Adjustment Procedures for Amplifier Group AN/GSA-33 and Audio Amplifier AM-413A/G

Background.

Some confusion exists at many activities concerning the use and proper adjustment of constant level amplifiers. It is imperative that the proper adjustment procedures be employed in order to derive the benefits for which the amplifiers were provided. Misuse of a constant level amplifier or improper adjustment of the amplifier can seriously degrade a communications system rather than provide the intended improvement.

A comprehensive article is currently in the process of preparation concerning the proper use and adjustment of constant level amplifiers pertaining to their use in the entire Naval Communication Service. This information will be disseminated to all activities concerned at a later date.

The following information is presented, as an interim measure, to aid activities which have experienced difficulty with adjustment of AN/GSA-33 and AM-413A/G amplifiers in an operational status. The basic elements of the system under discussion are shown in block diagram form, figure 1.

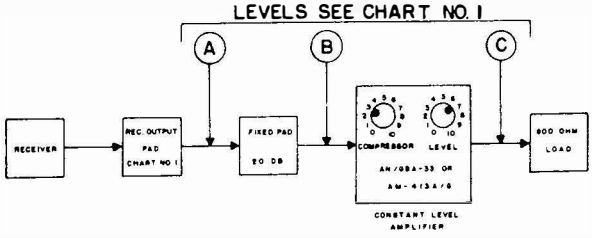


Figure 1. Adjustment Procedures for: Amplifier Group AN/GSA-33 and Audio Amplifier AM-413A/G.

The system consists of a receiver, a fixed pad at the output of the receiver (not always required), a fixed 20 db pad at the input to the amplifier, a constant level amplifier, and the load, which in most cases, is either a telephone line or a voice channel in a microwave link.

The reason for installing a fixed pad at the output of some receivers is to allow the final amplifier stage in the receiver to operate in the most favorable region of its dynamic range, without the possibility of exceeding acceptable levels on the lines feeding the constant level amplifiers. A 20 db fixed pad is required at the input to the constant level amplifier because the compressor control is difficult to set properly at scale settings between zero and 2 or 3 scale divisions. In other words, the 20 db pad provides compatability between the level of the input signal and the most favorable range of the compressor control.

The reason for the constant level amplifier in the system is two-fold: (1) The gain feature of the amplifier enhances the level of weak signals thus processing them for satisfactory transmission over a telephone line and (2) the compression feature of the amplifier automatically limits excessively strong signals to the same satisfactory level; the desired peak level in either case being approximately zero vu. The term vu (volume units) is used exclusively in the remainder of the article in connection with level measurements because the signals to be measured are of a complex waveform (nonsinusoidal), and, a accordingly, cannot be measured satisfactorily with a db meter.

The levels shown in chart No. 1, figure 2 are indicative of the levels to be expected at various points in the system.

Since a proper understanding of the function of the two controls associated with constant level amplifiers of the AN/GSA-33 and the AM-413A/G type is essential, a brief explanation follows: The COMPRESSOR control in the AM-1910/G (a unit of AN/GSA-33) is nothing more than an attenuator and its range is approximately 40 db.

CONDITION	A	B	C
NOISE ONLY	-10 VU	-30 VU	-20 VU -10 VU (SEE NOTE 1)
WEAK VOICE SIGNAL	-4 TO -6 VU AVERAGE	-24 TO -26 VU AVG.	-4 TO -6 VU PEAKING NEAR 0 VU
STRONG VOICE SIGNAL	+9 TO +11 VU AVERAGE	-9 TO -11 VU AVERAGE	-4 TO -6 VU PEAKING NEAR 0 VU

NOTE 1. - FOR RECEIVERS EQUIPPED WITH SQUELCH, ADJUST FOR -10 VU WITH SQUELCH OFF.

NOTE 2 - USE TS-629/U OR OTHER VU METER.

Figure 2. Chart No. 1

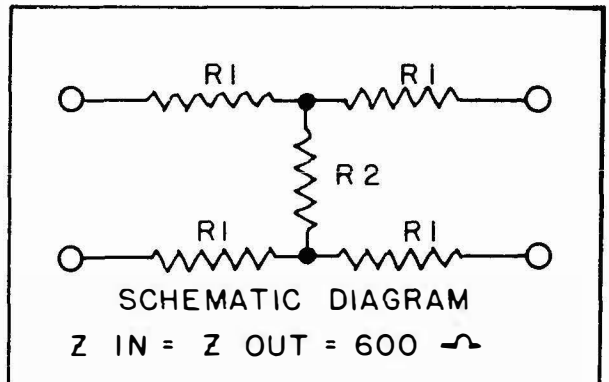
The action of the COMPRESSOR control in the AM-413A/G amplifier is identical to that in the AM-1910/G although the manner in which the attenuation is accomplished is a little more sophisticated. So bear in mind, that with either type of compression amplifier, adjustment of the COMPRESSOR control serves one purpose and that is to attenuate the input signal applied to the amplifier. Amplifier AM-413/G does not have a variable compressor control; it has only a compressor on-off switch; and, for this reason, its use in the system being considered is not recommended. It can be used, however, provided a variable attenuator, having a range of approximately 40 db, is inserted between the 20 db fixed pad, shown in figure 1, and the input to the amplifier. The variable pad then becomes the compressor control. The LEVEL control in either amplifier serves one purpose only. That purpose is to establish the amplifier output signal level at a prescribed maximum for the system in which it is used.

Adjustment Procedure (for receivers equipped with noise silencer or squelch).

Before making any adjustments, be sure the basic elements of the system shown in figure 1 are operating satisfactorily and that the appropriate pads are installed. The receivers listed in chart No.2, figure 3, require a 15 db pad installed directly at the output terminals. Refer to chart No. 3, figure 4, for details concerning the construction of 15 and 20 db pads.

RECEIVER TYPE	OUTPUT PAD
AN/FRR-26- 27 AN/FRR-30- 31	15 DB
AN/FRR - 49 AN/FRR-502 R-274 B/URR	15 DB
RECEIVERS WITH MAX. OUTPUTS OF LESS THAN 60 MW IN 600 OHMS DO NOT REQUIRE PADS.	
INSTALL PADS DIRECTLY AT RECEIVER OUTPUT TERMINALS.	

Figure 3. Chart No. 2



ATTENUATION	R1	R2
15 DB	200	220
20 DB	250	120
USE 1-WATT, 5% RESISTORS		

Figure 4. Chart No. 3

To simplify the adjustment procedure, receiver residual noise can be used as a signal source. A typical example of the proper adjustment procedure follows:

Step 1. Initial Control settings.

(a) Turn receiver and amplifier power switches ON.

(b) Turn receiver silencer or squelch OFF.

(c) Turn amplifier compressor switch ON and turn COMPRESSOR control maximum clockwise.

Step 2. Turn the receiver RF GAIN control maximum clockwise and adjust the receiver AF GAIN control for -10 vu noise output (in the absence of any signal) as measured on the line side of the receiver output pad. Use a bridging type vu meter, TS-629/U for example, to make this and subsequent measurements. Do not use a db meter.

Step 3. Adjust the amplifier LEVEL control for zero vu noise level as measured at the output of the amplifier. This is the final adjustment of this control.

Step 4. Adjust the amplifier COMPRESSOR control for a -10 vu noise level at the output of the amplifier. This is the final adjustment of the amplifier controls.

Step 5. Switch the receiver silencer or squelch ON, tune in a useable signal and adjust the silencer control in accordance with the procedures outlined in the receiver instruction book.

Step 6. Check the results acheived. When the above procedures have been followed, the levels in the system will be within the limits shown in chart No. 1, figure 2. The object is to set the receiver gain controls and the controls on the constant level amplifier in such a manner as to allow the receiver to operate at near optimum conditions. The weakest useable voice signal (approximately 10 db above the noise level) should appear at the output of the amplifier at approximately -4 to -6 vu, peaking near zero, and all signals of greater amplitude at the output of the receiver will be limited in the compression amplifier to approximately the same value. On some voice signals infrequent peaks may reach +1 or +2 vu.

It should be noted that it may be possible for signal levels measured at the input to the amplifier to exceed the levels measured at the output of the amplifier. This is merely indicative of the fact that the compression amplifier is performing its task in the system.

Adjustment Procedure (for receivers not equipped with squelch).

Step 1. Follow the procedures listed in paragraph 2 above with the following exceptions:

(a) Omit step 1 (b).

(b) In step 4, adjust the amplifier COMPRESSOR control for a -20 vu noise level at the output of the amplifier. It should be noted that a small movement of the COMPRESSOR control results in a considerable amount of attenuation, and, accordingly, adjustment of this control should be made precisely.

Step 2. Check your results. Tune the receiver to a weak signal and again to a moderately strong signal. In either case the levels at the various points in the system should agree closely with the levels shown in chart No. 1, figure 2. (5S)

POTENTIAL SHOCK HAZARD IN POWER SUPPLY PP-3565/GRC-100A

Activities using Power Supply PP-3565/GRC-100A in Radio Set AN/MRC-97 are cautioned not to attempt to ground pin "B" of primary power connectors J-501 and J-502. Reference should be made to NAVSHIPS 94590, Technical Manual for AN/MRC-97, page 4-6, figure 4-4, schematic diagram for Power Supply PP-3565/GRC-100A. Receptacles J501 and J502 on front panel provide for input power, 115VAC or 230VAC, to transformer terminal board TB501, and no ground is provided at the primary terminals of transformer T501 with this optional type operation. It can be seen from the power supply schematic that grounding pin "B" of 115VAC receptacle J502 will introduce a potential shock hazard.

AN/PRC-6 REPLACEMENT CAPACITOR C-43

The replacement capacitor C-43, part of the AN/PRC-6, is too large to be installed in the space allocated. Accordingly, the Electronic Supply Office has initiated action to stock the following capacitor: N5910-726-1384, 15000 μμfd ±10 percent, 100 VDC, molded plastic case. 0.175 inch diameter by 1-1/16 length.

AN/PRC-8, AN/PRC-9, AN/PRC-10 TOOLS FOR SERVICING AND MAINTENANCE

The Bureau has received information from the Signal Corps describing the fabrication of the chassis holder, a fast-tuning knob, a calibration tool, and an alinement tool for servicing and maintenance of AN/PRC-8, AN/PRC-9 and AN/PRC-10 equipments. This information is summarized for use by ships and activities desiring to fabricate these items.

The chassis holder should be fabricated in accordance with Figures 1 and 2. This stand will hold the chassis safely and securely while servicing. It permits easy access to both front and back of the set for metering and checking test points.

The following material is required for fabrication: 4 feet of 1/2-inch angle iron; 1/2-inch steel plate, 10 inches wide x 16 inches long; 3/32-inch steel plate, 2 feet long x 3/4 inch wide; 1-inch steel rod, 6 1/2 inches long. The spring clamp (Signal Corps Stock Number 6Z6918-8) should be either bolted or welded on the two end pieces. (See Figure 3 for completed stand and calibrating tool).

