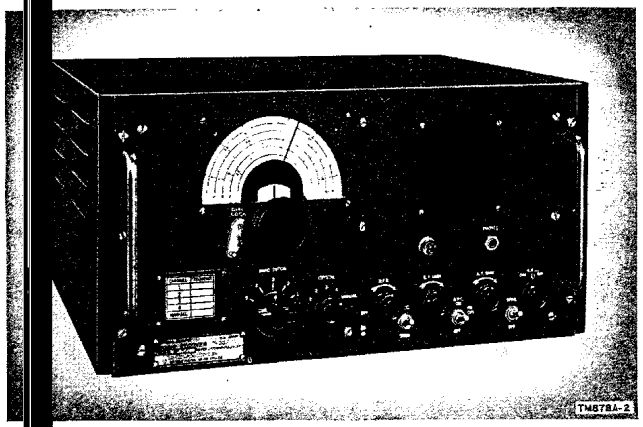


Figure 2. Radio Receiver R-96A/SR, front view.

1. Application

C-w and a-m (amplitud ...ls of ...ract...lly all radio freque ...norm... ...d for ...narin... communications a ...ered... ...s re- ...eiver... The outside case ...d re... ...the ...eceiv... if it is to be used o... ...oard... ...ever, ...he c... ...er is removed easil... ...the ... can ...e m... ...nted on a standa... ...inch ... ...anel, ...hen ...e receiver is oper... ...n sh... ...ions. ...he c... ...er should not be ... ...d u... ...htly ...ore ...diation than the m... ...m F... ...eral ...omm... ...nications Commis... ...req... ...s is ...llowa... ...e. A send-receive... ...h (S... ...lows ...onve... ...ent operation of ...itenn... ...hing ...lay ... ...ich may be on the ...ated ... ...tter. ...he a... ...tenna leads betwe... ...e rel... ...the ...eceiv... ...input terminals sh... ...e wel... ...d.

2. Technical Characteristi...

Freq...ncy range:
Ba... 1.....
Ba... 2.....
Ba... 3.....
Ba... 4.....
Ba... 5.....
Cr...tal-controlled channels ...ency ...nge c... ...c to ...700 k...
Cr...tal type..... ...tal U... ...8/U.
Re...iver type..... ...rhete...
Ty...s of signals which can ...tor... ...a-m ...be received. ...ice.
Nu...ber of tubes.....
I. f. (intermediate frequen-... ...c.
Po...r input..... ...olt, 5... ...ycle ...(alt... ...cur- ...t), 1... ...olt d... ...cur- ...t), 1...
An...na..... ...e wir...
We...t..... ...bound...

3. Packaging Data

a. D...SCRIPTION. Radio ... ...er R... ...R is ...cked... ...a nailed wooden s... ...g co... ...the ...e is ...ted in *b* below. R... ...spa... ...are ...cked... ...an additional met... ...tain... ...in ...rn is ...acked in the large v... ...box... ...ing ...e rec...iver. The receiver ...cked... ...ort ...pme... as shown in figu... Z-p... ...d a ...oden... cover plate surrou... ...rec... ...ong ...th si... silica gel pads. T... ...ire p... ...h a ...ruga...d fiberboard inner ... ...whi... ...ed. ...is ca...on then is placed ...mois... ...or- ...of b...rier, which in turn ...ed ar... ...in ...outer... fiberboard carton. ...oute... ...ard

carton is plac...d inside a waterproof barrier (bag) along with th... spare parts carton. The bag then is placed insi...e a nailed wooden shipping container. All l...ose wires and cables are packed and secured agai...st their respective units before packaging.

b. EXPORT PACKAGING DATA.

Item	Carton or box	Number of cartons	Outside dimensions (in.)	Volume (cu ft)	Gross weight (lb)
Radio Receiver R-96A/SR.	Inner carton.	1	22¼ x 21 x 10¾.	3. 52	.....
	Outer carton.	1	23¾ x 21¾ x 11½.	4. 39	.....
	Wooden carton.	1	33¾ x 23¾ x 11¾.	7. 64	.....
Spare parts box.	Metal box.	1	9¾ x 21½ x 11½.	1. 67	.....

7. Table of Components (fig. 1)

Component	Req No.	Height (in.)	Depth (in.)	Length (in.)	Volume (cu. ft)	Weight (lb)
Radio Receiver R-96A/SR	1	10	17½	20⅞	2. 11	69. 5
Spare parts box	1	11	8¼	21¼	1. 08	22. 19

8. Description of Radio Receiver R-96A/SR

a. Radio Receiver R-96A/SR is an 11-tube superheterodyne receiver designed to receive a-m and c-w signals in the frequency ranges of 135 to 510 kc and 1 to 12 mc to cover the operating frequencies of the standard marine bands, as well as many land-based and airborne transmitters. This is necessary to facilitate complete shipboard reception for all types of military operations. Four crystal-controlled channels also are provided in the 1,700 to 8,700 kc frequency range. A speaker is contained within the set and a phone jack is provided on the front panel for headset operation. An anl (automatic noise limiter) circuit assists in reception during pulse-type noise interference. All operating controls are located on the front panel (fig. 2). The receiver is provided with a cabinet suitable for desk or shelf mounting. The cabinet is designed to support the weight of Radio Transmitter T-33/SR when it is used in conjunction with the receiver. If required for installation, the receiver may be removed from the cabinet and

mounted in a standard 19-inch relay rack. This should not be done on shipboard, as removing the set from its cabinet changes the radiation characteristics of the receiver. The receiver will not pass the specifications of the FCC if removed from its cabinet.

b. The receiver can be removed from the dust cover by removing six screw-head bolts. The bolts are located at the ends of the front panel in line with the two handles (fig. 2). After the bolts are unscrewed, grasp the handles and pull the chassis outward from the dust cover.

c. Access to the fuses, antenna and terminal strip connections, and power input connection can be made by removing the four Dzus fasteners which hold the rear access plate to the receiver. A rear view of the receiver with the access plate removed is shown in figure 3. The polarized power plug is located on the top of the chassis (fig. 10). A 1½-inch hole has been made on the right side (towards the rear) of the dust cover in order that the power line can be brought through the dust cover to the chassis. A 1½-inch hole is necessary to allow room for the power plug to pass through the dust cover.

9. Running Spares and Included Parts

a. A group of spare parts, packed within a spare parts chest, is included with each radio receiver. Spares are provided for all normally expendable items such as tubes, fuses, pilot lamps, etc. Following is a list of these running spares:

Description	*Quantity*
Tube JAN-6SA7	2
Tube JAN-6SJ7	4
Tube JAN-6H6GT	2
Tube JAN-6SQ7GT	2
Tube JAN-6SK7	8
Tube JAN-25L6GT	2
Tube JAN-25Z6GT	2
Lamp, neon, General Electric NE-51	2
Lamp, Mazda #47	2
Fuse FU-50	10

b. The following parts included with the radio receiver are not expendable:

Description	*Quantity*
Headset H-16/U	2
Cord CD-307 (headset extension cord)	2
Cord, power	1

10. Additional Equipment Required

No additional equipment is required for the operation of this receiver as a single unit, assuming proper power supply leads and antenna connections are available. If the receiver is used in conjunction with Radio Transmitter T-83/SR, a special connecting cable must be used. This cable (fig. 4) is supplied with the transmitter.

11. Differences in Models

Radio Receiver R-96A/SR is similar to Radio Receiver R-96/SR. However, Radio Receiver R-96A/SR has been made largely with JAN components and has other minor differences. For data on Radio Receiver R-96/SR, see TM 11-878.

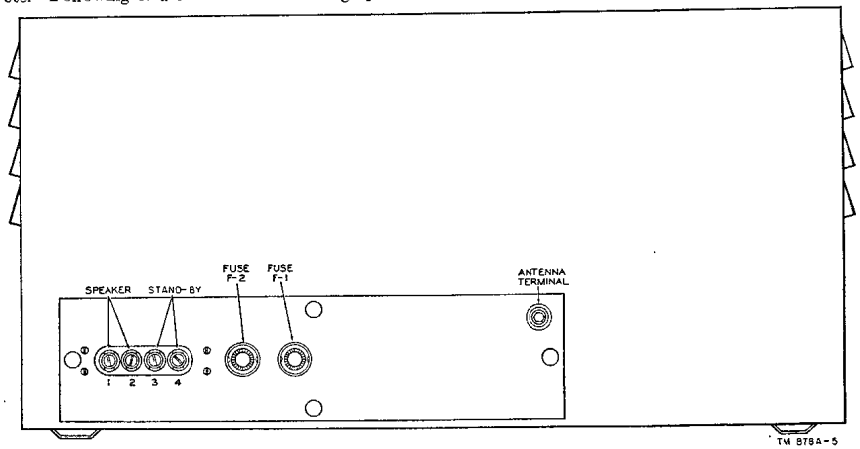


Figure 3. Radio Receiver R-96A/SR, rear view.

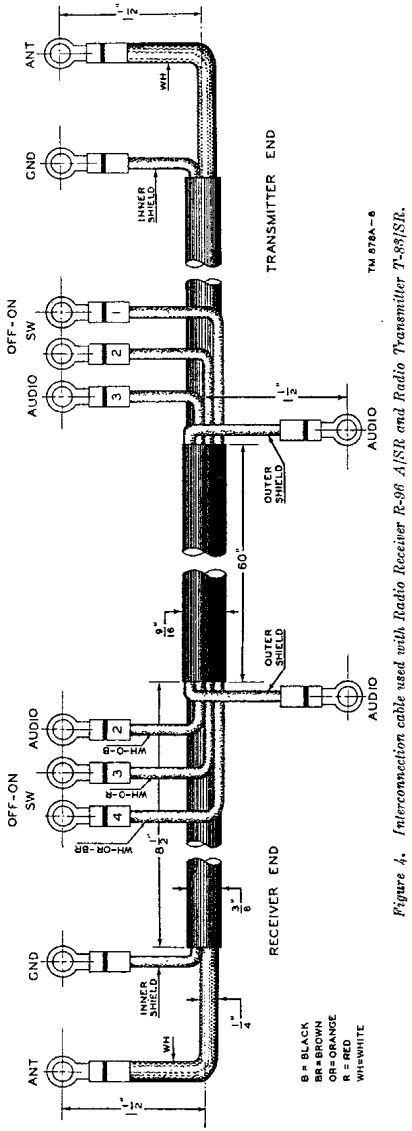


Figure 4. Interconnection cable used with Radio Receiver R-96 A/SR and Radio Transmitter T-83/SR.

