

★

TECHNICAL MANUAL

for

STRIP RECEIVER

MODEL STR-2A



THE TECHNICAL MATERIEL CORPORATION  
MAMARONECK, N. Y.

OTTAWA, CANADA

★

★

TECHNICAL MANUAL

for

STRIP RECEIVER

MODEL STR-2A



THE TECHNICAL MATERIEL CORPORATION  
MAMARONECK, N. Y.

OTTAWA, CANADA

COPYRIGHT 1965  
THE TECHNICAL MATERIEL CORPORATION

## NOTICE

THE CONTENTS AND INFORMATION CONTAINED IN THIS INSTRUCTION MANUAL IS PROPRIETARY TO THE TECHNICAL MATERIEL CORPORATION TO BE USED AS A GUIDE TO THE OPERATION AND MAINTENANCE OF THE EQUIPMENT FOR WHICH THE MANUAL IS ISSUED AND MAY NOT BE DUPLICATED EITHER IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER WITHOUT THE WRITTEN CONSENT OF THE TECHNICAL MATERIEL CORPORATION.



# THE TECHNICAL MATERIEL CORPORATION

C O M M U N I C A T I O N S   E N G I N E E R S

700 FENIMORE ROAD

MAMARONECK, N. Y.

## W a r r a n t y

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



## TABLE OF CONTENTS

<u>Paragraph</u>		<u>Page</u>
<u>SECTION 1. GENERAL INFORMATION</u>		
1-1	Functional Description	1-1
1-2	Physical Description	1-1
1-3	Equipment Supplied	1-2
1-4	Technical Specifications	1-4
<u>SECTION 2. INSTALLATION</u>		
2-1	Initial Inspection	2-1
2-2	Power Requirements	2-1
2-3	Mechanical Installation	2-1
2-4	Electrical Installation	2-3
2-5	Initial Check	2-4
<u>SECTION 3. OPERATOR'S SECTION</u>		
3-1	Controls and Indicators	3-1
3-2	Operating Procedure	3-3
3-3	Stopping Procedure	3-4
3-4	Changing TTRR Modules	3-4
3-4	Operator's Maintenance	3-4
<u>SECTION 4. PRINCIPLES OF OPERATION</u>		
4-1	Circuit Analyses	4-1

TABLE OF CONTENTS (Cont.)

<u>Paragraph</u>		<u>Page</u>
<u>SECTION 5. MAINTENANCE</u>		
5-1	Preventive Maintenance	5-1
5-2	Troubleshooting	5-1
5-3	Repair	5-5
5-4	Alignment	5-6

SECTION 6. PARTS LIST

SECTION 7. SCHEMATIC DIAGRAMS

LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
<u>SECTION 1. GENERAL DESCRIPTION</u>		
1-1	Strip Receiver, Model STR-2A	1-0
<u>SECTION 2. INSTALLATION</u>		
2-1	Transformer Wiring Diagram, STR	2-2
2-2	Rear View, STR	2-5
<u>SECTION 3. OPERATOR'S SECTION</u>		
3-1	Front Panel, STR	3-2

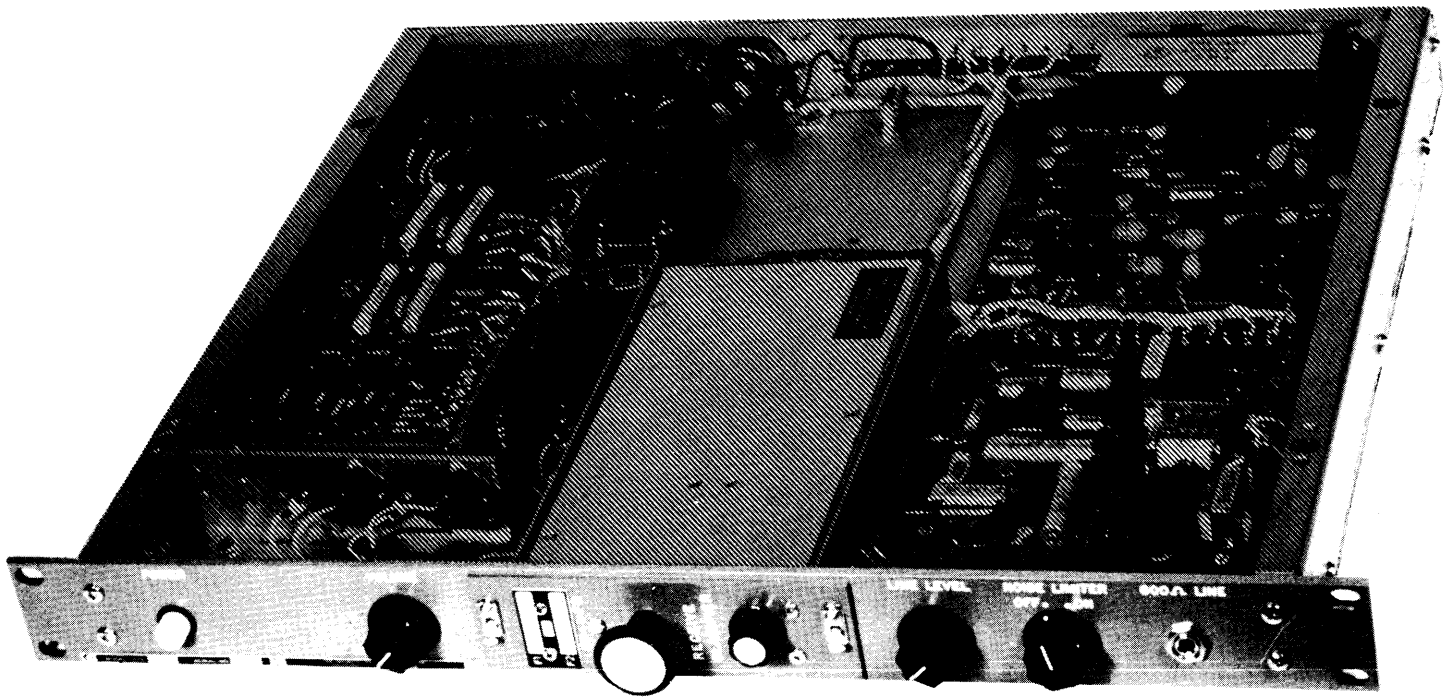


## LIST OF ILLUSTRATIONS (Cont.)

<u>Figure</u>		<u>Page</u>
<u>SECTION 4. PRINCIPLES OF OPERATION</u>		
4-1	Block Diagram, STR	4-4
<u>SECTION 5. MAINTENANCE</u>		
5-1	Top View, Cover Removed, STR	5-7
<u>SECTION 7. SCHEMATIC DIAGRAMS</u>		
7-1	Schematic Diagram, STR	7-1

## LIST OF TABLES

<u>Table</u>		<u>Page</u>
<u>SECTION 1. GENERAL INFORMATION</u>		
1-1	Semiconductor Complement	1-2
1-2	Equipment Supplied	1-3
<u>SECTION 3. OPERATOR'S SECTION</u>		
3-1	Controls and Indicators	3-1
<u>SECTION 5. MAINTENANCE</u>		
5-1	Test Equipment	5-2
5-2	Voltage Measurements	5-4



3014C-1

Figure 1-1. Strip Receiver, Model STR-2A

SECTION 1  
GENERAL INFORMATION

1-1. FUNCTIONAL DESCRIPTION.

Strip Receiver, Model STR-2A (figure 1-1), is a transistorized, double-conversion, superheterodyne communications receiver. The STR uses one of four fixed-tuned, plug-in modules (Model TTRR) for its r-f section. The TTRR modules are interchangeable and cover the frequency range from 2- to 32- megacycles; each module has two selectable, crystal-controlled local oscillator frequencies. A RECEIVER CLARIFIER control (located on front panel of TTRR) provides fine-tuning of the local oscillator.

The STR produces two separate audio outputs: 500 milliwatts into 4 ohms for speaker or earphone jack, and 5 milliwatts into a 600-ohm balanced load. A VOLUME control is provided to vary the speaker level, and a LINE LEVEL control to vary the 600-ohm audio output. An earphone jack permits monitoring the 600-ohm audio output.