Details of the fast tuning knob, which should be used to turn the tuning knob of the receiver transmitter, are shown in Figure 4. Its use prevents possible injury to fingers,

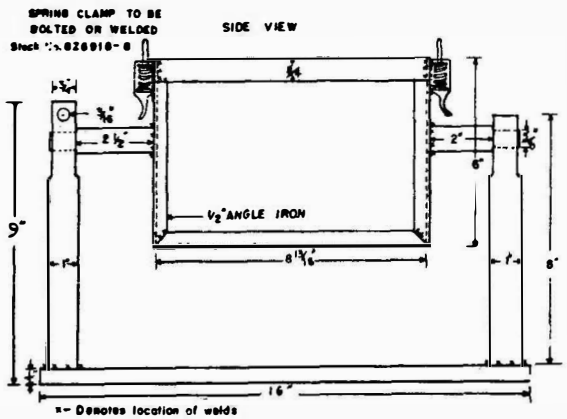


FIGURE - 1

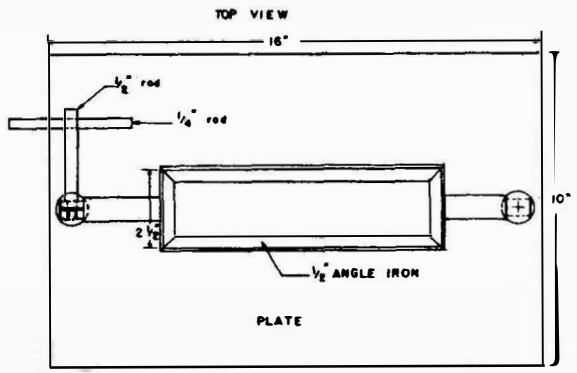


FIGURE - 2

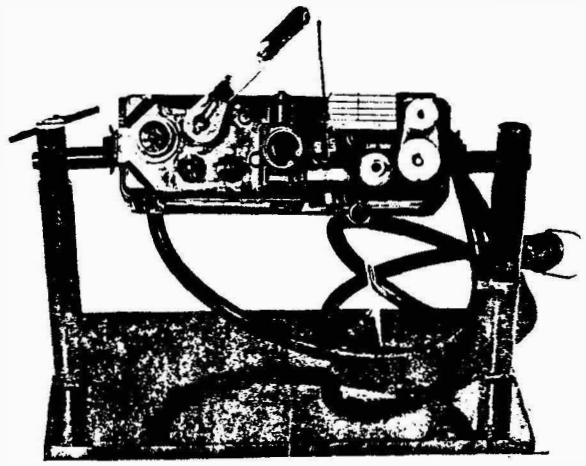
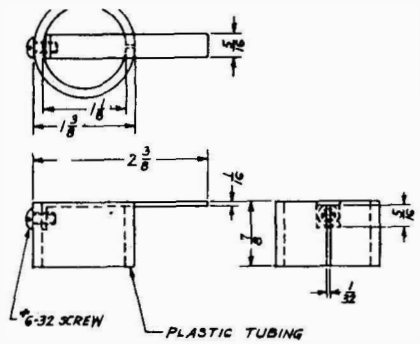


Figure 3



FAST TUNING KNOB

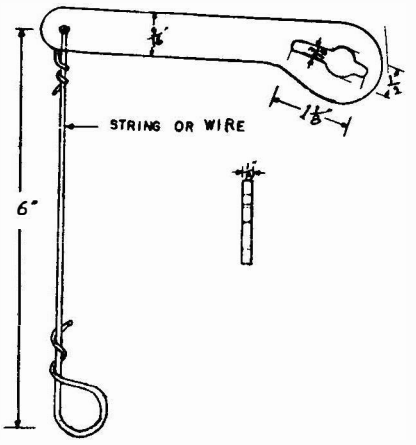
FIGURE - 4

and enables fast tuning from one end of the dial to the other.

The calibrating tool, Figure 5, may be fabricated from 1/8-inch sheet steel, 1 1/4 inches wide x 5 inches long. Use of this tool eliminates the necessity of holding down the calibrate ON-OFF switch by hand. The present practice is to use both hands to calibrate the radio set and to use the chin and shoulder to hold the handset to the ear when tuning.

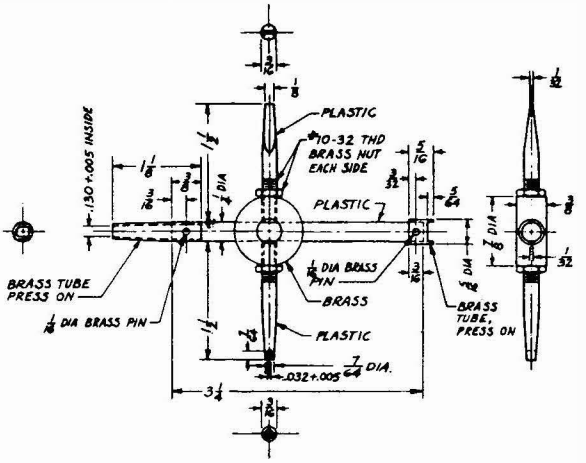
Use of the alinement tool, Figure 6, saves time when servicing the equipment and eliminates the necessity of selecting separate wrenches and screwdrivers. It is a four-in-one tool containing all the individual items required in the alinement procedure.

Based on material published in S.C.E.L. "Maintenence Information Bulletin, MIB-125".



CALIBRATING TOOL FOR RADIO SETS AN/PRC-8,9,10

FIGURE - 5



ALIGNMENT TOOL

Figure 6

Transmitter-Receiver AN/PRC-39—Modification of Case to Permit Tuning of Final Tank Circuit

The Bureau of Ships has been notified by NAS Brunswich that difficulty exists in tuning the final tank circuit of the AN/PRC-39. Each time the metal case is removed and replaced, the capacity effect of the metal case will detune the final tank circuit. Drill a hole of sufficient size in the case directly over the final tank circuit to allow the final tank circuit to be resonated for maximum RF output upon reinsertion into the case. This hole, when not in use, is sealed with a rubberized knock-out plug to maintain watertight integrity of the equipment.

Drill a 3/4-inch-diameter hole in the aluminum case directly over the final tank circuit in accordance with figure 1 of this article. Insert a 3/4-inch rubberized knock-out plug into the hole. The stock number of the plug is: KZ5340-893-8798. (608)

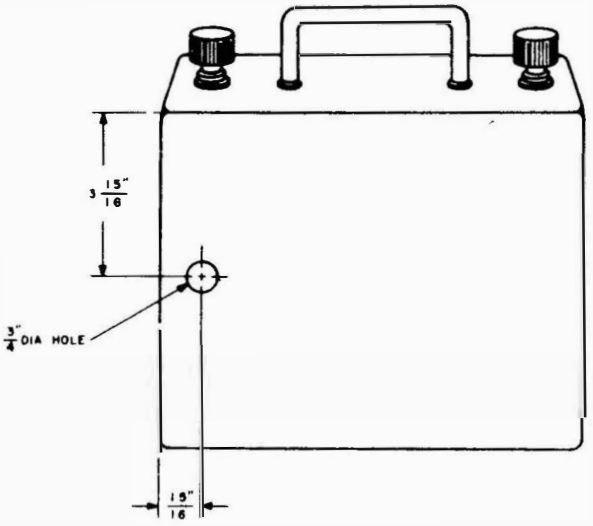


Figure 1. Case modification AN/PRC-39.

POTENTIAL PERSONNEL HAZARD IN MERCURY BATTERY PACK (FSN 1N6140-075-3497 OR FSN 1N6135-075-3497)

Activities using the AN/PRC-40(AX) transceiver are cautioned to examine all of the subject batteries currently in use or in storage. There is a possibility of a swelling condition which may result in an explosion of the battery pack. If distortion or swelling is noted, the battery should be appropriately disposed of, either by burial in a secluded area away from all personnel or by dumping at sea.

Changed Item of Supply for AN/PRC-40AX—Plastic Enscapsuloted Battery Replaced by Battery and Battery Holder

The purpose of this change is to reduce cost of support and eliminate a personnel safety hazard.

The plastic encapsulated mercury battery FSN 1N6135-075-3497 is replaced by a mercury battery in a paperboard cover FSN 1N6135-941-6034, and a battery holder 1N6135-999-4649. The anticipated life of the battery holder is equal to that of the equipment. Therefore, the battery holder is not expected to require replacement after the initial installation.

A 1/2 ampere fuse FSN 9N5920-281-0224, retained in an in-line fuse holder FSN 9N5920-199-9235, is added to the battery circuit. This fuse provides protection from possible explosion of the battery in the event of a short circuit within the equipment.

Procedure:

1. Remove radio set from cabinet.
2. Disconnect power cable from battery and chassis, and retain cable.
3. Cut one wire of the two-wire power cable, retained in above step, at its midpoint (approximately 3-1/2 inches from back of five-prong plug.)
4. Insert the in-line fuse holder FSN 9N5920-199-9235, "tailoring" both ends of the wire cut to accomodate the fuse holder neatly and solder the connections.
5. Remove and retain the two screws holding battery to chassis. Discard battery.
6. Use the two screws retained in previous step to attach lower tray assembly, the one with large bracket, in place of the battery so that the back of tray is against the chassis.
7. Insert 1/2 ampere 3AG fuse FSN 9N5920-281-0224 into fuse holder.
8. Connect cable to battery.
9. Place battery into tray attached to chassis and fasten the other tray assembly in place, using self tapping screws supplied, so that battery is held between the two trays of the battery holder.
10. Plug the remaining end of power cable into chassis.
11. Cement the one-inch thick polyurethane pad supplied into bottom of case, using a suitable adhesive to hold it in place.
12. Position the power cable and fuse holder so as not to catch on the side of the carrying case and slide the radio into the case. (17S)

AN/PRC-41 and AN/PRC-47–BB-451/U Battery; Used with Radio Sets

Storage Battery BB-451/U is a silver-zinc, alkaline battery which requires special charging precautions for optimum cyclic life. All charging should be done with the battery charges designed for this purpose, either PP-3240A/U or PP-4567/U. Alternate charging procedures are discussed in the Technical Manual for Storage Battery BB-451/U, TM-04072A-15/1B, but they are not recommended unless extreme care is exercised and unless an urgent requirement exists.

Holders of earlier versions of this technical manual should obtain the "B" revision, because significant maintenance information has been incorporated into this revision. (681)

AN/PRC-41 Radio Set—Ceramic Screw Replacement in R-F and Power Amplifier Module

Activities servicing Radio Sets AN/PRC-41 are advised of a modification to the RF and power amplifier module (1A8) which permits replacement of a ceramic screw in the grid stator assembly (1A8 MP30). Access to the screw is normally blocked by the module top plate (1A8 MP34) and requires disassembly of the module to replace in the event of failure. Access can be obtained by drilling a hole through the top plate, as shown in figure 1.

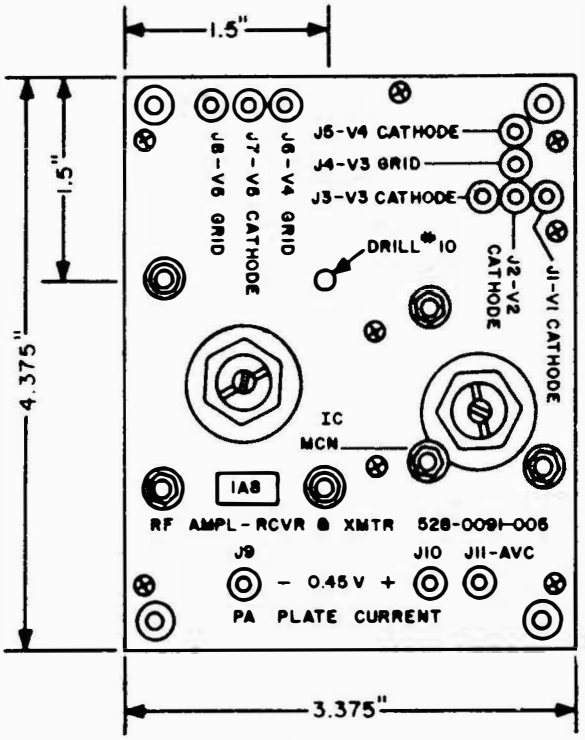


Figure 1. Location of Drilled Hole in Module Top Plate

with a #10 drill bit. Use a 6-32 tap to remove the broken ceramic screw and to clean out the threads. Insert the new ceramic screw and tighten very carefully with a screw-driver which is inserted thru the drilled hole. This hole will not affect the operation of the RF and power amplifier module but will reduce the time required to make the repair. Implementation of this modification is recommended for all Radio Sets AN/PRC-41 which require replacement of the ceramic screw in grid stator assembly (1A8 MP30). (836)

AN/PRC-41 Radio Set—Charging of Batteries, BB-451/U

The purpose of this article is to advise AN/PRC-41 users of battery chargers which may be used with the BB-451/U.

Battery chargers PP-3240/U and PP-3240A/U are the original chargers used with the silver-zinc battery BB-451/U. Charger PP-4567/U was procured by the Marine Corps for use with BB-451/U but should not be ordered or used in Navy applications. Where a replacement charger is required by Navy activities, the acceptable replacement is PP-6241/U which should be ordered under stock number 4G-6130-00-106-6445

(EIB 959)

AN/PRC-41 and AN/PRC-47–BB-451/U Battery; Used with Radio Set

See article in AN/PRC-41 section under the same title. (681)

AN/PRC-96 Radio Set—Lithium Battery Safety Precautions

This article provides safety precautions intended to prevent the possibility of personnel injury or equipment damage due to incorrect use of lithium batteries installed in the AN/PRC-96 Radio Set. The following precautions should be taken:

1. If a battery cell in the AN/PRC-96 becomes weak and requires replacement, replace both battery cells. Never use a partially discharged lithium battery cell in series with a fully charged cell.
2. Do not use the AN/PRC-96 lithium batteries in any other equipment.
3. Lithium batteries are potentially dangerous. Do not abuse, short circuit, recharge, or expose the battery to high temperature or fire.
4. When reinserting the radio set into its storage case, ensure that the ON/OFF VOLUME switch is not inadvertently turned to ON by the packing material.
5. Ensure that spare batteries, both new and used, are individually placed in a plastic bag and sealed, or individually wrapped in an electrical insulating material.