CHAPTE 2

O ATING INS UCTIONS

Section I. NSTAL ON OF RA RECEIVER R-96A/SR

12. Siting

a. Since Radio Recei r R-96A mounted on shipboard for marine se, there ly is not much choice as to the est sitin ion. In most cases, the antenna ready ha installed on the ship or landing b t, and th location has been predetermined.

b. In the event this ceiver is installed on a ship that has n predeter antenna location, the antenna s uld be l as high above the deck of the s as poss Figure 5 shows a method of insta ation tha n used.

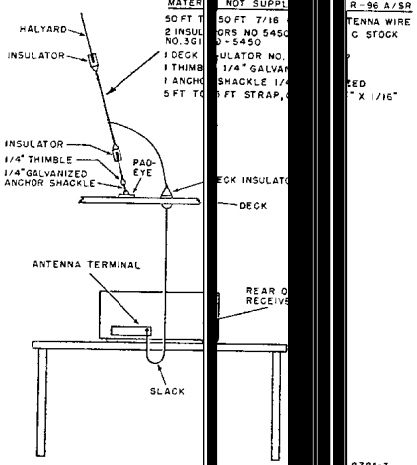


Figure 5. A method of installing a s nna.

c. If the receiver loc ion has en predetermined, it should b as far as le from any electrical interfere e, such ship's

rs. An operating position should be chosen will have an approximately even tempera- nd low humidity.

13. Uncrating, Unpacking, and Checking New Equipment

ution: This radio receiver and the spare may be easily damaged during the unpacking ss. Be extremely careful not to drop or ge the units. Avoid thrusting pinch bars y other unpacking tools, such as a screw into the interior of any fiberboard shipping ner. Do not unpack in a location where dirt, or excessive moisture may affect the ment. Follow closely the unpacking instruc- given below. Figure 6 illustrates the pack- of Radio Receiver R-96A/SR and its spare box.

UNPACKING.

1) Cut the metal straps surrounding the wooden box. The best method of cutting metal straps is to use a heavy pair of side cutters or to twist or bend the strap until it crystallizes and breaks.
2) Using a nail puller, remove the nails in the top of the wooden shipping container. Remove the nails in the four wooden edge strips that hold the cover to the sides. Remove the top cover.
3) Remove the excelsior or wadding from the top of the waterproof barrier.
4) Lift out the waterproof bag containing the radio receiver and spare parts box.
5) Slit the waterproof bag and remove the spare parts box and the outer carton containing the receiver.
6) Slit the seams of the fiberboard carton and open the flaps.
7) Lift the inner vaporproof bag and slit it open.

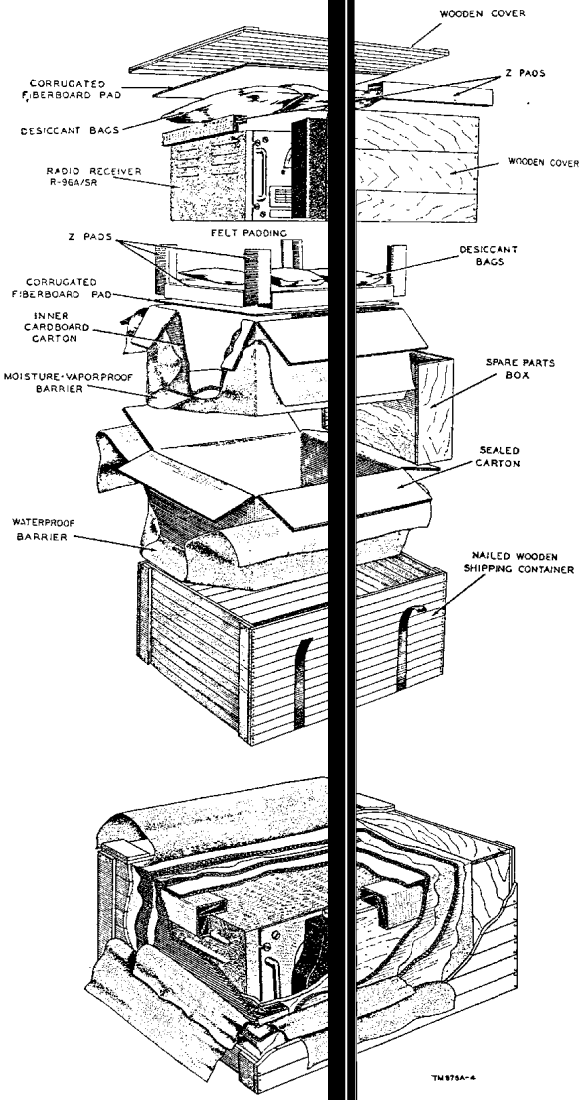


Figure 6. Packaging and packing Ra eceiver R-96A/SR.

Remove the inner fiberboard carton, slit the seams, and open the flaps.

Remove the Z-pads and the dehydrating agent contained in the bags.

Remove the receiver from the fiberboard carton.

Break the bands surrounding the unit that hold the plywood protection board over the face of the unit.

Remove the plywood protection board.

The unit now is unpacked and ready for installation.

Save all of the packaging material except the bags of dehydrating agent. Store all of the cartons in order in the wooden shipping container.

ACKING. After unpacking the equipment, y check it for damage that may have during shipment. Compare the packing the unpacked equipment.

ACKING. If it is necessary to repack the t, repack it in the reverse order of un- above).

14. Installation of Receiver

Radio Receiver R-96A/SR is designed for marine use and shipboard installa should be installed at a point as far from s spray and moisture as possible. Howeve be installed in a convenient place from t tional standpoint, and leads between it power supply, ground, antenna, or other ing units should be kept to a minimum. are shipped in their sockets; therefore, it sary only to check each one to see that it located in its socket. Figure 7 shows the of each tube on the chassis. Check to each tube is in its proper location.

a. When not used in conjunction with a unit, the receiver can be mounted on top or operation table or in a rack. When i mounted on a table or desk, the dust cove Remove the receiver from the dust cover and carefully set it aside. Place the du in the desired location, and mark on to desk the location of the four leg projection

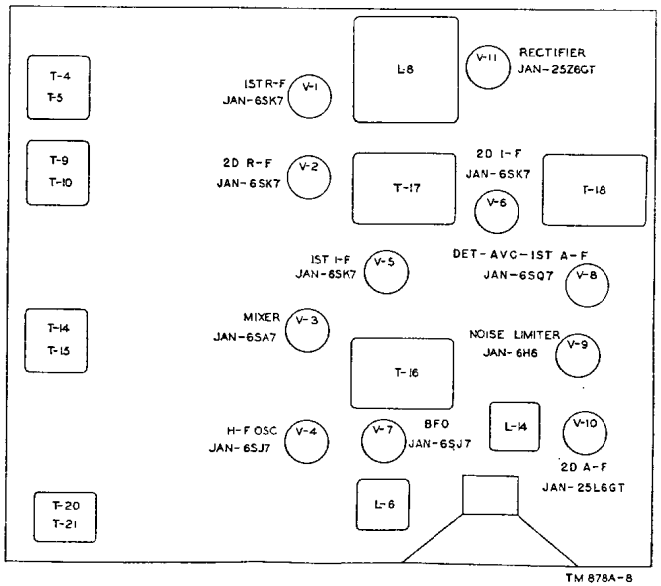


Figure 7. Radio Receiver R-96A/SR, tube location chart.

ner of the cover. These projections hav oles
them so that the desk or table top can be n ked
ily by pencil from the inside of the cov If
table or desk top is metal, drill holes th ugh
top and firmly bolt the dust cover to If
desk or table top is wood, attach the dust ver
it with wood screws. After the cover has een
ured, replace the receiver in it. It is ess tial
t the receiver be mounted firmly on the esk
prevent it from moving about and being m-
d in the event that the ship pitches or ro in
vy seas. The antenna may be connect as
wn in figure 5.

When the receiver is used in conjun ion
Radio Transmitter T-83/SR, the transm ter
mounted on top of the radio receiver. he
iver dust cover is designed to carry his
ght. Bulkhead mounting brackets, bolts, ts,
lockwashers are included in the spare ts
of the transmitter. Parts also are avai le
this source for securing the transmitter t he
iver. No shock mounting brackets are n s-
for either the transmitter or the receiver.

For rack mounting, Radio Rec er
6A/SR (with dust cover removed) is desi ed
t a standard 19-inch rack. The six ts
h hold the receiver to the dust cover ca e
for mounting the receiver on the r k.
receiver should not be removed from ts
net if the radiation characteristic is import t.

15. Connections and Interconnections

Radio Receiver R-96A/SR may be used as an individual receiver, or it may be used in conjunction with Radio Transmitter T-83/SR. In either case, it is necessary to remove the terminal strip cover plate on the rear of the receiver. The plate is fastened to the receiver by four Dzus fasteners. These fasteners can be removed by turning them one-half turn in a counterclockwise direction with an ordinary screw driver of adequate size. When the cover plate is removed, access to the terminal strip, the antenna binding post, and the power plug is accomplished (fig. 3).

a. It is possible to connect the power plug without removing the chassis from the dust cover. This is done by inserting the female socket end of the power cord in the hole provided on the left (looking at the receiver from the rear) side of the receiver. Insert the plug through the dust cover. It now can be grasped through the terminal opening in the rear and connected to the male socket located in the top of the chassis. See figure 10 for the location of the power socket

b. When the receiver is used as an individual unit and not in conjunction with the transmitter, connect the antenna wire to the antenna binding post located at the rear of the receiver inside the terminal cover plate. The ground wire should be connected to a suitable grounding point, such as a pipe or ground terminal on board the ship.

