

NAVSHIPS 93286

(Non-Registered)

★

TECHNICAL MANUAL
for
**ANTENNA COUPLER
GROUP AN/SRA-22**

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA

DEPARTMENT OF THE NAVY

BUREAU OF SHIPS

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SECTION 1
GENERAL INFORMATION

1-1. INTRODUCTION.

This technical manual contains installation and operation instructions, operating principles, and maintenance procedures for Antenna Coupler Group AN/SRA-22. The AN/SRA-22 uses techniques for resonating antenna systems and matching these systems to 50-ohm coaxial lines. The antenna coupler group is designed for surface ships operation in the frequency range of 2.0 to 30.0 megacycles. It will handle 1 kw PEP and is designed to operate with a 35-foot whip antenna or wires longer than 35 feet. Refer to figure 1-1.

1-2. FUNCTIONAL DESCRIPTION.

Antenna Coupler Group AN/SRA-22 consists of Coupler Control C-2698/SRA-22 and Antenna Coupler CU-714/SRA-22.

a. COUPLER CONTROL C-2698/SRA-22. - This unit contains all controls and indicators for complete operation of Antenna Coupler CU-714/SRA-22. The controls and indicators are as follows.

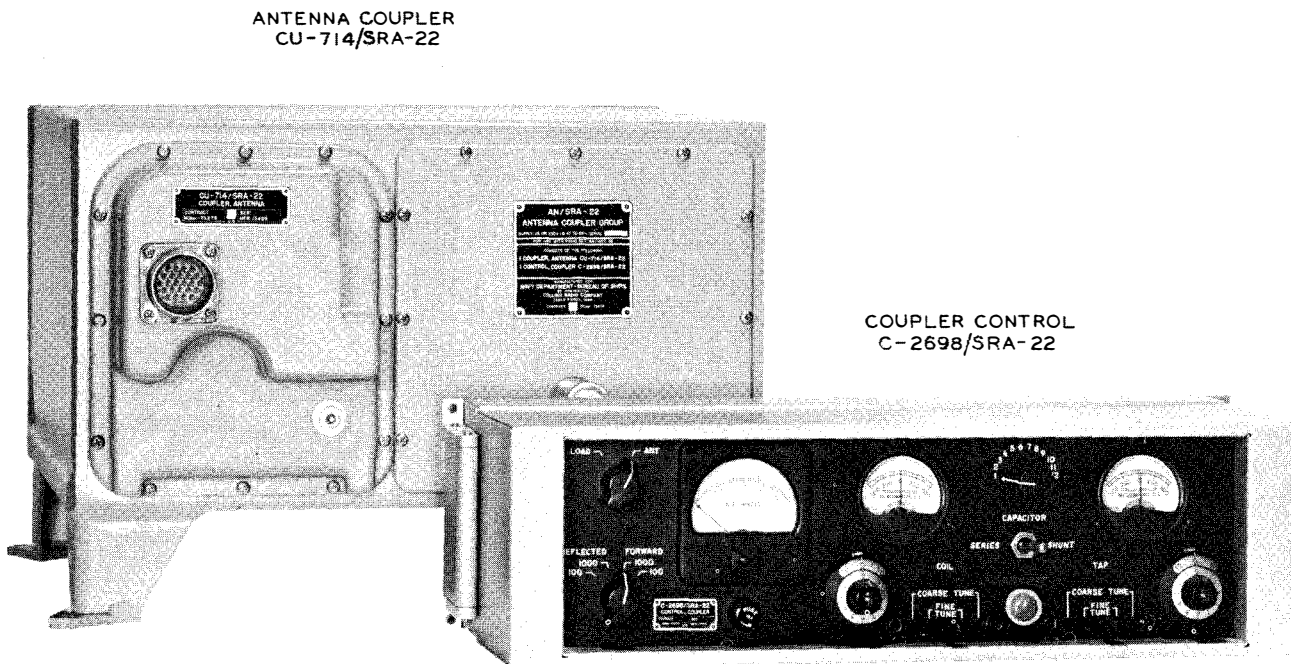


Figure 1-1. Antenna Coupler Group AN/SRA-22

(1) Tap motor drive and coil motor drive and their position indicators consist of sending potentiometers in the coupler control and receiving potentiometers in the antenna coupler. The sending potentiometers are connected to the individual tap and coil drives in such a manner that coil and tap positions are immediately determined.

(2) A capacitor position switch is a twelve-position wafer switch which drives the variable vacuum capacitor to a predesignated position.

(3) The load-antenna switch is used to switch the associated transmitter r-f power output to the antenna coupler or to a dummy load.

(4) The forward and reflected power switch selects either forward or reflected power which is read on the wattmeter.

b. ANTENNA COUPLER CU-714/SRA-22. - This unit consists of two variable elements, a variable tapped coil and a variable capacitor. The inductor of the network consists of a windup coil, in which a silver ribbon is wound from a metal drum onto a ceramic drum to increase inductance and from the ceramic drum onto the metal drum to decrease inductance. Using this type of variable inductive element, it is possible to secure an extremely wide range of high Q inductance values without self-resonances.

The metal and the ceramic drums making up the windup coil are driven through a gear train from a single motor. A coil tap driven by a second motor is provided by a contact which makes a sliding connection with the ribbon on the ceramic drum. It is mounted on a ring assembly which rotates around the coil, using the ribs of the ceramic drum as a helical guide. With the two motors driving the two drums and the tap, it is possible to secure a variable inductor having a variable tap position.

A third control motor drives a variable vacuum capacitor having a range of 5 to 500 uuf. Phase control is accomplished when capacitive current from the tap through the portion of the coil above the tap to the antenna equals the inductive current through the portion of the coil from tap to ground. Proper load or resistance presented to the coaxial transmitter line is accomplished when the tap is at a position on the coil so that the resistive component of the antenna is transformed to 50 ohms. In cases where tuning can not be accomplished by operation of the coil alone, the variable vacuum capacitor is inserted either in shunt or in series with the antenna to obtain a tuning point.

With carrier power, the coil and tap motor drives are adjusted to obtain minimum reflected power as indicated on the wattmeter. The capacitor is positioned by setting the CAPACITOR switches (twelve-position switch and SERIES/SHUNT toggle switch). The COIL and TAP sending potentiometers are set to the desired positions, and the COIL and TAP are then adjusted using the motor drive switches until a null is achieved on the indicators.

1-3. FACTORY OR FIELD CHANGES.

No field changes have been made on Antenna Coupler Group AN/SRA-22.

1-4. QUICK REFERENCE DATA.

- R-f input impedance 50 ohms.
- Number of channels Continuous tuning.
- Frequency range 2.0 to 30.0 mc.

- Duty cycle Continuous at 500 watts average or 1 kw PEP voice.
- R-f power input 1000 watts PEP, maximum.
- Matching capabilities 35-foot whip, or long wire antenna more than 35 feet in length.
- Matching efficiency Approximately $\frac{0.85 \times 250}{250 + Q_a} \times 100\%$

$$Q_a = \text{antenna} \frac{x_a}{r_a}$$
- Maximum swr 1.3:1.
- Power requirements 115/230 volts, 50-60 cps, 1 phase, 100 watts maximum.
- Ambient temperature limits -28° to + 65°C (-18° to +149°F).
- Weight (coupler control) 17 lb.
- Weight (antenna coupler) 42 lb.
- Total weight (coupler control and antenna coupler) 59 lb.
- Volume in cubic feet (antenna coupler) 2.4.

1-5. EQUIPMENT LIST.

a. EQUIPMENT SUPPLIED. - Equipment supplied is listed in table 1-1.

TABLE 1-1. ANTENNA COUPLER GROUP AN/SRA-22

QUANT. PER EQUIP.	NAME	DESIGNATION	*OVER-ALL DIMENSIONS			*VOLUME	*WEIGHT
			HEIGHT	WIDTH	DEPTH		
**1	Antenna Coupler	CU-714/SRA-22	11-1/2	18-7/8	19-15/16	2.4	42
**1	Coupler Control	C-2698/SRA-22	5-1/4	19	6-7/8	0.39	17
2	Technical Manual	NAVSHIPS 93286					

TABLE 1-1. ANTENNA COUPLER GROUP AN/SRA-22 (Cont)

QUANT. PER EQUIP.	NAME	DESIGNATION	*OVER-ALL DIMENSIONS			*VOLUME	*WEIGHT
			HEIGHT	WIDTH	DEPTH		
1	Maintenance Standards Book						
1	Operator's Chart						

*Unless otherwise stated, dimensions are in inches, volume in cubic feet, weight in pounds.
**Mating connectors are supplied with the antenna coupler and coupler control units.

b. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED. - No additional equipment is required for proper operation of Antenna Coupler Group AN/SRA-22.

c. DIODE COMPLEMENT. - Antenna Coupler Group AN/SRA-22 uses no tubes; however, six diodes are used in Coupler Control C-2698/SRA-22. Diodes used are listed in table 1-2.

TABLE 1-2. ANTENNA COUPLER GROUP AN/SRA-22
DIODE COMPLEMENT

UNIT	NUMBER OF DIODES TYPES INDICATED			
	1N108	1N536	1N82A	TOTAL
Coupler Control C-2698/SRA-22	2	4		6
Directional Coupler (subassembly A of coupler control)			2	2
	2	4	2	8

d. SHIPPING DATA. - Shipping data is listed in table 1-3.

TABLE 1-3. ANTENNA COUPLER GROUP AN/SRA-22 SHIPPING DATA

BOX NO.	NOMENCLATURE		*OVER-ALL DIMENSIONS			*VOLUME	*WEIGHT
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	**Coupler Control	C-2698/SRA-22	20	14-1/2	20	3.4	53
2	**Antenna Coupler	CU-714/SRA-22	22	8	10	1.2	25
	Technical Manual	NAVSHIPS 93286					
	Maintenance Standards Book						
	Operator's Chart						

*Unless otherwise stated, dimensions are in inches, volume in cubic feet, and weight in pounds; equipment coated and ready for shipment.
**Mating connectors are supplied with the antenna coupler and coupler control units.

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING.

Carefully unpack Antenna Coupler CU-714/SRA-22 and Coupler Control C-2698/SRA-22, and inspect for evidence of shipping damage. If damage is evident, notify the transportation agency immediately. Packing material must be retained to substantiate damage claims.

2-2. INSTALLATION REQUIREMENTS.

a. **INSTALLATION POINTERS.** - Coupler Control C-2698/SRA-22 is designed for rack mounting. When using the coupler control with Radio Set AN/URC-32, remove the blank panel, which is below the interconnection box, J-1007/U, and mount the coupler control in this space. Antenna Coupler CU-714/SRA-22 is sealed and uses waterproof connectors. Because of the weather-tight enclosure, the antenna coupler shall be mounted adjacent to the base of the antenna. A distance of 19 inches minimum should be left for removing the antenna coupler from its case. It is important to have a good ground to the ship or the ship grounding system.

b. **OUTLINE DRAWING.** - Figure 2-1 shows outline and mounting installation dimensions for the antenna coupler, and figure 2-2 shows outline and installation dimensions for the coupler control.

c. **INTERCONNECTING DIAGRAMS.** - Figure 2-3 shows an interconnecting diagram of Antenna Coupler Group AN/SRA-22 for use with Radio Set AN/URC-32. Figure 2-8 shows an interconnection diagram of the antenna coupler group for use as a separate unit with other transmitters. Cable requirements are given in table 2-1.

TABLE 2-1. ANTENNA COUPLER GROUP AN/SRA-22 CABLE REQUIREMENTS

NO. OF CABLES	TYPE OF CABLE	TERMINATION AT ANTENNA COUPLER	TERMINATION AT COUPLER CONTROL	TERMINATION AT DUMMY LOAD
1	MSCA-24	24 contact round male	24 contact flat female	
1	RG-8/U	Series N plug, straight	Series N plug, right angle	
1	RG-8/U		Series N plug, right angle	Series N plug, straight
1	RG-8/U		Series N plug, right angle (from transmitter)	

TABLE 2-1. ANTENNA COUPLER GROUP AN/SRA-22 CABLE REQUIREMENTS (Cont)

NO. OF CABLES	TYPE OF CABLE	TERMINATION AT ANTENNA COUPLER	TERMINATION AT COUPLER CONTROL	TERMINATION AT DUMMY LOAD
1	RG-58/U		Series BNC plug (from receiver input)	
1	#22 AWG multi-conductor inter-connection cable (from AN/URC-32)		16 contact male plug (from AN/URC-32)	

NOTE

Determine cable lengths for any specific installation.

d. CABLE ASSEMBLY. - Install type N connectors on the RG-8/U and RG-10/U type cables as shown in figures 2-4 and 2-5. Install 16-pin plug P6 on one end of a multiconductor cable when Antenna Coupler Group AN/SRA-22 is used with equipment other than Radio Set AN/URC-32. Cut cable to the required length for specific installation. Install 24-pin plug P5 on one end of cable and a 24-pin round plug P7 on the other end of the cable. Refer to figures 2-6 and 2-7 for instructions.

2-3. INSPECTION AND ADJUSTMENTS.

a. Check the grounding of the antenna coupler case to the ship or ship grounding system. It is most important to have a good ground for the antenna coupler.

b. Set TAP COARSE TUNE/FINE TUNE on coupler control to COARSE TUNE, and note if TAP indicator meter changes reading.

c. Set COIL COARSE TUNE/FINE TUNE on coupler control to COARSE TUNE, and note if COIL indicator meter changes reading.

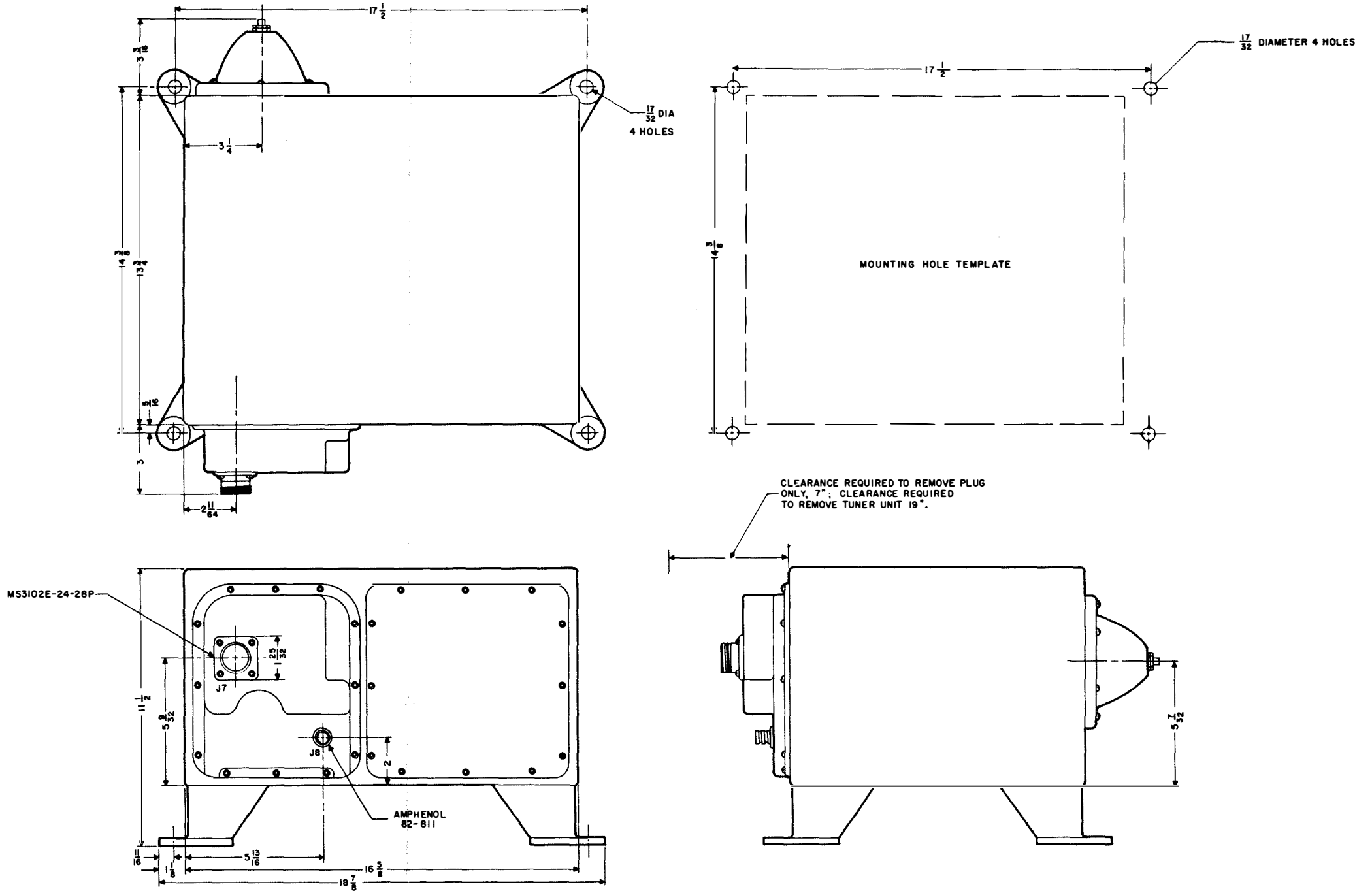
d. Set LOAD/ANT switch on coupler control to LOAD position. (Make sure a dummy load is connected to the coupler control.) Refer to paragraph 3-2b and proceed as outlined.

2-4. PREPARATION FOR RESHIPMENT.

No disassembly of Antenna Coupler CU-714/SRA-22 and Coupler Control C-2698/SRA-22 is necessary for reshipment. Coupler Control C-2698/SRA-22 should be wrapped in neutral paper and put into a carton padded with corrugated padding along with five one-pound bags (16-unit bag) of desiccant. This control should be wrapped with a vapor-proof barrier and put into a final carton that measures 20 inches by 14-1/2 inches by 20 inches.

Antenna Coupler CU-714/SRA-22 should be wrapped in neutral paper and put into a carton padded with corrugated padding along with three one-pound bags of desiccant. This carton should be wrapped with a vapor-proof barrier and put into a final carton that measures 22 inches by 8 inches by 10 inches.

2. POI
1. ALI

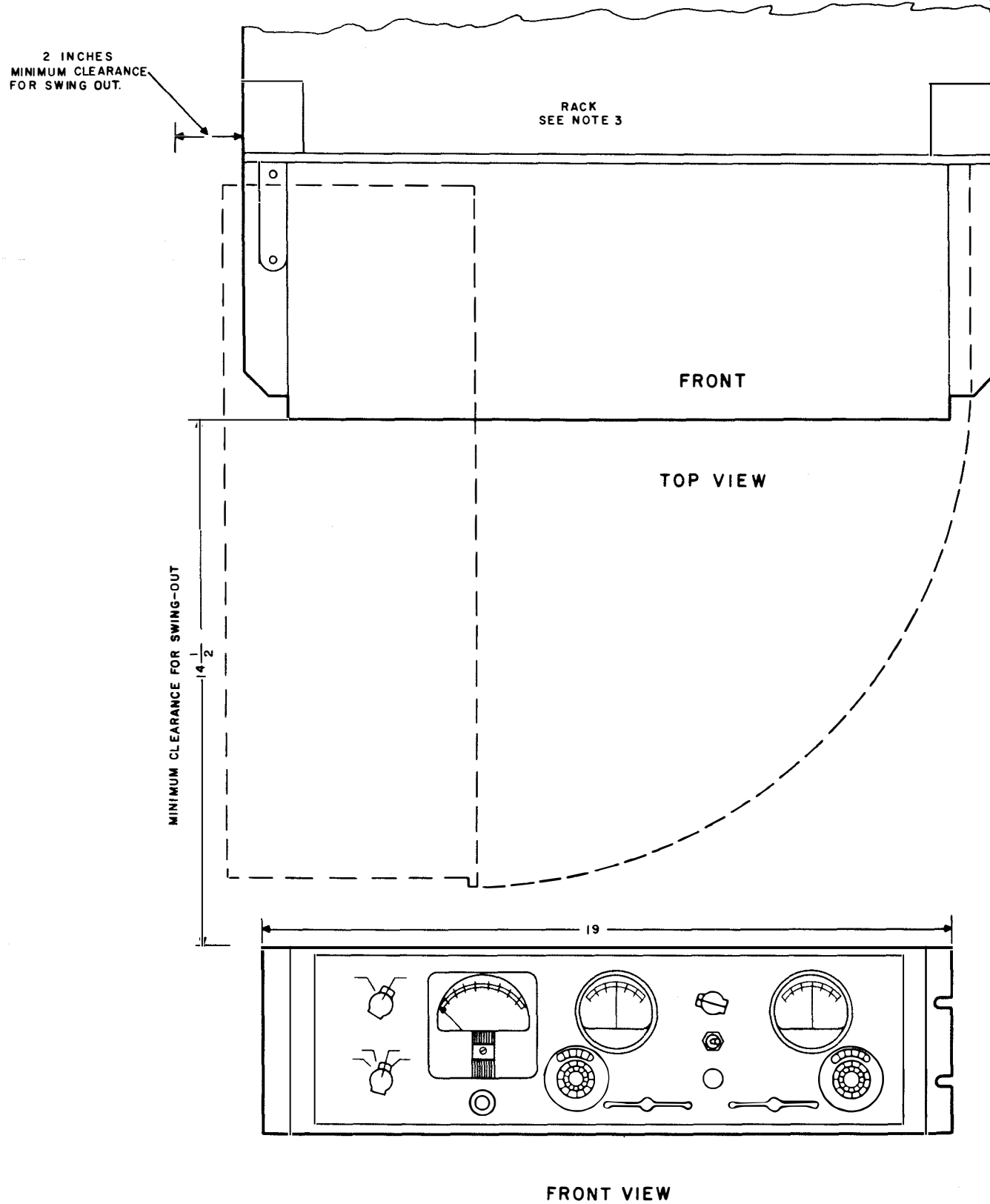


WEIGHT UNCRATED	WEIGHT CRATED	OVERALL DIMENSIONS CRATED	CUBICAL CONTENTS CRATED
42 LB	53 LB	20" X 14 1/2" X 20"	3.4 CU. FT.

4. HEAT DISSIPATION: 270 WATTS MAXIMUM (CONTINUOUS OPERATION)
 3. AMBIENT TEMPERATURE RANGE - 28° TO + 65° CENTIGRADE.
 2. POWER REQUIREMENTS: 115/230 ± 10% SINGLE PHASE, 47-63 CPS, 85 WATTS, 95% P.F.
 1. ALL DIMENSIONS ARE GIVEN IN INCHES.
- NOTES

Figure 2-1. Antenna Coupler
CU-714/SRA-22, Outline and
Mounting Dimensions

ORIGINAL



- NOTES:
1. POWER REQUIREMENTS: 115/230 VOLTS ± 10% SINGLE PHASE, 47-63 CYCLES, 20 WATTS, 95% P.F.
 2. AMBIENT TEMPERATURE RANGE - 28° TO + 65° CENTIGRADE.
 3. THIS EQUIPMENT IS DESIGNED TO BE MOUNTED IN AN ELECTRICAL EQUIPMENT RACK.
 4. ALL DIMENSIONS GIVEN IN INCHES.

WEIGHT UNCRATED	WEIGHT CRATED	OVERALL DIM. CRATED	CUBICAL CONT. CRATED
17 LB.	25 LB.	22" X 8" X 10"	1.2 FT.

