sunair electronics, inc.

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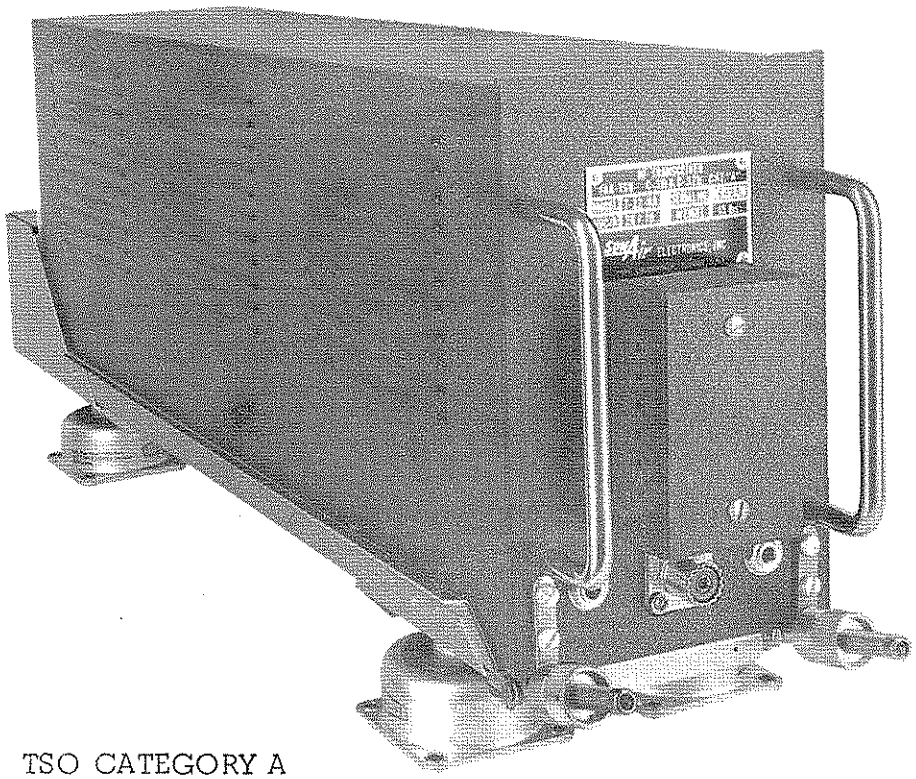

TSO CATEGORY A

HF TRANSCEIVER

MODEL

T-22-RA

3rd Edition, 15 August 1968
Applies to T-22-RA. Serial No. 11191 and Subsequent.
Part Number 99611.

WARRANTY POLICY

AVIONICS DIVISION

Sunair Electronics warrants each equipment manufactured by it to be free from defects in material or workmanship, under normal use for which intended, for one (1) year from date of installation. Sunair will hereunder replace or repair (at Sunair's discretion) any defective components (excluding tubes, semi-conductors and crystals) which carry a standard Electronic Industries Association warranty of ninety (90) days.

Any defective equipment (or component) should be returned, transportation charges prepaid, to Sunair or to a Sunair authorized warranty station. Provided that the failure is within the terms of this Warranty and is not due to damage, misuse, improper installation or unauthorized modification or repair, Sunair will, in addition to replacing component parts within specified periods, also assume Warranty labor costs for ninety (90) days from date of original installation. Any such charges must be reasonable and for actual bench repair only and limited to a maximum of four (4) hours. Labor not directly related to correcting the defective condition cannot be honored.

This Warranty is in lieu of all other guaranties, expressed or implied. The obligation and responsibility of Sunair shall be limited to that expressly provided herein and Sunair shall not be liable for consequential or other damage or expense whatsoever therefor or by reason thereof.

Sunair reserves the right to make changes in design or additions to or improvements in its equipment without obligation to install such additions or improvements in equipment theretofore manufactured.

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ILLUSTRATIONS

SECTION 1

SPECIFICATIONS

Weights:	Transceiver T-22-RA W/Shockmount - 20.0 Lbs. Coupling Unit CU2200 - 8.75 Lb. Remote Control Unit - 1.4 Lbs.
Power Requirements:	27.5 Volts at 3 Amp. Receive 9 Amp. Transmit
TSO Catagory A:	Qualified under the Requirements fo the Radio Technical Commission for Aeronautics, Papers 120-61/DO-108, 15-53/DO-49A and 14-53/DO-48A

RECEIVER

Frequency Range:	2 MHz to 18 MHz
Frequency Tolerance:	NMT ± 3 db from Center Frequency
1-Sensitivity:	NLT 6 db S+ N/N for 3 uv
1-Selectivity:	± 3 kHz NMT 6 db with 1 uv input; ± 10 kHz NLT 60 db above 1 uv
Spurious Response Rejection:	Image NLT 60 db above 1 uv Other Spurious Responses - NLT 60 db above 1 uv
AGC:	NMT 10 db Change in Output with Input from 10 uv to 500,000 uv
Audio Output:	NMT 10 uv for 50 mw output with 500 ohm load

TRANSMITTER

Frequency Range:	2 MHz to 18 MHz
Frequency Tolerance:	0.005% W/SunAir Crystals
RF Output:	NLT 35 W at 27.5 V
2-Modulation:	NLT 85% at 1 kHz & 1 Vrms audio input to interface amp.
2-Audio Response:	NMT 6 db Variation of Input to Maintain Same Output from 350 Hz to 2500 Hz 1 Vrms audio input to interface amp.
Harmonic Output:	Suppression of Spurious Radiations Exceeds the Minimums Set by the FCC

1-If measurements are not made in a screen room, these tests should be made on a channel above 5 MHz.

2-If interface amplifier is not used, audio input must be increased to 3 Vrms.

PURPOSE OF MANUAL

1. This manual contains installation, alignment, operation and maintenance information on the T-22-RA High-Frequency Transceiver manufactured by SunAir Electronics, Inc. The data included is designed to aid authorized service agencies and other technical personnel in the servicing of these units.

PARTS REPLACEMENT

2. A complete stock of replacement parts for all SunAir equipment is maintained at the factory. In some cases, the part supplied against an order for a replacement item may not be an exact duplicate of the original part where the original item has been superseded by a newer and more efficient design. Such replacement parts will be interchangeable electrically. If the new part has a different size or shape, all necessary hardware to permit installation in older sets will be furnished.

Refer to the parts list section of this manual for full descriptions of all electrical components listed in the schematic. If any components which you may require are not listed, please contact the factory sales order department for price and delivery.

Parts for SunAir equipment may be secured from SunAir distributors and dealers throughout the world. When direct orders from the factory are required, it is very important that complete information be provided, so as to permit efficient processing of your order.

The following information is necessary, at the time of ordering the replacement part, to assure the customer of receiving the correct part and to enable SunAir to effect prompt shipment.

(a) SunAir model number of the equipment
(b) Operating voltage
(c) Serial number
(d) SunAir part number of the item
(e) Full word description
(f) Circuit symbol, if applicable
(g) Quantity required of each item
(h) Purchase order number
(i) Your name, address, and zip code
(j) Shipping destination
(k) Mode of shipment

When ordering crystals, the following additional information is required:

(a) Exact frequency desired
(b) Crystal use; transmit or receive

When placing orders directly with the factory, the following rules will apply:

(a) Each order for replacement parts is subject to a minimum billing of $5.00.
(b) Material ordered in error or returned for customer convenience will be subject to a ten per cent (10%) of list price restocking charge.
(c) When ordering, please address your order to the attention of the Sales Order Department.
(d) Telephone orders may be placed between the hours of 8:00 A.M. to 5:00 P.M. (E.S.T.) Monday through Friday by calling area code 305, 525-1505 and asking for the Sales Order Department.

A replacement parts price catalog has been prepared for use by SunAir customers in ordering replacement parts for SunAir's standard products. Copies of this catalog are available upon request.

EQUIPMENT AND PARTS REPAIR

3. Complete factory service is available on any SunAir equipment. Repairs, adjustments or modifications which are of such a nature as to warrant factory service will be made in accordance with the instructions of the customer.

RETURN OF EQUIPMENT OR MATERIAL

4. To return equipment or material, advise SunAir Electronics, Inc., giving full particulars.

If the item is thought to be defective, give full information concerning the nature of the defect. SunAir will then authorize the return. Failure to secure this authorization prior to forwarding the equipment or material, or failure to provide complete information may cause unnecessary delay in processing.

messages of equal urgency or importance, The following suggestions are offered to help obtain the maximum utility from your SunAir Transceiver.

(a) Always monitor the frequency to be certain another operator is not using it before making a transmission.

(b) Hold the microphone close to the lips and speak clearly and distinctly. Use a normal voice level. Loud talking or shouting are not necessary and will distort the transmission.

(c) Keep all transmissions brief and to the point. Avoid cluttering the frequency with unnecessary conversation.

(d) Have the transceiver checked at regular intervals by a competent radio service agency to make certain it is always in good operating condition. A gradual loss of performance might otherwise go unnoted and communication range will be reduced.

RECEIVER

10. See the schematic. The receiver is a double conversion superheterodyne employing two crystal-controlled oscillators for frequency stability and dependability. Separate audio sections for receiving and transmitting permit complete independence of each.

The input circuit is designed for an impedance of 50 ohms and is capacitively coupled to the RF amplifier control grid and its tuned circuits. The RF amplifier, V-1, is capacitively coupled to the first mixer control grid and its tuned circuits. The first mixer, V-2, is a pentagrid mixer with the oscillator section operating 1.5 megacycles higher than the assigned channel frequency within the frequency range of 2.0 megacycles to 8 megacycles and 1.5 megacycles lower than the assigned channel frequency within the range of 8 megacycles to 18.0 megacycles. The resultant mixed output of V-2 (1.5 megacycles) is directly coupled to T-1, a doubletuned filter resonant at 1.5 megacycles. The second mixer, V-3B, receives its mixing frequency of 1.955 megacycles from V-3A, a crystal-controlled oscillator. The 455 kilocycle output of V-3B is transformer coupled to V-4, the 455 kilocycle IF amplifier. The output of V-5 is coupled to the AGC and

demodulation diodes, CR-1 and CR-2. The demodulated audio is capacitively coupled to the audio amplifier, V-6. The audio output transformer, T-5, has a secondary impedance of 500 ohms with a 150 ohm tap. The 500 ohm tap is normally connected.

Volume is controlled by the potentiometer in the control head, R-64, which is connected across the audio output (pin 33) to ground. Refer to the schematic and Figure 29 (transceiver channeling diagram).

TRANSMITTER

11. The transmitter oscillator, V-7A, is a crystal-controlled Pierce oscillator capacitively coupled to V-7B, the buffer-driver. The buffer-driver is inductively plate tuned. The amplified frequency is capacitively coupled to V-8, a beam power pentode output stage. The inductively tuned pi-network is so designed as to present an impedance of 50 ohms to the antenna.

    Inductively tuned harmonic traps are incorporated to reduce the harmonic output of the assigned frequency to a level below the minimum FCC requirements.

    High level plate and screen modulation is utilized for highest efficiency. The microphone output drives the microphone interface amplifier which is transformer coupled to the grid of V-9, a Class A modulator.

SIDETONE

12. Sidetone is accomplished by rectification of the transmitter output taken at the antenna relay. The entire sidetone circuit is located on the small printed circuit board mounted under the main chassis adjacent to the receiver output transformer.

    Relay K-1 switches the receiver output to sidetone output during transmit. The sidetone signal is amplified by the receiver audio amplifier tube V-6.

    The sidetone level is adjustable to deliver 50 mw to a 500 ohm output by capacitor C-81, located on the sidetone printed circuit board. C-81 should be adjusted after installation to provide a comfortable audio listening level.

TUNED CIRCUITS

13. There are five sets of tuned circuits excluding the IF transformers in the T-22-RA. They are: the receiver RF grid, mixer grid, the buffer-driver plate, PA plate and harmonic traps.

The T-22-RA receiver uses a separate set of tuned inductors for each odd-numbered channel. The even-numbered channels are tuned to their respective frequencies by means of trimmer capacitors located on the side of the switch deck. The transmitter also uses a separate set of tuned inductors for each odd-numbered channel and a separate capacitor to resonate the associated even-numbered channel. In instances of large frequency spreads between the paired channels, an extra fixed capacitor can be added on the switch deck to increase the efficiency of the stage.

CHANNELING

14. Channeling in the T-22-RA is accomplished by means of a solenoid type motor controlled by a pair of wire-saving switch wafers, a master wafer on the control head,and a slave wafer on the solenoid motor. One is a direct opposite of the other (See Figure 5). Completion of channeling is accomplished when the ground return is opened. An arc suppressor circuit is incorporated to reduce arcing of the interrupter and switch wafer contacts.

A second master wafer is located on the transceiver switch deck for channeling the antenna coupling unit. These channeling wires are brought out to the main chassis plug J1 on pins 17 through 21, inclusive.

RF INVERTER

15. RF Inverter (Figure No. 30) has been added internally to the T-22-RA Serial No. 11191 & subsequent. This RF Inverter detects the difference between the forward and reflected power, and drives the power indicator meter. When the forward and reflected power is equal, such as when the antenna system is completely mismatched, the meter will indicate "0". As the reflected power decreases the meter reading will increase. Therefore, to tune an antenna system, tune for a peak on the meter. When an antenna system is tuned, the meter will indicate relative transmitter power output.

FREQUENCY	RF COIL		MIXER COIL		RF CAP	MIX CAP	TRANSMITTER OSC COIL		TRANS CAP	PA COIL		PA CAP	ANT CAP	TRAP COIL		TRAP CAP
	TYPE	SUNAIR P/N	TYPE	SUNAIR P/N	VALUE	VALUE	TYPE	SUNAIR P/N	VALUE	TYPE	SUNAIR P/N	VALUE	VALUE	TYPE	SUNAIR P/N	VALUE
2.0 - 2.2 MC	A6	63351			75 pf	75 pf	A6	63351	50 pf		64020	270 pf	1200 pf	D6	63143	330 pf
2.2 - 2.6		63351			50	50		63351	32		64020	250	1200		63143	220
2.6 - 2.8	A6X	63870			50	20		63351	20		64305	220	1000	D5	63155	220
2.8 - 3.3	A6X	63870			50	20		63351	20		64305	200	1000		63155	220
3.3 - 3.5	A6X	63870			20	20		63351	5		64305	120	750		63155	150
3.5 - 4.2	A5	63363			50	50	A5	63363	50		64290	100	750	D4	63167	150
4.2 - 5.0		63363			32	32		63363	32		64032	100	600		63167	150
5.0 - 5.4		63363			20	20		63363	20		64056	75	600	D3	63179	100
5.4 - 5.8		63363			20	20	A4	63375	20		64056	75	600		63179	100
5.8 - 6.4	A4	63375			32	32	A3	63105	50		64068	65	600		63179	68
6.4 - 6.7		63375			20	20		63105	32		64070	50	500		63179	68
6.7 - 7.0		63375			20	20		63105	20		64070	50	500		63179	68
7.0 - 7.5	A3	63105			32	32		63105	12		64082	40	500		63179	50
7.5 - 8.0		63105			20	20	A2	63117	32		64082	30	390	D2	63181	68
8.0 - 8.5	A2	63117			32	32		63117	20		64109	30	390		63181	68
8.5 - 9.1		63117			20	20	D6	63143	20		64109	20	390		63181	68
9.1 - 9.5		63117			12	12		63143	20		64111	20	390		63181	50
9.5 - 10.0	A1	63129			32	32		63143	12		64123	20	390	D1	63193	68
10.0 - 10.5		63129			32	32	D5	63155	32		64135	20	390		63193	50
10.5 - 11.5		63129			20	20		63155	20		64135	20	360		63193	50
11.5 - 12.5		63129			12	12	D4	63167	32		64147	10	360		63193	50
12.5 - 13.5	A0-0	63131	A0-3	63777	20	20	D3	63197	20		64159	10	300	D1-3	63935	68
13.5 - 14.0	A0-0	63131	A0-3	63777	12	12		63197	20		64161	10	300		63935	50
14.0 - 15.0	A0-2	63765	A0-4	63789	12	12		63197	12		64173	None	250		63935	50
15.0 - 16.0	A0-3	63777	A0-5	63791	12	12		63197	12		64173	None	250	D1-4	63947	50
16.0 - 17.0	A0-4	63789	A0-6	66523	12	12	D2	63181	12		64185	None	250		63947	50
17.0 - 18.0	A0-5	63791	A0-8	66535	12	12		63181	12		64185	None	250		63947	50

SAME AS RF COIL

Tunable coils used in the T22-RA are called out in the following table. Capacitors used with a coil for a given frequency is also designated.

FIGURE NO. 1 COIL—CAPACITOR COMBINATION

SECTION 2

ALIGNMENT AND SERVICE INFORMATION

FREQUENCY SELECTION OF CHANNELS

15. Frequencies for the SunAir Transceivers are preselected by the customer, and the proper coils and capacitors for the tuned circuits are installed by the manufacturer. Should different frequencies be desired, changes in the coil-capacitor combinations may be necessary. Refer to Figure 1 for these requirements. The changes can be made in the field after the components are purchased from SunAir.

In order to obtain maximum performance from these units, the frequency of the adjacent channels should not have a difference in excess of the maximums listed below:

CHANNEL FREQUENCY

FREQUENCY RANGE	MAXIMUM SEPARATION
2 to 3.5 MHz	250 kHz
3.5 to 5 MHz	500 kHz
5 to 7.5 MHz	750 kHz
7.5 to 10 MHz	1000 kHz
10 to 14 MHz	1250 kHz
14 to 18 MHz	1500 kHz

In addition, a minimum of 5 kc separation must be maintained between adjacent channels 1-2, 3-4, 5-6, etc.

More than two frequencies may be used on a coil/capacitor combination in order to make the best use of the 22 positions. In some cases it may be required as indicated on the following example:

3023.5	#1 coil/capacitor combination
4362 4401 4440	#2 coil/capacitor combination
5504	#3 coil/capacitor combination
6620 6692 6750	#4 coil/capacitor combination

The tunable coils used in the T-22-RA are called out in the following table.
The capacitor used with a coil for a given frequency is also designated.

