RF OSCILLATOR 0-140B/FRT—Test Procedure

The following test procedure is recommended for use:

The AN/USM-26 frequency meter is an extremely useful instrument to quickly locate a trouble in the RF oscillator 0-140B/FRT-15 utilized in AN/FRT-25 equipments. Advantages of this procedure are speed and accuracy in locating troubles. Reference to specific pages of the instruction manual is avoided, since more than one equipment is involved. Reference to dials "A", "B", "C", "D", and "G" in this procedure are those of 0-140B/FRT-15 equipments.

Procedure:

1. The 200 kc. oscillator, the basic oscillator of the unit, should be checked first. The frequency counter may be connected directly to J-3501. The frequency counted should be close to 200 kc.

2. The output of the 101-100 kc. oscillator should be checked at J-3702. Setting dial "D" to zero on the white scale should result in a frequency of 101 kc. Adjust dial "D" for exactly 100 kc.

3. The multivibrators should be checked next. The 100 kc. output is available at P-3501, the 10 kc. at P-3502, and the 1 kc. at P-3503. Remember that any error in the 200 kc. oscillator will result in an error in the multivibrator checks. As an example, a 10 cycle error in the 200 kc. oscillator will result in a 5 cycle error in the 100 kc., a 0.5 cycle error in the 10 kc., and no readable error in the 1 kc. Every effort should be made, however, to remove all error in the 200 kc. oscillator. Any count other than that described above indicates need to adjust the multivibrator. If the multivibrator needs adjustment, the procedure outlined in section 7 of the instruction book should be followed, except that the AN/USM-26 may be used in place of the oscilloscope and the audio oscillator.

4. The 29-20 kc. output may be checked at J-3302. The setting of dial "C" should be 9 for 20 kc. output, and zero for 29 kc. Check the output at each setting of dial "C".

5. The 130-120 output may be checked at 0-3602. If the 101-100 kc. oscillator is set at exactly 100 kc., this check will be easier. There is no need to rotate dial "C" again, since this check only shows that there is an output at the correct frequency. This frequency is affected by both dials "C" and "D".

6. The 500-400 kc. output appears at P-3402. Rotating dial "B" should change this output in 10 kc. steps. The 500-400 kc. signal is affected by dials "B", "C", and "D", and by manipulating these controls the entire range of 500-400 kc. may be observed.

7. There are no further quick checks of the 0-140B/FRT-15 where the AN/USM-26 is useful. It is not possible to check the RF output at J-3153, since both the sum and difference frequency outputs of the balanced modulator appear here. If no trouble was found in the above checks and the RF output at J-3153 still is not correct, assume that the trouble lies in the frequency selector-mixer CV-276/FRT-15A. If it is necessary to check the 2300-4500 kc. input to the balanced modulator, a convenient point to connect the AN/USM-26 is across L-3155. Should strong RF fields from nearby transmitters interfere with this check, requiring better shielding, an alternate procedure is to connect the frequency counter to the RF output jack J-3153. Remove the 500-400 kc. input at J-3152, and rotate R-3171 until a reading can be obtained on the counter. Note, however, that this procedure unbalances the balanced modulator, and it must again be balanced out following the procedure described in Section 7 of the instruction manual.

8. A final check of the R.F. Oscillator 0-140B/FRT-15 may be made by rotating the mixer tuning dial "G", and observing the Multiplier Cathode Currents. (3S)

0-1612/URC and 0-1622/ ARC Frequency Standards
— Rejuvenation of NiCad Battery Cells —

This article provides a method for rejuvenating defective NiCad Battery Cells in the 0-1612/URC and 0-1622/ARC Frequency Standards by subjecting each defective cell to a heavy charging current for a few seconds and then trickle charging in the normal manner.

WARNING

Do not subject the defective cell to heavy charging current for more than fifteen (15) seconds maximum in order to avoid formation of an easily ignited explosive hydrogen and oxygen mixture.

1. Using a constant current power source, apply four (4) to six (6) amperes to each defective cell for a maximum of fifteen (15) seconds. The cell voltage should rise from zero to approximately 1.2 volts. Cell should be discarded if six (6) amperes applied for fifteen (15) seconds fails to clear short in cell".

2. Once this voltage rise is observed, the cells may be trickle charged with 200 ma current.

(EIB 940)

O-1612/URC and O-1622/ARC Frequency Standards--Rejuvenation of NiCad Battery Cells

See article in O-1612/URC Section under the same title. (EIB 940)

0-1695/U Cesium Beam Frequency Reference— Storage Instructions

Failure to observe the following storage instructions will result in shortened beam tube and battery life and may necessitate corrective maintenance to restore the 0-1695/U Frequency Reference to satisfactory operating condition.

Storage temperature determines the frequency of maintenance actions required to sustain full cesium beam tube and battery operating life expectancy. The following chart specifies the recommended time intervals between internal battery recharges and ion pump activations.

Temperature Range	Internal Battery Recharge	Ion Pump Activation
35° to 40° C	4 months	Continuous operation
30° to 35° C	9 months	6 months
25° to 30° C	12 months	6 months

For detailed storage instructions, refer to the 0-1695/U Cesium Beam Frequency Reference Operating Manual, NAVELEX 0969-LP-167-2010.

If extended storage is anticipated, the 0-1695/U Frequency Reference(s) should be shipped to NAVELEXSYSENGCEN, Washington, D.C. for storage.

SHIP TO:	MARK FOR:
N00171	N65979
RO NAV DIST WASH	NAVELEXSYSENGCEN
SUPPLY & FISCAL DEPT	BLDG 70 WASHNAVYD
WASHINGTON NAVY YARD	WASHINGTON, D.C. 20374
WASHINGTON, D.C. 20374	ATTN: PTTI

User requests for 0-1695/U Frequency References should allow sufficient lead time for shipping.

For information, contact the NAVELEX WASHDIV Frequency and Time Depot, AV 294-4022.

(EiB 942)

OA-133/FRN-12A VHE OMNI-RANGE TYPICAL METER READINGS AND DIAL SETTINGS

In the following table are manufacturer's recommended, typical meter and dial readings for the OA-133/FRN-12A Omni-Range Transmitter:

Xtal Freq 12.7 MC Output Freq 114.3 MC

METER READINGS

Osc Grid	Buf Plate	Tripler Grid	Tripler Plate
2.4 MA	30 MA	7 MA	63 MA

IPA Grid	IPA Cath 1	IPA Cath 2	P.A. Grid	P.A. Screen	P.A. Cath 1	P.A. Cath 2
7.5	110	110	12	14	150	150

Line Voltage	Trans H.V.	Mod H.V.	Mod Cath	Mod Output
230 V	1850 V	1850 V	60 MA	0%

DIAL SETTING

Osc Grid	Buf Plate	Tripler Grid	Tripler Plate	Osc Amp Output
45	53	13	49	1/2 CCW

IPA Grid	IPA Plate	P.A. Grid	P.A. Plate	P.A. Neut Setting
29	60	30	44	74

Power output Hi - 220 Watts Power output Lo - 30 Watts
Rear of Transmitter Output Coupling adjust 1/4 turn CCW.
Output coupling loop from final tank (resonators) adjusted for maximum power output.

Xtal Freq 12.444 MC Output Freq 112.0 MC

METER READINGS

Osc Grid	Buf Plate	Tripler Grid	Tripler Plate
2.2 MA	29 MA	7.8 MA	65 MA

IPA Grid	IPA Cath 1	IPA Cath 2	P.A. Grid	P.A. Screen	P.A. Cath 1	Tripler Plate
6.9 MA	100 MA	100 MA	18 MA	15 MA	150 MA	150 MA

Line Voltage	Trans H.V.	Mod H.V.	Mod Cath	Mod Output
230 V	1850 V	1850 V	60 MA	0%

DIAL SETTING

Osc Grid	Buf Plate	Tripler Grid	Tripler Plate	Osc Amp. Output
2	25	7	25	1/2 Turn CCW

IPA Grid	IPA Plate	P.A. Grid	P.A. Plate	P.A. Neut Dials
15	55	2	23	77

Power output Hi - 220 Watts Power output Lo - 35 Watts
Rear of Transmitter Output Coupling adjust 3/4 turn CCW.
Output coupling loop from final tank (resonators) adjusted for maximum power output.

Xtal Freq 13.1 MC Output Freq 117.9 MC

METER READINGS

Osc Grid	Buf Plate	Tripler Grid	Tripler Plate
2.4 MA	28 MA	7 MA	58 MA

IPA Grid	IPA Cath 1	IPA Cath 2	PA Grid	PA Screen	PA Cath 1	PA Cath 2
5.3	75	75	15	25	170	170

Line Voltage	Trans H.V.	Mod H.V.	Mod Cath	Mod Output
230 V	1850 V	1850 V	60 V	0%

DIAL SETTING

Osc Grid	Buf Plate	Tripler Grid	Tripler Plate	Osc Amp Output
87	96	65	97	1/2 CCW

IPA Grid	IPA Plate	P.A. Grid	P.A. Plate	P.A. Neut Dials
49	80	47	75	70

Power output Hi - 230 Watts Power output Lo - 30 Watts
Rear of Transmitter Output Coupling adjust 1/2 turn CCW.
Output coupling loop from final tank (resonators) adjusted for maximum power output.

Technical Information on Components of TACAN Antenna Group OA-1801/SRN-6

Electronics Information Bulletin No. 571, dated 9 October 1961, promulgated information concerning Magnetic Amplifier L6001, a component of TACAN Antenna Group OA-1801/SRN-6. Additional and similar information concerning this component and other components of the antenna assembly are included in this article for consideration and for effective maintenance.

A. Saturable Reactors L6001 and L6006

The most common cause of failure of Antenna Group OA-1801/SRN-6 has been the saturable reactors L6001 and L6006 in the bearing control servo system and roll control servo system, respectively. Overheating caused by excessive quiescent current causes an eventual insulation failure inside the can, resulting in shorted gate windings. When this occurs, the diodes may be damaged. To correct these failures, the units should be properly adjusted to provide the correct value of quiescent current. Adjustment procedures for L6001 and L6006 are as follows.

1. Adjustment Procedure for L6001:

(a) Disconnect demodulator power supply terminal 1 of TB6012. Remove 3 and 1 of TB6011. Connect 820-ohm resistors across 1 and 2, 3 and 4 of TB6011.

(b) Connect 0- to 50-volt a.c. voltmeter across terminals 5 and 6 of TB6012. This meter reads balance voltage. Connect 0.5-amp a.c. ammeter in series with terminal 5 of TB6011. This meter reads quiescent current.

(c) Observe quiescent current. It should read less than 275 ma. If it does not, remove R6005 and R6006. Replace them with two decade resistance boxes, starting at 18,000 ohms each. Adjust box across R6006 until magamp is balanced. Quiescent current shall be 225 to 275 ma. If current is too low, increase R6005 and rebalance. (Connect nearest RETMA value 1/2-watt carbon resistor at R6005). Re-adjust R6006 for balance output (less than 1.5 volts). Replace R6005 with a resistor of value needed.

2. Adjustment Procedure for L6006:

(a) Disconnect leads from terminals 6 and 8 of TB6016 and short to terminal 7 of TB6016. Disconnect lead from pin 4 of TB6017.

(b) Connect a 0- to 50-volt a.c. meter across terminals 5 and 6 of TB6017. This meter reads balance voltage. Connect 0.5-amp a.c. ammeter in series with terminal 7 of TB6017. This meterreads quiescent current.

(c) Adjust R6034 to balance (less than 1.5 volts). Observe quiescent current at the 0.5-amp a.c. ammeter. It should read between 300 and 500 milliamperes a.c. Apply shunting resistors in parallel with R6030 and R6031 to reduce this current to range of 300 to 350 milliamperes. Readjust balance with R6034 as required during this procedure.

NOTE: After adjustments described above have been completed, the temperature rise of the reactors should be less than 25 degrees Centigrade in still air.

B. Replacement of Slow-Blow Fuses F6007 and F6008

The replacement of slow-blow fuses F6007 and F6008 by instantaneous type fuses is not recommended. This replacement would contribute no additional protection against loss of L6006 since, in order to have the instantaneous fuses withstand the inrush current on switching, their ratings would have to be considerable increased and would actually reduce the protection against the slow failures which have been experienced in this component.

C. Technical Manual Revisions

The applicable Technical Manual, NAVSHIPS 93654, is being revised to include the foregoing information. (612)

OA-1801/SRN-6A, OA-7203/URN-20 Antenna Groups, Overhaul and Updating Program —

On 1 February 1976 NAVELEXSYSENGCEN Vallejo was assigned the responsibility for conducting the OA-1801/7203 overhaul and updating program sponsored by COMNAVELEXSYSCOM. This overhaul and updating program applies to all models and serial numbers and is accomplished at no charge to the operating forces. This program is premised on an exchange concept. An overhauled and updated antenna group will be issued as a replacement in exchange for an unmodified antenna group. The overhaul/update turn-around time frame is approximately five months for the same antenna group and approximately one month if a replacement antenna group is available. Expeditious handling of antenna groups will help reduce turnaround time.

(EIB 930)

TACAN Antennas—Authorization for Pinning

All ships are authorized to "pin" their OA-7203( )/URN-20(V) and OA-1801( )/SRN-6 TACAN antennas in the stowed position. Recent testing has shown that because of the wide beam pattern inherent to these antennas (in the vertical plane), the stabilization feature is not required.

All forces should discontinue any efforts to repair or support the roll-stabilization circuits. Field changes to accomplish the antenna pinning follow this article. Upon completion of these changes, the ships roll information is no longer required for TACAN Radio Set operation.

5-OA-1801	2-OA-7203C
1-OA-1801A	2-OA-7203D
1-OA-1801B	1-OA-7203E
5-OA-7203	1-OA-7203F
5-OA-7203A	

(EIB 963)

OA-3953/SYA-4(V), OA-3955/SYA-4(V), TS-1780/SYA-4(V)– Maintenance Hint

The following is to provide additional maintenance information to aid in troubleshooting the High Voltage Power Supply P/N 581308. Reports from the field show that an inconsistency exists between the measured resistance value of reactor L1 and the resistance shown on the schematic and case of the reactor.

The Technical Manual NAVSHIPS 94640(A) Volume 2, page 88-11/88-12, figure 88-4, shows the resistance of L1 to be 300 ohms, when actually the specification for L1 is 300 ohms maximum at 20° C. Measurements in the field have shown the resistance to be 150 or 200 ohms nominal values. The actual resistance value at 20° C for the reactor can be 25 to 50 percent less than the specification for the maximum value because of the size wire, number of turns, and other parameters required for the correct inductance of 2.5 Henries.

The markings on the case of L1 do not indicate the actual resistance, but give 300 ohms, which is the maximum specification. Therefore during future troubleshooting, Data Systems Technicians should look for the nominal value of resistance for L1 as specified above.

Technical Manual Corrections for the high voltage power supply will be issued to reflect the subject information. (684)

OA-3953/SYA-4(V), OA-3955/SYA-4(V), TS-1780/SYA-4(V)— Maintenance Hint

See article in OA-3953/SYA-4(V) section under the same title. (684)

OA-1801/SRN-6A, OA-7203/URN-20 Antenna Groups, Overhaul and Updating Program

See article in OA-1801/SRN-6A Section under the same title. (EIB 930)

OA-7781/USQ-20(V) (SB-2622/USQ-20(V) and SB-2624/USQ-20(V)), CV-2036/USQ-20(V) (KCMX), OJ-166/UYA-4(V) and OJ-167/UYA-4(V), CP-789(V)/UYK Center Drive Shaft — Maintenance Hint

The purpose of this maintenance hint is to provide a means of gaining access to logic chassis in the event the roll pin fails.

The center drive shaft is used in these equipments to mate and unmate logic chassis plugs and mainframe jacks. It is a solid metal shaft with a threaded coupling (designed to accept a wrench provided with each equipment) on the front end that is secured with a roll pin. The shaft has a hex nut secured with a set screw on the back end, which retains the shaft within the logic chassis.

The technicians concerned should take the following action:

1. Remove logic chassis from the equipment, following instructions in applicable technical manuals.
2. Remove entire shaft by loosening set screw in hex nut on rear of shaft, remove hex nut and pull shaft from chassis figure 1).
3. Push out roll pin using drift punch of appropriate size.
4. Unscrew coupling.
5. Using a hacksaw, cut a slot in the end of shaft large enough to accommodate a large flat blade screwdriver (about 1/8" deep).
6. Reassemble and replace shaft in logic chassis reversing foregoing steps 2 and 4.
7. Lubricate threaded portion on rear of shaft using anti-seize and lubricating compound NSN 8030-00-105-0270 only. (Other lubricants will creep into connector jacks.)
8. Replace logic chassis in equipment.

In the event of roll pin failure, the coupling will unscrew from main shaft. A large flat blade screwdriver can then be used to unmate and remove logic chassis for repair.

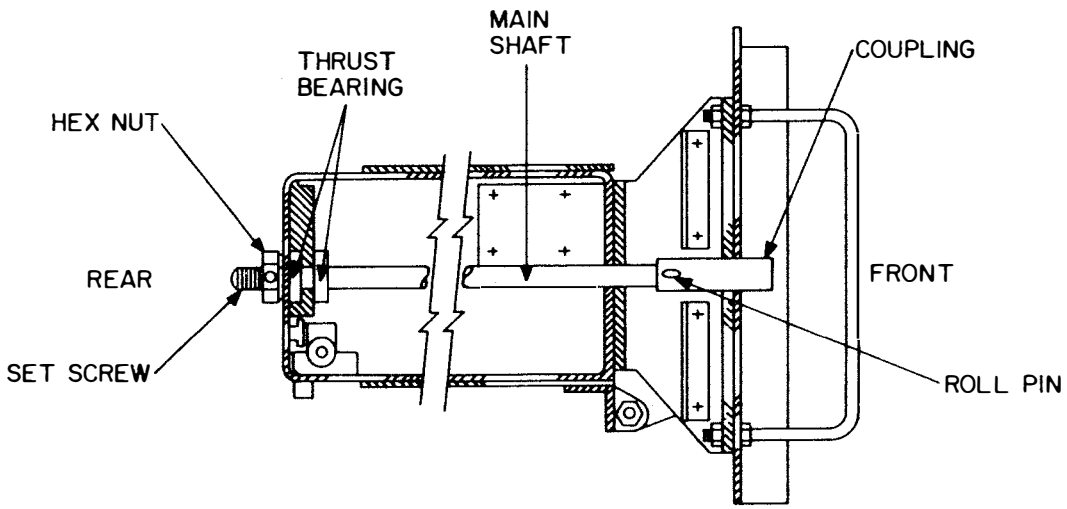


Figure 1. Access to Center Drive Shaft.

(EIB 913)

OA-7900/GMQ-10 Converter-Indicator Group

The Bina-View Displays Part Number AA0111-1853 used in the ID-1348/GMQ-10 unit of the OA-7900/GMQ-10 are repairable items as denoted by the Federal Stock Number 2RH6660-973-7626. All faulty Bina-View units should be returned for overhaul in accordance with paragraph 9, page XVII, NAVAIR 00-35QL-22. (795)

OA-7979(V)/UYA-4—Maintenance Instruction

The purpose of this maintenance instruction is to bring to the attention of DS maintenance personnel the existence of a potential short between the CRT ring of the OA-7979(V)/UYA-4(V) and the plotting board (PT-409A) lamp terminals.

This potential short could result from insufficient spacing between the CRT ring and the plotter mounting surface. To detect and correct the problem stated above, perform the following steps:

Procedures:

1. Turn off all power at the PPI console to be modified. Observe all safety precautions.

2. Loosen the 16 screws securing the CRT panel or plotting board to the PPI console. Tip the panel forward, disconnect the connector plug and remove the panel.

3. Obtain a scale calibrated in 1/100" and check the dimension between the front of the CRT support ring and the panel cutout in the PPI console as indicated in figure 1. This dimension must be checked at the top of the CRT and on each side. Do not include the RFI gasket in the measurement.

4. If the dimension is within tolerance at all three locations, proceed to step 10, if not proceed to step 5.

5. Raise the PPI console lid and loosen the nut on the CRT clamp around the neck of the CRT shield at the rear of the PPI concole as indicated in figure 1.

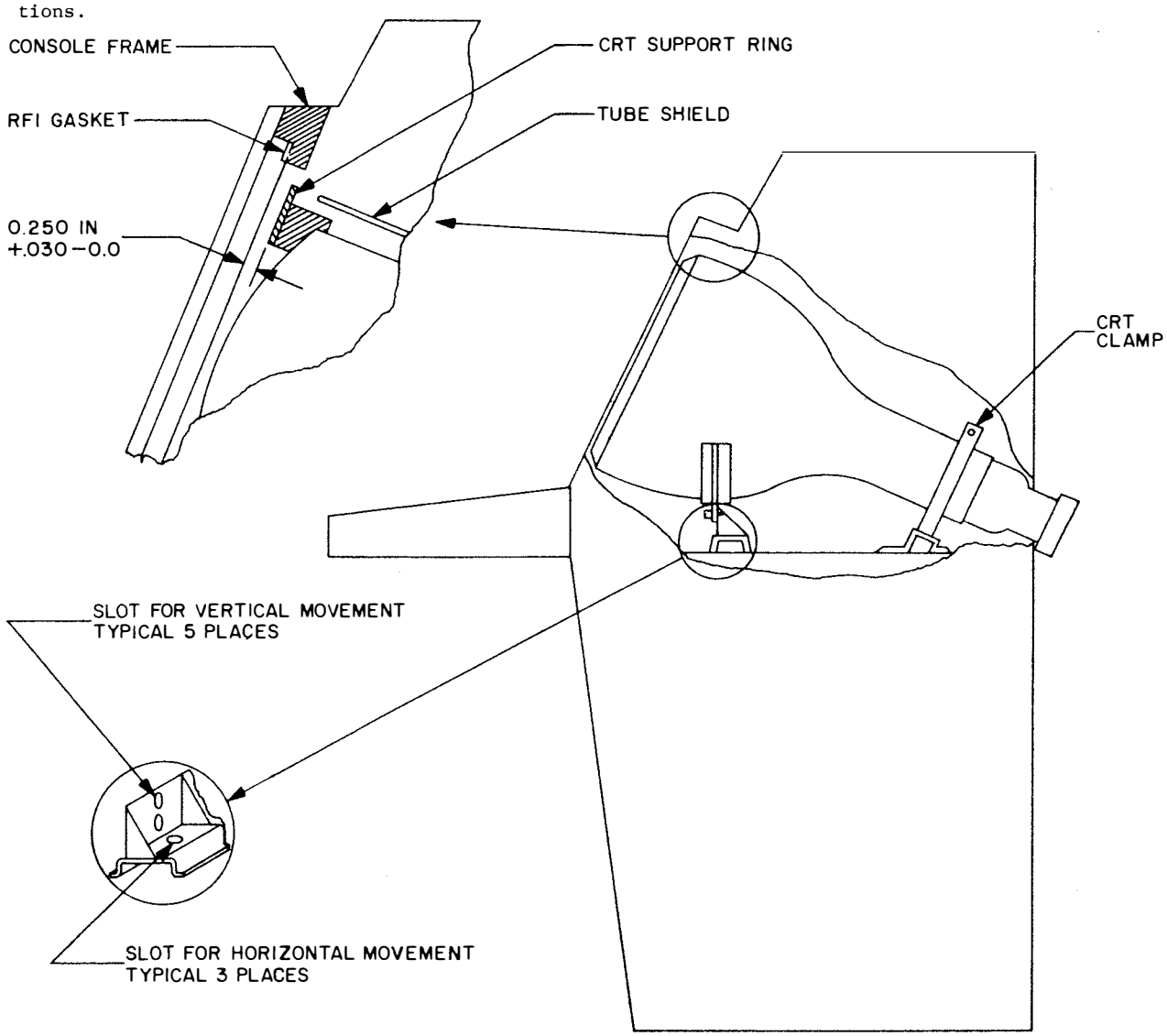


Figure 1. PPI Console

6. Loosen the three screws in the front CRT support bracket which have the slots for horizontal movement (Refer to detail in figure 1). There is one screw on the left side, one on the right and one in the middle of the CRT support bracket.

7. Move the CRT and tube shield back to the 0.250" (+.030 -0.0) dimension as indicated in detail in figure 1.

NOTE

Do not slide the CRT assembly back further than the minimum dimension indicated or the PT-490A plotter optics will be degraded due to increased parallax.

8. The dimension indicated in step 7 must be checked at the top of the CRT and on each side. If the CRT needs to be moved vertically, loosen the five screws in the front CRT support bracket which have the slots for vertical movement as indicated in detail in figure 1.

9. Tighten the screws that were loosened on the front CRT support bracket and the nut on the CRT clamp around the neck of the CRT shield.

10. Connect the CRT panel or plotting board panel connector plug and tighten the sixteen screws which hold the panel to the PPI console frame.

11. Restore power to the PPI console and check for normal operation. *(834)*

OA-7979(V)/UYA-4(V) Action Entry Panel Switch Mounting Brackets—Information Concerning

Many holders of OA-7979(V)1/UYA-4(V) through OA-7979(V)9/UYA-4(V) data display consoles have reported the inability to obtain the switch mounting brackets, Hughes Aircraft Company (HAC) P/N 1576467, required for initial installation of the new, more reliable switch now provided under FSN 9N5930-890-9713 for replacement of switches A4S1 through A4S18.

NAVSECNORDIV investigation has revealed that the cost of procuring HAC bracket 1576467 for stocking in the supply system is prohibitive; therefore, NAVSECNORDIV has designed and procured a limited number of substitute brackets. These brackets have been distributed to primary holders of affected equipment along with copies of NAVSECNORDIV Drawing 23/73-18, which provides detailed information for fabrication of the brackets.

Action has been initiated to have the substitute bracket stocked in the supply system; and when NAVSECNORDIV has been apprised of the Federal Stock Number assigned to the bracket, this information will be immediately disseminated to all equipment users.