1-2. PHYSICAL DESCRIPTION.

a. EXTERNAL. - The STR is provided with a front panel for installation in a standard 19-inch wide rack. Most of the operator's controls and indicators are located on the front panel; a terminal board, for output connections, is mounted to the rear apron (refer to figure 2-2). The rear apron also contains the power input connector, the line fuse, and the SQUELCH control. A removable top cover of the STR facilitates

maintenance, repair and alignment. The associated TTRR module is inserted in the STR and held in place by two slide-latches. The STR is 19 inches wide, 1 3/4 inches high, and 15 inches deep; the unit, including the TTRR module, weighs approximately 11 pounds.

b. INTERNAL. - Most of the smaller components in the STR are located on three printed-circuit boards (i-f section, audio section, and power supply) that are mounted to the chassis. The larger components are chassis-mounted. Table 1-1 lists the semiconductor complement of the STR.

1-3. EQUIPMENT SUPPLIED.

Table 1-2 lists the equipment supplied with the STR.

TABLE 1-1. SEMICONDUCTOR COMPLEMENT.

Symbol	Type	Function
CR911	1N547	+12 v Rectifier
CR912	1N547	+12 v Rectifier
CR913	1N547	-12 v Rectifier
CR914	1N547	-12 v Rectifier
CR1001	1N294	Detector
CR1002	1N294	Noise Limiter
CR1003	1N68	AGC Detector
CR1004	1N68	AGC Detector
CR1005	1N68	AGC Detector
CR1512	1N3022B	-12 v Regulator Zener Ref.
CR1515	1N3022B	+12 v Regulator Zener Ref.
Q901	2N350A	-12 v Regulator
Q902	2N350A	+12 v Regulator
Q1001	2N2084	I-F Amplifier
Q1002	2N2084	Mixer
Q1003	2N2084	I-F Emitter Follower
Q1004	2N2084	I-F Amplifier
Q1005	2N1370-7	Audio Emitter Follower

TABLE 1-1. SEMICONDUCTOR COMPLEMENT (CONT).

Symbol	Type	Function
Q1007	2N2084	Intermediate Freq. Oscillator
Q1008	2N2084	Buffer Amplifier
Q1009	2N1190	250 kc Amplifier
Q1010	2N1308	First AGC Amplifier
Q1011	2N697	Second AGC Amplifier
Q1113	2N1370-4	First Audio Amplifier
Q1114	2N1370-4	Second Audio Amplifier
Q1115	2N1370-4	Second Audio Amplifier
Q1116	2N1039	Power Amplifier
Q1117	2N1039	Power Amplifier
Q1118	2N1370-7	Line Amplifier
Q1119	2N1317-4	Squelch Trigger
Q1120	2N1317-4	Squelch Trigger
Q1121	2N2001	Relay Driver

TABLE 1-2. EQUIPMENT SUPPLIED.

Name	Designation	Quantity
Strip Receiver	STR-2A	1
Cable Assembly*	CA-555-4	1
Fanning Strip		1
R-F Connector Plug	UG88U	2

NOTE: \* Cable available with terminations other than the 115 volt polarized plug.

#### 1-4. TECHNICAL SPECIFICATIONS.

Frequency Range: 2 to 32 mc, in 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: Fixed-tuned, plug-in module.

Frequency Control: Crystal-controlled Oscillators.

Reception: AM, AME, MCW.

Sensitivity: 3 microvolt input for 10 db  
signal-plus-noise to noise ratio.

IF Bandwidth 6 kc.

AGC Characteristics: No more than 10 db increase in  
output for 83 db increase in  
input from 5 microvolts.

Audio Response: 300 to 3000 cps  $\pm$  db,  
1000 cps reference.

Audio Output : 500 milliwatts into 4 ohms;  
+7dbm (5 mw) into 600 ohms.

Noise Limiter: Automatic, switch-selected.

Speech Clarifier: Manually controlled.

Antenna Input Impedance: 50 ohms, unbalanced.

Power Requirements: 104/115/208/230 vac,  $\pm$ 10%,  
50-60 cps, single phase,  
8 watts. Additional 6 watts for  
TTRR crystal oven (if used).

Environmental Conditions: 0°C (32°F) to 50°C (122°F), up  
to 90% relative humidity.

Dimensions: 1-3/4 inches high  
19 inches wide  
15 inches deep.

Weight: 10 lbs.

SECTION 2  
INSTALLATION

2-1. INITIAL INSPECTION.

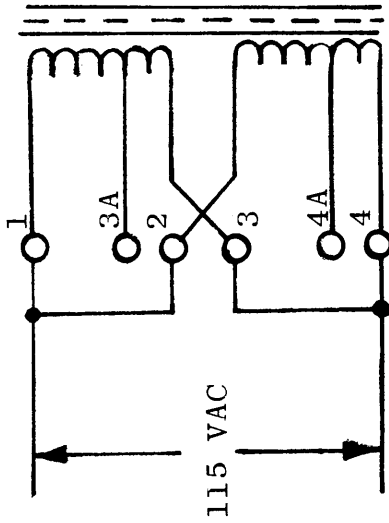
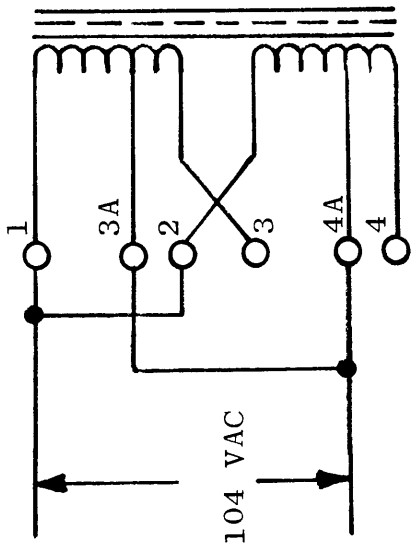
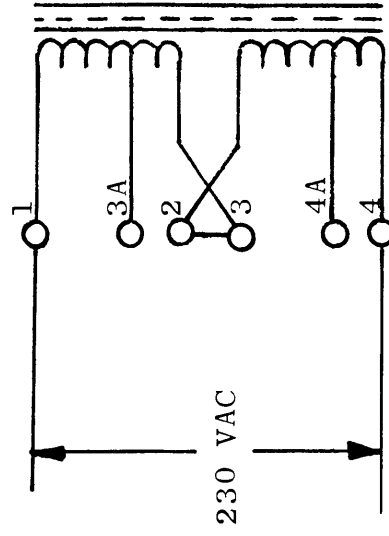
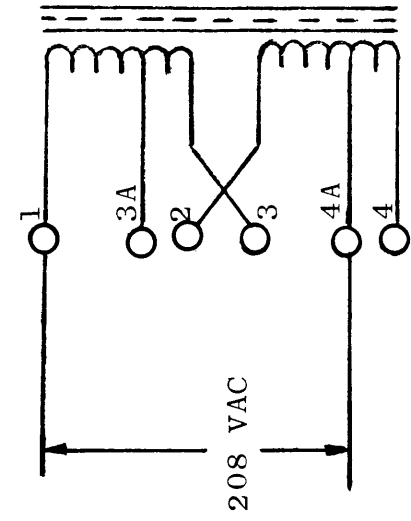
The STR is tested at the factory and is carefully packaged to prevent damage during shipment. Upon receipt of the equipment, inspect the packing case and its contents for damage that might have occurred during transit. Unpack the equipment carefully and inspect all packaging material for parts that may have been shipped as 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 can operate with 104 volts, 115 volts, 208 volts, or 230 volts a-c power; it is factory wired for 115 volts a-c unless otherwise specified on customer's order. Minor wiring changes must be made to power transformer T901 (see figure 2-1) if the TPSA is to be operated from a power source other than that for which it was originally configured. For 104 or 115 vac operation, line fuse F901 should be 0.25 amp.; for 208 or 230 vac operation, F901 should be 0.125 amp. Make sure that the crystal ovens (if used) in the associated TTRR module are compatible with the power source used (refer to the TTRR manual).

