NAVSHIPS 91355

RESTRICTED
(Non-Registered)

INSTRUCTION BOOK

for

FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 and FREQUENCY SHIFT CONVERTER CV-57/URR

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, NEW JERSEY, U.S.A.

BUREAU OF SHIPS

NAVY DEPARTMENT

Contract NObsr-39421

Approved by BuShips: 6 August 1950

IB-384L

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title page	Original	4–1 to 4–4	Original
A, B, C	Original	5–1 to 5–4	Original
i to ix	Original	6–1 to 6–3	Original
1–0 to 1–12	Original	7–0 to 7–82	Original
2–1 to 2–18	Original	8–1 to 8–63	Original
3–1 to 3–28	Original	i–1 to i–8	Original

One print each of Figures 7–19, 7–20, 7–21 also in envelope at end of instruction book.

10 January 1951
Temporary Correction T-4
to Instruction Book for
Frequency Shift Converter-Comparator
Groups AN/URA-6, AN/URA-7, and
Frequency Shift Converter CV-57/URR
NAVSHIPS 91355

1. In Figures 7-21 (on page 7-35, 7-36, and in envelope at end of book) and Figure 7-44 (page 7-79, 7-80), make the following revisions:

(a) Break the connection between R922 and R923, and connect the lower end of R922 to pin 1 of X906. Connect the open top end of R923 to pin 8 of X907.

(b) Break the connection of the arm on R923 to pin 8 of X906. Instead, connect the arm of R923 to ground.

(c) Change resistance values of R921, R946, R945, R922, from 4.7K, 47, 47, 470, to 68K, 680, 680, 68K respectively.

(d) Delete resistor R940, and connect P901-3 directly to junction of R910 and R911. Insert resistor R940 (10K) between P901-2 and X906-6.

2. In Figure 7-36 make the following revisions. Also make these revisions in Figures 19 and 20 (on pages 7-31 through 7-34, and in envelope at end of book).

(a) Reverse connections at pins 8 and 9 of switch S302. S302-8 should go to P301-4, and S302-9 should connect to arm of R318.

(b) Connect S302-7 to ground.

(c) Insert resistor R304 (100K) between P301-6 and the junction of C306 and C311.

3. Corresponding changes to the wiring diagrams affected by the revisions in paragraphs 1 and 2, will be made in Figure 7-37 (page 7-65, 7-66) and 7-45 (page 7-81, 7-82), to come later.

RADIO CORPORATION OF AMERICA - RCA VICTOR DIVISION
Camden, New Jersey, U.S.A.

Contract: NObsr-39421

4. Make following changes to Section 8:

Page No.	
8-33	For R-304: Change description to that used for R-615 on page 8-36; add function, "diversity control dropping" and make all other column entries same as that for R-615, except that spare parts totals should be "6, 21, 21" and involved symbol desig. should read, "R-304, R-615, R-621, R-622, R-624, R-625, R-912, R-917, R-918, R-937".
8-36	For R-615: Change description to "Same as R-304"; delete all column entries excepting the function column.
8-37	For R-621, R-622, R-624, R-625: Change description to "Same as R-304".
8-42	For R-912, R-917, R-918: Change description to "Same as R-304".
8-44	For R-937: Change description to "Same as R-304". For R-940: Change function to "V-906 and V-907 Plate Dropping".
8-61	For N16-R-50632-431: Change key symbol from "R-615" to "R-304".

14 December 1950
Temporary Correction T-3
to Instruction Book for
Frequency Shift Converter-
Comparator Groups AN/URA-6, AN/URA-7
and Frequency Shift Converter
CV-57/URR
NAVSHIPS 91355

Pages 1-8 and 1-9:
In Table 1-1, after the words "Receiver Coupling Kit" add "Standard Navy Stock No. F16-C-91911-1005"

Page 3-5:
In sub-paragraph 3h(1) change "plate pin 8" to read "grid pin 4"

Page 3-6:
In Figure 3-5, on socket X303 change PIN 8 to read PIN 4

Page 3-17:
At beginning of paragraph 7 add the following NOTE:

NOTE: Certain adjustments may require the chassis to be withdrawn or removed from the case. This is done as follows:

a. TO SLIDE THE CHASSIS OUT OF THE CASE:

(1) Grasp the handles, push the button near the top of each handle with the thumb, turn the left-hand handle clockwise and the right-hand handle counterclockwise as far as they will go.

(2) Pull the chassis out of the case as far as it will go and return the handles to their original positions.

b. TO SLIDE CHASSIS INTO CASE:

(1) Grasp the handles, push the button near the top of each handle, turn the left-hand handle clockwise and the right-hand handle counterclockwise as far as they will go.

(2) Slide the chassis into the case as far as it will go.

(3) When completely in case, return handles to normal position to lock chassis in place.

Radio Corporation of America
RCA Victor Division
Camden, New Jersey, U.S.A.

Contract NObsr-39421

Page 3-17 (continued):

c. TO CHANGE CHASSIS POSITION AFTER WITHDRAWING CHASSIS FROM CASE:

(1) Grasp the handles, push the bell-shaped buttons near the inside bottom of the handles, and raise or lower the chassis approximately to one of the locking positions.

(2) Release the buttons and move the chassis until the locking mechanism snaps into position.

d. TO REMOVE CHASSIS FROM RAILS:

(1) Slide chassis out of case and set to vertical position.

(2) Slide retainers (just forward of chassis pivots) upward until top eyelet is free of slot.

(3) Let retainer drop. Press bell-shaped buttons and lift chassis forward from rails.

e. TO REPLACE CHASSIS ON RAILS:

(1) Check that the retainers on each side are hanging downward.

(2) Hang chassis on rails, by the pivots, pushing it to the rear as far as it will go.

(3) Push bell-shaped buttons. Pull the retainers as high as they will go, press them against mounting plate, and slide downward as far as they will go being careful to see that top rivet in retainer engages slot in mounting plate.

WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Always observe all safety regulations and precautions. See Safety Notice and High-voltage warning printed on pages viii and ix in the Front Matter of instruction book.

Page 7-1:
At end of text in second column, add "Refer to Section 3, paragraph 7, for instructions on removal of chassis from case"

Page 7-26:
For T202, d-c resistance should read 20 ohms for the primary and 20 ohms for the secondary.

Page 7-71,7-72:
In upper left corner of Figure 7-40, change destination of lead to read "RBB-RBC X303 PIN 4, RDM X6 PIN 8"

Page 7-73:
At bottom left corner of Figure 7-41, change destination of lead to read "RBB-RBC X303 PIN 4, RDM X6 PIN 8"

14 December 1950
Temporary Correction T-3 to
RCA IB-38482-WXY-1
Frequency Shift Converter-
Comparator Groups AN/URA-6, AN/URA-7
and Frequency Shift Converter
CV-57/URR
To be inserted in: Combined
Parts and Spare Parts List

TABLE 8-4

Page 8-3:
C-105 - Desc. - Delete "marked w/ NT #, prefixed by Mfr's desig. ltr",

Page 8-4:
C-119 - Add Standard Navy Stock No. - N16-C-16908-3063

Page 8-13:
Add E-103 - BOARD, TERMINAL: general purpose; 4 solder lug term, all term spaced 11/16" apart, 1/16" thk lam phenolic board; 1-5/16" lg x 1.0" wd x 3/8" thk o/a; has integral aluminum mtg bkt having one end bent at 90 deg, bent end has single mtg hole 0.147" diam
Function - Supports Resistors and Capacitors
Mfr - 1
Dwg. No. - A-8833237-501
All Symbol Desig. - E-103
Total No. per Equip. - 1, 2, and 0 respectively

Page 8-31:
R-103 - All Symbol Desig. - Delete R-501 and R-922
Change Total No. per Equip. for AN/URA-6 to 4 and AN/URA-7 to 0

R-106 - Desc. - Change 2700 ohms to "1200 ohms"
Change JAN Type No. to - RC20BF122K
Change Standard Navy Stock No. to - N16-R-49940-811
Change Dwg. No. to - A-8897969-63
All Symbol Desig. - Add R-637
Change Total No. per Equip. to - 2, 5, and 3 respectively

Page 8-31 (continued):
Add R-112* - Desc. - RESISTOR, FIXED: comp; 68,000 ohms p/m 10%, 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN color code; spec JAN-R-11
Function - V-102 Cathode Compensation
JAN Type No. - RC20BF683K
Standard Navy Stock No. - N16-R-50552-811
Dwg. No. - A-8897969-84
All Symbol Desig. - R-112, R-310, R-641
Total No. per Equip. - 3, 7, and 7 respectively

Page 8-33:
R-310 - Change Desc. to - Same as R-112
After the Function column - Delete all information in subsequent columns

R-313 - Change Standard Navy Stock No. to - N16-R-50894-811

Page 8-38:
R-637 - Change Desc. to - Same as R-106
After the Function column - Delete all information in subsequent columns

R-641 - Change Desc. to - Same as R-112

Page 8-43:
R-921* - Desc. - Change 4700 ohms to "68,000 ohms"
Change Function to - M-1601 Series
Change JAN Type No. to - RC20BF683J
Delete Standard Navy Stock No.
Change Dwg. No. to - A-8897969-203
All Symbol Desig. - Delete R-930 and add R-922

R-922 - Change Desc. to - Same as R-921

Page 8-44:
R-939* - Change Desc. to - RESISTOR, FIXED: comp; 4700 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN color code; spec JAN-R-11
Add JAN type No. - RC20BF472J
Add Standard Navy Stock No. - N16-R-50128-431
Add Dwg. No. - A-8897969-175
All Symbol Desig. - Add R-939
Total No. per Equip. - Add 0, 1, and 1 respectively

Page 8-44 (continued):

R-945* - Desc. - Change 47 ohms to "680 ohms"
Change Function to - M-1601 Shunt
Change JAN Type No. to - RC20BF681J
Delete Standard Navy Stock No.
Change Dwg. No. to - A-8897969-155

R-946 - Change Function to - M-1601 Shunt

TABLE 8-5. CROSS REFERENCE PARTS LIST

Page 8-60:

Change the 3rd column heading to - JAN (OR AWS) DESIGNATION, also, the 5th column (1st heading) to - JAN (OR AWS) DESIGNATION
Change Key Symbol R-637 to R-106
Delete JAN Type RC20BF272K and Key Symbol R-106
Change Key Symbol R-921 to R-939
After Key Symbol R-806 - Add JAN Type RC20BF681J, Key Symbol R-945
After Key Symbol R-305 - Add JAN Type RC20BF683J, Key Symbol R-921
Change Key Symbol R-310 to R-112

Page 8-61:

Delete Standard Navy Stock No. N16-R-49426-631 and Key Symbol R-945
Change Key Symbol R-637 to R-106
Delete Standard Navy Stock No. N16-R-50039-811 and Key Symbol R-106
Change Key Symbol R-921 to R-939
Change Key Symbol R-310 to R-112

RESTRICTED

Temporary Correction to
RCA IB-38482-WXY-1
Frequency Shift Converter-
Comparator Groups AN/URA-6
AN/URA-7 and Frequency Shift
Converter CV-57/URR

16 October 1950
Temporary Correction T-2
to Instruction Book for
Frequency Shift Converter-Comparator
Groups AN/URA-6, AN/URA-7, and
Frequency Shift Converter CV-57/URR
NAVSHIPS 91355

SPECIAL NOTICE FOR NAVSHIPS 91355 REGARDING PANORAMIC COUPLING KIT TYPE CRV-10563-B

This instruction book for Frequency Shift Converter-Comparator Groups AN/URA-6 and AN/URA-7 and Frequency Shift Converter CV-57/URR, NAVSHIPS 91355, is supplied in lieu of a separate book for Panoramic Coupling Kit, Type CRV-10563-B.

Information on Panoramic Coupling Kit, Type CRV-10563-B is included on pages 1-9, 1-10, 2-10, 3-1, and 7-11 and illustrated on Figures 1-1c, 3-1 to 3-9 inclusive, 7-40 and 7-41.

Methods for modifying RBB, RBC, and RDM equipments for use with Frequency Shift Converter CV-57/URR and Frequency Shift Converter-Comparator Group AN/URA-6 are covered in this book. However the Panoramic Coupling Kit, Type CRV-10563-B may also be used for other applications. In each case refer to the instruction book for the particular equipment concerned.

TABLE 8-4

Page 8-3
C-104 - Add Standard Navy Stock No. - N16-C-29128-2546

Page 8-4
C-119 - Change Desc. to - .... temp coef -220 mmf/mf °C; .... case 0.875" max lg ....
Change Dwg. No. to - A-8830139-3

Page 8-5
C-204 - Add Standard Navy Stock No. - N16-C-29602-9746
Change equipment and stock spare quantities for AN/URA-7 to 1 and 2 respectively.

RADIO CORPORATION OF AMERICA - RCA VICTOR DIVISION
Camden, New Jersey, U. S. A.

Page 8-6
C-219 - Add Standard Navy Stock No. - N16-C-17742-1841

Page 8-16
E-606 - Add Standard Navy Stock No. - N17-B-78083-1401

Page 8-20
H-1102 - Add Standard Navy Stock No. - N41-W-2445-6

Page 8-23
J-1401 - Add Standard Navy Stock No. - N17-J-39108-2701

Page 8-25
M-1401 - Change Standard Navy Stock No. to N17-M-19051-9600

Page 8-43
R-923 - Add Standard Navy Stock No. - N16-R-87680-9449

TABLE 8-5. CROSS REFERENCE PARTS LIST

Page 8-61
Key Symbol M-1601 - Change Standard Navy Stock No. to - N17-M-19051-9600

After Key Symbol W-1401 - Add Standard Navy Stock No. - N41-W-2445-6, Key Symbol H-1102

25 SEPTEMBER 1950

Temporary Correction to
RCA IB-38482-WXY-1
Frequency Shift Converter-
Comparator Groups AN/URA-6,
AN/URA-7 and Frequency Shift
CONVERTER CV-57/URR

Temporary Correction T1 to
Instruction Book for Frequency
Shift Converter-Comparator
Groups AN/URA-6, AN/URA-7 and
Frequency Shift Converter CV-57/URR
NAVSHIPS 91355

TABLE 8-4

Page 8-24

L-1101 - Change Desc. to - ... shielded; inductance 5.3 mh, 1060
Add Standard Navy Stock No. - N16-C-76763-2803

Page 8-25

L-1102 - Add Standard Navy Stock No. - N16-C-76666-4963

Page 8-48

T-101 - Change Desc. to - Coil, RF; osc; 1 wnd, 2 pie universal wnd; rectangular, aluminum shield can; 91 turns/pie; total turns 182 w/ taps at 16th turn and 45th turn; 3-23/64" lg max x 29/32" sq less mtg attachments ; o/a lg 4-1/64" max; phenolic coil ... #4-40 X 15/64" lg located one ea ...

Add Standard Navy Stock No. - N16-C-76504-4569

Page 8-50

T-601 - Change Standard Navy Stock No. to - N17-T-62664-5501

Page 8-56

X-702 - Change Desc. to - ... wire leads; 1-7/8" diam socket; beryllium copper silver ....
Change Standard Navy Stock no. to - N16-S-64286-3950

TABLE 8-5. CROSS REFERENCE PARTS LIST

Page 8-60

After Key Symbol L-501 - Add Standard Navy Stock No. - N16-C-76504-4569, Key Symbol T-101

After Key Symbol T-201 - Add Standard Navy Stock No. - N16-C-76666-4963, Key Symbol L-1102 and Standard Navy Stock No. -N16-C-76763-2803, Key Symbol L-1101

Page 8-61

After Key Symbol X-601 - Add Standard Navy Stock No. -N16-S-64286-3950, Key Symbol X-702

After Key Symbol E-1401, Add Standard Navy Stock No. - N17-T-62664-5501, Key Symbol T-601

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
Code 993-100
6 August 1950

From: Chief, Bureau of Ships
To: All Activities concerned with the Installation, Operation and Maintenance of the Subject Equipment.

Subj: Instruction Book for Frequency Shift Converter-Comparator Groups AN/URA-6 and AN/URA-7 and Frequency Shift Converter CV-57/URR, NAVSHIPS 91355.

1. NAVSHIPS 91355 is the instruction book for the subject equipment and is in effect upon receipt.

2. NAVSHIPS 91355 is a RESTRICTED, non-registered publication and shall be handled, transported and safeguarded in accordance with U. S. Navy Regulations. When superseded by a later edition, this publication shall be destroyed.

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D. H. CLARK
Chief of Bureau

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTION

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

SECTION 7—CORRECTIVE MAINTENANCE

SECTION 8—PARTS LIST

INDEX

LIST OF ILLUSTRATIONS

SECTION 1—GENERAL DESCRIPTION

SECTION 2—THEORY OF OPERATION

SECTION 3—INSTALLATION

LIST OF ILLUSTRATIONS (continued)

*Also in envelope at back of book.

LIST OF TABLES

GUARANTEE

The equipment, including all parts and spare parts, except vacuum tubes, batteries, rubber and material normally consumed in operation, is guaranteed for a period of one year from the date of delivery of the equipment to and acceptance by the Government with the understanding that all such items found to be defective as to material, workmanship or manufacture will be repaired or replaced, f.o.b. any point within the continental limits of the United States designated by the Government, without delay and at no expense to the Government; provided that such guarantee will not obligate the Contractor to make repair or replacement of any such defective items unless the defect appears within the aforementioned period and the Contractor is notified thereof in writing within a reasonable time and the defect is not the result of normal expected shelf life deterioration.

To the extent the equipment, including all parts and spare parts, as defined above, is of the Contractor's design or is of a design selected by the Contractor, it is also guaranteed, subject to the foregoing conditions, against defects in design with the understanding that if ten percent (10%) or more of any such said item, but not less than two of any such item, of the total quantity comprising such item furnished under the contract, are found to be defective as to design, such item will be conclusively presumed to be of defective design and subject to one hundred percent (100%) correction or replacement by a suitably redesigned item.

All such defective items will be subject to ultimate return to the Contractor. In view of the fact that normal activities of the Naval Service may result in the use of equipment in such remote portions of the world or under such conditions as to preclude the return of the defective items for repair or replacement without jeopardizing the integrity of Navy communications, the exigencies of the Service, therefore, may necessitate expeditious repair of such items in order to prevent extended interruption of communications. In such cases the return of the defective items for examination by the Contractor prior to repair or replacement will not be mandatory. The report of a responsible authority including details of the conditions surrounding the failure, will be acceptable as a basis for affecting expeditious adjustment under the provisions of this contractural guarantee.

The above one year period will not include any portion of time the equipment fails to perform satisfactorily due to any defects, and any items repaired or replaced by the Contractor will be guaranteed anew under this provision.

INSTALLATION RECORD

Contract Number NObsr-39421 Date of Contract, 30 June 1947

Serial Number of equipment .....

Date of acceptance by the Navy .....

Date of delivery to contract destination .....

Date of completion of installation .....

Date placed in service .....

Blank spaces on this page shall be filled in at time of installation. Operating personnel shall also mark the "date placed in service" on the date of acceptance plate located below the model nameplate on the equipment, using suitable methods and care to avoid damaging the equipment.

REPORT OF FAILURE

Report of failure of any part of this equipment, during its entire service life, shall be made to the Bureau of Ships in accordance with current regulations using form NAVSHIPS NBS 383 (revised). The report shall cover all details of the failure and give the date of installation of the equipment. For procedure in reporting failures see Chapter 67 of the Bureau of Ships Manual or superseding instructions.

ORDERING PARTS

All requests or requisitions for replacement material should include the following data:

1. Federal stock number or, when ordering from a Marine Corps or Signal Corps supply depot, the Signal Corps stock number.
2. Name and short description of part.

If the appropriate stock number is not available the following shall be specified:

1. Equipment model or type designation, circuit symbol, and item number.
2. Name of part and complete description.
3. Manufacturer's designation.
4. Contractor's drawing and part number.
5. JAN or Navy type number.

DESTRUCTION OF ABANDONED MATERIAL IN THE COMBAT ZONE

In case it should become necessary to prevent the capture of this equipment, and when ordered to do so, DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED, OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

Means:

1. Explosives, when provided.
2. Hammers, axes, sledges, machetes, or whatever heavy object is readily available.
3. Burning by means of incendiaries such as gasoline, oil, paper or wood.
4. Grenades and shots from available firearms.
5. Burying all debris, where possible and when time permits.
6. Throwing overboard or disposing of in streams or other bodies of water.

Procedure:

1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch and instrument boards.
3. Destroy all controls, switches, relays, connections and meters.
4. Rip out all wiring and cut interconnections of electrical equipment. Smash gas, oil, and water cooling system, in gas engine generators, etc.
5. Smash every electrical or mechanical part, whether rotating, moving or fixed.
6. Break up all operating instruments such as keys, phones, microphones, etc.
7. Destroy all classes of carrying cases, straps, containers, etc.
8. Bury or scatter all debris.

DESTROY EVERYTHING!

SAFETY NOTICE

The attention of officers and operating personnel is directed to Chapter 67 of the *Bureau of Ships Manual* or superseding instructions on the subject of radio safety precautions to be observed.

This equipment employs voltages which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working with the equipment.

While every practicable safety precaution has been incorporated in this equipment, the following rules must be strictly observed:

KEEP AWAY FROM LIVE CIRCUITS:

Operating personnel must at all time observe all safety regulations. Do not change tubes or make adjustments inside equipment with high voltage supply on. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors. To avoid casualties always remove power and discharge and ground circuits prior to touching them.

DON'T SERVICE OR ADJUST ALONE:

Under no circumstances should any person reach within or enter the enclosure for the purpose of servicing or adjusting the equipment without the immediate presence or assistance of another person capable of rendering aid.

DON'T TAMPER WITH INTERLOCKS:

Do not depend upon door switches or interlocks for protection but always shut down motor generators or other power equipment. Under no circumstances should any access gate, door, or safety interlock switch be removed, short-circuited, or tampered with in any way, by other than authorized maintenance personnel, nor should reliance be placed upon the interlock switches for removing voltages from the equipment.

RESUSCITATION

AN APPROVED POSTER ILLUSTRATING THE RULES FOR RESUSCITATION BY THE PRONE PRESSURE METHOD SHALL BE PROMINENTLY DISPLAYED IN EACH RADIO, RADAR, OR SONAR ENCLOSURE. POSTERS MAY BE OBTAINED UPON REQUEST TO THE BUREAU OF MEDICINE AND SURGERY.

WARNING

Voltages over 300 volts shall be measured as follows:

(1) De-energize the equipment. Ground terminals to be measured to ground to discharge any capacitors connected to these terminals. (See Note F)

(2) Connect meter to terminals to be measured using a range higher than the expected voltage.

(3) WITHOUT TOUCHING METER OR TEST LEADS, energize the equipment and read the meter.

(4) De-energize the equipment. Ground the terminals connected to the meter to ground before disconnecting meter.

NOTES:

(A) MAKE SURE you are NOT GROUNDED whenever you are adjusting equipment or using measuring equipment.

(B) In general, USE ONE HAND only when servicing live equipment.

(C) If test meter must be held or adjusted while voltage is applied GROUND the case of the meter before starting measurement and DO NOT touch the live equipment or personnel working on live equipment while you are holding the meter. Some moving vane type meters should not be grounded. These should not be held during measurements.

(D) DO NOT FORGET that high voltages MAY BE PRESENT across terminals that are nominally low voltage, due to equipment breakdown. Be careful even when measuring low voltages.

(E) DO NOT use test equipment known to be in poor condition.

(F) High voltage high capacity capacitors should be discharged with a grounding stick with approximately 10 ohms in series with the grounded line. Where neither terminal of a capacitor is grounded, short capacitor terminals to each other.

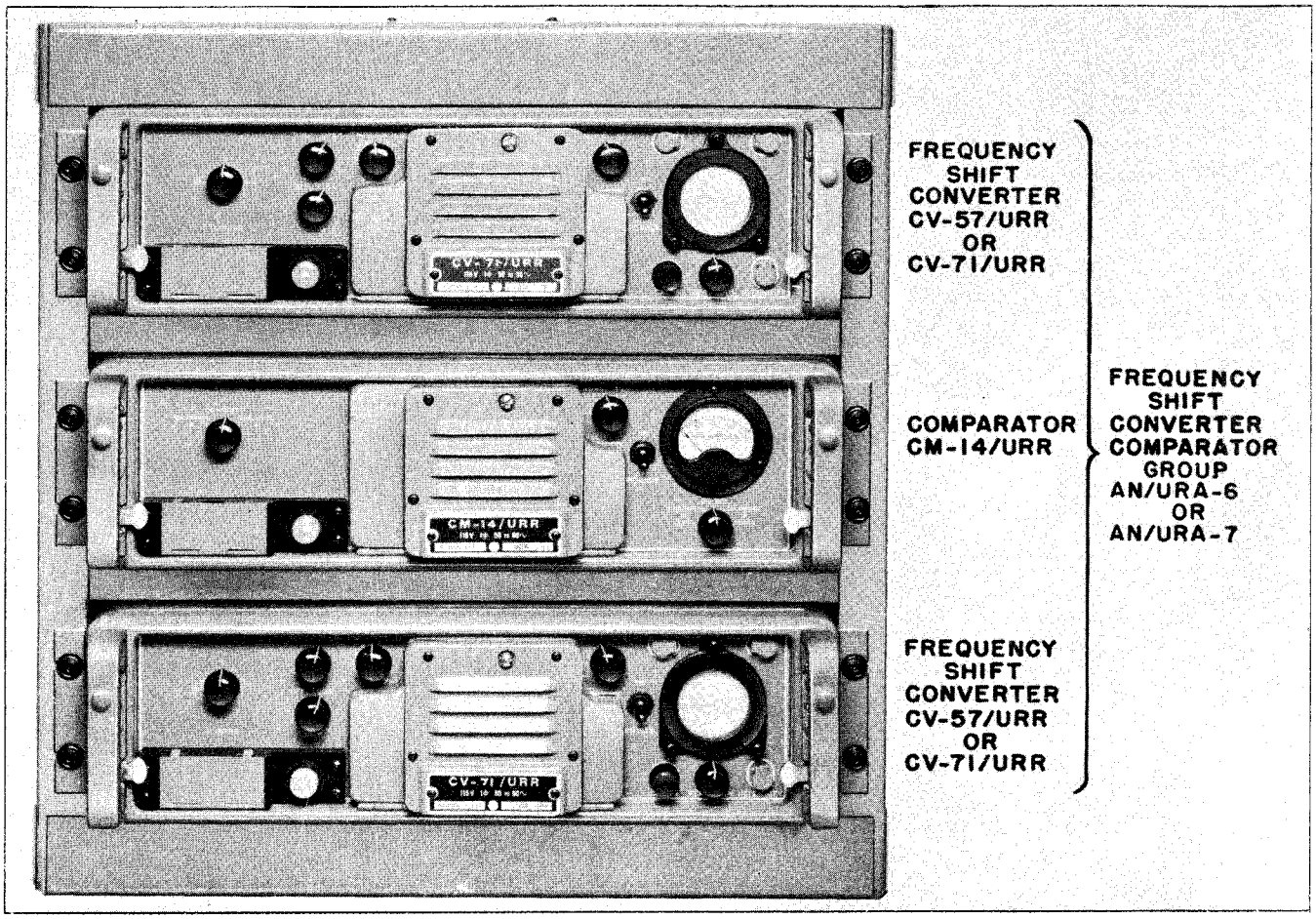

Figure 1—1a. Frequency Shift Converter-Comparator Group AN/URA-6 or AN/URA-7

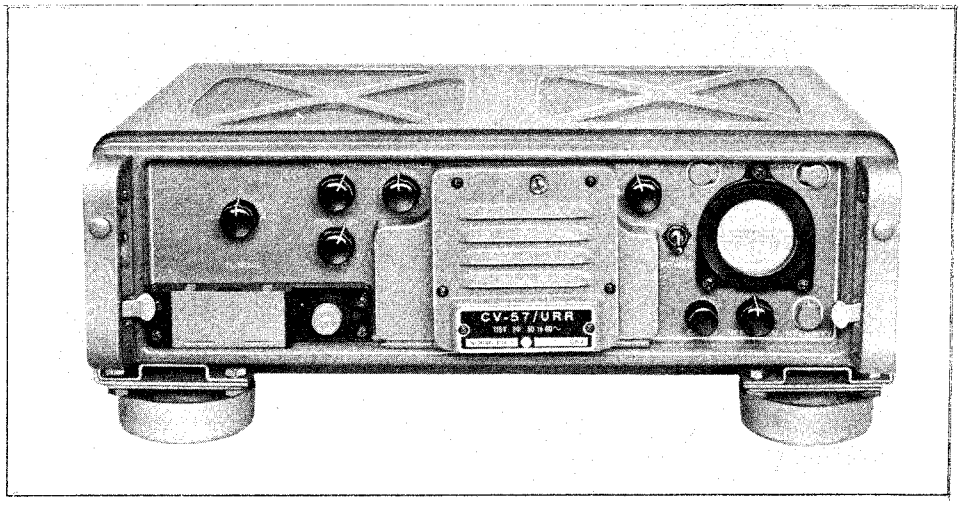

Figure 1—1b. Frequency Shift Converter CV-57/URR

SECTION 1

GENERAL DESCRIPTION

1. SCOPE OF THIS BOOK.

This book covers Frequency Shift Converter CV–57/URR (395-470 kc type, single channel), and Frequency Shift Converter-Comparator Groups AN/URA–6 (395-470 kc type, dual channel) and AN/URA–7 (50-kc type, dual channel). It includes description, theory, installation, operation, maintenance, and parts lists. Refer to Tables at the end of this section for a listing of items included in the above major equipments.

2. PURPOSE AND BASIC PRINCIPLES.

These equipments are designed to operate on frequency shift keyed radio telegraph signals, as derived from the intermediate-frequency circuits of communication receiving equipments, to provide keying facilities for the operation of teletype printers or other similar automatic recording devices.

To achieve the above purpose the signals are filtered to remove all frequencies except those necessary for a good signal, amplified to a level above the saturation point of a limiter, and passed through a discriminator to obtain positive and negative pulses. These pulses are filtered and used to trigger a double Eccles-Jordan flip-flop circuit to operate d-c keying tubes which key the teletypewriter loop. A d-c pulse, identical with the d-c pulses appearing in the teletypewriter loop, in addition keys an internal tone for transmission to a remote point.

In each of the AN/URA–6 and AN/URA–7 equipments two receiving channels are used in a diversity arrangement, and a Comparator (CM–14/-URR) selects the stronger signal to control the teletypewriter loop and the keyed tone. Each channel can be used independently in separate circuits, no diversity being then utilized. The CV–57/URR operates on one channel only.

3. DESCRIPTION OF UNITS.

a. FREQUENCY SHIFT CONVERTER CV–57/-URR.—See Figure 1–1b. Frequency Shift Converter CV–57/URR may be used either alone or as a component of the Frequency Shift Converter-Comparator Group AN/URA–6. It is housed in a case 5-1/8 inches high, 17-5/16 inches wide, and 11-13/16 inches deep. The unit is finished in smooth grey enamel. Removable brackets with shock mounts are supplied for table mounting; when so mounted the overall height is 7-1/8 inches. Brackets are supplied for standard relay rack installation without the shock mounting feature (See Figure 1–2). The chassis slides completely out of the cabinet, on rails, and can be placed in one of several positions to facilitate servicing (see Figure 7–1). The front panel controls

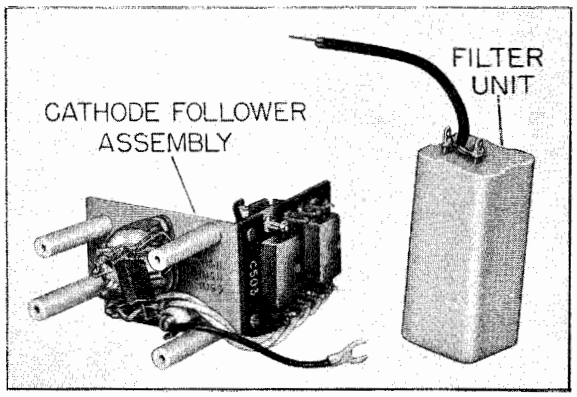

Figure 1–1c. Receiver Coupling Kit Type 10563

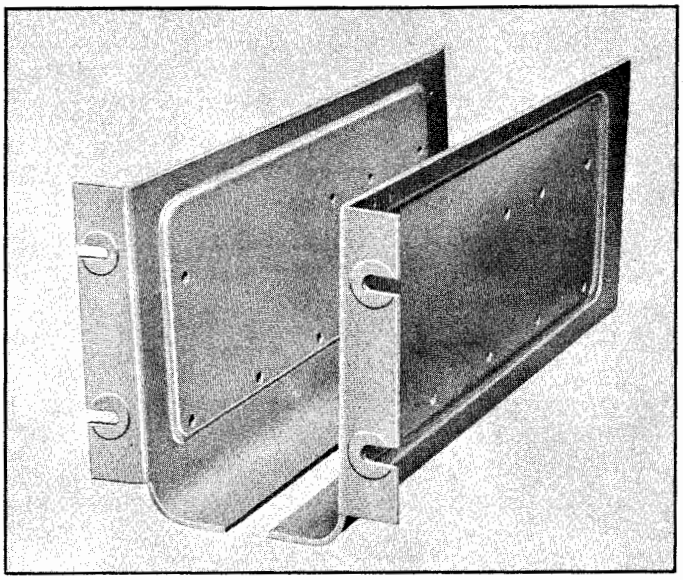

Figure 1–2. Gusset, Rack Mounts for Frequency Shift Converter CV-57/URR

which do not normally need frequent attention are located behind a cover (containing an air filter) in the center of the panel. Screwdriver-operated controls are mounted behind oilcup-type hole covers. Jacks are provided, under a spring cover, on the lower left corner for checking the tone and teletypewriter outputs (See Figure 4–1). Power-line fuses are located on the filter unit attached to the rear of the cabinet and are accessible only from within the cabinet (see Figure 5–1).

Frequency Shift Converter CV–57/URR includes the following units, which are described below (see Figure 1–4). Mention is also made of Frequency Shift Converter CV–71/URR which differs from the CV–57/URR in that it operates at 50-kc input frequency and is supplied only as a part of Frequency Shift Converter-Comparator Group AN/URA–7.

UNIT NAME	SYMBOL SERIES
Converter Chassis	1400
Cable Filter Unit	1100
Input Unit (for CV-57/URR)	100
Input Unit (for CV-71/URR)	200
I-F Unit	300
Keyer Unit	600
Tuning Monitor Unit	700
Power Supply Unit	800
Jumper Cable	W1402

(1) CONVERTER CHASSIS (see Figure 1–4). —The Converter Chassis supports all the Frequency Shift Converter units except the Cable Filter Unit which is mounted on the back of the case. The units are interconnected by plugs and jacks when inserted in place. A plug, P1401, on the rear of the Converter chassis connects this chassis to jack J1101 on the Cable Filter Unit when in operating position. For servicing, the chassis can be slid out of the cabinet and locked in any one of four positions while still supported by cabinet rails. A jumper cable is provided for connecting the chassis (see Figure 3–15) with the Cable Filter Unit when the chassis is withdrawn from the cabinet. An air filter, in the center of the panel, covers the controls requiring only occasional adjustment, but makes them readily accessible by a half-turn screw holding the cover against the panel. Two jacks, TTYP and PHONES, are located on the bottom left of the panel, protected by a cover. To the right of these jacks is the neon lamp B+ indicator. The POWER OFF-ON switch is located to the right center of the air filter.

(2) CABLE FILTER UNIT (for CV–57/URR). —See Figure 7–2. All external connections to the equipment are made through the Cable Filter Unit. Filtering is provided for the power lines, teletypewriter output circuit, tone output circuits, and cathode-ray tube remote vertical circuit. The Cable Filter Unit and Converter Chassis are interconnected automatically when the Converter Chassis is pushed in place. The entire filter assembly is fastened to the rear of the cabinet by eight screws accessible from the inside of the cabinet (see Figure 5–1).

Looking in the front of the cabinet, the items of the Cable Filter Unit are arranged from left to right as follows: fuses, Allen wrenches, fan, and spare fuses. Below the spare fuses is a jack, J1101, through which all connections between the Converter Chassis and the Cable Filter Unit are made. The fuses can only be replaced after sliding the Converter Chassis out of the case.

The housing is in the shape of a triangle with the apex toward the rear. On the lower side of the triangle are mounted all jacks for external connections. A removable cover, held in place by five half-turn screws, forms the top of the assembly, making all internal connections and parts available for repair or replacement (see Figure 3–10).

(3) INPUT UNIT FOR CV–57/URR.—The Input Unit for the CV–57/URR Converter converts the receiver intermediate frequency of 395-470 kilocycles to a frequency of 40 kilocycles for the I-F Unit. Three tubes are used, an oscillator, an automatic frequency control tube, and a converter. The unit is located on the left front of the Converter Chassis and is tunable over the range of 395 to 470 kilocycles to match the receiver with which it operates.

The unit (see Figures 7–11, 7–12) is supported in the Converter Chassis by its front and rear flanges and held in place by captive screws, two on the back flange and one on the front flange. The front and rear brackets extend upward to protect the unit and serve as handles for lifting the unit into and out of the Converter Chassis. The single tuning control and a fixed capacitor (C108) are located on the front bracket. The tuning capacitor couples to the panel knob shaft by a mechanical coupler when the unit is mounted in place.

The location of the various parts on the bottom is as follows, looking at the unit with the bottom turned upward. At the front, extending crosswise is the connecting plug P101. On the left side, from front to rear, are tube socket X103, capacitors C118 and C115 (C118 is on the left), transformers T103 and T102. On the right side are a feed-through terminal E102, tube socket X101, capacitor C102, transformer T101, tube socket X102, and capacitors C110 and C101. Capacitor C110 is on the right. Extending along the center from P101 to the rear of the chassis is terminal board E101. Capacitor C120 is near the rear of the terminal board.

(4) INPUT UNIT FOR CV–71/URR.—This Input Unit is a part of Frequency Shift Converter CV–71/URR which is supplied as a component of the Frequency Shift Converter-Comparator Group AN/-URA–7. It converts the intermediate frequency of the associated receiver from 47.5–52.5 kilocycles to a 40-kilocycle frequency for the I-F Amplifier Unit.

The unit (see Figures 7–11, 7–12) is essentially similar in construction to the Input Unit described above. Its components are designated by symbols in the 200-series.

(5) I-F UNIT.—The I-F Unit has one stage of intermediate-frequency amplification, a limiter stage, and a discriminator stage. One signal input is required and four signal outputs are provided, a diversity control signal, an automatic frequency control signal (AFC), the Tuning Monitor and remote tuning monitor signal, and the output signal to the keyer. Three switches and one potentiometer make up the controls, which are all adjustable from the front panel.

The I-F Unit (see Figures 7–13, 7–14) is mounted on the Converter Chassis, between the Keyer Unit and Input Unit, by its front and rear flanges. It is secured in place by one captive screw through the front flange and two captive screws through the rear flange. The front and rear brackets extend upward to form handles for lifting the unit into and out of the main chassis. All controls are mounted on the front bracket and couple to the knob shafts when the unit is mounted in place, provided the driving pins are properly aligned. Facing the rear of the

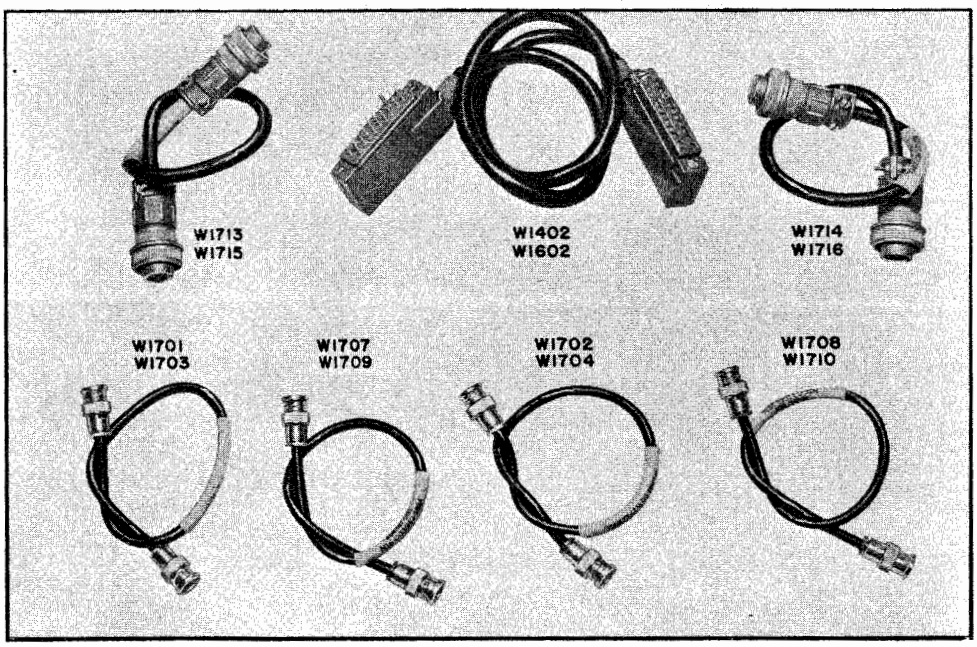

Figure 1–3. Cables for AN/URA-6, AN/URA-7, and CV-57/URR Equipments

front bracket the TUNE-OPERATE switch, S302, is at the top right, with the AFC ON-OFF switch, S303, located below. At the top left is the THRESHOLD control R318. Below the THRESHOLD control is the NARROW-WIDE switch S301.

On the bottom front center of the chassis is located the connecting plug P301. On the left side, from front to rear, are tube socket X303, transformer T304, tube socket X302, and transformer T303. On the right side, from front to rear, are transformer T301, capacitor C318, transformer T302, and tube socket X301. Two terminal boards, mounted back to back, extend from the center of plug (P301) to the rear of the chassis. Terminal board E302 is to the left and terminal board E301 is to the right. Switch S301 extends above the chassis in line with the two terminal boards. Various mica capacitors are supported by clips underneath the chassis.

(6) KEYER UNIT.—The Keyer Unit is supplied with d-c signal pulses from the I-F Unit. These pulses serve to control the electronic keying tubes to key the external teletypewriter loop. The unit also supplies an on-off tone signal of adjustable level and frequency for remote teletypewriter operation and monitoring purposes.

One Keyer Unit (see Figures 7–9 and 7–10) is mounted at the front center of the Converter Chassis and a similar unit is mounted on the Comparator Chassis; each Keyer Unit is held in place by three captive screws, two at the rear and one at the front. Brackets at the front and rear serve as handles for lifting the unit into and out of the chassis. The front bracket is also the mounting for all the controls of the unit. On the bottom front center is located the connecting plug P601. On the right-hand side of the plug is terminal board E602 and on the left-hand side is terminal board E601. To the rear of the plug is a row of capacitors, C603, C616, C615, and C601 from left to right, and four tube sockets, X601, X606, X602, and X603, to the rear of the capacitors. In back of the tube sockets are terminal boards E605 and E604, mounted over the terminals of Z601 and L601. Transformer T601 is to the right. To the rear of the items just mentioned are four tube sockets, X607, X608, X604, and X605, and four capacitors, C617, C618, C606, and C602. Terminal board E603 is fastened to the rear bracket. The rear bracket also mounts a toggle switch, S604.

Mounted on the front bracket are the following controls: S601, S602, S603, R613, R629, and R633. Looking at the top right of the rear of the front

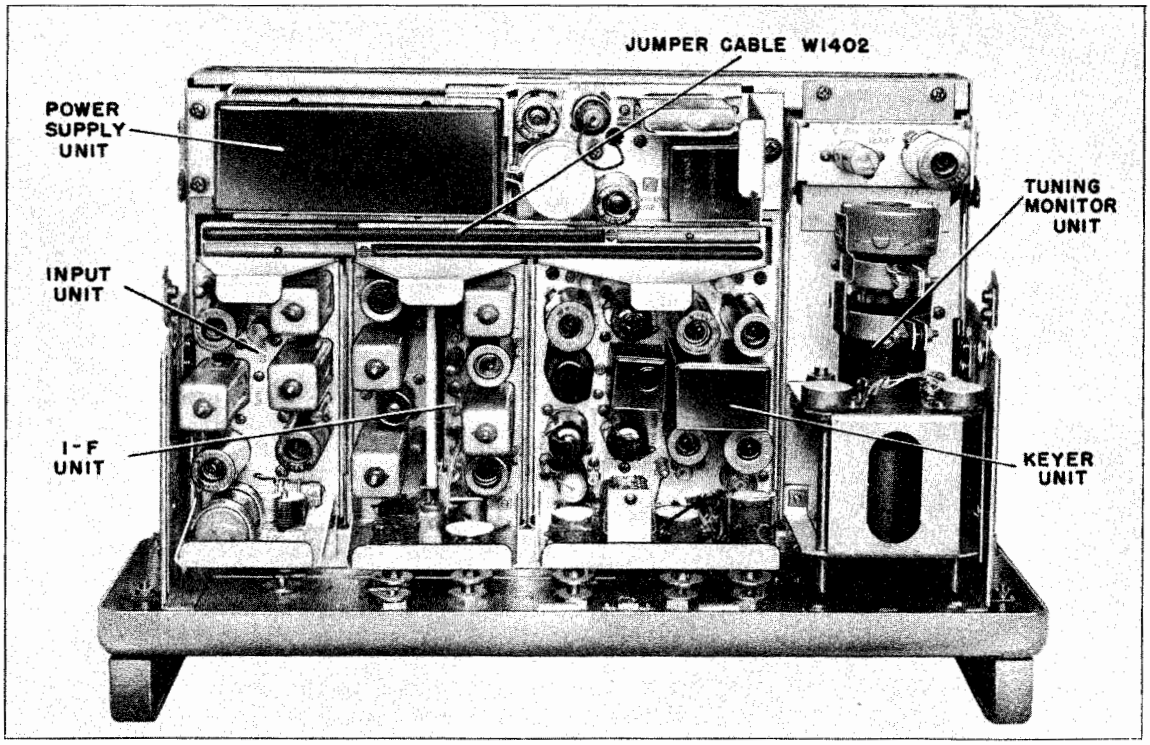

Figure 1–4. Frequency Shift Converter CV-57/URR or CV-71/URR, Top View

bracket is the TONE FREQ switch, S602, with the TONE LEVEL control, R629, located below. To the left is the terminal board E608, mounting the tone oscillator tuning capacitors C607 to C614 inclusive. To the top left of E608 is the SPEED (LOW-HI-ADJ) switch, S601, with the MOD BAL control, R633, below. On the extreme left is the NORM-REV switch, S603A,B, above the %MARK control, R613. The controls S601, S602, S603, and R629 couple to the panel knobs by means of mechanical couplers. Controls R633 and R613 are screwdriver-adjusted through the front panel.

(7) TUNING MONITOR UNIT (see Figures 7–7 and 7–8).—The Tuning Monitor is supplied with d-c pulses from the I-F Unit discriminator to indicate proper tuning of the receiver. When the CAL IN button is depressed the proper setting of the THRESHOLD control can be observed.

The Tuning Monitor Unit is fastened to the right side of the Converter Chassis by four captive screws, two at the front and two at the rear. Connections are made by a plug and jack when the unit is placed in position. All the controls, except the Vertical Linearity control, are on the front panel.

The chassis is formed from aluminum with a vertical crosswise bracket supporting the cathode-ray tube shield and three controls, CENT, R702, Vertical Linearity, R705, and FOCUS, R715. Clamped to the tube shield are the tube and socket clamp for the JAN–2BP1. A shelf, at the rear of the chassis, supports a capacitor, C701, and a tube socket, X701, with its shield. On the bottom of the chassis are the connecting plug, P701, a terminal board, E701, for resistors and small capacitors, and a bracket mounting controls VERT GAIN, R701, INTENSITY, R713, and CAL IN switch, S701.

The control shafts of R701 and S701 connect or disconnect with the panel knob shafts by means of mechanical couplings on removal or replacement of the unit. Controls R702, R713, and R715 are screwdriver-adjusted and are accessible through spring covers on the top of the front panel. Access to R705 can only be had by withdrawing the chassis from the case.

(8) POWER SUPPLY UNIT (for CV–57/URR or CV–71/URR).—See Figures 7–3 and 7–4. The Power Supply Unit supplies power to all the units assembled on the Converter Chassis. This Unit has no controls and is readily changed by unscrewing four captive screws and lifting from position. All connections are made by a single plug, P801.

The chassis is formed from aluminum; flanges at both ends support it on the Converter Chassis (looking from the front of the converter Chassis with the Power Supply Unit in its operating position). The right-hand flange has one captive screw and the left-hand flange has two captive screws. A fourth captive screw is located beside socket X801. These screws hold the unit in place on the Converter Chassis. The power transformer, T801, is mounted

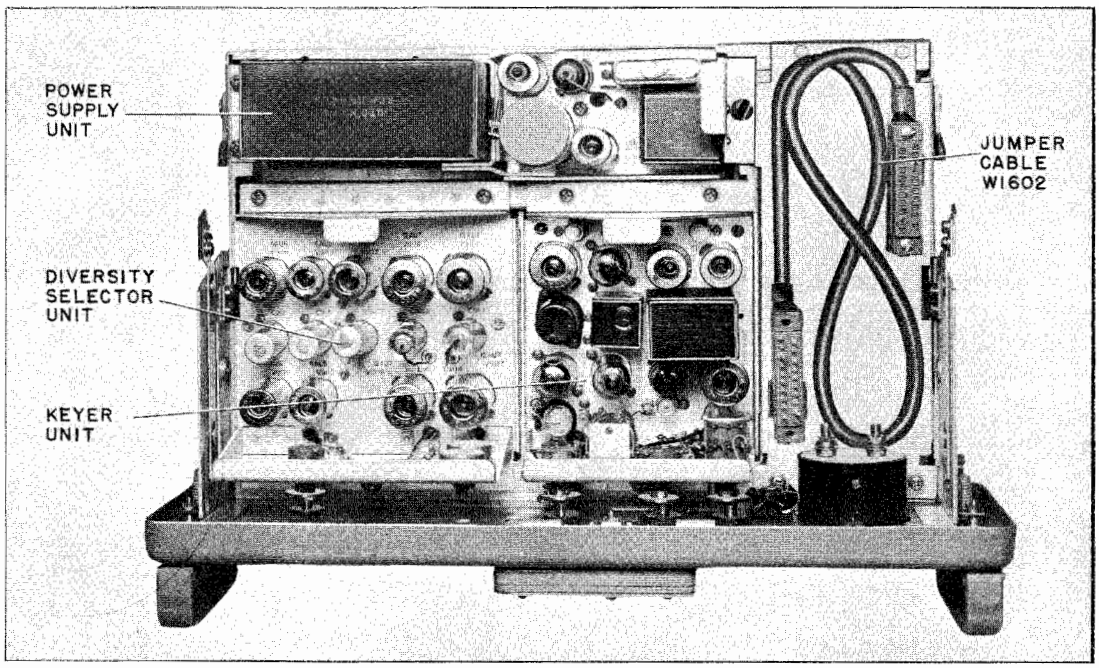

Figure 1–5. Comparator CM-14/URR, Chassis Top View

on the left side of the chassis and the remaining components are grouped on the right side. Capacitor C802A,B is mounted by an octal socket, X804, with a screw-adjusted clamp to hold it in place.

Filter Choke L801 and capacitor C801A,B,C are on the top of the chassis with their terminals passing through the chassis for wiring convenience. A bracket, on the right-hand side of the chassis, and the power transformer provide means of lifting the unit into and out of the Converter Chassis. Four tube sockets are mounted in the chassis, X801 through X804, three for the tubes and one for the filter capacitor C802A, B. Under the chassis is a terminal board, E801, and the connecting plug P801.

b. FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA–6 AND AN/URA–7.—The Frequency Shift Converter-Comparator Groups AN/URA–6 and AN/URA–7 differ only in the Converters supplied. The AN/URA–6 Group is supplied with two CV–57/URR Converters while the AN/URA–7 Group is supplied with two CV–71/URR Converters. The Converters, in turn, differ only in their Input Units: The CV–57/URR Converter operates on a 395- to 470-kc input signal and its Input Unit is identified by component symbols in the 100 series; the CV–71/URR Converter operates on a 47.5- to 52.5-kc input signal and its Input Unit is identified by component symbols in the 200 series.

Each Frequency Shift Converter-Comparator Group consists of two Frequency Shift Converter CV–57/URR or CV–71/URR and one Comparator CM–14/URR, all secured in a table-mounting frame (see Figure 1–1a). The units may be removed from this frame and mounted in a standard relay rack. The Converters are connected to separate receivers. The Comparator selects the stronger of the two signals from the Converters to key the teletypewriter loop and the tone signal.

The Comparator differs in appearance from the Frequency Shift Converters in that it has a meter in place of the cathode-ray tube of the Converter units.

The Frequency Shift Converters are described in the preceding paragraph. The Comparator CM–14/-URR will now be described. It is made up of the following units.

UNIT NAME	SYMBOL GROUP
Comparator Chassis	1600
Cable Filter Unit	1300
Diversity Selector Unit	900
Keyer Unit	600
Power Supply Unit	1000
Jumper Cable	W1602

These units are described below, except the Keyer Unit which is identical to the Keyer Unit used in the Converters and was described previously in paragraph 3*a*(6).

(1) COMPARATOR CHASSIS. — See Figure 1–5. The Comparator Chassis supports all the Comparator units except the Cable Filter Unit which is mounted on the back of the case. The units are interconnected by plugs and jacks when inserted in place. A plug, J1601, on the rear of the Comparator Chassis connects the chassis to J1301 on the Cable Filter Unit when in operating position. For servicing, the chassis can be slid out of the cabinet and locked in any one of four positions while still supported by cabinet rails. A jumper cable is provided for connecting the chassis (similar to that shown in Figure 3–15) with the Cable Filter when the chassis is withdrawn from the cabinet. An air filter and cover, in the center of the panel, cover the controls requiring only occasional adjustment, but make them readily accessible by a half-turn screw holding the cover against the panel.

Two jacks, TTYP and PHONES, are located on the bottom left of the panel protected by a cover. To the right of the jacks is the neon lamp B+ indicator. The POWER OFF-ON switch is located to the right center of the air filter.

(2) CABLE FILTER UNIT (for CM–14/URR). —See Figure 7–2. Converter and external connections to the Comparator are made through the Cable Filter Unit. Filtering of the power lines and tone output circuits is provided. Connections between the Cable Filter Unit and Comparator Chassis are made automatically when the Comparator Chassis is pushed in place. The entire filter assembly is fastened to the rear of the cabinet by eight screws accessible from the inside of the cabinet (see Figure 5–2).

The housing is in the shape of a triangle with the apex toward the rear. On the lower side of the triangle are mounted all jacks for external connections. A removable cover, held in place by five half-turn screws, forms the top of the assembly and makes all internal connections and parts available for repair or replacement (see Figure 7–2).

Looking at the front of the cabinet, the items of the Cable Filter Unit are arranged from left to right as follows: fuses, Allen wrenches, fan, and spare fuses. Located below the spare fuses is a jack, J1301, through which all connections between the Comparator Chassis and the Cable Filter Unit are made. The fuses can only be replaced after sliding the chassis out of the case.

(3) DIVERSITY SELECTOR UNIT.—See Figures 7–17 and 7–18. The Diversity Selector Unit

receives the incoming signal being fed into each of the two Converter channels and selects the stronger of the signals to operate a gating circuit. The d-c pulses from the two Converter discriminators are fed into the gating circuit. The discriminator output from the Converter receiving the stronger signal is selected to operate the Comparator Keyer Unit.

The Diversity Selector Unit is supported, by its front and rear flanges, on the left front of the Comparator Chassis. Two captive screws through the rear flange and one captive screw through the front flange hold the unit in place. The front and rear brackets extend upward to make handles for inserting and removing the unit from the Comparator Chassis. The three controls, S901, R905, and R923, are mounted on the front bracket.

Underneath the chassis at the front center is a plug, P901, through which all connections are made. To the left is terminal board E904 and on the right is terminal board E905. To the rear of the plug are four tube sockets, X907, X906, X902, and X901 from left to right. In the center, arranged from left to right, are capacitors C919, C920, C914, C913, and C912. Mounted above the capacitors are terminal boards E902 and E903. Terminal board E906 is mounted on the right-hand side of E902. To the rear of the terminal boards is a row of tube sockets, X905, X904, X903, X909, and X908 from left to right. Mounted on the rear bracket is terminal board E901.

Looking at the right rear of the bracket is the CHANNEL A-COMBINED-CHANNEL B switch, S901. To the top left is the GATE BAL control, R923, with the CONT BAL control, R905, below. The CHANNEL A-COMBINED-CHANNEL B switch couples to the panel knob by means of a mechanical coupler. The GATE BAL and CONT BAL controls are screwdriver adjusted through the front panel.

(4) POWER SUPPLY UNIT (for CM–14/URR). —See Figures 7–5 and 7–6. The Power Supply Unit supplies power to all the units assembled on the Comparator Chassis. This unit has no controls and is readily changed by unscrewing four captive screws and lifting from position. All connections are made by a single plug, P1001.

The chassis is formed from aluminum with flanges at both ends for support on the Comparator Chassis (looking from the front of the chassis with the Power Supply Unit in its operating position). The right- and left-hand flanges have, respectively, one and two captive screws. A fourth captive screw is located beside the socket X1001. These screws hold the unit in place on the Comparator Chassis. The power transformer, T1001, is mounted on the left side of the chassis and the remaining parts are grouped on the right side. Capacitor C1002A,B is mounted by an octal socket, X1004, with a screw-adjusted clamp to hold it in place.

Filter choke L1001 and capacitor C1001A,B,C are mounted on the top of the chassis with their terminals passing through the chassis for wiring convenience. A bracket, fastened to the right side of the chassis, together with the power transformer provide means of lifting the unit into or out of the Comparator Chassis. Four sockets, X1001 through X1004, are mounted in the chassis, three for the tubes and one for the filter capacitor C1002A,B. Under the chassis is located a terminal board, E1001, and the connecting plug P1001.

c. RECEIVER COUPLING KIT, TYPE 10563.— The Receiver Coupling Kit is to be installed in an associated radio receiver (such as Navy Model RBB, RBC, or RDM) to provide for a low-impedance line from the receiver third i-f amplifier plate circuit to the input circuit of the Converter unit. The kit contains two major sub-assemblies, a Cathode-Follower Assembly and a Low-Pass Filter Unit. Figures 7–15 and 7–16 show the physical arrangement of the parts. The circuits are described in Section 2 while installation instructions are given in Section 3. This kit is for use only with Frequency Shift Converter CV–57/URR and Frequency Shift Converter-Comparator Group AN/URA–6, which operate on an input frequency of 395 to 470 kc. It is neither supplied nor intended for use with Frequency Shift Converter-Comparator Group AN/URA–7, which operates on an input frequency of 47.5 to 52.5 kc.

4. REFERENCE DATA.

a. Equipment Designation:

(1) Frequency Shift Converter CV–57/URR (Single Channel, 395 to 470 kc).

(2) Frequency Shift Converter Comparator Group AN/URA–6 (Dual Channel, 395 to 470 kc).

(3) Frequency Shift Converter Comparator Group AN/URA–7 (Dual Channel, 50 kc).

b. Contract Number: NObsr-39421 dated 30 June 1947.

c. Contractor: Radio Corporation of America, RCA Victor Division, Camden, New Jersey, U. S. A.

d. Cognizant Inspector: Inspector of Naval Material, Philadelphia District, Upper Darby, Pa.

e. Number of packages per complete shipment:

(1) CV–57/URR

(2) AN/URA–6

(3) AN/URA–7

f. Total cubical contents (cu. ft.):

CV–57/URR	Crated 6.25	Uncrated 1.5
AN/URA–6	Crated 8.25	Uncrated 5.8
AN/URA–7	Crated 8.25	Uncrated 5.8

(Equipment spare parts included.)

g. Total weights:

CV–57/URR	Crated	Uncrated
AN/URA–6	Crated	Uncrated
AN/URA–7	Crated	Uncrated

(Equipment spare parts included.)

h. Frequency Range: 395 to 470 kc for CV–57/-URR and AN/URA–6. 47.5 to 52.5 kc for AN/-URA–7.

i. Frequency Shift:

(1) Ten to 200 cycles total separation between "MARK" and "SPACE" frequencies for narrow-band operation.

(2) 200 to 1000 cycles total separation between "MARK" and "SPACE" frequencies for wide-band operation.

j. Output:

(1) Electron tube keyer for keying 60-ma teletype loop (loop current must be supplied from external teletype battery or power supply).

(2) Tone signal, 12 milliwatts into 600-ohm load.

(3) Tone signal frequencies, 595, 765, 935, 1105, 1275, 1445, 1615, 1785 cycles per second. Provision is also made for an externally supplied tone frequency for alternative use within the 595-1785-cycle range.

k. Input impedance:

(1) AN/URA–6, 70 ohms unbalanced.

(2) AN/URA–7, 910 ohms unbalanced.

(3) CV–57/URR, 70 ohms unbalanced.

l. Input signal level required: 2500 microvolts to 0.5 volt.

m. Type of signal: Frequency shift keying. Keying speeds up to 100 dot cycles per second, corresponding to four-channel multiplex, 100 words per minute each channel.

n. Power Supply: 105, 115 or 125 volts, 60 cycles, single phase.

o. Power required:

(1) CV–57/URR, 80 watts at 115 volts.

(2) AN/URA–6 or AN/URA–7, 240 watts at 115 volts.

TABLE 1-1. EQUIPMENT SUPPLIED
(SINGLE CHANNEL, FREQUENCY SHIFT CONVERTER CV-57/URR)

QUAN. PER EQUIPMENT	NAME OF UNIT	NAVY TYPE DESIGNATION	OVERALL DIMENSIONS (INCHES)			VOLUME CU. FT.	WEIGHT
			HEIGHT	WIDTH	DEPTH		
1	Frequency Shift Converter (Single Channel) including tubes and external connecting plugs and jumper cable	CV-57/URR	5-1/8*	17-5/16**	15-1/4	1	
2	Instruction Books (IB-38482)	NAVSHIPS 91355					
1	Receiver Coupling Kit	10563					
1	Suitable container, containing: (A) 1 Bracket Assembly, Shock Mount Right Hand (B) 1 Bracket Assembly, Shock Mount Left Hand (C) 1 Gusset, rack mount right hand (D) 1 Gusset, rack mount left hand (E) 1 Channel (F) 4 Shock Mounts (G) 1 Suitable container, containing: (1) 26 screws #8-32 x 3/8 pan head (2) 16 screws 1/4-20 x 1/2 hex head (3) 26 lock washers #8 (4) 16 lock washers 1/4 (5) 16 nuts 1/4-20 (6) 8 washers #8						

* Height 7-1/8″ with shock mounting brackets.
** 19-1/16″ with rack mounting brackets.

TABLE 1-1. EQUIPMENT SUPPLIED (continued)
(DUAL CHANNEL, FREQUENCY SHIFT CONVERTER-COMPARATOR GROUP AN/URA-6)

QUAN. PER EQUIP-MENT	NAME OF UNIT	NAVY TYPE DESIGNATION	OVERALL DIMENSIONS (INCHES)			VOLUME CU. FT.	WEIGHT
			HEIGHT	WIDTH	DEPTH		
1	Frequency Shift Converter-Comparator Group including tubes and external connecting plugs and jumper cable	AN/URA-6	21-3/4	20-1/4	17-5/32	4.16	
2	Receiver Coupling Kits	10563					
2	Cables, Diversity Control, W1703 and W1704						
2	Cables, Diversity Signal, W1709 and W1710						
2	Cables, Power, W1715 and W1716						
2	Instruction Books (IB-38482)	NAVSHIPS 91355					

(DUAL CHANNEL, FREQUENCY SHIFT CONVERTER-COMPARATOR GROUP AN/URA-7)

1	Frequency Shift Converter-Comparator Group including tubes and external connecting plugs and jumper cable	AN/URA-7	21-3/4	20-1/4	17-5/32	4.16	
2	Cables, Diversity Control, W1701 and W1702						
2	Cables, Diversity Signal, W1707 and W1708						
2	Cables, Power, W1713 and W1714						
2	Instruction Books (IB-38482)	NAVSHIPS 91355					

Unless otherwise stated, dimensions are in inches, volume in cubic feet, weight in pounds.

TABLE 1-1. EQUIPMENT SUPPLIED
(RECEIVER COUPLING KIT, NAVY TYPE 10563)

QUAN. PER EQUIP-MENT	ITEM	DESCRIPTION	OVERALL DIMENSIONS (INCHES)			VOLUME CU. FT.	WEIGHT
			HEIGHT	WIDTH	DEPTH		
1	1	Cathode Follower Assembly including one (1) JAN-6AB7 (V501) tube in place	4-1/2	2	3-1/2	0.26	
1	2	Low-pass Filter Unit (L501, L502, C504, C505, C506)	4-1/2	2-1/2	1-1/2		
1	3	Suitable container, containing: (A) 1 can, shield (B) 1 cover, shield can (C) 1 board, insulating (D) 1 receptacle (E) 1 plug (F) 1 adapter, angle (G) 1 spring, grounding (H) 1 cable					
1	4	Suitable container, containing hardware, etc.: (A) 2 screws #6-32 x 3/8 FH (B) 4 screws #6-32 x 3/8 RH (C) 4 screws #4-40 x 7/16 Bind. H. (D) 4 washers, insulated 1/8" ID x 5/16" OD x 1/32" (G) 4 lockwashers #4 (H) 6 lockwashers #6 (I) 2 nuts #6-32 (J) 1 conductor 1-1/2" lg. x 0.40" dia. (K) 1 spaghetti 1" lg. x 0.053" ID					
1	5	Envelope, containing: (A) 2 decalcomanias (J501) (1 spare) (B) 2 decalcomanias (J302) (1 spare)					
1	6	Sheet of 3 Templates for RBB/RBC receivers					

TABLE 1-1. EQUIPMENT SUPPLIED (continued)
(RECEIVER COUPLING KIT, NAVY TYPE 10563) (continued)

QUAN. PER EQUIP-MENT	ITEM	DESCRIPTION	OVERALL DIMENSIONS (INCHES)			VOLUME CU. FT.	WEIGHT
			HEIGHT	WIDTH	DEPTH		
1	7	Suitable container, containing hardware: (A) 2 screws #10-32 x 3/8 RH (B) 3 screws #6-32 x 5/16 RH (C) 2 spacers 0.147" ID x 5/16" OD x 1/16" (D) 2 lockwashers #10 (E) 3 lockwashers #6 (F) 2 nuts #10-32					
1	8	Suitable container, containing: (A) 1 bracket, rear (B) 1 bracket, side					
1	9	Suitable container, containing wire, etc.: (A) 1 cable (1 conductor, shielded and braided) (B) 1 cable (11-1/4" lg. 1 conductor, shielded) (C) 1 sleeving (9" lg. x 0.106" ID)					
1	10	Sheet of Templates for RDM receivers					
1	11	Packing List					

TABLE 1-2. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED
SINGLE CHANNEL, FREQUENCY SHIFT CONVERTER CV-57/URR

QUANTITY PER EQUIPMENT	NAME OF UNIT	NAVY TYPE DESIGNATION	REQUIRED USE	REQUIRED CHARACTERISTICS
1	Radio Receiver	RBB, RBC, or RDM series**	Receiving signal	70 ohms 2500 microvolts to 0.5 volt; 400- to 470-kc intermediate frequency output
1	Teletypewriter and loop power supply		Printing received signal	Standard or high-speed, 60-ma power supply
1	Headset		Monitoring signals	600-ohm impedance
6	Connecting cables, lengths depend on installation:			
	1 Power	MCOS-2	Power line connection	Two wire power
	1 Input	RG-11/U or RG-12/U	Receiver i-f to input	Coaxial, 70 ohms
	1 Teletypewriter	MCOS-2	CV-57/URR to teletypewriter	Shielded single* or two wires
	1 Tone Output (if used)	TTHFWA-1 or RG-108/U	Tone signal to telephone line	Shielded single* or two or three wires
	1 CRT REM VERT (if used)	RG-11/U or RG-12/U	Oscilloscope signal (external)	Shielded single
	1 External Tone Input (if used)	TTHFWA-1 or RG-108/U		
4	Screws for rack mounting or 5/16-18 bolts and flat washers for table top mounting			

* Depends on local system.
** or other receiver having good stability and suitable frequency range.

TABLE 1-2. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED (continued)
DUAL CHANNEL, FREQUENCY SHIFT CONVERTER-COMPARATOR GROUP, AN/URA-6

QUANTITY PER EQUIPMENT	NAME OF UNIT	NAVY TYPE DESIGNATION	REQUIRED USE	REQUIRED CHARACTERISTICS
2	Radio Receivers	RBB, RBC, or RDM series**	Receiving signal	70 ohms 2500 microvolts to 0.5 volt; 400- to 470-kc intermediate frequency output
	Teletypewriter and loop power supply as required.		Printing received signal	Standard or high-speed, 60-ma power supply for each loop
1	Headset		Monitoring signals	600-ohm impedance
	Connecting cables, lengths depend on installation:			
	1 Power	MCOS-2	Power line connection	Two wire power
	2 Input	RG-11/U or RG-12/U	Receiver i-f to input	Coaxial, 70 ohms
	1, 2 or 3 Teletypewriter as required	MCOS-2	AN/URA-6 to teletypewriter	Shielded single* or two wires
	1, 2 or 3 Tone Output as required	TTHFWA-1 or RG-108/U	Tone signal to telephone line	Shielded single* or two or three wires
	2 CRT REM VERT (if used)	RG-11/U or RG-12/U	Oscilloscope signal (external)	Shielded single
	1, 2 or 3 External tone input (if used as required)	TTHFWA-1 or RG-108/U		
4	3/8 bolts with nuts and flat washers for bench mounting			

* Depends on local system.
** or other receiver having good stability and suitable frequency range.

TABLE 1-2. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED
DUAL CHANNEL, FREQUENCY SHIFT CONVERTER-COMPARATOR GROUP AN/URA-7

QUANTITY PER EQUIPMENT	NAME OF UNIT	NAVY TYPE DESIGNATION	REQUIRED USE	REQUIRED CHARACTERISTICS
2	Radio Receivers	RBP or RCP**	Receiving Signals	910 ohms 2500 microvolts to 0.5 volt; 48- to 52-kc output frequency
	Teletypewriter and loop power supply as required.		Printing received signals	Standard or high-speed, 60-ma power supply for each loop
1	Headset		Monitoring signals	600-ohm impedance
	Connecting cables, lengths depend on installation:			
	1 Power	MCOS-2	Power line connection	Two wire power
	2 Input	RG-11/U or RG-12/U	Receiver i-f to input	Coaxial
	1, 2 or 3 Teletypewriter as required	MCOS-2	AN/URA-7 to teletypewriter	Shielded single* or two wires
	1, 2 or 3 Tone Output as required	TTHFWA-1 or RG-108/U	Tone signal to telephone line	Shielded single* or two or three wires
	2 CRT REM VERT (if used)	RG-11/U or RG-12/U	Oscilloscope signal (external)	Shielded single
	1, 2 or 3 External tone input (if used as required)	TTHFWA-1 or RG-108/U		
4	3/8 bolts with nuts and flat washers for bench mounting			

* Depends on local system.
** or other receiver having good stability and suitable frequency range.

TABLE 1-3. SHIPPING DATA

SHIPPING BOX NO.	CONTENTS		OVERALL DIMENSIONS (INCHES)			VOLUME	WEIGHT
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		

Unless otherwise stated, dimensions are in inches, volume in cubic feet, weight in pounds.

TABLE 1-4. BASIC SIMILARITIES IN THIS SERIES EQUIPMENT

MODEL	INPUT FREQUENCY	UNITS INVOLVED	REMARKS
CV-57/URR	395 to 470 kc		Single channel operation
CV-60/URR	1000 cps narrow, 2550 cps wide, center frequency		Single channel operation
CV-71/URR	47.5 to 52.5 kc		Single channel operation
CM-14/URR			Provides diversity switching on dual channel systems
AN/URA-6	395 to 470 kc	2—CV-57/URR 1—CM-14/URR	Dual channel, diversity operation
AN/URA-7	47.5 to 52.5 kc	2—CV-71/URR 1—CM-14/URR	Dual channel, diversity operation
AN/URA-8	1000 cps narrow, 2550 cps wide, center frequency	2—CV-60/URR 1—CM-14/URR	Dual channel, diversity operation

NOTE: CV–60/URR and AN/URA–8 equipments are covered in instruction book NAVSHIPS 91339.

TABLE 1-5. ELECTRON TUBE COMPLEMENT

COMPLEMENT FOR ONE (1) FREQUENCY SHIFT CONVERTER CV-57/URR or CV-71/URR

UNIT	NUMBER OF TUBES OF TYPE INDICATED												
	6AB7	6BE6	1Z2	6X4	OA2	6C4	12AX7	6AU6	6AL5	2BP1	12AU7	6AQ5	TOTAL NO OF TUBES
Input		1				1		1					3
I-F Unit								2	1				3
Tuning Monitor							1			1			2
Keyer									1		5	2	8
Power Supply			1	1	1								3
Total No. of each type		1	1	1	1	1	1	3	2	1	5	2	19

COMPLEMENT FOR ONE (1) COMPARATOR CM-14/URR

Diversity Selector						1		2	2		4		9
Keyer									1		5	2	8
Power Supply			1	1	1								3
Total No. of each type			1	1	1	1		2	3		9	2	20

COMPLEMENT FOR ONE (1) COUPLING KIT 10563

Tube Shelf Assembly	1												1

SECTION 2
THEORY OF OPERATION

1. INTRODUCTION.

This section covers the theory of operation of the single-channel Frequency Shift Converter CV–57/-URR, the dual-channel diversity Frequency Shift Converter-Comparator Groups AN/URA–6, AN/-URA–7, and the Receiver Coupling Kit 10563. (Frequency Shift Converter CV–71/URR is discussed in paragraph 17 of this section, as a part of Frequency Shift Converter-Comparator Group AN/URA–7.) An antenna, radio receiver, and teletypewriter with battery or power supply are required for the single-channel equipment. Dual-channel diversity equipment requires two antennas, two receivers, and a teletypewriter with battery or power supply.

The Converter changes a frequency shift signal into d-c pulses sufficient to operate a teletypewriter or other automatic recording devices. A frequency shift signal is one whose normal frequency is shifted to another frequency for a period of time corresponding to the coding of the information being transmitted. The subject equipment is designed to handle shifts of from 10 to 1000 cycles.

2. SINGLE-CHANNEL FREQUENCY SHIFT CONVERTER CV-57/URR.

In the CV–57/URR unit (see Figure 2–1, Single-Channel Equipment CV–57/URR Block Diagram) the signal is filtered, converted to a 40-kc frequency, amplified, clipped (by the limiter) and fed through the discriminator. The discriminator output is amplified, filtered, amplified again, and triggers two Eccles-Jordan flip-flop stages in cascade to key the tone oscillator and teletypewriter-loop keyer tubes.

Frequency Shift Converter CV–57/URR includes the following operating sub-assemblies shown interconnected on the System Schematic, Figure 7–19.

UNIT NAME	FIGURE NUMBER (SCHEMATIC DIAGRAM)	SYMBOL SERIES
Converter Chassis	Part of 7-19	1400
Cable Filter Unit	7-24	1100
Input Unit	7-38	100
I-F Unit	7-36	300
Keyer Unit	7-42	600
Tuning Monitor Unit	7-22	700
Power Supply Unit	7-28	800

3. CONVERTER CHASSIS ASSEMBLY (for CV-57/URR).

Refer to the System Schematic Figure 7–19. All connections to the Cable Filter and to the units on the Converter Chassis are made by plugs and jacks. Plug P1401, mounted on the rear of the Converter Chassis, engages with jack J1101 on the Cable Filter Unit when the Converter Chassis is properly seated in the case. This permits external cable connections, which are made to the Cable Filter Unit, to be carried into the chassis assembly cable and distributed to jacks J1403 to J1407 inclusive. These jacks, in turn, engage the proper sub-assembly plugs when these units are assembled in the Converter Chassis. Other electrical items of the chassis are the B+ "on" indicator and socket I/X1401, the POWER OFF-ON switch S1401, the TTYP and PHONES jacks J1401 and J402, and the B+ dropping resistor R1402.