Frequency	R.F. & Mixer Coils SunAir Part No.		R.F. Capacitor	Mixer Capacitor	Transmitter Osc. Coil SunAir Part No.		Transmitter Capacitor	P.A. Coil SunAir Part No.	P.A. Capacitor	Antenna Capacitor	Trap Coil SunAir Part No.		Trap Capacitor
2.0 - 2.2 MC	A6	63351	75 pf	75 pf	A6	63351	50 pf	64020	280	1200 pf	D6	63143	330 pf
2.2 - 2.6		63351	50	50		63351	32	64020	250	1200		63143	330
2.6 - 2.8		63351	20	20		63351	20	64305	220	1000	D5	63155	220
2.8 - 3.3		63351	20	20		63351	20	64305	200	1000		63155	220
3.3 - 3.5		63351	12	12		63351	12	64305	120	750		63155	150
3.5 - 4.2	A5	63363	50	50	A4	63375	50	64290	100	750	D4	63167	150
4.2 - 5.0		63363	32	32		63375	32	64032	100	600		63167	150
5.0 - 5.4		63363	20	20		63375	20	64056	75	600	D3	63179	100
5.4 - 5.8		63363	20	20		63375	12	64056	75	600		63179	100
5.8 - 6.4	A4	63375	32	32	A3	63105	50	64068	60	600		63179	68
6.4 - 6.7		63375	20	20		63105	32	64070	50	500		63179	68
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7.5 - 8.0		63105	20	20	A2	63117	32	64082	30	450	D2	63181	68
8.0 - 8.5	A2	63117	32	32		63117	20	64109	30	400		63181	68
8.5 - 9.1		63117	20	20	D6	63143	20	64109	20	400		63181	68
9.1 - 9.5		63117	12	12		63143	20	64111	20	400		63181	50
9.5 - 10.0	A1	63129	32	32		63143	12	64123	20	400	D1	63193	68
10.0 - 11.0		63129	20	20	D5	63155	20	64135	20	400		63193	50
11.0 - 12.5		63129	12	12	D4	63167	32	64147	10	350		63193	50
12.5 - 13.5	A0	63131	20	20	D3	63197	20	64159	10	300	D1-3	63935	68
13.5 - 14.0		63131	12	12		63197	12	64161	10	300		63935	50
14.0 - 15.0	A0-2	63765	12	12		63197	12	64173	None	250		63935	50
15.0 - 16.0	A0-3	63777	12	12		63197	12	64173	None	250	D1-4	63947	50
16.0 - 17.0	A0-4	63789	12	12	D2	63181	12	64185	None	250		63947	50
17.0 - 18.0	A0-5	63791	12	12		63181	12	64185	None	250		63947	50

FIGURE NO. 1
COIL-CAPACITOR COMBINATIONS

SECTION 2

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In addition, a minimum of 5 kc separation must be maintained between adjacent channels 1-2, 3-4, 5-6, etc.

More than two frequencies may be used on a coil/capacitor combination in order to make the best use of the 22 positions. In some cases it may be required as indicated on the following example:

3023.5	#1 coil/capacitor combination
4362 4401 4440	#2 coil/capacitor combination
5504	#3 coil/capacitor combination
6620 6692 6750	#4 coil/capacitor combination

If more frequencies are added to one coil/capacitor combination the additional frequencies must be limited to not more than ±1% of the base frequency. As an example, with a base frequency of 4401 kHz the maximum frequency spread for additional frequencies is 44 kHz

In the event combinations as shown above are necessary, the switch wafers will be wired accordingly but the schematic will not specifically show the special jumpering since it is intended only as a general representation of the transceiver.

16. EQUIPMENT REQUIRED

1. SunAir Test Set or Equivalent Cable Assembly
2. DC Power Source
3. RF Signal Generator
4. Frequency Counter
5. Vacuum Tube Voltmeter
6. Audio Voltmeter
7. Bird Thruline Wattmeter or Calibrated 50 Ohm Dummy Load with an RF Ammeter
8. Oscilloscope

17. ALIGNMENT, RECEIVER

I.F. Alignment

Connect the audio meter to head phone jack. Shunt a 500 ohm load across the headphone jack. Connect the signal generator to pin 4 of I.F. Transformer T-2. Set the signal generator to 455 kHz and align I.F. Transformers T2, T3 and T4 for maximum audio output. Adjust the secondary of T4, then the primary, then repeat for T3 and T2 in a like manner. Signal generator output level should be as low as possible to allow a sharp indication on the meter and to avoid AGC action.

Connect the signal generator to pin 7 of mixer oscillator V2. Reset the signal generator to 1500 kHz and adjust I.F. Transformer T1 for maximum output on audio meter. Signal generator output level should be as low as possible to allow a sharp indication on the meter and to avoid AGC action. Adjust L23 of the 1955 oscillator for maximum audio output.

R.F. and Mixer Alignment

Connect the signal generator to antenna connector J2. Set signal generator to desired frequency (Channel 1). Turn the transceiver channel selector Channel 1 (odd channel) and adjust L-1 and L-12 for maximum audio output. Signal generator should be adjusted for low level output to prevent AGC action.

Turn the channel selector to Channel 2 (even channel) and reset the signal generator to desired frequency. Adjust trimmer capacitors C-6 and C-33 for maximum meter indication. Approximately the same indication should be observed on Channels 1 and 2. If equal outputs are not observed, it may be necessary to change the LC ratio or add a capacitor across the trimmer until approximately equal outputs are obtained.

The above procedure should be followed for all remaining coils L-2 through L-11, L-13 through L-22 and trimmer capacitors C-8 through C-26 and C-35 through C-53.

18. TRANSMITTER

Oscillator Adjustment

Connect the VTVM to pin 38 of J-1. Set the meter to read approximately 100 VDC negative. Use a non-metallic alignment tool for adjustment.

Set channel selector to Channel 1. Energize transmitter and adjust L-25 for maximum negative voltage indication on VTVM and note the reading. Set channel selector to Channel 2 and readjust L-25 until approximately the same voltage readings are observed on Channel 1 and Channel 2. The same procedures should be followed for the remaining driver coils L-26 through L-35. If a frequency change involving replacement of coil-capacitor combinations or complete transmitter failure have occurred, disconnect the screen grid, pin 3, of the transmitter P.A. and adjust the driver coils for maximum negative voltage. Upon reconnecting the screen grid, oscillator coils may require readjustment.

Power Amplifier Adjustment

Connect antenna output J2 to a 52 ohm R.F. wattmeter. Set channel selector to Channel 1. Energize transmitter and adjust L-37 for maximum indication on the wattmeter.

CAUTION: Do not switch channels with the transmitter operating. This could cause arcing across switch contacts.

Set channel selector to Channel 2 and readjust L-37 until approximately equal output is observed on both channels. If the output is reduced more than 10% to make both channels equal, then a separate P.A. capacitor is required for each channel. Follow the same procedures to adjust the remaining P.A. coils L-38 through L-47.

HARMONIC TRAPS

19. Connect VTVM to AGC line of a suitable receiver, tuned to receive the second harmonic of the frequency in use. The antenna pick up for the receiver should be closely coupled to the 50 ohm load to allow ample signal. Set the channel selector to No. 1 position and energize the transmitter. Adjust coil L-50 for minimum (DIP) voltage on VTVM. Switch the channel selector to Channel 2. Tune the second harmonic of Channel 2 and readjust L-50 until approximately equal readings are obtained on Channel 1 and Channel 2. Follow the same procedures for adjusting the remaining harmonic trap coils L-51 through L-60.

MODULATION

20. The modulator in conjunction with the microphone interface amplifier will accept carbon, or transistorized type microphones. Modulation level is adjusted by R-52 located on the underside of the chassis adjacent to the microphone input transformer, T-7 The modulation level should be checked with an oscilloscope using the aircraft microphone and R-52 adjusted to yield approximately 85% modulation. The audio input from the microphone must be wired to pin 42 of P1. Refer to the schematic diagram and page 45 for information concerning the interface amplifier.

21. When servicing the SunAir Model T-22-RA Transceiver, it will be helpful to refer to the block diagrams and schematics on the equipment. In addition, the following list of typical symptoms with probable sources of faults should help to solve many servicing problems.

Transceiver

If the complete transceiver is malfunctioning, the unit should be checked for proper input A+ power and for a blown fuse (F-1). If the fuse is blown, check for one of the following:

a) Short in the A+ input wiring
b) Shorted transistor (defective)
c) Reversed battery polarity on installation
d) Transistor shorted to heat sink (defective insulating washer)

If, with proper A+ to the transceiver, the unit is still malfunctioning, proceed with the following B+ power supply checks:

a) With proper A+ power supply, listen for a high frequency "whine" (1500 to 2000 Hz) at the power supply. Lack of this "whine" indicates that the transistors are not switching. Check for one of the following causes of trouble.

   1. B+ short to ground
   2. Defective transistors in power supply
   3. Defective component in power supply

b) If power supply "whine" is present, check for low B+. The causes of low B+ may be internal (within the power supply) or external (in the load). Check for the following:

   1. External - shorted tube or bypass capacitor
   2. Internal - shorted diode or filter capacitor

Transmitter

Inoperative, no RF output

a) Defective component in oscillator or power supply
b) Defective tube
c) Defective crystal

Operative, but low RF output

a) Defective tube
b) Transmitter out of alignment
c) Low B+, see Power Supply checks

Output OK, percent of modulation low

a) Defective transistor in audio amplifier stage
b) Defective microphone
c) Defective components in modulation circuit
d) Defective relay
e) Low microphone voltage

Modulation distorted

a) Check audio amplifier stages

Output and modulation OK, frequency out of tolerance

a) Defective component(s) in oscillator driver stage
b) Defective crystal

Receiver

Inoperative, no audio

a) Check tube and components in audio amplifier stage
b) Check F-1

Inoperative, but loud hiss at maximum volume

a) Defective tube

Receiver operative, but low sensitivity

a) Defective tube
b) Defective diode in detector, noise limiter or AGC circuit
c) Open coil in RF or mixer stage
d) Receiver out of alignment
e) Defective volume control

Receiver operative, but audio distorted

a) Defective diode in detector, noise limiter or AGC circuit
b) Defective tube or components in audio amplifier circuit

NOTE:

Voltages on receiver taken at no signal input.
Voltages on transmitter taken when keyed with no modulation.
* Denotes VTVM Triplett Model 650 or equivalent.
All other voltages measured with AVO 20,000 ohm/v VOM or equivalent.
1 meg resistor used in series with VTVM test lead.

Readings will deviate with change of input voltage and operating frequency.

V1 12BZ6
RF Amplifier

1. Control Grid	0
2. Cathode	1.7
3. Heater	13.6
4. Heater	0
5. Plate	60
6. Screen	40
7. Suppressor	1.7

V2 12BE6
First Mixer

1. Control Grid	0
2. Cathode	1.8
3. Heater	13.6
4. Heater	0
5. Plate	230
6. Screen	45
7. Control Grid	0

V3 6111
Second Injection
Oscillator & Second Mixer

1. Oscillator Plate	
2. Oscillator Grid	
3. Heater	6.3
4. Oscillator Cathode	
5. Mixer Cathode	
6. Heater	0
7. Mixer Grid	
8. Mixer Plate	230

V4 12BZ6
First IF Amplifier

1. Control Grid	0
2. Cathode	1.8
3. Heater	13.6
4. Heater	0
5. Plate	220
6. Screen	114
7. Suppressor	1.8

V5 12BZ6
Second IF Amplifier

1. Control Grid	0
2. Cathode	1.3
3. Heater	13.6
4. Heater	27.2
5. Plate	310
6. Screen	106
7. Suppressor	1.3

V6 12BH7 A
Audio Output

1. Plate	107
2. Control Grid	0
3. Cathode	11.6
4. Heater	13.6
5. Heater	27.2
6. Plate	315
7. Control Grid	0
8. Cathode	4.1
9. Heater Center Tap	NC

V7 12BH7 A
Transmitter
Oscillator-Driver

1. Plate	302
2. Control Grid	0
3. Cathode	0
4. Heater	27.2
5. Heater	13.6
6. Plate	90
7. Con.Grid	-9.2
8. Cathode	0
9. Htr.Ctr.Tap	NC

V8 6883B
Power Amplifier

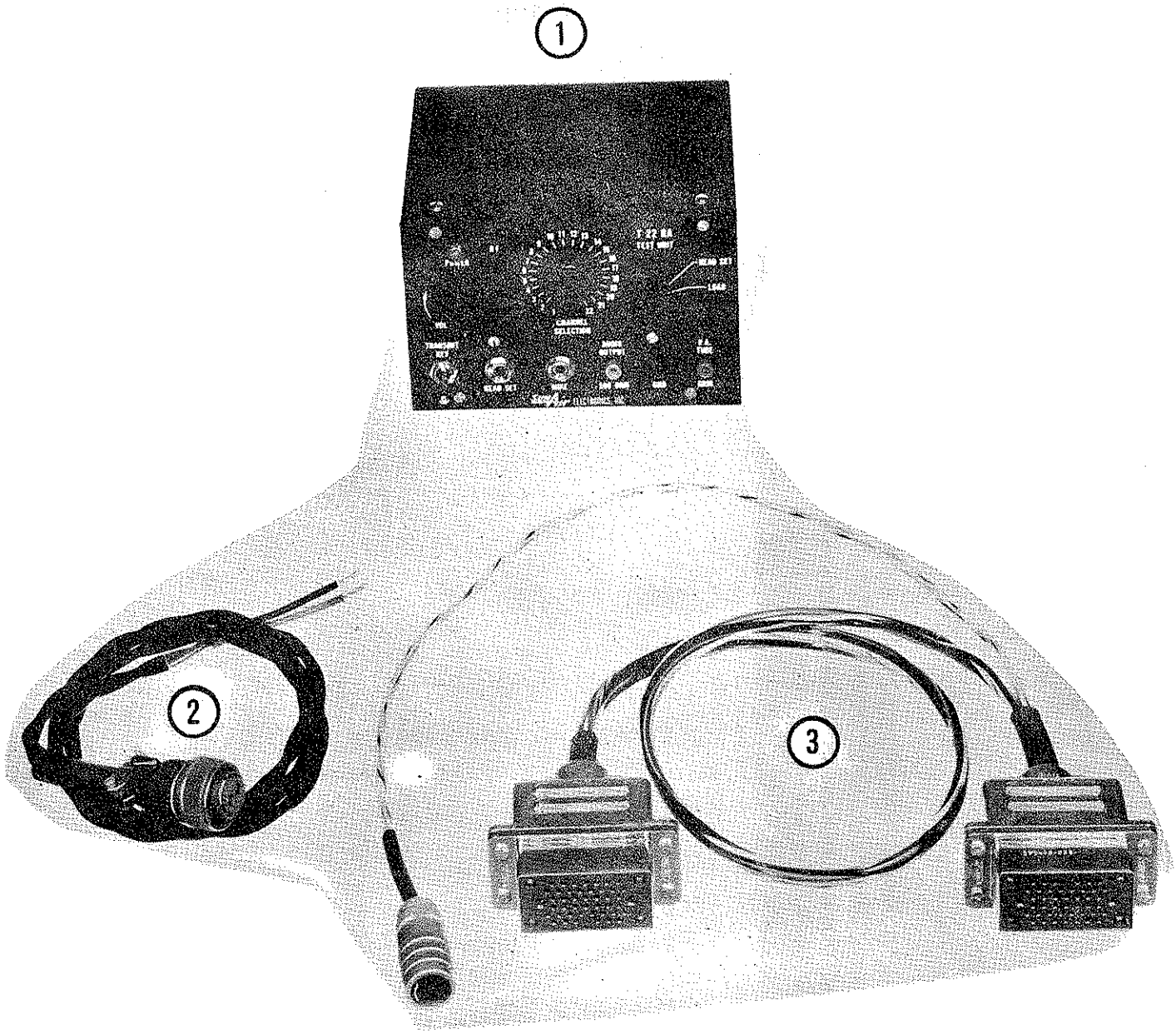
1. Cath.&Supr.	13.5
2. Heater	27.2
3. Screen	228
4. Cath.&Supr	13.5
5. Con. Grid	-90*
6. Cath &Supr	13.5
7. Heater	13.6
8. No Connection	
Cap Plate	582

V9 6883B
Modulator

1. Cath & Supr.	41.5
2. Heater	0
3. Screen	302
4. Cath & Supr.	41.5
5. Control Grid	0
6. Cath & Supr.	41.5
7. Heater	13.6
8. No Connection	
Cap Plate	590