2-3. MECHANICAL INSTALLATION.

a. LAYOUT. - The STR should be located so that its front



3014C-2

Figure 2-1. Transformer Wiring Diagram, STR



panel controls are accessible to the operator. The solid-state circuitry used in the unit generates only a minimum amount of heat; therefore, several STR receivers may be installed in a stack, one above the other.

b. MOUNTING. - Place the STR in the desired location in the rack, then fasten the front panel to the rack with four screws. The rear of the receiver must be suitably supported in order to prevent excessive strain on the front panel. If the STR is located in a vehicle or ship where it is subject to vibration, the rear of the unit should be rigidly supported to prevent possible damage due to vibration and vertical movement.

#### 2-4. ELECTRICAL INSTALLATION. (Refer to figure 2-2).

a. Connect power cord CA-555 between a-c power source and AC INPUT jack J904.

b. Connect 50-ohm antenna lead-in to ANT jack J1502; use BNC connector supplied with STR.

c. Connect 4-ohm speaker to terminals 9 and 10 of TB1501. If this audio output is not used, a 3.3-ohm 1 watt resistor should be connected across these terminals.

d. Make connection to terminals 3 and 5 of TB1501 for 600 ohm audio output (telephone line, 600-ohm speaker, etc.). If this audio load is balanced, terminal 4 may be grounded. If the 600-ohm audio output is not used, connect a 560-ohm, 1/4 watt resistor across terminals 3 and 5.

e. Connect external squelch alarm device to terminals 6 and 7, or terminals 7 and 8, of TB1501. (Terminals 6 and 7

are shorted when the receiver is squelched; terminals 7 and 8 are shorted when the receiver is not squelched).

f. Remove jumper between terminals 1 and 2 of TB1501 and connect external squelch control to terminals 1, 11, and 12, as shown in figure 7-1. If an external squelch control is not used, the jumper between terminals 1 and 2 must remain connected.

g. A sample of the 250 kc i-f signal is available at IF OUT jack J1535 for connection to a single-sideband adapter (such as TMC Model MSR), or to a carrier-operated anti-noise device (such as the CODAN), or for other purposes.

#### 2-5. INITIAL CHECK.

After installing the STR and making necessary electrical connections, check the unit for proper operation. Using the VOLUME control, apply power to the STR and observe if a signal is received. When a signal is received, check the operation of each front-panel control (refer to Section 3).

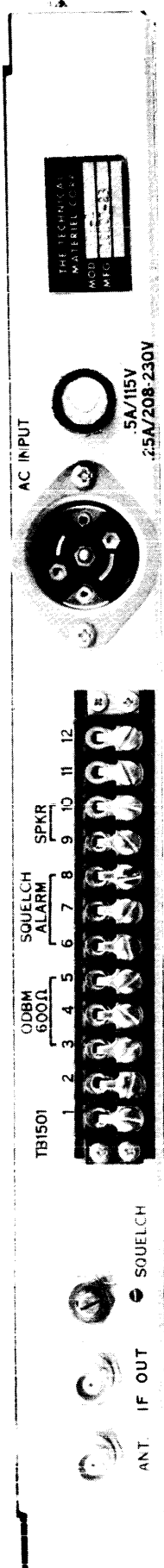


Figure 2-2. STR, Rear Panel

30140-5

SECTION 3  
OPERATOR'S SECTION

3-1. CONTROLS AND INDICATORS. (Refer to figure 3-1).

Before attempting to operate the STR, the operator should first familiarize himself with all controls and indicators listed in table 3-1 and illustrated in figure 3-1.

TABLE 3-1. CONTROLS AND INDICATORS.

Designation	Function
POWER lamp (DS 1501)	Lights when line voltage is applied to STR power supply; controlled by AC OFF/VOLUME control.
AC OFF/VOLUME control and switch (S1512, R1546)	Clockwise rotation applies primary power to STR power supply; further clockwise rotation increases audio output to speaker.
F1/F2 switch (on TTRR module)	Selects either F1 reception frequency or F2 reception frequency.
RECEIVER CLARIFIER control (on TTRR module)	Fine-tuning control for receiver.
LINE LEVEL control (R1545)	Clockwise rotation increases 600-ohm audio output level.
NOISE LIMITER switch (S1520)	When set at ON, applies noise limiting action to STR.
600 $\Omega$ LINE jack (J1516)	Permits headphone monitoring of 600-ohm audio output.
SQUELCH control (R1547, on rear of unit)	Adjusts level of r-f input required to enable audio output circuits.



3014C-4

Figure 3-1. Front, Panel, STR

### 3-2. OPERATING PROCEDURE.

a. Ensure that correct TTRR module is employed for frequency to be received (refer to paragraph 1-4).

#### NOTE

If none of the available TTRR modules are tuned to the desired frequency, refer to Section 5 of the TTRR manual for crystal changing and alignment information.

b. Rotate SQUELCH control fully clockwise.

c. Set F1/F2 switch at proper position for desired frequency.

d. Rotate AC OFF/VOLUME control clockwise. The POWER lamp should light. Adjust VOLUME control for comfortable speaker output.

e. Adjust LINE LEVEL control for desired level of -600 ohm audio output. This level may be measured by connecting a bridging-type VU meter to the 600 $\Omega$  LINE jack.

f. Adjust RECEIVER CLARIFIER control to minimize distortion of received signal.

g. For receiver squelching, rotate SQUELCH control counter-clockwise until noise abruptly disappears (must be performed when no signal is being transmitted). Do not rotate SQUELCH control beyond point at which noise disappears.

h. If noise-limiting action is desired, set NOISE LIMITER at ON.

### 3-3. STOPPING PROCEDURE.

Rotate AC OFF/VOLUME control fully counter-clockwise until switch clicks off; the POWER lamp should go off.

### 3-4. 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 catches located on each end of module upward to lock module in place.

### 3-5. OPERATOR'S MAINTENANCE.

Operator's maintenance usually consists of replacing lamps or fuses, and checking that all controls are functioning properly. If abnormal performance is noted, report the nature of malfunction to technical personnel.

#### WARNING

Never replace a fuse with one of higher current rating. If a fuse burns out immediately after having been installed, do not replace it a second time unless the cause of trouble has been corrected.

SECTION 4  
PRINCIPLES OF OPERATION

4-1. CIRCUIT ANALYSES.

Refer to block diagram, figure 4-1, and schematic diagram, figure 7-1.

a. TTRR. - Signals from the antenna are routed to jack J1502 and then to the TTRR module through pin 6 of J1511. The TTRR contains the r-f amplifier stages, first conversion stage, and the high frequency oscillator of the receiver. The TTRR selects the desired signal, amplifies it, and converts it to the first i-f frequency of 1.75 megacycles. (For further information on the TTRR, refer to the TTRR Technical Manual.)

b. I-F BOARD. - The 1.75 mc i-f signal from the TTRR is amplified by Q1001, and applied to mixer Q1002. The mixer also receives the 2 mc output of IFO (intermediate frequency oscillator) Q1007 through buffer amplifier Q1008. The buffer amplifier isolates the IFO from load variations, thereby improving frequency stability. The output of mixer Q1002 (the second i-f signal) is coupled through filter FL1001 to emitter follower Q1003. The filter passes only signals within a 6 kc bandwidth, centered at 250 kc. The output of emitter follower Q1003 is applied to i-f amplifier Q1004 and, through a resistive voltage divider, to IF OUT jack J1535. The output of i-f amplifier Q1004 is routed to 250 kc amplifier Q1009 (part of AGC circuit), and to detector CR1001.

The detector output signal (negative pulsating d-c voltage) is developed across resistor R1015 and applied to



audio emitter follower Q1005. When NOISE LIMITER switch S1520 is set at ON, diode CR1002 and capacitor C1021 present a low impedance path to ground for high amplitude negative voltage transients (noise). The output of emitter follower Q1005 is routed to VOLUME control potentiometer R1546, and is also routed to LINE LEVEL potentiometer R1545 through rheostat R1022. R1022 may be adjusted to limit the level of signal applied to the line amplifier circuit.