The B+ "on" indicator is a neon lamp connected between ground and the 200-volt supply in series with a limiting resistor R807 located in the power supply. The neon lamp glows to indicate that a voltage of 200 volts is present in the power supply.

The POWER OFF-ON switch makes or breaks both legs of the a-c line into the power transformer primary. The TTYP jack, J1401, is connected in series with the external teletypewriter loop circuit and is used to meter the teletypewriter loop current and otherwise monitor the loop circuit. The PHONES jack, J1402, is supplied with keyed tone output signals through the Tone Output Filter, Z1101, for monitoring purposes.

4. CABLE FILTER UNIT (for CV-57/URR).

Refer to Schematic Diagram, Figure 7–24. All external cable connections are made by jacks mounted on the rear of the Cable Filter Unit. These jacks and their functions are listed below together with the names with which they are designated on the equipment.

SYMBOL No.	NAME	FUNCTION
J1102	VERT. CRT-REMOTE	Remote vertical cathode-ray tube signal
J1104	EXT. TONE IN	External tone signal input
J1105	TONE OUTPUT	Tone output
J1106	TTYP OUTPUT	Teletypewriter signal (output)
J1107		A-C power outlet
J1108	PWR INPUT	A-C power input
J1109	DIV. CONT	Diversity control voltage
J1110	DIV. SIG	Diversity output signal
J1111	I-F INPUT	I-F Input

Electrical connections from these jacks to the various sub-assembly units on the Converter Chassis are made through jack J1101. This is mounted on the lower right-hand of the inside panel and engages plug P1401 mounted on the Converter Chassis.

The equipment is protected from overload by two three-ampere fuses, F1101 and F1102, each in series with one leg of the line. The fuses *do not* protect circuits which may be connected to a-c power outlet jack J1107.

A power line filter, Z1102, is inserted in the power line in series with the power transformer primary. This filter has an attenuation of at least 65 db from 14 kc to 10 mc and of at least 50 db from 10 mc to 30 mc when fully loaded. It prevents any signal generated in the equipment from entering the power line and also prevents external signals from entering the equipment.

A tone output filter, Z1101, is inserted in series with the tone output from the Keyer Unit. It has the same attenuation and purpose as the power line filter just described. The output connections of the tone filter are taken to the PHONES jack J1402 for monitoring purposes.

The tone output impedance is 600 ohms nominal from 595 to 1785 cycles with a maximum power output of at least 12 milliwatts across a 600-ohm non-inductive load. The output circuit has its center tap brought out to terminal B of the Tone Output jack J1105 and may be grounded if required by external conditions.

Other filtering circuits include resistor R1101, choke L1101, and capacitor C1103 to filter the cathode-ray tube remote signal; and choke L1102 and capacitor C1102 to filter the teletypewriter output.

A fan, B1101, operates from the 115-volt power line. Capacitor C1101 provides the necessary phase shift to operate the fan motor. The fan maintains an even temperature distribution when the equipment is in use.

5. INPUT UNIT (for CV-57/URR).

See Schematic Diagram, Figure 7–38. The Input Unit receives the intermediate-frequency (395 to 470 kc) signal from the associated receiver. It converts it into a 40-kc signal which it then feeds into the I-F Unit (discussed in paragraph 6). AFC is provided across the oscillator to correct for receiver drift. The following tubes are used in the Input Unit of the CV–57/URR Converter.

SCHEMATIC SYMBOL	TUBE TYPE	FUNCTION
V101	JAN-6C4	Oscillator
V102	JAN-6AU6	Automatic frequency control (AFC)
V103	JAN-6BE6	Converter

The signal is fed from the receiver to the Converter through the Receiver Coupling Kit, which is mounted in the receiver: The output of this Coupling unit is fed through the Cable Filter Unit and plug P101 to the junction of capacitors C111, C112 of the Input Unit. These capacitors tune the primary of transformer T102 and provide proper impedance match. Additional selectivity is provided by transformers T102, T103 and associated tuning capacitors.

A characteristic is thereby obtained, such that the circuit bandwidth at 400 kc center frequency is not more than 7.6 kc at 6 db down; and not more than 56 kc at 60 db down.

The equipment is adjusted between 395 and 470 kc by adjusting the powdered-iron cores of the transformer windings.

The converted signal appears at the plate of tube V103 and is fed to the input of the I-F Unit through plug P101.

The oscillator tuned circuit, T101, is bridged by

two fixed capacitors, C104 and C119, and is adjusted to a frequency of 430 to 510 kc by a powdered-iron core. External tuning of the circuit over a narrow range is accomplished by C105, a variable air capacitor acting as a vernier.

The plate circuit of the automatic frequency control tube, V102, acts as a variable reactance across the oscillator tank circuit to tune the oscillator over a small range. The reactance presented by the tube depends on the transconductance, which is controlled by the AFC bias from the discriminator. This bias is obtained from the I-F Unit through pin 11 of P101 and filtered by resistors R103, R104, R105, and capacitor C108.

6. I-F UNIT.

See Schematic Diagram, Figure 7–36. The I-F Unit receives a 40-kc signal from the Input Unit, which is amplified through highly selective transformers and fed to a discriminator whose output is applied to the Keyer Unit. The following tubes are used in the I-F Unit:

CIRCUIT SYMBOL	TUBE TYPE	FUNCTION
V301	JAN-6AU6	1st I-F Amplifier
V302	JAN-6AU6	Limiter
V303	JAN-6AL5	Discriminator

The signal from the Input Unit is fed to the primary of transformer T301 through pin 10 of plug P301. It is then applied, through transformer T302, to the grid of amplifier tube V301. Further selectivity is obtained through transformer T303 which applies the signal to the grid of limiter tube V302. Each i-f transformer has two coupling coils, one for narrow-band reception and one for wide-band reception. A switch, S301, selects the coupling coil desired by means of the NARROW-WIDE knob on the front panel. Capacitors C302, C303, C305, C306, C307, C311, C313 tune the associated circuits.

The selectivity of these circuits is such that the bandwidth, at 6 db down, is between 0.8 and 1 kc in the NARROW position and between 1.6 and 2 kc in the WIDE position of the switch. The shape factor (bandwidth 60 db/bandwidth 6 db) does not exceed 3.75 and 3.5 in the NARROW and WIDE positions, respectively.

The signal appearing at the plate of tube V301 has an amplitude which is proportional to the receiver output; a portion of this signal is fed to pin 6 of plug P301 for diversity control in Comparator CM–14/URR.

Tube V302 operates as a limiter, using a grid leak, R309, to supply a bias voltage which increases as the amplitude of the incoming signal increases. A bleeder, consisting of resistors R310 and R311, fixes the screen voltage to assist in the limiting action.

In the plate circuit of V302 is the discriminator transformer, T304, with associated capacitors C314, C316, C317 which provide proper tuning. The transformer is also switched in the NARROW or WIDE position by the NARROW-WIDE control knob on the front panel (switch S301).

The discriminator diode, V303, supplies three output signals, as follows:

(*a*) A Monitoring signal, which is fed to the Tuning Monitor Unit and a remote cathode-ray tube monitor through pin 3 of P301.

(*b*) an AFC signal, which is fed to the converter oscillator of the Input Unit through pin 8 of P301,

(*c*) an output signal, which is fed to the Keyer Unit through the THRESHOLD control, R318, and pin 4 of P301.

The discriminator characteristic, when tube V302 is limiting, gives a 1.8-kc spread between peaks on the WIDE position and a 1.35-kc spread between peaks on the NARROW position. The slope sensitivity is about 0.04 volt per cycle on either position.

The AFC OFF-ON switch, S303, grounds the AFC voltage when in the OFF position. The TUNE OPERATE switch, S302, opens the output signal circuit and grounds the AFC voltage for tuning purposes.

7. KEYER UNIT.

See Schematic Diagram, Figure 7–42. The Keyer Unit receives the d-c pulses from the discriminator, amplifies and filters them to energize the Eccles-Jordan flip-flop circuit which, in turn, keys a power output stage to key the teletypewriter loop circuit. The output of the flip-flop circuit also keys on and off a tone oscillator for monitoring and transmission over telephone lines and radio links. The tubes used in the Keyer Unit are as follows:

SCHEMATIC SYMBOL	TUBE TYPE	CIRCUIT FUNCTION
V601A	JAN-12AU7	A-F Amplifier I
V601B		A-F Amplifier II
V602A	JAN-12AU7	Balance Modulator
V602B		Trigger Driver
V603A,B	JAN-12AU7	Trigger I
V604A,B	JAN-12AU7	Trigger II
V605A	JAN-12AU7	Tone Modulator
V605B		Tone Oscillator
V606	JAN-6AL5	D-C Restorer
V607	JAN-6AQ5	Teletypewriter Loop Keyer
V608	JAN-6AQ5	Teletypewriter Loop Keyer

The audio signal from pin 14 of P601 is amplified by a-f amplifier I tube, V601A. The output of this stage is fed through the LOW-HI-ADJ switch, S601,

which is connected between the plate circuit of V601A and the input circuit of V601B. The LOW-HI-ADJ switch, S601, inserts a low-pass filter, Z601, for either low- or high-speed teletype signals or a calibration signal in the ADJ position.

Filter Z601 cuts off frequencies above those necessary for teletype operation. In the LOW position the filter response is flat within 6 db from 80 to 140 cycles and is down not less than 40 db from 240 cycles and above. However, capacitors C617, C618 cause the overall circuit response to be flat within 6 db from 80 to 125 cycles and down not less than 40 db from 200 cycles and above (these are approximate values only). In the HI position the filter response is flat within 6 db from 80 to 300 cycles and is down not less than 40 db from 500 cycles and above. However, capacitor C618 causes the overall circuit response to be flat within 6 db from 80 to 240 cycles and down not less than 40 db from 415 cycles and above (these are approximate values only).

The output voltage of a-f amplifier II tube, V601B, is applied to grid pin 2 of the trigger driver tube, V602B, through capacitor C616 and resistor R605. This same signal is fed to the Tuning Monitor through pin 5 of P601 to indicate proper setting of the THRESHOLD control on the I-F Unit. When the THRESHOLD control is properly adjusted this voltage should be approximately 17 volts peak to peak; the traces on the cathode-ray tube screen will then coincide with the top and bottom engraved lines on the Tuning Monitor window when the CAL IN switch, S701, is depressed. Accuracy of the trace indication can be checked by setting the LOW-HI-ADJ switch, S601, to the ADJ position and observing the traces to coincide with the top and bottom lines on the window when the CAL IN button is depressed. See Section 3, paragraph *7a*(14).

Connected between the grid of the trigger driver tube, V602B, and ground is a d-c restorer tube, V606, and its associated circuits. This circuit selects a portion from the output of V601B near the zero-voltage axis, eliminating the superimposed noise and telegraph distortion. This is accomplished by two diodes, one which (pins 1 and 7) clips the negative portion and the other (pins 2 and 5), positively biased, clips the signal level above plug four volts. Therefore, appearing on the grid, pin 2, of the trigger driver, V602B, is a four-volt peak to peak square wave of plus two volts average. This square wave is identical to the discriminator square-wave output, except that the amplitude-modulated noise has been reduced and the d-c component has been removed by capacitive coupling.

In normal frequency shift teletypewriter operation the teletypewriter loop circuit is closed during the standby, or mark signal. This keeps the teletypewriter in condition to receive the coding pulses which key the teletypewriter loop circuit through the keyer tubes, V607 and V608. The d-c component, from the discriminator, could be used to return the output tubes to conduction after each coding pulse has been received; however, since this component has been removed, a mark-return circuit is provided at the grid of the trigger driver, V602B, to accomplish this result.

The mark-return circuit has a normal and a reverse position and consists of resistor R610 and switch S603B. This switch is used in the NORM position when the detected audio output from the receiver returns to a higher frequency in the mark or standby position. This permits the grid of V602B to return to plus four volts through resistor R610 and causes the output tubes, V607 and V608, to conduct. The REV position of switch S603B is used when the receiver output returns to a lower frequency and permits the grid of V602B to return to zero voltage.

The output signal of V602B is direct-coupled to an Eccles-Jordan flip-flop stage, V603A,B, which in turn is capacitively coupled to another Eccles-Jordan flip-flop stage, V604A,B, having two stable positions. The output, taken from the grids of the second stage, V604A,B, is fed to the control grids of the output tubes, V607 and V608, and the tone modulator tubes, V605A and V602A, through the NORM-REV switch, S603A.

The pulse appearing in the teletypewriter loop circuit must be an exact duplicate of the pulse appearing at the discriminator output to prevent loss of printing margin on the teletypewriter. The keyer unit is provided with a %MARK control, R613, located in the cathode circuit of tube V602B; this permits adjustment of the operating bias of this tube to obtain linear amplification of the pulses appearing on its grid and thereby minimize distortion of these pulses.

This control is adjusted to give a symmetrical square wave in the teletypewriter loop circuit with the LOW-HI-ADJ switch in the ADJ position. The detailed procedure is given in Section 3, paragraph *7a*(20).

The output tubes, V607 and V608, obtain their plate voltage and current from an external power supply or battery through the teletypewriter loop and are controlled by the negative pulses received from the grids of the second trigger stage, V604A,B.

The common circuit of the screen grids (pins 6) of the two output tubes, V607, V608, includes an ON-OFF toggle switch, S604. When the teletype equipment is disconnected from the output tubes their plate voltage is removed. Under this condition the design and construction of the tubes is such that they will oscillate at about 200 mc. To prevent this, the switch S604 must be opened when the teletypewriter is not used.

Certain operating requirements necessitate transmission of the keyed teletype pulses over telephone lines or radio relay links. The tone oscillator, V605B, and tone modulator, V605A, provide facilities for such transmission.

The tone oscillator tube, V605B, and its tuned circuits, L601 and C607 through C614, permit a choice of eight tone frequencies, namely 595, 765, 935, 1105, 1275, 1445, 1615, and 1785 cycles per second. The output of the tone oscillator is fed through TONE LEVEL control, R629, to the tone modulator V605A. The tone modulator is keyed by the square-wave signal from trigger II tube. The output of the tone modulator is coupled through transformer T601 and tone output filter Z1101 to the TONE OUTPUT jack J1105 for connection to an external line and the PHONES jack J1402 for monitoring purposes. A balance modulator tube, V602A, balances out the transients resulting from square-wave signal currents. The MOD BAL control, R633, is adjusted for a minimum of transients as described in Section 3, paragraph *7a*(19).

8. TUNING MONITOR UNIT.

See Schematic Diagram, Figure 7–32. The Tuning Monitor Unit is a direct-coupled oscilloscope which serves to indicate proper tuning of the associated radio receiver and to set the THRESHOLD control, R318, to its proper level.

The following tubes are used in the Tuning Monitor Unit:

SCHEMATIC SYMBOL	TUBE TYPE	CIRCUIT FUNCTION
V701	JAN-12AX7	Vertical Amplifier
V702	JAN-2BP1	Cathode-ray Tube

When the associated radio receiver is tuned through the frequency range of the discriminator the average voltage from the discriminator will vary from a negative to a positive value. Since at the center of the discriminator characteristic the d-c component is zero, the discriminator voltage will indicate proper tuning of the radio receiver.

Intensity and focus voltages are provided by the —600-volt bleeder made up of R713 (the INTENSITY control), R714, R715 (the FOCUS control), and R716. The arm of the INTENSITY control, R713, adjusts the bias on grid pin 2 of V702 to vary the brilliance of the pattern on the cathode-ray tube. Resistor R715 varies the voltage on pin 4 of V702 to focus the pattern on the screen. The heater leads of V702 are connected, through P701 pins 9 and 10, to a special 6.3-volt winding on the power transformer in the Power Supply Unit. This is necessary because the cathode-ray tube operates at a cathode voltage of —600 volts to ground.

A sine-wave voltage for horizontal deflection is applied to pin 10 and is obtained from a tap on the power transformer T801, located in the Power Supply Unit, through pin 2 of P701. Pin 9 of the cathode-ray tube is grounded to complete the sine-wave voltage circuit.

The d-c signal from the audio discriminator is applied to the VERT GAIN control, R701, through pin 14 of P701. The level of the grid signal of V701A is adjusted by R701 to provide a pattern of reasonable size. The output of V701A is cathode-coupled to V701B through R702. The output of V701B is directly coupled to the vertical plate, pin 6 of V702, through the CAL IN switch S701.

Control R705 applies a d-c voltage to the other vertical plate, pin 7, and is adjusted so that the amplifier tube V701B operates over the linear portion of its characteristic. Detailed adjustment procedure is given in Section 3, paragraph *7a*(5) (*e*).

The V CENT control, R702, varies the vertical centering of the image on the cathode-ray tube. This control is in series with the cathode of V701A and a tap on the negative high-voltage bleeder. Therefore, the signal appearing on the arm of resistor R702 consists of the normal cathode signal and an adjustable negative d-c voltage depending on the setting of the control. When this signal is fed into the grid of V701B the adjustable d-c voltage controls the average voltage appearing on the plate and, in effect, controls the vertical centering of the pattern. The V CENT control is initially adjusted as explained in Section 3, paragraph *7a*(5).

The THRESHOLD control, R318, is set to its proper level by comparing the voltage at the input of the clamping circuit (pin 6 of V601B in the Keyer Unit) against a pre-determined deflection of the cathode-ray tube which is marked by top and bottom lines engraved on the tube window. This procedure is given in detail in Section 3 paragraph *7a*(14). The CAL IN switch, when depressed, applies the clamping circuit voltage to the vertical plate of V702 to make this comparison.

9. POWER SUPPLY UNIT (for CV-57/URR).

See Schematic Diagram, Figure 7–28. The Power Supply Unit consists of a negative high-voltage supply for the cathode-ray tube, a regulated low-voltage supply for critical circuits, an unregulated low-voltage supply, filament voltage supply for all tubes, and an a-c voltage supply to provide horizontal deflection voltage for the cathode-ray tube.

SCHEMATIC SYMBOL	TUBE TYPE	CIRCUIT FUNCTION
V801	JAN-1Z2	High-voltage Rectifier
V802	JAN-6X4	Low-voltage Rectifier
V803	JAN-0A2	Voltage Regulator

Connections to plug P801 are as follows:

VOLTAGE	P801 PIN NUMBER	SERVICE
105, 115, 125 A-C	12 and 14	A-C input
115 A-C	5	Fan supply
6.3 A-C	9 and 10	Heater of cathode-ray tube, V702
6.3 A-C	1 and 7	Heaters of all tubes except cathode-ray tube, V702, and H-V rectifier, V801
35 A-C	6	Horizontal sweep voltage for cathode-ray tube, V702
+200 D-C	2	General plate voltage supply
+150 D-C	3	For Tuning Monitor Unit and audio amplifier and tone oscillator in Keyer Unit
−600 D-C	8	High voltage for cathode-ray tube, V702
−45 D-C	4	Bias for trigger and teletype keyer tubes in Keyer Unit
+80 D-C (nominal)	11	Voltage for neon B+ indicator, I1401
Ground	13	Return for D-C and 35 volt A-C voltages

The high-voltage rectifier tube, V801, supplies −600 volts. Capacitors C801A,B,C and resistors R801, R802 filter this high-voltage supply. Resistors R803 and R805 form a voltage divider and bleeder with a −45 volt tap. This bleeder also discharges the capacitors when the line voltage is turned off, should the load be disconnected.

The 200-volt supply includes rectifier tube V802, filter capacitors C802A and B (35 microfarads each), and filter choke L801. Bleeder resistor R806 discharges the capacitors in case the load is disconnected.

Tube V803 regulates the 150-volt supply, the current through the tube increasing or decreasing when the input voltage rises or falls. The 200-volt source feeds the regulator tube V803 through series resistor R804; variations in tube current change the voltage drop across this resistor to provide a regulated output.

Resistor R807, in series with pin 11 of P801, limits the current through the neon B+ indicator I1401, located on the Converter Chassis panel.

Input power to transformer T801 is fed through the power line filter Z1102 located in the Cable Filter Unit to suppress r-f noise.

Provision for 105-, 115- or 125-volt nominal line voltages is made by a tapped primary brought out to terminals 2, 3, and 4 respectively; terminal 1 provides the connection for the other side of the line.

10. DUAL-CHANNEL FREQUENCY SHIFT CONVERTER-COMPARATOR GROUP AN/URA-6.

See Figure 2–2, Dual-Channel Equipment AN/URA–6 Block Diagram. The dual-channel equipment has two Converter CV–57/URR units which operate from separate receivers, and a Comparator CM–14/URR unit.

The Comparator CM–14/URR takes the discriminator output voltage and the diversity control voltage from the two CV–57/URR units and, by electronic switching, selects the discriminator voltage from the channel supplying the stronger control signal. The selected discriminator voltage is then used to key the teletypewriter loop or provide a tone signal for transmission to a remote point.

The Comparator CM–14/URR (see Figure 2–3) includes the following operating sub-assemblies shown interconnected on the System Schematic, Figure 7–21:

UNIT NAME	FIGURE NUMBER (SCHEMATIC DIAGRAM)	SYMBOL SERIES
Comparator Chassis	Part of 7-21	1600
Cable Filter Unit	7-26	1300
Diversity Selector Unit	7-44	900
Keyer Unit	7-42	600
Power Supply Unit	7-30	1000

11. COMPARATOR CHASSIS ASSEMBLY (for CM-14/URR).

See Schematic Diagram, Figure 7–21. All connections to the Cable Filter Unit and the units on the Comparator Chassis are made by plugs and jacks. Plug P1601, mounted on the rear of the Comparator Chassis, engages with jack J1301 on the Cable Filter Unit when the Comparator Chassis is properly seated in the case. This permits all external cable connections, which are made to the Cable Filter Unit, to be carried into the chassis assembly cable and distributed to jacks J1603 and J1605 inclusive. These jacks, in turn, engage the proper sub-assembly plugs when these units are assembled in the Comparator Chassis. The other electrical items of the chassis, in addition to the jacks and cable, are the B+ indicator and socket I/X1601, the POWER OFF-ON switch S1601, the meter switch S1602, comparison meter M1601 and the TTYP and PHONES jacks J1601 and J1602.

The B+ "on" indicator is a neon lamp connected between ground and the 200-volt supply, in series with a limiting resistor R1008 located in the power supply. The neon lamp glows to indicate that a voltage of 200 volts is present in the power supply.

The POWER OFF-ON switch makes or breaks both legs of the a-c line connecting into the power transformer primary. The TTYP jack, J1601, is in series with the external teletypewriter loop circuit and is used to meter the teletype current and otherwise monitor the loop circuit. The PHONES jack, J1602, is supplied with keyed tone output signals through the Tone Output Filter, Z1301, for monitoring purposes.

The CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL switch, S1602, connects the meter, M1601, to indicate the incoming signal level of either channel A or channel B or, in the DIV IND position, to show which channel is supplying the input to the Comparator Keyer Unit.

12. CABLE FILTER UNIT (for CM-14/URR).

Refer to Schematic Diagram, Figure 7–26. All external cable connections are made by jacks mounted on the rear of the Cable Filter Unit. These jacks and their functions are listed below together with the names with which they are designated on the equipment.

SYMBOL No.	NAME	CIRCUITS
J1302	EXT. TONE IN	External tone signal input
J1303	TONE OUTPUT	Tone output
J1304	TTYP OUTPUT	Teletype output
J1305	PWR INPUT	A-C power input
J1306	PWR OUTPUT	A-C power output (paralleled with J1305 and J1307)
J1307	PWR OUTPUT	A-C power output (paralleled with J1305 and J1306)
J1308	DIV-CONT CHAN-A	Diversity control voltage channel A
J1309	DIV-CONT CHAN-B	Diversity control voltage channel B
J1310	DIV-SIG CHAN-A	Diversity signal input channel A
J1311	DIV-SIG CHAN-B	Diversity signal input channel B

Electrical connections from these jacks to the various sub-assembly units on the Comparator Chassis are made through jack J1301. This jack is mounted on the lower right-hand of the inside panel and engages plug P1601 mounted on the Comparator Chassis.

The equipment is protected from overload by two three-ampere fuses, F1301 and F1302, each in series with one leg of the line. The fuses *do not* protect circuits to the Converters, through jacks J1306 and J1307. These circuits are fused in the individual Converters.

A power line filter, Z1302, is inserted in the power line in series with the power transformer primary. This filter has an attenuation of at least 65 db from 14 kc to 10 mc and at least 50 db from 10 mc to 30 mc when fully loaded. It prevents any signals generated in the equipment from entering the line and also prevents external signals from entering the equipment.

A tone output filter, Z1301, is inserted in series with the tone output from the Keyer Unit. It has the same attenuation and purpose as the power line filter just described. The output connections of the tone filter are taken to the PHONES jack, J1602, for monitoring purposes.

The tone output impedance is 600 ohms nominal from 595 to 1785 cycles with a power output of at least 12 milliwatts across a 600-ohm non-inductive load. The output circuit has its center tap brought out to terminal B of the Tone Output jack J1303 and may be grounded if required by external conditions.

A fan, B1301, operates from the 115-volt power line. Capacitor C1301 provides the necessary phase shift to operate the fan motor. The fan maintains an even temperature distribution when the equipment is in use.

13. DIVERSITY SELECTOR UNIT.

See Schematic Diagram, Figure 7–44. The Diversity Selector Unit compares the channel A and channel B diversity control signals and permits the stronger signal to operate the gating circuit which switches the discriminator output of either channel A or channel B Converters to the input of the Keyer Unit. The following tubes are used in the Diversity Selector Unit:

SCHEMATIC SYMBOL	TUBE TYPE	CIRCUIT FUNCTION
V901	JAN-6AU6	Channel A Amplifier
V902	JAN-6AL5	AVC and Differential Rectifier Channel A
V903	JAN-6C4	D-C Amplifier
V904	JAN-12AU7	First Control Trigger
V905	JAN-12AU7	Second Control Trigger
V906	JAN-12AU7	Gate B and Gate B Control
V907	JAN-12AU7	Gate A and Gate A Control
V908	JAN-6AU6	Channel B Amplifier
V909	JAN-6AL5	AVC and Differential Rectifier Channel B

The diversity control signal from channel A is amplified by V901 and its output is rectified negatively by a diode, pins 5 and 2 of V902. The diversity control signal from channel B is amplified by V908 and its output is rectified positively by a diode, pins 5 and 2 of V909. The two rectified outputs are combined across resistors R931 and R932 which form a differential rectifier circuit, the output of which is used to control the gating circuits. A negative voltage at the junction of R931 and R932 indicates channel A signal is the stronger. Conversely, a positive voltage indicates a reverse condition.

A portion of the output appearing at the plate of V901 and a portion of the output of V908 are rectified negatively by two diodes, pins 1 and 7 of V902 and pins 1 and 7 of V909. The outputs of these diodes are combined across a common load resistor R947 and returned to both grids through R902, R941, and R942. This voltage provides AVC control which extends the operating range of the amplifier tubes to accommodate approximately 50 db input range of signal amplitude.

The output of the differential rectifier which appears at the junction of resistors R931 and R932 is fed to the grid of the d-c amplifier tube V903 through links O901 and O902 and the CHANNEL A—COMBINED—CHANNEL B switch S901. Since the Comparator CM–14/URR is designed for use with either a-f or i-f type Converters, the links O901 and O902 permit connection to a twin-T network for the a-f type Converter or filter capacitor C909 for the i-f type Converter. This adjustment is made at the time of installation.

(The twin-T network is a low-pass filter having its maximum attenuation at 100 cycles; it removes the 1000- or 2550-cycle component which may be present in the signal supplied by the Audio Input Unit of the a-f type Converter. This network is not operative in the equipment discussed in the present instruction book, being disconnected by links O901, O902.)

The CHANNEL A—COMBINED—CHANNEL B switch S901 permits single-channel operation from channel A or channel B or diversity operation from both channels. In the CHANNEL A position it applies a fixed negative voltage to the grid of V903 to hold this tube in non-conducting condition. In the CHANNEL B position it applies a fixed positive voltage to the V903 grid to hold this tube in a conducting condition. In the combined position the switch applies the output voltage of the differential rectifier to operate V903 in the normal manner.

The Control Balance resistor, R905, permits the gating circuits to switch channels with an equal change of input level for either channel. This adjustment is explained in detail in Section 3, paragraph *7c*(11).

The output of V903 is direct-coupled to an Eccles-Jordan flip-flop stage, V904, which in turn is capacitively coupled to another Eccles-Jordan flip-flop stage, V905, having two stable positions. The output, taken from the grids of the second stage, V905, is fed to the control grids of the gate-A control tube, V907, and the gate-B control tube, V906.

The gate circuits consist of a control tube in series with a gate tube for each of the two channels. The discriminator outputs of channels A and B are fed to grids (pin 2) of the gate tubes V907 and V906, respectively.

When the grid (pin 7) of V907 receives a positive voltage from V905, current flows through the cathode resistors R921 and R946, impressing a voltage on the plate (pin 1) of V907 and permitting the input signal on the grid (pin 2) of this tube to appear across the cathode resistor R926. When a positive voltage appears on the gate-A control tube, V907 pin 7, a negative voltage appears on the gate-B control tube, V906, pin 7. Such a condition stops the flow of current through cathode resistors R923,

R922, and R945, resulting in no plate voltage on gate-B. Since no plate current can flow, the signal on the input grid cannot appear across the common cathode resistor R926.

When the channel B input signal level exceeds the channel A signal level the polarities on the gate control grids are reversed and the opposite condition exists on the gate tubes. The outputs of the two gate tubes, combined across cathode load resistor R926, are then fed to the input of the Keyer Unit.

The GATE BAL control, R923, varies the plate voltage on pin 1 of V906 to compensate for differences in gain of the two gate tubes. When properly balanced the switched plate voltage pulse created by the switching action of the control tubes is effectively cancelled in the common cathode resistor R926. Adjustment is explained in detail in Section 3, paragraph *7c*(10).

The CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL switch, S1602, connects the meter, M1601, to indicate the incoming signal level of either channel A or channel B or, in the DIV IND position, to show which channel is supplying the input to the Comparator Keyer Unit. In the CHANNEL A position the meter is inserted in series with the cathode resistor, R948, of the AVC rectifier V902. A similar connection to V909 is made when the switch is in the CHANEL B position. The current reading of the meter is therefore proportional to the voltage appearing across its respective differential rectifier. Further use of the meter is explained in Section 4, paragraph 5*e*. In the DIV IND position the meter is inserted across the resistors R944, R945, and R946 to indicate which of the gate tubes, V906 and V907, has voltage on its plate and is therefore conducting. A reading to the left of center indicates channel A is conducting and a reading to the right indicates channel B is conducting.

14. KEYER UNIT.

The Keyer Unit receives the d-c pulses from either channel A or channel B discriminator through jack J1310 or J1311 depending on which channel is selected by the Diversity Selector Unit. The selected pulses are then used to key the teletypewriter loop circuit and to key on and off a tone oscillator for transmission to a remote point. The detailed theory of the Keyer Unit is given in paragraph 7 of this section, since the Keyer Units used on the Comparator and on the Converter are interchangeable.

15. POWER SUPPLY UNIT (for CM-14/URR).

See Schematic Diagram, Figure 7–30. The Power Supply Unit consists of a negative-voltage supply for bias voltages, a regulated d-c voltage supply for critical circuits, an unregulated d-c voltage supply and a filament voltage supply for all the tubes.

The tubes used in the Power Supply Unit are as follows:

SCHEMATIC SYMBOL	TUBE TYPE	CIRCUIT FUNCTION
V1001	JAN-1Z2	Negative Voltage Rectifier
V1002	JAN-6X4	Positive Voltage Rectifier
V1003	JAN-0A2	Voltage Regulator

Connections to P1001 are as follows:

VOLTAGE	P1001 PIN NUMBER	SERVICE
105, 115, 125 A-C	12 and 14	A-C input
115 A-C	5	Fan supply
6.3 A-C	1 and 7	Heaters of all tubes except negative voltage rectifier, V1001
+200 D-C	2	General plate voltage supply
+150 D-C	3	Tone Oscillator and Audio Amplifier plate voltage in Keyer Unit
—130 D-C	8	Trigger and gate bias in Diversity Selector Unit
—45 D-C	4	Bias for trigger and teletype keyer tubes in Keyer Unit
+80 D-C (nominal)	11	Voltage for neon B+ indicator, I1601
Ground	13	Return for D-C voltages

The negative-voltage rectifier tube, V1001, supplies —130 and —45 volts. Capacitors C1001A,B,C and resistors R1001, R1002 filter the negative voltage supply. Resistors R1003 and R1005 form a voltage divider and bleeder with a —45 volt tap. They also discharge the capacitors when the line voltage is turned off, should the load be disconnected.

The 200-volt supply includes rectifier tube V1002, filter capacitors C1002A and B (35 microfarads each), and filter choke L1001. Bleeder resistor R1006 discharges the capacitors in case the load is disconnected.

Tube V1003 regulates the 150-volt supply, the current through the tube increasing or decreasing when the input voltage rises or falls. The 200-volt source feeds the regulator tube V1003 through the series resistors R1004 and R1007. Variations in tube current change the voltage drop across these resistors to provide a regulated output.

Resistor R1008, in series with pin 11 of P1001, limits the current through the neon B+ indicator I1601, located on the Comparator Chassis panel.

Input power to transformer T1001 is fed through the power line filter Z1302, located in the Cable Filter, to suppress r-f noise.

Provision for 105-, 115-, or 125-volt nominal line voltages is made by a tapped primary brought out to terminals 2, 3, and 4 respectively; terminal 1 provides the connection for the other side of the line.

16. DUAL-CHANNEL FREQUENCY SHIFT CONVERTER-COMPARATOR GROUP AN/URA-7.

Frequency Shift Converter-Comparator Group AN/URA–7 includes two Frequency Shift Converters CV–71/URR and one Comparator CM–14/-URR. Thus it differs from Frequency Shift Converter-Comparator Group AN/URA–6 in that it utilizes CV–71/URR Converters in place of CV–57/-URR Converters and that no Receiver Coupling Kit is used with the AN/URA–7 equipment. The arrangement of the Converters and Comparator is the same in both the AN/URA–6 and AN/URA–7 equipments and is illustrated in the Block Diagram, Figure 2–2.

17. FREQUENCY SHIFT CONVERTER CV-71/URR.

The only difference between Frequency Shift Converter CV–71/URR and Frequency Shift Converter CV–57/URR is that the input signal frequency for the former is from 47.5 to 52.5 kc while the input frequency for the latter is from 395 to 470 kc. Circuit-wise, the difference between the two Converter models is in the Input Unit, which is described in the following paragraph. For a discussion of the other units refer to the appropriate preceding paragraphs of this section. The Block Diagram of Figure 2–1 applies to both Converter models.

18. INPUT UNIT (for CV-71/URR).

See Schematic Diagram, Figure 7–34. Essentially, the Input Unit of the CV–71/URR Converter differs from that of the CV–57/URR Converter (described in paragraph 5 of this section) in that certain circuit component values have been changed in view of the different operating frequency, as mentioned in the preceding paragraph. While the circuit components in the Input Unit of the CV–57/URR equipment are designated by symbols in the 100-series, those in the Input Unit of the CV–71/URR bear symbols in the 200-series.

The following tubes are used in the Input Unit of the CV–71/URR Converter;

SCHEMATIC SYMBOL	TUBE TYPE	CIRCUIT FUNCTION
V201	JAN-6C4	Oscillator
V202	JAN-6AU6	Automatic Frequency Control (AFC)
V203	JAN-6BE6	Converter

The signal is fed from the receiver to the Converter through the Cable Filter Unit and plug P201 to the junction of capacitors C211, C212 of the Input Unit. These capacitors tune the primary of transformer T202 and provide proper impedance match. Additional selectivity is provided by transformers T202, T203 and associated capacitors.

A characteristic is thereby obtained, such that the circuit bandwidth at 50 kc center frequency is not more than 2.4 kc at 6 db down; and not more than 11 kc at 60 db down.

The equipment is adjusted between 47.5 and 52.5 kc by adjusting the powdered-iron cores of the transformer windings.

The converted signal appears at the plate of tube V203 and is fed to the input of the I-F Unit through plug P201.

The oscillator tuned circuit, T201, is bridged by fixed capacitors C204, C219 and is adjusted to a frequency of 47.5 to 52.5 kc by a powdered-iron core. External tuning of the circuit over a narrow range is done by C205, a variable capacitor used as a vernier.

The plate circuit of the automatic frequency control tube, V202, appears as a variable reactance across the oscillator tank circuit to tune the oscillator over a small range. The reactance presented by the tube is dependent on the transconductance, which is controlled by the afc bias from the discriminator. This bias is obtained from the I-F Unit through pin 11 of P201 and filtered by resistors R203, R204, R205 and capacitor C208.

19. RECEIVER COUPLING KIT, TYPE 10563.

As stated in Section 1, the Receiver Coupling Kit, Type 10563 includes a Cathode-follower Assembly and a Low-pass Filter Unit. These are described below with reference to the Schematic Diagram, Figure 7–40.

Only one tube, V501, is used, a type JAN–6AB7.

a. CATHODE-FOLLOWER ASSEMBLY.—The Cathode-follower Assembly is an L-shaped bracket with a terminal board and socket for mounting the

component parts. A switch, S501, in the heater circuit turns the unit off and on. The tube, V501, gets its heater and plate power from the receiver in which it is installed. Operating as a cathode follower, the tube grid (pin 4) signal is supplied by the plate circuit of the third i-f stage in the associated Navy Model RBB, RBC, or RDM Receiver through a 100-micromicrofarad d-c blocking capacitor, C501. The output is taken from the cathode (pin 5) through a 0.01 microfarad capacitor. Resistor R501 is the load and bias resistor. Plate (pin 8) and screen grid (pin 6) voltage is obtained from the radio receiver +200-volt supply through resistor R502. Capacitor C503 bypasses the signal voltage which appears in the plate circuit, to ground.

b. LOW-PASS FILTER UNIT.—The Low-pass Filter consists of a coil and capacitor assembly with a shield can and an output jack, J501. The filter is mounted on the rear shield of the radio receiver and is connected to the Cathode-follower Assembly by a shielded single-conductor cable covered with an insulating braid. The filter includes two series-connected coils with a capacitor connected from each coil terminal to ground. A grounded shield separates the two coils. The mounting bracket holes match the output jack so that the jack mounting screws also support the Low-pass Filter Unit. An overall shield mounts on the radio receiver.

The Low-pass Filter unit passes frequencies below 550 kc with very little attenuation. The attenuation increases with frequency above 550 kc.

The output impedance of the filter is approximately 70 ohms.

A one-volt 400-kc signal at the input of the cathode follower will produce a signal of 0.1 to 0.3 volt across a 70-ohm resistor at the filter output.

JACK SYMBOL	NAME
J1102	VERT. CRT-REMOTE
J1104	EXT. TONE IN
J1105	TONE OUTPUT
J1106	TTYP OUTPUT
J1107	
J1108	PWR. INPUT
J1109	DIV. CONT.
J1110	DIV. SIG.
J1111	I-F INPUT

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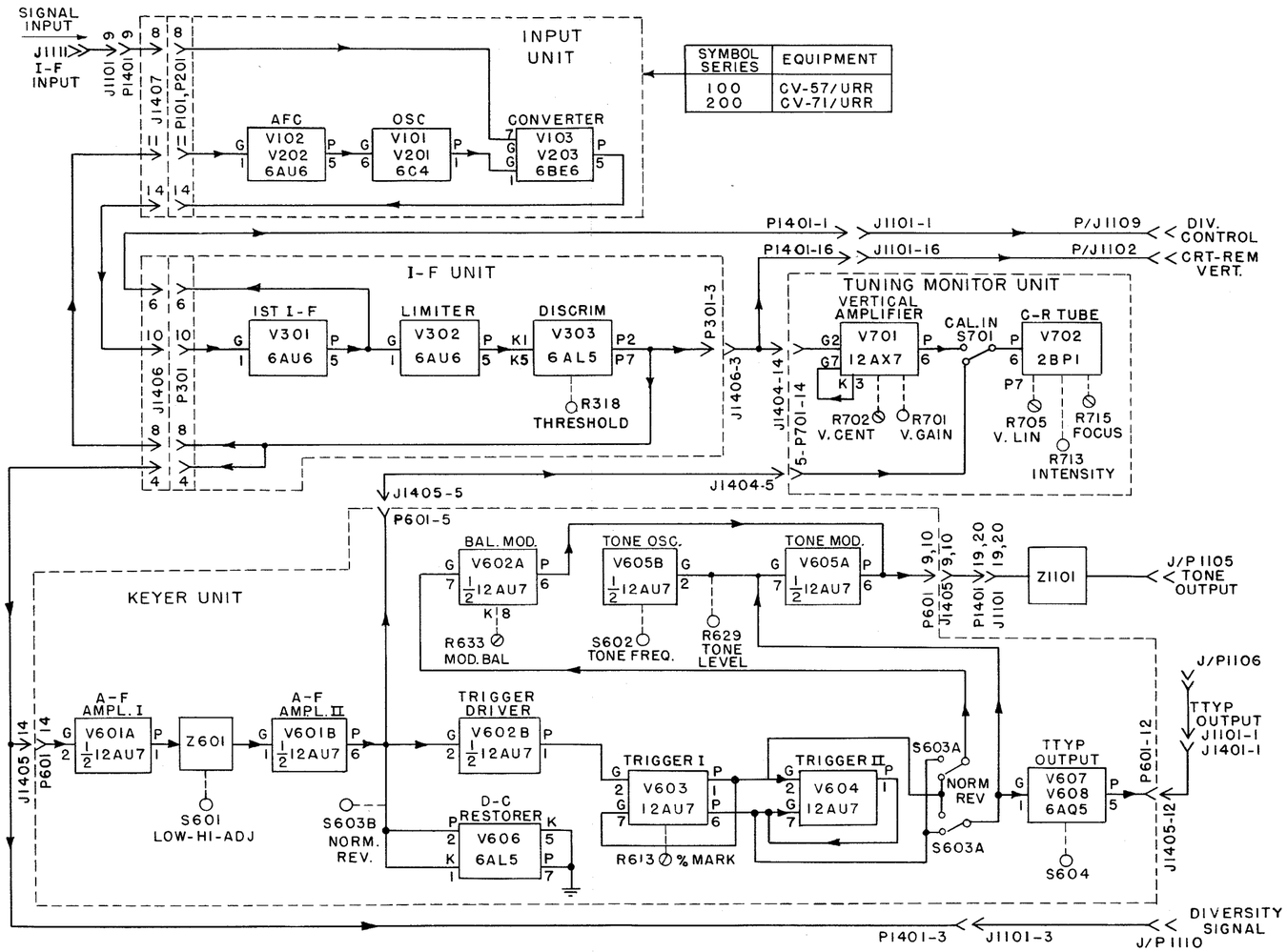

Figure 2-1. Frequency Shift Converter on CV-71/URR, Block Diagram

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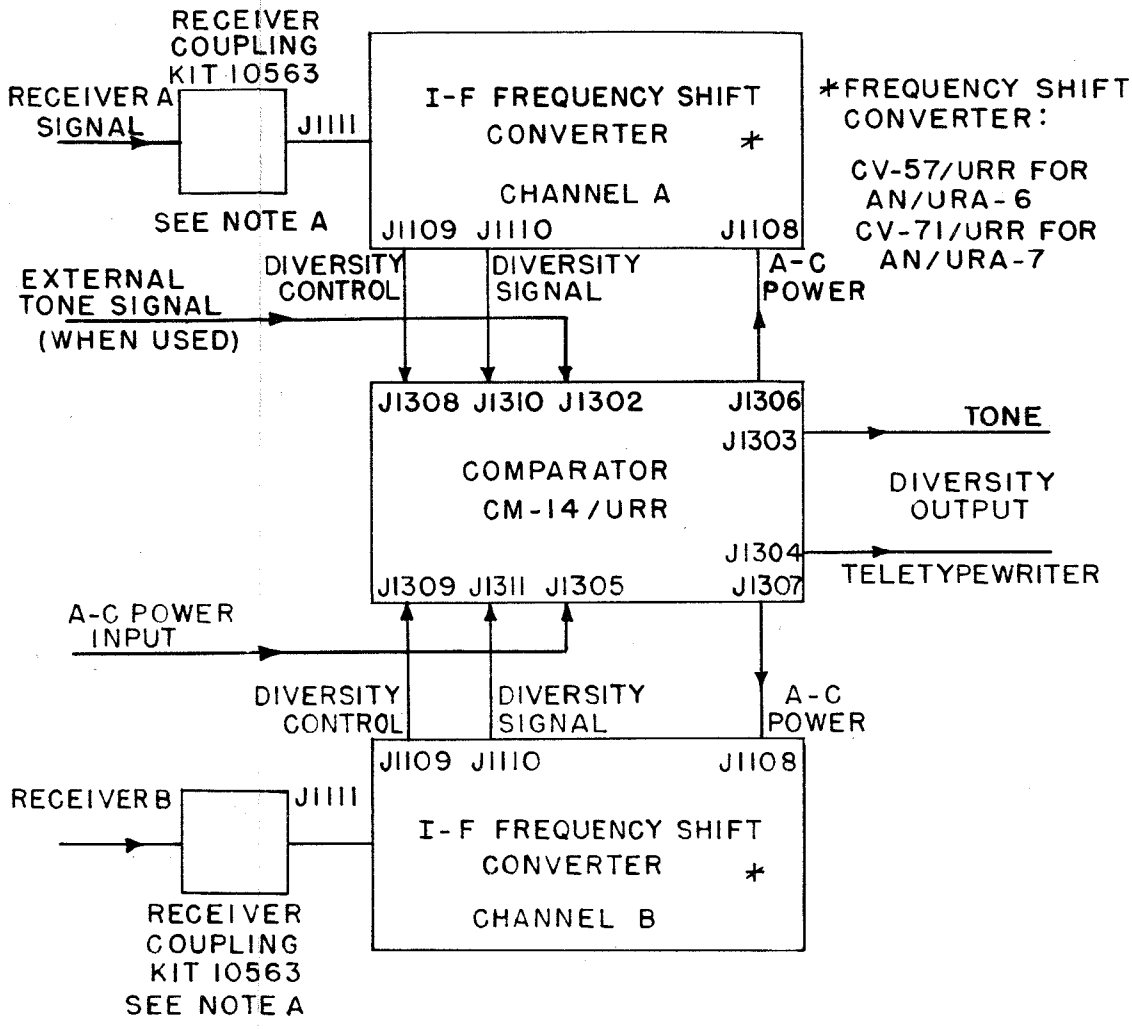

NOTE A: RECEIVER COUPLING KIT 10563 USED ONLY WITH CV-57/URR AND AN/URA-6 EQUIPMENTS.

JACK SYMBOL	NAME
J1108	PWR. INPUT
J1109	DIV. CONT
J1110	DIV. SIG.
J1111	I-F INPUT I-F INPUT
J1302	EXT. TONE IN
J1303	TONE OUTPUT
J1304	TTYP OUTPUT
J1305	PWR. INPUT
J1306	PWR. OUTPUT
J1307	PWR..OUTPUT
J1308	DIV. CONT. CHAN-A
J1309	DIV. CONT. CHAN-B
J1310	DIV. SIG. CHAN_A
J1311	DIV. SIG. CHAN_B

Figure 2–2. Frequency Shift Converter-Comparator Group AN/URA-6 and AN/URA-7, Block Diagram

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JACK SYMBOL	NAME
J1302	EXT. TONE IN
J1303	TONE OUTPUT
J1304	TTYP OUTPUT
J1305	PWR. INPUT
J1306	PWR. OUTPUT
J1307	PWR. OUTPUT
J1308	DIV-CONT CHAN-A
J1309	DIV-CONT CHAN-B
J1310	DIV-SIG CHAN-A
J1311	DIV-SIG CHAN-B

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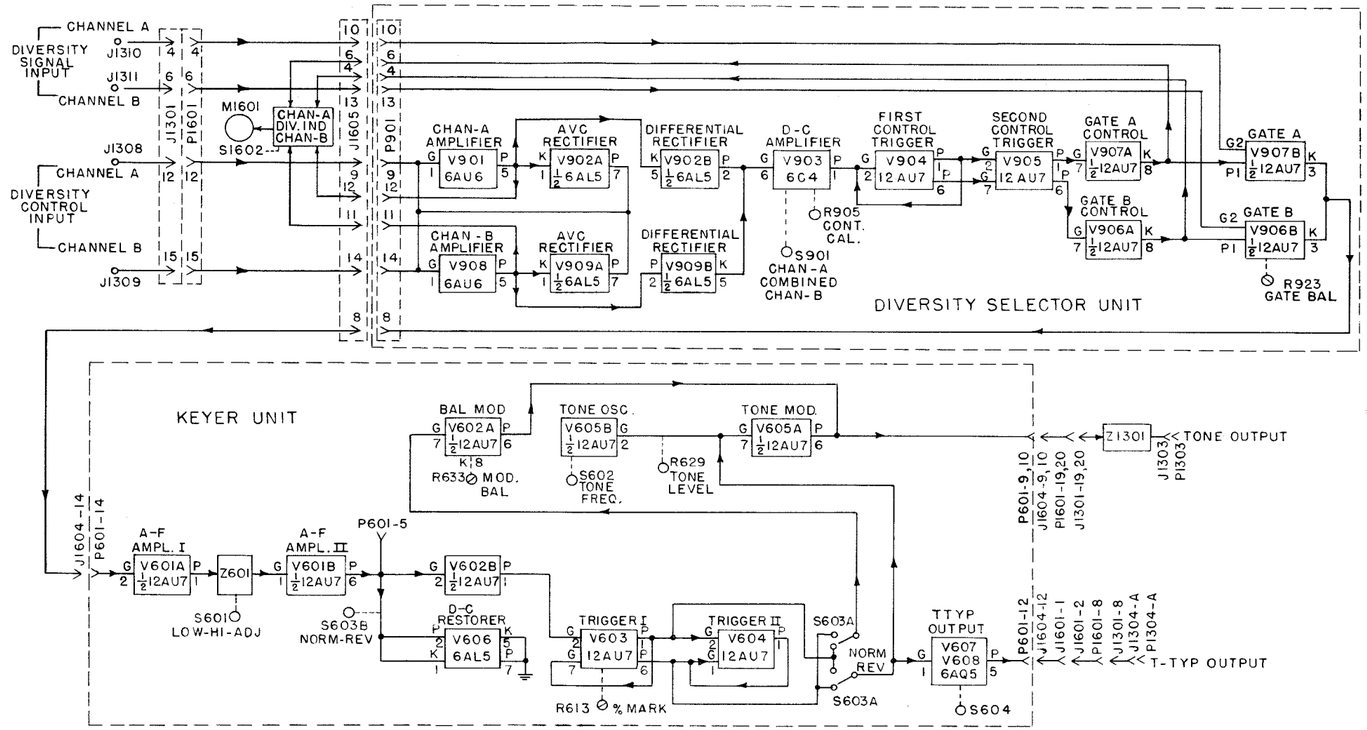


Figure 2–3. Comparator CM-14/URR, Block Diagram

SECTION 3
INSTALLATION

1. UNPACKING.

CAUTION

THE EQUIPMENT IS SUPPLIED WITH THE CHASSIS INSTALLED IN THE CABINET AND THE ELECTRON TUBES IN PLACE. IT IS THEREFORE VERY IMPORTANT THAT ALL MECHANICAL SHOCKS BE AVOIDED WHEN UNPACKING AND INSTALLING THE EQUIPMENT IN ORDER NOT TO DAMAGE ANY PART.

The following special precautions should be observed:

Keep boxes and crates containing equipment in an upright position at all times.

Observe the weights marked on the boxes and make certain that appropriate lifting and transporting gear is available to handle the equipment without subjecting it to shock or damage.

Remove at least three sides from the boxes or crates with a nail puller. Do not use a hammer or pinch bar for this purpose.

2. INSTALLATION, GENERAL.

The various pieces of equipment making up the complete system should be arranged for convenience of operation and accessibility for maintenance. Allow front clearance for tuning and maintenance and rear clearance for connection plugs and cables to the Cable Filter Units. See Figure 3–21 for clearance dimensions of the CV–57/URR and Figures 3–22 and 3–23 for clearance dimensions of the AN/URA–6 and AN/URA–7 equipments. Observe tilting clearances shown on drawing, for equipment that may be installed in the relay rack above or below.

Receiver Coupling Kits, Type 10563, are supplied one with the CV–57/URR and two with the AN/URA–6 equipment, for installation in the associated radio receiver to provide low-impedance i-f coupling between the radio receiver and Converter. The Filter Unit in the Receiver Coupling Kit passes frequencies of 400 kc ±100 kc.

CAUTION

The equipment frame should be securely grounded to insure best performance and eliminate possibility of electric shock to personnel.

3. INSTALLATION OF RECEIVER COUPLING KIT IN RBB OR RBC RECEIVER.

a. REMOVAL OF RBB/RBC CHASSIS FROM CABINET.—Remove the RBB-RBC chassis from its cabinet in the following manner:

(1) Disconnect the antenna, audio output and interconnecting cable plugs from their receptacles at the rear of the radio receiver.

(2) Loosen the twelve panel thumb screws by turning them approximately six turns. These thumb screws are of the captive type and do not release entirely.

(3) Grasp the two round knobs located on the front of the receiver and pull the chassis out part way, until the stops strike. These stops may be released by pressing them through the holes on both sides, near the bottom.

(4) Pull the chassis completely out and set it on a level surface.

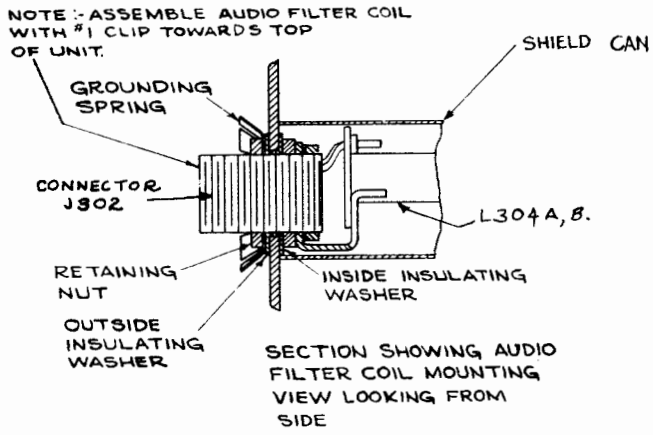


Figure 3–1. Audio Filter Coil (L304A,B) Mounting on RBB/RBC Receivers

b. REMOVAL OF AUDIO FILTER COIL AND CONNECTOR ASSEMBLY.—Remove the audio filter coil, L304-A,B, and connector assembly, J302, in the following manner: (See Figure 3–1).

(1) Remove retaining nut.

(2) Remove the grounding spring.

(3) Remove the outside insulating washer.

(4) Remove shield can screws and brackets.

(5) Remove audio filter coil, connector assembly, and inside insulating washer. NOTE: It is not necessary to unsolder any wires.

c. CHASSIS DRILLING.—See Figure 3–2.

(1) Cut out template No. 1 (item 6 of Table 1–1) with a razor or some sharp instrument. Hold the template in place against the rear of the RBB or RBC radio receiver chassis with scotch tape, friction tape, etc. See Figure 3–2A.

(2) Mark off the position of the seven additional holes by means of a center punch.

(3) Drill the holes in the back of the chassis frame as shown in Figure 3–2A. NOTE: Use a small drill (#47 Drill, 0.078-inch diameter) before drilling the finished (correct) size of the 0.187-inch diameter holes.

(4) Cut out template No. 2. Remove the ground terminal and drill the three additional (0.187-inch diameter) holes. See Figure 3–2B.

(5) Drill an additional 0.187-inch hole, 3/4 inch toward the front and 1/2 inch to the left of the front left hole drilled in step 4. See Figure 3–2B.

d. CABINET DRILLING.—See Figure 3–3.

(1) Cut out template No. 3. See Figure 3–3.

(2) Drill the additional (one-inch diameter) hole.

(3) Remove the paint on the inside and outside of the cabinet as shown on Figure 3–3.

e. AUDIO FILTER MOUNTING.—Remount the Audio Filter Coil, L304A,B, and Connector Assembly, J302, in their new positions as shown in Figure 3–1. Use the same mounting hardware (brackets, nuts, etc.) as were used for the original mounting.

f. LOW-PASS FILTER UNIT MOUNTING.—See Figure 3–4 and see Table 1–1 for item references.

(1) Connect lead "D" (item 4-J) on Receptacles J501 (item 3D) as shown in Figure 3–4. Assemble the four insulating washers (item 4–D), grounding spring (item 3G), receptacle (item 3D), insulating board (item 3C), coil assembly (item 2), four lockwashers (item 4G), and four screws (item 4C) as shown in Figure 3–4. Add spaghetti (item 4K) over lead "D" and connect to terminals of coil assembly.

(2) Place the shield can (item 3A) over the above assembly.

(3) Fasten the shield can assembly (item 3A) to the chassis frame by two lock washers (item 4H), two nuts (item 4I), and two screws (item 4A).

(4) Place the shield can cover (item 3B) in position. Note: The cable "C" (see Figure 3–5) should be fed through the side hole.

(5) Place the decalcomanias in position as shown in Figure 3–2A.

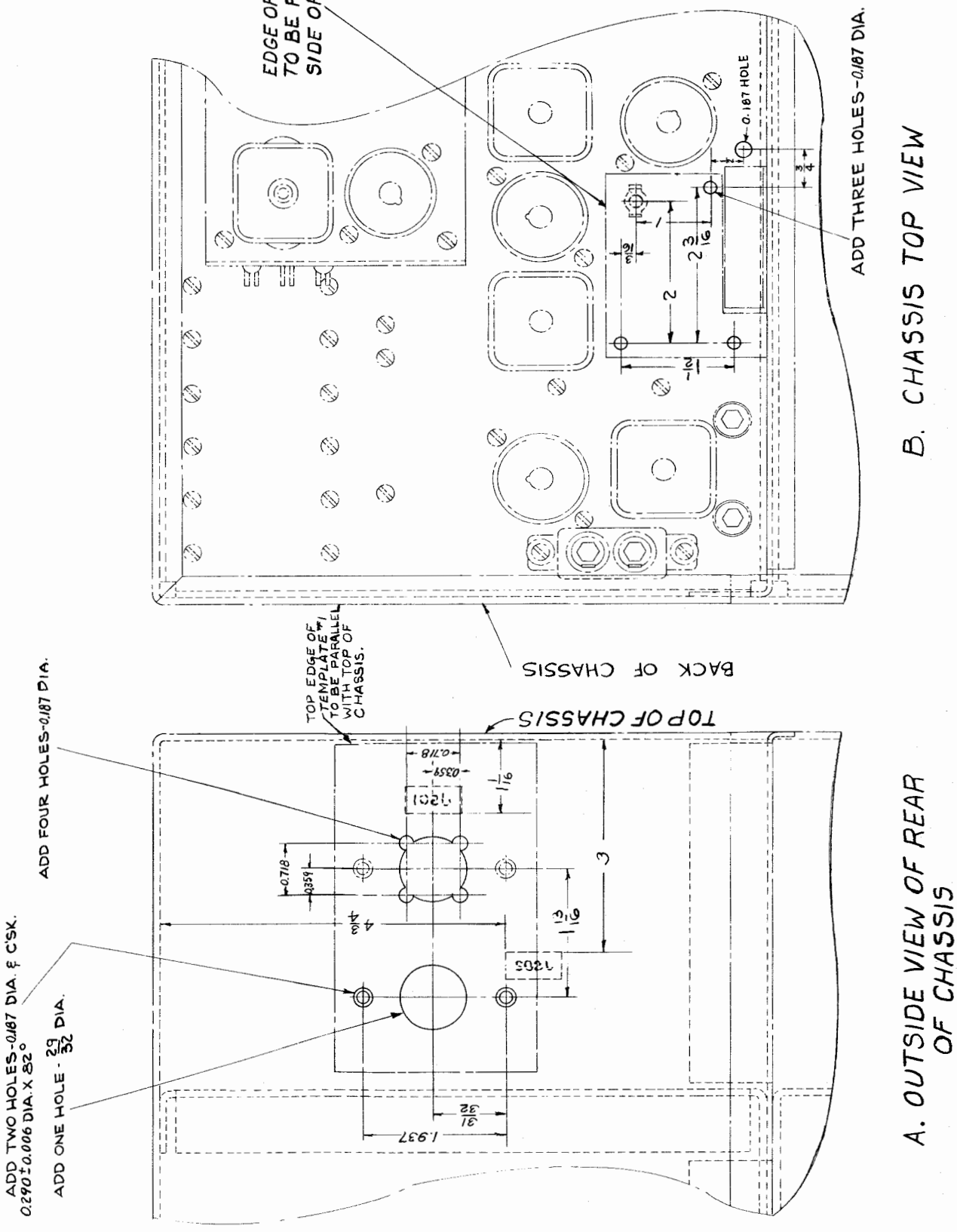


Figure 3—2. Chassis Drilling, RBB/RBC Receivers, for Installation of Receiver Coupling Kit

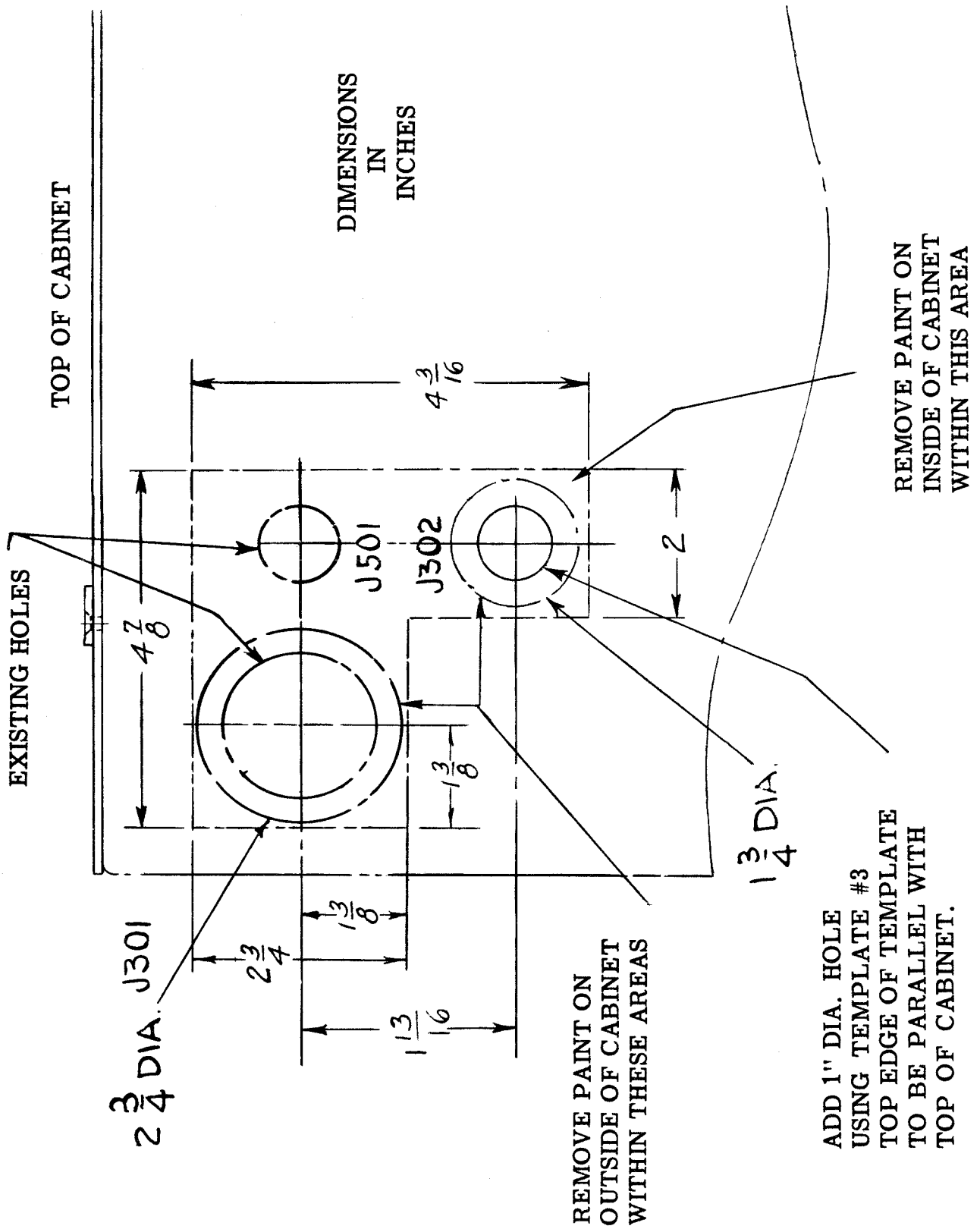


Figure 3–3. Cabinet Drilling, RBB/RBC Receivers, for Installation of Receiver Coupling Kit

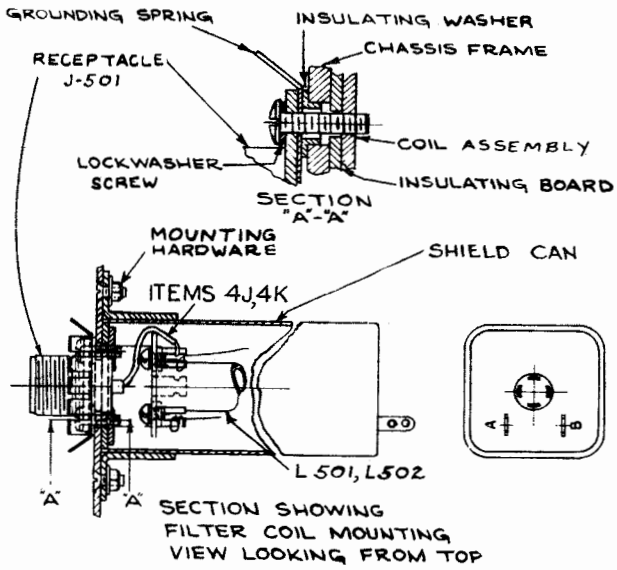


Figure 3–4. Low-Pass Filter Unit Mounting

g. CATHODE-FOLLOWER ASSEMBLY MOUNTING.—See Figure 3–5 and see Table 1–1 for item references.

(1) Mount the Cathode-Follower Assembly in position as shown in Figure 3–5.

(2) Fasten this assembly to the chassis by means of the four screws (item 4B) and four lock washers (item 4H). NOTE: Be sure to put the ground terminal in place as shown in Figure 3–5.

h. WIRING.—See Figures 3–5 and 7–41 and see Table 1–1 for item references.

(1) Connect lead "A" (part of item 1) to the Third I-F, X303, plate pin 8 (see Figure 3–5).

(2) Connect cable "B" (item 3H) to TB307. The white lead with red tracer is connected to terminal No. 7 and the white lead with brown tracer is connected to terminal No. 5.

(3) Connect cable "C" (part of item 2) to TB501, terminal No. 1, located on the Cathode-Follower Assembly.

(4) Turn S501 to ON and replace the receiver in the cabinet.

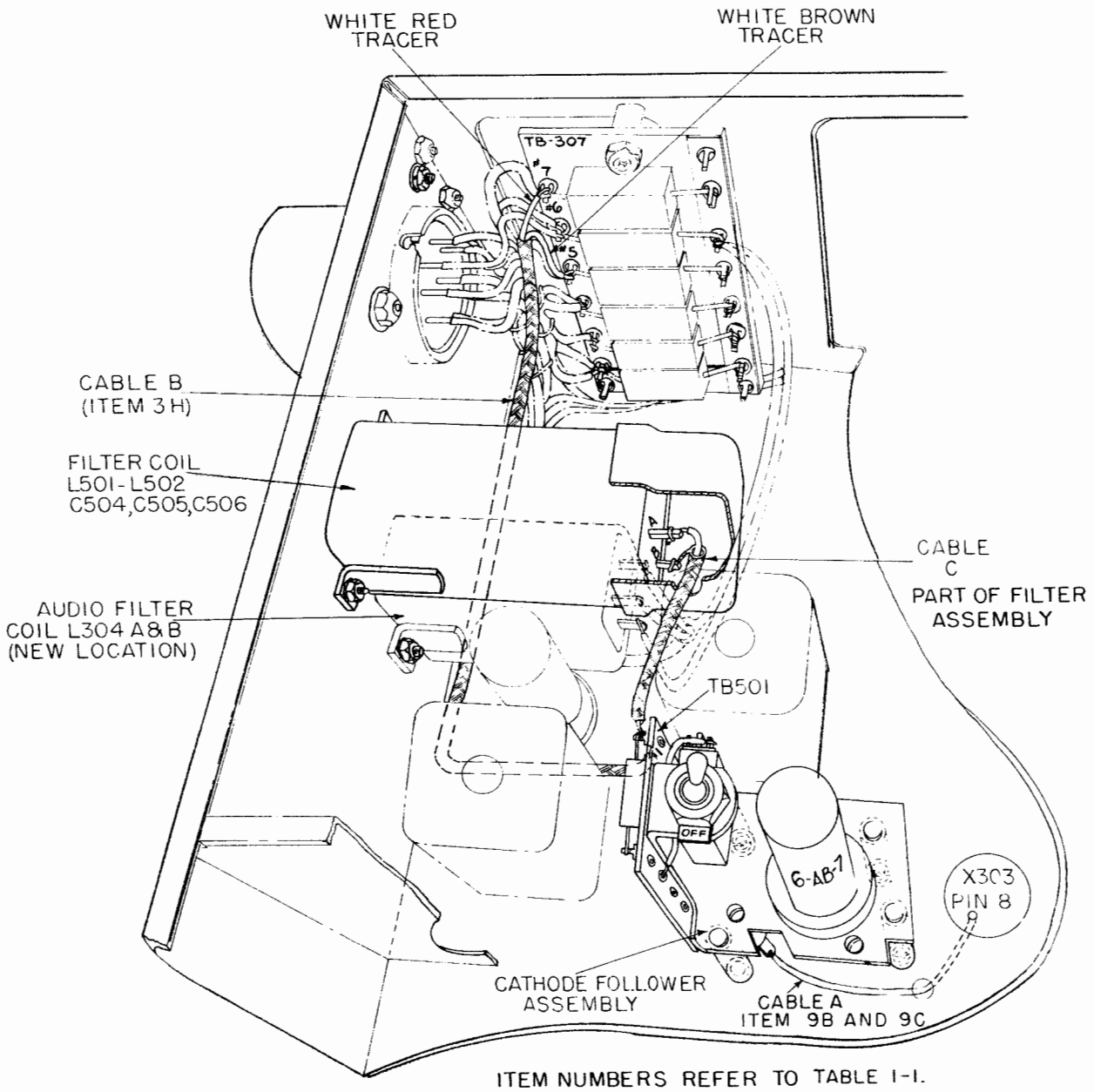


Figure 3–5. Receiver Coupling Kit Installation on RBB/RBC Receivers

4. INSTALLATION OF RECEIVER COUPLING KIT IN RDM RECEIVER.

a. CHASSIS DRILLING.—See Table 1–1 for items referenced in the following steps *a* to *j*.

(1) Cut out the templates (item 10) with a razor or some sharp instrument. Hold the templates in place against the RDM receiver chassis with scotch tape or friction tape. See Figure 3–6 for the template locations, one being placed on right side of chassis, the other on rear apron of chassis.

(2) Mark the positions of the new holes by means of a center punch.

(3) Drill the new holes with a 0.187-inch drill.

(4) Drill a 1/4-inch hole close to the right apron between sockets X9 and X10, as shown on Figure 3–8.

b. Mount the Tube Shelf Assembly (item 1) on the Side Bracket (item 8-B), using the 6–32 x 3/8 screws (item 4B) and the number 6 lock washers (item 4-H) supplied. Because of the position of the mounting spacers, the Tube Shelf will only fit one way. See Figure 3–6 for position.

c. Mount the Side Bracket on the receiver side-apron, using two 10-32 x 3/8 screws (item 7A) No. 10 lock washers (item 7C), and No. 10 nuts (item 7E).

d. Mount the Receptacle (item 3D) on the Coil Assembly, using four 4-32 x 7/16 binder-head screws (item 4C). Slide the spaghetti (item 4K) over the conductor (item 4J) and solder between coil terminal and receptacle (see Figure 3–4). Do not use the Insulating Board (item 3C) or the Insulating Washers (item 4D).

e. Slide the Coil Assembly in the Shield Can (item 3A) and fasten the complete assembly to the Rear Bracket (item 8A) using two 6-32 screws (item 4A), two lock washers (item 4H), two 6-32 nuts (item 4I), and two spacers (item 7C).

f. Mount the Rear Bracket on the receiver rear-apron, using three 6-32 screws (item 7B), and lock washers (item 7E). See Figures 3–6 and 3–7.

g. Crimp and solder center conductor of cable (item 9A) to terminal A of Coil Assembly. Solder shield pigtail to terminal B.

h. Solder center conductor at other end of above cable to terminal 1 of TB501 on Tube Shelf Assembly. See Figure 3–7.

i. Install power cable (item 3H) as follows:

(1) At longer lead end, strip back the braid six inches.

(2) Crimp and solder red-tracer lead at other end of cable to terminal 3 of TB501 on the Tube Shelf.

(3) Crimp and solder brown-tracer lead to terminal 2 of TB501 on Tube Shelf.

(4) Push leads through 1/4-inch hole near X9 and X10.

(5) Crimp and solder brown-tracer lead to pin 7 of X10. See Figure 3–8.

(6) Crimp and solder red-tracer lead to terminal 9 of TB3. See Figure 3–8.

j. Install signal cable (item 9B) as follows:

(1) Crimp and solder cable to TP1 on Tube Shelf Assembly (see Figure 7–41). Remove short lead if necessary.

(2) Slide sleeving (item 9C) over cable.

(3) Put cable through hole made by punching as shown at G16 in Figures 3–8 and 3–9.

(4) Crimp and solder cable to pin 8 of X6.

k. Check to assure switch S501 is in ON position and replace receiver in cabinet.