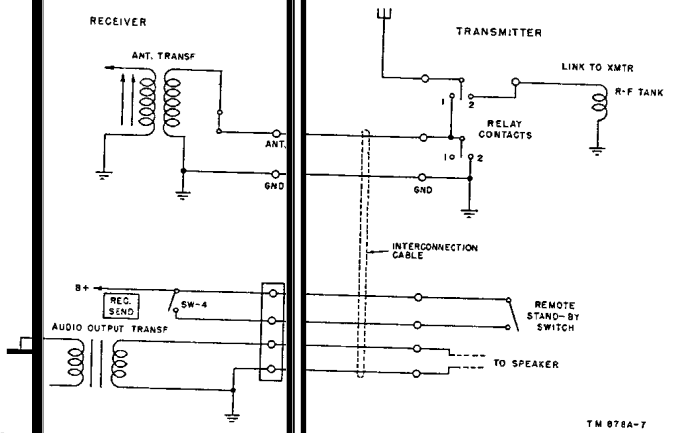


Figure 8. Interconnections between Radio Receiver R-96A/SR and Radio Transmitter T-83/SR, schematic diagram.

c. When the receiver is
Radio Transmitter T-8
cable between the two u
4 and 8, must be used.
with the transmitter as
components. It is conne
and transmitter and gr
when the transmitter i
allows sidetone operatio
provides connections fo
speaker. Figure 8 is a
illustrates the interconn
units. The cable connec
indicated in figures 4 an
cable connections are sec
board and the antenna b

in conjunction with
an interconnecting
as shown in figures
is cable is supplied
t of the spare parts
between the receiver
the receiver input
operation. It also
he transmitter and
use of a remote
natic diagram that
s between the two
to the receiver are
Make sure that all
rmly to the terminal
g post.

16. Service upon Receipt of Used or Reconditioned Equipment

a. Follow the instructions in paragraph 13 for uncrating, unpacking, and checking equipment.

b. Check the used or reconditioned equipment for tags or other indications that pertain to changes in the equipment. If practical, it is preferable to have a new receiver for comparison while this check is being made. If any changes in wiring have been made, note them on the schematic diagram in this manual. Do not change or mutilate the schematic diagram; this would cause confusion if the schematic should be used with a receiver which had not been changed. Under FCC rulings, no changes are allowed in receivers intended for shipboard use.

ection II. CONTROLS AND TERMINALS

17. Front Panel Contro

's. 2 and 9)

Control	Function
BAND SWITCH (SW-1)	Sele si fc
Tuning control and dial	Sele tl
DIAL LOCK	Car q o c
CRYSTAL-MANUAL switch (SW-2)	Sele c tl N T is tl
B. F. O.-OFF switch and control (SW-5 and R-20).	In p V a b p o a

e band in which the de-
equency is located, as

on 1. 0.135 to 0.260 mc.
on 2. 0.260 to 0.510 mc.
on 3. 1.0 to 3.0 mc.
on 4. 3.0 to 6.0 mc.
on 5. 6.0 to 12.0 mc.
e desired frequency in
d being used.
ed to prevent the fre-
from shifting as a result
ation after the tuning
has been set.
ny one of the four
controlled channels (in
to 8.7-mc range) or the
AL tuning position.
pper crystal frequency
ys 550 kc higher than
nted signal frequency.
treme counterclockwise
turns the bfo off.
he bfo is on, this switch
gulates the amount of
tage injection, making
the selection of an
n point when receiving
gnal.

Control	Function
R. F. GAIN control (R-10).	Varies the r-f (radio-frequency) sensitivity.
A. F. GAIN control and PWR. OFF switch (R-30 and SW-8).	In the extreme counterclockwise position, turns off both plate and filament voltages in the receiver. When on, regulates the volume of the speaker or headset.
A. N. L. OFF-ON switch (SW-7).	Turns the noise limiter off or on. The noise limiter is useful when interference due to gas ignition systems or other types of high noise peaks make normal reception difficult.
REC.-SEND switch (SW-4).	Is provided for use when the receiver is used with an associated transmitter. In the SEND position, makes the receiver inoperative but leaves the filaments on, so that the receiver is ready for instant use. It also operates the transmitter control relay.
A. V. C. ON-OFF switch (SW-3).	Turns the avc circuit on or off.
SPKR.-OFF switch (SW-9).	Turns the speaker on or off.
PHONES jack (J-1)	Is provided to allow the use of a headset, if desired.

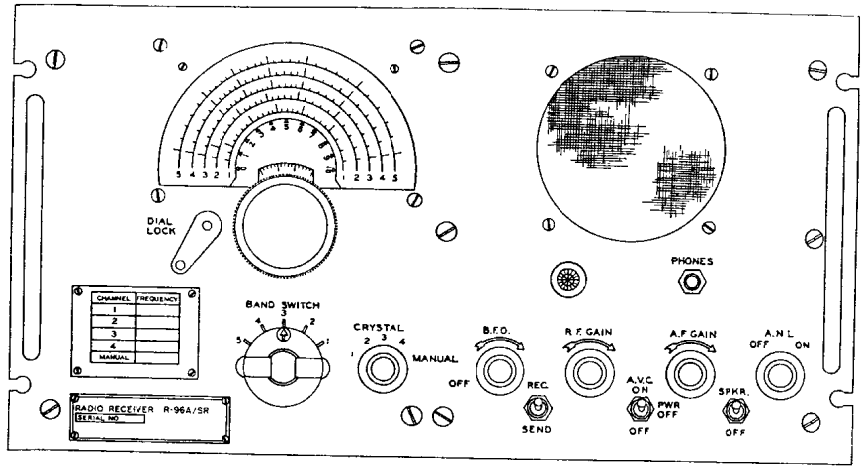


Figure 9. Radio Receiver R-96A/SR, front panel view.

18. Rear Terminal Connections (fig. 3)

Terminal	Function
1. (Ground)	Shield and audio return.
2. (Audio)	For external speaker or handset on associated transmitter.
3 and 4. (Stand-by)	Control leads to antenna relay on associated transmitter. Shorted on SEND position of switch SW-4.

Terminal	Function
Fuses F-1 and F-2	Main line fuses.
Antenna terminal	Connects antenna lead to first r-f transformer switch wafer SW-1A.

Section III. OPERATION UNDER USUAL CONDITIONS

19. Starting Procedure

a. PRELIMINARY. Set the front panel controls as follows:

Control	*Position*
B. F. O.-OFF	OFF.
R. F. GAIN	Maximum clockwise position.
A. F. GAIN-PWR. OFF	OFF.
A. N. L. OFF-ON	OFF.
REC.-SEND	REC.
A. V. C. ON-OFF	OFF.
SPKR.-OFF	SPKR. (on).

b. STARTING. Turn on the receiver by turning the A. F. GAIN-PWR. OFF control clockwise, advancing it to approximately midscale position. The pilot light will light and, after several seconds, noise or signals will be heard in the speaker. If the receiver does not operate, see paragraph 45 (equipment performance checklist).

20. Radiophone Reception

a. Set the BAND SWITCH to the band which covers the frequency of the signal to be received. Do this by rotating the band switch knob until the indicator points to the number corresponding to the desired band on the tuning dial (par. 17).

b. Unlock the dial by operating the DIAL LOCK lever.

c. the receiver to the frequency de ed
cted band by rotating the tuning ob
ndicator shows the proper frequenc on
ted dial.
d. desired signal is subject to objectio ble
rn the A. V. C. ON-OFF switch to N.
e. the A. N. L. OFF-ON to ON h-f
uency) noise due to ignition interfer ce,
etc., sent.
f. eadset operation is desired, turn the
FF switch to OFF and insert the he set
PHONES jack.
g. receiver can be silenced by turnin the
ND switch to SEND. This allow the
be ready for instant service wi ut
noise present in the speaker or he et.
Swi the REC.-SEND switch to the C.
posi stantly places the receiver in oper on.
h. crystal operation of the h-f oscilla r is
desi crystal 550 kc higher than the de red
sign uency is inserted into any of the ur
ack ked XTAL 1 through XTAL 4 (fig 10

Section IV. OPERATION UNDER UNUSUAL CON TIONS

23. eral

a. operation of Radio Receiver R-96 SR
may ifficult in regions where extreme ld,
nea idity and moisture, and sand cond ons
pre In the following paragraphs, instruc ons
are on procedures for minimizing the e cts
of t nusual operating conditions.
b. same checks should be made as are ade
in p phs 32 and 45.

24. ration in Arctic Climates

S temperatures and climatic cond ous
asso with cold weather affect the eff ent
ope of the equipment. Instructions nd
pre s for operation under such ad rse
con follow:
a dle the equipment carefully.
b the equipment warm and dry. the
set in a heated inclosure, construc an
insu box for the set. Keep resistor h ers
(if ed) turned on, provided this doe not
ove he power source. If this meth is
imp al, turn A. F. GAIN-PWR. OFF ck-
wis SW-8 closes (clicks). Keep the fila-
mer vacuum tubes lighted constantl by

af 37). Up to four C stal Un s CR-18/U may
b utilized in this receiver Setting the
C YSTAL-MANUAL switch (SW-2) to the
c esponding positi on the front panel
(YSTAL-1, 2, 3, o) will c use the h-f oscil-
l r to operate at t crystal frequency. The
si al frequency must record l on the channel
cl rt. Crystal opera n may e used for c-w
r ption.

2 Code Reception

or reception of c-w gnals. t rn the B. F. O.-
F switch clockwis to its ON position and
a st for satisfactory eption. The other con-
t s serve the same fu ion durig code reception
a hey do for radioph reception (par. 20).

2 Stopping Proced

urn the receiver by ro ating the A. F.
G IN-PWR. OFF co l to its extreme counter-
cl kwise position.

ring the REC.-SE D switch in the SEND
p ition when the equ ment is not in operation,
a provided this d not overtax the power
s ce. The latter m hod is disadvantageous,
si e tube life will be rtened.
Wear a knitted w en cap over the earpieces
w n operating in the en air with headsets that
d not have rubber ea ieces. Frequently, when
h dsets without rub earpieces are worn, the
e es of the ears may eze without the operator
b g conscious of it. ever flex rubber earcaps,
b ause this may ren them useless. If water
g s into the headset eiver, o if moisture con-
d ses within it, the w er may freeze and impede
t actuation of the d hragm. When this hap-
p s, remove the bak e cap and remove the ice
a moisture from the ceiver.
. When equipment hich has been exposed to
t cold is brought int a warm oom, it will start
t weat and will cont e to do so until it reaches
r m temperature. en the equipment has
r ched room tempe ure, dr it thoroughly.
T s condition also ar s when equipment warms
u during the day a exposure during a cold
n ht.