A copy of NAVSECNORDIV Drawing 23/73-18 is provided as figure I to ensure that all

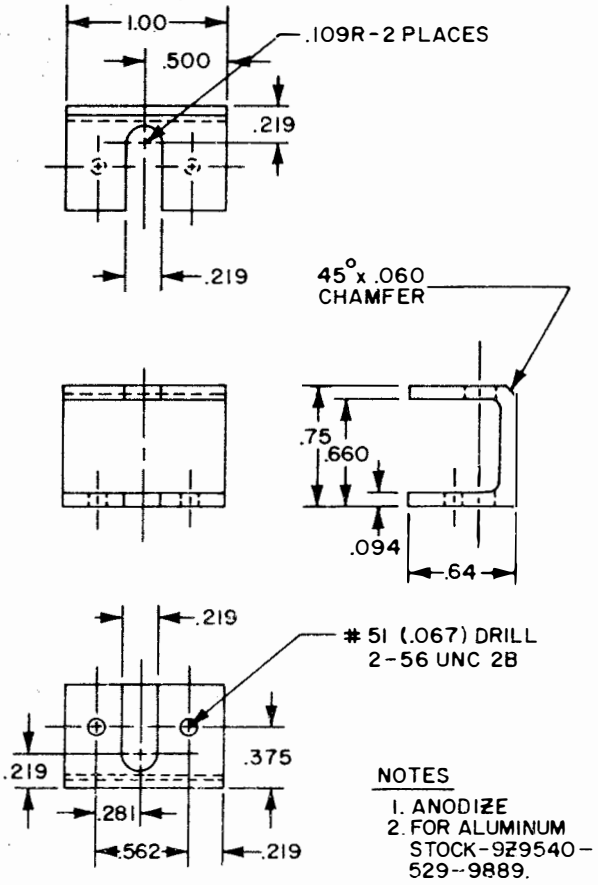


Figure 1. Fabrication of Switch Mounting Bracket

equipment holders have the detailed information required for fabrication or procurement of brackets prior to their availability in the supply system. *(EIB 862)*

OA-7979(V)/UYA-4(V), OJ-194(V)/UYA-4(V) Data Display Consoles–Maintenance Hint

The purpose of this article is to disseminate urgent maintenance information, provided by Puget Sound Naval Shipyard, to holders of the subject consoles with non-hinged swing out card boxes. This information documented severe damage to coaxial cables in the console card box area and provided a simple method of preventing a recurrence of the damage.

The foregoing damage occurred when the affected cables were crushed between the card box rear access panel and interconnection panel A20. This type damage can be avoided simply by securing the coaxial cables to the card box cable harnesses which connect to the interconnection panel.

Holders of affected equipment are therefore instructed to secure the coaxial cables, which connect to A20J7 thru A20J15, using lacing twine or plastic cable ties. Equipment holders are urged to take this action at earliest opportunity. (EIB 944)

OA-7984(V)/UYK (UNIVAC 1532) Input/Output Console — Correction of Miswiring of -15V Power Supply Fuse

It has been reported that the -15V fuse (F8) may not protect the -15V power supply due to a factory miswiring.

All activities with OA-7984(V)/UYK should check for proper wiring as follows:

1. Secure all power to the OA-7984(V)/UYK
2. Remove fuse F8 from the power supply chassis (A6).
3. Remove the two hole down screws on the power supply chassis and lift the upper plate. This will expose terminal E4.
4. Check for continuity from the end terminal on the fuse holder to terminal E4. If the reading is greater than zero ohms the wiring is correct and no action is required.

If the wiring is not correct make the following wire changes to power supply chassis A6.

1. Locate the wire that is connected between fuse holder XF8-1 (located on the end of the fuse holder) and E4. Remove end of wire from XF8-1 and connect it to XF8-2 (located on the side of fuse holder).

Power up the OA-7984(V)/UYK and run off line test to ensure proper operation.

(EIB 911)

OA-8364/URC-58(V) (RF-302R) REMOTE CONTROLLED ANTENNA COUPLER–REVISED TUNING PROCEDURE

See article under AN/URC-58(V) with same title.

MODIFICATION TO OBQ-1

A modification to the voltage measuring circuit of the OBQ-1 equipment to eliminate the capacity effects from D-C probe, lead to ground, and circuit elements of equipment being worked on and to provide D-C isolation at the probe rather than in the OBQ-1 itself, has been suggested.

The step-by-step procedure follows (See figures 1 and 2):

1. Shunt resistor R34(1 Meg) in OBQ-1 with a short piece of copper wire, soldered securely at both ends. (Figure 1.)

2. Remove existing lead from D-C probe of OBQ-1 and discard.

3. Prepare new single-conductor, shielded lead as follows (figure 2):

a. Remove 3/4 inch of rubber jacket from one end (taking care not to cut shield wires).

b. Remove 1/2 inch of shield (do not cut into inner rubber insulation).

c. Tin the remaining 1/4 inch of shield protruding from under rubber jacket to provide a smooth and non-fraying end.

d. Remove 1/4 inch of inner rubber insulation without nicking inner conductor.

e. After cutting off all but 1/4 inch of one pigtail of the 1 meg. resistor, securely twist together the end of the inner conductor of the cable and the short end of resistor lead in a straight line and solder.

f. Insert resistor-cable assembly into probe so that long resistor lead comes out through probe tip; pull tight and solder. (If necessary, bore out probe handle to accept larger cable.)

g. Remove 2-1/2 inches of outer rubber jacket of other end of cable and unravel exposed shield.

h. Pull all sheild wires to one side of inner rubber insulation, twist into a tight, flexible wire, and solder the proper size spade lug or tip to end.

i. Remove 1/4 inch of inner rubber insulation without nicking center conductor. Attach the other spade lug or tip to center conductor and solder. Tape this connection, lapping over both shank of lug and rubber insulation, and serve tightly.

The Bureau considers that this suggestion will increase the usefulness of the OBQ-1. However, since the OBQ-1 is obsolescent, it is not economically justifiable to require a field change to all of these equipments. No field change will be issued. The modification should be made wherever the user feels that it is worthwhile.

OE-82C/WSC-1(V) Antenna Group—Installation Information

This article provides information on changes to installation procedures for Prodelin 31-891 heliax aluminum coaxial cable and ordering information for the sealing "O" rings of mating connectors.

A special tool is needed to remove the outer jacket material of the 31-891 coaxial cable used for the RF runs for the OE-82C/WSC-(V) satellite communications antenna because the jacket is now bonded to the aluminum outer conductor.

With each order of the new cable shipped by the manufacturer, Prodelin, Inc., the special tool will be provided free of charge. Additional tools may be ordered by installation activities using Prodelin Part Number PT268-193-1. The new cable can be identified by a cloth tag attached to the cable which reads as follows:

Dear Customer:

The coaxial cable you have received for this order (Prodelin catalog number 31-891) has had an engineering change to improve the jacketing. This cable now has a superior, abrasive-resistant, high strength jacket. This jacket is firmly bonded to the aluminum outer conductor, however, and requires a different method of stripping the jacket in preparation for attaching a connector. A special tool and detailed instructions have been provided for your assistance.

Thank you.

PRODELIN INC.

Prodelin has also changed the part number for the sealing "O" ring required to mate the 97-875 or 75-875 connectors with the 31-891 cable. The original number was PC 198-212-6. For ease of ordering this has been changed to catalog number 308-891. This changes note 2 on NAVSEA Drawing 28687 RE-0125921.

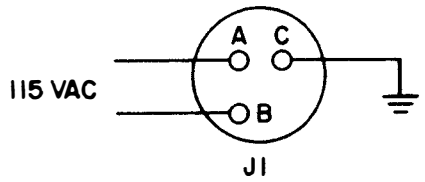
(EIB 987)

OE-158/BRQ Antenna Group—Verification of AC Power Connector Wiring

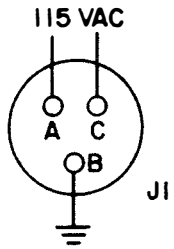
This article provides information to verify whether a wiring change is required at the AC Power Connector, J1, on the rear of Antenna Control C-9294/BRQ. This wiring change may be necessary in order to conform to standard wiring and safety specifications.

This change should be accomplished prior to initial installation or when an antenna control unit is removed for repair or overhaul.

The initial production units of C-9294/BRQ were wired internally as shown below:



Correct wiring of this connector should be:



Procedure:

Using an ohmmeter determine which pin, B or C is connected directly to ground. If pin B is connected to ground, the unit is wired correctly. If pin C is connected to ground proceed as follows:

a. Remove the six (6) screws securing the connector plate to the rear of C-9294/BRQ.

b. Carefully withdraw the connector plate to expose the rear of connector J1.

c. Unsolder the wires on pins B and C.

d. Interchange the wires and resolder to pins B and C.

e. Using an ohmmeter check that pin C reads open circuit to ground and that pin B is a direct connection to ground.

f. Replace and secure the connector plate.

The Antenna Control is now wired to conform to specification and as shown in NAVSEA SE 110-AA-MMA-00-0/OE-158/BRQ, FOMM Technical Manual for Antenna Group OE-158/BRQ.

Upon installation determine that the mating connector supplying ships power, 1P1 is wired to conform to the above change.

NOTE

All Antenna Control's C-9294A/BRQ are wired correctly.

EIB 9[illegible]

OA-7781/USQ-20(V),(SB-2622/USQ-20(V) and SB-2624/USQ-20(V)), CV-2036/USQ-20(V)(KCMX), OJ-166/UYA-4(V) and OJ-167/UYA-4(V), CP-789(V)/UYK Center Drive Shaft--Maintenance Hint

See article in OA-7781/USQ-20(V) Section under the same title.
(EIB 913)

OJ-194(V)/UYA-4(V) and OJ-197/UYA-4(V) Data Display Consoles, Computer Controlled Action Entry (CCAE) Panel–Maintenance Information Concerning

See article in AN/UYA-4 section with the same title. (EIB 904)

OJ-7979(V)/UYA-4(V), OJ-194(V)/ UYA-4(V) Data Display Consoles-- Maintenance Hint

See article in OJ-7979(V)/UYA-4(V) Section under the same title. (EIB 944)

OJ-194(V)/UYA-4(V) and OJ-197/UYA-4(V) Data Display Consoles, Computer Controlled Action Entry (CCAE) Panel—Maintenance Information Concerning

See article in AN/UYA-4 section with the same title. (EIB 904)

OJ-287/UYK Keyboard Printer — Correction of Possible Wiring Discrepancy

The purpose of this article is to correct a possible wiring discrepancy in the Line Feed Timing Circuits of the OJ-287/UYK Keyboard Printer. This check applies to OJ-287/UYK serial numbers A1-A21 and B1-B17. In some units polarized Capacitor 15D4D has been found to be miswired. If the capacitor is left miswired it will eventually short and cause the Line Feed Solenoid to remain constantly energized until it burns up.

To check for correct wiring of Capacitor 15D4D on Logic Chassis 1A1A2A1 read continuity between 0805-5 and 0905-11 and continuity between 0805-10 and 0905-13. If continuity exists, the Capacitor 15D4D is wired correctly. If no continuity is found, proceed as follows:

On the bottom of Logic Chassis 1A1A2A1, delete the following wires:

0805-10 to 0905-11
0805-5 to 0905-13

Add the following wires:

0805-5 to 0905-11
0805-10 to 0905-13

Return the equipment to normal operating condition and check for normal operation.

No changes to the technical manual are required.

(EIB 936)

OU-83/UYK (CV-2953 (P)/UYK and CV-2954(P)/UYK) Signal Data Converter Circuit — Card Removal Hint

This article provides information to facilitate removal of the printed circuit cards that are located in the back slots of the A1 and A2 circuit card drawers. The circuit card guides for these slots have a portion of the side channel flattened (see figure 1) to allow removal/installation of the circuit cards with a slight rotational motion as shown in figure 2-A rather than a straight perpendicular motion as shown in figure 2-B.

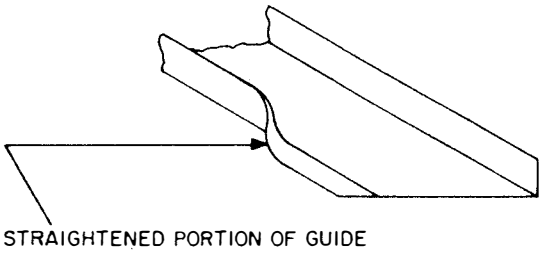


Figure 1. Circuit Card Guide.

Figure 2A. Circuit Card Puller (Rotational).

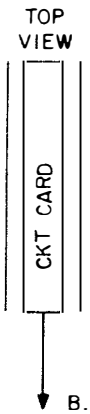


Figure 2B. Circuit Card Puller (Perpendicular).

The following procedure should be used to properly remove circuit cards from the back slots.

1. Fully extend the A1 or A2 drawer and lock it in position.
2. Remove the top and bottom circuit card locking bars, located along the front edges of the circuit cards involved, by removing the three screws holding each bar in place.
3. Removal of several adjacent circuit cards may be necessary to provide clearance for removal of the desired cards.
4. Using the circuit card puller, pull the card straight forward to break it loose from the plug; then using the rotational motion shown in figure 2-A, carefully remove the desired card.

A field change proposal is now being considered that would allow further extension of the circuit card drawers and thus eliminate the card removal problem. However, pending formal approval and installation of the field change use the foregoing card removal procedure.

(EIB 911)

OU-83/UYK Signal Data Converter Group— Maintenance Hint (for SSN-688 Class CSDC)

In case of a power supply (P/N 497843-1) failure in the dual frame configuration of the CSDC (OU-83/UYK) with no spare power supply available, the CSDC can be re-configured to a degraded mode as a single frame CV-2953(P)/UYK with only essential ships interfaces available.

Remove power to the CSDC and interchange the remaining power supplies to insure that both sections of Frame one (1), CV-2953(P)/UYK, have good power supplies installed.

Follow the instructions on figure 3-14, Volume 2 of the OU-83/UYK Technical Manual (NAVSHIPS 0967-483-7020) for Frame 1 operation.

Return power to Frame 1 only and re-establish communications between the CSDC and the AN/UYK-7 Computer via the OJ-172 DEAC.

NOTE

The shorting plugs listed on Figure 3-14 were included in the installation kit (P/N 497931-1) supplied with the OU-83/UYK when it was delivered to the contracting shipbuilders. It is advisable that the on-board location of these plugs be known in advance so that the emergency degraded condition can be initiated quickly should an equipment failure occur.

(EIB 973)

OU-83/UYK, CV-2953/UYK and CV-2953A/UYK, Signal Data Converter Group--Maintenance Hint

See article in CV-2953,-2953A/UYK Section under the same title.
(EIB 958/966)

PP-2222/WRT Power Supply of AN/WRT-1 and AN/WRT-2—Elimination of Chatter from Relays K201 through K204; Maintenance Hint

Relays K201 through K204 tend to chatter after prolonged use due to the accumulation of dirt on the ends of the laminated core pole pieces which prevents full closure when relay is energized. This chatter may be eliminated from the relay by cleaning the ends of the laminated core pole pieces with a very fine grade of sandpaper or crocus cloth.

Procedure:

1. Remove all power sources to the transmitter.
2. Loosen captive front panel screws of the PP-2222/WRT and slide out the drawer.
3. Remove six Phillips screws which secure front panel. Lower front panel on a supporting object.
4. Release four fasteners of front top shield cover and lift shield cover.
5. Remove rectifier tubes V201 through V206.
6. Remove both 10-32 screws from relay.
7. Release top and bottom fastener of relay armature. Remove armature.
8. Using a very fine grade of sandpaper or crocus cloth, clean ends of relay armature pole pieces to a smooth finish. Repeat procedure to core ends of other section of relay which contains the relay coil.
9. Reinstall relay armature in the reverse procedure used for disassembly.
10. Replace rectifier tubes V201 through V206.
11. Reconnect ceramic plate caps to their respective tube. CAUTION: BE SURE PLATE CAP LEAD IS CONNECTED TO CORRECT TUBE.
12. Fasten front panel. Lower and fasten top front shield cover.
13. Release locking catch, push in drawer, and fasten front panel screws. (748)

PP-3495A/UG Power Supply—Information Concerning

This article provides information pertinent to stable DC Voltage output and reliable operation.

Activities utilizing this power supply should check the DC output voltage to assure that it is stable. Power supplies as delivered by the contractor contained defective magnetic amplifiers, Reference Designation "Z1". The defective magnetic amplifiers can be identified by removing the cover and viewing marking of Z1. Magnetic amplifiers bearing the marking "AEROTRONIC 82011 TF4RX41MA MFD. BY JB ELECTRONIC TRANS. INC. JB PART NO. 330P1", are defective and should be replaced. Replacement magnetic amplifiers can be obtained through normal supply channels utilizing Federal Stock Number (FSN) 9N5950-016-0331. When replacing this unit assure that wiring of Z1 is made as illustrated in figure 6-3, page 6-4 of NAVSHIPS 0967-425-1010 (formerly NAVSHIPS 94972, dated August 1963), Technical Manual for PP-3495A/UG Power Supply.

This power supply also may have missing clamps on capacitors C1 and C2. These clamps and hardware for mounting can be obtained by request to the Naval Ship Engineering Center, Norfolk Division, Code 6621D, Norfolk, Virginia 23511. State in the request the number of power supplies that have clamps missing.

The ERRATA SHEET furnished by subject contractor is to be disregarded. *(808)*

PP-3495A/UG Power Supply—Possible Safety Hazard

This article advises all Commands that a possible safety hazard exists on PP-3495A/UG power supplies manufactured by MELCOR Electronics Corporation, Farmingdale, New York under Contract No. N00126-71-C-0138. The power supplies manufactured by MELCOR have the ground wire leading from TB2, terminal 5 connected to the socket of capacitor C1. Reports received from the Fleet advised that in some instances this does not provide sufficient electrical ground. All Commands are advised to ensure that an electrical ground exists, by measuring the continuity between TB2, terminal 5 and the equipment chassis. If not, proper grounding should be accomplished in accordance with Technical Manual NAVSHIPS 0967-425-1010 dated 30 August 1963 (formerly NS94972). *(813)*

PP-3495C/UG and PP-3495B/UG Power Supplies—Interchangeability of

The purpose of this article is to inform interested personnel of the physical differences and therefore the interchangeability between the two power supplies listed below.

- PP-3495C/UG - NSN 1H 6130-00-058-0124
- PP-3495B/UG - NSN 1H 6130-00-764-5840

1. Subcategory (SCAT) 8006, identifies both subject power supplies as acceptable for fulfillment of SCAT job requirements aboard ship.

2. The July 1976 Naval Management Data List (NMDL) specifies issuance of power supply PP-3495B when stocks of power supply PP-3495C are exhausted.

3. Although the two power supplies are electrically compatible, a physical difference exists. Power supply PP-3495B (Figure 1) is physically larger in its overall dimension and has a different mounting configuration than power supply PP-3495C (Figure 2).

4. Due to the physical differences of the two power supplies and differences in shipboard installations, PP-3495B may not necessarily fit in the space allocated to PP-3495C.

5. Shipboard users should consider their individual application when ordering one of the foregoing power supplies. If the application is constrained by size, it is extremely important that the ordering requisition include a "2B" advice code. Using a "2B" advice code will preclude normal SCAT substitution.

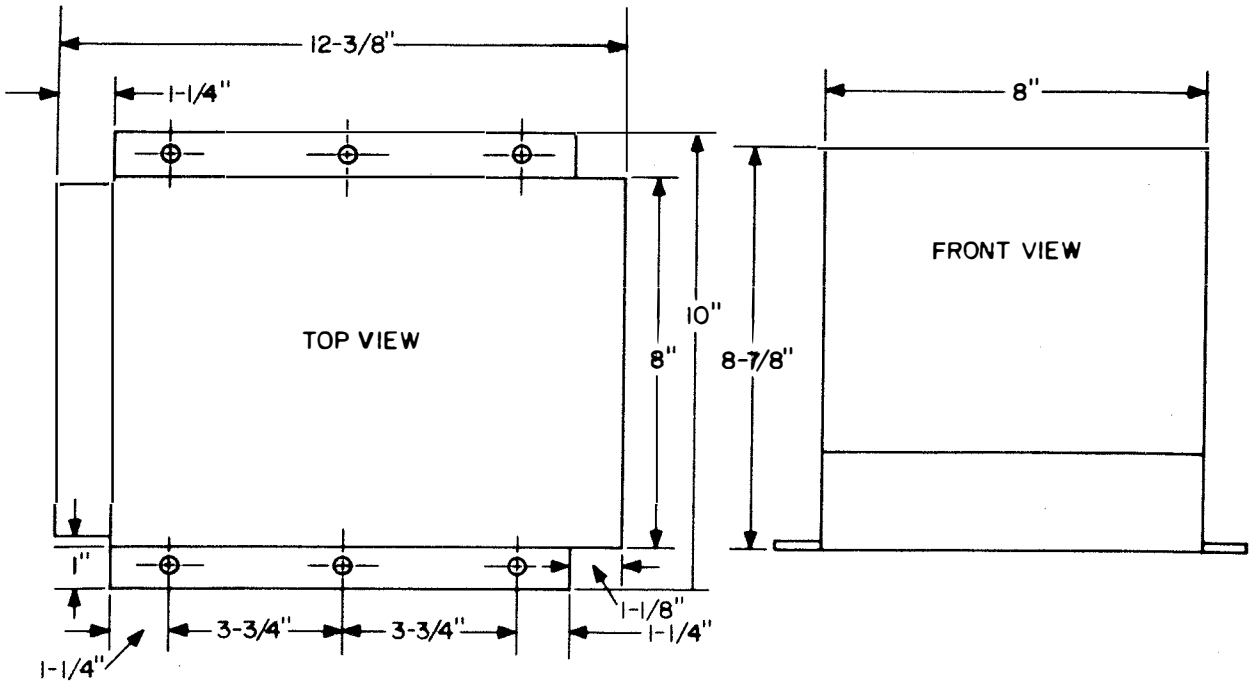


Figure 1. PP-3495B/UG Power Supply.

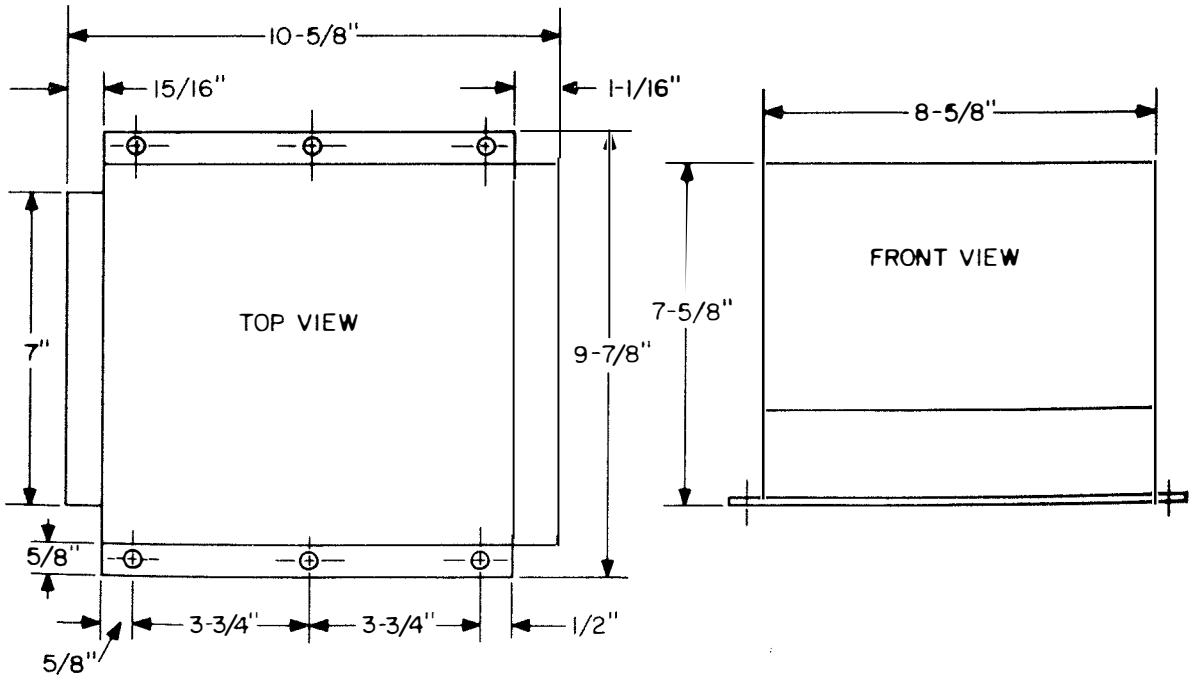


Figure 2. PP-3495C/UG Power Supply.

(EIB 942)

POSSIBLE SHOCK HAZARD ON PSP-2 POWER SUPPLY

Possible shock hazard exists when the PSP-2 Power Supply is used with the CV-763/URR Frequency Shift Converter and is energized while physically and electrically separated from the common cabinet ground.

The Coast Guard recently reported an instance wherein a cover plate mounting screw, in the vicinity of the Output Current Control R-1, was found to be touching an exposed wire, placing the chassis at a potential difference of 200 volts with respect to circuit ground.

The schematic (figure 1) shows that the power supply is "floating" with respect to chassis ground. This is an inherent design feature of optional polarity power supplies. Therefore, special precaution must be exercised when working with this type of equipment, particularly when it is separated from its grounded rack.

To check for possible circuit-to-chassis grounding, remove all external connections to terminals 1, 2, and 3. Use a voltmeter set at proper scale to determine that a potential does not exist between the PSP-2 Power Supply chassis and terminals 1 and 2 individually.

Operating and maintenance personnel, upon ensuring that chassis and circuits are properly isolated, will record this and subsequent checks on the Electronics Equipment History card, NAVSHIPS 536.

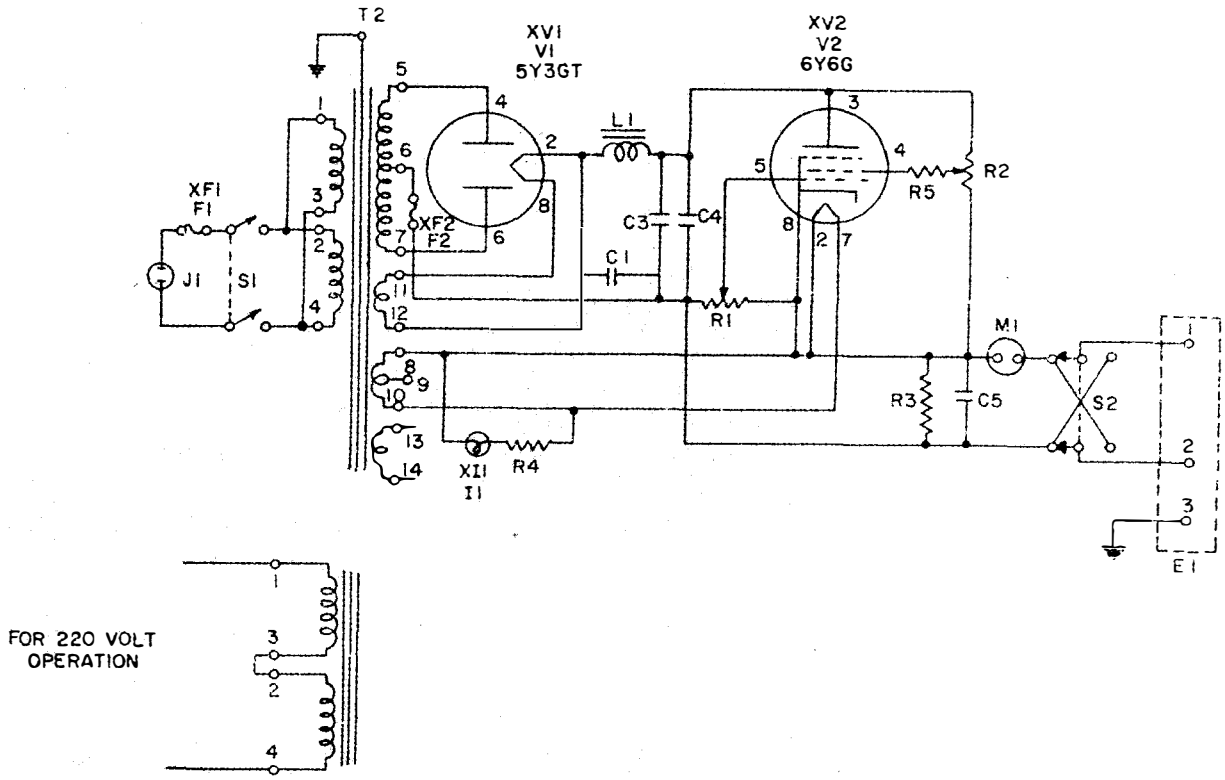


Figure 1.

