TECHNICAL MANUAL
FOR
RECEIVER REMOTE
CONTROL SYSTEM
MODEL RCSR-1

THE TECHNICAL MATERIEL CORPORATION

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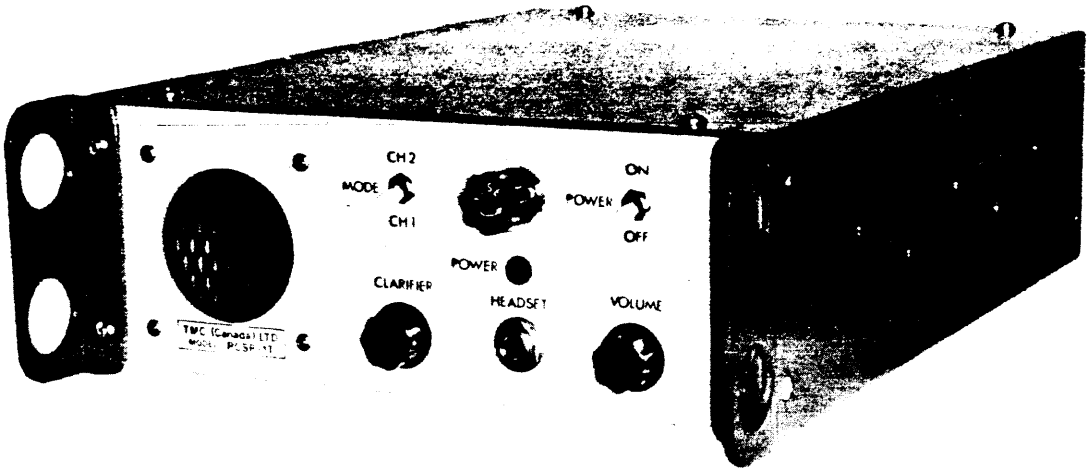


FIGURE 1-1 REMOTE CONTROL UNIT , RCSR-1T

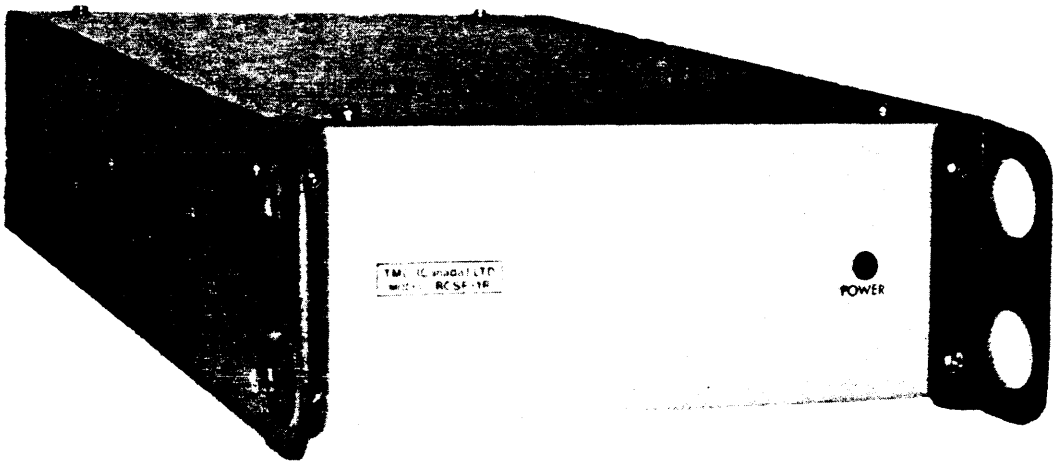


FIGURE 1-2 RECEIVER CONTROL UNIT, RCSR-1R

SECTION 1
GENERAL DESCRIPTION

1-1 FUNCTIONAL DESCRIPTION

The RCSR-1 system provides remote control of the MODE of operation and CLARIFIER control of a dual IF single frequency receiver. The system is composed of two units, one RCSR-1R Receiver Control Unit and one RCSR-1T Remote Control Unit. The RCSR-1 system provides remote control of the TMC model STR-5 Strip Receiver, or any other similar receiver, over a 600 ohm balanced line. Other 2 way audio transmission systems may be used provided they terminate at 600 ohms, balanced. Apart from main power switching, all receiver controls are duplicated at the RCSR-1T Remote Control Unit. ON/OFF keying of one fixed audio tone provides MODE control while the variable frequency of another audio tone is converted into a d.c. voltage which can be used to fine tune the HFO of a receiver; i.e. a CLARIFIER control.

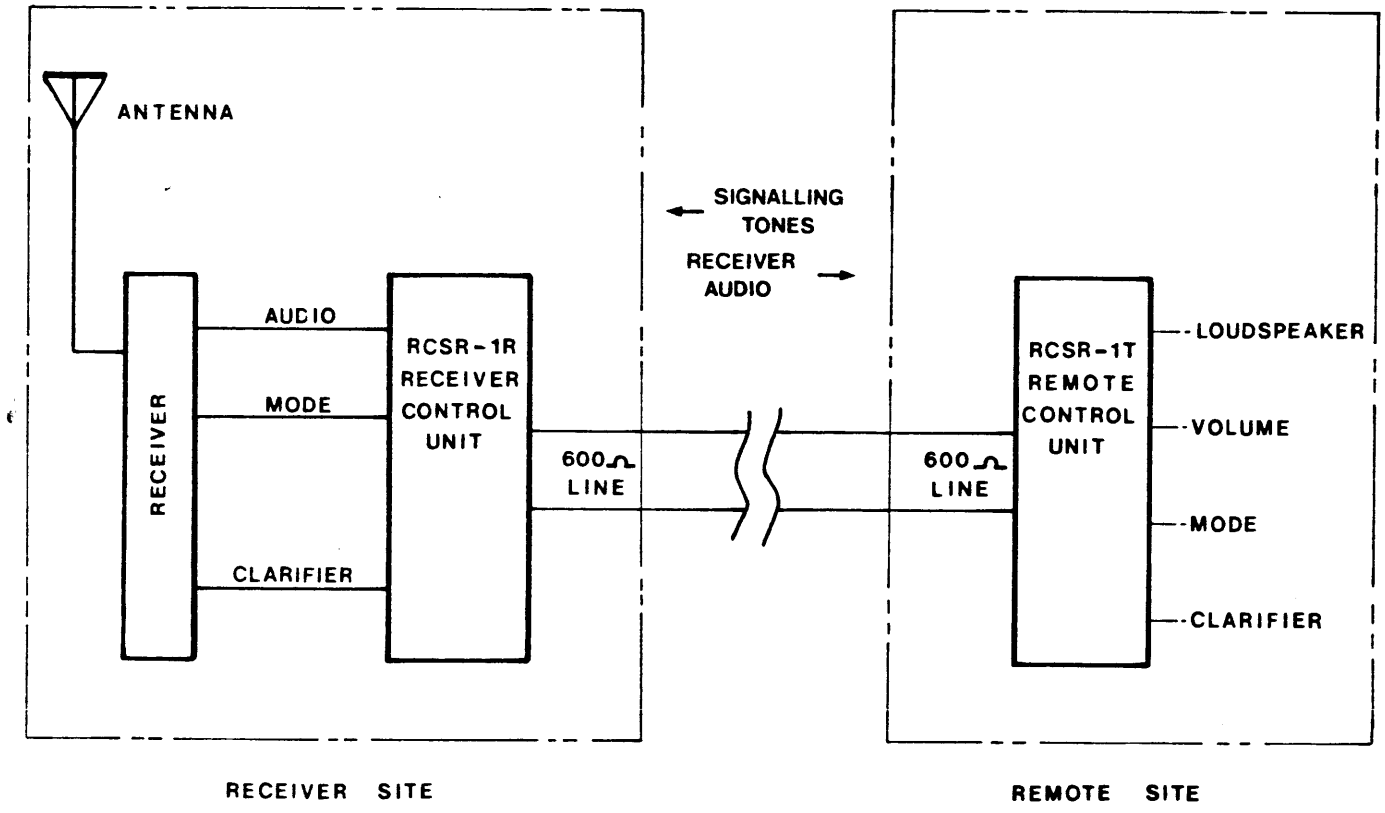


FIGURE 1-3 RCSR-1 SYSTEM BLOCK DIAGRAM

1-2 PHYSICAL DESCRIPTION

The RCSR-1 system consists of two separate units, the RCSR-1T at the remote site and the RCSR-1R at the local site.
Both units are designed for table top mounting, but adaptor kits are available for 19" rack mounting either singly or in pairs (see Sec. 2-4 for details).
Excluding the power supply components for the RCSR-1T Remote Control Unit and all front panel mounted components, all electronic components are mounted on plug-in printed circuit boards. To eliminate the possibility of a circuit board being plugged into the wrong connector, each circuit board is slotted to match a key installed on the corresponding connector. The location of the slots in each circuit board are listed below.

A11082-5	Between pins 1 and 2	A11086-5	Between pins 9 and 10
A11083-5	Between pins 3 and 4	A11087-5	Between pins 11 and 12
A11084-5	Between pins 5 and 6	A11088-5	Between pins 13 and 14
A11085-5	Between pins 7 and 8		

1-3 SEMICONDUCTOR COMPLEMENT

Unit or Assembly	Designation	Description	Function
RCSR-1T	A1	UGH7812393	Voltage Regulator
	CR1	DD10010-2	Bridge Rectifier
	DS1	TS10017	Primary Power Indicator
RCSR-1R	DS1	TS10017	Primary Power Indicator
A11086-5	A1	NW MC1458GL	Send and Receive Line Amplifier
A11087-5	A1	NW MC1741CP1	Wien Bridge Oscillator
A11088-5	A1	NW CA3020A	Audio Amplifier
A11085-5	A1	NW SN74121	Pulse Generator
	A2	NW MC1741CP1	DC Amplifier
	CR1	1N5231B	Voltage Regulator
	Q1	2N3904	Input Amplifier
	Q2	2N3904	Pulse Amplifier
A11083-5	A1	NW MC1558	Audio Amplifier
	Q1	TIS 91	Integrator
	Q2	TIS 90	Relay Drive

1-4 TECHNICAL SPECIFICATIONS

Control Functions	CLARIFIER	Provides a 2-10 Vdc continuously variable, high impedance output at the local site for fine tuning of HF Oscillator of a receiver.
	MODE	Provides remote selection of the Channel 1 AGC source, Channel 1 audio, and BFO supply ON; or Channel 2 audio and BFO supply OFF.
Compatible Receivers		Designed for use with TMC Model STR-5 receivers.
		May be used with any similar single frequency, dual IF stage receiver with switchable BFO, a d.c. controlled CLARIFIER and dual audio outputs

Control	MODE	2900 Hz, Odbm, ON/OFF switching
	CLARIFIER	2400-2600 Hz, Odbm, frequency varying
Input impedance		300 ohm unbalanced
Input level		Odbm, ± 3dbm
Monitor output		1/2 watt
Bandwidth		300 Hz to 3,000 Hz minimum
Line Impedance		600 ohms balanced
Maximum Tolerable Line Attenuation		10 db
Primary Power Requirements	RCSR-1T	115/230 VAC, 50-60 Hz, 10 watts
	RCSR-1R	+12 Vdc, 0.15A
Weight	RCSR-1R	6 Lbs. (2.7 Kg) approx.
	RCSR-1T	6 Lbs. (2.7 Kg) approx.
Dimensions		Both units measure: Height 3 1/4" (8.25 cm); Width 9" (22.8 cm) Length 12" (30.5 cm)

1-5 LOOSE ITEMS SUPPLIED

The following are supplied with the RCSR-1 system as loose items:

1	TM105-10AL	Fanning Strip, 10 terminal
2	TM105-2AL	Fanning Strip, 2 terminal
1	IN 106040	Technical Manual

1-6 OPTIONAL ITEMS

The following items are available as customer options

1.	STR-5 Test Connector	A10685
2.	Extender Card for RCSR-1 Units	A11089
3.	Front Panel Rack Mntg Plate	MS11377
4.	Dual Unit Mtg. Kit	KIT10050

SECTION 2
INSTALLATION

2-1 INITIAL INSPECTION

When the RCSR-1 system is unpacked, all units should be checked for any possible physical damage. All front panel controls should be checked for ease of operation.
If any damage is found refer to the warranty at the front of the manual for instruction.

2-2 POWER REQUIREMENTS

The Remote Control Unit, RCSR-1T can be operated using either a 115 Vac or 230 Vac power source. If an RCSR-1T wired for one power source voltage is to be operated from the other, the power transformer jumpers on the RCSR-1T must be changed. Wiring configurations for power transformer T1 are shown on Figure 7-2, Schematic Diagram RCSR-1T. For 115 Vac operation, the rear panel fuse F1 must be 1/4A; while for 230 Vac operation, it must be a 1/8A fuse.
The Receiver Control Unit, RCSR-1R is operated from a + 12 Vdc, 150ma. power source. When used in conjunction with many receivers such as TMC Model STR-5, this power can be obtained from the receiver, otherwise an external power supply must be provided

2-3 INITIAL CHECKOUT

Before attempting to check out the RCSR-1 system, check out separately the receiver to be controlled. Consult the technical manual of the receiver for instructions on this procedure. Before being installed, the units of the RCSR-1 system should be checked out on a local basis. A short length of 600 ohm audio cable should be used to link the Remote Control Unit and Receiver Control Unit so that both units may be checked at the same site as a system. If any unit in the system does not operate properly, the checkout and alignment procedure of para. 5-3 should be followed. The following procedure should be used to check the RCSR-1 system.

a. Connect the RCSR-1R to the receiver following Figure 2-1. Link the RCSR-1R and the RCSR-1T with a short length of 600 ohm cable. Apply power to both units following the instructions of para 2-2 and sec. 3. Check that the POWER indicator lamps on the RCSR-1R and the RCSR-1T light (POWER switch S2 on the RCSR-1T must be set to the ON position).

b. Select the CH 1 position on MODE switch S1 on the RCSR-1T. Disconnect the Channel 1 audio output of the receiver from terminal 8 of TB1 on the rear panel of the RCSR-1R. Remove top cover of the RCSR-1T and adjust pot R1 on A202 Hybrid Circuit Assembly for a null of the signalling tone as heard over the loudspeaker. This is best done with VOLUME control R1 on the RCSR-1T fully CW.

c. Connect an audio signal generator to terminal 8 of TB1 on the RCSR-1R. Adjust the generator for a 1 kHz, 2.2 volt p.p. output. Remove Variable Tone Generator Assembly A203 from the RCSR-1T. With the MODE switch on the RCSR-1T in the CH1 position, monitor the audio tone at pin 10 of J104 of the RCSR-1R with an oscilloscope and adjust R1 on A104 for a null of less than 10 mv. p.p.

d. Reconnect the receiver audio to terminal 8 of TB1 and replace top covers of the Remote and Receiver Control Units. Connect an RF signal generator to the receiver antenna and adjust for a steady clear audio output over loudspeaker of the RCSR-1T. Check that adjustment of the CLARIFIER pot on the RCSR-1T varies the receiver frequency.

e. Check that the receiver operates in the CH 1 mode of operation when the MODE switch S1 on the RCSR-1T is in the CH 1 position, and in the CH 2 mode operation when S1 is in the CH 2 position (readjusting the signal generator frequency and modulation if necessary).

f. If the system is proven to operate properly, the installation procedure described below may be followed.