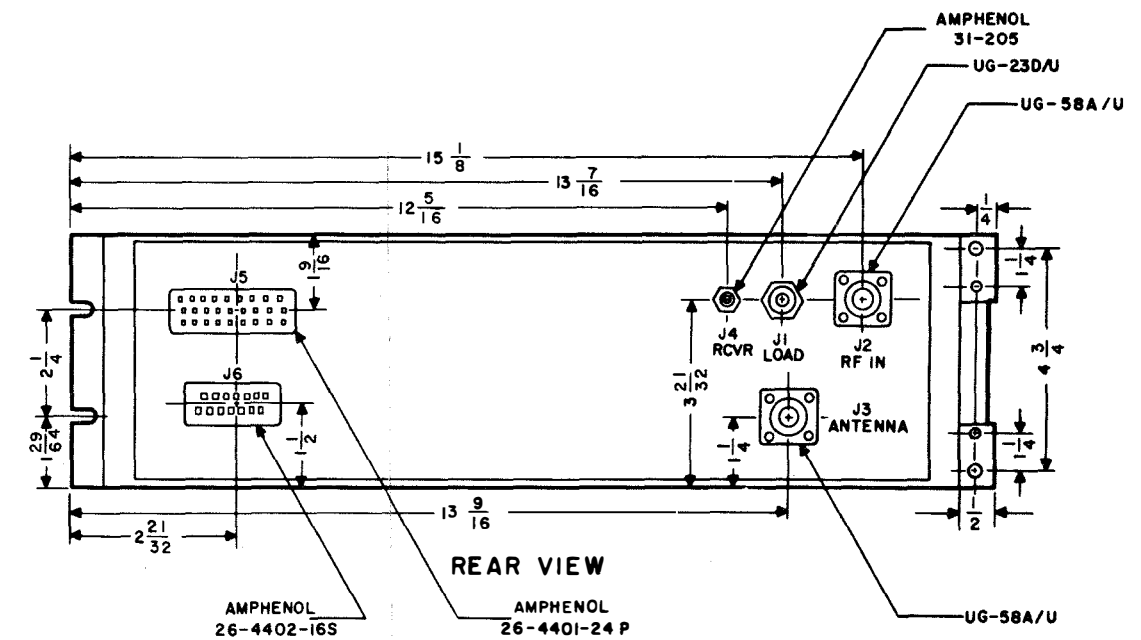


Figure 2-2. Coupler Control C-2698/SRA-22, Outline and Mounting Dimensions

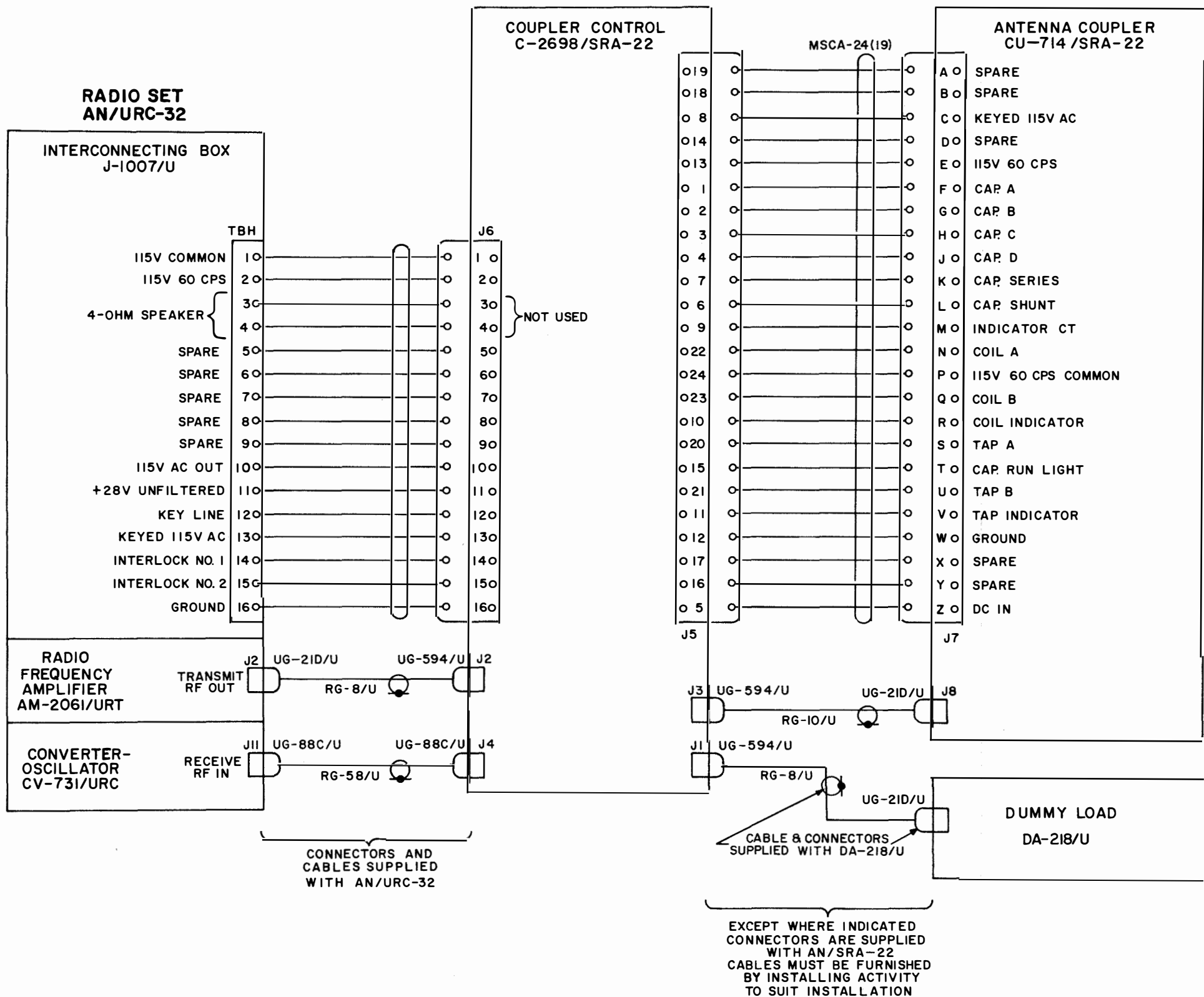


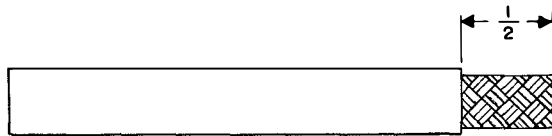
Figure 2-3. Interconnecting Diagram of Antenna Coupler Group AN/SRA-22

for Use with AN/URC-32

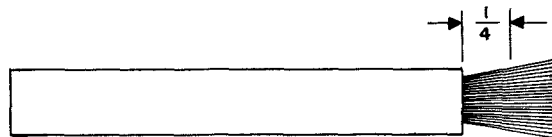
ORIGINAL



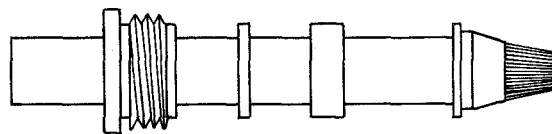
CUT END OF CABLE EVEN.



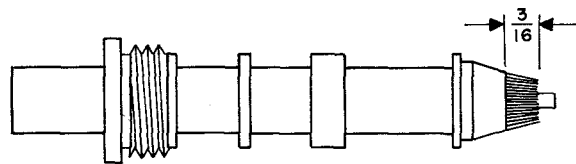
REMOVE VINYL JACKET $\frac{1}{2}$ INCH -
DON'T NICK BRAID.



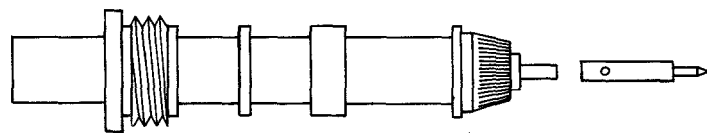
COMB OUT COPPER BRAID AS SHOWN.
BARE $\frac{1}{4}$ INCH OF CENTER CONDUCTOR -
DON'T NICK CONDUCTOR.



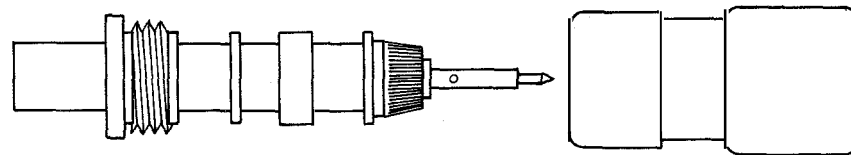
TAPER BRAID AS SHOWN. SLIDE NUT,
WASHER AND GASKET ON VINYL JACKET.
SLIDE CLAMP ON BRAID.



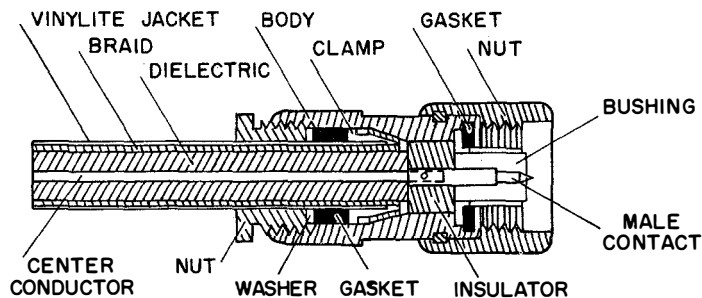
WITH CLAMP IN PLACE, TRIM BRAID
AS SHOWN.



FOLD COPPER BRAID BACK ON CLAMP.
TIN CENTER CONDUCTOR,
USING MINIMUM AMOUNT OF
HEAT.

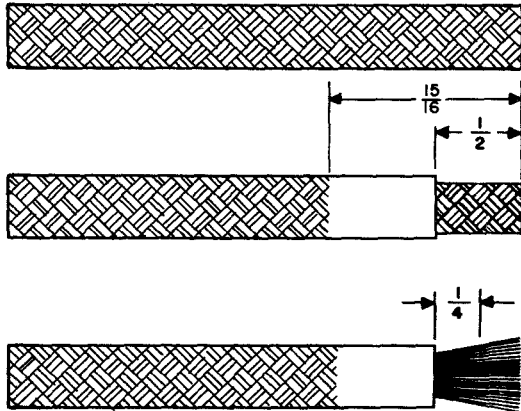


HOLDING CONTACT WITH PLIERS,
SOFT SOLDER CONTACT TO
CENTER CONDUCTOR. IT IS
IMPERATIVE THAT BACK END
OF CONTACT BE FLUSH WITH
POLYETHYLENE DIELECTRIC.
DO NOT USE EXCESS SOLDER.
WIPE CLEAN - SEE THAT END OF
CABLE INSULATOR IS CLEAN
AND FREE OF SOLDER, ROSIN
AND FOREIGN MATERIAL.



SLIDE BODY INTO PLACE CAREFULLY SO
THAT CENTER CONDUCTOR ENTERS HOLE
IN INSULATOR. FACE OF CABLE DIELECTRIC
MUST FIT FLUSH AGAINST INSULATOR.
PROPERLY TIGHTEN BODY AND NUT
WITH WRENCHES.

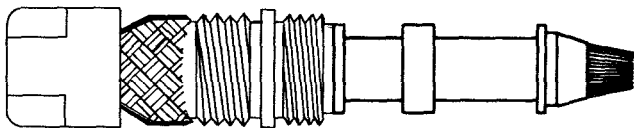
Figure 2-4. Installation of Type N Male Connectors on RG-8/U Cable



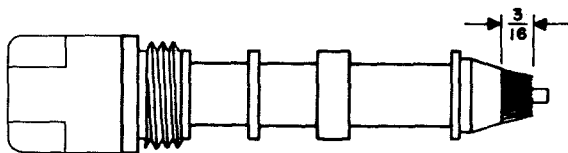
CUT END OF CABLE EVEN.

REMOVE OUTER BRAID $\frac{15}{16}$ AND VINYL JACKET $\frac{1}{2}$ INCH, DON'T NICK INNER BRAID.

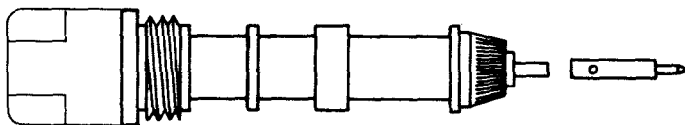
COMB OUT INNER BRAID AS SHOWN. BARE $\frac{1}{4}$ INCH OF CENTER CONDUCTOR - DON'T NICK CONDUCTOR.



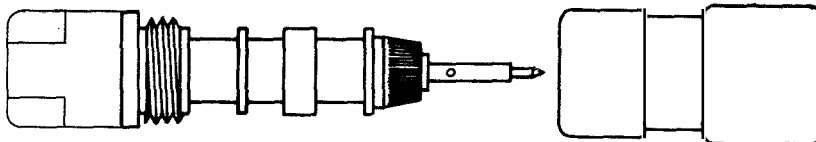
TAPER BRAID AS SHOWN. SLIDE CAP ON OUTER BRAID AND ADAPTER, WASHER AND GASKET ON VINYL JACKET. SLIDE CLAMP ON INNER BRAID.



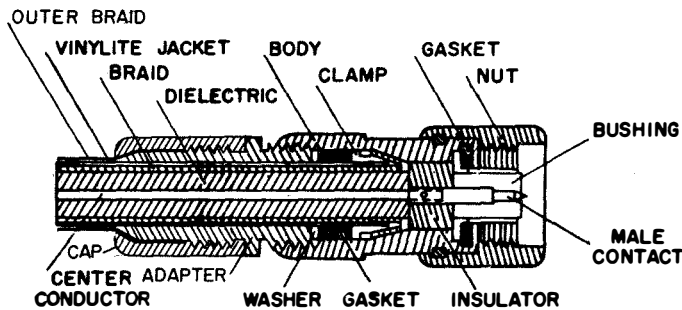
WITH CLAMP IN PLACE, TRIM INNER BRAID AS SHOWN.



FOLD INNER BRAID BACK ON CLAMP. TIN CENTER CONDUCTOR, USING MINIMUM AMOUNT OF HEAT.



HOLDING CONTACT WITH PLIERS, SOFT SOLDER CONTACT TO CENTER CONDUCTOR. IT IS IMPERATIVE THAT BACK END OF CONTACT BE FLUSH WITH POLYETHYLENE DIELECTRIC. DO NOT USE EXCESS SOLDER. WIPE CLEAN - SEE THAT END OF CABLE INSULATOR IS CLEAN AND FREE OF SOLDER, ROSIN AND FOREIGN MATERIAL.



SLIDE BODY INTO PLACE CAREFULLY SO THAT CENTER CONDUCTOR ENTERS HOLE IN INSULATOR. FACE OF CABLE DIELECTRIC MUST FIT FLUSH AGAINST INSULATOR. PROPERLY TIGHTEN BODY AND NUT WITH WRENCHES.

Figure 2-5. Installation of Type N Male Connectors on RG-10/U Cable

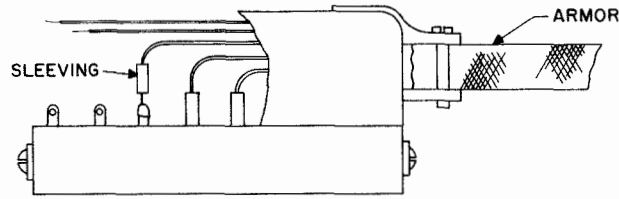


Figure 2-6. Installation of 16- and 24-Pin Connectors on Cable

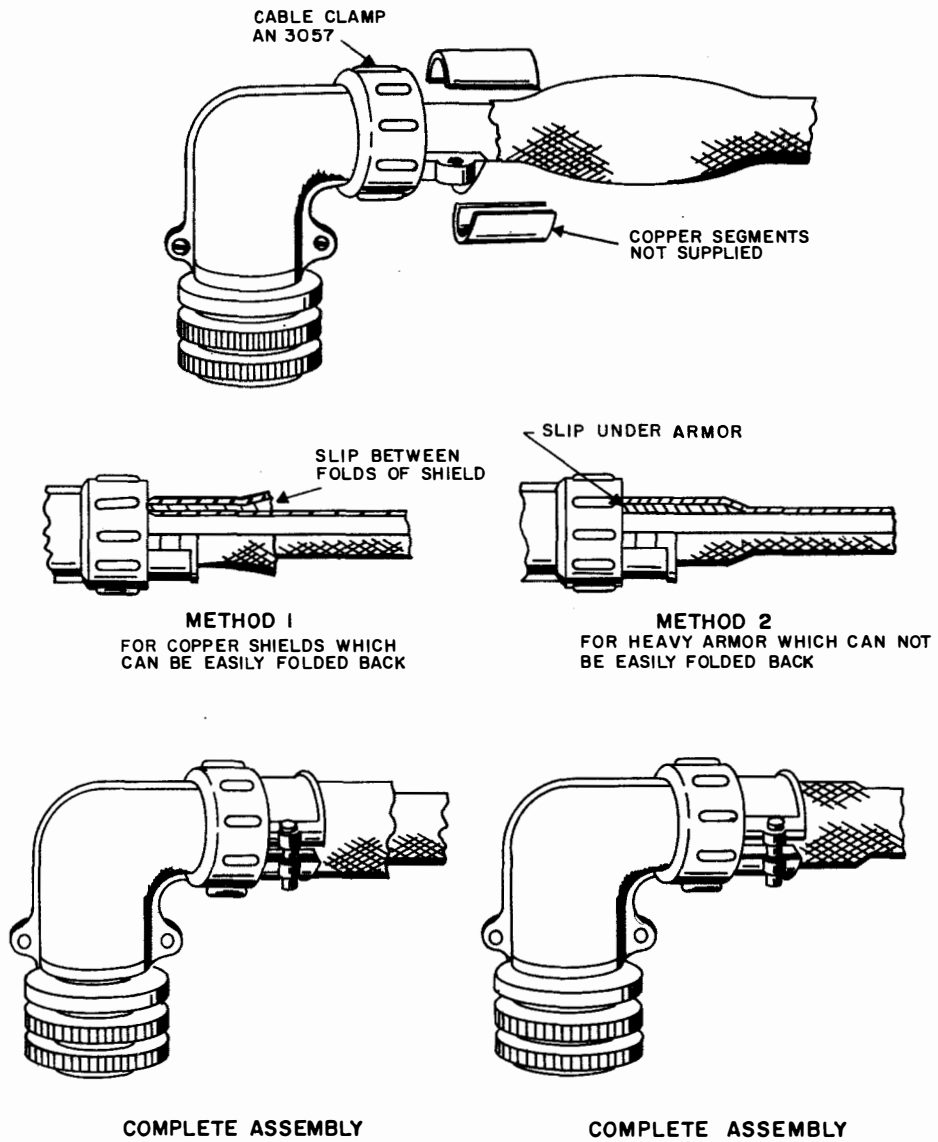


Figure 2-7. Terminating Cable Armor at AN Connectors

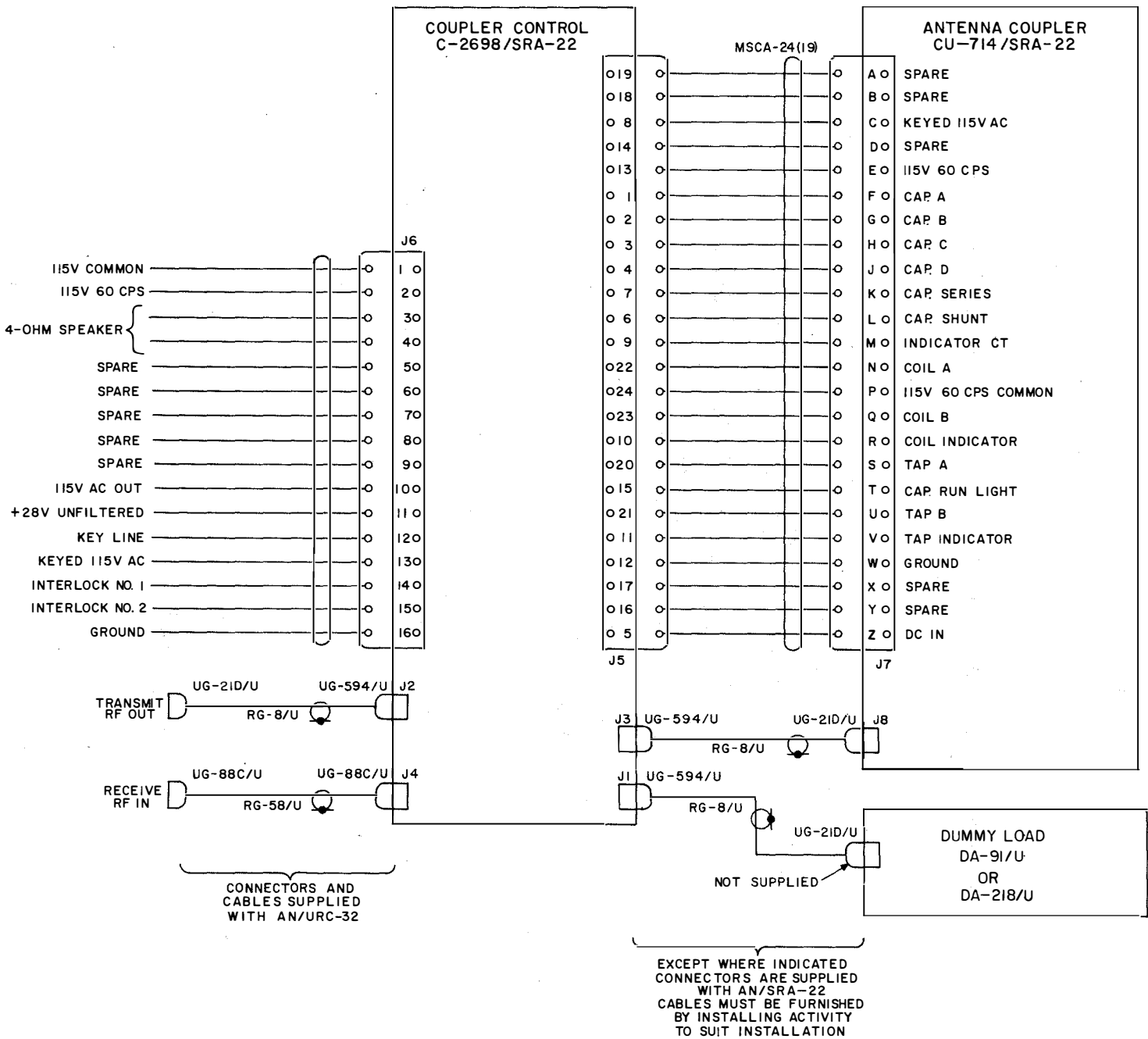


Figure 2-8. Interconnecting Diagram of Antenna Coupler Group AN/SRA-22 for Use as Separate Unit

SECTION 3
OPERATOR'S SECTION

3-1. FUNCTIONAL OPERATION.

Antenna Coupler Group AN/SRA-22 will satisfy the tuning requirements of whip and other antennas normally encountered in shipboard applications. Antenna Coupler Group AN/SRA-22 consists of Antenna Coupler CU-714/SRA-22 and Coupler Control C-2698/SRA-22 and is normally used with Radio Set AN/URC-32.

a. The antenna coupler contains the variable elements to tune the antenna to resonance. It is of weatherized construction, sealed to withstand the environmental conditions that are found on naval vessels.

b. Coupler Control C-2698/SRA-22 contains all controls and indicators for complete operation of the antenna coupler from a transmitter.

3-2. OPERATING PROCEDURES.

a. DESCRIPTION OF CONTROLS. - Coupler Control C-2698/SRA-22 contains all controls and indicators for complete operation of Antenna Coupler CU-714/SRA-22. Table 3-1 describes the operating controls and indicators; figure 3-1 identifies them.