A field change kit, to be announced in a future EIB, will provide a safer replacement lithium battery and instructions for disposal of present lithium batteries used in the AN/PRC-96. Until publication of future instructions, mark the used batteries "Discharged-Do Not Use." At sea, discharged batteries should be removed from the plastic bag, and disposed overboard in deep water (in excess of 500 feet) outside the prohibited zone (50 mile limit). Do not store for shore disposal. For shore disposal, lithium batteries should be buried in controlled hazardous waste landfills. (See NESO-20.2-011, Hazardous Waste Disposal Guide.

(EIB 975)

SAFETY NOTICE-PRECAUTIONS FOR INSTALLING GLASS FILTER GLOBES IN AN/SAT-2 AND US/X-3A INFRARED TRANSMITTING SETS

A potential safety hazard exists in Infrared Transmitting Set AN/SAT-2 and in Infrared Transmitting Set US/X-3A. A casualty occurred to a newly installed AN/SAT-2 equipment during its initial test. The glass filter globe on one yard arm beacon exploded violently after about two minutes of "locked-key" operation, scattering jagged glass fragments over a radius of 25 feet. Fortunately, no personnel injury resulted, however the flying glass could easily have caused serious harm to anyone within range. It is believed that the casualty resulted from a flaw in the glass combined with the pressure of heated air trapped inside the beacon which is watertight. The internal air pressure would account for the explosive violence of the failure.

The filter globe is identified as Part O-103 in NAVSHIPS 0967-069-9010, Technical Manual for Infrared Transmitting Set AN/SAT-2. It is a hemisphere of thick, heattreated, black glass about 11 inches in diameter which weighs about 12 pounds. The corresponding part in the US/X-3A equipment is identical. The possibility of one of these globes shattering spontaneously is greatest when it is first installed. Following an established safety procedure at that time will protect personnel from injury from this source.

The following safety precautions should be observed whenever a new AN/SAT-2 system is installed or whenever a filter globe is replaced for any reason:

a. Examine each globe carefully for flaws, chips, cracks, or deep scratches.

b. Install the globe exactly as shown in NAVSHIPS 0967-069-9010. Make sure the gasket is straight and that the wing nuts are tightened down uniformly and only hand tight. Do not use a wrench.

c. Test the newly installed globe by burning the beacon lamp in the "steady source" position for at least three, ten-minute periods with a like time between periods for cooling.

d. Warn personnel to stand clear during the test.

e. Any casualties should be reported promptly to the Naval Electronic Systems Command.

TONE MIXING ON UHF TELETYPE THROUGH CONTROL UNIT C-492/SG

Recently, several reports have been received regarding difficulty with the Model TDZ transmitter when used in conjunction with the AN/SGC-1 terminal equipment and type C-492/SG teletype-control unit.

The difficulty arises when the Send-Receive switch in the control unit C-492/SG is thrown to the Send position, thereby causing the MCW oscillator tone in the TDZ to mix with the tone output of the AN/SGC-1. This results in tones other than those desired being transmitted.

Under normal conditions where an M-15 teletypewriter is used for UHF communications, one of the following remedies will be found satisfactory.

(a) If the teletypewriter in question is used for UHF communications only, the Send-Receive switch and carrier-control contacts of the control unit C-492/SG should not be connected and the signal line should go directly from the printer to the teletype panel, leaving the only function of the control unit to turn the transmitter power on and off. It should be noted that the carrier-control feature of control unit C-492/SG is not required as this function is controlled automatically by the AN/SGC-1 terminal unit.

(b) In a second system, where the teletypewriter might also be used in HF receive only or HF send-receive circuits; the C-492/SG control unit should be wired in the normal manner, that is with the signal line and carrier control circuit fed through the control unit. When this condition exists, instead of throwing the Send-Receive switch to the Send position when it is desired to communicate on UHF, simply throw it to the Receive position and perform the necessary patching in the TT-23/SG teletype panel. This is possible since the printer and keyboard of a M-15 are connected in series.

Each of these systems, the conditions of which might be common in certain ships, has merit. However, it is believed that the latter method will be found more satisfactory in that it allows the teletypewriter to operate in other circuits also.

WIRING DIFFERENCES OF AN/SGC-1 AND AN/SGC-1A

Due to an internal wiring difference, chassis and cabinets of the AN/SGC-1 and the QN/SGC-1A radio-teletype terminal sets are not interchangeable. Subsequent to a field change, all installation and maintenance activities should not interchange chassis and cabinet of this equipment.

BAND PASS FILTER (SYMBOL NO. Z102) IN AN/SGC-1 AND AN/SGC-1A

Unsatisfactory performance has been reported in the above equipments die to defective Discriminator Z102. Instruction Books, NAVSHIPS 91152 and NAVSHIPS 91503 show the characteristics of the filter at 500 and 700 cycles to have zero attenuation. Indications are that certain capacitors used in the filter networks have increased in value sufficiently to lower the frequency of resonance.

When this condition exists, excessive attenuation to the incoming audio gain at the radio receiver is necessary. When the receiver gain is increased, noise may be introduced into the Radio-Teletype Terminal equipment that will cause reduced operating efficiency.

The Discriminator filter should be checked from time to time to insure that the resonant frequency is within plus or minus 5% or 500 and 700 cycles.

ADJUSTMENT OF SIGNAL INPUT LEVEL

Operators may have noticed that the Red-Receive panel light of Radio-Teletype Terminal Set, AN/SGC-1( ), sometimes is illuminated even though no teletype signal is being received. The probable sources of this trouble are either interference, excessive ripple in the power supply of the AN/SGC-1( ) or its associated receiver, or a high noise level from the output of the associated radio receiver. The latter condition is the most probable cause of trouble and it is generally brought about through an improper setting of the squelch control on UHF receivers. The squelch level of the associated receiver and the Rec-level attenuator of the AN/SGC-1( ) should be adjusted to eliminate this trouble.

AN/SGC-1 ADJUSTMENT AND OPERATION

Two predominant causes for improper operation of Radio-Teletype Terminal Sets AN/SGC-1( ) are incorrect setting of the Mark Oscillator, Frequency-Adjust Control and excessive noise from the associated receiver. The Mark, Frequency-Adjust Control should be adjusted as indicated in the Instruction Book for AN/SGC-1 (NAVSHIPS 91152) and AN/SGC-1A (NAVSHIPS 91503). If an accurate test oscillator is not available, adjust the control to the midpoint of its physical rotation. The procedure outlined in NAVSHIPS 91503 should be disregarded as it may result in erroneous adjustment.

Spurious noise and static may lock the terminal in the receive condition which prevents the terminal from switching automatically to the send position. The squelch or silencer circuits of the associated receiver should be adjusted so that no audio output is supplied from the receiver until the associated transmitting station goes on the air. Care must be taken to make sure that the adjustment of the squelch circuit does not lower or increase the sensitivity of the receiver excessively.

The following is the proper procedure for adjusting the squelch control:

a. Rotate the squelch control to the least sensitive position of the receiver.

b. With the transmitting station off the air, rotate the squelch control slowly toward the greatest sensitivity of the receiver until the Red-Receive lamp of the AN/SGC-1( ) is illuminated.

c. Back off the squelch control slowly until the Red-Receive lamp is extinguished.

AN/SGC-1( ) LOSSES IN FILTER Z102

Reports from using activities have stated that the insertion loss of filter Z102 in the AN/SGC-1( ) exceeds the values shown in figures 2-6 of NAVSHIPS 91152 and 91503. The electrical configuration of filter Z102 is shown in figure 1 of this article.

The actual insertion loss is greater than indicated in figure 2-6, since the graph is intended solely as an aid in understanding the theory of operation. The data on the graph should not be used to determine the performance of the filter.

The real and apparent losses through the filter, when measured with an electronic voltmeter such as the AN/USM-34, may total 10 to 12 db or more. The real loss through the filter is stated in the design specifications for the equipment. The design specifications read:

a. The Mark filter shall present not more than 5-db attenuation at 700 cps. In addition, the attenuation curve shall be approximately symetrical around 700 cps.

b. The Space filter shall present not more than 5-db attenuation at 500 cps. In addition, the attenuation curve shall be approximately symmetrical around 500 cps. Test data on the 10-AN/SGC-1( ) equipments were taken by METU-5 and forwarded to the Bureau of Ships; test results are given in Tables I and II.

The test data indicate that the frequency of peak response on almost all filters has drifted downward. However, all filters have less than 5 db loss at the operating frequency except the mark filters for equipments 227 and 338.

In addition to the power consumed in the filter, another power loss of 7 db is incurred when the harmonics of the fundamental frequency are removed from the square wave output of V-102. When these losses are added, the total may be 10 to 12 db. This value corresponds closely to the voltage drop across Z102, which is shown in figure 5-8 of NAVSHIPS 91152 and 91503.

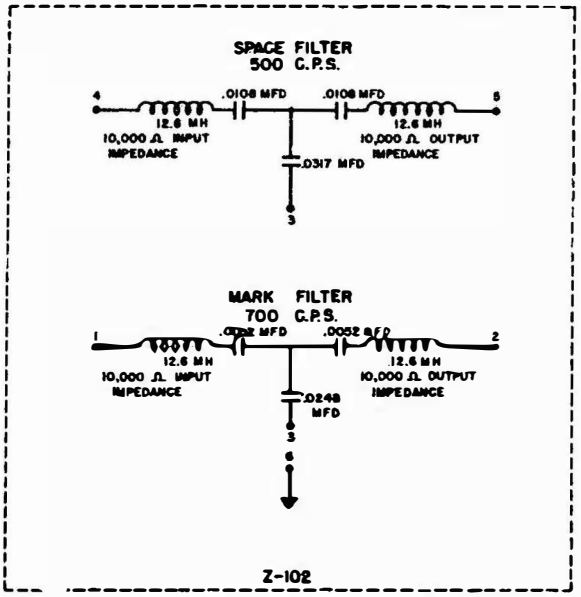


FIG. 1 ELECTRICAL CONFIGURATION OF FILTER

The second requirement of filter Z102 is to attenuate the undesired frequency. Figure 2-6, of NAVSHIPS 91152, indicates the loss to be about 15 db. Paragraph 4 of section 2, NAVSHIPS 91152, states the attenuation to be about 18 db. The test data from METU-5 indicates the rejection of the mark sign by the space filter to be about 20 db and the rejection of the space sign by the mark filter to be about 11 db. It will be noted that the maximum attenuation of the space signal by the mark filter was obtained when the frequency of peak response of the mark filter was centered on 695 cps.

The limits for rejection were not defined in the original specification. Using activities have indicated that satisfactory operation may be obtained with 12 db attenuation.

To determine the performance of filter Z102, the test equipment should be connected as shown in figure 2. One vacuum tube voltmeter may be used for all tests. The test procedure follows:

1. Apply power to the AN/SGC-1( ) until the terminal equipment reaches normal operating temperatures. A minimum of 2 hours is usually required.

2. Remove power from the AN/SGC-1( ) when making all test connections or adjustments. After the test connections or adjustments have been made, apply power. Observe all safety regulations.

3. Remove V-101.

4. Connect the audio oscillator to point A through an 0.1 - mfd dc blocking capacitor. Make sure that the audio oscillator is terminated in its correct impedance.

5. Connect the V.T.V.M. to point B. Set the selector knobs on V.T.V.M. for the highest voltage on the ac range.

6. Apply power to the AN/SGC-1( ). Adjust the frequency of the audio oscillator for 500 cps, ±5 cycles. Increase the output from the audio oscillator until the voltmeter at B ceases to rise in proportion to the input voltage. Note the voltage at B.