FIGURE NO.2

VOLTAGE READINGS

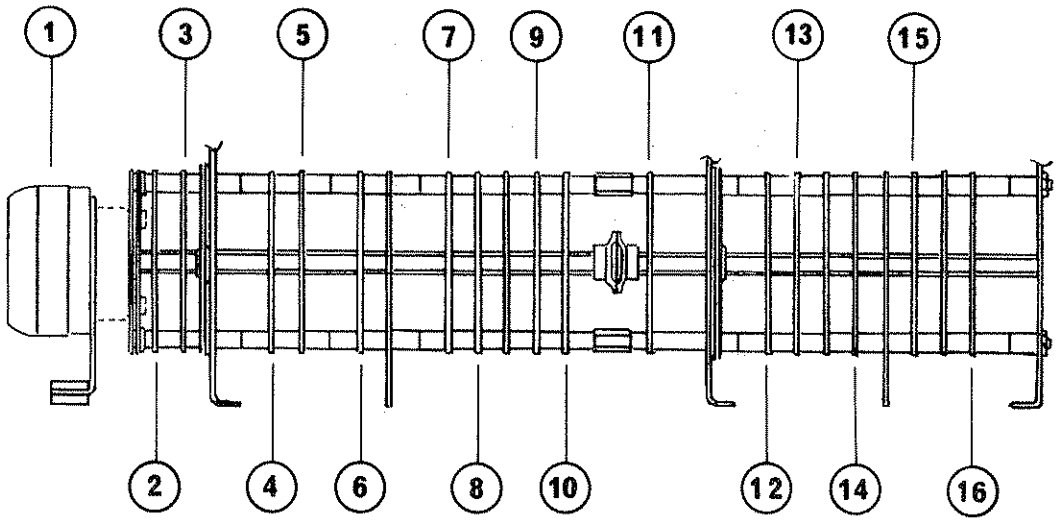


1. TEST SET CONTROL BOX	93849
2. POWER CABLE ASSEMBLY	93978-2
3. MAIN CABLE ASSEMBLY	98253

FIGURE NO.3

T22-RA TEST SET COMPLETE

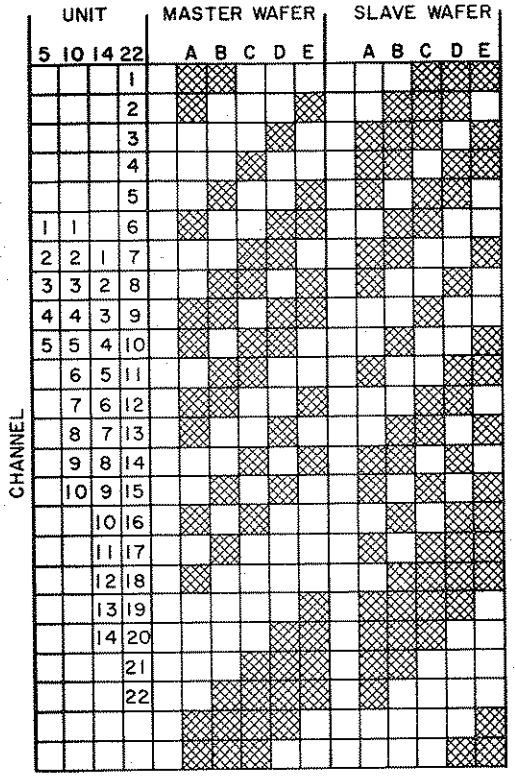
P/N 93875



Item	Part No.	Ckt.Sym.	Description
1	32285	KR1	Channeling Solenoid
2	32417	S14	Solenoid Slave Wafer
3	32209	S13	Antenna Remote Loading Master Wafer
4	32211	S11	P.A.Coil Antenna Side & Tuning Capacitors
5	32211	S12	Trap Capacitors
6	32211	TP1	Trap Coils
7	32716	S9	P.A.Coils, Plate Side Tuning Capacitors
8	32716	S10	P.A.Coils, Plate Side
9	32211	S8	Oscillator Coils, Tuning Capacitors
10	32211	S7	Oscillator Coils
11	32211	S5	Receiver Crystal Wafer
12	32211	S6	Transmitter Crystal Wafer
13	32211	S1	R.F. Coils
14	32211	S2	Capacitors Fixed & Variable R.F.Tuning
15	32211	S4	Capacitors Fixed & Variable Mixer Tuning
16	32211	S3	Mixer Coils

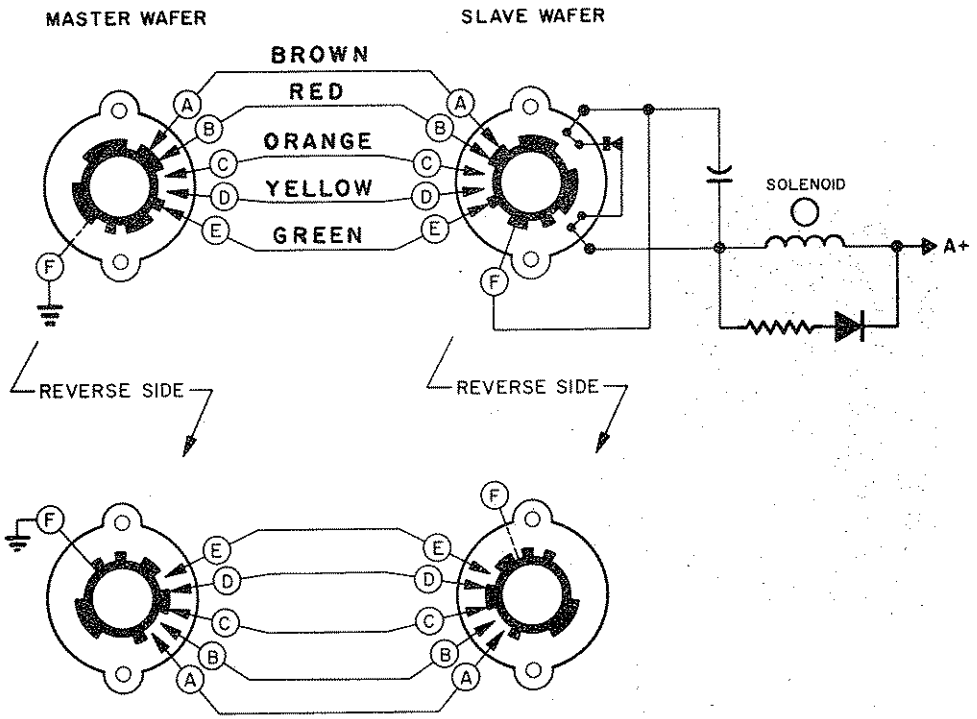
FIGURE NO.4

SWITCH DECK ASSEMBLY



INDICATE INTERCONNECTION OF WAFER PINS A,B,C,D OR E TO PIN F.

INDICATE NO INTERCONNECTION OF PINS A,B,C,D OR E TO PIN F.



UNIT	WAFERS SHOWN IN CHANNEL NO.
T-22-RA	CHANNEL NO. 7
SA-14	" NO. 1
T-5-RA	" NO. 2
T-10-R	" NO. 2

FIGURE NO. 5

TRANSCEIVER CHANNELING

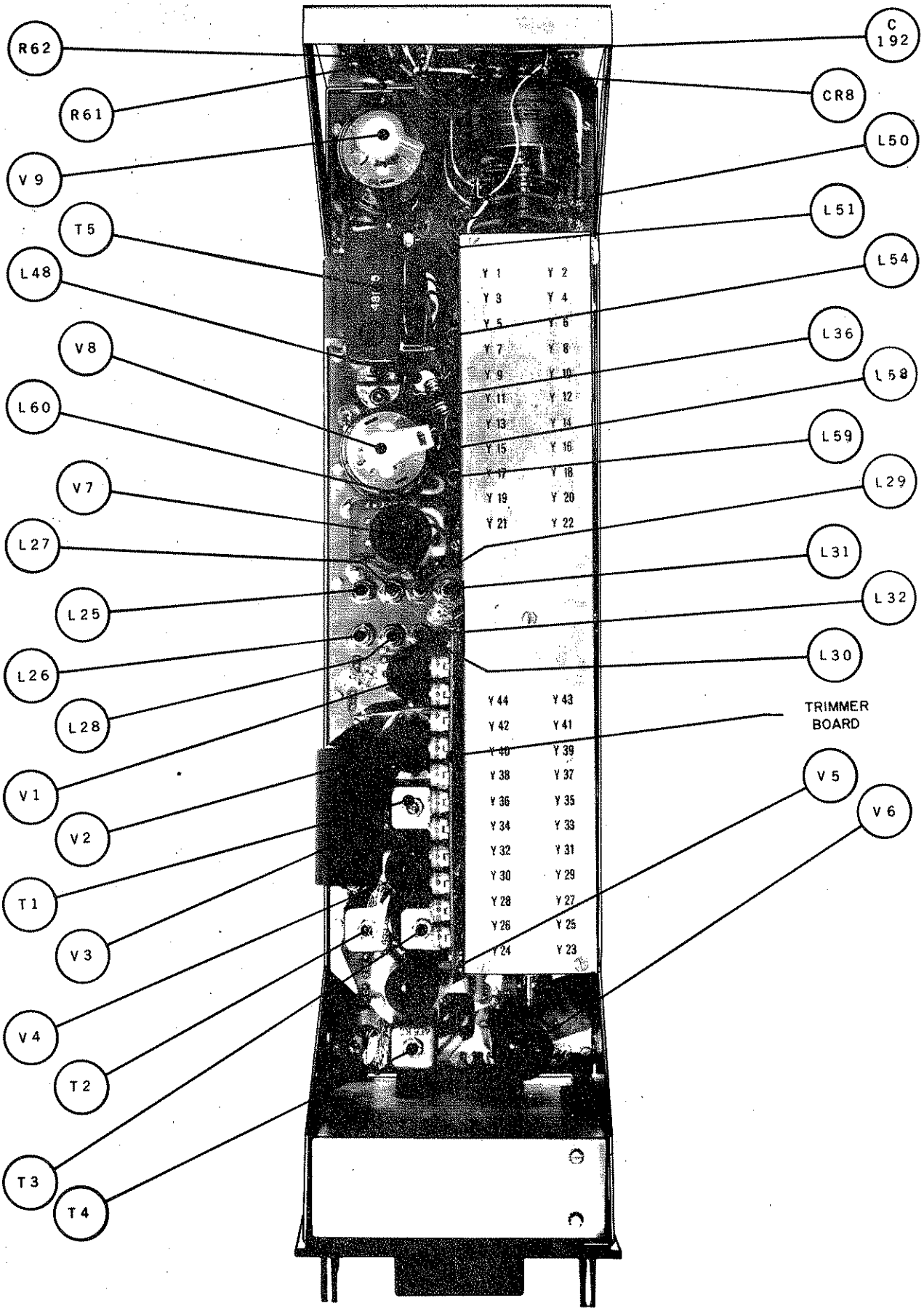


FIGURE NO. 6

TRANSCEIVER PARTS IDENTIFICATION

(Top View)

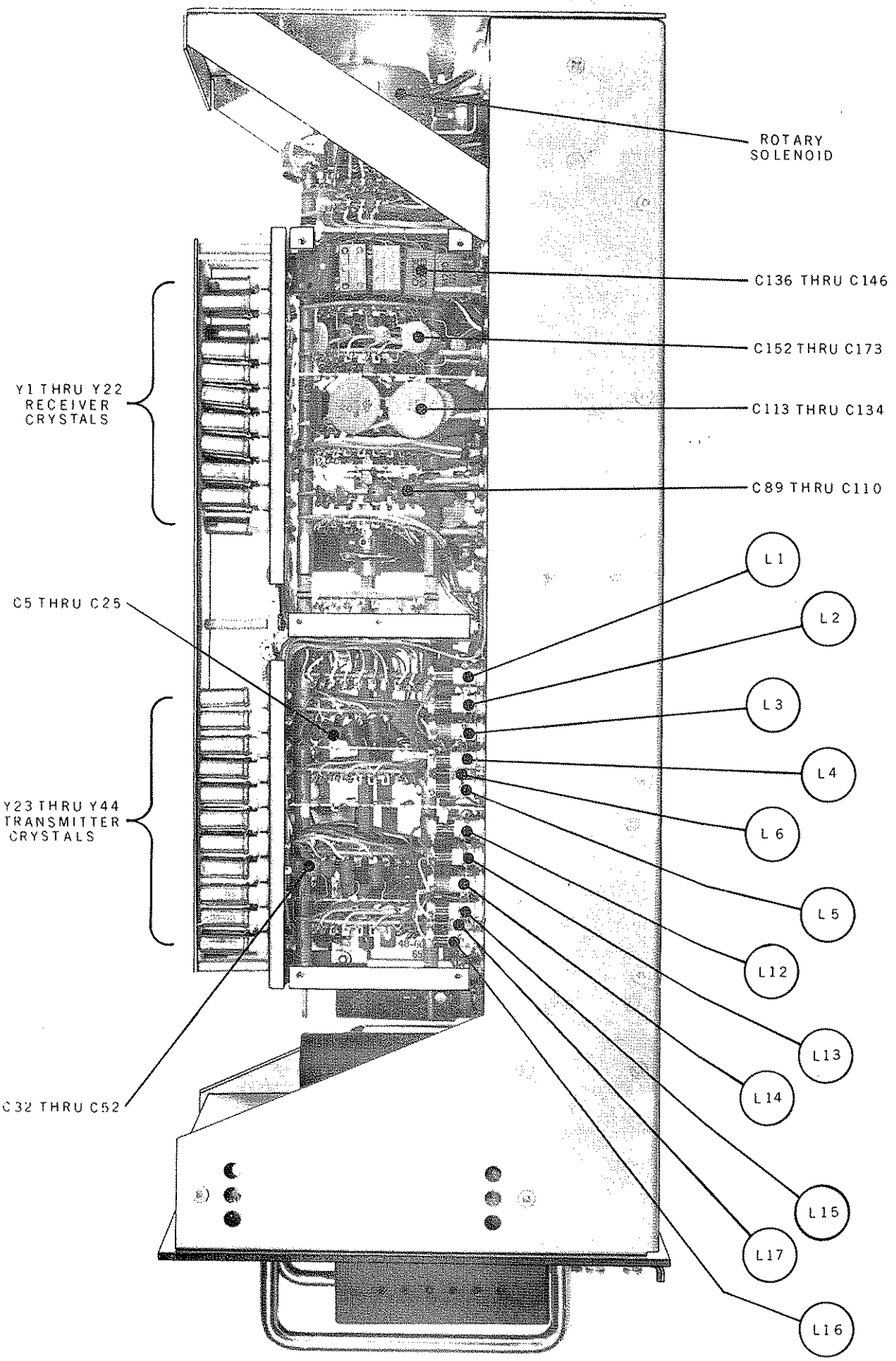


FIGURE NO.7

TRANSCEIVER PARTS IDENTIFICATION

(Side View)

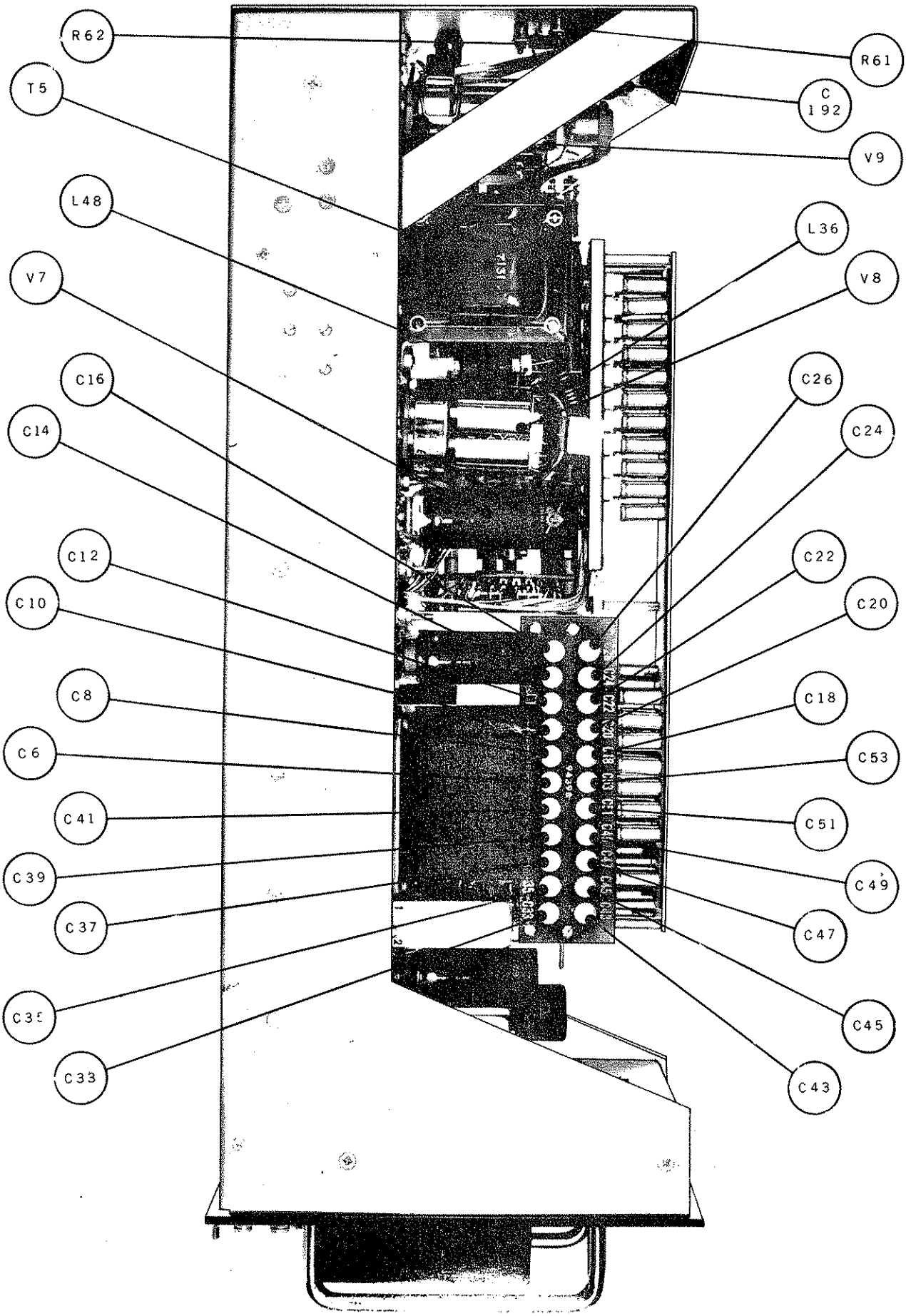


FIGURE NO.8

TRANSCEIVER PARTS IDENTIFICATION

(Side View)