PU-390/G Power Unit – Voltage and Frequency Sensing Relay Adjustment Procedure

Power Unit PU-390/G is equipped with voltage and frequency sensing circuits which monitor the condition of primary power. When the voltage or frequency of the primary power drops below specified values, these sensing circuits actuate to start Power Unit PU-390/G and transfer the load to it. When the primary power returns to specified values of voltage and frequency, the sensing circuits actuate to return the load to the primary power source.

To perform their function properly, these sensing circuits must be adjusted to actuate at correct values of voltage and frequency. The following procedure provides step-by-step directions for setting the voltage and frequency sensing circuits to actuate at correct values.

Procedure:

Equipment required:

1. Variable voltage transformer (variac) 0-135V.
2. Voltmeter, 0-300 volts AC.
3. Frequency meter, 55 to 65 cycles.
4. Frequency variable power source, 208 volts AC, 3 phase, 4 wire.
5. Relay operation indicator (a 120-volt AC meter or a 120-volt light with leads).

NOTE

The frequency variable power supply may be another engine generator, any size, as very little power is required, or the unit being adjusted may be connected to furnish its own power. Whichever supply is used, the engine driving the generator must be controlled manually to obtain frequencies other than 60 cycles.

Procedure:

NOTE

If a relay refuses to adjust or cycles in and out of its own accord during adjustment, a new plug-relay (the small relay to the right on the chassis) is needed.

1. Remove all cables from the NORMAL POWER panel and the LOAD panel.
2. If a separate power generator is used as the power source, connect its power output to the NORMAL POWER PANEL of the PU-390/G.
3. If the PU-390/G being adjusted is used as its own power source, connect jumpers from LOAD panel terminal T1 to NORMAL POWER panel terminal N1, T2 to N2, and T3 to N3. (T0 is internally connected to N0.)
4. Apply power to the PU-390/G for at least one-half hour before performing adjustments to allow the relays to reach normal operating temperature.
5. Remove all power from the PU-390/G control panel.
6. Unscrew wing nuts holding the control panel in place and drop the panel forward to give access to the relays.
7. Place the automatic control switch in MANUAL position.
8. Remove lead R1 (upper right rear terminal) from the far right voltage sensing relay (or phase A relay) and connect it to the line terminal of the variac. Connect the movable arm terminal of the variac to the terminal on the relay from which R1 was removed. Connect the third terminal of the variac to ground panel grounding flex strap, figure 1.
9. Connect one voltmeter lead to the variac movable arm terminal. Connect the other voltmeter lead to relay terminal N2 (upper rear left terminal), as shown in figure 1.
10. Loosen the lock nuts on the relay adjustments.
11. The relay operation indicator should be connected between terminal NF1, the lower left outer terminal of the **third voltage relay** from the right (or phase C relay), and ground. See figure 1.
12. Apply power to the unit. Adjust the variac to apply normal voltage (208 volts) to the relay under test, as indicated by the meter. Allow the circuit to stabilize for five minutes.

WARNING

THIS EQUIPMENT HAS HAZARDOUS VOLTAGES PRESENT ON THE RELAYS. EXTREME CARE SHOULD BE USED IN MAKING THE FOLLOWING ADJUSTMENTS.

13. Set the voltage by use of the variac to the desired pickup value of 192 volts and adjust the relay control until the relay picks up. By repeatedly reducing the voltage and slowly increasing it until the relay picks up, the actuating voltage can be determined.
14. Set the voltage with the variac to the dropout level of 185 volts and adjust the relay dropout control until it operates at this voltage. (See NOTE at the end of this article.)
15. As the two adjustments are somewhat interacting, repeat steps 13 and 14 until the desired pickup and drop-out values are obtained. Tighten the control locks and check operation to be sure they were not moved by the lock nuts.
16. Remove all power from the unit. Disconnect the variac and voltmeter leads from the relay. DO NOT MOVE THE RELAY OPERATION INDICATOR. Reconnect lead R1 to its original terminal. (707)
17. Disconnect lead R1 from the middle voltage sensing relay (phase B) and connect it to the line terminal of the variac. Connect the moving arm terminal of the variac to the terminal of the relay from which R1 was removed.
18. Connect the voltmeter lead to relay terminals N33. See figure 1.
19. Loosen the lock nuts for the adjustments for this relay.

20. Repeat steps 12 through 16 on this relay.

21. Disconnect lead N3 from the third voltage sensing relay (phase C) and connect it to the line terminal of the variac. Connect the movable arm terminal of the variac to the relay terminal from which lead N3 was removed.

22. Connect the voltmeter lead to relay terminal N2.

23. Repeat steps 12 through 16 to adjust this relay.

24. Remove the relay operation indicator from phase C relay and connect it to terminal N33, the upper left outer terminal, of the frequency sensing relay (the far left relay), figure 2.

25. Plug the frequency meter into the output receptacles.

26. Loosen the lock nuts on the frequency sensing relay controls.

27. Apply power to the unit.

28. Reduce the frequency until the relay drops out; then, increase the frequency to 59 cycles.

29. Adjust the pick up control until the relay picks up.

30. Set the frequency at 57 cycles and adjust the relay drop-out control until the relay drops out. (See NOTE at the end of this article.)

31. Repeat steps 28 through 30 until the desired pick-up and drop-out frequency values are obtained.

32. Remove all power from the unit. Disconnect the frequency meter, voltmeter (if connected), and power supply cables. Remove jumpers between LOAD panel and NORMAL POWER panel if used.

33. Reconnect all cables removed in step 1.

34. Return Control Panel to normal position. Adjustments is now complete.

NOTE

This adjustment procedure applies to original sensing relays, which may be identified by the relays being mounted on the exterior side of the relay chassis, and visible when the control panel is hinged down. If replacement type relays are installed, they may be identified by no relays being visible on the exterior side of the relay chassis. If it is found that replacement type relays are installed, the adjustments may be held to closer tolerance; step 13 should be retained at 192 volts and step 14 may be increased to 188 volts. Step 28 and 29 should be retained at 59 cycles and step 30 may be increased to 58 cycles. (707)

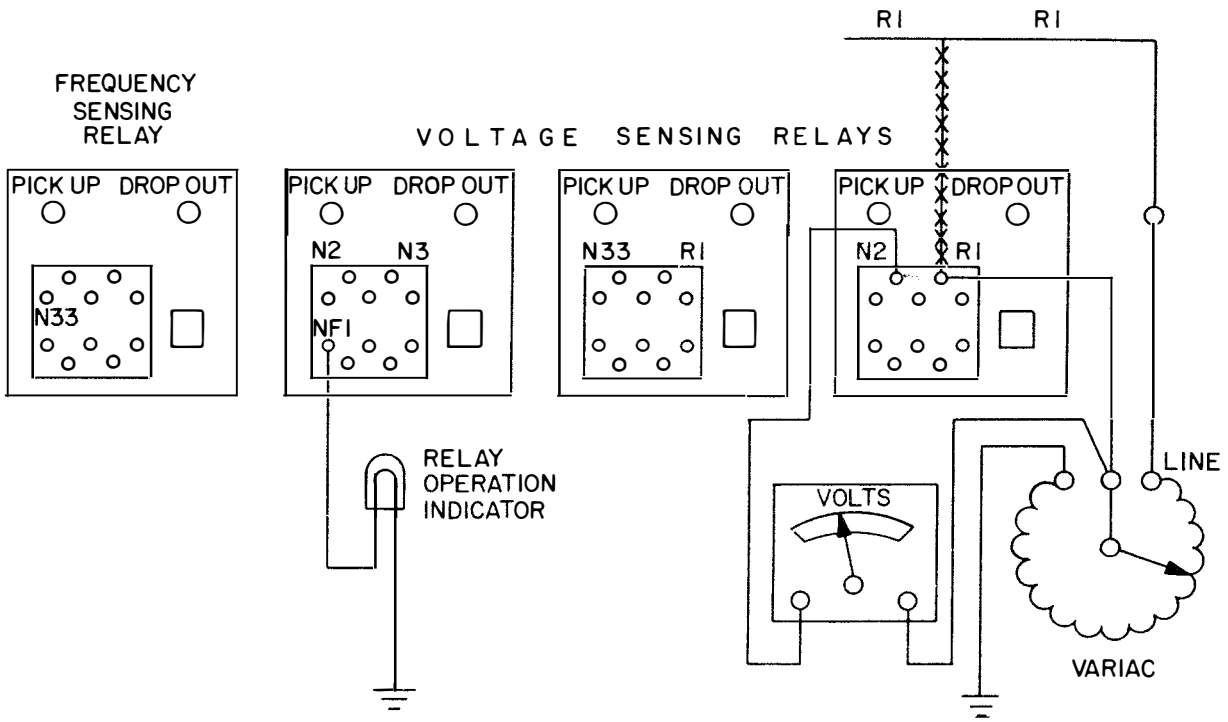


Figure 1. Relay Adjustment Test Setup.

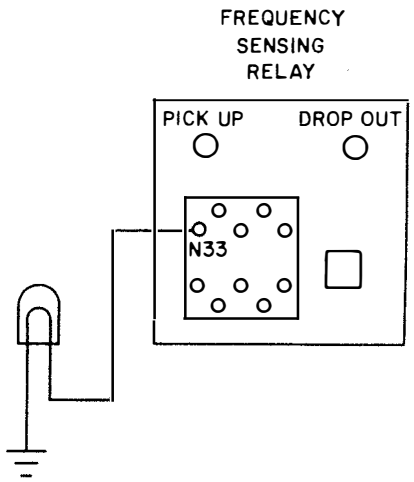


Figure 2. Frequency Sensing Relay, Adjustments and Test Connections.

R-278B/GRC-27A Receivers, Bandwidth Requirements—Alignment Procedures

The purpose of this article is to emphasize the need for strict adherence to the Technical Manual alignment procedure when aligning the 2.05 mc 3rd IF Amplifier of the R-278B/GRC-27A Receivers.

Insufficient bandwidth of the 3rd IF Amplifier in the R-278B/GRC-27A Receiver is caused by servicing personnel not using the 2200 ohm swamping resistor specified in Step 5, page 6-5, of NAVSHIPS 92774. Unless the swamping resistor is used, the tuning indications are poorly defined and the bandwidth will be much narrower than the 65 kc. requirement.

Field Change 12 to the AN/GRC-27 and AN/GRC-27A Radio Sets, which will soon be published, will make the radio sets compatible with broadband ancillary equipment. To work properly with the ancillary equipment, the 3rd IF Amplifier bandwidth must be 65 kc, centered at 2.05 mc. Unless the swamping resistor is used, this requirement will not be fulfilled.

A frequency counter must also be connected to the RF output X200K output jack as shown in Figure 1 to assure that the AN/URM-25D Signal Generator is providing exactly 2.05 mc. (689)

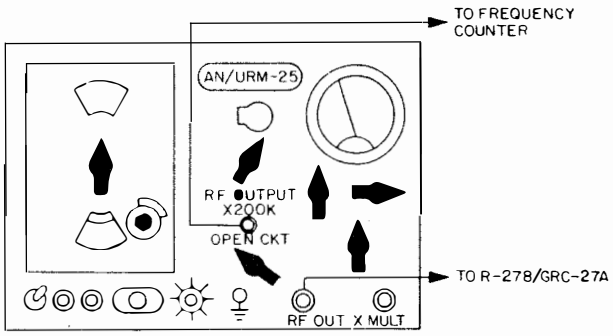


Figure 1. AN/URM-25D Test Set-Up

RADIO RECEIVING SET R-390A/URR ANTENNA CONNECTIONS

The Operational Test and Evaluation Force, Pacific Projects Division, has reported that many R-390A/URR Receivers, on ships they have visited, are connected to the coaxial antenna cables in such a manner as to impair performance substantially. It is possible that the original yard installation may have been incorrectly made, and the situation may be similar in other ships using these receivers.

There are two antenna input terminals on the back of the receiver; one, J103 marked "WHIP-UNBALANCED" and a second, J104, marked "125 OHM-BALANCED." On all the receivers inspected, the coaxial cable from the antenna patch panel was connected to terminal J103, perhaps the logical place to connect it since the antennas themselves are whip antennas or unbalanced wire antennas. However, this input terminal J103 is intended to be used only where a **very short** wire or cable runs from the antenna to receiver, such as in a vehicular or jeep installation. In the average shipboard installation, the coaxial cable length from antenna to receiver is many feet. Under these conditions the coaxial cable from the antenna should be connected to terminal J104 using an UG-970/U adapter-connector. This connector is built so that it grounds one side of the input terminal J104, adapting it for use with unbalanced coaxial cables. Figure 10, on page 17, of the **Technical Manual** TM 11-856A, illustrates this connector and page 13, paragraph 15 b-(2) discusses this point.

Incorrect installation can make a very substantial difference in receiver performance. Tests made at 55-spaced frequencies, between 2 and 30 MC on an R-390A/URR Receiver have shown that the average audio output voltage due to signals picked up by a receiving antenna was 123 times, or 42 decibels, greater with the antenna cable connected through a UG-970/U adapter to input terminal J104 than with the cable connected to terminal J103. At ten of the 55 frequencies the audio output voltage was in excess of 500 times greater.

The reconnection is extremely simple to make. Detach the antenna cable from input terminal J103, fit adapter-connector UG-970/U to the coaxial antenna cable, and connect the combination to antenna input terminal J104. Refer to FC 5-R-390A/URR, NAVSHIPS 0967-063-2140.

R-390/URR, AVAILABILITY OF TRANSMISSION LINE RADIO INTERFERENCE FILTERS

See article in AN/SRR-11 section under the same title.

TUNING RADIO RECEIVERS USING A FREQUENCY COUNTER

To set the frequency of a receiver with an electronic counter, the following system can be used effectively to better than one part in 10^5.

Example: Tuning a high frequency receiver:

CAQI-524D or AN/USM-26	AN/URM-25 Series Signal Generator	R-390/URR Receiver Antenna

Connect the RF OUTPUT X 20,000 jack of the AN/URM 25 signal generator to the input of the 100 megacycle head of the counter. Adjust the AN/URM -25 MULTIPLIER dial to maximum attenuation and connect the RF OUTPUT X MULT jack output to the antenna input of the R-390/URR receiver in place of the antenna.

Then:

1. Place MOD SELECTOR switch of AN/URM-25 on OFF.
2. Place METER READS switch of AN/URM-25 on RF.
3. Vary carrier control until the meter of AN/URM-25 reads approximately full scale.
4. Vary the frequency of the AN/URM-25 until the desired frequency is read on the counter.
5. Turn receiver frequency dial to desired frequency reading.
6. Adjust the receiver for wide-band reception.
7. Vary the output attenuator of the AN/URM-25 until a voltage registers on the receiver output meter.
8. Decrease the receiver bandwidth to .1kc while varying the receiver frequency dial to obtain maximum signal strength reading on the receiver output meter.
9. The receiver will then be set on the frequency which is indicated on the counter. Verify receiver dial reading.

NOTE: On some models of AN/URM-25 the RF OUTPUT X 20,000 is designated HIGH RF and the MULTIPLIER dial is designated ATTENUATOR and reads in microvolts full scale.

R390A/URR MAINTENANCE NOTES—REPLACEMENT OF DEFECTIVE CERAMIC FILTERS

Serial numbers 1 through 413 of the R390A/URR Radio Receiver manufactured by the Electronics Assistance Corp. under contract No. 22137-PC-60 used ceramic filters in lieu of mechanical filters in the IF Amplifier Assembly. When the ceramic filters fail they should be replaced with the mechanical filters listed in the equipment APL. It should be noted that additional circuit changes are required to return equipment to operating condition. This is necessary since equipments having ceramic filters do not utilize the capacitors shown in figure 15 of NAVSHIPS 93053, Volume III. When replaced by mechanical filters, the capacitors are required. These capacitors were physically installed but not connected in equipments utilizing ceramic filters. This provided means for future mechanical filter replacement.

The following notes will be helpful when replacement is required: Refer to NAVSHIPS 0967-063-2030, Volume III.

1. Ceramic filters have 2 terminals while mechanical filters have 3 terminals at each end. The ground terminal at each end of the mechanical filter should not be used.
2. Excessive heat during soldering may damage filters.
3. The capacitor assembly at the top and bottom may be removed to provide additional space for soldering.

When connecting capacitors or remounting capacitor assembly, insure that the 51 mmfd fixed capacitors (C507 and C516) are in the correct location. Refer to figure 15, 39 and symbol number markings on side of IF assembly and filter cover for correct position.

4. The common lead on the bottom capacitor assembly should be connected to the ground lug nearby on the chassis.

5. The lead (orange-white) from bandwidth switch S-503-8 to top of filters, should be connected to the common side of the four filters.

6. Connect only associated capacitors to filter being replaced. Make sure the remaining capacitor leads will not touch circuit wiring.

7. Make sure that related wiring is as shown in figure 12 with an additional trimmer capacitor across input and output of mechanical filter installed.

8. Adjust trimmer capacitors in accordance with paragraph 64 b 10 of the technical manual using an AN/USM-116 in lieu of TS505.

9. Adjust the IF Gain following the procedure outlined in paragraph 73 of the technical manual. Check the bandwidth following the procedure given in the Maintenance Standards Book, NAVSHIPS 0967-063-2050. (668)

R-390A/URR MAINTENANCE HINT–CAL ZERO ADJUST ASSEMBLY FAILURES

In response to reports received, the following information will be helpful, when failures occur.

The CAL ZERO ADJUST Assembly, Symbol E-124, FSN 1N5820-784-9316, usually is repairable. This assembly fails due to the clutch disk breaking loose from the peened and rolled end of the shaft, when the CAL ZERO ADJUST knob is turned too far counterclockwise. To prevent unnecessary down time, have the local machine shop make the following repairs when failure occurs. The size screw thread used may vary, depending on tools and screws available, but the screw head should be pan-head type to work properly. Remove the CAL ZERO ADJUST assembly from the R-390A/URR (NAVSHIPS 0967-063-2030, Vol. 3, para. 58). Have the machine shop cut off spindle flush at the end of the shaft, and then drill and tap for a 4-40 screw. The depth of the hole should be less than the length of the screw used (about 3/32-inch). A 3/8-inch screw with hole depth of 1/4-inch is recommended. Enlarge the disk center hole to accommodate the screw. Shorten the length of the screw to allow lateral movement (.003 to .006 inch clearance between the disk and the screw head) when assembled. This will allow flush engagement with the three clutch pins on the gear train assembly. Replace the assembly and adjust the helical ring clamp position behind the CAL ZERO ADJUST knob, for positive stop after engagement of clutch pins. (669)

R-390A/URR Radio Receiver–Adjustable Tuning Cores, Procurement of

Many Electronics Technicians are ordering transformers for the R-390A/URR Receivers when the tuning core fails.

NOTE: Tuning cores do not come with the transformer and must be ordered separately. Below are symbols and stock numbers of R-390A/URR tuning cores associated with their respective transformers which are not listed or described in Volume III of Technical Manual for Radio Receiver R-390A/URR (NAVSHIPS 93053).

Core Adjustable Tuning Used in Radio Receiver R-390A/URR

Transformer Symbol No.	Includes Coils Symbol Number	Use Core FSN
T-201	L-212 L-213	9N5950-348-1752
T-202	L-214 L-215	9N5950-348-1752
T-203	L-216 L-217	9N5950-348-1752
T-204	L-218 L-219	9N5950-348-1752
T-205	L-220 L-221	9N5950-348-1752
T-206	L-222 L-223	9N5950-348-1752
Z-201-1	L-224-1	9N5950-348-1752
Z-201-2	L-224-2	9N5950-348-1752
Z-202-1	L-225-1	9N5950-348-1752
Z-202-2	L-225-2	9N5950-348-1752
Z-203-1	L-226-1	9N5950-348-1752
Z-203-2	L-226-2	9N5950-348-1752
Z-204-1	L-227-1	9N5950-348-1752
Z-204-2	L-227-2	9N5950-348-1752
Z-205-1	L-228-1	9N5950-348-1752
Z-205-2	L-228-2	9N5950-348-1752
Z-206-1	L-229-1	9N5950-348-1752
Z-206-2	6-229-2	9N5950-348-1752

The above "CORES" are marked with single RED and White Dot.

Z-213-1	L-232-1	9N5950-698-0226
Z-213-2	L-232-2	9N5950-698-0226
Z-213-3	L-232-3	9N5950-698-0226
Z-216-1	L-233-1	9N5950-698-0226
Z-216-2	L-233-2	9N5950-698-0226
Z-216-3	L-233-3	9N5950-698-0226

The above "CORES" are marked with green dot. Core FSN 2RS1660-698-0255 as listed in APL is not identified to any symbol number in the R-390A/URR. (629)

Operation of R-390A/URR with CV-591A/URR–Maintenance Hint

NAVSECNORDIV has received reports that improper communications results when converter CV-591A/URR is used with Radio Receiver R-390A/URR. The reason specified for this difficulty is the inversion of sidebands.

Pages 3-2 and 3-3 of NAVSHIPS 0967-051-2010 (Formerly NAVSHIPS 93210), Technical Manual for the CV-591A/URR, shows the proper installation of the sideband indicators when used with single and dual conversion receivers.

There is some confusion apparently in determining the the proper installation of these indicators when the CV-591A/URR is used with the R-390A/URR.

Although the R-390A/URR employs triple conversion for operation below 8 mc, it can be considered a conven-

tional **dual conversion type receiver** when used in conjunction with the CV-591A/URR.

A review of the conversion methodsused in this receiver will show that the first conversion, with the receiver operating below 8 mc, takesplace in the firstmixer tube. The first crystal oscillatoroperates at 17 mc (R-390A/URR), which is above the incoming signal frequency. The resultant (sum) frequency, causedby the mixing of the incoming signal frequency and that of thefirst crystal oscillator frequency of 17 mc (R-390A/URR), is raised to a higher frequency. It is converted up rather than down in frequency, as is normally the case in a conventional mixing action. Thefirst mixeroutput becomes the first variable I.F. signal of 17.5 to 25.0 mc (R-390A/URR). Because of the operation of the mixer in this manner, no sideband inversion takesplace.

The second and third conversions, which occur below 8 mc, do cause sideband inversions (dual conversion) to an I.F. of a lower frequency. Above 8 mc, the second and third conversions actually become the first and second conversions of the incoming signal frequency and sideband inversion does take place. The first mixer is bypassed when the receiver is operating above 8 mc.

In view of this brief reviewof the conversion methods used in Radio Receiver R-390A/URR, and the proper installation of the sideband indicators in Converter CV-591A/URR, as shown in the technical manual, no difficulty should be encountered in establishing or maintaining single sideband communications if the equipment is operating properly. (698)

TUNING IN A SINGLE CHANNEL TELETYPE SIGNAL ON AN R-390/URR RECEIVER

Many QRK 5 capable signals are degraded so much in ship that the signals become either unreadable or take too many hits to be of much use. To understand how to tune a radio teletype signal many aspects of the equipment involved and the signal itself must be considered.

850 cycle shift radio teletype signals are used for 60 and 100 word per minute teletype transmission. This type of transmission is normally called FSK (Frequency Shift Keying). Assume the **assigned** frequency is8694 kilocycles. **This is the center of the handwidth to be radiated from the transmitter.** Two signals will be transmitted alternately, neither of which are8694 kilocycles. The teletype mark will be transmitted 425 cycles above the center frequency of 8694 and the space will be transmitted 425 cycles below the center frequency. The transmitter for this frequency will develop a mark signal of 8694.425 kc/s and a space signal of 8693.575 kc/s. Only these two frequencies are transmitted and these are the only two frequencies that must be received.

The R-390/URR receiver should be set up as follows:

a. Place the receiver in the calibrate positon on the FUNCTION switch andplace 8700 kcs in the window of the receiver. Set the BFO switch to "on" and BW switch to 100 cps psotion. Advance the RF GAIN control to about 7 or 8. Tighten the ZERO ADJUST knob finger tight. Rotate the KILOCYCLE CHANGE knob until the CARRIER METER indicates a peak reading. Rotate the BFO PITCH KNOB until a zero beat is obtained. If the BFO dial does not now read zero use an allen wrench to re-set the BFO PITCH KNOB. This procedure has aligned the receiver frequency window to read the correct frequency. UNLOCK THE ADJUST FOR ZERO KNOB AT THIS TIME.

b. Place the FUNCTION switch to AGC and dial the **assigned** frequency so it appears in thewindow. In this case the assigned frequency is 8694 kc/s. Rotate the BFO PITCH KNOB counterclockwise until it reads approximately -2.5 on the calibrated scale. Place the bandwidth kc switch in the 2 position. Listen to the radioteletype aduioteletype signal in the headphones and view the signal on the teletype converter oscilloscope. With sufficient output from the receiver to properly drive the teletype converter (+10 db for AN/URA-17) vary the BFO PITCH control SLOWLY AND SLIGHTLY until the two horizontal lines on the teletype converter oscilloscope are equal distance above and below the center line engraved on the scope face. When this condition exists the receiver is properly tuned to the correct frequency and the audio coming from the receiver to theteletype converter is 2975 cp/s for a mark and 2125 for a space. Tune ANT TUNE knob for maximum indication of CARRIER METER. If interference from adjacent signals is heard, try tuning the BFO PITCH knob to +2.5. The only difference as far as equipment setup is that now the mark/space output of the converter is reversed in polarity and the condition can be corrected with polarity switch on the converter.

c. Note the reading on the meter is upper right corner of the receiver at this time. This is the CARRIER METER and indicates not only relative strength or the input signal but also how much AGC (automatic gain control) action is taking place within the receiver. If the meter reading is below approximately 20 db, try other antennas on the circuit. Pick the antenna with the highest reading on the CARRIER METER after ANT TUNE knob has been adjusted for maximum indication in each case. Keep the RF GAIN control in the same position while comparing receiving antennas. Whenthe best antenna is determined, advance the RF GAIN control to either maximum or about position 9. If the CARRIER METER indicates above 80 db, decrease the RF GAIN control until the CARRIER METER indicates approximately 60 db. Too much action can cause distortion.

d. If you cannot obtain an AGC reading of over 30 db by use of any receaving antenna, try a different patch cord for the antenna patch panel. If this does not work, try a different receiver and if this fails try another patch cord for the antenna patch panel. If none of these procedures give a strong clear signal, try a different receiver frequency. Check DNC-14 for the approximate band of frequencies that should be usable between your position and the transmitting station.

e. The receiver is now tuned and the converter must now be adjusted properly. Adjust the input control of the converter until the top and bottom horizontal scope lines are the same height as the top and bottom of the signal indicated on the scope. Place the SPEED switch to FAST

and the POLARITY switch to NORMAL. Place the FUNCTION switch to either SINGLE or DIVERSITY as the case may be and copy a fiver signal.