7. Reduce the output of the audio oscillator until the voltage at point B decreases to 1/3 the value noted in step 6. This insures that the input to the filter is a sine wave and not a square wave. Under this operating condition, the measured attenuation is the real loss of the filter.

8. Measure and record the voltages at points B, C and D.

9. Adjust the frequency of the audio oscillator for 700 cps, ± 5 cycles. Adjust the output voltage until the voltmeter at point B reads the same as in step 6 above.

10. Measure and record the voltages at points B, C, and D. The insertion loss of the mark filter is determined by dividing the voltage at point C in step 10 by the voltage at point B in step 10. The loss should not exceed 5 db. Table III shows db values for various voltage ratios.

The insertion loss of the space filter is determined by dividing the voltage at point D in step 8 by the voltage at point B in step 8. The loss should not exceed 5 db.

The rejection of the space frequency by the mark filter is found by dividing the voltage at point C in step 8 by

the voltage at point C in step 10. The loss should be 12 db or greater.

The rejection of the mark frequency by the space filter is found by dividing the voltage at point D in step 10 by the voltage at point D in step 8. The loss should be 12 db or greater.

11. Adjust the frequency of the audio oscillator from 400 to 800 cps in increments of 10 cps and repeat step 9 for each setting of the oscillator. Record the frequencies at which the voltage on points C and D are at a maximum.

If the insertion loss of the filter at the pass band exceeds 5 db or if the rejection of the undersired frequency is less than 12 db, the filter is defective and should be replaced.

If a replacement is not readily available, emergency repairs may be made on some filters where the frequency of peak response has shifted downward. The emergency repairs are made by connecting external capacitors in series with the filter. The schematic diagram of the connections is shown in figure 3. The values of capacitors, which will give optimum performance, are best determined by trial and error. To select the range of values to be tried, Table IV may be used as a guide. The test procedure, to determine the performance of the filter should be repeated after each group of external capacitors have been connected into the circuit. If an improvements is noted, the capacitors may be bolted to the chassis and any splices covered with spaghetti. The physical dimensions of the capacitors, are shown in figure 4.

Any equipment modified by these emergency repairs should be tagged and identified so that it can be properly repaired at the earliest opportunity. The changes should be recorded on the Electronic-Equipment History Card, NAVSHIPS 536.

Table I
Electrical Characteristics of Space Filters in the AN/SGC-1

Equip Ser.	Freq of peak response in cps	Insertion loss in DB at peak response	Pass band Freq where Atten is 5 DB or less	Insertion loss in DB at mark Freq of 700 cps
227	485	2.8	385-525	25
229	420	2.3	385-525	24
230	420	3.8	385-505	25
231	435	2.5	400-535	23
232	505	3.0	395-535	24
233	425	2.4	390-530	24
236	400	3.6	375-500	26
238	420	3.9	390-515	25
363	430	2.5	395-530	25

Table II
Electrical Characteristics of Mark Filters in the AN/SGC-1

Equip Ser.	Freq of peak response in cps	Insertion loss in DB at peak response	Pass band Freq where Atten is 5 DB or less	Insertion loss in DB at mark Freq of 500 cps
227	650	3.4	590-680	14
229	640	3.7	620-710	18
230	665	3.8	600-700	15
231	695	3.8	615-725	18
232	610	4.5	590-700	15
233	620	4.0	590-700	15
236	600	3.5	570-695	17
238	635	4.0	600-705	15
363	675	3.8	600-705	17

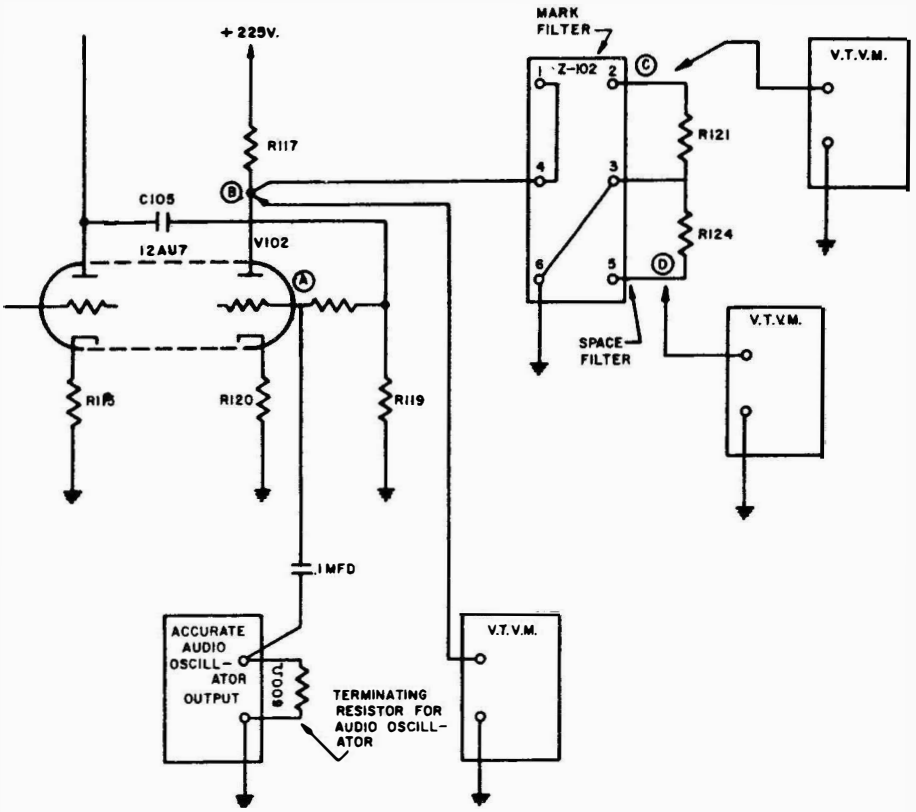


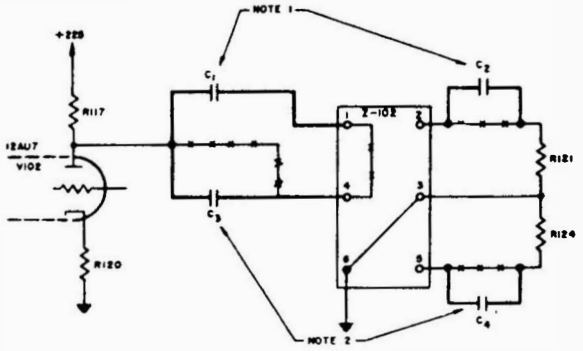
FIG. 2 CONNECTIONS FOR TEST EQUIPMENT

Table IV

Filter	Freq of peak response	Suggested values of external capacitors			
		C1	C2	C3	C4
Mark	550	.01	.01		
Mark	590	.01	.02		
Mark	630	.02	.02		
Mark	650	.02	.05		
Mark	665	.05	.05		
Mark	700	None	None		
Mark	725	No Corr.			
Mark	750	Possible			
Space	420			.02	.02
Space	450			.05	.05
Space	500			None	None
Space	525			No Corr.	
Space	550			Possible	

Table III

Voltage Ratio	Decibels
1.00	0
0.89	-1
0.79	-2
0.70	-3
0.62	-4
0.56	-5
0.50	-6
0.44	-7
0.39	-8
0.35	-9
0.31	-10
0.28	-11
0.25	-12
0.22	-13
0.20	-14
0.17	-15
0.16	-16
0.15	-17
0.12	-18



NOTES:
1. ADD CAPACITORS C1 & C2 (SEE TABLE IX) TO RAISE THE FREQUENCY OF THE MARK FILTER.
2. ADD CAPACITORS C3 & C4 (SEE TABLE IX) TO RAISE THE FREQUENCY OF THE SPACE FILTER.

FIG. 3 CONNECTION OF EXTERNAL CAPACITORS

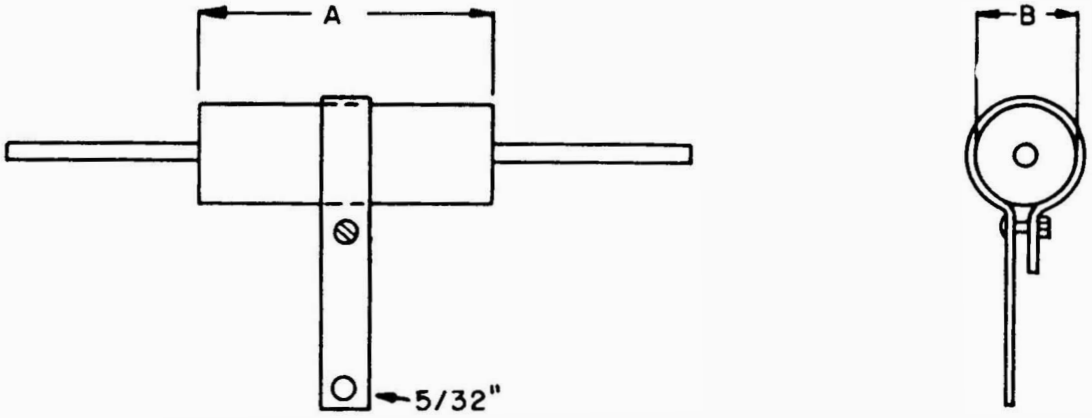


FIG. 4

PHYSICAL DIMENSIONS OF EXTERNAL CAPACITORS

CAPACITOR	DIMENSION "A"	DIMENSION "B"	CAPACITY
CP28AIEF 103K	1 5/16"	1/2"	.01 MFD
CP28AIEF 203K	1 13/16"	1/2"	.02MFD
CP28AIEF 503K	1 11/16"	11/16"	.05MFD

AN/SGC-1 TONE MODULATED TELETYPE

The AN/SGC-1 tone modulated teletype circuits are reliable and "netable" types. This type circuit is ideal for ORSETES nets within a task group or task unit. For this reason, the operator/technician should understand the use of the equipment in order to get the most from the equipment at all times. There is no better way to find the capability of an equipment than by actual operation. This can be done easily between two ships in port or at sea, using an authorized UHF frequency by operators who want to become proficient.

The AN/SGC-1 is a DC-to-audio converter in the tmosmit mode. It receives DC from the teletype machine and converts this DC into audio frequencies for futher transmission by a radio transmitter, usually UHF. The audio tone for a teletype mark is 700 hz and the space frequency is 500 hz. In the receive mode, the equipment is an audio-to-DC converter. Audio from the receiver is fed into the SGC equipment. When 700 hz tone is received, the equipment converts this to a teletype mark; when 500 hz tone is received, this is converted into a teletype space. The equipment has a mode selector switch that can place the equipment into constant XMIT or constant RCVE, or an AUTO position that permits the equipment to switch to receive whenever a signal arrives from the receiver or go to transmit whenever the keyboard of the local teletype is operated. This is the ideal situation for "netted" operation.

The equipment has three basic inputs/outputs other than the power connection. A teletype machine naturally must be connected to the DC portion of the machine. There is an audio input for the output of the receiver to feed tones into the SGC equipment. There is also an audio output for the SGC to furnish tone modulation to a transmitter.

The equipment is very simple to use, except for two points. The first point is the adjustment of the receiver that is used to receive the radio frequency signals from another ship. If the output of the receiver is noisy, when no actual signal is being received, the noise will trigger the SGC equipment into a RCVE conditon and the equipment will not automatically go to the TRANS when the local teletype keyboard is operated. The output of the receiver must be squelched off to a very low level during the time no signal is being received. This level should be in the neighborhood of 20 or -30 dbm. Sufficient audio gain on the receiver output should be available so that the received tones can leave the receiver at approximately 0 dbm. Do not let noise from the receiver trigger the SGC into a RECEIVE condition when no tones are being received. The second point is based on the modulation level that has been set on the ship. If all radiophone remotes are set to furnish -10 dbm into the speech amplifiers of the transmitters and the output of the SGC equipment is set to furnish 0 dbm to the transmitter, over modulation will occur and this will bring about teletype distortion. If the modulation system for radiophone remotes has been set, for example, at plus 10 dbm, and the output of the SGC unit is set for 0 dbm, under modulation will occur and the range between ships will be decreased for reliable communications. The output audio from the SGC equipment should be set to furnish the same level of audio into the audio transmitters that the remote radiophone units furnish. With levels properly set and the function switch in AUTO, the SGC equipment can furnish very reliable communications for your ship.

