to each antenna coupler (1) a.c. to operate the cooling fans which remove the heat generated during operation and (2) d.c. to operate the control and protective circuits. The power supply panel also contains an audible alarm to warn the operator of a loss-of-air flow within any of the antenna couplers.

Antenna Coupler Group AN/SRA-34A (V)

Antenna Coupler Group AN/SRA-34A (V) is a variable group of antenna couplers, associated adapters, and switching units. The major units of the group are antenna coupler group OA-4794A, coupler adapter MX-4845A, transmitter adapter MX-4847B, remote switching control C-4787, and RF switching group including electrical equipment cabinet CY-4033 and RF switching units SA-1070 as shown in figure 6-18. Each of these major units is shown in figure 6-18 as a functional section of the AN/SRA-34A (V); however, the quantity of each major unit supplied for a particular AN/SRA-34A(V) system will vary depending upon individual installation requirements. For example, a specific installation may require several MX-4845A equipments and may not include an MX-4847B unit.

The AN/SRA-34A (V) units have one primary feature in common. All are intended for use in a diplex system of antenna coupler control. (A diplex system permits two RF signals to operate on the same transmission line simultaneously.)

FUNCTION OF MAJOR UNITS.—Antenna Coupler Group OA-4794A/SRA-34 (V) provides antenna coupling between HF receivers and/or transmitters utilizing diplex control, and shipboard antennas that cover the 2.000- to 5.999-MHz frequency range. The OA-4794A/SRA-34 (V) consists of Electrical Equipment Cabinet CY-4032A/SRA-34 (V) and four Antenna Coupler CU-1169/SRC-16 units. The OA-4794A/SRA-34 (V) is capable of accepting up to four RF input channels. Channel spacing is dependent on the particular receiver and/or transmitter in use. The RF power handling capability of each channel is 5 kw peak envelope power, and 2.5 kw average. The CY-4032A/SRA-34 (V) contains a water-cooled heat exchanger which permits internal closed-cycle air cooling for the CU-1169/SRC-16 units.

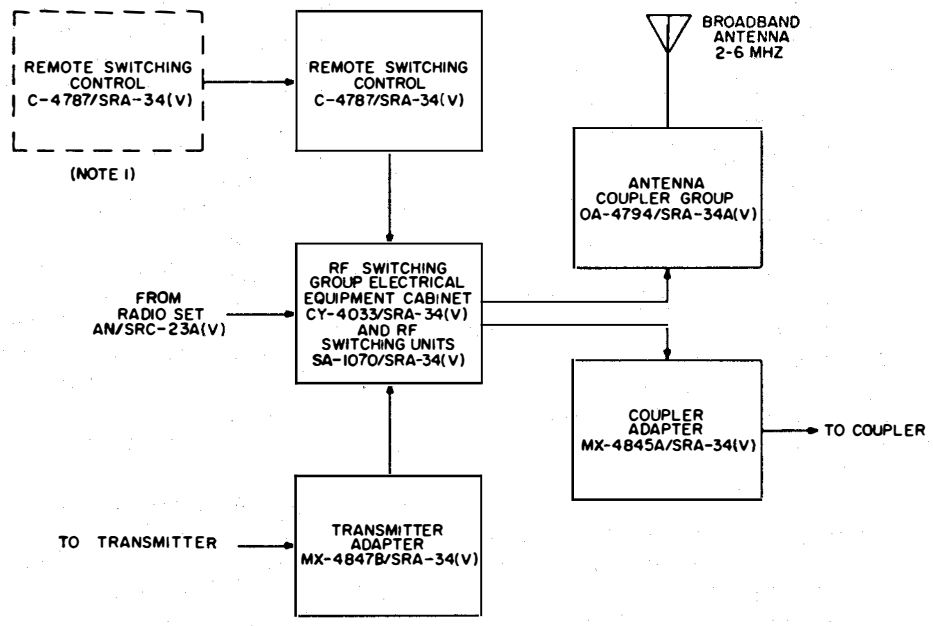

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Figure 6-18.—Antenna coupler group AN/SRA-34A(V) functional block diagram.