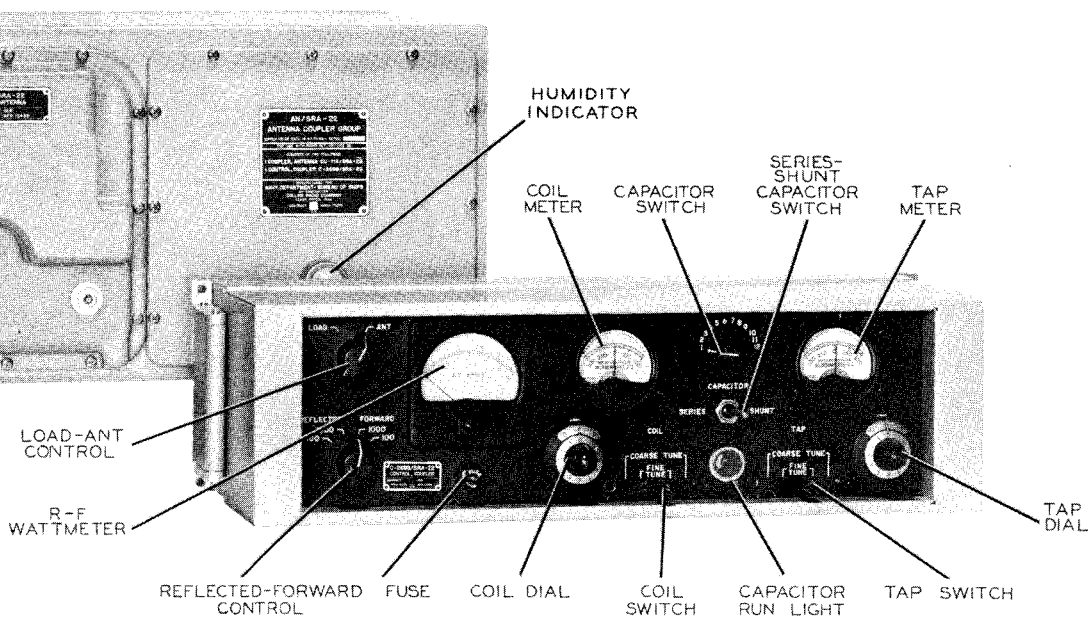


Figure 3-1. Antenna Coupler Group AN/SRA-22, Front Panel Control Location

TABLE 3-1. CONTROLS/INDICATORS AND FUNCTIONS

CONTROL OR INDICATOR	FUNCTION
COIL dial and TAP dial	COIL and TAP dials are potentiometers referred to as the sending potentiometers. The potentiometers in the antenna coupler are referred to as the receiving potentiometers. The sending potentiometer is connected to the coil and tap drives in such a manner that the coil and tap positions are immediately determined.
COIL COARSE TUNE/FINE TUNE switch	To obtain a null on the COIL meter.
TAP COARSE TUNE/FINE TUNE switch	To obtain a null on the TAP meter.
CAPACITOR SERIES/SHUNT toggle switch	Places the capacitor either in series or shunt with the antenna.
CAPACITOR switch	A twelve-position wafer switch which drives the variable vacuum capacitor to a predesignated position.
REFLECTED/FORWARD control (r-f wattmeter switch)	Selects forward or reflected power which may be read on the r-f wattmeter.
LOAD/ANT control	Used to switch r-f power to the antenna coupler or to a dummy load.
R-f wattmeter	Reads the forward or reflected power which is selected by the REFLECTED/FORWARD control.
COIL meter	Operates COIL COARSE TUNE/FINE TUNE switch until the COIL meter indicates a null (zero).
TAP meter	Operates TAP COARSE TUNE/FINE TUNE switch until the TAP meter indicates a null (zero).
CAPACITOR run light	Lights when variable capacitor is running.

b. SEQUENCE OF OPERATION WITH RADIO SET AN/URC-32 OR OTHER TRANSMITTERS WHEN 50-OHM LOAD IS AVAILABLE. - Refer to the operator's section of the Technical Manual for Radio Set AN/URC-32 (NAVSHIPS 93285), or to the technical manual of the transmitter being used, for the tuning procedure and proceed as follows.

(1) Set the PA TUNE control on R-F Amplifier AM-2061/URT of Radio Set AN/URC-32, or r-f amplifier of the transmitter being used, within the desired frequency band limits. Refer to the operator's section in the Technical Manual for Radio Set AN/URC-32 for calibration curve of PA TUNE control on the AN/URC-32 r-f amplifier.

(2) Set CAPACITOR SERIES/SHUNT toggle switch on Coupler Control C-2698/SRA-22 to the SHUNT position and the 12-position CAPACITOR switch to position 1.

NOTE

It is recommended that the LOAD/ANT switch on the coupler control be set to LOAD position. This will feed the r-f amplifier of Radio Set AN/URC-32, or the r-f amplifier of the transmitter being used, directly into an external dummy load. Following the tuning procedure outlined in the operator's section of the Technical Manual for Radio Set AN/URC-32, or for the transmitter if not an AN/URC-32, load the r-f amplifier into the dummy load. CAUTION - Do not switch from LOAD to ANT with power on. Open the keying circuit of the transmitter and set LOAD/ANT switch on the coupler control to ANT. The r-f amplifier is now tuned and should not be readjusted during the following tuning procedure of Antenna Coupler Group AN/SRA-22.

(3) Set the LOAD/ANT switch to ANT and r-f wattmeter switch to 1000 REFLECTED. Set COIL and TAP dials to 100 and operate COIL and TAP COARSE TUNE/FINE TUNE switches for zero on indicator meters. Close keying circuit of transmitter.

(4) Adjust the COIL dial to read approximately 500.

(5) Operate the COIL COARSE TUNE/FINE TUNE switch on the coupler control in the direction required to obtain a null on the COIL meter, watching the reflected power for a dip. If no dip occurs, operate the COIL COARSE TUNE/FINE TUNE switch until the COIL meter is nulled for a 130 reading on the COIL dial and TAP meter is nulled for a 100 reading on the TAP dial.

(6) Advance the twelve-position CAPACITOR switch one position at a time, watching the reflected power for a dip. If no dip is detected by the time position 12 is reached, switch the CAPACITOR SERIES/SHUNT toggle switch to SERIES. Turn the twelve-position CAPACITOR switch one step at a time toward position 1, watching the reflected power for a dip.

(7) If a dip is noticed, switch the r-f wattmeter switch to 1000 FORWARD position to see if the forward power is still high. Switch the r-f wattmeter switch back to the 1000 REFLECTED position.

(8) Once the dip is found, use the FINE TUNE position on the COIL and TAP COARSE TUNE/FINE TUNE switches to reduce the reflected power to zero (100 REFLECTED position).

(9) Adjust the COIL and TAP dials on the coupler control unit for a zero reading on the COIL meter and TAP meter.

(10) Record channel frequency, capacitor, coil, and tap settings on charts supplied on dust cover.

c. SEQUENCE OF OPERATION WITH RADIO SET AN/URC-32 OR OTHER TRANSMITTERS WHEN NO 50-OHM LOAD IS AVAILABLE. - Refer to the operator's section of the Technical Manual for Radio Set AN/URC-32 (NAVSHIPS 93285), or to the technical manual of the transmitter being used, for the tuning procedure and proceed as follows.

(1) Set the PA TUNE control on R-F Amplifier AM-2061/URT of Radio Set AN/URC-32, or r-f amplifier of the transmitter being used, within the desired frequency band limits. Refer to the operator's section in the Technical Manual for Radio Set AN/URC-32 for calibration curve of PA TUNE control on the AN/URC-32 r-f amplifier.

(2) Set CAPACITOR SERIES/SHUNT toggle switch on Coupler Control C-2698/SRA-22 to the SHUNT position and the 12-position CAPACITOR switch to position 1.

NOTE

Set the LOAD/ANT switch on the coupler control to ANT position which will feed the r-f amplifier of the transmitter directly into Antenna Coupler Group AN/SRA-22. Proceed as follows.

(3) Set the r-f wattmeter switch to 1000 REFLECTED. Set COIL and TAP dials to 100 and operate COIL and TAP COARSE TUNE/FINE TUNE switches for zero on indicator meters.

(4) Adjust the COIL dial to read approximately 500.

(5) Key to transmit and adjust PA control for a dip in the PLATE CURRENT meter reading (refer to technical manual of transmitter used).

(6) Operate the COIL COARSE TUNE/FINE TUNE switch on the coupler control in the direction required to obtain a null on the COIL meter, watching the reflected power for a dip. If no dip occurs, operate the COIL COARSE TUNE/FINE TUNE switch until the COIL meter is nulled for a 130 reading on the COIL dial.

(7) Advance the twelve-position CAPACITOR switch one position at a time, watching the reflected power for a dip. If no dip is detected by the time position 12 is reached, switch the CAPACITOR SERIES/SHUNT toggle switch to SERIES. Turn the twelve-position CAPACITOR switch one step at a time toward step 1, watching the reflected power for a dip.

(8) If a dip is noticed, switch the r-f wattmeter switch to 1000 FORWARD position to see if the forward power is still high. Switch the r-f wattmeter switch back to the 100 REFLECTED position.

(9) Once the dip is found, use the FINE TUNE position on the COIL and TAP COARSE TUNE/FINE TUNE switches to reduce the reflected power to zero (100 REFLECTED position).

(10) Recheck PA control for a dip in PLATE CURRENT meter reading.

(11) Repeat PA control and coupler control adjustments until a PLATE CURRENT meter dip is obtained with zero reflected power output.

(12) Adjust the COIL and TAP dials on the coupler control unit for a zero reading on the COIL meter and TAP meter.

(13) Record channel frequency, capacitor, coil, and tap settings on charts supplied on dust cover.

d. SECURE. - Antenna Coupler Group AN/SRA-22 is a passive group, therefore no securing instructions are necessary. Securing the transmitter secures the coupler.

e. TYPICAL TUNING CHART. - Figure 3-2 is a typical chart for pretuning Antenna Coupler Group AN/SRA-22. The FREQUENCY MC column is for the frequency used, CAPACITOR column is the position to which the CAPACITOR SERIES/SHUNT toggle switch is set, the COIL column is the position in which the potentiometer COIL is set, and the TAP column is the position to which the potentiometer TAP is set for a tuned condition. All of the above controls are located on the coupler control unit. Charts are located on the dust cover of the coupler control unit. Prepare larger charts when more frequencies are used.

FREQUENCY MC	CAPACITOR	COIL	TAP

Figure 3-2. Typical Tuning Chart

f. PRECAUTIONS. - Do not attempt to load the transmitter into the antenna coupler group with the antenna disconnected from the antenna coupler or the antenna coupler disconnected from the coupler control. The antenna coupler, coupler control, or transmitter might be seriously damaged. Do not operate coupler if humidity indicator on Antenna Coupler CU-714/SRA-22 has a pink color. Refer to maintenance section 5, table 5-3, for possible troubles and correction of the troubles.

3-3. OPERATOR'S MAINTENANCE.

a. OPERATOR'S CHECK. - Table 3-2 contains routine checks to be made by the operator.

TABLE 3-2. ROUTINE CHECK CHART

WHAT TO CHECK	HOW TO CHECK	CHECK RESULTS
Complete equipment.	Inspect visually.	Equipment should be mounted properly, and knobs and dials should be intact.
LOAD/ANT control, REFLECTED/FORWARD control, CAPACITOR switch, CAPACITOR SERIES/SHUNT switch, TAP COARSE TUNE/FINE TUNE switch and COIL COARSE TUNE/FINE TUNE switch.	Operate controls.	Detent action should be positive and the knobs should be secure on shafts.

TABLE 3-2. ROUTINE CHECK CHART (Cont)

WHAT TO CHECK	HOW TO CHECK	CHECK RESULTS
R-f wattmeter, COIL meter, TAP meter, COIL dial, and TAP dial.	Visually inspect meters and operate dials.	The three meters should read zero. Lock mechanism on the dials should lock and unlock properly. The dials should operate smoothly when turned.

b. EMERGENCY MAINTENANCE. - The only emergency maintenance that can be performed is the replacement of the fuse in Coupler Control C-2698/SRA-22. Refer to figure 3-1 for fuse location. This fuse is in one side of the 115-volt a-c line which supplies power to the antenna coupler system. Table 3-3 contain symptoms indicating probable fuse failures.

TABLE 3-3. SYMPTOMS OF PROBABLE FUSE FAILURES

CONTROL SETTINGS AND INSTRUCTIONS	SYMPTOMS
Set COIL COARSE TUNE/FINE TUNE switch to COARSE TUNE.	If fuse is open, COIL meter will remain at zero.
Set TAP COARSE TUNE/FINE TUNE switch to COARSE TUNE.	If fuse is open, TAP meter will remain at zero.
Switch CAPACITOR twelve-position switch one position at a time.	If fuse is open, the CAPACITOR run light will not light.

SECTION 4

PRINCIPLES OF OPERATION

4-1. OVER-ALL FUNCTIONAL DESCRIPTION.

Antenna Coupler Group AN/SRA-22 is shown in block diagram form in figure 4-1, and the primary power distribution diagram is shown in figure 4-6. Both Coupler Control C-2698/SRA-22 and Antenna Coupler CU-714/SRA-22 are necessary to attain a complete antenna coupling system. The antenna coupler depends entirely on the coupler control sequence to accomplish tuning and loading operation.

a. Coupler Control C-2698/SRA-22 consists of the following controls:

- (1) TAP motor drive and position indicator.
- (2) COIL motor drive and position indicator.
- (3) CAPACITOR position switch.
- (4) CAPACITOR SERIES/SHUNT switch.
- (5) LOAD/ANT switch.
- (6) R-f wattmeter and r-f wattmeter switch.

b. Antenna Coupler CU-714/SRA-22 consists of the following:

(1) The variable coil tap which is motor driven and operated by a TAP motor drive control on coupler control unit.

(2) The inductor of this network consists of a windup coil, in which a silver ribbon is wound from a metal drum onto a ceramic drum to increase inductance and from the ceramic drum onto the metal drum to decrease inductance. This drive motor is operated by the COIL motor drive control on the coupler control unit.

(3) The variable capacitor is motor driven and operated by the CAPACITOR position switch on the coupler control unit. The CAPACITOR SERIES/SHUNT toggle switch on the coupler control unit places the capacitor either in series or shunt with the antenna.

4-2. FUNCTIONAL SECTIONS.

a. COUPLER CONTROL C-2698/SRA-22.

(1) TAP AND COIL INDICATORS. - Refer to figure 4-2 for the simplified schematic diagram. The position indicators (TAP and COIL) consist of sending potentiometers in the coupler control and receiving potentiometers in the antenna coupler. The sending potentiometers are connected to individual tap and coil drives by gears so that coil and tap positions

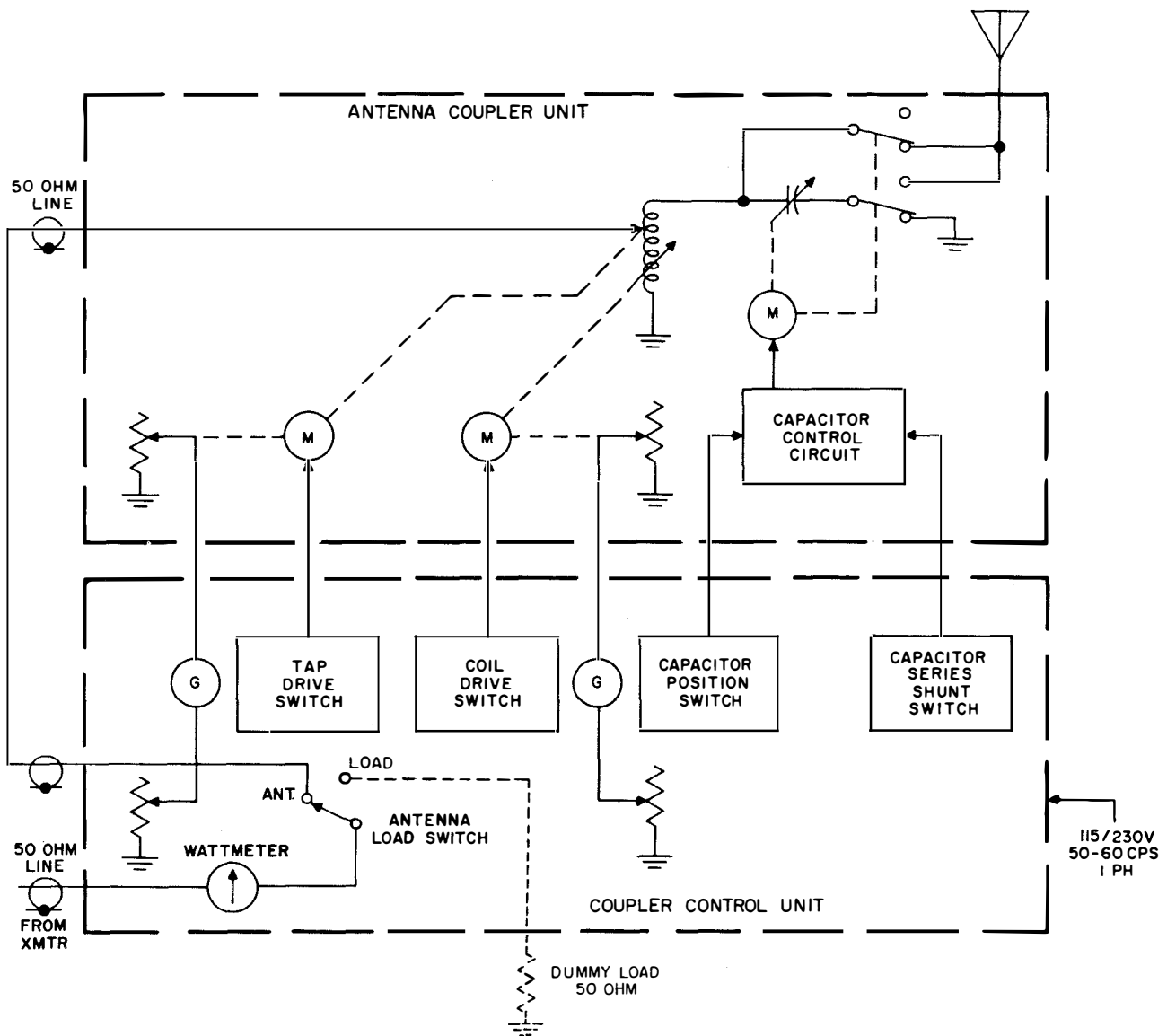


Figure 4-1. Antenna Coupler Group AN/SRA-22, Block Diagram

are immediately determined. When resistance settings of potentiometers R1 and R6 or R2 and R7 are equal, indicator meters M1 or M2 will read zero. Diodes CR3 and CR4 (on TAP indicator meter) and diodes CR5 and CR6 (on COIL indicator meter) are used to prevent excessive overload current from damaging the meters. Resistors R4 (on TAP indicator meter) and R5 (on COIL indicator meter) provide bias for the diodes. Capacitors C8 and C9 are used for r-f protection for meters M1 and M2.

(2) COIL COARSE TUNE/FINE TUNE. - Refer to figure 4-3 for the simplified schematic diagram. When switch S3 is set to COARSE TUNE (switch contacts 1 and 6), 115 volts ac is applied through contacts 4 and 12 of relay K2 to common of S3 through contact 6 to terminal 3 of coil motor B3 which is in the antenna coupler unit. When switch S3 is set to FINE TUNE (switch contacts 2 and 7), one end of capacitor C3 receives a ground through switch S3.

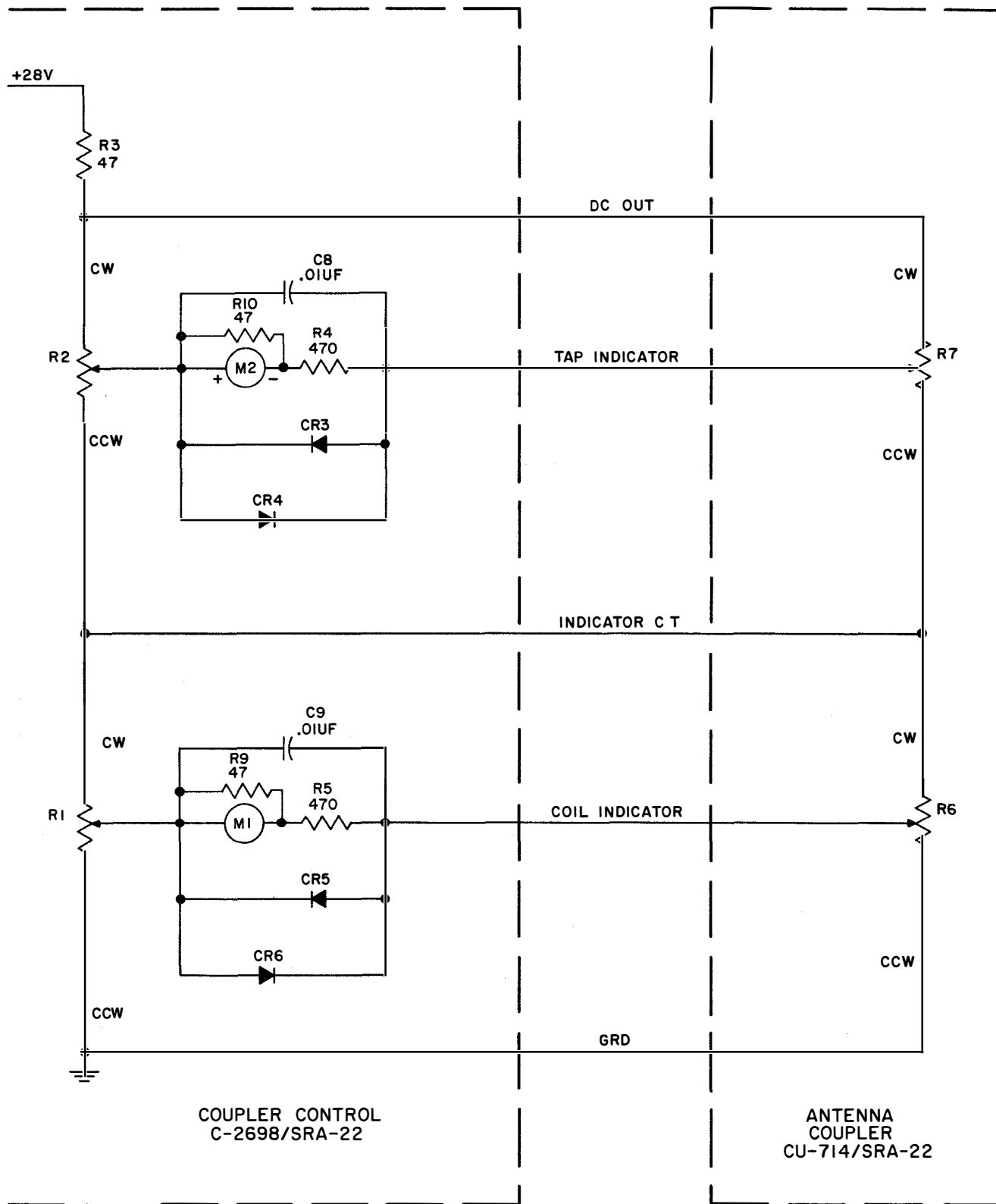


Figure 4-2. TAP and COIL Indicator Meter Circuits, Simplified Schematic Diagram

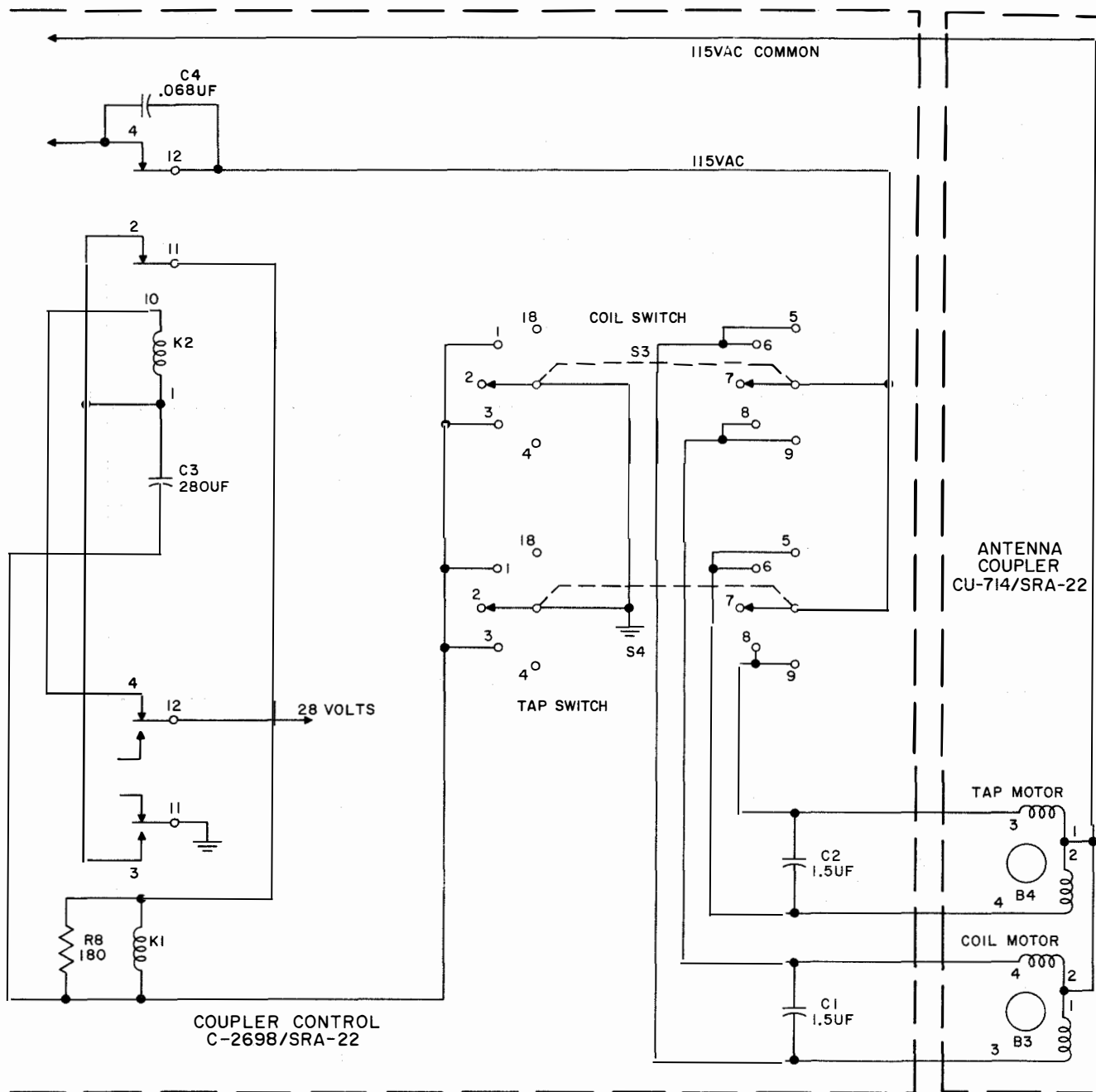


Figure 4-3. COIL-TAP Tuning Circuit, Simplified Schematic Diagram

Relay K2 coil receives +28 volts through contacts 4 and 12 of relay K1, as the result, relay K2 is energized. Capacitor C3 begins at this time to charge, and when it is fully charged, relay K2 will become de-energized. When relay K2 is de-energized, 28 volts is applied through contacts 2 and 11 of relay K2 to coil of relay K1, energizing relay K1, and capacitor C3 discharges into relay K1. When relay K1 is energized from the capacitor, a ground is applied through relay K1 contacts 3 and 11 to capacitor C3, discharging the capacitor. When capacitor C3 is discharged, relay K1 will become de-energized. Each time relay K2 is de-energized,

coil motor B3 in the antenna coupler unit will have 115 volts ac applied to it in pulses through contact 7 of switch S3. The short pulses allow the coil motor to operate for short durations giving control over tuning of the coil. Capacitor C4 which is across contacts 4 and 12 of relay K2 is used as a radiation suppressor and also reduces arcing at relay contacts.