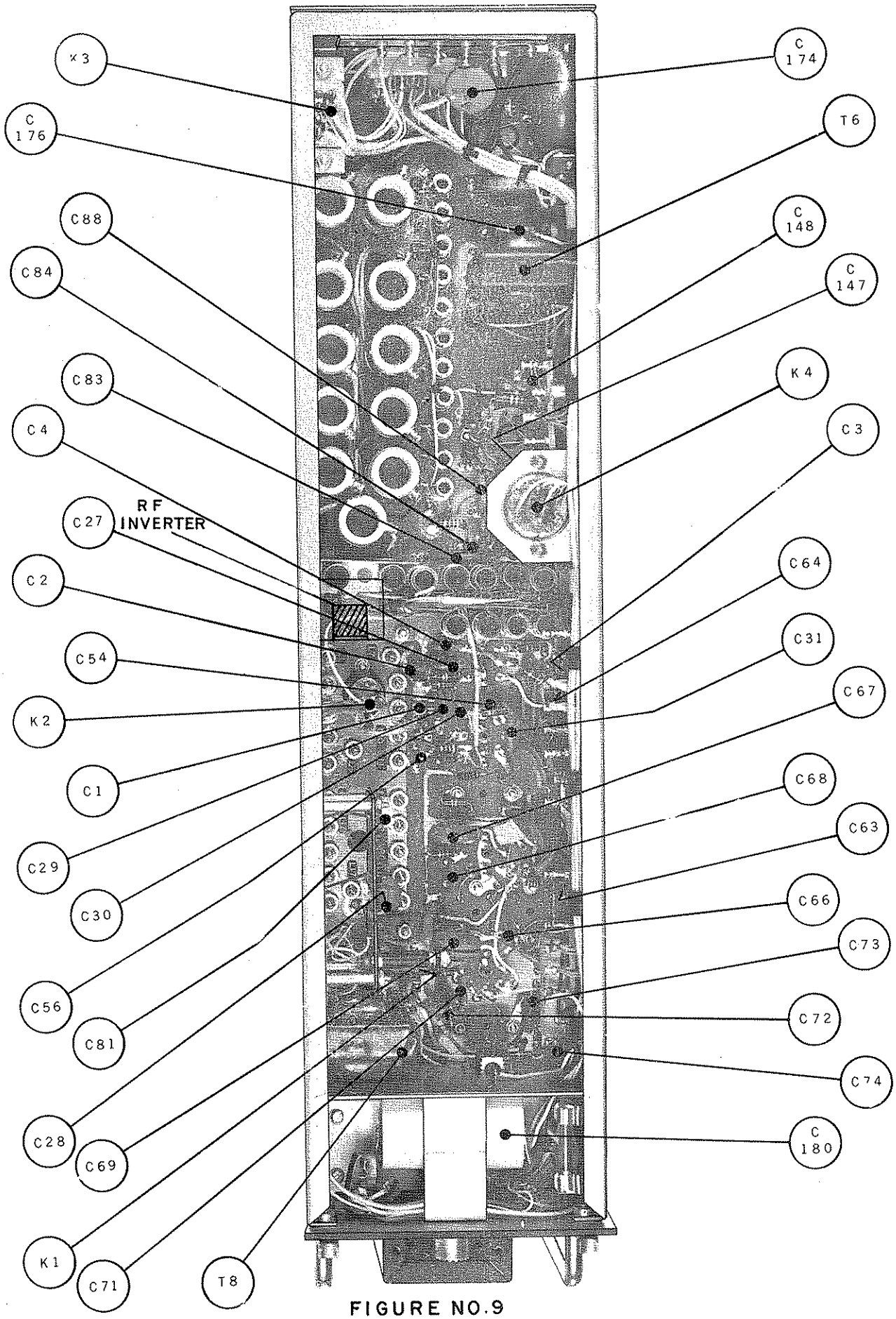


FIGURE NO.9

TRANSCEIVER PARTS IDENTIFICATION

(Bottom View)

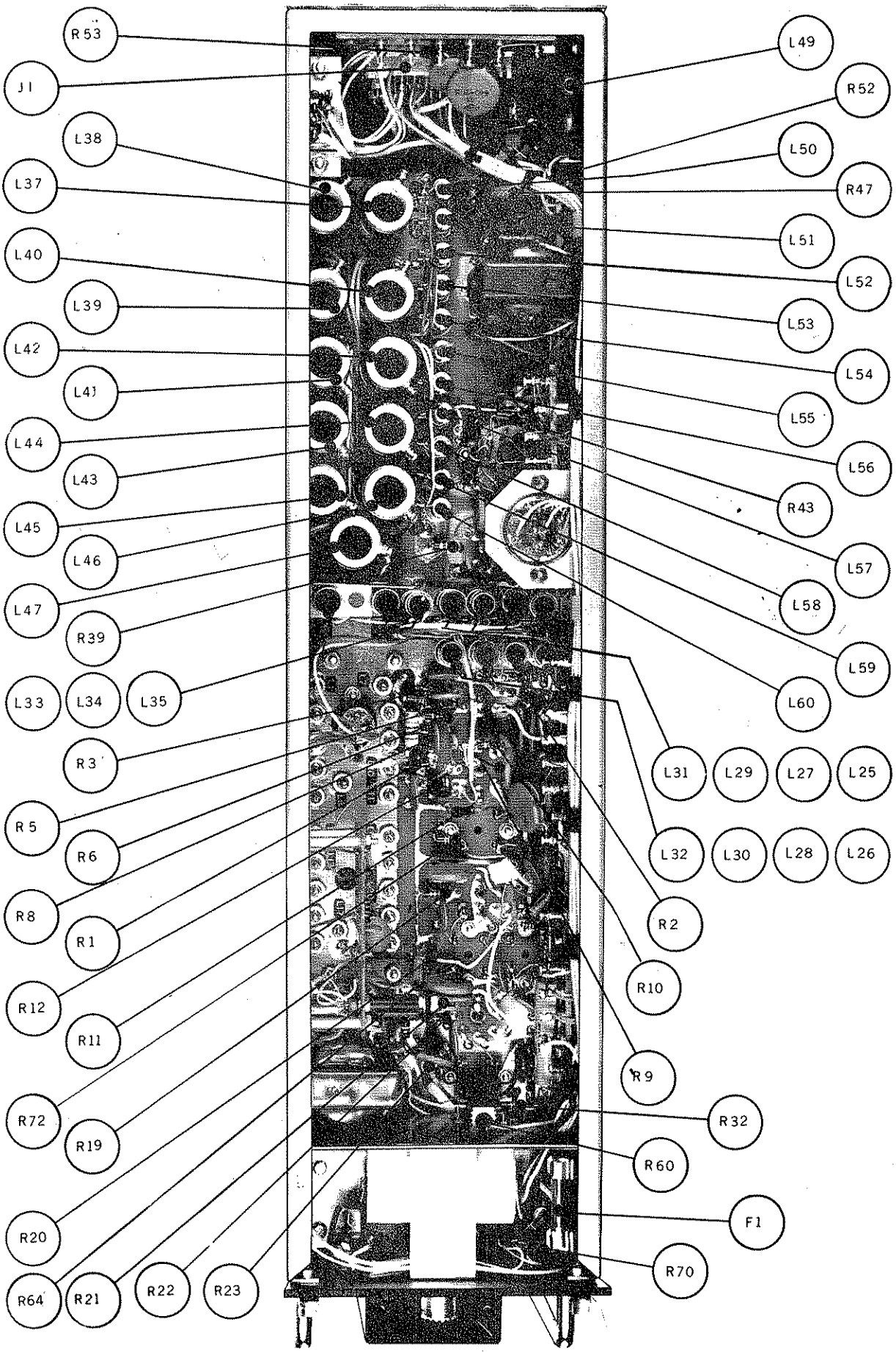


FIGURE NO.10

TRANSCEIVER PARTS IDENTIFICATION

(Bottom View)

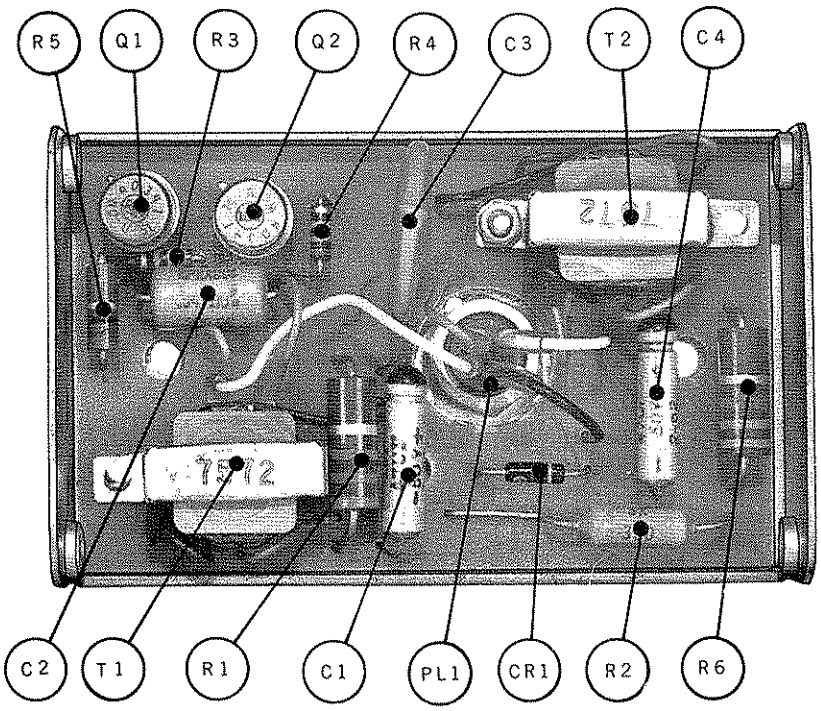


FIGURE NO. 11
INTERFACE AMPLIFIER

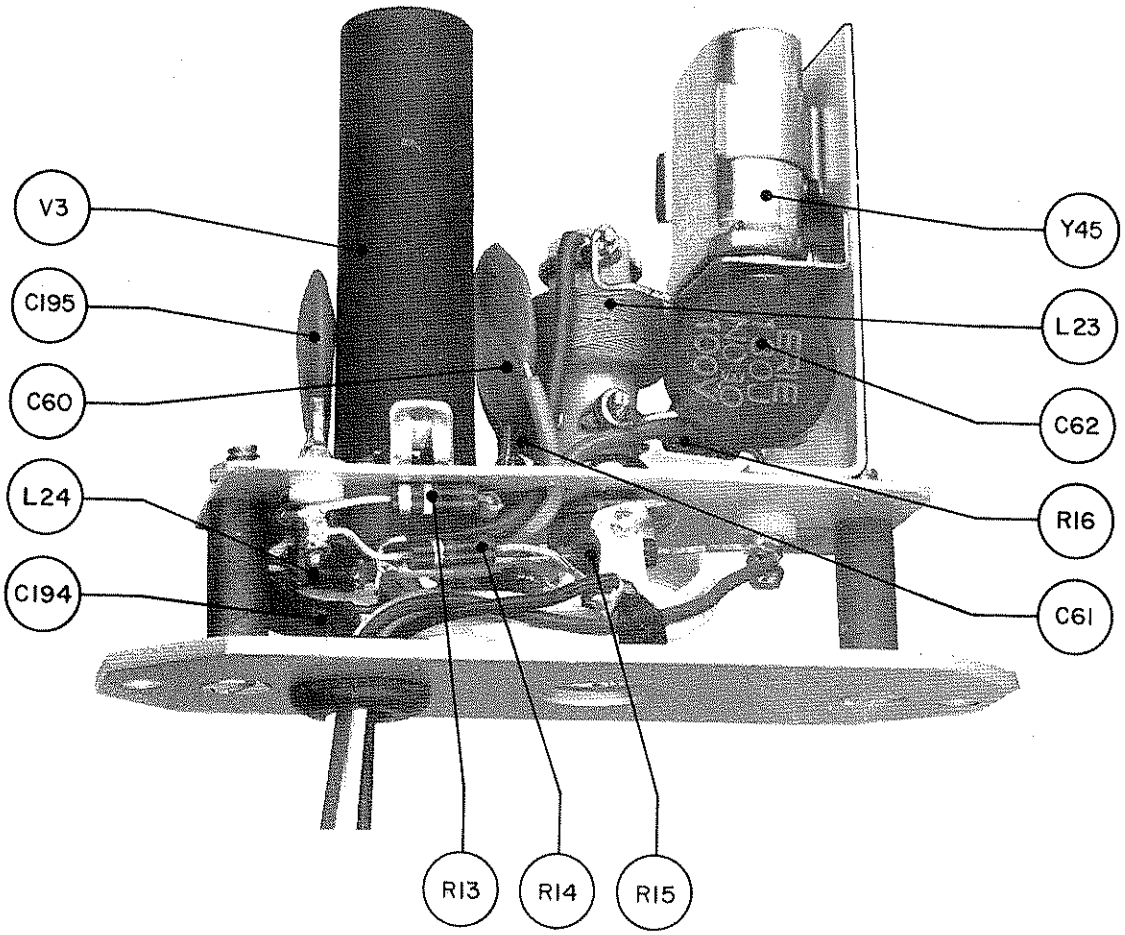


FIGURE NO. 12
OSCILLATOR MIXER SUBASSEMBLY

The coupling unit is provided to match specific antenna lengths. Each unit is pretuned at the factory to match a given antenna at preselected channel frequencies. Once the coupling unit is installed and operating, no further consideration to antenna matching is required.

When deciding upon the location of the coupling unit in the aircraft, one important fact must be remembered. The length of wire between the loading unit and the fixed antenna feed through must be as short as possible. It should be six (6) inches or less. Excessive length causes radiation inside the aircraft. It will result in considerable detuning and very limited range, even though the meter indicates that it is properly tuned.

When calculating the length of the antenna, the length of the lead should be considered as this lead becomes part of the radiating element.

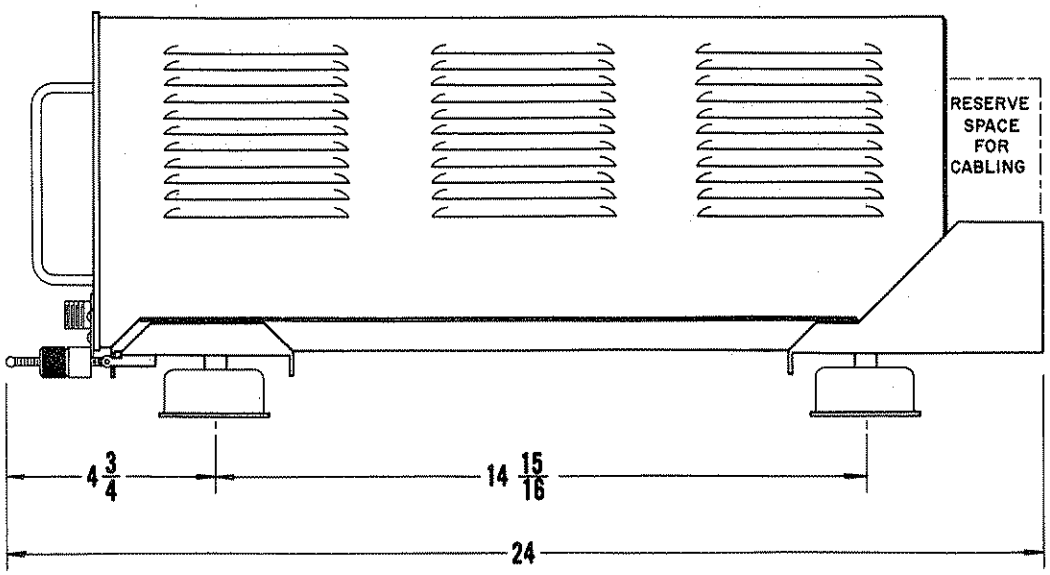
The antenna and coupling unit should be matched to the transmitter. The transmitter should not be tuned to the coupling unit. Tuning the transmitter to the coupling unit results in severe detuning, excessive current usage and overheating. Under no circumstance should the transmitter be retuned unless a 50 ohm load is connected to the transmitter output.

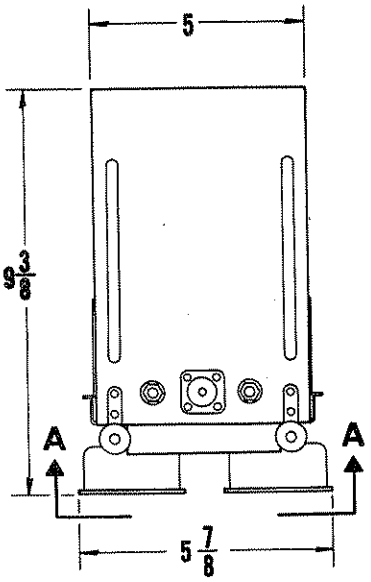
A fixed antenna kit is available from SunAir. The various parts are shown in C.U. Coupler Manual, Part No. 99374. They are relatively easy to install and should present no problems.

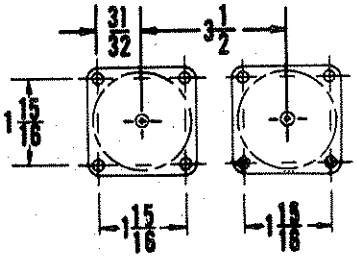
Several types of R.F. inverters may be used to indicate antenna tuning. SunAir transmitters now have the R.F. inverter mounted internally in the transmitter (Figures 9 and 30). An external inverter may be used as shown in the Electric Reel Manual, Part No. 99477.

A trailing antenna kit is available from SunAir. The various parts are shown in the Installation Manual, Electric Reel Antenna Kit, Part No. 99477.

Important: All solder joints must be extremely solid to avoid trouble caused by vibration, corrosion and arcing.