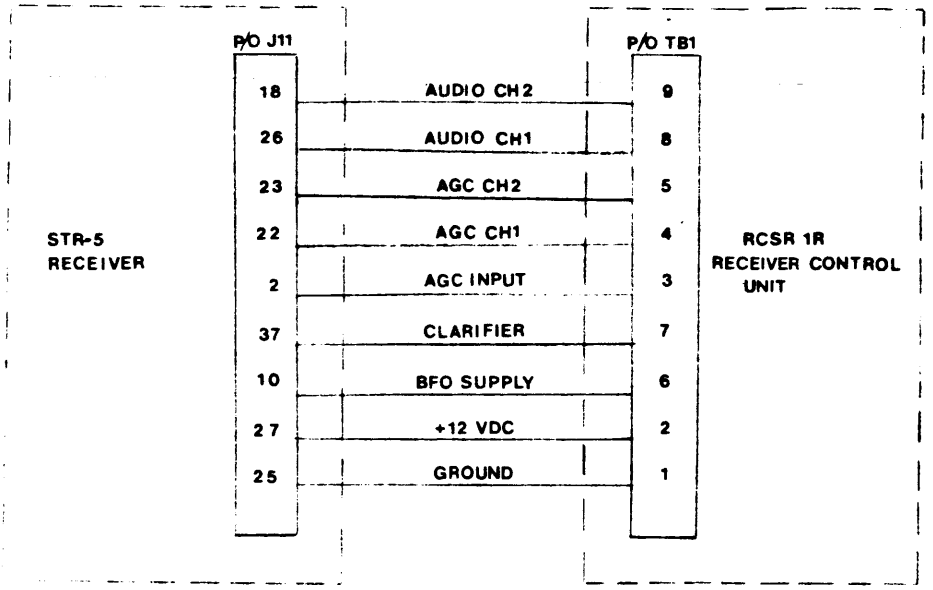


FIGURE 2-1 WIRING BETWEEN RCSR-1R AND STR-5

2-4 EQUIPMENT LOCATION

For ease of operation and maintenance, ensure sufficient clearance to allow easy access to all rear panel connectors and front panel controls. The RCSR-1R Receiver Control Unit should be located near the receiver, however cable length is not critical.
The RCSR-1 system utilizes solid state circuitry throughout; thus no special allowances are required for ventilation, and several units may be stacked one above the other.

2-5 MOUNTING

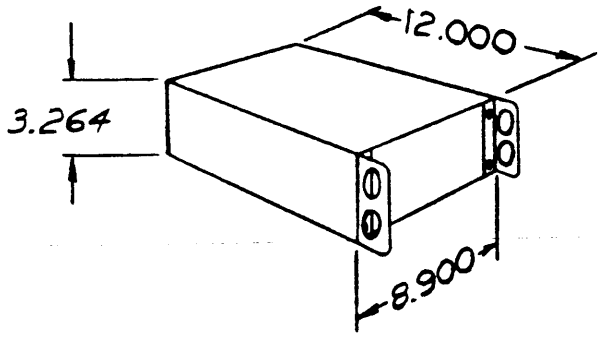
Both units of the RCSR-1 system are designed for table top mounting. However adaptor brackets are available to provide either single or double unit mounting in a standard 19" relay rack. Details for mounting units with these brackets are shown in figure 2-2

2-6 INSTALLATION AND ALIGNMENT

Installation sites for both units of the RCSR-1 system should be chosen according to the recommendations of para 2-2, 2-4, and 2-5 above. Because of the remote control nature of the system, the RCSR-1T will be separated from the RCSR-1R and receiver in most cases by considerable distances; thus several installation and alignment visits to the receiver site may be impractical. A procedure for installation and alignment is described below which requires only one receiver site visit.
When installing the units, electrical connections are made to the following connections.

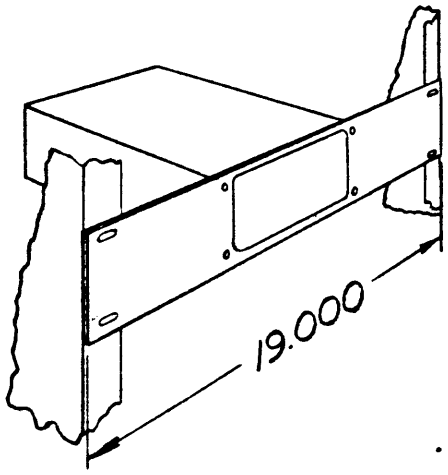
TB1	RCSR-1T	600 ohm line
J6	RCSR-1T	Headset (when used)
TB1	RCSR-1R	Receiver Controls
TB2	RCSR-1R	600 ohm line

Interconnections between RCSR-1 and an STR-5 receiver are shown in Figure 2-1.



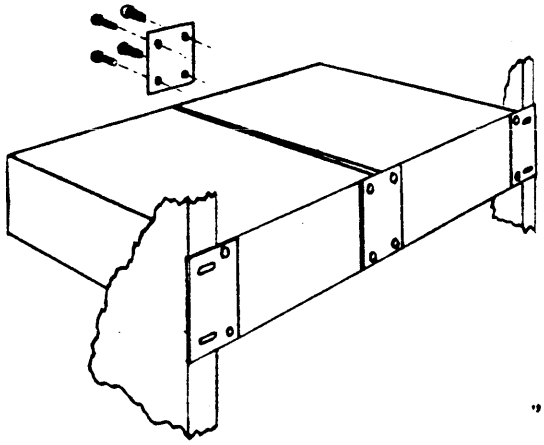
STANDARD MOUNTING
TABLE PACKAGE
(4 RUBBER FEET)

SINGLE UNIT ADAPTER
PANEL FOR 19" RACK



19" PANEL - TMC PART Nº MS 11377

DUAL UNIT MOUNTING
KIT FOR 19" RACK



KIT 10050 CONSISTING OF	TMC PART Nº
2 MOUNTING PLATES	MS 11383
2 CONNECTOR PLATES	MS 11384
4 SCREWS	SCBP-632SS6
4 WASHERS	LWE-06MSS

FIGURE 2-2 RCSR-1 MOUNTING DETAILS

a. Install Remote Control Unit RCSR-1T in its operating location at the remote site and connect the 600 ohm line to TB1 on the rear panel. Apply primary power to the unit and set POWER switch S2 to the ON position. Set MODE switch S1 to the CH 1 position. Remove Variable Tone Generator A203 from its connector J203.

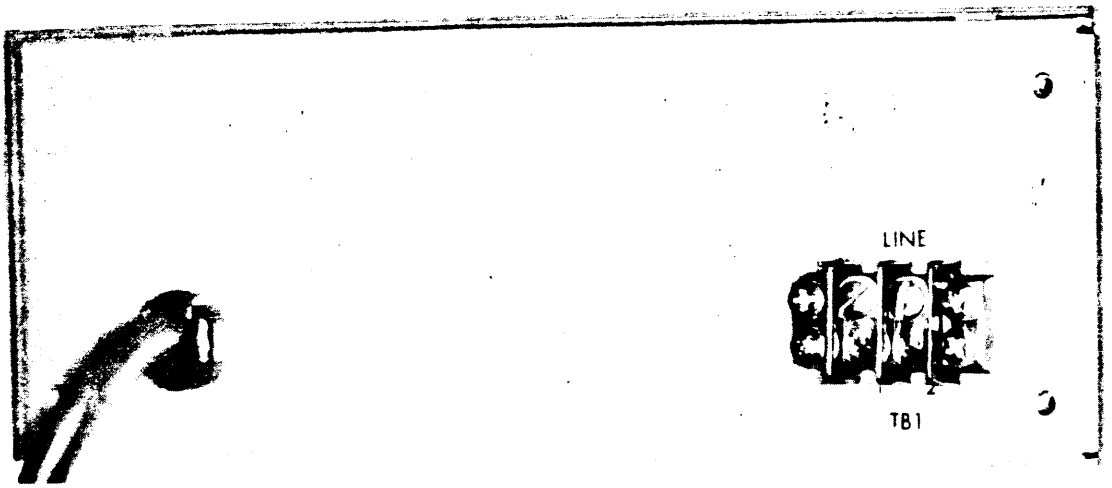
b. Install the Receiver Control Unit RCSR-1R in its operating location at the receiver site and connect the 600 ohm line to TB2 on the rear panel of the unit. Align the receiver under local control first, according to the instructions in the technical manual, and run a 9 core cable from the receiver to the RCSR-1R

c. Initially, connect only ground and + 12 vdc to the RCSR-1R. Connect an audio signal generator across terminal 8 and ground of TB1 and adjust the signal generator for a 2.2 v.p.p., 1kHz output Monitor the signal at pin 10 of J104 with an oscilloscope and adjust balance pot R1 on A104 for a null of less than 10 mv.p.p. If this null cannot be achieved, a capacitor of approximately the line capacitance must be added across terminal posts E1 and E2 on A104. Complete the connections between the receiver and TB1 of the RCSR-1R. Now adjust R11 on A101 Frequency to Voltage Converter Assembly for 2.0 volts DC on terminal 7 of TB2.

d. After the Receiver Control Unit has been installed and aligned, the Remote Control Unit Hybrid Transformer should be balanced. Set VOLUME control R1 on the front panel of the RCSR-1T fully CW. Adjust balance pot R1 on A202 Hybrid Circuit Assembly for a null of the audio signalling tone, as heard over the loudspeaker. If the tone is still audible when R1 is properly adjusted, a capacitor must be added to A202, as in para 2-6-c above.

e. When both hybrid transformers have both been balanced for the 600 ohm line, the system is ready for operation. However if the line is changed, or its characteristics vary, the hybrid transformers may have to be re-balanced. In general, if the audio signalling tones become audible, the transformers must be re-balanced.

The balance of the hybrid transformer in the RCSR-1T is not critical for proper operation of the system but only to eliminate the signalling tones from being heard. However the balance of the transformer in the RCSR-1R is important for proper system operation, otherwise receiver audio could affect the remote control devices and interfere with the signalling tones.



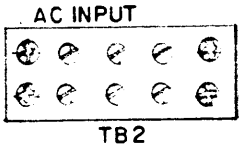


FIGURE 2-3 REAR VIEW , RCSR-1T
REMOTE CONTROL UNIT

SOME UNITS MAY BE CONSTUCTED WITH
A TERMINAL STRIP WHEN USED IN A SYSTEM

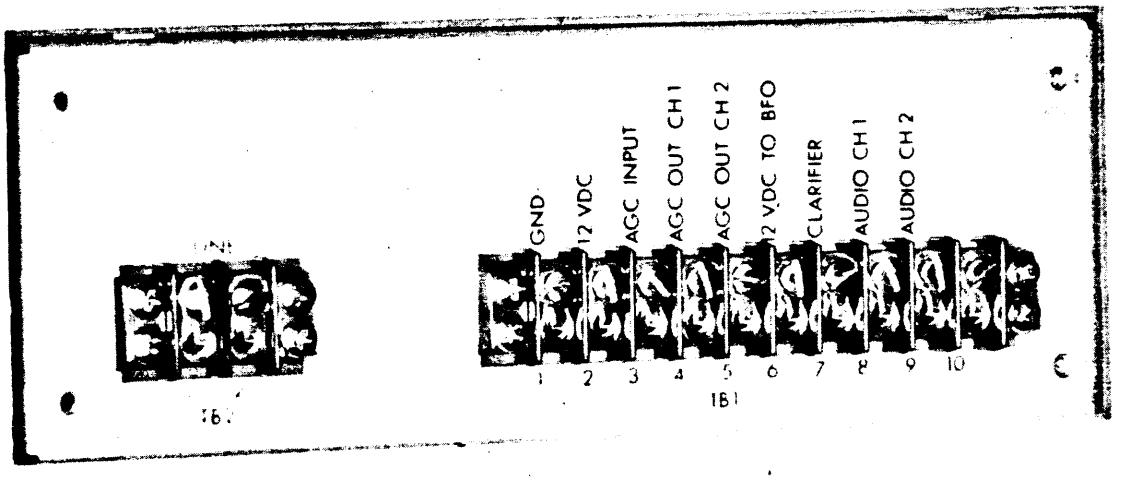


FIGURE 2-4 REAR VIEW RCSR- 1R
RECEIVER CONTROL UNIT

SECTION 3
OPERATOR'S INSTRUCTIONS

3-1 CONTROLS AND INDICATORS

Before attempting to operate the RCSR-1 system, the operator should become familiar with the controls and indicators on the front panel of each unit. The designation and function of each control and indicator is listed below.