25. Operation in Tropical Climates

When it is necessary to operate this receiver tropical climates, where excessive heat can ca equipment failure, special care is required inso as placement is concerned. The receiver sho always be kept in an inclosure where the dir rays of the sun do not reach it. Power lines sho not be run along the desk. If it is absolut necessary to have the receiver in the open, extre care must be observed to prevent the opera from burning himself on the metal case. Wh land-based and operated in tropical climates, ra equipment may be instal ed in tents, huts, when necessary, in underground dugouts. Wh installed below ground and frequently when up in swampy areas, moist re conditions are m acute than normal in the tropics. Ventilat usually is very poor, and th high relative humid causes condensation of mo sture on the equipm whenever the temperatur of the equipment comes lower than the ambient air temperatu To minimize this action place lighted elec bulbs in the cabinet. If the set is rack mount place the bulbs under the quipment.

26. Operation in Desert Climates

This receiver is not like to be operated un desert conditions, because it is a marine receiv In the event that it is, how ver, observe the follo ing precautions.

a. Conditions similar to those encountered in tropical climates often prevail in desert areas. se the same measures to insure proper operation f the equipment.

b. The main problem which arises with equip- ent operation in desert areas is the large amount f sand or dust and dirt which enters the moving arts of the equipment, such as variable capacitors nd dial drive mechanisms. The ideal preventive recaution is to house the equipment in a dust- roof shelter. Since, however, such a building eldom is available and would require air con- itioning, the next best precaution is to make the uilding in which the equipment is located as ustproof as possible with available materials. Hang wet sacking over the windows and doors, over the inside walls with heavy paper, and ecure the side walls of tents with sand to prevent heir flapping in the wind.

c. Never tie power cords, signal cords, or other iring connections to either the inside or the out- ide of tents. Desert areas are subject to sudden ind squalls which may jerk the connections loose r break the lines.

d. Take care to keep the equipment as free from ust as possible. Make frequent preventive aintenance checks (par. 32). Pay particular ttention to the condition of the lubrication of the quipment. Excessive amounts of dust, sand, or irt that come into contact with oil and grease esult in grit, which will damage the equipment.

CHAPTER 3

ORGA IZATIONAL MAINTENANCE INSTRUCTIONS

Secti . ORGANIZATIONAL TOOLS AND MATERIALS

27. Tools d Mat s Issued for Use With Rad Receiv -96A/SR

No tools materi r maintenance purposes are supplie vith th dio receiver. However, each ship's io oper may draw maintenance materials, s h as c ng cloth, carbon tetrachloride, et from sh supply. A marine operators tool k for mi repair and maintenance purposes, m be issu t the Port of Embarkation Signal S pply Sh Ordinarily, only plug-in items, such as tubes, are changed by the using organization.

28. Special Tools

Two special Allen wrenches are fastened to the receiver by clips (on the shield wall near tube V–5 and transformer T–17); they can be used when working on the dial drive assembly or when removing the knobs from their respective shafts. No other special tools are required to maintain Radio Receiver R–96A/SR.

ion II. PREVENTIVE MAINTENANCE SERVICES

29. Definit n of Pr tive Maintenance

PM (pr ntive tenance) is work performed on uipmen sually when the equipment is not use) to it in such good working order that b k-dow d needless interruptions in service w be kept a minimum. PM differs from troubl hooting d repair since its object is to prev certai oubles from occurring. For further formati n PM techniques, refer to TB SIG S.

Note. Oper ns desc in this section are organizational main ance. M 38-650.

30. Gener Preve Maintenance Techniq

a. Use N 0000 sa per to remove corrosion.

b. Use a ean, d int-free cloth or a dry brush for c ing.

(1) If cessary cept for electrical contacts, moist he cloth or brush with Sol nt, dry ning (SD); then wipe th arts dr h a cloth.

Caution: Under no circumstances will gasoline be used for cleaning purposes.

(2) Clean electrical contacts with a cloth moistened with carbon tetrachloride; then wipe them dry with a dry cloth.

c. If available, dry compressed air may be used at a line pressure not exceeding 60 pounds per square inch to remove dust from inaccessible places; be careful, however, or mechanical damage from the air blast may result.

d. For further information on PM techniques, refer to TB SIG 178.

31. Preventive Maintenance Checklists

The checklists which follow (par. 32) show the operator how to maintain the equipment so that trouble shooting and repair will be reduced to a minimum. They indicate what to check, when to check, how to check, and the precautions which should be taken before, during, and after checking the equipment. The checklists are, in most cases, self-explanatory; and the operations and techniques do not require lengthy explanations.

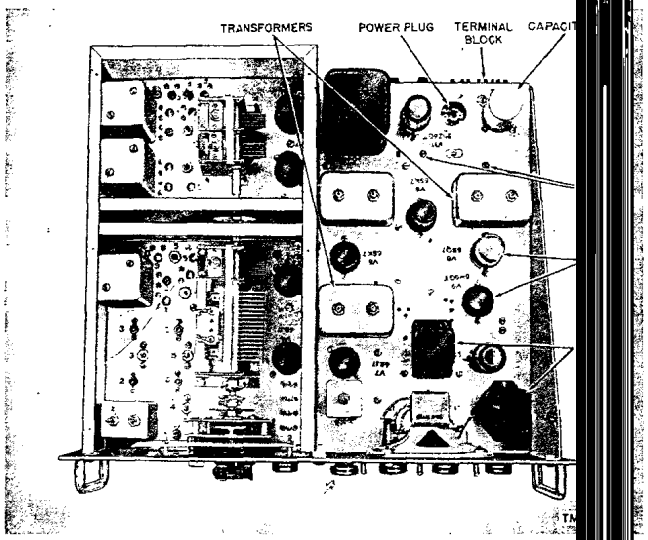


Figure 10. Radio Receiver R–96A/SR, top view showing typical PM iten

32. Preventive Maintenance Checklist for Radio Receiver R–96

a. EXTERIOR (fig. 2).

Item No.	What to check	When to check*	How to check	Precautions
1	Cabinet	W	Inspect inside and outside of cabinet. Check panel screws; pilot lamp, control knobs, and switches for loose mountings.	
		D	Check all connections.	
		D	Clean cabinet with a dry clean cloth.	
		W	Use compressed air to blow out accumulated dirt and dust. Repaint scratched, rusted, and chipped surfaces (par. 401).	
		W	Tighten loose mounting bolts, screws, knobs, and connections.	
2	Jack	W	Examine jack for loose mounting nut, dirty contacts, and improper spring tension. To remove dirt, use a brush and carbon tetrachloride. To remove corrosion, use crocus cloth and then a clean cloth. Increase spring tension, when necessary, and try the action of the jack after each adjustment. Keep soldered connections intact.	
3	Fuses	W	Inspect fuse caps for evidence of burning, charring, and corrosion; inspect fuse clips for accumulation of dirt and loss of tension.	

*D—daily; W—weekly, M—monthly

CHAPTER 4

AUXILIARY EQUIPMENT

46. Radio Transmitter T–83/SR

a. Radio Transmitter T–83/SR is a 50-watt telephone and telegraph marine radio transmitter. Either c-w or phone transmission is available on any of five preset channels in the frequency range between 1,700 and 8,700 kc. Three separate units house the entire transmitter installation (fig. 15). Provisions are made for remote control operation of the radio transmitter.

b. The transmitter is designed for operation from a 115-volt, 50- to 60-cycle a-c power source, and requires approximately 460 watts for radiotelephony or 390 watts for telegraphy. It usually is mounted on top of Radio Receiver R–96A/SR (par. 14).

47. Common Operation of Radio Receiver R–96A/SR and Radio Transmitter T–83/SR

a. A single antenna is used for both the receiver and transmitter. The antenna is connected to the antenna terminal on top of the transmitter. The interconnecting cable (fig. 4) is used between the receiver and transmitter. This cable is shipped with the transmitter. The cable has leads inside of it to bring the received audio signal to the handset receiver unit, to connect the transmitter antenna (switched by the switching relay inside of the transmitter) to the receiver, and to disable receiver reception and operate the antenna relay from the front panel of the receiver (by means of the REC.-SEND switch).

b. For further information on Radio Transmitter T–83/SR, refer to TM 11–837.

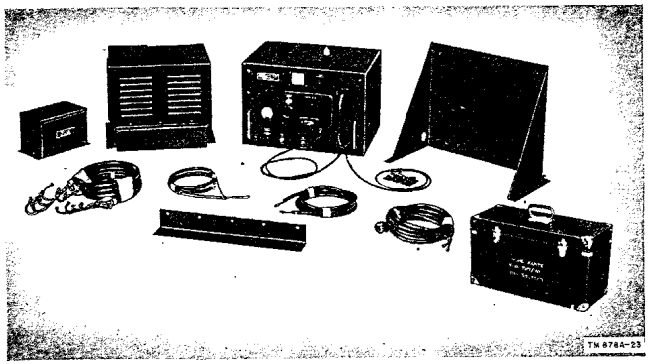


Figure 15. Components of Radio Transmitter T–83/SR.