16 HOLES TO MOUNT SHOCK RACK TO BE .204 DIA.

A-A

MAXIMUM SWAY-1.50 INCHES

FIGURE NO. 14
TRANSCEIVER, MOUNTING DETAIL

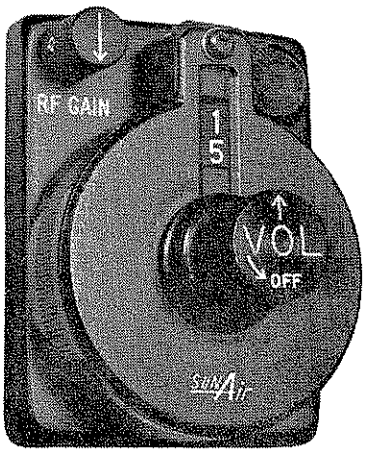


FIGURE NO. 16
DRUM TYPE CONTROL HEAD
P/N 33344

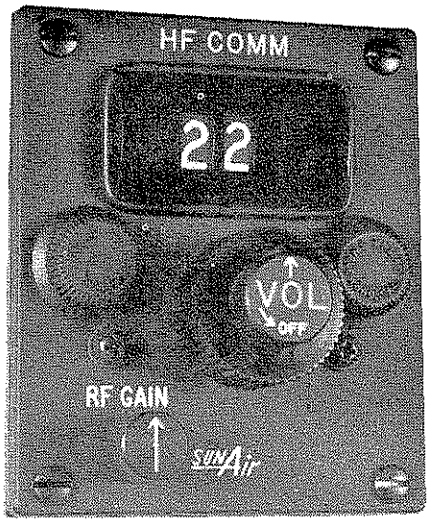


FIGURE NO. 17
DIGITAL TYPE CONTROL HEAD
P/N 33332

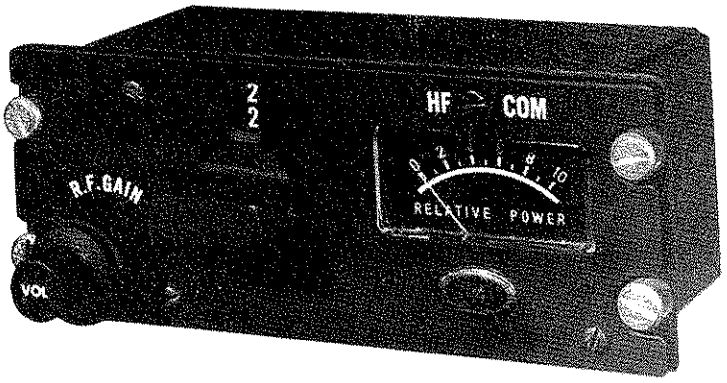
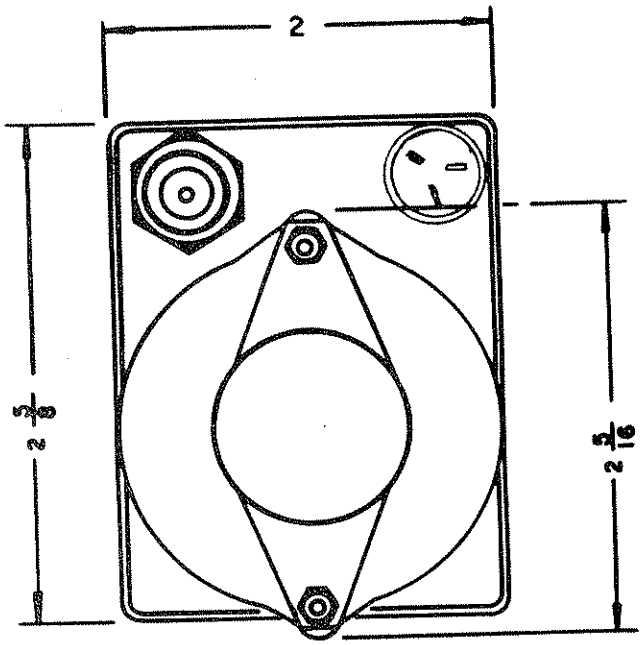
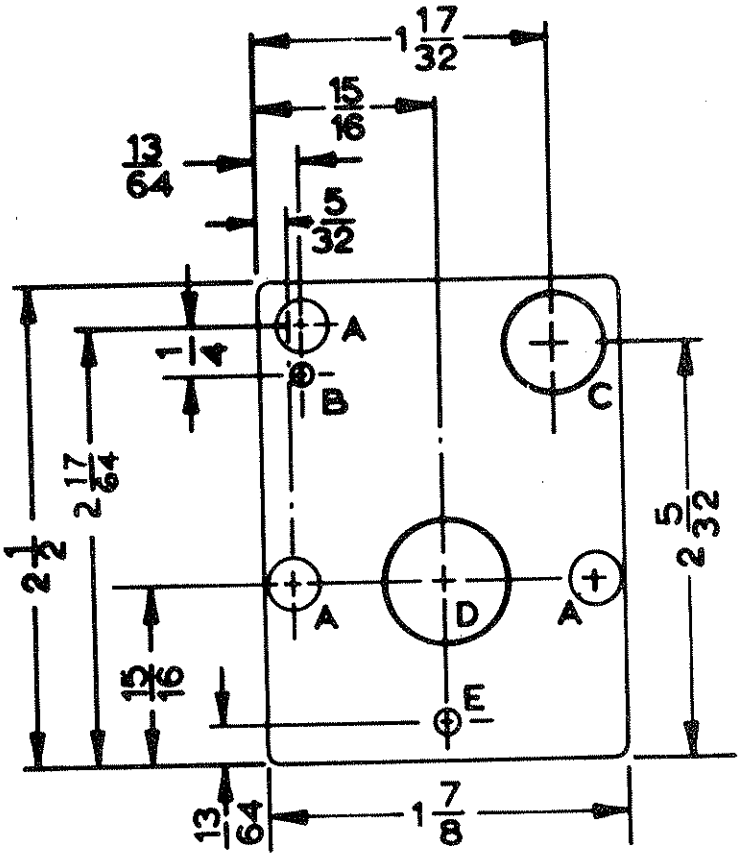


FIGURE NO. 18
SCU-22 CONTROL HEAD
P/N 99906 & 99907



REAR VIEW



DRILL NOTES:

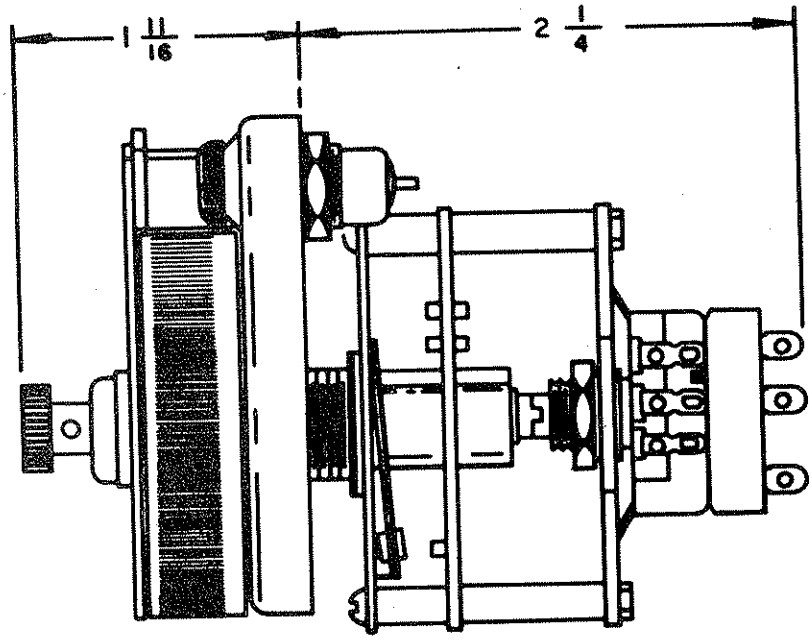
A-1/4 In. Dia. (3)

B-3/32 In. Dia. (1)

C-1/2 In. Dia. (1)

D-5/8 In. Dia. (1)

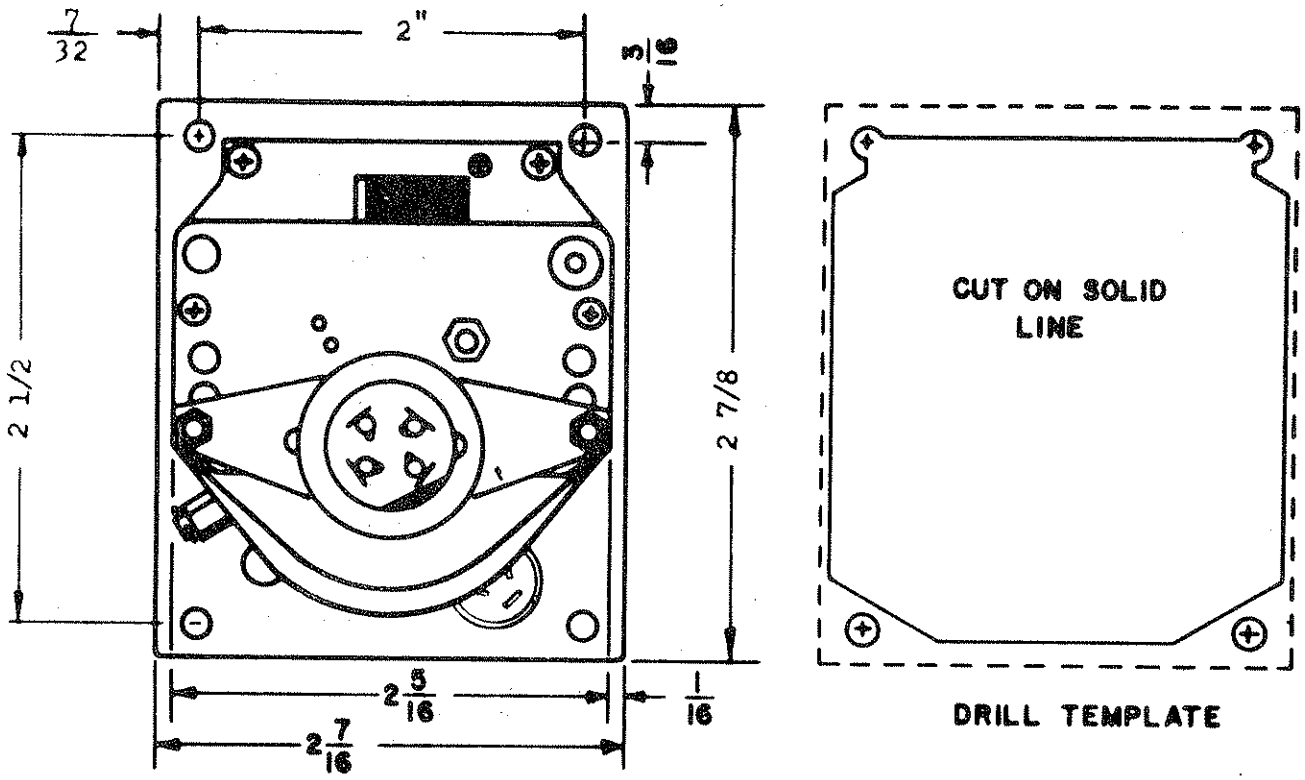
E-3-48 Tap (1)

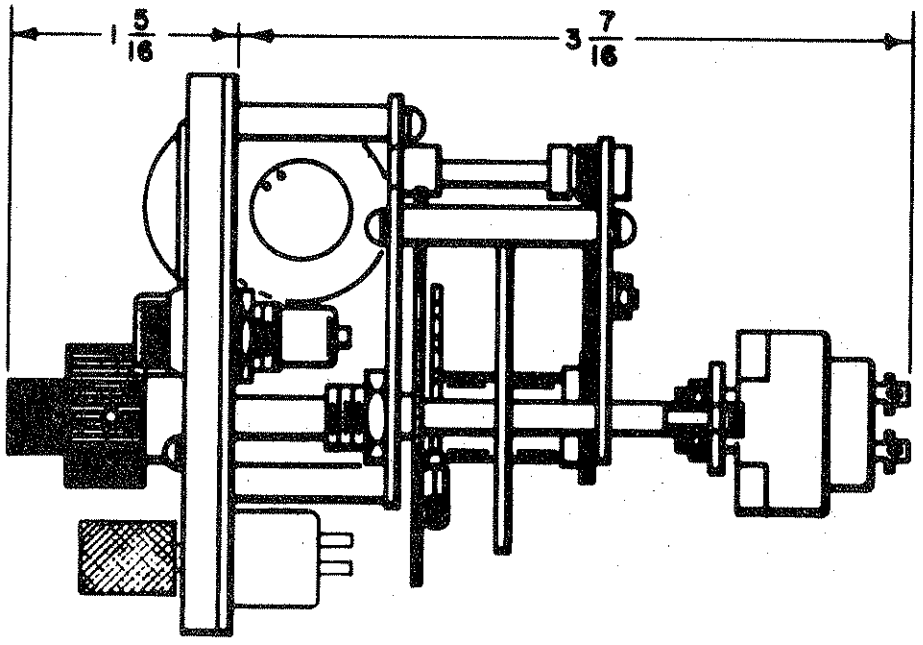


Weight: 7 oz.

FIGURE NO.19

DRUM TYPE CONTROL HEAD, MOUNTING DETAIL
P/N 33344

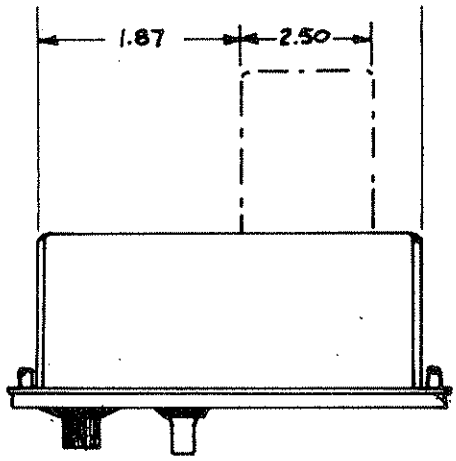




WEIGHT: 10 oz.

FIGURE NO. 20

DIGITAL TYPE CONTROL HEAD, MOUNTING DETAIL
P/N 33332



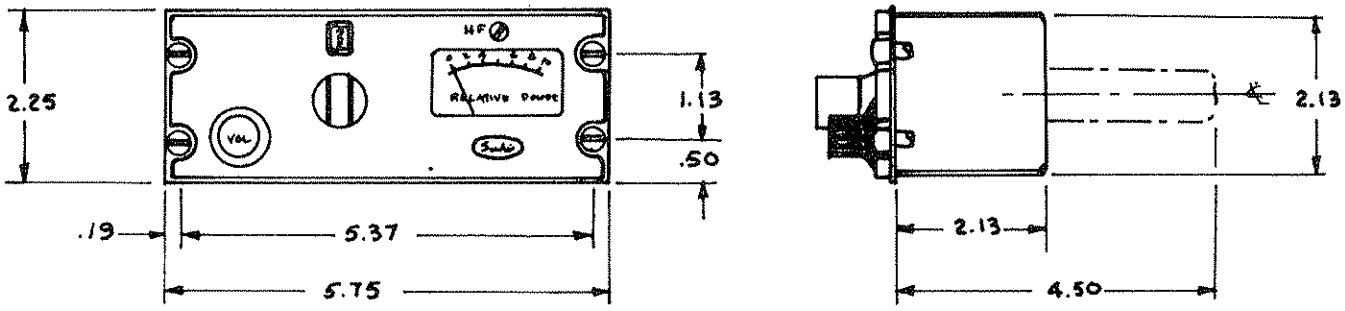


FIGURE NO.21

SCU-22 CONTROL UNIT, MOUNTING DETAIL
P/N 99906 & 99907

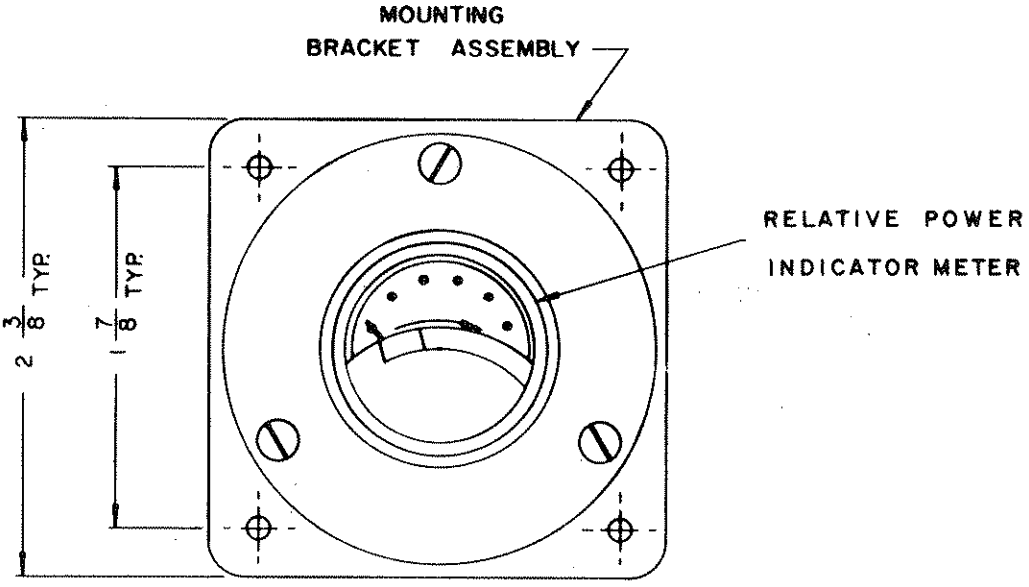
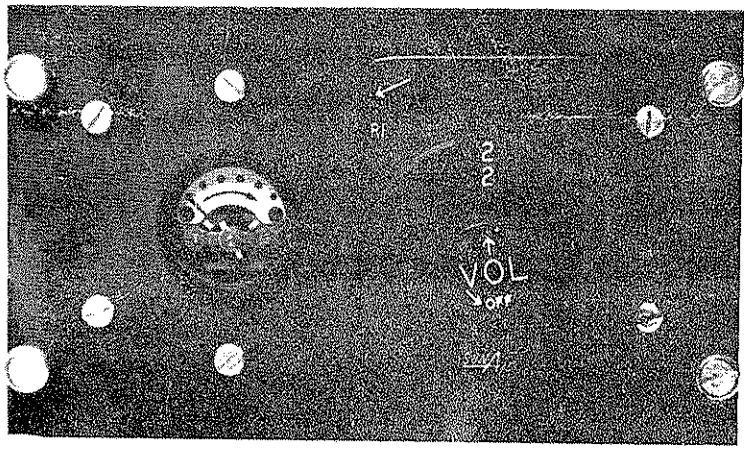


FIGURE NO.22

R.F. INDICATOR, MOUNTING DETAIL
P/N 90859



P/N 91401
(Front View)