Unit	Control or Indicator	Function
RCSR-1T	S1 Power ON/OFF	Controls primary power RCSR-1T
	DS1 POWER lamp	Indicates primary power connected to RCSR-1T and S1 is in the ON position.
	S2 MODE switch	Selects mode of operation of receiver
	R1 VOLUME control	Controls monitor volume
	R2 CLARIFIER control	Provides fine tuning of receiver frequency
RCSR-1R	DS1 POWER lamp	Indicates primary power connected to RCSR-1R

3-2 OPERATING PROCEDURES

a. Apply primary power to the receiver. Allow any appropriate period of time for receiver frequency to stabilize.

b. Connect primary power to the RCSR-1R (not neccessary if primary power is supplied from receiver as when used in conjunction with TMC Model STR-5 Strip Receiver).

c. Set power ON/OFF switch S1 on the RCSR-1T to the ON position.

d. Select the proper operating channel (CH1 or CH2), using MODE switch S2 on the RCSR-1T. When the RCSR-1 system is used in conjunction with TMC Model STR-5 Strip Receiver, the modes of operation implied by Channel 1 and Channel 2 are as follows.

Model	STR-5U/L	STR-5A/U	STR-5A/L
CH1	USB	USB	LSB
CH2	LSB	AM	AM

e. Adjust VOLUME control R1 on the RCSR-1T for a comfortable audio level.

f. Adjust CLARIFIER control R2 on the RCSR-1T for maximum voice or audio tone clarity.

SECTION 4
PRINCIPLES OF OPERATION

4-1 GENERAL

This section explains the principles of operation of the RCSR-1 Receiver Remote Control System.

4-2 PRINCIPLE OF OPERATION

In this subsection, the principle of operation of the RCSR-1 system shall be described. For the purpose of discussion a general receiver will be described first and referred to in the text. A detailed circuit analysis of each unit is given in paragraphs 4-3 and 4-4.

a. RECEIVER - RF signals from the antenna are amplified and converted to an I.F. frequency which is demodulated by two I.F. circuits simultaneously, thus providing two seperate audio outputs. Both circuits also generate an AGC signal to be applied to the RF input stage. The first mixer local oscillator is fine tunable by a variable d.c voltage. Mode control selects the AGC to be applied to the RF stage and, if neccessary, controls the BFO supply.

b. MODE CONTROL - MODE Control of the receiver involves selecting the proper AGC and audio output signals for channel 1 and channel 2 operation, and switching on a BFO for the SSB mode. Receiver mode is selected by the ON/OFF keying of an audio frequency tone. For the purpose of discussion it will be assumed that, as in the STR-5A/( ), receiver channels 1 and 2 refer fo the SSB and AM modes of operation, respectively.
When MODE switch on the RCSR-1T is set to the channel 2 (AM) position a 2900 Hz oscillator is keyed on, and when set to the channel 1 (SSB) position the oscillator is off. The tone is coupled to a 600 ohm balanced line by a hybrid transformer, and seperated at the RCSR-1R by another hybrid transformer. The presence of this tone is detected by an active circuit and a relay energized. This relay, when de-energized selects the channel 1 (SSB) audio to be routed to the RCSR-1T and the channel 1 AGC signal to be applied to the receiver RF stage. A d.c. supply is provided for the BFO. When the relay energizes, the BFO supply voltage is disconnected, and the channel 2 AGC and audio signals are selected.

c. AUDIO CONTROL - The appropriate receiver audio output is selected by a relay on the tone detector (see 4-2-b) and coupled through the hybrid transformer to the line linking the two control units. At the RCSR-1T the receiver audio is routed to an audio amplifier to be monitored on a loudspeaker or headphones.

d. CLARIFIER CONTROL The frequency of the HFO oscillator in the receiver can be fine tuned by adjusting the voltage across a variable capacitance diode. This is done, locally, by a CLARIFIER potentiometer. In the RCSR-1 system an audio tone, whose frequency is controlled by CLARIFIER potentiometer R2 is generated at the RCSR-1T. This tone is transmitted to the RCSR-1R over the balanced line and the frequency is converted to a d.c. voltage. This d.c. signal is then used as the clarifier voltage for the receiver.

4-3 OPERATING PRINCIPLES RCSR-1T

a. The RCSR-1T accepts receiver audio from the RCSR-1R, amplifies it and presents it over a loudspeaker. A variable tone and a fixed audio frequency tone are also generated for controlling the receiver. Both these audios are coupled into a 600 ohm balanced line through a hybrid transformer. The control tones are generated by Tone Encoder A204 and Variable Tone Generator A203. These outputs are patched into the 600 ohm line by Hybrid Circuit A202. At the same time, the receive side of the line is routed, by A202, to Audio Amplifier A201.

b. TONE ENCODER ASSEMBLY A204
Tone Encoder A204 provides a 2900 Hz tone at an output level of OdBm when pin 8 of J204 is grounded. MODE switch S1 in the channel 2 position provides a ground across pin 8 of J204, and the tone is ON.

In the channel 1 position the ground is removed and the tone is OFF. Thus when the tone is ON, channel 2 is selected and when the tone is OFF, channel 1 is selected.

c. VARIABLE TONE GENERATOR ASSEMBLY A203

Variable Tone Generator A203 provides a constant tone with a frequency variable nominally between 2400 and 2600 Hz. Operational Amplifier A1 acts as the active element in a Wien Bridge Oscillator. Incandescant bulb DS1 provides level stability; thus a very pure sine wave is generated. A phase shift network consisting of R2, C2, R5, C4 and dual ganged pots R2A and R2B provides positive feedback and determines the output frequency.

d. HYBRID CIRCUIT ASSEMBLY A202

The Hybrid Circuit A202 consists of a hybrid transformer and two signal amplifiers connected into a circuit designed to separate the audio signals on a 600 ohm line into those being transmitted and those being received. Transformers T1 and T2 are connected together as a Hybrid Transformer. Potentiometer R1 provides balancing of the Hybrid Transformer. Terminals E1 and E2 are provided for capacitive balancing should a line with a significant reactive element be used. Integrated circuit A1 is composed of two independent operational amplifiers and is connected so that the transmit and receive parts of the Hybrid Transformer are always terminated in 600 ohms. In this way the setting of the potentiometer R1 (to provide maximum isolation) depends on only the balanced line used.

e. AUDIO AMPLIFIER ASSEMBLY A201

Audio Amplifier A201 is composed of an integrated circuit amplifier A1 and a matching transformer T1. The output is controlled by external potentiometer R1 and coupled to a loudspeaker by T1. A 10 ohm resistor R5 ensures proper loading when a high impedance headset is used.

f. POWER SUPPLY

The power supply for the RCSR-1T is chassis mounted. It consists of a transformer T1, a bridge rectifier assembly CR1, filter capacitors C1 and C2 and an integrated circuit voltage regulator A1. Light emitting diode DS1 gives a power-on indication.

4-4 OPERATING PRINCIPLES, RCSR-1R

Audio signal tones from the RCSR-1T are received and interpreted by the RECEIVER CONTROL UNIT RCSR-1R. A clarifier voltage is developed by A102 and A103, and the mode is selected by A103. The selected audio is patched into the 600 ohm line by a hybrid circuit A104. +12 VDC power is supplied from the STR-5.

a. HYBRID CIRCUIT ASSEMBLY A104

Hybrid Circuit Assembly A104 is the same in the RCSR-1R as is A202 in the RCSR-1T (See para. 4-3-d). The receiver port is connected to the low pass filter A102 and tone detector A103. The send port is connected to the receiver output of A103.

b. LOW PASS FILTER ASSEMBLY A102

Low Pass Filter Assembly A102 is a passive device designed to filter the 2900 Hz tone from the input to frequency to voltage convertor A101. It is a low pass filter with a sharp cut-off designed to attenuate any signals above 2900 Hz by at least 40 db.

c. FREQUENCY TO VOLTAGE CONVERTER ASSEMBLY A101

Frequency to Voltage Converter Assembly A101 accepts the output from A102 and converts the frequency to a d.c. voltage for use as the clarifier signal. Input amplifier Q1 provides a fixed amplitude signal into A1, an integrated circuit one-shot multivibrator. Each audio cycle entering A1 triggers a 4 volt pulse. The amplitude and time of this pulse are constant and independent of the triggering input. These pulses are amplified and integrated by Q2 to provide a DC voltage related to the frequency of the input tone. A2 is an integrated circuit DC amplifier disigned to provide a 2 to 10 volts DC output for a 2400 - 2600 Hz input frequency.

d. FIXED TONE DETECTOR ASSEMBLY A103

Fixed Tone Detector Assembly A103 consists of a 2900 Hz tone detector and relay circuitry designed to

select the channel of operation of the receiver. Audio from the Hybrid Circuit A104 is fed directly to A103. If a 2900 Hz tone is present at a level above - 30 dbm the relay energizes. The channel 2 AGC and audio sources are selected by the relay. When no tone is present, the relay de-engerizes and the channel 1 AGC and audio sources are selected. In addition the audio relay contacts are used to switch a + 12 VDC supply for BFO distribution board.

SECTION 5
MAINTENANCE

5-1 GENERAL

This section describes preventive maintenance, checkout and alignment and troubleshooting procedures for the RCSR -1 system. The following equipment is required to perform these procedures.

a. Audio Frequency Signal Generator.
b. Oscilloscope.
c. Power Supply, +12VDC @ 150 ma
d. V.O.M., Simpson Model 260, or equivalent
e. Frequency Counter, Hewlett Packard Model 5326B, or equivalent.

5-2 PREVENTIVE MAINTENANCE

Preventive maintenance for the RCSR-1 system consists of routine visual inspection and maintenance. Cleaning is neccessary to prevent excessive build-up of dust on components which could reduce the efficiency of the system or increase component wear. A vacuum cleaner or compressed air hose should be used to clean the units. A visual check of the units when opened for cleaning can often indicate any deteriorating or defective components. Down time due to components failure can thus be reduced by looking for any indications, or damage to wiring. Any components supected of deterioration should be replaced.

5-3 ALIGNMENT AND CHECKOUT PROCEDURE

A procedure for aligning and checking the circuits of the RCSR-1T system is given below. Circuit diagrams of each unit and printed circuit assemblies may be found in Section 7. Component designations used in this procedure correspond to those used in the schematic diagrams and found marked on the circuit boards themselves. Figures 5-1 to 5-9 can be used to assist in identifying the assemblies and locations.

a. Remove all P.C. boards from both units

b. Connect proper AC power source to the power cord of the RCSR-1T.
WARNING: Check that the RCSR-1T is wired for the proper AC line voltage. Connection of a unit wired for 115 VAC to a 230 VAC line will result in damage to the unit.

c. Turn POWER switch S-2 on the RCSR-1T to the ON position and check to see that POWER indication light DS1 is illuminated. If it is not refer to the troubleshooting procedure.

d. Turn POWER switch S-2 to OFF. Insert A204 Tone Encoder Assembly A11082-5 into connector J204 in the RCSR-1T.

e. Turn POWER switch S2 to ON. Turn MODE switch S1 to channel 2. Use oscilloscope to check for audio tone on pin 10 of J204. Adjust R1 level control on A204 Tone Encoder ASSEMBLY for 4.0. volts peak to peak. Turn MODE switch S1 to channel 1. Tone should disappear.

f. Turn POWER switch S2 to the OFF position and insert A203 Variable Tone Generator Assembly A11087-5 into connector J203 in the RCSR-1T. Turn POWER switch S2 to the ON position.

g. Insert A203 Variable Tone Generator Assembly A11087-5 into connector J203 on the RCSR-1T. Connect a frequency counter across TB1 and turn CLARIFIER control R2 on the front panel fully CCW. The counter should read between 2300 and 2500 Hz. Record this reading. Turn the CLARIFIER control fully CW and record the reading on the frequency counter, which should be between 175 Hz and 225 Hz higher than the CCW reading.

h. Turn the POWER switch to OFF. Remove A202 Variable Tone Generator Assembly A11087-5 from the RCSR-1T and turn POWER switch to ON. Set MODE switch to channel 2 and adjust R2 on A204 Tone Encoder Assembly A11082-5 for a reading of 2900 Hz. Remove the frequency counter from TB1.

i. Connect an RCSR-1R to the RCSR-1T with a short length of 600 ohm audio cable between TB1 of the RCSR-1T and TB2 of the RCSR-1R.

j. Connect a +12Vdc power supply to terminal 2 and ground (terminal 1) on TB1 on the RCSR-1R.

k. Insert A104 Hybrid Circuit Assembly A11086-5. Turn the 12 volt power supply on and check POWER indicator lamp DS1 on the front panel of the RCSR-1T for illumination.

l. Insert A201 Audio Amplifier Assembly A11088-5 into J201 on the RCSR-1T turn VOLUME control on the front panel of the RCSR-1T fully CW and adjust R1 on A202 Hybrid Circuit Assembly for a null of the audio tone on the loudspeaker.

m. Turn the 12 volt power supply off and insert A103 Tone Detector Assembly A11083-5 into J103 on the RCSR-1R. Turn the power supply back on and cycle the MODE switch on the RCSR-1T several times between CH1 and CH2. There should be an audible click from the relay on A103 for each cycle.

n. Connect an Audio Signal Generator between terminal 8 of TB1 and ground on the RCSR-1R and adjust the generator for a 1 kHz output at 2.2 volts P.P.

o. Set Volume Control on the front panel of the RCSR-1T one quarter turn CW. The 1 kHz tone should be clearly audible when MODE switch is in the CH1 position but not in the CH2 position.

p. Set the Volume Control fully CCW and the MODE Switch to the CH1 position. Remove Variable Tone Generator Assembly A203 from the RCSR-1T. Using an oscilloscope, MONITOR the Audio tone at pin 10 of J104 of the RCSR-1R, and adjust balance pot R1 on Hybrid Circuit Assembly A104 for a null of less than 10 mv. p.p.

q. Insert A102 Low Pass Filter Assembly, A11084-5 into J102 of the RCSR-1R. Set the MODE switch on the RCSR-1T to the CH 2 position and check pin 1 of J102 with an oscilloscope for an audio tone of less then 10 mv p.p.

r. Insert A203 Variable Tone Generator Assembly A11087-5 into J203 of the RSCR-1T and check for a minimum of .5 volts peak to peak audio on pin 1 of J102 at all settings of the CLARIFIER control on the front panel of the RCSR-1T.

s. Turn 12 volt power supply off and insert A101 Frequency to Voltage Converter Assembly A11085-5 into J101 of the RCSR-1R. Turn the 12 volt supply on and connect an oscilloscope probe to terminal 7 of TB1 of the RCSR-1R. Turn CLARIFIER control on the RCSR-1T fully cw and adjust R11 on A101 Frequency to Voltage Converter for 10 volts DC on Pin 5 of J101. Turn the CLARIFIER control fully CCW and the DC level should drop to 2 volts or less.

t. Connect audio signal generator across terminal 9 and ground on TB1 on the RCSR-1R. Adjust the generator for 1000 Hz at OdBM and set the Volume control on the RCSR-1T at approximately one quarter turn CW. The 1000 Hz tone should be clearly audible when MODE switch S1 is in the CH1 position, but not when it is in the CH2 position.

u. Connect an ohmmeter between terminals 3 and 4 of TB1 on the RCSR-1R. The meter should read less than 10 ohms when MODE switch S1 is in the channel 1 position and greater than 10,000 ohms in the channel 2 position. Now remove the ohmmeter lead from terminal 4 of TB1 and connect it to terminal 5. When MODE switch S1 is in the channel 2 position the ohmmeter should read less than 10 ohms and when the MODE switch is in the channel 1 position the ohmmeter should read greater than 10,000 ohms.

v. Connect a 1000 ohm, 1/2 watt resistor from terminal 6 of TB1 on the RSCR-1R to ground and connect a volt meter across it. When the MODE switch is in the channel 2 position the volt meter should read zero volts, but when the mode switch is in the channel 1 position the voltmeter should read greater than +7 volts DC.