Don't overlook the "spread" between mark and space frequencies on the SGC equipment; 700 hz for mark and 500 hz for space gives a spread of 200 hz. The normal spread for low frequency teletype is 170 hz and this gives another capability for the SGC. The equipment can be used to copy 170 hz shift low-frequency teletype such as a broadcast. Just tune up a receiver to the desired signal and set the BPO on the receiver so that the audio from the receiver is approximately 700 hz for mark and 500 hz for the space and feed this signal into the SGC equipment. Place the function switch to receive and plug a teletype into the DC side of the equipment. Have the ET's make sure that both the mark and space frequencies are correct from the equipment and the AN/SGC-1 will provide reliable communications when properly use. (737)

AN/SGC-1 and/or CV-2460/SGC Send Input to the AN/SRC-20( )–Proper Level of

This article corrects the send level adjustment of the AN/SGC-1 or CV-2460/SGC for proper input to the AN/SRC-20( ) communication equipment.

Tests conducted at NAVELEXSYSENGCEN Portsmouth, VA using various send line levels for modulation of Standard Navy UHF equipment (AN/SRC-20( ) Family) disclosed the following:

1. Send line levels of -10 DBM produced rated modulation with minimum harmonic content measured in percent distortion on correctly adjusted equipment (see NAVELEX manuals 0967-438-9010 and 0967-439-0050).
2. Send line levels above -10 DBM produced excessive distortion.
3. NAVTELCOM INSTR. C2300.19, Chapter 4, of June 1975, page 48(c) and page 51(e) specifies 0 DBM send level setting which produces harmonic distortion of 23% which is unacceptable.

In view of the foregoing, the correct send line level for best communications is -10 DBM. (EIB 946)

ANTENNA GROUP AN/SRA-3

Antenna Group AN/SRA-3 is presently being used as the antenna for Radio Set AN/VRC-8, -9, -10, -16, -17, and -18 where permanently installed aboard ship.

When used with these equipments, Antenna Couplet CU-226/SR, a component of the AN/SRA-3, is not required and should not be installed.

The couplet shall be turned over to the electronics officer for disposal.

AN/SRA-9, -12 Modified Installation Method

It has been suggested that the method of mounting Electrical Assemblies AN/SRA-9 and AN/SRA-12 be modified so that access to the rear of the unit can be gained for changing filter subassemblies without dismounting the whole unit. This can be accomplished by securing the right-hand end of the panel, by means of a piano hinge, to the standard 19-inch rack or other foundation. The left-hand end of the panel is secured by the usual No. 10-32 screws.

Normally, the proper filter subassemblies to cover the ship's regularly operating channels are installed at the shipyard and it is seldom necessary for ship's force to change these subassemblies. For this reason, a general field change to modify the mounting of this equipment is not justified. The method indicated in the suggestion is satisfactory, but its use will be left to the discretion of the installing activity.

ELECTRICAL FILTER ASSEMBLY AN/SRA-12, 12A, EQUIPMENT AFFECTED

Reception when using the AN/SRA-12 may be improved by proper internal connection and proper operation of the receivers connected to the filter assembly.

The following adjustments and connections should be checked:

a. Using AN/SRR-11, 12, or 13 receivers, the links in the antenna circuit should be connected for parallel operation and low impedance.

b. The antenna compensator controls on the front panel of all receivers should be rotated a full 360 in determining the position of maximum signal. In the AN/SRR-11 this rotation actuates a switch which adds a fixed capacitor over 180 of the rotation.

c. For maximum signal, only the red circled jacks at the bottom of each row should be used. The other jacks, which are connected to the filters through decoupling resistors, should be used only if more than one received frequency is within the pass band indicated above the row, or for very strong signals.

AN/SRA-13 THRU 16–ANTENNA COUPLERS INCREASED POWER LEVELS AND IMPROVED OPERATING PERFORMANCE

An equipment modification has been developed to permit operation of the AN/SRA-13 through 16 with high powered transmitters similar to the AN/URT-23. The plans for this modification have been distributed to Naval Shipyards. A formal field change bulletin will be distributed in the future.

This equipment modification for 1 KW (RMS) operation will:

a. Reduce the elevated operating temperatures and resonant frequency drift which would be experienced at the 1 KW (RMS) power level.

b. Provide proper control of operating performance by means of proper alignment, inclusion of impedance compensation circuitry, and close control of input impedance.

c. Provide improved voltage flashover capability at the 2 KW (PEP) level.

d. Eliminate troublesome sources of RF noise that exists in unmodified equipments.

Details of this equipment change are provided in Puget Sound Naval Shipyard drawings 409273MC1 through 409273MC6. These drawings may be used pending availability of the formal field change. Due to the complexity, installation of this change by a Naval Shipyard is reccommended.
(EIB 731)

VOLTAGE BREAKDOWN REDUCTION in ANTENNA TUNER COUPLER AN/SRA-18

On destroyers DDR types, two Antenna Tuner Couplers AN/SRA-18 are located on the TACAN mast, just aft of number one stack, where soot collects very rapidly. Life expectancy under these conditions has been about three weeks. It has been recommended by the USS WILLIAM M WOOD (DDR714) that the installation of the tunner/coupler units be installed so that the terminals of the unit face aft instead of forward. Since a number of instances of voltage breakdown troubles, caused by soot accumulation, have occurred with these units, the Bureau of Ships concurs with this recommendation in order to reduce voltage breakdown.

AN/SRA-18, TN-342/WRT-2 and TN-345/WRT-1 Antenna Tuners--Improved Method of Sealing Feedthrough Insulator (IL-59/UR)

The following improved method was received from Boston Naval Shipyard.

Most IL-59/UR feedthrough insulators are subject to leakage around the feedthrough bolt and cap when used on pressurized units. This leakage can be stopped by using the following method:

1. Disassemble the insulator.
2. Clean all metal surfaces.
3. Clean the top surface of the teflon insulation material.
4. Apply a 1/16 inch layer of Silicone Rubber (RTV-731) FSN 9Z5330-842-6380 to the inside of the insulator cap.
5. Reassemble the insulator and tighten until a solid bead of RTV is forced out around the insulator cap.
6. Let stand for 24 hours.
7. Retighten insulator assembly until a good seal is assured to compensate for shrinkage of the RTV and then reinstall the insulator in the tuner. *(80 1)*

Antenna Tuning Group AN/SRA-20
Roller Modification

The following information was submitted by Mobile Electronics Technical Unit Eleven:

"(a) When tuning channels 1 through 4, selector A allows four circuit to be operated from a single auto-transformer T-101, matching the antenna on four pre-set channels. The rollers, used to tune T-101 on channels 1 through 4, slide on fixed shafts and the clearance between roller and the shaft appears to be excessive. As a result, the rollers which do not make contact with the auto-transformer during the tuning of channels 1 through 4, will shift due to shipboard vibration and when a pre-set channel is again selected there is no assurance that it will remain tuned. A mismatch can result. Operation of Control B also resulted in unused roller movement.

(b) S-101C Channel selector C acted much as did Channel selector A. This problem was more pronounced in positions 1 and 2 which affected L-101 and L-102 and was more critical than the situation described above. The rollers may be stablized on the stationary shafts by the addition of a spring loaded contact as illustrated in Figure 1."

It is recommended that ships experiencing difficulty with the AN/SRA-20 coil rollers in the R F tuner unit, modify these rollers as described.

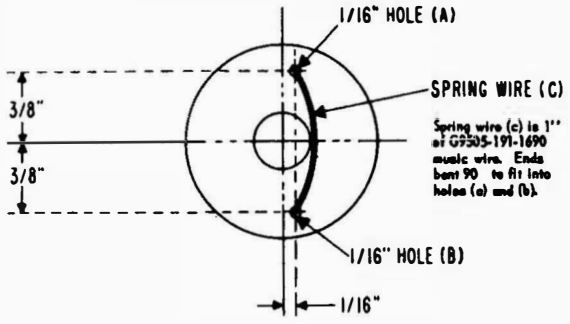


FIGURE 1

Antenna Coupler Group AN/SRA-22

Performance and Operational Reports received indicate several equipment failures that have been attributed to improper operation or installations.

It is important to tune the AN/SRA-22 with only TUNE power applied from the associated Radio Set AN/URC-32 (tune switch is located on the power amplifier chassis), otherwise a badly detuned antenna can cause damage to the coupler unit if full power is applied. Additionally, the AN/SRA-22 antenna coupler control unit contains a SERIES-SHUNT and CAPACITOR switch that must be operated in accordance with the instructions in the technical manual (or on the associated Operating Instructions Chart). Steps should be followed in that definite discreet sequence and this switch should not be moved again until the red light on the panel indicates the variable capacitor of the coupler has stopped moving as indicated by the red light being extinguished.

On certain frequencies and when working into a whip antenna, if the switch is moved more than one step at a time, a radical large change in Q is possible so that exceptionally high voltages can develop within the coupler to cause a voltage breakdown.

Additional difficulties reported indicate that improper antenna tuning is caused by a dirty antenna base insulator, leaky coaxial cable transmission line to the coupler, or inadequate coupler unit grounding. Periodic inspection and cleaning of the antenna base insulator "megger" checks of the transmission line, and verification of a good ground connection to the Coupler CU-714/SRA-22 case will reduce these failures. Do not rely on a good ground being provided by the bolts attaching the coupler to its mounting; a separate ground strap is mandatory. (532)

AN/SRA-22 ANTENNA COUPLER–BUREAU OF SHIPS PLAN DISCREPANCY

BUSHIPS plan RE47C2013, recently issued, contained an inadvertent wiring error. Installations of Antenna Coupler AN/SRA-22, using this drawing for cabling information, has resulted in a damaged tuner unit.

BUSHIPS plan RE47C2013 has been superseded by plan RE47D2021A. This plan and the AN/SRA-22 Technical Manual (NAVSHIPS 93286) are correct and shall be used. (516)

AN/SRA-22–TUNING INFORMATION

In order to assure proper tuning of the AN/SRA-22 equipment and to eliminate equipment failure, the following points should be understood:

1. Do not operate the AN/URC-32 at output powers of over 500 watts.
2. Always use "Tune" power of the AN/URC-32 when tuning the AN/SRA-22.
3. When tuning the AN/SRA-22 to any new or change of frequency, always start the tuning procedure with:
   a. Capacitor series/shunt switch on "Shunt
   b. Capacitor switch on "Position 1"
   c. Coil and tap dials on "100"
   d. Coil and tap meter on "0"
   e. Capacitor-indicator light (red) "Out"
4. Do not rely on fixed precalibrated capacitor, coil, or tap settings issued by any activity unless these settings have proven to be satisfactory by actually checking the settings, by tuning the AN/SRA-22 in accordance with the existing procedures in NAVSHIPS 93286 change 2, or NAVSHIPS 93286.21(A). (**Note:** These publications are now available in Navy issuing activities and they should be requisitioned as soon as possible.) The impedances of 35-foot whip antennas on board ships are not necessarily the same because impedance depends on many factors; thus the AN/SRA-22 settings of capacitor, coil, and tap will not be the same for all ships or even for the same class of ships. It is best to calibrate each antenna and AN/SRA-22 using the information (Procedures) in the above mentioned publications and not to take for granted the AN/SRA-22 settings that were taken on other ships. (561)

AN/SRA-22–INSTALLATION

In cases where installation requirements dictate the need for a right-angle multiconductor plug, in lieu of the supplied straight type (P5), the following plug may be requisitioned and installed:

	Type	FSN
Connector	AN3106A-34-285(s)	N5935-195-8049
Clamp	AN3057-16	N5935-283-3402

The connector sleeve supplied with the equipments plug (P5) may be removed and used on the right-angle type connector. (560)

AN/SRA-22; PREMATURE TRIGGERING OF VSWR PROTECTIVE CIRCUIT

Investigation of reports concerning the triggering of the VSWR protective circuit (furnished in later production models of the AN/SRA-22 or installed as a field change) by as little as 4 watts of reflected power has indicated that the possible cause is a poor ground system established at the time of installation of the AN/SRA-22 equipment.

Ships and activities are again cautioned to ensure a good metal-to-metal contact in the grounding of the CU-714/SRA-22 coupler unit. **Do not** rely on the equipment mounting bolts; use a grounding strap. Additionally, be sure that the cable used in the antenna transmission line system are good.