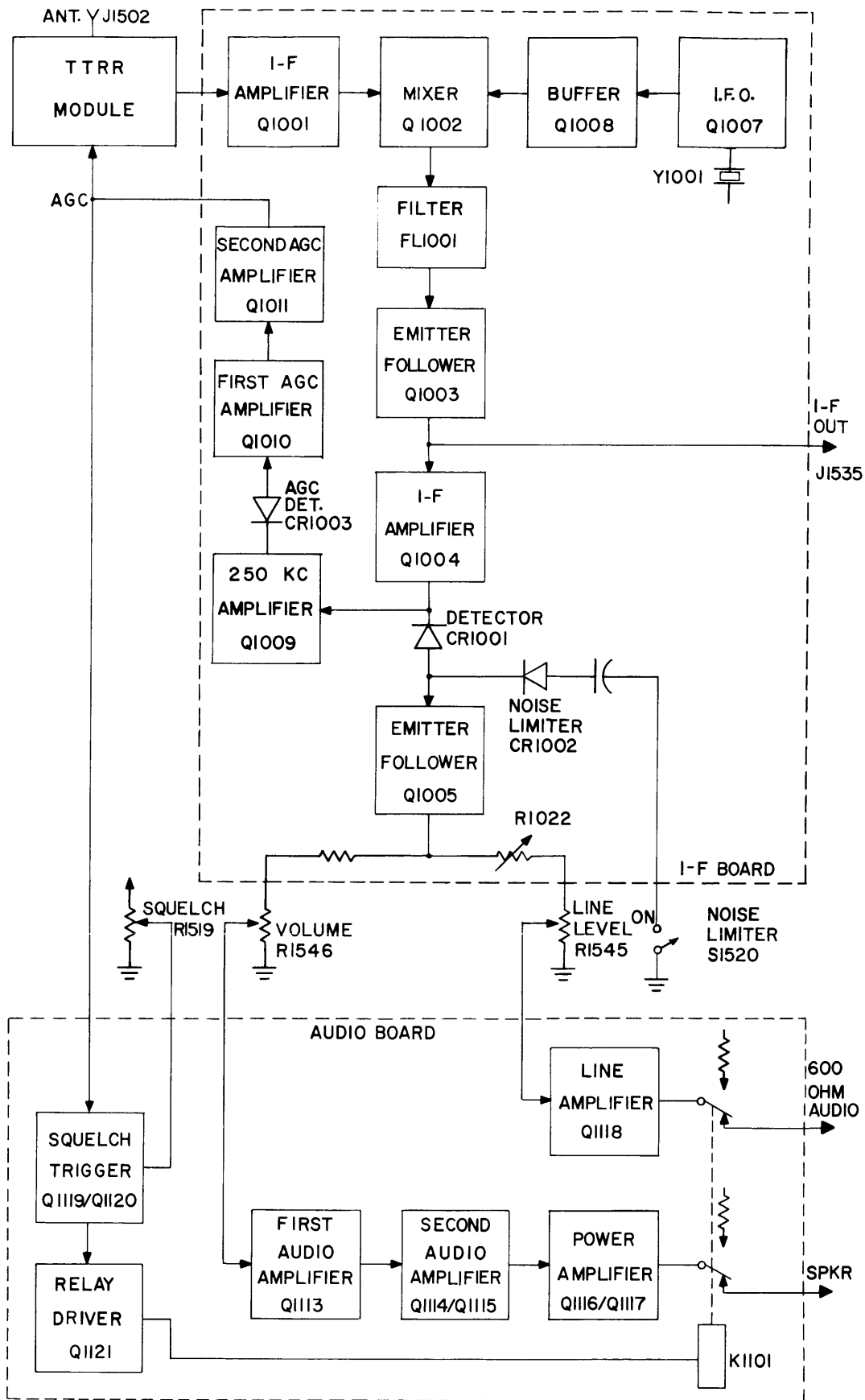
A sample of the i-f signal is applied to 250 kc amplifier Q1009. The output of the 250 kc amplifier is rectified by AGC detector CR1003. This AGC signal, a positive d-c voltage proportional to the peak envelope voltage of the i-f signal, is applied to d-c amplifier Q1010, and then to d-c amplifier Q1011. The output of the AGC amplifier chain is routed to the TTRR module through pin 2 of receptacle J1511, and to the squelch trigger circuit on the audio board.

c. AUDIO BOARD. - An audio signal is routed from VOLUME control potentiometer R1546 to first audio amplifier Q1113. The output of Q1113 is coupled to second audio amplifier/phase inverter Q1114. Q1114 also receives negative feedback through R1147 from the output of the power amplifier. The emitter to emitter coupling between Q1114 and Q1115, and the grounded base configuration of Q1115, constitutes a combined phase inverter and push-pull amplifier. The output of the second audio amplifier is applied to power amplifier Q1116/Q1117. The output, up to 500 milliwatts into 4 ohms, of this push-pull amplifier is routed through the squelch relay K1101 to speaker terminals (9 and 10) on terminal board TB1501.

An audio signal is routed from LINE LEVEL potentiometer R1545 to line amplifier Q1118. The output, up to 5 milliwatts into 600 ohms, of this single-ended amplifier is routed through squelch relay K1101 to the line terminals (3 and 5) of terminal board TB1501.

Positive AGC voltage is routed to the base of squelch trigger Q1120, and a positive voltage from SQUELCH control potentiometer R1547 is routed to the base of squelch trigger Q1119. When signals are being received, the AGC voltage rises, Q1120 is cut off, and Q1119 conducts (note common emitter resistor). The base of relay driver Q1121 is sufficiently negative so that it conducts, and relay K1101 is energized. When K1101 is energized, the speaker audio and 600-ohm audio signals are routed to their respective terminals. When the AGC voltage drops, Q1119 is cut off and Q1120 conducts; Q1121 is cut off by positive potential at collector of Q1120. When K1101 is de-energized, the speaker audio signal is dissipated by resistor R1160, and the 600-ohm audio signal is dissipated by resistor R1168.

d. POWER SUPPLY. - Primary power is applied through switch S1512 (ganged to VOLUME control R1546) and fuse F901 to power transformer T901. The two 12 vdc supplies are identical. Each 12 v supply consists of a full-wave solid-state rectifier, R-C filter, and zener-referenced series regulator. The positive terminal of the -12 v supply and the negative terminal of the +12 v supply are grounded.



3014C-5

Figure 4-1. Block Diagram, STR

SECTION 5  
MAINTENANCE

5-1. PREVENTIVE MAINTENANCE.

Periodically, remove the STR from the rack and inspect for general cleanliness and condition of connections at the rear of the unit. Remove the top cover, and the TTRR module. Check components for discoloration, damaged wiring, broken or loose solder connections, leaking capacitors, and warped or damaged printed-circuit boards. Clean the components with a soft brush; vacuum cleaner; or clean, dry, filtered, compressed air. Check all hardware for tightness.

CAUTION

Before removing TTRR module  
from STR, make sure power  
supply is disconnected.

5-2. TROUBLESHOOTING. (Refer to figure 5-1 for component location).

a. Required test equipment is listed in table 5-1. Disconnect external wiring from TB1501; make sure that jumper between terminals 1 and 2 is connected. Connect 600 ohm resistor between terminals 3 and 5 on TB1501, and connect 4 ohm loudspeaker or 3.2 ohm resistor between terminals 9 and 10. Connect r-f signal generator to ANT jack. Adjust signal generator to deliver operating frequency of TTRR module (F1 or F2) at 100  $\mu$ v with 30% modulation at 1000 cps.

TABLE 5-1. TEST EQUIPMENT.

Item	Function
R-F Signal Generator (Hewlett Packard, Model 606A, or equiv.)	Used during troubleshooting and alignment procedures.
Oscilloscope (Tektronix, Model 545, or equivalent)	Same.
Volt-Ohm-Milliameter (Simpson, Model 260, or equivalent)	Same.
Frequency Counter (Hewlett Packard, Model 524C, or equiv.)	Same.
3.2 ohm, 1 watt resistor, or 4 ohm loudspeaker	Same.
600 ohm, 1/2 watt resistor	Same.

b. Using oscilloscope, check signal level at terminal 1 of i-f board; level should be approximately 50 mv peak-to-peak. If this level is not observed, check TTRR module, as outlined in TTRR manual.