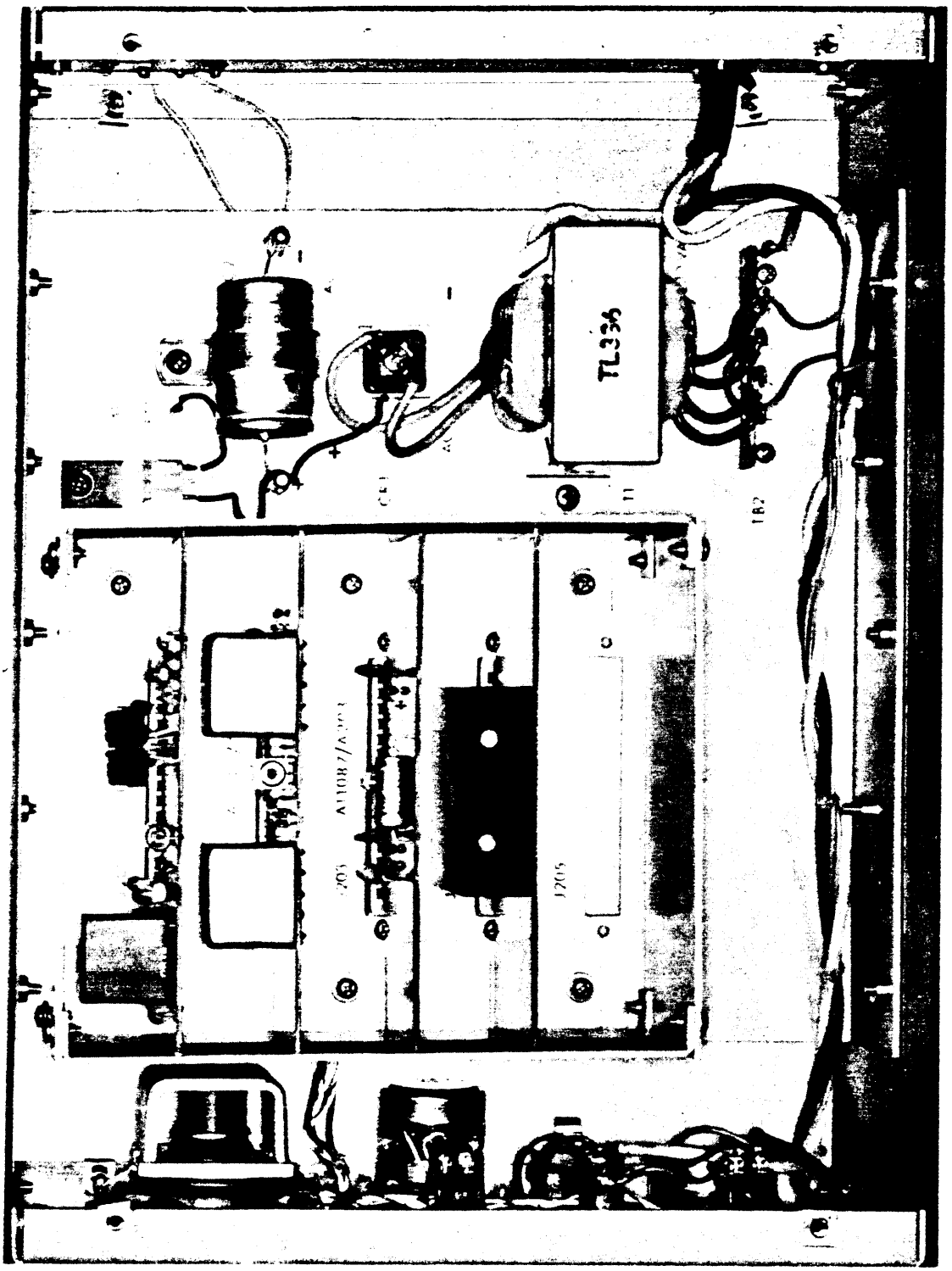


FIGURE 5-1 TOP VIEW RCSR-1T
REMOTE CONTROL UNIT

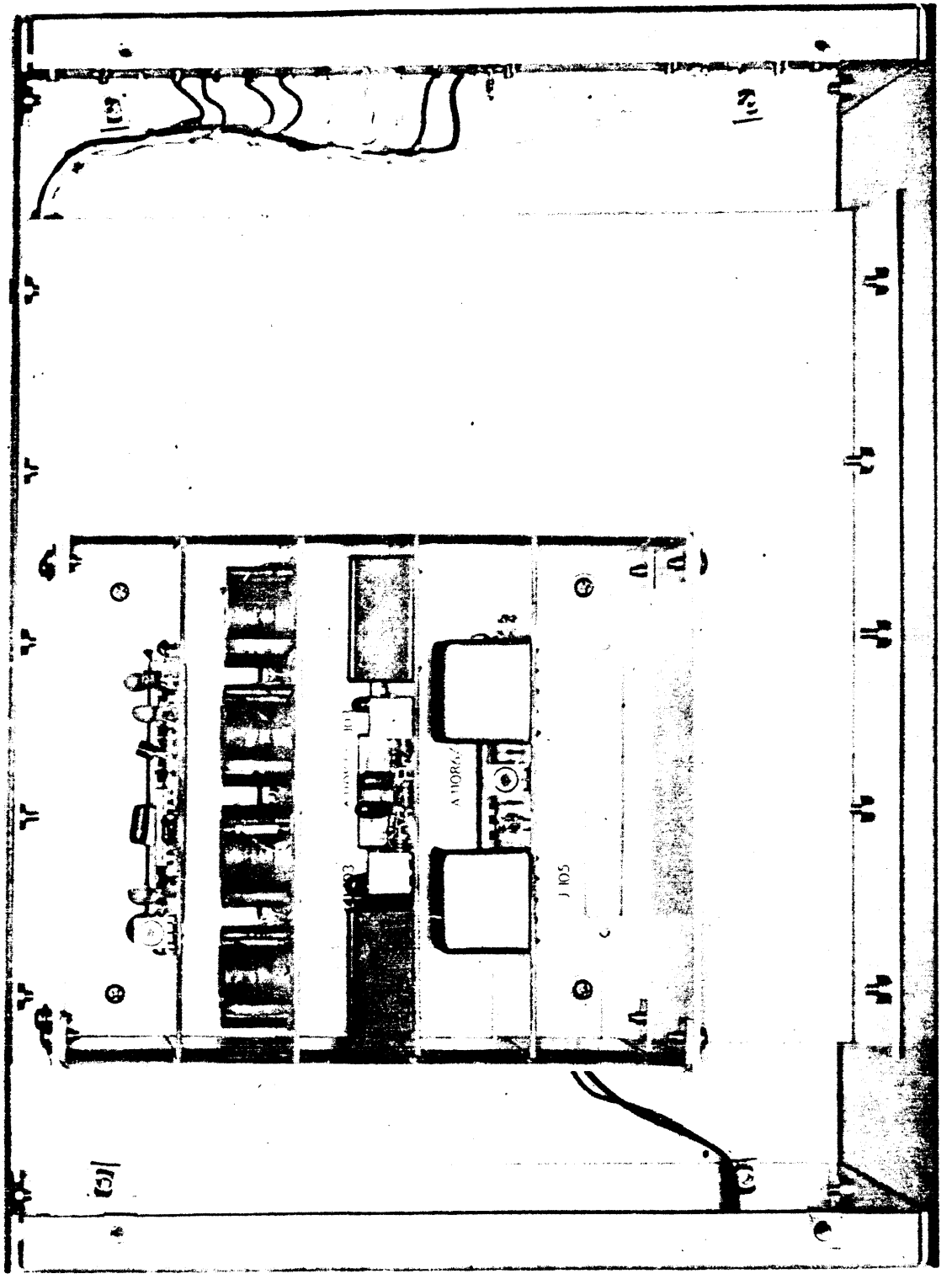


FIGURE 5-2 TOP VIEW RCSR-1R
RECEIVER CONTROL UNIT

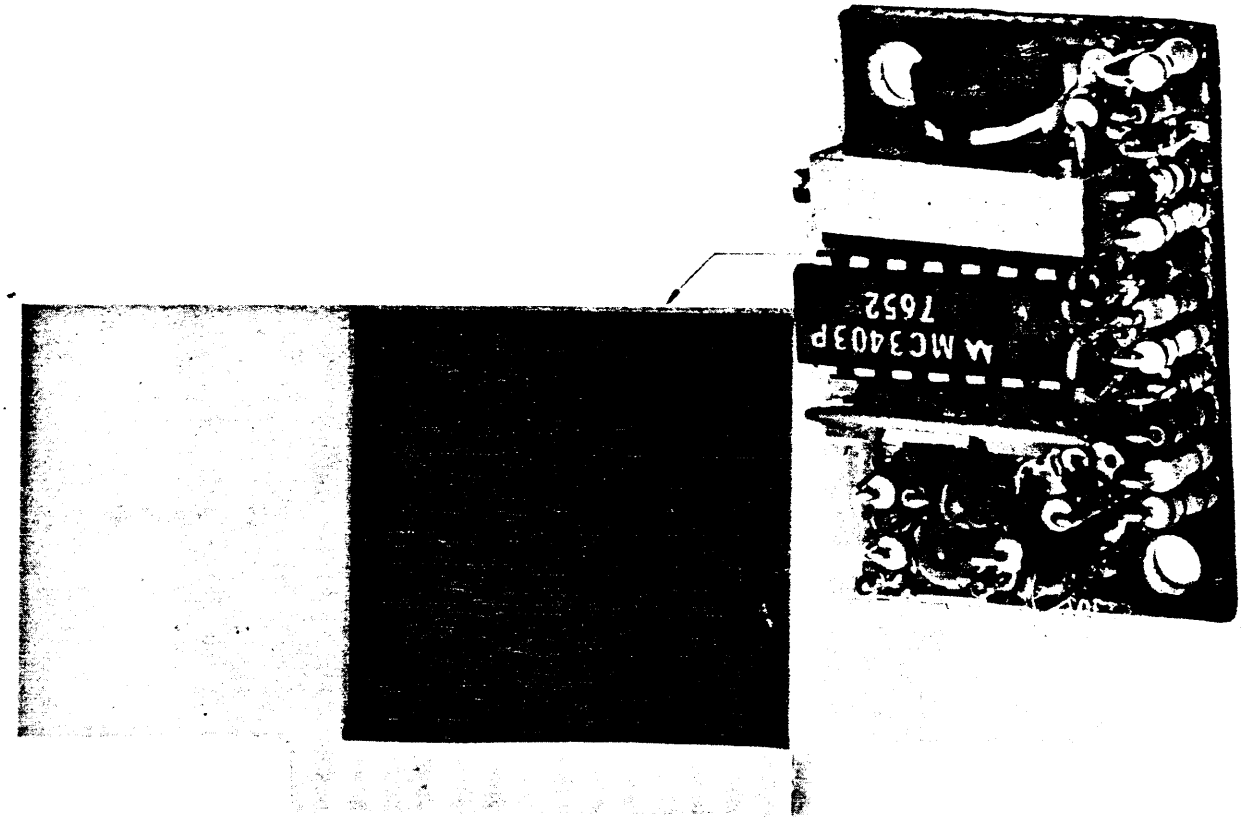


FIGURE 5-3 TONE ENCODER ASSEMBLY A11082-5

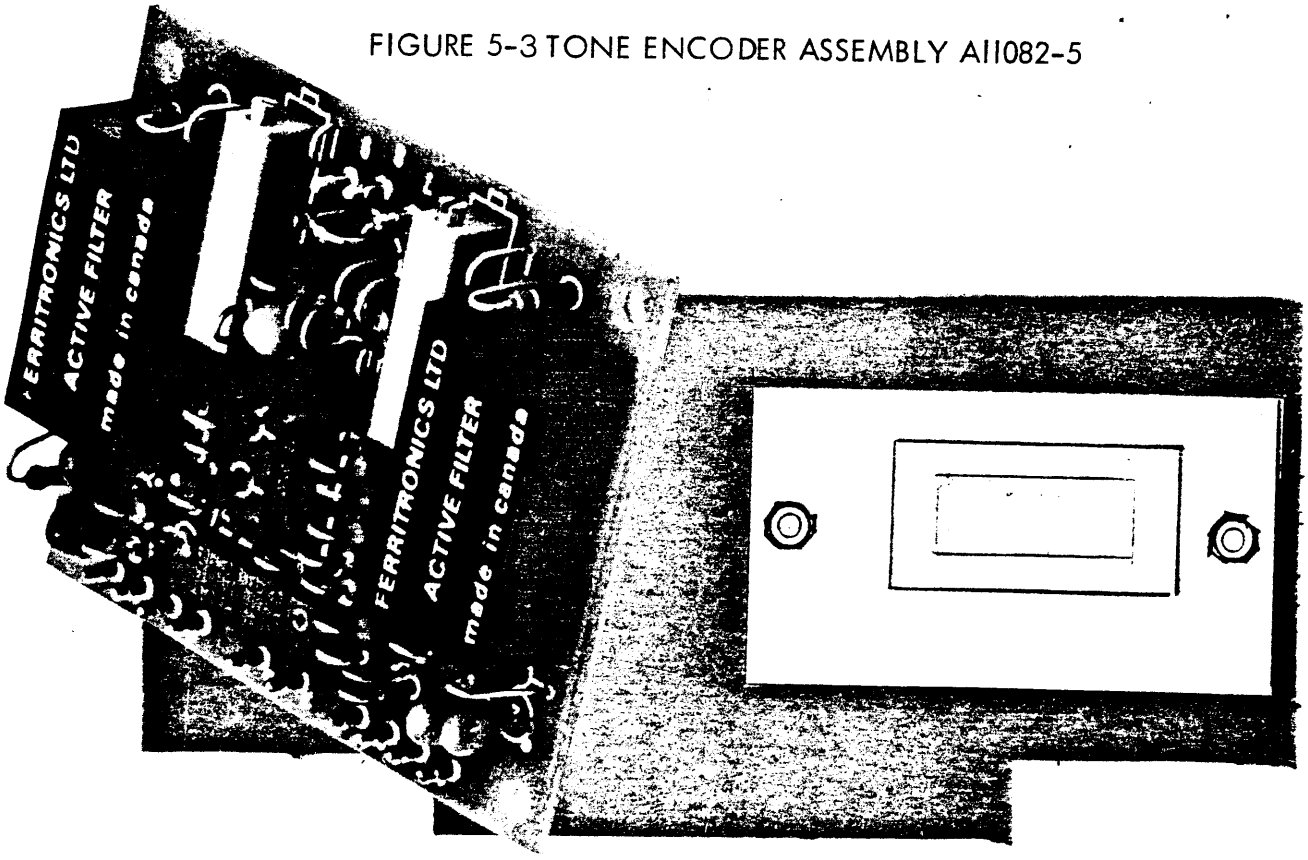


FIGURE 5-4 TONE DETECTOR ASSEMBLY A11083-5

FIGURE 5-5 LOW PASS FILTER ASSEMBLY A11084-5

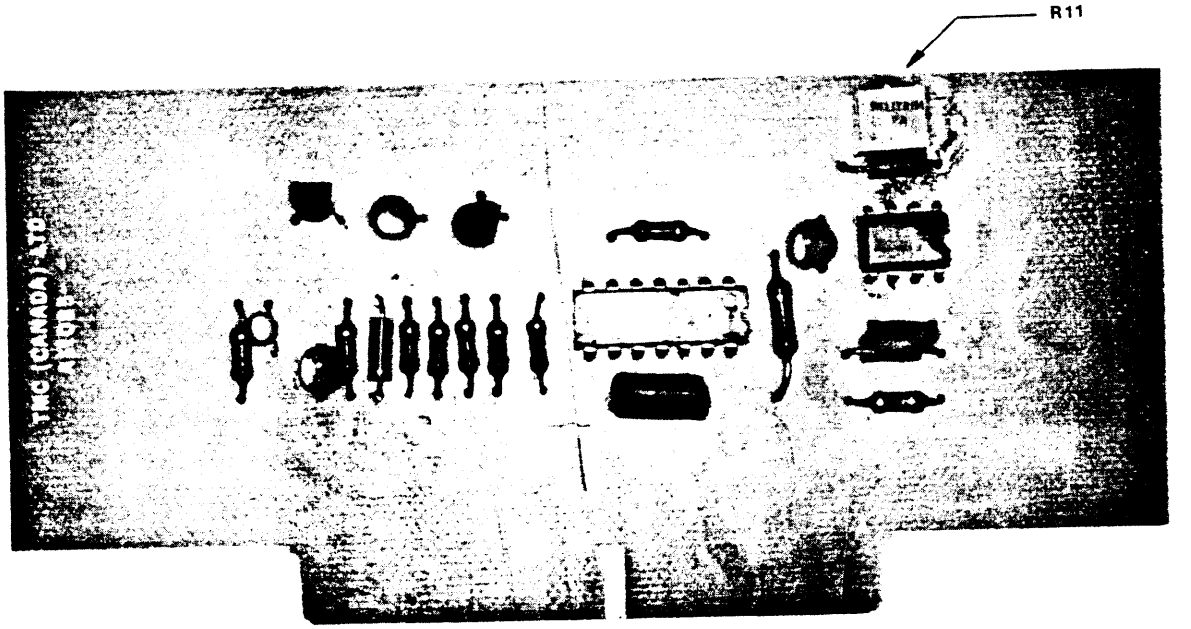


FIGURE 5-6 FREQUENCY TO VOLTAGE CONVERTER
ASSEMBLY A11085-5

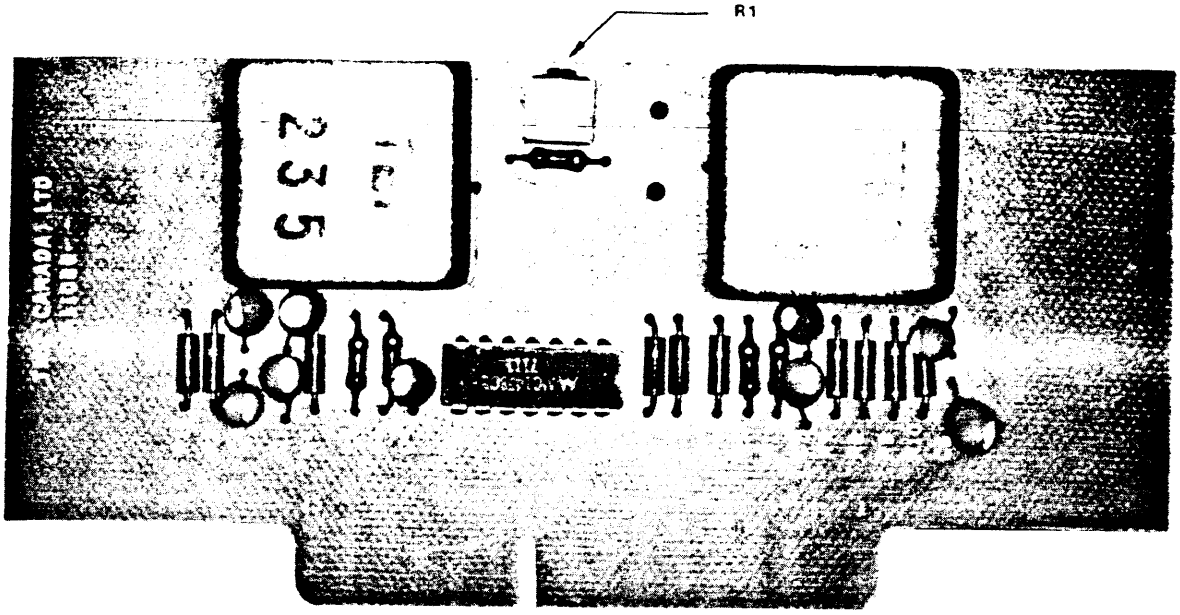


FIGURE 5-7 HYBRID CIRCUIT ASSEMBLY A11086-5

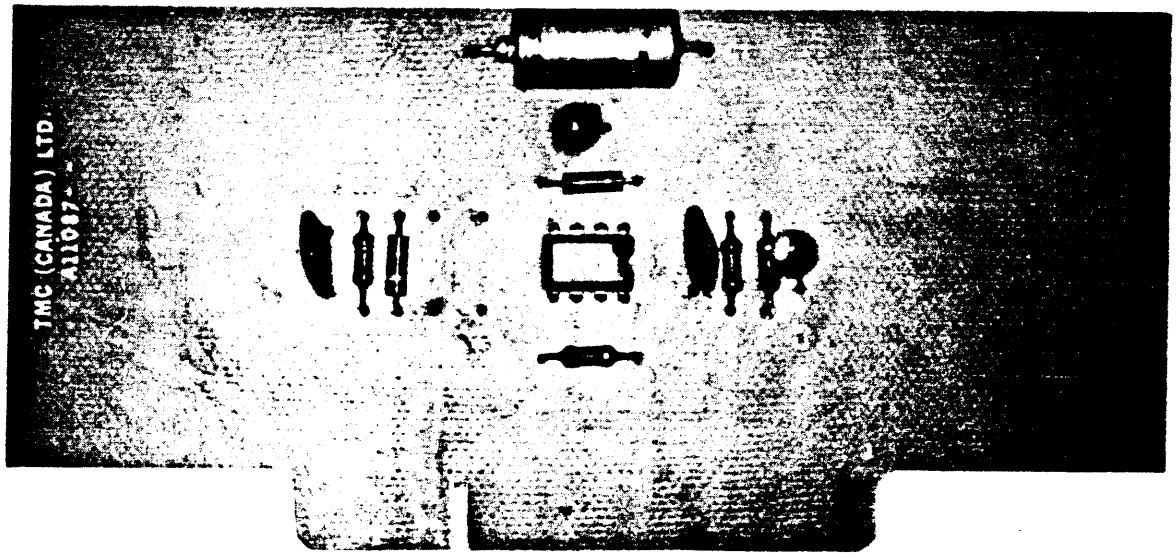


FIGURE 5-8 VARIABLE TONE GENERATOR
ASSEMBLY A11087-5

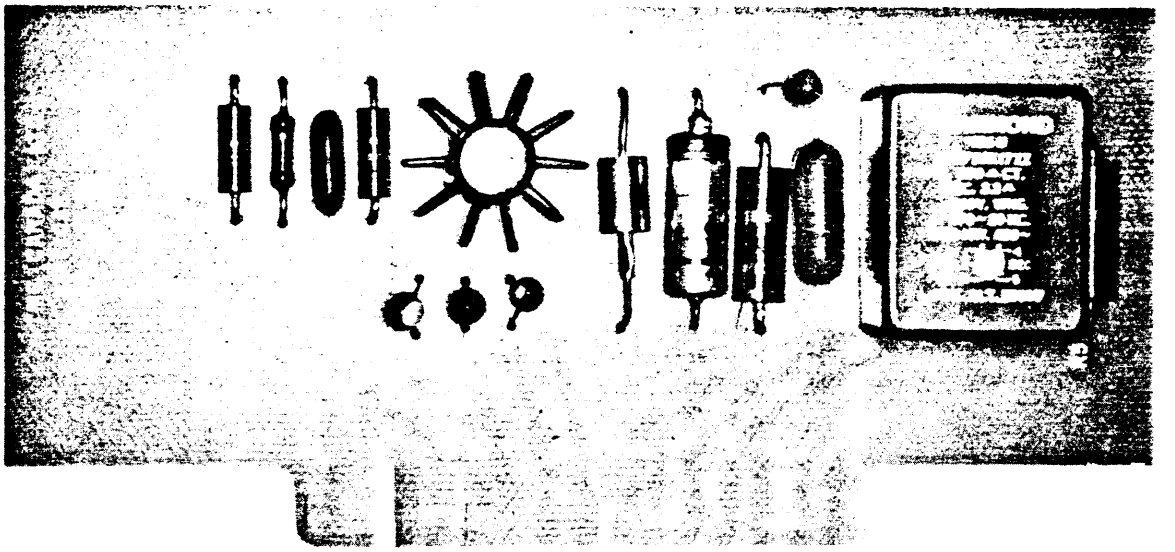


FIGURE 5-9 AUDIO AMPLIFIER ASSEMBLY A11088-5

5-4 REPAIR

Repairs to the units of the RCSR-1 system will generally consist of the replacement of an electronic component, for which the following precautions should be observed.

a. Always replace a component with its exact duplicate. Components should always be placed in the same position as the one being replaced.

b. Do not use a soldering iron with a power rating in excess of 100 watts for work on printed circuit boards or on delicate components. When soldering heat sensitive components such as semiconductor devices, use needle nose pliers as a heat sink.

c. Extreme caution must be taken when soldering components on printed circuit boards not to apply excess heat which may cause printed wire to lift off of the board.

d. Check all solder joints made, as cold or loose solder joints may cause trouble at a later date.