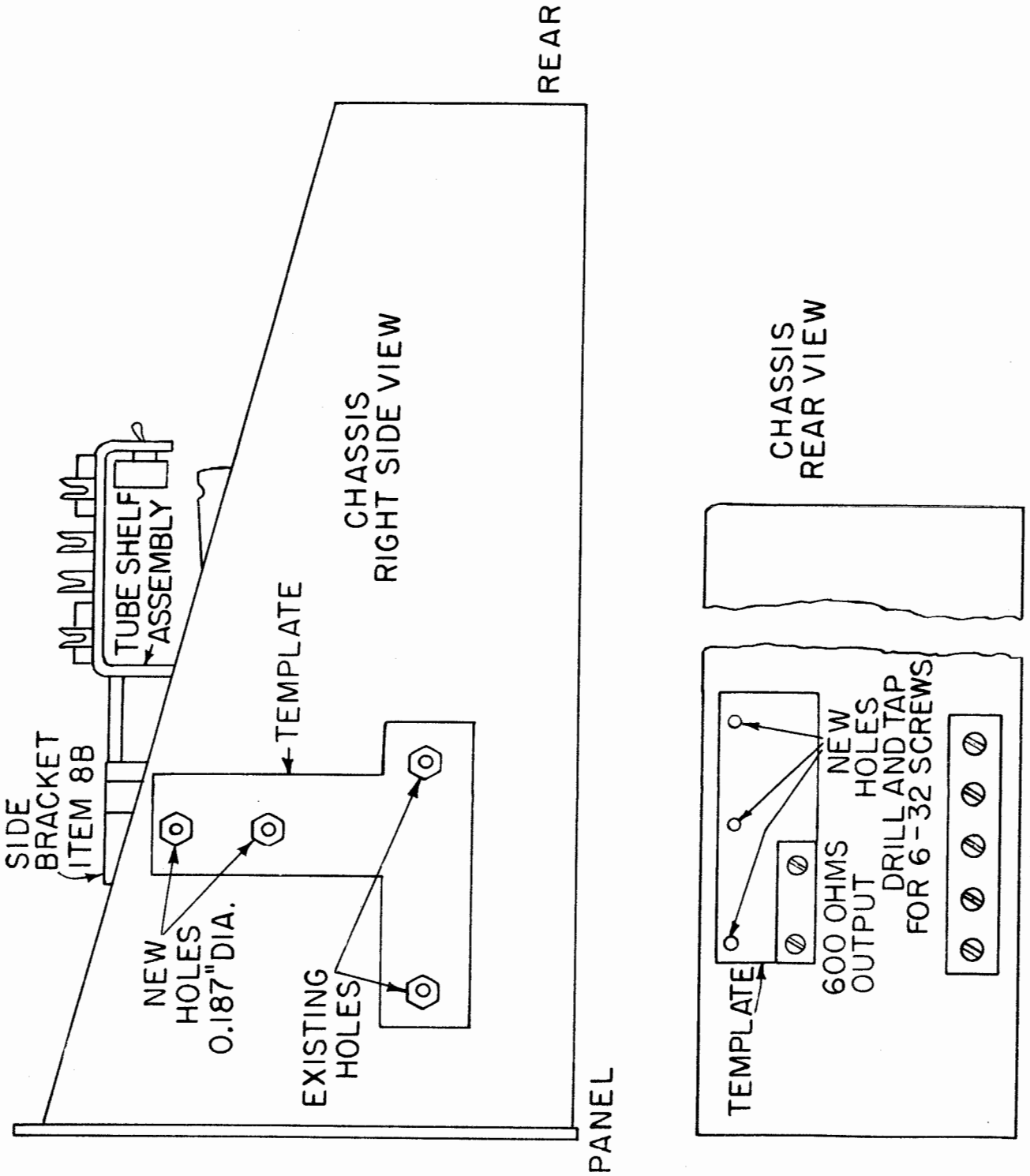


Figure 3–6. Drilling Plan, RDM Receiver, for Installation of Receiver Coupling Kit

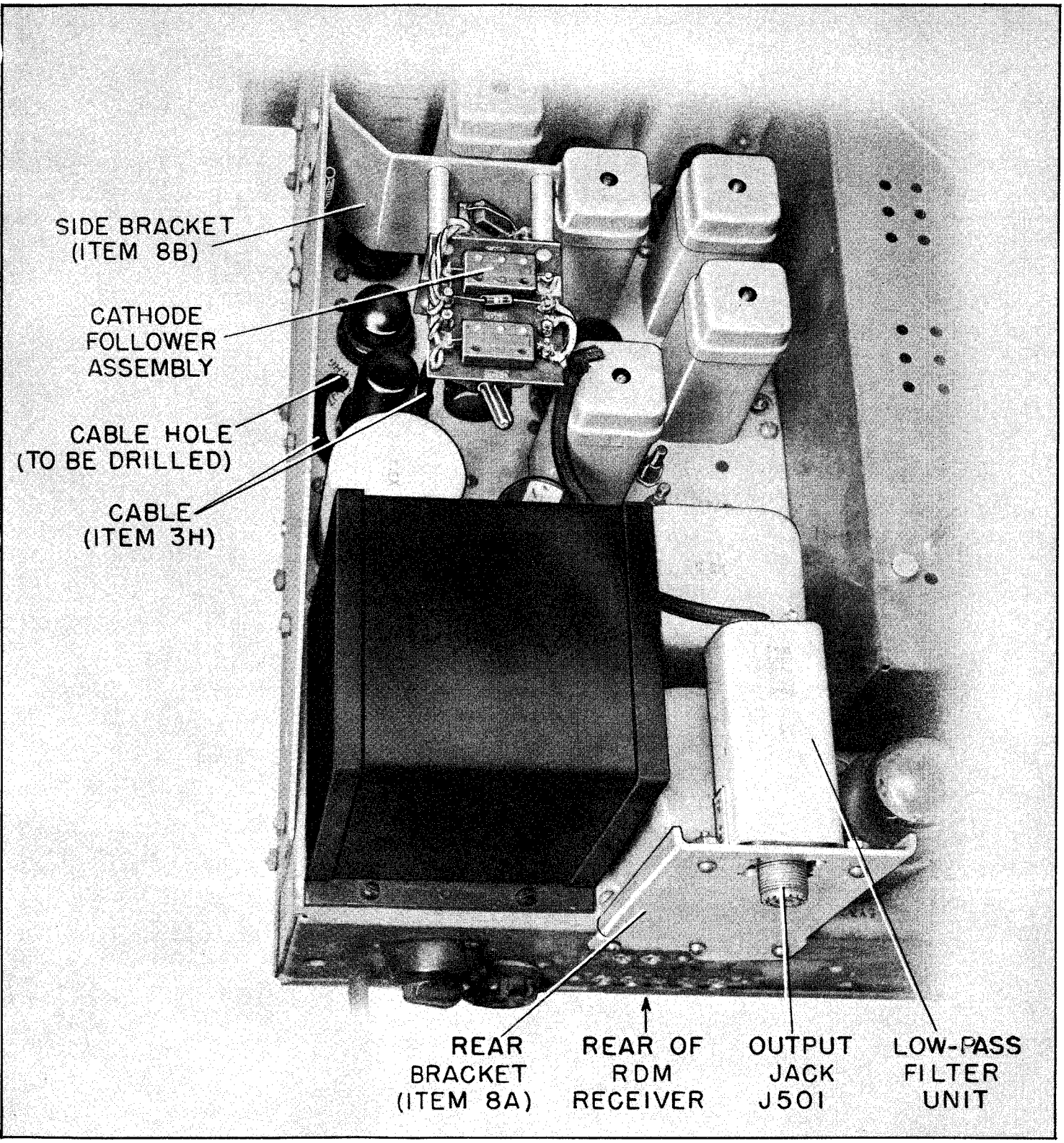


Figure 3–7. Receiver Coupling Kit Installation on RDM Receiver, Top View

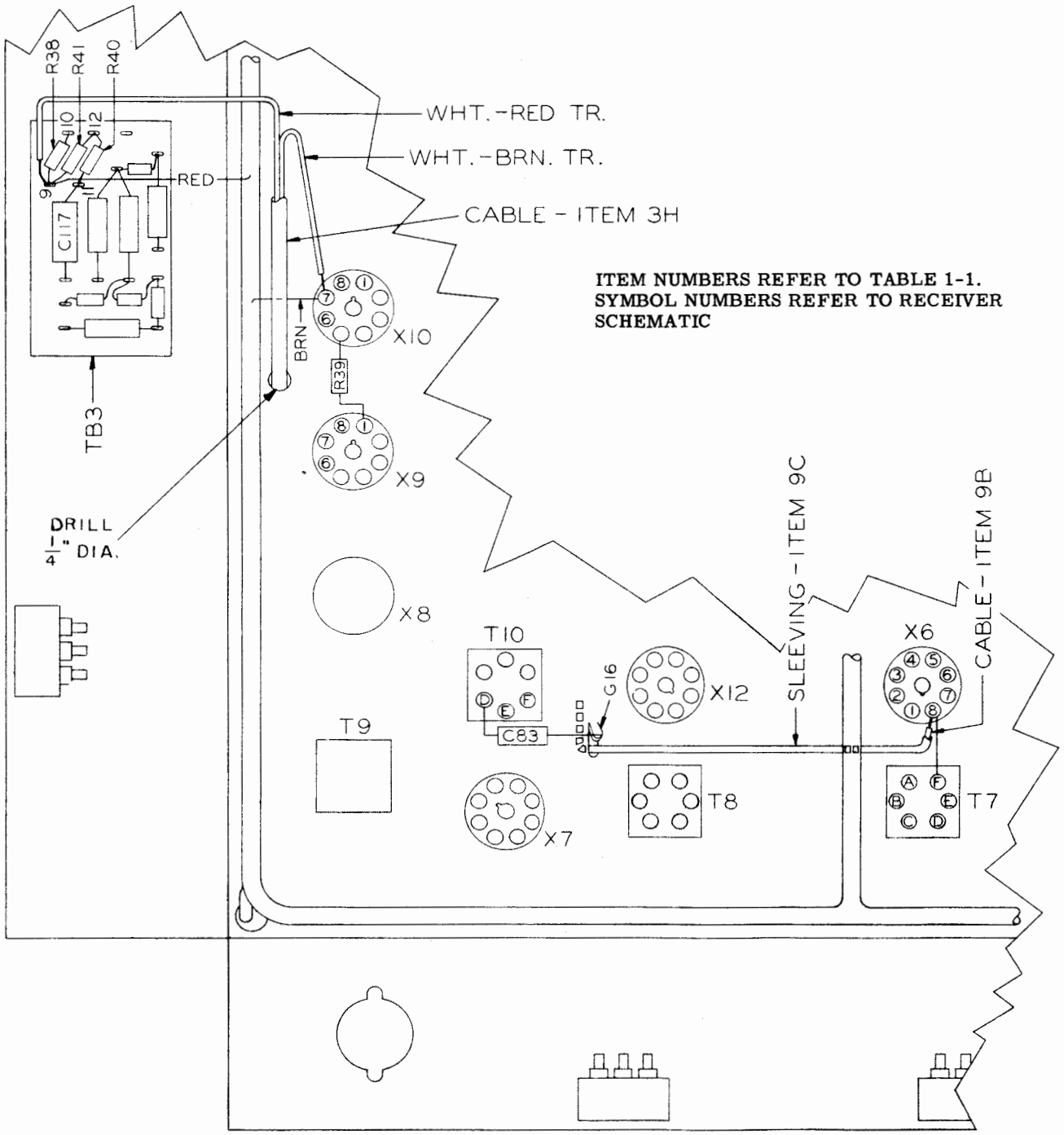


Figure 3–8. Receiver Coupling Kit Installation on RDM Receiver, Wiring Side of Chassis

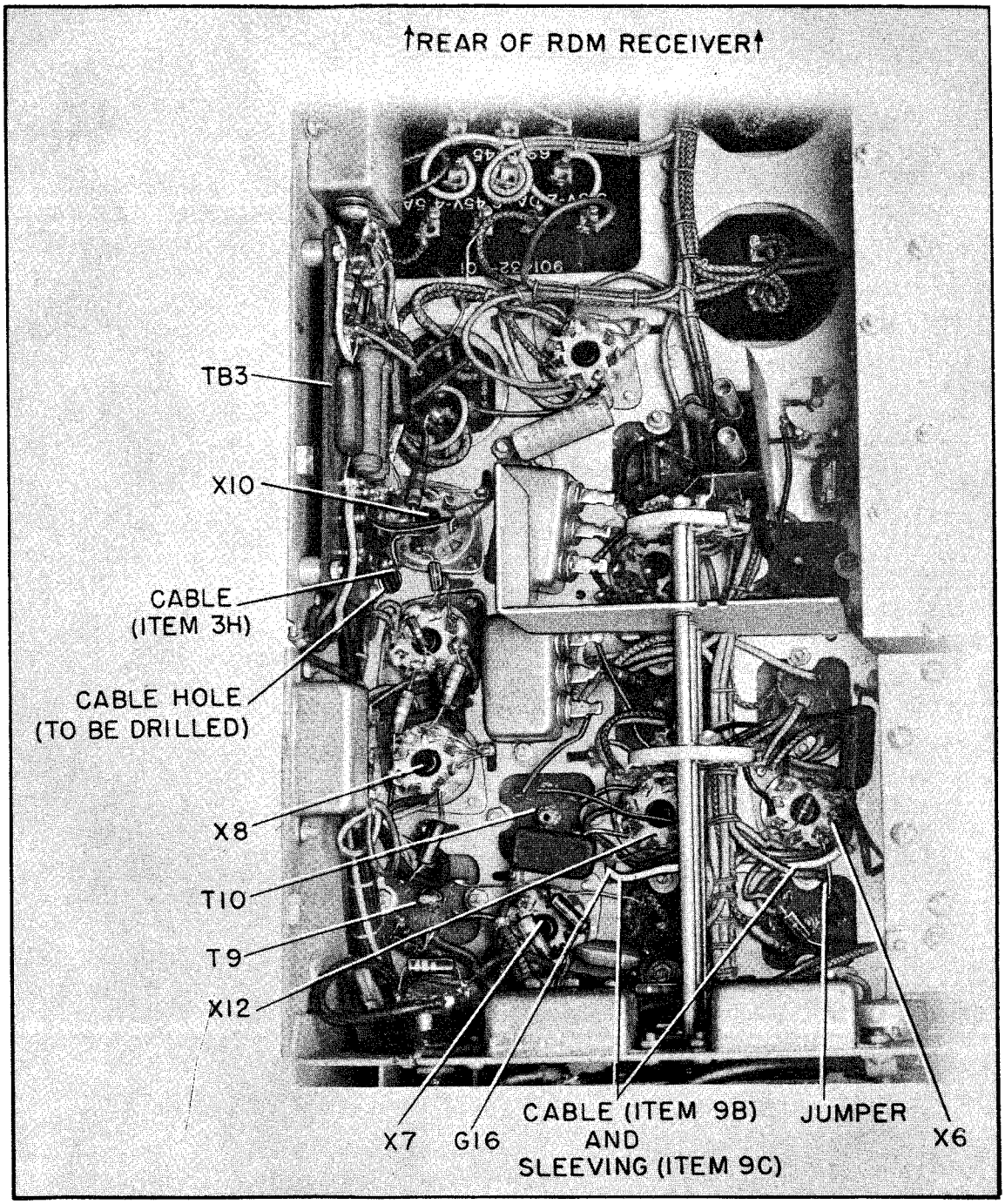


Figure 3–9. Receiver Coupling Kit Installation on RDM Receiver, Bottom View

5. INSTALLATION OF FREQUENCY SHIFT CONVERTER CV-57/URR.

a. RACK MOUNTING.—Place the equipment on a bench; place the rack mounts (see Figure 1–2), identified as (C) and (D) in Table 1–1, against the cabinet sides so the slotted flanges turn outward, parallel to the front panel, and fasten each in place with nine No. 8-32 x 3/8 screws supplied. Put lock washers under the screw heads. See Figure 3–22 for further information. Refer to Figure 3–23 for tilting clearances to avoid interference with other equipment that may be located above or below. Mount the cabinet in the rack, using rack screws and washers (not supplied).

b. TABLE MOUNTING. — Assemble the shock mount first. Proceed as follows:

(1) Assemble the shock mounts, (F) of Table 1–1, two each on the bracket assemblies, (A) and (B) Table 1–1, using 1/4-20 screws, lock washers and nuts supplied (see Figure 3–22). Put the lock washers under the nuts.

(2) Attach the above two assemblies to the channel, (E) of Table 1–1, using eight No. 8-32 x 3/8 screws. Put flat washers and lock washers under the screws, with the lock washers next to the screws.

(3) Turn the case upside down and put shock mount assembly in place.

(4) Fasten shock mount in place with nine No. 8-32 x 3/8 screws and lock washers on each side of cabinet.

(5) Drill the four mounting holes in the table for 5/16-inch diameter bolts (not supplied): Two holes with centers 14 inches apart for the front shock mounts, and two holes with their centers 7-5/8 inches to the rear of the front bolt hole centers.

(6) Turn the equipment to rest on the shock mounts and bolt to the table with 5/16-inch bolts. Table 3–1 shows a listing of external connectors and related information. Figure 3–10 is a rear view of Converter CV–57/URR showing the locations of these connectors.

TABLE 3-1. EXTERNAL CONNECTORS, CV-57/URR

SYMBOL	TYPE	PIN NUMBERS USED	FUNCTION
J1102	49194	Center and shell	Cathode-ray Tube Remote Vertical jack
P1102	49195	Center and shell	Cathode-ray Tube Remote Vertical plug
J1104	AN-3102-14S-7S	A,B,C	External Tone Input jack
P1104	AN-3106-14S-7P	A,B,C	External Tone Input plug
J1105	AN-3102-14S-7S	A,B,C	Tone Output jack
P1105	AN-3106-14S-7S	A,B,C	Tone Output plug
J1106	AN-3102-14S-9P	A,B	Teletype Output jack
P1106	AN-3106-14S-9S	A,B	Teletype Output plug
J1107	97-4085	1,2	A-C Outlet
J1108	AN-3102-14S-7P	A,B,C	Power Input jack
P1108	AN-3106-14S-7S	A,B,C	Power Input plug
J1109	AN UG-290/U	Center and shell	Diversity Control for diversity operation*
J1110	AN UG-290/U	Center and shell	Diversity Signal for diversity operation*
J1111	49194	Center and shell	I-F Input jack
P1111	49195	Center and shell	I-F Input plug

* Used for dual-channel operaton only. See Table 3-2.

c. CONNECTING CABLES.

(1) GENERAL. — Connections to the equipment vary with different installations. In each case the equipment should be installed in accordance with approved installation plans which will show where to install it and the types of cables to be used.

Length and termination of connecting cables depend on the installation. The equipment is delivered with the mating plugs (and their associated cable clamps and ferrules) connected to their corresponding receptacles (jacks) on the unit. Remove each plug, one at a time, when it is ready for cable fabrication. For coaxial cable fabrication refer to Figure 3–11.

For multi-conductor cable fabrication refer to Figure 3–12. To disassemble the plug, first unscrew its associated cable clamp on the back of the plug. Be careful not to lose the ferrule seated inside the cable clamp, between the clamp and plug. Refer to Figure 3–12 for further details.

(2) POWER CABLE. — Remove plug P1108 from PWR INPUT jack J1108, disassemble and, using a two-wire power cable, solder the wires to pins A and C. Reassemble the plug and replace on PWR INPUT jack J1108.

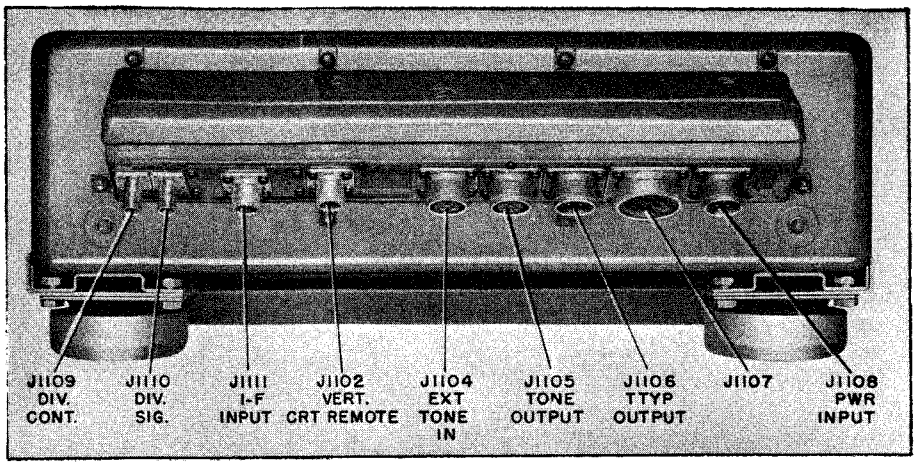


Figure 3–10. Frequency Shift Converter CV-57/URR, Rear View

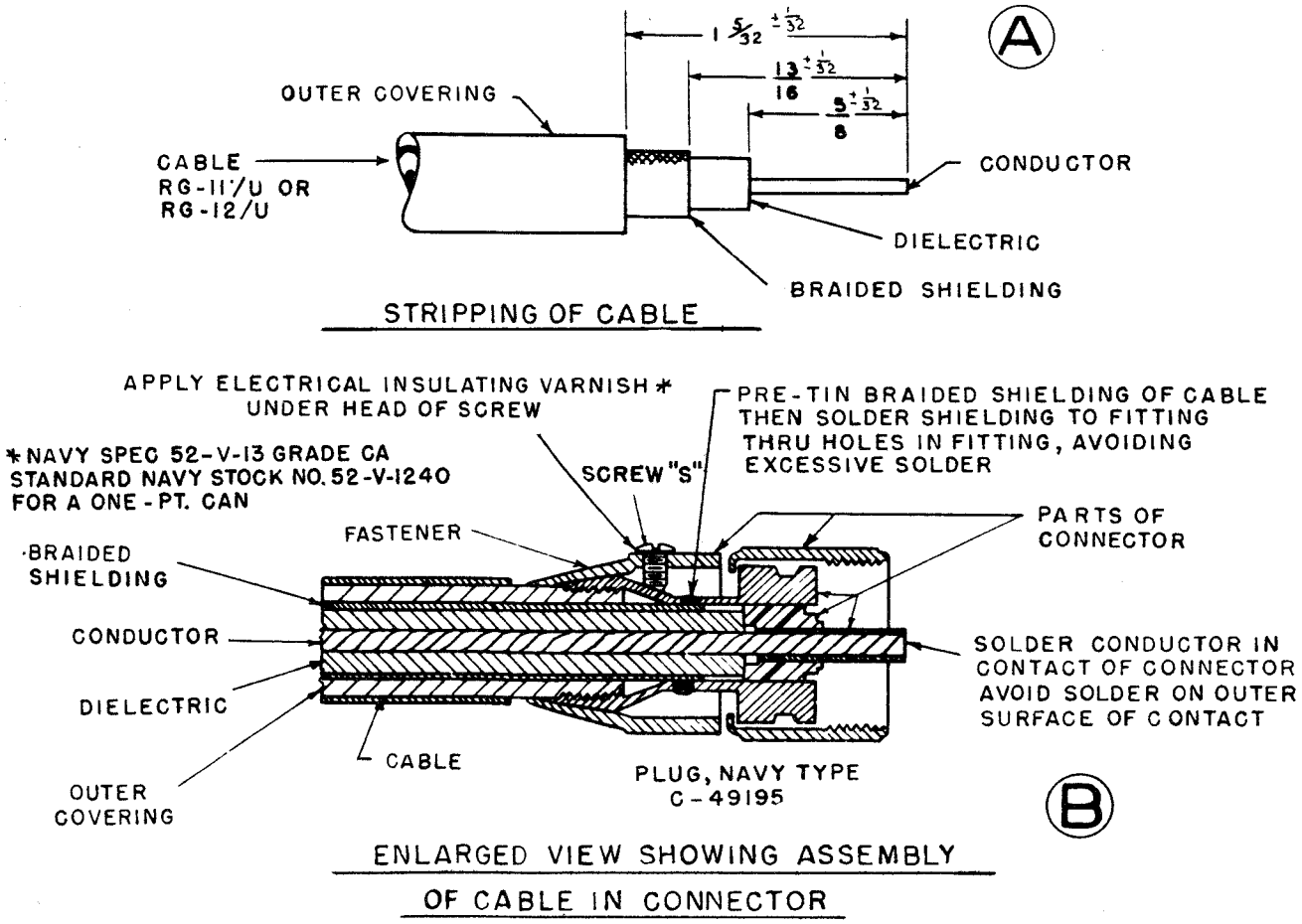
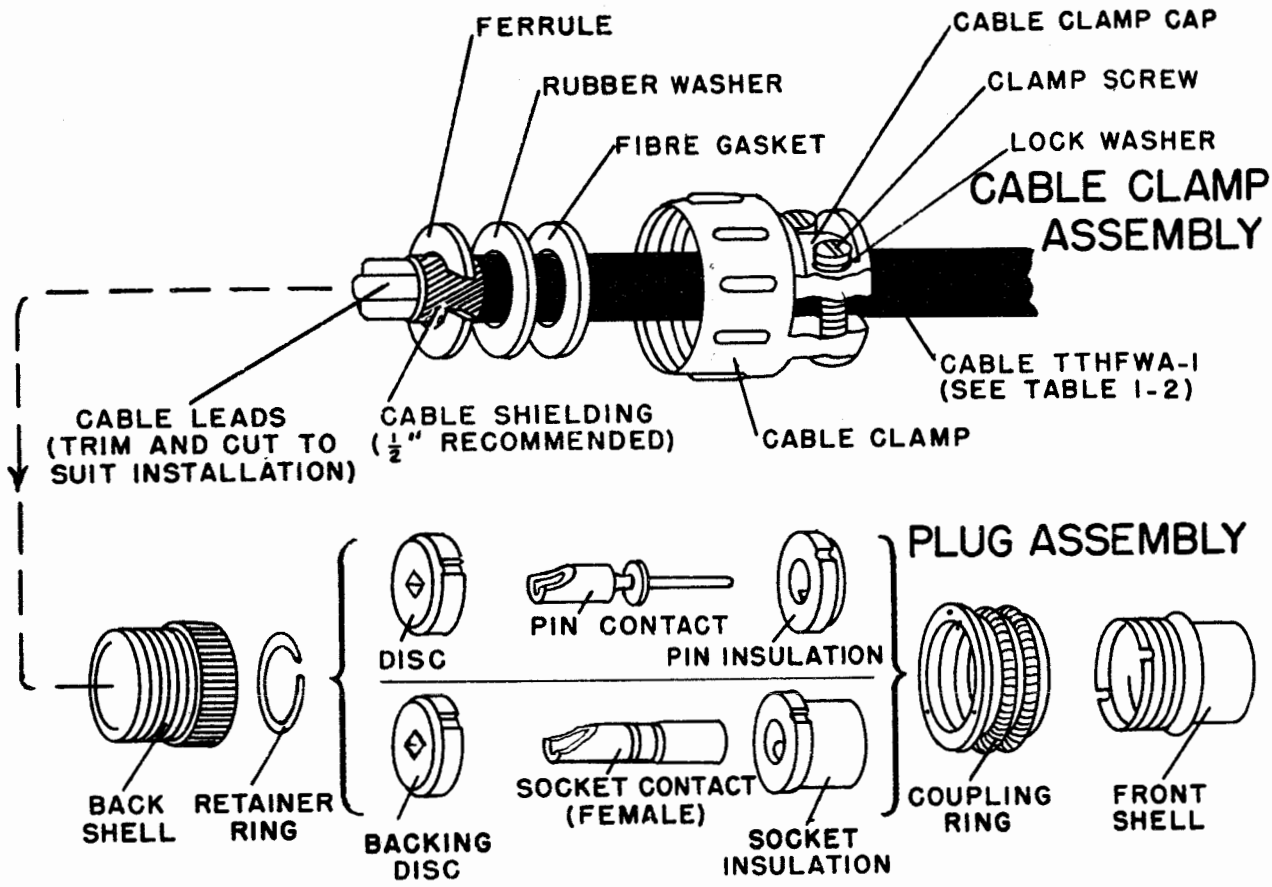


Figure 3–11. Cable Fabrication Instructions, Single-Conductor Cable



1. Unscrew cable clamp from plug, being careful not to lose ferrule, rubber washer, and fibre gasket.
2. Remove cable clamp cap by unfastening the two clamp screws.
3. Slip cable through cable clamp, fibre gasket, and rubber washer, the threaded portion of clamp being towards the end of cable.
4. Disassemble plug for soldering wires by unscrewing its back shell. Slip the cable through back shell and the plug coupling ring, which is freed when the back shell is removed.
5. Cut and strip cable and wires to suit. Pre-tin each wire. Cut back the shielding to within one-half inch of the outer covering.
6. Pre-tin braided shielding of cable.
7. Solder wires to plug contacts. Avoid excessive solder.
8. Reassemble plug. The cable shielding should show about one-quarter inch beyond the assembled plug.
9. Slip ferrule over cable so that shielding is on side that will be within connector housing. Solder shielding to ferrule, not permitting any solder to get near outer edge of ferrule as this causes a barrier between ferrule and rim of connector shell.
10. Push the cable in so that the ferrule is up against the connector shell rim, position the clamp rubber washer and fibre gasket, and then screw the cable clamp body onto the back shell of plug.
11. Reassemble the cable clamp cap with the two associated clamp screws and lock washers.

Figure 3–12. Cable Fabrication Instructions, Multi-Conductor Cable

(3) TELETYPEWRITER OUTPUT CABLE.—Remove plug P1106 from TTYP OUTPUT jack J1106, disassemble and, using two-wire cable, connect leads to A and B. Note that pin B is grounded inside the Converter. If using single-conductor shielded wire, solder conductor to A and shield to B. Reassemble plug and replace on TTYP OUTPUT jack J1106. The teletypewriter loop current must be supplied from external teletype battery or power supply. The negative side of the teletypewriter loop is grounded in the Frequency Shift Converter CV–57/URR. See Figure 3–13.

(4) SIGNAL INPUT (I-F INPUT) PLUG P1111.—Remove plug from I-F INPUT jack J1111 and disassemble. Using 70-ohm coaxial cable, solder the center conductor to the plug center, and the shield to the plug shell. Reassemble plug and engage in jack. The other end of the cable goes to the associated receiver by way of Receiver-Coupling Kit, Navy type 10563.

(5) TONE OUTPUT CABLE.—Remove plug P1105 from the TONE OUTPUT J1105 and disassemble. If two-wire or single-wire shielded cable is used, solder leads to A and C. Pin B is the center tap of the output transformer and should be used only when a balanced grounded output is required. Reassemble plug and replace on TONE OUTPUT jack J1105. Connect a short length of bus wire from pin B of TONE OUTPUT jack J1105 to GND 5 (see Figure 7–25) if a ground is necessary.

(6) EXTERNAL TONE INPUT CABLE (IF USED).—Remove plug P1104 from the EXT. TONE IN jack J1104. If two-wire or single-wire shielded cable is used, solder leads to A and B. Terminals A and C of jack J1104 are connected together. Terminal B of J1104 is connected to the shield and ground. Reassemble plug and insert in jack J1104. Use of this cable is optional.

(7) VERTICAL CRT REMOTE CABLE (IF USED).—Remove plug P1102 from the VERT. CRT-REMOTE jack J1102. Using 70-ohm coaxial or single-wire shielded cable, solder the center conductor to the plug center, and the shield to the plug shell. Reassemble plug and insert in jack J1102. Use of this cable is optional.

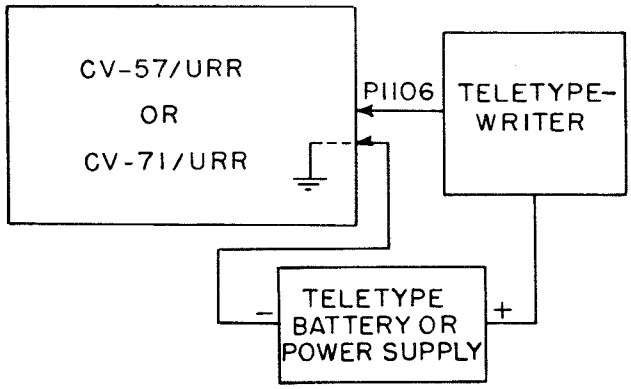


Figure 3–13. Teletypewriter Loop Circuit, Block Diagram

6. INSTALLATION OF FREQUENCY SHIFT CONVERTER-COMPARATOR GROUP AN/URA-6 or AN/URA-7.

a. MOUNTING. — The AN/URA–6 or AN/-URA–7 equipment is supplied in a rack for table mounting. Four holes are provided in the base to bolt the rack to the table with 3/8-inch bolts (not supplied), see Figure 3–22. The centers of the front holes are 15-1/2 inches apart, located 1-11/16 inches back from the front of the cabinet. The centers of the rear holes are 11-1/16 inches directly to the rear of the centers of the front holes.

Access to the two front bolt holes can be had by removing the four screws holding the bottom Converter in the cabinet and then removing the Converter. After bolting the cabinet to the table, replace the Converter previously removed.

The Converters and Comparator can be removed from the table-mounting rack and installed in a standard relay rack. This is shown in Figure 3–23. The units may be fastened to the relay rack by the same screws as are used in the table-mounting rack. Spaces between the units may be covered by blank panels, each being held by two screws (one at each end). These panels and their screws are not supplied as parts of the subject equipment and must be procured separately. Observe the clearances shown on the drawing to allow for pulling out the chassis and tilting them for servicing, in order to avoid interference with other equipment that may be mounted in the relay rack above or below the units of the AN/URA–6 or AN/URA–7 equipments.

TABLE 3-2. EXTERNAL CONNECTORS, AN/URA-6 or AN/URA-7

(1100–Symbol Series, one on each Converter or two per equipment. 1300-Symbol Series, one per equipment)

SYMBOL	TYPE	PIN NUMBERS USED	FUNCTION
J1102	49194	Center and shell	Cathode-ray Tube Remote Vertical jack
P1102	49195	Center and shell	Cathode-ray Tube Remote Vertical plug
J1104	AN-3102-14S-7S	A,B,C	External Tone Input jack
P1104	AN-3106-14S-7P	A,B,C	External Tone Input plug
J1105	AN-3102-14S-7S	A,B,C	Tone Output jack
P1105	AN-3106-14S-7P	A,B,C	Tone Output plug
J1106	AN-3102-14S-9P	A,B	Teletype Output jack
P1106	AN-3106-14S-9S	A,B	Teletype Output plug
J1107	97-4085	1,2	A-C Outlet
J1111	49194	Center and shell	I-F Input jack
P1111	49195	Center and shell	I-F Input plug
J1302	AN-3102-14S-7S	A,B,C	External Tone Input jack
P1302	AN-3106-14S-7P	A,B,C	External Tone Input plug
J1303	AN-3102-14S-7S	A,B,C	Tone Diversity Output jack
P1303	AN-3106-14S-7P	A,B,C	Tone Diversity Output plug
J1304	AN-3102-14S-9P	A,B	Teletype Diversity Output jack
P1304	AN-3106-14S-9S	A,B	Teletype Diversity Output plug
J1305	AN-3102-14S-7P	A,B,C	Power Input jack
P1305	AN-3106-14S-7S	A,B,C	Power Input plug

b. CONNECTING CABLES.

(1) GENERAL.—Connections to the equipment vary with different installations. In each case the equipment should be installed in accordance with approved installation plans which will show where to install it and the types of cables to be used.

The equipment is delivered with the mating plugs (and their associated cable clamps and ferrules) connected to their corresponding receptacles (jacks) on the unit. Remove each plug, one at a time, when it is ready for cable fabrication. For single-conductor cable fabrication refer to Figure 3–11 and Table 1–2. For multi-conductor cable fabrication refer to Figure 3–12. To disassemble the plug, first unscrew its associated cable clamp on the back of the plug. Be careful not to lose the ferrule seated inside the cable clamp, between the clamp and plug. Refer to Figure 3–12 for further details.

(2) CONVERTER-TO-COMPARATOR CABLES.—Connect the six cables supplied with the equipment (Figure 3–14) as follows: (The first cable symbol number given is for the AN/URA–6 equipment; the symbol number in parentheses is for the AN/URA–7 equipment):

(*a*) Cable W1703 (W1701) from DIV. CONT. jack J1109 of top converter to DIV.-CONT. CHAN-A jack J1308 of Comparator.

(*b*) Cable W1704 (W1702) from DIV. CONT. jack J1109 of bottom converter to DIV.-CONT. CHAN-B jack J1309 of Comparator.

(*c*) Cable W1709 (W1707) from DIV. SIG. jack J1110 of top converter to DIV.-SIG. CHAN-A jack J1310 of Comparator.

(*d*) Cable W1710 (W1708) from DIV. SIG. jack J1110 of bottom converter to DIV.-SIG. CHAN-B jack J1311 of Comparator.

(*e*) Cable W1715 (W1713) from PWR INPUT jack J1108 of top converter to PWR OUTPUT jack J1306 of Comparator.

(*f*) Cable W1716 (W1714) from PWR INPUT jack J1108 of bottom converter to PWR OUTPUT jack J1307 of Comparator.

(3) POWER CABLE. — Remove plug P1305 from PWR INPUT jack J1305, disassemble and, using a two-wire power cable, solder the wires to pins A and C. Reassemble the plug and replace on PWR INPUT jack J1305.

(4) TELETYPEWRITER CABLE. — Remove plug P1304 from TTYP OUTPUT jack J1304, disassemble, and using two-wire cable, solder leads to A and B as shown in Figure 3–12. The teletypewriter loop current must be supplied from external teletype power supply as shown in applicable installation drawing. The negative side of the teletypewriter loop is grounded in the Frequency Shift Converter-Comparator Group AN/URA–6 or AN/URA–7. See Figure 3–13. Teletypewriter cables may be connected in the same manner to individual Converter units, if desired, for single-channel operation. See paragraph 5*c*(3) of this section.

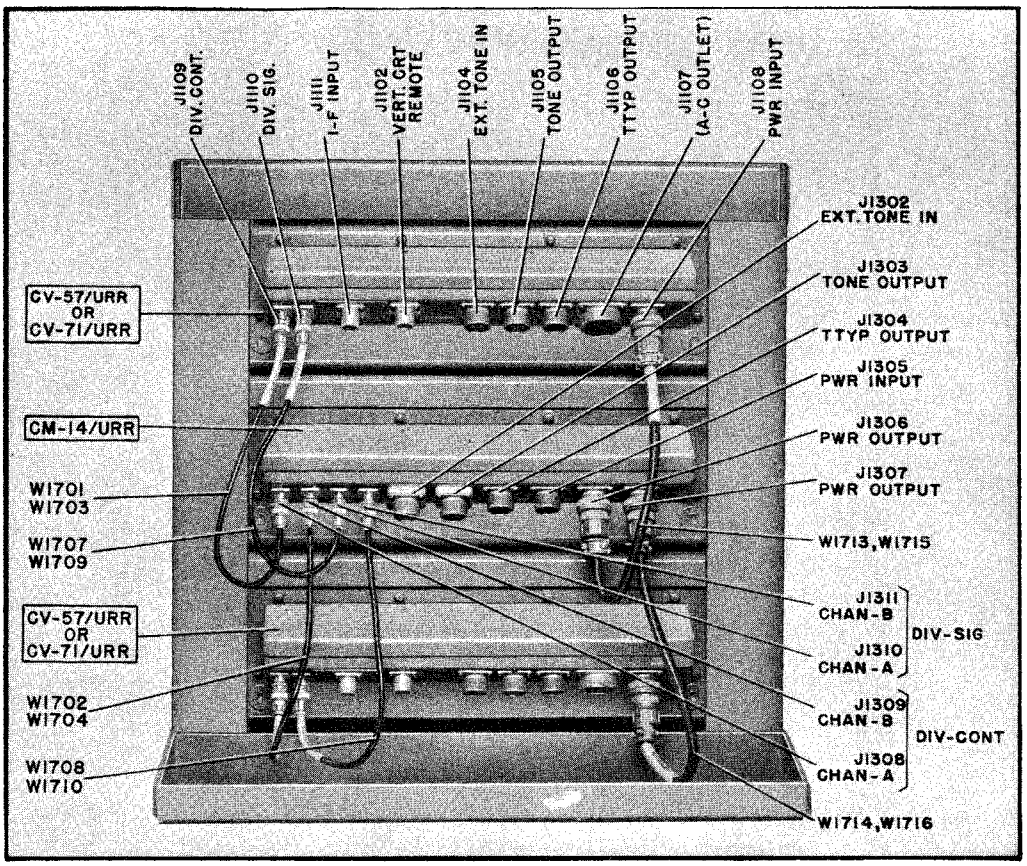


Figure 3–14. Frequency Shift Converter-Comparator Group AN/URA-6 and AN/URA-7, Rear View

(5) I-F INPUT CABLES ON BOTH CONVERTERS.—Remove the plugs P1111 from I-F INPUT jacks J1111 and disassemble. Using 70-ohm coaxial cable RG–11/U or RG–12/U, solder the center conductor to the plug center, and the shield to the plug shell (see Figure 3–11). Reassemble plugs and place in proper jacks. The two cables of the two converters will go to separate receivers.

(6) TONE OUTPUT CABLE. — Remove the plug from TONE OUTPUT jack J1303 and disassemble. If two-wire or single-wire shielded cable is used, solder leads to A and C. Pin B is the center tap of the output transformer and should be used only when a balanced grounded output is required. Reassemble plug and replace on TONE OUTPUT jack J1303. Connect a short length of bus wire from pin B of TONE OUTPUT jack J1303 to GND. 4 (see Figure 7–27) if a ground is necessary. Tone output cables may be connected in the same manner to individual Converter units if desired, for single-channel operation. See paragraph 5*c*(5) of this section.

(7) EXTERNAL TONE INPUT CABLE (IF USED).—Remove plug P1302 from EXT. TONE IN jack J1302. If two-wire or single-wire shielded cable is used, solder leads to A and B. Terminals A and C of jack J1302 are connected together. Terminal B of J1302 is connected to the shield and ground. Reassemble plug and insert in jack J1302. Use of this cable is optional. External tone input cables may be connected in the same manner to individual Converter units, if desired, for single-channel operation. See paragraph 5*c*(6) of this section.

(8) VERTICAL CRT REMOTE CABLE (IF USED).—Optional use may be made of a connection to a remote cathode-ray tube through the VERT. CRT-REMOTE jack J1102 on the Converter units. See paragraph 5*c*(7) of this section.

7. INITIAL ADJUSTMENTS.

Refer to Figure 4–1 for location of front panel controls.

a. FREQUENCY SHIFT CONVERTER CV–57/-URR.

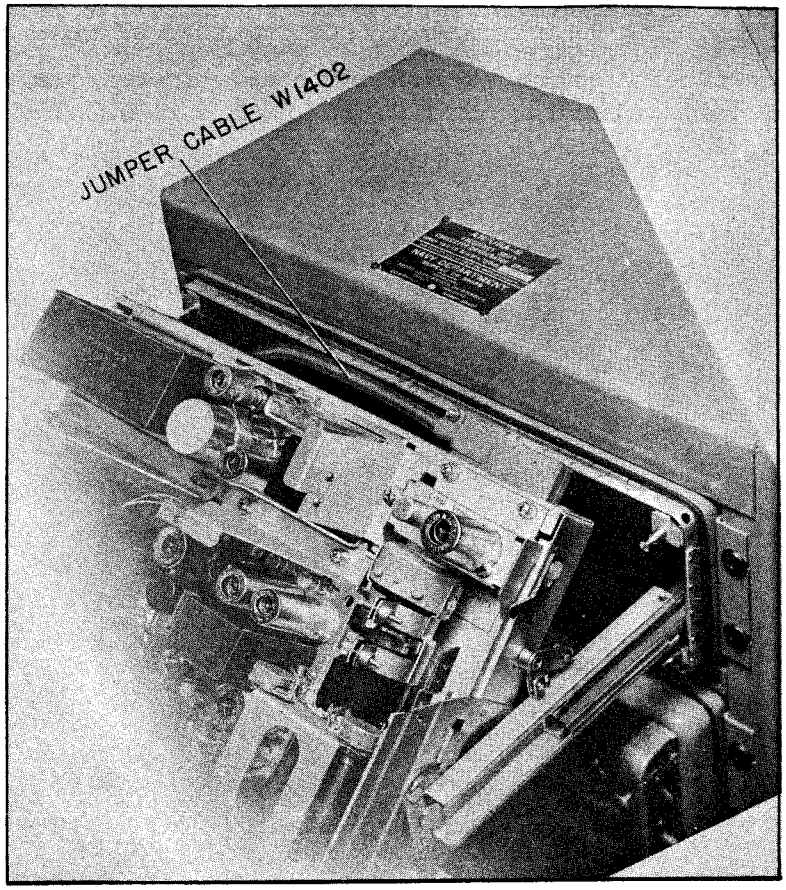


Figure 3–15. Jumper Cable in Use in Frequency Shift Converter CV-57/URR

(1) Measure the power-line voltage by connecting a 150-volt range a-c voltmeter across the two contacts of the a-c outlet J1107 located next to PWR INPUT jack J1108 (see Figure 3–10). Pull chassis out of cabinet and remove Power Supply sub-assembly from chassis. Adjust tap on power transformer T801, if necessary, by changing the grey lead on terminals 2, 3 or 4. Transformer terminals 2, 3, and 4 are, respectively, for approximate line voltages of 105, 115, and 125 volts. Leave the fan lead (brown) on terminal 3 of the transformer. See Figures 7–4 and 7–29. Re-install Power Supply sub-assembly on chassis and push chassis back in place.

(2) Turn POWER switch, S1401, to ON. Neon pilot light on front panel should light about ten seconds later, which allows for tube warm-up.

(3) Set TUNE-OPERATE switch, S302, to TUNE.

(4) Set the TONE FREQ switch, S602, under the cover on the front panel, to the desired frequency. If an external tone frequency is used, set TONE FREQ to EXT and adjust frequency of tone generator. Adjust to suitable output level with TONE LEVEL control, R629.

(5) After about one minute, adjust the Tuning Monitor as follows:

(*a*) Using a screwdriver, adjust the INTENSITY control, R713, to give a reasonably bright trace. Too bright a trace will result in short tube life and focusing difficulties.

(*b*) Using a screwdriver, adjust the FOCUS control, R715, for sharpest trace.

(*c*) Turn POWER switch to OFF. Slide chassis out of case and connect Cable Filter jack, J1101, and Converter plug, P1401, with jumper cable furnished. See Figure 3–15.

(*d*) Turn POWER switch to ON and allow about one minute for warm-up. Push CAL IN button, S701, (no signal input, VERT GAIN control, R701, set fully counterclockwise).

(*e*) Loosen lock nut and adjust R705 (located on the rear of the cathode-ray tube mounting bracket, below the V CENT potentiometer, R702) until scope line coincides with engraved center line. Tighten lock nut. See Figure 7–7.

(*f*) Release CAL IN button.

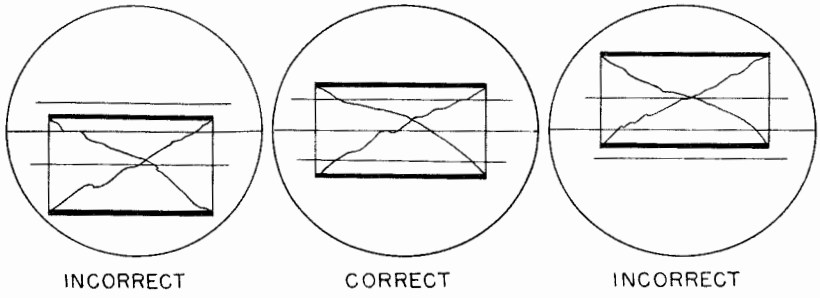


Figure 3–16. Radio Receiver Tuning Patterns as Seen on Tuning Monitor

(*g*) Adjust V CENT on panel with a screwdriver until scope line coincides with engraved center line.

(*h*) Readjust FOCUS with a screwdriver for best average focus with CAL IN button depressed and released.

(*i*) Make certain S604 (toggle switch on rear bracket of Keyer Unit) is in ON position, see Figure 7–9.

(6) Set SPEED switch to LOW for normal- (60 words per minute) speed or HIGH for high-speed multiplex or speeds greater than 60 words per minute.

(7) Plug a 0–100 ma milliammeter, such as Navy Model OE (connected to a phone plug with the tip to the "minus" and the shank to the "plus" terminal of the meter), into the TTYP jack on the front panel. With no keying signal (steady mark) adjust the loop current control, at the teletype power supply, for 60 ma. When the unit is keying, the current indication on the meter will drop.

(8) Using a signal generator, such as Navy Model LP or equivalent, feed into the associated radio receiver a signal having a frequency within the receiver tuning range. Carefully tune the receiver to this signal, using such tuning meter or indicator as it may have.

(9) Connect an r-f voltmeter (40 kc, approximately 10-volt range), such as Navy Model OBQ or Multimeter ME–25/U series or equivalent, across the DIV. CONT jack J1109 at rear of Converter.

(10) Set the TUNING control, C105, to the approximate center of its range. On the Input Unit (see Figures 7–11, 7–12), adjust the core of transformer T101, and then the top and bottom cores of transformers T102, T103, for maximum indication on the r-f voltmeter. Reduce receiver gain to avoid overloading and keep voltmeter reading on scale. Turning off the receiver bfo may facilitate this adjustment.

(11) Disconnect the Model LP signal generator and tune the radio receiver to a frequency shift signal. With the VERT GAIN control, adjust the separation of the two lines on the cathode-ray tube to a convenient distance apart.

(12) Adjust receiver tuning (main dial on receiver and TUNING dial, C105, on Converter) to center the lines on the cathode-ray tube (see Figure 3–16).

(13) Set TUNE-OPERATE switch, S302, to OPERATE; teletypewriter may start printing.

(14) Push CAL IN button and adjust THRESHOLD control, R318, to produce a pattern on the cathode-ray tube which matches the top and bottom lines engraved on cathode-ray tube window (see Figure 3–17).

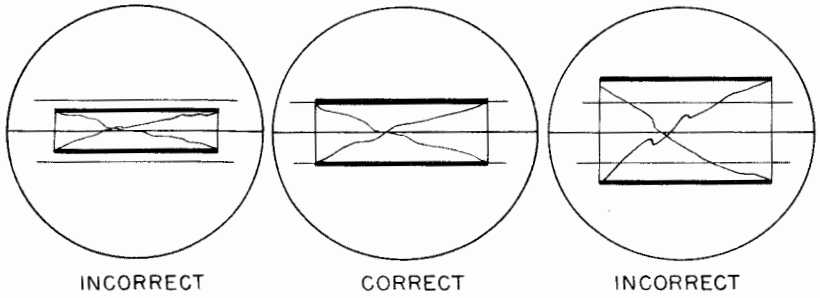


Figure 3–17. Tuning Pattern (CAL IN) on Tuning Monitor

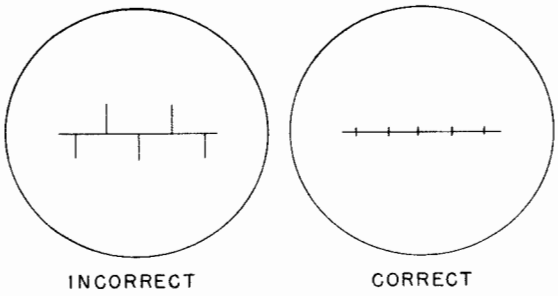


Figure 3–18. Adjustment of MOD BAL Control

(15) Release CAL IN button.

(16) Teletypewriter should be printing; if it does not, change position of NORM-REV switch, S603.

(17) Turn the LOW-HIGH-ADJ switch, S601, to the ADJ position and push the CAL IN button. The cathode-ray tube pattern should fit between the top and bottom engraved lines of the window, within about 1/16 inch. This is a sensitivity check of the tuning monitor tube V702 and amplifier tube V601B. If the pattern does not match the engraved lines, the circuits of V601 and the tube V702 itself need checking as described in Section 6.

(18) Turn the LOW-HIGH-ADJ switch to original (LOW or HIGH) position.

(19) Connect an external test oscilloscope, such as Oscilloscope OS–8/U, Navy Model OBL or OBT series, to the TONE OUTPUT or PHONE jacks, J1105 or J1402, and with TONE FREQ switch, S602, on EXT., TONE LEVEL control, R629, on 10, no tone input adjust MOD BAL control, R633, for minimum transients, as seen on the oscilloscope (see Figure 3–18).

(20) Adjust the %MARK control, R613, as follows:

(*a*) Set SPEED switch. S601, on the ADJ position.

(*b*) Connect external oscilloscope input across a 20-ohm resistor connected to a plug inserted in the TTYP jack.

(*c*) Set test oscilloscope sweep for approximately 90 cycles with sync off.

(*d*) Adjust sweep control on scope for the peak of one cycle to be centered in the trough of another cycle.

(*e*) Adjust the %MARK control until the peaks and troughs are equal in width (see Figure 3–19).

(*f*) Remove test oscilloscope and return SPEED switch to former (LOW or HIGH) position. Teletypewriter should be printing normally. If it is not, repeat procedure. If operation is still unsatisfactory, equipment needs trouble-shooting, see Section 7.

(*g*) If no teletypewriter equipment is available for connection to the Frequency Shift Converter CV–57/URR, use the following *ALTERNATE PROCEDURE* in place of the above steps (*a*) to (*f*).

1. Set SPEED switch to ADJ position.

2. Connect an audio voltmeter to the PHONES jack, J1402, on the front panel.

3. Set the TONE FREQ switch, S602, to the 1785-cycle position and the TONE LEVEL control, R629, to its maximum position.

4. Place the NORM-REV switch S603 alternately in the FORM and REV positions and adjust the %MARK control, R613, to obtain equal indications on the audio voltmeter in the two positions of the switch.

(21) Cut off power. Remove jumper cable and push chassis back in case. Remove voltmeter from DIV. CONT jack.

b. FREQUENCY SHIFT CONVERTER CV–71/URR.—Initial adjustments for Frequency Shift Converter CV–71/URR are the same as for Frequency Shift Converter CV–57/URR as set forth in the preceding paragraph *7a* except in sub-paragraph *7a*(10) read T201, T202, T203 instead of T101, T102, T103. Note that the signal from the associated receiver is of the order of 50 kc instead of 400 kc.

c. FREQUENCY SHIFT CONVERTER-COMPARATOR GROUP AN/URA–6 or AN/URA–7.

(1) Set up each channel as described in paragraph *7a* or *7b* of this section with:

(*a*) The teletypewriter plugged into the channel being adjusted.

(*b*) Note that instead of connecting an r-f voltmeter as in step (9) of paragraph *7a*, the meter on the front panel of Comparator CM–14/URR may be used as an indicating device when aligning the Input Unit transformers.

(2) Measure the power-line voltage by connecting a 150-volt range a-c voltmeter, such as Navy type 60044 Vacuum-tube volt-ohm-meter or equivalent, across contacts of the a-c outlet on one of the two Converter units (see paragraph *7a*(1) of this section). Pull chassis out of cabinet and remove Power Supply sub-assembly from chassis. Adjust tap on power transformer T1001 of the Comparator, if necessary, by changing the grey lead on terminal

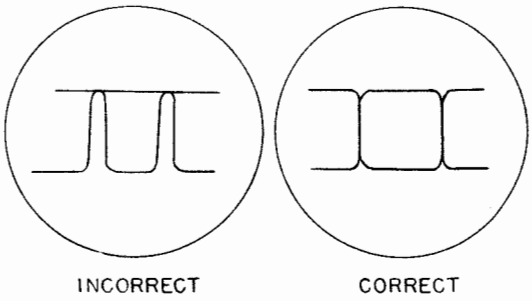


Figure 3–19. Test Oscilloscope Patterns for % MARK Control Adjustment

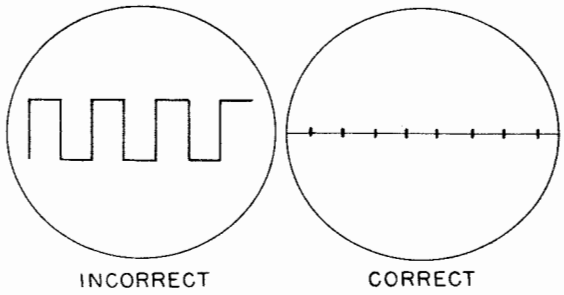


Figure 3–20. Test Oscilloscope Patterns for GATE BAL Control Adjustment

2, 3, or 4. Transformer terminals 2, 3, and 4 are, respectively, for approximate line voltages of 105, 115, and 125 volts. Do not change the fan lead (brown) from terminal 3. See Figures 7–6 and 7–31. Re-install Power Supply sub-assembly on chassis and push chassis back into cabinet.

(3) Turn Comparator POWER switch to ON. Neon pilot light on front panel should light after about ten seconds.

(4) Set the TONE FREQ switch, S602, under the front panel cover of the Comparator (see Figure 4–1) to the desired frequency. If an external tone frequency in place of internal tone is used set TONE FREQ to EXT and adjust the frequency of the tone generator. Adjust signal to suitable output level with TONE LEVEL control.

(5) Set SPEED switch, S601, on Comparator to LOW for normal–(60 words per minute) or HIGH for high-speed multiplex or speeds greater than 60 words per minute.

(6) Plug a 0–100 ma milliammeter, such as Navy Model OE (connected to a phone plug with the tip to the "minus" and the shank to the "plus" terminal of the meter), into the TTYP jack on the front panel. With no keying signal (steady mark) adjust the loop current control, at the teletype power supply, for 60 ma. When the unit is keying, the current indication on the meter will drop.

(7) With channel A (top Converter unit) receiving signals, set CHANNEL A—COMBINED—CHANNEL B switch to CHANNEL A position.

(8) Connect the external test oscilloscope to the TONE OUTPUT or PHONE jack, J1303 or J1602, of Comparator and with TONE FREQ on EXT, TONE LEVEL control, R629, on 10, no tone input adjust MOD BAL control, R633, for a minimum of transients.

(9) Adjust %MARK control, R613, of Comparator as follows:

(*a*) Set SPEED switch to ADJ.

(*b*) Connect external oscilloscope input across a 20-ohm resistor connected to a plug inserted in the TTYP jack.

(*c*) Set test oscilloscope horizontal sweep for approximately 90 cycles with sync off.

(*d*) Adjust test oscilloscope sweep control for the peak of one cycle to be centered in the trough of another cycle.

(*e*) Adjust the %MARK control until the peaks and troughs are equal widths (see Figure 3–19).

(*f*) Remove oscilloscope and return SPEED switch to original position. Teletypewriter should print normally. If it does not, change position of Comparator NORM-REV switch.

(*g*) If no teletypewriter equipment is available for connection to the Frequency Shift Converter-Comparator Group, use the following *ALTERNATE PROCEDURE* in place of the above steps (*a*) to (*f*):

1. Set SPEED switch to ADJ position.

2. Connect an audio voltmeter to the PHONES jack on the front panel.

3. Set the TONE FREQ switch to the 1785-cycle position and the TONE LEVEL control to its maximum position.

4. Place the NORM-REV switch alternately in the NORM and REV positions and adjust the %MARK control to obtain equal indications on the audio voltmeter in the two positions of the switch.

(10) Adjust GATE BAL control, R923 (see Figure 4–1), as follows:

(*a*) Slide the Comparator out of the cabinet and connect to Cable Filter Unit by jumper cable supplied.

(*b*) Connect a jumper from a filament lead to grid of V903, pin 6 (location of this tube is shown in Figures 5–4 and 7–45).

(*c*) Set CHANNEL A — COMBINED — CHANNEL B switch to COMBINED.

(*d*) Connect a test oscilloscope to V906 cathode, pin 3, and ground.

(*e*) Channel switching is now occurring at a 60-cycle rate. The test oscilloscope pattern will be a square wave switching oscillogram. Adjust the GATE BAL for minimum of pattern (see Figure 3–20).

(*f*) Turn power off and remove jumper and test oscilloscope.

(*g*) Throw switch S604 (on the rear bracket of the Keyer Unit) to the ON position.

(11) Adjust CONT BAL control, R905 (see Figure 4–1), as follows:

(*a*) Set CHANNEL A — COMBINED — CHANNEL B switch, S901, to COMBINED.

(*b*) Set CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL switch, S1602, to DIV IND.

(*c*) Set links O901 and O902 (on Diversity Selector Unit) to I-F position. See Figure 7–18.

(*d*) Apply separate 1000-cycle signals of about 0.1 volt to DIV-CONT CHAN-A jack J1308 and DIV-CONT CHAN-B jack J1309 on the rear of the Cable Filter. One channel will conduct. If the panel meter, M1601, reads approximately 50, channel A is conducting; if meter reads approximately 150, channel B is conducting; and if meter reads approximately 100, the channels are switching too fast for the meter to follow. The latter case will not occur during this adjustment. The output signals of the two associated receivers may be used for this purpose if an electron-tube a-c voltmeter is used to measure the diversity control voltages which appear at DIV-CONT CHAN-A jack J1308 and DIV-CONT CHAN-B jack J1309. To connect the voltmeter to these jacks, first remove the Cable Filter Unit top cover, and this will give access to the desired terminals at the rear of the jacks.

(*e*) Increase the input voltage to the channel not conducting until it conducts, as indicated by the meter. Record the increase in voltage necessary to make it conduct, then reduce the voltage to 0.1 volt.

(*f*) Increase input voltage on other channel until it conducts, as shown by panel meter and record voltage. If the two voltages recorded in steps (*e*) and (*f*) are within 10 per cent of each other, then the CONT BAL is correctly adjusted. If they are not, change the CONT BAL setting and repeat procedure until voltages to shift each channel are equal.

(*g*) If the preceding procedure is impracticable because of lack of necessary test equipment or for any other reason, use the following **ALTERNATE SIMPLIFIED PROCEDURE** for adjusting the CONT BAL control:

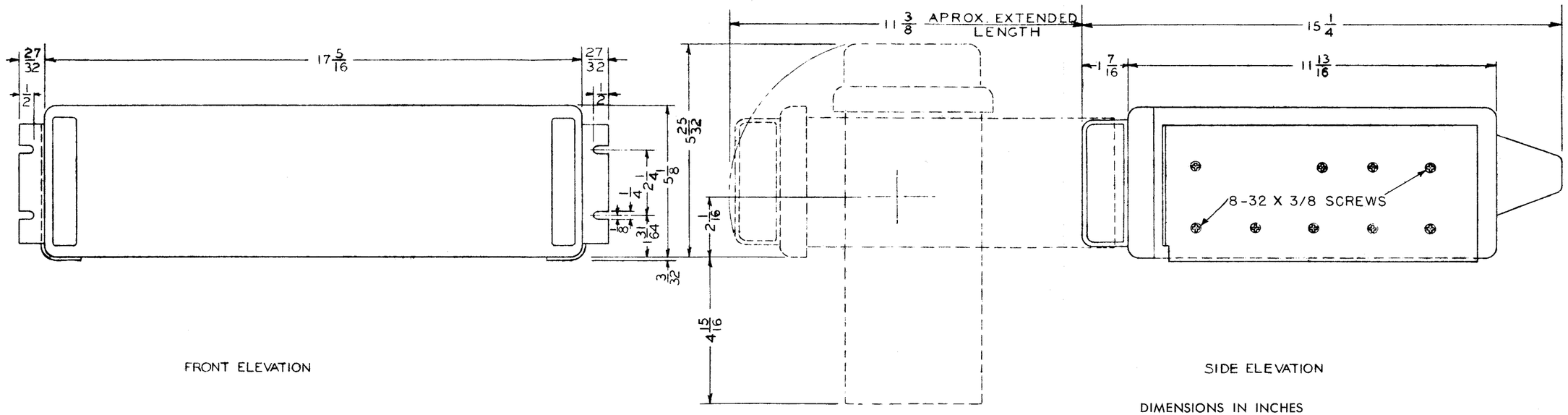
When the CONT BAL control, R905, is properly adjusted, the operation of the CHANNEL A—COMBINED—CHANNEL B switch, S901, should be as follows. With no signal from either channel and with the switch in the CHANNEL A position, the panel meter, M1601, should indicate approximately 50; and throwing the switch over to the COMBINED position should not change this indication. With the switch in the CHANNEL B position, the panel meter should indicate approximately 150; and throwing the switch into the COMBINED position should not change this indication. If the meter indication should change when turning the switch from the CHANNEL A or CHANNEL B position to the COMBINED position, adjust the CONT BAL control until no such change is observed on the meter.

(*h*) Pull the Comparator chassis out of the case and connect its 14-conductor jumper cable. Set the TONE FREQ switch to 1785-cycle position. Insert a lead into the PHONES jack on the front panel and touch the free end of the lead to the diversity control input "A" on the Diversity Selector Unit (this point is marked "A" in Figure 7–18 and is shown in Figure 7–45 as terminal 8 of E905). Adjust the TONE LEVEL control, R629, to obtain an indication of 50 on the panel meter, M1601. Next move the free end of the lead to the diversity control input "B" on the Diversity Selector Unit (this point is marked "B" in Figure 7–18 and is shown in Figure 7–45 as terminal 22 of E901). The panel meter should indicate 50 $\pm$ 20%. If it does not, the circuits of the Diversity Selector Unit require checking and trouble shooting for faulty tubes or circuit components. Use the information (schematic diagrams, wiring diagrams, voltage and resistance measurements) given in Section 7.

(*i*) Remove signal from DIV-CONT CHAN-A and DIV-CONT CHAN-B jacks J1308 and J1309, and plug original cables in place. This completes the adjustment of the AN/URA–6 or AN/URA–7.

CAUTION

Any of the Keyers not connected to teletypewriters in operating condition must have switch S604 (on rear bracket of Keyer Unit) in the OFF position.

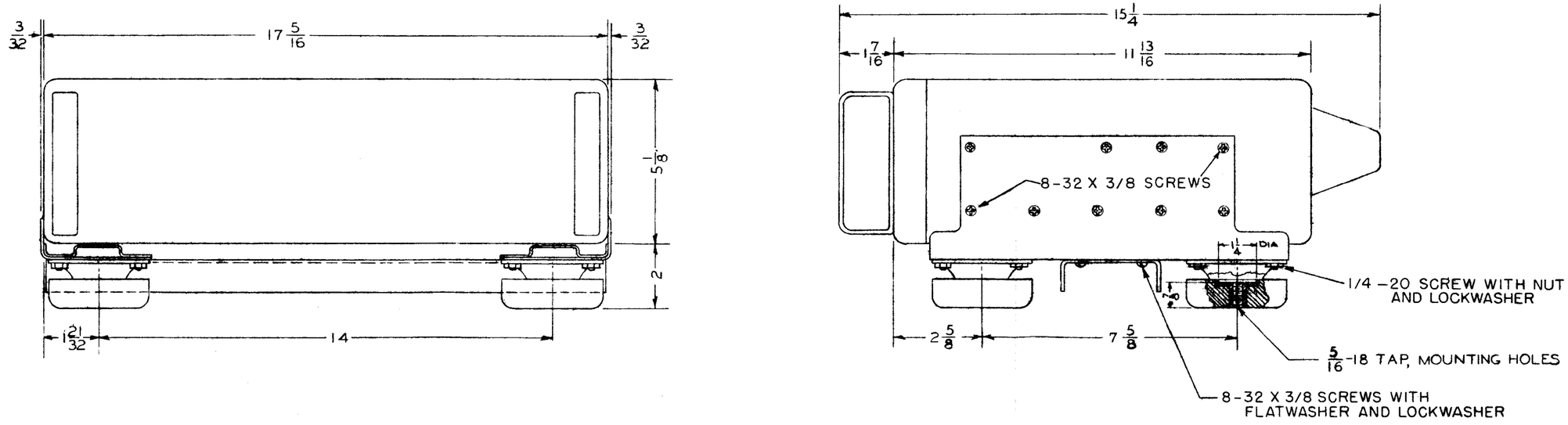


FRONT ELEVATION

RACK MOUNTING ASSEMBLY

SIDE ELEVATION

DIMENSIONS IN INCHES
WEIGHTS:
34 POUNDS IN CASE FOR RACK MOUNTING
40 POUNDS IN CASE WITH SHOCK MOUNTS



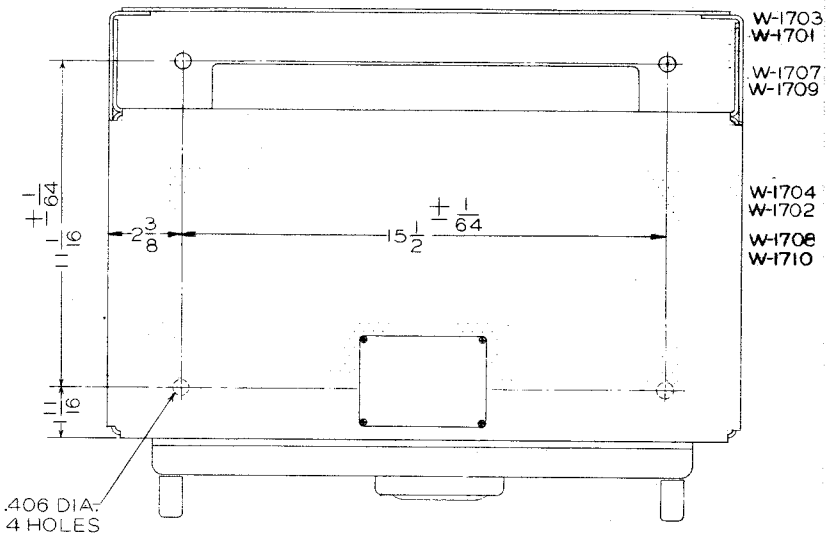
FRONT ELEVATION

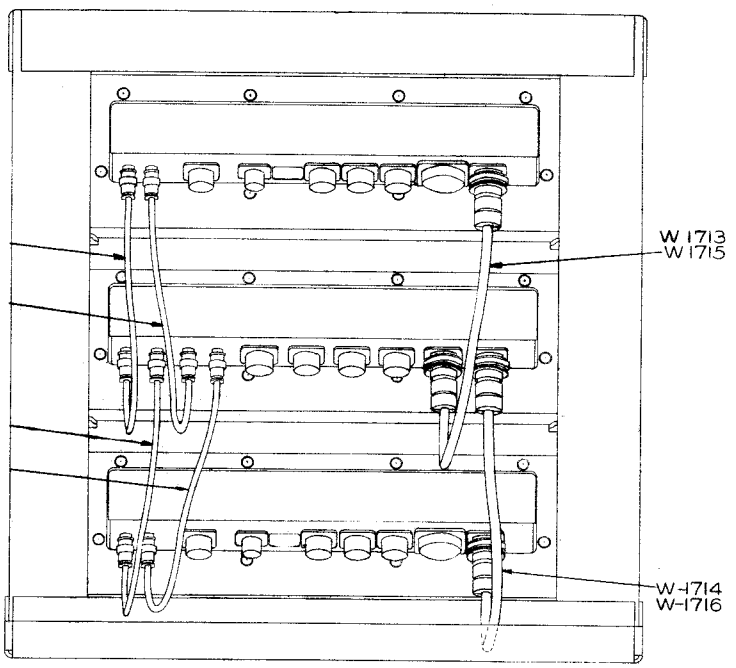
BASE MOUNTING ASSEMBLY

SIDE ELEVATION

Figure 3–21. Frequency Shift Converter CV-57/URR, Outline Drawing

RESTRICTED
NAVSHIPS 91355

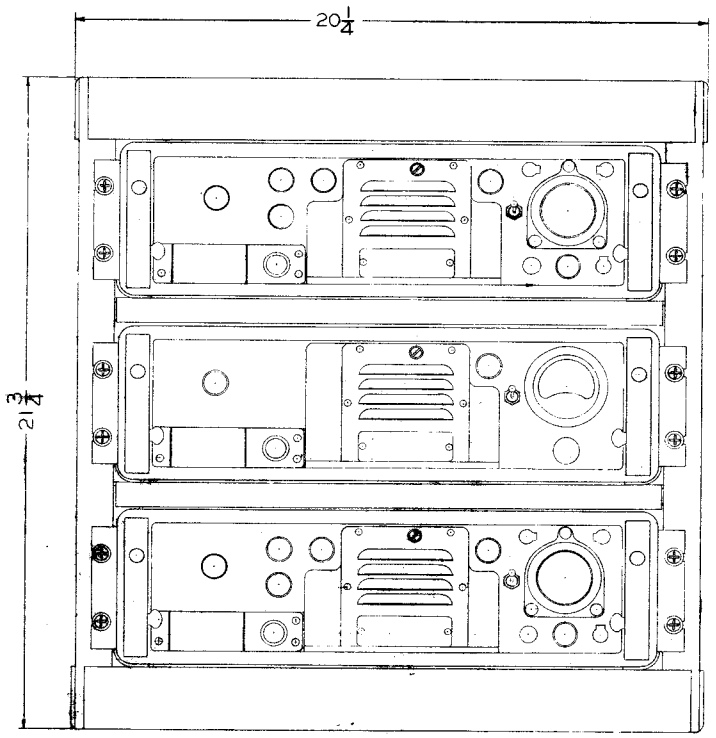




VIEW IN DIRECTION OF ARROWS "A-A"

DIMENSIONS IN INCHES

WEIGHT: 125 POUNDS



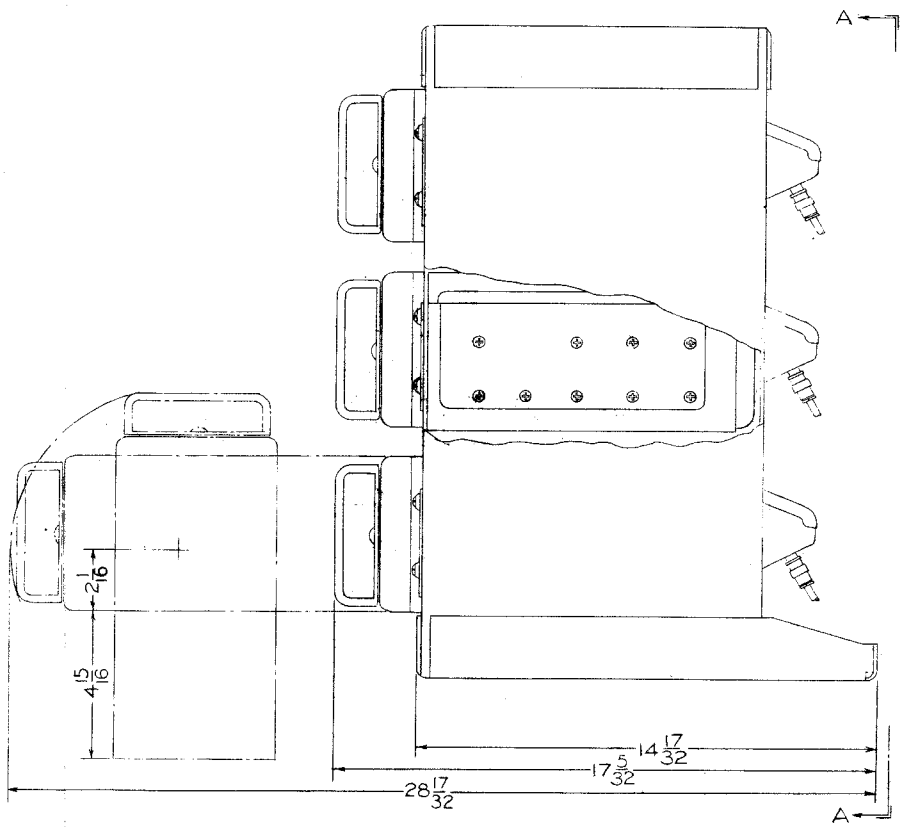
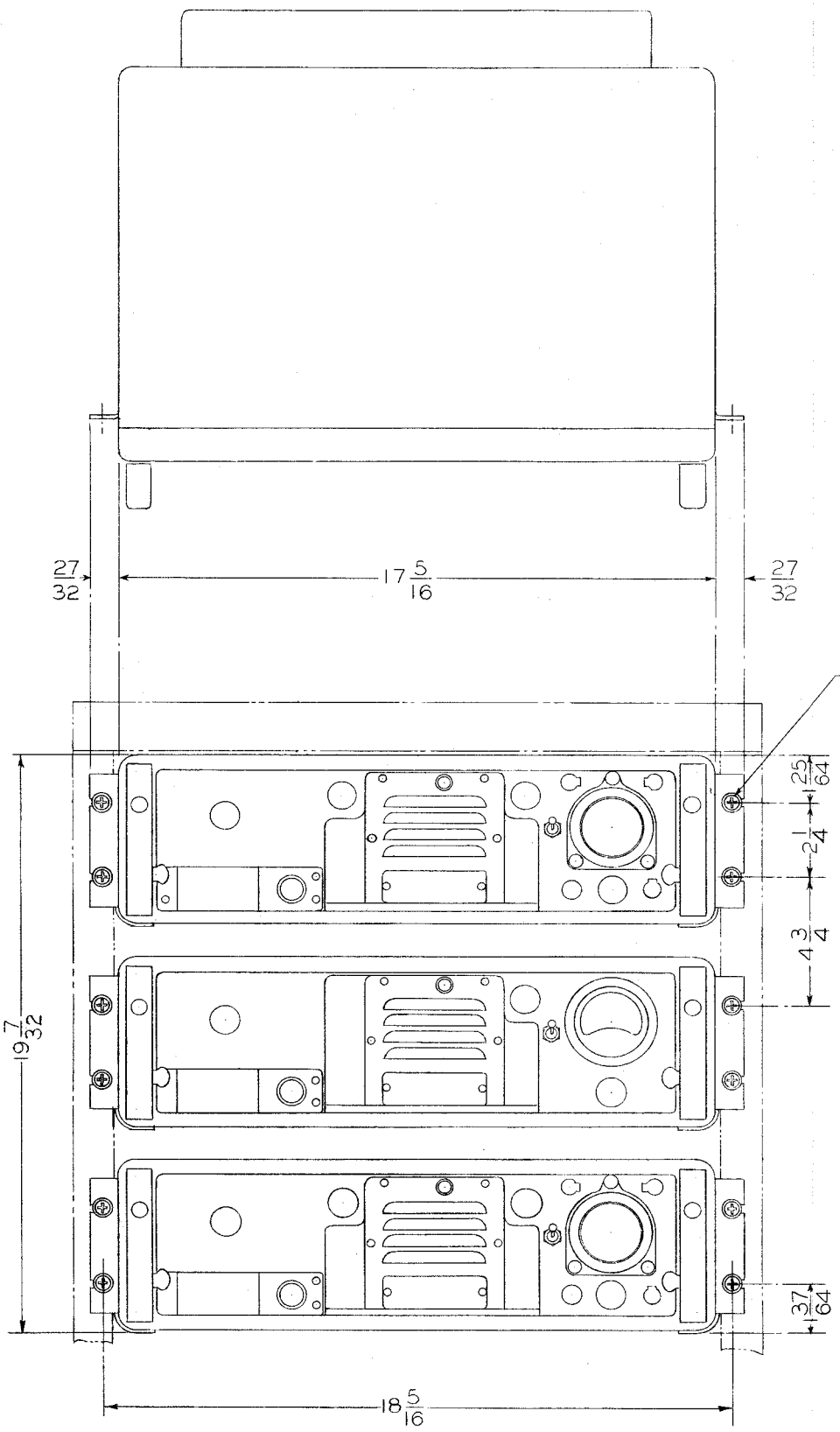


Figure 3–22. Frequency Shift Converter-Comparator Groups AN/URA-6 and AN/URA-7, Outline Drawing

RESTRICTED
NAVSHIPS 91355

DIMENSIONS IN INCHES



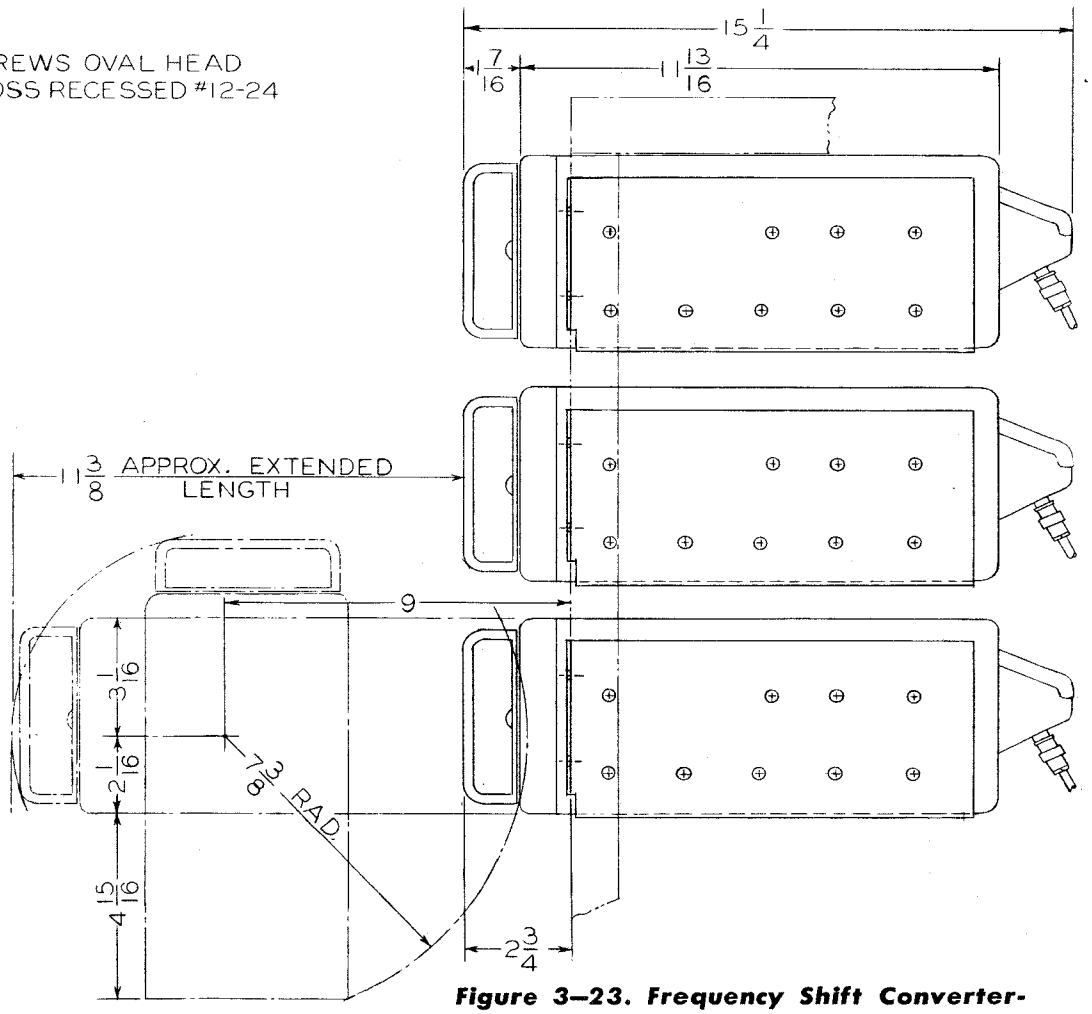


Figure 3–23. Frequency Shift Converter-Comparator Groups AN/URA-6 and AN/URA-7, Relay Rack Mounting Installation Drawing

SECTION 4
OPERATION

1. INTRODUCTION.

The Frequency Shift Converters covered by this instruction book are only part of a complete teletypewriter radio receiving system. Other equipment necessary for use of Frequency Shift Converter CV–57/URR includes an antenna to pick up the radio signals, a radio receiver to select and amplify the radio signals, and a teletypewriter with a d-c power supply to provide loop current. If the tone signal is used for transmission to a remote point, terminal equipment to operate from the on-off keyed tone must also be provided. A frequency shift keyed signal centered about the intermediate frequency of the associated radio receiver is the input signal for the Frequency Shift Converter. This signal shifts to higher and lower frequencies corresponding to the characters transmitted. The Frequency Shift Converter translates the frequency shifts into off-on keyed d-c square-wave pulses to key the receiving teletypewriter loop circuit.