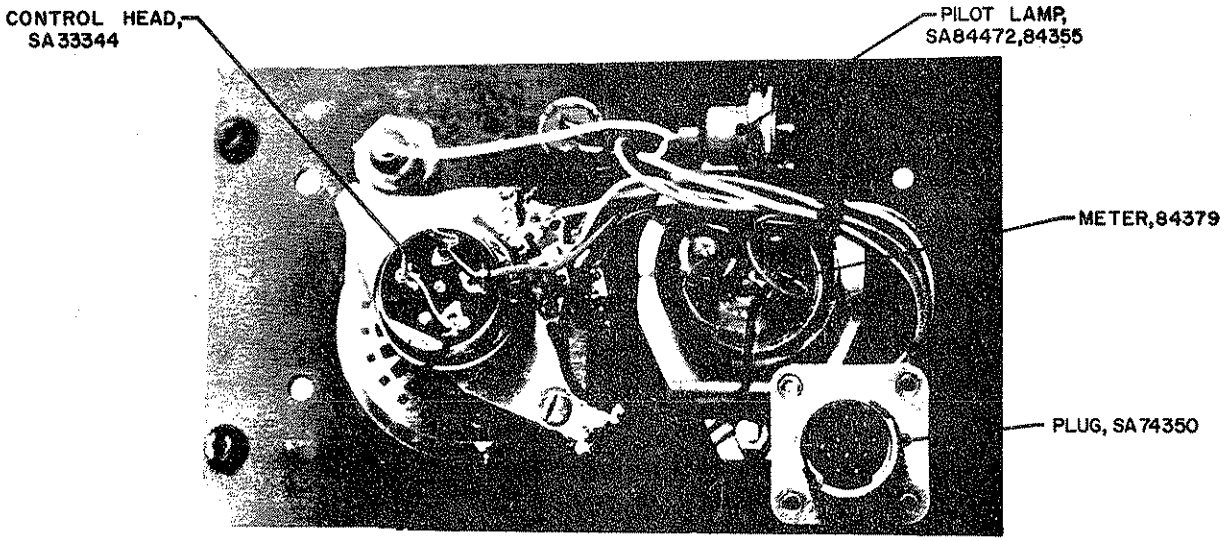


FIGURE NO. 23
REMOTE CONTROL UNIT, PARTS IDENTIFICATION
(Rear View)

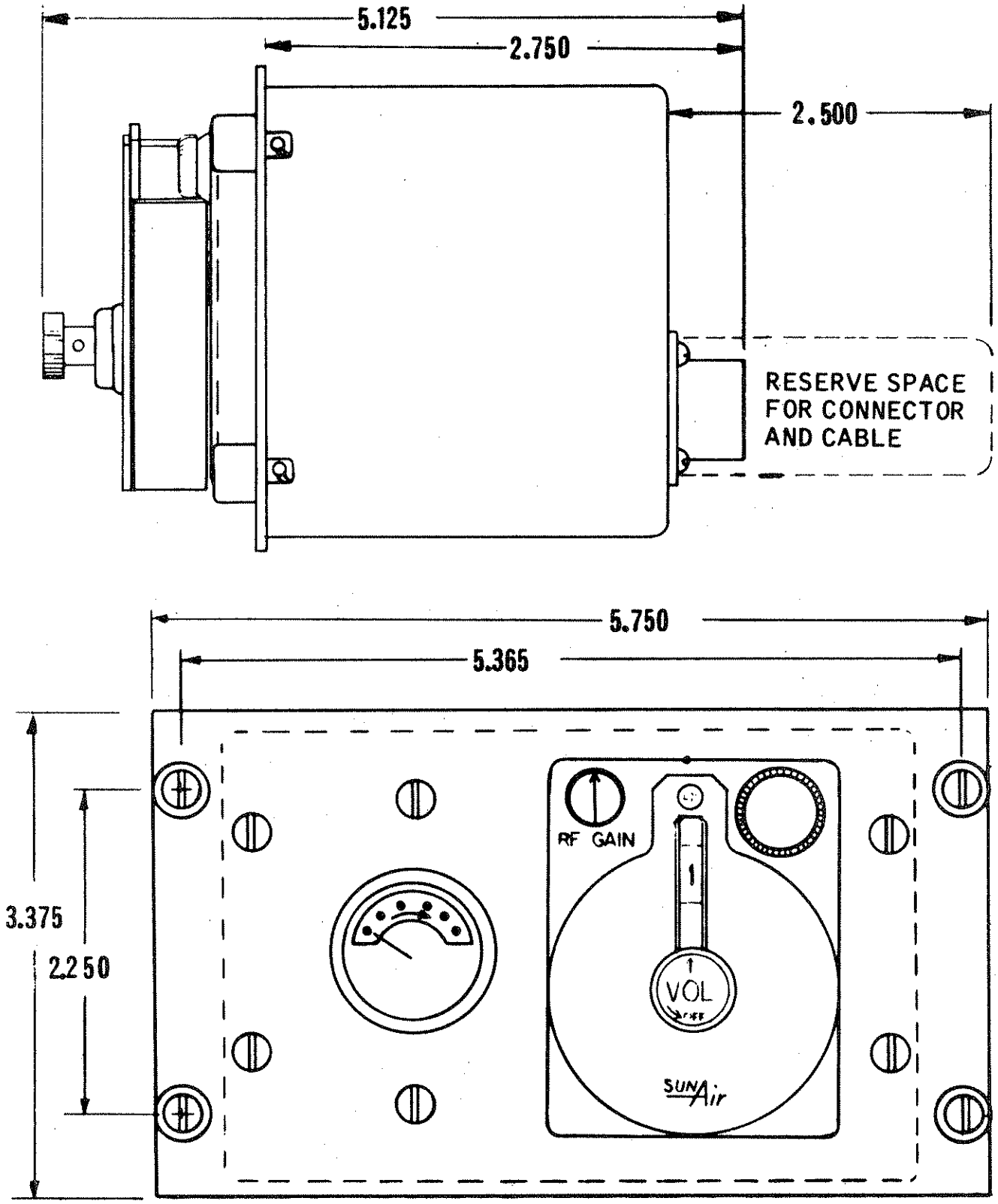


FIGURE NO. 24

REMOTE CONTROL UNIT, MOUNTING DETAIL

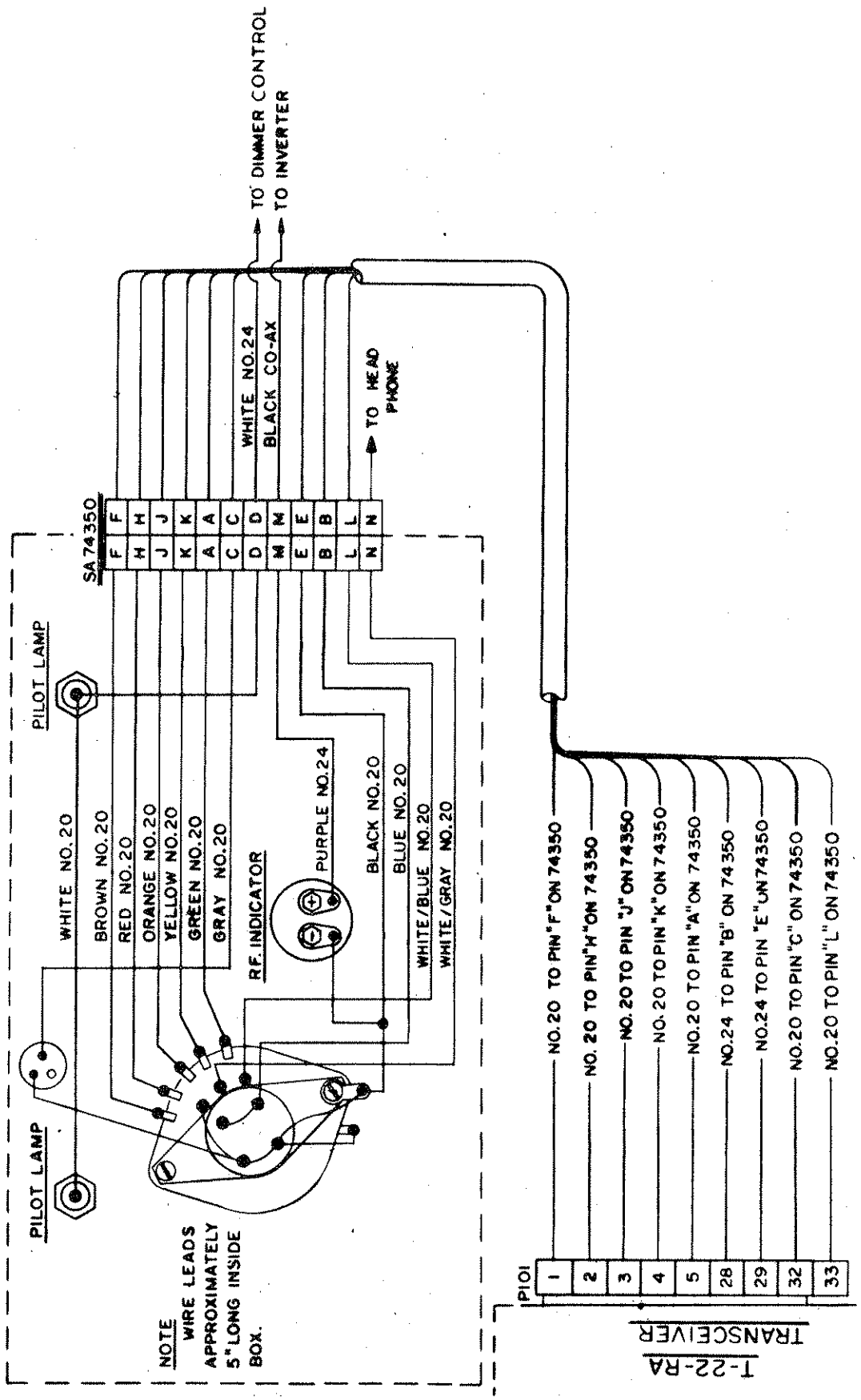


FIGURE NO. 25

SCHEMATIC, REMOTE CONTROL UNIT

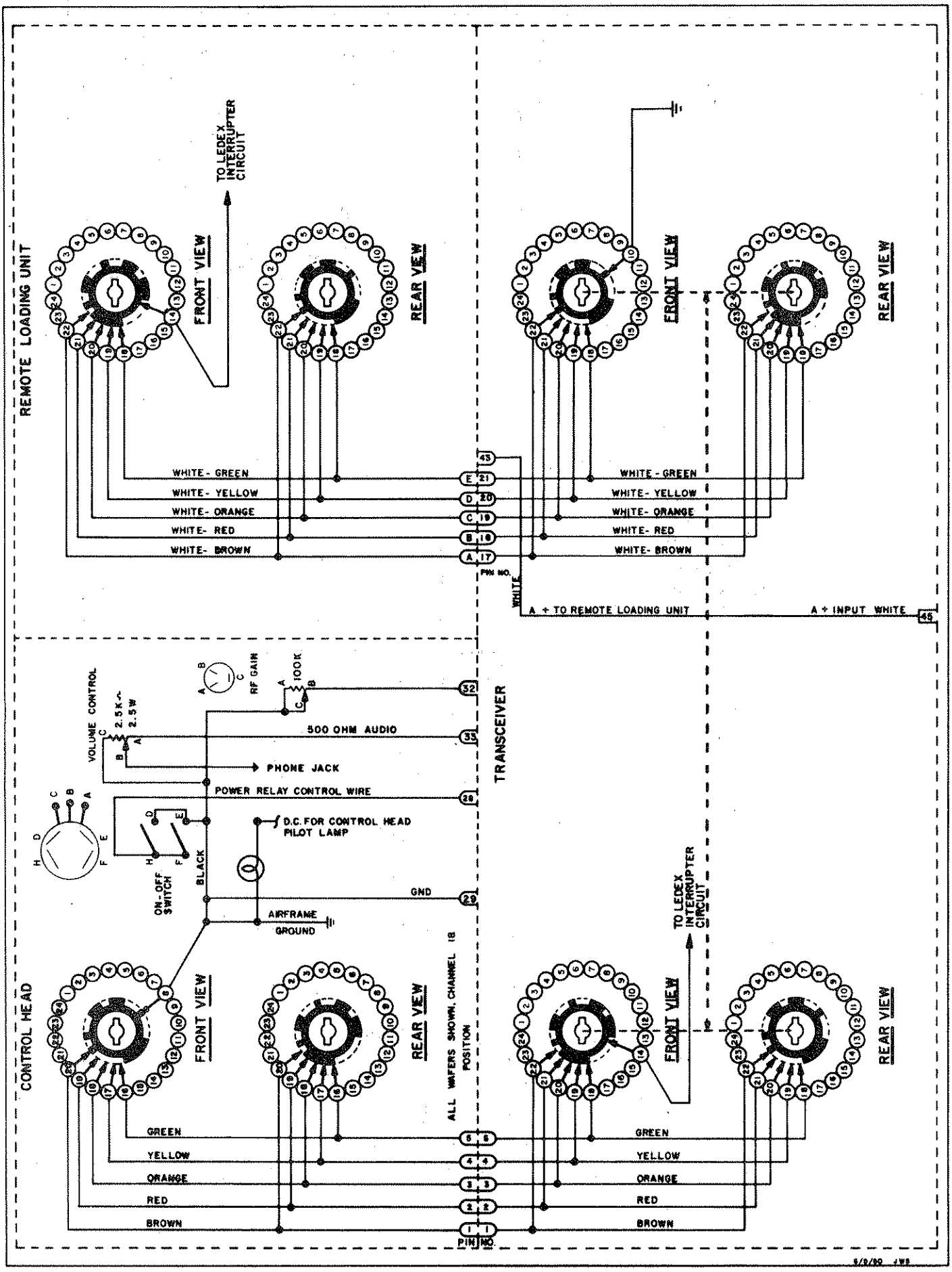


FIGURE NO. 26

DIAGRAM, TRANSCEIVER CHANNELING

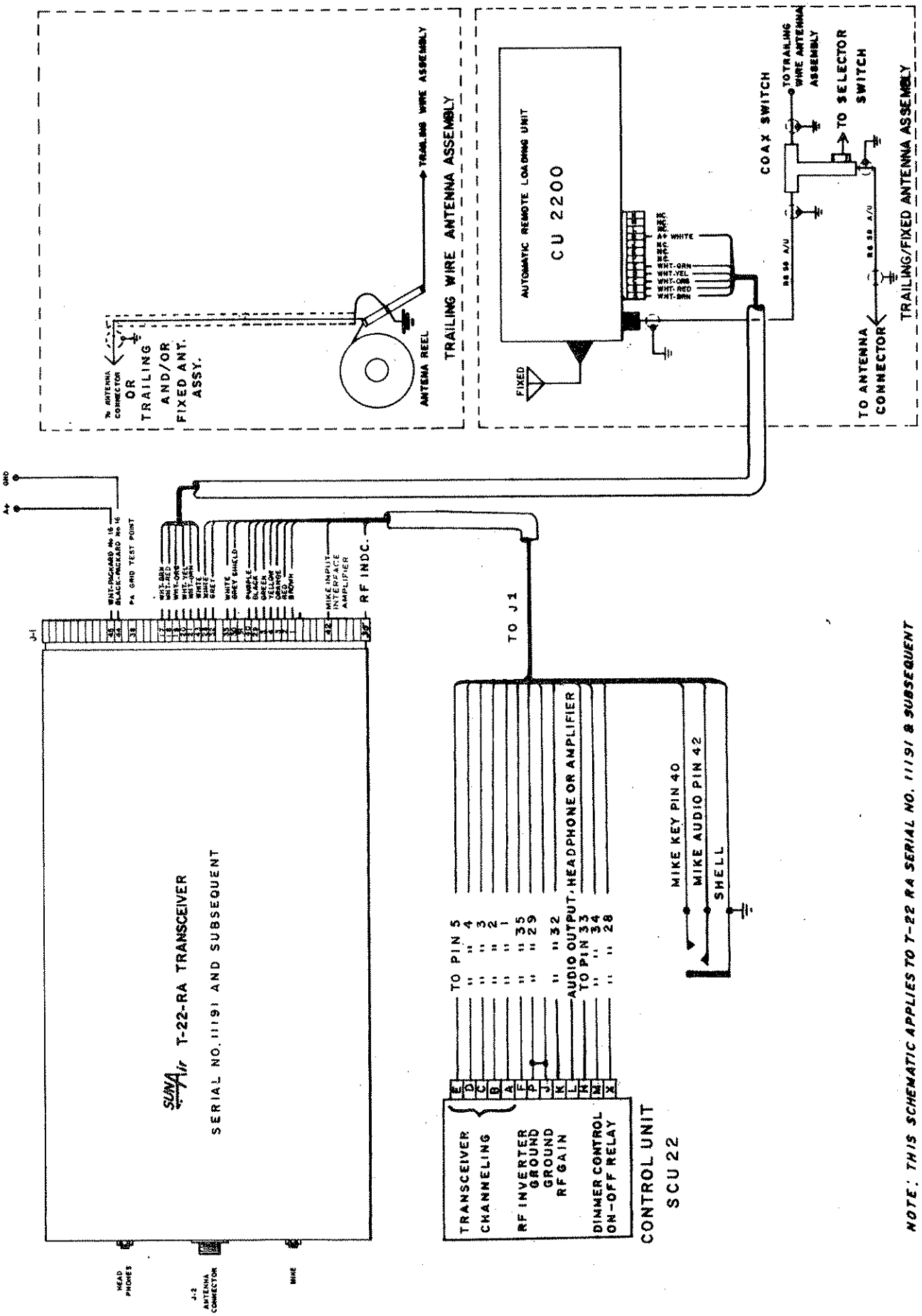
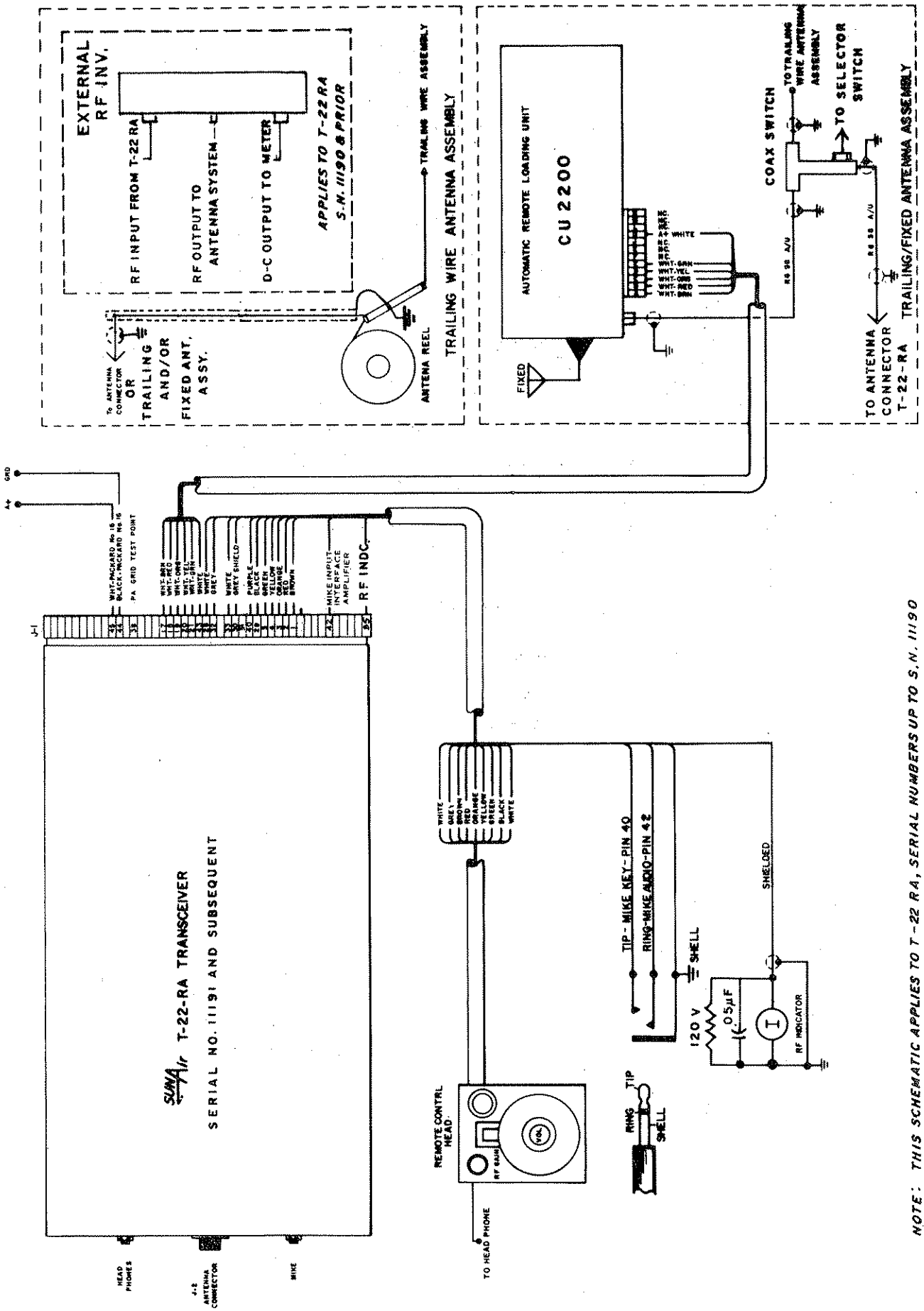