5-5 TROUBLESHOOTING

a. VARIABLE TONE GENERATOR ASSEMBLY A11087
If the Variable Tone Generator Assembly does not oscillate, check pins 10 and 11 for + 12Vdc, ± 1 volt. If the voltage is correct remove the board from the unit and, with the bulb still soldered onto the circuit board, measure the resistance across the bulb. If it reads between 50 and 200 ohms, it is not defective. If the bulb is good and there is no oscillation, then replace A1.

b. FREQUENCY TO VOLTAGE CONVERTER ASSEMBLY A11085-5
If there is at least a 75mv peak audio signal on pin 9 of the Frequency to Voltage Converter, and if the proper 2 to 10 volt dc signal is not on pin 5, then the board is either defective or misaligned. If alignment procedure has been followed and the board still does not function properly, then it must be defective.
Check pin 9 of J101 to see that there is at least a 75mv peak to peak audio signal of a frequency between 2300 and 2700 HZ. If there is, then check pin 6 of A1 for a pulse at a rate equal to the audio frequency input. The pulse should be approximately 3 volts peak to peak. If these pulses are not there, check to see that there are pulses of at least 4 volts peak to peak on pin 5 of A1. If there are pulses on pin 5 but none on pin 6, check pin 14 of A1 for 5 to 6 volts dc. If the voltage on pin 14 is correct, replace A1; if not, replace CR1.
If there are pulses at pin 6 of A1, check the collector of Q3 for the same pulses but with a height of greater than 10 volts. If the pulses are absent, replace Q2. If the pulses are correct at the collector of Q2, check the DC voltage on the positive side of C3. It should be between 2 and 3 volts with no more than 100MV ripple. If there is more ripple, or an incorrect voltage, check C3. Set R11 for a DC bias of 3.0 volts on pin 3 of A2. Measure the voltage on pin 2 of A2. If it is not 3.0 volts, replace A2.

c. TONE ENCODER ASSEMBLY A11082-5
Check that when pin 6 is at + 12 Vdc and pin 2 is at ground, an audio tone of approximately 2900 Hz is present at pin 10. Adjust R1 for 4.0 volts p.p. and adjust R2 for a frequency of 2900 Hz. If sufficient output cannot be obtained, or if the frequency cannot be set at 2900 Hz, the oscillator module must be replaced.

d. HYBRID CIRCUIT ASSEMBLY A11086-5
Check to see that the voltage on pin 9 of A1 is within a few millivolts of that on pin 8, and that the voltage on pin 5 of A1 is within a few millivolts of that on pin 6. If either condition is not met, replace integrated circuit A1. If A1 tests satisfactorily, then check transformers T1 and T2 for continuity and isolation.

e. AUDIO AMPLIFIER ASSEMBLY A11088-5
Check for + 12 Vdc ± 1 volt on pins 4 and 7 of A1. Check for + 12 Vdc on the centre tap, pin 2, of the primary winding of output transformer T1. If 12 volts is present on pin 2 of T1 but not on either of pins 4 and 7 of A1, then replace T1. If 12 volts is present on pins 4 and 7 and there is no audio output, replace integrated circuit A1.

f. TONE DETECTOR ASSEMBLY A11083-5

CIRCUIT DESCRIPTION

Signal is coupled into the tone decoder at pin 1 and is coupled through non-polar capacitors C1 and C2 to the first active filter where some preliminary selectivity is obtained. Active Filter AF1 is a low selectivity active filter tuned with R2 and R3 to the required centre frequency of the tone decoder. From the output of AF1 at pin 3 (TP1) the signal is coupled to limiting amplifier IC1 where the signal is amplified and limited by diodes D1 and D2 to form a constant amplitude squarewave. The signal is coupled into high selectivity active filter AF2 via R24. The centre frequency of AF2 is adjustable via R10 and R11. In the normal selectivity case, the output of AF2 is coupled directly to pin 5 of the buffer amplifier to drive the detector circuitry Q1, etc. For higher selectivity applications, R12 and R13 are added to attenuate the amplitude of the signal from the output of AF2 thereby decreasing the bandwidth at the detector transistor Q1. At the centre frequency, Q1 is turned on in a pulse mode at the decode frequency, thereby charging C3 and turning on transistors Q2 and Q3 and turning off transistor Q4. Q2 and Q3 turning on will close the contacts of the 1 form A relay (VR1) and give a high DC out signal at pin 9 since Q4 is turned off. If a connection is made between pin 9 and pin 7 the high DC voltage at pin 9 holds on Q2 and Q3 thereby latching the decoder output. The latched decoder output can be reset either by applying a positive signal to pin 8 thereby turning on Q4 or by a ground signal at pin 2 which shunts the positive voltage from pin 9 to ground, thereby enabling Q2 and Q3 to turn off.

Pin 2 can also be used as a decoder disable function. In this mode pin 2 is held at ground until the decoder is required to be activated when it is allowed to rise above the threshhold of Q2 and Q3.

Power is applied to the decoder at pins 5 and 6. D4 is reverse polarity protection for the decoder while R22 and D5 and their corresponding decoupling capacitors generate an internal ground necessary for the operations of AF1 and AF2.

g. LOWPASS FILTER ASSEMBLY A11084-5

The Lowpass Filter Assembly is a passive audio filter and is not intended to be serviced in the field. To check the circuit assembly, connect a signal generator to pin 15 of the circuit board and a 600 ohm load and an audio VTVM to pin 1. Vary the audio frequency between 300 Hz and 3000 Hz. The output should be flat within 3 db up to 2600 Hz and should be attenuated by at least 40 db above 2900 Hz. If the assembly does not operate to these specifications it must be replaced or returned to TMC (Canada) Ltd. for alignment or repair. Do not attempt any adjustment of the circuits.

SECTION 6
PARTS LIST

6-1 INTRODUCTION

Reference designations have been assigned to identify all electrical parts of the equipment (adjacent to the parts they identify) and are shown in drawings, on diagrams and in the parts list. The letters of 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. To expedite delivery, specify the TMC part number and model number of the equipment when ordering replacement parts.
Parts lists are not provided for Printed Circuit Board Assemblies A11082-5 TONE ENCODER, A11083-5 Tone Detector and A11084-5 Low Pass Filter because any repairs or alignment of these must be performed by factory personnel.

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
A201	Audio Amplifier	A11088-5
A202	Hybrid Circuit	A11086-5
A203	Variable Tone Generator	A11087-5
A204	Tone Encoder	A11082-5
A1	Intergrated Circuit; Voltage Regulator	UGH7812393
C1	Capacitor, Fixed, Electrolytic; 1000 uf, -10% +150%, 50WVDC	CE116-8VN
C2	Capacitor, Fixed, Ceramic; 1 uf, 100WVDC	CC100-28
CR1	Rectifier, Bridge, 10A, 200V	DD10010-2
DS1	Diode, Light Emitting	TS10017
F1	Fuse, Cartridge, Slow Blow, 1¼", 1/4A; for 115 VAC supply	FU102-.250
F1	Fuse, Cartridge, Slow Blow, 1¼", 1/8A; for 230 VAC supply	FU102-.125
J6	Jack Headphone	JJ089
J201	Connector, PC Board, Double Sided, 15 Contacts	JJ319A15DPE
J202	Same as J201	
J203	Same as J201	
J204	Same as J201	
J205	Not used	
J206	Connector, Three Circuit	TS10020
LS1	Loudspeaker, 3 ohms, 5 watt	LS106

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
R1	Resistor, Variable, Composition; 5 K ohm ±10%, 2 watts	RV4NAYFD502A
R2	Resistor, Variable, Composition Dual 5 K ohms, ±20%, 2 watts	RV10014
R3	Resistor, Fixed, Composition ; 560 ohms ±5%, 1/2 watt	RC20GF561J
S1	Switch, Toggle; DPDT	SW10062
S2	Same as S1	
T1	Transformer, Power	TF10086
TB1	Block, Terminal; 2 Connections	TM100-2
TB2	Strip, Terminal; 4 Connections	TM117-25

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
A101	Freq. to Voltage Converter	A11085-5
A102	Low Pass Filter	A11084-5
A103	Tone Detector	A11083-5
A104	Hybrid Circuit	A11086-5
C1	Capacitor, Fixed, Electrolytic; 220 uf -10%, +150%,40V	CE105-220-40
C2	Capacitor, Fixed, Electrolytic; 47 uf, -10%, +100%, 35V	CE10017-47-35B
C3	Same as C2	
C4	Same as C2	
DS1	Diode, Light Emitting	TS10017
J101	Connector, PC Board, Double Sided; 15 Contacts	JJ319A15DPE
J102	Same as J101	
J103	Same as J101	
J104	Same as J101	
R1	Resistor, Fixed, Composition; 220 ohms ±5%, 1/2 watt	RC20GF221J
R2	Resistor, Fixed, Composition; 330 ohms ±5%, 1/4 watt	RC07GF331J
R3	Same as R1	
R4	Resistor, Fixed, Composition; 560 ohms ±5%, 1/2 watt	RC20GF561J
R5	Resistor, Carbon Film; 590 ohms ±1%, 1/8 watt	RN55-D-5900F

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
TB1	Block, Terminal; Barrier type 10 Connections	TM100-10
TB2	Block, Terminal; Barrier type 2 Connections	TM100-2

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
A1	Integrated Circuit, Monostable Multivibrator	NW-SN74121
A2	Integrated Circuit; Operational Amplifier	NW-MC1741CP1
C1	Capacitor, Solid, Tantalum; 4.7 uf ±20%, 35WVDC	CE10014-4.7-35
C2	Capacitor, Flat, Foil; 0.1 uf, 250 VDC	CC10011-8
C3	Capacitor, Solid, Tantalum; 1.0 uf ±20%, +35WVDC	CE10014-1-35
C4	Capacitor, Fixed, Ceramic; .01 uf -20%,+80%, 25 VDC	CC100-41
C5	Same as C1	
C6	Same as C1	
CR1	Diode, Zener; 5.1 volts, 5%, 1/2 watt	1N5231B
R1	Resistor, Fixed, Composition; 1.0 K ohms ±5%, 1/4 watt	RC07GF102J
R2	Resistor, Fixed, Composition; 2.7 K ohms ±5%, 1/4 watt	RC07GF272J
R3	Resistor, Fixed, Composition; 1.2 K ohms ±5%, 1/4 watt	RC07GF122J
R4	Resistor, Fixed, Composition; 220 ohms ±5%, 1/4 watt	RC07GF221J
R5	Same as R2	
R6	Resistor, Fixed, Composition; 220 ohms, ±5%, 1/2 watt	RC20GF221J
R7	Resistor, Fixed, Composition; 2.2 K ohms ±5%, 1/4 watt	RC07GF222J
R8	Same as R1	

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
R9	Resistor, Fixed, Composition; 15 K ohms ±5%, 1/4 watt	RC07GF153J
R10	Resistor, Fixed, Composition; 27 K ohms ±5%, 1/4 watt	RC07GF273J
R11	Resistor, Variable, Composition; 1.0 K ohms ±30%, 1/2 watt	RV124-2-102
R12	Resistor, Fixed, Composition; 680 K ohms ±5%, 1/4 watt	RC07GF684J
R13	Resistor, Fixed, Composition; 4.7 K ohms ±5%, 1/4 watt	RC07GF472J
Q1	Transistor, NPN	2N3904
Q2	Same as Q1	

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
A1	Integrated Circuit; Dual Operational Amplifier	NW-MC1458CL
C1	Capacitor, Solid, Tantalum; 4.7 uf ±20%, 35 VDC	CE10014-4.7-35
C2	Same as C1	
C3	Same as C1	
C4	Same as C1	
C5	Same as C1	
C6	Same as C1	
C7	Same as C1	
C8	Same as C1	
C9	Same as C1	
R1	Resistor, Variable, Composition; 500 ohms, ±30%, 1/2 watt	RV124-2-501
R2	Resistor, Fixed, Composition; 270 ohms ±5%, 1/4 watt	RC07GF271J
R3	Resistor, Fixed, Composition; 10 ohms ±5%, 1/4 watt	RC07GF100J
R4	Resistor, Fixed, Composition; 10 K ohms ±5%, 1/4 watt	RC07GF103J
R5	Resistor, Fixed, Composition; 620 ohms ±5%, 1/4 watt	RC07GF621J
R6	Same as R4	
R7	Same as R5	
R8	Same as R5	
R9	Same as R5	

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
R10	Same as R5	
R11	Same as R4	
R12	Same as R5	
R13	Resistor, Carbon, Film, 590 ohms ±1%, 1/8 watt	RN55-D-5900F
R14	Same as R4	
R15	Same as R3	
R16	Same as R13	
T1	Transformer; Audio	TF10087
T2	Same as T1	

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
A1	Integrated Circuit; Operational Amplifier	NW-MC1741CP1
C1	Capacitor, Fixed, Electrolytic; 47 uf -10% +100%, 35 WVDC	CE10017-47-35B
C2	Capacitor, Fixed, Ceramic; 001 uf ±10%, 500 VDC	CC100-9
C3	Capacitor, Solid, Tantalum; 4.7 uf ±20%, 35 VDC	CE10014-4.7-35
C4	Same as C2	
DS1	Lamp, Incandescant	BI 10008
R1	Resistor, Fixed, Composition; 560 ohms ±5%, 1/4 watt	RC07GF561J
R2	Resistor, Fixed, Composition; 62 K ohms ±5%, 1/4 watt	RC07GF623J
R3	Resistor, Fixed, Composition; 390 ohms ±5%, 1/4 watt	RC07GF391J
R4	Not used	
R5	Same as R2	
R6	Resistor, Fixed, Composition; 1 K ohm ±5%, 1/4 watt	RC07GF102J
R7	Same as R6	

REF DESIGNATION	DESCRIPTION	TMC PART NUMBER
A1	Integrated Circuit; Audio Amplifier	NWCA3020A
C1	Capacitor, Solid, Tantalum; 0.1 uf ±20%, 35 WVDC	CE10014-.1-35
C2	Capacitor, Fixed, Electrolytic; 47 uf -10% +100%, 16VDC	CE10017-47-16B
C3	Capacitor, Flat, Foil; .022 uf, 250VDC	CC10011-3
C4	Capacitor, Solid, Tantalum; 1 uf ±20%, 35 VDC	CE10014-1-35
C5	Same as C1	
C6	Capacitor, Solid, Tantalum; 2.2 uf ±20%, 35 VDC	CE10014-2.2-35
C7	Capacitor, Flat, Foil, 0.22 uf, 250 VDC	CC10011-10
R1	Resistor, Fixed, Composition; 15 K ohms ±5%, 1/2 watt	RC20GF153J
R2	Resistor, Fixed, Composition; 620 ohms ±5%, 1/2 watt	RC20GF621J
R3	Resistor, Fixed, Composition; 510K ohms ±5%, 1/2 watt	RC20GF514J
R4	Not used	
R5	Resistor, Fixed, Composition; 10 ohms ±5%, 1 watt	RC32GF100J
T1	Transformer; Audio	TF10047