CHAPTER 5

THEORY OF RECEIVER R–96A/SR

48. Introductio

a. It is an es
pairman unders
and how it fun
able to locate a
This is especial
ment. It is for
complete theory
this manual. T
maintenance d
chapters.

b. Radio Rec
heterodyne type
stages of i-f amp
ing and detectin
The frequency r
1 to 12 mc. In
crystal control o
in the range fro

Note. Informatio
is given in the ide

49. Block Diag

a. The signal
the first r-f ampli
this stage, the si
second r-f ampli
signed to give no
maximum off-ch
tion ratios. Fro
the signal goes in
is combined wi
oscillator, V–4.
550 kc higher th
stages. The com
signal and that c
difference beat o
outpnt of the
circuits are tuned

further ampl
stages (V–5 a

b. After th
signal is sent
V–8), where
first a-f (aud
of V–8). Fro
second a-f a
tector and firs
may be switc
pulses or ot
disturbance w
the headset
econd a-f am
r both, may

c. In order
mount of d-
ed back to th
tage, and the
he gain of th
he signal stre
hen the inc
reater voltag
hrough avc
ontrolled tub
When a weak
oltage on the
hem to furthe

d. In order
equency oscil
gnal that is
gnal in the s
mbined sign
eat note that
further amp
ceiver operat
cycles) or 1
ctifier (V–11
polarized to
eration.

the first and second i-f

i-f stage, the amplified
iode detector (first half of
odulated and fed into the
cy) amplifier (second half
he signal is coupled to the
V–10). Between the de-
lifier, a noise limiter (V–9)
the circuit to reduce static
s of pulse-type electrical
it cause excessive noise in
r. At the output of the
ther a speaker or headset,
listen to the audio signals.
plish avc action, a small
from the detector load is
f the r-f stages, the mixer
tage. This voltage varies
s in inverse proportion to
e incoming signal. Thus,
nal is strong, there is a
the detector load, which,
ases the grids of the avc
duces their amplification.
is received, there is less
rolled tubes, which allows
the signal.

the c-w signals, a beat-
7) is used. It generates a
d with the incoming i-f
tage (V–6), and these two
are detected, producing a
-f range. This audio note
the a-f amplifiers. The
either 115 volts ac (50 to
dc by use of a half-wave
chassis power line socket
orrect connection for d-c

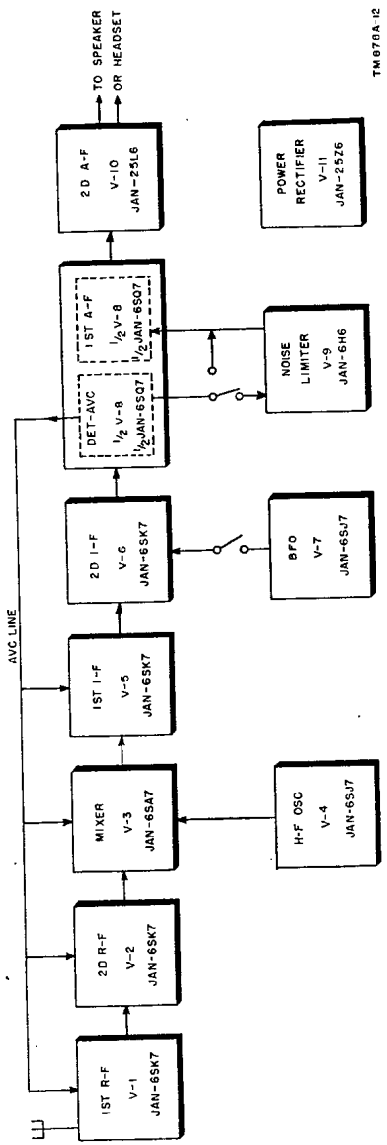


Figure 16. Radio Receiver R-98/ISR, block diagram.

50. R-f Amplifiers (figs. 17 and 40)

a. Since the r-f amplifiers are designed to cover well-separated frequencies, it is necessary to use a band switching arrangement. The BAND SWITCH is a nine-gang switch (SW–1) that switches to five positions; the band 5 position is shown in figure 17. To see all band switch positions, refer to the complete schematic diagram, figure 40. Note that the secondary of the input transformer of each r-f stage is tuned. At the input terminals of the antenna transformer (T–1), there is a neon bulb (E–2) which acts as a static drain to prevent damage to the antenna transformer. Neon tube E–2 grounds any excessive voltage which might appear on the antenna, due either to lightning flashes in the immediate vicinity or to excessive signal, by ionizing and allowing the excess charge to flow to ground. The secondary of the antenna transformer is tuned by variable capacitor C–10, one section of the ganged tuning capacitors. To make capacitor C–10 track properly, the h-f end is adjusted by the trimmer capacitor (C–1) and the l-f (low-frequency) end by the movement of a movable metal core inductor in the coil form itself (except for coils in bands 1 and 2). (This is designated by the arrowhead lines.) Capacitors C–2 through C–5 aline the h-f ends of transformers T–2 through T–5.

b. Coupling to the first r-f stage (V–1) grid is accomplished by capacitor C–6. This capacitor also decouples the avc circuit and prevents it from being grounded through the secondary of the antenna transformer. Avc voltage is brought to the r-f stage through avc decoupling resistor R–3. In the OFF position, the A. V. C. ON-OFF switch, SW–3, shorts the avc voltage to B— (fig. 40). This prevents avc from acting on the avc controlled tubes. The grid bias of tubes V–1 and V–2 is changed by varying the resistance of R. F. GAIN control potentiometer R–10 (fig. 40), in order to vary the gain of the r-f stages. The voltage from cathode to grid of V–1 is lowest when control R–10 is in its minimum resistance (maximum gain) position. Choke L–10 and capacitor C–9 are an r-f filter in the cathode circuit, to help prevent oscillation of the first r-f stage and also to lessen the amount of stray r-f frequency currents entering or leaving that stage. R-f transformer T–6 (fig. 17) couples the signals to the second r-f stage (V–2). Resistor R–2 supplies the proper voltage for the screen grid, and capacitor C–8 bypasses any r-f signal on the screen to cathode at that point.

Decc ling of the plate circuit is ac d by
meal f resistor R–4 and capacito
c. e band switching, the grid, plate
circu of the second r-f amplifier ically
simil to those of the first r-f st e dif-
feren between the two stages lies i ies of
coils capacitors and in the fact t lhode
chok used in the second r-f stag The
gain the second r-f stage also is d by
R. F AIN control R–10. The f the
seco tage is coupled to the mixer ough
r-f t sformer T–11. Individual rmers
T–3 T–5 (fig. 42) in the input st r-f
stage –1), T–6, T–7, and T–8 in tl f the
seco -f stage, and T–11, T–12, an n the
inpu the mixer (V–3) have *twist* *paci-*
tors a d between their primaries ar aries.
A tw d wire capacitor consists o dded
turns insulated wire which capacit nects
the p iary to the secondary windin turns
are n n metallic contact. Its chie is to
add t nall amount of inductive, as paci-
tive, ctance to peak the coil ar t the
desir alue of Q over the frequenc which
the c in conjunction with the tur citor,
is des ed to cover.
d. nsformers T–1 through 40)
coup he antenna to the first r-f grid
(pin They are alined at the h- their
band y capacitors C–1 through rans-
form T–1 through T–3 use metal ctors
for a ng at the l-f end of the ba and
T–5 e resistors (R–61 and R–6 their
seco ies which lower the secondar cause
the t sformers to have a wider fr pass-
band
e. nsformers T–6 through T T–11
throu T–13 are the same as T–1 T–3
(exce for the twisted wire capaci hined
in c e), and T–9 and T–10 and T T–15
matc in operating theory) T–4 a Re-
sisto –63 and R–64 and R–65 6 are
analo s to R–61 and R–62. R–1 6 are
low-v e cathode resistors for app mini-
mum s to V–1 and V–2, when th AIN
contr s at minimum resistance (m ain).
With these (R–1 and R–6) the lifier
stage ould distort the received the
maxi n gain setting.
f. decoupling of the grid the
secon -f stage is effected by mea istor
R–5 capacitor C–18. The scre f the
secon -f stage is kept at ground r- l by

iate fr quency of 550 kc. By injecting this
al into he second i-f amplifier grid (fig. 40),
ther v h the unmodulated incoming signal,
differe e frequency of the two signals is de-
ed at e detector to give an audio voltage
ss the detector load. The circuit uses a
ified I rtley type oscillator. The resonant
it co ists of tapped inductance L–6 and
citors –74 and C–82.

The c hode current flows through the ground
of the inductance (from tap 1 to tap 3) to
uce th required feedback voltage for oscilla-
. Res tor R–39 and capacitor C–75 are the
-leak s f-bias resistor and bypass capacitor.
volta is applied to the plate (plate, screen,
suppr sor grids are tied together to make a
le) th ugh resistor R–19 and potentiometer
0. Po ntiometer R–20 varies the plate
nge, th reby controlling the amount of signal
ted in the second i-f stage control grid (pin
rough he slight coupling of capacitor C–37.
ch SW 5 turns the bfo circuit on and off by
ing or reaking the positive d-c plate supply
to Tu e JAN–6SJ7 (V–7). Capacitor C–82
f the emperature compensating type. It
ts in eping the bfo frequency output con-
t desp e changes in ambient temperature.

Dete or and Avc (fig. 24)

The d tector (V–8) is of the diode type and is
he sam envelope as the first audio amplifier.
two d de plates of Tube JAN–6SQ7 are used
detect n. When the secondary of the third
ransfo ner supplies i-f voltage, current flows
ugh re stors R–26 and R–40. Current flows
een c hode and the parallelled diode plates
n the s nal voltage drives the diodes positive,
a volt ge is developed across these resistors.
acitor –43 bypasses the i-f ripple so that only
and a io voltages are left. The d-c voltage
ed as t e negative avc voltage. Audio voltages
aken om the junction of the two load resis-
R–26 and R–40, and fed to the A.F. GAIN
rol (R 30) through capacitor C–51 (fig. 40).
mova e arm of the A.F. GAIN control is
ected o the grid of the first audio amplifier
hat th voltage applied to the grid (pin 2)
–8 may e varied; this, in turn, varies the audio
me in he speaker or headset.

The c system used is similar to the type
in m ny communication receivers. How-
, it do not make use of any *delaying action.*

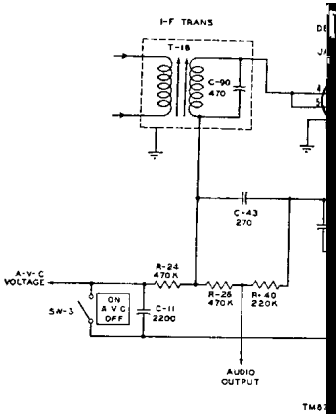


Figure 24. Detector and avc, simplified schema

The pulsating d-c voltage developed
detector load resistors, R–26 and R–4
off through resistor R–24. It is used
voltage to control the first four sta
receiver.

c. Resistor R–24 and capacitor C–1
the network that filters the pulsating
to make it have a steady d-c value
pulsating at an a-f rate. Switch SW-
the avc line to B— when it is in the A
position.