NOTE

Before troubleshooting the TTRR module, make sure that AGC circuitry is operating properly. Check level of AGC signal at pin 2 of J1511; level should be approximately +3 vdc.

c. Check signal level at collector of Q1001; level should be approximately 1.1 volts peak-to-peak. If this level is not observed, check i-f amplifier Q1001.

d. Disconnect signal generator. Check signal level at emitter of Q1002; level should be approximately 1.2 volts peak-to-peak. If this level is not observed, check IFO and buffer (Q1007 and Q1008, respectively).

e. Connect signal generator to ANT jack. Check signal level at base of Q1003; level should be approximately 100 mv peak-to-peak. If this level is not observed, check mixer Q1002.

f. Check signal level at collector of Q1004; level should be approximately 1.2 volts peak-to-peak. If this level is not observed, check i-f amplifier Q1004 and i-f emitter follower Q1003.

g. Check i-f signal at collector of Q1009; level should be approximately 2.8 volts peak-to-peak. If this level is not observed, check 250 kc amplifier (part of AGC circuit).

h. Check audio signal at emitter of Q1005; level should be approximately 100 mv peak-to-peak. If this is not observed, check detector and emitter follower Q1005.

i. Connect VOM across 600 ohm resistor at terminals 3 and 5 of TB1501. Adjust LINE LEVEL control to obtain 0.78 vrms across 600 ohm resistor. If this level is not obtained, check line amplifier Q1118. Signal at base of Q1118 should be approximately 40 mv peak-to-peak.

j. Connect VOM across speaker terminals (3.2 ohm resistor, or speaker), and adjust VOLUME control to obtain 0.5 vrms across load. If this level is not obtained, check audio amplifiers; the levels should be as follows:

- (1) Base of Q1113, 10 mv peak-to-peak,
- (2) Collector of Q1114 and Q1115, 1 volt peak-to-peak.

(3) Collectors of Q1116 and Q1117,  
10 volts peak-to-peak.

k. Refer to table 5-2 for d-c voltage measurements.

TABLE 5-2. VOLTAGE MEASUREMENTS

Ref. Symbol	Emitter	Base	Collector
Q1001	.31 v	-	-11 v
Q1002	-.6 v	-	-11 v
Q1003	.28 v	-	-11.2 v
Q1004	.41 v	-	-5.2 v
Q1005	.62 v	-	-2.5 v
Q1007	-.15 v	-	-5.6 v
Q1008	-.17 v	-	-11.2 v
Q1009	.52 v	-	-11 v
Q1010	4.3 v	4.4 v	11.4 v
Q1011	3.4 v	4.0 v	10 v
Q1113	.28 v	-	-7 v
Q1114	.29 v	.1 v	-11 v
Q1115	.15 v	-	-11 v
Q1116, Q1117	11 v	11.2 v	-12 v
Q1118	.16 v	-	-10 v
Q1119	2.9 v	2.7 v	-8 v
Q1120	2.9 v	3.0 v	-9.3 v
Q1121	-9 v	-9.3 v	-9.1 v

- NOTES:
- (1) Input signal adjusted to 100 $\mu$ v 30% modulated with 1 kc audio.
  - (2) Controls set as follows: VOLUME adjusted for .5vrms output at speaker terminals; LINE LEVEL adjusted to produce 0 dbm at line output; SQUELCH turned full open.
  - (3) All voltages referenced to ground.

### 5-3. REPAIR.

Repair of STR consists of component replacement and re-soldering wire connections. The following precautions should be observed:

a. Use replacement components identical to defective component (same part number), and position the replacement component in exact place on the board or the chassis.

#### NOTE

After a component has been repaired or replaced, the STR may require alignment (refer to paragraph 5-4).

b. Use long-nosed pliers or alligator clips when soldering wire leads in order to transfer heat from the junction and thus prevent damage to the component.

#### NOTE

Use 50-watt soldering iron for soldering all wire leads and connections. Use suitable flux remover to clean soldered joints.

#### CAUTION

Excess heat near the board surfaces may damage the printed circuit wiring.



5-4. ALIGNMENT.

a. Remove TTRR module. Disconnect external wiring from TB1501; make sure that jumper between terminals 1 and 2 is connected. Connect 600 ohm resistor between terminals 3 and 5 of TB1501; connect 4 ohm loudspeaker or 3.2 ohm resistor between terminals 9 and 10.

b. Rotate SQUELCH fully clockwise, and turn on STR with VOLUME control.

c. Connect frequency counter to emitter of Q1002. Adjust C1034 until counter indicates 2000 kc  $\pm$  2 cps. Disconnect counter.

d. Connect signal generator to terminal 1 of i-f board; adjust generator to deliver 1750 kc at 50 mv (50,000  $\mu$ v) with 30% modulation at 1000 cps.

e. Connect oscilloscope to base of Q1004; adjust C1002 and C1004 to obtain maximum signal.

f. Rotate LINE LEVEL control fully clockwise. Connect VOM across 600 ohm resistor. Adjust R1022 on i-f board until VOM indicates 0.78 vrms for 0 dbm output. If a higher level 600 ohm audio output is desired (up to +7 dbm), adjust R1022 accordingly.

g. Disconnect all test equipment, replace TTRR module, and connect external wiring for normal operation.