Operation of the circuit with switch S3 on COARSE TUNE (contacts 5 and 10) and FINE TUNE (contacts 4 and 9) is the same, except the 115 volts ac is fed to terminal 4 instead of terminal 3 on coil motor B3. This permits coil motor, along with phase-shift capacitor C1, to reverse direction of rotation.

(3) TAP COARSE TUNE/FINE TUNE. - The operation of the circuit with switch S4 on TAP COARSE TUNE and FINE TUNE is the same as for COIL COARSE TUNE and FINE TUNE, except tap motor B4 is operated with phase-shift capacitor C2.

(4) DIRECTIONAL COUPLER. - Refer to figure 4-4 for the simplified schematic diagram. Transmission line current I flows through the line center conductor and through the center of a toroid coil. The conductor forms the primary and the coil the secondary of a toroidal transformer, T1. Induced toroid current produces a voltage that divides equally across series resistors R1 and R2. This results in two equal voltages, E_1 and E_2 , across the resistors. Since the junction of the R1 and R2 is grounded, E_1 and E_2 are opposite in phase and proportional to line current I . Line voltage E_1 is applied across two capacity dividers, C1-C2 and C3-C4, resulting in two equal voltages of the same phase, E_3 and E_4 .

When the transmission line is mismatched (terminated in an impedance other than to 50 ohms), E_1 and E_2 represent the vector sum of two components, one proportional to the current of the forward wave, and the other proportional to the current of the reflected wave.

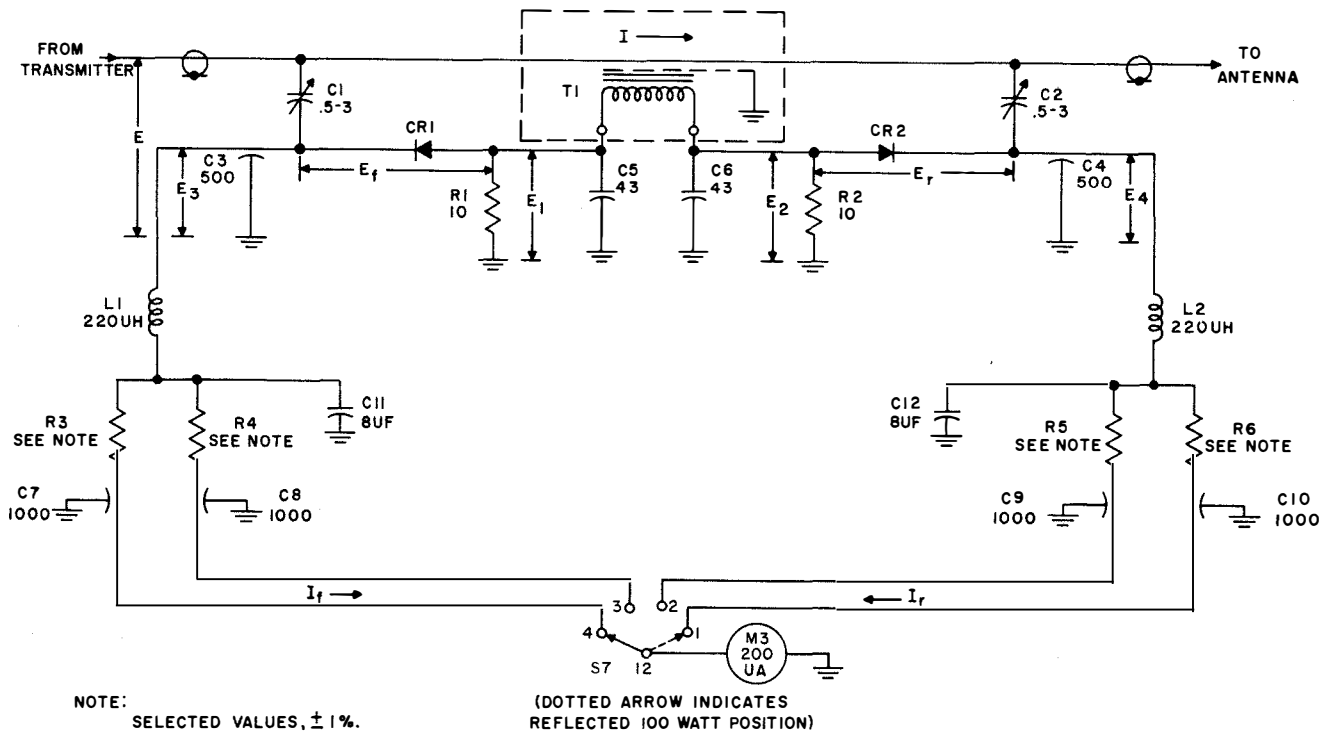


Figure 4-4. Directional Coupler, Simplified Schematic Diagram

Similarly, E_3 and E_4 represent the vector sum of forward and reflected wave voltage components. Capacitors C1 and C2 are factory adjusted so that the magnitude of the forward voltage and current components are identical; also the reflected components are then equal. The settings of C1 and C2 are correct for a 50-ohm transmission line only.

The phase relationship between the various components is such that the r-f voltage across rectifier CR1 (E_f) is equal to the arithmetic sum of the two equal forward components, while the r-f voltage across rectifier CR2 (E_r) is equal to the arithmetic sum of the two equal reflected components.

The r-f voltages, E_f and E_r , are rectified and filtered by CR1, CR2, C3, and C4 to produce d-c currents I_f and I_r through meter M3. The meter scale is calibrated in such a way that I_f produces a scale reading proportional to forward power, while I_r produces a scale reading proportional to reflected power.

Capacitors C11 and C12 cause the meter reading to approach the PEP level during SSB voice transmission.

Calibrating resistors R3, R4 (1000-watt scale), R5 and R6 (100-watt scales) are selected so that I_f and I_r give accurate indications of the two power levels. Accuracy of the r-f wattmeter is maintained over a frequency range of 2.0 to 30.0 megacycles on both the inductively coupled and capacitively coupled elements. In the inductive element, the increase with frequency of the induced voltage is canceled by the voltage drop in the toroidal coil due to the increase with frequency of the inductive reactance. In the directly coupled capacitive element, the ratio of the capacitive reactances in the voltage divider remains constant even though the reactance varies with frequency. Capacitors C5 and C6 compensate for the residual series inductances of resistors R1 and R2.

Real power is the power output of the transmitter. When a line is perfectly matched, reflected power is zero and real power is equal to forward power. When the line is mismatched, the phase relationship between the forward power and reflected wave components causes the forward power to increase by an amount equal to the magnitude of the reflected power. Since the reflected power cancels a portion of the forward power at the transmitter terminals, the real power in the line is equal to the difference between forward and reflected power or:

$$\text{REAL POWER} = \text{FORWARD POWER} - \text{REFLECTED POWER.}$$

(5) TRANSFER RELAY AND LOAD/ANT SWITCH. - The antenna is connected to the receiver through the tuned circuit in Antenna Coupler CU-714/SRA-22 to normally closed contacts on the transfer relay, K3, which is in Coupler Control C-2698/SRA-22. Radio Set AN/URC-32 feeds through the wattmeter coupler to the common contact of LOAD/ANT switch S1. When switch S1 is in LOAD position, the transmitter will feed into an external load. When in ANT position, the transmitter will feed the antenna through transfer relay K3 contacts through tuned circuit to the antenna. Transfer is provided by transfer relay K3 which is operated by a keying relay in Radio Set AN/URC-32.

When the keying circuits are released, K3 de-energizes and returns the antenna circuit to the receiver. Contacts 3 and 4 on transfer relay K3 is connected in the bias circuit of r-f amplifier of Radio Set AN/URC-32. When Radio Set AN/URC-32 is keyed, transfer relay K3 is energized and contacts 3 and 4 on the transfer relay are opened removing the bias to r-f amplifier allowing r-f output. If when Radio Set AN/URC-32 is keyed and the transfer relay should not energize, the r-f amplifier of the Radio Set AN/URC-32 will have no output thus protecting the receiver section of Radio Set AN/URC-32 from the r-f output of Radio Set AN/URC-32.

b. ANTENNA COUPLER CU-714/SRA-22.

(1) CAPACITOR DRIVE CIRCUIT. - The CAPACITOR position switch, located in the control coupler unit, is a twelve-position wafer switch which drives the variable vacuum capacitor to a predesignated position. Refer to figure 4-5 for the simplified schematic diagram.

When one of the twelve positions on the switch is selected, 115 volts ac is fed through the common contact of switch S2 through contacts 7, 8, 9, or 10 depending upon which position is selected to S10 contacts 7, 8, 9, or 10 in the antenna coupler unit. From the common contact of switch S10, the 115 volts ac is applied to the two common contacts of switch S1 through contacts 2 or 3 to capacitor motor B2. The contact (2 or 3) will depend upon the position to which switch S2 is set and at which end of the range the capacitor limit switch, S11, is positioned.

The capacitor run light is connected from the 115-volt common through a 250K resistor to the common contact of switch S10 on the antenna coupler. Capacitor drive switch S11 is gear driven by capacitor motor B2. When switch S11 is driven to the position to break the circuit, capacitor motor B2 will stop and the CAPACITOR run light will go out.

The capacitor is driven from minimum to maximum capacitance, or the reverse by motor B2. Switch S11 determines whether the capacitor is in series or shunt with the antenna in accordance with switch S5. Switch S11 is provided with a cam-operated, 192.0-degree sector gear. The capacitor is driven from minimum to maximum capacitance in shunt with the antenna. When the maximum position is reached, switch S9 operates and places the capacitor in series with the antenna. Switch S11 causes B1 to drive the capacitor from maximum to minimum capacitance in series. When the minimum position is reached, switch S9 operates again and places the capacitor in shunt with the antenna.

(2) TUNING AND LOADING. - In general, the following conditions apply to Antenna Coupler CU-714/SRA-22 operation. When the antenna appears capacitive and less than 50 ohms, no additional capacity is necessary to resonate the antenna. When the antenna appears inductive and less than 50 ohms, series capacity is necessary to resonate the antenna. When the antenna appears inductive and more than 50 ohms, shunt capacity is necessary to resonate the antenna. Wire and whip antenna reactance periodically changes sign many times through the frequency range of 2.0 to 30.0 megacycles. Consequently, series or shunt capacity is employed for about half of the frequencies of the antenna coupler.

The tuning and loading is performed by manually operating the controls on the front panel of Control Coupler C-2698/SRA-22 for a minimum reflected power and a high forward power as indicated on the r-f wattmeter in the control coupler.

(3) BLOWER. - Keyed 115 volts ac is applied to pin 3 of J9 on the blower assembly when Radio Set AN/URC-32 is transmitting. Pin 2 of J9 on the blower assembly is supplied with 115 volts ac through a temperature switch, S8. This switch will not close until the temperature in Antenna Coupler CU-714/SRA-22 reaches +65°C (+149°F) completing the circuit to the blower motor. The enclosed air of the antenna coupler is circulated by the blower when the transmitter is keyed or when the internal temperature exceeds +65°C (+149°F). The enclosed air is forced through the double wall of the case and cooled by natural radiation and convection.

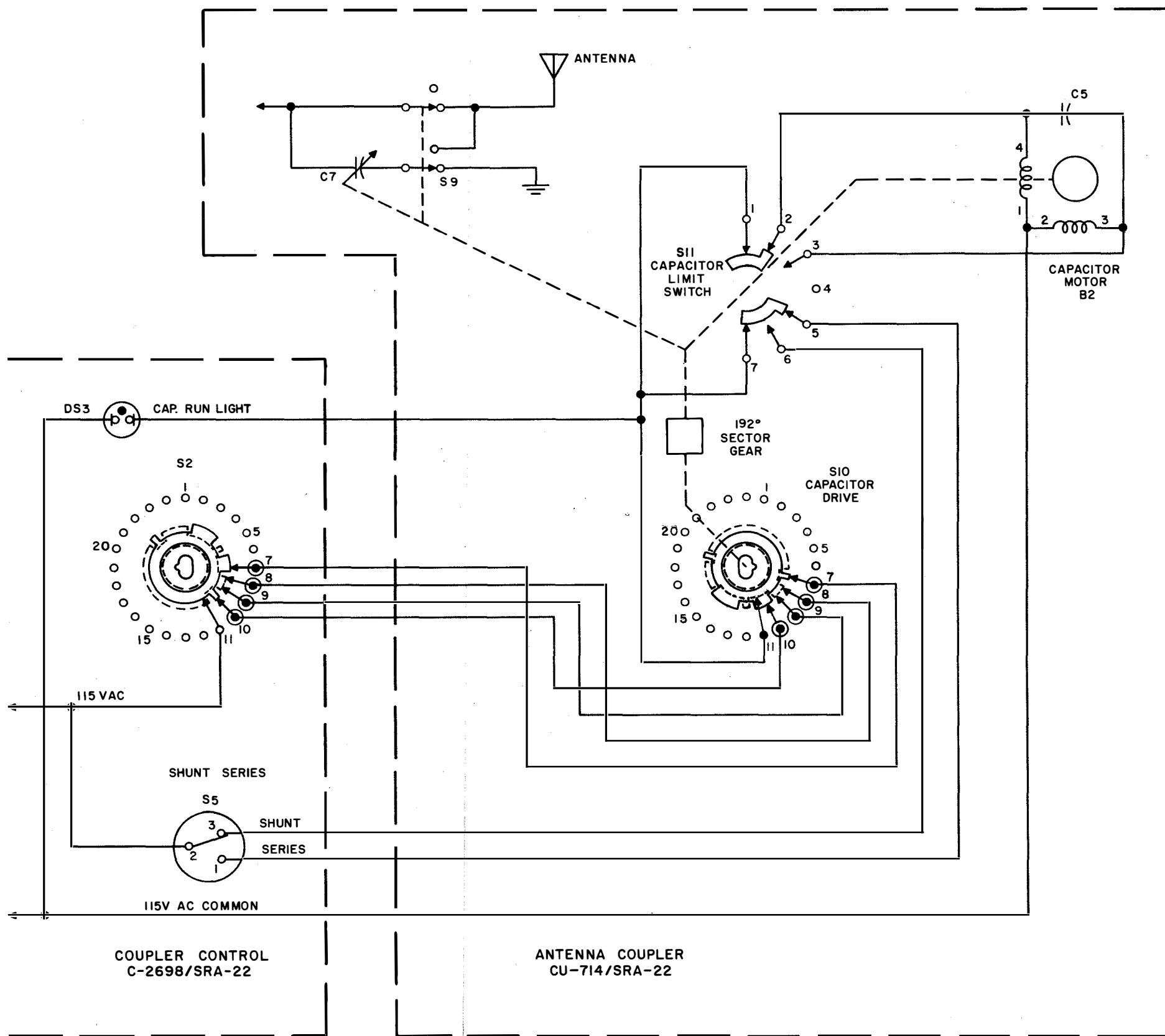


Figure 4-5. Capacitor Drive Circuit,
Simplified Schematic Diagram

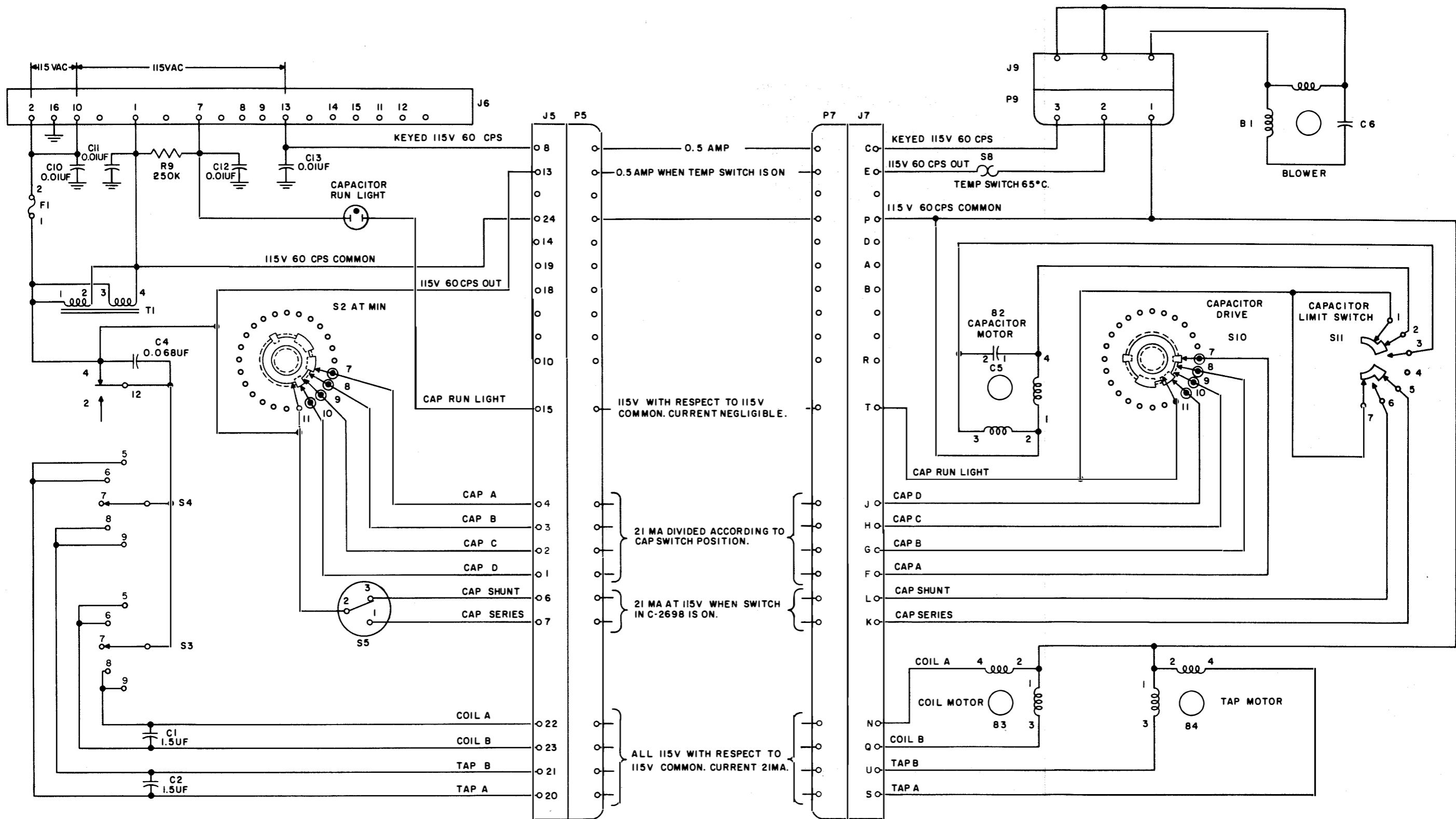


Figure 4-6. Antenna Coupler Group AN/SRA-22, Primary Power Distribution Schematic Diagram

FAILURE REPORT

"Report each failure of the equipment, whether caused by a defective part, wear, improper operation, or an external cause. Use **ELECTRONIC FAILURE REPORT** form DD787. Each pad of the forms includes full instructions for filling out the forms and forwarding them to the Bureau of Ships. However, the importance of providing complete information cannot be emphasized too much. Be sure that you include the model designation and serial number of the equipment (from the equipment identification plate), the type number and serial number of the major unit (from the major unit identification plate), and the type number and reference designation of the particular defective part (from the technical manual). Describe the cause of the failure completely, continuing on the back of the form if necessary. Do not substitute brevity for clarity. And remember--there are two sides to the failure report--

"YOUR SIDE"

"Every **FAILURE REPORT** is a boost for you:

1. It shows that you are doing your job.
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"BUREAU SIDE"

"The Bureau of Ships uses the information to:

1. Evaluate present equipment.
2. Improve future equipment.
3. Order replacements for stock.
4. Prepare field changes.
5. Publish maintenance data.

Always keep a supply of failure report forms on board. You can get them from the nearest **Forms and Publications Supply Distribution Point.**"

SECTION 5

MAINTENANCE

5-1. GENERAL.

This section contains over-all trouble shooting, functional section trouble shooting, and maintenance information for Antenna Coupler Group AN/SRA-22.

5-2. TEST EQUIPMENT AND SPECIAL TOOLS.

There are no special tools required for trouble-shooting procedures described in this manual. The only test equipment necessary is Multimeter AN/PSM-4 or equivalent.

5-3. OVER-ALL TROUBLE SHOOTING.

a. PRELIMINARY CHECK. - The following sensory observations should be made as the first step in localizing the cause of trouble.

(1) Check fuse on Coupler Control C-2698/SRA-22. Refer to figure 3-1 for fuse location and table 3-3 for symptoms of probable fuse failure.

(2) Inspect plugs to connectors J1 through J6 on rear of Coupler Control C-2698/SRA-22 for proper contact to the connectors.

(3) Inspect plugs to connectors J7 and J8 on Antenna Coupler CU-714/SRA-22 for proper contact to the connectors.

(4) Inspect connection from antenna to antenna terminal on Antenna Coupler CU-714/SRA-22.

(5) Look for any physical damage to cables or equipment.

b. CONTROL SETTINGS. - All controls on the front panel of Coupler Control C-2698/SRA-22 may be left in any position except the LOAD/ANT control (S1), which should be set to ANT position, and the REFLECTED/FORWARD control (S7) which should be set to 1000 REFLECTED position.

c. SYSTEM TROUBLE-SHOOTING CHART. - Table 5-1 describes the checks to be made to localize the cause of trouble to a functional section of Antenna Coupler Group AN/SRA-22. The functional sections are Antenna Coupler CU-714/SRA-22 and Coupler Control C-2698/SRA-22.