Since the teletypewriter signals are essentially d-c signals (square waves), transmission over telephone lines is limited; therefore, a tone modulator, keyed on and off by the teletype signals, is provided. This on-off keyed tone signal must be demodulated to operate a teletypewriter.

The Frequency Shift Converter-Comparator Group, AN/URA–6 or AN/URA–7, serves the same purpose, respectively, as Frequency Shift Converter CV–57/-URR or CV–71/URR, except that two receivers are used for diversity operation. The Comparator CM–14/URR compares continuously the levels of the two signals, and select the stronger one to key the teletypewriter loop circuits. When diversity operation is not required, the two converters can be used for different signals and operate different teletypewriters.

2. CAPABILITIES AND LIMITATIONS.

The equipment provides the best possible teletype signals when not subjected to interference and the irregularities of radio transmission. It will give accurate conversion up to the point when the noise level is approximately equal to or greater than the signal. The Radio Receiver output signal level must be high enough to keep the input to the limiter stage well above saturation level.

Little attention of the operator is required during operation after the equipment has warmed up (warm-up time for the Converters and Comparator is about ten minutes; additional time may be required for the associated receivers). The tuning monitor gives continuous, visible monitoring of the discriminator output. The neon ON indicator, operating from the +200 volt supply, gives a continuous indication of the B-power supply for the tubes.

The meter in the Comparator can be switched to indicate the signal strength of each channel or to indicate which channel is selected at the moment to control the keyer.

3. OPERATING CONTROLS.

All operating controls are located on the front panel with all but the essential operating controls located under a center cover or behind oil-cup-type hole covers. This feature helps prevent breaks in service due to the operator manipulating the wrong knob accidentally. All but two controls, primarily of a maintenance nature, are accessible from the front panel.

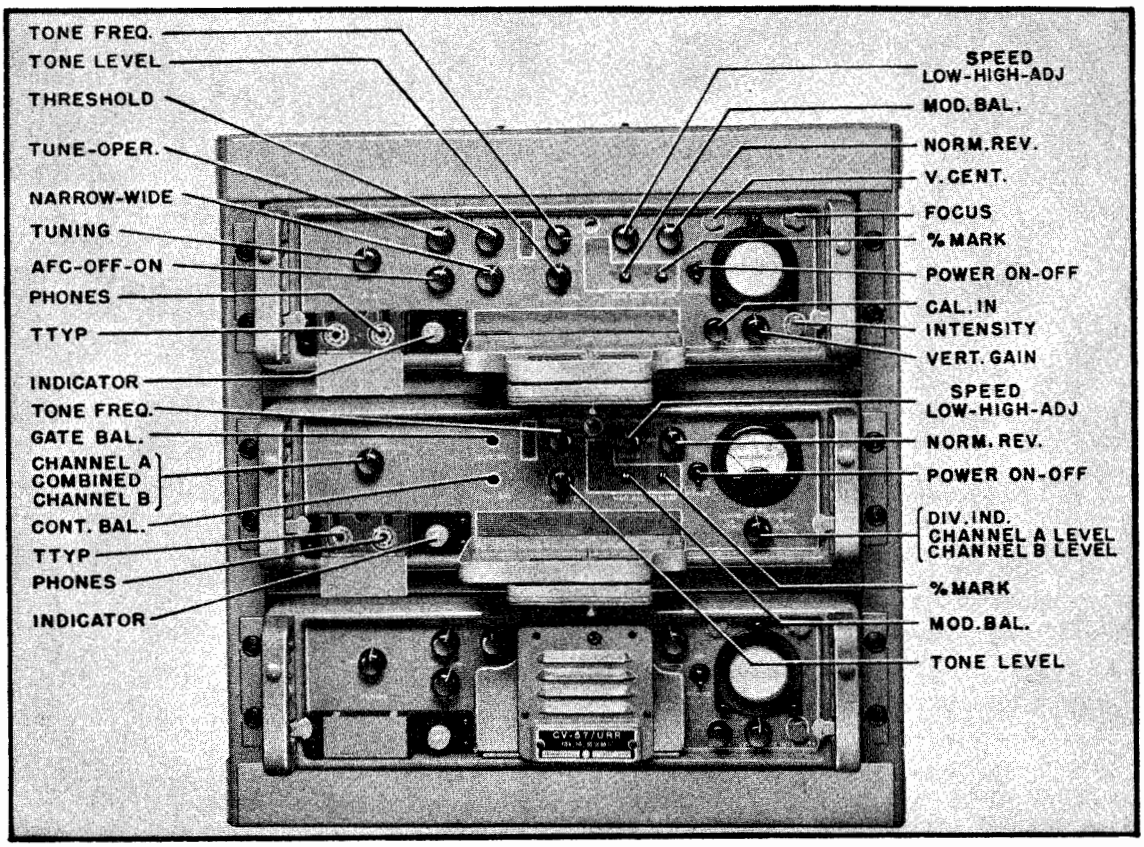


Figure 4–1. Operating Panel Controls

4. TUNING ADJUSTMENT.

Tuning is accomplished with the associated radio receiver, but the following adjustments are necessary on the CV–57/URR, AN/URA–6 and AN/-URA–7 equipments (see Figure 4–1):

CONTROL	FUNCTION
TUNING	Tunes the Converter units to the intermediate frequencies of the associated radio receivers (vernier tuning).
AFC ON-OFF	In the OFF position, disables AFC circuits when AFC is not wanted.
TUNE-OPERATE	In the TUNE postion it prevents the Keyer from keying the teletypewriter loop.
THRESHOLD	Adjusts the input signal to the Keyer for the proper level.
NARROW-WIDE	Selects input signal and switches the discriminator for narrow or wide shift.
TONE FREQ	Adjusts tone signal to one of eight internal fixed frequencies or an external frequency.
TONE LEVEL	Adjusts the amplitude of the tone signal.
SPEED	Selects proper filter for standard- or high-spced teletypewriter. Applies a standard voltage for adjustments in the ADJ position.
NORM-REV	Reverses polarity of teletype signals.
POWER, OFF-ON	Turns power to equipment on or off. Does not de-energize fuses, convenience outlet, power line filter or switch wiring.
VERT GAIN	Adjusts height of pattern on cathode-ray tube.
CAL IN	When depressed, connects cathode-ray tube to indicate Keyer input voltage.

The following controls are on the Comparator CM–14/URR, part of the AN/URA–6 or AN/-URA–7 equipments.

CONTROL	FUNCTION
CHANNEL A— COMBINED— CHANNEL B	Switches Comparator Keyer to channel A alone, both channels in diversity operation, or channel B alone.
CHANNEL A LEVEL—DIV IND— CHANNEL B LEVEL	Shows signal level of channel A, which channel is supplying the signal in diversity operation, or the signal level of channel B.

5. SUMMARY OF OPERATION.

a. SINGLE-CHANNEL CV–57/URR STARTING PROCEDURE.

(1) Turn POWER switch of Frequency Shift Converter to ON, turn on power to radio receiver and teletypewriter and allow sufficient time for all equipment to warm up.

(2) Set TUNE-OPERATE switch of the Frequency Shift Converter to TUNE and AFC ON-OFF control to ON.

(3) Tune in a frequency shift signal on the radio receiver with receiver bfo adjusted to give a beat note of about 1000 cycles, using a pair of headphones to assist in locating the signal. Receiver bfo may now be turned off if desired. The receiver tuning controls serve for rough tuning adjustment while the TUNING control on the Converter front panel serves for fine (vernier) tuning. Adjust the tuning controls carefully to vertically center the horizontal lines on the Tuning Monitor. See Figure 3–16.

(4) Set TUNE-OPERATE switch to OPERATE.

(5) Push CAL IN button and adjust the THRESHOLD control, to produce cathode-ray tube pattern which matches lines engraved on tuning monitor window. See Figure 3–17.

(6) Release CAL IN button.

(7) Teletypewriter should be printing correctly; if it is not, change the position of the NORM-REV switch. If trouble is not corrected, advise technician.

(8) Observe the Tuning Monitor indication occasionally and readjust receiver tuning as necessary to maintain proper operation until the equipment has thoroughly stabilized.

b. TUNING SINGLE-CHANNEL, CV–57/URR, TO ANOTHER FREQUENCY.

(1) Set TUNE-OPERATE switch to TUNE and AFC control to ON.

(2) Tune in a frequency shift signal on the radio receiver with receiver bfo adjusted to give a beat note of about 1000 cycles, using a pair of headphones to assist in locating the signal. Receiver bfo may now be turned off if desired. The receiver tuning controls serve for rough tuning adjustment while the TUNING control on the Converter front panel serves for fine (vernier) tuning. Adjust the tuning controls carefully to vertically center the horizontal lines on the Tuning Monitor. See Figure 3–16.

(3) Set TUNE-OPERATE switch to OPERATE.

(4) Push CAL IN button and adjust THRESHOLD control, to produce cathode ray tube pattern which matches lines engraved on the Tuning Monitor window. See Figure 3–17.

(5) Release CAL IN button.

(6) Teletypewriter should now be printing; if it is not, change the position of the NORM-REV switch.

c. OTHER ADJUSTMENTS, SINGLE CHANNEL.

(1) TONE LEVEL.—Adjustment can be made any time by means of the TONE LEVEL control R629. If an external tone source is used, adjustment can also be made, independently, by changing the amplitude at the source. Tone will not be keyed on and off when TUNE-OPERATE switch is in TUNE position when there is no signal being received and when a steady mark signal is being received.

(2) TONE FREQUENCY.—Adjustment can be made at any time convenient to the operator when using the internal tone oscillator. An external signal (switch on EXT) can only have its frequency adjusted at the source.

(3) MAINTENANCE ADJUSTMENTS.—Adjustments other than those mentioned are part of the initial and maintenance adjustments. For further information see sections 3 and 7 of this book.

d. STOPPING THE SINGLE-CHANNEL EQUIPMENT.—To stop the equipment throw the Frequency Shift Converter POWER switch to OFF.

e. DUAL-CHANNEL AN/URA–6 or AN/URA–7 STARTING PROCEDURE.

(1) Throw the POWER switches of each of the three units to ON. Turn on power to the two radio receivers and teletypewriter and allow sufficient time for all equipment to warm up.

(2) Set the TUNE-OPERATE switches of the two Frequency Shift Converters to TUNE and the AFC controls to ON.

(3) Tune in a frequency shift signal on both radio receivers with receiver bfo adjusted to give a beat note of about 1000 cycles, using a pair of headphones to assist in locating the signal and to make sure that both receivers are tuned to the same signal. Receiver bfo may now be turned off if desired. The receiver tuning controls serve for rough tuning adjustment while the TUNING control on the Converter front panel serves for fine (vernier) tuning. Adjust the tuning controls carefully to vertically center the horizontal lines on the Tuning Monitor. See Figure 3–16.

(4) Adjust the frequency of each receiver accurately to be sure they are tuned to the same signal.

(5) Set TUNE-OPERATE switch on each of the Converters to OPERATE.

(6) Push CAL IN button and adjust each THRESHOLD control to produce cathode-ray tube pattern which matches lines engraved on tuning monitor window. See Figure 3–17.

(7) Release CAL IN button.

(8) Set CHANNEL A—COMBINED—CHANNEL B switch of the Comparator to CHANNEL A. The teletypewriter should operate. If the printing appears to be garbled, change the position of the NORM-REV switch of the Comparator.

(9) Set CHANNEL A—COMBINED—CHANNEL B switch of the Comparator to CHANNEL B. The teletypewriter should operate. If the printing appears to be garbled, check the tuning of the channel B receiver to make sure it is tuned to the same signal as the channel A receiver.

(10) Set channel B receiver gain to zero. Set CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL switch to CHANNEL A and adjust channel A radio receiver output (gain control) for a reading of approximately 90 microamperes on the Comparator meter. Adjust channel B receiver gain until meter reads half of above setting.

(11) Set CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL switch to CHANNEL B LEVEL position. The meter should now read approximately the same as for channel A.

(12) Set CHANNEL A—DIV IND—CHANNEL B switch to DIV IND. A reading of approximately 50 microamperes indicates channel A is supplying the signal, 150 microamperes indicates channel B is supplying the signal and 100 microamperes indicates the channels are switching too rapidly for the meter to follow. If one channel carries the signal most of the time increase the receiver gain of the other channel.

f. TUNING DUAL-CHANNEL, AN/URA–6 or AN/URA–7, to ANOTHER FREQUENCY.

(1) Set the TUNE-OPERATE switches of the Converters to TUNE and AFC controls to ON.

(2) Tune in a frequency shift signal on both radio receivers with receiver bfo adjusted to give a beat note of about 1000 cycles, using a pair of headphones to assist in locating the signal and to make sure that both receivers are tuned to the same signal. The receiver bfo may now be turned off if desired. The receiver tuning controls serve for rough tuning adjustment while the TUNING control on the Converter front panel serves for fine (vernier) tuning. Adjust the TUNING control carefully to vertically center the horizontal lines on the Tuning Monitors. See Figure 3–16.

(3) Set TUNE-OPERATE switch on each of the Converters to OPERATE.

(4) Push CAL IN button and adjust each THRESHOLD control to produce cathode-ray tube pattern which matches lines engraved on tuning monitor window. See Figure 3–17.

(5) Release CAL IN button.

(6) Set CHANNEL A—COMBINED—CHANNEL B switch of the Comparator to CHANNEL A. The teletypewriter should operate. If the printing appears to be garbled, change the position of the NORM-REV switch of the Comparator.

(7) Set CHANNEL A—COMBINED—CHANNEL B switch of the Comparator to CHANNEL B. The teletypewriter should operate. If the printing appears to be garbled, check the tuning of the channel B radio receiver to make sure both radio receivers are tuned to the same signal.

(8) Set Channel B receiver gain to zero. Set CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL switch to CHANNEL A and adjust channel A radio receiver gain for a reading of approximately 90 microamperes on the Comparator meter. Adjust channel B receiver gain until meter reads half of above setting.

(9) Set CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL switch to CHANNEL B LEVEL. The meter should now read approximately the same as for channel A.

(10) Set CHANNEL A—DIV IND—CHANNEL B switch to DIV IND. A reading of approximately 50 microamperes indicates channel A is supplying the signal, 150 microamperes indicates channel B is supplying the signal and 100 microamperes indicates the channels are switching too rapidly for the meter to follow. If one channel carries the signal most of the time increase the receiver gain of the other channel.

g. OTHER ADJUSTMENTS, DUAL CHANNEL.

(1) TONE LEVEL.—Adjustment can be made any time by means of the TONE LEVEL control R629. If an external source is used, adjustment can also be made, independently, by changing the amplitude at the source.

(2) TONE FREQUENCY.—Adjustment can be made at any time, operating or non-operating.

(3) SINGLE CHANNEL OPERATION.—Should it be desired to operate the teletypewriter from one particular channel only, set the CHANNEL A—COMBINED—CHANNEL B switch to CHANNEL A or CHANNEL B, depending on which channel is to operate the teletypewriter. Each Frequency Shift

Converter CV–57/URR or CV–71/URR can be used independently by connecting separate teletypewriter loops to TTYP OUTPUT jack J1106 of the respective Converters.

CAUTION

Any of the Keyer Units not connected to teletypewriters in operation must have toggle switch S604 (on rear bracket of Keyer Unit) in the OFF position.

(4) MAINTENANCE ADJUSTMENTS.— Adjustments other than those mentioned are part of the maintenance or initial adjustments. For further information, see Sections 3 and 7 of this book.

b. STOPPING THE DUAL-CHANNEL EQUIPMENT.—To stop the equipment throw the POWER switches on each of the three units to OFF.

SECTION 5
OPERATOR'S MAINTENANCE

1. ROUTINE CHECKS.

Make the following Tuning Monitor sensitivity check once a week when possible:

a. Set the SPEED switch of the Frequency Shift Converters to the ADJ position.

b. Observe the lines on the tuning monitor screen. They should coincide, within 1/16 inch, with the top and bottom lines inscribed on the Tuning Monitor window. If they do not, report to technician.

2. EMERGENCY MAINTENANCE.

NOTICE TO OPERATORS

Operators shall not perform any of the following emergency maintenance procedures without proper authorization.

a. REPLACING FUSES.

WARNING

Never replace a fuse with one of a higher rating unless continued operation of the equipment is more important than probable damage. If a fuse burns out immediately after replacement, do not replace it a second time until the cause has been corrected.

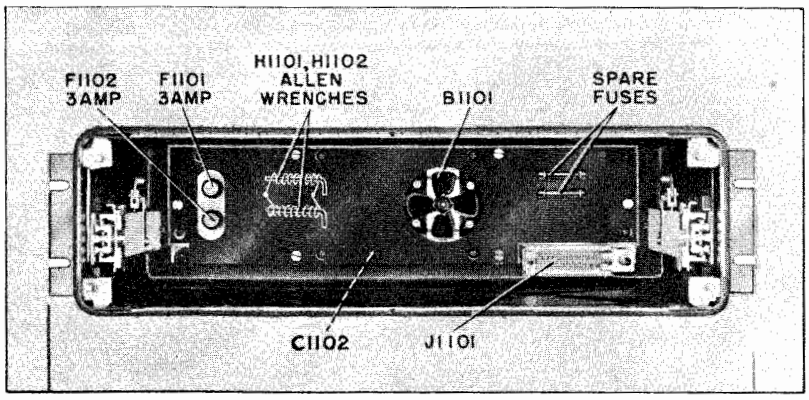


Figure 5–1. Frequency Shift Converters CV-57/URR and CV-71/URR Fuse Locations

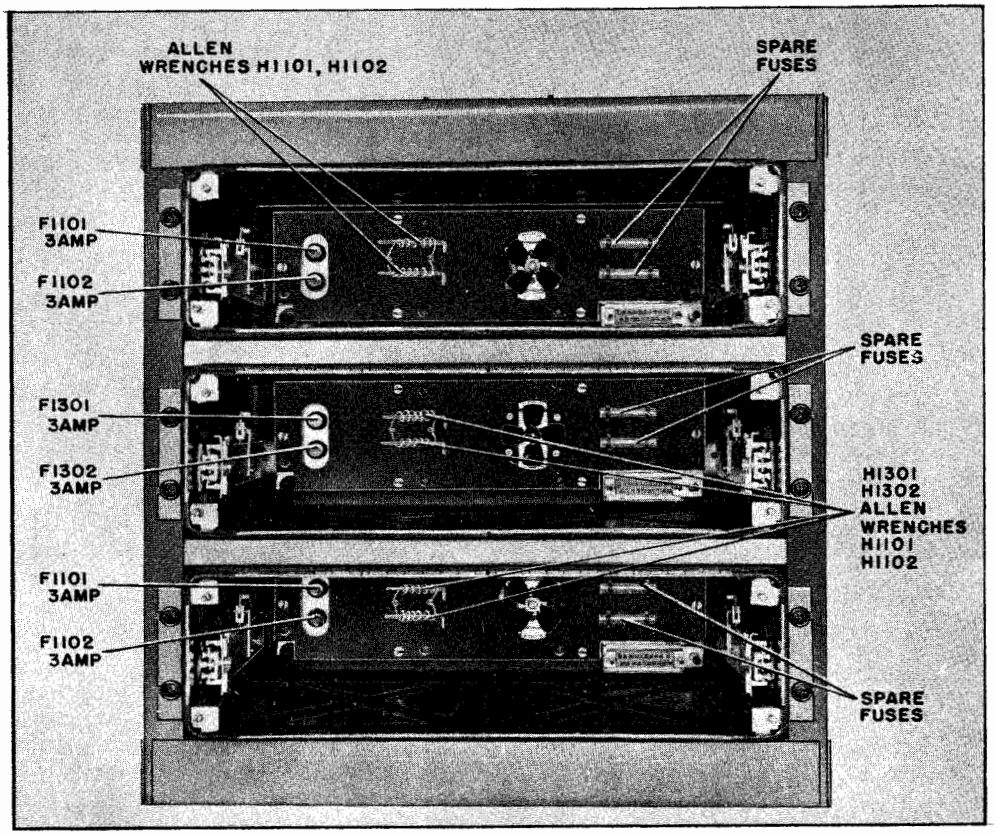


Figure 5–2. Frequency Shift Converter-Comparator Groups AN/URA-6 and AN/URA-7 Fuse Locations

(1) SYMPTOMS OF FUSE FAILURE.—Pilot light not lighted. Tubes will be cold when chassis is pulled from case.

(2) FUSE LOCATIONS.—The fuses are located one above the other at the left rear of the cabinet in the Cable Filter Compartment. Spare fuses will be found to the right of the fan. See Figures 5–1 and 5–2.

(3) REPLACEMENT.

(*a*) Slide chassis out of cabinet and tilt 45 degrees.

(*b*) Reach in cabinet and unscrew one fuse holder cap by turning cap counterclockwise. Cap with fuse is now free of holder.

(*c*) Pull fuse from cap and replace with new one, if blown.

(*d*) If fuse is good screw cap, in a clockwise direction, back in holder and repeat with the other fuse.

(*e*) Slide chassis back in cabinet.

b. REPLACING ELECTRON TUBES.

WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Always observe all safety regulations and precautions. Refer to the Safety Notices and high-voltage Warning printed on pages viii and ix in the Front Matter of this instruction book.

(1) LOCATING DEFECTIVE TUBE.—Defective tubes may be located as follows. Turn the POWER switch to OFF. Slide the chassis out of the case and connect the jumper cable (W1402 for the Converter or W1602 for the Comparator) between the cable filter jack (J1201 or J1301 as the case may be) and the corresponding plug. Turn the POWER switch to ON and allow about one minute warm-up time. Tubes which fail to glow and also feel cold when touched are defective. KEEP AWAY FROM LIVE CIRCUITS.

(2) REPLACING ELECTRON TUBES.

(*a*) SPECIAL PRECAUTIONS.

1. Turn off power before changing tubes.

2. When replacing the 1Z2 tube, V801 or

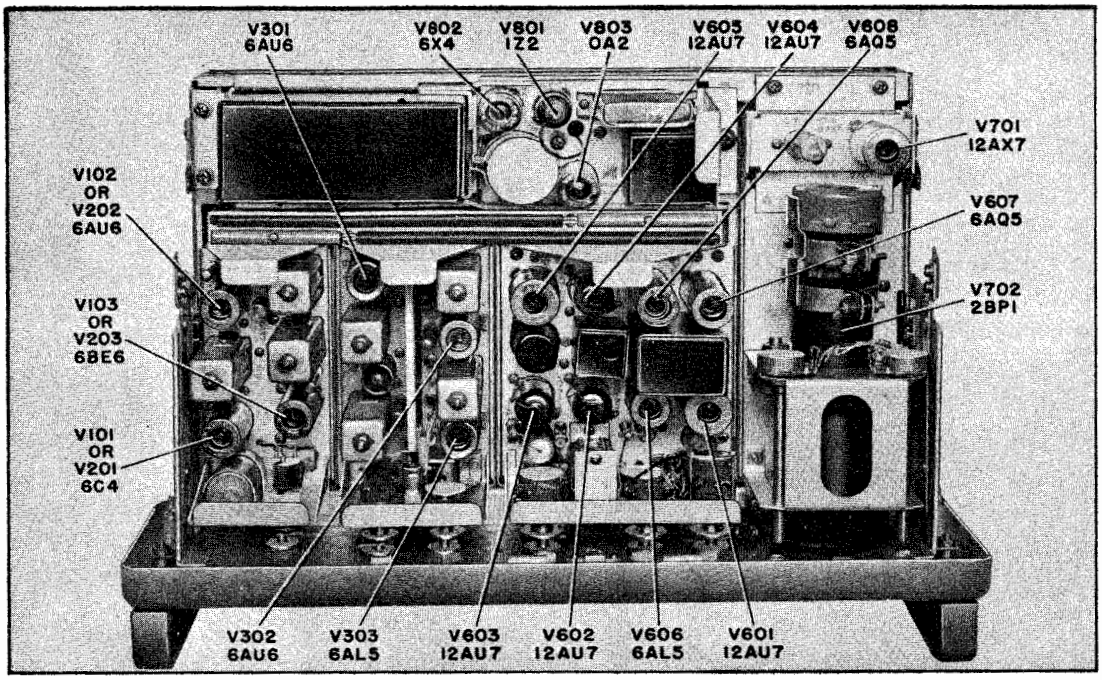


Figure 5–3. Frequency Shift Converters CV-57/URR and CV-71/URR Tube Locations

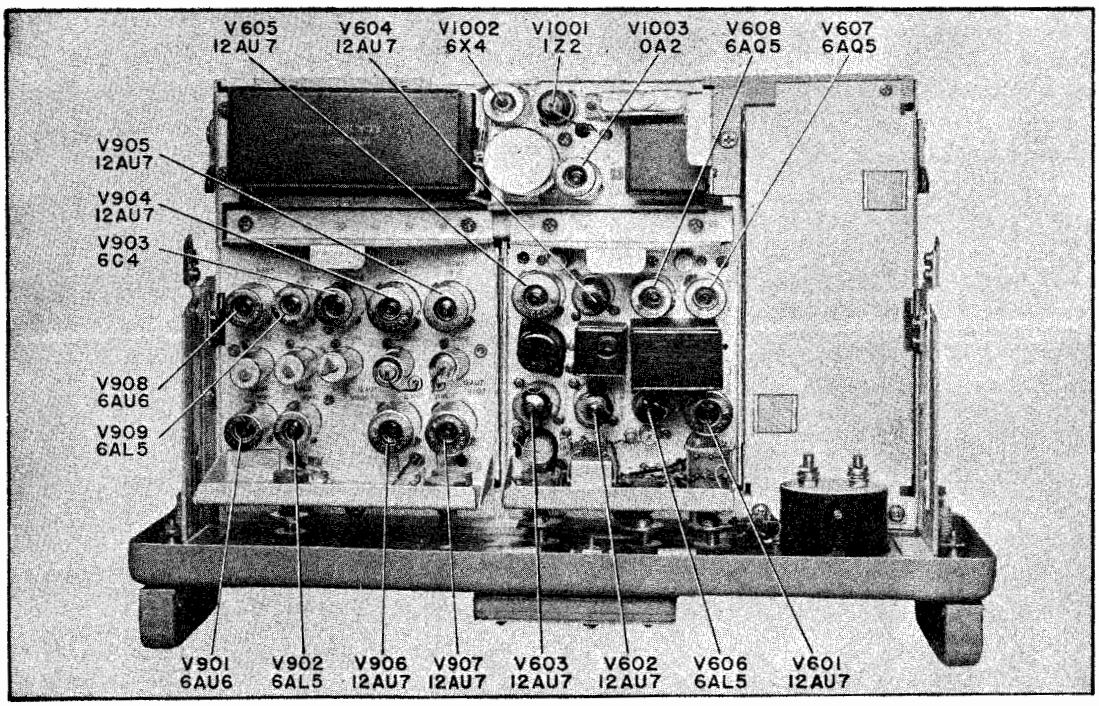


Figure 5–4. Comparator CM-14/URR Tube Locations

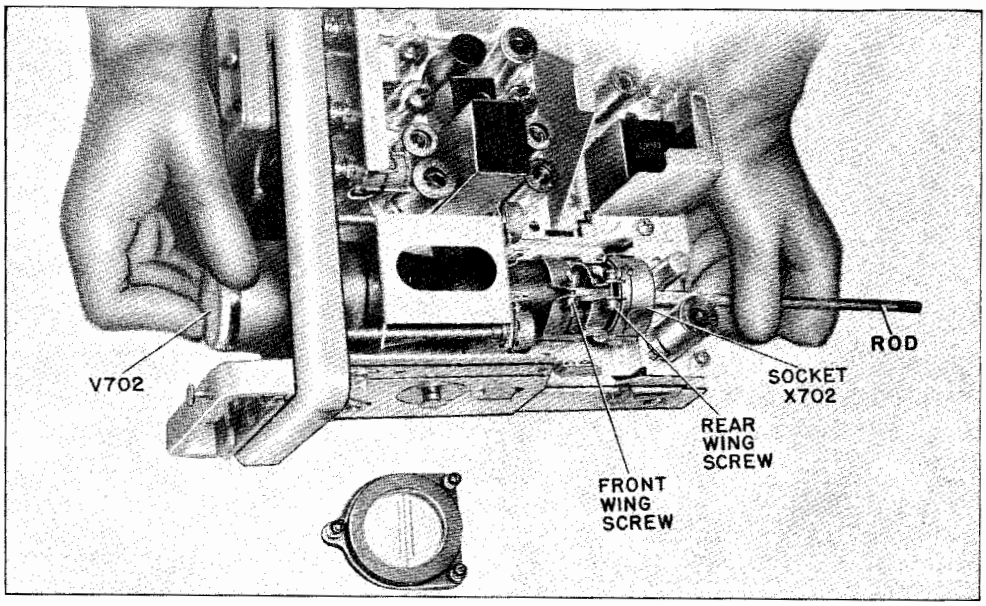


Figure 5–5. Removal of Cathode-ray Tube from Tuning Monitor

V1001, AVOID CONTACT WITH THE INSIDE CLIP OF THE CAP or a shock may be experienced if the bleeder resistors are open. The cap is insulated and normal handling of the cap will prevent contact, but the inside contact of the cap may be discharged as follows: hold the shank of a screwdriver firmly in contact with the chassis, then touch the inside metal clip of the cap to the tip of the screwdriver.

3. The cathode-ray tube, V702, MUST BE HANDLED CAREFULLY. Always keep these tubes in their shipping cartons when not in use. Scratches on the bulb may impair their usability and increase the chance of breakage. Do not knock the tubes. IT IS RECOMMENDED THAT PROTECTIVE GOGGLES, GLOVES, AND CLOTHING BE WORN WHILE HANDLING A CATHODE-RAY TUBE.

(*b*) TUBE CLAMPS.—Three types of tube clamps are used, the push-and-turn shield, the spring-wire type and the screw-clamp type (used only on the cathode-ray tube). Remove and replace clamps as follows:

1. PUSH-AND-TURN SHIELD.—Push shield downward, turn counterclockwise as far as it will go, and lift off. Replace tube, slide shield down over locking pins as far as it will go, turn clockwise, and release.

2. SPRING-WIRE CLAMP.—Push spring wire to side and pull out tube, insert new tube and release spring wire.

3. SCREW CLAMP. — WARNING: JUMPER CABLE SHOULD NOT BE CONNECTED. See Figure 5–5. Unscrew rear thumbscrew of cathode-ray tube socket, remove front window on panel, and through hole in socket, push tube forward through hole in front panel, using a rod (see Figure 5–5) such as a pencil or similar tool. Replace tube, tighten thumbscrew and replace panel window. Front thumbscrew may have to be loosened to rotate tube so image lines on tube are parallel to engraved lines on window.

c. REPLACING SUB-CHASSIS.—The sub-chassis units may be replaced in little more time than necessary to change a tube. Three (or four) screws hold the units in place and all connections are made automatically by plugs and jacks. When removing a sub-chassis from the main chassis, loosen rear screws first and front screws last. When installing a sub-chassis tighten the front screws first and the rear screws last.

If the equipment fails to operate correctly after the above measures have been taken, advise a technician.

TABLE 5-1 ROUTINE CHECK CHART

The following chart shows routine check, with no signal input, to be made by operator every week. If test shows failure, report to technician.

WHAT TO CHECK	NORMAL INDICATION	PROCEDURE
Tuning Monitor Sensitivity	See paragraph 1	Report to technician
Tone Oscillator	Tone heard when plugging headphones in PHONES jack	Plug headphones in PHONES jack, listen for tone at all positions of TONE FREQ control
NORM-REV Switch	Same as above	Same as above but repeat for both positions of NORM-REV switch
CONT BAL control	No change in Comparator Meter reading when CHANNEL A—COMBINED—CHANNEL B switch is operated from COMBINED position to CHANNEL A or to CHANNEL B position	See Section 6, paragraph 2*f*

SECTION 6
PREVENTIVE MAINTENANCE

1. ROUTINE MAINTENANCE.

NOTE

THE ATTENTION OF MAINTENANCE PERSONNEL IS INVITED TO THE REQUIREMENTS OF CHAPTER 67 OF THE *BUREAU OF SHIPS MANUAL*, OF THE LATEST ISSUE.

Every 1000 hours check or adjust the following items:

a. JUMPER CABLES.—Check each jumper cable by sliding the chassis out of the case and operating the equipment with the cable in place.

b. TUBES.—Check all tubes except the cathode-ray tube in a tube tester and replace any showing signs of deterioration. The condition of the cathode-ray tube is best shown by the unit control settings. Controls associated with tubes being replaced should be readjusted as described in Sections 3 and 7.

c. SYSTEM SENSITIVITY. — Check the system sensitivity as follows:

(1) Connect an r-f signal generator, such as R-F Signal Generator Set AN/URM–25 series or equivalent (approximately 400 kc for CV–57/URR or AN/URA–6 equipments or 50 kc for AN/URA–7 equipment) to the I-F INPUT jack J1111. The output impedance should be approximately 70 ohms for CV–57/URR or AN/URA–6 equipments; and approximately 910 ohms for AN/URA–7 equipment.

(2) Connect an external oscilloscope (such as Oscilloscope OS–8/U, Navy Models OBL, OBT or equivalent) to the plate, pin 5, of the limiter tube V302 and ground.

(3) Vary the output voltage of the r-f signal generator over a range of 2500 microvolts to 0.5 volt. The pattern should be a square wave over the entire range, showing limiter action. After completion of test remove r-f signal generator and external oscilloscope.

d. TUNING MONITOR SENSITIVITY.—Set the SPEED switch of the Converter units to the ADJ position and depress the CAL IN button. The image lines on the cathode-ray tube should coincide with the top and bottom lines on the tuning monitor window. If the amplitude is less than it should be, check the circuits of V601B in the Keyer Unit, the voltage source (resistors R639 and R640 in the Keyer) or replace the cathode-ray tube V702.

e. TUNING MONITOR ADJUSTMENT.—Readjust the Tuning Monitor as follows:

(1) Using a screwdriver, adjust the INTENSITY control R713 to give a reasonably bright trace.

Too bright a trace will result in short tube life and focusing difficulties.

(2) Using a screwdriver, adjust FOCUS control for sharpest trace.

(3) Slide chassis out of case and connect Cable Filter jack and Converter plug with jumper cable furnished.

(4) Set TUNE-OPERATE switch to TUNE, SPEED switch on HIGH or LOW.

(5) Push CAL IN button.

(6) Loosen lock nut and adjust R705 until horizontal trace on oscilloscope is centered vertically with center line engraved on tuning monitor window. Tighten lock nut.

(7) Release CAL IN button.

(8) Adjust V CENTER on panel, with a screwdriver, so tuning monitor trace is centered vertically with center line engraved on tuning monitor window.

(9) Remove jumper cable and push chassis back in case.

f. %MARK CHECK.

(1) Set the SPEED switch to ADJ position.

(2) Connect an external test oscilloscope, such as Navy OBL or OBT series, across a 20-ohm resistor connected to a plug inserted in the TTYP jack.

(3) Set the test oscilloscope sweep speed for approximately 90 cycles with sync off.

(4) Adjust the sweep control on the test oscilloscope for the peak of one cycle to be centered in the trough of another cycle (see Figure 6–1).

(5) If the troughs and peaks are unequal in width adjust the %MARK control to make them equal.

(6) After completion of check return SPEED switch to former position.

(7) If no teletypewriter equipment is available for connection to the Frequency Shift Converter-Comparator group, use the following **ALTERNATE PROCEDURE** in place of the above steps:

(*a*) Set SPEED switch to ADJ position.

(*b*) Connect an audio voltmeter to the PHONES jack on the front panel.

(*c*) Set the TONE FREQ switch to the 1785-cycle position and the TONE LEVEL control to its maximum position.

(*d*) Place the NORM-REV switch alternately in the NORM and REV positions and adjust the %MARK control to obtain equal indications on the audio voltmeter in the two positions of the switch.

g. MOD BAL CHECK.—With the TONE FREQ control on EXT, TONE LEVEL control on 10 and no tone signal input, look for transients as part of the pattern of the test oscilloscope connected to the TONE OUTPUT or to the PHONE jack. Adjust the MOD BAL control for minimum transients. Disconnect the test oscilloscope.

h. GATE BALANCE ADJUSTMENT.

(1) Slide the Comparator out of the cabinet and connect to Cable Filter by means of the jumper cable supplied.

(2) Connect a jumper from a filament lead to grid of V903, pin 6 (location of this tube is shown in Figures 5–4 and 7–45).

(3) Set CHANNEL A—COMBINED—CHANNEL B switch to COMBINED.

(4) Connect a test oscilloscope from V906 cathode, pin 3, to ground.

(5) Channel switching is now occurring at a 60-cycle rate.

The oscilloscope pattern will be a square wave switching oscillogram. Adjust the GATE BAL control for minimum of pattern (see Figure 6–2).

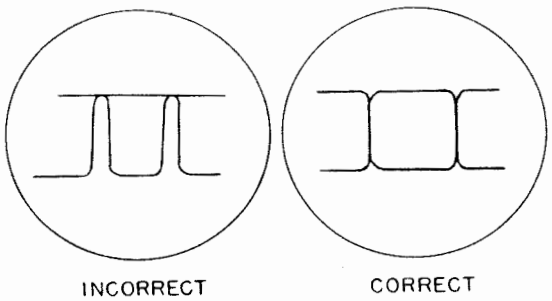


Figure 6–1. Test Oscilloscope Patterns for % MARK Control Adjustment

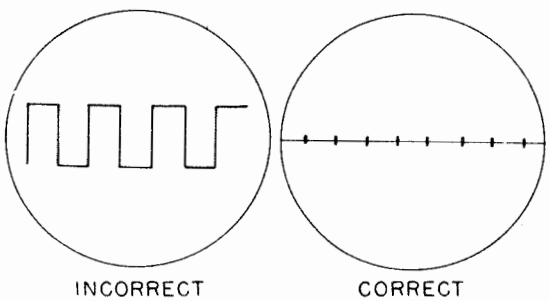


Figure 6–2. Test Oscilloscope Patterns for GATE BAL Control Adjustment

(6) Turn off power and remove jumper and oscilloscope.

i. TELETYPEWRITER LOOP CURRENT ADJUSTMENT.—Plug a 0–100 ma milliammeter, such as Navy Model OE series (connected to a phone plug with the tip to the "minus" and the shank to the "plus" terminal of the meter), into the TTYP jack on the front panel. With no Keying signal adjust the loop current control, at the teletype power supply, for 60 ma. When the unit is Keying normally, the current indication on the meter will drop.

2. ADJUSTMENT AFTER REPLACEMENT OF D-C AMPLIFIER, V903.

Adjust CONT BAL control (shown in Figure 4–1) as follows:

a. Set CHANNEL A—COMBINED—CHANNEL B switch to COMBINED.

b. Set CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL switch to DIV IND.

c. Apply separate 1000-cycle signals of about 0.1 volt to DIV-CONT CHAN-A jack J1308 and DIV-CONT CHAN-B jack J1309 on the rear of the Cable Filter. One channel will conduct. If the panel meter, M1601, reads approximately 50, channel A is conducting; if meter reads approximately 150, channel B is conducting; and if meter reads approximately 100, the channels are switching too fast for the meter to follow. The latter case will not occur during this adjustment. The output signals of the two associated receivers may be used for this purpose if an electronic voltmeter, such as in Multimeter ME–25/U series, is used to measure the diversity control voltages which appear at DIV-CONT CHAN-A jack J1308 and DIV-CONT CHAN-B jack J1309. To connect the voltmeter to these jacks, first remove the Cable Filter Unit top cover, and this will give access to the desired terminals at the rear of the jacks.

d. Increase the input voltage to the channel not conducting until it conducts, as indicated by the meter. Record the increase in voltage necessary to make it conduct, then reduce the voltage to 0.1 volt.

e. Increase input voltage on other channel until it conducts, as shown by panel meter and record voltage. If the two voltages recorded in steps *d* and *e* are within 10 per cent of each other, then the CONT BAL is correctly adjusted. If they are not, change the CONT BAL setting and repeat procedure until voltages to shift each channel are equal.

f. If the preceding procedure is impracticable because of lack of necessary test equipment or for any other reason, use the following **ALTERNATE SIMPLIFIED PROCEDURE** for adjusting the CONT BAL control:

When the CONT BAL control, R905, is properly adjusted, the operation of the CHANNEL A—COMBINED—CHANNEL B switch, S901, should be as follows. With the switch in the CHANNEL A position, the panel meter, M1601, should indicate approximately 50; and throwing the switch over to the COMBINED position should not change this indication. With the switch in the CHANNEL B position, the panel meter should indicate approximately 150; and throwing the switch into the COMBINED position should not change this indication. If the meter indication should change when turning the switch from the CHANNEL A or CHANNEL B position to the COMBINED position, adjust the CONT BAL control until no such change is observed on the meter.

g. Pull the Comparator chassis out of the case and connect its 14-conductor jumper cable. Set the TONE FREQ switch to 1785-cycle position. Insert a lead into the PHONES jack on the front panel and touch the free end of the lead to the diversity control input "A" on the Diversity Selector Unit (this point is marked "A" in Figure 7–18 and is shown in Figure 7–45 as terminal 8 of E905). Adjust the TONE LEVEL control, R629, to obtain an indication of 50 on the panel meter, M1601. Next move the free end of the lead to the diversity control input "B" on the Diversity Selector Unit (this point is marked "B" in Figure 7–18 and is shown in Figure 7–45 as terminal 22 of E901). The panel meter should indicate 50 $\pm$ 20%. If it does not, the circuits of the Diversity Selector Unit require checking and trouble shooting for faulty tubes or circuit components. Use the information (schematic diagrams, wiring diagrams, voltage and resistance measurements) given in Section 7.

h. Remove signal from jacks J1308 and J1309 and plug original cables in place.

3. LUBRICATION.

The only mechanism requiring lubrication is the rail system for sliding the main chassis into and out of the cabinet. Apply a light oil such as Military Symbol MS–2175 or specification MIL–L–15016 (Standard Navy Stock No. 14–0–2586 for a five-gallon can) when necessary.

FAILURE REPORTS

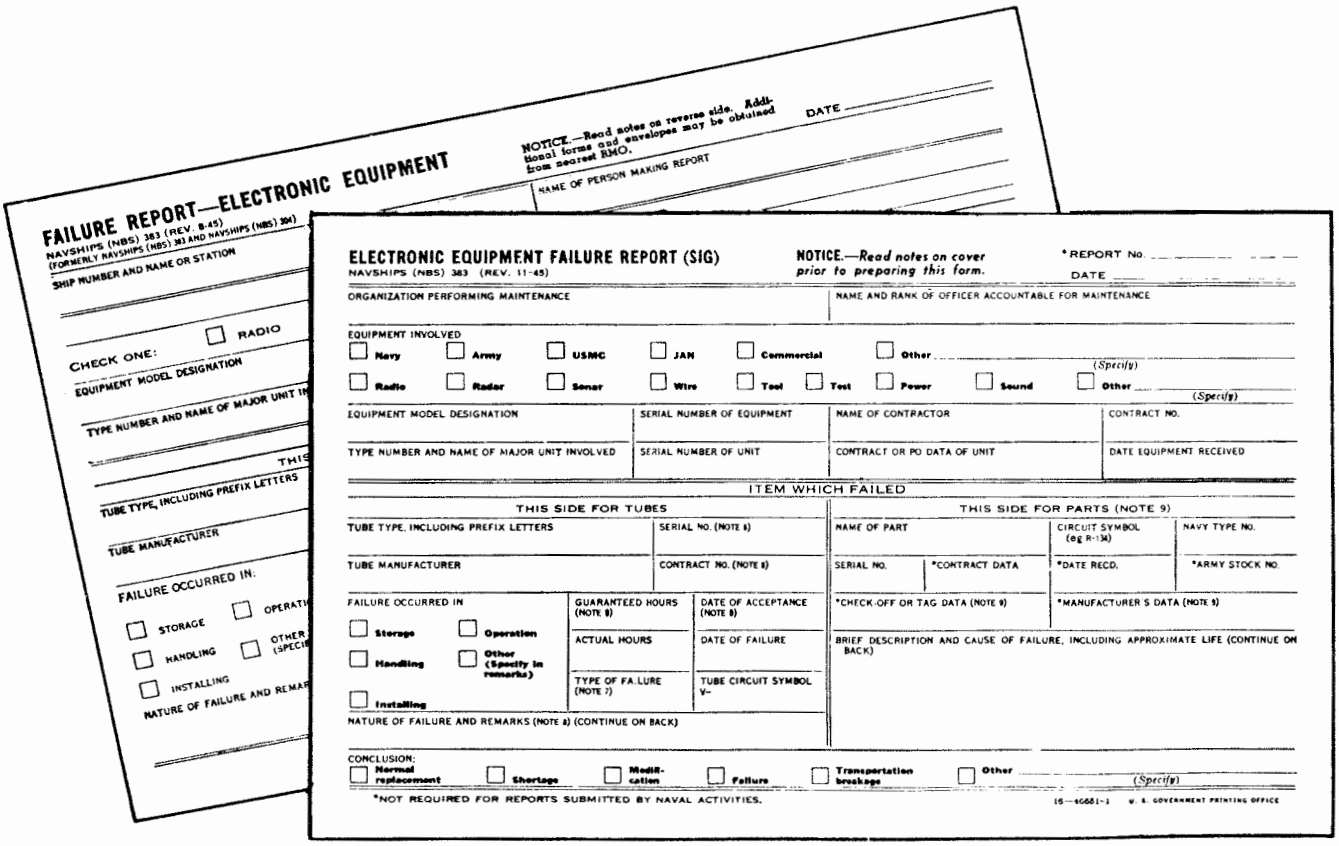
A FAILURE REPORT must be filled out for the failure of any part of the equipment whether caused by defective or worn parts, improper operation, or external influences. It should be made on Failure Report, form NBS-383, which has been designed to simplify this requirement. The card must be filled out and forwarded to BUSHIPS in the franked envelope which is provided. Full instructions are to be found on each card.

Use great care in filling the card out to make certain it carries adequate information. For example, under "Circuit Symbol" use the proper circuit identification taken from the schematic drawings, such as T-803, in the case of a transformer, or R-207, for a resistor. Do not substitute brevity for clarity. Use the back of the card to completely describe the cause of failure and attach an extra piece of paper if necessary.

The purpose of this report is to inform BUSHIPS of the cause and rate of failures. The information is used by the Bureau in the design of future equipment and in the maintenance of adequate supplies to keep the present equipment going. The cards you send in, together with those from hundreds of other ships, furnish a store of information permitting the Bureau to keep in touch with the performance of the equipment of your ship and all other ships of the Navy.

This report is not a requisition. You must request the replacement of parts through your Officer-in-Charge in the usual manner.

Make certain you have a supply of Failure Report cards and envelopes on board. They may be obtained from any Electronics Officer.



FAILURE REPORT—ELECTRONIC EQUIPMENT
NAVSHIPS (NBS) 383 (REV. 8-45)
(FORMERLY NAVSHIPS (NBS) 383 AND NAVSHIPS (NBS) 384)
SHIP NUMBER AND NAME OR STATION
CHECK ONE: RADIO
EQUIPMENT MODEL DESIGNATION
TYPE NUMBER AND NAME OF MAJOR UNIT IN
TUBE TYPE, INCLUDING PREFIX LETTERS
TUBE MANUFACTURER
FAILURE OCCURRED IN:
STORAGE
HANDLING
INSTALLING
NATURE OF FAILURE AND REMA
NOTICE.—Read notes on reverse side. Additional forms and envelopes may be obtained from nearest RMO.
DATE
NAME OF PERSON MAKING REPORT

ELECTRONIC EQUIPMENT FAILURE REPORT (SIG)
NAVSHIPS (NBS) 383 (REV. 11-45)
NOTICE.—*Read notes on cover prior to preparing this form.*
*REPORT NO.
DATE
ORGANIZATION PERFORMING MAINTENANCE
NAME AND RANK OF OFFICER ACCOUNTABLE FOR MAINTENANCE
EQUIPMENT INVOLVED
Navy Army USMC JAN Commercial Other (Specify)
Radio Radar Sonar Wire Tool Test Power Sound Other (Specify)
EQUIPMENT MODEL DESIGNATION | SERIAL NUMBER OF EQUIPMENT | NAME OF CONTRACTOR | CONTRACT NO.
TYPE NUMBER AND NAME OF MAJOR UNIT INVOLVED | SERIAL NUMBER OF UNIT | CONTRACT OR PO DATA OF UNIT | DATE EQUIPMENT RECEIVED
ITEM WHICH FAILED
THIS SIDE FOR TUBES
TUBE TYPE, INCLUDING PREFIX LETTERS | SERIAL NO. (NOTE 8)
TUBE MANUFACTURER | CONTRACT NO. (NOTE 8)
FAILURE OCCURRED IN
Storage Operation
Handling Other (Specify in remarks)
Installing
GUARANTEED HOURS (NOTE 8) | DATE OF ACCEPTANCE (NOTE 8)
ACTUAL HOURS | DATE OF FAILURE
TYPE OF FAILURE (NOTE 7) | TUBE CIRCUIT SYMBOL V—
NATURE OF FAILURE AND REMARKS (NOTE 6) (CONTINUE ON BACK)
THIS SIDE FOR PARTS (NOTE 9)
NAME OF PART | CIRCUIT SYMBOL (eg R-134) | NAVY TYPE NO.
SERIAL NO. | *CONTRACT DATA | *DATE RECD. | *ARMY STOCK NO.
*CHECK-OFF OR TAG DATA (NOTE 9) | *MANUFACTURER'S DATA (NOTE 9)
BRIEF DESCRIPTION AND CAUSE OF FAILURE, INCLUDING APPROXIMATE LIFE (CONTINUE ON BACK)
CONCLUSION:
Normal replacement Shortage Modification Failure Transportation breakage Other (Specify)
*NOT REQUIRED FOR REPORTS SUBMITTED BY NAVAL ACTIVITIES.
16—66681-1 U. S. GOVERNMENT PRINTING OFFICE

SECTION 7
CORRECTIVE MAINTENANCE

WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Always observe all safety regulations and precautions. Refer to the Safety Notices and high-voltage Warning printed on pages viii and ix in the Front Matter of this instruction book.

The following procedures, together with the trouble-shooting charts in Tables 7–1 and 7–2, constitute a systematic check of the functioning of the equipment. The overall circuits are first considered, after which information is given permitting to trace possible faults in individual units or sub-assemblies. Reference should be made also to the schematic and wiring diagrams and the tables of voltage and resistance measurements given at the end of this section. Adjustment procedures described in Section 3 will often be found useful in restoring proper operation of the equipment.

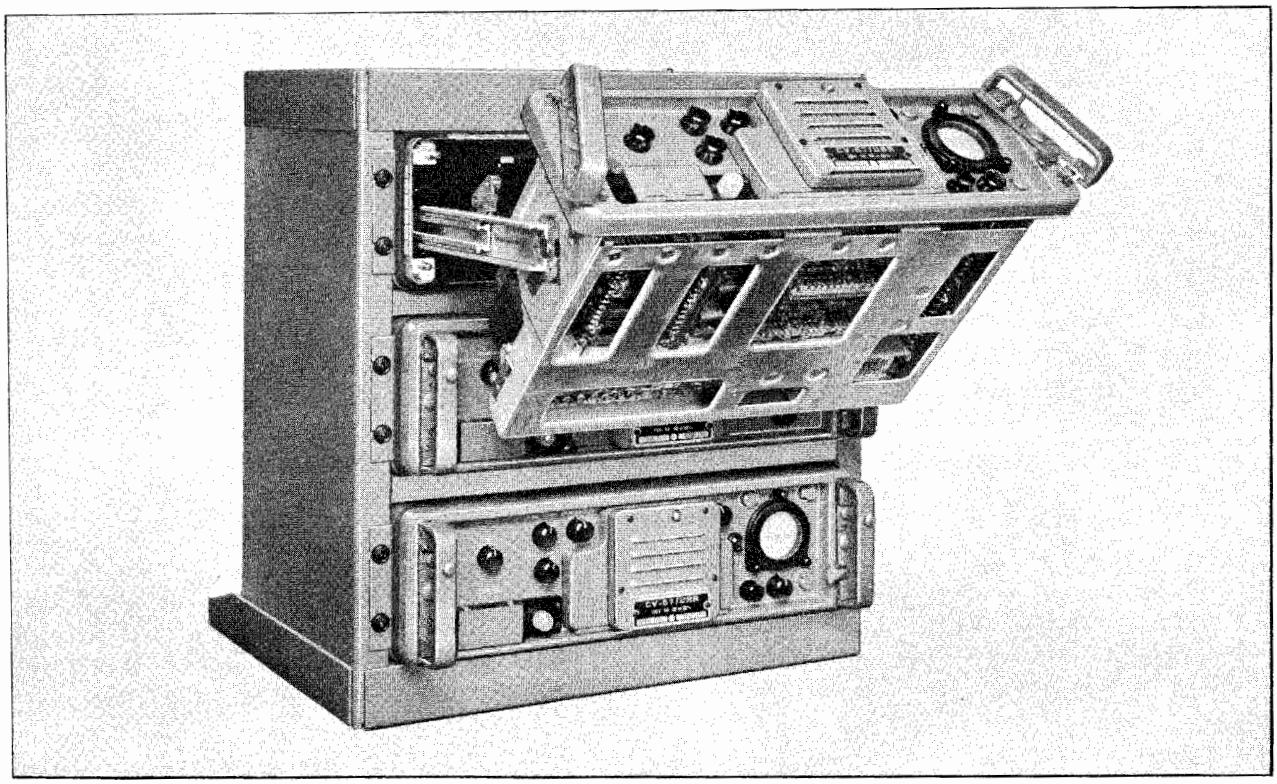


Figure 7–1. Frequency Shift Converter-Comparator Group AN/URA-6 or AN/URA-7, with Chassis Extended for Servicing

1. LOCALIZING TROUBLE.

a. FREQUENCY SHIFT CONVERTER, CV–57/-URR, See Table 7–1.

(1) Check power (fuses good, pilot light on).

(2) If two lines appear on the tuning monitor while receiving frequency-shift signals and can be made to merge by reducing the radio receiver gain to zero, the Input Unit and I-F Unit are operating.

(3) Press the CAL IN button. Two flickering lines on the tuning monitor indicate proper operation of circuits up to and including V601B in the Keyer.

(4) Plug a pair of headphones into the PHONES jack. A keyed tone signal will indicate the Keyer is operating, except for the output tubes, V607 and V608, which are checked in step 5.

(5) Plug a 0–100 ma milliammeter such as Navy Model OE series (connected to a phone plug with the tip to the "minus" and the shank to the "plus" terminal of the meter) into the TTYP jack on the front panel. A reading of about 60 ma on the milliammeter and a reading of 70 volts on a d-c voltmeter connected from jack to ground indicate the output tubes of the Keyer to be conducting but not keying.

(6) Replace the unit that the above tests have shown to be defective. Most troubles in any of the units can be located by replacing tubes as described in section 5 or by checking voltages and resistance values within that unit. Troubles in the Cable Filter Unit, Power Supply, or Tuning Monitor can best be located by continuity checks. See later paragraphs in this section, referring to the individual units.

b. FREQUENCY SHIFT CONVERTER-COMPARATOR GROUP AN/URA–6 or AN/URA–7.—See Table 7–2.

(1) Check power of each unit (fuses good, pilot light on).

(2) Tune the two radio receivers to a frequency shift keyed signal. If two lines appear on each of the Tuning Monitors and can be made to merge by reducing the respective radio receiver gain to zero, the Input Units and I-F Units of the Converters are operating.

(3) Set the CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL first on CHANNEL A LEVEL and then on CHANNEL B LEVEL. Indication of similar levels shows the Diversity Selector Unit channel amplifiers and avc rectifiers, V901, V908, V902, and V909, to be functioning.

(4) Set the CHANNEL A LEVEL—DIV IND—CHANNEL B LEVEL switch to DIV IND. Change the CHANNEL A—COMBINED—CHANNEL B switch first to CHANNEL A, then to CHANNEL B. The meter should read 50 on the CHANNEL A position and 150 on CHANNEL B position, showing that the channel switching circuits are operating correctly.

(5) Plug a pair of phones in the PHONES jack of the Comparator. If a keyed tone is heard, the trouble is in the output tubes of the keyer or in the teletypewriter loop which are checked in step 7.

(6) Turn the Comparator SPEED switch to ADJ. If a keyed signal is heard, the trouble is in, or ahead of, the circuits of V601B of the Keyer.

(7) Plug a 0–100 ma milliammeter such as Navy Model OE series (connected to a phone plug with the tip to the "minus" and the shank to the "plus" terminal of the meter) into the TTYP jack on the front panel. A reading of about 60 ma on the milliammeter and a reading of about 70 volts on a d-c voltmeter connected from jack to ground indicate the output tubes of the Keyer to be conducting but not keying. A reading of approximately 30 ma indicates normal keying.

(8) Replace the defective unit (note that the Keyer Unit of the Frequency Shift Converters CV–57/URR, CV–71/URR, and Comparator CM–14/-URR are interchangeable) and shoot the trouble by checking tubes, voltages, and resistances, as shown in Tables 7–3 to 7–10 inclusive in another part of this section.

2. UNIT TROUBLE SHOOTING AND REPAIR.

a. EQUIPMENT REQUIRED. — The equipment for trouble shooting should consist of the following:

(1) A 20,000 ohms-per-volt multimeter such as Navy Model OE series or equivalent.

(2) An electronic multimeter such as Multimeter ME–25/U series, Navy Model OBQ series or equivalent.

(3) An oscilloscope, such as Oscilloscope OS–8/U, Navy Models OBL or OBT series or equivalent.

(4) A microammeter such as Navy Type 60107.

(5) An adjustable r-f signal generator such as R-F Signal Generator Set AN/URM–25 series, Navy Model LP series or equivalent, with minimum range 25 to 500 kc and an impedance of approximately 70 ohms for testing of CV–57/URR and AN/URA–6 equipments or 910 ohms for testing of AN/URA–7 equipment (this impedance will have to be obtained by a matching network).

(6) A 14-conductor cable approximately 4 feet long with a 14-prong plug on one end and a 14-prong jack on the other end to match the connectors for the operating sub-assemblies.

TABLE 7-1. TROUBLE SHOOTING CHART, CONVERTER

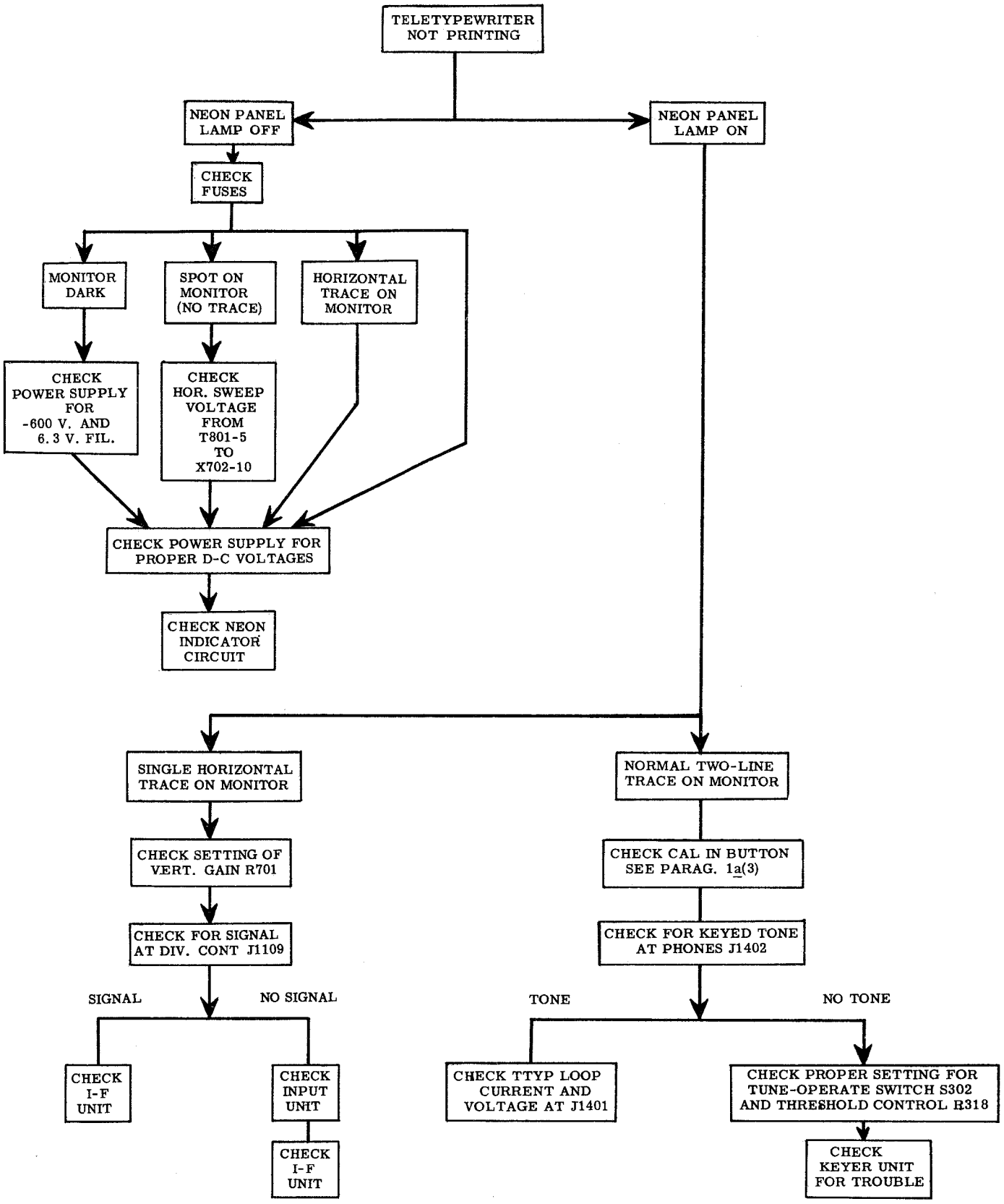
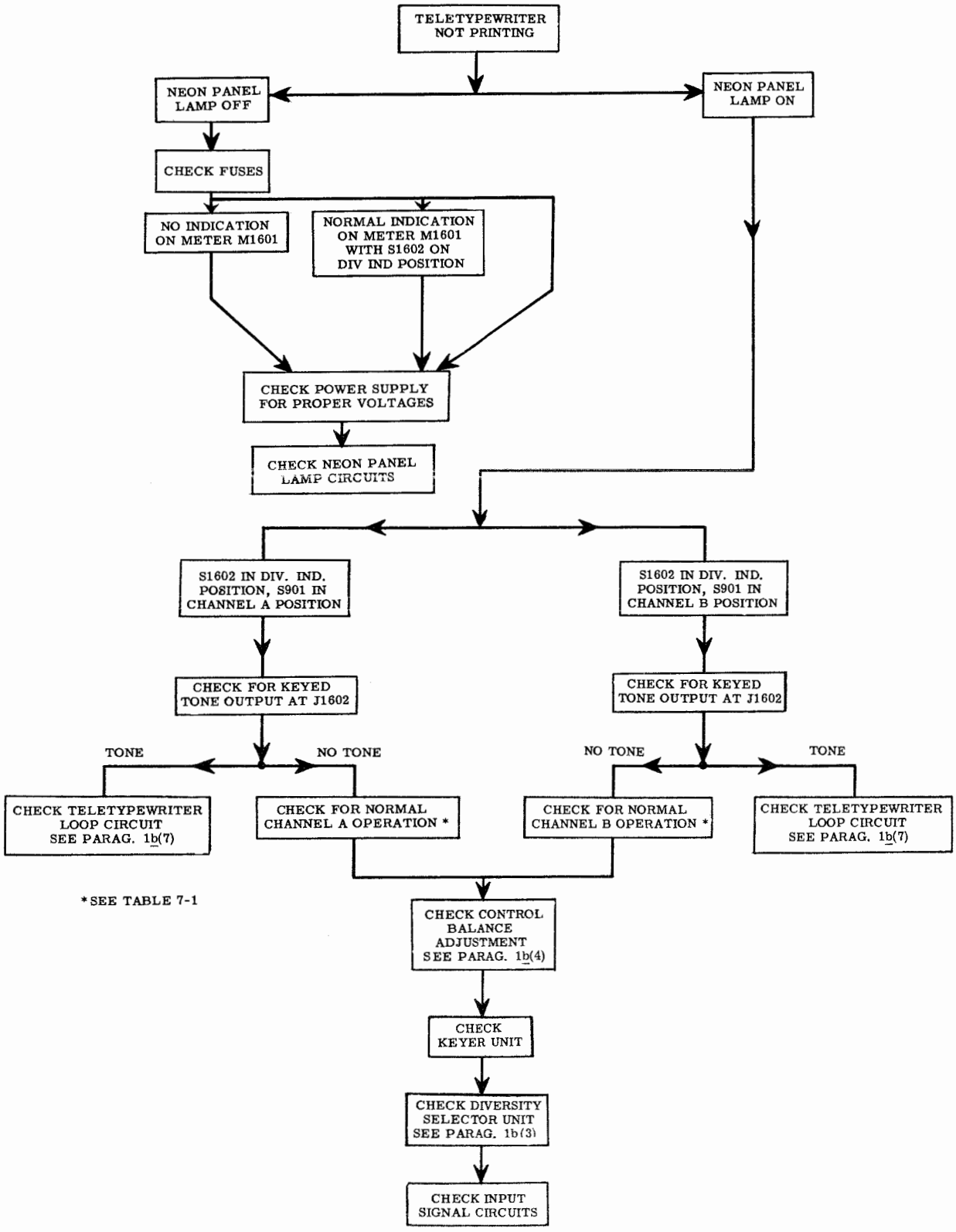


TABLE 7-2. TROUBLE SHOOTING CHART, COMPARATOR



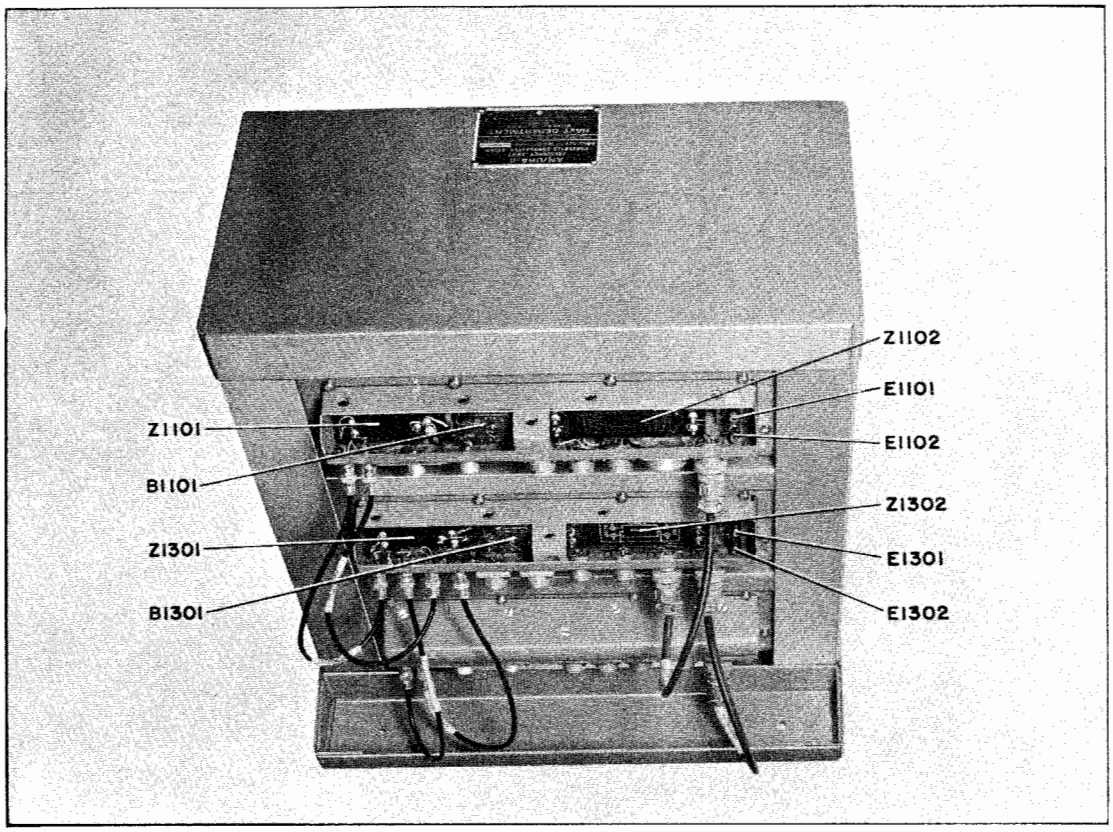


Figure 7–2. Cable Filters

(7) Use the equipment itself for servicing during non-operating periods. Where continuous operation is required, a separate maintenance system, comparable to the equipment in use, may be desirable.

(8) Tools normally used in the electronic technician's work will be satisfactory for this work.

NOTES

1. Before attempting to remove the individual units controlled by panel knobs, pull the panel knobs outward to disengage the mechanical coupling. After the unit has been re-seated in the chassis, merely pushing the knobs will engage the mechanical couplers if the settings have not been disturbed; otherwise it will be necessary to push and turn the knobs to engage the couplings.
2. Remove the chassis by unscrewing the rear screws and then the front screw. Replace units by tightening the front screw first and then the rear screws.

b. CABLE FILTERS.—See Figure 7–2. Check the circuits for continuity and shorts, using an ohmmeter. Trouble in the fan motor can best be remedied by replacing the motor or motor capacitor. See Figures 7–24 and 7–25 for the Converter Cable Filter schematic and wiring diagram and Figures 7–26 and 7–27 for the Comparator Cable Filter schematic and wiring diagram.