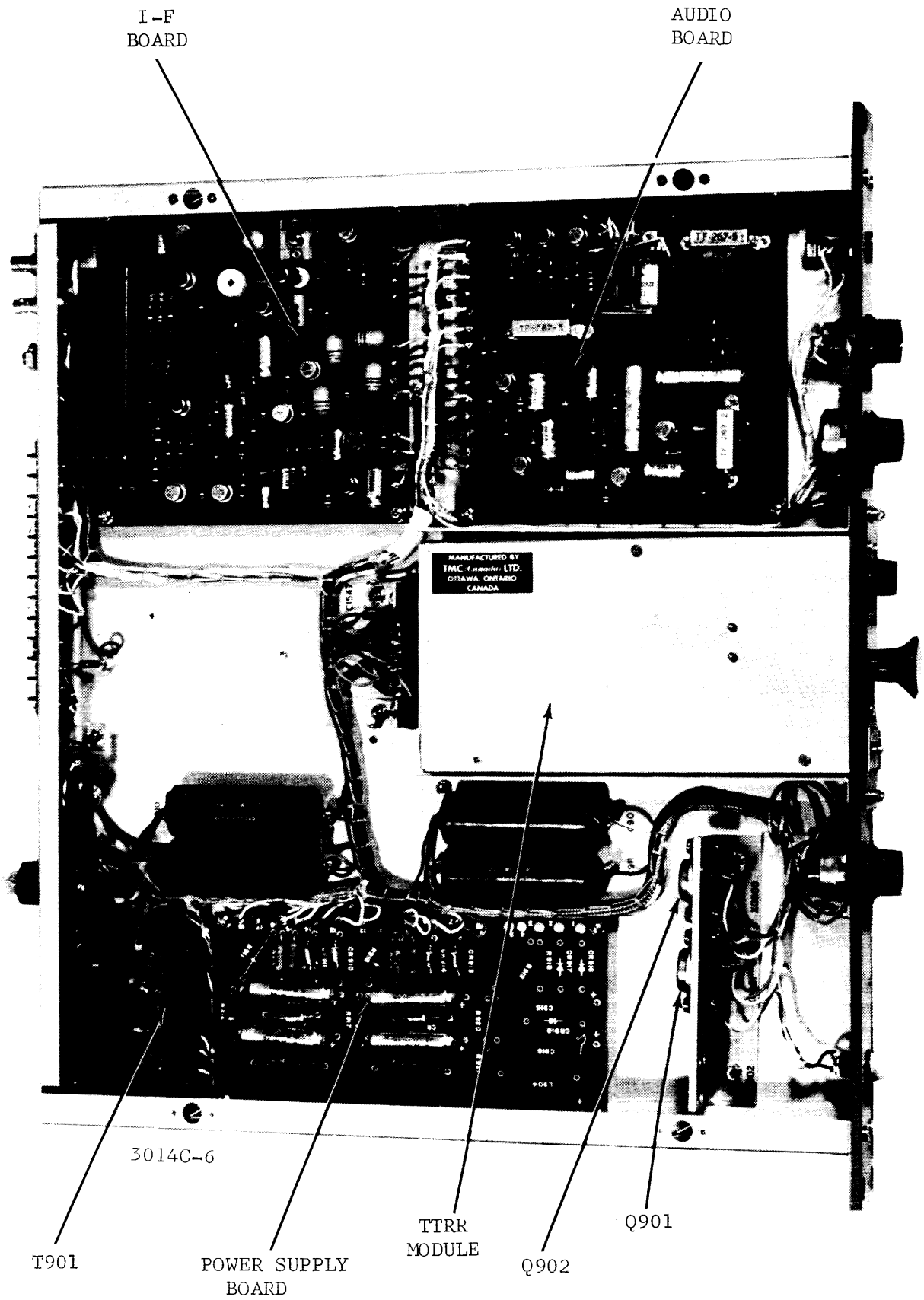


Figure 5-1. Top View, STR

## SECTION 6

### PARTS LIST

INTRODUCTION. 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 F101 is designated XF101. To expedite delivery, when ordering replacement parts, specify the TMC part number and the model number of the equipment.

Title	Page
Power Supply, Main Chassis. . . . .	2
Receiver Intermediate Frequency . . . . .	5
Receiver Audio Frequency . . . . .	13
Main Chassis . . . . .	18

## POWER SUPPLY, MAIN CHASSIS

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C900 thru 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	CAPACITOR, FIXED, ELECTROLYTIC: 100 uf, -10% +150% at 120 cps at 25°C; 25 WVDC; polarized; insulated tubular case.	CE105-100-25
C909	Same as C908.	
C910	Same as C907.	
C911	Same as C907.	
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 V; max. power 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.	
F900 thru F906	NOT USED	

## POWER SUPPLY, MAIN CHASSIS

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
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 V AC 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
L900	NOT USED	
L901	NOT USED	
L902	COIL, RADIO FREQUENCY: fixed; 3 PI; 1 mh inductance; 23 ohms, $\pm 10\%$ resistance; current rating 75-100 ma max.	CL101-2
L903	Same as L902.	
Q900	TRANSISTOR: germanium; base 50 V; emitter 40 V; dissipation 90 watts at 25°C; normal operating temperature range -65°C to +100°C; load resistance 2.2 ohms, collector current 3 amps, base current 0.13 amps; 1.56" lg. x 1.05" wide x .32" high; male plug-in type.	2N350A
Q901	Same as Q900.	
R900 thru R908	NOT USED	
R909	RESISTOR, FIXED, WIREWOUND: 10 ohms, $\pm 5\%$ ; 3 watts.	RW123-100J
R910	Same as R909.	
R911	RESISTOR, FIXED, COMPOSITION: 100 ohms, $\pm 10\%$ ; 1 watt.	RC32GF101K
R912	Same as R911.	

## POWER SUPPLY, MAIN CHASSIS

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R913	NOT USED	
R914	Same as R909.	
R915	Same as R909.	
R916	Same as R911.	
R917	Same as R911.	
T900	NOT USED	
T901	TRANSFORMER, POWER, STEP-DOWN: primary input (#1) 104/115 or 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
XF900 thru XF906	NOT USED	
XF907	FUSEHOLDER: extractor post type, moveable end terminals.	FH100-1
XQ900	SOCKET, SEMICONDUCTOR DEVICE: 2 pin contact accommodation, 0.040 or 0.0505 dia.; polarized; 1 terminal lug grounding strap; o/a dimensions 1-37/64" x 1" max.	TS166-S1
XQ901	Same as XQ900.	

## RECEIVER INTERMEDIATE FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1000	NOT USED	
C1001	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80% -20%; 100 WVDC.	CC100-28
C1002	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: 10-75 uuf; operating temperature range -55°C to +85°C; 350 WVDC.	CV109-8
C1003	CAPACITOR, FIXED, MICA DIELECTRIC: 1,800 uuf, +2%; 500 WVDC.	CM100-13
C1004	CAPACITOR, VARIABLE, MICA DIELECTRIC: 280 uuf max. when tight, 25 uuf max. at 3 turns; 175 WVDC.	CV114-1
C1005	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 200,000 uuf, +80% -20%; 25 WVDC.	CC100-33
C1006	NOT USED	
C1007	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 25,000 uuf, +80% -20%; 500 WVDC.	CC100-25
C1008	Same as C1007.	
C1009	Same as C1001.	
C1010 thru C1013	NOT USED	
C1014	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 470,000 uuf, +20%; peak working voltage 100 VDC; radial lead type.	CC112R474M
C1015	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1,000 uuf, +10%; 500 WVDC.	CC100-9
C1016 thru C1018	Same as C1014.	
C1019	Same as C1015.	
C1020	Same as C1015.	
C1021	Same as C1014.	

## RECEIVER INTERMEDIATE FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1022	Same as C1014.	
C1023	CAPACITOR, FIXED, ELECTROLYTIC: 50 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized; insulated tubular case.	CE105-50-15
C1024	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized; insulated tubular case.	CE105-10-15
C1025	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10,000 uuf, GMV; 500 WVDC.	CC100-16
C1026	Same as C1005.	
C1027	Same as C1005.	
C1028 thru C1032	NOT USED	
C1033	CAPACITOR, FIXED, MICA DIELECTRIC: 24 uuf, $\pm 5\%$ ; 500 WVDC; char. C.	CM15C240J
C1034	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: 6-50 uuf; operating temperature range -55°C to +85°C; 350 WVDC.	CV109-6
C1035	Same as C1001.	
C1036	CAPACITOR, FIXED, MICA DIELECTRIC: 270 uuf, $\pm 5\%$ ; 500 WVDC; char. F.	CM15F271J
C1037	CAPACITOR, FIXED, MICA DIELECTRIC: 1,000 uuf, $\pm 5\%$ ; 500 WVDC; char. F.	CM20F102J
C1038	Same as C1005.	
C1039	Same as C1001.	
C1040	Same as C1025.	
C1041	Same as C1005.	
C1042	CAPACITOR, FIXED, ELECTROLYTIC: 6 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized; insulated tubular case.	CE105-6-15



## RECEIVER INTERMEDIATE FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1043	Same as C1005.	
C1044	CAPACITOR, FIXED, ELECTROLYTIC: 25 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized; insulated tubular case.	CE105-25-15
C1045	Same as C1005.	
C1046	Same as C1025.	
C1047	Same as C1005.	
C1048	Same as C1015.	
C1049 thru C1060	NOT USED	
C1061	CAPACITOR, FIXED, MICA DIELECTRIC: 10 uuf, +5%; 500 WVDC; char. C.	CM15C100J
CR1000	NOT USED	
CR1001	SEMICONDUCTOR DEVICE, DIODE: germanium; min. peak inverse voltage for zero dynamic impedance 70 V; continuous reverse working voltage 60 V; average forward current 60 ma; recurrent peak forward current 150 ma; forward surge current (1 sec.) 500 ma.	1N294
CR1002	Same as CR1001.	
CR1003	SEMICONDUCTOR DEVICE, DIODE: silicon; forward current 5 ma at 1 volt; reverse current 625 ua at 100 volts, 25°C.	1N68
CR1004	Same as CR1003.	
CR1005	Same as CR1003.	
FL1000	NOT USED	
FL1001	FILTER, BANDPASS: symmetrical; operating frequency 250 KC; bandwidth, 6 KC; input and output impedance 10K ohms nom.; hermetically sealed brass case.	FX195-3
L1000	NOT USED	