TABLE 5-1. ANTENNA COUPLER GROUP AN/SRA-22
SYSTEM TROUBLE-SHOOTING CHART

STEP	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1	Turn switch S1 of low-voltage power supply of Radio Set AN/URC-32 to ON position. Release fasteners on dust cover of coupler control and remove dust cover.	Red indicator light on low-voltage power supply will light (on Radio Set AN/URC-32).	
2	Set COIL COARSE TUNE/FINE TUNE switch to COARSE TUNE.	COIL meter (on front panel of Coupler Control C-2698/SRA-22) should show an indication and slowly change in reading while the COIL COARSE TUNE/FINE TUNE switch is set to COARSE TUNE.	If no indication is obtained, check fuse F1 which is located on coupler control front panel. If fuse F1 is not open, refer to tables 5-2, 5-3, 5-4, 5-5, and 5-6. If indication is normal, proceed with step 3.
3	Set TAP COARSE TUNE/FINE TUNE switch to COARSE TUNE.	TAP meter (on front panel of Coupler Control C-2698/SRA-22) should show an indication and slowly change in reading while the TAP COARSE TUNE/FINE TUNE switch is set to COARSE TUNE.	If no indication is obtained, refer to tables 5-2, 5-3, 5-4, 5-5, and 5-6. If indication is normal, proceed with step 4.
4	Set TAP COARSE TUNE/FINE TUNE switch to FINE TUNE.	TAP meter (on front panel of Coupler Control C-2698/SRA-22) should show an indication and slowly change in reading while the TAP COARSE TUNE/FINE TUNE switch is set to FINE TUNE.	If no indication is obtained, refer to tables 5-2, 5-3, 5-4, 5-5, and 5-6. If indication is normal, proceed with step 5.
5	Set COIL COARSE TUNE/FINE TUNE switch to FINE TUNE.	COIL meter (on front panel of Coupler Control C-2698/SRA-22) should show an indication and slowly change in reading while the TAP COARSE TUNE/FINE TUNE switch is set to FINE TUNE.	If no indication is obtained, refer to tables 5-2, 5-3, 5-4, 5-5, and 5-6. If indication is normal, proceed with step 6.

TABLE 5-1. ANTENNA COUPLER GROUP AN/SRA-22
SYSTEM TROUBLE-SHOOTING CHART (Cont)

STEP	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
6	Switch CAPACITOR twelve-position switch one position at a time.	The CAPACITOR run light should light.	If no indication is obtained, refer to tables 5-2, 5-3, 5-4, 5-5, and 5-6. If indication is normal, proceed with step 7.
7	Refer to the operator's section of the Technical Manual for Radio Set AN/URC-32 for the tuning procedure of the radio set and paragraph 3-2 _b of this manual for sequence of operation. Set the CAPACITOR, COIL, and TAP dials (on coupler control) to a setting recorded on the charts supplied on dust cover. Key radio set and operate the COIL and TAP COARSE TUNE/FINE TUNE switches for a null on COIL meter and TAP meter.	Reflected power on watt-meter M3 should read approximately zero.	If indication is abnormal, refer to tables 5-2, 5-3, 5-4, 5-5, and 5-6. If indication is normal with a 1.3:1 swr or less, the equipment is operating normally.

5-4. FUNCTIONAL SECTION TROUBLE SHOOTING.

a. PRELIMINARY CHECK. - The preliminary checks for this section is the same as preliminary checks for over-all trouble-shooting section (paragraph 5-3a).

b. CONTROL SETTINGS. - All controls on the front panel of Coupler Control C-2698/SRA-22 may be left in any position, except the LOAD/ANT control S1 which should be set to ANT position and the REFLECTED/FORWARD control S7 which should be set to 1000 REFLECTED position. Set the twelve-position CAPACITOR switch S2 to position 1.

c. FUNCTIONAL SECTION TROUBLE-SHOOTING CHART. - Table 5-2 isolates the particular part at fault within a functional section (Antenna Coupler CU-714/SRA-22 or Coupler Control C-2698/SRA-22).

TABLE 5-2. COUPLER CONTROL C-2698/SRA-22 TROUBLE-SHOOTING CHART

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1		Turn switch S1 of low-voltage power supply of Radio Set AN/URC-32 to ON position.	Red indicator light on low-voltage power supply will light (on Radio Set AN/URC-32).	
2		Remove the two screws that mount the right end of the rear panel to the rack. This will allow the unit to swing out on its hinge making the components available.		
3	Figures 5-2, 5-3, and 5-4 (nut on Bakelite board).	Connect negative terminal of Multi-meter AN/PSM-4 to chassis and positive terminal to +28 volts.	Multimeter should read +28 volts.	If indication is normal, proceed with step 4.
4	Figures 5-2, 5-3, and 5-4. CCW and CW are marked on potentiometer R1.	Connect multimeter across TAP potentiometer R1 with positive terminal to CW and negative terminal to CCW.	Multimeter should read between +9 and +12 volts.	If indication is normal, proceed with step 5. If the voltage is exceedingly high (+28 volts), de-energize radio set and check potentiometer R1 for an open winding. Replace R1 if necessary.
5	Figures 5-2, 5-3, and 5-4. CCW and CW are marked on potentiometer R2.	Connect multimeter across COIL potentiometer R2 with positive terminal to CCW and negative terminal to CW.	Multimeter should read between +9 and +12 volts.	If indication is normal, proceed with step 6. If the voltage is exceedingly high (+28 volts), de-energize radio set and check potentiometer R2 for an open winding. Replace R2 if necessary.
6	Figures 5-2, 5-3, and 5-4. CAPACITOR run light and pins 20, 21, 22, and 23 of J5.	Remove plug J5. Set TAP COARSE TUNE/FINE TUNE switch S4 and COIL COARSE TUNE/FINE TUNE switch S3 to COARSE TUNE position. (Cont)	Multimeter should read 115 volts ac at each pin on J5 (pin 20, 21, 22, and 23).	If indication is normal, proceed with step 7. If no voltage is present on pins 20, 21, 22, and 23 of J5, check for 115 volts ac at common of switch S3. If (Cont)

TABLE 5-2. COUPLER CONTROL C-2698/SRA-22 TROUBLE-SHOOTING CHART (Cont)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
6		(Cont) (Coarse tune on one side of neutral will put voltages on pins 21 and 22. On the other side of neutral, pins 20 and 23.) Set multimeter to a-c scale and connect one terminal to CAPACITOR run light and the other terminal to pins 20, 21, 22, 23 of J5 in progressive order.		(Cont) there is no voltage on common of switch S3, check terminal 4 of relay K2. If there is voltage at this point, replace relay K2.
7	Figures 5-2, 5-3, and 5-4. Same as in step 6.	Same as step 6.	Multimeter should read 115 volts ac in pulses at each pin on J5 (pins 20, 21, 22, and 23).	If indication is normal, proceed with step 8. If no voltage pulses are present on pins 20, 21, 22, and 23 of J5, check capacitor C3 and relays K1 and K2. Replace if necessary.
8	Figures 5-2, 5-3, and 5-4. CAPACITOR run light and pins 1, 2, 3, and 4 on J5.	<p>Set switch S2 to position 1. Connect one terminal of multimeter to CAPACITOR run light and the other terminal to pins 1, 2, 3, and 4 as follows:</p> <p>S2 in position 1</p> <p>S2 in position 2</p> <p>S2 in position 3</p> <p>S2 in position 4</p> <p>S2 in position 5</p> <p>S2 in position 6</p> <p>S2 in position 7</p> <p>S2 in position 8</p> <p>S2 in position 9</p> <p>S2 in position 10</p>	<p>115 volts on pins 2 and 3</p> <p>115 volts on pins 3 and 4</p> <p>115 volts on pins 1 and 2</p> <p>115 volts on pin 2</p> <p>115 volts on pin 3</p> <p>115 volts on pin 4</p> <p>115 volts on pin 1</p> <p>115 volts on pins 1 and 2</p> <p>115 volts on pins 1, 2, and 3</p> <p>115 volts on pins 2, 3, and 4</p>	If indication is normal, proceed with step 9. If voltage is not present on any one of the pins, check switch S2 contacts. Replace switch if necessary.

TABLE 5-2. COUPLER CONTROL C-2698/SRA-22 TROUBLE-SHOOTING CHART (Cont)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
8 (Cont)		S2 in position 11 S2 in position 12	115 volts on pins 1, 3, and 4 115 volts on pins 1, 2, and 4	
9	Figures 5-2, 5-3, and 5-4.	Refer to the operator's section of the Technical Manual for Radio Set AN/URC-32 for the tuning procedure of the radio set and paragraph 3-2b of this manual for sequence of operation. Set switch S1 to LOAD position (feeds an external dummy load). Set switch S7 to 1000 REFLECTED. Key radio set and tune r-f amplifier.	Meter M3 should read a high forward power with switch S7 set to 1000 FORWARD and a low reflected power when switch S7 is set in 100 REFLECTED position.	If indication is normal, proceed with step 10. If meter M3 gives no indication, de-energize radio set and check switch S7. If switch S7 is not defective, remove coupler unit and check components and replace defective one.
10	Figures 5-2, 5-3, and 5-4.	Repeat step 9.	Same as in step 9.	If no output is indicated on meter M3, check transfer relay K3. This relay should become energized when the radio set is keyed. Replace transfer relay if necessary.

NOTE

Before proceeding with the antenna coupler trouble-shooting procedure, the coupler control should be operating normally. Connect plug P5 into connector J5 and proceed as follows.

TABLE 5-3. ANTENNA COUPLER CU-714/SRA-22 TROUBLE-SHOOTING CHART

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1	Figure 5-6.	Loosen the twelve screws mounting the antenna coupler to its case. Slide the antenna coupler from its case. (Cont)	Capacitor motor B2 in antenna coupler should operate the vacuum capacitor at each step of CAPACITOR switch S2.	If indication is normal, proceed with step 2. If motor B2 will not run, check for 115 volts ac on terminals 3 or 4. If there is no (Cont)

TABLE 5-3. ANTENNA COUPLER CU-714/SRA-22 TROUBLE-SHOOTING CHART (Cont)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1		(Cont) Operate CAPACITOR switch S2 on coupler control, one step at a time.		(Cont) voltage at motor B2, check switches S10 and S11. If there is voltage on motor B2 and it will not turn, check capacitor C5. Check the gear train to determine if it is binding.
2	Figure 5-6.	Operate COIL COARSE TUNE/FINE TUNE switch S3 in COARSE TUNE position.	Coil motor B3 should operate the coil drums.	If indication is normal, proceed with step 3. If motor B3 will not run, check for 115 volts ac on terminals 3 or 4. If there is no voltage at motor B3, Check cable from coupler control and wiring. If there is voltage on motor B3 and it will not turn, check the gear train and the mounting of the coil drums for binding.
3	Figure 5-6.	Operate TAP COARSE TUNE/FINE TUNE switch S4 in COARSE TUNE position.	Tap motor B4 should operate the tap ring on the coil.	If motor B4 will not run, check for 115 volts ac on terminals 3 or 4. If there is no voltage at motor B4, check cable from coupler control and wiring. If there is voltage on motor B4 and it will not turn, check the gear train for binding.
4	Figure 5-6.	Check humidity indicator DS4 for moisture.	The humidity indicator DS4 should indicate blue.	If the humidity indicator is pink, it indicates that there is excessive moisture in the unit. Remove antenna coupler from its case. Inspect all of the components and let unit dry out - bake if necessary. If any arcing occurred, replace the component where the arcing occurred.

d. **VOLTAGE AND RESISTANCE MEASUREMENTS.** - Once trouble has been isolated to a functional section (Antenna Coupler CU-714/SRA-22 or Coupler Control C-2698/SRA-22), conventional trouble-shooting procedures can be used to locate a defective part with the aid of schematic diagrams and the voltage and resistance measurements of table 5-4. All measurements are taken from terminal to 115-volt 60-cycle common (pin 24 on connector J5) except the voltages measured across potentiometers R1 and R2, R6 and R7. Across R1 and R6 potentiometer, the negative terminal of the multimeter is connected to CCW pin on potentiometer, and across potentiometer R2 and R7, the negative terminal of the multimeter is connected to CW pin on potentiometer. All measurements should be made with Multimeter AN/PSM-4 or equivalent and will be nominal values. All voltage readings are taken with the Radio Set AN/URC-32 low-voltage power supply energized which provides 115 volts ac to Coupler Control C-2698/SRA-22. Disconnect plug P5 from connector J5. All resistance measurements are taken with power off.

TABLE 5-4. VOLTAGE AND RESISTANCE MEASUREMENTS OF
COUPLER CONTROL C-2698/SRA-22

CONTROL SETTINGS*	TERMINAL	V DC	V AC	OHMS
Any position	R1-CW (to ground)	+18 - +24	---	200
	R1-CW R1-CCW	+9 - +12	---	100
Any position	R2-CCW R2-CW	+9 - +12	---	100
Switch S2 to position 1	S2-8 S2-9	---	115	---
Switch S2 to position 2	S2-9 S2-10	---	115	---
Switch S2 to position 3	S2-7 S2-8	---	115	---
Switch S2 to position 4	S2-8	---	115	---
Switch S2 to position 5	S2-9	---	115	---
Switch S2 to position 6	S2-10	---	115	---
Switch S2 to position 7	S2-7	---	115	---
Switch S2 to position 8	S2-7 S2-8	---	115	---

TABLE 5-4. VOLTAGE AND RESISTANCE MEASUREMENTS OF
COUPLER CONTROL C-2698/SRA-22 (Cont)

CONTROL SETTINGS*	TERMINAL	V DC	V AC	OHMS
Switch S2 to position 9	S2-7 S2-8 S2-9	---	115	---
Switch S2 to position 10	S2-8 S2-9 S2-10	---	115	---
Switch S2 to position 11	S2-7 S2-9 S2-10	---	115	---
Switch S2 to position 12	S2-7 S2-8 S2-10	---	115	---
---	J5-8	---	115	
---	K3-2 (to ground)	+28	---	---
*Controls not listed can be in any position.				

NOTE

Connect plug P5 to connector J5 on the coupler control.

TABLE 5-5. VOLTAGE AND RESISTANCE MEASUREMENTS OF
ANTENNA COUPLER CU-714/SRA-22

TERMINAL	V DC	V AC	OHMS
R6-CW R6-CCW	+9 - +12	---	50
R7-CW R7-CCW	+9 - +12	---	50
C6 to standoff from blower		When transmitter is keyed	

5-5. TYPICAL TROUBLES.

Table 5-6 contains possible troubles of Antenna Coupler Group AN/SRA-22. Correcting troubles consists of replacing defective components and realigning gear trains and potentiometers as applicable. The Nature of Trouble column suggests the required corrective action. In some cases, disassembly and reassembly procedures are necessary to permit repair.

TABLE 5-6. POSSIBLE TROUBLES OF ANTENNA COUPLER GROUP AN/SRA-22

TROUBLE	NATURE OF TROUBLE	SYMPTOMS
Vacuum capacitor does not home.	Excessive mechanical friction in gear train; open or shorted contacts on switch S9, S10, or S11; open motor leads to B2; open or shorted phasing capacitor C5; or motor B2 is malfunctioning.	Capacitor will not run or binds at certain points.
Coil does not home.	Excessive mechanical friction in gear train; ceramic drum or aluminum shorting drum open or shorted. Contacts on switch S3 (in coupler control) open; motor leads to motor B3 open or shorted. Phasing capacitor C1 shorted or open. Motor B3 malfunctioning.	Ceramic and aluminum drums will not run or bind at certain points.
Tap does not home.	Excessive mechanical friction in gear train or tap; open motor leads to motor B4. Open or shorted phasing capacitor C1 or motor B4 is malfunctioning.	Gear train will not run or binds at certain points.
Coil, tap, and capacitor homes properly but no r-f signal from Radio Set AN/URC-32 when the radio set is keyed.	Open relay K3 coil or no voltage to relay.	Transfer relay K3 not operating.

5-6. ALIGNMENT.

The alignment of the TAP and COIL potentiometers are the only alignments necessary in the coupler control unit.

a. TEST EQUIPMENT AND SPECIAL TOOLS. - There are no special tools required for the tuning and adjustments covered in this section.

b. **SPECIAL JIGS.** - The only special jig or test assembly required is a potentiometer alignment jig. Refer to figure 5-1 for the schematic diagram. This alignment jig is used to align the potentiometers with the end ranges of the coil and tap drives.

c. **CONTROL SETTINGS.** - All controls on the front panel of the coupler control may be left in any position except the **COIL COARSE TUNE/FINE TUNE** and **TAP COARSE TUNE/FINE TUNE** switches, S3 and S4. These two switches should be in neutral position (levers straight out).

d. **TEST SETUP.** - Refer to figure 5-1 for diagram showing the test setup required to align the potentiometers in the coupler control. The potentiometers are aligned at the factory and need not be realigned unless the shaft coupling loosens or slips or if the potentiometers are replaced.

e. **CONNECTIONS.** - Connect the equipment as shown in figure 5-1.

(1) Remove plug P5 from connector J5 on the coupler control.

(2) Set the OFF-ON switch on the low-voltage power supply of Radio Set AN/URC-32 to ON position.

(3) Connect the plug from the potentiometer alignment jig to connector J5 on the coupler control.

(4) Set the switch in the potentiometer alignment jig to coil position.

(5) Adjust the potentiometer and its dial so that for a zero center indication on the **COIL** meter (on coupler control), the dial reads 100.

(6) Set the switch of the potentiometer alignment jig to tap position.

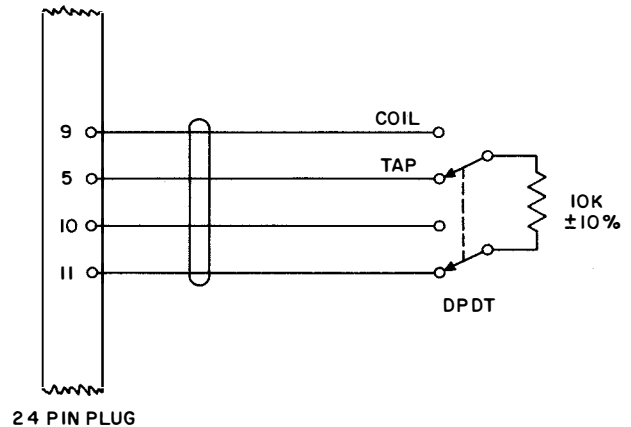
(7) Adjust the potentiometer and its dial so that for a zero center indication on the **TAP** meter, the dial reads 100.

(8) Disconnect the plug of the potentiometer alignment jig from connector J5 on coupler control.

(9) Connect plug P5 to connector J5. (This connects the coupler control to the antenna coupler.)

(10) Loosen the twelve screws which mount the antenna coupler in its case. Remove the unit from its case by pulling it straight out.

(11) Run, by hand, the coil to its minimum stop.



NOTE:

A DOUBLE POLE DOUBLE THROW TOGGLE SWITCH OR EQUIVALENT MAY BE USED. THE PLUG IS A 24 PIN WITH FLAT FEMALE CONTACTS - AMPHENOL 26-450I-24S. THE CABLE FROM SWITCH TO PLUG MAY BE ANY DESIRED LENGTH.

Figure 5-1. Potentiometer Alignment Jig, Schematic Diagram

(12) Back the coil off two turns, and place a small mark on the coil form with a marking pencil and use a pointer to determine two turns as close as possible.

(13) Run, by hand, the tap to its maximum stop.

(14) Loosen the coupling on the potentiometer R6 shaft, and adjust the shaft until the COIL meter on the front panel of the coupler control reads zero center. Tighten the coupling control.

(15) Loosen the coupling on the potentiometer R7 shaft, and adjust the shaft until the TAP meter on the front panel of the coupler control reads zero center. Tighten the coupling control.

(16) Plug the antenna coupler into its case. Make sure that blower plug P9 lines up with connector J9 and that antenna feedthrough plug P10 lines up with J10.

5-7. REMOVAL, ADJUSTMENT, REPAIR, AND REASSEMBLY OF PARTS AND SUBASSEMBLIES.

This section contains essential instructions for removal and disassembly of Coupler Control C-2698/SRA-22 and removal and disassembly of tap assembly and coil assembly of Antenna Coupler CU-714/SRA-22. For complete overhaul and disassembly procedures, refer to the Technical Manual of Overhaul Instructions of Antenna Coupler Group AN/SRA-22.

a. REMOVAL AND DISASSEMBLY OF COUPLER CONTROL C-2698/SRA-22.

(1) Radio Set AN/URC-32 should be de-energized.

(2) Release the thumb fasteners on the dust cover of the coupler control. Remove the dust cover.

(3) Remove the two screws that mount the right side of the coupler control to the rack. This will allow the unit to swing out.

(4) Remove coaxial plugs P1, P2, P3, P4, and plugs P5 and P6 from connectors on rear panel of unit.

(5) Grasp the unit firmly, and remove the two screws that mount the hinge to the rack. Carefully lay the unit on a bench.

(6) Remove coaxial plug P5 from directional coupler.

(7) With a suitable wrench, remove the nut and lock washer from connector J1.

(8) Remove the 14 screws and lock washers holding the rear panel to the chassis. This will allow the rear panel to swing down. Care should be taken not to damage the cable.

(9) Viewing the coupler control from the front, remove the nine screws that mount the front panel to the chassis. This will allow the panel to swing down. Care should be taken not to damage the cable.

(10) Repeat paragraph 5-7a in reverse order for reassembly of front and rear panels. With the front and rear panels removed, the disassembly or removal of components is obvious. Refer to figures 5-2, 5-3, and 5-4 for location of components. The only adjustment necessary in this unit is that of potentiometers R1 and R2. Refer to paragraph 5-6 of this section for complete alignment procedure.

b. REMOVAL AND DISASSEMBLY OF ANTENNA COUPLER CU-714/SRA-22.

- (1) Remove plug P7 and coaxial plug P8 from connectors on the antenna coupler unit.
- (2) Loosen the twelve screws holding the antenna coupler in its case.
- (3) Pull unit out of case. Remove the twenty-four screws holding the shroud over the coil drum assembly.
- (4) Loosen the twelve screws holding the plate over the right half of the case. Remove plate.
- (5) Remove the two screws and lock washers which mount connector J9 to bracket.
- (6) Remove the six screws and lock washers that mount the blower assembly to the case. Remove the blower from case.

c. TAP ASSEMBLY AND DRUM ASSEMBLY, REMOVAL AND REPLACEMENT.

- (1) Manually run the coil and tap to maximum (all of the coil ribbon wound on ceramic drum and the tap assembly run to top of coil against the stop).
- (2) Remove the screw holding the silver ribbon to the aluminum shorting drum, and turn the ceramic drum to wind on the remaining ribbon. Tape the ribbon end in place to prevent uncoiling.
- (3) Remove the antenna coupler front casting by removing the screws around the front-panel flange.
- (4) Remove the fiber plate behind the front casting by removing the screws around the rear edge of the fiber plate.
- (5) Remove the tap assembly by running it off the ceramic drum.

NOTE

This completes removal of the tap assembly. Replacement is the reverse of removal. For ceramic drum replacement procedure, continue with the following instructions.

- (6) Using a small punch and hammer, punch out the roll pin that secures the ceramic drum to the gear train shaft.
- (7) Replace defective ceramic drum.

NOTE

If the end assembly of the defective ceramic drum is to be used on the replacement drum, remove the end assembly by unsoldering the ribbon and removing the four screws that secure the end assembly to the drum. Mount the end assembly on the replacement ceramic drum, and solder the ribbon in place. Replace the end-assembly screws making sure that the end-assembly end-stop block is positioned in line with the hole where the ribbon enters the ceramic drum.

- (8) Run the ribbon onto the drum in the grooves provided. Tape the loose end of the ribbon to prevent uncoiling.

(9) Replace the ceramic drum to engage the gear train shaft, and secure with a new roll pin in the shaft. Using a punch, flare the roll pin to secure it in place.

(10) Replace the tap assembly by running it onto the ceramic drum past the end of the ribbon, but do not engage the tap assembly with the tap drive gear.

(11) Remove the tap securing the end of the silver ribbon, and attach the ribbon end to the aluminum drum by means of the screw provided.

NOTE

Before securing the ribbon to the aluminum drum, the aluminum drum should be rotated approximately two and one-half to three turns clockwise to obtain spring loading.

(12) Adjust the ceramic drum to the maximum end stop, adjust the tap drive gear to the minimum end stop, and adjust the tap assembly toward minimum coil (bottom end of ribbon) until the tap contacts are positioned on the ribbon at the point where the ribbon extends toward the aluminum shorting drum but still contacts the ceramic drum. Engage the tap assembly with the tap drive gear.