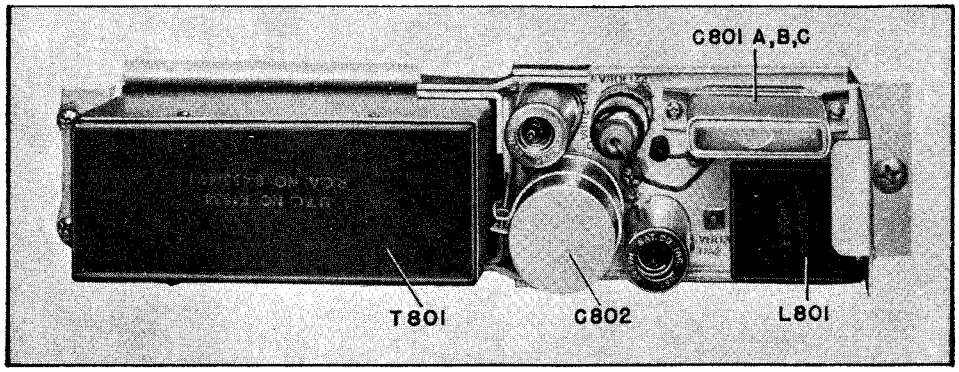


Figure 7–3. Converter Power Supply Chassis, Top View

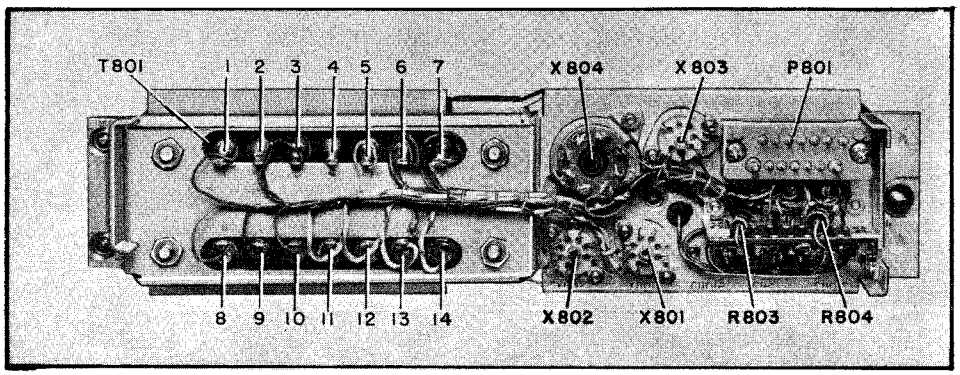


Figure 7–4. Converter Power Supply Chassis, Bottom View

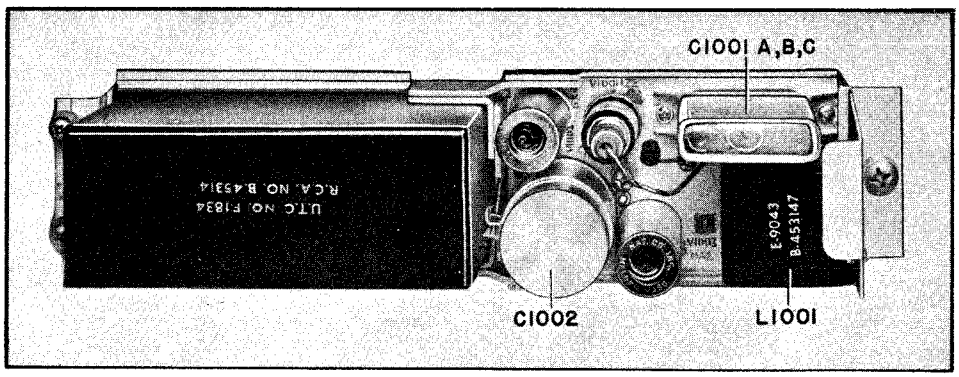


Figure 7–5. Comparator Power Supply Chassis, Top View

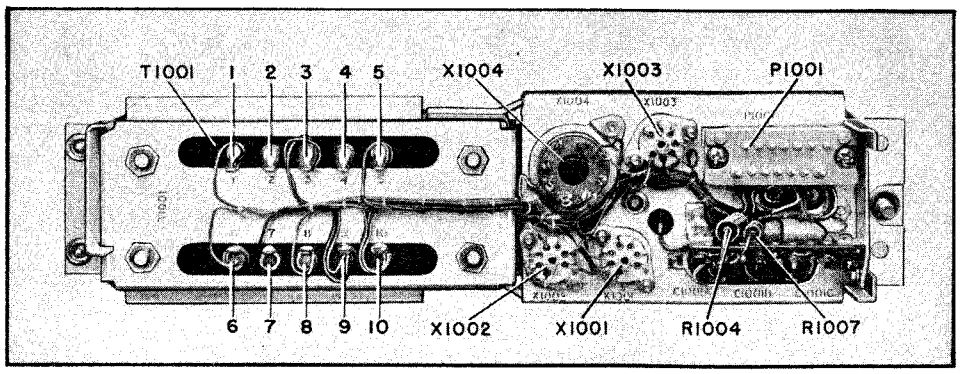


Figure 7–6. Comparator Power Supply Chassis, Bottom View

c. POWER SUPPLIES.—See Figures 7–3 to 7–6 inclusive. First check the resistance values as given in Table 7–8 for the Converter Power Supply and Table 7–9 for the Comparator Power Supply. Measure voltages only when the Power Supply is delivering normal load. The proper load voltages are indicated on the schematic and wiring diagrams, Figures 7–28 and 7–29, for the Converter Power Supply and Figures 7–30 and 7–31 for the Comparator Power Supply.

d. TUNING MONITOR.—See Figures 7–7 and 7–8. Circuit check (resistance and continuity) and tube replacement will locate troubles in the Tuning Monitor. See Table 7–7 for the resistance measurements. See Figure 7–32 and 7–33 for the schematic and wiring diagrams giving part locations and electrical values.

After the trouble has been corrected, the vertical centering for both positions of the CAL IN button must be adjusted with no signal input as follows.

(1) Depress the CAL IN button and adjust R705 so the sweep line coincides with the engraved center line on the Tuning Monitor window.

(2) Release CAL IN button and adjust the V CENT control so the horizontal sweep line coincides with the center line engraved on the Tuning Monitor window.

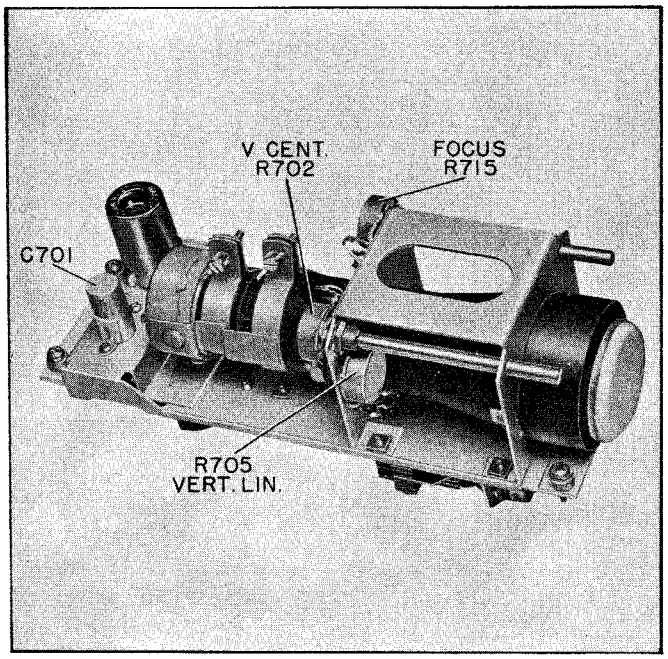


Figure 7–7. Tuning Monitor Chassis, Top View

After the centering is completed, adjust the FOCUS for the best average focus for the two CAL IN positions.

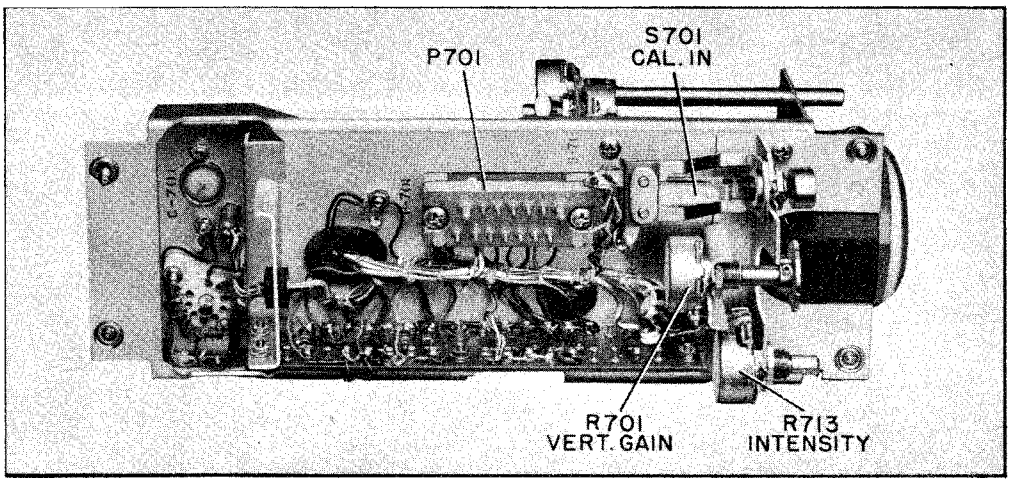


Figure 7–8. Tuning Monitor Chassis, Bottom View

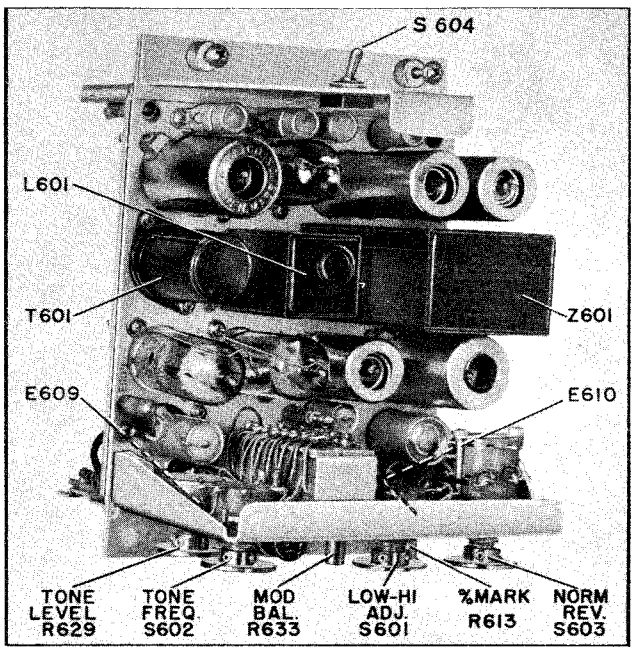


Figure 7–9. Keyer Chassis, Top View

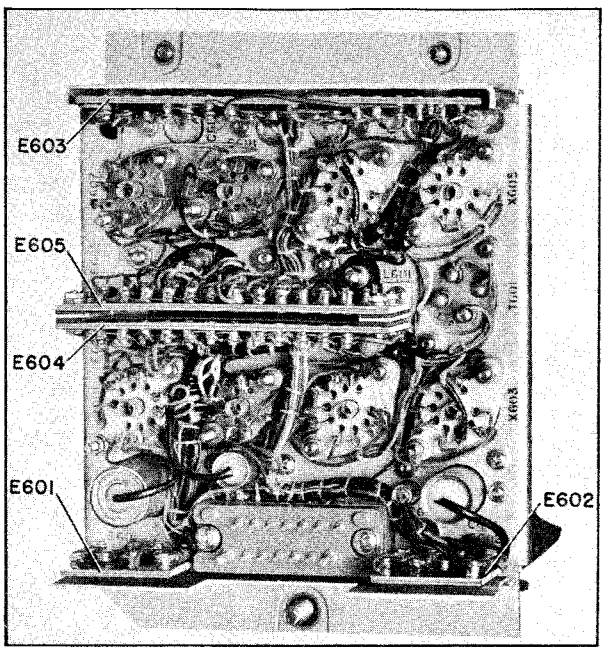


Figure 7–10. Keyer Chassis, Bottom View

e. INPUT UNIT.—See Figures 7–11 and 7–12. Check the tubes, then circuit-check the unit for shorts, open circuits, or off-value parts (see Figures 7–34, 7–35, 7–38, 7–39, and Tables 7–3 and 7–4). If the trouble is not located, use the following procedure.

(1) Apply a 400-kc signal (for CV–57/URR or AN/URA–6 equipments) or a 50-kc signal (for AN/URA–7 equipment) of about 0.01 volt to the i-f input, pin 8 of plug P101 or P201 as the case may be. Set the NARROW-WIDE switch to NARROW. Connect an external test oscilloscope to the plate pin 5 of converter tube V103 or V203. If no signal is observed, check for incoming signal on pin 7 or local-oscillator input on pin 1. Absence of signal in either case indicates direction of trouble:

(2) If no signal appears on pin 7 of V103 (or V203), check the circuit by connecting test oscilloscope to terminal D of transformers T102 (or T202) and T103 (or T203) in that order.

(3) If no signal appears on pin 1 of V103 (or V203), remove tube V103 (or V203) from its socket. If signal then appears, the trouble is in the AFC circuits.

f. I-F UNIT.—See Figures 7–13 and 7–14. Check the tubes, then circuit-check the unit for shorts, open circuits, or off-value parts (see Figures 7–36, 7–37, and Table 7–5). If the trouble is not located, use the following procedure.

(1) Apply a 40-kc signal of about one volt t pin 10 of plug P301 or, if the Input Unit is know to be in operating order, apply a signal to the I- INPUT jack J1111 (400 kc for CV–57/URR AN/URA–6 equipment, 50 kc for AN/URA– equipment). Place switch S301 in WIDE positio

(2) With the test oscilloscope, check for pre ence of signal successively at V302 pin 1, V301 pin V301 pin 1, T301 terminal D. Absence of signal a one of these points indicates trouble in the relate circuit.

(3) Place switch S302 in TUNE position. Co nect a VoltOhmyst or equivalent indicating meter t pin 7 of V303. Vary the input-signal frequency. Th meter should trace out the discriminator curv Changing the input-signal level between 2500 micr volts and 0.5 volt should not change the discriminato curve amplitude.

g. KEYER UNIT.—See Figures 7–9 and 7–1 Check the tubes then circuit check the unit fo shorts, open circuits or off value parts (see Figur 7–42, 7–43 and Table 7–6). Switch S604 (on th rear bracket) must be in the ON position for th teletypewriter to operate. The switch, in the OF position, opens the screen grid circuit of the outpu tubes when the Keyer is not connected to a tele typewriter.

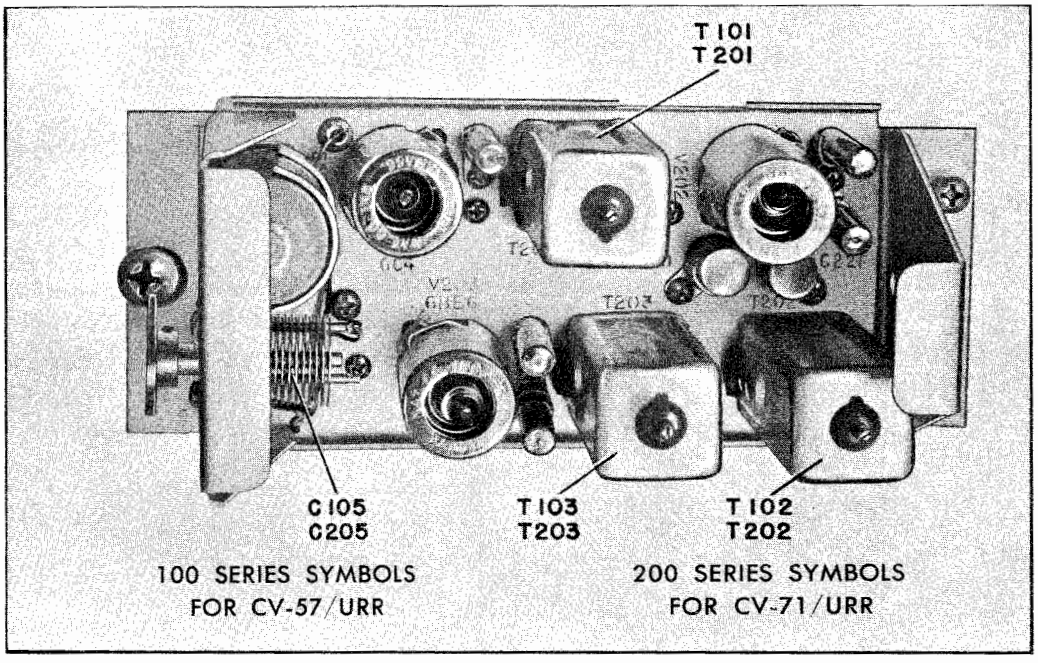


Figure 7–11. Input Unit, Top View

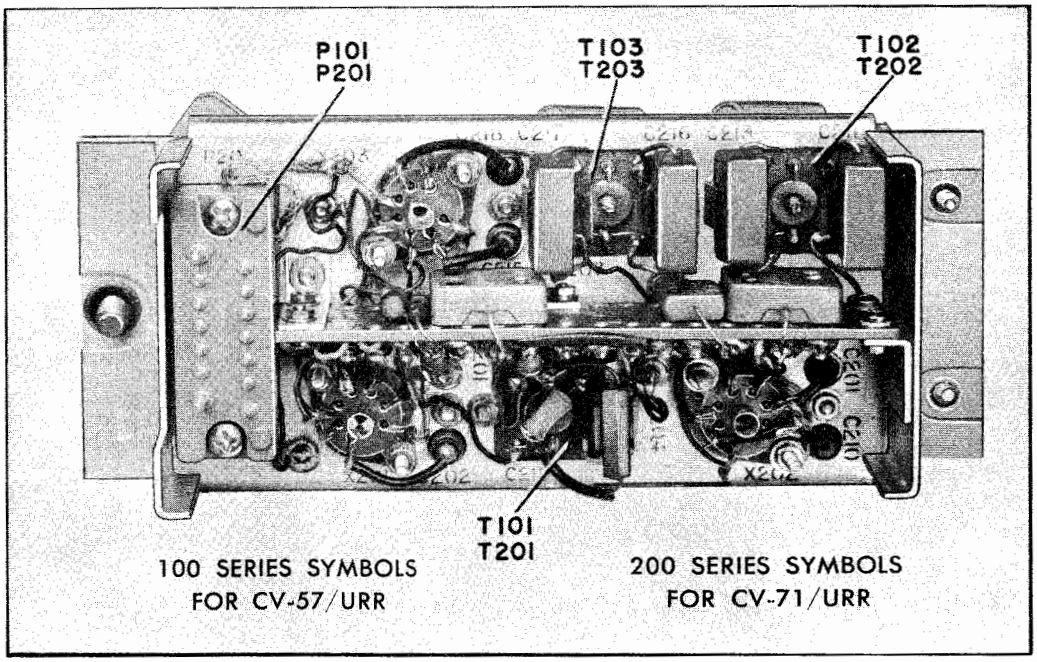


Figure 7–12. Input Unit, Bottom View

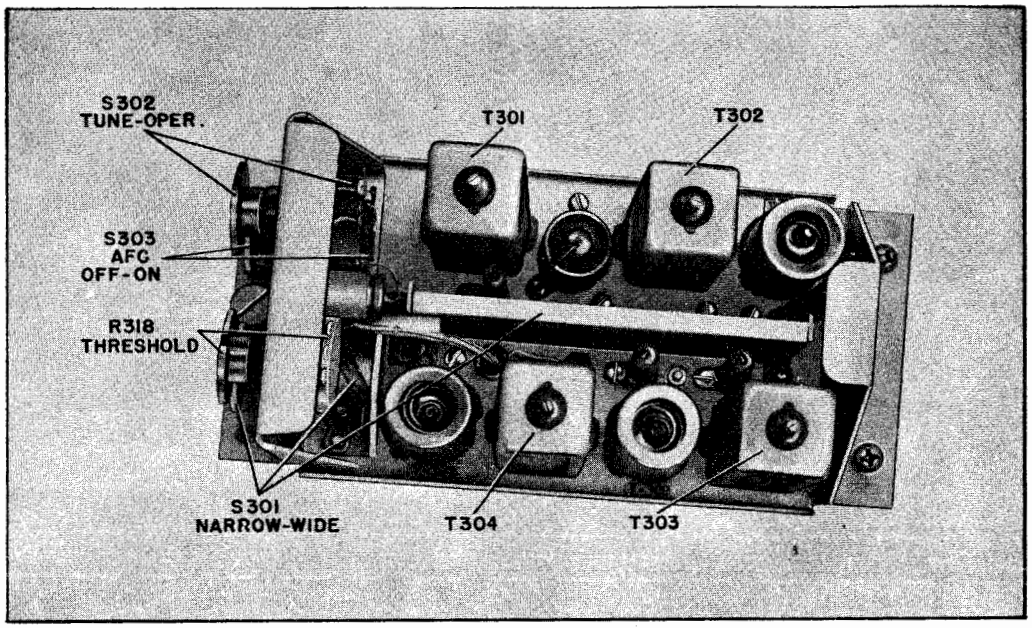


Figure 7–13. I-F Unit, Top View

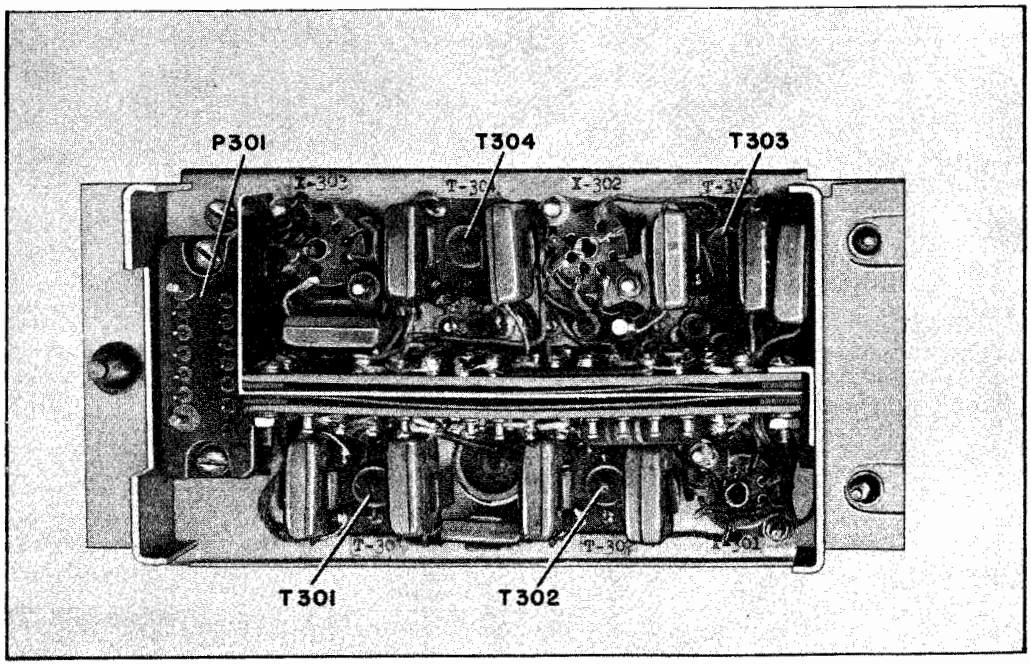


Figure 7–14. I-F Unit, Bottom View

Connect a 0.5-volt source of 60-cycle sine-wave voltage to P601-14 or E609 and ground. Proceed from stage to stage, using the test oscilloscope as an indicator (see Figures 7–9 and 7–10).

(1) Connect the test oscilloscope to pin 1 of V601 before turning on the power. Turn on the power and adjust the test oscilloscope to 30 cycles sweep frequency, giving a pattern with two complete cycles. A signal indicates that the 1,2,3 triode of V601 is working satisfactorily. Turn off power and remove oscilloscope leads.

(2) Connect the test oscilloscope to pin 7 of V601. Turn on the power and check the three positions of S601, the SPEED switch. Low and HIGH positions should give the same amplitude, but the ADJ position may give a different amplitude since the signal will be coming from a different source. Return S601 to its original position. This checks the signal to the grid, pin 7, of V601B.

(3) Connect the test oscilloscope to E610. A signal with the same shape but increased amplitude, compared to step (2), should be obtained.

(4) With the power turned off, connect the test oscilloscope input to the indicated pins of tubes V603 and V604 in the order 2,7,1,6. Turning on the power, a square wave should be obtained in all cases with the NORM-REV switch in either position. If the signal is anything but a square wave, check the values of parts in the circuits of the tubes V603 and V604.

(5) Turn off power, connect the test oscilloscope to either pin 1 or 7 of first V607, and then V608, turning on the power every time. If the square-wave keying signal is obtained, turn the power off and change the test oscilloscope lead to pin 5 of V607. Turn the power on, and if no signal is obtained the trouble is in the output circuits of the keyer tubes V607 and V608.

(6) Connect the test oscilloscope to the center contact of the TONE LEVEL control R629 or pin 7 of V605 to check the Tone Oscillator operation. Further check of tube V605 can be had by connecting the test oscilloscope (with the power turned off) to pin 6 of V605 and then across the output (terminals 3 and 4) of T601.

h. DIVERSITY SELECTOR UNIT.—See Figures 7–17, and 7–18. Check tubes, then circuit check the unit for shorts, open circuits or off-value parts (see Figures 7–44, 7–45 and Table 7–10).

Apply an adjustable 400-kc (for CV–57/URR or AN/URA–6) or 50-kc (for AN/URA–7) sine-wave voltage (0.5 volt maximum) to pins 9 and 14 on plug P901. Check to make sure the connector links O901 and O902 are set to the I-F position.

(1) Connect the microammeter first to pin 12 of P901, and adjust a-c voltage to give a 50-microampere reading. Change meter to pin 11 of P901. The reading should also be about 50 microamperes. If these readings are obtained the channel amplifier and avc rectifier circuits are satisfactory. Continue with step (3). If not satisfactory, continue with step (2).

(2) If no indication is obtained in step (1), connect a test oscilloscope first to pin 1 and then to pin 5 of each of the two input tubes V901 and V908. A sine wave should appear at each point indicated, but the amplitude of the signal at pin 5 should be greater than at pin 1. Turn the power off before contacting pin 5. If a signal is on pin 5 check the circuits of V902 and V909 pins 1 and 7 each.

(3) Connect an electronic voltmeter between O901 and ground (see Figure 7–18). A d-c voltage should be observed whose polarity will depend on which channel is conducting (positive when channel A is conducting, negative when channel B is conducting).

(4) Turn off power. With switch S901 on COMBINED (center position) connect pin 6 of V903 to one side (pin 4) of filament. Connect test oscilloscope to pin 6 of V903. Turn on the power and observe signal amplitude. Turn off power, connect test oscilloscope to pin 1 of V903. Turn on power. If signal amplitude is smaller, trouble is in V903 circuit. If signal amplitude is greater proceed with step (5).

(5) Connect the test oscilloscope (with the power turned off) to pins 2,7,1 and 6 of tubes V904 and V905. At all points a square-wave signal should be obtained; if not, check circuit values and voltages for the trouble.

(6) Connect the test oscilloscope to pin 7 of V906 and then to pin 7 of V907. A square-wave signal should be on each grid and cathode, pin 8. A similar signal should appear on the plate, pin 1 of V906 and V907.

(7) Any further trouble would be in the signal input and output circuits and may be readily located by circuit check. See the Schematic Diagram, Figure 7–44.

(8) Remove test lead from pin 6 of V903.

i. RECEIVER COUPLING KIT 10563. — Check the tube, then circuit-check for shorts, open circuits, or off-value parts (see Figures 7–40 and 7–41).

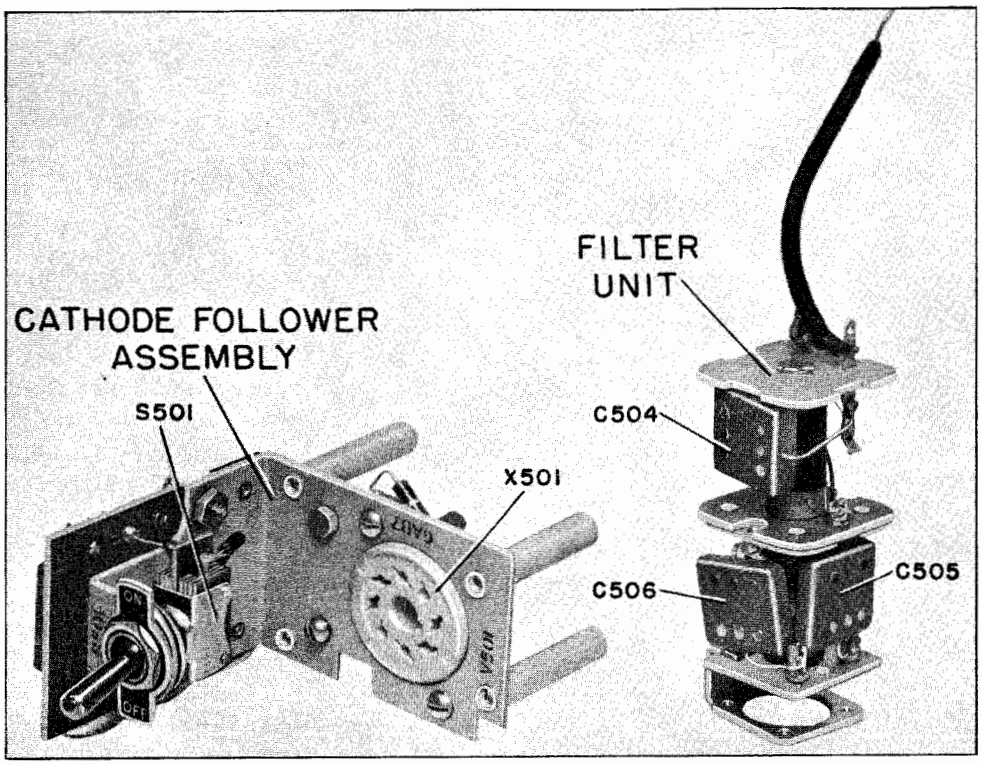


Figure 7–15. Receiver Coupling Kit Type 10563, Top View

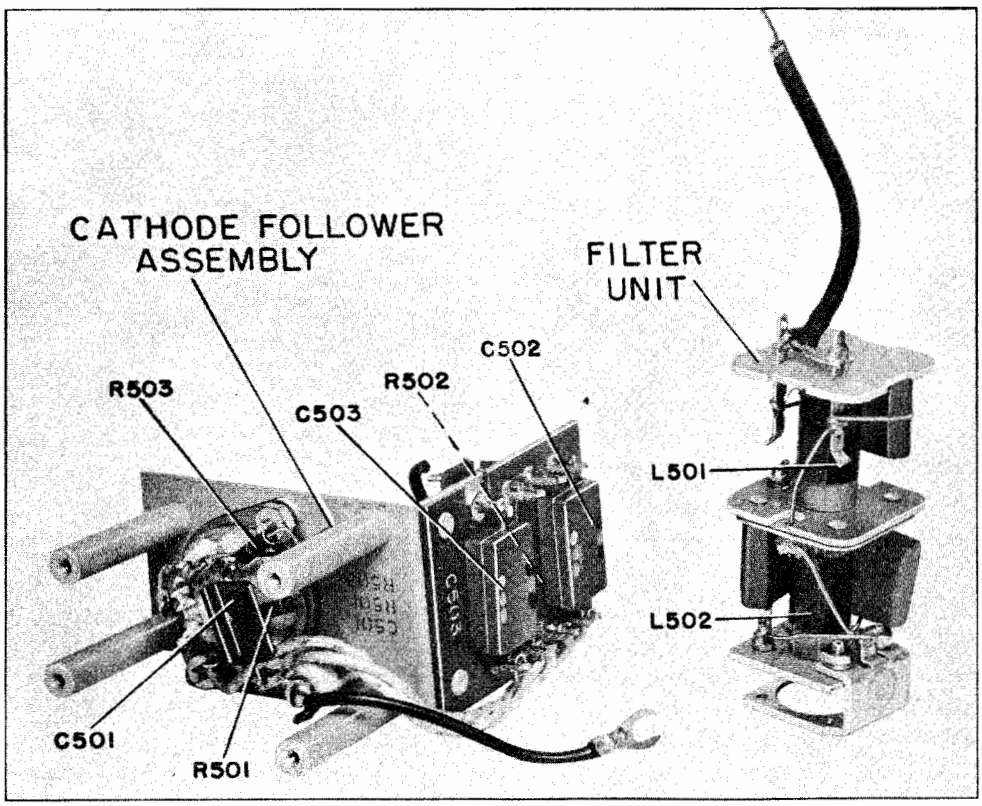


Figure 7–16. Receiver Coupling Kit Type 10563, Bottom View

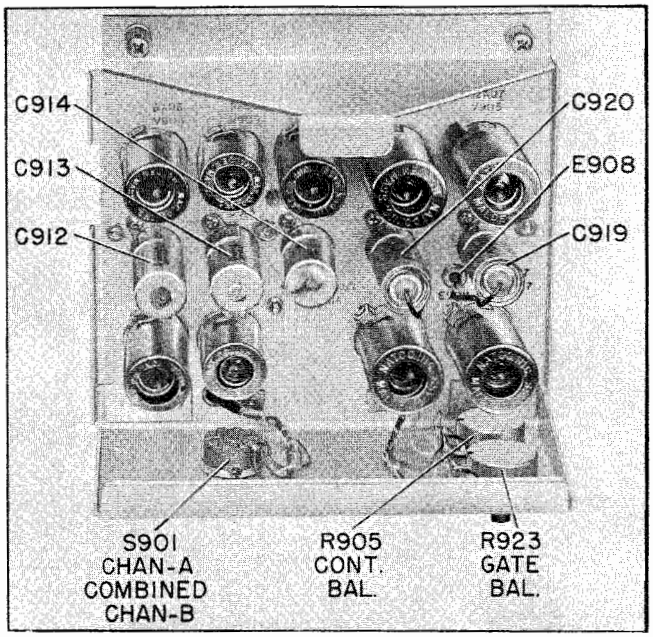


Figure 7–17. Diversity Selector Unit Chassis, Top View

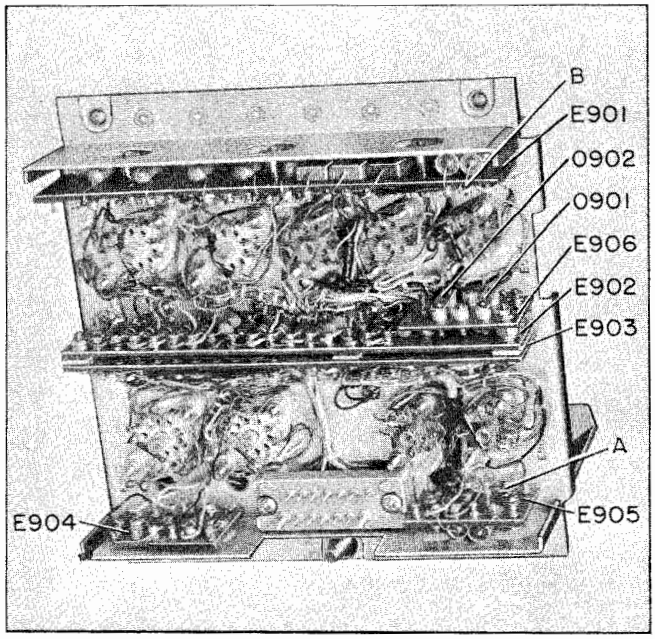


Figure 7–18. Diversity Selector Unit Chassis, Bottom View

3. VOLTAGE AND RESISTANCE MEASUREMENTS.

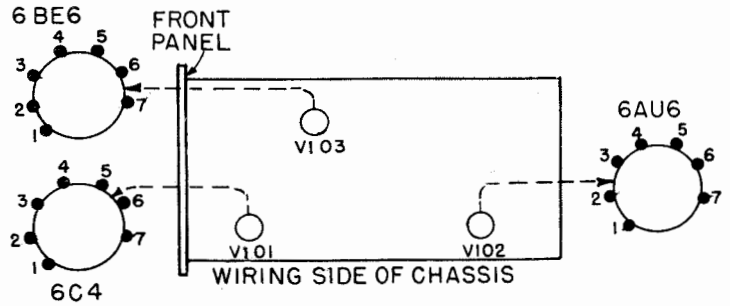
The following Tables 7–3 to 7–10 inclusive show voltage and resistance measurements made on the equipment under the following conditions:

1. TUNE-OPERATE control in TUNE position.
2. NARROW-WIDE control in WIDE position.
3. TONE FREQ control at 595 position.
4. TONE LEVEL control at 10 position.
5. SPEED control at LOW position.
6. NORM-REV control in NORM position.
7. VERT GAIN control at maximum clockwise postion.
8. FOCUS control in normal operating position.
9. THRESHOLD control at 0.
10. INTENSITY control in normal operating position.
11. Teletypewriter out, Keyer Unit toggle switch S604 in OFF position.
12. On Comparator CM–14/URR, CHANNEL A —COMBINED—CHANNEL B control and CHANNEL A—DIV IND—CHANNEL B control set to CHANNEL A position.
13. Units assembled in chassis for voltage measurements to chassis ground.
14. Units removed from chassis for resistance measurements to chassis ground.
15. No signal input.
16. Voltage readings taken with a 20,000 ohms per volt multimeter Model OE series or equivalent.

WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Always observe all safety regulations and precautions. Refer to the Safety Notices and high-voltage Warning printed on pages viii and ix in the Front Matter of this instruction book.

TABLE 7-3. INPUT UNIT, CV-57/URR, VOLTAGE AND RESISTANCE MEASUREMENTS



Test conditions as described in paragraph 3.

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOL	PIN NUMBERS								PLATE CAP
	1	2	3	4	5	6	7	8	
V101	90	—	6.1*	6.1*	90	−6	0	—	—
V102	0	2.8	6.1*	6.1*	101	108	2.8	—	—
V103	−1.6	2.1	6.1*	6.1*	185	68	0	—	—

* Voltage measured between pins 3 and 4.

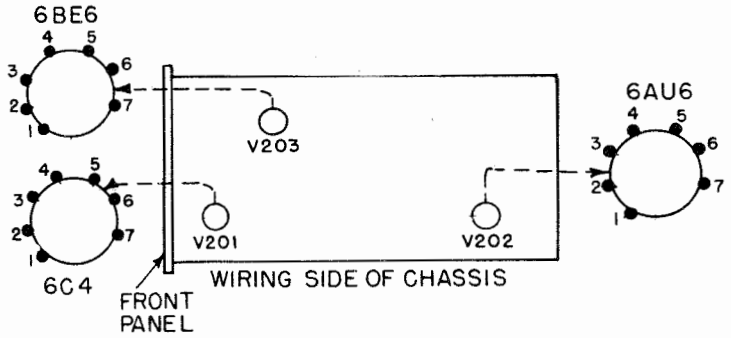
RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

V101	Inf.	—	—	—	Inf.	390K	0	—	—
V102	1 Meg.	2700	—	—	Inf.	Inf.	2700	—	—
V103	820K	470	—	—	Inf.	Inf.	0	—	—

RESISTANCE MEASUREMENTS ON P101 TO CHASSIS GROUND

PIN NO.	RESISTANCE, OHMS	PIN NO.	RESISTANCE, OHMS
1	Inf.	8	Inf.
2	Inf.	9	0
3	Inf.	10	0
4	Inf.	11	1.25 Meg.
5	Inf.	12	Inf.
6	Inf.	13	0
7	Inf.	14	Inf.

TABLE 7-4. INPUT UNIT, CV-71/URR, VOLTAGE AND RESISTANCE MEASUREMENTS



Test conditions as described in paragraph 3.

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOL	PIN NUMBERS								PLATE CAP
	1	2	3	4	5	6	7	8	
V201	90	—	6.1*	6.1*	90	−6	0	—	—
V202	0	3.6	6.1*	6.1*	131	131	3.6	—	—
V203	−2.7	1.5	6.1*	6.1*	182	98	0	—	—

* Voltage measured between pins 3 and 4.

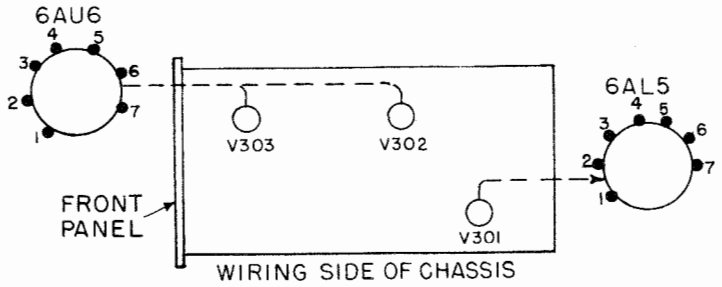
RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

V201	Inf.	—	—	—	Inf.	390K	0	—	—
V202	1 Meg	8200	—	—	Inf.	Inf.	8200	—	—
V203	820K	330	—	—	Inf.	Inf.	0	—	—

RESISTANCE MEASUREMENTS ON P201 TO CHASSIS GROUND

PIN NO.	RESISTANCE, OHMS	PIN NO.	RESISTANCE, OHMS
1	Inf.	8	Inf.
2	Inf.	9	0
3	Inf.	10	Inf.
4	Inf.	11	1.25 Meg
5	Inf.	12	Inf.
6	Inf.	13	0
7	Inf.	14	Inf.

TABLE 7-5. I-F UNIT, VOLTAGE AND RESISTANCE MEASUREMENTS



Test conditions as described in paragraph 3.

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOL	PIN NUMBERS								PLATE CAP
	1	2	3	4	5	6	7	8	
V301	0	2.0	6.1*	6.1*	169	112	2.0	—	—
V302	−0.5	0	6.1*	6.1*	177	53	0	—	—
V303	0.4	0	6.1*	6.1*	0.4	—	0	—	—

* Voltage measured between pins 3 and 4.

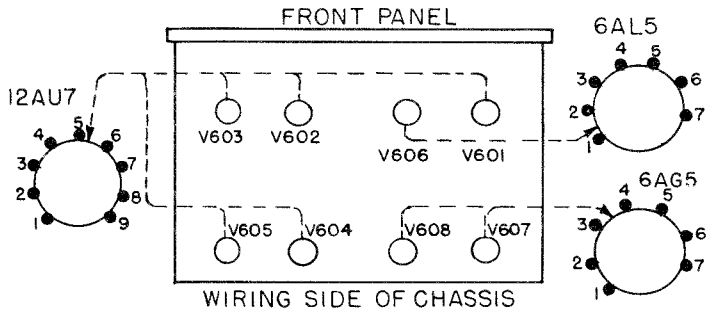
RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

V301	56	680	—	—	Inf.	Inf.	680	—	—
V302	1 Meg.	0	—	—	Inf.	33K	0	—	—
V303	680K	0	—	—	680K	—	1 Meg.	—	—

RESISTANCE MEASUREMENTS ON P301 TO CHASSIS GROUND

PIN NO.	RESISTANCE, OHMS	PIN NO.	RESISTANCE, OHMS
1	Inf.	8	0
2	100K	9	0
3	1 Meg.	10	100K
4	Inf.	11	0
5	Inf.	12	Inf.
6	Inf.	13	0
7		14	Inf.

TABLE 7-6. KEYER UNIT, VOLTAGE AND RESISTANCE MEASUREMENTS



Test conditions as described in paragraph 3.

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOL	PIN NUMBERS									PLATE CAP
	1	2	3	4	5	6	7	8	9	
V601	105	0	2.25	3.1*	3.1*	55	0	2.1	3.1*	—
V602	42	4.0†	6.0	3.1*	3.1*	107	−20	0	3.1*	—
V603	158	42	65	3.1*	3.1*	120	62	65	3.1*	—
V604	16.5	1.7	1.6	3.1*	3.1*	105	−23	1.6	3.1*	—
V605	87	0.02	19	3.1*	3.1*	110	0.4	3.2	3.1*	—
V606	4.0†	4.0†	3.1*	3.1*	4.6	—	0	—	—	—
V607	−0.2	0	3.1*	3.1*	180	0	−0.2	—	—	—
V608	−0.2	0	3.1*	3.1*	180	0	−0.2	—	—	—

* a-c volts. † measured with electron-tube voltmeter.

RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

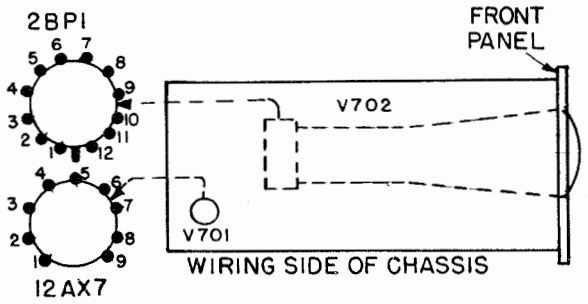
V601	inf.	1.8 meg	390	56K	56K	inf.	1.8 meg	1800	56K	—
V602	300K	1 meg	5.5K	56K	56K	150K	400K	900	56K	—
V603	130K	300K	19K	56K	56K	140K	72K	19K	56K	—
V604	210K	250K	1K	56K	56K	210K	250K	1K	56K	—
V605	inf.	3700	12K	56K	56K	150K	420K	600	56K	—
V606	1 meg	1 meg	56K	56K	56K	—	0	—	—	—
V607	270K	0	56K	56K	180K	inf.	270K	—	—	—
V608	270K	0	56K	56K	180K	inf.	270K	—	—	—

TABLE 7-6. KEYER UNIT, VOLTAGE AND RESISTANCE MEASUREMENTS—Continued

RESISTANCE MEASUREMENTS ON P601 TO CHASSIS GROUND

PIN NO.	RESISTANCE, OHMS	PIN NO.	RESISTANCE, OHMS
1	56K	8	1200
2	125K	9	inf.
3	inf.	10	inf.
4	260K	11	0
5	inf.	12	180K
6	inf.	13	0
7	56K	14	inf.

TABLE 7-7. TUNING MONITOR UNIT, VOLTAGE AND RESISTANCE MEASUREMENTS



Test conditions as described in paragraph 3.

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOL	PIN NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
V701	150	0	1.7	3.1*	3.1*	80	−0.5	0	—	—	—	—
V702	−560	−570	−560	−300	—	80	80	150	0	35*	—	−560

* a-c volts

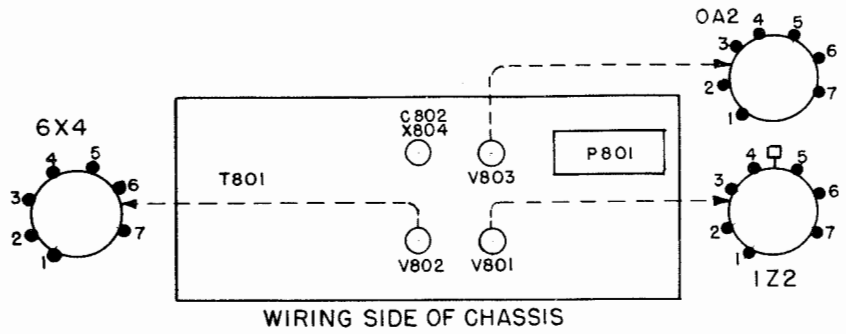
RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

V701	85K	1 meg	inf.	inf.	inf.	550K	inf.	0	inf.	—	—	—
V702	5 meg	5 meg	5 meg	3 meg	—	550K	48K	85K	0	0	—	5 meg

RESISTANCE MEASUREMENTS ON P701 TO CHASSIS GROUND

PIN NO.	RESISTANCE, OHMS	PIN NO.	RESISTANCE, OHMS
1	inf.	8	5.5 meg
2	inf.	9	5 meg
3	85K	10	5 meg
4	inf.	11	inf.
5	inf.	12	inf.
6	inf.	13	0
7	inf.	14	1 meg

TABLE 7-8. CONVERTER POWER SUPPLY VOLTAGE AND RESISTANCE MEASUREMENTS



Test conditions as described in paragraph 3.

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOL	PIN NUMBERS								PLATE CAP
	1	2	3	4	5	6	7	8	
V801	—	600*	600*	—	—	—	—	—	-670
V802	197*	—	3.1*	3.1*	—	197*	215	—	—
V803	—	—	—	—	150	—	0	—	—

* a-c volts

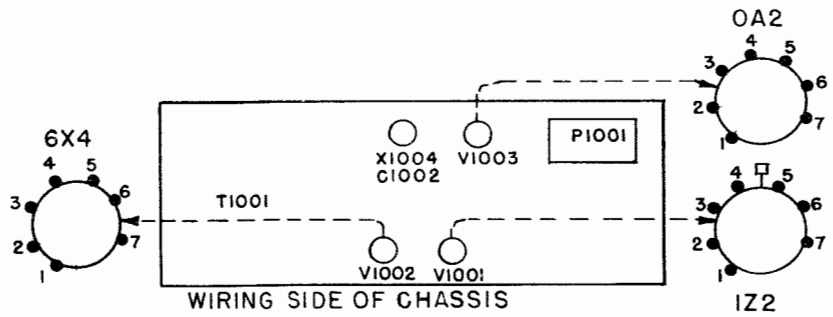
RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

V801	—	1700	1700	—	—	—	—	—	600K
V802	110	—	0.1	0.1	—	105	550K	—	—
V803	—	—	—	—	550K	—	0	—	—

RESISTANCE MEASUREMENTS ON P801 TO CHASSIS GROUND

PIN NO.	RESISTANCE, OHMS	PIN NO.	RESISTANCE, OHMS
1	0.1	8	550K
2	550K	9	inf.
3	550K	10	inf.
4	150K	11	700K
5	inf.	12	inf.
6	19	13	0
7	0.1	14	inf.

TABLE 7-9. COMPARATOR POWER SUPPLY VOLTAGE AND RESISTANCE MEASUREMENTS



Test conditions as described in paragraph 3.

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOL	PIN NUMBERS								PLATE CAP
	1	2	3	4	5	6	7	8	
V1001	—	200*	200*	—	—	—	—	—	175
V1002	200*	—	3.1*	3.1*	—	200*	200	—	—
V1003	—	—	—	—	150	—	0	—	—

* a-c volts

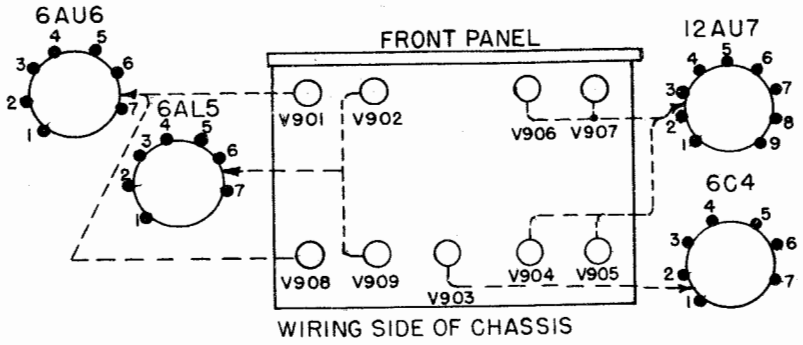
RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

V1001	—	70	70	—	—	—	—	—	230K
V1002	75	—	0.1	0.1	—	70	550K	—	—
V1003	—	—	—	—	550K	—	0	—	—

RESISTANCE MEASUREMENTS ON P1001 TO CHASSIS GROUND

PIN NO.	RESISTANCE, OHMS	PIN NO.	RESISTANCE, OHMS
1	0.1	8	210K
2	550K	9	inf.
3	550K	10	inf.
4	150K	11	700K
5	inf.	12	inf.
6	inf.	13	0
7	0.1	14	—

TABLE 7-10. DIVERSITY SELECTOR UNIT, VOLTAGE AND RESISTANCE MEASUREMENTS



Test conditions as described in paragraph 3.

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOL	PIN NUMBERS									PLATE CAP
	1	2	3	4	5	6	7	8	9	
V901	−0.5	0	3.1*	3.1*	14	95	0	—	—	—
V902	0.01	−0.01	3.1*	3.1*	0.01	—	−0.02	—	—	—
V903	65	—	3.1*	3.1*	65	−1.5	2.3	—	—	—
V904	105	65	65	3.1*	3.1*	140	40	65	3.1*	—
V905	120	−16†	0	3.1*	3.1*	150	−0.03	0	3.1*	—
V906	0	0	1.6	3.1*	3.1*	150	−18†	0	3.1*	—
V907	23	0	1.6	3.1*	3.1*	150	18†	23	3.1*	—
V908	−0.5	0	3.1*	3.1*	14	95	0	—	—	—
V909	0.01	0.01	3.1*	3.1*	−0.01	—	−0.02	—	—	—

* a-c volts. † measured with electron-tube voltmeter.

RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

V901	2.25 meg	0	inf.	inf.	inf.	inf.	0	—	—	—
V902	inf.	400K	inf.	inf.	270K	—	270K	—	—	—
V903	325K	—	inf.	inf.	325K	4.7K	5.25K	—	—	—
V904	160K	325K	18K	inf.	inf.	170K	85K	18K	inf.	—
V905	250K	1.5 meg	0	inf.	inf.	250K	1.5 meg	0	inf.	—
V906	6K	1 meg	56K	inf.	inf.	165K	500K	6K	inf.	—
V907	4.7K	1 meg	56K	inf.	inf.	165K	500K	6K	inf.	—
V908	2.25 meg	0	inf.	inf.	inf.	inf.	0	—	—	—
V909	inf.	270K	inf.	inf.	400K	—	270K	—	—	—

TABLE 7-10. DIVERSITY SELECTOR UNIT, VOLTAGE AND RESISTANCE MEASUREMENTS—Continued

RESISTANCE MEASUREMENTS ON P901 TO CHASSIS GROUND

PIN NO.	RESISTANCE, OHMS	PIN NO.	RESISTANCE, OHMS
1	inf.	8	56K
2	inf.	9	inf.
3	165K	10	inf.
4	1200	11	inf.
5	260K	12	inf.
6	47	13	inf.
7	inf.	14	inf.

TABLE 7-11. TUBE OPERATING VOLTAGES AND CURRENTS

TUBE SYMBOL	TUBE TYPE	FUNCTION	PLATE VOLTS	PLATE MA	SCREEN VOLTS	SCREEN MA	SUP-PRESSOR VOLTS	CATH-ODE VOLTS	GRID VOLTS	HEATER VOLTS AC
V101	6C4	Local Oscillator	90	3	—	—	—	0	−6	6.3
V102	6AU6	AFC Reactance	101	0.7	108	0.4	2.8	2.8	0	6.3
V103	6BE6	Converter	185	1.3	68	2.7	2.1	2.1	−1.6	6.3
V201	6C4	Local Oscillator	90	3	—	—	—	0	−6	6.3
V202	6AU6	AFC Reactance	131	0.4	131	0.1	3.65	3.65	0	6.3
V203	6BE6	Converter	182	2	98	8	1.5	1.5	−2.7	6.3
V301	6AU6	IF Amplifier	169	2.7	112	0.9	1.72	1.72	0	6.3
V302	6AU6	Limiter	177	2.1	52.5	0.4	0	0	−0.58	6.3
V303A	6AL5	IF Discriminator	0	0	—	—	—	0.42	—	6.3
V303B			0	0	—	—	—	0.42	—	6.3
V601A	12AU7	A-F Amplifier I	105	5.75	—	—	—	2.25	0	6.3
V601B		A-F Amplifier II	55	1.17	—	—	—	2.1	0	6.3
V602A	12AU7	Balanced Modulator	107	0	—	—	—	0	−20	6.3
V602B		Trigger Driver	42	0.43	—	—	—	6	4	6.3
V603A	12AU7	Trigger I	120	3.0	—	—	—	65	62	6.3
V603B		Trigger I	158	0	—	—	—	65	42	6.3
V604A	12AU7	Trigger II	16.5	1.6	—	—	—	1.6	1.7	6.3
V604B		Trigger II	105	0	—	—	—	1.6	−23	6.3
V605A	12AU7	Tone Modulator	107	6.7	—	—	—	3.2	0.4	6.3
V605B		Tone Oscillator	87	1.5	—	—	—	19	0.1	6.3
V606A	6AL5	D-C Restorer	4	—	—	—	—	4.6	—	6.3
V606B		D-C Restorer	0	—	—	—	—	4.0	—	6.3
V607†	6AQ5	TTYP Keyer	80	30	97	3.2	—	0	0	6.3
V608†	6AQ5	TTYP Keyer	80	30	97	3.2	—	0	0	6.3
V701A	12AX7	D-C Amplifier	150	0.2	—	—	—	1.7	0	6.3
V701B		D-C Amplifier	80	0.15	—	—	—	0	−0.5	6.3
V702	2BP1	CRT (Tuning Monitor)	150	0	−300	0	150	−560	−570	6.3
V801	1Z2	High Voltage Rectifier	−670	2	—	—	—	600*	—	1.5
V802	6X4	Low Voltage Rectifier	197*	70	—	—	—	21.5	—	6.3

* Represents a-c volts. † With TTYP plug inserted and S604 on.

TABLE 7-11. TUBE OPERATING VOLTAGES AND CURRENTS—Continued

TUBE SYMBOL	TUBE TYPE	FUNCTION	PLATE VOLTS	PLATE MA	SCREEN VOLTS	SCREEN MA	SUP-PRESSOR VOLTS	CATH-ODE VOLTS	GRID VOLTS	HEATER VOLTS AC
V803	OA2	Voltage Regulator	150	15	—	—	—	0	—	—
V901	6AU6	Channel "A" Amplifier	14	3.3	95	2.5	0	0	−0.5	6.3
V902A	6AL5	AVC Rectifier	—	—	—	—	—	—	—	6.3
V902B		Differential Rectifier	—	—	—	—	—	—	—	6.3
V903	6C4	D-C Amplifier	65	0.32	—	—	—	2.3	−1.5	6.3
V904A	12AU7	First Control Trigger	105	3.6	—	—	—	65	65	6.3
V904B			140	0	—	—	—	65	40	6.3
V905A	12AU7	Second Control Trigger	120	0	—	—	—	0	−16	6.3
V905B			15	1.2	—	—	—	0	−0.03	6.3
V906A	12AU7	Gate B Control	150	0	—	—	—	0	−18	6.3
V906B		Gate B	0	0	—	—	—	1.6	0	6.3
V907A	12AU7	Gate A Control	150	3	—	—	—	23	18	6.3
V907B		Gate A	23	4.7	—	—	—	1.6	0	6.3
V908	6AU6	Channel B Amplifier	14	3.3	95	2.5	0	0	−0.5	6.3
V909A	6AL5	AVC Rectifier	—	—	—	—	—	—	—	6.3
V909B		Differential Rectifier	—	—	—	—	—	—	—	6.3
V1001	1Z2	Negative Voltage Rectifier	−175	—	—	—	—	200*	—	1.5
V1002	6X4	Positive Voltage Rectifier	200*	70	—	—	—	200	—	6.3
V1003	OA2	Voltage Regulator	150	15	—	—	—	0	—	—

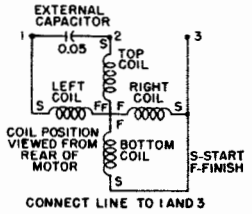
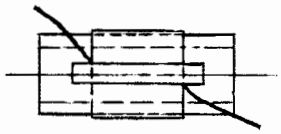
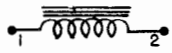
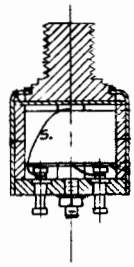
* Represents a-c volts.

TABLE 7-12. RATED TUBE CHARACTERISTICS

TUBE TYPE	FILAMENT VOLTAGE (V)	FILAMENT CURRENT (A)	PLATE VOLTAGE (V)	GRID BIAS (V)	SCREEN VOLTAGE (V)	PLATE CURRENT (MA)	SCREEN CURRENT (MA)	A-C PLATE RESISTANCE (OHMS)	VOLTAGE AMPLIFICATION FACTOR (MU)	TRANSCONDUCTANCE (MICROMHOS)		EMISSION	
										NORMAL	MINIMUM	IS (MA)	TEST VOLT
0A2			150			5 to 30						30	185*
1Z2	1.25	265	15KV			8.5						9.5	100
2BP1	6.3	0.6	2750 max.	200 max.	1100 max.								
6AL5	6.3	0.3	165			10						40	10
												40	10
6AQ5	6.3	0.45	250	−12.5	250	45	3.75	2000		5200	3000	100	30
6AU6	6.3	0.3	250	− 0.8	150	11	6			6250	4150	60	20
6BE6	6.3	0.3	250	−16.5	100	4.1	9.8			660	280	50	15
										9000	5500		
6C4	6.3	0.15	25	−8.5		14.5			18.5	4000	2500	70	30
6X4	6.3	0.6	400			75						140	50
												140	50
12AU7	6.3	0.3	250	−8.5		14.5			18.5	2650	1750	70	30
	12.6	0.15										70	30
12AX7	6.3	0.3	250	−2		1.75			115	2050	1250	55	30
	12.6	0.15										55	30
12AB7	6.3	0.45	300	−3	200	12	3			5000	4000	65	20

*Applied through a dropping resistor.

TABLE 7—13. WINDING DATA

SYMBOL DESIGNATION	RCA PART NUMBER	DIAGRAM	WINDING	WIRE SIZE	TURNS	D-C RESISTANCE IN OHMS	IMPEDANCE RATIO	HIGH-POT A-C VOLTS	REMARKS
B1101	454892		Bobbin Bobbin	No. 40SE No. 40SE	Top or bottom 1900 Right or left 1800	358 340			Dry at 121°C (250°F) for one hour. Apply 1 coat of varnish to coils and bake at 121°C (250°F) two hours. Apply second coat of varnish and bake 8 hours at 135°C (275°F).
B1301	Same as B1101	See B1101							Same information as given under B1101.
L501	890737-501		One layer space wnd.	No. 30E	55±1	0.55			22 uh. Phenolic form, air core, wax impreg. Part of Z501. Form. diameter 0.5 inch.
L502	Same as L501	Same as L501							
*L601	453141		Close. layer wound	No. 43SE	10,000½ tapped at 9360	1-2 3354 1-3 3081		750	Adjust air gap in core for frequency. Approx. 0.017.
†L601	Same as above	Same as above	Close. layer wound	No. 43SE	10,857 tapped at 10,179	1-3 3284 3-2 271			Halowax Dip for impregnation and potted in wax.
*L801	453147		Close. layer wound	No. 34SE	1850	150		1000	0.003-inch air gap in core. Layers separated by 0.001-inch thick paper. 4.5 henrys min. 30v-60 cycles at 70 ma d-c.
†L801	Same as above	Same as above	Close. layer wound	No. 33SE	2600	150		1000	Vacuum varnish impregnation asphalt potting. 4.5 henrys min. 30v-60 cycles at 70 ma. d-c.
L1001	Same as L801	See L801							Same information as given under L801.
L1101	456846-501		Universal 1 cross per turn	No. 38 AWG Single enameled	1060	86.2			6.7 mh.
L1102	456846-502	Same as above	Universal 1 cross per turn	No. 34 AWG Single Nylon enameled	150	2.32			143 uh.

* Made by Chicago Transformer.
† Made by United Transformer.

TABLE 7–13. WINDING DATA—Continued

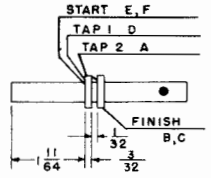
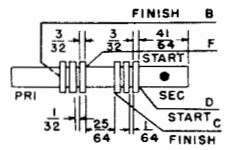
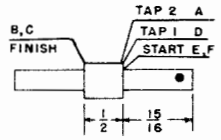
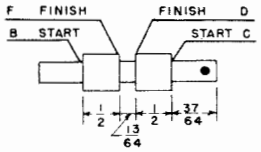
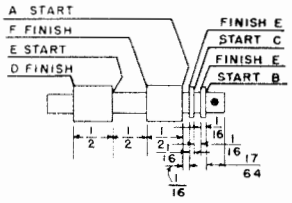
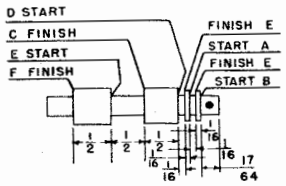
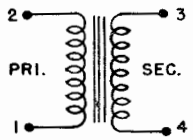
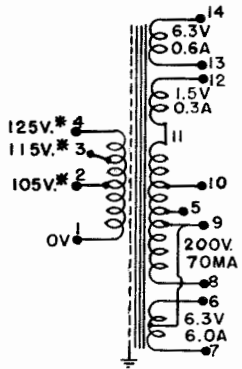
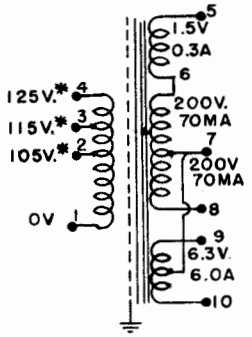
SYMBOL DESIGNATION	RCA PART NUMBER	DIAGRAM	WINDING	WIRE SIZE	TURNS	D-C RESISTANCE IN OHMS	IMPEDANCE RATIO	HIGH-POT A-C VOLTS	REMARKS
T101	739972-506		Universal 4 crosses per turn, 2 sections	Litz 3 strands of No. 41 wire, Single Nylon	91 turns per section, tap No. 1 at 16 turns, tap No. 2 at 45 turns	S to T1 0.747 S to T2 2.3 Total 9.37			Coil sections wound in series. 0.455-inch max dia. after winding.
T102	739972-501		Universal 4 crosses per turn, 2 coils, 3 sections per coil	Litz 3 strands of No. 34 wire, Single Nylon	130 turns per section	20.5 per Coil			Sections of each coil wound in series. Start leads are 180 degrees apart.
T103	Same as T102	Same as T102							
T201	739972-504		Universal ½ cross per turn	Litz 3 strands of No. 40 wire, Single Nylon	690 turns, tap No. 1 at 36 turns, tap No. 2 at 500 turns	S to T1 1.16 S to T2 21.16 Total 28.7			
T202	739972-502		Universal ½ cross per turn	No. 34 Single Nylon enameled	Primary 708 turns, Secondary 692 turns	20 20			
T203	Same as T202	Same as T202							
T301	739972-505		Universal Coils BE and CE 6 crosses per turn; Coils DE and AF ½ cross per turn	Coils BE and CE No. 34 Single Nylon enameled; Coils DE and AF No.34 Formex ins. (heavy Vinyl acetal)	Coil BE :52 Coil CE :52 Coil DE :810 Coil AF :816	1.53 1.53 23.2 23.7			
T302	Same as T301	Same as T301							
T303	Same as T301	Same as T301							

TABLE 7–13. WINDING DATA—Continued

SYMBOL DESIGNATION	RCA PART NUMBER	DIAGRAM	WINDING	WIRE SIZE	TURNS	D-C RESISTANCE IN OHMS	IMPEDANCE RATIO	HIGH-POT A-C VOLTS	REMARKS
T304	739972-503		Universal Coils BE and AE 6 crosses per turn; Coils CD and EF ½ cross per turn	Coils BE and AE No. 34 Single Nylon enameled; Coils CD and EF No. 34 Formex ins. (heavy Vinyl acetal)	Coil BE:75 Coil AE:55 Coil CD:824 Coil EF:803	2.32 1.61 23.7 23.1			
*T601	453142		Close, layer wound Primary 1-2 Secondary 3-4	 No. 42SE No. 38SE	 3096 744	 842 57.63		 1000 1000	 0.0075-inch paper between layers. 0.001-inch paper between layers.
†T601	Same as above	Same as above	Close, layer wound Primary 1-2 Secondary 3-4	 No. 41SE No. 37SE	 4500 936	 1045 65		 1000 1000	Vacuum wax dip, wax potted.
*T801	453149	 *INPUT TO POWER LINE FILTER	Primary 1-4 Secondary 8-10 Secondary 10-11 Secondary 11-12 Secondary 13-14 Secondary 6-7	No. 25SE No. 34SE No. 39SE No. 25SE No. 25SE 2 No. 16SE	351 tapped at 213 and 284 3136 tapped at 1568 and 1831.5 3040 11.5 49 46	7.2 347 1317 0.13 0.805 0.49		2500 2500 2500 2500 2500 2500	0.004-inch paper between layers. 0.0015-inch paper between layers. 0.001-inch paper between layers. Wound one on top of other.
†T801	Same as above	Same as *T801	Primary 1-4 Secondary 8-10 Secondary 10-11 Secondary 11-12 Secondary 13-14 Secondary 6-7	No. 23SE No. 34SE No. 42SE No. 26SE 2 No. 25SE 3 No. 17SE	608 tapped at 503 and 555 2190 tapped at 1095 and 1285 2275 8 34 34	5.86 204 1418 0.293 0.346 0.068		1260 2000 2000 2000 2000 1015	

* Made by Chicago Transformer.
† Made by United Transformer.

TABLE 7—13. WINDING DATA—Concluded

SYMBOL DESIGNATION	RCA PART NUMBER	DIAGRAM	WINDING	WIRE SIZE	TURNS	D-C RESISTANCE IN OHMS	IMPEDANCE RATIO	HIGH-POT A-C VOLTS	REMARKS
*T1001	453148	 * INPUT TO POWER LINE FILTER	Primary 1-4 Secondary 6-8 Secondary 5-6 Secondary 9-10	No. 24SE No. 31SE No. 23SE 2 No. 16SE	356 tapped at 217 and 288 2836 tapped at 1418 11.5 46 each, center tapped	6.4 0.14 0.049		1500 1500 1500 1500	0.004-inch paper between layers. 0.0015-inch paper between. One wound on top of other.
†T1001	Same as above	Same as above	Primary 1-4 Secondary 6-8 Secondary 5-6 Secondary 9-10	No. 23SE No. 32SE No. 26SE No. 13 center tapped	646 tapped at 534 and 589 2260 center tapped 8½ 36 center tapped	6 147.5 0.305 0.066		1500 1500 1500 1500	Vacuum varnish impregnation. Asphalt compound potting.
*Z601	453144	See Schematic following this table.	1-2 4-5			2620 5800		500 500	Values given in Schematic following this table.
†Z601	Same as above	See Schematic following this table.	1-2 4-5			2293 5024		500 500	Values given in Schematic following this table.
*Z1101	453539	See Schematic following this table. { Input transformer. Output transformer.	Primary 1-2 Secondary Primary Secondary 3-4	No. 35SE No. 41SE No. 41SE No. 36SE	570 1980 1980 688 tapped at 344	24 36.3		500 500 500 500	0.001-inch paper between layers. 0.00075-inch paper between layers. 0.00075-inch paper between layers. 0.001-inch paper between layers.
†Z1101	Same as above	See Schematic following this table. { Input transformer. Output transformer.	Primary 1-2 Secondary Primary Secondary 3-5 Secondary 4-5			12.7 6.41 7.31		500 500 500 500 500	Vacuum varnish impregnation. Asphalt compound potted.
†Z1102	Same as above	See Schematic following this table.	Terminals 1-4 Terminals 2-3			0.738 0.738		250 250	
Z1301	See Z1101	See Z1101							
Z1302	See Z1102	See Z1102							

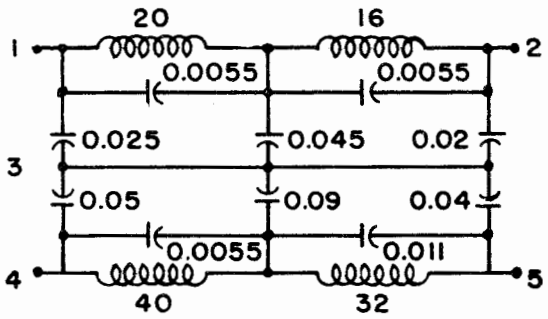
* Made by Chicago Transformer.
† Made by United Transformer.

SCHEMATICS FOR WINDING DATA

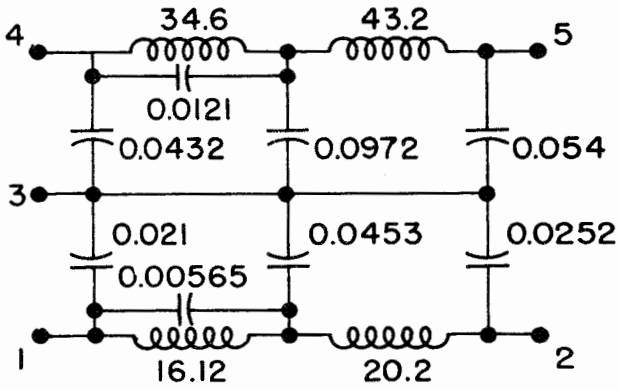
Complete repair of the filter assemblies is an intricate factory procedure and is not described here. In addition to values of components shown on schematic diagrams, refer to the filter characteristics given in the following paragraphs of Section 2:

Filter Symbol	*Paragraph*
Z601	7
Z1101	4
Z1102	4
Z1301	12
Z1302	12

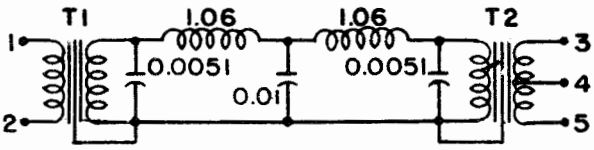
In the adjoining schematic diagrams inductance values are in henrys, capacitance values in microfarads, and resistance values in ohms.



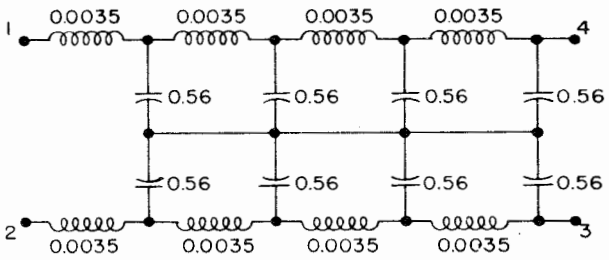
Z601 SCHEMATIC DIAGRAM CTC



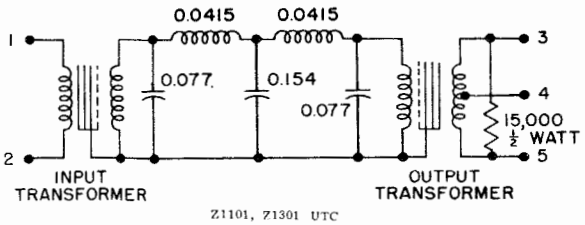
Z601 UTC



Z1101, Z1301 TONE OUTPUT FILTER CTC



Z1102, Z1302 UTC



Z1101, Z1301 UTC

RESISTANCE, VOLTAGE AND CURRENT VALUES OF COILS AND TRANSFORMERS

SYMBOL	WINDING	TERMINALS	VOLTAGE 60 CPS	CURRENT AMPERES	RESISTANCE OHMS CTC MANUFACTURE	UTC MANUFACTURE	RCA MANUFACTURE
L601		1-2			3354	3555	
		1-3			3081	3284	
L801		1-2			150	150	
L1101							86.2
L1102							2.32
T101		EF-CB					9.37
		FF-D					0.747
		EF-A					2.3
T101	Primary	F-B					20.5
	Secondary	D-C					20.5
T103	Same as T102						
T301	Primary	F-A					23.7
	Secondary	B-E					1.53
	Secondary	C-E					1.53
	Secondary	D-E					23.2
T302	Same as T301						
T303	Same as T301						
T304	Primary	E-F					23.1
	Primary	B-E					2.32
	Primary	A-E					1.61
	Secondary	C-D					23.7
T601	Primary	1-2			842	1045	
	Secondary	3-4			57.3	65	
T801		1-2	105*	0.65			
	Primary	1-3	115*	0.6			
		1-4	125*	0.55	7.2	5.86	
	Secondary	6-7	6.3 CT	6	0.099	0.068	
	Secondary	8-10	400 CT	0.07	347	204	
	Secondary	9-11	625	0.002			
	Secondary	11-12	1.5	0.3	0.13	0.293	
	Secondary	13-14	6.3	0.6	0.805	0.346	
	Secondary	9-5	35				

*Applied through power line filter.

For a larger print of this drawing, see Envelope 1 at end of this instruction book.

