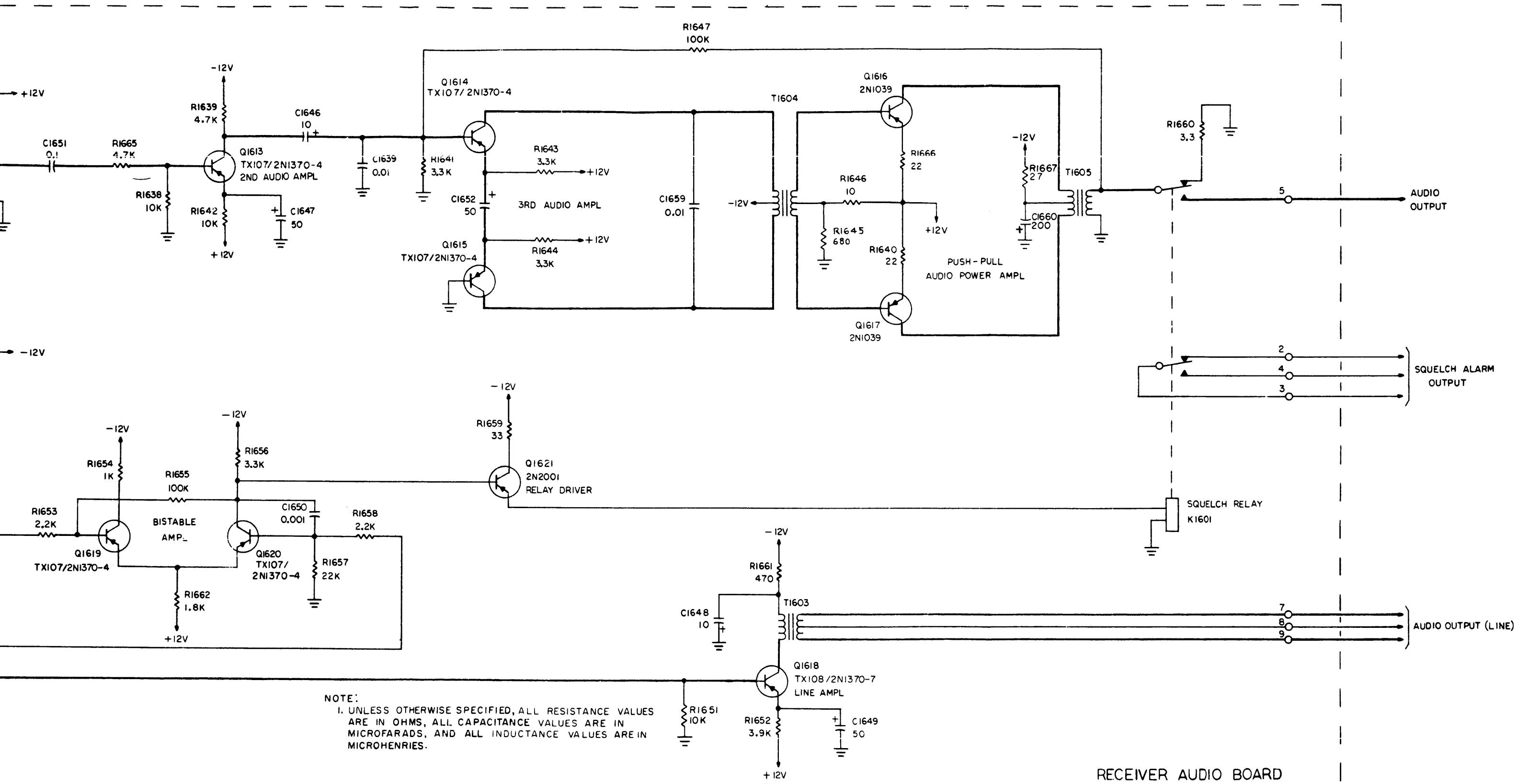
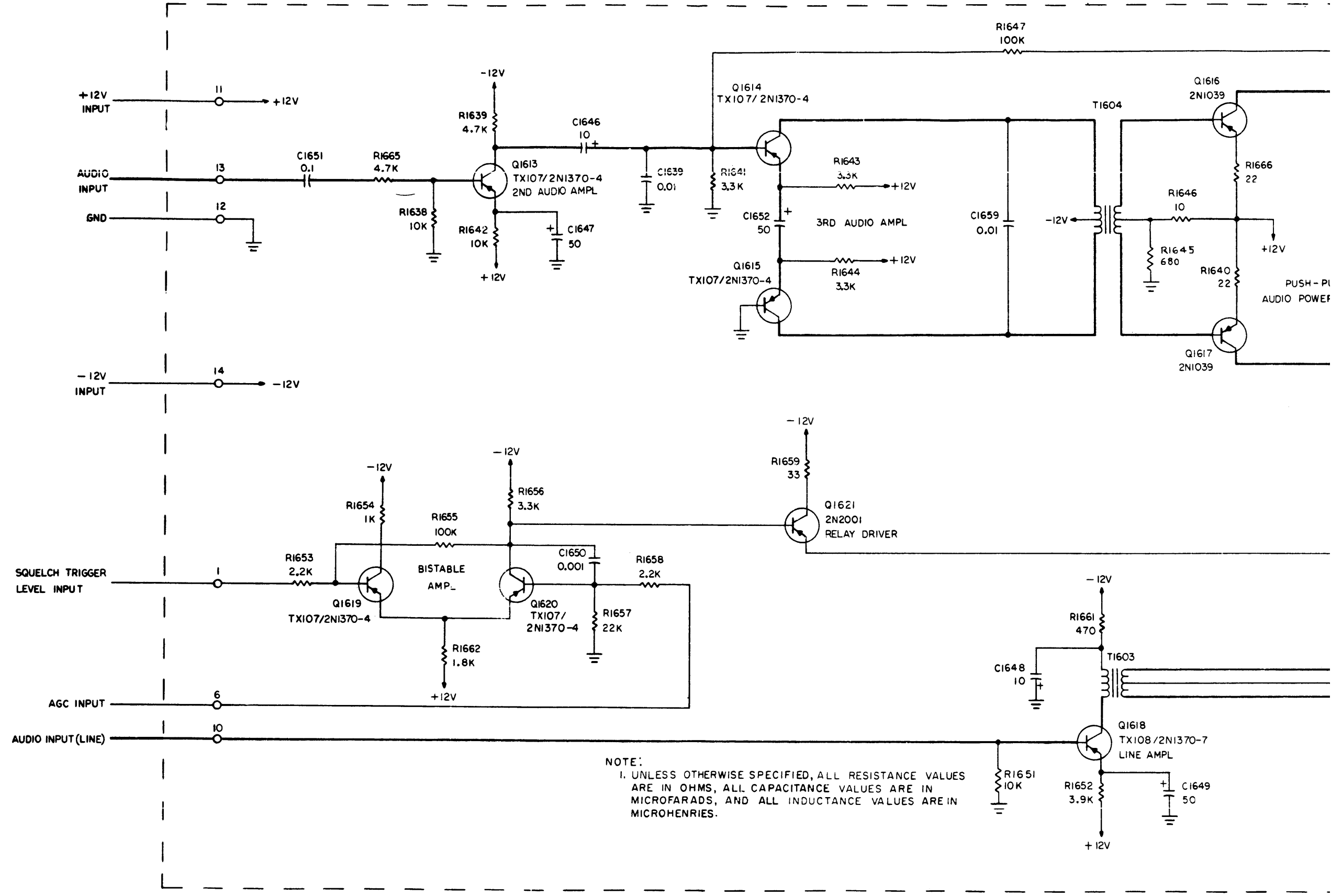


Figure 7-1. Schematic Diagram, Model STR-1 (Sheet 3 of 3)



NOTE:
1. UNLESS OTHERWISE SPECIFIED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN MICROFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRIES.

3014-13 (CK-741D)

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