Coupler Adapter MX-4845A/SRA-34 (V) adapts the control circuits of various antenna couplers to the diplex antenna coupler control system. Compatibility with the AN/SRA-13 through AN/SRA-16, AN/SRA-22, AN/SRA-56 through AN/SRA-58, and AN/URA-38 may be achieved by use of one of the jumper plug assemblies supplied with the MX-4845A/SRA-34(V). The only connection required between the MX-4845A/SRA-34 (V) and the RF switching group is the RF transmission line.

Transmitter Adapter MX-4847B/SRA-34 (V) adapts the control circuits of various radio transmitters to the diplex antenna coupler control system. Compatibility with the AN/WRT-2, AN/URC-32, AN/SRT-15, or the AN/URT-23 is achieved by use of one of the jumper plug assemblies supplied with the MX-4847B/SRA-34 (V). The only connection required between MX-4847B/SRA-34 (V) and the RF switching group is the RF transmission line.

The RF switching group functions as an RF switching matrix between radio transmitters, and/or receivers and antenna couplers employing diplex control. Electrical Equipment Cabinet CY-4033/SRA-34 (V) contains provisions for one to four RF Switching Units SA-1070/SRA-34 (V). A maximum of 20 RF sources may be connected to a maximum of 25 loads on a 1-for-1 basis. One RF switching unit is required for every five RF sources. The RF switching group may be controlled locally (manually) or remotely. Remote control requires the use of one or more Remote Switching Control C-4787/SRA-34 (V) units. The CY-4033/SRA-34 (V) contains a water-cooled heat exchanger which permits internal closed-cycle air cooling.

The remote switching control C-4787/SRA-34(V) is a remote control unit for the RF switching group. It may be located up to 900 feet from the CY-4033/SRA-34 (V). One SA-1070/SRA-34 (V) is controlled by each remote switching control unit. Each SA-1070/SRA-34 (V) requires a C-4787/SRA-34 (V) for remote control operation.

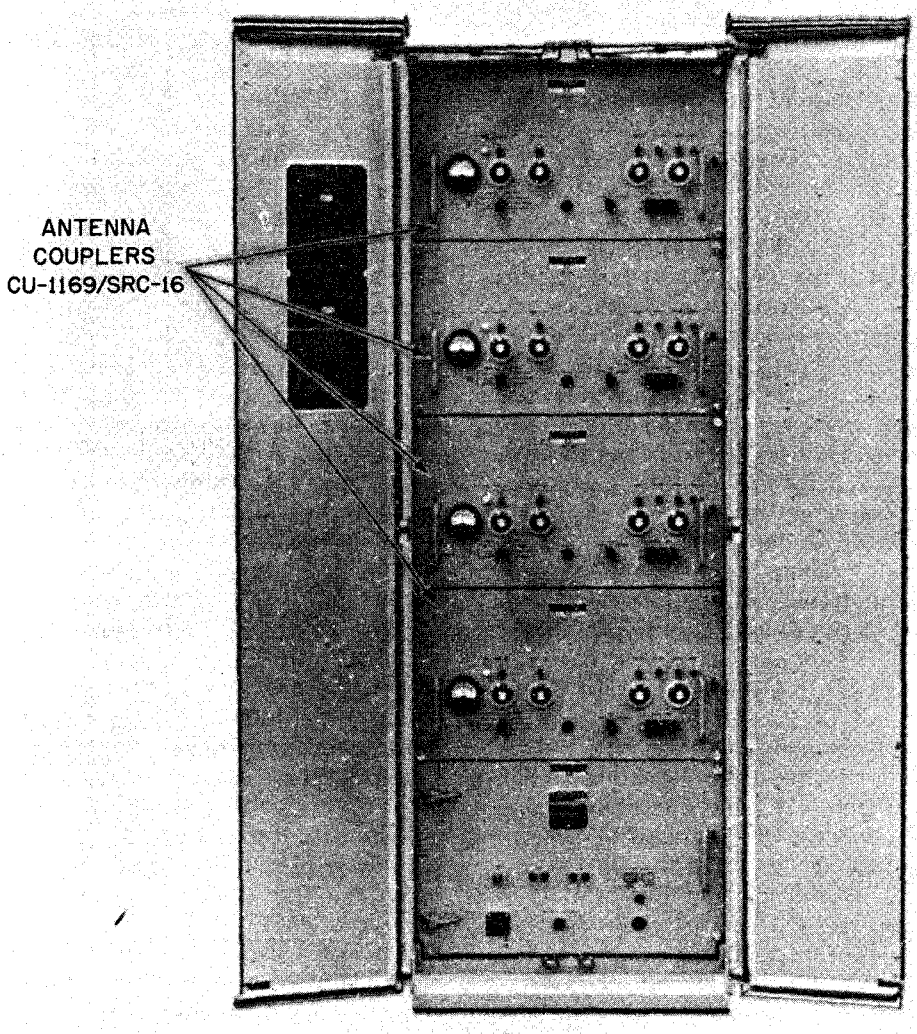
ANTENNA COUPLER GROUP OA-4794A.—Antenna coupler group OA-4794 consists of four antenna couplers CU-1169/SRC-16 mounted in electrical equipment cabinet CY-4032A as stated previously. This coupler group (fig. 6-19) may be used with an automatic receiver-transmitter such as Radio Set AN/SRC-23A (V), or with manual equipment and the appropriate adapter. Each of the antenna couplers mounted in Electrical Equipment Cabinet CY-4032A/SRA-34 (V) has its own RF input, but all four are connected to a common antenna. The antenna coupler bandpass permits RF output from any one, or up to eight, of the antenna couplers to a common antenna. (Outputs from two adjacent antenna coupler groups operating in the same frequency band may be connected together.) If more than one transmitter is transmitting at the same time, the frequencies must differ by at least 5 percent.