The reasons for this elaborate set up of a receiver for RATT signals is, of course to provide good QRK copy. The reasoning behind this procedure is as follows:

a. The receiver is aligned first to exact frequency on the dial by the CALIBRATE function so that the dial will indicate correct assigned frequency. This is necessary in order to use reduced IF bandwidth. Reduced bandwidth in the intermediate amplifier (IF) is necessary to reduce adjacent channel interference. The receiver must be set on assigned frequency so that the mark and space frequencies will both go through the IF amplifier without attenuation of either mark or space frequency.

b. The BFO PITCH knob must be turned to about either the +2.5 or -2.5 position on the dial in order to generate the audio output of the receiver at proper frequency for centering within the teletype converters.

c. The purpose of trying more than one antenna is the simple fact that some antennas work better on some frequencies than they do on others. Antennas will change their characteristics not only with frequency but with changes of course where the received signal arrives from a different relative bearing.

d. Radio frequency patch cords receive hard usage and sometimes go bad. If more than one patch cord is utilized it tends to prove that the original patch cord was either good or bad depending on the change of conditions between two patch cords.

The time taken to properly set up a circuit is well worth while as the circuit will then operate at maximum efficiency and fewer reruns, patching of messages and fewer changes of frequencies will result in more spare time for operations. Although the desire for rapid communications is always foremost with communications, the procedure for obtaining rapid communications is sometimes "SLOW DOWN AND DO IT PROPERLY".

R-390( )/URR RADIO RECEIVER – OPERATOR NOTE

When the R-390/URR is operated in the "standby" or "calibrate" mode, a short to ground is placed across the antenna input terminal. This will cause the antenna input signal to be grounded in an installation having the antenna cable connected to the red (bottom row) receptacles of the AN/SRA-12 antenna multicoupler. This also effects all other receivers connected to the alternate receptacles of that subassembly.

Radio operators should disconnect the antenna input to the R-390/URR when replacing the R-390/URR in "standby" or "calibrate" mode. This may be done at the AN/SRA-12. (EIB 721)

R-390A/URR Radio Receiver–Maintenance Hint

NAVSECNORDIV has received a Users Comment Sheet from J. C. Chovan, ETN2, USS FORRESTAL (CVA 59).

He reported a problem and forwarded a solution which may be useful to holders of Radio Receivers R-390A/URR who have experienced this condition.

The condition reported concerns low sensitivity of the receiver, and overheating of resistors in the cathode and plate of the first, second and third mixers and the first crystal oscillator circuits.

He reported that this condition appeared to be due to mistuning of the tank circuits of these stages. This has been verified by NAVSECNORDIV.

When the tank circuits of these stages in the receiver are mistuned, the currents drawn by the tubes have a tendency to rise. These currents may rise to a level which exceeds the wattage rating of these resistors, thereby causing overheating and sometimes failure. When the tanks are properly aligned the current drawn through the resistors is well within their rated values.

Replacement of these resistors by higher wattage units appears to be in order, but is not recommended or approved by NAVSECNORDIV.

Replacement of these resistors by means of a field change would be too costly and time consuming to be accomplished to the R-390A/URR, at a time when these receivers are being replaced by the R-1051( )/URR.

Detuning of these tanks appears to be caused by vibration, which causes the slugs to change position in the tank, lowering the sensitivity and introduces overheating in the resistors.

NAVSECNORDIV therefore recommends that users of the equipment encountering this condition ensure that these circuits are properly aligned, and where vibration may be a factor, a drop of glyptol be affixed carefully to the slug to ensure that it will remain in the proper position to maintain correct tuning.

This recommendation applies only to those equipments experiencing this condition and it is not intended to be accomplished to all Radio Receivers R-390A/URR. (760)

R-390/URR Series Panel Lamp–Maintenance Hint

The type 328 lamps currently used in the R-390/URR's have a rated life span of 1000 hours.

Activities interested in greatly prolonged life of R-390/URR panel lamps may replace the type 328's with the type 381 (FSN 9G6240-927-3180). The type 381 lamps have a rated life span of 20,000 to 50,000 hours but should be used only in a vibration and shock free environment (i.e., ashore). (EIB 866)

installations if not received in the field change kit -- not required for AN/URC-35 installations.)

2 ea. Field Change Bulletins 0967-971-1040

2 ea. Technical Manual Supplements 0967-970-9018

A packaged 4G5820-00148-6101 field change kit should be marked Field Change 2-AN/URC-35. This kit should contain the following:

1 ea. Subassembly PC Board A2A9A1

1 ea. Subassembly PC Board A2A9A2

2 ea. Field Change Bulletins 0967-287-5050

2 ea. Technical Manual Supplements 0967-287-5013

Whenever one of the foregoing kits is received without the correct documentation for the type installation required, a copy of the required bulletin and/or technical supplement may be obtained from:

Naval Electronic Systems
Engineering Center
P.O. Box 55
Portsmouth, VA 23705
ATTN: Code 614
or: Via AUTOVON 690-9120, or
Area Code 804-444-9120

Additional supplementary information relative to the installation of these field change kits appeared previously in EIB 890, dated 7 Oct 1974. Replacement subassemblies, A2A9A1 and A2A9A2 may be ordered from the Navy Supply System under NSNs 4G 5820-01-003-6288 and 4G 5820-01-021-6458 respectively. DO NOT REORDER FIELD CHANGE KITS TO OBTAIN REPLACEMENT A2A9A1 or A2A9A2 circuit board subassemblies. (EIB 945)

R-1051B/URR Radio Receiver–Modification for Quality Monitoring System

NAVTELCOM INSTRUCTION C2300.19 of 5 June 1975 promulgates procedures for modification of the Radio Receiver R-1051B/URR to be used in the system. In Appendix C, Table C-1 of the Instruction, parts are listed for this modification. Item 3, a 10-turn dial REVODEX #RD-422, is listed without identification of a procurement source.

TRW/IRC
2801 72nd Street North
St. Petersburg, FL 33733
Phone: 813-347-2181

Allied Electronics
1355 Sleepy Hollow Road
Elgin, IL 60126
Phone: 312-697-8200 (EIB 951)

Either the frequency of the 5 MHz internal oscillator is off more than 20 Hz or the distribution amplifier output is not between 1 and 2 volts. RF voltmeter and frequency counter measurements will confirm adequacy of each of the COMPARE signals.

2. When making adjustments, always rotate the frequency adjustment slowly and with only slight torque to prevent damaging piston driven capacitor end stops. When this happens, there will be no end stop and the oscillator will not change frequency with adjustment. A defective oven (burned out) will result in the oscillator output remaining 30 to 300 Hz high, providing it is still oscillating.

3. When the COMPARE circuit is functioning and the lamp flashes at a slow rate, make the final adjustment only after the internal ambient temperature of the equipment has been allowed to stabilize. Any adjustment made before stabilization is reached will result in introducing an error after the unit is temperature stabilized. The equipment should be turned on a minimum of two hours prior to checking or readjusting the internal oscillator. (EIB 907)

Field Change 5-R-1051/URR, 1-R-1051B/URR, 9-AN/WRC-1, 1-AN/WRC-1B Improved Antenna Overload Protection Circuitry—Information Relative to Installation—Improvement of

The purpose of this article is to provide additional corrective information relative to the installation of Field Change 5-R-1051/URR, 1-R-1051B/URR, 9-AN/WRC-1, and 1-AN/WRC-1B.

Reports have been received by NAVSECNORDIV from various naval fleet and shore activity personnel relative to a short which sometimes occurs between relay K1 located in the A2A9A1 PCB and the tie terminal between CR3 and CR5 located on the A2A9A2 PCB. This fault is apparently due to different lengths of hex-spacers which were used in different production runs of the equipment when manufactured. These four hex-spacers were used in the installation of the original antenna protective device and are reused to install the antenna protective device furnished in the field change kit. All of the field change kits (approx 7,000) have been delivered and placed in the Naval Supply System, therefore, the most logical and least expensive way to correct this difficulty at this time is to install one to two #4 flat washers (or as necessary) between the A2A9A2 PCB at each hex-spacer. If no washers of this type are readily available at the respective activity they may be ordered under FSN: 9Z5310-699-2697 (washer #4 flat, 1/4" OD, 031" thk, CRS) at one cent each.

Maintenance personnel at activities where this field change has been accomplished are advised to check if ample clearance exists between the relay K1 and the terminal aforementioned, 1/16 inch spacing or greater is acceptable. (EIB 890)

Field Change 5-R-1051/URR, 1-R-1051B/URR, 9-AN/WRC-1, 1-AN/WRC-1B, and/or 2-AN/URC-35 entitled: Improved Antenna Overload Circuitry—Installation Information Concerning

The purpose of this article is to provide Fleet personnel with information on field change kits which may be improperly marked, and/or contain field change bulletins not applicable to the equipment for which the kit was ordered.

Reports received from forces afloat have advised that "Improved Antenna Overload Circuitry" field change kits, when ordered for R-1051, R-1051B/URR receivers are being received improperly marked and contain AN/URC-35 field change bulletins in lieu of R-1051, R-1051B bulletins.

The field change kit antenna overload circuit assembly A2A9, consists of subassemblies A2A9A1 and A2A9A2 which are identical, physically and electrically, whether the kit is required for an R-1051( ) or AN/URC-35 installation. However, in order to properly install the assembly, the correct field change bulletin is required.

A packaged 4G5820-00-182-3052 field change kit should be marked Field Change 9-AN/WRC-1, 1-AN/WRC-1B, 5-R-1051/URR and 1-R-1051B/URR. The kit should contain the following:

1 ea.	Subassembly PC Board A2A9A1
1 ea.	Subassembly PC Board A2A9A2
1 pc	#24 AWG, stranded, yellow hook-up wire, 14 inches long. (May be substituted in R-1051

between the two 5 MHz frequencies. If an error is indicated, it may be consistent throughout the check, or it may progressively increase as the receiver's dial frequency is increased. This does not void the check, however, the error does indicate that one or both of the 5 MHz sources are off-frequency and an adjustment or calibration is required. If an AN/URQ-9, -10, -10A was used at the receiver antenna patch panel as a 5 MHz source, the error indications (998, 999, 1001, 1002, etc.) were in all probability a result of the receiver's internal standard being off-frequency, rather than the AN/URQ-9, -10, -10A.

When the same 5 MHz that is being used to operate the receiver is applied to the antenna input (the same EXT or INT 5 MHz as applicable) the SSB difference output frequency should be 1000 Hz even if the common 5 MHz is off-frequency. The 1000 Hz lock will be obtained even if the 5 MHz is off as much as ±70 to 80 Hz, providing the receiver's mixing and error canceling circuitry is functioning properly.

Some personnel have experience difficulties in accomplishing the check when using the 5 MHz from the AM-2123/U rather than directly from the AN/URQ-9, -10, -10A. The counter will indicate a locked condition (1000 Hz) at one or two MHz dial increments and possibly the 5, 10, 15, 20 and 25 MHz dial increments. This is due mainly to the harmonic filtering and shielding within the AM-2123( )/U distribution amplifier. Switching over to the AN/URQ-9, -10, 10A's 5 MHz output usually eliminates this problem if the receiver is actually okay.

When the rear of the later model R-1051D/URR's and R-1051E/URR's is not accessible, a clip lead may be used to jumper TP1 on the frequency standard electronic assembly (Unit A2A5) to terminal E1 on the antenna overload protective assembly (Unit A2A9). The receiver chassis may be withdrawn from the chassis and the interlock defeated to accomplish the check. LINE and PHONE level controls may be adjusted as required.

The check is valid and lock-in should be obtained at all MHz dial frequency increments in either the LSB or USB mode. **EIB 850**

R-1051( )/URR, T-827( )/URT and RT-618( )/URC Equipments; Internal Frequency Standard (A2A5)—Compare Lamp Indications

The purpose of this article is to clarify the external 5 MHz input level requirements necessary for the equipments' compare circuitry to perform properly when utilizing various types of A2A5 internal frequency standard assemblies.

The previous output level requirement of the distribution amplifiers AM-2123( )/U has been greater than 4 volts RMS (with and without 50 ohm termination). This high level has caused certain type A2A5 frequency standards to indicate in the COMPARE mode while other types do not.

There are a variety of frequency standard modules (A2A5) in use which are interchangeable in the various equipments. The equipments will operate with any of these frequency standards. However, in the COMPARE mode, some of these modules will not indicate properly to allow the internal oscillator to be compared and adjusted to the ship's reference source. All types will function properly when the external source 5 MHz input level is adjusted for 1 to 2 volts RMS (measured with and without 50 ohm load at the AM-2123( )/U output).

Corrective action should be taken within the RF distribution amplifier to lower the 5 MHz output levels. A separate EIB article "AM-2123( )/U RF Amplifiers - 5 MHz Output Levels Lowered to meet AN/WRC-1 Family Communications Requirements" should be consulted for corrective action within the AM-2123( )/U amplifiers.

It should be noted that optimum operation and reliability exists when all equipments utilize the ships reference source of 5 MHz. In this mode (EXT), the module is very dependable and equipment dial frequencies are locked to the same reference (AN/URQ-9, 10, 10A). Activities should take appropriate action to insure that the equipment is utilizing the external mode for normal operation. Most installations have the frequency distribution system already installed. An Alteration Equivalent to Repair (AER) has been implemented by NAVELEXSYSCOM on certain AN/WRC-1 family A2A5 frequency standard modules which will be performed by authorized repair depots during the repair cycle. Activities receiving these type frequency standards will receive additional instructions packaged with the repaired frequency standard. As soon as this AER program gains momentum, an EIB article will be published and necessary documentation will be revised as appropriate.

The following information will be helpful when checking or adjusting the internal (A2A5) frequency standard to the ship's reference source in the COMPARE mode:

1. When the COMPARE lamp does not flash, insure the equipment has been on for at least fifteen minutes so that the internal oscillator will be at least within 20 Hertz at 5 MHz. Also insure that the 5 MHz external reference source is present at the equipment on the correct cable from the distribution amplifier. The actual COMPARE circuitry within the module very seldom fails. Usually one of the two COMPARE signals is incorrect.

R-1051E/URR Radio Receiver—Installation Procedure

The connector mating kit furnished with the R-1051E/URR contains two strain relief boots, manufacturers Part No. 4032585-0701. These boots are to be used with connector plug, MS-3106-E-10SL-4S and replaces the cable clamp which was previously furnished but was too small to accommodate the overall diameter of TTHFWA 1-1/2 cable.

The following procedure should be followed when assembling the boot on the connector:

a. Remove armor from cable end. Do not remove more than 0.88 inches.

b. Solder the desired leads to the pins of the connector.

c. Slide boot over connector end with smaller diameter going toward cable. Note that expansion of boot permits the insertion of completely wired connector.

d. Position boot at connector back shell.

e. Using heat gun with a deflector attachment to localize air stream, shrink boot onto connector backshell. Heat gun must be capable of heating to 175°C.

f. Continue heating to produce a tight seal over the cable jacket and connector.

Activities requiring additional boots may order them from supply using FSN 9G5970-989-6238. (847)

R-1051( )/URR Radio Receiver, MRC Test Entitled: "Test Frequency Locking Action"--Supplemental Information Concerning Accomplishment of

Numerous PMS feedback reports and complaints have been received by NAVSECNORDIV relative to the accomplishment and results obtained during the performance of the R-1051( )/URR receiver MRC test entitled, "Test Frequency Locking Action." The MRC presents one general method of accomplishing the test. It is not possible for this MRC, or other MRC's to provide alternate methods to cover individual situations which may be used or employed to accomplish maintenance checks which provide the same end results. The following information is provided in an attempt to prevent some of the difficulties that have been encountered by maintenance personnel when performing this check, either by the MRC procedure or some necessary alternate procedure which was locally devised and employed in order to accomplish the same basic check because the rear of the R-1051( )/URR was not accessible.

The accomplishment of the test is dependent in part on the application to the receiver's antenna input of a 5 MHz standard frequency plus all of its resulting harmonics. The receiver must be in proper mechanical alignment and must have good selectivity and sensitivity (properly functioning RF Gain, IF/Audio Gain, AGC, Mixing and error canceling circuitry) in order to lock-in with a 1000 Hz counter indication from 2-29 MHz at each selected MHz increment. One microvolt or less of the relative harmonic available at the antenna input for the MHz dial frequency increment selected is all the receiver requires to provide the 1000 Hz difference SSB audio output. There may be instances when one or two of the MHz frequency selections will result in an unlocked random counter indication This may be due to the specific harmonic required being overridden by excessive noise within only that portion of harmonics containing the desired harmonic, poor front-end selectivity or poor overall receiver gain for the MHz position selected. If the receiver fails to lock at all selections, or will just lock at several of the dial selections, the opposite sideband (set KC dials to 999 for USB --- for LSB) may be checked to see if the trouble is common to both or only one side band.

MRC C-304 Q-1 under control number AO AAV7 accomplished the test using the receiver's "INT 5 MC OUT" jack on the rear of the receiver connected to the "ANT" jack. In order to have 5 MHz from the receiver's internal frequency standard available at the "INT 5 MC OUT" jack for connection to the "ANT" jack, the frequency standard's COMP/INT/EXT switch must be in the "COMP" position. This step was not included in the MRC "Preliminary Procedure," and has resulted in unsatisfactory tests and complaints from many activities. The step has now been included in the revised MRC C-304, Q-1 under control #52 AGY5 G for R-1051( )/URR and R-1051B/URR receivers.

Personnel at some of the installations where the rear of the R-1051( )/URR's is not readily accessible have been accomplishing the check successfully by connecting an external frequency standard directly to the receiver's antenna input at the receiver antenna patch panel; while personnel at other similar installations have been unsuccessfully trying to perform the check in the same manner. A successful check is dependent on a properly operating receiver over-all, whether an AN/URQ-9, -10, -10A or AM-2123( )/U is used at the antenna patch panel as a 5 MHz source and to what position the receiver's internal frequency standard's "COMP/INT/EXT switch is positioned. If the receiver's internal 5 MHz standard is being used to operate the receiver (COMP/INT/EXT switch in the INT position) and 5 MHz from a DIFFERENT source is applied to receiver's antenna input, the counter will indicate 1000 Hz throughout the check only if there is no significant frequency difference

If either the upper sideband or lower sideband module goes out, either one can be interchanged but caution should be exercised that no troubles exist in the other sections of the receiver which may have caused the original burn-out.

No attempt should be made to make any measurements except with the equipment recommended in the technical manual. Some test equipments have damaging voltages either in their probe or in the unit itself which can ruin the transistors in the R-1051/URR.

Operating the R-1051/URR without an audio load can ruin the output transistors. The proper speaker impedance should also be checked for this reason.

A simple measuring device to ascertain the operation of the oscillators can be made by utilizing an R-390/URR as a sensitive "sniffer" tuning to the inoperative freqs on the R-1051/URR and then checking with a piece of coax as a probe to the guilty oscillator. It is not necessary to make metallic contact with the suspected offender. The R-390/URR acts as a very sensitive voltmeter and actual readings on the carrier level meter will tell if this part of the circuit is or is not functioning.

R-1051( )/URR RADIO RECEIVER–OPERATION IN AFTS RATT MODE

When using the R-1051( )/URR for A7J (Audio Frequency Tone Shift Radio Teletype) single or multichannel (AN/UCC-1) reception, the use of the mode selector switch in the "FSK" position instead of "USB" will provide more optimum results.

Because of the continuous nature of an AFTS RATT signal, a shorter "hang time" for automatic gain control (AGC) is desired. In the R-1051( )/URR the "hang time" is reduced in the "FSK" mode. The "USB" and "LSB" mode provide a 50% longer AGC "hang time" since the circuitry was intended for optimum performance on voice reception. (EIB 721)

AN/WRC-1B, R-1051B/URR–NEW PRODUCTION

See article under AN/WRC-1 with the same title. (EIB718)

R-1051/URR, T-827/URT, AN/WRC-1 SERIES, AN/URT-23 AND AN/URC-35 FAMILY EQUIPMENTS – INTERCHANGEABILITY DATA ON TRANSLATOR SYNTHESIZERS.

See article under AN/WRC-1 with same title. (761)

R-1051B/URR AND T-827B/URT – EQUIPMENT DAMAGE CAUSED BY APL ERRORS

This article advises maintenance and supply personnel of errors in two APL's which will cause damage to the R-1051B/URR and/or T-827B/URR. The part number appearing in the FSN column for Translator Synthesizers Assemblies (A2A6) is in error and should be corrected as follows.

1. R-1051B/URR, APL 81095102 of Mar 67–change 1A2A6 FSN column to read 2N5820-879-7577.

2. T-827B/URT, APL 88485702 of Mar 67 – change 2A2A6 FSN column to read 2N5820-879-7577. (EIB 730)

R-1051/URR Radio Receivers–Failure of

The following comment is an excerpt from the U.S. Navy Emission and Bandwidth Handbook, NAVSHIPS 0967-308-0010.

"A decrease in the number of receiver failures and an increase in reliability and frequency stability can be realized by leaving the R-1051/URR in a "power on" status at all times. The R-1051/URR mode selector switch should be placed in the STANDBY position in lieu of the OFF position. This procedure also keeps the receive antenna protective device active thereby providing continuous protection to the receiver front end."

The foregoing statement can be generalized to most of the Navy's electronic equipment. The continuous (day after day) turning equipment on and off creates transients which are the chief source of opening up vacuum tube filaments on older types, and creating the same type of stresses on transistor junctions.

Therefore, it is recommended that if the situation presents itself, the E.T. may save himself time and effort by placing equipment in "standby" position instead of "off". It will also effect a cost savings for the Navy by reducing parts usage and equipment downtime. (784)

R-1051D/URR Radio Receiver and T-827D/URT Transmitter–Maintenance Hint

This article alerts holders of the subject equipment of a quality assurance problem with series regulator transistor A2Q1(2N3442) mounted on the main frame chassis.

Many reports have been received concerning improperly mounted hardware and components on the subject equipment. The improper mounting of A2Q1 appears to be a commonly reported problem.

Before proceeding, it is recommended that a transistor mounting kit consisting of a mica insulator, insulator bushings and mounting hardware be requisitioned under FSN 5961-617-5167.

De-energize and secure all power to the equipment.

Remove and remount transistor A2Q1 to the chassis using Dow Corning or Wakefield Thermal Compound as a heat sink. Do not use maximum mounting pressure on the transistor case as this slightly warps the case spoiling heat transfer to the heat sink and causes destruction of the transistor. Return equipment to normal operation. (849)

AN/WRC-1, R-1051/URR SHOCK AND VIBRATION MOUNTS

The AN/WRC-1 and R-1051/URR equipments are supplied with shock and vibration mountings that have been designed specifically for each of the equipments to meet the rigorous requirements of specification MIL-E-16400. The mounts are not interchangeable, although they appear alike. The AN/WRC-1 shock and vibration mount is nomenclatured MT-3115/UR (Barry part no. 18870-6( )) and the R-1051/URR shock and vibration mount when used separate from the AN/WRC-1 configuration is nomenclatured MT-3114/UR (Barry part no. 18870-5 ( )).

NAVSEC has received reports that some shock and vibration mounts supplied with the AN/WRC-1, R-1051/URR equipments appeared to be interchanged. Investigation disclosed that the prime contractor, General Dynamics, had inadvertently applied nomenclaute plates incorrectly; that is, applied MT-3115/UR plates to the MT-3114/UR shock and vibration mounting on an unknown number of delivered equipments.

Each of the equipment shock and vibration mountings have the associated equipment identification stenciled on the top plate of the mounting. All activities installing these equipments should verify use of the proper mount by citing the stenciling appearing on the top plate as well as confirming the vendor's number:

Equipment	Correct Nomenclature	Correct Vendor Part Number
AN/WRC-1	MT-3115/UR	Barry no. 18870-6 ( )
R-1051/URR	MT-3114/UR	Barry no. 18870-5 ( )

Installation of the AN/WRC-1, R-1051/URR aboard ship or in vehicles without the associated shock and vibration mount can incur serious damage to the equipment if vibration and severe shock is encountered.

R-1051/URR Radio Receiver and T-827/URT Exciter of AN/WRC-1, Panel Lamp Replacement–Maintenance Hint

The problems encountered in the replacement of the frequency indicating panel lamps in the R-1051/URR and T-827/URT can be minimized to a great extent by using the replacement procedure provided in this article.

The subject panel lamps are a special assembly manufactured by Grimes Mfg. Co. P/N A-9906-1. They are in the federal supply system under FSN 9G6240-623-3618. Because the lamps have high internal resistance and are in parallel, if one lamp burns out, the other lamp will operate brighter. To prevent the remaining lamp from burning out shortly thereafter, replace defective lamps as soon as possible.

Procedure:

A. Replacement of panel lamps located between the 1 KC and 10 KC digit knobs.

1. Remove power to the R-1051/URR or T-827/URT.
2. Open receiver or exciter drawer.
3. Set the frequency knobs to 15.555 MC.
4. Loosen the four captive hold down screws and lift out the translator/systhesizer dlectronic assembly. (Suggestion: Lift the screws and turnabout one-half turn into the captive nut. Then use the screws for handles to lift the assembly).

Replace defective panel lamp, assuring new lamp is tight in socket.

6. Replace translator/systhesizer.
7. Restore power and check operation.

B. Replacement of panel lamps located between 1 MC and 10 MC digit knobs.

1. Remove power to the R-1051/URR or T-827/URT.
2. Open receiver or exciter drawer.
3. Set the frequency knobs to 15.555 MC.
4. Loosen the four captive hold down screws and lift out the RF Amplifier electronic assembly.
5. Remove the two screws from the bottom of the Code Generator assembly.
6. Loosen the screw on the top of Code Generator mounting plate. This screw is somewhat difficult to locate. It is shown at the bottom of Fig. 5-102, NAVSHIPS 0967-970-9010 (formerly 94840(A), Vol. 1 (R-1051/URR)), or Fig. 5-141, NAVSHIPS 0967-971-0010 (formerly 94840(A), Vol. 1 (T-827/URT)). This screw is located about 1/2 inch directly below the fuse holder.

NOTE: In the T-827/URT unit, remove the protective support bracket, located behind the front panel, to allow access to the screw.

7. Remove the two nuts securing Code Generator plug P8 and remove plug from jack.
8. Remove the Code Generator.
9. Replace defective panel lamp, assuring the new lamp is tight in its socket.
10. Reinstall the code Generator, mounting plug, and RF Amplifier.
11. Restore power and check operation. (700)

R-1051/URR.