AN/SRA-22 BLOWER MOTOR

Failure information, reviewed by the Electronics Maintenance Center, has indicated certain component failures in CU-714/SRA-22 coupler are caused by high temperatures within its cabinet. One such report, submitted by USS TANNER (AGS-15), stated that blower motor (B-1) in Control Coupler C-2698/SRA did not run, thus causing the failure of CU-714/SRA-22 components because of high cabinet temperature. It was determined that the blower had failed to function because of transmit-receive relay contact failure. Relay contacts in section "D," K-1, located in AN/URC-32 Sideband Generator had burned open.

The Electronics Maintenance Center is investigating the failure of the transmit-receive relay contacts and will provide corrective action. In the interim, it is recommended that section "D," K-1, transmit-receive relay contacts be inspected frequently to ensure that good contact closure is occuring. Contact closure may be checked by connecting an a.c. voltmeter between terminals 1 and 13, terminal board H located in junction box (J-1007) in the AN/URC-32. The voltmeter will read 115/120 volts (when the transmitter is keyed) if the relay contacts are closing properly.

AN/SRA-22 ANTENNA COUPLER-SUPPLEMENTARY INSTRUCTIONS FOR ALINEMENT OF COIL STOP ASSEMBLY MP-129

The advisability of further amplifying the instructions relative to STOP and POTENTIOMETER alinements after repair of Coil Stop Assembly MP-129, index 282, stems from recent comments received from the fleet. The following supplementary instructions and suggestions should help clarify and resolve some of the problems experienced after repairs as well as reduce repeated failures of these equipments.

References:

AN/SRA-22 Operator's Instruction Chart, NAVSHIPS 93286.21(B)

AN/SRA-22 Technical Manual, NAVSHIPS 93286, including CHANGE 3

Recommendations:

Coil Stop Assembly MP-129 (Index 282): To reduce the possibility of a casualty associated with the coil stop assembly, operating personnel should use caution when carrying out steps 4, 5, and 6, the COIL COARSE TUNE/FINE TUNE switch should be so used that the operator will minimize a tendency to overshoot when bringing the COIL meter to zero (needle center of scale). Using the COIL COARSE/FINE TUNE switches in the FINE TUNE position will aid in preventing the possibility of overshooting.

If the coil switch is operated much beyond that specified in steps 4, 5, and 6, as will be indicated to the operator by the COIL meter swinging to the right of zero (needle to right of center), the coil will come up against the coil stop assembly. Repeated banging of the coil against the coil stop assembly has been responsible for the weakening of the coil stop assembly, which, on failure, can cause antenna coupler damage and a resultant CASREPT.

Further, repeated or extended operation of the COIL COARSE TUNE/FINE TUNE switches (which causes the coupler to bang or remain for extended periods against the coil stop assembly) can cause motor failures.

Potentiometer Alinement: Whenever any repairs or replacement of parts are made to the CU-714/SRA-22 tuning assembly, the potentiometer alinement (see NAVSHIPS 93286, including Change No. 3, page 5-15) should be rechecked to insure that the COIL and TAP dials will provide proper indications of the coil and tap positions. If a recheck of the potentiometer alinement is not made, neither the COIL and TAP meters nor the COIL and TAP dials will be useful in carrying out the proper tuning procedure of the Operator's Instruction Chart (NAVSHIPS 93286.21B).

NOTE

Correct spelling of paragraph 5-6c(8) of NAVSHIPS 93286 (including Change No. 3), page 5-16, to read, "RUN THE TAP."

Replacement of Coil Stop Assembly: New production models of the AN/SRA-22 are being provided with an improved Coil Stop Assembly MP-129 (Index 282) of heavier gauge (21 gauge, 0.0285) spring material. On units that are being repaired at the AN/SRA-22 repair facilities, this new coil stop assembly is being installed during repair.

Replacement Procedure:

a. Remove CU-714/SRA-22 tuning assembly from watertight case.

b. Refer to AN/SRA-22 technical manual, figure 5-5, page 5-19 (exploded view of CU-714/SRA-22 tuning assembly).

c. Manually roll ribbon and coil tap to about midpoint of High Voltage Drum.

d. Mark position of Low Voltage Drum (Index 107), Low Voltage Drum End Assembly (Index 120), and the Low Voltage Drum Driven Gear (Index 102). This marking is for reference alinement during reassembly.

e. Remove four screws (index 104).

f. Remove roll pins (index 100) from either side of gear 102.

g. Remove switch (index 78) from shaft and push to one side; this will permit removal of gear 102.

h. Push end assembly (index 120) against spring into Low Voltage Drum.

i. Remove gear 102

j. Mark position of Coil Stop Assembly (index 282) on fiber plate face (index 419) so that a new coil stop assembly can be inserted in the same position as the one that was removed. Remove set screws (index 260) for Coil Stop (index 261). Remove damaged Coil Stop Assembly (index 282). Install a new stop assembly and reverse the above procedure for re-assembly.

k. Recheck potentiometer alinement. (619)

ANTENNA COUPLER GROUP AN/SRA/22-AND ITS USE WITH SUBMARINE EMERGENCY WHIP ANTENNA AT-774/UR

The U. S. Navy Electronics Laboratory, San Diego, has recently completed tests and measurements on Antenna Coupler Group AN/SRA-22 and its use with the submarine emergency whip antenna AT-774/UR. Results of these tests show that the equipment provides satisfactory performance over the entire frequency range from 2.0 to 25 mc. The efficiency of the coupler was approximately 40 percent 2 to 4 mc., 60 to 80 percent from 4 to 8 mc., and 80 to 90 percent above 8 mc. No difficulty was experienced when operating with full power (500 watts) at any frequency tested.

RIBBON BREAKAGE IN AN/SRA-22

When the coil-ribbon breaks on the AN/SRA-22, it often breaks an inch or two from the end which is attached to the metal drum. It has been reported that emergency repairs have been made by shortening the ribbon by the amount that was broken off. This practice is not approved and will be discontinued, because it changes the end-stop settings and causes further damage to the unit. If a new ribbon is not available, the two ends are to be silver-soldered and the ribbon replaced with a new one as soon as it is available.

CU-714/SRA-22 FAILURES IN AN/SRA-22

An investigation of P and O failure reports concerning this unit indicates that a majority of the failures have been caused by miswiring of plug P-7 upon installation. Costly components are damaged beyond repair because of negligence, not verifying proper connection, wiring continuity, checks for solder shorts, and the proper sealing against salt water penetration of the completed plug after assembly. These units are in critically short supply because of funding limitations which permit the procurement of one AN/SRA-22 for each AN/URC-32. When a replacement unit is requested, its issue jeopardizes other ship installations until repair of the failed unit and return to stock can be effected.

Several ships have remoted the antenna tuning-assembly section from the case and have forwarded only this unit to a repair activity. This practice has caused additional damage and further equipment shortages.

Although the black unit-nomenclature plate is attacted to the tuning unit section, the nomenclature CU-714/SRA-22 applies to the entire antenna coupler unit, including the case and blower. See figure 101 of the NAVSHIPS 0967-136-6010 the technical manual for AN/SRA-22.

When shipping for repair, assure that the entire unit is sent. Additionally, when shipping the CU-714/SRA-22, the shipping labeling should include the unit stock number (FSN-F5984-789-1987) for stock identification. If the CU-714/SRA-22 and the control unit C-2698/SRA-22 are turned in, the appropriate stock number is then FSN F5985-543-1861. Pack adequately to insure against further damage caused by shipping.

Overhaul Instructions Manual

Change 1 to this manual (NAVSHIPS 93286.61) is now available and if not received, should be requisitioned. This manual is normally held by shipyards, repair activities, METU's, and tenders. This change provides additional repair instructions, disassembly-assembly information, and Alignment details.

Erratic Tuning

When experiencing erratic tuning, particularly in the 2- to 5-mc range, checks should be made for a poor or lost ground connection on the CU-714/SRA-22 unit. A GOOD ground connection MUST be made to this unit. DO NOT RELY ON THE EQUIPMENTS, MOUNTING LAG BOLTS; provide a good ground strap and clean metal-to-metal connections.

A faulty C7 vacuum capacitor will also cause erratic tuning.

CU-714/SRA-22 Tuning Slug (H7)

If failure of the tuning slug is experienced and repairs cannot be immediately made, the AN/SRA-22 can still be used at frequencies above 3 mc. Normally, the slug is only necessary at the lower frequencies. For this emergency measure, use caution in tuning and follow the tuning procedure steps.

Operator's Tuning Chart

The design of the AN/SRA-22 is primarily for use with a standard 35-foot whip and the Operators Instruction Chart (NAVSHIPS 93286.21 (A), supplied with the equipment) provides for tuning this type of antenna. When tuning other types of antennas, refer to the equipment technical manual.

When tuning antennas shorter than 35 feet, the procedures are the same except when tuning frequencies in the 2- to 3.5-mc range. For this type of antenna, a new step (5a.) should be added after the "NOTE" in step 5, of tuning chart as follows:

"5. Tuning step for antennas shorter than 35 feet in the 2to 3.5mc range. If no dip is found, leave the COIL and TAP where they are (i.e., the COIL should be at 500 and the TAP at 100). Advance the CAPACITOR position switch one position at a time (waiting until the run light goes out between each step) while watching the reflected power for a dip. CAUTION DO NOT switch the capacitor SERIES/SHUNT at all times when this step is used." Change the NOTE in Step 5 to read "proceed to STEP 5a."

C-2698/SRA-22 Control Unit

Assure the installation of a 1-1/2 ampere fastblow (3AG) type fuse at F1. Replace fuse if other than this type is installed. The 1N1084 diodes and the helipots will not take

the possible 300-percent overload that a slow-blow allows.

Stock numbers. For information, the stock numbers for recurring failure items are:

1E7 Coil ribbon	9Z9545-649-7822
1H7 Coil core	9N5950-681-6870
1L1 Coil form	9N5950-583-0924
1M116 roller	N-5820-671-1311

Water in Antenna Coupler

Penetration of water into the case of the antenna coupler has been attributed to an improperly designed gasket in the units with serial numbers 1 through 495. The Contractor recently shipped replacement gaskets to all holders of these equipments. The new gaskets should be installed as soon as possible and the original gaskets returned to the contractor. When replacing this gasket, the use of a silicon compound such as DC-4 will insure a more watertight seal.

Always replace the J-9 blower motor plug before replacing the tuning unit of the CU-714/SRA-22 in its case.

Test Cable

A test cable is a valuable asset for the AN/SRA-22 for use when the CU-714/SRA-22 unit is removed from its mounting and placed near the AN/URC-32 for testing or maintenance checks. This control cable can be locally fabricated with a plug (N5935-296-8775), a suitable length of MSCA-24 or similar cable, and a plug (N5935 (N5935-552-7255).

CAUTION- When testing the AN/SRA-22, insure that the output bowl insulator is terminated in a suitable load, such as shown on BUSHIPS plan RE 66C 2145B, or damage will result.

CHECK-OUT PROCEDURE FOR AN/SRA-22 ANTENNA COUPLER

See article in AN/URC-32 section under the same title.

AN/SRA-22 ANTENNA COUPLER GROUP–MAINTENANCE HINT

The purpose of this article is to advise maintenance personnel that the major cause of damage to coil 1L1 is due to heat being generated in slug 1H7. When 1L1 has to be replaced, the 1H7 slug also should be replaced.

The 1H7 slug contains iron granules in a teflon bonding material. When excessive heat is generated in 1H7 it causes the teflon bonding material to melt thereby allowing the iron granules to come in contact with each other creating more heat which eventually destroys the 1H7 slug. There is a cumulative nonreversible action. Therefore, if the 1H7 slug is not replaced along with 1L1, it will damage the new 1L1 coil more rapidly due to the 1H7's already deteriorated condition. (656)

AN/SRA-22 ANTENNA COUPLER GROUP–COOLING HINT

The purpose of this article is to advise maintenance personnel that the removal and discarding of the shrouds on CU-714/SRA-22 will result in excessive component heating. The purpose of the shrouds is to direct enclosed air through the center of coil (1L1) around slug (1H7), and through to the double wall of the case. The air is then cooled by natural radiation and convection from the case. (672)

AN/SRA-22 ANTENNA COUPLER – GROUP SEALING OF SETSCREW WITH GLYPTAL OR VARNISH

Failure to secure setscrews by applying glyptal or varnish on the threads is causing failures of the AN/SRA-22 Antenna Coupler. Drive motors, stiches, and gears are becoming disengaged from their shafts during normal use and vibrations, because they have not been properly secured. (674)

AN/SRA-22 CONNECTOR SEALING

To further moisture-proof the RF and multiconductor cable connectors terminated at the weather exposed CU-714/SRA-22 unit, it is recommended that these connectors, after assembly, be coated with a sealant as described in the General Maintenance Handbook, NAVSHIPS 0967-000-0160, Section 6. (605)

AN/SRA-22–MAINTENANCE HINT

This article describes the method to be used, and the material required, for improved weatherproofing of Antenna Coupler CU-714/SRA-22.