RECEIVER INTERMEDIATE FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
L1001	COIL, RADIO FREQUENCY: fixed; 47,000 uh, +5%; 452 ohms DC resistance; current rating 27 ma; molded case.	CL275-473
L1002	COIL, RADIO FREQUENCY: fixed; 56,000 uh, +5%; 499 ohms DC resistance; current rating 26 ma; molded case.	CL275-563
L1003	COIL, RADIO FREQUENCY: fixed; 220 uh, +10%; current rating 200 ma; molded case.	CL140-6
L1004	Same as L1003.	
L1005	COIL, RADIO FREQUENCY: fixed; 100 uh, +10%; 2.8 ohms DC resistance; molded case.	CL240-100
L1006	COIL, RADIO FREQUENCY: fixed; 1,000 uh, +5%; 16.0 ohms DC resistance; current rating 140 ma; molded case.	CL275-102
L1007	Same as L1003.	
L1008	Same as L1003.	
L1009	COIL, RADIO FREQUENCY: fixed; 10,000 uh, +5%; 76.6 ohms DC resistance; current rating 66 ma; molded case.	CL275-103
L1010	COIL, RADIO FREQUENCY: fixed; 150 uh, +5%; 3.3 ohms DC resistance; current rating 315 ma; molded case.	CL275-151
Q1000	NOT USED	
Q1001	TRANSISTOR: germanium; PNP; JEDEC type 2N2084 transistor with a controlled hfe limit of 100-150; JEDEC type T033 case.	TX109
Q1002 thru Q1004	Same as Q1001.	
Q1005	TRANSISTOR: germanium; PNP; JEDEC type 2N1370-7 transistor with a controlled hfe limit of 120-150; JEDEC type T05 case.	TX108
Q1006	NOT USED	
Q1007	Same as Q1001.	

## RECEIVER INTERMEDIATE FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
Q1008	Same as Q1001.	
Q1009	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 range -65°C to +100°C.	2N1190
Q1010	TRANSISTOR: germanium; NPN; JEDEC type 2N1308 transistor with a controlled hfe limit of 80-150; JEDEC type T05 case.	TX106
Q1011	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
R1000	NOT USED	
R1001	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, +5%; 1/2 watt.	RC20GF332J
R1002	RESISTOR, FIXED, COMPOSITION: 10,000 ohms, +5%; 1/2 watt.	RC20GF103J
R1003	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, +5%; 1/2 watt.	RC20GF102J
R1004	Same as R1002.	
R1005	Same as R1003.	
R1006	RESISTOR, FIXED, COMPOSITION: 12,000 ohms, +5%; 1/2 watt.	RC20GF123J
R1007	RESISTOR, FIXED, COMPOSITION: 470 ohms, +5%; 1/2 watt.	RC20GF471J
R1008	RESISTOR, FIXED, COMPOSITION: 5,600 ohms, +5%; 1/2 watt.	RC20GF562J
R1009	RESISTOR, FIXED, COMPOSITION: 1,800 ohms, +5%; 1/2 watt.	RC20GF182J

## RECEIVER INTERMEDIATE FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1010	RESISTOR, FIXED, COMPOSITION: 47 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF470J
R1011	Same as R1007.	
R1012	RESISTOR, FIXED, COMPOSITION: 4,700 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF472J
R1013	Same as R1002.	
R1014	RESISTOR, FIXED, COMPOSITION: 330 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF331J
R1015	RESISTOR, FIXED, COMPOSITION: 8,200 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF822J
R1016	RESISTOR, FIXED, COMPOSITION: 100,000 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF104J
R1017	Same as R1012.	
R1018	RESISTOR, FIXED, COMPOSITION: 15,000 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF153J
R1019	RESISTOR, FIXED, COMPOSITION: 39,000 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF393J
R1020	Same as R1008.	
R1021	Same as R1012.	
R1022	RESISTOR, VARIABLE, COMPOSITION: 50,000 ohms, $\pm 10\%$ ; nom. power rating 0.25 watt at 70°C; linear taper.	RV111U503A
R1023 thru R1025	NOT USED	
R1026	Same as R1003.	
R1027	Same as R1012.	
R1028	Same as R1002.	
R1029	RESISTOR, FIXED, COMPOSITION: 560 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF561J

## RECEIVER INTERMEDIATE FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1030	RESISTOR, FIXED, COMPOSITION: 6,800 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF682J
R1031	Same as R1007.	
R1032	Same as R1003.	
R1033	Same as R1002.	
R1034	RESISTOR, FIXED, COMPOSITION: 2,700 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF272J
R1035	Same as R1002.	
R1036	Same as R1003.	
R1037	Same as R1016.	
R1038	RESISTOR, FIXED, COMPOSITION: 220 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF221J
R1039	RESISTOR, FIXED, COMPOSITION: 22,000 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF223J
R1040	Same as R1006.	
R1041	RESISTOR, FIXED, COMPOSITION: 10 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF100J
R1042	Same as R1041.	
T1000	NOT USED	
T1001	TRANSFORMER, INTERMEDIATE FREQUENCY: fixed; operating frequency 1.75 MC; nom. primary inductance 4.5 uhy, $\pm .200$ uhy; 4 terminals; wire lead type.	TZ126
XY1000	NOT USED	
XY1001	SOCKET, CRYSTAL: 2 silver plated beryllium copper contacts, for crystals having a 0.050 pin dia. and 0.486 spacing.	TS104-2
Y1000	NOT USED	

## RECEIVER INTERMEDIATE FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
Y1001	CRYSTAL UNIT, QUARTZ: 2 MC, $\pm 0.005\%$ ; operating temperature range $-55^{\circ}\text{C}$ to $+30^{\circ}\text{C}$ ; max. capacitance 7.0 uuf; parallel resonance; load capacitance 32.0 uuf, $\pm 0.5$ uuf; HC-6/U type holder.	CR18A/U 2.0 00000MC

## RECEIVER AUDIO FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1100 thru C1138	NOT USED	
C1139	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10,000 uuf, GMV; 500 WVDC.	CC100-16
C1140 thru C1145	NOT USED	
C1146	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized; insulated tubular case.	CE105-10-15
C1147	CAPACITOR, FIXED, ELECTROLYTIC: 50 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized; insulated tubular case.	CE105-50-15
C1148	Same as C1146.	
C1149	Same as C1147.	
C1150	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1,000 uuf, GMV; 500 WVDC.	CC100-29
C1151	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80% -20%; 100 WVDC.	CC100-28
C1152	Same as C1147.	
C1153 thru C1159	NOT USED	
C1160	CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized; insulated tubular case.	CE105-200-15
EQ1100 thru EQ1115	NOT USED	
EQ1116	HEAT SINK: transistor heat dissipating element.	HD101
EQ1117	Same as EQ1116.	
K1100	NOT USED	

## RECEIVER AUDIO FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
K1101	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
Q1100 thru Q1112	NOT USED	
Q1113	TRANSISTOR: germanium; PNP; JEDEC type 2N1370 transistor with a controlled hfe limit of 60-75; JEDEC type T09 case.	TX107
Q1114	Same as Q1113.	
Q1115	Same as Q1113.	
Q1116	TRANSISTOR: germanium; PNP; collector to base and collector to emitter voltage 60 V; emitter to base voltage 20 V; collector current 3 amps, base current 1 amp; junction-storage temperature range -55°C to +100°C; power dissipation 20 watts at 25°C.	2N1039
Q1117	Same as Q1116.	
Q1118	TRANSISTOR: germanium; PNP; JEDEC type 2N1370-7 transistor with a controlled hfe limit of 120-150; JEDEC type T05 case.	TX108
Q1119	Same as Q1113.	
Q1120	Same as Q1113.	
Q1121	TRANSISTOR: 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
R1100 thru R1136	NOT USED	
R1137	RESISTOR, FIXED, COMPOSITION: 100 ohms, +5%; 1/2 watt.	RC20GF101J



## RECEIVER AUDIO FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1138	RESISTOR, FIXED, COMPOSITION: 10,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF103J
R1139	RESISTOR, FIXED, COMPOSITION: 4,700 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF472J
R1140	RESISTOR, FIXED, COMPOSITION: 22 ohms, <u>+5%</u> ; 2 watts.	RC42GF220J
R1141	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF332J
R1142	Same as R1138.	
R1143	Same as R1141.	
R1144	Same as R1141.	
R1145	RESISTOR, FIXED, COMPOSITION: 680 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF681J
R1146	RESISTOR, FIXED, COMPOSITION: 10 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF100J
R1147	RESISTOR, FIXED, COMPOSITION: 100,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF104J
R1148 thru R1150	NOT USED	
R1151	Same as R1138.	
R1152	RESISTOR, FIXED, COMPOSITION: 3,900 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF392J
R1153	RESISTOR, FIXED, COMPOSITION: 2,200 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF222J
R1154	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF102J
R1155	Same as R1147.	
R1156	RESISTOR, FIXED, COMPOSITION: 22,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF223J
R1157	Same as R1156.	