The necessary control information is transferred between the transmitter-receiver and the antenna coupler by a sequence of low-power pulses diplexed on the RF line. Since there are four antenna couplers involved, each requires its own control circuits. Each antenna coupler, therefore, has its own diplex subassemblies that consist of a low-pass filter assembly, a coupler electronic gate, and an electronic digital counter. In addition to the diplex subassemblies, a pair of antenna couplers shares a sequential timer card and a power supply module. The four antenna couplers share a common thermal alarm control.

The circuits of Electrical Equipment Cabinet and the four antenna couplers are cooled by an internal closed-cycle cooling system employing a water - cooled heat exchanger. In the event of excessive temperatures, alarm signals are generated that light the alarm indicators on the lower panel of the electrical equipment cabinet (fig. 6-19).

Each of the four antenna couplers requires its own diplex circuits for operation. These circuits include a low-pass filter, an electronic digital counter, a coupler electronic gate, one circuit of a sequential timer, and an input to the thermal alarm control as shown by the functional block diagram in figure 6-20.

Control information is transferred by a sequence of low-power pulses diplexed on the RF line. This sequence of pulses is repeated continuously as long as the equipment is energized. The first pulse is a synchronization pulse and is twice the duration of the remaining pulses. This pulse is detected in the coupler electronic gate, and the information is used to reset flip-flops in the electronic digital counter. Each of seven control pulses is preceded by a clock pulse. The clock pulse is detected in the coupler electronic gate, and this information steps flip-flops in the electronic digital counter to provide the proper enable pulses. The control pulses carry binary information; that is, they are each either on or off, indicating, for example, operate or standby.



67.228(162A)

Figure 6-19.—Antenna coupler group OA-4794A/SRA-34(V).

The coupler electronic gate has circuits for detecting and generating the various control pulses. The synchronizing pulse is detected, and the sync output is sent to the electronic digital counter to reset the flip-flops. The clock pulses are detected and sent to the electronic digital counter to trigger the flip-flops. The control pulses from the transmitter-receiver are detected and ANDed with enable pulses to control the antenna coupler. The control signals from the antenna couplers are ANDed with the enable pulses from the electronic digital counter and then applied to the RF line to control the transmitter-receiver.