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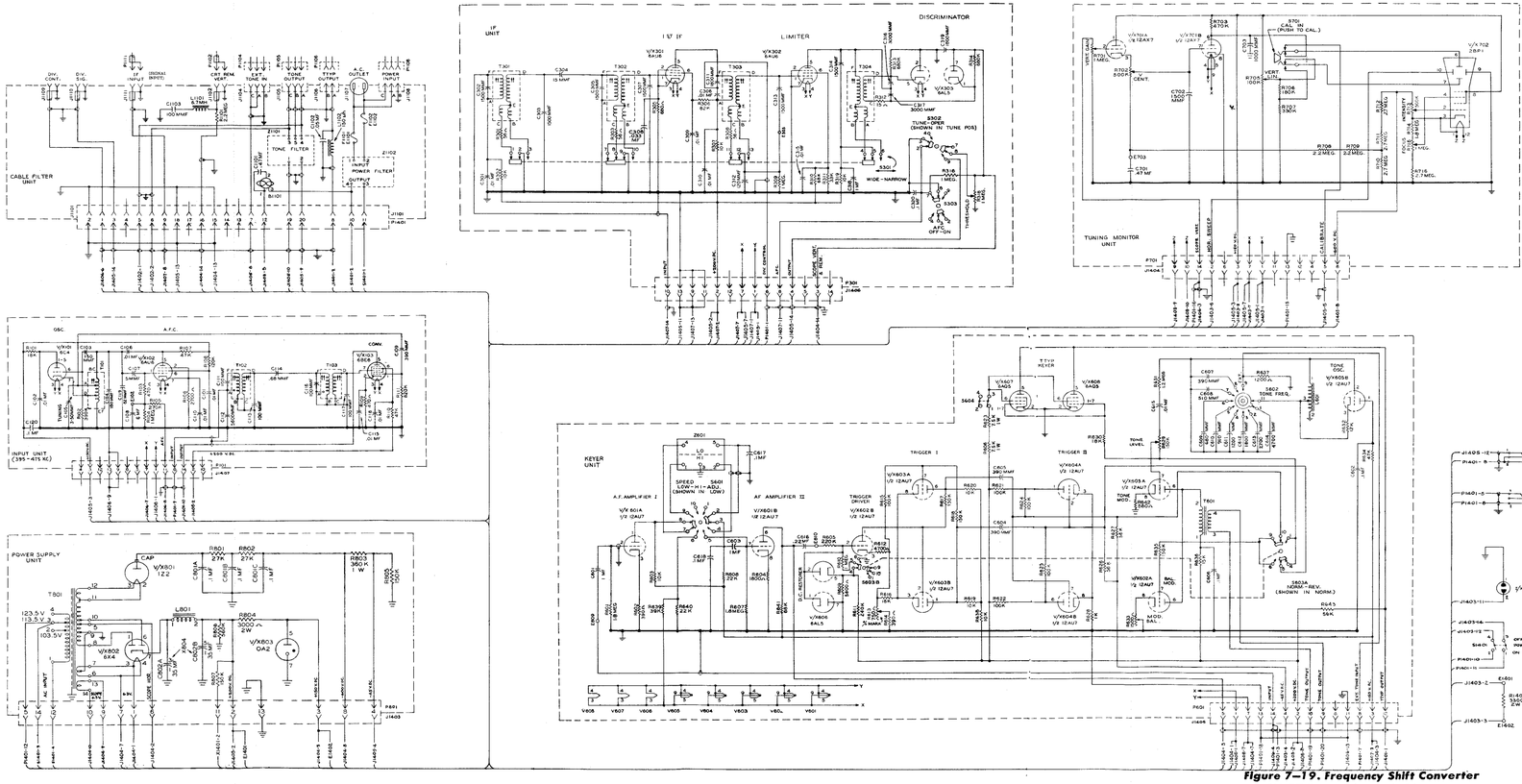

Figure 7-19. Frequency Shift Converter CV-57/URR, Schematic Diagram

RESISTANCE, VOLTAGE AND CURRENT VALUES OF COILS AND TRANSFORMERS

SYMBOL	WINDING	TERMINALS	VOLTAGE 60 CPS	CURRENT AMPERES	RESISTANCE OHMS		
					CTC MANUFACTURE	UTC MANUFACTURE	RCA MANUFACTURE
L601		1-2			3354	3555	
		1-3			3081	3284	
L801		1-2			150	150	
L1101							86.2
L1102							2.32
T201		EF-CB					28.7
		EF-D					1.16
		EF-A					21.16
T202	Primary	F-B					20
	Secondary	D-C					20
T203	Same as T202						
T301	Primary	F-A					23.7
	Secondary	B-E					1.53
	Secondary	C-E					1.53
	Secondary	D-E					23.2
T302	Same as T301						
T303	Same as T301						
T304	Primary	E-F					23.1
	Primary	B-E					2.32
	Primary	A-E					1.61
	Secondary	C-D					23.7
T601	Primary	1-2			842	1045	
	Secondary	3-4			57.3	65	
T801		1-2	105*	0.65			
	Primary	1-3	115*	0.6			
		1-4	125*	0.55	7.2	5.86	
	Secondary	6-7	6.3 CT	6	0.099	0.068	
	Secondary	8-10	400 CT	0.07	347	204	
	Secondary	9-11	625	0.002			
	Secondary	11-12	1.5	0.3	0.13	0.293	
	Secondary	13-14	6.3	0.6	0.805	0.346	
	Secondary	9-5	35				

*Applied through power line filter.

For a larger print of this drawing, see Envelope at end of this instruction book.

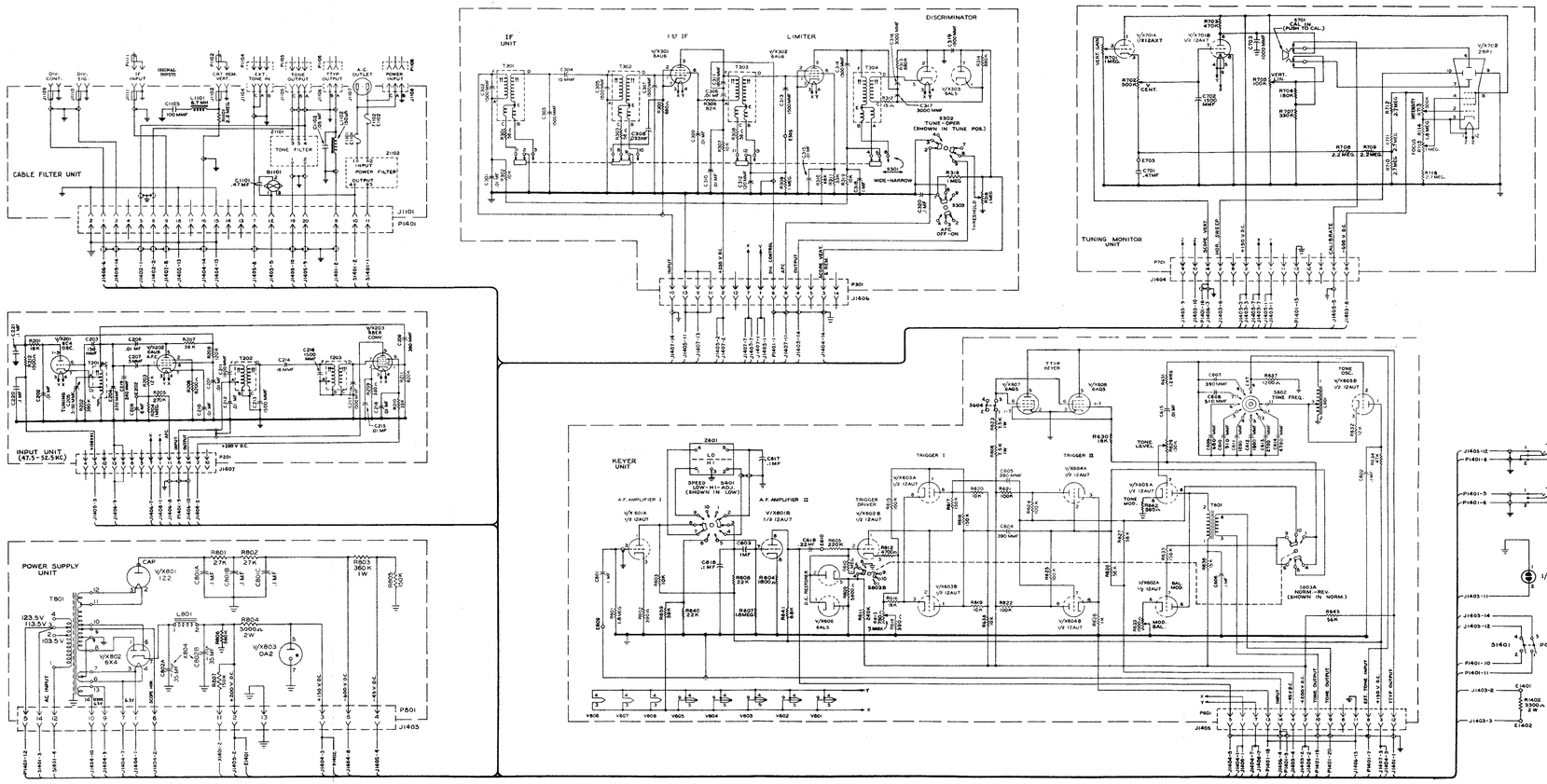

Figure 7–20. Frequency Shift Converter CV-71/URR, Schematic Diagram

RESISTANCE, VOLTAGE AND CURRENT VALUES OF COILS AND TRANSFORMERS

SYMBOL	WINDING	TERMINALS	VOLTAGE 60 CPS	CURRENT AMPERES	RESISTANCE OHMS	
					CTC MANUFACTURE	UTC MANUFACTURE
L601		1-2			3354	3555
		1-3			3081	3284
L1001		1-2			150	150
T601	Primary	1-2			842	1045
	Secondary	3-4			57.3	65
T1001		1-2	105*	0.61		
	Primary	1-3	115*	0.55		
		1-4	125*	0.51	6.4	6.0
	Secondary	5-6	1.5	0.3	0.14	0.305
	Secondary	6-8	400 CT	0.07	166	147.5
	Secondary	9-10	6.3 CT	6	0.04	0.066

*Applied through power line filter.

For a larger print of this drawing, see Envelope 1 at end of this instruction book.

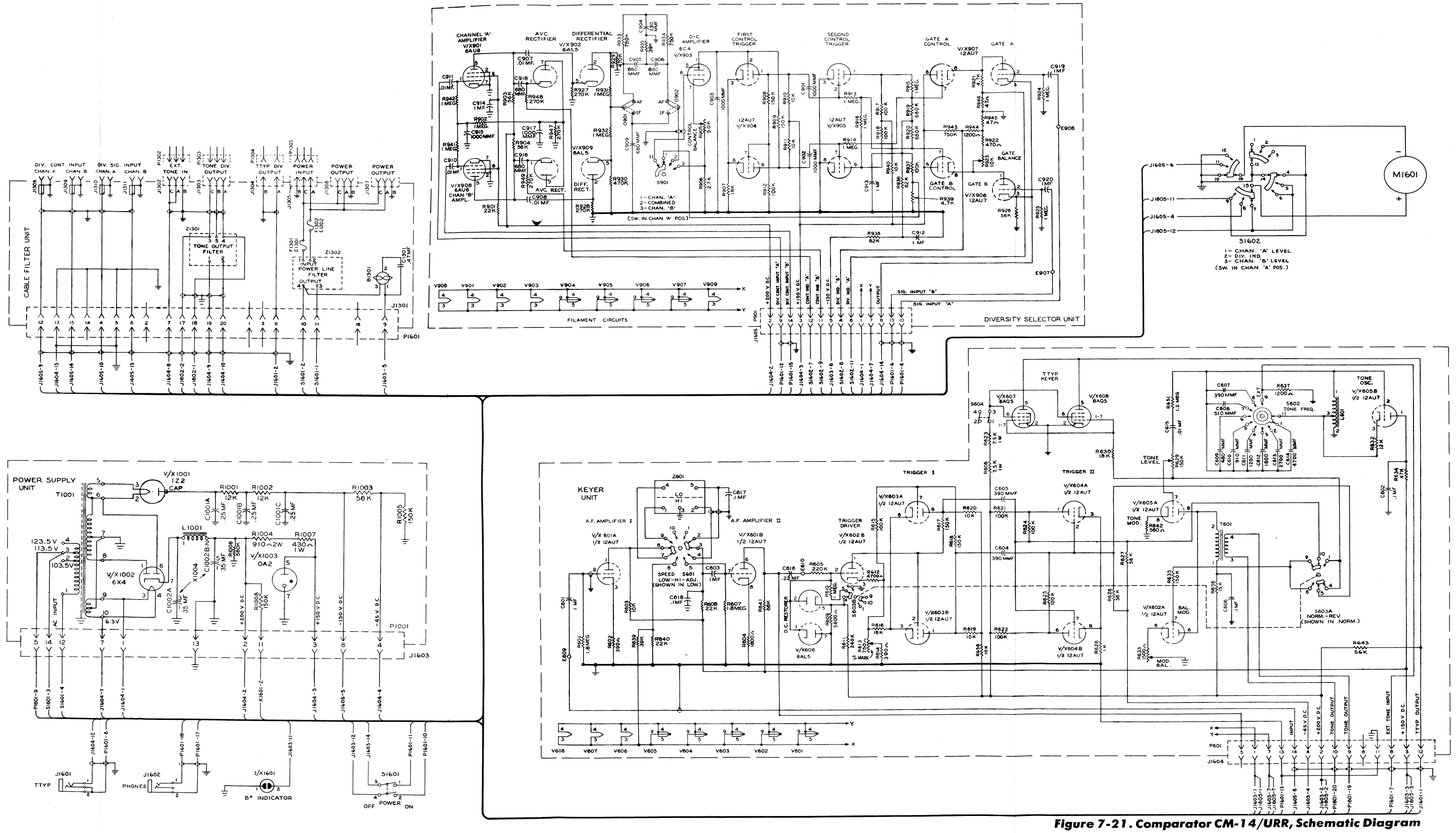

Figure 7-21. Comparator CM-14/URR, Schematic Diagram

NOTE: Numbers in wires refer to wire table. Coding at ends of wires indicate wire number and destination.

WIRE TABLE	
WIRE NO.	DESCRIPTION
1	CABLE SPECIFICATIONS
3 TO 4	
6 TO 7	
9 TO 10	
12	
14 TO 15	
17 TO 18	
20	
22 TO 23	CABLE SPECIFICATIONS
25	CABLE SPECIFICATIONS
27 TO 34	WIRE-BROWN
37	WIRE-RED/BLACK TR.
39 TO 40	WIRE-WHT/GREEN TR.
42 TO 43	WIRE-BROWN
45 TO 46	WIRE-GRAY
48 TO 62	WIRE-BLACK
65	WIRE-BROWN
68 TO 71	WIRE-RED
73-74	WIRE-WHITE
75	WIRE-RED/YELLOW TR.
77 TO 80	WIRE-RED/GREEN TR.
81 TO 85	WIRE-BUSS .020 DIA.

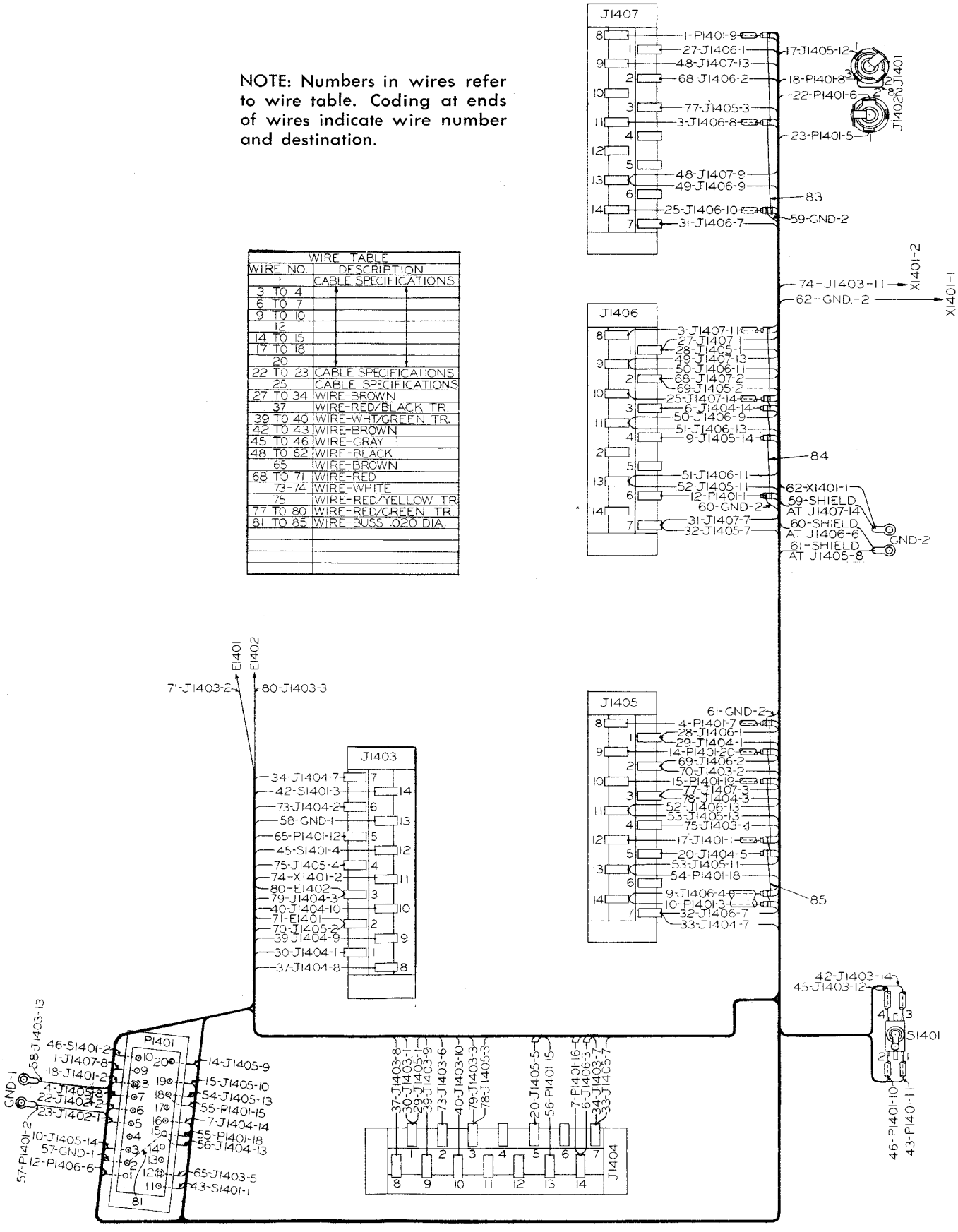

Figure 7—22. Frequency Shift Converter CV-57/URR or CV-71/URR, Main Chassis Wiring Diagram

WIRE TABLE	
WIRE NO.	DESCRIPTION
1	CABLE SPECIFICATIONS
3	
5	
7	
9	
11	
13 TO 14	
16 TO 17	
19 TO 20	CABLE SPECIFICATIONS
22 TO 23	WIRE-GRAY
25 TO 26	WIRE-BROWN
28 TO 36	WIRE-BLACK
43	WIRE-BROWN
47 TO 49	WIRE-RED
51	WIRE-RED/YELLOW TR
53 TO 54	WIRE-RED/GREEN TR.
56	WIRE-WHT/GREEN TR.
58	WIRE-WHT/BLACK TR.
60	WIRE-GRN/YELLOW TR.
62	WIRE-RED/BLACK TR.
65	WIRE-GRN/BLACK TR.
66 TO 76	WIRE-BUSS .020 DIA.
77 TO 79	EXT. TUB. .053 I.D. BLK.
80 TO 83	WIRE-BROWN
87	WIRE-WHITE

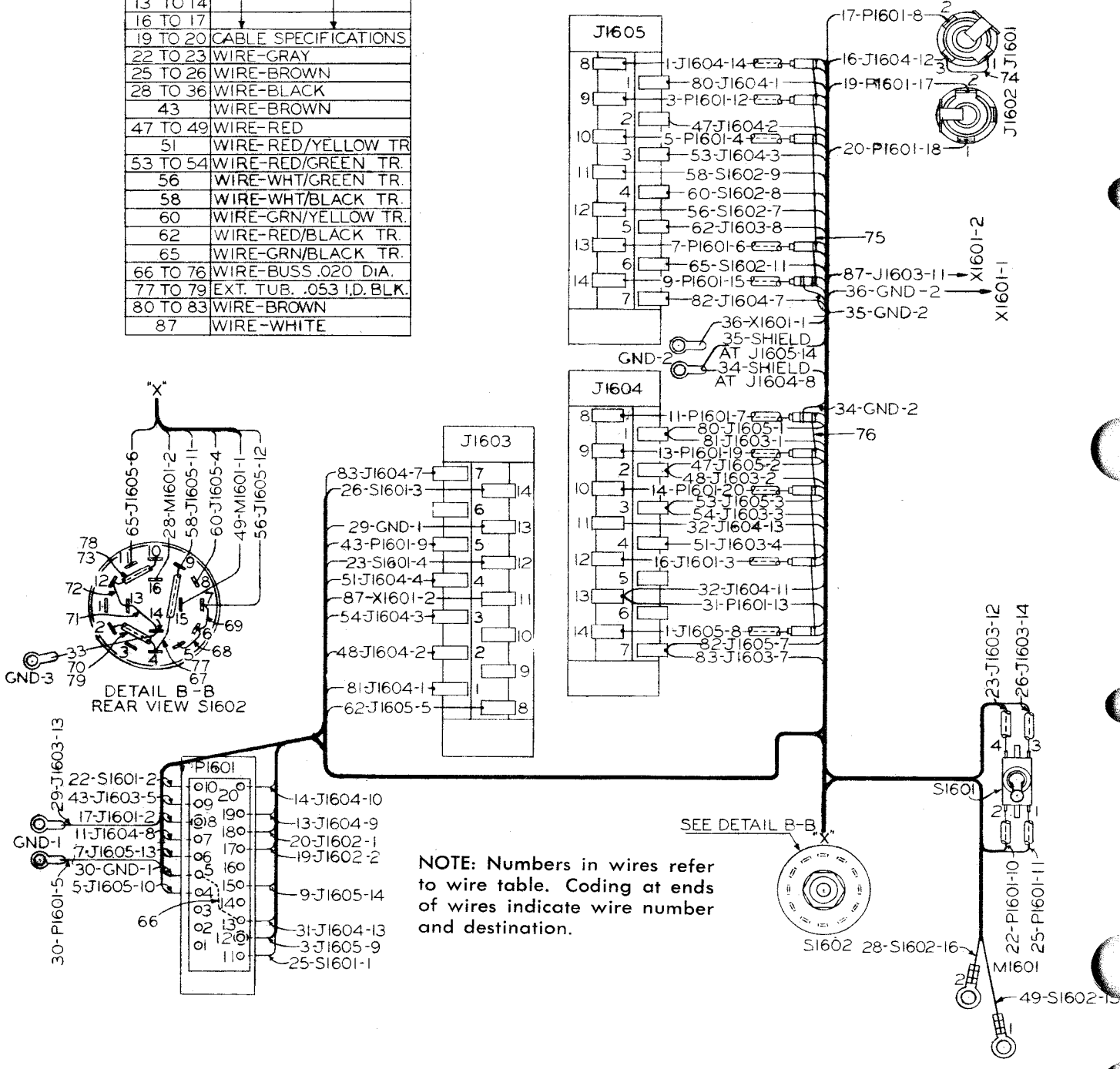

Figure 7–23. Comparator CM-14/URR Main Chassis Wiring Diagram

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COIL DATA FOR INPUT FILTER

SYMBOL	WINDING	TERMINALS	RESISTANCE OHMS		
			CTC MANUFACTURE	UTC MANUFACTURE	OTHER MANUFACTURE
B1101		1-3			680
		2-3			716
L1101		1-2			86.2
L1102		1-2			2.32
Z1101	Primary	1-2	24	12.7	
	Secondary	3-4		6.41	
		4-5		7.31	
		3-5	36.3	13.72	
Z1102		1-4		0.738	
		2-3		0.738	

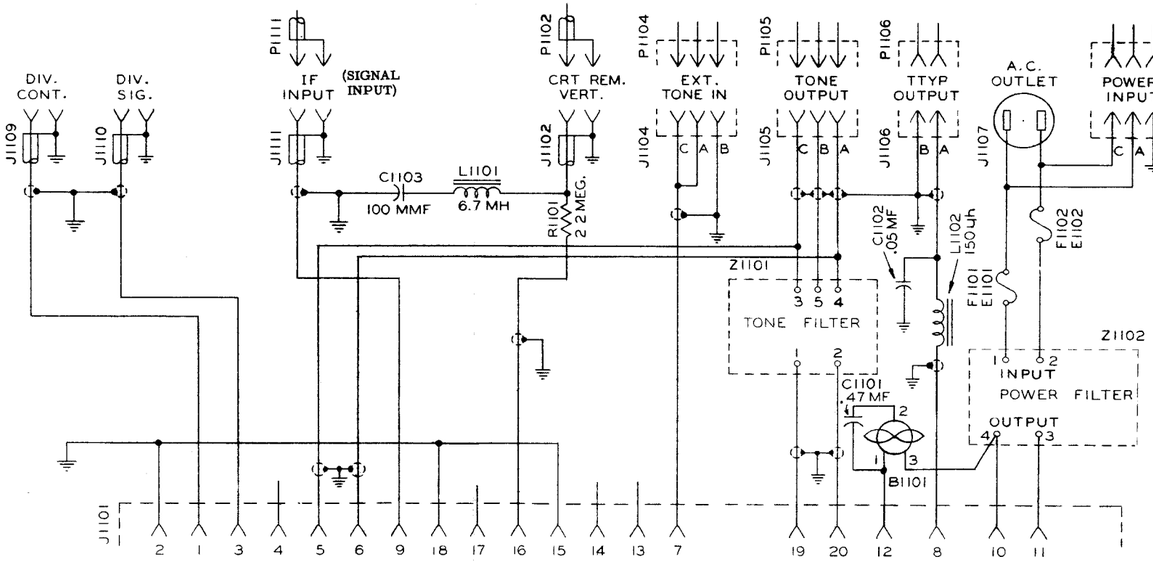

Figure 7–24. Frequency Shift Converter Cable Filter, Schematic Diagram

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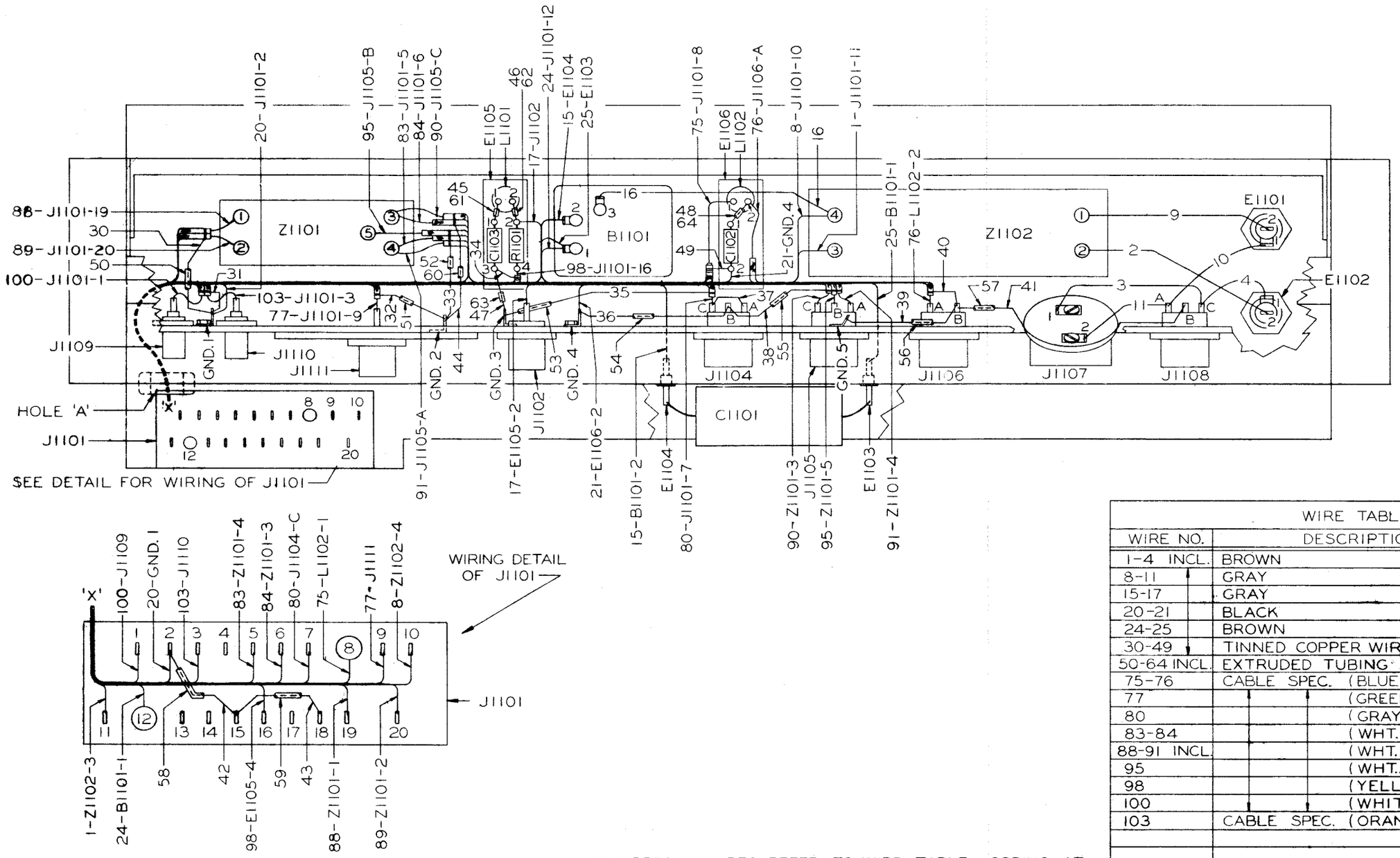

"DETAIL ENDS OF CABLES"

WIRE TABLE	
WIRE NO.	DESCRIPTION
1-4 INCL.	BROWN
8-11	GRAY
15-17	GRAY
20-21	BLACK
24-25	BROWN
30-49	TINNED COPPER WIRE .020 DIA.
50-64 INCL.	EXTRUDED TUBING BLACK
75-76	CABLE SPEC. (BLUE)
77	(GREEN)
80	(GRAY)
83-84	(WHT./BLUE TR.)
88-91 INCL.	(WHT./GREEN TR.)
95	(WHT./BLACK TR.)
98	(YELLOW)
100	(WHITE)
103	CABLE SPEC. (ORANGE)

NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATES WIRE NUMBER & DESTINATION OF WIRE THUS; 24-J1101-12, 24=WIRE NO., J1101=CONNECTOR J1101, AND 12=TERMINAL 12 OF J1101 AS INDICATED ON THIS DRAWING.

Figure 7–25. Frequency Shift Converter Cable Filter, Wiring Diagram

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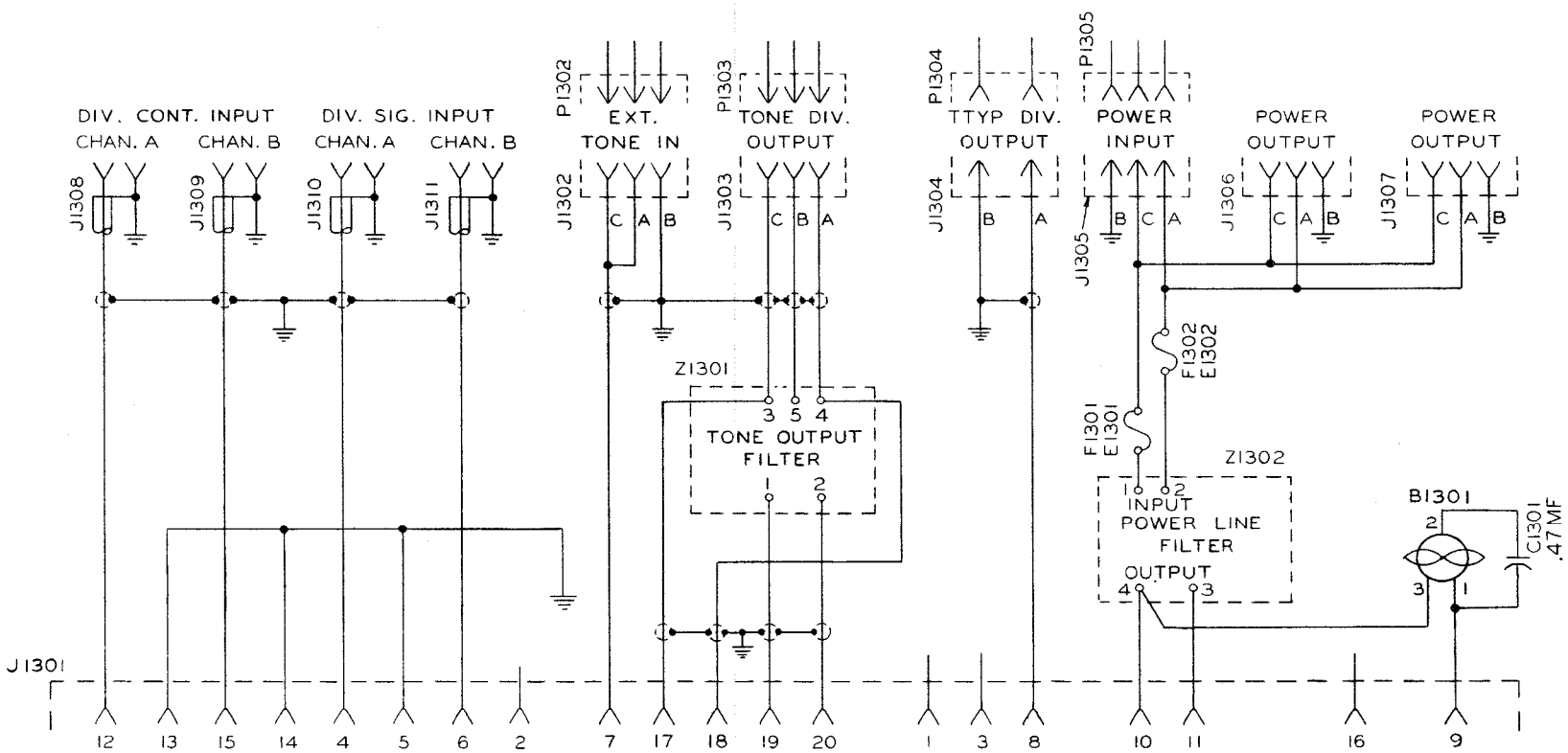

Figure 7–26. Comparator Cable Filter, Schematic Diagram

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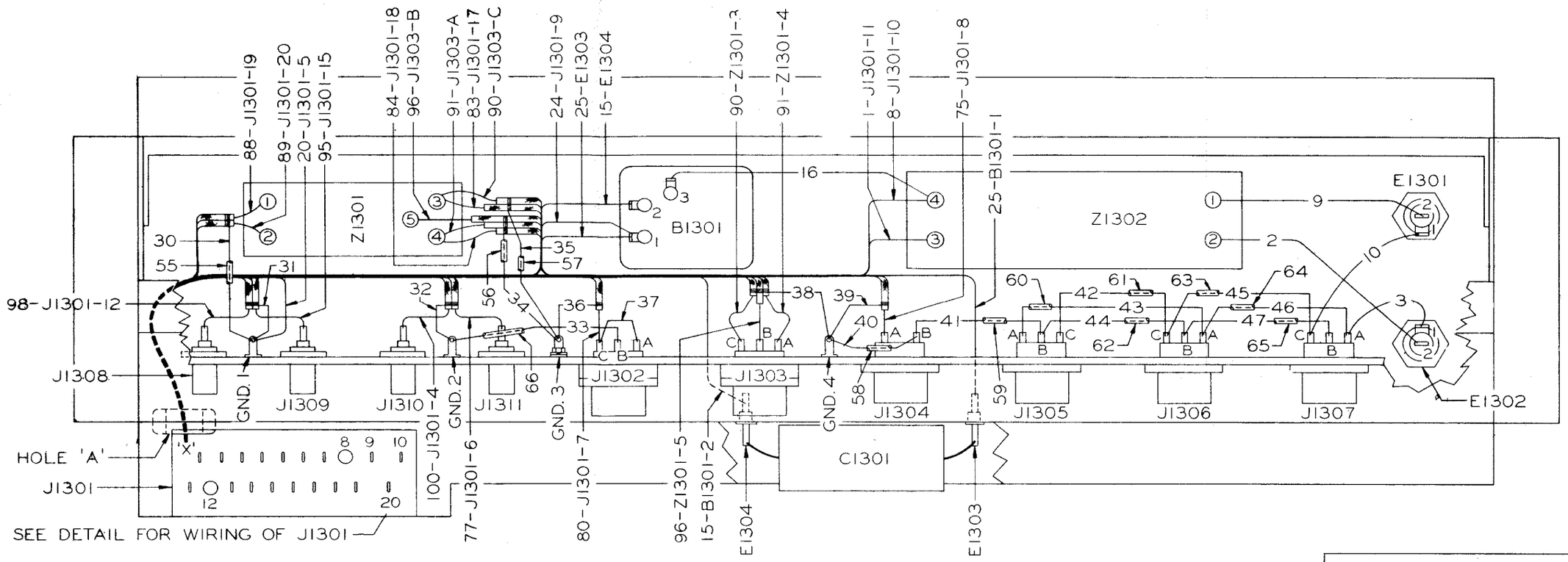

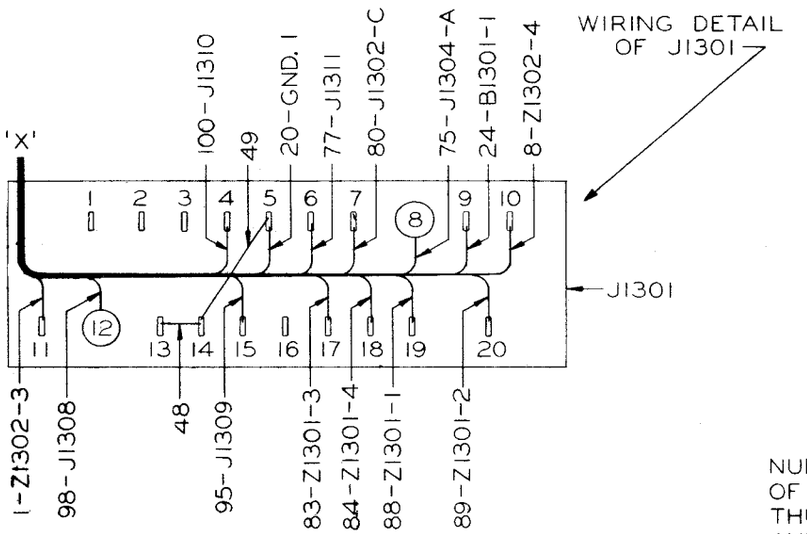

NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATES WIRE NUMBER & DESTINATION OF WIRE THUS; 77-J1301-6, 77=WIRE NO., J1301=CONNECTOR J1301, AND 6=TERMINAL 6 OF J1301 AS INDICATED ON THIS DRAWING.

WIRE TABLE	
WIRE NO.	DESCRIPTION
1-3 INCL.	BROWN
8-10 INCL.	GRAY
15-16	GRAY
20	BLACK
24-25	BROWN
30-49 INCL	TINNED COPPER WIRE .020 DIA.
55-66 INCL	EXTRUDED TUBING BLACK
75	CABLE SPEC. (BLUE)
77	(GREEN)
80	(GRAY)
83-84	(WHT./BLUE TR.)
88-91 INCL.	(WHT./GRN. TR.)
95-96	(WHT./BLK. TR.)
98	(WHITE)
100	CABLE SPEC. (ORANGE)

"DETAIL ENDS OF CABLES"

Figure 7–27. Comparator Cable Filter, Wiring Diagram

RESISTANCE, VOLTAGE AND CURRENT VALUES OF COILS AND TRANSFORMERS

SYMBOL	WINDING	TERMINALS	VOLTAGE 60 CPS	CURRENT AMPERES	RESISTANCE OHMS	
					CTC MANUFACTURE	UTC MANUFACTURE
L801		1-2			150	150
T801		1-2	150*	0.65		
	Primary	1-3	115*	0.6		
		1-4	125*	0.55	7.2	5.86
	Secondary	6-7	6.3 CT	6	0.099	0.068
	Secondary	8-10	400 CT	0.07	347	204
	Secondary	9-11	625	0.002		
	Secondary	11-12	1.5	0.3	0.13	0.293
	Secondary	13-14	6.3	0.6	0.805	0.346
	Secondary	9-5	35			

*Applied through power line filter

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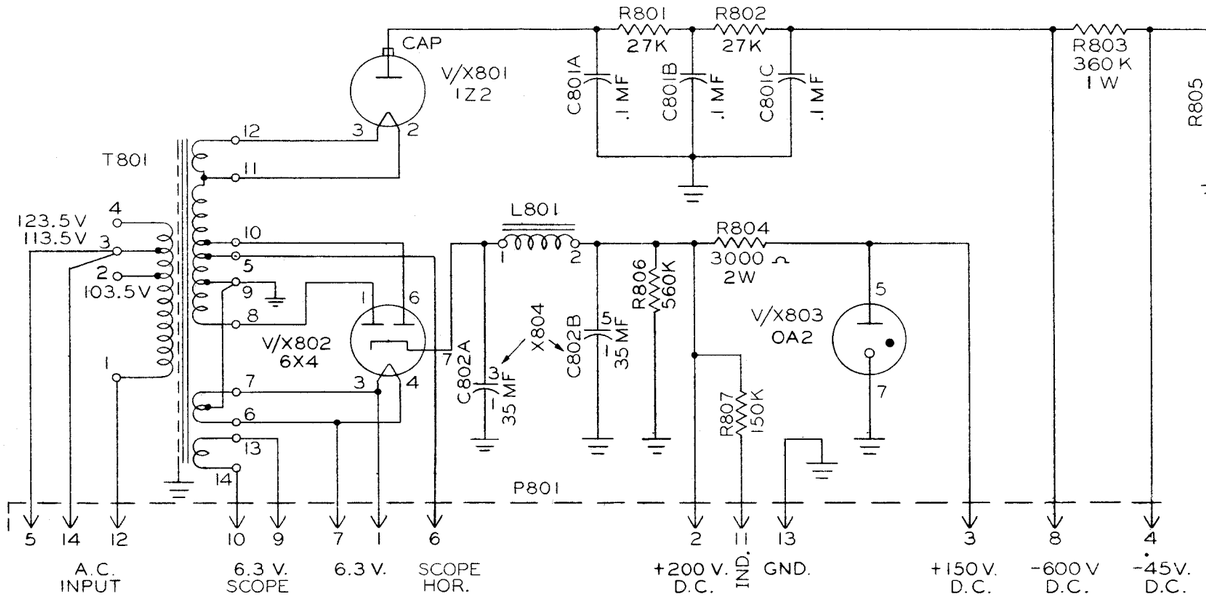
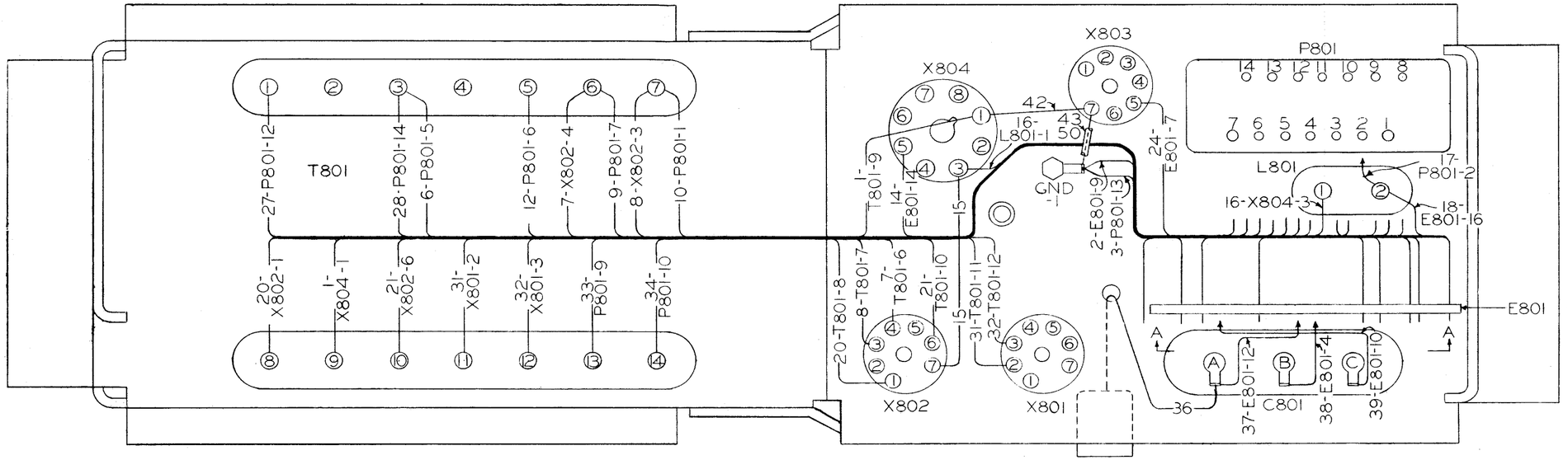
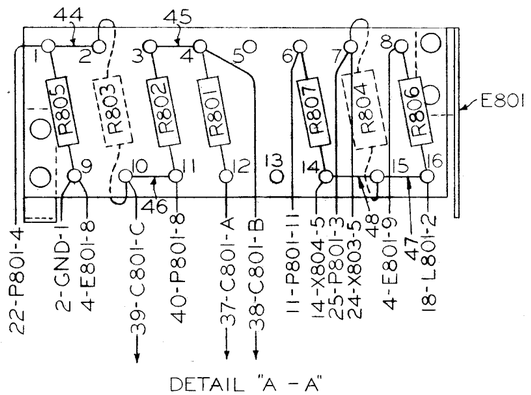


Figure 7–28. Frequency Shift Converter Power Supply, Schematic Diagram



WIRE TABLE	
WIRE NO.	DESCRIPTION
1 TO 4	WIRE-BLACK
6 TO 8	WIRE-BROWN
11 — 12	WIRE-WHITE
14 TO 18	WIRE-RED
20 TO 22	WIRE-RED/YELLOW TR.
24 TO 25	WIRE-RED/GREEN TR.
27-28	WIRE-GRAY
	WIRE-BROWN
31 TO 34	WIRE-WHT/GREEN TR.
36 TO 40	WIRE-RED/BLACK TR.
42 TO 48	WIRE-BUSS .032 DIA.
50	EXT. TUBING
9 — 10	WIRE-BROWN

CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS; 32-X801-3, 32=WIRE NO., X801=SOCKET X801 AND 3=TERMINAL 3 OF X803 AS INDICATED ON THIS DRAWING.



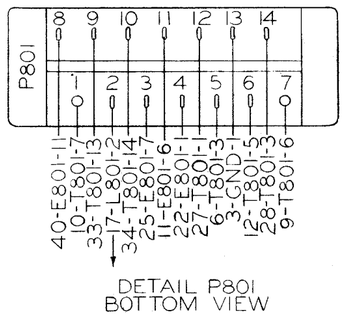


Figure 7–29. Frequency Shift Converter Power Supply, Wiring Diagram

RESISTANCE, VOLTAGE AND CURRENT VALUES OF COILS AND TRANSFORMERS

SYMBOL	WINDING	TERMINALS	VOLTAGE 60 CPS	CURRENT AMPERES	RESISTANCE OHMS	
					CTC MANUFACTURE	UTC MANUFACTURE
L1001		1-2			150	150
T1001		1-2	105*	0.61		
	Primary	1-3	115*	0.55		
		1-4	125*	0.51	6.4	6.0
	Secondary	5-6	1.5	0.3	0.14	0.305
	Secondary	6-8	400 CT	0.07	166	147.5
	Secondary	9-10	6.3 CT	6	0.04	0.066

*Applied through power line filter.

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NAVSHIPS 91355

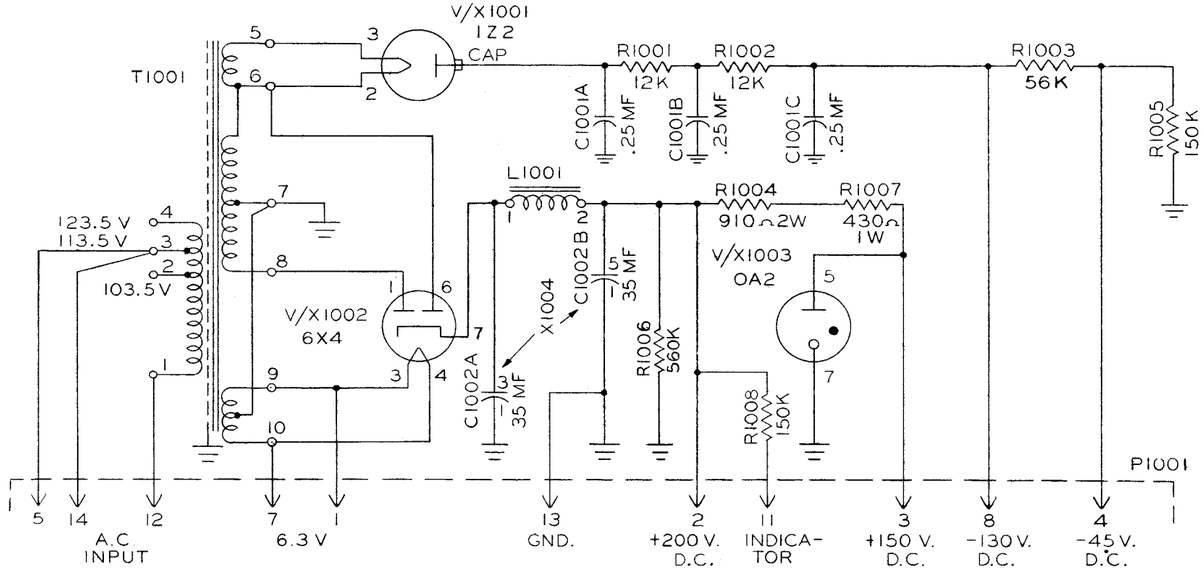
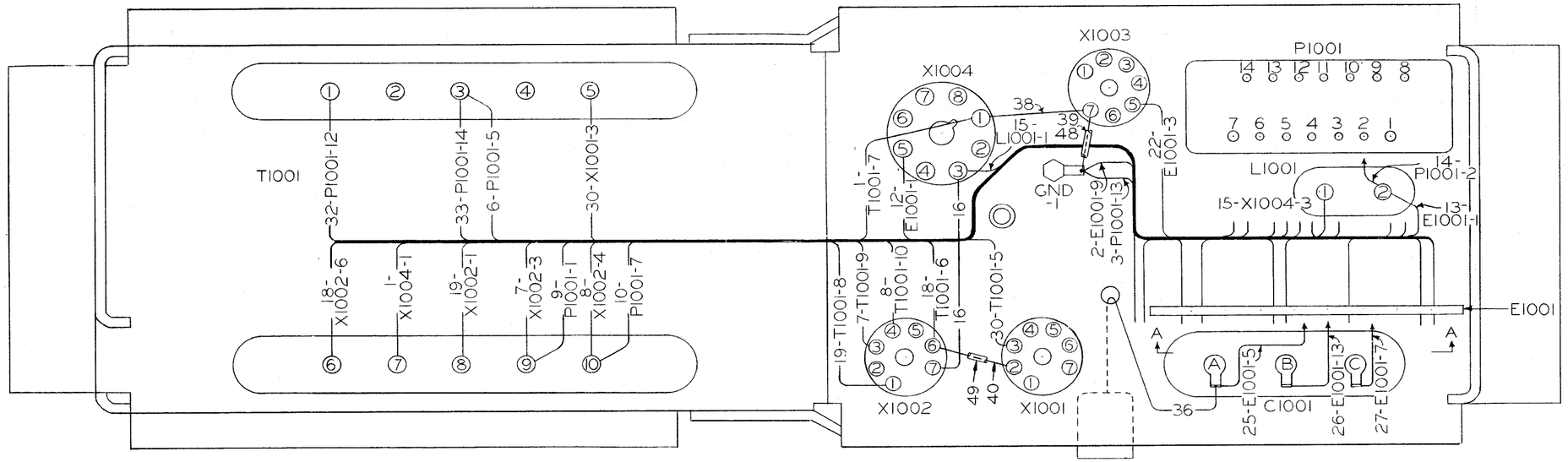
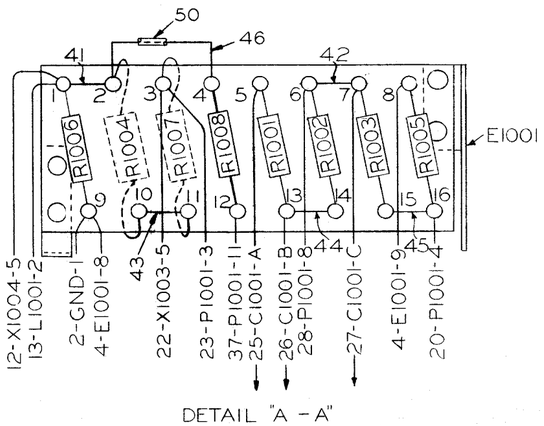


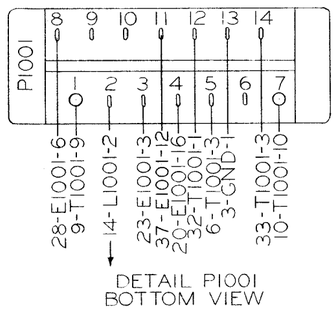
Figure 7–30. Comparator Power Supply, Schematic Diagram



WIRE TABLE	
WIRE NO.	DESCRIPTION
1 TO 4	WIRE-BLACK
6 TO 8	WIRE-BROWN
12 TO 16	WIRE-RED
18 TO 20	WIRE-RED/YELLOW TR.
22 TO 23	WIRE-RED/GREEN TR.
25 TO 28	WIRE-RED/BLACK TR.
30	WIRE-GREEN/YELLOW TR.
32-33	WIRE-GRAY
	WIRE-BROWN
36	WIRE-RED
38 TO 46	WIRE-BUSS .032 DIA.
48 TO 50	EXT. TUBING
9—10	WIRE BROWN
37	WIRE WHITE



DETAIL "A - A"



DETAIL P1001
BOTTOM VIEW

CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS, 30-X1001-3, 30=WIRE NO., X1001=SOCKET X1001 AND 3=TERMINAL 3 OF X1001 AS INDICATED ON THIS DRAWING.

Figure 7–31. Comparator Power Supply, Wiring Diagram

RESTRICTED
NAVSHIPS 91355

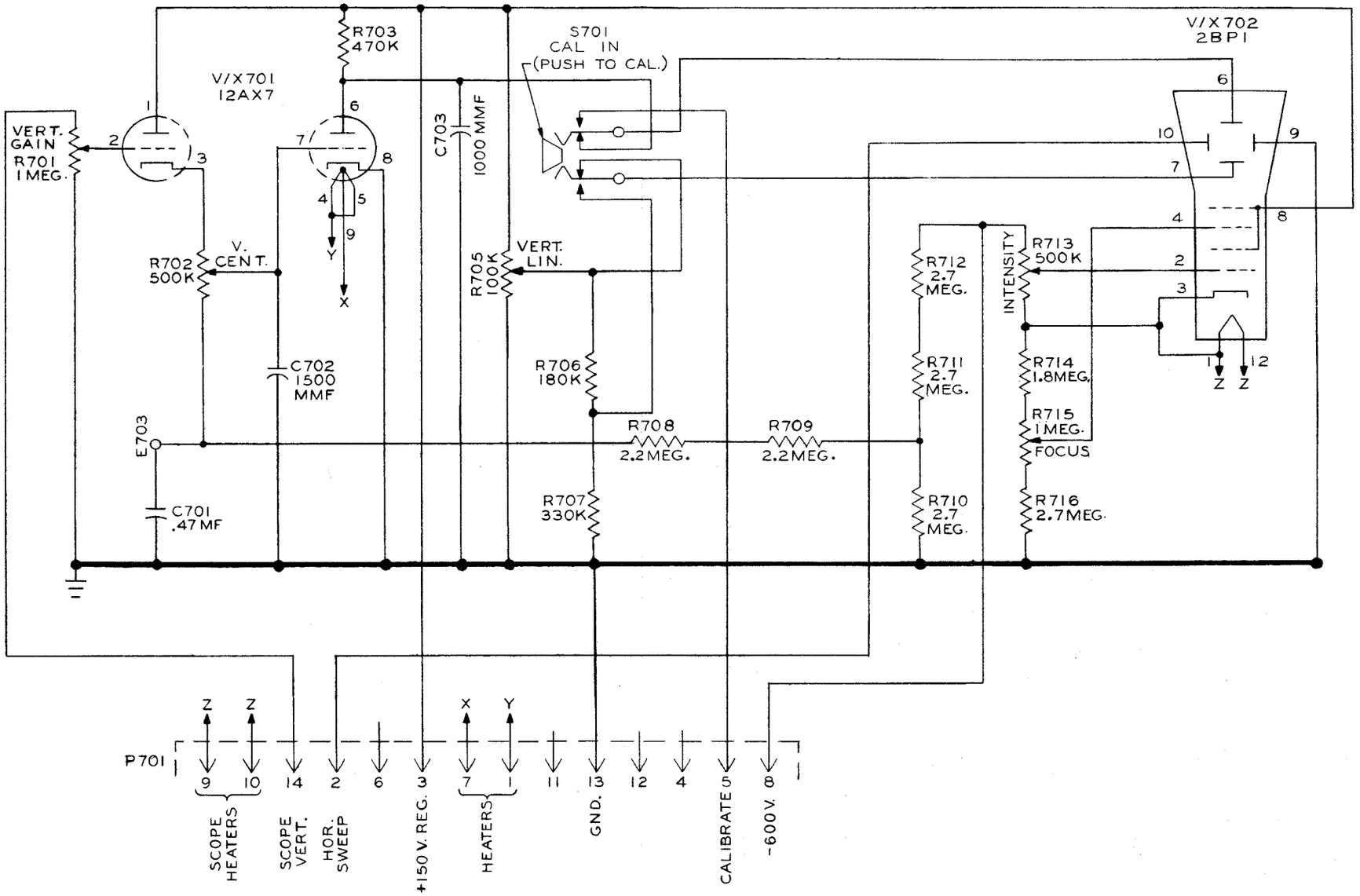


Figure 7–32. Tuning Monitor, Schematic Diagram

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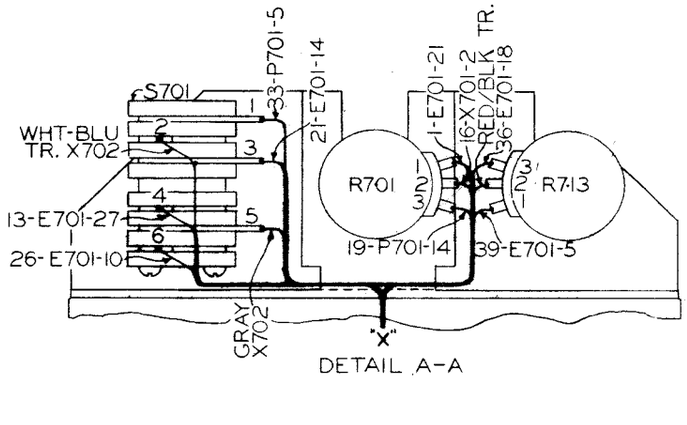
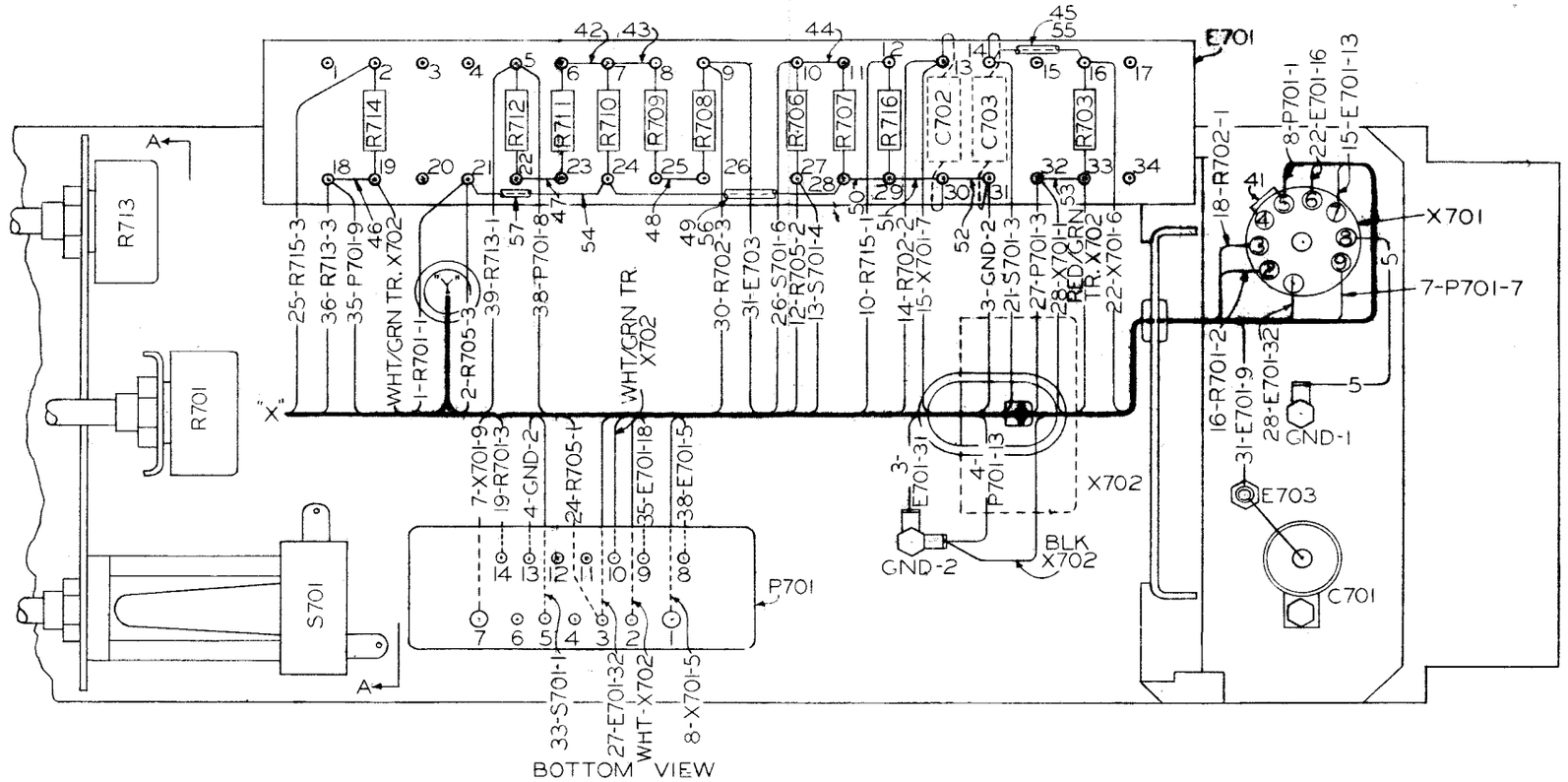
RESTRICTED
NAVSHIPS 91355

RESTRICTED
NAVSHIPS 91355

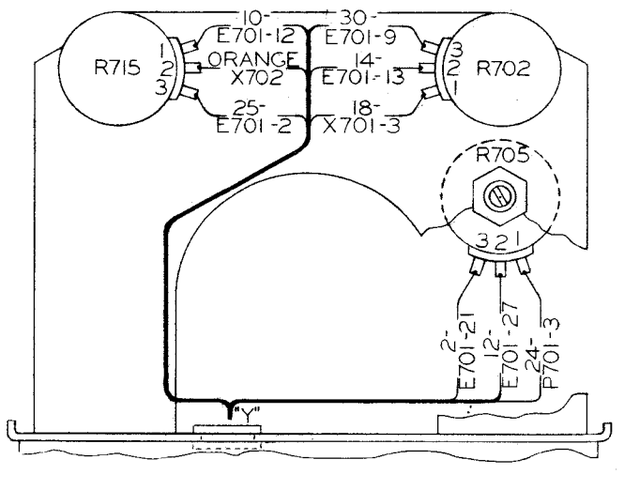


DETAIL A-A

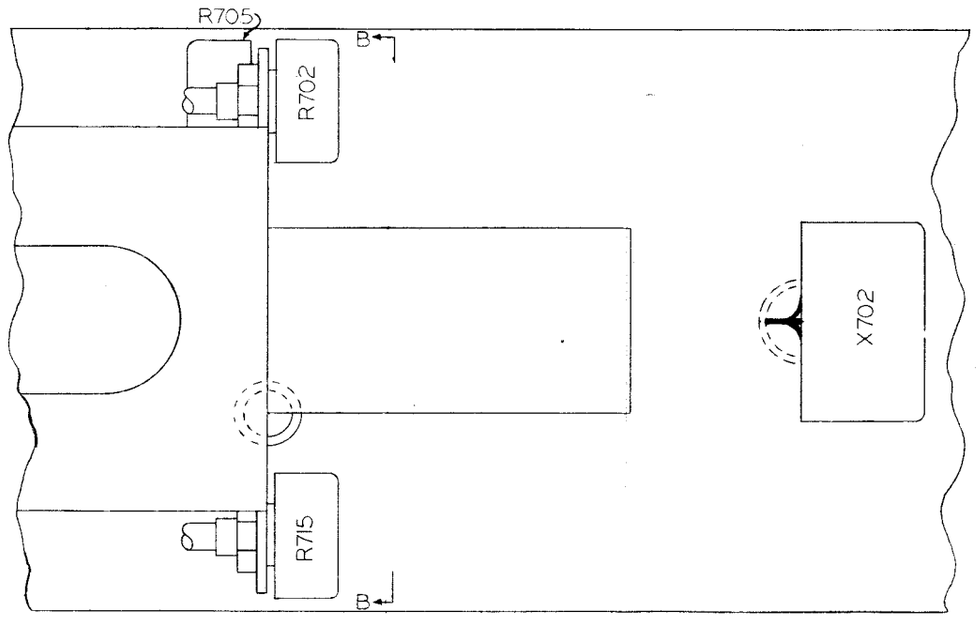


BOTTOM VIEW

CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS; 28-X701-1, 28 = WIRE NO., X701 = SOCKET X701 AND 1 = TERMINAL 1 OF X701 AS INDICATED ON THIS DRAWING.



DETAIL B-B



TOP VIEW

WIRE TABLE	
WIRE NO.	DESCRIPTION
1 TO 5	WIRE-BLACK
7 TO 8	WIRE-BROWN
10	WIRE-WHITE
12 TO 16	WIRE-GREEN
18 TO 19	WIRE-YELLOW
21 TO 22	WIRE-BLUE
24 TO 28	WIRE-RED/GREEN TR.
30 TO 31	WIRE-WHT/BLUE TR.
33	WIRE-WHT/BLACK TR.
35 TO 36	WIRE-WHT/GRN TR.
38 TO 39	WIRE-RED/BLACK TR.
41 TO 54	WIRE-BUSS .032 DIA.
55 TO 57	EXT. TUBING.

Figure 7–33. Tuning Monitor, Wiring Diagram

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COIL DATA FOR INPUT UNIT, 47.5 TO 52.5 KC

SYMBOL	WINDING	TERMINALS	RESISTANCE OHMS
T201		EF-BC	28.7
		EF-D	1.16
		EF-A	21.16
		A-BC	6.38
T202	Primary	B-F	20
	Secondary	C-D	20
T203	Same as T202		

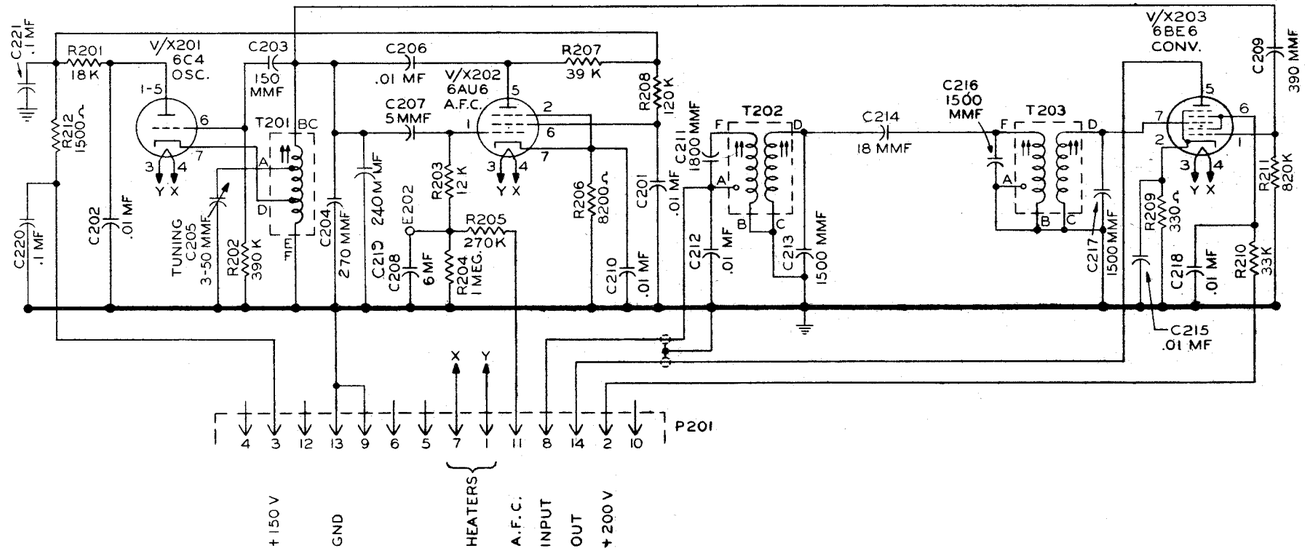

Figure 7–34. Input Unit 47.5 to 52.5 kc, Schematic Diagram

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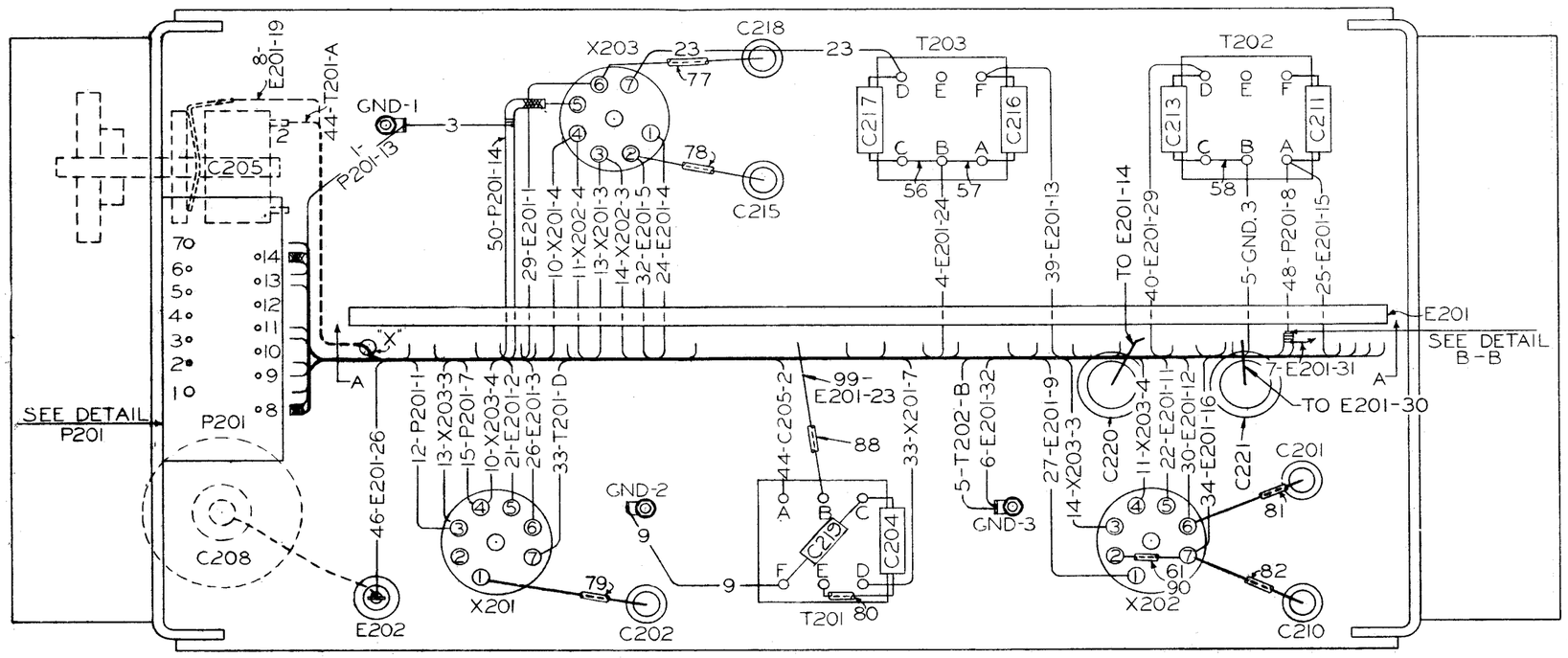
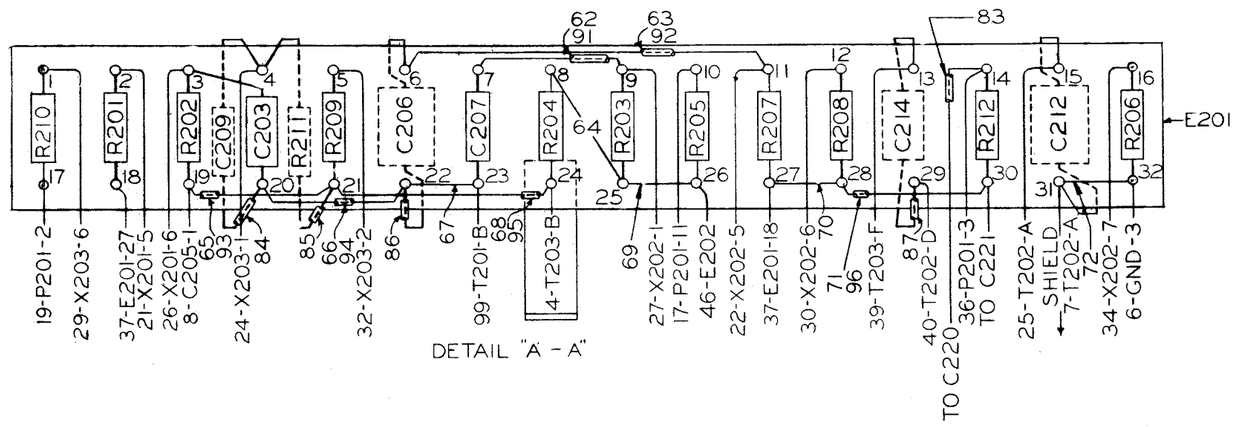
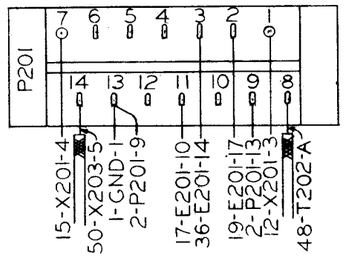


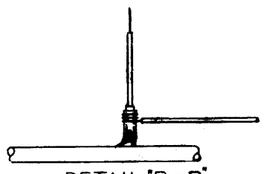


CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS: 34-X202-7, 34=WIRE NO., X202=SOCKET X202 AND 7=TERMINAL 7 OF X202 AS INDICATED ON THIS DRAWING.

