

CHAPTER 1  
GENERAL INFORMATION

1-1. INTRODUCTION.

This technical manual contains operating instructions and principles, scheduled tests, servicing information, troubleshooting, and yard and tender repair information for Antenna Coupler Group AN/SRA-22.

The AN/SRA-22 (figure 1-1) is designed primarily for operation with the AN/URC-32 series radio equipment, but may be used with any radio equipment in the 2.0 to 30.0 megacycle frequency range, provided the transmitter power output is not more than 1000 watts on a short-term duty cycle or 350 watts continuously. Figure 1-2 illustrates a typical relationship of the AN/SRA-22 with other radio equipment. Antenna Coupler Group AN/SRA-22 requires 115 volts ac, 50-60 cycles for operation, which may be derived from its associated equipment or supplied separately. Its function is to provide an impedance match between a 50-ohm coaxial transmission line and a wire or whip antenna 35 to 50 feet in length. Difficulty may be experienced on some frequencies obtaining an adequate match to antennas of greater or lesser length. In addition to its basic function of providing an impedance match, the equipment also provides the following features:

- a. Automatic transfer of antenna from receiver to transmitter on keying associated transmitter.
- b. Manual switching of transmitter output between antenna and dummy load.
- c. Determination of VSWR on coaxial transmission line.
- d. Measurement of power output of associated transmitter.
- e. Interruption of keying circuit of associated transmitter if transmission line VSWR becomes excessive (30 watts reflected).
- f. Reduction of power output of associated transmitter during TUNE operation.

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, and interconnection terminal board TB-5. Refer to figures 1-1 and 1-3.