It is recommended that the receiver unit be left in a "standby" condition if not being operationally used. This will increase reliability and retain the internal frequency standards stability. When the receiver is turned completely "off" the existing front-end protective circuit (A9 subassembly) is de-energized and in the event of high-level rf feed-in on the antenna input, damage could be caused to the equipment. A field change isbeing investigated to assure retention of this circuit even though the receiver is "off."

R-1051/URR – Notes

Excessive RF into the front end will ruin the RF transistors in short order.

Field Change 7-R-390A/URR Receivers—Reduction of Internal Interference—Information Concerning the Future Accomplishment of

Field Change 7-R-390A/URR was developed and released for usage and installation in only those receivers located in Ships Signal Exploitation Spaces (formerly Supplementary Radio Spaces). Investigation indicates that the change has been installed in R-390A/URR receivers not used in, or intended for use in those specific shipboard spaces. This has resulted in the premature depletion of the field change from the Naval Supply System. In order to conserve limited R-390A/URR supporting funds, it was decided that the field change would not be reprocured as a packaged kit. However, for those activities (Naval Security Groups, etc.) still concerned with the reduction or elimination of R-390A/URR internal interfering signals (spurious outputs), the following information is herein provided for test and accomplishment, as may be locally desired. The decision to install any of the modifications should be made only after the test and determination that existing spurs interfere with the assigned operational requirements for that specific receiver.

Spurious outputs relative to all the frequencies listed in table I will not necessarily be found in each R-390A/URR receiver checked, however, those frequencies listed are a compilation of the basic dial frequencies which usually result in spurious receiver outputs for the several contractor (Collins, Motorola, Capehart, Stewart-Warner, AMELCO, Electronic Assistance Corp.) produced R-390A/URR receivers, all as a group.

Field Change 7-R-390A/URR changed R-210 and R-702 from 56K ohm 1/2 watt resistors to 220K ohm 1/2 watt resistors. In addition, the field change also provided and installed an RF shield. It may not be found necessary to change both resistors after checking the receiver against the frequencies in table I, and in some cases it may be found that one, or possibly neither resistor, may require changing. In any event, the spurious outputs which usually result from oscillations occurring in the RF amplifier have been indicated in the table by an asterisk, those resulting from harmonic mixing, etc. within the VFO, comprise the remainder of the table I frequencies. Objectionable RF amplifier spurs may be reduced or eliminated by changing R-210 from 56K ohms to 220K ohms. Objectionable VFO spurs may be reduced or eliminated by changing R-702 from 56K ohms to 220K ohms. If the resistors are not available locally they may be ordered under NSN 5905-00-192-0667. Installation of the RF shield has been discontinued.

Refer to the current R-390A/URR technical manual, NAVSHIPS 0967-LP-063-2010 , for the applicable schematics for resistor locations, and the instructions for the removal and reinstallation of the applicable subchassis. The IF GAIN adjustment should be performed in accordance with the technical manual instructions if either or both resistors are changed and the VFO calibration should also be checked in accordance with the technical manual instructions if it was removed from the receiver chassis in order to change R-702.

TABLE I

FREQUENCY (kHz)

910.13	5,637.80	10,318.70	13,712.51
1,500.24	6,303.10	10,763.90	13,864.34
1,635.00*	6,999.76	10,945.96	16,122.00*
2,368.00*	7,841.07	11,068.84	17,381.00*
2,727.75	8,376.00*	11,564.04	18,626.00*
3,227.20	8,591.20	11,746.02	19,397.00*
4,000.60	9,340.95	12,364.01	25,680.08
4,970.13	9,568.30	12,546.00	27,621.00*
5,357.00*	10,091.19	12,627.00*	28,755.00*
			30,392.00*

*Spurious outputs at these frequencies are usually the result of oscillations within the RF amplifier. After ten seconds the spurious output may stop, but if the receiver dial is adjusted 10 or kHz in either direction it may be found again.

NOTE

Frequencies not marked with an asterisk should be scanned at least ±100Hz.

(EIB 911)

15. Carefully remove any burr's, shavings, etc., and install the control so that its terminals will be up and so that the screw driver adjustment will be accessible at the front panel of the receiver.

16. Use the lead pulled out of the cable harness in step 10 and connect it to the end terminal of the control that isn't jumpered to the center terminal. Connect the other end of the lead to the ground terminal at the side of the CARRIER METER which is already being used as a ground for C101. Solder the connections.

17. Use approximately an 8 inch length of insulated hook-up wire and connect the center terminal of the control to the CARRIER METER terminal noted in step 6.

18. Reinstall and secure the IF subchassis to the receiver chassis. Reconnect the plugs and connectors disconnected in step 8.

19. Reconnect the BANDWIDTH KC switch and BFO PITCH control to their respective shafts and to the positions noted in step 7. Tighten the shaft clamps.

20. Reinstall the receiver dust cover and the receiver in its regular installation and reconnect the cables etc. which were disconnected in step 2.

21. Reapply power and use the R-390A/URR M-1 MRC to check the CARR-METER ADJ. Readjust if necessary and lock control.

22. Use tapewriter and make a label for the CARR-METER ADJ control and attach to the front panel just below the control.

The foregoing procedure may be applied to R-390/URR receivers, however, the hook-up and wiring should be accomplished relative to the R-390/URR schematic and technical manual. The control should be located in the area of the front panel that is just above the dial indicator.

(EIB 899)

3. Remove the receiver's top dust cover.

4. Unsolder and disconnect the two leads at the center terminal of the "CARR-METER ADJ" control. Do not disconnect the jumper between the center and one end terminal, or the resistor connected across the control to each end terminal.

5. Unsolder and disconnect the short lead between the "CARR-METER ADJ" control and "GAIN ADJ" control. Remove the lead from both controls.

6. With an ohmmeter determine which of the two leads disconnected in step 4 connects directly to the + terminal of the "CARRIER LEVEL" meter. The correct lead and terminal will indicate approximately zero ohms on the RX1 scale. NOTE the Meter terminal and the lead.

7. Note the position of the BANDWIDTH KC switch and BFO PITCH control. Loosen the clamp on each shaft and pull on each knob to disconnect it from its respective shaft.

8. Loosen the three phillips head screws which secure the IF sub-chassis to the receiver chassis. Disconnect P-512 from J-512, P-116 from J-116, P-218, from J-518, and P-213 from J-513. Lift out the IF sub-chassis.

9. Route the lead the was connected directly to the positive terminal of the CARRIER LEVEL meter in step 6 through the hole under the control to the under side of the chassis.

10. The other lead should connect directly to a standoff terminal and a 680 ohm resistor (R-524) which goes to pin 7 of XV504, (see figure 1). Unsolder this lead from the standoff terminal and pull it out of the wiring harness. Retain the lead.

11. Connect and solder the lead routed through to the underside of the chassis in step 9 to the standoff and R-524.

12. On the front panel of the receiver, to the right of the ANT TRIM control locate and center punch the point indicated in figure 2. Drill a 3/8 inch hole at this point.

13. Remove the CARR-METER ADJ control from its mounting on the IF sub-chassis. Retain the lock-nut, mounting nut and lock washer.

14. Using the control, locate and drill a 1/8 inch hole for the control's position lock tab. Insert the control from front to locate hole. See figure 2.

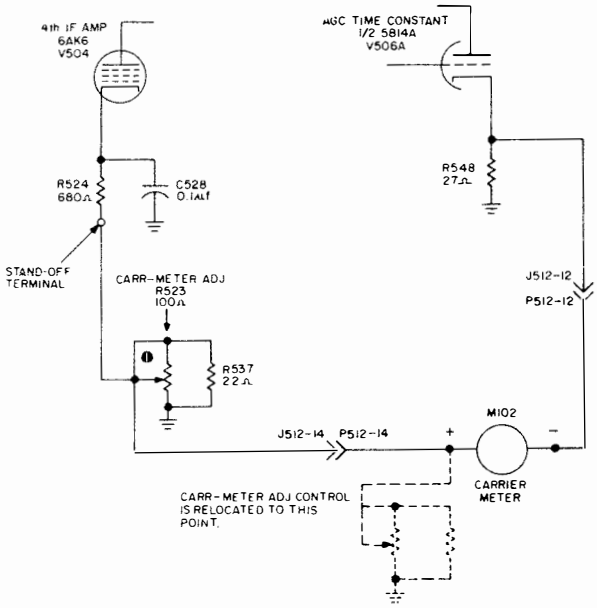


Figure 1. Schematic Carrier Meter Adjust

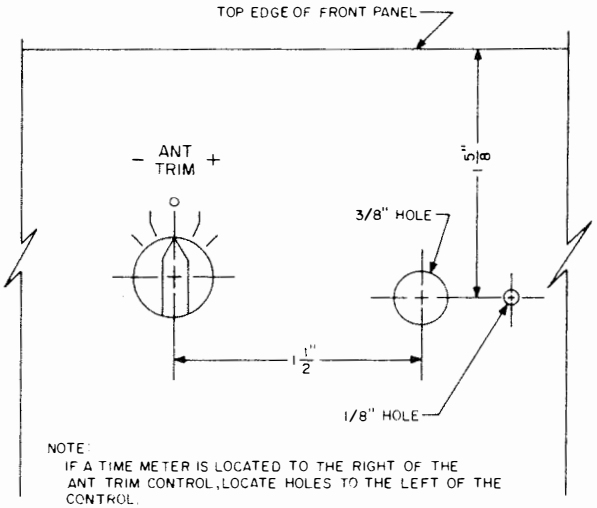


Figure 2. Front Panel Location

R-390A/URR Receivers, Frequent Failures and Replacements of V603 and V604 AF Amplifier Tubes, 6AK6 Type—Maintenance Hint

It has been reported by CTMC David MYERS of NAVSECGRU, Edzell, Scotland that they are replacing a large number of 6AK6 tubes used in the V603 and V604 R-390A/URR receiver AF amplifier application. Upon investigation, they found that when Field Change #6 to an R-390A/URR was accomplished, plate voltage to these two tubes is increased by 20 to 35 VDC, depending on AC line input voltage. Tube specifications for 6AK6's stipulate that they should not be operated with plate voltages (plate to cathode) in excess of 180 VDC. R-390A/URR field change #6 is boosting the plate to cathode voltage to between 200 and 215 VDC. This is resulting in the development of internal tube shorts, which in turn, in some instances, also results in damage to each tube's respective cathode resistors.

In order to minimize downtime and the unnecessary use of repair time and parts, a series B+ dropping resistor may be installed by activities which are experiencing this problem.

Refer to the 15 April 1970 issue of the R-390A/URR Technical Manual, NAVELEX 0967-063-2010, figure 5-13, sheet 2, zone B-7. The resistor will be located between terminal #5 of J619 and terminal #1 of L601 and may be installed as follows:

a. The following resistor types and values are recommended for this installation and should be obtained from supply, before starting the installation, if they are not on hand. One resistor is required for each receiver. Use a 200 ohm resistor if the AC line voltage is consistently maintained at 115 VAC; use a 220 ohm resistor if the line voltage will vary up to 120 and 125 VAC.

* RW31V221 220 ohms, 14 watts 9N5905-00-642-2542
* RW31V201 200 ohms, 14 watts 9N5905-00-636-9919
RW68V221 220 ohms, 11 watts 9N5905-00-772-9153
RW68V201 200 ohms, 11 watts 9N5905-00-973-9225
* Requires the addition of hook-up wire pigtails to the resistor terminals.

b. Remove the AC power from the receiver at the main bulkhead switch.

c. Remove the receiver chassis from its cabinet or rack. Disconnect and tag as necessary the cables connected to the rear of the receiver.

d. Place the receiver chassis on its side on a flat work surface and remove the AF amplifier sub-chassis.

e. Unsolder and disconnect the single lead from L601 terminal #1. Check that the opposite end of the lead is connected to J619 terminal #5.

f. Cut the wiring harness ties as necessary to enable connection of the disconnected end of the lead to XC-606 spare terminal #2.

g. Install the resistor between L601-1 and XC-606-2. Prior to the resistor installation, position any leads in the area between L601 and XC-606 so that they will not contact the resistor, or be between the resistor and the chassis. Retie the leads as necessary and solder the connections.

h. Reconnect the AF sub-chassis to J619 and J620 so that the component side of the chassis is accessible; reapply AC line power to the receiver, and set the FUNCTION switch to AGC.

i. Check the DC plate voltage between pins 5 and 7 at V603 and V604 tube sockets. --- Depending on AC line input levels, B+ should be in the approximate range of 170 to 180 VDC.

j. After the resistor installation, the CARRIER meter and IF GAIN adjustments should be checked, and performed if found necessary, in accordance with the procedures in Chapter 6 of the technical manual.

k. Remove the AC power from the receiver and reinstall the AF amplifier sub-chassis in its respective mounting location; reconnect the cables at the rear of the receiver chassis, and reinstall the receiver in its cabinet or rack.

l. Reapply AC power to the receiver; return the receiver to the mode desired. (EIB 895/907)

R-390A/URR Receivers, Relocation of "CARR-METER ADJ" Control to the Receiver's Front Panel—Maintenance Hint

The purpose of this article is to provide a procedure for relocating the "CARR-METER ADJ" control to the receiver's front panel in order to simplify the monthly accomplishment of the R-390A/URR M-1 MRC at those installations where the control is not readily accessible without removing the receiver from its installation.

1. Turn the receiver power off at the bulkhead switch.

2. Disconnect and mark or tag cables etc. as neccessary to enable removal of the receiver from its installation.

Acoustic feedback, RBH speaker to any microphone.	In this instance an RBH was used with a TBL-6. Feedback was eliminated by connecting the TBL-6 keying relay in series with the RBH speaker so that the speaker circuit was open when the transmitter key was closed.
No signal output. Low plate voltage	The lead from the primary of the coil in CF-101 had been forced against the side of the shield by gunfire, shorting the plate lead to ground. The CF-101 unit was removed and the lead insulated.
Low sensitivity on certain bands.	Check for shorted trimmer condenser on band with low sensitivity.
Volume reduced by over fifty percent when model PD-1 voice recorder equipment was connected to model RBH receivers.	The voice recorder input transformer was grounded on one side while the output transformer of the RBH receiver was grounded at center tap. Corrected difficulty by removing ground at RBH receiver.
Low sensitivity on band "C".	Band switching assembly contacts found loose and dirty. This condition was cleared up by cleaning and tightening the contacts.
Power system shorted; operator received shock when he touched receiver. Set insensitive.	Discovered a 6F8G tube in the 6C8G socket and a bad 6J5 tube. The line ON/OFF switch was defective and one side was grounded to the chassis. Defective tubes and switch replaced. Set operated normally.
RBH-2.—No signals at all getting through the audio-frequency stages.	Found C-189 shorted.
RBH-2.—Usual receiver background noise but no signals on bacd C. By jarring receiver, the signals would come in and out.	Found fixed capacitor in r-f coil catacomb was not soldered to catacomb contact pin. Inspection of pin indicated this. Found by opening the catacomb and prodding the leads to band C coils with insulated screwdriver.
RBH-1.—Weak or intermittent operation of receiver.	Due to failure of preselector coil to make contact at the same time as the coils in the main part of the receiver. May also be caused by the coil selector mechanism dropping down out of position due to loosening of rods supporting the same. Repaired by readjustment of the coil selector mechanism.

MODIFICATION TO SIMPLIFY OPERATION OF RBH EQUIPMENTS

The Bureau is in receipt of numerous complaints from the fleet which express dissatisfaction with the RBH radio receiving equipment because the multiplicity of controls on the panels of these receivers makes them ill suited for their intended purpose. This equipment has been alloted to the fleet for monitoring aircraft circuits, and was intended for installation at the conning station to be used for aircraft covering circuit watch.

A series of modifications are listed below which, if accomplished, will simplify the control panel of the receiver and make it possible to use the regulator conning station personnel as operators:

(1) The knobs and shaft extensions should be removed from the crystal filter controls after these controls are set to give the desired selectivity. A broad-band response is desirable so the PHASING control should be set at OFF and the SELECTIVITY control set to give the greatest background noise.

(2) The beat oscillator should be rendered inoperative and automatic-volume-control made effective at all times. This is accomplished by turning the CONTROL switch to CW0 and then throwing the two toggle switches inside the cabinet associated with this switch. This makes it impossible to operate the switches with the shaft. The knob is then removed.

(3) The r.-f. GAIN control is made semi-adjustable. This is accomplished by removing the knob, sawing a screw driver slot in the end of the shaft and applying a shaft lock such as the Millen type 10061. To adjust the r.-f. gain, it is first set at full gain and a strong station tuned in. The a.-f. gain is then set just below the point where the audio system begins to overload. The set is then turned off the signal, the r.-f. gain is set to give a tolerable noise output from the speaker, and the shaft is locked. Individual experience may suggest a more suitable method of adjustment under operating conditions.

MODIFICATION OF RBH-1 EQUIPMENTS TO PROVIDE CARRIER CONTROLLED NOISE SUPPRESSION ACTION

The following modification to provide carrier-controlled noise suppression action in the RBH-1 radio receiver has been proposed. This modification blocks the audio system so that no sound is heard in the loudspeaker until a carrier wave comes on. The avc voltage developed by the carrier in the avc tube then unlocks the audio enabling reception of the message.

In the original modification resistor R-148 and switch S-103 which were employed in the "S-meter" circuit have been used, thereby removing the S-meter from the circuit. If it is desired to retain the S-meter feature, an additional potentiometer of 1,000 ohms and an S. P. S. T. switch must be procured and mounted on the front panel on the receiver.

1 8-mfd. 450-v. d.-c. electrolytic capacitor.
1 1-mfd. 400-v. paper capacitor.
1 10,000-ohm, 2-watt resistor.
1 24,000-ohm, 2-watt resistor.

The wiring in the receiver is rearranged in accordance with figure 1, utilizing components already in the receiver as required. Resistor R-148 functions as a noise suppression threshold control or an adjustment which determines the strength of the incoming carrier necessary to unlock the audio system. Switch S-103 is used to remove the noise suppression feature if desired. The circuit is adjusted by setting the suppressor threshold control so that atmospheric disturbances are just barely eliminated with the r-f gain full on and no carrier being received. The suppressor circuit is highly sensitive and only a very weak signal is required to trigger it. Sensitivity of the receiver may be reduced by the r-f gain control although too much reduction in gain will decrease or eliminate the avc voltage and as a consequence the suppressor circuits will not unlock the audio system.

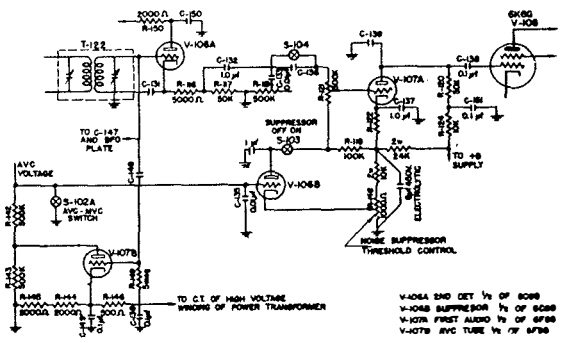


FIGURE 1.--Modification of model RBH-1 to provide carrier-controlled noise suppression action

RBH SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered
Lack of a-c power.

Cause and Remedy
Check fuse holders F-101 and F-102. This activity has found many of these fuse holders defective. The soldering lug connection through the middle of the hard rubber case to the inside ferrule is often not properly soldered and there is a tendency in this type of fuse holder for the lug to break off. To make repairs, the whole rear and bottom of the receiver must be removed.

MODEL RBG SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
Receiver not capable of receiving c-w signals. Beat frequency oscillator dead.	Resistor R-136 badly burned and broken; capacitor C-132-B measured 5000 ohms to ground without tube V-107. Checked and replaced R-127. Replaced R-136 and C-132-B. Receiver then operated normally.

RBA SERIES RECEIVERS, RF TRANSFORMERS TUNING MODIFICATION

Access to the adjustable tuning slugs of the rf transformers in the RBA series receivers is improved by the modification to the receiver chassis and transformer shields as outlined in Figure 1.

Templates may be made, based upon the outline dimensions given in Figure 1, to facilitate drilling of holes.

TENDER SPARE PARTS FOR THE POWER PACKS OF RBA, RBB, AND RBC EQUIPMENTS

The Bureau has under procurement 200 sets of tender spare parts for the power packs of RBA equipments. These spare parts are applicable not only to the power packs of RBA equipments, but also to those of RBB and RBC equipments. In addition, the Bureau has on procurement 824 sets of stock spares which are applicable to the power packs of RBA, RBB, and RBC. Upon exhaustion of tender spare parts, the Bureau will issue these stock spare parts in lieu of tender spare parts requested by the field. All power packs for these receivers are the same, and all types of spares are 100 percent interchangeable.

Tender and stock spares for the RBA, RBB, and RBC receivers themselves are not interchangeable, and should be requested for the specific receiver required.

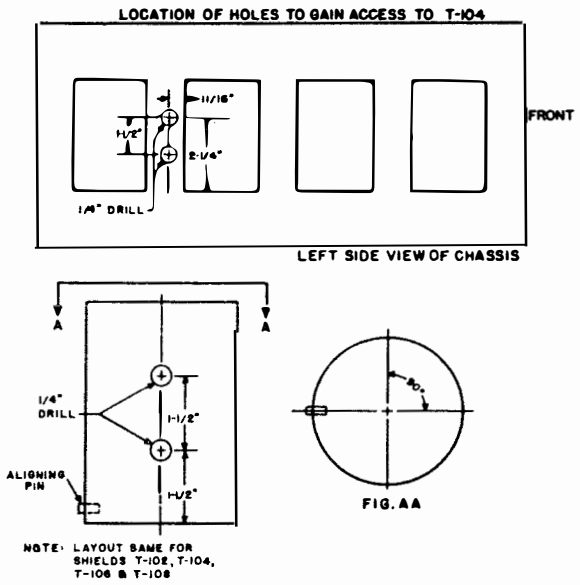


Figure 1

MODEL RBA SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
Failure of filter chokes L–405 or L–406:	The faulty unit should be taken apart and a repair attemped. In the majority of cases, the core of the choke has either shorted across the contacts or shorted a contact to ground. A repair can be effected by insulating these contacts thoroughly from each other and from the core of the coil. If the coil has had time to "burn out" this repair will not be successful. In this case, a TEMPORARY SUBSTITUTE for the component can be effected by using a 400-ohm, 50-watt resistor. The voltage output remains the same and the hum output will not increase noticeably. This procedure is recommended ONLY AS AN EMERGENCY REPAIR MEASURE. Failures due to internal shorts may be prevented by adapting the procedure described on page RBA: 1.
Weak signals.	Setscrews on coupling from main tuning dial to auxiliary gain control, R–128 were found loose, R–128 was set to proper operating value and coupling secured.—U.S.S. CHANDELEU
Failure of 250–volt d–c meter, M–101	Usually traced to the multiplier, which may be temporarily replaced with a resistor of higher wattage, the resulting error depending on the accuracy of the replacement.
	Type 6SK7, third r–f tube shorting between elements after warming up. U.S. NAVAL STATION, NAVY 129
Poor operation of low-frequency receivers such as RAO, RBA and RAK when operated in parallel on the same antenna with a high-frequency receiver, such as the RBL, RBB, RBC and RAL.	This is due to the fact that the input impedance of the antenna circuit of high–frequency receivers is very low and, hence, practically short circuits the antenna to ground leaving little signal for the low-frequency receiver with its high-input impedance. The best solution is to provide separate antennas for low-and high-frequency receivers. If conditions are such as to prevent this, the receivers may be decoupled by inserting a condenser in series with the antenna connection of the high-frequency receiver. The decoupling impedance may be mounted inside the junction box on the "Boston" line.
RBA–1–Intermittent operation.	Found poor solder joint on sockets for V–102 and V–107.—U. S. S. STACK (DD–406)
RBA–1–No indication on output meter.	Emergency repair was made by substituting a type–22152 meter found in spare parts for model RAK–RAL series of equipments—U.S.S. LONG ISLAND (CVE–1).

RBA SIMPLIFIED ALINEMENT

The following simplified alinement procedure for RBA equipment has been suggested.

Part I-Alinement of the cw oscillator using LR (Frequency meter):

Aline the RBA by using the calibrator output from the LR equipment . The LR has three convenient outputs of 10 kc, 20 kc and 100 kc. (Refer to Instruction Book for the LR.) The outputs are used as a standard to make the cw oscillator track on all four bands .

Band	Revr. Freq.	LR Freq.	Revr. Freq.	LR Freq.
No. 1	30 kc	10 kc	20 kc	20 kc
No. 2	90 kc	10 kc	40 kc	20 kc
No. 3	240 kc	20 kc	100 kc	100 kc
No. 4	600 kc	100 kc	240 kc	20 kc

When the adjustment has been correctly performed, the 1000-cycle note will increase with an increase in receiver-dial frequency.

Part II-Alinement of RF coils using LP (signal generator):

Use the same frequencies which were used to aline the cw oscillator. Tune the four trimmer capacitors for each band to the 1000-cycle note. Tune for maximum indication on the output meter.

The advantages gained in using this simplified tuning method are: (1) accurate calibration of the receiver of RBA, (2) maximum sensitivity with only a few microvolts input for 1000-cycle indication on the output meter; (3) alinement is accomplished with the reception switch in the cw position with no modulation from the signal generator; (4) alinement procedure time is cut approximately 50 per cent.

RAO SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
RAO-3.--Impossible to receive signals on band "C". Noticeable background noise received when the r-f and audio gains were full on. Other bands normal.	The r-f coil assembly was checked and it was found that the plates of the oscillator trimmer capacitor C-121 were shorted. The plates were not bent, but apparently had not been correctly spaced at the time of manufacture. To correct this, the condenser was detached from the coil assembly. The stator plate assembly was removed and unsoldered in the same manner. The stator plates were then respaced and centered so they would "mesh" correctly with the rotor plates. The condenser was reassembled and installed in receiver. Normal operation restored after oscillator realignment.
RAO-2.--No receiver output.	Investigation disclosed grounded antenna circuit and shorted C-150. Cleared grounds and replaced defective C-150 capacitor. Operation then was normal.
Low receiver sensitivity.	Investigation disclosed dirty contacts on band switching unit. Cleaned contacts and reception was greatly improved.
Erratic operation of receiver on 1300-kc. to 2800-kc. band.	Found cold soldered joint between coil and terminal in band change circuit.
RAO-3.--Very low audio output from receiver.	Trouble was found to be in the audio output transformer T-102, the two secondary leads having broken off completely at the terminal strip. When resoldered to the lugs, normal operation was restored. Apparently, the leads had broken off because they protruded too far above the chassis and were in the way of the coil carriage. Each time the band was changed on the receiver, the carriage hit the leads. Dressing the leads away from the carriage eliminated future troubles.
RAO-3.--AVC system inoperative due to excessive negative voltage output.	This was caused by a faulty capacitor C-145 in the grid circuit of V-107B. C-145 had developed a high resistance lead. Operation satisfactory when the capacitor was replaced.
RAO-2.--Loss of receiver noise with strong signals just audible.	Found that volume control R-121 was open; also coupling capacitor C-138 broken loose at connection. Also found tube socket for first audio tube V-106 defective (rocking the tube in its socket caused the signals to cut in and out). Repaired socket by squeezing connections.
RAO-3.--The slightest vibration would put the receiver out of operation. After much checking the trouble was traced to crystal filter assembly.	Upon disassembly of IF transformer and crystal filter found a drop of solder in the IF transformer can and bits of corrosion on plates of capacitor C-133. Removed solder. Capacitor was cleaned and lubricated. Receiver functioned properly.