56. Noise Limiter (figs. 25 and 26)

a. General. The noise limiter (V–9
series type and is designed to suppress
type of noise interference which is pic
the antenna and amplified through
receiver up to the detector. A.N.L
switch SW–7, shown in figure 25, sw
noise limiter twin diode either into th
out of the circuit. With this switch i
position, the audio output from th
stage is taken from the junction o
detector load resistors, R–26 and
applied through the audio coupling
C–51 across A. F. GAIN control R
movable contact of R–30 applies the af
of the triode audio section of tube
detector circuit then functions simila
detector circuit in a conventional radi
using a normal half-wave diode detec
ever, when the noise limiter switch is

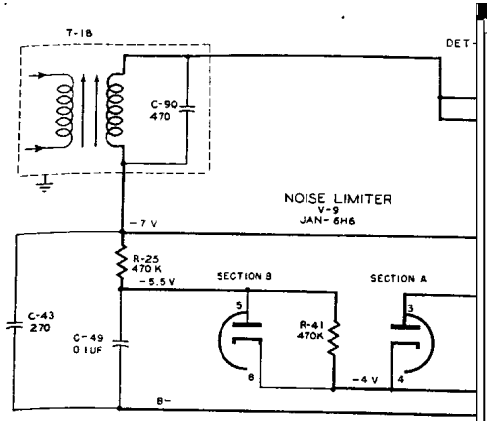
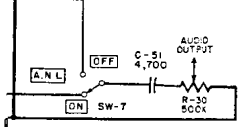


Figure 25. Noise limiter, simplified circuit diag

position, the audio signal must travel through section A of tube V–9 (pins 3 and 4) to reach capacitor C–51 and the gain control. This diode acts as an automatic switch; opening on short, strong noise pulses to prevent the noise from reaching the first audio amplifier stage. Resistor R–27 (fig. 40) is the cathode resistor of the triode audio section of tube V–8, and C–44 is the cathode bypass capacitor; these parts are not shown in the simplified circuits of figures 25 and 26 because they are not important to the function of the noise limiter circuit.

b. Operation.

(1) Figure 25 shows the noise limiter in operation when there is a normal signal present but no noise. Rectification of the i-f signal in the detector (V–8) causes a direct current to flow through load resistors R–26 and R–40. Note that the series-parallel combination of resistors R–25 and R–41 and diode section A of tube V–9 is in parallel with load resistor R–26. Current flows through resistor R–26 in the proper direction to make the cathode of diode section A more negative than the plate; hence, this diode will conduct and there will be a small current flow through resistor R–25. Since diode section A conducts, the audio signal developed across detector load resistor



TM 878A-19

explanation.

applied through diode sec-
put coupling capacitor C–51.
a small current flow through
-41. Under the above con-
noise, the polarity across
that the plate (pin 5) of
B of tube V–9 is negative
to the cathode (pin 8). and
ction is cut off. Capacitor
up to the maximum carrier
evel through resistor R–25.
l serves to isolate the audio
capacitor C–49.
nt a noise pulse exceeds the
rrier modulation level. the
of diode section A of tube
neously will be driven more
it was before. Figure 26
polarities and some assumed
his condition. The cathode
n A (pin 4), however, can-
go to a more negative
ause of the comparatively
time of capacitor C–49
or R–25. The charge on
9, then, keeps the potential
e of diode section A prac-
ged; the result is that the
section A is more negative
de, and conduction in the

by clips on the side of the r-f shield wall directly above tube V–5. Insert the wrench into the Allen screws and turn counterclockwise to loosen the screws enough to remove the knobs from their shafts.

c. To remove the dial lock lever, unscrew the pivot screw and pull the lever away from the panel.

d. To remove the front panel, take off the toggle switch nuts and all screws which hold the panel to the chassis members. Leave the speaker, panel lamp, and PHONES jack secured to the panel. Be careful, at this point, to prevent the weight of the front panel from damaging the dial gear drive. After all the screws that fasten the dial gear drive assembly to the panel are removed, the flexible coupling and the screw lugs under the dial drive are the only fastenings holding the dial drive to the chassis. By loosening the setscrews on the flexible coupling and taking the nuts from the mounting lug screws underneath the chassis, the

Section IV. ALINEMENT

96. Test Instruments Used for Alinement and Adjustment

a. SIGNAL GENERATOR. The signal generator used to aline Radio Receiver R–96A/SR should be an accurately calibrated instrument capable of producing audio tone modulated r-f signals. It should cover the frequencies from 135 to 12,000 kc. Signal Generator I–72 is an instrument capable of producing these frequencies. A satisfactory output is about 100 microvolts, and an output impedance of 100 ohms will provide the required match for alining the r-f circuits. The output impedance and attenuator calibration is not very important for alinement of the i-f stages. Dial calibration of the receiver can be made only as accurate as the calibration of the signal generator unless a frequency meter is used. For best results in alinement and stage gain measurements, the signal generator and receiver should be located in a screen room, if one is available.

b. OUTPUT METER. An a-c type output meter capable of responding to the signal generator modulating frequency is needed for alinement of the receiver. The meter also should be capable of indicating half-scale voltage on the 10-volt range. An output meter such as furnished with Test Set I–56 is satisfactory for this purpose.

until a zero beat is heard. The signal generator now is set for the exact frequency desired. Turn off the frequency meter and remove the wire attached to the signal generator output connection.

Connect signal generator to—	Adjust for maximum (in order given)
Stator plate of mixer capacitor C–30	T–18, T–17, and T–16. Two adjustments on each transformer. Repeat.

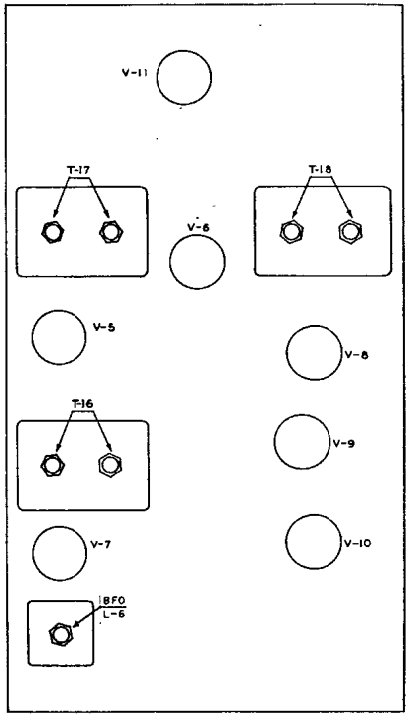


Figure 36. I-f alinement diagram.

102. H-f Oscillator, Mixer, and R-f Alinement Procedure and Chart

a. H-f oscillator, mixer, and r-f alinement procedure follows the order listed below for each band:

(1) H-f oscillator adjustment on the high end of the band.
(2) Mixer adjustment on the high end of the band.
(3) Second r-f adjustment on the high end of the band.
(4) First r-f adjustment on the high end of the band.
(5) H-f oscillator adjustment on the low end of the band.
(6) Mixer adjustment on the low end of the band.
(7) Second r-f adjustment on the low end of the band.
(8) First r-f adjustment on the low end of the band.

Note. There are no adjustments on the h-f end of the r-f and mixer coils (T–4, T–5, T–9, T–10, T–14, and T–15).

b. The h-f oscillator adjustments may have enough range to tune to both the higher and lower values which give the proper intermediate frequency at the mixer stage. This receiver is designed to operate correctly when the oscillator is tuned to the higher frequency. If tuned to the lower frequency, the oscillator will not track with the r-f and mixer stages and may cause images.

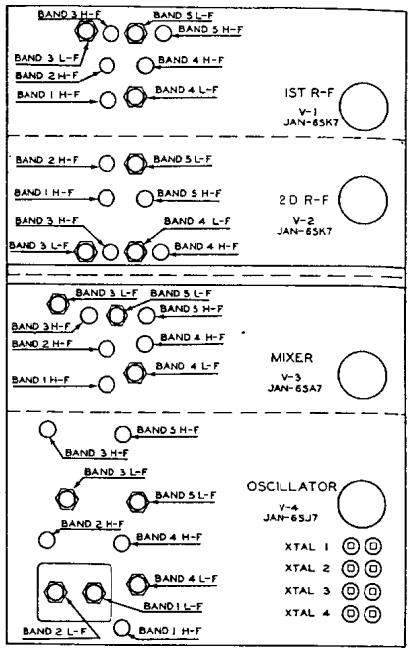


Figure 37. R-f alinement diagram.

c. The h-f oscillator, mixer, and r-f alinement chart is given below:

	End of band	Band No 5	4	3	2	1
Dial setting frequency	High	11. 5 mc	5. 8 mc	2. 8 mc	480 kc	240 kc
	Low	6. 5 mc	3. 5 mc	1. 6 mc	280 kc	140 kc
Signal generator frequency	High	11. 5 mc	5. 8 mc	2. 8 mc	480 kc	240 kc
	Low	6. 5 mc	3. 5 mc	1. 6 mc	280 kc	140 kc
Oscillator adjustments to be peaked	High	C–61	C–62	C–63	C–64	C–67
	Low	T–22	T–23	T–24	T–20	T–21
Mixer adjustments to be peaked	High	C–24	C–25	C–26	C–27	C–28
	Low	T–11	T–12	T–13		
Second r-f adjustments to be peaked	High	C–12	C–13	C–14	C–15	C–16
	Low	T–6	T–7	T–8		
First r-f adjustments to be peaked	High	C–1	C–2	C–3	C–4	C–5
	Low	T–1	T–2	T–3		

Section V. FINAL TESTING

103. General

Receiver performance sometimes is impaired slightly when replacements have been made, if the receiver recently has been moistureproofed and fungiproofed, or if the receiver has been in use for a long time without readjustment. The receiver must meet the minimum standards required of Signal Corps class A equipment. When the performance is thought to be below standard, follow the final testing explained in paragraphs 104 through 115. The following tests are explained:

Beat-frequency oscillator.
Dial calibration accuracy.
Sensitivity (a-m signal).
Selectivity.
Image rejection ratio.
Ave characteristics.
Power output.
Frequency response.