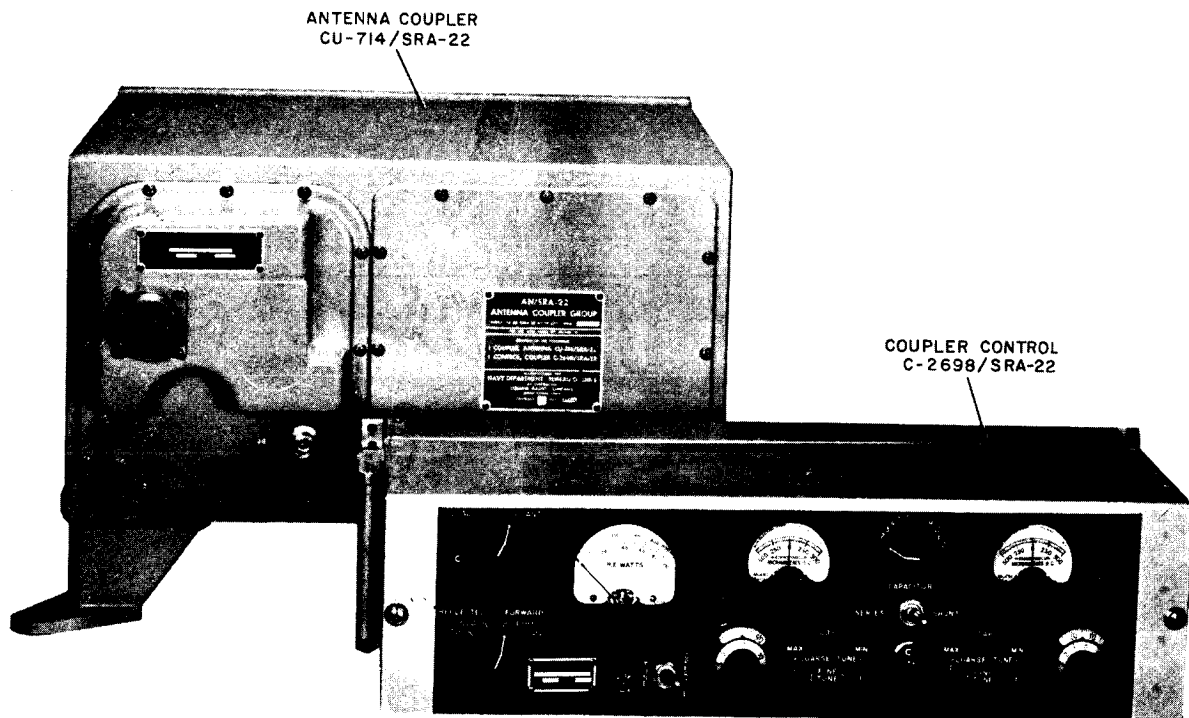


Figure 1-1. Antenna Coupler Group AN/SRA-22

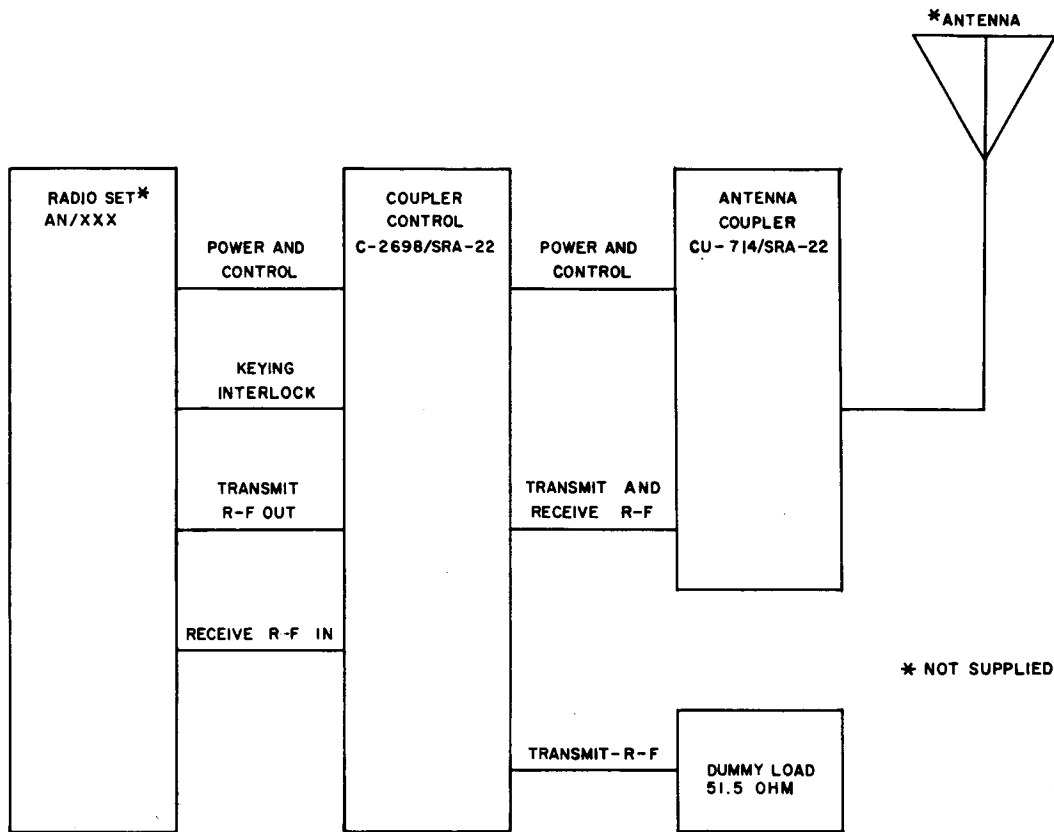


Figure 1-2. Antenna Coupler Group AN/SRA-22, Relationship of Units

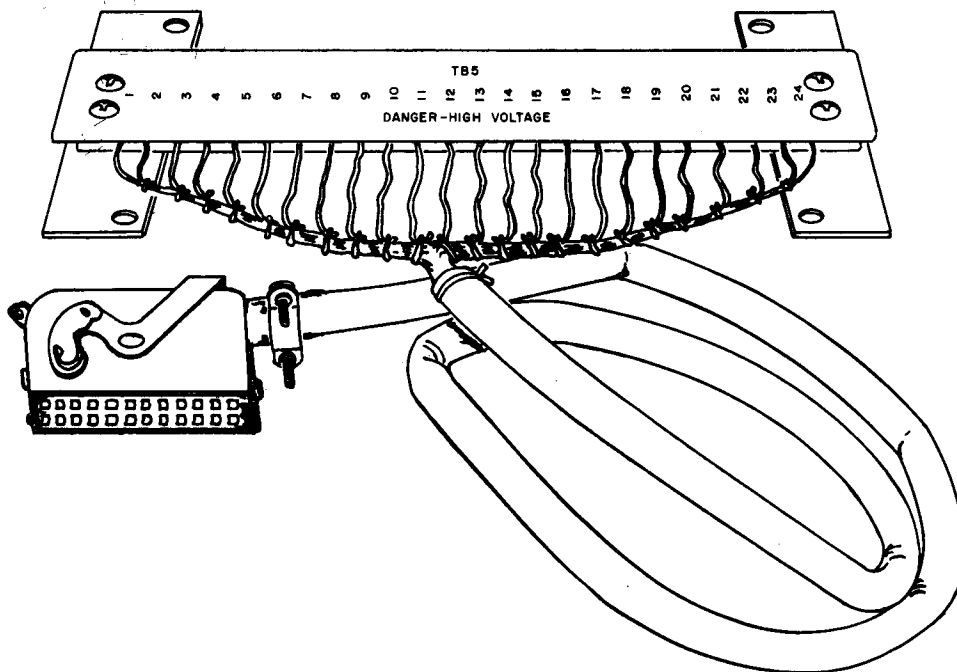


Figure 1-3. Interconnection Terminal Board TB-5

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:

(1) Tap motor and coil motor drive and position indicators consist of sending potentiometers in Antenna Coupler CU-714/SRA-22 and receiving potentiometers in Coupler Control C-2698/SRA-22. The sending potentiometers are connected to the tap and coil drives in such a manner that tap and coil positions are immediately determined when the respective meters are nulled.

(2) The 12-position CAPACITOR switch drives the variable vacuum capacitor.

(3) The LOAD-ANT switch is used to connect the associated transmitter r-f power output to the antenna coupler or to a 50-ohm load.

(4) The REFLECTED-FORWARD switch selects either forward or reflected power which is read on the r-f power meter.

(5) The SERIES-SHUNT switch places the variable vacuum capacitor either in series or shunt with the antenna.

(6) The red indicator CAPACITOR run lamp lights when the variable vacuum capacitor motor runs and blinks when the VSWR protector circuit is actuated by excessive reflected power.

(7) The TUNE-OPERATE switch interlocks Coupler Control C-2698/SRA-22 so that 115 volts, 60 cps is applied to the coupler control only in the TUNE position. Also, in the TUNE position, the AN/XXX output power is reduced to minimize the possibility of damage to the coupler control or transmitter.

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 to 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 with 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 465 pf. 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 transmission 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 some cases where tuning cannot 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 applied, the coil, tap, and capacitor motor drives are adjusted to obtain minimum reflected power as indicated on the r-f power meter. After a tune has been obtained, the coil and tap receiving dials on Coupler Control C-2698/SRA-22 are adjusted for a null on the respective meters. The dial readings and capacitor switch settings are then recorded for future use on the tuning chart located on the dust cover of Coupler Control C-2698/SRA-22.

c. INTERCONNECTION TERMINAL BOARD TB-5. - Interconnection terminal board TB-5 consists of a 24 connection terminal board with mounting brackets, cover and cable assembly. Purpose: To provide a convenient connection for D5 cable assembly and shipboard cable.