RAL SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
RAL-6.—Signals very weak.	Found R-101 in first r.-f. amplifier circuit burned out. Replaced with spare and operation again normal.
RAL-7--Intermittent regeneration and erratic operation.	Detector tube socket plate prong receptacle discovered to be faulty. Snapped in two, resulting in contact on one side of prong only. Heavy seas or jars would cause signal to drop out. Installed new tube socket, circuit symbol X-103, and normal operation was resumed.
RAL-8.--Intermittent reception while tuning toward the low-frequency end on all bands.	This failure caused by the main tuning capacitor C-102C in the detector stage shorting. This defect was temporarily remedied by placing a small wood spacer under the spring at the end of the rotor shaft nearest the defective section. The failure was permanently corrected by replacing the capacitor.
RAL-2.—Stray oscillations present on higher frequencies when switch S-15 is in SHARP position, the oscillation persisting even when volume and regeneration controls were set at minimum.	Feedback was found to be occurring between leads of L-13 (type CRV-53032 low pass filter) and grid lead of tube V-4 (type 6D6), repaired by rerouting leads to L-13 and shielding grid lead of V-4. Receiver then was perfectly stable.
RAL-5.—Very noisy reception with frequency shift whenever the receiver was moved or jarred.	Cleaned and very lightly burnished the rotor and stator contacts of all coil switches which remedied the trouble.
RAK/RAL-6.—Weak output from RAL-6 receiver.	Removing audio leads to control unit from the receiver brought the signal level back to normal. Upon investigation of control unit it was found that an audio lead was grounded by a lug. Ground was removed by bending lug back to shape and normal operation restored.
RAL Series.—Receiver dead. No plate voltage on second r.-f. amplifier.	The "regeneration" windings for bands 4, 5, and 6 on inductance L-108 pass through a steatite ceramic tube on the very edge of the slot that contains the primary windings. The regeneration winding is at ground potential and the primary winding has a potential of 80 volts. As a result of both windings being enamel covered a short developed between them, thereby grounding the plate voltage for the second r.-f. stage. Repairs were made by removing the primary windings, placing a piece of varnished cambric over the slot in the tube at the point where the regeneration winding goes into the hole, and then rewinding the primary over the varnished cambric. This provided insulation between the two windings at the point of the shorting.
RAL Series.--Receiver not stable, stations drifted across dial, also receiver was very noisy.	Found resistor R-201 in power supply broken with wires making intermittent contact. Normal operation restored by replacement of resistor. The resistor in question is in series with the 874 current regulator tube and opening of the resistor caused loss of regulation.
RAL-6.—Intermittent operation and erratic regeneration.	It was found that the trouble was caused by a bad ground connection on the second r.-f. tube V-102, type 6D6. Normal operation was restored by making proper connection.
RAL Series.--Check or receiver disclosed that it operated normally on all bands but 7, 8, and 9.	Discovered, upon further checking, that the primary winding in the antenna transformer was open--a direct result of, at some time receiving a "shot" of RF. Since this opening was at a terminal connection, it was possible to "jump" the break by a piece of wire. The set then operated perfectly.
Model RAL and other types of receivers were using a common antenna. Reception was very poor on the other receivers when the model RAL receiver was being operated.	Antenna link (shorting link across decoupling capacitor C-101) was found to be closed. Opened the link. Reception then was good with the model RAL receiver in simultaneous use with the others.

and RAL. However, the power output of the generator winding is insufficient to simultaneously supply transmitter-tube filaments and the RAK-RAL so a 230-volt, one-ampere DPDT switch (see figure 1) is required to permit alternate operation of either the transmitter or receiver. The suggested temporary hookup is intended for accomplishment only in an emergency.

The following steps will accomplish the changeover:

(a) Remove the RAK and RAL power supplies from their cases. Throw the voltage-regulator switch to the OUT position on both power supplies. Unscrew and remove the ballast tube V-201 from the power supply that is used with the RAL receiver. Check the power supply used with the RAK receiver to be sure that the ballast tube V-201 has been previously removed. (Caution: Operation of voltage-regulator switch to OUT changes connection of ballast tube from being in series with the input-transformer primary winding to a parallel connection. Ballast tube must be removed to prevent unwanted current drain. Also removing the ballast tube from one power supply but not the other will result in a voltage overload on the other power supply when connected in series.)

Place the RAK-RAL power switch at the radio-room ac distribution panel in the OFF position. Remove the RAK-RAL control unit (mixer) from its case. Disconnect the receiver power supply ac cables from the left-hand terminal strip, (viewed from above), loosen the cable clamp and pull the cables from the case. (Caution: Be sure these are the ac, not the audio cables). Replace the control unit in its case. Connect the RAK-RAL ac power-input circuits in series by connecting one lead of each ac input cable with jumper leads to the terminals at one end of the DPDT switch.

(c) At the TBL, remove the leads, which connect to the motor-generator set, from terminals 8 and 9. Connect these leads with jumpers to the center terminals of the DPDT switch. Connect jumpers from the remaining two switch terminals to terminals 8 and 9 on the TBL. (Note: Starting from cold tube filaments, about 30-seconds lag between transmission and reception).

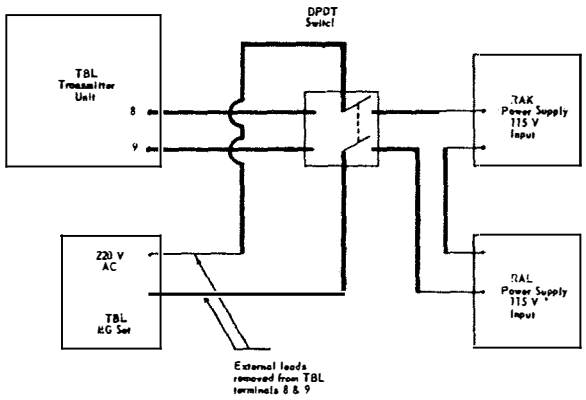


Figure 1

60-WATT OPERATION OF RAK RECEIVING EQUIPMENTS

When one RAK and one RAL are energized by a 300-watt rotary converter, it is necessary to operate the RAL at 200 watts and the RAK at 60 watts.

RAK SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
Noise, erratic regeneration.	Loose and dirty tube shields. Cleaned joints with fine sandpaper made sure shields were tight.
Low volume.	Check receiver attenuator relays for open antenna circuit.
RAK-7/RAL-7.—Fouling of band change switch pinion gears.	Shorten leads to bypass condensers in the vicinity of the band change switch pinion gears.
RAK.—Receiver inoperative.	Found loose connection at J-1 in loop coupling unit.
Very weak signals in receivers. Antenna-to-ground resistance reading low.	Upon investigation of the antenna trunk, water was found in its base. The water was up over the entering insulator coming in contact with the antenna lead and causing it to be shorted to the ground. It was found that the water had entered through the seams on the whip antenna and through the standoff insulator which is between the ship antenna and trunk. A small hole was drilled in the base of the trunk and the water was allowed to drain. After the water had drained the hole was tapped and a plug installed.
Low audio output; loss of sensitivity.	Audio screen bypass condenser, C-125, shorted.
RAK-6.—Lost signal entirely. No regeneration.	Found that solder joints between one side of R-114 and one side of R-115 were so close that they touched shoring out R-115. Pushed them apart to prevent further troubles.
RAK-6.—No signals were heared.	Sensitivity check showed 1500 mircovolt sensitivity. The setting of the regeneration control was unusually high on those bands on which any regeneration could be obtained and the setting of this control was affected by movements of the sensitivity control. A voltage check showed that the 180-volt B supply was varied by changes in sensitivity control setting. The cause was due to capacitor C-112 developing a 0.25-megohm internal short circuit, thereby biasing the grid of the next stage positive. Replaced capacitor and operation was normal.

HIGH HUM LEVEL IN MODELS RAK/RAL SERIES RECEIVING EQUIPMENTS

In the event that high hum level develops in the models RAK/RAL series receiving equipments, the trouble may be traced to the type 6D6 tubes employed in the detector and audio amplifier stages. It has been discovered that the type 6D6 manufactured by Ken-Rad produces excessive hum when used in these stages. This trouble has been traced to the construction of the heater element. The RCA tubes originally supplied in these equipments have a spiral wound heater, while the tubes in question (a large quantity are on hand at stock depots) use the folded type heater. In circuits employing a high resistance in the grid return or high bias, any leakage of electrons from the a-c operated heater over the top or under the bottom of the cathode to the grid can cause hum modulation. Any type 6D6 available should operate satisfactorily in r-f circuits and other circuits where the grid return resistance is of a relatively low value.

RAK–RAL EMERGENCY OPERATION

Failure in a submarines's ac power circuits may result in loss of some communications facilities, including the RAK-RAL (receivers). The Portsmouth Navy Shipyard has submitted a method for emergency operation of these receivers if two-way communication is required on power from the TBL (transmitter) motor generator (230 VDC input).

The 220 VAC winding of the TBL motor generator normally supplies filament voltages through a step-down transformer for the transmitter tubes. Only minor changes have to be made in receiver connections, including removal of the RAL ballast tube, to permit series operation of the RAK

ANTENNA CONNECTION TO RBK SERIES RECEIVERS

All RBK series receivers subsequent to RBK (no numeral) should be carefully checked upon installation or when complaints of poor reception are received to make sure that the antenna is connected to the antenna post and not to the coaxial fitting on the back of the receiver. This fitting is provided for use with a panoramic adaptor.

RBL SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
No output.	Inspection disclosed grounded antenna plug. The grounds were cleared and the receiver operated normally.
RBL-2.--Intermittent drop in signal level on band "D."	Found cold-solder joint where lead from L-114 connects to lug of band switch S-107.
RBL.--Transmission from TBS transmitter located adjacent to RBL made signals on RBL unreadable.	Installed r-f choke in series with antenna of RBL between antenna terminal E-102 and antenna series capacitor C-101. R-f choke consisted of 5½ microhenries 0.85 ohm d-c resistance single layer, wound on steatite core.
RBL-2.--Noisy operation of receiver.	Traced to a loose screw in the second r-f stage. This screw secured a grounding wire to the chassis. Repaired by tightening screw.

RBM AND LM VINYL COVERING FOR CABLE PLUGS

It is suggested the black-vinyl extruded covering on covering on RBM and LM cable plugs be substituted for rubber sleeving which dries up and cracks.

The Bureau approves the use of connectors with vinyl tubing whenever the rubber insulation requires replacement. The vinyl material should be Grade A of ML-I-631 and should not be subjected to temperatures above 75 degrees C. The adoption of the suggestion is left to the discretion of individual activities.

BURNOUT OF CATHODE BIAS RESISTOR IN RBO EQUIPMENTS

A frequent cause of failure in the RBO is the burnout of the 680-ohm cathode bias resistor (R-145) for the type 6K6GT power-amplifier tube. This is due to inter-electrode short circuits inside the type 6K6GT power-amplifier tube.

During the early production of model RBO receivers, it became necessary to secure a quantity of type 6K6GT tubes on very short notice. A quantity of commercial tubes was available, and these tubes were obtained and used. These tubes were not built to Navy specifications and under conditions of shock and vibration frequently develop interelectrode leakage or short circuits.

It is desired that all installation and maintenance activities remove all commercial 6K6GT tubes from RBO receivers and replace them with Navy standard JAN6K6GT tubes. The commercial tubes may be identified by the absence of the JAN designation and the Navy Inspector's anchor stamp.

TUBE TYPE 6V6GT/G USED AS POWER AMPLIFIER IN RBO EQUIPMENTS

A type 6K6GT tube was utilized as the power amplifier (V-109) in early production of RBO series receiving equipment. Later production, especially the RBO-2 equipments, incorporated the type 6V6GT/G tube for this purpose.

Tube type 6V6GT/G is the proper tube to use in this application for all models. When the type 6K6GT tubes now used as the power amplifier fail, they should be replaced by the preferred type 6V6GT/G.

The parts list and spare parts lists of the equipment instruction book and its supplements should be corrected with respect to the type listed under Navy type number and manufacturers designation.

RBO SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
No audio output.	Look for open circuit in output transformer Thordarson T-46789.
Output transformer primary or secondary open.	This is caused by removal of the load from the receiver's output circuit. Under the original circuit arrangement it is possible, for example, that with two RBO receivers on board, all speaker-amplifier units are switched to receiver 1, leaving receiver 2 without a load. The remedy is to modify the RBO receiver in accordance with the instructions on page RBO:1. This will provide a permanently connected load for the receiver.
"Cross talk" between channels.	Due to capacitive coupling between "hot" wires of unbalanced system. Modify RBO in accordance with page RBO:1. Make sure that center of input transformer of speaker-amplifier or speaker-amplifier unit is grounded.
Weak signals in one of the speaker amplifier units (49131).	One side of the input transformer was found open. Replaced transformer.
Very weak signals in monitoring phones.	Found lead wire from phone jack J-101 to resistor R-108 poorly connected to resistor. Loose strands from wire shorted out phone jack. Corrected by resoldering the wire.
When first turned on, receiver operated perfectly. After a short period of time, the output suddenly dropped off.	The screen grid of V-109 (6K6GT) in the output stage was discovered to be red hot. Output tube circuits were checked with an ohmmeter and the primary of the output transformer was found to be open. Replaced the transformer, and the equipment operated normally.
Receiver extremely low in sensitivity on short wave bands and completely dead on the broadcast band.	The trouble was traced to a shorted C-107 cathode and screen bypass capacitor. This capacitor was replaced, resulting in normal short wave band sensitivity and excellent reception in the broadcast band.
Equipment would work normally for a period of time, then would suddenly have a loud hum. When gear was checked for open windings, bad condensers or bad condensers or bad resistors, no indication of the cause of the trouble was found.	An open winding in the secondary coil of output transformer T-113 was discovered when the gear was checked in operation. It was found that after an hour or so of operation the secondary winding would open. This transformer was replaced and no further trouble was encountered.
Low volume on broadcast band of RBO receiver.	Antenna coil burned out while operating transmitter in the same compartment. Condition can be remedied by disconnecting RBO antenna before keying transmitter.

RBO SERIES TROUBLE SHOOTING NOTES--Continued

Difficulty Encountered	Cause and Remedy
Weak signals on broadcast band.	Trouble found to be with antenna input assembly, broadcast r-f transformer primary, and trimmer C-149. Apparently a heavy shot of r-f current had passed through units at some time, burning and melting windings of T-103 primary and shorting C-149. Replaced units with spares and realigned broadcast section. Operation returned to normal.
Loss of signals on all bands.	Burned plate filter R-143, and shorted plate bypass C-106-B for oscillator V-102. Replaced from spares and returned operation to normal.
Poor sensitivity, poor selectivity, and distortion in RBO (and RCH) receivers.	The triple .1 mfd. capacitor in the r-f stage of these receivers found to be leaky. Replaced.
RBO.-- When in port or very near a broadcasting station, the RBO received the signal clearly. When fifty to a hundred miles existed between the transmitting and receiving antennas, no signal was received. Short wave broadcasts were picked up at night only, and then were very weak and the signals would fade in and out.	The trouble was found to be a shorted decoupling capacitor (C112A) and an open resistor (R113). When the capacitor shorted, the current through the resistor increased to a value which caused it to burn out. When these two faulty components were replaced the equivalent operated normally.
Receiver would operate properly at quarter volume but audio output would become greatly distorted as volume was increased.	Resistor R-133 (0.22 megohm) had opened. Replaced R-133 and operation became normal.
Audio output was very low and distorted.	Voltage check disclosed zero voltage on screen of 1st Audio Amplifier V-107. Resistor R-138 had opened. Replaced R-138 and operation became normal.

RBS EQUIPMENT TROUBLE SHOOTING NOTES

Difficulty Encountered

RBS.--Receiver sensitivity was normal but radio output was barely audible.

Cause and Remedy

Found to be due to coupling capacitor C-580 having a leakage resistance of about 40,000 ohms. Replaced capacitor.--U. S. S. SUMPTER (APA-52).

RIGID CABINETS AND HINGED COVERS USED WITH MODEL RBS RECEIVING EQUIPMENTS

Outline dimensions, cable connections and other pertinent information regarding the model RBS series receiving equipment was published in RIB No. 80.

The receiver and amplifier-power units can be separated from the mounting bracket and installed in a normal manner. The receiver may be installed on a standard-operating table or shelf as shown in RIB No. 93

The rigid cabinet and hinged cover shall not be considered an integral part of the receiver. It is not necessary to use these items when an RBS receiver is installed. The stocking of the cabinets and covers as a separate item apart from the receiver is authorized.

The Bureau recommends that activities follow the methods shown in RIB No. 93 when installing model RBS series receivers. (6/1/47)

FAILURE OF BAND SWITCH IN MODEL RBS RECEIVING EQUIPMENT

The U.S.S. Boxer (CV-21) has reported failure of band switch S-501 in the model RBS radio receiver. The selector rachet on the shaft of the switch, which is a part of the dial mechanism, came loose from the shaft so that the shaft turned freely.

All ships and stations using model RBS receivers are requested to advise the Bureau of any similar failures in order that corrective action may be taken by the manufacturer.

RBS CROSS-TALK

A beneficial suggestion discloses a possible source of cross talk in the connection between the RBS equipment and the receiver-transfer switchboard. The radio receiver has a ten-watt audio amplifier built into the rectifier power-supply unit for operation with a speaker.

Since there may be some misunderstanding regarding the proper connection of the receiver to remote stations, the following information is a reminder to installing activities.

At a local operating position, the output receptacle (J-503) on the receiver unit provides sufficient audio power for headphone reception. For convenience, two additional headphone jacks (J-904) and J-905) with an audio-level control are located on the rectifier power-supply unit. Also, located on this unit is the speaker receptacle (J-902) which carries the 10-watt output of the built-in audio amplifier. Since remote stations onboard ship intended for voice reception are equipped with individual amplifiers and speakers or combinations thereof, connecting them to this 10-watt output is not necessary.

When the audio output of the receiver is connected to the receiver-transfer switchboard, the connection should be made from the same output level as the receiver-headphone receptacle (J-503); not from the amplified output at the speaker receptacle (J-902)

All ships and maintenance activities should check the connection of the RBS to the transfer switchboard as an improper connection may be the cause of cross-talk.

ANTENNA CONNECTIONS ON MODEL RBS EQUIPMENTS (RIB-205)

An article in RIB 202 recommended the installation of Models RBS series receiving equipments without the splash-proof cabinet. At time of installation, provision must be made for connecting the antenna coax to the equipment. This can be done by installing a type 49120 concentric jack on a bracket as close to the antenna and ground terminals of the receiver as possible, and connecting the jack to the terminals with short jumpers.

On Model RBS-2 equipments, an antenna connection adapter assembly, J-506, is furnished with each receiver, and can be installed on the receiver with or without the splash-proof cover.

ANTENNA CONNECTION ON RBS & TCS EQUIPMENT

Activities having RBS and TCS installations are reminded that coaxial antenna connections may be used on these equipments. This type of antenna connector was approved by the Bureau for use at the option on the activity. An article regarding use with the RBS was published in the Radio Installation Bulletin number 205 which is reprinted below. Information on use with TCS equipment may be located in the Electronic Information Bullentin Number 311.

REPORTS OF UNSATISFACTORY PERFORMANCE OF RCH RECEIVING EQUIPMENTS

Reports received from installation and maintenance activities frequently complain of unsatisfactory performance of the RCH equipment upon installation. The subject of these complaints is the lack of gain, low sensitivity and frequency instability. When the Bureau of Ships assumed control of the technical aspects of the subject equipment several preliminary models were tested and found to be better than any of the other available equipments which would fill the requirements for a non-radiating, low and high frequency communications receiving equipment. The performance of this equipment will not equal that of some other Navy receivers; however, with proper handling it can be made to give satisfactory service.

These equipments were not tropicalized and were not packed for overseas shipment so deterioration may possibly result from long storage periods. Complete re-alignment of the receiver may be necessary at the time of installation. Alignment should be performed by expert personnel carefully following the instruction book procedure because there is considerable interaction between frequency bands, and one band cannot be adjusted without affecting the adjustment of the other bands. Several repetitions of the alignment procedure may be necessary to obtain the best sensitivity and gain.

Overloading on strong signals accompanied by pulling of the oscillator frequency can be prevented by maintaining the gain control settings as low as possible consistent with adequate audio output.

FAILURE OF PHONE CONTROL SWITCH S-103

Phone control switch S-103 operates in both the primary and the secondary circuits of the output transformer. When the equipment is operated with no load on the secondary of the transformer, extremely high audio voltage peaks occur across the primary winding and causes voltage breakdown between the two circuits of the switch and between the switch contacts and the grounded switch supports. It is important that a 600-ohm load be permanently connected to the 600-ohm speaker terminals to prevent the occurrence of these high voltage peaks. If a speaker is not used or if the speaker is disconnected, a 600-ohm resistor must be connected across the speaker terminals E-102.

In installations where no speaker is used it may be advantageous to set the PHONE OUTPUT ADJ. (screwdriver adjustment on left end of cabinet) to maximum to permit operating the gain control at a lower level.

In installations where there is no application for switch S-103 and arcing still occurs after applying the precautions described, the d-c portion of the switch can be removed from the circuit. Disconnect the three switch wires from the number three pin of V-110 and terminals B and P of T-120 (the wire from terminal B of T-120 to C-102 must be left connected). Connect a new lead from terminal P of T-120 to the number three pin of V-110. The 600-ohm load on the speaker terminals must still be maintained to avoid damaging the transformer.

RCH RECEIVER TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
RCH.--Oscillation in either voice or CW reception.	Trace to open capacitor C-123 between plates of diode V-107 and plate of V-106.

ADAPTING RCK AND TDQ FOR CCL SERVICE AT SHORE STATIONS

The following field change is recommended in order to relieve the shortage of the TDG-1 and RBQ-1 transmitter and receiver which are presently utilized with the UN (Western Electric Type 42-A-1) Carrier Control System and also in order to fully utilize the capabilities of the Army CF-1 four-channel telephone terminal when utilized alone or when the Type CF-1 terminal is utilized with the Navy Model UF Carrier Telegraph Equipment.

To obtain best use of the Army Type CF-1 telephone terminal the u-h-f transmitter and receiver should have a flat frequency response up to 12 kc. The unmodified TDQ transmitter is down about 16 db at 10 kc and the unmodified RCK receiver is down about 8 db at 10 kc when ban switch is set to "wide."

In their present form the Models TDQ/RCK combination will permit use only of channels one and two of the four channels of the Type CF-1 terminal.

INSTALLATION NOTES COVERING RCK SERIES RECEIVING EQUIPMENTS

The RCK series receiving equipments have been developed for use with the TDQ series transmitting equipments. These receivers are the first of a new series of equipments in which the i-f, audio and power circuits are standardized and the r-f, oscillator and mixer circuits are varied from model to model.

The RCK is a superheterodyne receiver designed to receive signals on any of four crystal controlled frequencies within the range of frequencies covered by the model TDQ transmitter. The model RCK receiver is approximately 11 inches high, 18 inches wide and 18 inches deep and weighs approximately 115 pounds. Power requirements are 106 watts at 110-120-volt, single-phase, 55-65-cycle AC. The tube complement is as follows:

No.	Type	Function
1	956	R-F amplifier
1	717A	Converter
2	717A	Multipliers
1	6N7	Crystal oscillator-multiplier
5	6AB7	I-F amplifiers
1	6H6	Second detector-peak limiter
2	6AB7	Audio amplifiers
1	6V6GT	Audio output amplifier
1	6U4G	Rectifier
1	VR150/30	Voltage regulator

The power output is 15 milliwatts into a 600-ohm load. A single tuning control operates seven tuned circuits. This control has four mechanical detents which are present in accordance with the frequencies of the crystals in use. Change of frequency is rapid and the operating frequency to which the receiver is tuned is indicated by the "lighting up" of one of the four bull's-eyes over the tuning dial.

The receiver chassis is designed to be removed from the cabinet by loosening the thumbscrews on the front panel and sliding the entire chassis assembly forward on the guide strips on each side of the cabinet. The mounting base to which the shock mountings for the receiver are attached is drilled with four holes through which 3/8" bolts of the proper length may be attached to fasten the receiver to a bench or table.

In planning an installation, care must be exercised to provide adequate clearance (minimum ½ 6-1/4") from the back of the receiver to the bulkhead or nearest obstruction to provide access to the power-input plug, antenna-ground plug, speaker plug, silencer plug, and fuses.

The antenna input circuit is unbalanced to ground and is intended to terminate a 50-ohm transmission line. When used with the TDQ series transmitter, the receiver input jack should be connected to the normally open position of the antenna changeover relay in the top chassis section of the transmitter.

Terminals are provided on the rear of the chassis for connection of 600-ohm speaker circuits. Speakers or speaker-amplifiers used in conjunction with the RCK receiver should be operated with taps adjusted on the line side of the matching transformers for optimum impedance match.

Sufficient slack should be left in connecting cables to permit withdrawal of the chassis from the cabinet without necessitating removal of plugs. An angle adapter on the antenna input plug should not be used; it will prevent withdrawal of the chassis without removal of the plug.

Complete instructions regarding the setting of the dial detents, alignment, and adjustment are contained in the instruction books. In conformance with recent practice, the instruction books also contain a complete table of point-to-point voltages and resistance for use in servicing.

OPERATION OF LOUD-SPEAKERS WITH RCK SERIES RECEIVING EQUIPMENTS

The RCK receiving equipment employs two stages of audio-frequency amplification which feed a power-amplifier output stage. The design is such as to impress a constant voltage (within three decibels) across the primary winding of the output transformer. This voltage is independent of changes in load resistance across the secondary terminals of the transformer from 600 to 30 ohms.

The maximum available undistorted output from the equipment is 100 milliwatts for a 600-ohm load. For a 30-ohm load, the power output is 850 milliwatts. The corresponding figures for resonant overload are 150 milliwatts and 1.35 watts. Thus, the RCK is capable of operating a loud-speaker, such as the type 49155, having a 30-ohm impedance and a nominal power input rating of 2 watts. If the RCK is to operate into a 600-ohm load, an amplifier-speaker such as the type 49131 will have to be employed for satisfactory loudspeaker reproduction. The audio-frequency output characteristics of the RCK equipment are approximately the same as the corresponding characteristics of the RBB/RBC receiving equipments and the same

treatment would apply to these latter equipments when loud-speaker operation is considered.