The sequential timer card contains two identical circuits. Each antenna coupler uses one circuit; therefore, two antennas couplers share the same card. If a coupler is receiver

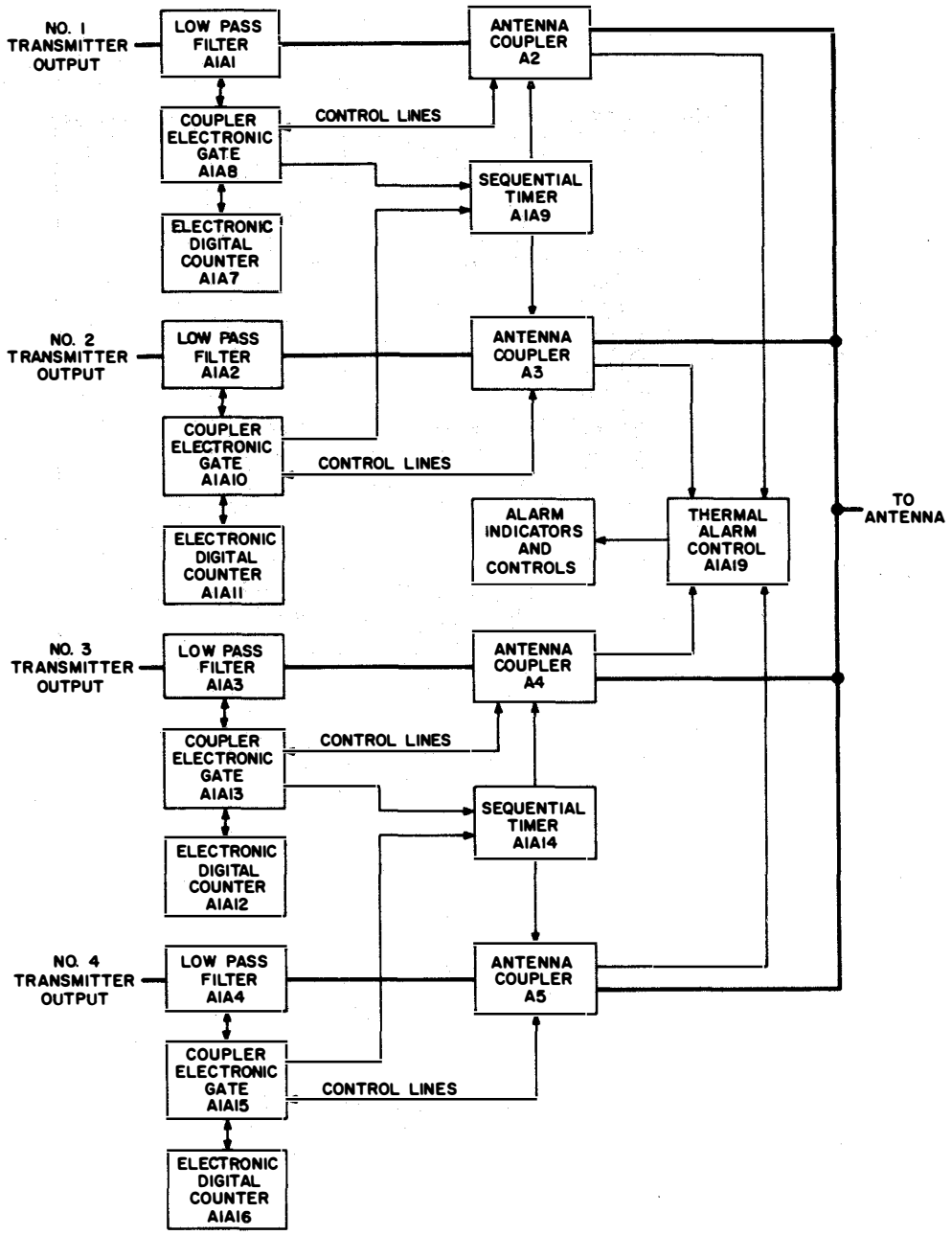


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Figure 6-20.—Antenna coupler group OA-4794A/SRA-34(V) functional block diagram.

tuned, the circuit provides a continuous operate signal (ground) to the antenna coupler for 30 seconds after the receiver tune and operate signals are removed by the transmitter-receiver. This 30-second extension of the operate signal is provided to permit switching the RF line (and diplexed control information) from the transmitter to the receiver.

The thermal alarm control receives a warning temperature ground from a thermal switch at the rear of the cabinet and alarm signals from all four antenna couplers. The warning signal energizes warning indicators, sounds a horn, and enables the UNSAFE temperature alarm gate for alarm signals coming from the antenna couplers. An alarm signal from any

antenna coupler accompanied by the warning temperature ground will light the UNSAFE temperature indicator and cause an alarm signal to be sent to the transmitter-receiver feeding that antenna coupler. The transmitter is placed in standby, and the antenna coupler alarm indicator is lit. In the thermal alarm control, there is a horn disable circuit operated by the HORN CANCEL button on the front panel and an emergency operation circuit called battle short enable. This circuit can be operated by the BATTLE SHORT button on the front panel.