### 1-3. FACTORY OR FIELD CHANGES.

a. Field change information available as of date of publication is set forth in table 1-1.

b. Production modification A added a VSWR protective device and improved the terminal board TB-5 cover to Coupler Control C-2698/SRA-22.

c. Powdered iron tuning core 1H-7 was replaced with a new type (Collins Radio Company part number 553-4440-003) in production beginning with serial number 1495.

TABLE 1-1. FIELD CHANGE INFORMATION

FIELD CHANGE	APPLICABLE	REFERENCE	PURPOSE	IDENTITY
1	Serials 1-353	NS-981259	Elimination of continuing equipment failures caused by operator tuning errors. FC-19/URC-32, FC-5/URC-32A, FC-2/URC-32B required concurrently.	Toggle switch marked TUNE-OPERATE mounted on C-2698/SRA-22 panel next to fuse holder.
2	Serials 1-1133	NS-981711	Protection of Antenna Coupler CU-714/SRA-22 against damage by installation of VSWR protective device.	Presence of VSWR protective device circuit board mounted on terminals of meter M3.
3	Serials 1-1132	EIB 614	Elimination of fuse failure in AN/XXX equipments.	Ground removed from pin 6-6 in C-2698/SRA-22.
4	All	EIB 629	Pressurization to reduce moisture and to aid cooling in Antenna Coupler CU-714/SRA-22.	Presence of 0-30 PSI gauge on front of CU-714/SRA-22.
5	All	NS-0285-081-0800	Improve protection against coil damage by installation of electrical limit switch for coil and tap motors.	Presence of wafer switches mounted on shaft of coil and tap potentiometers in the CU-714/SRA-22. Removal of capacitors C-1 and C-2 from C-2698/SRA-22.
6	All	EIB 644	Reduction of heat accumulation in CU-714/SRA-22 tuning slug 1H-7.	Brass bolt 1H-58 supporting slug 1H-7 changed to nylon.
7	All	EIB 658	Prevent equipment damage through being tuned in OPERATE condition.	TUNE-OPERATE switch changed to 4PDT; COIL and CAPACITOR positioning controls disabled except in TUNE.
8	Serials 1-350	EIB 659	Provide protective cover for terminal board TB-5.	Protective cover 12-1/2 inches x 1-1/2 inches mounted over terminal board TB-5.



TABLE 1-2. ANTENNA COUPLER GROUP AN/SRA-22, EQUIPMENT SUPPLIED

QTY PER EQUIP	NOMENCLATURE		*OVER-ALL DIMENSIONS				
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH	*VOLUME	*WEIGHT
**1	Coupler Control	C-2698/SRA-22	5-1/4	19	6-7/8	0.39	17
**1	Antenna Coupler	CU-714/SRA-22	11-1/2	18-7/8	19-15/16	2.4	42
1	Terminal Board TB-5	Collins Radio Part No. 367-0932-00					
1	Terminal Board Cover	Collins Radio Part No. 547-1299-002					
1	Cable Assembly	Collins Radio Part No. 547-1289-00					
2	Technical Manual	NAVSHIPS 0967-136-6010					
1	Operator's Chart	NAVSHIPS 93286.21(B)					

\* 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.

TABLE 1-3. ANTENNA COUPLER GROUP AN/SRA-22, DIODE COMPLEMENT

UNIT	NUMBER OF DIODES, TYPES INDICATED							TOTAL
	1N108	1N536	1N82A	1N647	1N457	1N963B	2N886	
Coupler Control C-2698/SRA-22	2	4						6
Directional Coupler (subassembly A1 of coupler control unit)			2					2
VSWR Protector (subassembly A2 of coupler control unit)				1	1	1	1	4
	2	4	2	1	1	1	1	12

TABLE 1-4. 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	22	8	10	1.2	25
2	**Antenna Coupler	CU-714/SRA-22	20	14-1/2	20	3.4	53
3	Terminal Board TB-5 and Cover						
	Cable Assembly						
	Technical Manual	NAVSHIPS 0967-136-6010					
	Operator's Chart	NAVSHIPS 93286.21(B)					

\* 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.