CAUTION

Make sure that the tap contacts seat firmly on the ribbon, or the ribbon and contacts may be burned when power is applied to the antenna coupler. The contacts may be adjusted by slightly bending the contact arms toward the ribbon.

(13) Replace the fiber plate to secure the coil drums in place, and replace the fiber plate mounting screws.

(14) Replace the front casting, and secure in place with screws around the front-panel flange.

CAUTION

Be sure that the grounding spring of the aluminum shorting drum is properly seated and making good mechanical contact.

(15) Manually run the coil and tap to maximum (all of ribbon on the ceramic drum and the tap against the end stop).

(16) Repeat paragraph 5-7b in reverse order for reassembly of antenna coupler.

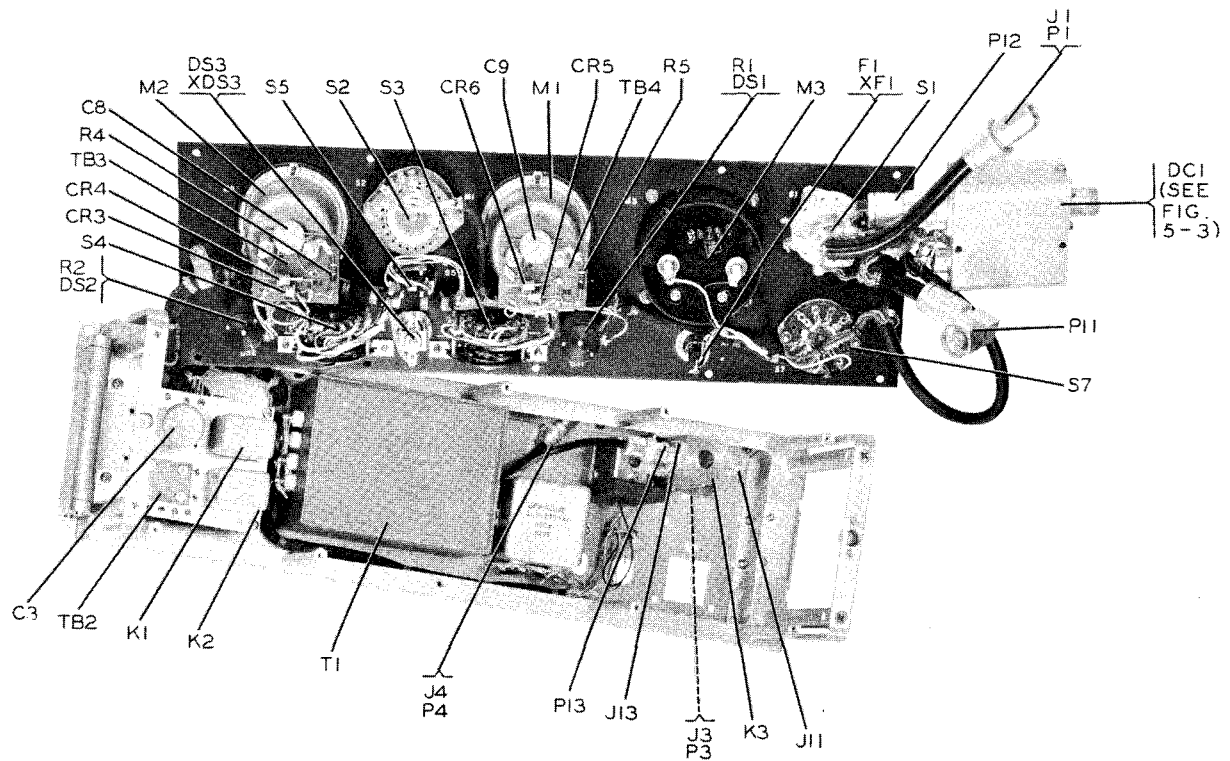


Figure 5-2. Coupler Control C-2698/SRA-22, Front Panel Removed

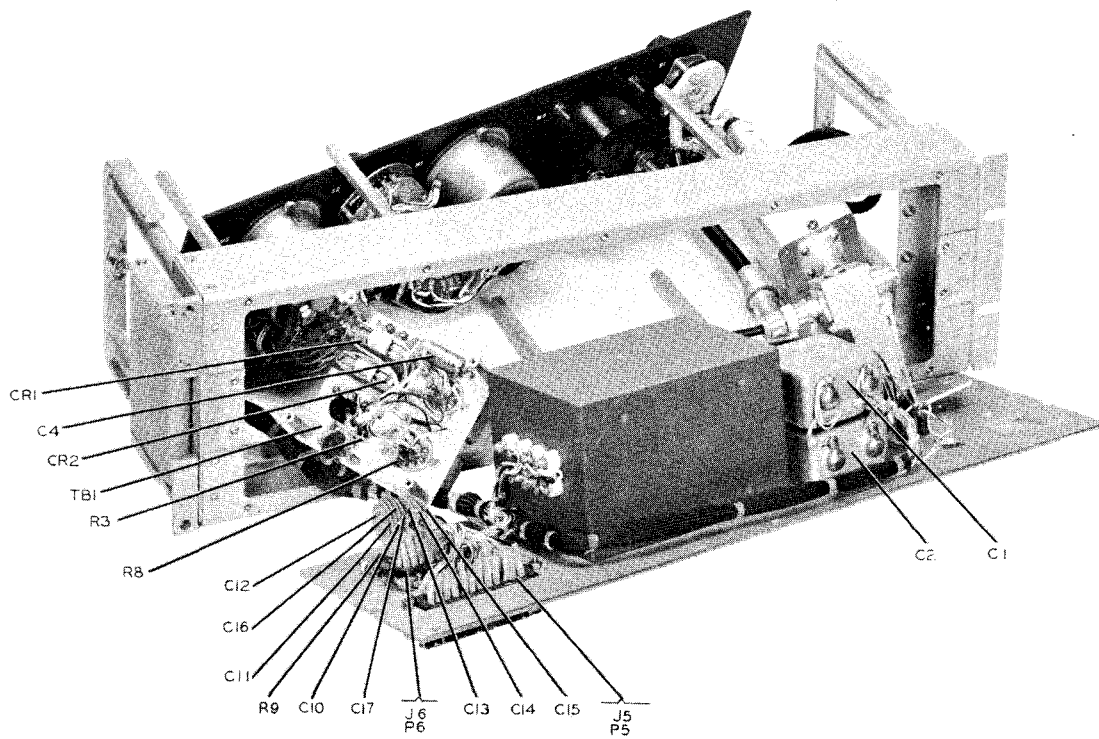


Figure 5-3. Coupler Control C-2698/SRA-22, Rear Panel Removed

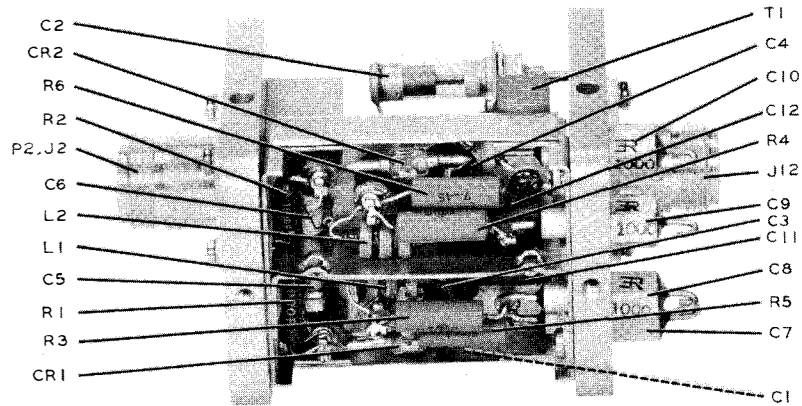


Figure 5-4. Coupler Control C-2698/SRA-22,
Directional Coupler

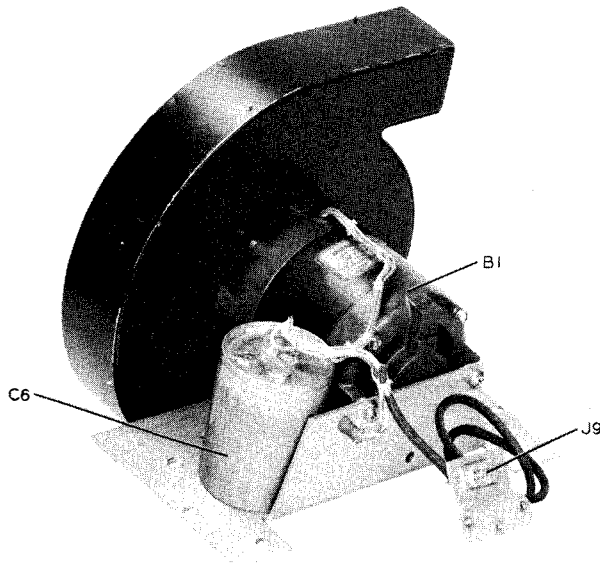
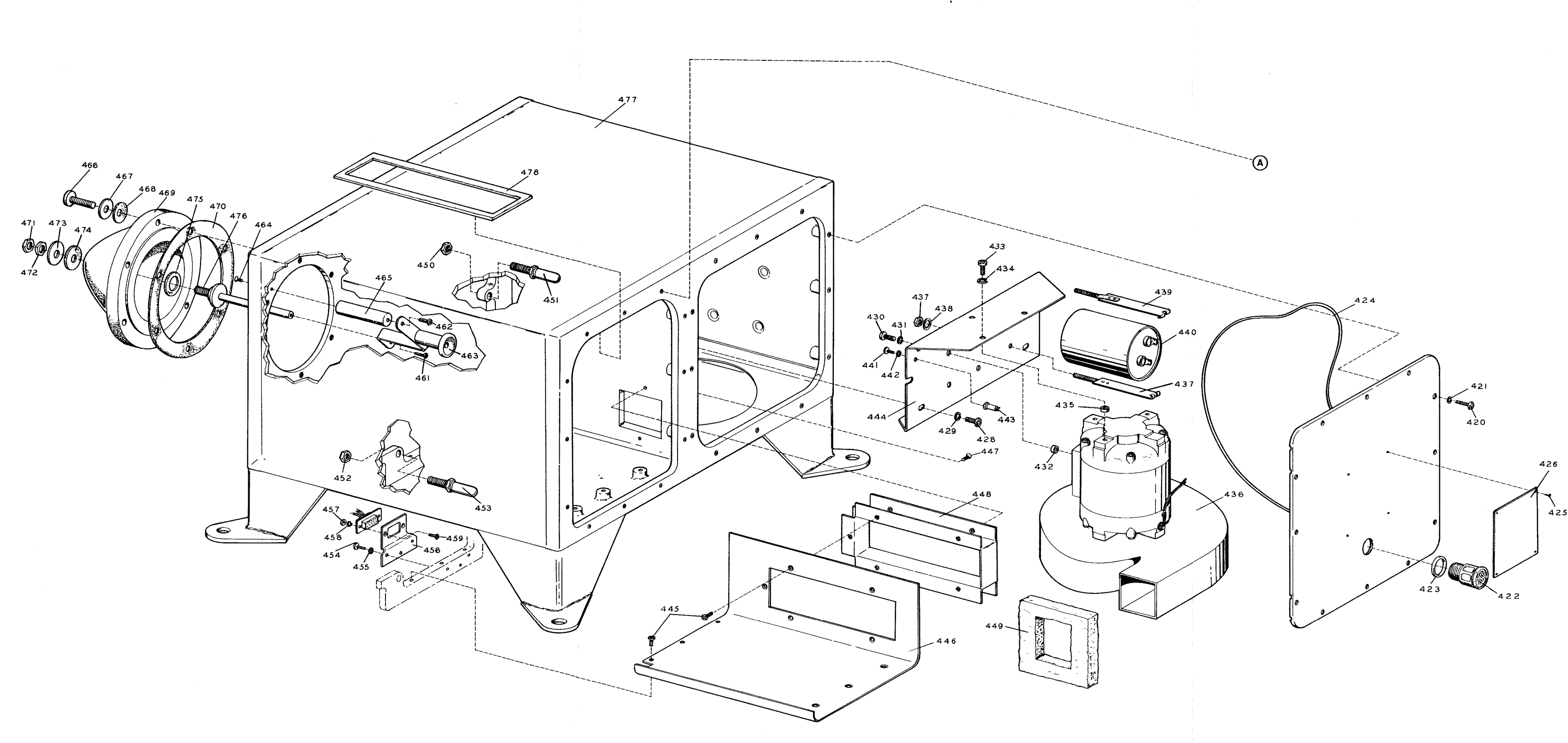


Figure 5-5. Antenna Coupler CU-714/
SRA-22, Blower Assembly



INDEX NO.	ITEM	INDEX NO.	ITEM	INDEX NO.	ITEM	INDEX NO.	ITEM	INDEX NO.	ITEM	INDEX NO.	ITEM
1	Screw	56	Capacitor C5	111	Washer	166	H-v spark gap contact	221	Washer	276	Washer
2	Gasket seal	57	Nut	112	Nut	167	Solder lug	222	Washer	277	Gear MP2
3	Screw	58	Switch S8	113	Screw	168	Screw	223	Contact button	278	Screw
4	Spacer	59	Spacer	114	Washer	169	Washer	224	Screw	279	Washer
5	Shroud	60	Screw	115	Coupler	170	Gear MP3	225	Lock washer	280	Gear MP29
6	Screw	61	Lock washer	116	Setscrew	171	Capacitor C7	226	Washer	281	Retainer ring
7	Lock washer	62	Solder lug	117	Flange coupler	172	Screw	227	Screw	282	Coil stop assembly
8	Screw	63	Center tap mount	118	L-v drum shaft	173	Nut	228	Washer	283	Screw
9	Nut	64	Ball bearing	119	Ball bearing	174	H-v contact	229	Strip contact	284	Strip contact
10	Shroud	65	Ball bearing	120	L-v drum end assembly	175	Screw	230	Spacer	285	Screw
11	Screw	66	Screw	121	Screw	176	Capacitor plate	231	H-v plate	286	Center tap block
12	Nut	67	Roller arm	122	Lock washer	177	Screw	232	Screw	287	Standoff
13	Shroud	68	Roller	123	Washer	178	H-v collar	233	Standoff	288	Spacer bar
14	Screw	69	Retainer ring	124	Screw	179	Gear (part of assem of C7)	234	Stud	289	Screw
15	Shroud	70	Screw	125	Lock washer	180	Capacitor lead screw	235	Stud	290	Spacer bar
16	Screw	71	Front plate	126	Screw	181	H-v strip	236	Stud	291	Screw
17	Cover	72	Tube insulator	127	Lock washer	182	Screw	237	Setscrew	292	Spacer bar
18	Cover	73	Setscrews	128	Strip contact	183	Retainer ring	238	Roll pin	293	Spacer bar
19	Screw	74	Coupler	129	Strip contact	184	Spacer	239	Screw	294	Screw
20	Nut	75	Roll pin	130	Slip ring	185	Spacer	240	Spacer	295	Spacer bar
21	Lock washer	76	Screw	131	Spacer	186	Plug P10	241	Screw	296	Spacer bar
22	Solder lug	77	Spacer	132	Spacer	187	H-v output plate	242	H-v rotor strip	297	Screw
23	Nut	78	Switch S10	133	Spacer	188	Screw	243	Nut	298	Screw
24	Stud	79	Spacer	134	Spacer	189	H-v post	244	Nut	299	Spacer
25	Bolt	80	Roll pin	135	Roller	190	Nut	245	H-v rotor	300	Screw
26	Washer	81	Tap drive pinion MP50	136	Screw	191	Spacer	246	Setscrews	301	Screw
27	Lock washer	82	Shaft MP51	137	Stop screw	192	Switch S11	247	Screw	302	Screw
28	Slug	83	Roller shaft	138	Screw	193	Spacer	248	Screw	303	Spring
29	Standoff	84	Setscrews	139	Roller shaft	194	Spacer	249	Lock washer	304	H-v rotor shaft MP12
30	Stud	85	Coupler MP9	140	Roller shaft	195	Stud	250	Nut	305	Screw
31	Standoff	86	Nut	141	Roller shaft	196	Nut	251	Lock washer	306	Spacer
32	Lock washer	87	Bracket	142	Gear MP46	197	Lock washer	252	Screw	307	Screw
33	Stud	88	Screw	143	Screw	198	Nut	253	Potentiometer locks	308	Screw
34	Screw	89	Potentiometer locks	144	Coil ribbon	199	Washer	254	Coupler MP8	309	Screw
35	Lock washer	90	Potentiometer R7	145	Screw	200	Screw	255	Potentiometer R6	310	Screw
36	Ground contact	91	Screw	146	Lock washer	201	Lock washer	256	R6 mounting bracket	311	Guide pin block
37	Screw	92	Lock washer	147	Solder lug	202	Solder lug	257	Setscrew	312	Screw
38	Nut	93	Contacts	148	Screw	203	Washer	258	Washer	313	Coil stop cam
39	Lock washer	94	Retainer ring	149	Flange coupler	204	Nut	259	Spring	314	Screw
40	Solder lug	95	Spacers	150	Spacers	205	Washer	260	Setscrew	315	Tap motor B4
41	Connector J7	96	Spacers	151	H-v output shaft	206	Retainer ring	261	Coil stop	316	Screw
42	Gasket	97	Spring	152	Washer	207	Washer	262	Screw	317	Capacitor motor B2
43	Hex nut	98	Spacer	153	H-v contact	208	Washer	263	Lock washer	318	Screw
44	Lock washer	99	Center tap hub	154	Nut	209	Washer	264	Washer	319	H-v post
45	Connector J8	100	Roll pin	155	Washer	210	Nut	265	H-v spark gap contact	320	Capacitor drive pin stops
46	Screw	101	Screw	156	Washer	211	Lock washer	266	Nut	321	Stop pin screw
47	Nomenclature plate	102	L-v drum driven gear	157	Screw	212	Washer	267	Lock washer	322	Oilite bearing
48	Lock washer	103	Stop assembly	158	Gear MP48	213	Washer	268	Screw	323	Oilite bearing
49	Front casting	104	Screw	159	H-v drum stop assembly	214	Stud	269	Plug P9	324	Oilite bearing
50	Screw	105	Screw	160	H-v drum L1	215	Solder lug	270	Screw	325	Oilite bearing
51	Standoff	106	Solder lug	161	Screw	216	H-v contact	271	Lock washer	326	Oilite bearing
52	Screw	107	L-v drum MP49	162	Lock washer	217	Spacer	272	Screw	327	Oilite bearing
53	Standoff	108	Sliding contact	163	Solder lug	218	Screw	273	Lock washer	328	Ball bearing MP41
54	Screw	109	L-v drum end assembly	164	Screw	219	Lock washer	274	Bracket	329	Ball bearing MP43
55	Nut	110	Screw	165	Lock washer	220	Solder lug	275	Screw	330	Ball bearing MP37

Figure 5-6. Antenna Coupler CU-714/SRA-22, Exploded View
(Sheet 1 of 2)

ORIGINAL

PARTS IDENTIFICATION

ITEM	INDEX NO.	ITEM	INDEX NO.	ITEM
Oilite bearing	386	Gear MP26	441	Screw
Ball bearing MP39	387	Spring	442	Lock washer
Ball bearings MP35	388	Retainer ring	443	Standoff
Oilite bearing	389	Stop arm	444	Blower mounting bracket
Ball bearing MP31	390	Screw	445	Screw
Ball bearing MP33	391	Pin stop	446	Cradle
Oilite bearing	392	Ball bearing MP42	447	Screw
Oilite bearing	393	Oilite bearing	448	Plenum
Oilite bearing	394	Spacer	449	Blower gasket
Oilite bearing	395	Oilite bearing	450	Nut
Oilite bearing	396	Ball bearing MP38	451	Guide pin
Spacer	397	Oilite bearing	452	Nut
Oilite bearing	398	Retainer ring	453	Guide pin
Oilite bearing	399	Oilite bearing	454	Screw
Oilite bearing	400	Oilite bearing	455	Lock washer
Secondary gear plate	401	Oilite bearing	456	Bracket
Screw	402	Ball bearing MP36	457	Nut
Gear MP24	403	Oilite bearing	458	Lock washer
Gear MP24	404	Ball bearing MP40	459	Screw
Screw	405	Ball bearing MP32	460	Connector J9
Gear MP27	406	Ball bearing MP34	461	Screw
Hub MP27	407	Ball bearing MP45	462	Screw
Gear MP23	408	Oilite bearing	463	Connector J10
Gear MP5	409	Oilite bearing	464	Screw
Setscrew	410	Oilite bearing	465	H-v post
Shaft MP28	411	Oilite bearing	466	Screw
Screw	412	Oilite bearing	467	Washer
Stop block	413	Oilite bearing	468	Washer
Gear MP18	414	Screw	469	H-v output insulator
Gear MP17	415	Oilite bearing	470	Gasket
Gear MP16	416	Oilite bearing	471	Nut
Gear MP30	417	Hub support	472	Nut
Gear MP6	418	Ball bearing MP44	473	Washer
Screw	419	Primary gear plate	474	Washer
Stop block	420	Captive screw	475	Gasket
Gear no. MP	421	Lock washer	476	H-v output shaft
Gear MP25	422	Humidity indicator DS4	477	Case
Gear MP13	423	Rubber gasket	478	Felt gasket
Gear MP15	424	Gasket MP52		
Gear MP19	425	Screw		
Gear MP20	426	Nomenclature plate		
Gear MP21	427	Blower plate		
Roll pin	428	Screw		
Gear MP7	429	Lock washer		
Gear MP14	430	Screw		
Gear MP4	431	Lock washer		
Retainer ring	432	Spacer		
Washer	433	Screw		
Washer	434	Lock washer		
Washer	435	Spacer		
Gear MP11	436	Blower B1		
Gear MP10	437	Capacitor mounting bracket		
Gear MP22	438	Lock washer		
Roll pin	439	Capacitor mounting bracket		
Shaft	440	Capacitor C6		

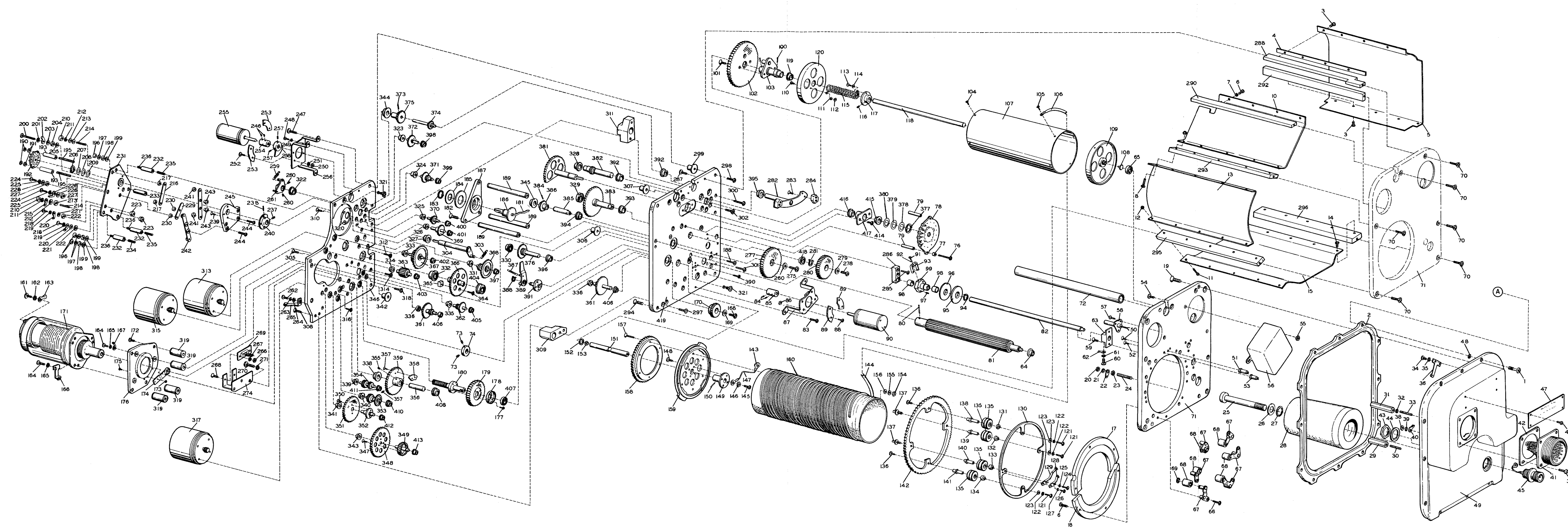
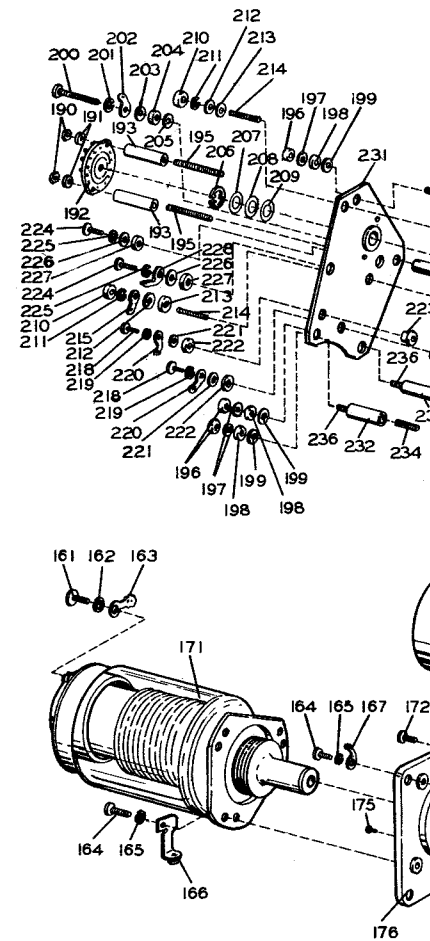