WIRE TABLE	
WIRE NO.	DESCRIPTION
1 TO 9	WIRE-BLACK
10 TO 15	WIRE-BROWN
17	WIRE-GRAY
19	WIRE-RED
21 TO 22	WIRE-BLUE
23 TO 27	WIRE-GREEN
29 TO 30	WIRE-ORANGE
32 TO 34	WIRE-YELLOW
36 TO 37	WIRE-RED/GREEN TR.
39 TO 40	WIRE-WHT/BLACK TR.
44	WIRE-WHT/BLUE TR.
46	WIRE-GRN/YELLOW TR
48	CABLE SPECIFICATIONS
50	CABLE SPECIFICATIONS
56 TO 72	WIRE-BUSS .020 DIA.
77 TO 88	EXT. TUBING BLACK
90 TO 96	EXT. TUBING BLACK
99	WIRE-BUS .032 DIA



DETAIL P201
BOTTOM VIEW



DETAIL "B-B"
END OF SHIELDED WIRE

Figure 7–35. Input Unit 47.5 to 52.5 kc, Wiring Diagram

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COIL DATA FOR I-F UNIT

SYMBOL	WINDING	TERMINALS	RESISTANCE OHMS
T301	Primary	A-F	23.7
T302	Secondary	B-E	1.53
T303		C-E	1.53
		D-E	23.2
T304	Primary	A-E	1.61
		B-E	2.32
		F-E	23.1
	Secondary	C-D	23.7

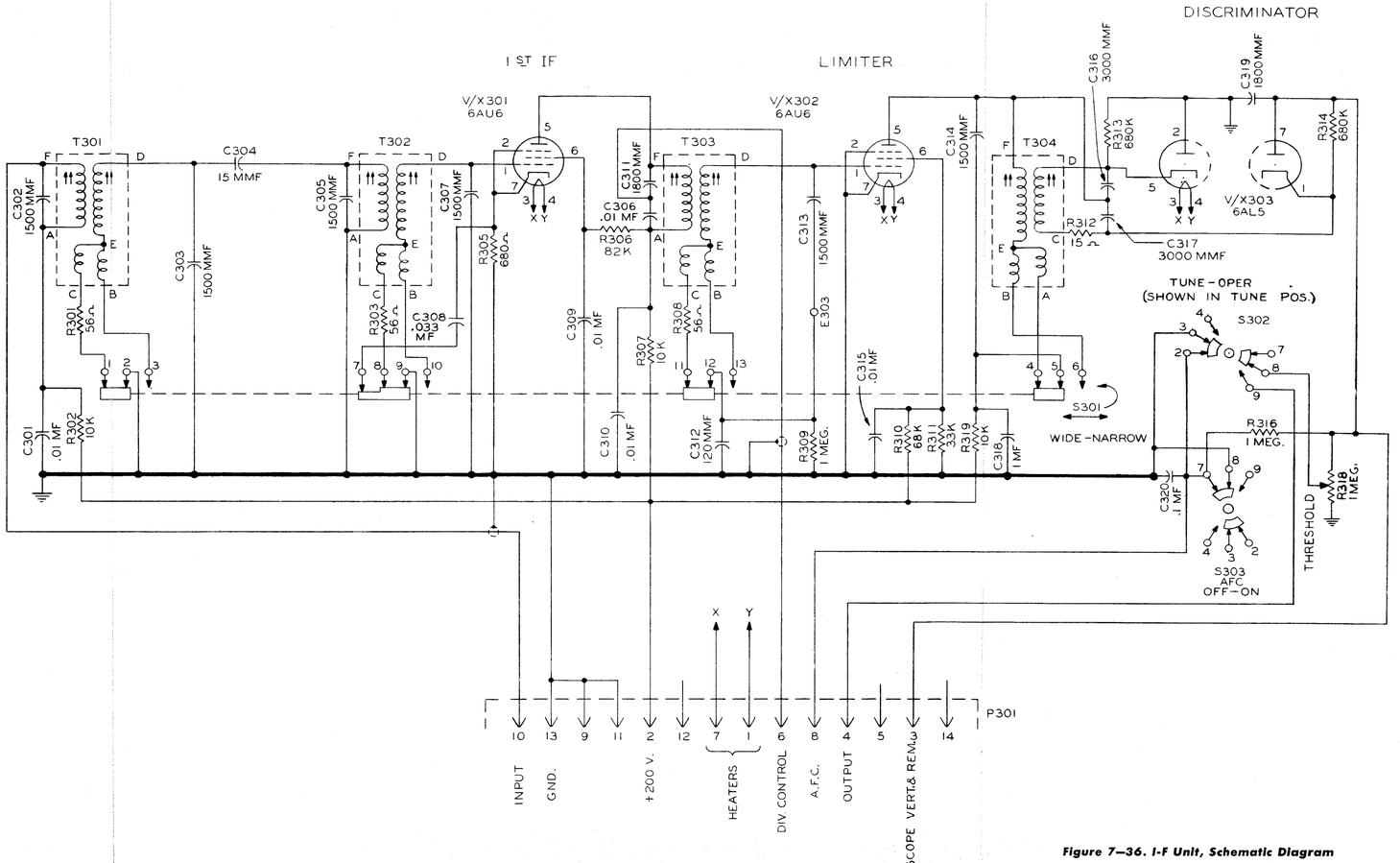

Figure 7–36. I-F Unit, Schematic Diagram

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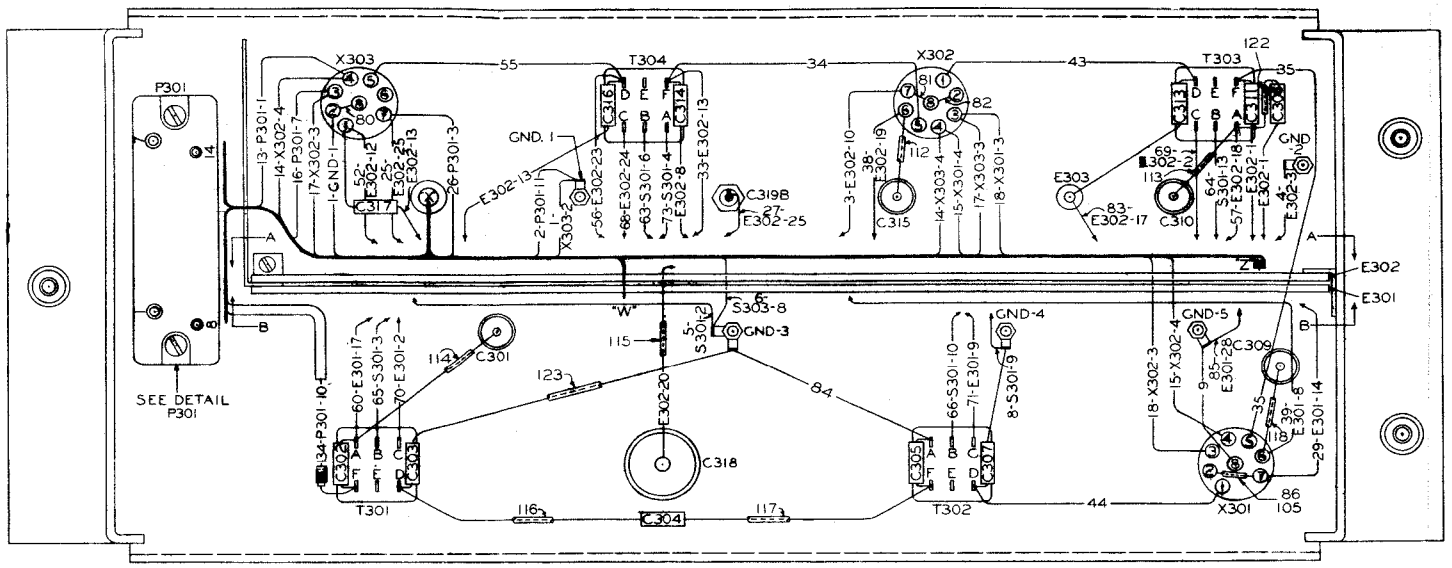
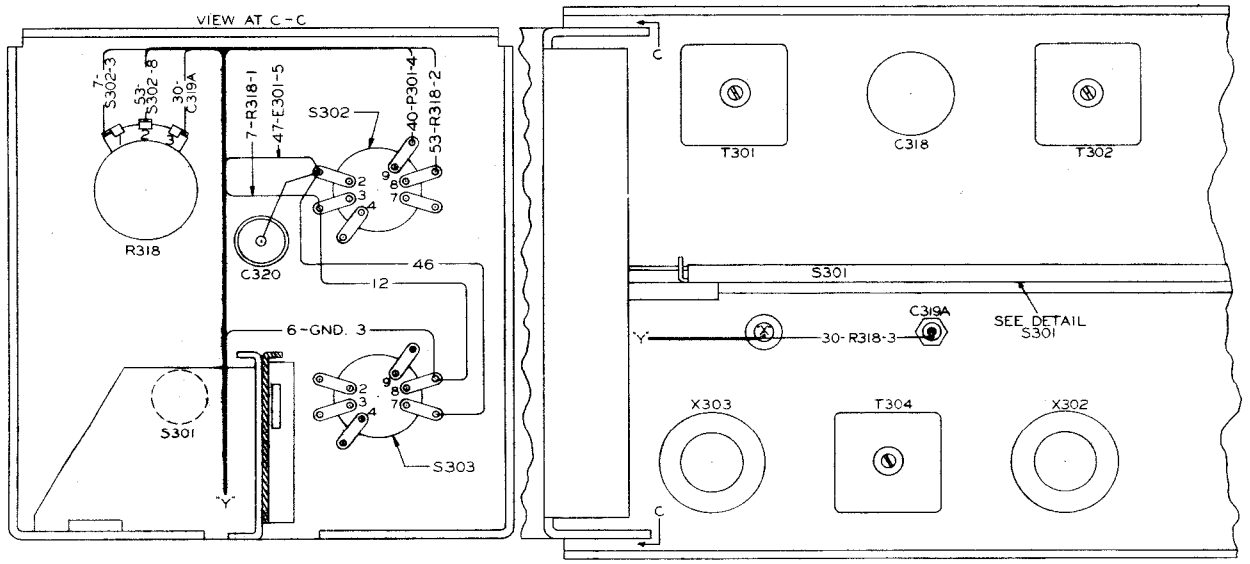
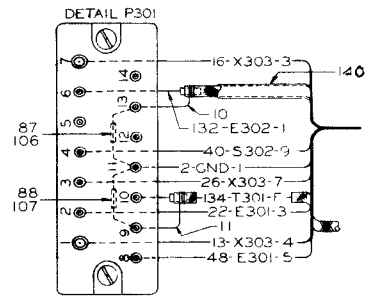
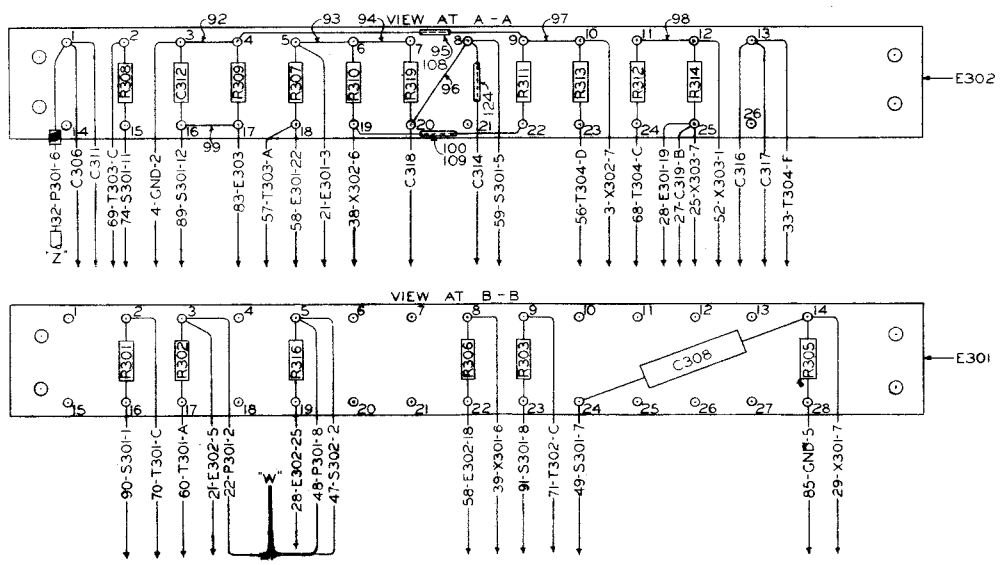
CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS; 18-X302-3, 18=WIRE NO. X302=SOCKET X302 AND 7=TERMINAL 7 OF X302 AS INDICATED ON THIS DRAWING.





WIRE TABLE	
WIRE NO.	DESCRIPTION
1 TO 12	WIRE-BLACK
13 TO 18	WIRE-BROWN
21 TO 22	WIRE-RED
25 TO 30	WIRE-YELLOW
33 TO 35	WIRE-BLUE
38 TO 40	WIRE-ORANGE
43 TO 44	WIRE-GREEN
46 TO 49	WIRE-GRAY
52 TO 53	WIRE-GRN/YEL TR.
55 TO 60	WIRE-RED/YEL TR.
63 TO 66	WIRE-RED/GRN TR.
68 TO 71	WIRE-WHT/GRN TR.
73 TO 74	WIRE-RED/BLK TR.
80 TO 100	WIRE-BUSS .020 DIA.
105 TO 109	EXT. TUBING BLACK
112 TO 118	EXT. TUBING BLACK
122 TO 124	EXT. TUBING BLACK
132	CABLE SPECIFICATION
134	CABLE SPECIFICATION
140	EXT. TUBING BLACK





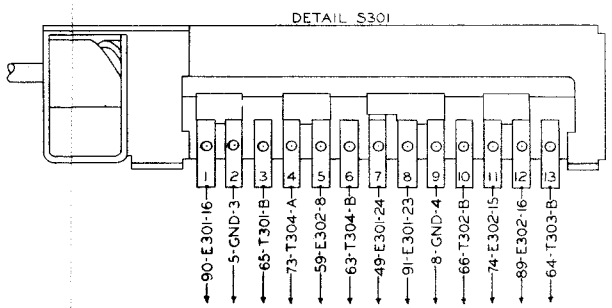


Figure 7–37. I-F Unit, Wiring Diagram

COIL DATA FOR INPUT UNIT, 395 TO 475 KC

SYMBOL	WINDING	TERMINALS	RESISTANCE OHMS
T101		EF-BC	9.37
		EF-D	0.747
		EF-A	2.3
		A-BC	6.223
T102	Primary	B-F	20.5
	Secondary	C-D	20.5
T103	Same as T102		

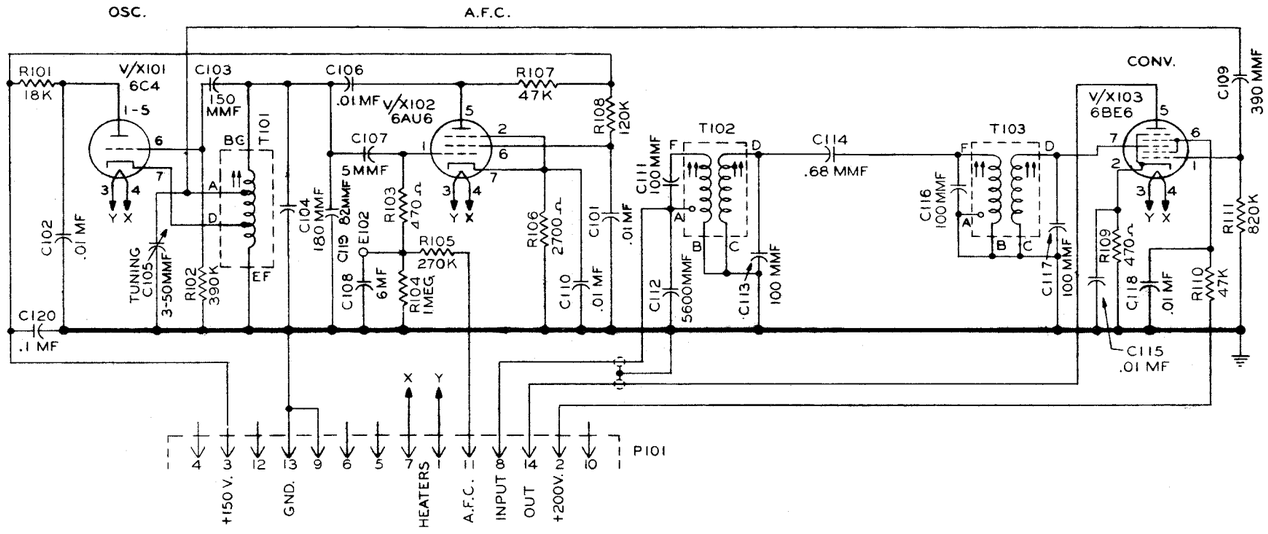


Figure 7–38. Input Unit, 395 to 475 kc, Schematic Diagram

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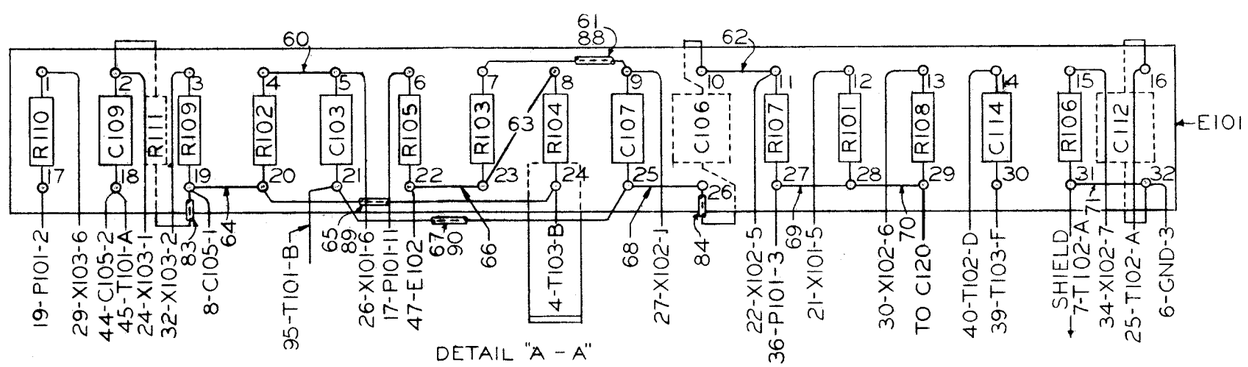
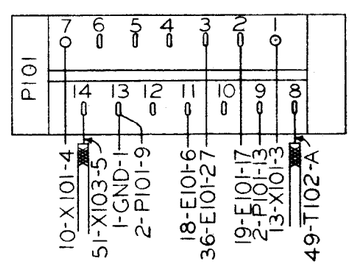
WIRE TABLE	
WIRE NO.	DESCRIPTION
1 TO 9	WIRE-BLACK
10 TO 15	WIRE-BROWN
17	WIRE-GRAY
19	WIRE-RED
21 TO 22	WIRE-BLUE
23 TO 27	WIRE-GREEN
29 TO 30	WIRE-ORANGE
32 TO 34	WIRE-YELLOW
36	WIRE-RED/GREEN TR.
39 TO 40	WIRE-WHT/BLACK TR.
44 TO 45	WIRE-WHT/BLUE TR.
47	WIRE-GRN/YELLOW TR.
49	CABLE SPECIFICATIONS
51	CABLE SPECIFICATIONS
54 TO 71	WIRE-BUSS .020 DIA.
77 TO 85	EXT. TUBING BLACK
87 TO 90	EXT. TUBING BLACK
95	WIRE-BUS .032 DIA.

CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS; 34-X102-7 34 =WIRE NO., X102 =SOCKET X102 AND 7=TERMINAL 7 OF X102 AS INDICATED ON THIS DRAWING.





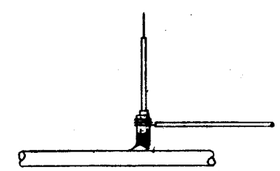


Figure 7–39. Input Unit, 395 to 475 kc, Wiring Diagram

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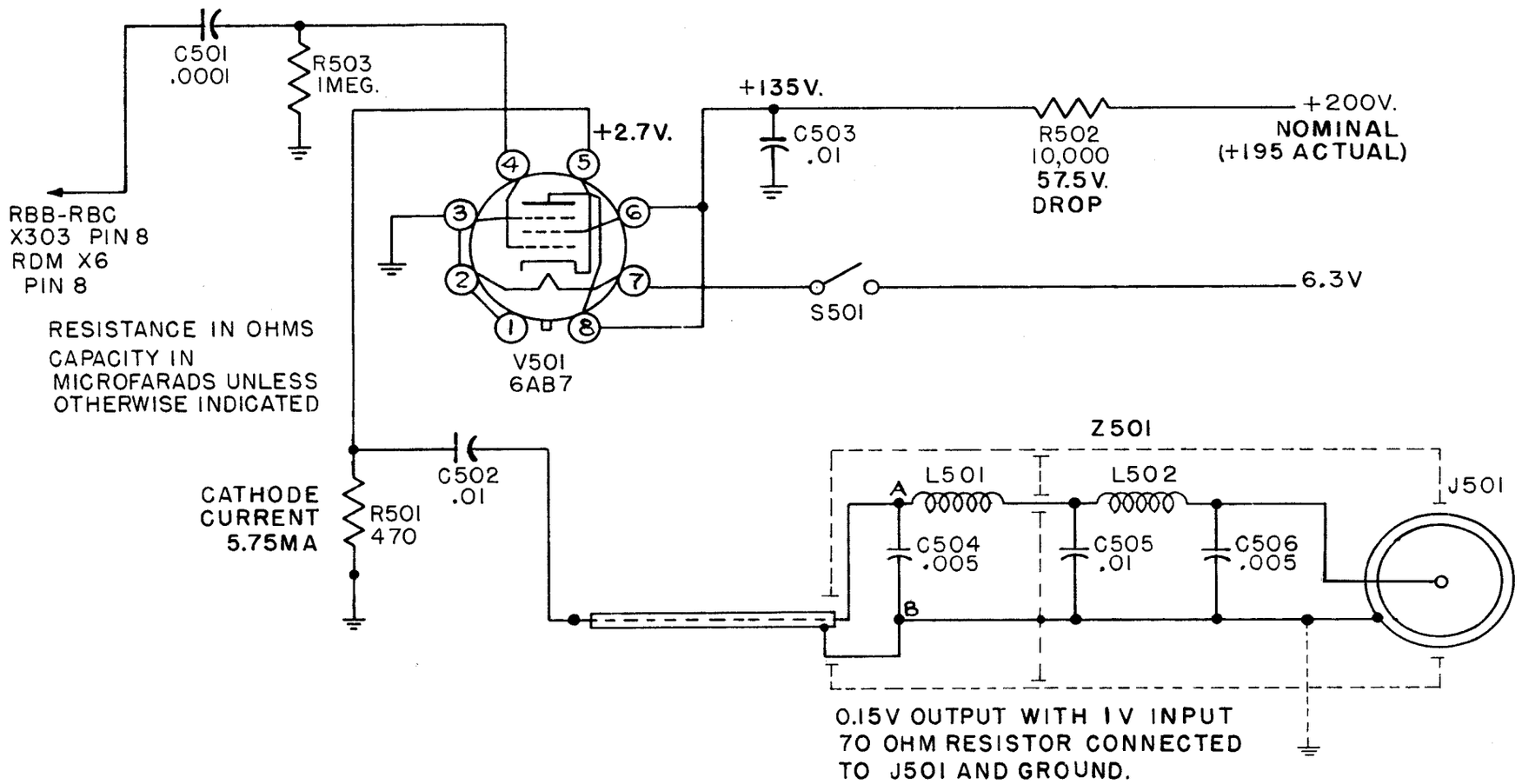


Figure 7–40. Receiver Coupling Kit, Schematic Diagram

RESTRICTED

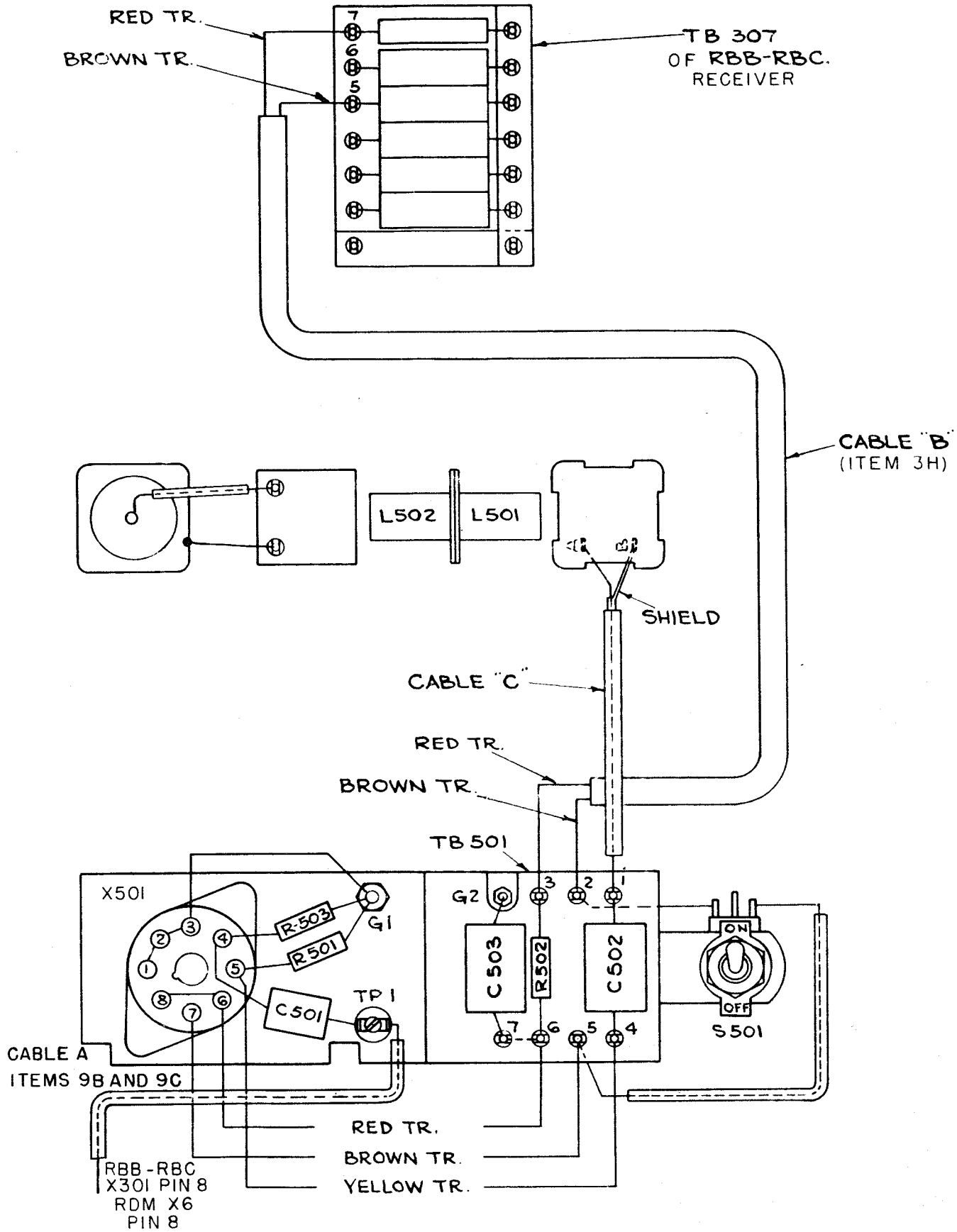


Figure 7–41. Receiver Coupling Kit, Wiring Diagram

COIL DATA FOR KEYER UNIT

SYMBOL	WINDING	TERMINALS	RESISTANCE OHMS	
			CTC MANUFACTURE	UTC MANUFACTURE
L601		1-2	3354	3284
		1-3	3081	3013
T601	Primary	1-2	3096	4500
	Secondary	3-4	744	936
Z601		1-2	2620	2293
		4-5	5800	5024

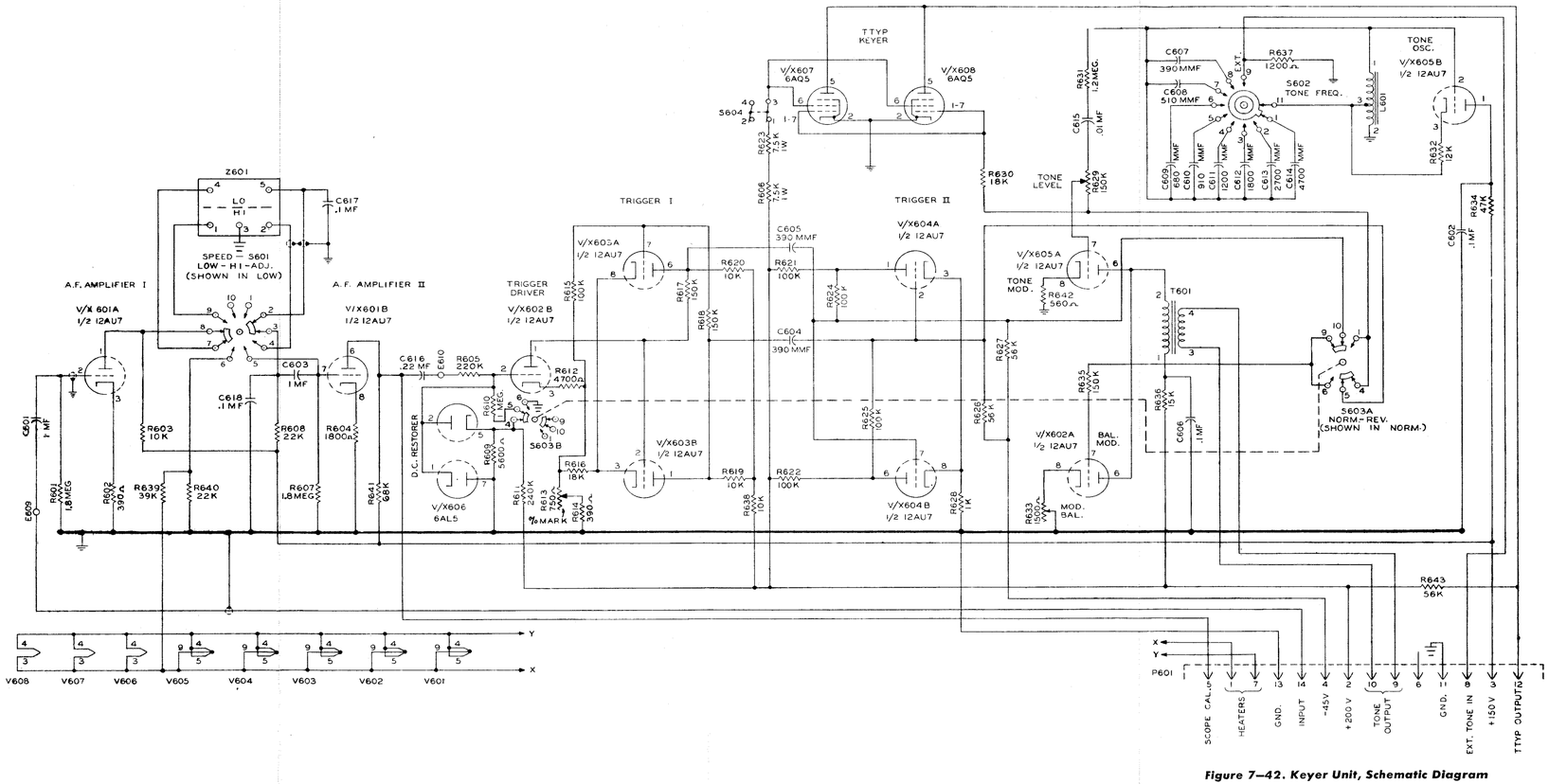
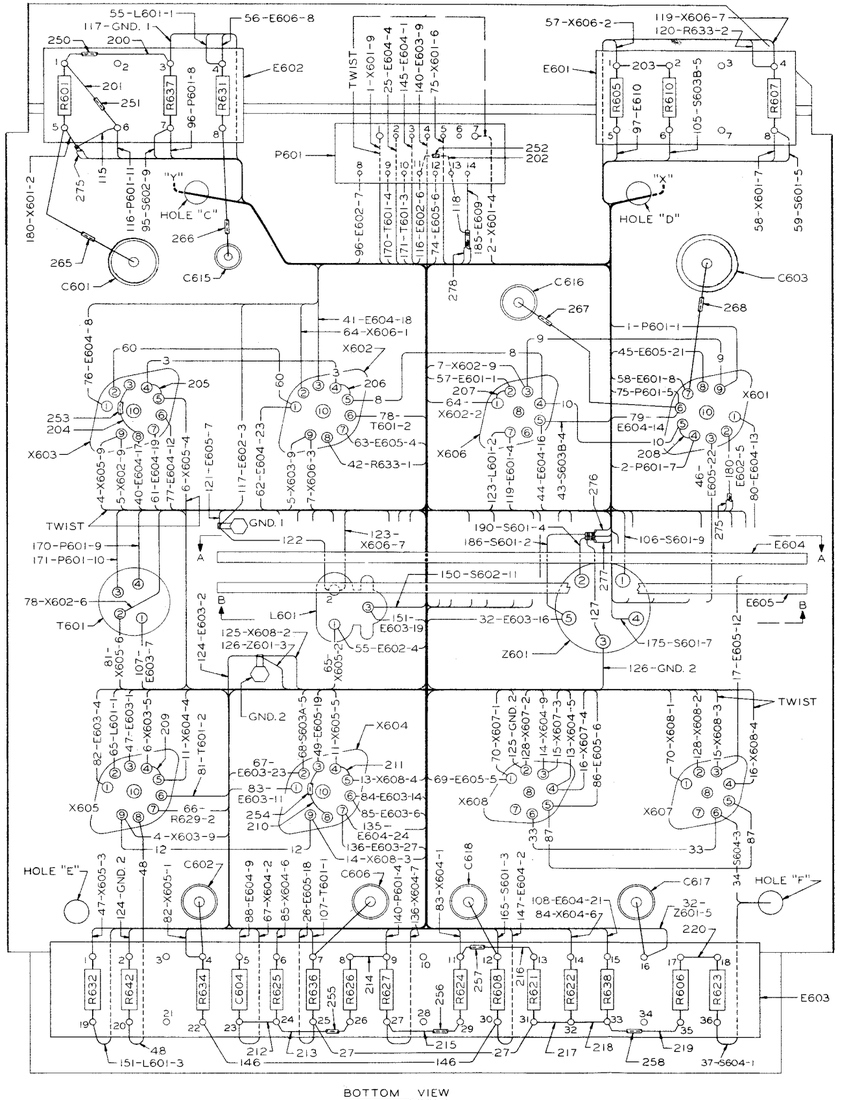
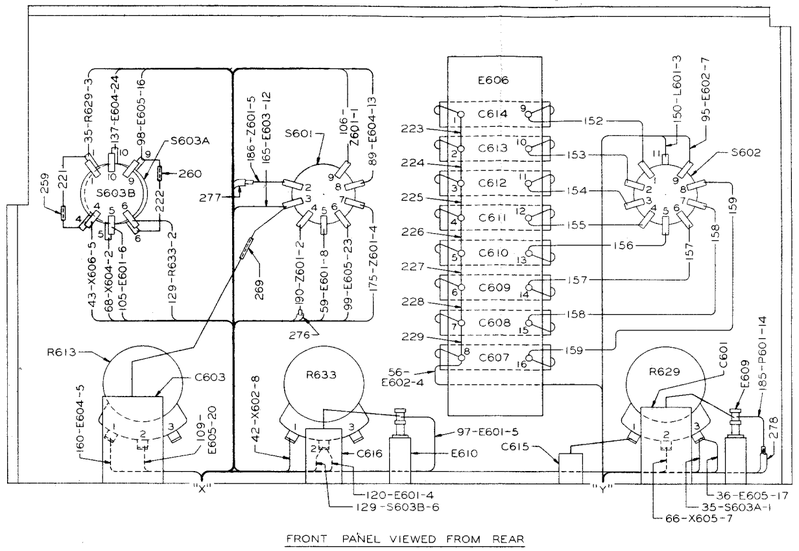
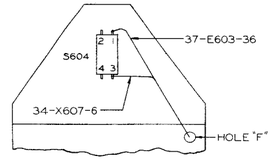


Figure 7–42. Keyer Unit, Schematic Diagram

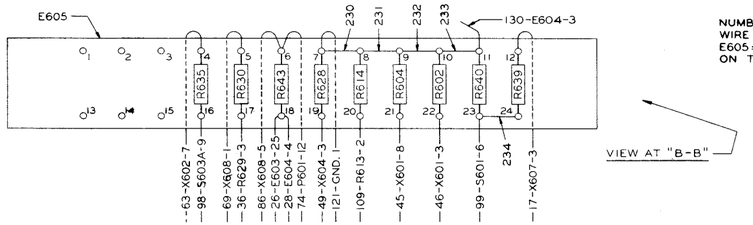


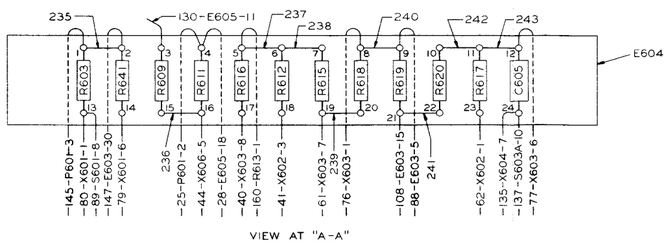


WIRE TABLE	
WIRE NO.	DESCRIPTION
1-17 INCL.	BROWN
25-28	RED
32-37	ORANGE
40-49	YELLOW
55-70	GREEN
74-89	BLUE
95-99	GRAY
105-109	WHITE
115-130	BLACK
135-137	RED/BLACK TR.
140	RED/YELLOW TR.
145-147	RED/GREEN TR.
150-160 INCL.	GREEN/YELLOW TR.
165	GREEN/BLACK TR.
170-171	WHITE/GREEN TR.
175	WHITE/BLUE TR.
180	CABLE SPEC. (GREEN)
185-186	CABLE SPEC. (ORANGE)
190	CABLE SPEC. (BLUE)
200-243 INCL.	TINNED COPPER WIRE .020 DIA.
250-260 INCL.	EXTRUDED TUBING BLK.
265-269 INCL.	EXTRUDED TUBING BLK.
275-278 INCL.	EXTRUDED TUBING BLK.



REAR PANEL VIEWED FROM FRONT





NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATES WIRE NUMBER & DESTINATION OF WIRE THUS; 86-E605-6, 86 = WIRE NUMBER, E605 = TERMINAL BOARD E605, AND 6 = TERMINAL 6 OF E605 AS INDICATED ON THIS DRAWING.

"DETAIL ENDS OF CABLES"

Figure 7–43. Keyer Unit, Wiring Diagram

RESTRICTED
NAVSHIPS 91355
RESTRICTED
NAVSHIPS 91355
RESTRICTED
NAVSHIPS 91355

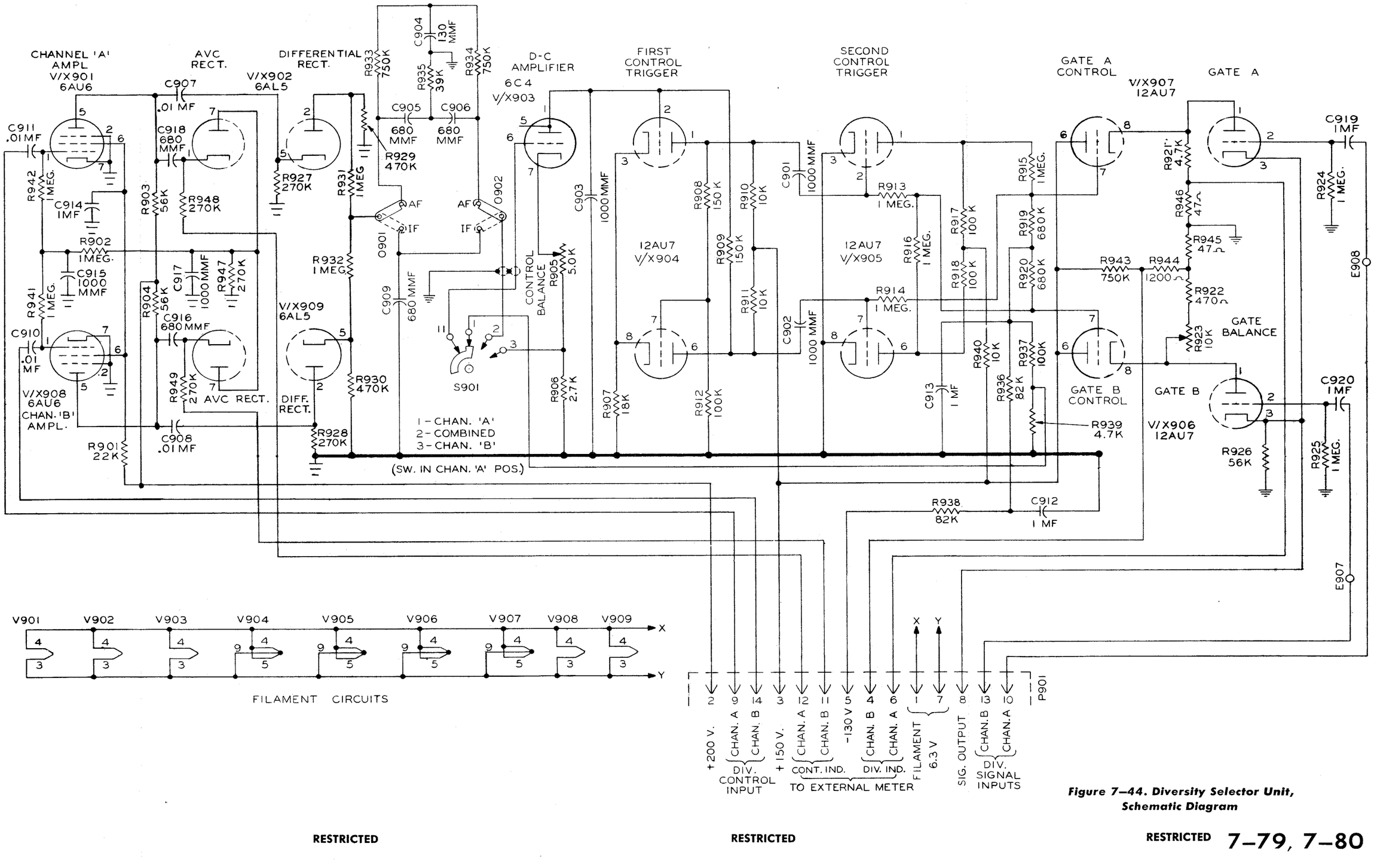
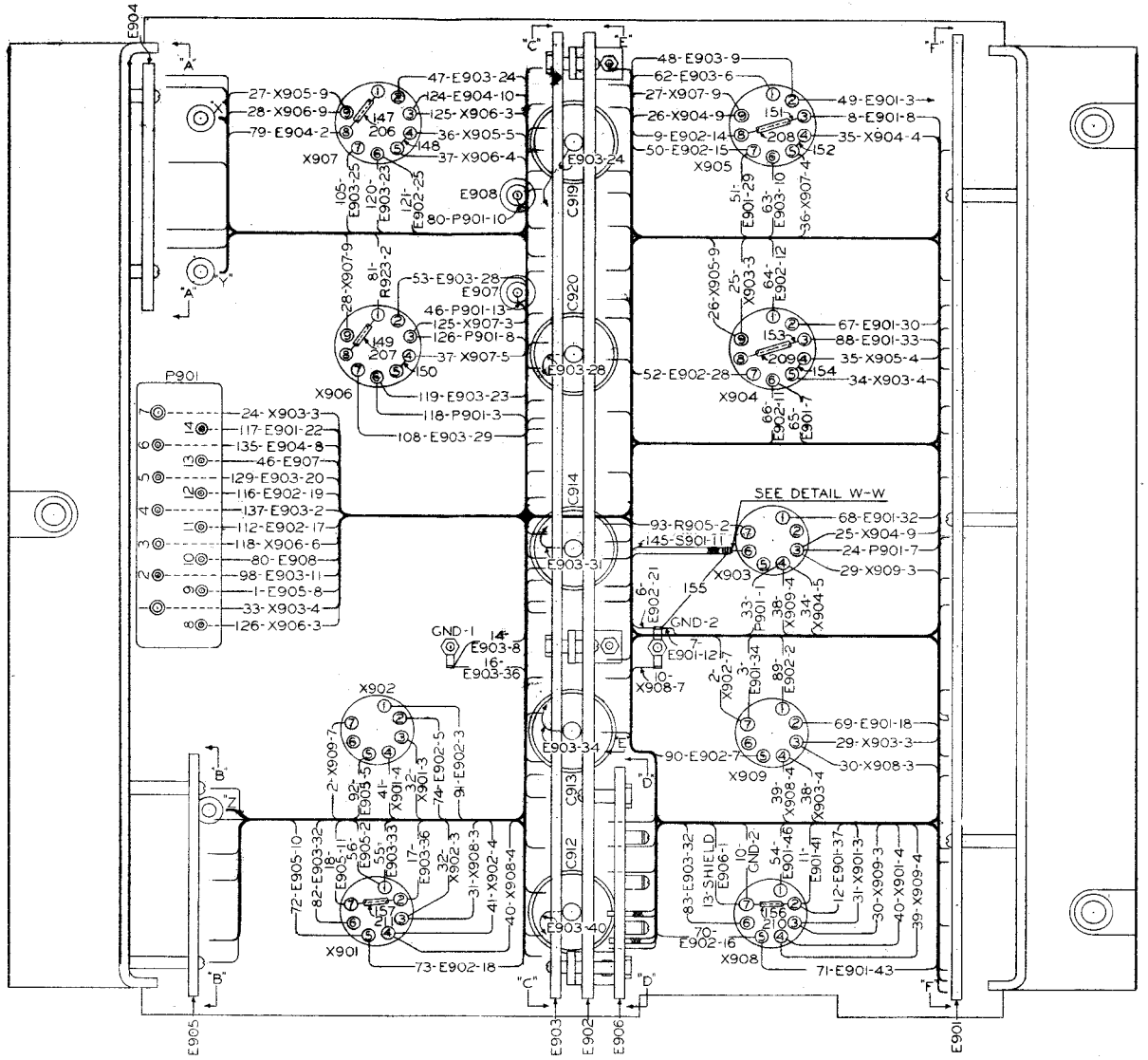
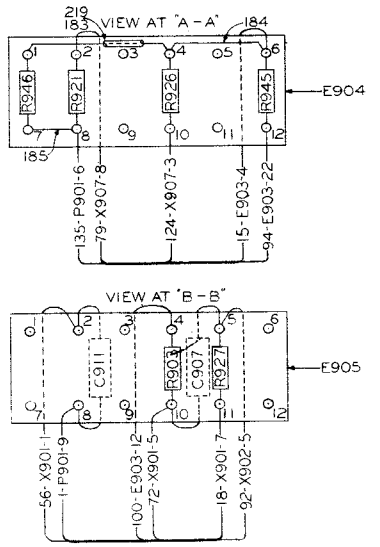


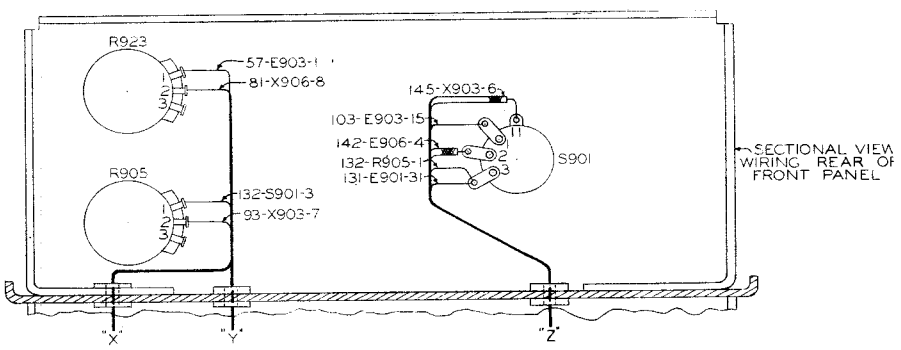
Figure 7–44. Diversity Selector Unit, Schematic Diagram

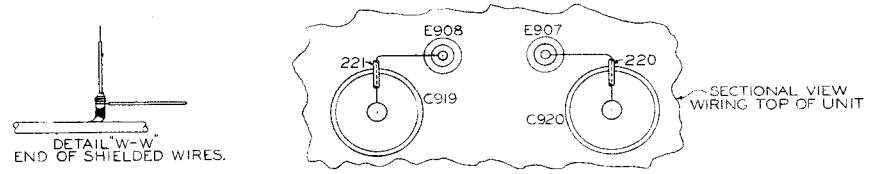
RESTRICTED
NAVSHIPS 91355

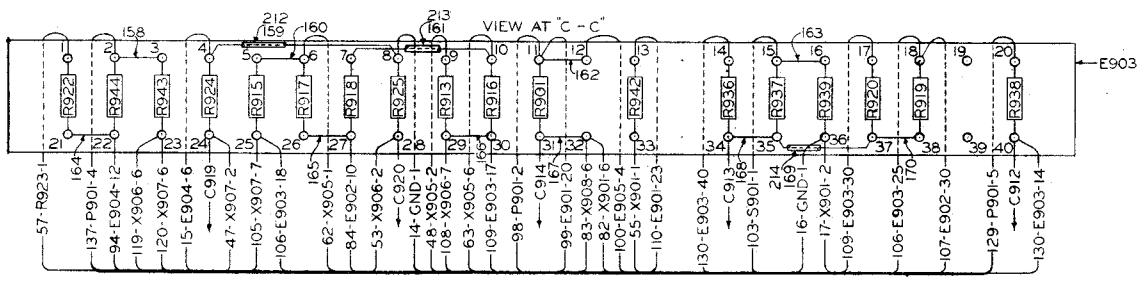


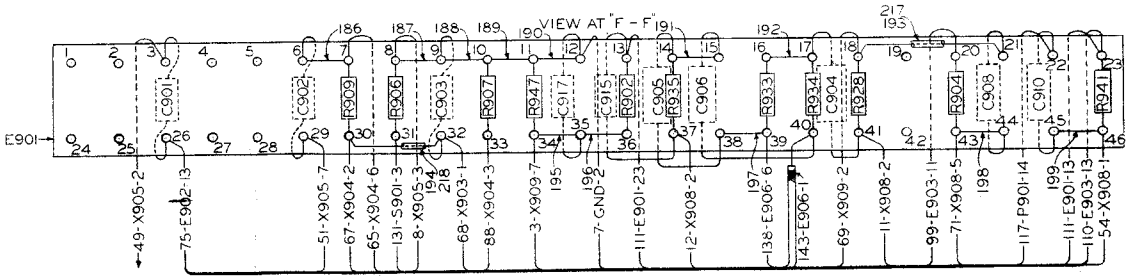
WIRE TABLE	
WIRE NO.	DESCRIPTION
1 TO 3	WIRE-WHITE
6 TO 18	WIRE-BLACK
24 TO 41	WIRE-BROWN
46 TO 58	WIRE-GREEN
62 TO 75	WIRE-BLUE
79 TO 84	WIRE-ORANGE
88 TO 94	WIRE-YELLOW
98 TO 100	WIRE-RED
103	WIRE-GRAY
105 TO 112	WIRE-WHT-BLUE TR.
116	WIRE-WHT-GREEN TR.
117	WIRE-WHT-BLACK TR.
118 TO 121	WIRE-RED-GREEN TR.
124 TO 126	WIRE-RED-YELLOW TR.
129 TO 132	WIRE-RED-BLACK TR.
135	WIRE-GRN-BLACK TR.
137 TO 139	WIRE-GRN-YELLOW TR.
142 TO 143	CABLE SPECS.
145	CABLE SPECS.
147 TO 199	WIRE-BUSS .020 DIA.
206 TO 219	EXT. TUBING .027 I.D. BK.
220 TO 221	EXT. TUBING .034 I.D. BK.

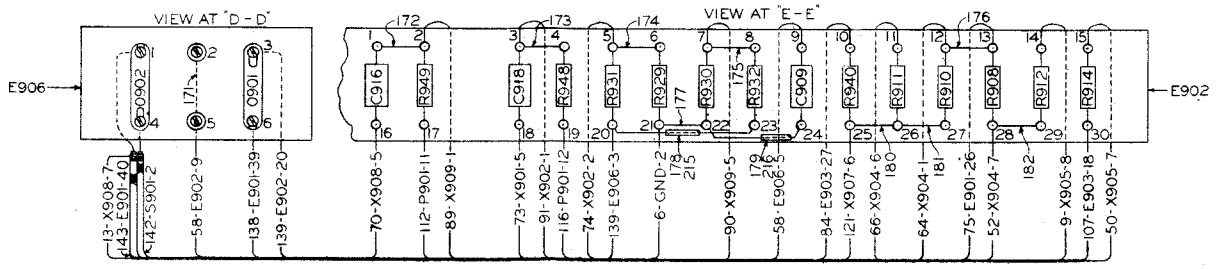












CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS; 51-E901-29, 51=WIRE NO., E901=TERMINAL BOARD E901 AND 29=TERMINAL 29 OF E901 AS INDICATED ON THIS DRAWING.

Figure 7–45. Diversity Selector Unit, Wiring Diagram

TABLE 8-1. WEIGHTS AND DIMENSIONS OF SPARE PARTS BOXES

EQUIPMENT SPARE PARTS						TENDER SPARE PARTS						STOCK SPARE PARTS					
SPARE PARTS BOX	OVERALL DIMENSIONS, IN.			VOLUME CU. FT.	WEIGHT	SPARE PARTS BOX	OVERALL DIMENSIONS, IN.			VOLUME CU. FT.	WEIGHT	SPARE PARTS BOX	OVERALL DIMENSIONS, IN.			VOLUME CU. FT.	WEIGHT
	HEIGHT	WIDTH	DEPTH				HEIGHT	WIDTH	DEPTH				HEIGHT	WIDTH	DEPTH		
MI 16292	12	12	6	0.5													
MI 16293	12	12	6	0.5			NONE SUPPLIED						SUPPLIED AS ITEMS OF A KIND IN BULK				
MI 16294	12	12	6	0.5													

TABLE 8-2. SHIPPING WEIGHTS AND DIMENSIONS OF SPARE PARTS BOXES

EQUIPMENT SPARES						TENDER SPARES						STOCK SPARES					
SPARE PARTS BOX	OVERALL DIMENSIONS, IN.			VOLUME CU. FT.	WEIGHT	SPARE PARTS BOX	OVERALL DIMENSIONS, IN.			VOLUME CU. FT.	WEIGHT	SPARE PARTS BOX	OVERALL DIMENSIONS, IN.			VOLUME CU. FT.	WEIGHT
	HEIGHT	WIDTH	DEPTH				HEIGHT	WIDTH	DEPTH				HEIGHT	WIDTH	DEPTH		
MI 16292	17	16.75	8.5	1.35													
MI 16293	17	16.75	8.5	1.35			NONE SUPPLIED						SUPPLIED AS ITEMS OF A KIND IN BULK				
MI 16294	17	16.75	8.5	1.35													

TABLE 8-3. LIST OF MAJOR UNITS

SYMBOL GROUP	NAME OF MAJOR UNIT	NAVY TYPE DESIGNATION
1400	Frequency Shift Converter	CV-57/URR
1400	Frequency Shift Converter	CV-71/URR
1600	Comparator	CM-14/URR
	Frequency Shift Converter-Comparator Group (Consists of two CV-57/URR units and one CM-14/URR unit)	AN/URA-6
	Frequency Shift Converter-Comparator Group (Consists of two CV-71/URR units and one CM-14/URR unit)	AN/URA-7

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS								SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)				
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
A-501	RECEIVER, SUB-ASSEMBLY: cathode follower for IF input; c/o 1 shelf assembly RCA part/dwg #430359-501, 1 socket RCA part/dwg #456824-501, 1 standoff insulator RCA part/dwg #426765-5, 2 fixed capacitors JAN CM40E103K, 1 fixed capacitor JAN CM20C101K, 1 fixed resistor JAN RC20BF471K, 1 fixed resistor JAN RC20BF105K, 1 fixed resistor JAN RC20BF103K, 1 vacuum tube JAN-6AB7; "L" shaped shelf; 2" lg x 4-3/4" h x 3-1/4" wd o/a; 4 mtg posts ea having one #6-32 thd x 5/8" d tapped hole, holes located at corners of a quadrilateral w/ sides of 1-1/2", 2", 1-1/16", 2-9/32" respectively	Cathode Follower Stage (Part of Rec-Coupling Kit Navy Type -10563)		N16-R-33591-1218	1	P-717888-501	A-501	1		0		0	2		0		0	0		0		0
B-1101	MOTOR, AC: capacitor-start induction type; 1/2000 hp approx, 3000 rpm w/ 0.5 mf capacitor; closed frame; ambient temp, power-off —20 to +55 deg C, power-on 0 to +65 deg C; plain shaft w/ 1/64" x 45 deg chamfer on end; 1-1/2" lg x 1-5/8" wd x 2" h excl term w/ shaft 0.124" +0.000" —0.001" diam x 3/8" lg protruding from one side of frame; 115 v, 60 cyc, single phase, 8 w max; mtd by two #6-32 tapped holes on 1" ctr on shaft end of frame; ball bearings; marked w/ NT # prefixed by mfr's ltr and RCA part/dwg #, continuous duty; run any position; all metal parts corrosion resistant to 200 hr salt spray; drives a 2-1/4" diam fan	Ventilator Fan		N17-M-54301-8001	1567 Type #AC-470-B	B-454892-1	B-1101, B-1301	1		1		2	3		1		2	3		1		2
B-1301	Same as B-1101	Ventilator Fan																				
C-101	CAPACITOR, FIXED; paper; single sect; 10,000 mmf p/m 20%; 600 vdcw; HS metallic case; 1-5/8" lg x 1/4" diam; mineral oil impr; 1 axial wire lead; int gnd; single mtg bkt 0.120" diam hole located 1/16" from lead end; fp, marked w/ cap, working v and RCA dwg #	Screen Bypass of AFC Tube V-102		N16-C-42767-6982	1	K-8858397-3	C-101, C-102, C-110, C-115, C-118, C-201, C-202, C-210, C-215, C-218, C-301, C-309, C-310, C-315	9		2		0	18		4		0	18		4		0

C-102	Same as C-101	Plate Bypass of Osc V-101																		
C-103	CAPACITOR, FIXED: ceramic; 150 mmf p/m 20%; hi-dielectric constant (does not fall within limits); 300 vdcw; 0.500" lg x 0.250" diam; radial wire leads; ceramic ins; humidity resistant; flash test 1500 v DC; pf 3% max from 1 kc to 1 mc; meets RCA part/dwg K-897113-1	Coupler to Grid of Osc V-101		N16-C-17409-8437	1682 Type K1200	A-99372-55	C-103, C-203	1		1		0	2	1	0	2	1	0		
C-104	CAPACITOR, FIXED: silver mica; 180 mmf p/m 2%; 500 vdcw; temp coef +10 to +34 parts million/°C; max case dimensions 51/64" lg x 15/32" wd x 7/32" thk less leads; low loss phenolic case; 2 axial wire lead term	Fixed Tuning Capacitor of T-101 to Approx 450 KC				A-8830137-1	C-104	1		1		1	2	1	2	0	0	0		
C-105	CAPACITOR, VARIABLE: air dielectric; plate meshing type, single sect; cap 50 mmf max, 3.4 mmf min; SLC air gap 0.015"; 1-5/64" lg approx x 25/32" wd x 15/16" h excluding shaft; shaft 0.250" diam x 9/16" lg; non-locking; extension shaft adjustment; 10 aluminum rotor plates, 9 aluminum stator plates; rotation 360 deg either direction; ceramic ins; 1 solder lug rotor term, 2 post type stator term; front surface w/ 2 sq mtg nuts tapped #4-40 thd; located on 17/32" mtg/c and 17/32" from bottom edge; terms hot solder dipped; corrosion resistant; marked w/ NT# prefixed by mfr's designation ltr; spec JAN-C-92	Vernier Tuning of T-101, C-104 to Approx 450 KC ±2 KC		N16-C-59676-1001	277 MAPC-50	B-453547-1	C-105, C-205	1		1		0	2	1	0	2	1	0		
C-106	CAPACITOR, FIXED: mica; 10,000 mmf p/m 5%; 300 vdcw; temp coef ltr C; 53/64" lg x 53/64" h x 11/32" wd, less term; molded phenolic case; 2 axial wire leads; color coded; spec JAN-C-5	Coupler to Plate of AFC Tube V-102	CM35C103J	N16-C-33617-4746		P-722029-513	C-106, C-206, C-212, C-306	2		0		0	4	0	0	6	0	0		
C-107	CAPACITOR, FIXED: ceramic dielectric; 5 mmf p/m 0.50 mmf; neg temp coef 30 (tol +60 —116) mmf/mf/°C; 500 vdcw; 0.562" lg x 0.25" diam; 2 axial wire leads; term mtg; ceramic ins; spec JAN-C-20A	Coupler to Grid of AFC Tube V-102	CC21HH050D	N16-C-15628-2060		P-722407-108	C-107, C-207	1		0		0	2	0	0	2	0	0		
C-108	CAPACITOR, FIXED: paper dielectric; single sect; 6 mf +30% —20%; 50 vdcw; HS metal case; case 1-13/16" lg x 1.0" diam, less leads; castor oil impr; 1 axial wire lead term, other side gnd to case; marked w/ cap, DC working v, test v; no mtg provisions	AFC Filter		N16-C-50756-8805		A-8847200-1	C-108, C-208	1		1		0	2	1	0	2	1	0		
C-109	CAPACITOR, FIXED: ceramic; 390 mmf p/m 20%; hi-dielectric constant (does not fall within limits); 300 vdcw; 0.500" lg x 0.250" diam; radial wire leads; ceramic ins; humidity resistant; flash test 1500 v DC; pf 3% from 1 kc to 1 mc; meets RCA part/dwg K-897113-1	Coupler to Grid #1 of Converter V-103		N16-C-18049-8437	1682 Type K1200	A-99372-65	C-109, C-209, C-604, C-605	3		1		0	8	2	0	8	2	0		
C-110	Same as C-101	Cathode Bypass of AFC Tube V-102																		

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
C-111	CAPACITOR, FIXED; mica dielectric; 100 mmf p/m 5%; 500 vdcw; temp coef ltr C; 51/64" lg x 15/32" wd x 7/32" thk; molded bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Pri Tuning Capacitor of T-102	CM20C101J	N16-C-28553-1201		P-722004-523	C-111, C-113, C-116, C-117	4		0		0	8		0		0	0		0		0
C-112	CAPACITOR, FIXED: mica dielectric; 5600 mmf p/m 5%; 500 vdcw; temp coef ltr C; 53/64" lg x 53/64" wd x 11/32" thk; molded phenolic case; 2 axial wire leads; spec JAN-C-5	Input Matching Capacitor	CM35C562J	N16-C-32826-3133		P-722029-507	C-112	1		0		0	2		0		0	0		0		0
C-113	Same as C-111	Seed Tuning Capacitor of T-102																				
C-114	CAPACITOR, FIXED: ceramic dielectric; 0.68 mmf p/m 0.068 mmf; high dielectric, no limiting range; 500 vdcw; 0.335" lg x 0.160" diam; 2 axial wire leads; ceramic ins; cap marked by color code	Coupler to T-103		N16-C-55551-1825	711 Type GA	A-99327-11	C-114	1		1		1	2		1		2	0		0		0
C-115	Same as C-101	Cathode Bypass of Converter V-103																				
C-116	Same as C-111	Pri Tuning of T-103																				
C-117	Same as C-111	Seed Tuning of T-103																				
C-118	Same as C-101	Screen Bypass of Converter V-103																				
C-119	CAPACITOR, FIXED: ceramic dielectric; 82 mmf p/m 2%; neg temp coef —750 mmf/mf °C (tol p/m 40) mmf/mf °C; 500 vdcw; case 0.812" max lg x 0.250" max diam; 2 radial wire lead term; ins w/ Durez; marked RCA #8830139-1 and temp characteristics	Temperature Compensating Capacitor for Osc V-101			1	A-8830139-1	C-119	1		1		1	2		1		2	0		0		0
C-120	CAPACITOR, FIXED: paper dielectric; single sect; 100,000 mmf +20% —10%; 200 vdcw; HS metal case; 13/16" lg x 13/32" diam, less leads; vitamin Q impr; 1 axial wire lead; int gnd; mts by single 0.120" diam hole in mtg bkt located near end of body opposite lead end; marked w/ cap, tol, rated working v, and mfr name	+B Filter Capacitor		N16-C-45801-8800	1	B-454030-50	C-120, C-220, C-221, C-602, C-606, C-617, C-618	5		3		0	14		4		0	16		5		0

C-201	Same as C-101	Screen Bypass of AFC Tube V-202																	
C-202	Same as C-101	Plate Bypass of Osc V-201																	
C-203	Same as C-103	Coupler to Grid of Osc V-201																	
C-204	CAPACITOR, FIXED: silver mica; 270 mmf p/m 2%; 500 vdcw; temp coef; +10 to +34 parts/million/°C; max case dimensions 51/64" lg x 15/32" wd x 7/32" thk, less leads; low loss phenolic case; 2 axial wire lead term	Fixed Tuning Capacitor of T-201 to Approx 90 KC				A-8830137-2	C-204	0		0		0		0		0		2	0	0
C-205	Same as C-105	Vernier Tuning of T-201 to Approx 90 KC ±2 KC																	
C-206	Same as C-106	Coupler to Plate of AFC Tube V-202																	
C-207	Same as C-107	Coupler to Grid of AFC Tube V-202																	
C-208	Same as C-108	Filter for AFC																	
C-209	Same as C-109	Coupler to Grid #1 of Converter V-203																	
C-210	Same as C-101	Cathode Bypass of AFC Tube V-202																	
C-211	CAPACITOR, FIXED: mica dielectric; 1800 mmf p/m 2%; 500 vdcw; temp coef ltr D; 53/64" lg x 53/64" wd x 11/32" thk; molded phenolic case; 2 axial wire leads; color coded; spec JAN-C-5	Pri Tuning Capacitor of T-202	CM30D182G	N16-C-31660-5014		P-722022-565	C-211, C-311	1		0		0		2		0		4	0	0
C-212	Same as C-106	Input Matching Capacitor																	
C-213	CAPACITOR, FIXED: mica dielectric; 1500 mmf p/m 2%; 500 vdcw; temp coef ltr D; case 53/64" lg x 53/64" h x 9/32" thk, less term; molded phenolic case; 2 axial wire lead term; color coded; spec JAN-C-5	Secd Tuning Capacitor of T-202	CM30D152G	N16-C-31502-2614		P-722022-563	C-213, C-216, C-217, C-302, C-303, C-305, C-307, C-313, C-314	6		0		0		12		0		18	0	0
C-214	CAPACITOR, FIXED: mica; 18 mmf p/m 10%; 500 vdcw; temp coef ltr B; 51/64" lg x 15/32" wd x 7/32" max thk; molded low loss bakelite case; 2 axial wire leads 1-1/8" lg #20 AWG; color coded; spec JAN-C-5	Coupler to T-203	CM20B180K	N16-C-26606-2076		P-722001-555	C-214	0		0		0		0		0		2	0	0
C-215	Same as C-101	Cathode Bypass of Converter V-203																	
C-216	Same as C-213	Pri Tuning Capacitor of T-203																	
C-217	Same as C-213	Secd Tuning Capacitor of T-203																	
C-218	Same as C-101	Screen Bypass of Converter V-203																	

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)				
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
C-219	CAPACITOR, FIXED: ceramic dielectric; 240 mmf p/m 2%; neg temp coef —750 mmf/mf °C (tol +120 —350 mmf/mf °C; 500 vdcw; case 0.937" max lg x 0.312" max diam less leads; 2 radial wire lead term; ins w/ Durez; marked RCA #8830139-2 and temp characteristics	Temperature Compensating for Osc V-201			1	A-8830139-2	C-219	0		0		0	0		0		0	2		1		2
C-220	Same as C-120	+B Filter Capacitor																			
C-221	Same as C-120	+B Filter Capacitor																			
C-301	Same as C-101	+B Filter of T-301																			
C-302	Same as C-213	Pri Tuning Capacitor of T-301																			
C-303	Same as C-213	Secd Tuning Capacitor of T-301																			
C-304	CAPACITOR, FIXED: mica; 15 mmf p/m 10%; 500 vdcw; temp coef ltr B; 51/64" lg x 15/32" wd x 7/32" max thk; molded low loss bakelite case; 2 axial wire leads 1-1/8" lg #20 AWG; color coded; spec JAN-C-5	Coupler to T-302	CM20B150K	N16-C-26447-8676		P-722001-554	C-304	1		0		0	2		0		0	2		0		0
C-305	Same as C-213	Pri Tuning of T-302																			
C-306	Same as C-106	Pri Voltage Divider of T-303																			
C-307	Same as C-213	Secd Tuning Capacitor of T-302																			
C-308	CAPACITOR, FIXED: paper dielectric; single sect; 33,000 mmf p/m 10%; 100 vdcw; HS metal case; 7/8" lg x 0.297" diam; vitamin Q impr; two axial wire lead term 1-5/8" lg; int gnd; term mtd; marked w/ cap, tol, working v, and mfr name; ins w/ plastic sleeving, oper temp range —55 °C to +85 °C	Cathode Bypass of Amplr V-301		N16-C-43632-9000	1	P-737816-10	C-308	1		1		0	2		1		0	2		1		0
C-309	Same as C-101	Screen Bypass of Amplr V-301																			
C-310	Same as C-101	+B Plate Bypass of Amplr V-301																			
C-311	Same as C-211	Pri Tuning Capacitor of T-303																			

	mmf p/m 20%; hi-dielectric constant (does not fall within limits); 300 vdcw; 0.500" lg x 0.250" diam; radial wire leads; ceramic ins; humidity resistant; flash test 1500 v DC; pf 3% max from 1 kc to 1 mc; meets RCA part/dwg K-897113-1	V-302			Type K1200														
C-313	Same as C-213	Secd Tuning Capacitor of T-303																		
C-314	Same as C-213	Pri Tuning Capacitor of T-304																		
C-315	Same as C-101	Screen Bypass of Limiter V-302																		
C-316	CAPACITOR, FIXED: mica dielectric; 3000 mmf p/m 2%; 500 vdcw; temp coef ltr D; case 53/64" lg x 53/64" h x 9/32" thk, less term; molded phenolic case; 2 axial wire lead term; color coded; spec JAN-C-5	Secd Tuning Capacitor of T-304	CM30D302G	N16-C-32188-1014		P-722022-570	C-316, C-317	2		0	0	4	0	0	4	0	0			
C-317	Same as C-316	Secd Tuning Capacitor of T-304																		
C-318	CAPACITOR, FIXED: paper dielectric; single sect; 1.0 mf +30% —20%; 200 vdcw; HS metal case; 1-13/16" lg x 43/64" diam, less leads; vitamin Q impr; 1 axial wire lead; int gnd; single mtg bkt 0.120" diam hole, located near end opposite to lead; marked w/ cap, tol, rated working v, and mfr name	+B Plate Bypass of Limiter V-302		N16-C-48854-8937	1	B-454030-8	C-318	1		1	0	2	1	0	2	1	0			
C-319	CAPACITOR, FIXED: ceramic dielectric; 1800 mmf —20% +50%; temp coef var, 1200 mmf min cap between —15°C and +85°C; 350 vacw; 11/16" lg x 5/16" diam across hex flats; 2 axial #16 AWG wire term, hook shape; bushing mtd w/ #12-28 male thd and nut; ceramic ins; brass feedthru bushing cad pl, integral w/ ceramic cap	Plate Bypass of Discriminator V-303	(-482869)	N16-C-18849-8648		K-887883-3	C-319	1		0	0	2	0	0	2	0	0			
C-320	CAPACITOR, FIXED: paper dielectric; single sect; 100,000 mmf +30% —20%; 200 vdcw; HS metal case; 13/16" lg x 13/32" diam, less leads; vitamin Q impr; 1 axial wire lead; int gnd; mts by single 0.120" diam hole in mtg bkt located at end opposite to lead; marked w/ cap, tol, rated working v, and mfr name	AFC Filter		N16-C-45814-8983	1	B-454030-11	C-320	1		1	0	2	1	0	2	1	0			
C-321 and C-322	Not Used																			
C-501	CAPACITOR, FIXED: mica; 100 mmf p/m 10%; 500 vdcw; temp coef ltr C; 51/64" lg x 15/32" wd x 7/32" thk, less leads; molded phenolic case; 2 axial wire leads; color coded; spec JAN-C-5	Input Coupler to V-501	CM20C101K	N16-C-28558-1681		P-722003-573	C-501	1		0	0	2	0	0	0	0	0			

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS									
									CV-57/URR IF INPUT 395-470 KC (SINGLE)				AN/URA-6 IF INPUT 395-470 KC (DUAL)				AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK		EQUIP		STOCK		EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
C-502	CAPACITOR, FIXED: mica dielectric; 10,000 mmf p/m 10%; 300 vdcw; temp coef ltr E; 1-1/32" lg x 41/64" wd x 11/32" thk, less leads; molded phenolic case; 2 axial wire leads; color coded; spec JAN-C-5	Output Coupler from V-501	CM40E103K	N16-C-33622-5604		P-722041-563	C-502, C-503	2		0		0	4		0		0	0		0		0
C-503	Same as C-502	Screen Bypass of V-501																			
C-504	CAPACITOR, FIXED: mica; 5100 mmf p/m 5%; 500 vdcw; temp coef ltr E; 53/64" lg x 53/64" wd x 11/32" thk, less leads; molded bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Output Filter of V-501	CM35E512J	N16-C-32720-7543		P-722033-506	C-504, C-506	2		0		0	4		0		0	0		0		0
C-505	CAPACITOR, FIXED: mica; 10,000 mmf p/m 10%; 300 vdcw; temp coef ltr E; case 53/64" lg x 53/64" h x 11/32" wd, less leads; molded low loss bakelite case; 2 axial wire lead term; spec JAN-C-5	Output Filter of V-501	CM35E103K	N16-C-33622-5237		P-722032-563	C-505	1		0		0	2		0		0	0		0		0
C-506	Same as C-504	Output Filter of V-501																			
C-601	CAPACITOR, FIXED: paper dielectric; one sect; 1 mf +20% —10%; 100 vdcw; HS metal can; 1-7/8" max lg x 37/64" max diam, less leads; vitamin Q impr; 2 axial term leads 1-1/2" lg; no int gnd; mts by snap on body bkt having 1 mtg ear w/ 0.120" diam hole; spec JAN-C-25	Grid Coupler of Amplr V-601A		N16-C-48841-9390	1	B-454030-53	C-601	1		1		0	3		2		0	3		2		0
C-602	Same as C-120	Plate Bypass of Osc V-605B																			
C-603	CAPACITOR, FIXED: paper dielectric; one sect; 1 mf +20% —10%; 200 vdcw; HS metal case; 1-29/32" max lg x 11/16" max diam, less leads; vitamin Q impr; 2 axial term leads 1-1/2" lg; no int gnd; mts by snap on body bkt having 1 mtg ear w/ 0.120" diam hole; spec JAN-C-25	Grid Coupler of Amplr V-601B		N16-C-48841-9487	1	B-454030-54	C-603	1		1		0	3		1		0	3		1		0
C-604	Same as C-109	Grid Coupler of Trigger V-604A																			
C-605	Same as C-109	Grid Coupler of Trigger V-604B																			
C-606	Same as C-120	+B Plate Filter of Mod V-605A																			

C-607	CAPACITOR, FIXED: mica dielectric; 390 mmf p/m 2%; 500 vdcw; temp coef ltr D; 51/64" lg x 15/32" wd x 7/32" thk, less leads; molded phenolic case; 2 axial wire leads; color coded; spec JAN-C-5	Tunes L-601 to 1785 Cycles	CM20D391G	N16-C-29893-2126		P-722006-587	C-607	1		0	0	3	0	0	3	0	0
C-608	CAPACITOR, FIXED: mica; 510 mmf p/m 2%; 500 vdcw; temp coef ltr E; 53/64" lg x 53/64" wd x 9/32" d, less leads; molded bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Tunes L-601 to 1615 Cycles	CM30E511G	N16-C-30183-3619		P-722024-552	C-608	1		0	0	3	0	0	3	0	0
C-609	CAPACITOR, FIXED: mica; 680 mmf p/m 2%; 500 vdcw; temp coef ltr E; 53/64" lg x 53/64" wd x 9/32" d, less leads; molded bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Tunes L-601 to 1445 Cycles	CM30E681G	N16-C-30526-2819		P-722024-555	C-609	1		0	0	3	0	0	3	0	0
C-610	CAPACITOR, FIXED: mica; 910 mmf p/m 2%; 500 vdcw; temp coef ltr E; 53/64" lg x 53/64" wd x 9/32" d, less leads; molded bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Tunes L-601 to 1275 Cycles	CM30E911G	N16-C-30921-8819		P-722024-558	C-610	1		0	0	3	0	0	3	0	0
C-611	CAPACITOR, FIXED: mica; 1200 mmf p/m 2%; 500 vdcw; temp coef ltr E; 53/64" lg x 53/64" wd x 9/32" thk, less leads; molded bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Tunes L-601 to 1105 Cycles	CM30E122G	N16-C-31264-8019		P-722024-561	C-611	1		0	0	3	0	0	3	0	0
C-612	CAPACITOR, FIXED: mica; 1800 mmf p/m 2%; 500 vdcw; temp coef ltr E; 53/64" lg x 53/64" wd x 9/32" d, less leads; molded bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Tunes L-601 to 935 Cycles	CM30E182G	N16-C-31660-5019		P-722024-565	C-612	1		0	0	3	0	0	3	0	0
C-613	CAPACITOR, FIXED: mica; 2700 mmf p/m 2%; 500 vdcw; temp coef ltr E; 53/64" lg x 53/64" wd x 9/32" d, less leads; molded bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Tunes L-601 to 765 Cycles	CM30E272G	N16-C-32135-3219		P-722024-569	C-613	1		0	0	3	0	0	3	0	0
C-614	CAPACITOR, FIXED: mica; 4700 mmf p/m 2%; 500 vdcw; temp coef ltr E; 53/64" lg x 53/64" wd x 11/32" thk, less leads; molded bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Tunes L-601 to 595 Cycles	CM35E472G	N16-C-32636-4863		P-722033-555	C-614	1		0	0	3	0	0	3	0	0
C-615	CAPACITOR, FIXED: paper dielectric; single sect; 10,000 mmf +20% —10%; 400 vdcw; HS metal case; 3/4" lg x 15/64" diam, less mtg; vitamin Q impr; 2 axial wire lead term; no int gnd connections; "C" clamp w/ mtg hole 0.120" diam on extended fl	Grid Coupler of Osc V-605B		N16-C-42761-8675	1	B-454030-55	C-615	1		1	0	3	1	0	3	1	0
C-616	CAPACITOR, FIXED: paper dielectric; 1 sect; 220,000 mmf +20% —10%; 200 vdcw; HS metal case; 1-13/32" max lg x 27/64" max diam, less leads; vitamin Q impr; 2 axial term leads 1-1/2" lg int gnd; mts by snap in body bkt having 1 mtg ear w/ 0.120" diam hole; spec JAN-C-25	Plate Coupler of Amplr V-601B and Mark Return Timing of V-602B		N16-C-46200-9900	1	B-454030-52	C-616	1		1	0	3	1	0	3	1	0
C-617	Same as C-120	Filter of Z-601																			