MATERIAL REQUIRED:

Item	Description	Stock No.
1	Insulation tape, plastic	5970-188-5477
2	Electrical insulating compound	N5970-295-8357
3	'O' ring stock	9Z5330-187-3611
4	Brass 'T' stock	9C4730-254-6242
5	Insulating compound stock	5970-159-1598
6	RVT-102 stock	2RM8040-225-4548
7	Gasket, material stock, 1/8 inch	KZ5330-244-9277

PROCEDURE:

The procedure to be used in weatherproofing cables and in sealing the coupler is fully illustrated in figures 1 and 2, respectively.

NOTE

All 'O' ring gaskets should be renewed after each overhaul to assure pressurization. (689)

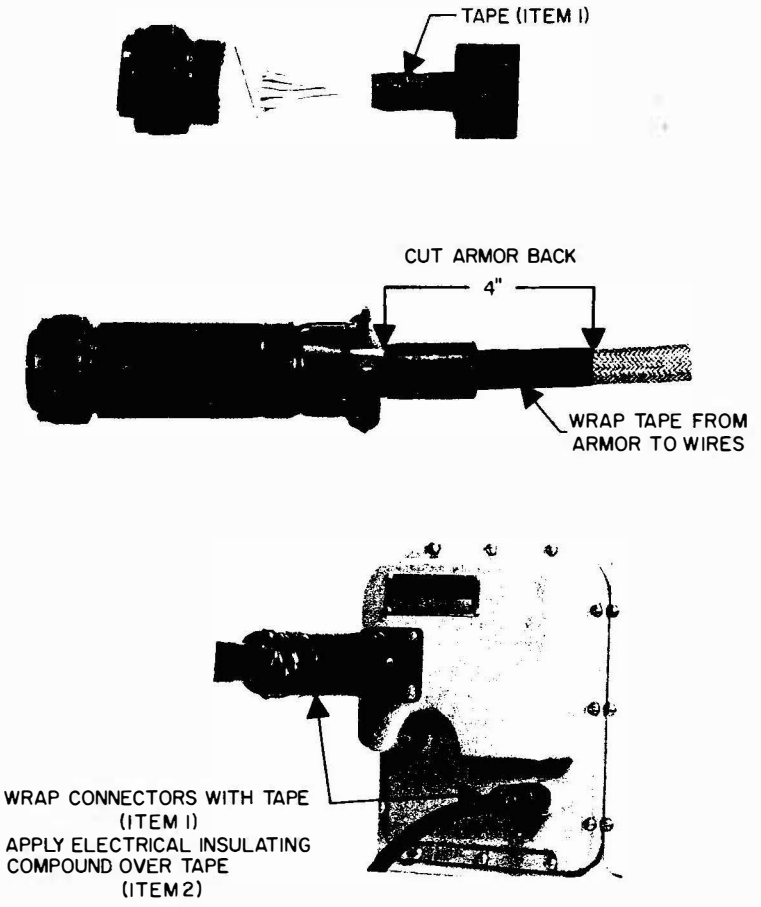


Figure 1. Weatherproofing Cable

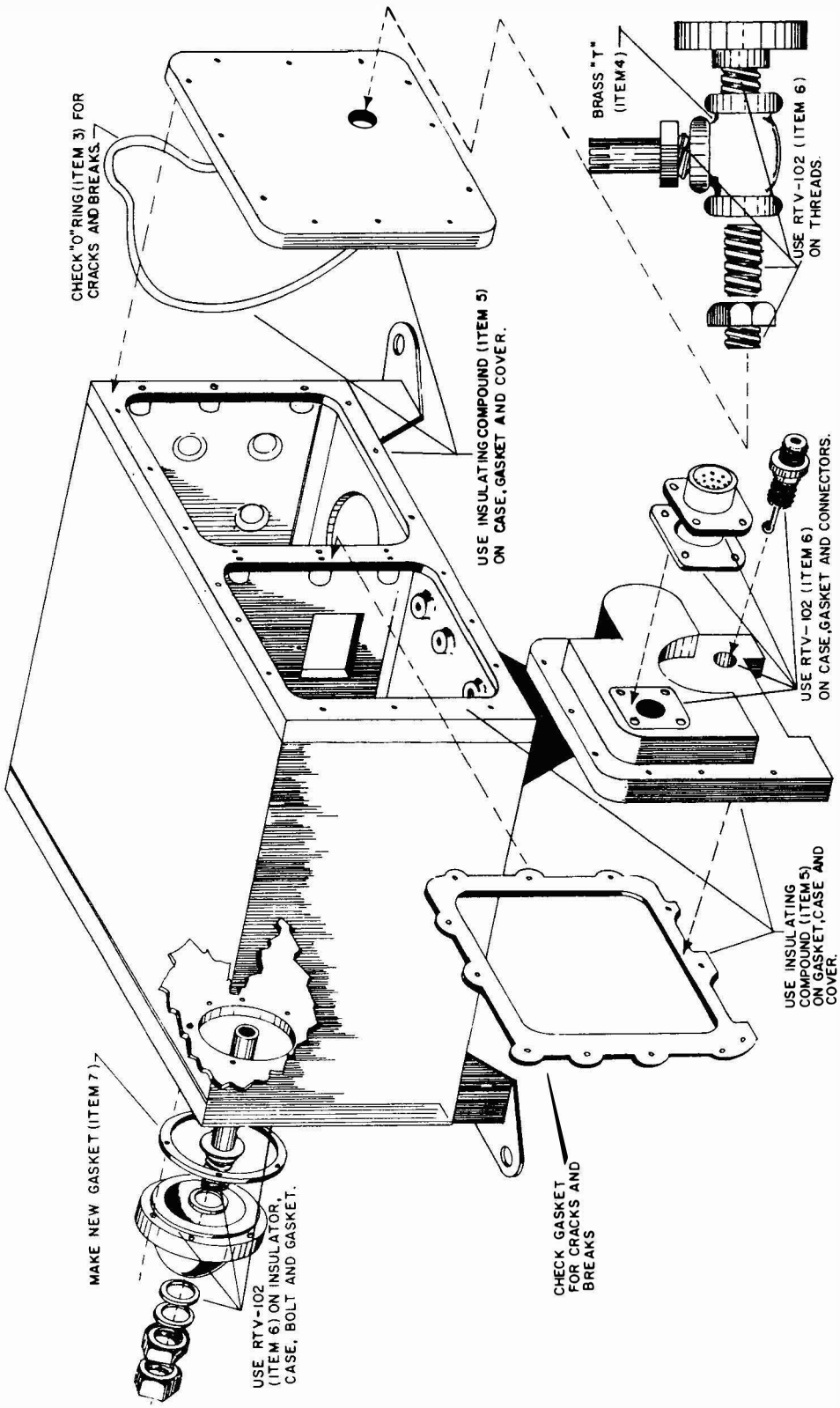


Figure 2. Method of Sealing CU-7714/SRA-22

CU-714/SRA-22 COUPLERS IMPROPER HANDLING OF

See article under CU-714/SRA-22:1 with same title.

AN/SRA-22 ANTENNA COUPLER GROUP– MAINTENANCE HINT TO REDUCE BREAKAGE OF RIBBON 1E7

Maintenance personnel are advised that the placement of the silver ribbon, 1E7, under the screw on the metal drum causes the ribbon to fracture and eventually break. (See figure 1).

Figure 1. Present Method of Mounting Silver Ribbon 1E7.

It is recommended that the ribbon not be secured under the screw, but that an additional turn of ribbon be taken on the drum. This will reduce ribbon breakage and cause the ribbon to run straight on the drum. (See figure 2). (701)

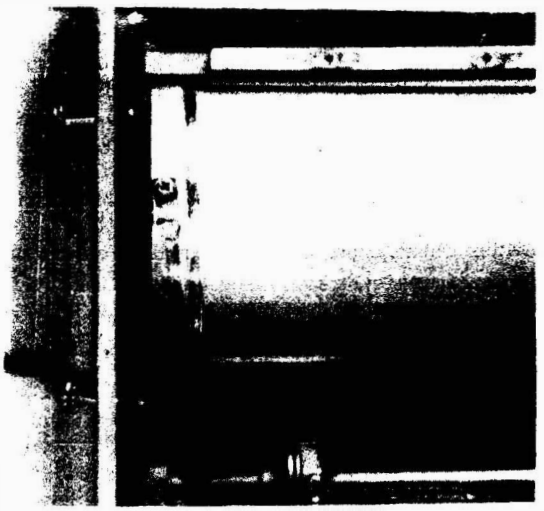


Figure 2. Recommended Method of Mounting Silver Ribbon 1E7

AN/SRA-22 ANTENNA COUPLER GROUP–REQUISITIONING AND TURN-IN PROCEDURES

The Naval Ship Engineering Center, Norfolk Division, has received reports stating that the wrong stock number (FSN F5985-543-1861) is being used when requisitioning units of Antenna Coupler Group AN/SRA-22.

When requisitioning units of Antenna Coupler Group AN/SRA-22 (F5985-543-1861) (in accordance with NAVSHIPS Instruction 9671.22B), the following applies.

UNIT	FSN
CU-714/SRA-22	F5985-789-1987
C-2698/SRA-22	F5820-897-5501

Repair facilities report that Antenna Coupler CU-714/SRA-22 is being received in a damaged condition by having been shipped without its case.

Activities are advised that shipping the CU-714/SRA-22 without the case has resulted in damage to the 1C7 vacuum capacitor and other parts. The cost to replace 1C7 vacuum capacitor is approximately $219.00 and cost of replacement of the missing case is $495.00. Therefore, in order to eliminate these unnecessary costly replacements, those activities which have shipped Antenna Couplers CU-714/SRA-22 to repair facilities without their cases should ship the cases to the respective repair facilities at the earliest practicable date.

In addition, activities are advised that no further shipments of the CU-714/SRA-22 shall be made without the case. (E1B 712)

INSTRUCTIONS FOR THE RETURN OF AN/SRA-22 AND ITS COMPONENTS FOR EXCHANGE AND REPAIR

1. The AN/SRA-22 (2Z5985-543-1861), which consists of Antenna Coupler CU-714/SRA-22 (2Z5985-789-1987), and Control Unit C-2698/SRA-22 (2Z5820-897-5501), as a whole or part, are subject to automatic return for exchange and repair when found to be inoperative.

2. In order to shorten the paper work and material pipeline between the Fleet and the Repair Facilities, all activities and ships are authorized to return the above material to the nearest of the five listed Repair Facilities for exchange. This will be done without reference to the Naval Electronic Systems Command Headquarters.

3. NAVEL EXINSTRUCTION 4400.2 ELEX 0522 of 26 December 1967, which supersedes BUSHIPS INST 9671.22 Ser 627DI-532 of 18 January 1965, is for all intents and purposes identical to the BUSHIPS INSTRUCTION, except that the three Repair Facilities in WESTPAC have been included as sources for the exchange and repair of this material.

4. **In Brief:** When the above material becomes defective, it is to be returned to the nearest of the five listed Repair Facilities, via the Naval Supply Depots, at Yokosuka, Subic Bay, and Guam for ships in WESTPAC, as expeditiously as possible. Replacements will be provided on a one for one basis from Ready-for-Issue stock held by the Stocking Activity. If Ready-for-Issue stock is not available, the requisitioned item will be placed on back order, and the requisitioner will be advised of the estimated date the replacement will be shipped. For each item returned, the ship or activity will submit a requisition for a replacement to the stocking activity to which they shipped the defective item. This requisition must include the document number under which the defective material was shipped, and provide the name of the Supply Actvity to which it was off-loaded. This action will be taken without reference to the Naval Electronic Systems Command, except that one copy of the requisition should be forwarded to NAVELEX Code 05222 for information.