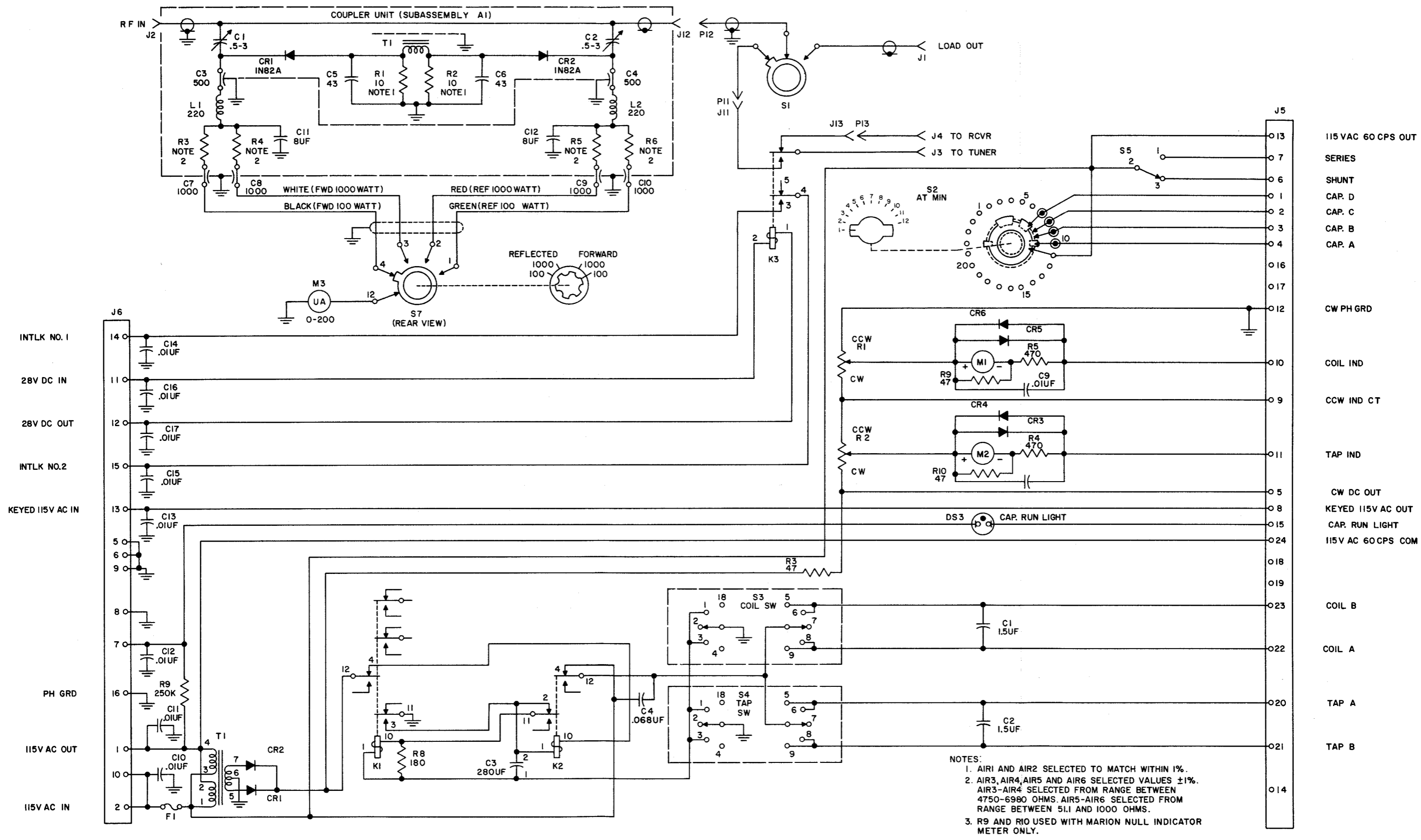
Figure 5-6. Antenna Coupler CU-714/SRA-22, Exploded View
(Sheet 2 of 2)

ORIGINAL

PARTS IDENTIFICATION

INDEX NO.	ITEM	INDEX NO.	ITEM	INDEX NO.	ITEM
331	Oilite bearing	386	Gear MP26	441	Screw
332	Ball bearing MP39	387	Spring	442	Lock washer
333	Ball bearings MP35	388	Retainer ring	443	Standoff
334	Oilite bearing	389	Stop arm	444	Blower mounting bracket
335	Ball bearing MP31	390	Screw	445	Screw
336	Ball bearing MP33	391	Pin stop	446	Cradle
337	Oilite bearing	392	Ball bearing MP42	447	Screw
338	Oilite bearing	393	Oilite bearing	448	Plenum
339	Oilite bearing	394	Spacer	449	Blower gasket
340	Oilite bearing	395	Oilite bearing	450	Nut
341	Oilite bearing	396	Ball bearing MP38	451	Guide pin
342	Spacer	397	Oilite bearing	452	Nut
343	Oilite bearing	398	Retainer ring	453	Guide pin
344	Oilite bearing	399	Oilite bearing	454	Screw
345	Oilite bearing	400	Oilite bearing	455	Lock washer
346	Secondary gear plate	401	Oilite bearing	456	Bracket
347	Screw	402	Ball bearing MP36	457	Nut
348	Gear } MP24	403	Oilite bearing	458	Lock washer
349		404	Ball bearing MP40	459	Screw
350	Screw	405	Ball bearing MP32	460	Connector J9
351	Gear } MP27	406	Ball bearing MP34	461	Screw
352		407	Ball bearing MP45	462	Screw
353	Gear MP23	408	Oilite bearing	463	Connector J10
354	Gear MP5	409	Oilite bearing	464	Screw
355	Setscrew	410	Oilite bearing	465	H-v post
356	Shaft MP28	411	Oilite bearing	466	Screw
357	Screw	412	Oilite bearing	467	Washer
358	Stop block	413	Oilite bearing	468	Washer
359	Gear MP18	414	Screw	469	H-v output insulator
360	Gear MP17	415	Oilite bearing	470	Gasket
361	Gear MP16	416	Oilite bearing	471	Nut
362	Gear MP30	417	Hub support	472	Nut
363	Gear MP6	418	Ball bearing MP44	473	Washer
364	Screw	419	Primary gear plate	474	Washer
365	Stop block	420	Captive screw	475	Gasket
366	Gear no. MP	421	Lock washer	476	H-v output shaft
367	Gear MP25	422	Humidity indicator DS4	477	Case
368	Gear MP13	423	Rubber gasket	478	Felt gasket
369	Gear MP15	424	Gasket MP52		
370	Gear MP19	425	Screw		
371	Gear MP20	426	Nomenclature plate		
372	Gear MP21	427	Blower plate		
373	Roll pin	428	Screw		
374	Gear MP7	429	Lock washer		
375	Gear MP14	430	Screw		
376	Gear MP4	431	Lock washer		
377	Retainer ring	432	Spacer		
378	Washer	433	Screw		
379	Washer	434	Lock washer		
380	Washer	435	Spacer		
381	Gear MP11	436	Blower B1		
382	Gear MP10	437	Capacitor mounting bracket		
383	Gear MP22	438	Lock washer		
384	Roll pin	439	Capacitor mounting bracket		
385	Shaft	440	Capacitor C6		





- NOTES:
1. AIR1 AND AIR2 SELECTED TO MATCH WITHIN 1%.
 2. AIR3, AIR4, AIR5 AND AIR6 SELECTED VALUES $\pm 1\%$. AIR3-AIR4 SELECTED FROM RANGE BETWEEN 4750-6980 OHMS. AIR5-AIR6 SELECTED FROM RANGE BETWEEN 51.1 AND 1000 OHMS.
 3. R9 AND R10 USED WITH MARION NULL INDICATOR METER ONLY.

Figure 5-7. Coupler Control C-2698/SRA-22, Schematic Diagram

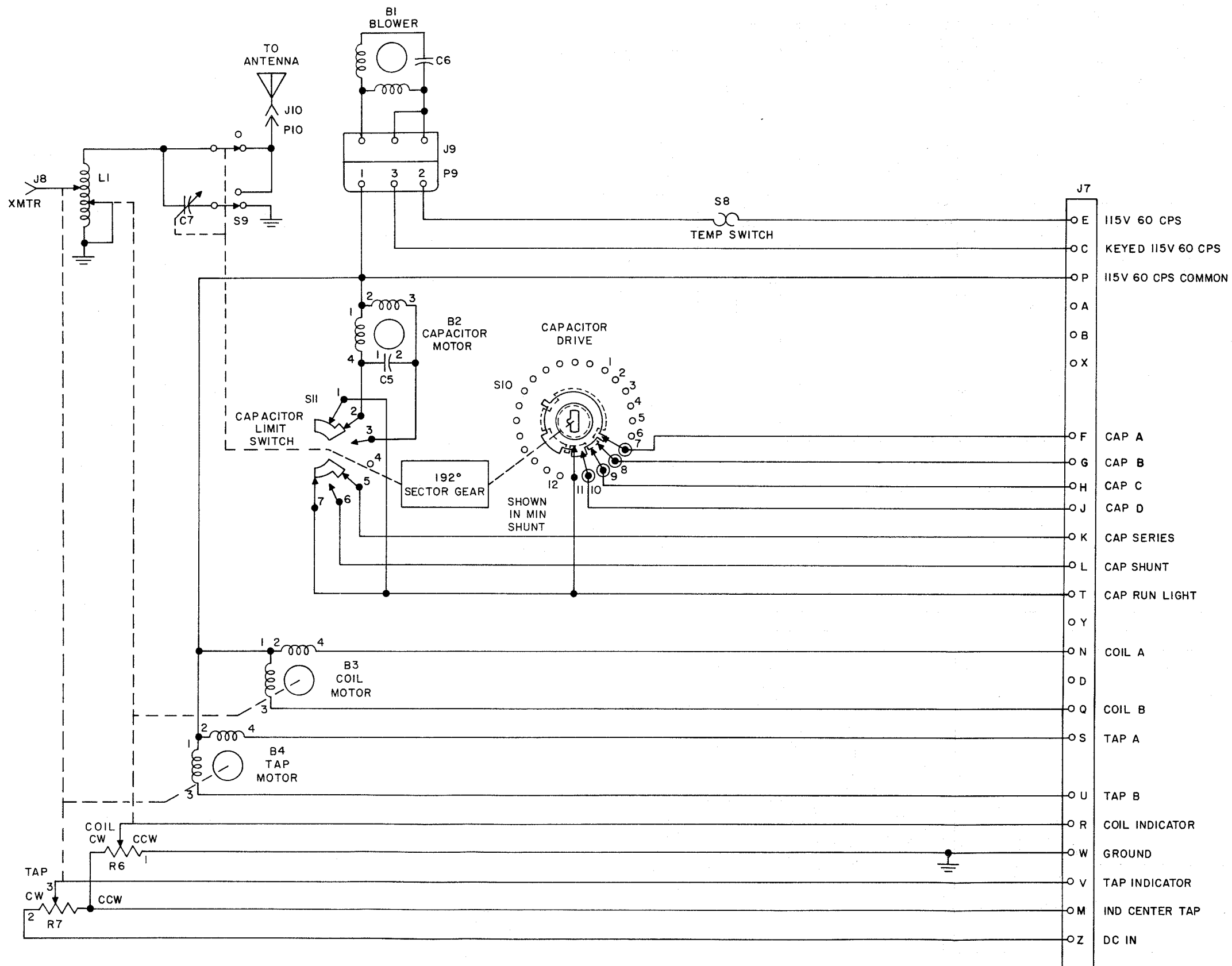


Figure 5-8. Antenna Coupler CU-714/SRA-22,
Schematic Diagram

SECTION 6

PARTS LIST

6-1. INTRODUCTION.

Reference designations (such as circuit symbols, reference symbols, etc.) have been assigned to identify all maintenance parts of the equipment. They are included on drawings, diagrams and the parts list. The letters of a reference designation indicate the kind of part (generic group), such as resistor, amplifier, electron tubes, etc. The number differentiates between parts of the same generic group. Parts of the same major unit are prefixed with the same unit number (see table 6-1).

Sockets associated with a particular plug-in device, such as an electron tube or a fuse, are identified by a reference designation which includes the reference designation of the plug-in device. For example, the X prefix identifies the socket for fuse F7 and is designated XF7.

6-2. MAINTENANCE PARTS LIST.

Table 6-1 lists all of the major units and their replaceable maintenance parts. The parts of each major unit are grouped together. Column 1 lists the reference series of each major unit, followed by the reference designations of the parts in alphabetical and numerical order. Column 2 refers to the explanatory notes. Column 3 gives the name and describes the various parts. Complete information is given for all key parts (parts differing from any part previously listed in this table) and subkey parts (parts identical with a key part but appearing for the first time for a major unit). The description is omitted for succeeding duplicate parts; however, reference is made to the key part or subkey part for the data. Column 4 gives the functional location of the part in the equipment.

6-3. STOCK NUMBER IDENTIFICATION.

New Stock Number Identification Tables (SNIT's) issued by the Electronics Supply Office include Federal Stock Numbers and Source, Maintenance and Recoverability Codes. Therefore, reference shall be made to the SNIT for this information.

6-4. LIST OF MANUFACTURERS.

Table 6-2 lists manufacturers of parts used in the equipment. The first column includes the abbreviations used in table 6-1 to identify manufacturers.

TABLE 6-1. ANTENNA COUPLER GROUP AN/SRA-22, MAINTENANCE PARTS LIST

ANTENNA COUPLER CU-714/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
Unit 1		COUPLER, GROUP, ANTENNA: AN/SRA-22; c/o antenna coupler control and antenna coupler Collins Radio P/N 522 1285 00	
1B1		COUPLER, ANTENNA: inductive- capacitive coupling; 2.0 to 30.0 mc range; 115 or 230v ac, 47 to 63 cps, single phase operating power Collins Radio P/N 544 7293 00	
1B2		FAN, TUBE AXIAL: Induction Motors P/N BC2918B	Cooling
1B3		MOTOR, CONTROL: 115v ac, 1.8 amps, 380 to 420 cps, main field; 115v ac, 1.8 amp, 620 ohms control field; G. M. lab P/N 665-53-80	Cap. motor
1B4		MOTOR, CONTROL: Same as 1B2	Coil motor
1C1 thru 1C4		MOTOR, CONTROL: Same as 1B2	Tap motor
1C5		Not used	
1C6		CAPACITOR, FIXED, PAPER DIELEC- TRIC: 230v ac working voltage; 1.5 uf ±20%; Sprague Elect. type S8235	Cap. motor phase
1C7		CAPACITOR, FIXED, PAPER DIELEC- TRIC: 220v ac working voltage; 5 uf ±10%; Sprague Elect. Collins Radio P/N 930 0591 00	Blower phase
1DS1 thru 1DS3 1DS4		CAPACITOR, VARIABLE, VACUUM DIELECTRIC: 5 to 465 uuf; 10 kv peak at min capacity, 5 kv peak at max capacity; incl hardware; 2-5/16 in. dia by 5-23/32 in. lg; Collins Radio P/N 544 6186 002	Antenna tuning
1J1 thru 1J6 1J7		Not used	
1J8		DEHYDRATOR: cartridge type; silica gel filled; incl silicon rubber gasket and metal cap Chandler type 23311	Humidity indicator
1J9		Not used	
		CONNECTOR, RECEPTACLE, ELEC- TRICAL: low loss plastic dielectric; MIL-C-5015 and 10432-28P, MS3102E-24-28P	Main power connector
		CONNECTOR, RECEPTACLE, ELEC- TRICAL: low loss plastic dielectric; Amphenol P/N 82-811	Transmitter connector
		CONNECTOR, RECEPTACLE, ELEC- TRICAL: low loss plastic dielectric; Cannon Elect. P/N DE-9P	Blower connector

ANTENNA COUPLER CU-714/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
1J10		CONNECTOR, RECEPTACLE, ELECTRICAL: brass; 1 rd female contact; straight shape; incl strap; Collins Radio P/N 544 7314 002	Antenna input
1L1		FORM, COIL: ceramic; Collins Radio P/N 544 0112 003	H-v drum
1MP1		CAM, STOP: aluminum; 0.250 in. by 0.870 in. by 0.875 in. approx overall; Collins Radio P/N 543 9823 002	
1MP2		GEAR, SPUR: teflon; 52 teeth, 20° pressure angle, 0.125 in. w face, 0.1687 in. dia by 0.271 in. lg; Collins Radio P/N 544 0009 002	C7 drive
1MP3		GEAR, SPUR: teflon; 20 teeth, 20° pressure angle, 0.156 in. w face, 0.687 in. dia by 0.312 in. lg; Collins Radio P/N 544 0010 002	C7 shaft
1MP4		GEAR ASSY: 1 steel gear w/ 68 teeth, 0.0937 in. w face, 1 gearshaft w/ 30 teeth, 0.141 in. w face; 0.729 in. dia by 1.250 in. lg; Collins Radio P/N 544 0032 002	Tap drive
1MP5		GEAR, ASSEMBLY: stainless steel; c/o gearshaft w/ 24 teeth, 0.141 in. w face & spur gear with 30 teeth, 0.125 in. w face, 20° pressure angle, ea complement; 0.333 in. dia by 0.750 in. lg overall; Collins Radio P/N 543 9833 002	Cap idler
1MP6		GEARSHAFT, SPUR: stainless steel; 24 teeth, 20° pressure angle, 0.375 in. w face; 0.406 in. dia by 0.750 in. lg overall; Collins Radio P/N 543 9834 002	Cap idler
1MP7		GEAR-SHAFT ASSY: stainless steel; 30 teeth, 20° pressure angle, 0.090 in. w face, 0.333 in. dia by 1.265 in. lg; incl shaft; Collins Radio P/N 544 7328 002	Coil pot. drive
1MP8		COUPLING, SHAFT, RIGID: aluminum; 3/8 in. dia by 1/2 in. lg; Collins Radio P/N 544 7323 002	Resistor shaft coupler
1MP9		COUPLING, SHAFT, RIGID: Same as 1MP8	Resistor shaft coupler
1MP10		GEARSHAFT, SPUR: stainless steel; 30 teeth, 20° pressure angle, 0.156 in. w face, 0.3125 in. pitch dia. 1.500 in. lg overall; Collins Radio P/N 543 9869 002	Coil idler

ANTENNA COUPLER CU-714/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
1MP11		GEAR-SHAFT ASSY: c/o 1 steel sector gear w/ 112 teeth, 20° pressure angle, 0.062 in. w face & 1 steel shaft; 1.781 in. dia by 1.406 in. lg; Collins Radio P/N 543 9888 002	Cap limit switch rotor
1MP12		SHAFT: stainless steel; 0.78125 in. by 0.8125 in. by 2.093 in., incl 1 pin and 1 switch arm; Collins Radio P/N 543 9889 002	H-v rotor shaft
1MP13		GEAR ASSY: c/o 2 stainless steel gears, 1 w/ 100 teeth, 0.091 in. w face, other w/ 19 teeth, 0.140 in. w face, ea w/ 20° pressure angle; 1.062 in. dia by 0.718 in. lg; Collins Radio P/N 543 9891 002	Coil idler
1MP14		GEAR, SPUR: aluminum; 64 teeth, 20° pressure angle, 0.062 in. w face, 0.787 in. dia by 0.625 in. lg; Collins Radio P/N 544 7324 002	Coil idler
1MP15		GEAR-SHAFT ASSY: c/o 1 aluminum gear w/ 48 teeth, 20° pressure angle, 0.091 in. w face, 1 shaft & 1 hub; 0.520 in. dia by 0.718 in. lg; Collins Radio P/N 543 9921 002	Coil idler
1MP16		GEAR ASSY: c/o 1 AL gear w/ 84 teeth and 1 SST gearshaft w/ 18 teeth; Collins Radio P/N 543 9931 002	Tap idler
1MP17		GEAR ASSY: c/o 1 aluminum gear w/ 96 teeth, 1 in. pitch dia, 0.091 in. w face & 1 steel spur gearshaft w/ 18 teeth, 0.1875 in. pitch dia, 0.125 in. w face, ea w/ 20° pressure angle, 96 diametral pitch; 1.020 in. dia by 1 in. lg overall; Collins Radio P/N 544 7333 002	Tap pot. drive
1MP18		GEAR-CAM ASSY: c/o aluminum gear w/ 124 teeth, 20° pressure angle, 0.062 in. w face & stainless steel hub, tapped for securing; 1.312 in. dia by 0.406 in. lg; Collins Radio P/N 543 9933 002	Tap idler
1MP19		GEAR ASSY: 1 aluminum gear w/ 42 teeth, 0.091 in. w face, 1 steel gearshaft w/ 20 teeth, 0.156 in. w face; 20° pressure angle ea; 0.4562 in. dia by 0.655 in. lg overall; Collins Radio P/N 543 9938 002	Coil idler

ANTENNA COUPLER CU-714/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
1MP20		GEAR ASSY: 1 steel gearshaft w/ 20 teeth, 0.156 in. w face, 1 aluminum gear w/ 49 teeth, 0.091 in. w face; 20° pressure angle ea; 0.530 in. dia by 0.655 in. lg; Collins Radio P/N 543 9939 002	Coil idler
1MP21		GEAR ASSY: 1 steel gearshaft w/ 20 teeth, 0.156 in. w face, 1 aluminum gear w/ 54 teeth, 0.091 in. w face; 20° pressure angle ea; 0.583 in. dia by 0.655 in. lg; Collins Radio P/N 543 9940 002	Coil idler
1MP22		GEAR-SHAFT ASSY: c/o 1 steel gear w/ 99 teeth, 0.093 in. w face, 20° pressure angle & 1 shaft; 1.578 in. dia by 1.187 in. lg; Collins Radio P/N 543 9943 002	Coil drive
1MP23		GEAR ASSY: c/o 1 steel gearshaft w/ 18 teeth, 0.156 in. w face, 1 gear w/ 60 teeth, 0.091 in. w face, ea w/ 20° pressure angle; 0.645 in. dia by 0.765 in. lg; Collins Radio P/N 543 9949 002	Cap idler
1MP24		GEAR ASSY: c/o 1 steel gear w/ 20 teeth, 0.188 in. w face, 1 plastic gear w/ 70 teeth, 3/32 in. w face ea w/ 20° pressure angle; 1.500 in. dia by 0.765 in. lg; Collins Radio P/N 543 9950 002	Cap idler
1MP25		GEAR ASSY: c/o 1 steel gearshaft w/ 24 teeth, 0.156 in. w face, & 1 gear w/ 81 teeth, 0.064 in. w face, ea w/ 20° pressure angle; 1.282 in. dia by 0.765 in. lg; Collins Radio P/N 543 9952 002	Cap idler
1MP26		GEAR-SHAFT ASSY: c/o stainless steel shaft & gear w/ 35 teeth, 20° pressure angle, 0.078 in. w face; 0.578 in. dia by 0.827 in. lg overall; Collins Radio P/N 543 9953 002	Cap idler
1MP27		GEAR-SHAFT ASSY: c/o 1 plastic gear w/ 40 teeth, 20° pressure angle, 1/8 in. w face, 1 steel shaft & hub; 1.312 in. dia by 0.718 in. lg; Collins Radio P/N 543 9951 002	Cap idler
1MP28		PIN, STRAIGHT, HEADLESS: stainless steel; 0.2497 in. dia by 0.765 in. lg; Collins Radio P/N 544 7342 002	Shaft drive