104. Test Conditions

a. Before making these final tests, make sure the proper test equipment is available. The test equipment should cover the bands of frequencies to be tested and should have calibrated outputs. Warm up the receiver and test equipment for 1 hour prior to making final tests. Unless otherwise specified, the standard test condition is used to provide a basis for the perfor of the equipment.

b. Apply an r-f signal modulated 30 p at 400 cycles to the antenna terminals; t n a dummy antenna consisting of 30 ohms 300 uuf (micromicrofarads) in series. Set t F. GAIN and the R. F. GAIN controls to t lly clockwise positions. Tune the receive res- onance with the signal from the signal tor and adjust the output of the generator t uce 50 mw in the output load. This load is hm resistor (R–34) placed across the secondi the audio output transformer when the ker (SPKR.-OFF) switch is in the OFF on. An a-c output meter is used for the tor unless a milliwatt meter is available. A ge of 1 volt will be indicated on the outp ter when 50 m-w output is being dissipate the load resistor. Refer to figure 38 for co ns of signal generator and output meter to er. Check alinement before any final tes A headset can be used for listening to the s

105. Positions of Controls

For any tests not involving a bfo or nois er, set the controls as follows:

Control	*Setti*
A. F. GAIN-PWR. OFF	Fully clock as instructe
R. F. GAIN	Do.

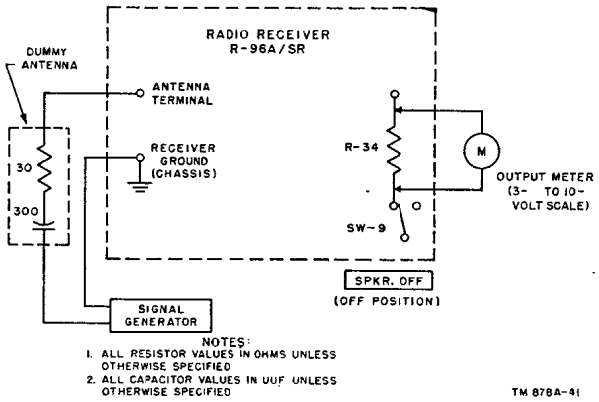


Figure 38. Over-all output check set-up.

	Setting
A. V. C. C	
A. N. L. C	
SPKR.-OF	Do.
REC.-SE	
B. F. O.-O	
DIAL LO	Do.
Main tuni	sired.
BAND S	Do.
CRYSTAL	Do.

106. Te es ouble

During nal ing the necessary test equ s m ow up that normally t e ttere est equipment must be sp to se it is accurate. Be sure t po upplie correct for all pieces of ent eck ctions for good contacts per ng.

	Possible causes
Beat-frequ	llat oes no ate close enough
	to in diate frequency.
Dial calibr	ura gnat g or not accurate,
	aliner ff, or dial drive
	off.
Sensitivity	w vo low emission, or
	aliner f.
Signal-to-n	icroph ubes, loose con-
	nectio poor contacts.
Selectivity	aline ff.
Image reje	o. terstа pting, leads too
	long, not properly
	dresso poor shield
	groun
Avc charac	ineme
Audio pow	w er of tubes or
	aliner f.
Frequency	ineme or audio filter
	compo changed in value.

Note. For f s of efer to p ns 79 and 80.

107. Bec enc cilla

a. Inje nn ated l of 550 kc (the i. f.) du ante the receiver.

b. Turn F. F sw n. An audio output si a 1,000 es should be heard.

c. No s dic either ble in the i-f or bfo cir

108. Dic rat ccur

a. The f t hing esults in very high tunin cy vera ngs across the band to b are ked, curacy of 1.03 percent sh at t. T curacy of calibration w en vera ts along any

cale, for the fin should be within ± percent.

b. Connect a su quency meter or crysta alibrator to the input and check th uning accuracy o the five bands. Mak ure the frequency the calibrator is mor ccurate than 1 pe

c. Set the B. F. switch to ON.

d. Tune receiv calibrator to severa oints in each ba 000-cycle audio signa ill be present if t rs are correct.

109. Sensitivity

a. The sensitivi of a receiver is a meas re of its ability t veak signals and is the gnal input nece produce rated powe utput at a 10 to 1 lus-noise to noise ratio he three differen quencies picked should e at the center, h ow ends of each band efer to the stag arts in paragraph 88 r test points.

b. The signal is connected to the ceiver through a antenna (fig. 38) suit- ble for the unba nput of this receiver. he receiver outp asured with an output eter adjusted to e output impedance of e receiver. The f the signal generator 30 percent mod 400 cps. The avc is rned off and the AIN control adjusted a setting at whi s no change in receiver utput as the A. V -OFF switch is turned N and OFF. W est signal tuned in on e receiver, the A N and signal generator utput are adjuste dition which produces e specified audi output (50 mw) with e signal modulat mw with the modula- on removed. T tor output in micro- lts is the sensiti e.

c. The a-c or d input to the receiver ould remain co roughout these tests. higher sensitivity oted with the receiver erating on ac. ration may vary the nsitivity to a ma 20 percent lower than th a-c operation.

110. Selectivity (

a. The controls he same as listed in ragraph 105, wit eption of the A. V. C. N-OFF switch turned to the OFF sition during the ecks.

b. Connect an generator to the re- iver dummy ant 38). Adjust the r-f generator to emit an unm ulated 10-microvolt, r-f signal.

c. Connect a VTVM ac the diode load resis- ors, R–26 and R–40. M note of the reference evel at resonance (recei tuned to maximum output after the signal gen or has been adjusted o 10 microvolts).

d. Adjust the r-f gene r to 20 microvolts output. The VTVM sh register a decided ncrease in the output volt . Detune the signal generator to either side he center test fre- quency. The output volt should drop. When he VTVM reads the exac ference voltage level c above), the signal gene r frequency at that oint is the bandwidth li on one side of the est frequency.

e. Detune the signal g ator in the reverse irection until the referenc vel again is reached. This will be when the V M voltage reading asses through its peak an ops to the reference evel, and will indicate t bandwidth limit on he other side of the cente st frequency.

f. The difference betw the frequency on ach side of the resonant ter frequency is the andwidth in kc or mc. S the r-f signal volt- ge was doubled, this is the dwidth at the 6 d-b oints.

g. Reset the r-f generato 100 microvolts out- ut and check the bandw by noting how far om the center frequency onance) it is neces- ary to go, to each side fore the reference vels are reached.

h. Repeat at 1,000 a 10,000 microvolts; 0,000 microvolts corresp s to 60 db if the riginal reference level w hecked with a 10- icrovolt signal input. In ween steps may be ken until enough points noted to draw a mooth selectivity curve.

i. If the r-f generator i ency calibration is ot accurate enough for the ired purpose, check ach step (center and side p s) with a frequency eter, such as Frequency eter Set SCR–211. isable the output of the f uency meter before pting the reference level o aking any readings the VTVM.

j. If au oscilloscope and audio oscillator are ailable, leave the frequen neter on the center equency (turned off when rence level is being ken). After the side p s are located, the equency meter may be t d on and the beat te from the receiver fed in he horizontal input the oscilloscope. This b note is formed by e mixing of the detuned al generator signal

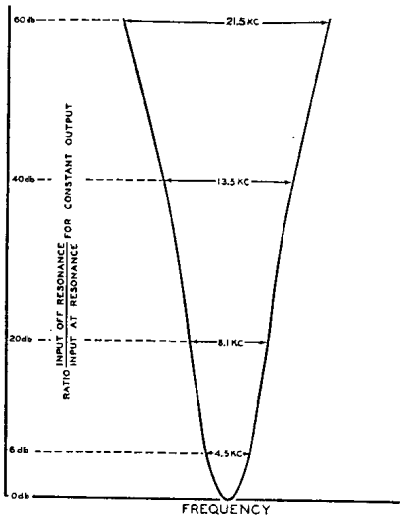


Figure 39. Selectivity curve.

and the center frequency of the frequency meter signal. The vertical oscilloscope input is connected to the output of the audio oscillator. By variation of the audio oscillator frequency, the pattern (Lissajous figures) on the oscilloscope may be made to show a 1 to 1 frequency ratio. The 1 to 1 ratio can be recognized by the appearance of a straight line, an ellipse, or a circle, depending on the phases of the input voltages. The difference between the side point and the center frequency may be read directly on the audio oscillator scale. The total bandwidth will be the sum of the two separate center-to-side frequency differences.

k. Minimum requirements—

Signal increases (db)	*Total bandwidth*
8	Not more than 4.5 kc.
22	Not more than 8.1 kc.
40	Not more than 13.5 kc.
60	Not more than 21.5 kc.

111. Image Rejection Ratio

a. Minimum Requirements.

Test frequency (kc)	*Rejection ratio*
Lowest nominal frequency	25,000 to 1
510	2,000 to 1
1,500	3,000 to 1
2,500	1,500 to 1
5,000	1,000 to 1
10,000	600 to 1

	Function of part
	Allows operator to move about freely without removing headset.
	Changes audio signals into sound.
	Bfo (V-7) grid.
	Broadening frequency response of transformer.
	Broadening frequency response of transformer.
	Broadening frequency response of transformer.
	Broadening frequency response of transformer.
	Broadening frequency response of transformer.
	Broadening frequency response of transformer.
	Bfo (V-7) ON-OFF switch.
	Power ON-OFF switch.