RCK C-113 CERAMIC SHAFT

Several reports of breakage of the ceramic shaft of the capacitor, C-113, have been reported. A large number of these failures can be attributed to improper maintenance. In some cases the five screws under the preselector unit which "jig" and secure the dial assembly in place have been replaced improperly. This has resulted in a loose dial assembly causing the ceramic shaft to crack. These screws should not be touched ordinarily and are painted red to call attention to this fact. Removal of the screws during routine removal of the preselector bottom plate places undue strain on the ceramic shafts causing breakage. Therefore—DON'T TOUCH.

INCORRECT VALUE OF RESISTOR R-246 IN RCK EQUIPMENTS

NYMI has reported to the Bureau that resistor R-246 in many new RCK receivers varies from 55,000 to 100,000 ohms. The correct value of this resistor is 47,000 ohms ± 10%, and unless this value is used, it is impossible to adjust the input meter to zero set. Activities experiencing this trouble should check the value of resistor R-246 and replace it if it does not read approximately 47,000 ohms.

PROPER CONNECTIONS BETWEEN RCK EQUIPMENTS AND TYPE 49155 LOUD-SPEAKER UNITS

The design of the audio output circuit of the RCK receiver is such that maximum audio power is available at the speaker jack J-304 when the actual load impedance is much lower than 600 ohms. Therefore, for satisfactory operation of single loud-speaker units of type 49155 with the model RCK, the 30-ohm imput taps on the speaker unit should be connected to the receiver output, even though the latter is designated 600 ohms.

CRYSTAL FAILURES IN RCK AND TDQ SERIES EQUIPMENTS

Reports from the field indicate frequent failures in the crystals supplied with the RCK and TDQ series equipments, resulting in failure of the oscillator circuit. Inability of the crystals to oscillate is due to manufacturing processes in the factory producing these crystals. These processes have been analyzed and corrective measures taken which it is believed will relieve the situation.

The Naval Research Laboratory and the manufacturer of the RCK and TDQ crystals are conducting further investigation in an endeavor to determine other possible causes of crystal failures. In order to carry out these investigations it is requested that all cognizant Naval activities and field personnel assist as follows:

(1) All defective crystals for RCK and TDQ equipments should be immediately returned to the Naval Supply Center, Norfolk, Va., untouched, unopened, and with seals unbroken if sealed.

(2) Failure reports should be submitted to the Bureau for each crystal sent to the NSC, Norfolk, Va. The failure report should state that the crystal has been sent to NSC, Norfolk, Va. Replacement crystals should be requested from the Naval Supply Center in accordance with Chapter 67 of the Bureau of Ships Manual.

RCK ALIGNMENT IN LESS TIME

In order to properly align Radio Receiver RCK, it is necessary that all covers be in place, especially the RF covers. These covers have holes through which an alignment tool may be inserted. It has been brought to the attention of the Bureau that these holes are unmarked, necessitating frequent reference to the pictorial view in the instruction book during alignment procedures.

It has been suggested that these holes be marked with their appropriate designations (such as C-101, E-202) in order to eliminate the need of referring to the instruction book for hole locations. The Bureau concurs that this suggestion will save time in the alignment procedure. A simple method is to type the appropriate designation on a small piece of paper and attach this by means of transparent tape adjacent to the hole corresponding to the symbol number.

REPLACING BROKEN VARIABLE CAPACITOR SHAFTS

Two suggestions have been approved which, because of their interrelation, are combined in this write-up to avoid any confusion which might arise from their separate publication.

The basic suggestion consists of replacing broken ceramic tuning capacitor shafts with shafts fabricated from GMG glass fiber (Melamine) rod.

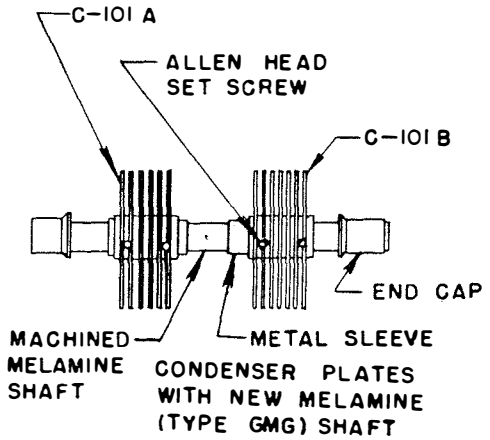


FIGURE 4. Showing New Shaft Installed.

The following is one method for repairing tuning capacitors (C-101 and C-113) in RCK equipments. The new shaft is machined to fit and the original metal sleeves and end caps are remounted (press fitted) on the shaft. Each capacitor plate assembly is secured to its metal sleeve by two Allen Head Set Screws. (See illustration.) This method is satisfactory for repairing these capacitors, which are not available in the electronics supply system.

The following method is for repairing the tuning capacitors in the RF and multiplier sections of RDZ equipments. The 17/64-inch diameter shaft is machined from a 5/16-inch diameter rod. Capacitor rotors must be aligned on the shaft so that proper meshing of rotor and stator plates is obtained. Realignment of the RF and multiplier sections will be necessary after reassembly of the equipment.

Machined surfaces of the new shaft should be coated with Insulating Varnish Compound, **N5970-511-8953** to reduce the effect of humidity.

Repairing the tuning capacitors by installing the new shaft, compared with the former practice of replacing the whole unit, saves material and reduces maintenance costs.

MODEL RCK SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
No audio output.	Discovered one lead from capacitor C-243, on the side going to the second amplifier grid, was so close to chassis that voltage arced over to ground. However, it did not read "short" when measured to ground with an ohmmeter. Bent lead away from ground and replaced shorted capacitor, from silencer diode to second amplifier grid, with spare capacitor. Operation was again normal.
RCK.--Inability to zero the input meter.	Resistor, R-246, found to be outside 10 percent tolerance limit. Replaced resistor. Normal operation restored.
Receiver had very low sensitivity.	Faulty operation was traced to a defective high-frequency trimmer capacitor C-113. This capacitor is made up with a "slug" type adjustable screw. The "slug" had expanded and would not clear the tubular part of the capacitor. The capacitor was removed and the "slug" sanded down. The capacitor was reinstalled and the receiver operated normally.

ENTERTAINMENT RECEIVERS FOR NAVAL VESSELS

RCU, RCU-1, and RCT radio-phonograph equipments, manufactured primarily for commercial use, have been added to the electronic material allowance for certain Naval vessels by the Chief of Naval Operations.

Some of the more important characteristics of these equipments are as follows:

Frequency range	535 kc. to 18.4 mc., continuous coverage in three bands.
Record player	RCU and RCU-1 automatic; RCT manual.
Weight	175 pounds.
Type of mounting	Deck.
Power requirements	180 watts, 115/230 volts, 60 cycle, single phase, a.c.
Spare parts	Contained in box inside cabinet.
Record stowage cabinet dimensions and weight.	13¾" high, 24-7/8" wide, 13-7/8" deep, and 67 pounds.

Inasmuch as these units were manufactured primarily for commercial use, no mounting facilities were provided for shipboard installation. It is therefore recommended that these equipments be fastened to a bulkhead by means of four hooks and padeyes. The padeyes should be attached to the equipment near the top and close to the bottom on each side of the unit with the corresponding hooks welded to the supporting bulkhead. This method provides a sturdy installation and will permit the unit to be unhooked and pulled out whenever servicing becomes necessary. Extreme caution should be exercised in attaching the padeyes to the sides of the wooden cabinet as the wood is easily damaged.

These receivers do not meet current requirements insofar as receivers radiation is concerned and, when installed in vessels, shall be considered as "strip ship" items.

FAILURE OF FILAMENT BALLAST REGULATOR TUBE IN RD-92/UX FACSIMILE RECORDER

Activities report the failure of ballast-tube thermal resistor V7 (Amperite type 6-36) which regulates the a-c series filament current for all tubes in the RD-92/UX Facsimile Recorder. (Refer to Symbol V-7 in NavShips 91401, Instruction Book for Facsimile Recorder).

In case of a failure and where a replacement is not immediately available, it is recommended that an 80-ohm, 50-watt resistor be substituted to maintain operation.

To effect this temporary repair, break the glass bulb of a defective 5Z3 or other 4 pin tube and remove the elements. Insert conductors in the tube base connection pins 1 and 4 and solder. Connect and solder the other end of the two conductors to the terminals of the resistor. Insert the tube base in the ballast tube socket XV-7. The resistor should be located external to the recorder in a well ventilated space.

With the RD-92A/UX Facsimile Recorder, a ballast-tube thermal resistor V-7 (Standard Navy Stock Number N16-R-85006-1525) is provided in the equipment spares. (12/1/52)

FACSIMILE RECORDER RD-92/UX

A mechanical "veedor root" counter (Symbol Designation 0-480, Standard Navy Stock Number N16B-750001-438) bracket and associated gears is installed on the RD-92/UX equipment. This mechanism is not installed in the RD-92A/UX equipment. See the instruction book for RD-92/UX, NAVSHIPS 91401.

The mechanism installed on the RD-92/UX indicates a count for every twelve revolutions of the recording drum for the purpose of indicating the approximate time that the equipment is in use. This mechanism is not required in the operation of the recorder.

Equipment and stock maintenance parts for these counters were not provided and none are available. In the event that the counter on RD-92/UX equipment becomes defective, it should be removed from the equipment.

RD-92/UX MOUNTING RAILS

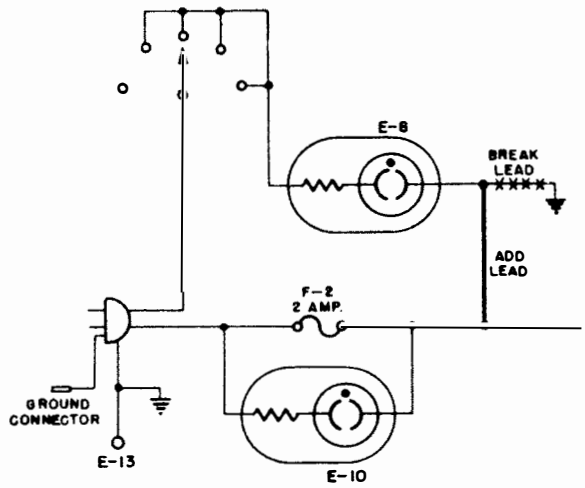
Field activities have reported that the on-off indication of the neon pilot lamp E-8 of Facsimile Recorder RD-92/UX is not definite when the Recorder is operated from an ungrounded-primary-power-input line. For this type of installation, the Bureau authorizes a rewiring of Pilot Lamp E-8 in accordance with figure 1.

After the equipment has been changed, make appropriate entries on the equipment history card and in instruction books.

Due to the minor nature of the modification, a field change will not be issued.

FACSIMILE RECORDER RD-92/UX

In a beneficial suggestion, it was suggested that activities using the RD-92/UX Facsimile Recorder cut 1/4-inch of bakelite off each corner of terminal board TB-2 as an aid to maintenance. This will allow TB-2 to pass through the meter opening in front panel when test meter M-1 is removed for repair.



CORRECTIONS TO SCHEMATIC DIAGRAM FIG. 13 OF NAVSHIPS 91401

NOTE: THIS DIAGRAM IS INTENDED AS AN AID IN REWIRING E-8, IT IS NOT A COMPLETE DRAWING OF THE RD-92/UX.

Figure 1

APPLICATION OF MODIFIED RD-92/( )/U, TT-41B/TXC-1B AND CV-172( )/U

See article in CV-172( )/U section under the same title.

COMMUNICATIONS RECORDER RD-217/UNH

BACKGROUND.

The Magnetic Recording Wheel Assemblies (part number 411 093) of the RD-217/UNH tape recorders are, in most instances, being replaced and discarded after six months of continuous operation. During this period of operation the recorder heads wear down approximately 0.005 of an inch. Further use of these worn heads produces unsatisfactory tape recordings. By the use of precision machinist measuring instruments and elaborate procedures, several several field activities compensated for this wear by adjusting "out" the positioning of the recorder heads in each assembly. A few activities approximated this adjustment. This action has resulted in excessive tape wear (where an over adjustment is made) and alternate changes in level of recording with each revolution of the wheel assembly (where both heads on the assembly were not adjusted by the same increment).

The unit cost of the magnetic recording wheel is $33.00. A study effort was initiated to determine what, if anything, could be done to extend its useful life. As a result of this effort a tool was developed to permit a simple and precise adjustment. It has been determined that each head can be adjusted four times and will have the effect of extending its useful life from 6 months to 2½ years. Figure 1 shows the outline dimensions of the tool, Adjuster, Magnetic Recording Head Assembly MX-4676/UNH. The adjustment procedure is listed below. The adjustment tool is being sent to all air activities where RD-217/UNH recorders are being used. No action on the part of air stations is required.

It is recommended that used recorder head assemblies be retained by the field activities for adjustment and reuse upon receipt of adjustment tool. Further, it is recommended that a record be maintained for each head assembly to prevent the reuse of a unit having more than four adjustments or 2½ years of operational use.

PROCEDURE FOR ADJUSTMENT OF MAGNETIC RECORDING WHEEL ASSEMBLY 411 093 USING ADJUSTOR TOOL MX-4676/UNH.

1. Remove Recording Wheel 411 093 as described in Section XI, paragraph 3, page 41, of the Service Manual for Sound-Scriber Model S-124 (Navy RD-217/UNH).

2. Remove the two screws which hold contact (slip) rings to top of wheel. The magnetic heads will now be exposed.

3. Turn wheel over and loosen - DO NOT REMOVE - the four nuts which secure heads to wheel assembly. Notice that screw holes are elongated, allowing magnetic heads to be extended above tape guide ring which encircles wheel assembly.

4. Leaving screws loose, place wheel over stud on Recorder Head Adjusting Tool (hereinafter called tool).

5. Push recording head against vertical planed surface of tool.

6. Keeping head reasonably tight against planed surface, turn tool over and tighten two screws which are exposed through hole in tool.

7. Lift and turn recording wheel so that other head is in proximity to planed surface of tool. Repeat steps 5 and 6.

8. Remove wheel from tool and tighten four nuts firmly.

NOTE: At this time, look at the surfaces of the recording heads. They should both be smooth. The air gap between magnetic poles is a barely visible line. (See figure 20, page 54 of the Service Manual.) If a noticeable depression is seen in either of the heads, the recording wheel must be replaced.

9. If both heads are smooth, replace contact ring cover, alining screw holes so that cover fits recording wheel exactly. The holes are not interchangeable.

10. Replace recording wheel as described in Section XI, paragraph 3.(o)-(u), page 43, of the Service Manual.

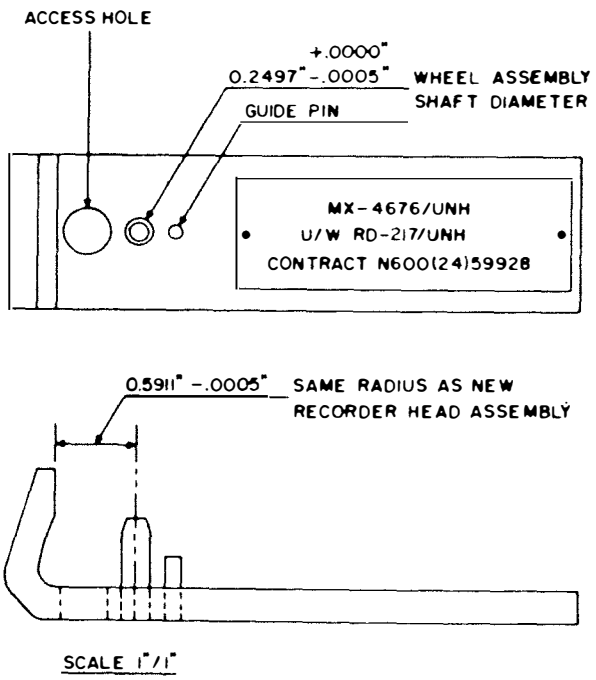


Figure 1. Dimensional Drawing of Adjuster, Magnetic Recorder Head Assembly MX-4676/UNH for RD-217/UNH.

RD-219A/U, RD-219B/U, and RD-269/U Recorder-Reproducers, Shock Hazard--Elimination of

Naval Safety Center, Norfolk, VA reports a shock hazard when subject recorder-reproducers are serviced out of their enclosures with AC power applied.

Problem correction is as follows:

Refer to figure 4-1 of NAVSHIPS 365-2720 (RD-219A/U)

Refer to figure 2-2 of NAVSHIPS 0965-065-9010 (RD-219B/U)

Refer to figure 2-2 of NAVSHIPS 0965-066-6010 (RD-269A/U)

Refer to figure 2-1 of NAVSHIPS 0965-012-5000 (RD-269/U)

Strip and apply spade lugs to the ends of an insulated two inch #18 stranded wire and connect one end to ship's ground (terminal 4 of terminal board TB-1). Then connect the other end to the mounting screw that secures the top of TB-1 to the enclosure. *(850)*

RD-231/USQ-20(V), Recorder-Reproducer (Paper Tape Unit)—Maintenance Information

Hardware parts (screws, nuts, etc.) used in the Photoelectric Reader of the RD-231/USQ-20(V) have been difficult to replace when they became worn or lost. These items are non-American standard, and American parts cannot be substituted.

The Electronics Supply Office is in the process of assigning a FSN to a kit of these parts (Ferranti P/N 65/19002).

When an activity requires one of these peculiar hardware items they may order one of the kits from supply, and then retain the kit within the maintenance complex to meet future requirements.

Pending assignment of the FSN to the parts kit, the kit may be procured by referencing the above Ferranti Part Number. (703)

RD-231/USQ-20(V),Signal Recorder-Reproducer (Paper Tape Unit)--Maintenance Information

Procurement of replacement parts for the Ferranti paper tape reader has been a problem. The tape reader head is the Ferranti Model TR-2B, and only the mechanical portion is used. This particular model uses a 54-tooth clutch and feed drum assembly.

The correct part numbers for these parts are as follows:

Item	Nomenclature	Mfg. P/N
1	Worm wheel	65/18058
2	Clutch drum	65/47083
3	Feed drum	65/47084
4	Differential pinion	65/18057

NAVSHIPS 94085(B) of 17 January 1966, Technical Manual for RD-231/USQ-20(V), contains the above information. Action is underway to include these parts in the supply system and to have federal stock numbers assigned. It is expected that the associated APL and COSAL will be revised to include these parts.

Activities servicing the RD-231/USQ-20(V) are advised to retain the above information within their maintenance complex. (708)

RD-243/USQ-20(V) SIGNAL DATA RECORDER REPRODUCER, (MAGNETIC TAPE UNIT) – MAINTENANCE HINT

The following information is relative to the recrowning of the read-write heads for the Potter Instrument Company Magnetic Tape transport.

A new replacement read-write head and mount assembly costs $1,190.00. Adjustments of the head on the head-mount are considered beyond the capability of the users; therefore, the head and head-mount are replaced as an assembly.

Under normal usage, a read-write head may be recrowned several times at a great cost savings. The present cost of complete overhaul including recrowning of the read-write head is $250.00, and is recommended when the head evidences wear between 0.002" and 0.003" (dial gauge reading). Each recrowning will reduce the head material an additional 0.001" to insure a true head surface. There is 0.015" of head material that may be removed prior to replacement of the head, and based upon these tolerances, a head may be recrowned a minimum of three times.

For recrowning overhaul, the head and mount assembly must be returned as a single unit to Potter Instrument Company, 151 Sunnyside Blvd., Plainview, New York. There is approximately a two week turn-around time. (689)

RD-243/USQ-20(V), SIGNAL DATA RECORDER REPRODUCER (MAGNETIC TAPE UNIT) – MAINTENANCE INFORMATION

The Erase Inhibit Ring (Master Tape Ring) has been difficult to acquire. Pending assignment of a FSN, this part may be procured from Univac, Univac Park, St. Paul, Minnesota 55116, using Univac Part No. 72400460. The approximate cost is $3.50 each.

Maintenance and/or Programming Activities, using the RD-243/USQ-20(V) or similar units requiring this Erase Inhibit Ring, are advised to retain the above information within their complex for reference purposes. (704)

RD-243/USQ-20(V) SIGNAL DATA RECORDER REPRODUCER (MAGNETIC TAPE UNIT) – MAINTENANCE INFORMATION

Recent information received from the Electronics Supply Office, Great Lakes, has verified the fact that an FSN has been assigned to the Erase Inhibit Ring (Master Tape Ring). The FSN is 9Z5340-582-3115. Action has been taken to include this item in APL 81694390 for the RD-243/USQ-20(V).

Further, the cost has been changed to 15¢ each. (EIB 720)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, RD-294(V)/UYK Magnetic Tape Recorder-Reproducer Read/Write Heads–Information on

Several Read/Write heads received for recrown/overhaul were not adequately packaged by the submitting activities to prevent damage to the heads during shipment.

All activities are requested to pay particular attention to the packaging of the Read/Write heads when submitting them for rework.

When heads are submitted for rework, they must be attached with the trough guides to the mounting base. The alignment of the head to the base is critical; therefore, removal of the head from the base is not recommended. (753)

RD-243/USQ-20 Signal Data Recorder-Reproducer–Maintenance Hint

The vacuum motor brushes, furnished as the parts kit of Field Change 6 RD-243/USQ-20, have been assigned a Federal Stock number. NTDS activities are invited to record the following information and retain it within the maintenance complex to facilitate procurement of these brushes.

Circuit Symbol Number–22A1A5A8E1
Federal Stock Number–1N5977-982-1844
Description–Brush Assembly (Vacuum Motor)
Unit of Issue–each
Manufacturer's Code–48294
Manufacturer's Part Number–S202-105
Unit Cost–$1.50

This information may also be recorded on page 27 of the Revised Interim Parts Listing for the RD-243/USQ-20 (revised data 1-2-69) (754)

RD-243/USQ-20(V); RD-261/USQ-34; RD-270(V)/UYK; and RD-294(V)/UYK Magnetic Tape Recorders Maintenance Information

The purpose of this article is to correct erroneous Federal Stock Number (FSN) information, alleviate problems in the procurement of new or reworked head assemblies and provide additional information relative to preventive maintenance of the tape drive units.

Some fleet activities have been using the FSN for the RD-261/USQ-34 head when requisitioning a head assembly for the RD-270(V)/UYK.

The correct FSN and manufacturers P/N's to be used when requisitioning read/write head assemblies are listed as follows:

1. RD-243/USQ-20(V), (UNIVAC Model 1243), read/write head assembly; FSN 2N5835-838-0707; PICO P/N 6702-8-1B. This unit is used in NTDS and IOIC.

2. RD-261/USQ-34, (UNIVAC Model 1560), read/write head assembly; FSN 4N7440-928-4427; PICO P/N 18509-16. This unit is ONLY used in IOIC as it uses one inch tape.

3. RD-270(V)/UYK, (UNIVAC Model 1240), read/write head assembly; FSN 2N7440-057-9798; PICO P/N 18505-7. This unit is used primarily in the AN/UYK-5 system, (UNIVAC 1500 system, 3M system, moonbeam system) and is also used in some AN/UYK-4 systems.

4. RD-294(V)/UYK, (UNIVAC 1540) and RD-294(V)/UYK add on, read/write head assembly; FSN 2N5835-465-8535; PICO P/N was 18501-7, is now 43854. This unit and add-on's are used in the AN/UYK-4 system, missile systems, AWCLS and SNAIAS.

Head assemblies, when requiring rework, should be requisitioned by MILSTRIP message to ESO, Attn: Code 542. Request disposition instructions in same message for failed head assembly. DO NOT ship heads to the previously designated rework contractor (Potter Instruction Company).

All previous EIB articles concerning disposition of heads requiring rework and any correspondence concerning this matter is hereby superseded by this article.

Recently purchased read/write head assemblies have a different recording face profile and a different method of attachment of the cable assemblies to the sense windings. It is reported that this profile enhances service life before recrowning, however, only one recrown is possible.

The head assembly cables are not a handling point. Previously, the cable shielding was soldered to a stress relief clamp and the head assembly could be handled by the cables. The new configuration does not have the stress relief clamp and the cable assembly attaches directly to the sense windings. DO NOT CARRY or HANDLE the head assembly by the CABLES.

New head assemblies which become inoperative upon or soon after installation should be reported by message in accordance with NAVSUPINST 4440.120C, SUP 0462B of 12 December 1969, specifically, enclosure (3), adding action addees ESO codes 06 and 542.

Maintenance activities supporting the RD-294(V)/UYK(V) and add-on units have been experiencing vacuum motor failures and have been required to purchase new motors at a cost of approximately $98.00 each. Most motor failures have been related to seized bearings or inoperative armatures. Listed as follows are these parts with procurement information.

1. Brush assembly, PICO P/N S-202-105; FSN 1N5977-982-1844; approximately $1.00 each.

2. Bearing, ball, new departure P/N 77038; FSN 3110-144-8858, approximately $1.10 each.

3. Armature assembly, open purchase from: American-Lincoln, 1916 Commercial St., Palo Alto, Calif., part number 22200255; approximate cost $15.25.

Preventive maintenance information for magnetic tape units have previously specified VISI-MAG for use to view recorded data on tape. No FSN has been assigned to VISI-MAG and sources of open purchase of small quantities have dwindled.

MAGNA-SEE, a product of Reeves Industries, has proved to be an acceptable substitute.

1. East Coast Sources:
   a. Reeves-Sound Craft, Division of Reeves Industries, Danbury, Conn.
   b. Distributors, Inc., Portsmouth, Va.
2. West Coast Sources:
   a. Magnetic T.V., Los Angeles, Calif.
   b. Newark Electronics, Ingleside, Calif.

The information relative to MAGNA-SEE conflicts with PMS for the RD-243/USQ-20(V). This PMS will be revised to include the use of MAGNA-SEE vice VISI-MAG. (793)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, RD-294(V)/UYK Magnetic Tape Transport Unit—Maintenance Hint

Activities performing maintenance on the subject units, which contain the Model 906II, 906II-1, 906II-1X, 906II-2, and the MTS120 transport, will on occasion be required to dismount a transport assembly from the main unit.

The transport, depending upon its application, weighs from 110 pounds to about 160 pounds. This unit is very awkward to handle, difficult to align hinge pins, or remove and install as prescribed in the maintenance sections of the related technical manuals.

A suggested technique to assist in the process of removing or installing the tape transport is to use a 3/8 X 16 NC eyebolt (FSN 9Z5306-272-2138), inserting it in a threaded hole located on the top edge of each transport about 10-1/2 inches from the right front top corner. A steel rod or any lifting device can then be inserted in the eyebolt to assist in removal or installation of the transport.

Activities are advised to acquire at least one of these eyebolts and retain it within the maintenance complex, along with a copy of this article. *(806)*

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK and RD-294(V)/UYK Read/Write Head Assemblies Turned in for Recrown/Overhaul--Information Concerning

The Electronics Supply Office (ESO) has established collection points for the subject R/W Head Assemblies that are returned for Recrown/Overhaul on a turn-around (2N Cog.) basis.

Approximately 35 head assemblies, located at an ESO collection point, were recently examined by NAVSECNORDIV and it was noted that about 10 units were missing the following hardware.