ANTENNA COUPLER CU-714/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
1MP29		GEAR , SPUR: teflon; 40 teeth, 20° pressure angle, 0.187 in. w face, 1.312 in. dia by 0.375 in. lg; Collins Radio P/N 544 0011 002	Coil drive
1MP30		GEAR ASSY: 1 aluminum gear w/ 56 teeth, 0.090 in. w face, 1 steel gear-shaft w/ 18 teeth, 0.156 in. w face, 20° pressure angle ea; 0.0604 in. dia by 0.656 in. lg; Collins Radio P/N 543 9980 002	Tap idler
1MP31		BEARING, BALL, ANNULAR: ground; single row; radial; w/ loading groove, self contained; both rings flush, 0.1250 in. bore dia; flanged outer ring type, 0.2500 in. od ring, 0.296 in. od flange, 0.031 in. w flange; 2 steel shields; ABEC-5 tolerance; New Hamp. Ball Bearing P/N SFR144PPK28	Tap drive
1MP32		BEARING, BALL, ANNULAR: Same as 1MP31	Tap drive
1MP33		BEARING, BALL, ANNULAR: Same as 1MP31	Tap drive
1MP34		BEARING, BALL, ANNULAR: Same as 1MP31	Tap drive
1MP35		BEARING, BALL, ANNULAR: Same as 1MP31	Coil drive
1MP36		BEARING, BALL, ANNULAR: Same as 1MP31	Coil drive
1MP37		BEARING, BALL, ANNULAR: single row; radial; 0.422 in. od by 0.1250 in. lg; New Hamp. Ball Bearing P/N SFR168PPK28	Tap drive
1MP38		BEARING, BALL, ANNULAR: Same as 1MP37	Tap drive
1MP39		BEARING, BALL, ANNULAR: Same as 1MP37	Tap drive
1MP40		BEARING, BALL, ANNULAR: Same as 1MP37	Tap drive
1MP41		BEARING, BALL, ANNULAR: Same as 1MP37	Coil drive
1MP42		BEARING, BALL, ANNULAR: Same as 1MP37	Coil drive
1MP43		BEARING, BALL, ANNULAR: Same as 1MP37	Coil drive
1MP44		BEARING, BALL, ANNULAR: Same as 1MP37	Coil drive
1MP45		BEARING, BALL, ANNULAR: Same as 1MP37	Cap drive

ANTENNA COUPLER CU-714/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
1MP46		GEAR, SPUR: plastic; 136 teeth, 20° pressure angle, 32 diametral pitch, 4.250 in. pitch dia, 0.125 in. w face; Collins Radio P/N 544 2687 002	Tap assembly driven gear
1MP47		BEARING, SLEEVE: bronze; flanged; 0.156 in. id, 1/4 in. od, 5/32 in. lg overall; Amplex Div. Chrysler Corp. P/N F-200-2	
1MP48		GEAR, SPUR: plastic; 80 teeth, 20° pressure angle, 32 diametral pitch, 2.500 in. pitch dia, 0.125 in. w face; 2.562 in. dia by 0.218 in. lg; Collins Radio P/N 544 0623 002	H-v drum assy driven gear
1MP49		SHAFT: aluminum; 0.2497 in. dia by 2.405 in. lg overall; tapped 6-32, 1/4 in. deep one end; incl silver contact; Collins Radio P/N 544 2670 002	L-v drum
1MP50		GEAR-SHAFT ASSY: aluminum gear w/ 18 teeth, 20° pressure angle, 32 diametral pitch, 0.562 in. pitch dia, 5.125 in. w face, aluminum shaft, 1 support & hardware; 0.625 in. dia by 6.438 in. lg overall; Collins Radio P/N 543 9968 002	Tap drive
1MP51		SHAFT: brass; chrome plated; 0.250 in. dia by 6-5/16 in. lg; Collins Radio P/N 543 9856 002	Center tap
1MP52		GASKET: rubber; 8.734 in. id, 9.012 in. od, 0.139 in. thk; Parker Appliance P/N 47-741, 2-269	Seal
1P1 thru 1P6		Not used	
1P7		CONNECTOR, PLUG, ELECTRICAL: 24 rd female contacts, 500v ac, 700v dc, 22 amps; straight shape; MIL-C-5015 MS3106E-24-28S	1J7 mating end
1P8		CONNECTOR, PLUG, ELECTRICAL: 1 rd male contact, 1 connector mating end; Amphenol P/N 82-202	1J8 mating end
1P9		CONNECTOR, RECEPTACLE, ELECTRICAL: low loss plastic dielectric; Cannon Elect. P/N DEF-9S-1	Blower receptacle
1P10		PIN, OUTPUT: brass; 0.750 in. dia; undercut and grooved; 1.187 in. lg overall; Collins Radio P/N 544 0102 00	1J10 mating end
1R1 thru 1R5		Not used	
1R6		RESISTOR, VARIABLE, LINEAR PRECISION: 1 section; 100 ohms ±5%; 0.5% max linearity; 1.5 w at +65°C; rotary motion shaft type, 360° (Cont)	Coil indicator pot.

ANTENNA COUPLER CU-714/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
1R7 1S1 thru 1S7 1S8		(Cont) rotation, 10° overtravel, phenolic case; Spectrol P/N 500-487 RESISTOR, VARIABLE: Same as 1R6 Not used SWITCH, THERMOSTATIC: contacts close on temp rise; +65°C, 6°C differential bimetal element; Fenwal type 67321	Tap indicator pot. Temperature control
1S9		ROTOR, ELECTRICAL, SWITCH: approx 3/4 in. by 1.593 in. by 2.187 in. overall; incl ground strip assy and high voltage strip assy; Collins Radio P/N 543 9965 002	H-v rotor assembly switch
1S10		SWITCH SECTION, ROTARY: phenolic insulation; brass silver contacts; 230v max ac, dc, 0.25 amp; Oak Mfr Co. type MF	Capacitor drive
1S11		SWITCH SECTION, ROTARY: phenolic insulation; silver alloy contacts; 230v max ac, dc, 0.25 amp; Oak Mfr Co. type A	Capacitor limit switch

COUPLER CONTROL C-2698/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
Unit 2		CONTROL, COUPLER: controls tuning capacitor position & series-shunt switch, coil position & tap control, power output switch & output selector switch; 115v or 230v ac, 47 to 63 cps, single phase; 5-1/4 in. by 8-3/16 in. by 19 in. overall; Collins Radio P/N 544 7294 00	
2A1DC1		COUPLER, DIRECTIONAL: transmission line type, 2 to 30 mc frequency range; bidirectional; 3-3/4 in. by 4-15/16 in. by 8-5/16 in. overall; Collins Radio P/N 542 4116 004	Power monitor
2A1CR1		SEMICONDUCTOR DEVICE, DIODE: CBS-Hytron P/N 1N82A	Rectifier
2A1CR2		SEMICONDUCTOR DEVICE, DIODE: Same as 2A1CR1	Rectifier
2A1C1		CAPACITOR, VARIABLE, AIR DIELECTRIC: concentric type; 0.5 uuf min, 3.0 uuf max; Corning Glass Works P/N 682011	Divider
2A1C2		CAPACITOR, VARIABLE, AIR DIELECTRIC: Same as 2A1C1	Divider
2A1C3		CAPACITOR, FIXED, MICA DIELECTRIC: 500v dc; 500 uuf $\pm 20\%$; Erie Resistor type 370	Divider
2A1C4		CAPACITOR, FIXED, MICA DIELECTRIC: Same as 2A1C3	Divider
2A1C5		CAPACITOR, FIXED, CERAMIC DIELECTRIC: 500v dc working; 75 uuf $\pm 2\%$; JAN-C-20A CC30VJ7506	Phase corrector
2A1C6		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2A1C5	Phase corrector
2A1C7		CAPACITOR, FIXED, CERAMIC DIELECTRIC: 500v dc working; 1000 uuf $+80\%$ -20% ; Erie Resistor type 327	D-c line filter
2A1C8		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2A1C7	D-c line filter
2A1C9		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2A1C7	D-c line filter
2A1C10		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2A1C7	D-c line filter
2A1C11		CAPACITOR, FIXED, ELECTROLYTIC: 6v dc working; 8 uf, -20°C to $+65^{\circ}\text{C}$; insulated aluminum case, hermetically sealed, 1/4 in. dia by 11/16 in. lg; Sprague Elect. type 30D	Peak reading
2A1C12		CAPACITOR, FIXED, ELECTROLYTIC: Same as 2A1C11	Peak reading

COUPLER CONTROL C-2698/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
2A1J1 2A1J2		Not used CONNECTOR, RECEPTACLE, ELEC- TRICAL: low loss plastic dielectric; MIL-C-71A UG-58A/U	Transmitter input
2A1J3 2A1J4 2A1J5		Not used Not used CONNECTOR, RECEPTACLE, ELEC- TRICAL: Same as 2A1J2	Load input
2A1L1		COIL, RADIO FREQUENCY: 3 universal wound pie sections, 75 turns ea; no. 36 AWG single silk enamel or single nylon enamel copper wire, approx 220 uh, 0.1 ampl Jeffers Elect. Collins Radio P/N 240 0037 00	R-f choke
2A1L2		COIL, RADIO FREQUENCY: Same as 2A1L1	R-f choke
2A1R1		RESISTOR, FIXED, FILM: 10 ohms $\pm 1\%$; 1/2 w; MIL-R-10509 RN20X10ROF	Toroid transformer load
2A1R2		RESISTOR, FIXED, FILM: Same as 2A1R1	Toroid transformer load
*2A1R3		RESISTOR, FIXED, FILM: 4,750 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B4751F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 4,870 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B4871F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 4,990 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B4991F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 5,110 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B5111F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 5,230 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B5231F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 5,360 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B5361F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 5,490 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B5491F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: tubular; 5,620 ohms $\pm 1\%$; 1/4 w; carbon film; 0.05%/°C; 3/16 in. dia by 5/8 in. lg; MIL-R-10509 RN65B5621F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 5,760 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B5761F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 5,900 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B5901F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 6,040 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B6041F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 6,190 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B6191F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 6,340 ohms $\pm 1\%$; 1/4 w; MIL-R-10509 RN65B6341F	Meter calibration
*Per operational requirement			

COUPLER CONTROL C-2698/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
*2A1R3		RESISTOR, FIXED, FILM: 6,490 ohms ±1%; 1/4 w; MIL-R-10509 RN65B6491F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 6,650 ohms ±1%; 1/4 w; MIL-R-10509 RN65B6651F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 6,810 ohms ±1%; 1/4 w; MIL-R-10509 RN65B6811F	Meter calibration
*2A1R3		RESISTOR, FIXED, FILM: 6,980 ohms ±1%; 1/4 w; MIL-R-10509 RN65B6981F	Meter calibration
2A1R4		RESISTOR, FIXED, FILM: Same as *2A1R3	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 51.1 ohms ±1%; 1/4 w; MIL-R-10509 RN65B51R1F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 100 ohms ±1%; 1/4 w; MIL-R-10509 RN65B1000F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 147 ohms ±1%; 1/4 w; MIL-R-10509 RN65B1470F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 196 ohms ±1%; 1/4 w; MIL-R-10509 RN65B1960F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 249 ohms ±1%; 1/4 w; MIL-R-10509 RN65B2490F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 301 ohms ±1%; 1/4 w; MIL-R-10509 RN65B3010F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 348 ohms ±1%; 1/4 w; MIL-R-10509 RN65B3480F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 402 ohms ±1%; 1/4 w; MIL-R-10509 RN65B4020F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: tubular; 464 ohms ±1%; 1/4 w; MIL-R-10509 RN65B4640F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 511 ohms ±1%; 1/4 w; MIL-R-10509 RN65B5110F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 562 ohms ±1%; 1/4 w; MIL-R-10509 RN65B5620F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 619 ohms ±1%; 1/4 w; MIL-R-10509 RN65B6190F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: tubular; 681 ohms ±1%; 1/4 w; MIL-R-10509 RN65B6810F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 750 ohms ±1%; 1/4 w; MIL-R-10509 RN65B7500F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 825 ohms ±1%; 1/4 w; MIL-R-10509 RN65B8250F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 909 ohms ±1%; 1/4 w; MIL-R-10509 RN65B9090F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 953 ohms ±1%; 1/4 w; MIL-R-10509 RN65B9530F	Meter calibration
*2A1R5		RESISTOR, FIXED, FILM: 1,000 ohms ±1%; 1/4 w; MIL-R-10509 RN65B1001F	Meter calibration
*Per operational requirement			

COUPLER CONTROL C-2698/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
2A1R6		RESISTOR, FIXED, FILM: Same as *2A1R5	Meter calibration
2A1T1		COIL, RADIO FREQUENCY: 60 turns of no 30 AWG, toroidal wound; Collins Radio P/N 542 0916 002	R-f transformer
2CR1		SEMICONDUCTOR DEVICE, DIODE: JEDEC P/N 1N1084	Power supply rectifier
2CR2		SEMICONDUCTOR DEVICE, DIODE: Same as 2CR1	Power supply rectifier
2CR3		SEMICONDUCTOR DEVICE, DIODE: Gen. Elect. P/N 1N536	Meter protector
2CR4		SEMICONDUCTOR DEVICE, DIODE: Same as 2CR3	Meter protector
2CR5		SEMICONDUCTOR DEVICE, DIODE: Same as 2CR3	Meter protector
2CR6		SEMICONDUCTOR DEVICE, DIODE: Same as 2CR3	Meter protector
2C1		CAPACITOR, FIXED, PAPER DIELECTRIC: Same as 1C5	Motor phase
2C2		CAPACITOR, FIXED, PAPER DIELECTRIC: Same as 1C5	Motor phase
2C3		CAPACITOR, FIXED, ELECTROLYTIC: 40v dc working; 280 uf; Sprague Elect. type 17D	Relaxation charge
2C4		CAPACITOR, FIXED, PAPER DIELECTRIC: 200v dc working; 68,000 uuf ±20%; Sprague P/N P64510	Arc suppressor
2C5 thru 2C7		Not used	
2C8		CAPACITOR, FIXED, CERAMIC DIELECTRIC: 500v dc working; 10,000 uuf +100% -20% MIL-C-11015A CK63Y1032	Meter bypass
2C9		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2C8	Meter bypass
2C10		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2C8	115-V a-c input bypass
2C11		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2C8	115-V a-c output bypass
2C12		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2C8	
2C13		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2C8	115-V keyed bypass
2C14		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2C8	Interlock #1 bypass
2C15		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2C8	Interlock #2 bypass
2C16		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2C8	28-V input bypass

COUPLER CONTROL C-2698/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
2C17		CAPACITOR, FIXED, CERAMIC DIELECTRIC: Same as 2C8	28-V output bypass
2DS1		DIAL, SCALE: 0 to 100 ccw, linear, primary; 0 to 10 ccw, linear, secondary; 100 scale div ea; chrome dials, plastic knob; George W. Borg Corp. Equip. Div. type 1326	Revolutions dial
2DS2		DIAL, SCALE: Same as 2DS1	Revolutions dial
2DS3		LAMP, GLOW: neon gas; 1/25 w, 65v ac, 90v dc; 1-1/8 in. h overall; General Electric P/N NE-51	Capacitor run light
2F1		FUSE, CARTRIDGE: 1.0 amp, 250v max dc, normal instantaneous; MIL-F-15160 FO2G1R00A	115-V a-c input line
2J1		CONNECTOR, RECEPTACLE, ELECTRICAL: 1 rd female contact; 70 ohms; straight shape; Industrial Prod. P/N 91025	Load output
2J2		Not used	
2J3		CONNECTOR, RECEPTACLE, ELECTRICAL: p/o 2K3; built in	R-f input
2J4		CONNECTOR, PLUG, ELECTRICAL: 1 female contact; straight shape; Amphenol P/N 31-205	Receiver
2J5		CONNECTOR, RECEPTICAL, ELECTRICAL: low loss plastic dielectric; Amphenol P/N 26-4401-24P	Power receptacle
2J6		CONNECTOR, RECEPTACLE, ELECTRICAL: low loss plastic dielectric; Amphenol P/N 26-4402-16S	Power receptacle
2J7 thru 2J10		Not used	
2J11		CONNECTOR, RECEPTACLE, ELECTRICAL: p/o 2K3; built in	Transfer relay 2K3
2J12		Not used	
2J13		CONNECTOR, RECEPTACLE, ELECTRICAL: p/o 2K3; built in	Transfer relay 2K3
2K1		RELAY, ARMATURE: 4C; 27.5v dc; RBM Mfr Co. P/N 22300-54	Fine tune drive
2K2		RELAY, ARMATURE: Same as 2K1	Fine tune drive
2K3		RELAY, ARMATURE: 1A contact arrangement; 115v ac or 27.5v dc 600 w; incl 2J11 & 2J13; Aemco P/N R-83	Transfer relay
2M1		AMMETER: panel type; dc; 500 to 0 to 500 ma $\pm 2\%$ accuracy; Sun Meter Corp P/N MR26W5HSDCUA	Tap indicator
2M1		OR AMMETER: dc; nonlinear; std null-indicator scale Marion Electrical Instrument Co. type NO. HS-2A	
2M2		AMMETER: Same as 2M1	Coil indicator

COUPLER CONTROL C-2698/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
2M3		WATTMETER: 0-100 & 0-1000 w scale, $\pm 2\%$ deflection; 1000 ohms; Simpson Electric type 27B	Power Output
2P1		CONNECTOR, PLUG, ELECTRICAL: 1 rd male contact; Automatic Metal P/N RF0235	2J1 mating end
2P2		CONNECTOR, PLUG, ELECTRICAL: Same as 2P1	A1J2 mating end
2P3		CONNECTOR, PLUG, ELECTRICAL: Same as 2P1	2J3 mating end
2P4		CONNECTOR, PLUG, ELECTRICAL: 1 rd male contact; Industrial Prod. P/N 85000	2J4 mating end
2P5		CONNECTOR, PLUG, ELECTRICAL: 24 flat female contacts; Amphenol P/N 26-4501-24S	2J5 mating end
2P6		CONNECTOR, PLUG, ELECTRICAL: 16 flat male contacts; Amphenol P/N 26-4502-16P	2J6 mating end
2R1		RESISTOR, VARIABLE, LINEAR PRECISION: 100 ohms $\pm 5\%$; $\pm 0.5\%$ linearity; 2 w; Spectrol. P/N 500-488	Tap indicator pot.
2R2		RESISTOR, VARIABLE, LINEAR PRECISION: Same as 2R1	Coil indicator pot.
2R3		RESISTOR, FIXED, COMPOSITION: 47 ohms $\pm 10\%$; 2 w; MIL-R-11 RC42GF470K	Series dropping
2R4		RESISTOR, FIXED, COMPOSITION: 470 ohms $\pm 10\%$; 1/2 w; MIL-R-11 RC20GF471K	Biasing resistor
2R5		RESISTOR, FIXED, COMPOSITION: Same as 2R4	Biasing resistor
2R6 and 2R7		Not used	
2R8		RESISTOR, FIXED, COMPOSITION: 180 ohms $\pm 10\%$; 1/2 w; MIL-R-11 RC20GF181K	Relay shunt
*2R9		RESISTOR, FIXED, COMPOSITION: 47 ohms, $\pm 10\%$; 1/2 w MIL-R-11 RC20GF470K	
*2R10		RESISTOR, FIXED, COMPOSITION: Same as *2R9	
2S1		SWITCH, ROTARY: Oak Mfr Co. type HC	R-f selector
2S2		SWITCH, ROTARY: Oak Mfr Co. type MF	Capacitor
2S3		SWITCH, ROTARY: Oak Mfr Co. P/N 89174-185	Coil switch
2S4		SWITCH, ROTARY: Same as 2S3	Tap switch
2S5		SWITCH, TOGGLE: spdt; 250v ac at 6 amps, 30v dc at 20 amps resistive; Jan-S-23 ST42D	Capacitor function

*These items to be used only with Marion Meter

COUPLER CONTROL C-2698/SRA-22

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
2S6 2S7 2T1		Not used SWITCH, ROTARY: Oak Mfr Co. type H TRANSFORMER, POWER, STEP-DOWN: 115v, 230v, 100 w, 50 to 60 cps, single phase primary, 30v dc, center tapped, 500 ma secondary; Chicago Std. P/N 27540	Power switch Power transformer
2TB1		TERMINAL BOARD: aluminum; 0.063 in. by 3 in. by 3-1/4 in.; Collins Radio P/N 544 7334 002	Relay board
2TB2		TERMINAL BOARD: phenolic; 1/16 in. by 1-1/16 in. by 1-11/16 in.; accommo- dates 4 terminals; Collins Radio P/N 544 7335 002	Rect. board
2TB3		TERMINAL BOARD: phenolic; 3/32 in. by 1-1/2 in. by 1-15/16 in.; incl 6 terminals; Collins Radio P/N 544 9417 002	Tap meter board
2TB4		TERMINAL BOARD: phenolic; 3/32 in. by 1-1/2 in. by 1-15/16 in.; incl 6 terminals; Collins Radio P/N 544 9419 002	Coil meter board
2XDS1 and 2XDS2 2XDS3		Not used	
		LAMPHOLDER: for miniature bayonet base pilot light bulb; Drake Mfg Co. type 50	Cap run light
2XF1		FUSEHOLDER: extractor post; 125v, 15 amps; Bussman P/N HKP-HJR	Protection

TABLE 6-2. ANTENNA COUPLER GROUP AN/SRA-22, LIST OF MANUFACTURERS

ABBREVIATION	NAME	ADDRESS
AGX	Aemco, Inc	Mankato, Minnesota
AMP	Amphenol Electronics Corp.	Chicago, Illinois
AXD	Amplex Div. of Chrysler Corp.	Detroit, Michigan
	Automatic Metal Products Co.	Brooklyn, New York
GBS	Borg Equip. Div. of George	
	W. Borg Corp	Janesville, Wisconsin
BUS	Bussmann Manufacturing Co.	St. Louis, Missouri
AKP	CBS-Hytron	Danvers, Mass.
CED	Cannon Electric Co.	Los Angeles, Calif.
	Chandler Evans Co.	New York, New York
	Chicago Standard Transformer Corp.	Chicago, Illinois
CR	Collins Radio Company	Cedar Rapids, Iowa
CGW	Corning Glass Works	Corning, New York
DMC	Drake Mfg. Co.	Chicago, Illinois
ERC	Erie Resistor Corp.	Erie, Pennsylvania
FEN	Fenwal, Inc.	Ashland, Mass.
GE	General Electric Co.	Schenectady, N. Y.
GML	G M Laboratories, Inc.	Chicago, Illinois
AAP	Induction Motors Corp.	Woodside, New York
IPC	Industrial Products Co.	Danbury, Conn.
JEDEC	Joint Electro Division Engr. Council	
JFE	Jeffers Electronics Corp.	St. Marys, Pa.
MAN	Marion Electric Co.	Marion, Indiana
	Marion Electrical Instrument Co.	Manchester, N. H.
NHBB	New Hampshire Ball Bearings, Inc.	Peterborough, N. H.
OAK	Oak Manufacturing Co.	Chicago, Illinois
PA	Parker Appliance Co., The	Cleveland, Ohio
RBF	R B M Manufacturing Co.	Logansport, Ind.
SATA	Sarkes-Tarzian, Inc.	Bloomington, Ind.
SIC	Simpson Electric Co.	Chicago, Illinois
	Spectrol Electronics Div. of	
	Carrier Corp.	San Gabriel, Calif.
SPR	Sprague Electric Co.	North Adams, Mass.
	Sun Electric Corp.	Chicago, Illinois

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