SECTION 7
SCHEMATIC DIAGRAMS

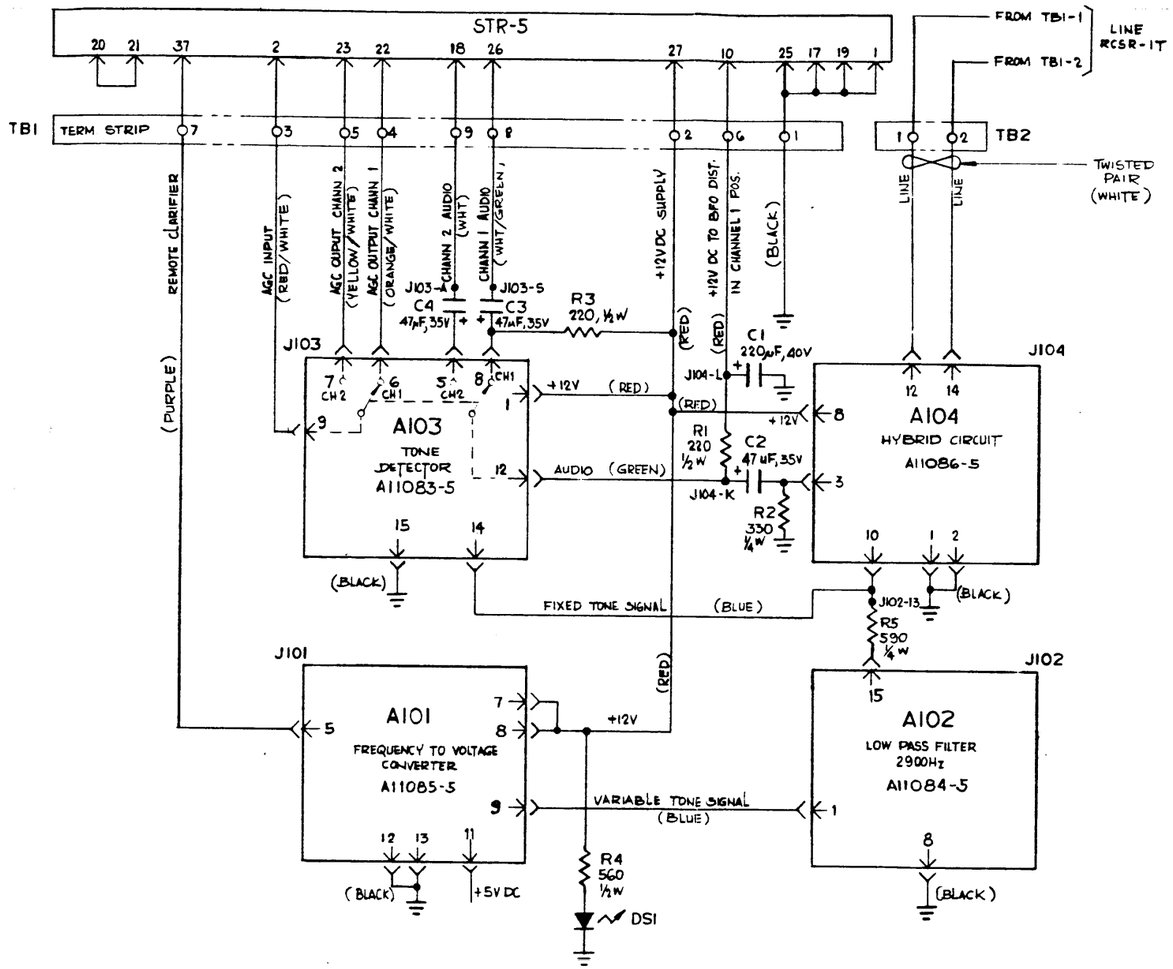


FIGURE 7-1 SCHEMATIC DIAGRAM, RCSR-1R
RECEIVER CONTROL UNIT

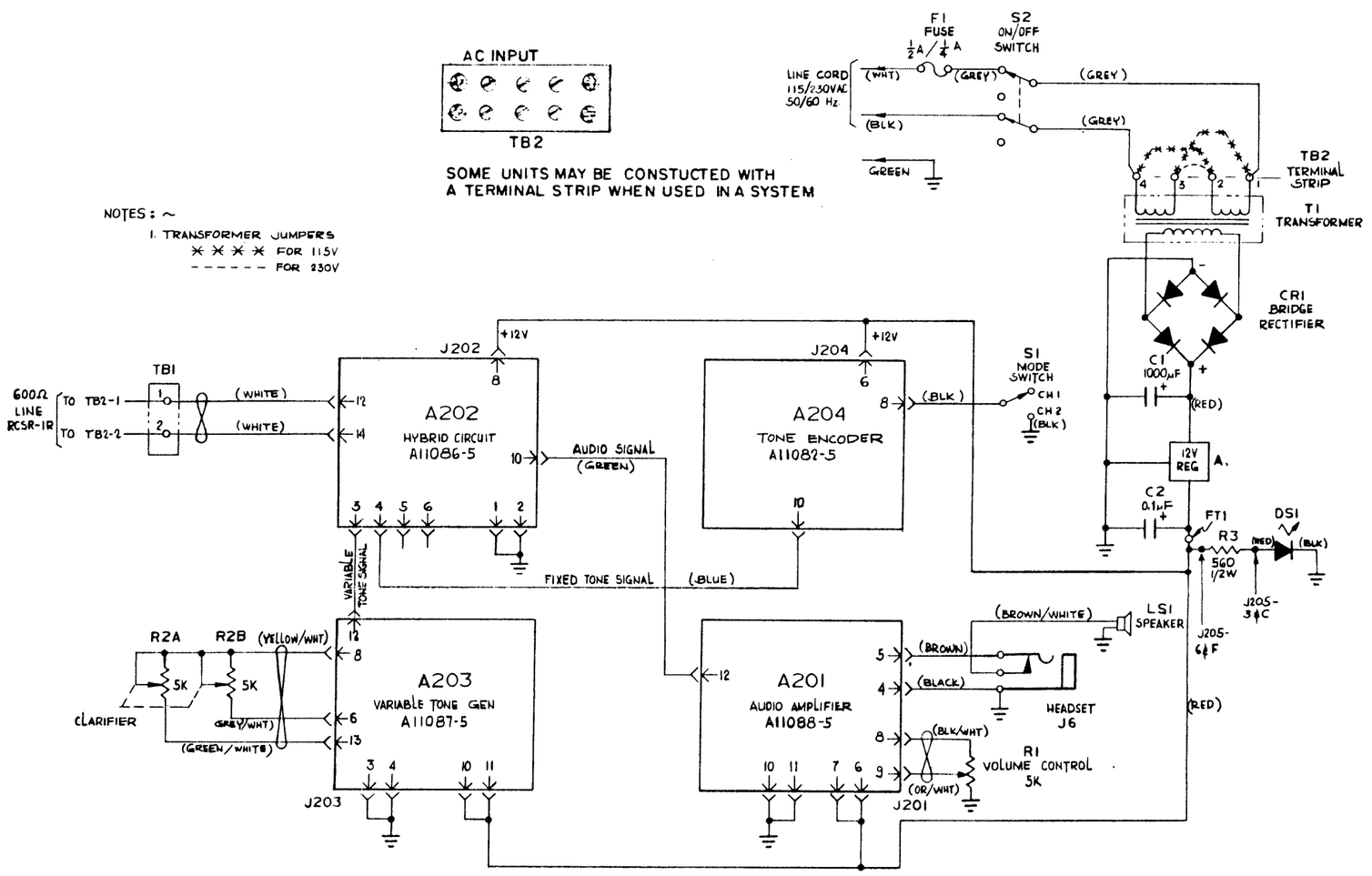


FIGURE 7-2 SCHEMATIC DIAGRAM, RCSR-1T
REMOTE CONTROL UNIT

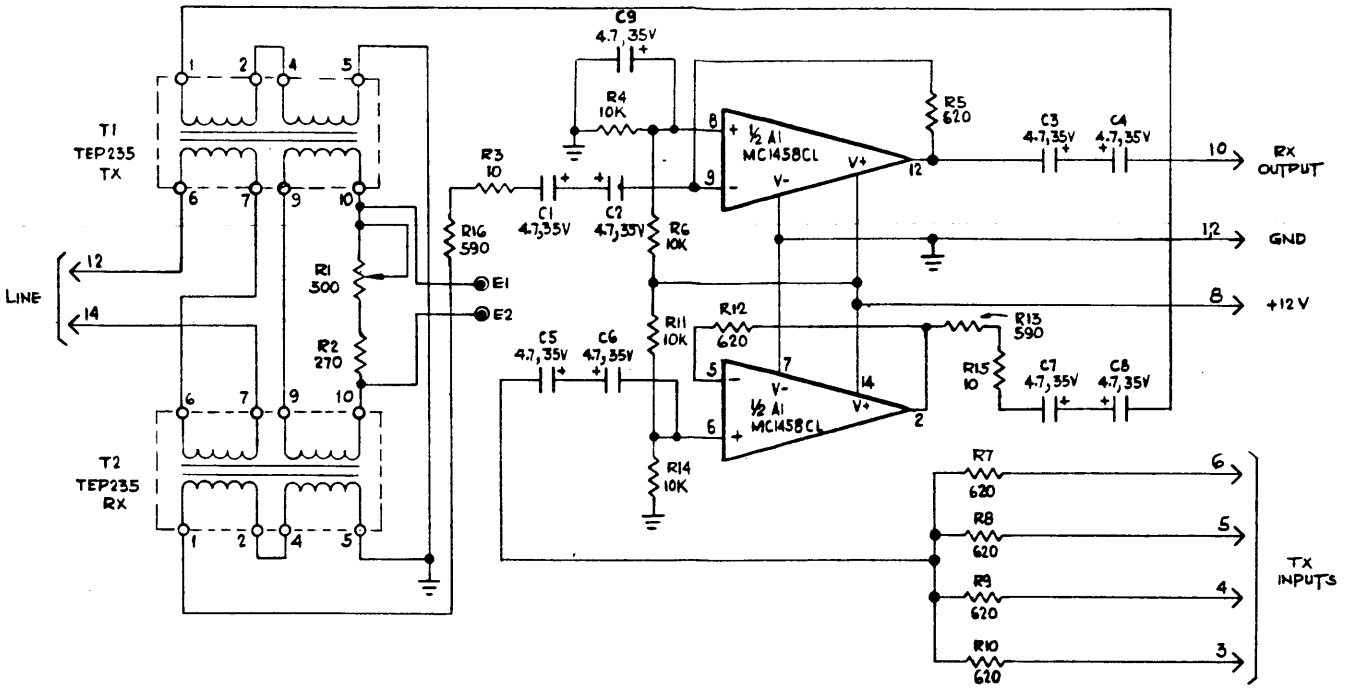


FIGURE 7-3 HYBRID CIRCUIT, A11086-5

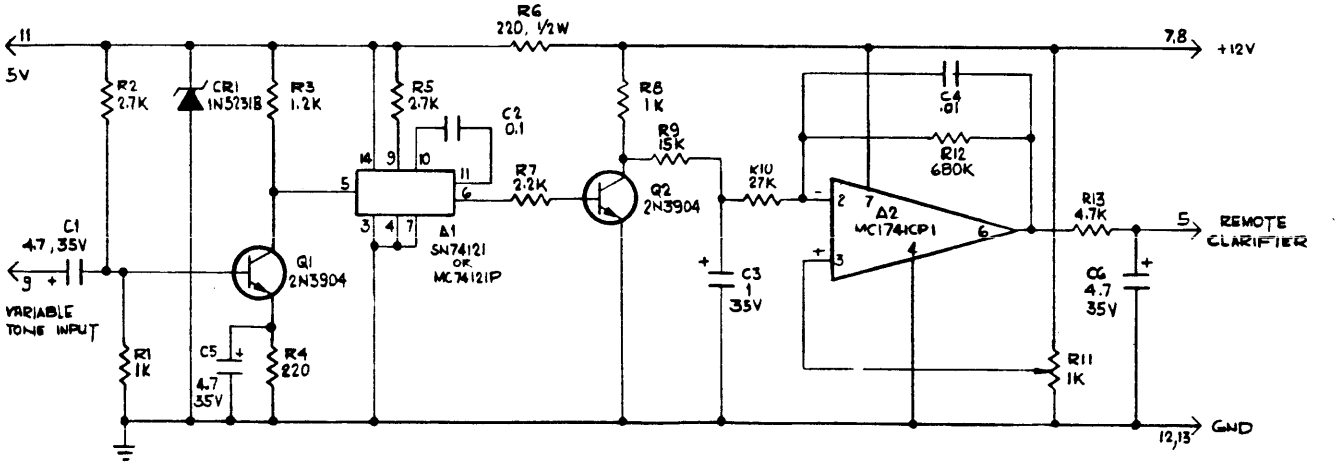


FIGURE 7-4 FREQUENCY TO VOLTAGE

CONVERTER, A11085-5

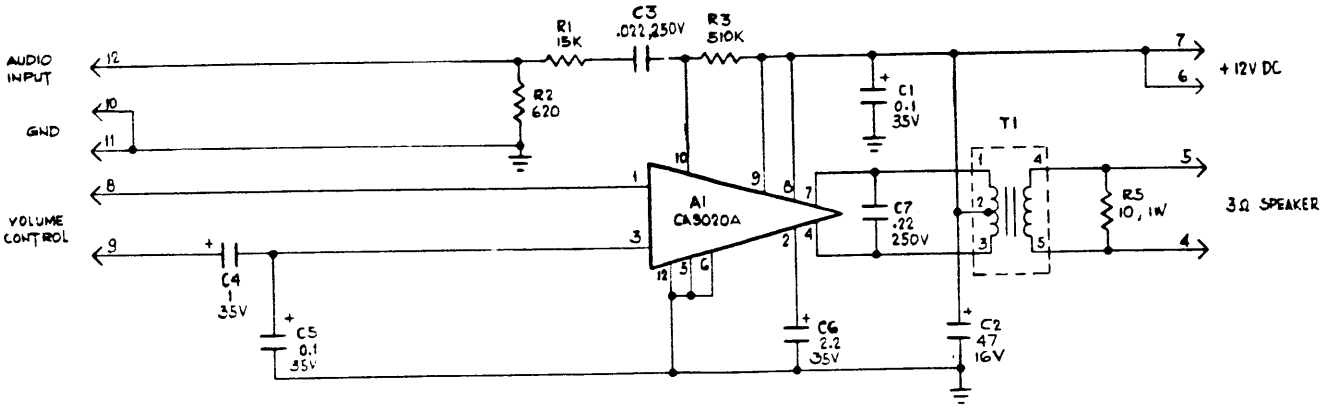


FIGURE 7-5 AUDIO AMPLIFIER, A11088-5

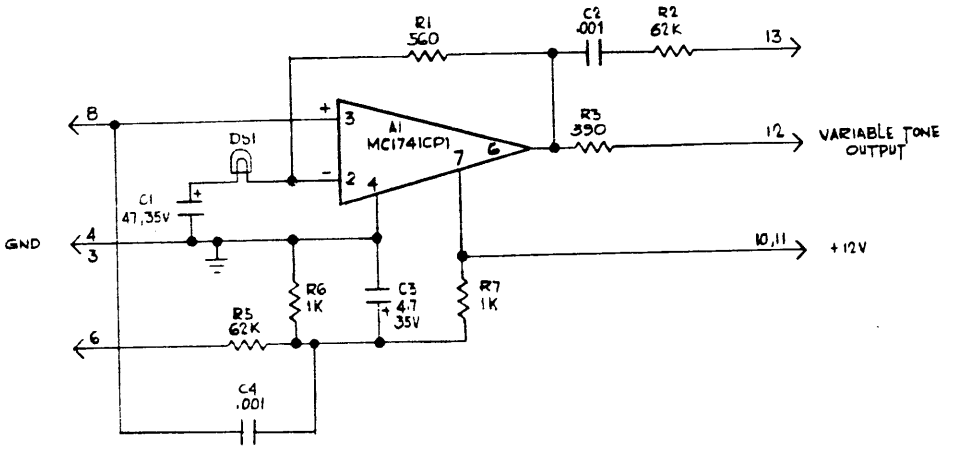


FIGURE 7-6 VARIABLE TONE GENERATOR, A11087-5

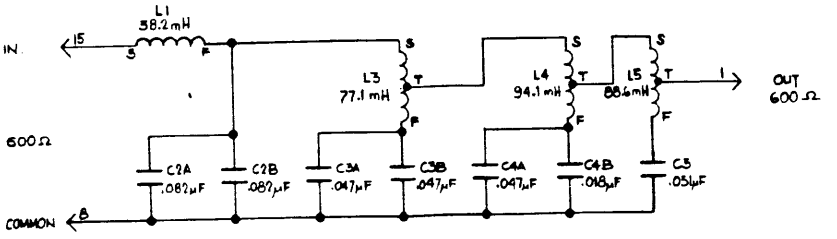
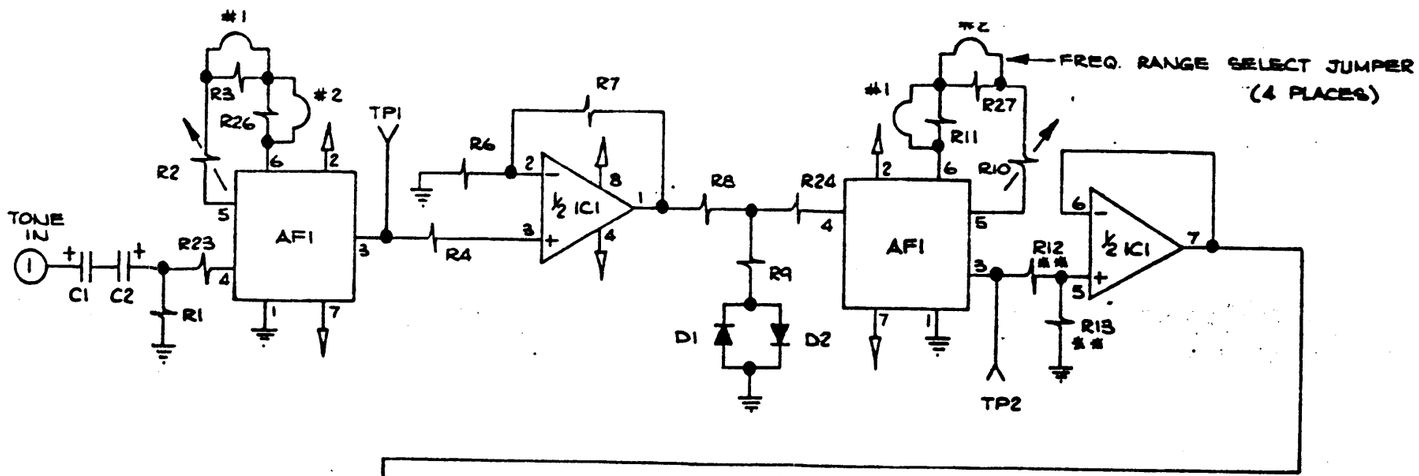
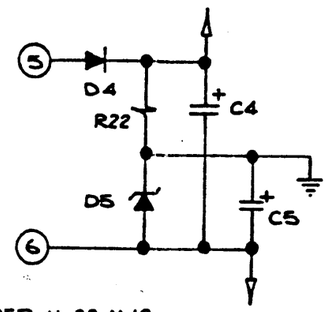
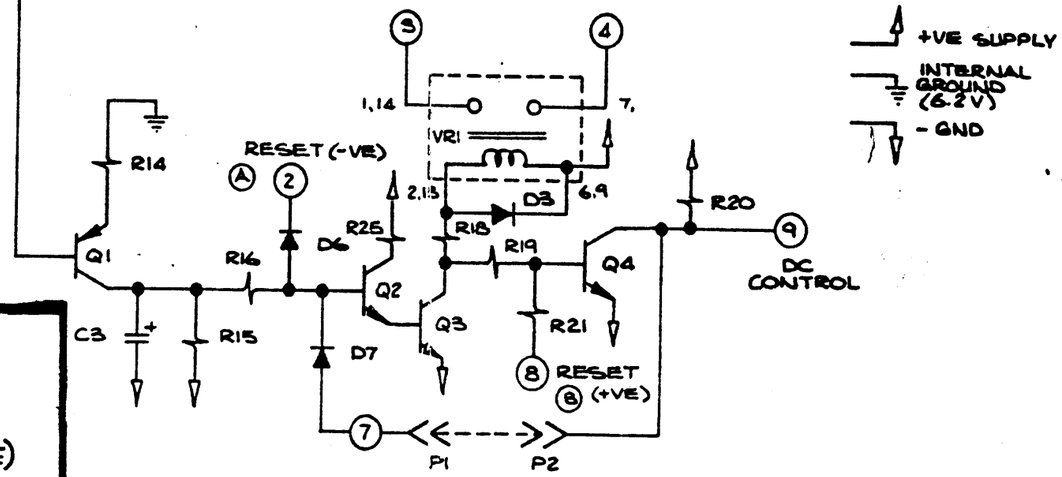


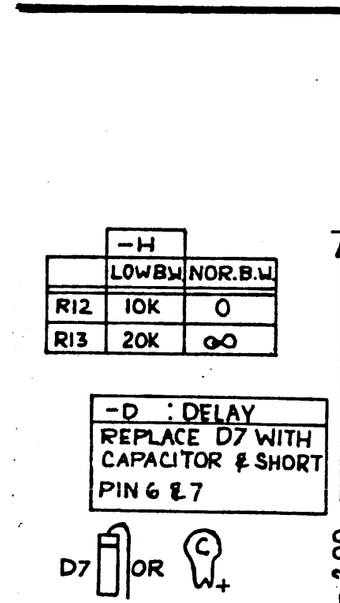
FIGURE 7-8 LOW PASS FILTER A11084-5

AF1	ACTIVE FILTER	M1100
AF2	" "	M1100
IC1	DUAL OP AMP	558
Q1	TRANSISTOR	PNP
Q2	"	NPN
Q3	"	NPN
Q4	"	NPN
D1-D4	DIODE	SI
D5	ZENER	6.2V
D6, D7	DIODE	SI
C1	CAPACITOR	1.0 ufd
C2	"	1.0 ufd
C3	"	3.3 ufd
C4	"	10.0 ufd
C5	"	10.0 ufd
R1	RESISTOR	51 KΩ