FIGURE NO. 27

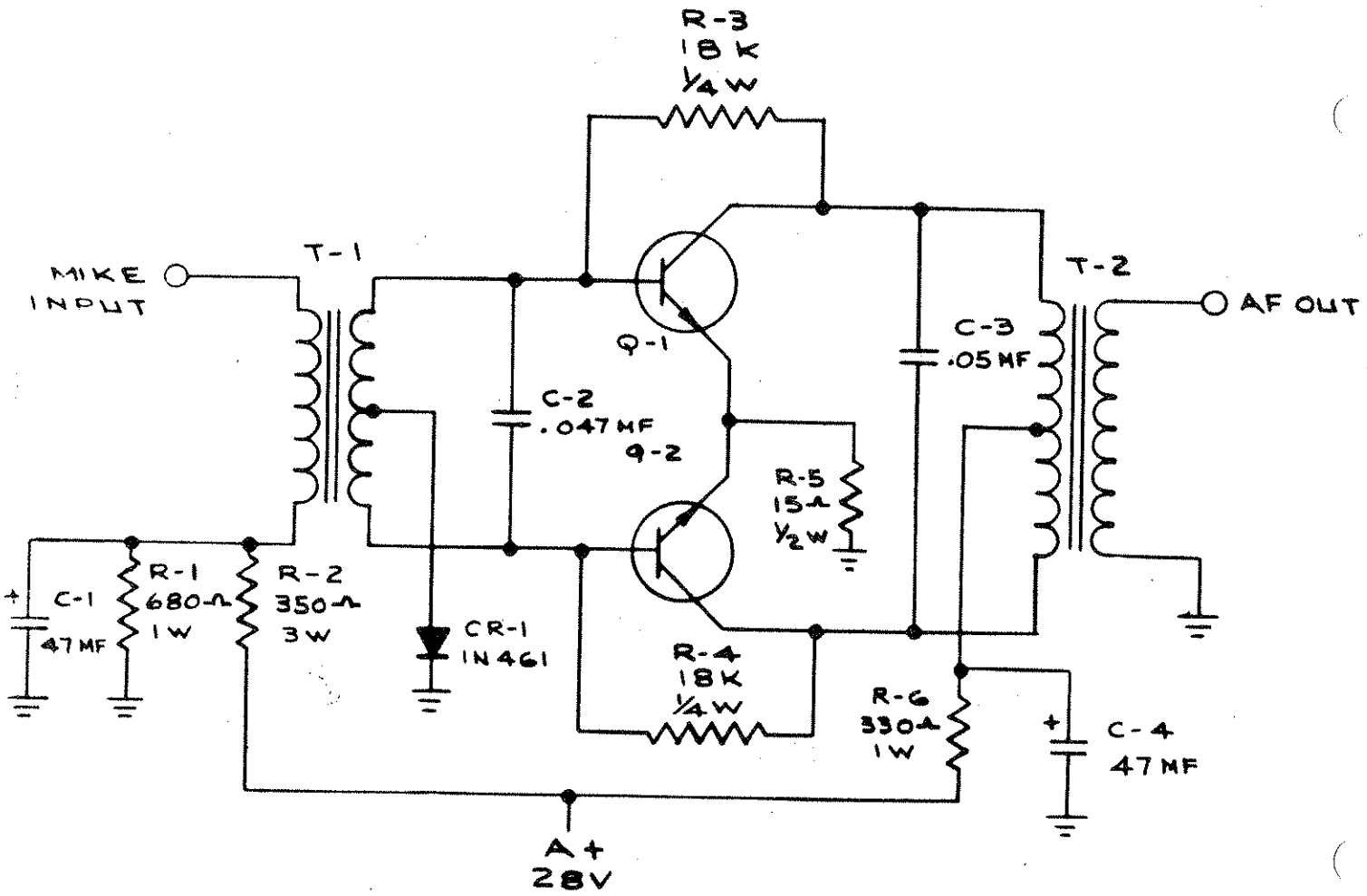
DIAGRAM, TRANSCEIVER INTERCONNECTION

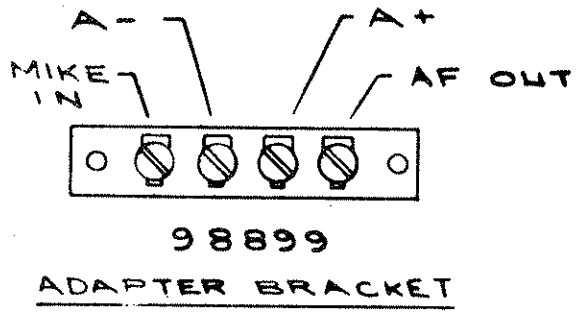


NOTE: THIS SCHEMATIC APPLIES TO T-22 RA, SERIAL NUMBERS UP TO S.N. 11190

FIGURE NO. 28

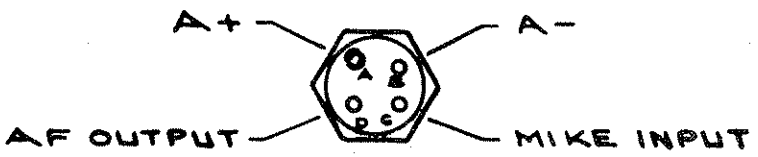
DIAGRAM, TRANSCEIVER INTERCONNECTION





98899

ADAPTER BRACKET



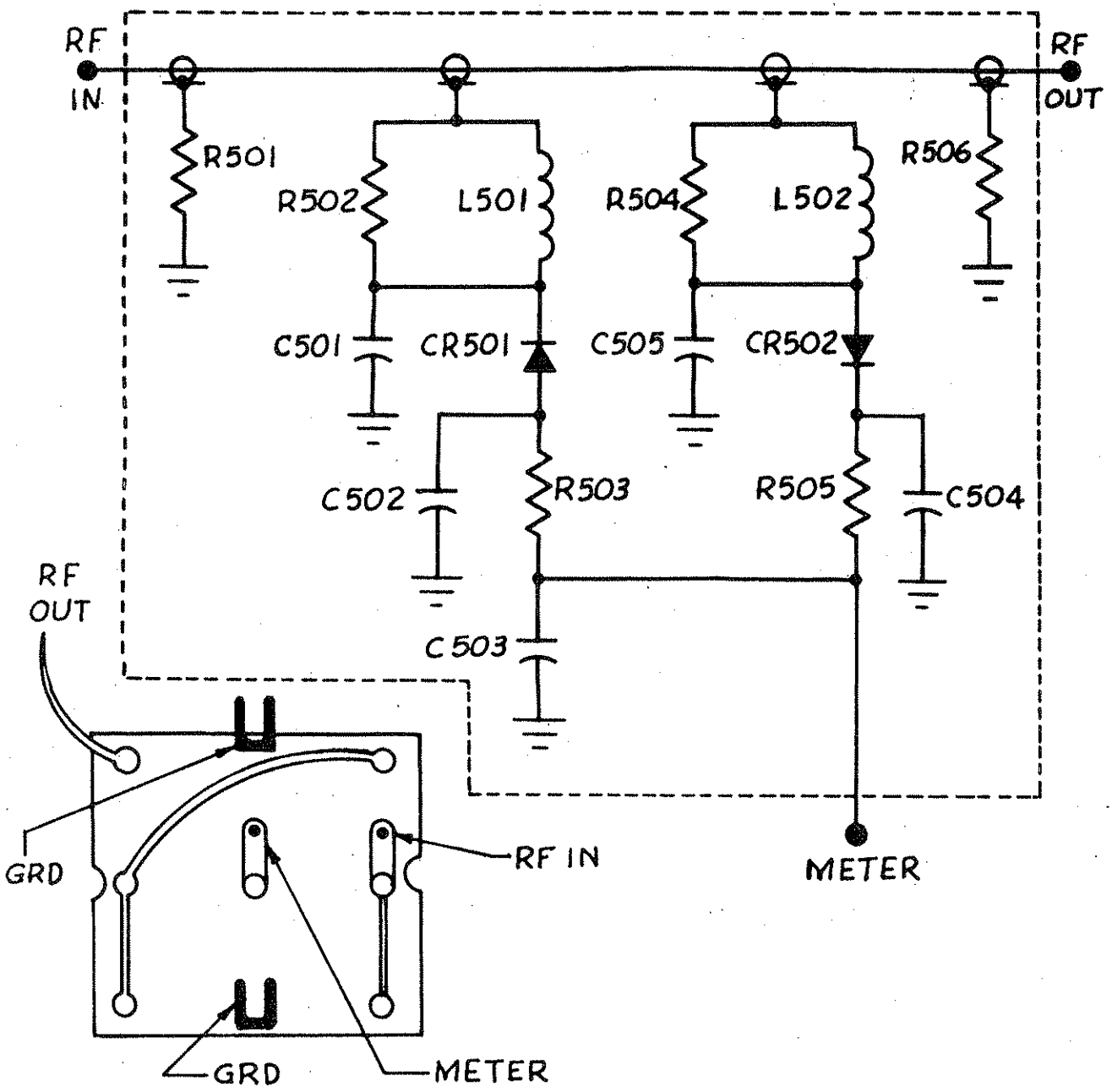
74568

PLUG

FIGURE NO. 29

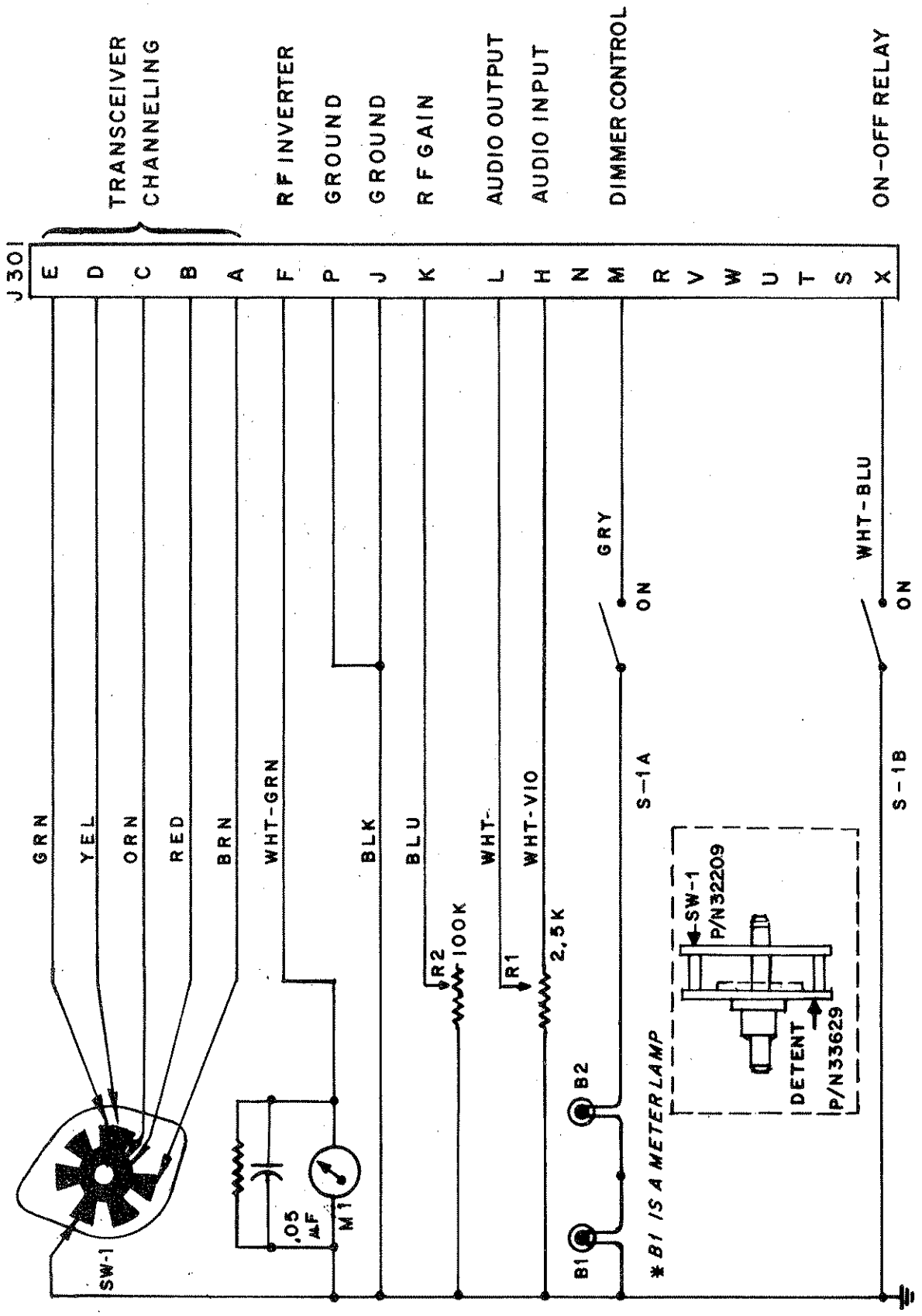
SCHEMATIC, INTERFACE AMPLIFIER

P/N 99128



NOTE: PAGE # 23, FIGURE NO. 9 SHOWS LOCATION OF R.F. INVERTER IN TRANSCEIVER

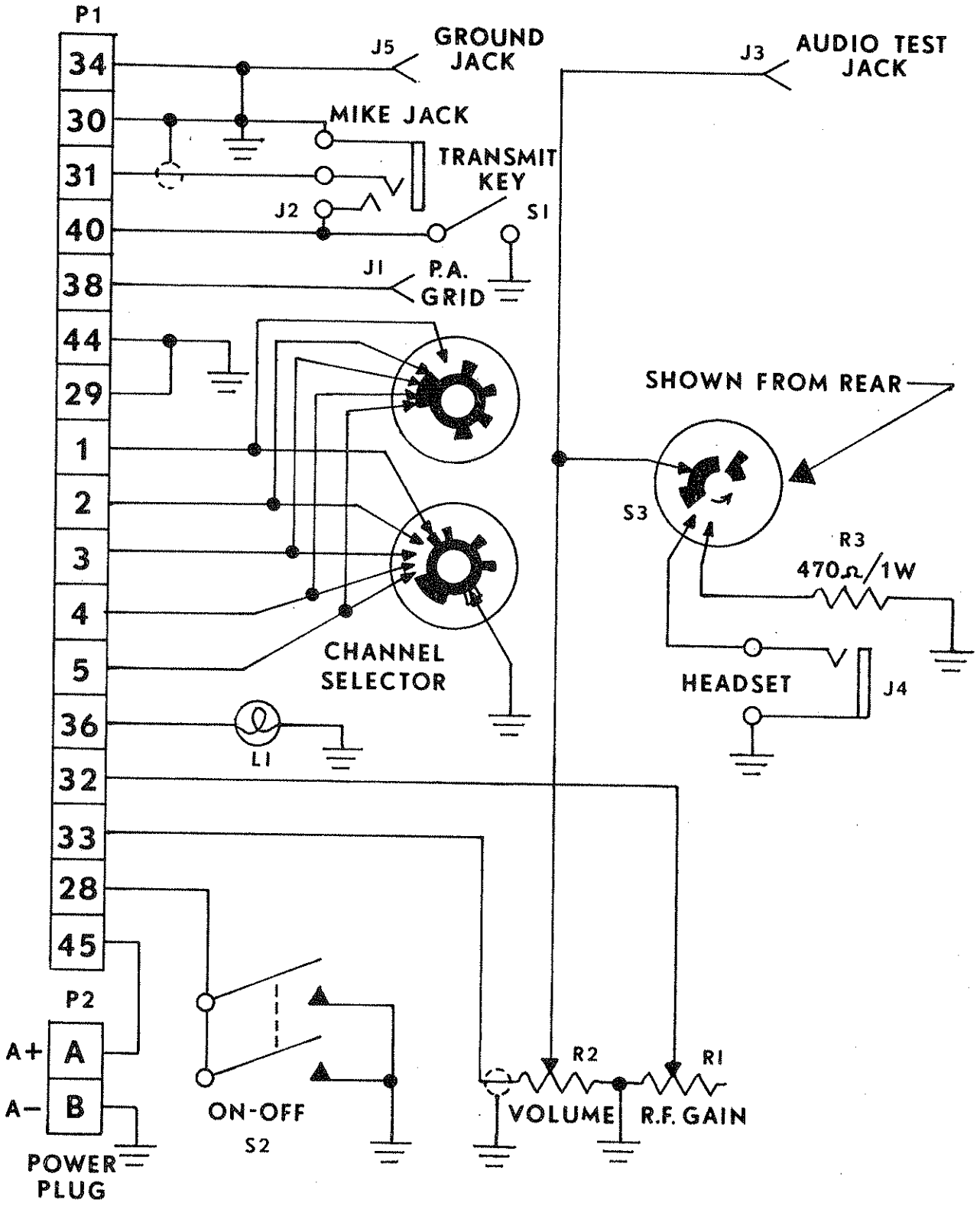
FIGURE NO. 30 -
SCHEMATIC & BASE CONNECTION DRAWING, R.F. INVERTER
P/N 98863



NOTE:
DRAWING APPLIES TO SERIAL NO. 151 & SUBSEQUENT

FIGURE NO. 31

SCHEMATIC, CONTROL UNIT, MODEL SCU-22



SCHEMATIC, TEST SET CONTROL BOX

CKT. SYM.	PART NO.	DESCRIPTION
C1	24238	CAPACITOR, TUBULAR 250pf 500V
C2	24197	" RADIAL 510pf "
C3	24355	" DISC. .01uf "
C4	24355	" " " "
C5	--	" FREQUENCY DEPENDENT (SEE CHART FIG. NO. 1)
C6	24795	" VARIABLE 1.5pf - 20pf
C7		SAME AS C5
C8		" " C6
C9		" " C5
C10		" " C6
C13		" " C5
C14		" " C6
C15		" " C5
C16		" " C6
C17		" " C5
C18		" " C6
C19		" " C5
C20		" " C6
C21		" " C5
C22		" " C6
C23		" " C5
C24		" " C6
C25		" " C5
C26		" " C6
C27	25103	CAPACITOR, DISC. .005uf
C28	24355	" " .01uf 500V
C29	24355	" " " "
C30	25012	" TYPE CN33 3.3pf
C31	24367	" DISC. .05uf 500V
C32	--	" FREQUENCY DEPENDENT (SEE CHART FIG. NO. 1)
C33		" VARIABLE 1.5pf - 20pf
C34		SAME AS C32
C35		" " C33
C36		" " C32
C37		" " C33
C38		" " C32
C39		" " C33
C40		" " C32
C41		" " C33
C42		" " C32
C43		" " C33
C44		" " C32
C45		" " C33
C46		" " C32
C47		" " C33
C48		" " C32
C49		" " C33
C50		" " C32
C51		" " C33
C52		" " C32
C53		" " C33
C54	24317	CAPACITOR, RADIAL 20pf 500V
C55	24252	" DISC. 100pf "
C56	24355	" " .01uf "
C57		DELETED
C58	24367	CAPACITOR, DISC. .05uf "
C59	26145	" RADIAL 30pf "
C60	24355	" DISC. .01uf "
C61	24355	" " " "
C62	25098	" " 500pf "
C63	24290	" 39pf "
C64	24367	" " .05uf "

CKT. SYM.	PART NO.	DESCRIPTION
C65	27395	CAPACITOR, RADIAL, 2uf 50V
C66	24355	" DISC. .01uf 500V
C67	24367	" " .05uf "
C68	24355	" " .01uf "
C69	24367	" " .05uf "
C70	24367	" " " "
C71	24355	" " .01uf "
C72	24367	" " .05uf "
C73	24264	" RADIAL, 75pf "
C74	24018	" DISC. 220pf "
C75	24355	" " .01uf "
C76	24264	" RADIAL, 75pf "
C77	24381	" DISC. 1500pf 3000V
C78	25555	" MICA 680pf 300V
C79		DELETED
C80	24355	CAPACITOR, DISC. .01uf 500V
C81	26169	" VARIABLE 5-25pf
C82	24032	" DISC. 100pf "
C83	24381	" " .0015uf
C84	24288	" RADIAL 50pf "
C85	24355	" DISC. .01uf "
C86	24094	" " 100pf 1KV
C87	24355	" " .01uf 500V
C88	24381	" " .0015uf
C89		
THRU C110	--	" FREQUENCY DEPENDENT (SEE CHART FIG. NO. 1)
C111	24381	" DISC. 1500pf 3KV
C112	24068	" " 33pf "
C113		
THRU C134	--	" FREQUENCY DEPENDENT (SEE CHART FIG. NO. 1)
C135	24367	" DISC. .05uf 500V
C136		
THRU C146	--	" FREQUENCY DEPENDENT (SEE CHART FIG. NO. 1)
C147	24381	" DISC. 1500pf 3KV
C148	25749	" " .005uf 1.4KV
C149		DELETED
C150		"
C151	24824	CAPACITOR, DISC. .015uf 500V
C152		
THRU C173	--	" FREQUENCY DEPENDENT (SEE CHART FIG. NO. 1)
C174	25206	" DISC. .05uf 1.5KV
C175		DELETED
C176	24575	CAPACITOR, TANTALUM 47uf 50V
C177	24410	" DISC. .01uf 1.6KV
C178	24410	" " " "
C179	24381	" " 1500pf 3KV
C180	24771	" MYLAR 7uf 700V
C181	24484	" " 4uf 400V
C182	24575	" TANTALUM 47uf 50V
C183	24355	" DISC. .01uf 500V
C184	24501	" MYLAR 2uf 400V
C185	24484	" " 4uf "
C186	24501	" " 2uf "
C187	24501	" " " "
C188	24587	" TANTALUM 100uf 30V
C189	24355	" DISC. .01uf 500V
C190	24587	" TANTALUM 100uf 30V
C191	24367	" DISC. .05uf 500V
C192	24630	" MOLDED .47uf 200V
C193	25098	" DISC. 500pf 500V

PARTS LIST

CKT. SYM.	PART NO.	DESCRIPTION
C194	25775	CAPACITOR, RADIAL 110pf 500V
C195	24355	" DISC. .01uf "
C196	24094	" " 100pf 1KV
CR1	44290	DIODE, SECOND DETECTOR
CR2	44290	" AGC
CR3	44290	" "
CR4 THRU CR7	40103	" POWER SUPPLY RECT.
CR8	41065	" ARC SUPPRESSION CIRCUIT
CR9	44290	" SIDETONE
F1	84886	FUSE, 10 AMP.
J1	74037	CONNECTOR, 45 PIN
J2	74192	" ANT.
J3	84044	JACK, HEADPHONE
J4	84056	JACK, MIKE
J5F	74570	PLUG, INTERFACE AMP. FEMALE
K1	66262	RELAY, SIDETONE
K2	66107	" ANT. CHANGEOVER
K3	66274	" ON-OFF
K4	66092	" B+ CHANGEOVER
KR1	32285	CHANNELING SOLENOID, ROTARY
L1 THRU L11	-----	COIL, MIXER. FREQ. DEPENDENT (SEE CHART FIG. NO. 1)
L12 THRU L22	-----	COIL, MIXER. FREQ. DEPENDENT (SEE CHART FIG. NO. 1)
L23	64355	COIL, 1955 kHz OSC.
L24	56205	CHOKE, 680 uh 1955 kHz OSC.
L25 THRU L35	-----	COIL, OSC. FREQUENCY DEPENDENT (SEE CHART FIG. NO. 1)
L36	97754	CHOKE PARASITIC POWER AMP.
L37 THRU L38	-----	COIL, PA. FREQUENCY DEPENDENT (SEE CHART FIG. NO. 1)
L48	56061	CHOKE, 2.5 uh R.F. POWER AMP.
L49	91255	CHOKE, AUDIO FILTER
L50 THRU L60		COIL, TRAP. FREQ. DEPENDENT (SEE CHART FIG. NO. 1)
L61	56114	CHOKE, 5 uh POWER SUPPLY
L62	93722	CHOKE, 400 uh POWER SUPPLY
L63	93734	CHOKE, .4 uh POWER SUPPLY
Q1	44020	TRANSISTOR, 2N174
Q2	"	" "
Q3	"	" "
Q4	"	" "
R1	16889	RESISTOR, COMP. 56 ohm .5W
R2	17390	" " 470 " "
R3	16231	" " 220k " "
R4	16645	" " 470k " "
R5	16671	" " 100k " "
R6	16712	" " 22k " "

CKT. SYM.	PART NO.	DESCRIPTION
R7		DELETED
R8	16724	RESISTOR, COMP. 10k .5W
R9	17338	" " 330 ohm "
R10	16724	" " 10k "
R11	16748	" " 1k "
R12	16683	" " 47k "
R13	17039	" " 100k .25W
R14	17156	" " 1k "
R15	17039	" " 100k "
R16	17352	" " 68k "
R17	18057	" " 470k "
R18	16580	" " 150 ohm .5W
R19	18423	" " 68k "
R20	16748	" " 1k "
R21	17390	" " 470 ohm "
R22	16231	" " 220k "