## RECEIVER AUDIO FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1158	Same as R1153.	
R1159	RESISTOR, FIXED, COMPOSITION: 68 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF680J
R1160	RESISTOR, FIXED, COMPOSITION: 3.3 ohms, <u>+5%</u> ; 1 watt.	RC32GF3R3J
R1161	RESISTOR, FIXED, COMPOSITION: 470 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF471J
R1162	RESISTOR, FIXED, COMPOSITION: 1,800 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF182J
R1163	NOT USED	
R1164	NOT USED	
R1165	Same as R1139.	
R1166	Same as R1140.	
R1167	Same as R1140.	
R1168	RESISTOR, FIXED, COMPOSITION: 560 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF561J
R1169	Same as R1137.	
T1100 thru T1102	NOT USED	
T1103	TRANSFORMER, AUDIO FREQUENCY: fixed; primary impedance 4,000 ohms, CT; DC resistance 370 ohms, <u>+20%</u> ; secondary impedance 600 ohms, CT; DC resistance 60 ohms, <u>+20%</u> ; operating frequency range 200-15,000 cps; frequency response <u>+3</u> db at 250-3,500 cps.	TF267-3
T1104	TRANSFORMER, AUDIO FREQUENCY: fixed; primary impedance 3,000 ohms, CT; DC resistance 260 ohms, <u>+20%</u> ; secondary impedance 1,000 ohms, CT; DC resistance 105 ohms, <u>+20%</u> ; operating frequency range 200-15,000 cps; frequency response <u>+3</u> db at 250-3,500 cps.	TF267-2

## RECEIVER AUDIO FREQUENCY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
T1105	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

## MAIN CHASSIS

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1500	CAPACITOR, FIXED, ELECTROLYTIC: 2,000 uf, 25 WVDC; polarized; hermetically sealed alumium case with clear vinyl plastic sleeve.	CE116-5VN
DS1500	NOT USED	
DS1501	LAMP, INCANDESCENT: single contact, rated for 28.0 VAC/VDC, 0.04 amps; T-3-1/4 bulb.	BI110-7
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: printed circuit board type; 20 female contacts, 5 amps continuous current rating; 600 V RMS.	JJ287-20
J1512 thru J1515	NOT USED	
J1516	JACK: telephone.	JJ315-1
J1517 thru J1534	NOT USED	
J1535	Same as J1502.	
R1500 thru R1518	NOT USED	
R1519	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF102J
R1520	Same as R1519.	
R1521 thru R1533	NOT USED	

## MAIN CHASSIS

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1534	RESISTOR, FIXED, COMPOSITION: 4,700 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF472J
R1535	Same as R1534.	
R1536 thru R1544	NOT USED	
R1545	RESISTOR, VARIABLE, COMPOSITION: 5,000 ohms, <u>+20%</u> ; 2 watts; taper A; consists of a SPST normally open switch, symbol no. S1512.	RV4NBYSA502-BYY
R1546	RESISTOR, VARIABLE, COMPOSITION: 5,000 ohms, <u>+20%</u> ; 2 watts; taper A.	RV4LAYS A50-2B
R1547	Same as R1546.	
S1500 thru S1511	NOT USED	
S1512	See R1545.	
S1513 thru S1519	NOT USED	
S1520	SWITCH, ROTARY: tap; 1 deck, 2 non-shortening 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
TB1500	NOT USED	
TB1501	TERMINAL BOARD, BARRIER: 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

SECTION 7  
SCHEMATIC DIAGRAMS

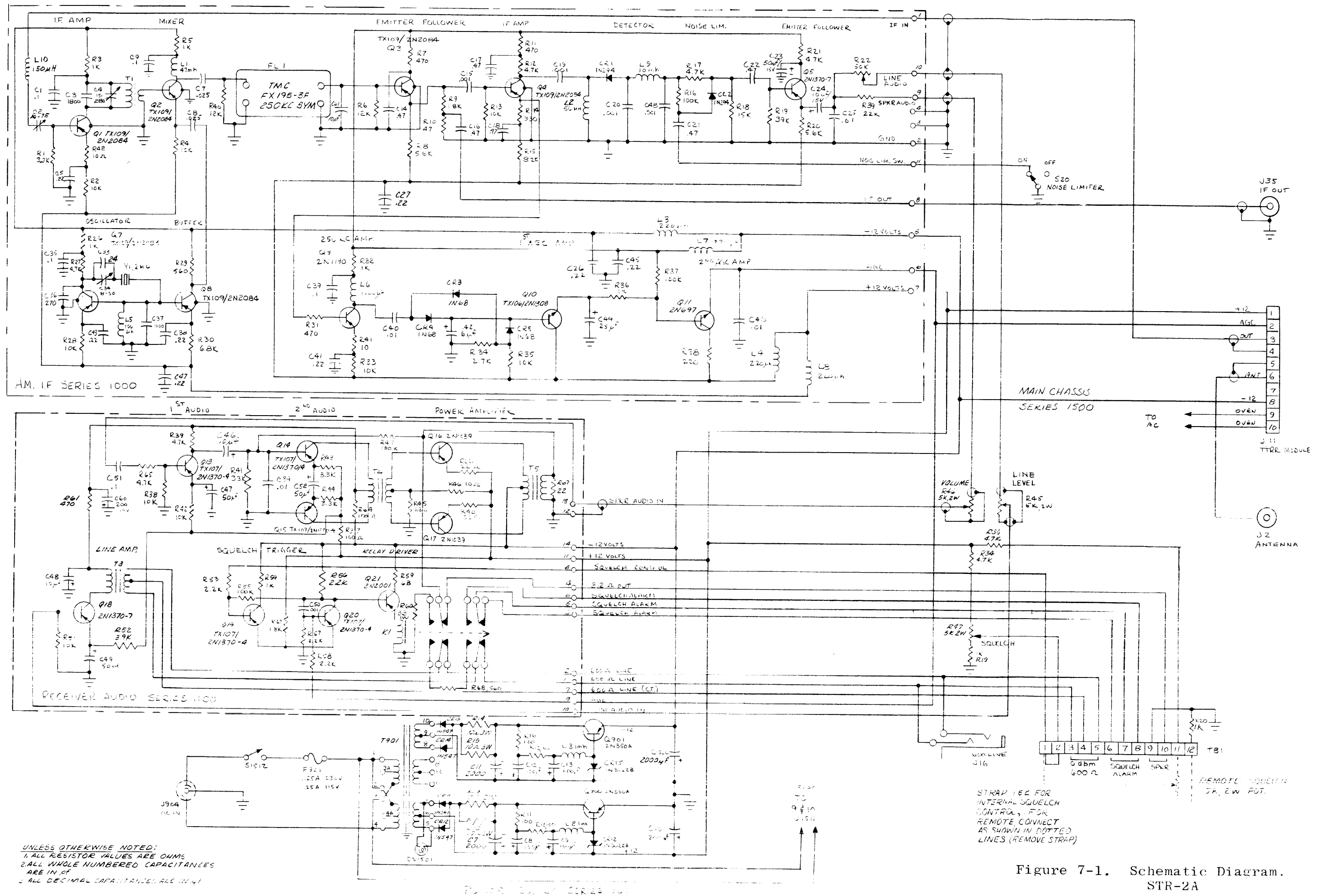


Figure 7-1. Schematic Diagram. STR-2A