R2	POTENTIOMETER	10 KΩ
R3	RESISTOR	9.76 KΩ *
R4	"	15 KΩ
R5	"	
R6	"	15 KΩ
R7	"	1.5 MΩ
R8	"	24 KΩ
R9	"	1 KΩ
R10	POTENTIOMETER	10 KΩ
R11	RESISTOR	9.76 KΩ *
R12	"	10 KΩ **
R13	"	20 KΩ **
R14	"	1 KΩ
R15	"	100 KΩ
R16	"	20 KΩ
R17	"	
R18	"	310 Ω
R19	"	20 KΩ
R20	"	5.1 KΩ
R21	"	20 KΩ
R22	"	510 Ω
R23	"	1 Ω
R24	"	1 Ω
R25	"	20 KΩ
R26	"	19.6 KΩ *
R27	"	19.6 KΩ *







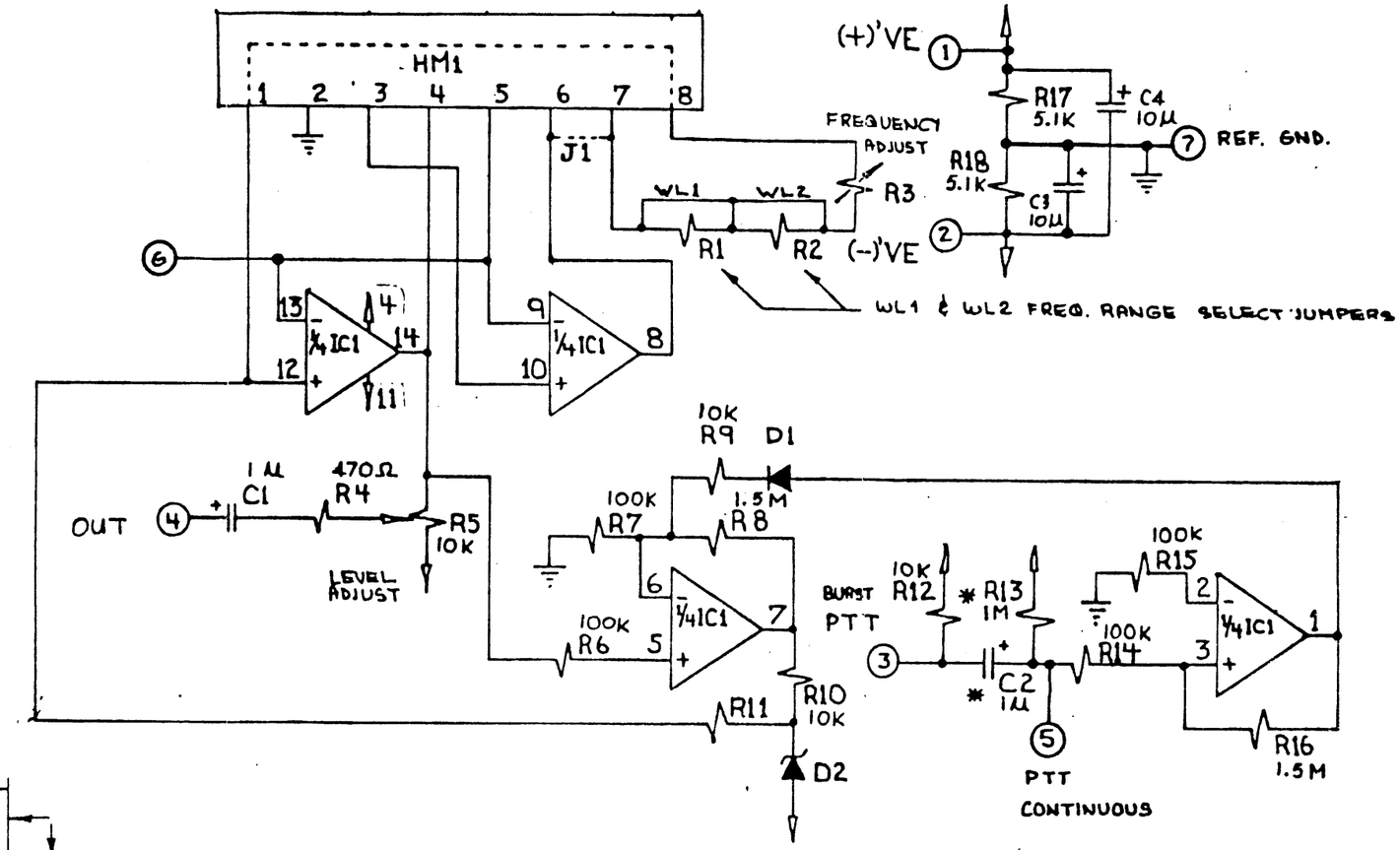


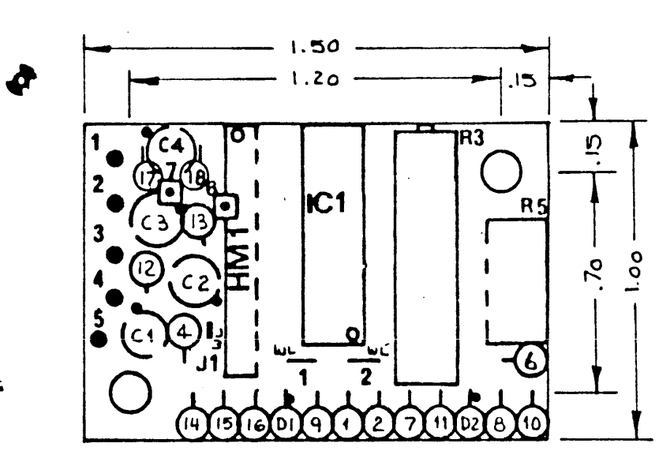
1 - INPUT (TONE)
2 - RESET (WITH -VE)
3 - RELAY CONTACT } N.O.*
4 - RELAY CONTACT }
5 - +VE SUPPLY
6 - -VE SUPPLY
7 - SEE NOTE
8 - RESET (WITH +VE)
9 - DC CONTROL (HIGH WITH CORRECT TONE)

NOTE:- FOR LATCH OPTION JUMPER PIN 7 TO 9 OR INSTALL JUMPER P1 TO P2 WHEN D7 IS REPLACED BY CAPACITOR FOR DELAY MODEL UNIT CAN NOT BE LATCHED

* NORMALLY OPEN

FIGURE 7-7
TONE DETECTOR A11083-5





TERMINAL DESCRIPTION

1		+VE SUPPLY
2		-VE GROUND
3		KEY (-VE) TO BURST TONE
4		OUTPUT
5		KEY (-VE) FOR CONTINUOUS TONE
*	6	SPECIAL TUNING PT.
*	7	SPECIAL TUNING PT REFERENCE GROUND

CAPACITOR

RESISTOR

DIODE

WL — WIRE LOOP

FIGURE 7-9
TONE ENCODER A11082-5