The low-pass filters (fig. 6-20) provide access to the RF transmission lines for the acceptance or application of the pulse train. They also provide low-frequency isolation so that the pulse train signals will not be loaded excessively by the antenna coupler inputs. A radio frequency line filter (not shown) suppresses RF interference in the cabinet primary power input. A separate filter is provided within the subassembly for each primary power lead.

The power supplies (not shown) provide regulated 29 volts to the coupler electronic gates, electronic digital counters, and sequential timers. They also provide unregulated 28 volts to the thermal alarm control.

UHF MULTICOUPLERS

UHF multicouplers are usually used for transceiving. This and the close channel spacing desired during operation require multiple-resonator filters to achieve the necessary isolation between channels. In all cases, coaxial cavity resonators are used. UHF multicouplers are designed for use with antennas whose VSWR is 2:1 or less throughout the operating frequency range of the multicouplers. Two UHF multicouplers largely used in the fleet are the CU-691/U and the AN/SRA-33.

Antenna Coupler CU-691/U

Antenna Coupler CU-691/U (fig. 6-21) provides isolation between four transmitter and/or receiver combinations operating simultaneously into a common antenna. Isolation is achieved with four highly selective tandem filters and a combining network. The high selectivity reduces intermodulation interference, cross modulation interference, and spurious responses. Harmonic radiation from the transmitter(s) is also attenuated.

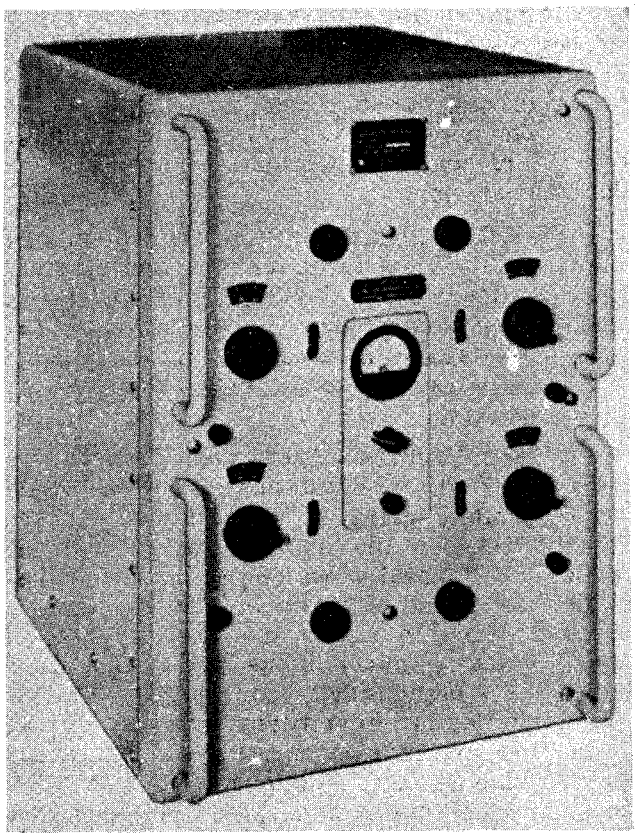

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Figure 6-21.—Antenna coupler CU-691/U.

GENERAL DESCRIPTION.—Inside the coupler are eight silver-plated aluminum tunable cavities. When properly tuned, each cavity is a 1/4-wavelength shorted coaxial element. The cavities are aperture coupled in groups of two, forming four dual-cavity tunable tandem filters. Adjustable tuning slugs in the cavity side walls permit compensation for minor irregularities in the cavity resonance curve. The outputs of the four filters are coupled to a common junction at the input of a combining network. The output of the combining network is the output connector for the antenna transmission line. The coupler is capable of accepting RF energy on all input channels simultaneously, each channel having a carrier power level of 200 watts.

A monitor coupler assembly is inserted in each input transmission line between the input type N coaxial connector and the input to the tandem filter. The coupler assembly develops d.c. voltages proportional to the forward and reflected wave components existing on each line. The d.c. voltages are supplied to the meter