R23	16748	" " 1k "
R24	16671	" " 100k "
R25	16683	" " 47k "
R26	18057	" " 470k .25W
R27	16748	" " 1k .5W
R28	18057	" " 470k .25W
R29	17493	" " 1.2 meg. "
R30	17687	" " 2.2 " "
R31	17493	" " 1.2 " "
R32	18423	" " 68k .5W
R33	16712	" " 22k "
R34	17560	" " 820 ohm "
R35	16671	" " 100k "
R36	16695	" " 33k "
R37	18423	" " 68k "
R38	16695	" " 33k "
R39	16683	" " 47k "
R40	16700	" " 27k "
R41	16499	" " 47 ohm 1W
R42	16621	" " 1.5 meg. 5W
R43	16504	" WW 27k 1W
R44	16097	" " 100 ohm 10W
R45	18241	" " 45k "
R46		DELETED
R47	16126	RESISTOR, WW 600 ohm 5W
R48	16126	" " " "
R49	16695	" COMP. 33k .5W
R50	16516	" " 1k 1W
R51	16463	" " 470k "
R52	33411	POTENTIOMETER, 500k
R53	17651	RESISTOR, COMP. 2.7k .5W
R54	16138	" WW 75 ohm 5W
R55	16114	" " 300 ohm "
R56	16114	" " " " "
R57	16114	" " " " "
R58	16310	" " 40 ohm 3W
R59	16279	" " 1000 ohm "
R60	16085	" " 30 ohm 10W
R61	16968	" " 1 ohm "
R62	16968	" " " "
R63	17027	" COMP. " 1W
R64	17669	" " 2.2k 5W
R65		DELETED
R66	16645	RESISTOR, COMP. 470k .5W
R67	16683	" " 47k "
R68	16712	" " 22k "
R69	16712	" " 22k "
R70	16736	" " 2.2k .5W

CKT. SYM.	PART NO.	DESCRIPTION
R71	16310	RESISTOR. WW. 40ohm 3W
R72		SELECTED VALUE 33k to 100k 1/2W
S1	32211	WAFER, R.F. COILS
S2	32211	" " CAPACITORS
S3	32211	" MIXER COILS
S4	32211	" " CAPACITORS
S5	32211	" RECEIVER CRYSTAL
S6	32211	" TRANSMITTER CRYSTAL
S7	32211	" OSCILLATOR COILS
S8	32211	" OSC. CAPACITORS
S9	32716	" P.A. PLATE CAPACITORS
S10	32716	" P.A. COILS, PLATE SIDE
S11	32211	" P.A. COIL ANTENNA SIDE
S12	32211	" TRAP CAPACITORS
S13	32209	" ANTENNA COUPLER MASTER
S14	32417	" SOLENOID SLAVE
TP1	32211	" TRAP COILS
T1	48002	TRANSFORMER, 1.5 mc I.F.
T2	48014	" 455 kc I.F.
T3	48014	" " "
T4	48014	" " "
T5	48105	" MODULATOR
T6	48117	" MIKE
T7	97273	" TOROID, POWER SUPPLY
T8	48478	" AUDIO OUTPUT
V1	76671	TUBE, TYPE 12BZ6
V2	76205	" " 12BE6
V3	76243	" " 6111
V4	76671	" " 12BZ6
V5	76671	" " "
V6	76190	" " 12BH7A
V7	76190	" " "
V8	76669	" " 6883B
V9	76669	" " "
Y1 THRU Y22	--	CRYSTAL, FREQUENCY DEPENDENT
Y23 THRU Y44	--	" " "
Y45	80024	" 1955 kc OSCILLATOR
	76023	SOCKET, TUBE, 9 PIN MINATURE
	76035	" " 7 " "
	76059	" " 8 " OCTAL
	76009	CAP, PLATE (P.A. PLATE CAP W/ PARASITIC CHOKE)
	76322	SOCKET, RELAY
	80000	" CRYSTAL
	76255	SHIELD, TUBE (FOR V-3 6111)
	76308	SOCKET, TUBE (FOR V-3 6111)
	84379	METER, R.F. INDICATOR
	11994	PAD, SHOCKMOUNT

CKT. SYM.	PART NO.	DESCRIPTION
		COMPONENTS AND OPTIONAL EQUIPMENT
	98382	TRANSCEIVER T-22-RA
	91360	SHOCKMOUNT, COMPLETE
	33344	CONTROL HEAD, DRUM TYPE
	33332	CONTROL HEAD, DIGITAL TYPE
	91401	REMOTE CONTROL UNIT
	95249	COUPLING UNIT, ANTENNA
	97912	INVERTER, R. F.
	98100	METER, R. F. INDICATOR
	84006	MICROPHONE, CARBON
	84018	HEADSET, 500 OHM
	96918	ANTENNA KIT, MANUAL REEL
	96932	ANTENNA KIT, ELECTRIC REEL 28V
	95146	ANTENNA KIT, FIXED, STANDARD
	95158	ANTENNA KIT, FIXED, ANTI-PRECIPITATION
	93875	TEST SET, COMPLETE WITH CABLES
	99128	AMPLIFIER, INTERFACE
		PLUGS REQUIRED FOR INSTALLATION AND NORMALLY FURNISHED WITH UNIT
	90873	4 EACH, PLUG, COAXIAL CABLE, MALE: 1 - TRANSCEIVER 2 - R. F. INVERTER 1 - ANTENNA COUPLER
	74362	2 EACH, PLUG, 12 PIN: 1 - ANTENNA COUPLER 1 - REMOTE CONTROL UNIT
		MICROPHONE INTERFACE AMPLIFIER NO. 99128
C1	24575	CAPACITOR, TANTALUM, 47uf 50V
C2	27163	" MYLAR, .047uf
C3	24367	" DISC. .05uf
C4	24575	" TANTALUM, 47uf .50V
CR1	40141	DIODE, TYPE 1N461
PL1	74568	PLUG, INTERFACE AMPLIFIER, MALE
Q1	44379	TRANSISTOR
Q2	44379	"
R1	18277	RESISTOR, 680ohm 1W
R2	16293	" 350 " 3W
R3	17572	" 18k " .25W
R4	17572	" " " "
R5	17857	" 15 " .5W
R6	16530	" 330 " 1W
T1	48662	TRANSFORMER, INPUT
T2	48662	" OUTPUT

PARTS LIST

CKT. SYM.	PART NO.	DESCRIPTION
		RF INVERTER P/N 98863
C501	26054	CAPACITOR, DISC. 22pf
C502	27321	" " .01uf
C503	27321	" " .01uf
C504	27321	" " .01uf
C506	26054	" " .22pf
CR501	44290	DIODE 1N914
CR502	44290	" "
L501	63911	CHOKE 56 uh
L502	63911	" " "
R501	17429	RESISTOR, COMP. 56 ohm 1/4W
R502	17807	" " 2.2k "
R503	17429	" " 56 ohm "
R504	17807	" " 2.2k "
R505	17429	" " 56 ohm "
R506	17429	" " " " "
		SCU 22 CONTROL UNIT P/N 99906 99907
S-1A & 1B R1&R2	33655	POTENTIOMETER WITH SWITCH
R3	17273	RESISTOR 150 ohm 1/4W
SW1	32209	WAFER, SWITCH
C1	27357	CAPACITOR .05 uf 25V
M1	87018	METER
J301	74491	CONNECTOR
P301	74506	CONNECTOR, Mates with J301
B2	87149	LAMP, DIAL, CLEAR
	87125	FILTER, LAMP, RED
	87137	FILTER, LAMP, BLU-WHT
	99907	LIGHT, BLU-WHT 28V
	99906	LIGHT, RED 28V

CKT. SYM.	PART NO.	DESCRIPTION

RECOMMENDED SPARE PARTS LIST

Quantity Required for supporting indicated numbers of units per year				MODEL T-22-RA	Voltage 28 V		
1	5	10	25	SunAir P/N	Description	Unit Price	Total Price
1	2	2	3	24484	Capacitor		
1	2	3	4	24501	Capacitor		
1	2	2	3	24575	Capacitor		
1	1	2	2	24587	Capacitor		
1	1	2	2	24771	Capacitor		
3	6	10	16	24795	Capacitor, Variable		
-	-	1	2	32285	Motor, Channeling		
2	4	6	8	40103	Diode		
1	2	3	4	40165	Diode		
2	4	8	12	44020	Transistor		
2	4	6	8	44290	Transistor		
-	-	1	2	48002	Transformer		
-	1	2	3	48014	Transformer		
1	2	2	3	48105	Transformer		
1	2	2	3	48117	Transformer		
1	2	2	3	48478	Transformer		
-	1	1	2	66092	Relay		
-	-	1	2	66107	Relay		
-	-	1	2	66262	Relay		
-	1	1	2	66274	Relay		
2	4	6	8	76190	Tube		
1	3	5	8	76205	Tube		
1	3	5	8	76243	Tube		
2	6	10	14	76669	Tube		

RECOMMENDED SPARE PARTS LIST

Quantity Required for supporting indicated numbers of units per year				MODEL T-22-RA		Voltage 28 V	
1	5	10	25	SunAir P/N	Description	Unit Price	Total Price
3	6	9	12	76671	Tube		
-	-	1	1	84379	Meter		
5	10	10	15	84886	Fuse		