1. Ferrite shield assemblies and mounting hardware.

2. Trough guide cover and mounting hardware.

3. Screws that secure the trough guides to the head mounting plate.

4. Screw that locates and secures the erase head to the read/write head.

5. Flat leaf spring and cover for the head assembly.

6. Drag pads and mounting hardware.

These missing parts will affect rework of the heads causing delivery delays and additional replacement costs.

Based upon the foregoing observations, NAVSECNORDIV emphasizes that the retention of hardware, including drag pads, from not-ready-for-issue (NRFI) head assemblies must cease and that the read/write head assemblies must be accompanied by all hardware when turned in for recrown/overhaul. (796)

RD-243/USQ-20(V) Recorder-Reproducer, Digital Data (Magnetic Tape Unit)—Maintenance Information

Activities have experienced difficulty in acquiring certain replacement parts for repair of the RRU Model tape hub assembly used on the Model 906-II and Model 906-II-1 tape transports of the RD-243/USQ-20(V) within the NTDS and IOIC complexes.

The cross bar and leaf spring assembly, which activates the write lockout switch when a lockout ring is installed on the tape reel, have become worn and broken.

Replacement parts are not available within the Naval Supply System, due to low usage. However, they may be procured through open purchase using the following information:

(1)	Cross Bar	PICO P/N A420774	Cost Approx. $20.00
(2)	Leaf Spring	PICO P/N A420775	Cost Approx. $10.00
(3)	Retainer	PICO P/N S-144-9	Cost Approx. $.15 each

Available from: Potter Instrument Company, 151 Sunnyside Blvd., Plainview, New York 11803, Phone: Area Code 516-694-9000, Parts Department X244.

Users of the RD-243/USQ-20 equipment are advised to retain this information within the maintenance complex for future reference. (820)

RD-243/USQ-20(V) Magnetic Tape—Information Concerning

Magnetic tape to support the RD-243/USQ-20(V) magnetic tape units has not been available through the supply system.

A commercial magnetic tape manufacturer has been contacted that can provide the proper tape on the proper reels to support the RD-243/USQ-20(V).

The commercial magnetic tape manufacturer is the Data Recording Products Division, 3M Company, 3M Center, St. Paul, MN 55101.

The tape is identified as 3M part No. 777B-1/2-2500-R135C and costs approximately $50 a reel.

Data Recording Products Division 3M Company Branch Offices are located in Atlanta, GA, Boston, MA, Honolulu, HI, Los Angeles, CA, Philadelphia, PA, South San Francisco, CA, and Seattle, WA. (EIB 970)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, RD-294(V)/UYK MAGNETIC TAPE RECORDER REPRODUCER READ/WRITE HEADS–INFORMATION ON

See article under RD-270(V)/UYK. (753)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, and RD-294(V)/UYK – Magnetic Tape Recorders Maintenance Information.

See Article under RD-243/USQ-20(V) with same title. (EIB 793)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK and RD-294(V)/UYK Read/Write Head Assemblies Turned in for Recrown/Overhaul–Information Concerning

See Article under RD-243/USQ-20(V) with same title. (796)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, RD-294(V)/UYK Magnetic Tape Transport Unit–Maintenance Hint

See Article under RD-243/USQ-20(V) with same title. (806)

RD-219A/U,RD-219B/U, and RD-269/U
Recorder-Reproducers, Shock Hazard
--Elimination of

See article under RD-219A/U with same title. (850)

RD-270(V)/UYK and RD-294(V)/UYK Magnetic Tape Recorder Reproducer Read/Write Heads—Information

Activities have posed questions relative to the interchangeability of RD-270(V)/UYK Read/Write heads with those of the RD-294(V)/UYK.

These Read/Write heads appear to be similar, but they are not interchangeable because of the following differences:

a. Connectors
b. Internal Gap Separation
c. Amplitude of the output signal

Therefore, no attempt should be made to adapt one type of head to another type transport base. (753)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, RD-294(V)/UYK Magnetic Tape Recorder Reproducer Read/Write Heads—Information on

See Article under RD-270(V)/UYK (753).

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, and RD-294(V)/UYK – Magnetic Tape Recorders Maintenance Information.

See Article under RD-243/USQ-20(V) with same title. (EIB 793)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK and RD-294(V)/UYK Read/Write Head Assemblies Turned in for Recrown/Overhaul—Information Concerning

See Article under RD-243/USQ-20(V) with same title. (796)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, RD-294(V)/UYK Magnetic Tape Transport Unit—Maintenance Hint

See Article under RD-243/USQ-20(V) with same title. (806)

RD-270(V)/UYK Magnetic Tape Unit--Maintenance Hint

NAVSECNORDIV has received inquiries concerning the replacement frequency and life expectancy of components in the tape transports used in the RD-270(V)/UYK Magnetic Tape Unit (MTU).

NAVSECNORDIV strongly recommends following preventive maintenance (PM) procedures outlined in the Maintenance Requirement Cards (MRC) for the MTU. It is realized that the MRCs do not normally require replacement of parts, this decision being left to the maintenance personnel performing the PM checks. However, a list of replaceable components can be found in Table 5-1 of the RD-270(V)/UYK Technical Manual Supplement, NAVSHIPS 0967-059-5020, which includes the life expectancy of most parts used in the tape transport. Maintenance personnel should use this table for guidance in scheduling the replacement of worn components. (800)

RD-294(V)/UYK and RD-270/UYK; Magnetic Tape Unit Erase Heads for--Information concerning

See article under RD-294(V)/UYK with same title. (794)

RD-270(V)/UYK Digital Data Recorder Reproducer—Procedure for Checking Erase Head Polarity

A new procedure for checking the proper polarity of a replaced erase head has been devised by NAVSECNORDIV. It is more clear-cut than the one provided in the technical manual for the equipment (NAVSHIPS 0967-059-5020). That is, the procedure outlined in the manual relies on the use of an oscilloscope and detecting differences in observed waveforms, whereas in the new procedure, the correct polarity is determined directly by the count in the longitudinal parity register. The steps in the new procedure are the following:

1. Set INACTIVE/NORMAL switch in the INACTIVE position.
2. Set MODE switch in the T3 position.
3. Set CLOCK CONTROL switch in OP STEP position.
4. Push the MASTER CLEAR button.
5. Depress SELECT and WRITE ENABLE indicator-switches on transport being tested and ensure that it is at BOT.
6. Set 01000(WRITE) in the operation code portion of the FUNCTION REGISTER; DO NOT set parity or density indicators.
7. Depress START.
8. Push MASTER CLEAR button after tape moves approximately 10 feet.
9. Set 01000 in the operation code portion of the FUNCTION REGISTER; also set the parity and density indicators.

10. Set 525252 in the C register.
11. Depress START.
12. Depress REWIND indicator on transport being tested.
13. Depress START twice.
14. Depress REWIND indicator on transport being tested.
15. Push the MASTER CLEAR button.
16. Set 00000(READ) in operation code portion of the FUNCTION REGISTER along with the parity and density set.
17. Depress START three times.

The third time START is depressed, the third record should be read with no longitudinal parity error. No longitudinal parity count indicates correct erase head polarity for that transport. If a longitudinal parity count is indicated in the longitudinal parity register, reverse the erase head polarity. Repeat the above procedure to verify the correction. It should be noted that once the erase head polarity is correctly established, it need only be checked/changed when the erase head is actually changed or replaced.

As already indicated, incorrect erase head polarity is normally evidenced by longitudinal parity errors and not by imput timing errors as some users have reportedly presumed. Input timing errors can be caused by any of the following mechanical conditions:

1. Tension arms too tight (adjust to 14 oz)
2. Poor vacuum blower (replace or repair bearings and brushes)
3. Clogged vacuum chamber (clean)
4. Clearance between idler roller and vacuum chamber too large (adjust to .006 inch)
5. Incorrect start time (adjust to 1.8 msec)
6. Worn pinch roller (replace)
7. Start read time delay too short (adjust to 2.0 msec)
8. Start write time delay too short (adjust in the range of 3.75 to 5.0 msec to obtain a 3/4-inch inter-record gap)
9. Drag pads too tight or loose (adjust 4-1/2 oz tape breakaway per pad)
10. Worn read/write head (replace)
11. Pinch roller breakaway force out of tolerance (adjust for 6 lbs without tape).

(848)

RD-270(V)/UYK Digital Data Recorder-Reproducer—Maintenance Hint

The purpose of this article is to inform technicians of a method to prevent the stub on the IBM reel hub assembly from being pulled out of the knob when the knob is tightened excessively.

This problem may be eliminated by inserting a flat, round metal standard (3/8 inch inside diameter) washer, FSN 5310-080-6004, between knob and bearing as shown in figure 1. *(EHB 859)*

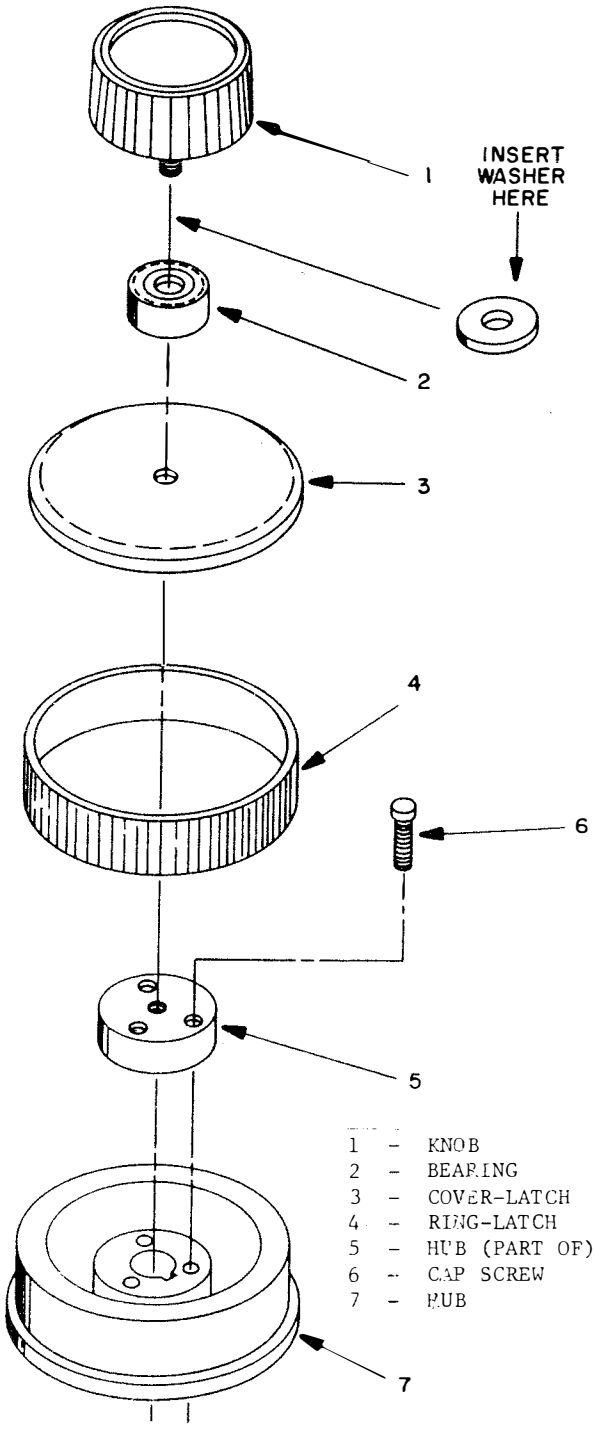


Figure 1. IBM Reel Hub Assembly.

RD-293/UYK-5(V) Card Reader-Punch-Interpreter (CRPI)—Maintenance Hint

The RD-293/UYK-5(V) CRPI read-station lamp assemblies use 24 lamps (P/N A32622) for their light sources. These lamps are further designated by a "T" number suffix (i.e. A32622T1 through A32622T 5) and are color coded to indicate the five types. The associated suffix number is related to the lamps resistance and intensity, and any of the five types may be used provided ALL six lamps in a series string have the same "T" number suffix. Mixing lamps within a string of six results in a marginal read condition. (754)

RD-293/UYK-5(V) Card Reader-Punch-Interpreter (CRPI)—Removal Tool for Interpreter

Removal of the interpreter sub-assembly from the CRPI is difficult and time consuming using standard tools.

COMINEPAC has designed a special tool (see figure 1) that can be locally manufactured at AN/UYK-5(V) activities. Use of the tool will reduce maintenance time caused by inaccessibility of the interpreter retaining screws. (768)

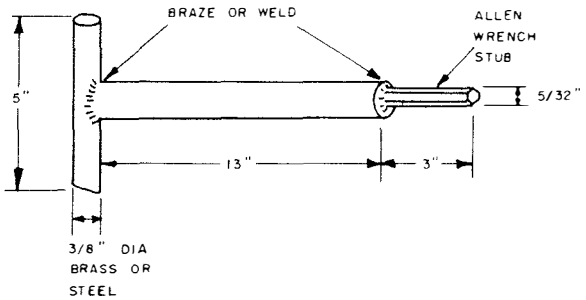


Figure 1 Interpreter Removal Tool

RD-293/UYK-5(V)—Flushing of Punch Assembly

The purpose of this article is to emphasize the use of proper solvent when flushing the EP-4 punch assembly of the RD-293/UYK-5(V) card reader-punch-interpreter (CRPI) unit.

Several card punches returned recently to Soroban, Inc. for repair were in extremely poor condition apparently due to flushing with alcohol.

When flushing the punch assembly, inhibited methyl chloroform (trichloroethane) FSN6810-664-0387 must be used as specified by MRC card CP-15-R1 (BCCN68-BP45-R). (771)

RD-293/UYK-5(V), RD-293B/UYK-5(V), and RD-293C/UYK-5(V)--Maintenance Hint

This article provides a solution to the cable breakage problem in the RD-293/UYK-5(V), RD-293B/UYK-5(V), and RD-293C/UYK-5(V).

The intercabling from chassis A4A1 and A4A2 is secured to the top of the logic compartment by plastic cable clamps. This method of securing the cables may cause wire breakage due to crimping of the cable assemblies when the chassis is opened or closed.

To allow the cables a greater degree of movement and flexibility, the plastic cable clamps which secure the cables to the top of the logic compartment should be removed permitting the cables to hang free.

This maintenance hint is the result of a beneficial suggestion submitted by Fredrick Venditti DS2, USS AJAX (AR 6). (796)

RD-293C/UYK-5(V) Card Reader Punch Unit (CRPU)—Correction of Miswiring of Stacker Door Switch

There have been several reports of the RD-293C/UYK-5(V) stacker door switch being inoperative due to a factory miswiring. When the stacker door switch is operating properly and the stacker door is open, the card feed circuit is disabled and the "Stacker Full" light will be lit. This is to prevent the inadvertent jamming of cards in the track.

All activities with RD-293C/UYK-5(V) should check for proper operation of stacker door switch as described above. If the switch does not operate properly make the following wire corrections:

NOTE
Observe All Safety Precautions

1. De-Energize and secure all power to the RD-293C/UYK-5(V) CRPU.
2. Remove Allen screws holding chassis A2 and extend track on its slides.
3. Move wire on stacker door switch (A2S1) from pin labeled "NO" to pin labeled "NC."
4. Move wire on stacker No. 2 full switch (A2A1S2) from pin labeled "NC" to pin labeled "NO."
5. Slide chassis A2 back into cabinet and fasten with Allen screws. Verify proper operation as above.
6. Return equipment to normal. (853)

RD-293(B or C)/UYK-5(V) Card Reader Punch Unit (CRPU) used in the AN/UYK-5 System and the RD-293/UYK-5(V) Card Reader Punch Interpreter Unit (CRPI) used in the AN/USQ-34 (NIPS)—Information Concerning

Fleet activities have experienced difficulty in obtaining replacements for worn track slides used in the subject units.

Replacement slides may be obtained through open purchase, using part No. 350309-L for the left side and part No. 350309-R for the right side. The cost for a set is about $78.76. These slides are available from Jonathan Manufacturing Co., 1101 So. Acacia Avenue, Fullerton, Calif. 92631.

It is advised that this information be retained within the ADP maintenance complex for future reference. *(8.29)*

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, RD-294(V)/UYK MAGNETIC TAPE RECORDER REPRODUCER READ/WRITE HEADS–INFORMATION ON

See article under RD-270(V)/UYK.(753)

RD-270(V)/UYK AND RD-294(V)/UYK MAGNETIC TAPE RECORDER-REPRODUCER READ/WRITE HEADS–INFORMATION ON

See article under RD-270(V)/UYK.(753)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, and RD-294(V)/UYK Magnetic Tape Recorders Maintenance Information.

See Article under RD-243/USQ-20(V) with same title. (EIB 793)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK and RD-294(V)/UYK Read/Write Head Assemblies Turned in for Recrown/Overhaul–Information Concerning

See Article under RD-243/USQ-20(V) with same title. (796)

RD-243/USQ-20(V), RD-261/USQ-34, RD-270(V)/UYK, RD-294(V)/UYK Magnetic Tape Transport Unit–Maintenance Hint

See Article under RD-243/USQ-20(V) with same title. (806)

RD-[illegible] and RD-294(V)/UYK, Magnetic Tape Unit Erase Heads for -[illegible] Information Concerning

It has been brought to the attention of NAVSEC NORDIV that the Erase Head, Potter Inst. Co., P/N EH-2-1, (UNIVAC P/N 7901780-30) mounted on the Read/Write Head Assy., Potter P/N 4385524, FSN 2N5835-465-8535, and used with RD-294(V)/UYK and RD-270/UYK was found to be improperly assembled. The leads attached to the head were too short and improper terminal connectors were installed.

Activities are requested to examine the read/write head assemblies that are being held as spares in support of the subject tape units and determine if:

a. The leads are a minimum of 14-1/2 inches and a maximum of 16-1/2 inches in length (including the terminal connectors);

b. Small spade type lugs are installed and if closed terminals are used, determine if they will fit into the terminal board spaces;

c. The erase head is properly aligned, and not skewed or protruding beyond in such manner that the tape would be scraped or damaged prior to passing over the read/write coil area.

Any activity discovering these or other discrepancies related to read/write head assemblies is advised to contact the Officer in Charge, Naval Ship Engineering Center, Norfolk Division, Naval Base, Norfolk, Va. 23511, SEC 6623B, in order that the discrepancy may be resolved with the minimum [illegible]. (794)

RDZ FRONT END ALINEMENT METHOD

The following method was mentioned in an article which appeared in EIB No. 401. This article stated that a field change incorporating this method would be issued. However, it has been subsequently determined that an official field change is not warranted.

A modification to the RDZ equipment (radio-receiver) permits alinement of the rf section while the receiver chassis is locked in the tilted position. At present, rf trimmer capacitors C-103E and C-103F are not accessible when the chassis is tilted because the bearing plate (left hand, viewed from in front of the receiver) obstructs the access holes in the rf section enclosure. Two new holes, indicated in figure, will permit adjustment of these trimmers without shifting the chassis position during alinement of the rf section. Time can be saved since the repeated alinement and control adjustments sometimes required for optimum results will be easier to perform. Position of the new holes in the bearing plate should be carefully marked to insure alinement with access holes in the rf enclosure, prior to drilling. Manufacturing tolerances and wear in the tilt-locking mechanism may require slight deviations from hole locations shown in the drawing. Careful drilling is essential to prevent metal chips from entering the rf section. Remove all chips after drilling is finished. This modification may be performed, if desired, by the maintenance activity. No official field change will be issued.

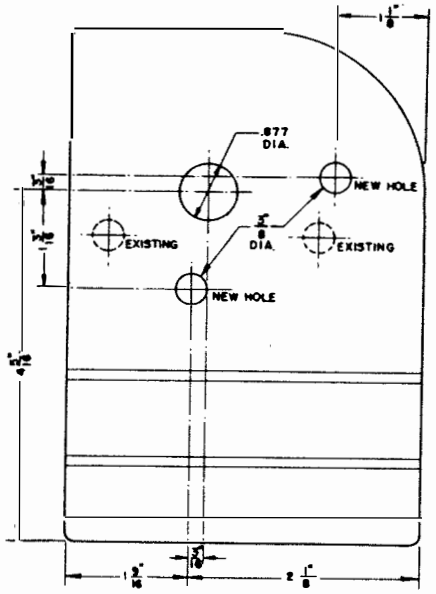


Figure 1

ELIMINATION OF SPURIOUS OSCILLATIONS IN RDZ RECEIVERS

Recently the Bureau received a report of spurious oscillations in Radio Receiving Equipments RDZ. Considerable thought had been given to the problem by the originator of the report. The trouble had been located and several methods of correcting the condition had been determined.

The first source of trouble was in the scanning amplifier-circuit, due primarily to the lack of proper termination of the scanning input-receptacle. It was found that by providing proper termination and a shield for the receptacle a large percentage of the interference was eliminated.

A considerable amount of this work could have been eliminated if the maintenance activity had known of Field Change No. 4-RDZ. This field change kit has just recently been made available to all Naval Shipyards and regular stocking activities, and is applicable to all RDZ's.

Additional oscillations were also reported in the fourth and fifth i-f amplifier stages. The causes of this condition are not corrected by Field Change No. 4-RDZ but were found to be as follows:

(1) Filament leads, carrying relatively-high current, laid closely against the tube grid connections, thereby causing coupling and feedback.

(2) Poor grounds of socket clamps of fourth and fifth i-f amplifier tubes caused interstage coupling and regeneration.

Condition (1) was corrected by carefully dressing the leads away from the tube base connections.

Condition (2) was corrected by soldering a short lead between the ground lug on the tube socket clamp and lugs No. 1 and No. 3 of the sockets--particularly those of V-205 and V-206.

The Bureau appreciates receiving information of this character, and requests that it continue to flow in.

ADJUSTMENT OF TUNING CAPACITOR END PLATES

Reports have been received by the Bureau of Ships of RDZ radio receivers that have been damaged by attempted adjustment of tuning capacitor end plates. While UHF equipment is especially sensitive to this type of maladjustment, the satisfactory adjustment of tuning capacitor end plates for **any** type communication receiver requires special information and equipment. DO NOT TAMPER WITH TUNING CAPACITOR END PLATE ADJUSTMENTS.

REPAIR OF AUTOTUNE UNITS IN RDZ RECEIVERS

Reports of failure of the autotune unit in RDZ receivers have come to the attention of the Bureau of Ships.

When repair of this unit aboard ship is not possible, making replacement with a spare unit necessary, the defective autotune should be returned to the electronics repair shop (tender or Shop 67 in a shipyard) for repair and return to stock.

CRYSTAL OVENS FOR RDZ, MAR, AND TDZ RADIO EQUIPMENTS

Several failures of the crystal oven, E-121, Navy type CFT-40148, used in RDZ, MAR and TDZ radio equipments have occurred in test and in the field. Activities report that the fine wires connecting the crystal socket to the pin in the oven base break causing an open circuit.

The manufacturer has corrected this defect in all crystal ovens shipped after December 7, 1945. A larger wire is used for the connections.

The ovens can be identified by the color-coding of the two screws on the internal crystal socket. Both screws on the holder in the **old type ovens** are colored a brownish red. In the new improved ovens they are color-coded by the month of manufacture as shown in the following list:

Month of manufacture	Color-Code: Screw nearest heater pins	Color-Code: Screw away from pins
Dec. 1945	Red	Blue.
Jan. 1946	Red	Yellow.
Feb. 1946	Red	Green.
Mar. 1946	Blue	Yellow.
April 1946	Blue	Blue.
May 1946	Brown	Brown.
June 1946	Red	Red.
July 1946	White	White.
Aug. 1946	Black	Black.

Crystal ovens of the old type should be returned to the Electronics Officer for replacement with the new improved ovens. Electronics Officers should ascertain that new improved ovens are provided for all RDZ, MAR and TDZ equipments before installation. The spare parts should also be checked for inclusion of the new oven.

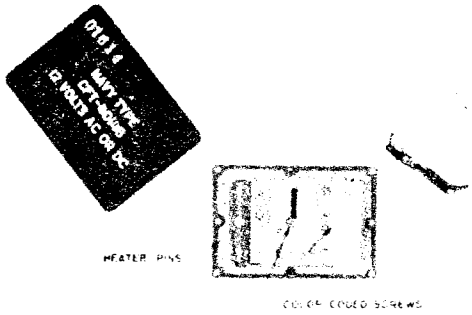


FIGURE 1.--The Crystal oven and the two identifying screws.

RDZ TROUBLE SHOOTING NOTES

Type of failure	Symptoms	Cause
Low emission, shorted, or intermittent	Weak output, no output, or intermittent operation.	Defective tubes.
I-f alignment, r-f alignment, or both required	Weak output or no output	Poor alignment.
Cold oven, broken wires connecting crystal socket to pin, poor connections on oven receptable, of dirty or poor contacts on S601.	Weak output, no output, or excessive frequency drift.	Defective crystal oven or circuit.
Silencer circuit ungrounded when not using remote units, grounded when using remote or defective resistors.	No silencing action	Silencer circuit inoperative.
Inactive or weak crystals	Weak output or no output on one or more channels.	Defective crystals.
Lubrication or replacement required	Remote dial selected higher channel than desired.	Defective minor switch.
Forms melted or warped	No output or poor i-f selectivity	Defective i-f coil forms. Accomplish F. C. No. 7-RDZ
Armature misadjusted or coil shorted	Autotune motor ran continusouly.	Defective relay K106 in Navy Type CQC-23497.
Broken ceramic shaft or broken coupler on Autotune Unit.	No output and no tuning	Faulty coupling between Autotune unit and tuning capacitor.
Bent pins or pin holders on sockets	Intermittent operation	Poor connections between tube pins and sockets.
Fuse missing or open	No output	Defective fuse.
No Panoramic Adapter or dummy load plugged into J403.	I-f oscillation present	Improperly terminated SCAN Jack J403.
Open control or poor contact or rotor	Noisy output when control was turned, or intermittent operation.	Defective RF GAIN control.
Loose coupling with excessive play, or damaged linkage.	Poor i-f selectivity	Faulty linkage between IF BAND control shaft and i-f transformers.
Lock nut not tightened sufficiently	Dial failed to indicate proper frequency.	Loose lock nut on tuning dial.

RDZ SERIES TROUBLE SHOOTING NOTES

Difficulty Encountered	Cause and Remedy
Low sensitivity.	Check 6AB7 i-f tubes. Replace if required and realign.
Low-audio output.	(1) Broken antenna plug. (2) Low emission of r-f amplifier tube type 956. (3) Realign completely.
Autotune motor runs continuously.	Relay K-106 of 23497 selector control unit out of adjustment.
Intermittent operation on one channel only.	Rosin joint on crystal oven receptacle.
Greatly reduced sensitivity when i-f band switch is in "sharp" position.	Check for failure of crystal oven. It should be hot.
No silencer action. High noise level.	Traced trouble to open circuit in remote squelch relay circuit. Found open circuit in remote control plug at rear of receiver. Cleaned and tightened plug which then resulted in proper squelch action consequently low noise level. Receiver was in otherwise good operating condition.