5. To expedite the movement of this material, a MOVEMENT PRIORITY DESIGNATOR (MPD) 03 is to be used on all shipments.

6. **Packaging and Packing:** Every component is to be thoroughly packaged and packed to prevent damage. The CU-714/SRA-22 must be shipped in its pressure-proof case. This has been called to the attention of all concerned in previous issues of the EIB. (See EIB 671 of 26 December 1965, and EIB 712 of 31 July 1967.) Both articles stress the necessity for shipment of the CU-714/SRA-22 in its pressureproof case to prevent damage to Vacuum Capacitor 1C7 which is a high cost item.

7. List of Authorized Repair Facilities:
   Norfolk Naval Shipyard, Portsmouth, Va.
   San Francisco Bay Naval Shipyard, San Francisco, Calif.
   U.S. Naval Ship Repair Facility, Guam, M.I.
   U.S. Naval Ship Repair Facility, Yokosuka, Japan
   U.S. Naval Ship Repair Facility, Subic Bay, P.I.

8. All of the restoration activities report that requisitions for replacements in Ready-for-Issue condition constantly exceed the quantity of Non-Ready-for-Issue material being turned in. All ships and stations are requested to expedite the movement of this material to the designated Repair Facilities in order to minimize this condition.

9. The stocking activity in WESTPAC should request release from COMSERVPAC of this material, if held in stock, and if not in stock, pass the requisition to COMSERVPAC for action. The remarks section of the passed requisition should contain an estimate of the earliest date that the requisition could be filled if back-ordered from restoration assets. COMSERVPAC will then determine if material is to be back ordered or if the requisition is to be passed to another activity.

10. The Naval Electronic Systems Command will not take action on requisitions for this material. They will be referred back to the requisitioner with instructions to place their requisition with the nearest Repair Facility in compliance with NAVEL EX INSTRUCTION 4400.2 of 26 December 1967, and assure the return of the Non-RFI material as required. (730)

OPERATION OF ANTENNA COUPLER AN/SRA-23(XN-1) WITH THE AN/URT-17 TRANSMITTER

Antenna coupler AN/SRA-23(XN-1) is capable of handling the output of transmitter AN/URT-17 without damage. It is necessary, however, to recalibrate the INCIDENT POWER meter in the coupler for full scale deflection with 1000 watts of RF power instead of 500 watts for which the meter was originally calibrated. To accomplish this, proceed as follows:

1. Connect a dummy load, DA-91/UR or equivalent, to the antenna terminal of the antenna coupler. **(WARNING:** This dummy load is rated at 500 watts without forced-air cooling. When dissipating 1000 watts, apply power only intermittently, 15-seconds on and 45-seconds off.)

2. Adjust the transmitter for a low-output indication on coupler incident-power-meter (about 250 watts). Complete tuning of transmitter and coupler for normal operation. Adjust incident-power-meter calibrating potentiometer for downscale reading, to potentiometer stop.

3. Adjust transmitter CW carrier to give 4.5-amperes of output current into the coupler, giving approximately 1000 watts into a 50-ohm load.

4. Adjust the incident-power-meter calibrating potentiometer so that meter reads 500 watts. Do not touch the reflected-power-meter calibrating potentiometer.

5. Attach a label to the incident-power-meter face indicating "METER READING X2." This completes the recalibrating procedure.

The above procedure is applicable to other installations involving transmitters with 1000-watt output capability when used with antenna couplers AN/SRA-23 (XN-1).

AN/SRA-33 Antenna Coupler Group--Maintenance Hint

The AN/SRA-33 is an automatically tuned UHF multicoupler to permit use of up to four AN/SRC-20, AN/SRC-21, or AN/GRC-27 radio sets into a common antenna. This equipment will begin deliver in September 1965.

Each of the four couplers is automatically tuned to any of 19 preset frequencies per radio set, giving a total combination of 76 frequencies when four radio sets are used.

The minimum allowable frequency separation between any two radio sets is approximately 5 megacycles. If the frequency separation between any two radio sets is less than 5 megacycles, the automatic interlock protective circuitry may disable the couplers to prevent damage.

Therefore, operators are cautioned not to preset the frequencies between any two radio sets closer than approximately 5 megacycles. (673)

AN/SRA-33 Multicoupler Key Line--Protection of CU-1131 Through CU-1134/SRA-33 Cavities

The maintenance personnel are advised that damage to the AN/SRA-33 multicoupler cavities will result if removal of jumper at pins G and H of J102 is not accomplished in Radio Set Control C-3866/SRC.

All AN/SRC-20/21 equipments installed before installation of the AN/SRA-33 multicoupler required pins G and H to be jumpered at J102 of Radio Set Control C-3866/SRC in order to key the transmitter.

If there is no jumper on pins G and H of J102, there exists a possibility of a jumper at K207, pin 1, and S201, terminal 8, of C-3866. In either case, the jumper should be removed so that the AN/SRA-33 will open associated key lines to the same channel, thus preventing any AN/SRC-20/21 installed in the same bank of multicoupler from keying into an unloaded cavity. (EIB 714)

AN/SRA-33 Antenna Coupler, NAVSHIPS 0967-037-8002—Information Concerning

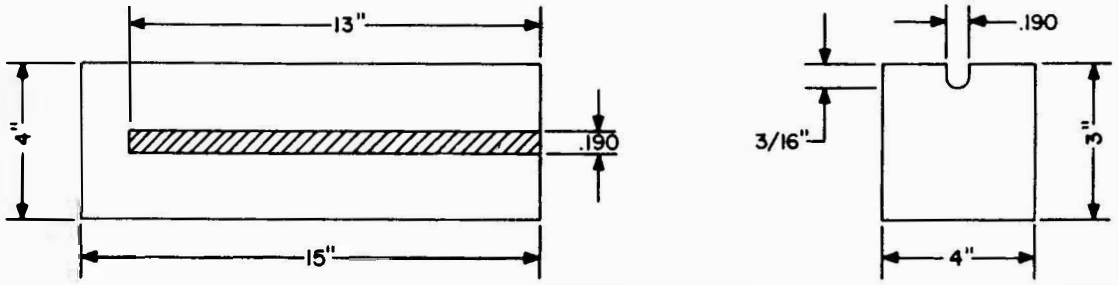
This article notifies manual holders that Change 2 to AN/SRA-33 Antenna Coupler, NAVSHIPS 0967-037-8002, dated 1 July 1976 is applicable only to DD-963 class ships installations. This change is not to be inserted in AN/SRA-33 Technical Manuals for any other ship.

(EIB 953)

AN/SRA-34(V) Stiletto--Maintenance Hint

This article provides a drawing for a stiletto maintenance jig (figure 1) that can easily be fabricated out of aluminum stock by any machine shop and is utilized for straightening the stilettoes used in the SA-1070/SRA-34A(V) matrix for crosspoint patching. To use the jig:

1. Remove stiletto from matrix, place the rod in the retaining groove, and roll with the palm of the hand until it is straight.
2. Reinsert the stiletto in matrix.



TOP VIEW END VIEW

Figure 1. Stiletto Maintenance Jig

(EIB 902)

AN/SRA-51 Antenna Group—Maintenance Hints

Fleet comments received by NAVSECNORDIV indicate several minor problems related to sealing of the CU-1691/SRA-51 cabinet. Some reports involve seizing of the captive hold-down door bolts and others note an occasional gas leak through the antenna feedthru terminal.

The captive door bolts are an insidious problem because if one seizes, the only solution is to cut off the head close to the front surface. Such drastic action mars the door finish, but is the only means to gain access to and apply penetrating oil to the threads. In order to reduce or prevent this problem, it is recommended that a 1/4 inch squeeze of silicone grease (DC-4, DC-5, DC-33 etc) be inserted into the bolt holes (44) and worked into the threads with a match stem or toothpick. Apply some grease to each bolt's threads also. Check the door(s) gasket for sufficient grease; wipe clean if foreign matter has adhered, and apply fresh silicone grease. Replace doors, tighten bolts and charge 1 to 2 psig of dry nitrogen with a MK-260/U nitrogen bottle kit. NOTE: The MK-260/U (FSN 4G5820-313-7703) is on the COSAL of all ships employing dry nitrogen filled lines, tuners, couplers, coaxial cable or waveguide. Refill MK-260/U at facilities such as Naval Stations and Naval Air Stations.

NAVSECNORDIV has a supply of improved replacement neoprene inserts for the lAlEl antenna insulator and will supply replacements upon request. The insert is difficult to install and is not recommended for routine installation. Since the installation of the antenna support cone Field Change 2-AN/SRA-51, the original insert is performing much better. Requests for insert kits may be directed to Officer in Charge, NAVSECNORDIV (Code 6621E), Naval Station, Norfolk, VA 23511. (EIB 855)

AN/SRA-56, -57, -58 Antenna Coupler Group — Maintenance Hint

The purpose of this article is to advise maintenance personnel of a problem that may exist when returning a coupler drawer to the cabinet.

1. Should the output coupling assembly get pushed all the way in accidentally when a drawer is pulled out or removed from the cabinet, it will be extensively damaged when the drawer is returned to the cabinet. Therefore, before returning a drawer to the cabinet make certain the output coupling assembly is in the fully extended position.

2. Using a tape embossing tool make a label stating: "DO NOT PUSH DRAWER INTO CABINET UNLESS OUTPUT COUPLING ASSEMBLY IS IN THE FULLY EXTENDED POSITION." Stick the label on the top of each drawer below the present warning label.

(EIB 935)

AN/SRA-56, AN/SRA-57, AN/SRA-58 Antenna Coupler Groups Low Power Tune Capability—Temporary Provision for

This article provides an interim method of modifying the AN/SRA-56, -57 and -58 Antenna Coupler Groups to provide a low power tune capability until a final field change can be made available for the subject equipments.

Field Change 1 to the AN/SRA-56, -57 and -58 provides a low power tune modification for these equipments. However, the supply of these field changes has been exhausted. Until additional quantitites of Field Change 1 are available, antenna coupler groups which must operate with low output power transmitters (less than 500 W, such as AN/URT-24) can be modified in accordance with paragraph 4.3.3.2 of Change 1 (NAVSHIPS 0967-284-6011) to the Technical Manual, NAVSHIPS 0967-284-6010. The shorting bar shown in Figure 4-3 is a six inch length of copper tubing of seven-eighths inch diameter mounted in the receptacles which normally hold resistor R-5. Every effort should be made to retain removed resistors R-5 and R-8 so they may be reinstalled during installation of Field Change 1, when it becomes available. (If resistors R-5 and R-8 are misplaced, the equipment will still operate with Field Change 1 but in a slightly degraded fashion.) When the equipment is modified per technical manual Change 1, this fact should also be noted in Figures 5-27 and 5-50.

The modification of the power attenuator is not being subjected to configuration control procedures but its installation should be locally noted.

An EIB article will announce the availability of the final low power tune field change kit when it is received in the supply system. These kits will be available in 12 to 18 months.

(EIB 950)

AN/SRA-60(V) Antenna Coupler Group—Maintenance Hint

This article provides maintenance personnel with a method of repairing the slip clutch and gear assembly in the CU-1791/SRA-60(V) should it become galled to the shaft.

1. Remove the CU-1791/SRA-60(V) drawer from the cabinet and remove the capacitor drive assembly as described in paragraph 5.4.1.5, step 1, 3-5 of Technical Manual NAVELEX 0967-421-4010.
2. Remove the drive pin from the counter drive gear and remove the gear from the shaft.
3. Remove the front cover from the capacitor drive assembly. Do not disturb the setting of the gears.
4. Mark the gears for realignment purposes before removing the damaged slip clutch and gear assembly.
5. The slip clutch and gear may now be removed and disassembled as shown in figure 1 on page 5.
6. Use crocus cloth to polish the damaged portion of the shaft and gear to a smooth finish.
7. Lubricate the portion of the shaft that the gear rides on with a dry lubricant (FSN 9150-754-0064). Use a cotton swab and be careful to keep the plastic discs free of lubricant.
8. Reassemble the unit reversing the removal procedure.
9. Adjust the slip clutches using the procedures described in paragraph 5.3.10 of Technical Manual NAVELEX 0967-421-4010.

(EIB 863)