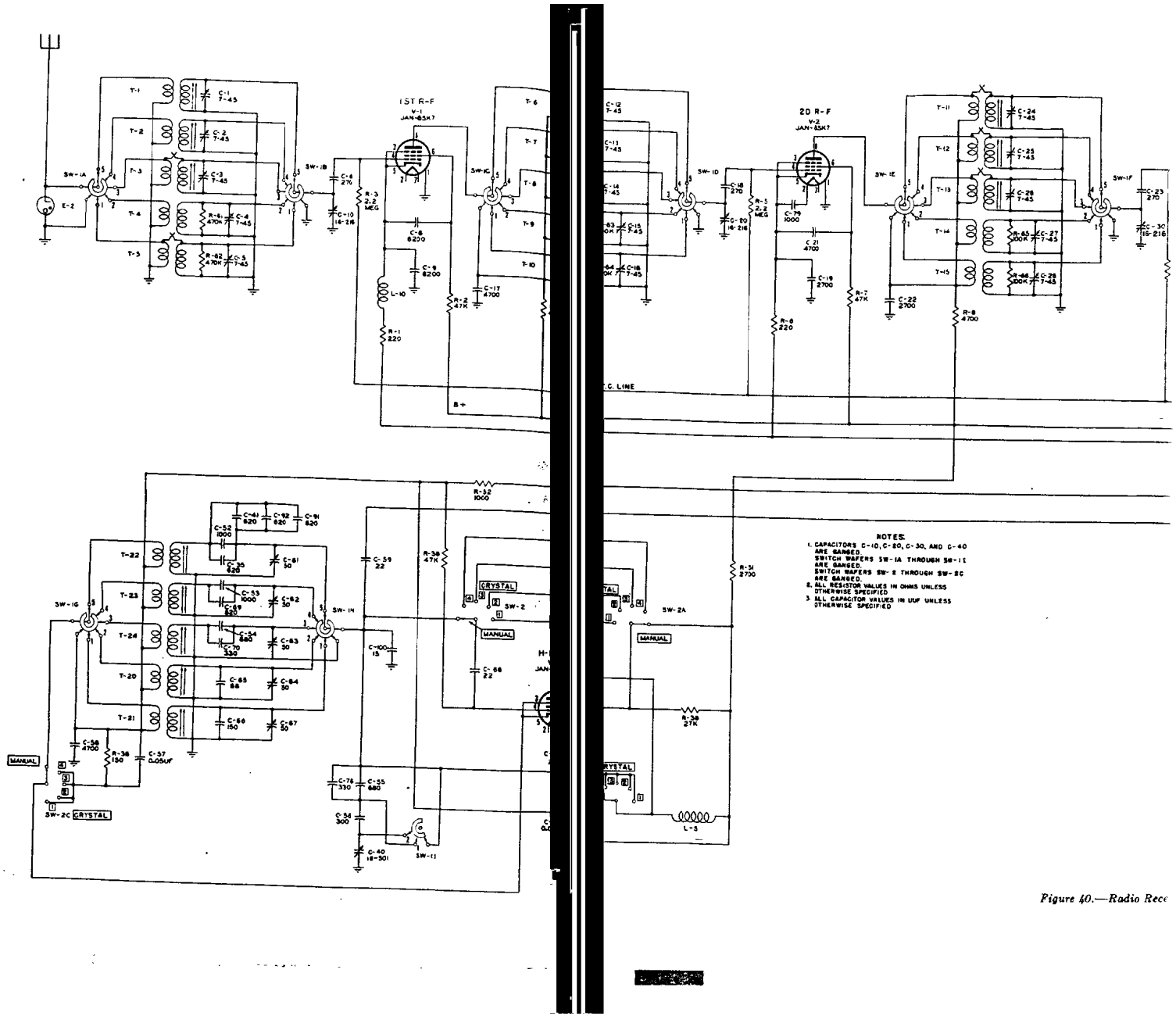


Figure 40.—Radio Rece

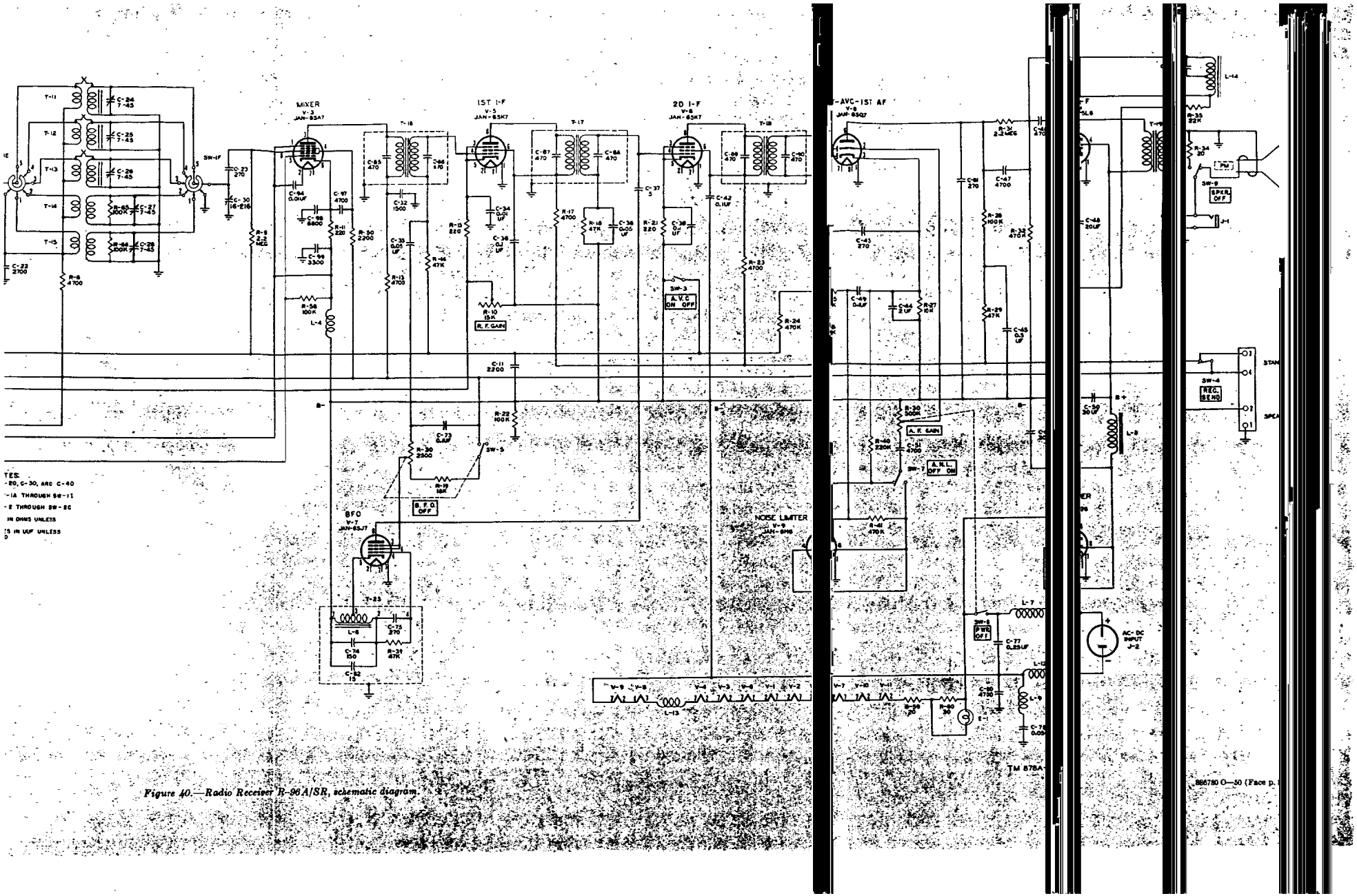
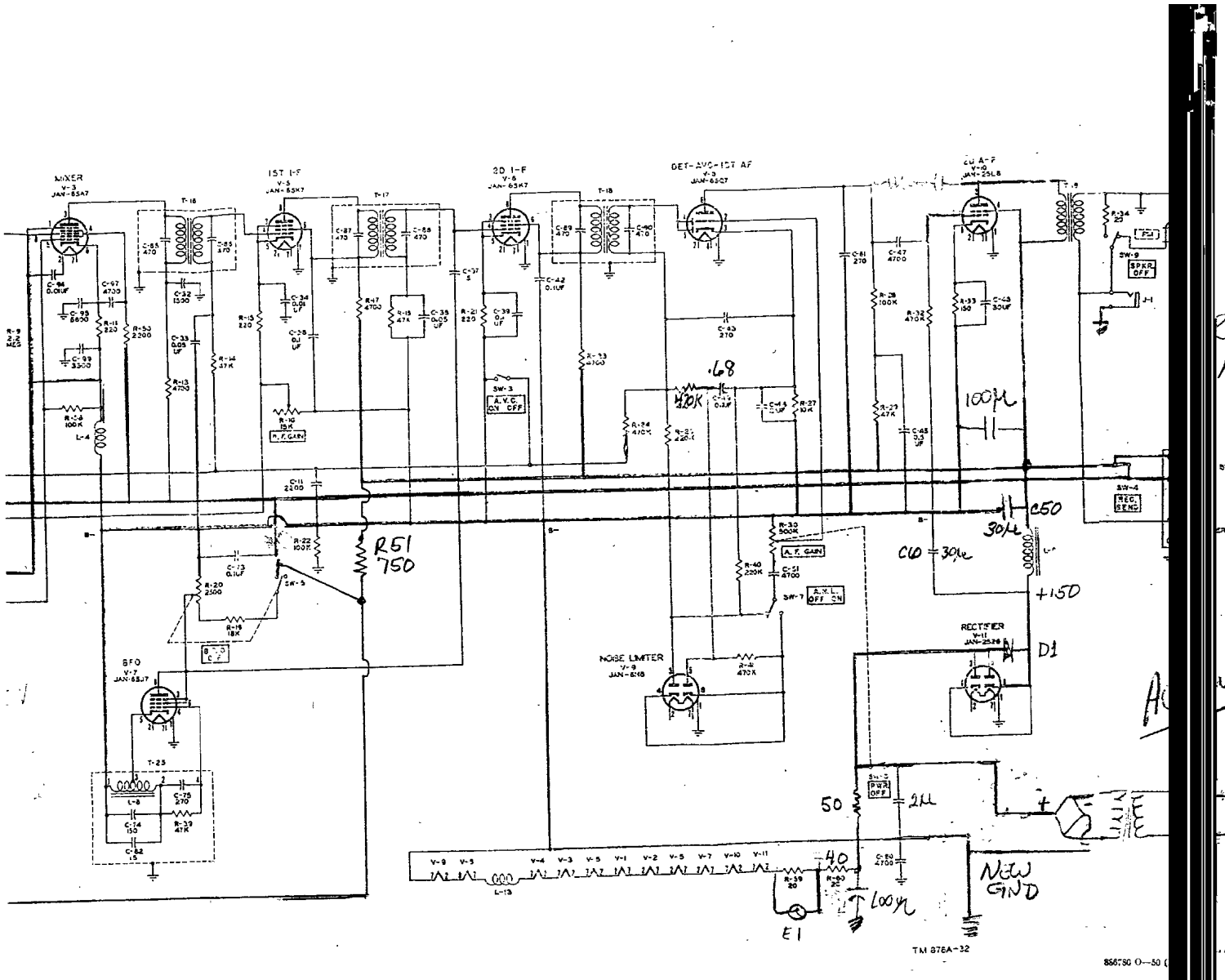


Figure 40.—Radio Receiver R-96A/SR, schematic diagram.



ceiver R-98.1/SR, schematic diagram

296 (NOTA) NO.
AUDIO CHOKE

F1 = AC FUSE

JULY 1110D HUM REDUCTION DCON FILS