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)				AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK			EQUIP		STOCK		EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
C-618	Same as C-120	Filter of Z-601																			
C-701	CAPACITOR, FIXED: paper dielectric; single sect; 470,000 mmf +30% −20%; 200 vdcw; HS metal case; 1-5/16" lg x 9/16" diam, less leads; vitamin Q impr; 1 axial wire lead; int gnd; mts by single 0.120" diam hole in mtg bkt located near one end of body opposite lead; marked w/ cap, tol, rated working v, and mfr name	Cathode Filter of Amplr V-701A		N16-C-47148-1001	1	B-454030-7	C-701	1		1		0	2		1		0	2		1		0
C-702	CAPACITOR, FIXED: ceramic dielectric; 1500 mmf p/m 20%; hi-dielectric constant (does not fall within limits); 300 vdcw; 0.812" lg x 0.250" diam, less leads; axial wire leads; ins; marked w/ cap value and type # or RMA color coded	Grid Bypass of Amplr V-701B		N16-C-18785-8460	1	A-984005-62	C-702	1		1		0	2		1		0	2		1		0
C-703	CAPACITOR, FIXED: ceramic dielectric; 1000 mmf p/m 20%; hi-dielectric constant (does not fall within limits); 300 vdcw; 0.812" lg x 0.250" diam, less leads; axial wire leads; ins; marked w/ cap value and type # or RMA color coded	Plate Bypass of Amplr V-701B		N16-C-18657-8451	1	A-984005-58	C-703, C-901, C-902, C-903, C-915, C-917	1		1		0	7		2		0	7		2		0
C-801	CAPACITOR, FIXED: paper dielectric; 3 sect; 100,000 mmf +20% −10% ea sect; 1000 vdcw; HS metal can; case 1-3/4" lg x 2-1/2" h x 41/64" wd, less term; chlorinated oil impr; 3 solder tab term 3/4" h on bottom; ea sect has one side int gnd to case; mtg bkt has 2 mtg slots 0.156" wd on 2-1/8" mtg/c; spec JAN-C-25	−B Supply Filter	CP69B5FG 104V	N16-C-54460-6510		K-984662-337	C-801	1		0		0	2		0		0	2		0		0
C-801A	Part of C-801																				
C-801B	Part of C-801																				
C-801C	Part of C-801																				
C-802	CAPACITOR, FIXED: electrolytic dielectric; 2 sect; 35 mf ea sect; 300 vdcw; oper temp range from −55 deg C to +85 deg C; case 2-1/2" lg x 1-1/2" diam, less term; HS metal can; 4 prong type 7/16" lg term on bottom; has single neg term not gnd to case; octal socket mtg; spec JAN-C-62	+B Supply Filter	CE52F350N	N16-C-21941-1255		P-735714-69	C-802, C-1002	1		0		0	3		0		0	3		0		0

C-802A	Part of C-802																	
C-802B	Part of C-802																	
C-901	Same as C-703	Grid Coupler of Trigger V-905																
C-902	Same as C-703	Grid Coupler of Trigger V-905																
C-903	Same as C-703	Plate Bypass of Amplr V-903																
C-904	CAPACITOR, FIXED: mica dielectric; 130 mmf p/m 5%; 500 vdcw; temp coef ltr C; case 51/64" lg x 15/32" wd x 7/32" thk, less leads; molded bakelite case; 2 axial wire lead term; color coded; spec JAN-C-5	Output Filter of Differential Rects V-902 and V-909	CM20C131J	N16-C-28816-8201		P-722004-526	C-904	0	0	0	1	0	0	1	0	0	
C-905	CAPACITOR, FIXED: mica; 680 mmf p/m 5%; 500 vdcw; temp coef ltr B; case 1-1/16" max lg x 7/32" max h x 15/32" max wd less term; molded low loss bakelite case; 2 axial wire leads; color coded; spec JAN-C-5	Output Filter of Differential Rects V-902 and V-909	CM25B681J	N16-C-30531-4592		P-722009-543	C-905, C-906	0	0	0	2	0	0	2	0	0	
C-906	Same as C-905	Output Filter of Differential Rects V-902 and V-909																
C-907	CAPACITOR, FIXED: miniature, paper; single sect; 10,000 mmf p/m 10%; 400 vdcw; HS metal case; 7/8" lg x 19/64" diam; castor oil impr; 2 axial wire leads; no int gnd connections; marked w/ cap, tol, working v, and NT # when assigned	Cathode Coupler to Differential Rect V-902		N16-C-42733-5951		A-8890699-48	C-907, C-908, C-910, C-911	0	0	0	4	2	0	4	2	0	
C-908	Same as C-907	Cathode Coupler to Differential Rect V-909																
C-909	CAPACITOR, FIXED: ceramic dielectric; 680 mmf p/m 20%; hi-dielectric constant (does not fall within limits); 300 vdcw; 0.812" lg x 0.250" diam, less leads; axial wire leads; ins; marked w/ cap value and type # or RMA color coded	Output Filter of Differential Rects V-902 and V-909		N16-C-18401-8451	1	A-984005-54	C-909, C-916, C-918	0	0	0	3	1	0	3	1	0	
C-910	Same as C-907	Grid Coupler of Amplr V-908																
C-911	Same as C-907	Grid Coupler of Amplr V-901																
C-912	CAPACITOR, FIXED: paper dielectric; single sect; 1.0 mf +20% —10%; 200 vdcw; HS metal case; 1-13/16" lg x 43/64" diam, less leads; vitamin Q impr; 1 axial wire lead; int gnd; mts by single 0.120" diam hole in mtg bkt located near 1 end of body opposite lead; marked w/ cap, tol, rated working v, and mfr name	—B Supply Filter		N16-C-48841-9486	1	B-454030-48	C-912, C-913, C-914	0	0	0	3	1	0	3	1	0	
C-913	Same as C-912	—B Supply Filter																
C-914	Same as C-912	Screen Bypass of Amplr V-901																

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)				AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK			EQUIP		STOCK		EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
C-915	Same as C-703	AVC Filter																			
C-916	Same as C-909	Cathode Coupling to AVC Rect V-902																			
C-917	Same as C-703	AVC Filter																			
C-918	Same as C-909	Cathode Coupling to AVC Rect V-902																			
C-919	CAPACITOR, FIXED: paper dielectric; single sect; 1.0 mf +20% −10%; 200 vdcw; HS metal case; 1-7/8" lg x 43/64" diam less leads; vitamin Q impr; 1 axial wire lead; int gnd; mts by single 0.120" diam hole in mtg bkt located near 1 end of body; marked w/ cap, tol, rated working v, and mfr name	Grid Coupler of Gate V-907		N16-C-48841-9485	1	B-454030-49	C-919, C-920	0		0		0	2		1		0	2		1		0
C-920	Same as C-919	Grid Coupler of Gate V-906																			
C-1001	CAPACITOR, FIXED: paper dielectric; 3 sect; 250,000 mmf +20% −10%; 600 vdcw; HS metal can; case 1-3/4" lg x 2-1/2" h x 41/64" wd less term and mtg; characteristic E; 3 solder tab 3/4" h term on bottom; 1 side ea sect int gnd to case; mts by channel bkt having two 0.156" diam slots on 2-1/8" mtg/c; spec JAN-C-5	−B Supply Filter	CP69B5FF254V	N16-C-54535-8505		K-984662-333	C-1001	0		0		0	1		0		0	1		0		0
C-1001A	Part of C-1001																				
C-1001B	Part of C-1001																				
C-1001C	Part of C-1001																				
C-1002	Same as C-802	+B Supply Filter																			
C-1002A	Part of C-1002																				
C-1002B	Part of C-1002																				
C-1101	CAPACITOR, FIXED: paper dielectric; single sect; 470,000 mmf p/m 20%; 400 vdcw; HS metal case; 1-7/8" lg x 0.670" diam; vitamin Q impr; 2 axial wire lead term 1-5/8" lg; int gnd; marked w/ cap, tol, working v, and mfr name; oper temp range −55°C to +85°C	Phase Capacitor of Motor B-1101		N16-C-47147-9001	590 Type 91P	P-737816-276	C-1101, C-1301	1		1		0	3		1		0	3		1		0

C-1102	CAPACITOR, FIXED: paper dielectric; single sect; 47,000 mmf p/m 20%; 400 vdcw; HS metal can; case 7/8″ max lg x 13/32″ max diam less leads; vitamin Q impr and filled; 2 axial wire leads; ungrounded case; marked w/ cap, working v, impr. vendor name; oper temp range −55°C to +85°C F characteristic; 800 v DC test	RF Bypass for Remote Scope		N16-C-44111-2680	590 Type 91P	P-737816-271	C-1102	1		1		0	2		1		0	2		1		0
C-1103	CAPACITOR, FIXED: mica dielectric; 100 mmf p/m 10%; 500 vdcw; characteristic B; case 51/64″ max lg x 15/32″ max h x 7/32″ max thk; molded bakelite case; 2 axial wire lead term; color coded; spec JAN-C-5	RF Bypass for Teletype Output	CM20B101K	N16-C-2855-1676		P-722001-573	C-1103	1		0		0	2		0		0	2		0		0
C-1301	Same as C-1101	Phase Capacitor of Motor B-1301																			
E-101	BOARD, TERMINAL: general purpose term board strip; 32 brass, solder dipped term; no 2 term closer than 0.218″ c to c; 2 rows 3/4″ apart; 1/16″ thk lam phenolic sheet; 4-3/8″ lg x 1-7/32″ wd x 35/64″ d o/a; four 0.147″ diam mtg holes on 5/8″ x 4-1/16″ mtg/c; wax impr; stencil both sides w/ 3/32″ h characters; 1 side w/ R-110, C-109, R-109, R-102, C-103, R-105, R-103, R-104, C-107, R-107, R-101, R-108, C-114, R-106; other side w/ R-111, C-106, C-112; 1 mtg bkt riveted to 1 side of board w/ a 0.147″ diam mtg hole	Supports Resistors and Capacitors		N17-B-78232-1844	1	A-8896277-502	E-101	1		0		0	2		0		0	0		0		0
E-102	INSULATOR, FEEDTHRU: solder-on term type; tinned copper term, HS in glass w/ tinned copper bushing; for #14 AWG max; 0.484″ lg x 0.200″ diam o/a; ea end of term w/ hole, 0.050″ diam; solder to wire; solder mtg, HS type thru term; spec JAN-I-9	Feedthru for C-108		N17-I-59387-9459	1	K-8893219-4	E-102, E-202	1		0		0	2		0		0	2		0		0
E-201	BOARD, TERMINAL: general purpose term board strip; 32 single end, brass solder dipped term, no 2 term closer than 0.218″ c to c; 1/16″ thk lam phenolic sheet; type LTS-E-3 in JAN-P-13; 4-3/8″ lg x 1-7/32″ wd x 13/32″ d o/a; four 0.147″ diam mtg holes on 4-1/16″ x 5/8″ mtg/c; one 0.147″ diam hole on ctr mtg bkt; wax impr; one side marked R-210, R-201, C-203, R-209, C-207, R-204, R-203, R-205, R-207, R-208, R-212, R-206, other side marked C-209, R-211, C-206, C-214, C-212	Supports Resistors and Capacitors		N17-B-78232-1849	1	A-8896277-501	E-201	0		0		0	0		0		0	2		0		0
E-202	Same as E-102	Feedthru for C-208																			

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS													
									CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)						AN/URA-7 IF INPUT 50 KC (DUAL)					
									EQUIP		STOCK				EQUIP		STOCK				EQUIP		STOCK			
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
E-301	BOARD, TERMINAL: general purpose term board strip; 28 brass, single end solder lug term in 2 rows of 14 ea; no 2 term closer than 0.250″ c to c; 5/8″ ctrs between rows, starting 15/32″ from one end; 1/16″ thk lam phenolic sheet; type LTS-E-3 in JAN-P-13; 4-3/8″ lg x 1-1/16″ wd x 10/32″ thk o/a; four 0.147″ diam mtg holes on 4-1/16″ x 5/8″ mtg/c; wax impr, 1 side marked R-301, R-302, R-316, R-306, R-303, C-308, R-305; spec JAN-P-13	Supports Resistors and Capacitors		N17-B-78207-1610	1	A-8896263-501	E-301	1		0		0	2		0		0	2		0		0
E-302	BOARD, TERMINAL: general purpose term board strip; 26 brass single end solder lug term in 2 rows of 13 ea; no 2 term closer than 0.250″ c to c; 5/8″ ctrs between rows, starts 15/32″ from one end; 1/16″ thk lam phenolic sheet; 4-3/8″ lg x 1-1/16″ wd x 10/32″ thk o/a; type LTS-E-3 in JAN-P-13; four 0.147″ diam mtg holes on 4-1/16″ x 5/8″ mtg/c; wax impr marked R-308, C-312, R-309, R-307, R-310, R-319, R-311, R-313, R-312, R-314; spec JAN-P-13	Supports Resistors and Capacitors		N17-B-78197-2101	1	A-8841023-501	E-302	1		0		0	2		0		0	2		0		0
E-303	TERMINAL, STUD: standoff; c/o one #4-40 mtg stud, 1 melamine insulator and 1 solder lug stud term; brass, hot solder dipped; cylindrical post shape; 1-5/32″ lg x 9/32″ diam o/a; mts by #4-40 x 7/32″ lg stud; stud w/ one 1/16″ diam x 1/8″ lg wire sect one 5/64″ diam x 5/32″ lg wire sect	Supports C-313 and Interconnecting Wire		N17-T-28240-3646	846 Type 764	A-8890637-3	E-303	1		0		0	2		0		0	2		0		0
E-501	BOARD, TERMINAL: general purpose; 7 solder lug term; no 2 term closer than 3/8″; lam phenolic board; 2-7/16″ lg x 1-7/8″ wd x 3/8″ h o/a; three 0.136″ diam mtg holes, 2 holes in a row one end, spaced 1.375″ c to c, other hole approx in ctr and 11/16″ from other end; one side has 3/8″ wd x 7/16″ d slot, marked C-502, R-502, C-503	Supports Resistors and Capacitors		N17-B-77787-2295	1	K-890719-501	E-501	1		0		0	2		0		0	0		0		0

E-502	INSULATOR, STANDOFF: round post shape; white, grade L-4 ceramic, glazed; 0.625″ lg; 3/8″ diam, one #6-32 x 3/16″ d tapped mtg hole in ctr of ea end; marked w/ JAN type #; spec JAN-I-8, JAN-I-10	Supports Interconnecting Wires	NS4W0105	N17-I-69156-6251		M-426765-5	E-502	1	0	0	2	0	0	0	0	0	0	
E-601	BOARD, TERMINAL: general purpose term board strip; 8 brass, solder dipped term; no two term closer than 0.312″ c to c; 1/16″ thk lam phenolic sheet; 1-3/16″ lg x 1-1/16″ wd x 5/16″ d o/a; 2 ctr mtg holes, 0.147″ diam on 5/8″ mtg/c; wax impr; marked R-605, R-610, R-607; same as 8896262-502 except for symbols	Supports Resistors		N17-B-77833-9721	1	A-8896262-501	E-601	1	0	0	3	0	0	3	0	0		
E-602	BOARD, TERMINAL: general purpose term board strip; 8 brass, solder dipped term; no two term closer than 0.312″ c to c; 1/16″ thk lam phenolic sheet; 1-3/16″ lg x 1-1/16″ wd x 5/16″ d o/a; 2 ctr mtg holes, 0.147″ diam on 5/8″ mtg/c; wax impr; marked R-601, R-637, R-631, same as 8896262-501 except for symbols	Supports Resistors		N17-B-77833-9722	1	A-8896262-502	E-602	1	0	0	3	0	0	3	0	0		
E-603	BOARD, TERMINAL: general purpose term board strip; 36 brass, single end solder lug term in 2 rows of 18 ea; no two term closer than 0.218″ c to c; 3/4″ ctrs between rows; 1/16″ thk lam phenolic sheet; type LTS-E-3 in JAN-P-13; 4-7/32″ lg x 1-1/16″ wd x 10/32″ d o/a; three 0.147″ diam mtg holes in ctr of board on 1-1/4″ mtg/c; wax impr marked R-623, R-606, R-638, R-622, R-621, R-608, R-624, R-627, R-626, R-636, R-625, C-604, R-634, R-642, R-632	Supports Resistors and Capacitors		N17-B-78252-2101	1	A-8896264-501	E-603	1	0	0	3	0	0	3	0	0		
E-604	BOARD, TERMINAL: general purpose; 24 solder lug term; term spaced 0.234″ c to c in 2 rows of 12 ea, 3/4″ between rows; lam phenolic board 1/16″ thk; 3-1/2″ lg x 1-1/16″ wd x 13/64″ h o/a; 4 mtg holes 0.147″ diam on 3.187″ x 5/8″ mtg/c; term hot solder dipped; board marked R-603, R-641, R-609, R-611, R-616, R-612, R-615, R-618, R-619, R-620, R-617, C-605	Supports Resistors and Capacitors		N17-B-78177-7712	1	A-8845468-501	E-604	1	0	0	3	0	0	3	0	0		
E-605	BOARD, TERMINAL: general purpose; 24 solder lug term; term spaced 0.234″ c to c in 2 rows of 12 ea, 3/4″ between rows; lam phenolic board 1/16″ thk; 3-1/2″ lg x 1-1/16″ wd x 13/64″ h o/a; 4 mtg holes 0.147″ diam on 3.187″ x 5/8″ mtg/c; term hot solder dipped; board marked R-635, R-630, R-643, R-628, R-614, R-604, R-602, R-640, R-639	Supports Resistors		N17-B-78177-7714	1	A-8845468-502	E-605	1	0	0	3	0	0	3	0	0		

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS													
									CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)						AN/URA-7 IF INPUT 50 KC (DUAL)					
									EQUIP		STOCK				EQUIP		STOCK				EQUIP		STOCK			
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
E-606	BOARD, TERMINAL: general purpose term bd; 16 solder lug term in 2 rows of 8 ea; all term spaced 0.218" c to c, rows spaced 7/16" apart; lam phenolic bd 1/16" thk; 2-19/32" lg x 3/4" wd x 25/32" h o/a; ea end has integral mtg bkt, one bkt has a #4-40 thd tap mtg nut, other bkt has a 0.120" diam mtg hole, nut and hole spaced 2-1/4"; marked C-614, C-613, C-612, C-611, C-610, C-609, C-608, C-607	Supports Capacitors			1	A-8846040-501	E-606	1		0		0	3		0		0	3		0		0
E-607 and E-608	Not Used																					
E-609	TERMINAL, STUD: (style #58); ins standoff post type; melamine (arc and flame resistant, thermosetting plastic) ins, body, metal post type solder lug term; one part undercut for #7 AWG wire, another part undercut for #11 AWG wire; 15/16" lg x 1/4" across flats o/a; ins body 19/32" lg; solder connects to wire; other end of body w/ #4-40 thd 7/32" lg metal insert for mtg	Terminal for C-601		N17-T-28255-3576	846 Type 760	A-8890637-5	E-609, E-610, E-703	3		0		0	8		0		0	8		0		0
E-610	Same as E-609	Terminal for C-616																				
E-701	BOARD, TERMINAL: general purpose term board strip; 34 brass, solder dipped term; no 2 term closer than 1/4" c to c; 1/16" thk lam phenolic sheet; 5-3/8" lg x 1-1/16" wd x 5/16" d o/a; six 0.147" diam mtg holes; 1st pair of holes 5/32" from edge of board on 5/8" mtg/c; 2nd pair 2-13/32" from the 1st pair, 3rd pair 2-21/32" from the 2nd pair; wax impr; stenciled on one side w/ the following: R-703, C-702, C-703, R-706, R-707, R-708, R-709, R-710, R-711, R-712, R-716, R-714; other side marked R-703, R-714	Supports Resistors and Capacitors		N17-B-78242-2201	1	M-455694-501	E-701	1		0		0	2		0		0	2		0		0
E-702	Not Used																					
E-703	Same as E-609	Terminal for C-701																				

E-801	BOARD, TERMINAL: general purpose term board strip; 16 brass, solder lug term; no 2 term closer than 0.218″ c to c; 8 per row two rows 3/4″ apart; 1/16″ thk lam phenolic sheet; 2-9/16″ lg x 1-1/4″ h x 1-1/16″ wd o/a; 2 bkt ea w/ 2 mtg holes, one bkt having 0.147″ diam holes on 5/16″ mtg/c, other bkt having 0.136″ diam holes on 5/16″ mtg/c; wax impr; mtg bkt riveted to board, 1 ea end; marked R-805, R-803, R-802, R-801, R-807, R-804, R-806	Supports Resistors		N17-B-78083-1306	1	A-8898286-502	E-801	1	0	0	2	0	0	2	0	0
E-901	BOARD, TERMINAL: general purpose term board strip; 46 brass, solder dipped term; no 2 term closer than 1/4″ c to c; 1/16″ thk lam phenolic sheet; 5-7/8″ lg x 1-1/16″ wd x 5/16″ d o/a; three 0.147″ diam mtg holes on 1-7/8″ mtg/c; wax impr; stenciled on 1 side w/ the following: C-901, C-902, R-909, R-906, C-903, R-907, R-947, R-902, R-935, R-933, R-934, R-928, R-904, C-908, C-910, R-941	Supports Resistors and Capacitors		N17-B-78302-5216	1	P-741611-505	E-901	0	0	0	1	0	0	1	0	0
E-902	BOARD, TERMINAL: general purpose term board strip; 30 brass, solder dipped term; no 2 term closer than 1/4″ c to c; 1/16″ thk lam phenolic sheet; 5-7/8″ lg x 1-1/16″ wd x 5/16″ d o/a; ten 0.147″ diam mtg holes; 1st pair of holes 3/16″ from edge of board on 5/8″ mtg/c; 2nd pair 3-1/2″ from the 1st pair, 3rd pair 2-3/8″ from the 2nd pair; 1st ctr mtg hole 1-1/16″ from edge of board, 2nd hole 1″ from the 1st, 3rd hole 1-1/2″ from the 2nd, 4th hole 1″ from the 3rd; all c to c measurements; wax impr; stenciled on one side w/ the following: R-914, R-912, R-908, R-910, R-911, R-940, C-909, R-932, R-930, R-929, R-931, R-948, C-918, R-949, C-916	Supports Resistors and Capacitors		N17-B-78222-5216	1	P-741611-504	E-902	0	0	0	1	0	0	1	0	0
E-903	BOARD, TERMINAL: general purpose term board strip; 40 brass, solder dipped term; no 2 term closer than 1/4″ c to c; 1/16″ thk lam phenolic sheet; 5-7/8″ lg x 1-1/16″ wd x 5/16″ d o/a; ten 0.147″ diam mtg holes; 1st pair of holes 3/16″ from edge of board on 5/8″ mtg/c; 2nd pair 3-1/2″ from the 1st pair, 3rd pair 2-3/8″ from the 2nd pair; 1st ctr mtg hole 1-1/16″ from edge of board, 2nd hole 1″ from the 1st, 3rd hole 1-1/2″ from the 2nd, 4th hole 1″ from the 3rd; all c to c measurements; wax impr; stenciled on one side w/ the following: R-922, R-944, R-943, R-924, R-915, R-917, R-918, R-925, R-913, R-916, R-901, R-942, R-936, R-937, R-939, R-920, R-919, R-938	Supports Resistors		N17-B-78272-5249	1	P-741611-502	E-903	0	0	0	1	0	0	1	0	0

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS													
									CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)						AN/URA-7 IF INPUT 50 KC (DUAL)					
									EQUIP		STOCK				EQUIP		STOCK				EQUIP		STOCK			
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	
E-904	BOARD, TERMINAL: general purpose term board strip; 12 brass, solder dipped term; no 2 term closer than 1/4" c to c; 1/16" thk lam phenolic sheet; 1-9/16" lg x 1-1/16" wd x 5/16" d o/a; two 0.147" diam mtg holes on 1" mtg/c; wax impr; stenciled on one side w/ following: R-946, R-921, R-926, R-945; spec JAN-P-13	Supports Resistors		N17-B-77982-9571	1	P-741611-507	E-904	0		0		0	1		0		0	1		0		0	
E-905	BOARD, TERMINAL: general purpose term board strip; 12 brass, solder dipped term; no 2 term closer than 1/4" c to c; 1/16" thk lam phenolic sheet; 1-9/16" lg x 1-1/16" wd x 5/16" d o/a; two 0.147" diam mtg holes on 1" mtg/c; wax impr; marked R-903, R-927	Supports Resistors and Capacitors		N17-B-77834-9121	1	P-741611-508	E-905	0		0		0	1		0		0	1		0		0	
E-906	BOARD, TERMINAL: general purpose term board strip; 6 brass, nickel plated term w/ dual ends; one end solder lug; other end w/ #0-80 tap x 1/8" d hole for screw; no 2 term closer than 9/32" c to c; 1/16" thk lam phenolic sheet; 1-1/2" lg x 1-1/16" wd x 3/8" d o/a; three 0.147" diam mtg holes; 2 holes one end on 5/8" mtg/c; single hole other end in ctr and 3/16" from edge; wax impr; marked AF-IF, IF-AF	Supports Links O-901 and O-902		N17-B-77734-7950	1	P-741611-506	E-906	0		0		0	1		0		0	1		0		0	
E-907	INSULATOR, FEEDTHRU: solder on term type; tinned copper term, HS in glass w/ tinned copper bushing; for #14 AWG wire; 13/16" max lg x 19/64" diam o/a; ea end of term w/ groove 3/32" wd x 0.015" max d and 1/16" from ends of term; solder connects to wire; glass ins, 3/16" h, sealed in fl 19/64" diam x 0.020" thk w/ shank 0.185" diam; solder mtg; HS type thru term; spec JAN-I-9	Supports C-919		N17-I-59417-6691	1581 Cat #W-113	K-8893219-2	E-907, E-908, E-1103, E-1104, E-1303, E-1304	2		0		0	8		0		0	8		0		0	
E-908	Same as E-907	Supports C-920																				

E-1001	BOARD, TERMINAL: general purpose term board strip; 16 brass, solder dipped term; no 2 term closer than 0.218″ c to c; 1/16″ thk lam phenolic sheet; 2-3/16″ lg x 1-1/4″ wd x 1-1/16″ d, o/a; 3 mtg holes on bkt; 1 bkt w/ 0.173″ diam mtg hole; other bkt w/ two 0.147″ diam mtg holes on 0.312″ mtg/c; wax impr; mtg bkt riveted to board, 1 ea end; stencil one side w/ 3/32″ h characters, R-1006, R-1004, R-1007, R-1008, R-1001, R-1002, R-1003, R-1005	Supports Resistors		N17-B-78082-6767	1	A-8898286-501	E-1001	0		0	0	1	0	0	1	0	0	
E-1101	FUSE HOLDER: extractor post type; single 3AG cartridge fuse 1/4″ diam x 1-1/4″ lg; black bakelite body w/ pl brass or copper cont; 250 v, 15 amp; 11/16″ diam across flats x 2-9/64″ lg o/a; mts by 1/2″-24 thd x 1/2″ lg for panel hole mtg, incl nickel pl nut and lock washer; 2 tinned solder lug term; finger tip fuse removal w/ quick lock shown by arrow on fuse cover; moisture and fp; requires mtg holes 0.505″ diam flatted on one side to 0.473″ diam; similar to Bussmann type HKP, except phenolic in accordance with JAN-P-14 type X latest spec; moisture and fp in accordance with JAN-T-152 spec	Supports F-1101		N17-F-74266-9227	768 Type HKP Modified	K-897868-3	E-1101, E-1102, E-1301, E-1302	2		0	0	6	0	0	6	0	0	
E-1102	Same as E-1101	Supports F-1102																			
E-1103	Same as E-907	Supports C-1101																			
E-1104	Same as E-907	Supports C-1101																			
E-1105	BOARD, TERMINAL: general purpose; 4 solder lug term; 2 rows of 2 term, rows 1/4″ apart, 1st term of row is 1-1/16″ from left end, 2nd term is 1-7/8″ from left end; lam phenolic board 1/16″ thk; 2-3/8″ lg x 1/2″ wd x 13/64″ h o/a; 2 mtg holes 0.173″ diam on 2-1/16″ mtg/c; has one 0.261″ diam hole 11/16″ in from one end; marked L-1101, R-1101, C-1103	Supports R-1101, C-1105 and L-1101		N17-B-77636-9541	1	A-8845211-501	E-1105	1		0	0	2	0	0	2	0	0	
E-1106	BOARD, TERMINAL: general purpose; 2 solder lug term; term spaced 11/16″ apart; lam phenolic board 1/16″ thk; 2-3/8″ lg x 1/2″ wd x 13/64″ h o/a; 2 mtg holes 0.172″ diam on 2-1/16″ mtg/c; has one 0.261″ diam hole 11/16″ in from one end; marked L-1102, C-1102	Supports C-1102 and L-1102		N17-B-77536-9380	1	A-8845211-502	E-1106	1		0	0	2	0	0	2	0	0	
E-1301	Same as E-1101	Supports F-1301																			
E-1302	Same as E-1101	Supports F-1302																			
E-1303	Same as E-907	Supports C-1301																			
E-1304	Same as E-907	Supports C-1301																			

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)						AN/URA-7 IF INPUT 50 KC (DUAL)					
									EQUIP		STOCK				EQUIP		STOCK				EQUIP		STOCK			
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
E-1401	TERMINAL, LUG: ins standoff post type; melamine ins body w/ metal post type solder lug term; one undercut for #7 AWG wire, other undercut for #11 AWG wire; 15/16″ lg x 1/4″ across flats; solder connects to wire; other end of body w/ #4-40 thd x 7/32″ lg screw for mtg	Supports R-1402		N17-T-28255-8501	846 Type #765	A-8890637-4	E-1401, E-1402	2		0		0	4		0		0	4		0		0
E-1402	Same as E-1401	Supports R-1402																			
F-1101	FUSE, CARTRIDGE: 3 amp; blowing time for 110% load, none; for 135% load, 1 hr; 250 v; one-time; glass body; ferrule term; 1-1/4″ lg x 1/4″ diam o/a; mts by ferrule term; 1/4″ diam ferrule term; type 3AG	AC Line	(-28032-3)	N17-F-16302-120	784 Type 312003	K-55544-4	F-1101, F-1102, F-1301, F-1302	2		0		0	6		0		0	6		0		0
F-1102	Same as F-1101	AC Line																			
F-1301	Same as F-1101	AC Line																			
F-1302	Same as F-1101	AC Line																			
H-1101	WRENCH: Allen set screw type; 0.050″ across flats; 1-29/32″ lg x 23/32″ wd o/a approx; steel w/ protective finish; 90 deg offset; "L" shape; for Allen set screw #4	For Allen Set Screw #4			731 Short Series	K-828505-14	H-1101, H-1301	1		0		0	3		0		0	3		0		0
H-1102	WRENCH: Allen set screw type; 1/16″ across flats; 1-29/32″ lg x 23/32″ wd o/a; steel w/ protective finish; 90 deg offset; "L" shape; for Allen set screw #6	For Allen Set Screw #6			731 Short Series	K-828505-13	H-1102, H-1302	1		0		0	3		0		0	3		0		0
H-1301	Same as H-1101	For Allen Set Screw #4																			
H-1302	Same as H-1102	For Allen Set Screw #6																			
H-1401	SCREW, MACHINE: RH; SS w/ passivating dip; 1/4″-20 thd; 5/8″ lg; 3/8″ lg thd; 1/8″ thk x 5/8″ diam head; 0.140″ lg x 5/16″ diam shoulder; head finished w/ steel-blast and gray tinted synthetic; thd flat on one side.	Fastens Handle to Front Panel		N43-S-99500-10	1	A-8897331-1	H-1401, H-1601	2		2		2	6		2		6	6		2		6
H-1402	SCALE: clear plastics; round shape; 2-7/64″ diam x 0.125″ thk o/a	Protects Scope Tube		N16-S-117101-278	1	A-8892351-1	H-1402	1		0		1	2		0		1	2		0		1

H-1601	Same as H-1401	Fastens Handle to Front Panel																			
I-1401	LAMP, GLOW: 65 v AC, 90 v DC starting voltage; bulb T-3-1/4 clear, 13/32" diam; 1-3/16" lg o/a; miniature bayonet base; burn any position; 120 v requires series resistor of 200,000 ohms for current of 300 ua	Power On		L7-L-6806-130	1377 Cat #NE-51	K-872291-9	I-1401, I-1601	1		0		0	3		0		0	3		0		0
I-1601	Same as I-1401	Power On																			
J-501	CONNECTOR, RECEPTACLE: 1 round female high conductivity copper alloy cont; straight type; body 27/32" lg x 11/16" OD fl 1" sq; nominal impedance 50 ohms, non-constant type; cylindrical die cast zinc body w/ sq mtg fl silver pl; low-loss mica-filled dielectric; accommodates solid dielectric coax cable of 0.41" OD, 0.29" dielectric insert; 4 mtg holes 1/8" diam on 23/32" x 23/32" mtg/c, has 5/8"-24 thd male coupling thd 35/64" lg on 1 end only	400-470 KC Output of Cathode Coupler V-501	(-49194)	N17-C-73108-5890	30 Type 83-1R	P-255223-1	J-501, J-1102, J-1111	3		0		0	6		0		0	4		0		0
J-1101	CONNECTOR, PLUG: 20 female cont, pol; straight type; 2-11/16" lg x 17/32" wd x 13/16" d o/a; cont #8 to #12 ten amp min, cont #1 to #7 one amp min; rectangular; two 0.156" diam holes x 2-3/8" mtg/c; 50 hr salt spray test; marked #738961-1	Filter and Frame Interconnections		N17-C-73323-7100	1	P-738961-1	J-1101, J-1301	1		1		2	3		1		5	3		1		9
J-1102	Same as J-501	Remote Circuit Output																			
J-1103	Not Used																				
J-1104	CONNECTOR, RECEPTACLE: 3 round female cont; straight type; 1-1/16" lg w/ mtg fl 1-3/16" x 1-3/16" sq, o/a; 20 amp, 70 v DC or 50 v AC (RMS); cylindrical body, die cast aluminum, w/ sq mtg fl; molded black bakelite insert; 3 solder lugs in rear for #16 AWG wire; 4 mtg holes 0.120" diam on 29/32" x 29/32" mtg/c; 7/8"-20 male thd for coupling nut; Navy spec #AN-WC-591	Ext Tone Input	AN-3102-14S-7S	N17-C-72240-1516	30 AN-3102-14S-7S	M-253475-33	J-1104, J-1105, J-1302, J-1303, J-1306, J-1307	2		0		0	8		0		0	8		0		0
J-1105	Same as J-1104	Tone Output																			
J-1106	CONNECTOR, RECEPTACLE: 2 round male cont; straight type; 1-1/16" lg w/ mtg fl 1-3/16" x 1-3/16" sq o/a; 20 amp, 70 v DC, or 50 v AC (RMS); cylindrical body, die cast aluminum, w/ sq mtg fl; molded black bakelite insert; 2 solder lugs in rear for #16 AWG wire; 4 mtg holes 0.120" diam on 29/32" x 29/32" mtg/c; 7/8"-20 male thd for coupling nut; Navy spec #AN-WC-591	Teletype Printer Output	AN-3102-14S-9P	N17-C-72596-2880	30 AN-3102-14S-9P	M-253475-23	J-1106, J-1304	1		0		0	3		0		0	3		0		0

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)				
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
J-1107	CONNECTOR, RECEPTACLE: 2 rectangular female cont; straight type; 3/4" lg x 1-5/8" sq fl o/a; 15 amp 115 v; 10 amp 250 v; cylindrical aluminum body w/ sq mtg fl; phenolic insert; 4 mtg holes 0.120" diam on 1-1/4" x 1-1/4" mtg/c; has 1-3/8"-18-NEF-2 thd male coupling on one end; for outdoor use, thd to accept weather proof cover	AC Outlet	(-49435)	N17-C-73139-7587	30 97-4085	A-8890697-1	J-1107	1		0		0	2		0		0	2		0		0
J-1108	CONNECTOR, RECEPTACLE: 3 round male cont; straight type; 1-1/16" lg w/ mtg fl 1-3/16" x 1-3/16" sq o/a; 20 amp, 70 v DC, or 50 v AC (RMS); cylindrical body, die cast aluminum, w/ sq mtg fl; molded black bakelite insert; 3 solder lugs in rear for #16 AWG wire; 4 mtg holes 0.120" diam on 29/32" x 29/32" mtg/c; 7/8"-20 male thd for coupling nut; Navy spec #AN-WC-591	AC Power Input	AN-3102-14S-7P	N17-C-72604-1516	30 AN-3102-14S-7P	M-253475-25	J-1108, J-1305	1		0		0	3		0		0	3		0		0
J-1109	CONNECTOR, RECEPTACLE: 1 round female cont; straight type; 1-1/32" lg x 0.375" OD, w/ mtg fl 11/16" sq o/a; nominal RF impedance 50 ohms; cylindrical, brass, silver pl body, w/ sq mtg fl; thermosetting polymer insert; accommodates solid dielectric coax cable, 0.206" OD w/ #20 inner cond; 4 mtg holes, #3-56 tap x 0.090" d on 1/2" x 1/2" mtg/c; electrolytic protective coating on all silver surfaces; contains 2 locking studs for male connector; Navy dwg RE-49F331	40 KC Diversity Control Output	UG-290/U	N17-C-73108-1267	30 AN-UG-290/U	M-445813-1	J-1109, J-1110, J-1308, J-1309, J-1310, J-1311	2		0		0	8		0		0	8		0		0
J-1110	Same as J-1109	Diversity Signal Output																				
J-1111	Same as J-501	IF Input																				
J-1301	Same as J-1101	Filter and Frame Interconnections																				
J-1302	Same as J-1104	Ext Tone Input																				
J-1303	Same as J-1104	Tone Diversity Output																				
J-1304	Same as J-1106	Teletype Printer Diversity Output																				
J-1305	Same as J-1108	AC Power Input																				

J-1306	Same as J-1104	AC Power Output																	
J-1307	Same as J-1104	AC Power Output																	
J-1308	Same as J-1109	40 KC Diversity Control Input																	
J-1309	Same as J-1109	40 KC Diversity Control Input																	
J-1310	Same as J-1109	Diversity Signal Input																	
J-1311	Same as J-1109	Diversity Signal Input																	
J-1401	JACK, TELEPHONE: for 2-cond 0.25" diam plug; 1-1/4" lg x 1-1/4" wd x 1" h o/a; J4 contact arrangement; includes brass nickel pl lock nut, and one steel nickel pl washer; 3/8" mtg hole; 3/8"-32 NEF thd for mtg lock nut; small; adaptable to compact equip (Part of W-1401)	Teletype Printer			1685 Type 1J-102	K-7862660-6	J-1401, J-1402, J-1601, J-1602	2		0	0	6	0	0	6	0	0		
J-1402	Same as J-1401	Headset																	
J-1403	CONNECTOR, RECEPTACLE: 14 female cont, pol; straight type; 2" lg x 3/4" wd x 21/32" d o/a; 1000 v min flashover between any cont, cont #1 to #7 ten amp min, cont #8 to #14 one amp min; rectangular; molded melamine insert; 2 holes 0.156" diam, 1.687" mtg/c; recessed connecting lugs; metal parts 50 hr salt spray corrosion test, marked #738962-2 (Part of W-1401)	Power Circuit		N17-C-73301-6068	1618 Cat #1637	P-738962-2	J-1403, J-1404, J-1405, J-1406, J-1407, J-1603, J-1604, J-1605	5		2	9	13	3	16	13	3	26		
J-1404	Same as J-1403	Power Circuit																	
J-1405	Same as J-1403	Power Circuit																	
J-1406	Same as J-1403	Power Circuit																	
J-1407	Same as J-1403	Power Circuit																	
J-1601	Same as J-1401 (Part of W-1601)	Teletype Printer																	
J-1602	Same as J-1401 (Part of W-1601)	Headset																	
J-1603	Same as J-1403 (Part of W-1601)	Power Circuit																	
J-1604	Same as J-1403 (Part of W-1601)	Power Circuit																	
J-1605	Same as J-1403 (Part of W-1601)	Power Circuit																	
L-501	COIL, RF: p/o low pass filter assem; single layer space wnd; unshielded; inductance at 1000 cyc, 22 uh p/m 10%, DC resistance approx 0.55 ohm; 55 p/m 1 turn #30 E wire; 1-3/16" lg x 1/2" OD o/a; phenolic form, air core; 1-3/16" lg x 1/2" OD; mtd w/ brass slug, both ends; 2 leads 1-1/2" lg; wax impr, coil part of low pass filter unit AB2523	Output Filter of V-501		N16-C-73329-3531	1	K-890737-501	L-501, L-502	2		0	0	4	0	0	0	0	0		
L-502	Same as L-501	Output Filter of V-501																	

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS													
									CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)						AN/URA-7 IF INPUT 50 KC (DUAL)					
									TOTAL NO. PER EQUIP.	EQUIP		STOCK			TOTAL NO. PER EQUIP.	EQUIP		STOCK			TOTAL NO. PER EQUIP.	EQUIP		STOCK		
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED			BOX	QUAN.	BOX	QUAN.			BOX	QUAN.	BOX	QUAN.			BOX	QUAN.	BOX	QUAN.
L-601	REACTOR, AUDIO: audio reactor for tone osc; single sect w/ tap; approx 1.5 hy, 25 microamps; 2200 ohms, term 1-2; 2100 ohms, term 1-3; 120 ohms, term 2-3 all DC resistances; 500 vdct; HS enclosed metal case; 1-9/16" h x 1-1/32" wd x 1-1/16" lg, less lugs; two #4-40 x 1/4" lg stud bolts; 1-5/16" c to c; three 3/8" lg stud solder lug term on standoff ins; 2 term 7/16" c to c, other term 25/64" from c of other 2; w/ a 405 mmf capacitor connected across terms 1-3, reactor will tune to approx 1785 cps; w/ a 4700 mmf capacitor connected across terms 1-3, reactor will tune to approx 595 cps; term 1-2, entire wnd, term 3, tap	Tunes Tone Osc (V-605B) With C-607 to C-614 Incl		N16-R-29650-2901	1	B-453141-1	L-601	1		0		1	3		0		4	3		0		6
L-801	REACTOR, FILTER: filter choke; single sect; inductance 4.5 hy, measured at 30 v, 60 cps, current 0.070 amp DC; 150 ohms DC resistance, p/m 10% at 25°C; 1000 v test; HS metal case; 2-5/16" h, less lugs, x 1-1/2" wd x 1-21/32" lg; two #6-32 x 5/16" lg stud bolts on 1-1/4" mtg/c; two 3/8" lg stud, solder lug term on standoff ins, 1/2" c to c on bottom of case; additional mtg bkt on side of case, 2 mtg holes 0.173" diam, 5/8" mtg/c; max ambient temp of operation 85°C; shock resistant; RSW and humidity; BuShips 16T30	+B Filter Choke		N16-R-29070-5501	1	B-453147-1	L-801, L-1001	1		1		1	3		1		3	3		1		8
L-1001	Same as L-801	+B Filter Choke																				
L-1101	COIL, RF: series resonant at 200 kc; single pie universal wnd; shielded; inductance 6.7 mh; 1060 turns #38 AWG wire; 1/2" lg x 0.560" diam less term and mtg bushing; 1" lg o/a; powdered iron core and form; 1 end w/ axial mtg bushing having 1/4"-32 thd x 13/64" lg; 2 solder lug term on other end; used in circuit as series resonant choke at 200 kc	RF Filter for Remote Scope			1	M-456846-501	L-1101	1		0		1	2		0		3	2		0		3

L-1102	COIL, RF: series single pie universal wnd; shielded; inductance 143 uh; 150 turns #34 AWG wire; 1/2" lg x 0.560" diam less term and mtg bushing; 1" lg o/a; powdered iron core and form; 1 end w/ axial mtg bushing having 1/4"-32 thd x 13/64" lg; 2 solder lug term on other end; used to block all freq beginning at 90 kc	RF Filter for Teletype Output			1	M-456846-502	L-1102	1	0	1	2	0	3	2	0	3
M-1601	METER, AMMETER: dc type (special); range 0-200 ua; round, phenolic flush mtg case; 2.695" diam fl x 2.21" diam body x 1.60" d behind fl less term, fl 0.38" d; accuracy p/m 2%; D'Arsonval movement; 250 p/m 2 mv drop max; calibrated for non-magnetic panel; 60 scale divisions; black markings and pointer on white background; self-contained; 3 mtg holes 0.125" diam on 1.22" rad spaced 120 deg apart on fl; 2 stud term 1/4"-28 thd x 0.75" lg spaced 1" c to c; has adj resistance range; spec JAN-I-6	Tuning and Diversity Indicator	MR25W107-SPEC	N17-M-19081-9600		B-456883-51	M-1601	0	0	0	1	0	0	1	0	0
O-901	ARM (NON-INK RECORDING): brass body dull white nickel finish; rectangular; 25/32" lg x 3/16" wd x 0.032" h o/a; 1 end contains encl ctr slot 1/4" lg x 1/8" rads; slot 1/16" from edge of body; other end w/ open slot 1/8" lg x 0.063" wd	Freq Operation Adj		N16-A-700001-181	1	A-8898385-2	O-901, O-902	0	0	0	2	0	0	2	0	0
O-902	Same as O-901	Freq Operation Adj														
O-1401	GASKET: for cabinet edges; neoprene; elliptical hole through piece; long angular bar shape; 44" lg x 1/4" wd x 1/4" h o/a; for panel to case seal; mat formed and cemented around open cabinet edges	Sealing Between Front Panel and Case		N17-G-169757-750	1	A-8844138-1	O-1401, O-1601	1	0	1	3	0	3	3	0	3
O-1402	SLIDE, SET: chassis slide assem; c/o 1 main mtg bkt plate 1 track plate 1 detent plate 1 spring 3 levers; main assem aluminum; small parts, brass and SS; rectangular shape approx; 10" lg x 4-1/8" h x 1-3/16" wd o/a approx; mtd by welding rear bkt plate to cabinet sides; mtg plate 8-7/16" lg x 4-1/8" wd x 1-3/16" h; bolts w/ Quintlock nuts are used on bkt plate for additional support; detent plate for chassis tilting, contains 4 slots; 3 tapered slots 0.187" d 1 large slot 1/4" d w/ 1/8" rad finish; all slots mtd 45 deg apart	Sliding Out Chassis for Accessibility		N16-S-480001-102	1669 Cat #C-780 RH	P-741634-1	O-1402, O-1602	1	0	1	3	0	1	3	0	1

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
O-1403	SLIDE, SET: chassis slide assem; c/o 1 main mtg bkt plate 1 track plate 1 detent plate 1 spring, 3 levers; main assem aluminum; small parts brass and SS; rectangular shape approx; 10" lg x 4-1/8" h x 1-1/4" wd o/a approx; mtd by welding rear bkt plate to cabinet sides; mtg plate 8-7/16" lg x 4-1/8" wd x 0.04" thk; bolts w/ Quintlock nuts are used on bkt plate for additional support; detent plate for chassis tilting, contains 4 slots; 3 tapered slots 0.187" d; 1 large slot 1/4" d w/ 1/8" rad finish; all slots mtd 45° apart; RSW per spec AN-QQ-391	Sliding Out Chassis for Accessibility		N16-S-480001-103	1669 Cat #C-780 LH	P-741634-2	O-1403, O-1603	1		0		1	3		0		1	3		0		1
O-1404	GASKET: soft rubber; round shape; 2-1/4" diam x 5/16" thk o/a	Sealing Between Front Panel and Scope Tube		N17-G-161779-101	1	A-8892349-1	O-1404	1		0		1	2		0		2	2		0		2
O-1405	CLEANER, AIR: panel type; aluminum frame; 4" lg x 3-31/32" +0.000" —0.031" wd x 1/2" thk o/a; non-replaceable, cloth covered screen mesh viscous coated filter; 5 mtg holes on front edges of frame, one 0.375" diam hole located 2-9/32" in from left side of frame 5/16" down from top edge; 2 holes 0.147" diam located 1/4" down from top edge 17/32" in from left side 2-7/8" apart and 2 holes 0.147" diam located 3/16" in from left and right sides 2-5/8" down from top edge; RSW	Air Filter		N17-C-793001-125	788 Type P-4A	M-455603-1	O-1405, O-1605	1		0		1	3		0		1	3		0		1

O-1406	BEZEL: for mtg window over CR tube face; assem c/o 1 window RCA part/dwg #8892351-1 1 gasket RCA part/dwg #8892349-1 3 Phillips head captive screws, #8-32 thd, RCA part/dwg #8840884-1; three #8 bronze lock washers RCA part/dwg #59048-18; black enamel finish, outside and edges; bezel only; irregular shape; cylindrical shape w/ 1 mtg hole in flange on 90 deg index; 2 holes on large flange; 2-7/8" h x 2-9/16" wd x 11/32" d o/a; three 0.240" diam mtg holes w/ 3/8" diam ctb 1/32" d; 1 hole 2-1/2" from ctrs of other 2; 2 holes on large fl on 2.062" mtg/c; made from aluminum alloy; 3 straight lines engraved on window 1/8" apart, 1-1/4" lg	Fastens Buffer and Window to Front Panel		N16-S-117101-277	1	P-739045-501	O-1406	1		0	1	2	0	1	2	0	1
O-1407	PROPELLER: propeller blades; electric motor operated; 4 metal blades, 2-1/4" diam; portable; unguarded; 2-1/4" diam x 11/32" d o/a; two #4-40 tapped radial hole spaced 120 deg in hub; direct drive; mts on shaft 0.124" diam; fan blades and hub are brass w/ black enamel finish; direction of rotation, counterclockwise facing air discharge	Equipment Cooling		N17-P-87208-3501	1	M-454892-2	O-1407, O-1607	1		0	1	3	0	1	3	0	1
O-1601	Same as O-1401	Sealing Between Front Panel and Case																
O-1602	Same as O-1402	Sliding Out Chassis for Accessibility																
O-1603	Same as O-1403	Sliding Out Chassis for Accessibility																
O-1604	Not Used																	
O-1605	Same as O-1405	Air Filter																
O-1606	Not Used																	
O-1607	Same as O-1407	Equipment Cooling																
P-101	CONNECTOR, RECEPTACLE: 14 male cont, pol; straight type; 2" lg x 3/4" wd x 23/32" d o/a; 1000 v min flashover between any cont, cont #1 to #7 ten amp min, #8 to #14 one amp min; rectangular; molded melamine insert; 2 holes, 0.156" diam, 1.687" mtg/c; recessed connecting lugs; metal parts 50 hr salt spray corrosion test marked #738962-1	Power Circuit		N17-C-73588-4094	1	P-738962-1	P-101, P-201, P-301, P-601, P-701, P-801, P-901, P-1001	5		2	9	13	3	16	13	3	26
P-201	Same as P-101	Power Circuit																
P-301	Same as P-101	Power Circuit																

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)				
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
P-501	CONNECTOR, PLUG: single male coax cont; straight type; 1-9/16" lg x 11/16" OD o/a; nom RF impedance 52 ohms; cylindrical brass body, silver pl; insert may be, dielectene, BM10553, durez 11863; or copolymer of styrene; cable opening 1/2" diam; 24 thd coupling sleeve; insert assem w/ polystyrene to seal connector air spaces; entire unit tropicalized	Scanning Adaptor Output Cable	(-49195)	N17-C-71414-2800	30 83-1SPN	P-255223-9	P-501, P-1102, P-1111	3		0		0	6		0		0	4		0		0
P-601	Same as P-101	Power Circuit																				
P-701	Same as P-101	Power Circuit																				
P-801	Same as P-101	Power Circuit																				
P-901	Same as P-101	Power Circuit																				
P-1001	Same as P-101	Power Circuit																				
P-1101	Not Used																					
P-1102	Same as P-501	Remote Circuit Line																				
P-1103	Not Used																					
P-1104	CONNECTOR, PLUG: 3 round male cont; straight type; 1-11/32" lg x 1-1/8" OD max; 20 amp, 70 v DC, or 50 v AC (RMS); cylindrical die cast aluminum body; molded melamine insert; one end w/ 3/4"-20 thd, other end w/ 7/8"-20 thd; one end w/ 3/4"-20 outside thd for cable clamp coupling; tropicalized; Army-Navy spec #AN-WC-591	Ext Tone Line	AN-3106-14S-7P	N17-C-70588-1524	30 AN-3106-14S-7P	M-253476-30	P-1104, P-1105, P-1302, P-1303, P-1731, P-1732, P-1733, P-1734	2		0		0	8		0		0	8		0		0
P-1105	Same as P-1104	Tone Output Line																				
P-1106	CONNECTOR, PLUG: 2 round female cont; straight type; 1-11/32" lg x 1-1/8" max OD o/a; 20 amp, 70 v DC, or 50 v AC (RMS); cylindrical die cast aluminum body; molded melamine insert; one end w/ 3/4"-20 thd, other end w/ 7/8"-20 thd; one end w/ 3/4"-20 outside thd for cable clamp coupling; tropicalized; Army-Navy spec #AN-WC-591	Teletype Line	AN-3106-14S-9S	N17-C-70320-2882	30 AN-3106-14S-9S	M-253476-26	P-1106, P-1304	1		0		0	3		0		0	3		0		0
P-1107	Not Used																					

P-1108	CONNECTOR PLUG: 3 round female cont; straight type; 1-11/32″ lg x 1-1/16″ OD o/a; 20 amp, 70 v DC, or 50 v AC (RMS); cylindrical die cast aluminum body; molded bakelite insert; one end w/ 3/4″-20 thd, other end w/ 7/8″-20 thd; one end w/ 3/4″-20 outside thd for cable clamp coupling; Army-Navy spec #AN-WC-591	AC Power Line	AN-3106-14S-7S	N17-C-70328-1524	30 AN-3106-14S-7S	M-253476-27	P-1108, P-1305, P-1725, P-1726, P-1727, P-1728	1		0		0		5		0		0		5		0		0
P-1109 and P-1110	Not Used																				
P-1111	Same as P-501	IF Input Line																			
P-1301	Not Used																				
P-1302	Same as P-1104	Ext Tone Line																			
P-1303	Same as P-1104	Tone Diversity Line																			
P-1304	Same as P-1106	Teletype Diversity Line																			
P-1305	Same as P-1108	AC Power Line																			
P-1401	CONNECTOR, PLUG: 20 male cont, pol; straight type; 2-11/16″ lg x 5/8″ wd x 15/16″ d, less cont and pol pins; cont #8 to #12 ten amp min, cont #1 to #7 one amp min; rectangular; molded melamine insert; two 0.156″ diam holes, 2-3/8″ mtg/c; 50 hr salt spray test; marked #738961-2	Filter and Frame Interconnections		N17-C-73617-2350	1	P-738961-2	P-1401, P-1601	1		1		4		3		2		9		3		1		15
P-1601	Same as P-1401	Filter and Frame Interconnections (Part of W-1601)																			
P-1701	CONNECTOR, PLUG: single male coax cont; straight type; 1-1/64″ lg x 9/16″ diam; 52 ohms impedance; cylindrical brass silver pl; Teflon (poly-P-114); 0.212″ diam cable opening; mts by thd on integral nut (outer shield of coax cable is locked by thd); in accordance w/ Navy dwg RE49F246	Part of W-1701		N17-C-71408-5333	1	A-8898625-501	P-1701, P-1702, P-1703, P-1704, P-1707, P-1708, P-1709, P-1710, P-1713, P-1714, P-1715, P-1716, P-1719, P-1720, P-1721, P-1722	0		0		0		8		0		0		8		0		0
P-1702	Same as P-1701	Part of W-1702																			
P-1703	Same as P-1701	Part of W-1703																			
P-1704	Same as P-1701	Part of W-1704																			
P-1705 and P-1706	Not Used																				
P-1707	Same as P-1701	Part of W-1707																			
P-1708	Same as P-1701	Part of W-1708																			
P-1709	Same as P-1701	Part of W-1709																			
P-1710	Same as P-1701	Part of W-1710																			

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS													
									CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)						AN/URA-7 IF INPUT 50 KC (DUAL)					
									TOTAL NO. PER EQUIP.	EQUIP		STOCK			TOTAL NO. PER EQUIP.	EQUIP		STOCK			TOTAL NO. PER EQUIP.	EQUIP		STOCK		
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED			BOX	QUAN.	BOX	QUAN.			BOX	QUAN.	BOX	QUAN.			BOX	QUAN.	BOX	QUAN.
R-203*	RESISTOR, FIXED: comp; 12,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-202 Grid Phase Shifter	RC20BF123K	N16-R-50309-811		A-8897969-75	R-203	0		0		0	0		0		0	2		0		0
R-204	Same as R-104	AFC Divider																				
R-205	Same as R-105	AFC Filter																				
R-206*	RESISTOR, FIXED: comp; 8200 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-202 Cathode Bias	RC20BF822K	N16-R-50237-811		A-8897969-73	R-206	0		0		0	0		0		0	2		0		0
R-207*	RESISTOR, FIXED: comp; 39,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-202 Plate Load	RC20BF393K	N16-R-50444-811		A-8897969-81	R-207, R-639	1		0		0	3		0		0	5		0		0
R-208	Same as R-108	V-202 Screen Dropping																				
R-209*	RESISTOR, FIXED: comp; 330 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-203 Cathode Bias	RC20BF331K	N16-R-49706-811		A-8897969-56	R-209	0		0		0	0		0		0	2		0		0
R-210*	RESISTOR, FIXED: comp; 33,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-203 Screen Dropping	RC20BF333K	N16-R-50417-811		A-8897969-80	R-210, R-311	1		0		0	2		0		0	4		0		0
R-211	Same as R-111	V-202 Grid Leak																				
R-212*	RESISTOR, FIXED: comp; 1500 ohms p/m 10%; 1/2 w; F characteristic; 0.406" max lg x 0.175" max diam; ins, RSW and humidity; 2 axial wire lead term 1-1/2" lg #21 AWG wire; spec JAN-R-11	B+ Filter	RC20BF152K	N16-R-49967-811		A-8897969-64	R-212	0		0		0	0		0		0	2		0		0

R-301*	RESISTOR, FIXED: comp; 56 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	T-301 Secd Load	RC20BF560K	N16-R-49463-811		A-8897969-47	R-301, R-303, R-308	3	0	0	6	0	0	6	0	0		
R-302*	RESISTOR, FIXED: comp; 10,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	T-301 +B Filter	RC20BF103K	N16-R-50282-811		A-8897969-74	R-302, R-307, R-319, R-603, R-638	5	0	0	12	0	0	12	0	0		
R-303	Same as R-301	T-302 Secd Load																
R-304	Not Used																	
R-305*	RESISTOR, FIXED: comp; 680 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-301 Cathode Bias	RC20BF681K	N16-R-49841-811		A-8897969-60	R-305	1	0	0	2	0	0	2	0	0		
R-306*	RESISTOR, FIXED: comp; 82,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-301 Screen Dropping	RC20BF823K	N16-R-50588-811		A-8897969-85	R-306	1	0	0	2	0	0	2	0	0		
R-307	Same as R-302	V-301 +B Filter																
R-308	Same as R-301	T-303 Secd Load																
R-309	Same as R-104	V-302 Limiter Grid Leak																
R-310*	RESISTOR, FIXED: comp; 68,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-302 Screen Dropping	RC20BF683K	N16-R-50552-811		A-8897969-84	R-310, R-641	2	0	0	5	0	0	5	0	0		
R-311	Same as R-210	V-302 Screen Voltage Divider																
R-312*	RESISTOR, FIXED: comp; 15 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, RSW and humidity; 2 axial wire lead term; color coded; spec JAN-R-11	T-304 Secd Load	RC20BF150K	N16-R-49288-811		A-8897969-40	R-312	1	0	0	2	0	0	2	0	0		
R-313*	RESISTOR, FIXED: comp; 680,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-303 Plate Load	RC20BF684K	N16-R-49841-811		A-8897969-96	R-313, R-314	2	0	0	4	0	0	4	0	0		
R-314	Same as R-313	V-303 Plate Load																
R-315	Not Used																	
R-316	Same as R-104	AFC Filter																
R-317	Not Used																	

CONTRACT NObsr-39421

* When ordering replacements specify "max dimensions not to exceed 5/32" diam x 13/32" lg"

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS													
									CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)						AN/URA-7 IF INPUT 50 KC (DUAL)					
									EQUIP		STOCK				EQUIP		STOCK				EQUIP		STOCK			
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	
R-318	RESISTOR, VARIABLE: comp; 1.0 megohm p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" max d; SS or brass nickel pl shaft 0.250" diam x 1/2" max lg; at 50% rotation not more than 10% resistance in use; at 60% rotation 22% resistance in use, then the value is linear to 95% rotation and 100% resistance in use; CTS "A" taper; ins contact arm w/o off position; high torque; no locking device; bushing 3/8"-32 thd x 1/4" lg; non-turn device on 7/16" radius at 9 o'clock; salt water spray corrosion resistant; ambient oper temp range —60 to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, and RCA part/dwg #	V-303 Discriminator Output Control		N16-R-88340-9355	786 Type 45	B-453560-15	R-318	1		0		0	2		0		0	2		0		0
R-319	Same as R-302	V-302 +B Filter																				
R-501	RESISTOR, FIXED: comp; 470 ohms p/m 10%; 1/2 w; F characteristic; 0.406" lg x 0.175" diam; ins, moisture resistant; 2 axial wire lead term; color coded; spec JAN-R-11	V-501 Cathode Load	RC20BF471K	N16-R-49769-811		P-722318-58	R-501	1		0		0	2		0		0	0		0		0
R-502	RESISTOR, FIXED: comp; 10,000 ohms p/m 10%; 1/2 w; F characteristic; 0.406" lg x 0.175" diam; ins, moisture resistant; 2 axial wire lead term; color coded; spec JAN-R-11	V-501 Plate Filter	RC20BF103K	N16-R-50282-811		P-722318-74	R-502	1		0		0	2		0		0	0		0		0
R-503	RESISTOR, FIXED: comp; 1 megohm p/m 10%; 1/2 w; F characteristic; 0.406" lg x 0.175" diam; ins, moisture resistant; 2 axial wire lead term; color coded; spec JAN-R-11	V-501 Grid Leak	RC20BF105K	N16-R-50975-0811		P-722318-98	R-503	1		0		0	2		0		0	0		0		0
R-601*	RESISTOR, FIXED: comp; 1.8 megohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-601A Grid Leak	RC20BF185K	N16-R-51038-811		A-8897969-101	R-601, R-607, R-714	3		0		0	8		0		0	8		0		0

R-602*	RESISTOR, FIXED: comp; 390 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-601A Cathode Bias	RC20BF391K	N16-R-49733-811		A-8897969-57	R-602, R-614	2		0	0	6	0	0	6	0	0
R-603	Same as R-302	V-601A Plate Load																	
R-604*	RESISTOR, FIXED: comp; 1800 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cyling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-601B Cathode Bias	RC20BF182K	N16-R-49985-811		A-8897969-65	R-604	1		0	0	3	0	0	3	0	0
R-605*	RESISTOR, FIXED: comp; 220,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-602B Grid Limiting	RC20BF224K	N16-R-50714-811		A-8897969-90	R-605	1		0	0	3	0	0	3	0	0
R-606**	RESISTOR, FIXED: comp; 7500 ohms p/m 5%; 1 w; F characteristic; 0.562" lg x 0.225" diam; ins, salt water immersion resistant; 2 axial wire lead term; color coded; spec JAN-R-11	V-607 and V-608 Screen Dropping	RC30BF752J	N16-R-50218-751		A-8897970-180	R-606, R-623	2		0	0	6	0	0	6	0	0
R-607	Same as R-601	V-601B Grid Leak																	
R-608*	RESISTOR, FIXED: comp; 22,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	Z-601 Output Matching	RC20BF223K	N16-R-50372-811		A-8897969-78	R-608, R-640, R-901	2		0	0	7	0	0	7	0	0
R-609*	RESISTOR, FIXED: comp; 5600 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-606 Cathode Voltage Divider	RC20BF562J	N16-R-50164-431		A-8897969-177	R-609	1		0	0	3	0	0	3	0	0
R-610	Same as R-104	V-602B Grid Leak																	
R-611*	RESISTOR, FIXED: comp; 240,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, RSW and humidity; 2 axial wire lead term; color coded; spec JAN-R-11	V-606 Cathode Voltage Divider	RC20BF244J	N16-R-50722-431		A-8897969-216	R-611	1		0	0	3	0	0	3	0	0
R-612*	RESISTOR, FIXED: comp; 4700 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-602B Cathode Bias	RC20BF472K	N16-R-50129-811		A-8897969-70	R-612	1		0	0	3	0	0	3	0	0

CONTRACT NObsr-59421

* When ordering replacements specify "max dimensions not to exceed 5/32" diam x 13/32" lg"

** When ordering replacements specify "max dimensions not to exceed 15/64" diam x 19/32" lg"

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)				AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK				EQUIP		STOCK		EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
R-613	RESISTOR, VARIABLE: comp; 750 ohms p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" max d; SS or brass nickel pl shaft 0.250" diam x 11/16" max lg w/ scdr slot; lin taper; ins contact arm w/o off position; high torque; no locking device; mtg bushing 3/8"-32 thd x 1/4" lg; non-turn device on 7/16" radius at 9 o'clock; salt water spray corrosion resistant; ambient oper temp range −60 to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, and RCA part/dwg #	V-602B Bias Control		N16-R-87305-5521	786 Type 45	B-453560-3	R-613	1		0		0	3		0		0	3		0		0
R-614	Same as R-602	V-602B Bias																				
R-615*	RESISTOR, FIXED: comp; 100,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-603A Grid Voltage Divider	RC20BF104J	N16-R-50632-431		A-8897969-207	R-615, R-621, R-622, R-624, R-625, R-912, R-917, R-918, R-937	5		0		0	19		0		0	19		0		0
R-616*	RESISTOR, FIXED: comp; 18,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-603 Cathode Bias	RC20BF183J	N16-R-50353-431		A-8897969-189	R-616, R-907	1		0		0	4		0		0	4		0		0
R-617*	RESISTOR, FIXED: comp; 150,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-603B Grid Voltage Divider	RC20BF154J	N16-R-50677-431		A-8897969-211	R-617, R-618, R-805, R-908, R-909, R-1005	3		0		0	11		0		0	11		0		0
R-618	Same as R-617	V-603A Grid Voltage Divider																				
R-619*	RESISTOR, FIXED: comp; 10,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-603B Plate Load	RC20BF103J	N16-R-50281-431		A-8897969-183	R-619, R-620, R-910, R-911, R-940	2		0		0	9		0		0	9		0		0

R-620	Same as R-619	V-603A Plate Load																		
R-621	Same as R-615	V-604A Plate Load																		
R-622	Same as R-615	V-604B Plate Load																		
R-623	Same as R-606	V-607 and V-608 Screen Dropping																		
R-624	Same as R-615	V-604B Grid Voltage Divider																		
R-625	Same as R-615	V-604A Grid Voltage Divider																		
R-626*	RESISTOR, FIXED: comp; 56,000 ohms p/m 5%; 1/2 w; F characteristic; 0.400" lg x 0.175" diam; ins, moisture resistant; 2 axial wire leads; color coded	V-604A Grid Voltage Divider	RC20BF563J	N16-R-50515-406		A-8897969-201	R-626, R-627, R-643, R-1003	3		0	0	10		0	0	10	0	0		
R-627	Same as R-626	V-604B Grid Voltage Divider																		
R-628*	RESISTOR, FIXED: comp; 1000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-604 Cathode Bias	RC20BF102J	N16-R-49921-431		A-8897969-159	R-628	1		0	0	3		0	0	3	0	0		
R-629	RESISTOR, VARIABLE: comp; 150,000 ohms p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" max d; SS or nickel pl round shaft 0.250" diam x 1/2" lg; lin taper; ins contact arm w/o off position; high torque; no locking device; mtg bushing 3/8"-32 thd x 1/4" lg; non-turn device on 7/16" radius at 9 o'clock; salt water spray corrosion resistant; ambient oper temp range —60 to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, and RCA part/ dwg #	V-605A Grid Voltage Control		N16-R-88040-8526	786 Type 45	B-453560-5	R-629	1		0	0	3		0	0	3	0	0		
R-630	Same as R-101	V-608 Grid Limiting																		
R-631*	RESISTOR, FIXED: comp; 1.2 megohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-605B Grid Isclating	RC20BF125K	N16-R-50993-811		A-8897969-99	R-631	1		0	0	3		0	0	3	0	0		
R-632	RESISTOR, FIXED: carbon film; 12,000 ohms p/m 1%; 1/2 w; temp coef not to exceed —0.0003 per °C over temp range of —40°C to +60°C; F characteristic; 0.255" diam x 0.625" max lg; glyptal ins; 2 axial wire leads	V-605B Cathode Bias		N16-R-73097-6558	1727 Type CP-½ Carbo Film	K-984059-185	R-632	1		0	1	3		0	3	3	0	3		

CONTRACT NObsr-39421

* When ordering replacements specify "max dimensions not to exceed 5/32" diam x 13/32" lg"

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
R-633	RESISTOR, VARIABLE: comp; 1500 ohms p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" max d; SS or brass nickel pl shaft 0.250" diam x 11/16" max lg w/ scdr slot; lin taper; ins contact arm w/o off position; high torque; no locking device; mtg bushing 3/8"-32 thd x 1/4" lg; non-turn device on 7/16" radius at 9 o'clock; salt water spray corrosion resistant; ambient oper temp range —60 to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, and RCA part/dwg #	V-602A Cathode Bias Control		N16-R-87380-9401	786 Type 45	B-453560-10	R-633	1		0		0	3		0		0	3		0		0
R-634	Same as R-107	V-605B Plate Dropping																			
R-635*	RESISTOR, FIXED: comp; 150,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-602A Grid Limiting	RC20BF154K	N16-R-50678-811		A-8897969-88	R-635, R-807, R-1008	2		0		0	6		0		0	6		0		0
R-636*	RESISTOR, FIXED: comp; 15,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-605A +B Filter	RC20BF153K	N16-R-50336-811		A-8897969-76	R-636	1		0		0	3		0		0	3		0		0
R-637*	RESISTOR, FIXED: comp; 1200 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	Ext Tone Load	RC20BF122K	N16-R-49940-811		A-8897969-63	R-637	1		0		0	3		0		0	3		0		0
R-638	Same as R-302	V-603 Plate Dropping																			
R-639	Same as R-207	AC Voltage Dividing																			
R-640	Same as R-608	AC Voltage Dividing																			
R-641	Same as R-310	V-601B Plate Load																			

	ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11																		
R-643	Same as R-626	V-607 Plate Dropping																	
R-701	RESISTOR, VARIABLE: comp; 1.0 megohm p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" max d; SS or brass nickel pl shaft 0.250" diam x 1-1/16" max lg; lin taper; ins contact arm w/o off position; high torque; no locking device; mtg bushing 3/8"-32 thd x 3/8" lg; non-turn device on 7/16" radius at 3 o'clock; salt water spray corrosion resistant; ambient oper temp range —60 to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, and RCA part/dwg #	V-701A Grid Input Control		N16-R-88340-9477	786 Type 45	B-453560-13	R-701	1		0	0	2	0	0	2	0	0	
R-702	RESISTOR, VARIABLE, comp; 500,000 ohms p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" max d; SS or brass nickel pl round shaft 0.250" ±0.001" diam x 3-1/2" max lg; w/ scdr slot; lin taper; ins cont arm w/o off position; high torque; no locking device; mtg bushing 3/8"-32 thd x 1/4" lg; non-turn device on 7/16" radius at 9 o'clock; salt water spray corrosion resistant; ambient oper temp range —60 to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, and RCA part/dwg #	V-701B Grid Input Control		N16-R-88180-9430	786 Type 45	B-453560-1	R-702	1		0	0	2	0	0	2	0	0	
R-703*	RESISTOR, FIXED: comp; 470,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-701B Plate Load	RC20BF474K	N16-R-50822-811		A-8897969-94	R-703	1		0	0	2	0	0	2	0	0	
R-704	Not Used																		
R-705	RESISTOR, VARIABLE: comp; 100,000 ohms p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" max d; SS or brass nickel pl shaft 0.250" diam x 11/16" max lg w/ scdr slot; lin taper; ins cont arm w/o off position; high torque; w/ locking device; bushing 3/8"-32 thd x 1/2" max lg w/ 4 slots 90° apart 1/4" lg x 1/32" wd; non-turn device on 7/16" radius at 9 o'clock; salt water spray corrosion resistant; ambient oper temp range —60 to +100°C; bushing SS or brass nickel pl; supplied w/ 3/8"-32 thd hex locking nut 5/32" thk x 1/2" across flats; marked w/ NT #, mfr prefix ltr, and RCA part/dwg #	V-702 Vert Plate Voltage Control		N16-R-88010-9591	786 Type 45	B-453560-17	R-705	1		0	0	2	0	0	2	0	0	

CONTRACT NObsr-39421

* When ordering replacements specify "max dimensions not to exceed 5/32" diam x 13/32" lg"

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS								SPARE PARTS											
								CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)				AN/URA-7 IF INPUT 50 KC (DUAL)			
								EQUIP		STOCK				EQUIP		STOCK		EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
R-706*	RESISTOR, FIXED: comp; 180,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-702 Vert Plate Voltage Divider	RC20BF184K	N16-R-50696-811		A-8897969-89	R-706	1		0		0	2		0		0	2		0		0
R-707*	RESISTOR, FIXED: comp; 330,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-702 Vert Plate Voltage Divider	RC20BF334K	N16-R-50759-811		A-8897969-92	R-707	1		0		0	2		0		0	2		0		0
R-708*	RESISTOR, FIXED: comp; 2.2 megohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-701A Cathode Bias	RC20BF225K	N16-R-51065-811		A-8897969-102	R-708, R-709, R-1101	3		0		0	6		0		0	6		0		0
R-709	Same as R-708	V-701A Cathode Bias																			
R-710*	RESISTOR, FIXED: comp; 2.7 megohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	—B Voltage Divider	RC20BF275K	N16-R-51092-811		A-8897969-103	R-710, R-711, R-712, R-716	4		0		0	8		0		0	8		0		0
R-711	Same as R-710	—B Voltage Divider																			
R-712	Same as R-710	—B Voltage Divider																			
R-713	RESISTOR, VARIABLE: comp; 500,000 ohms p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" max d; SS or nickel pl shaft 0.250" diam x 3/4" max lg w/ scdr slot; lin taper; ins cont arm w/o off position; high torque; no locking device; bushing 3/8"-32 thd x 3/8" lg; non-turn device on 7/16" radius at 9 o'clock; salt water spray corrosion resistant; ambient oper temp range —60 to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, and RCA part/dwg #	V-702 Grid #1 Voltage Control		N16-R-88180-9490	786 Type 45	B-453560-16	R-713	1		0		0	2		0		0	2		0		0
		—B Voltage Divider																			

R-715	RESISTOR, VARIABLE: comp; 1.0 megohm p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" max d; SS or nickel pl shaft 0.250" diam x 3-1/2" lg w/ scdr slot; lin taper; ins cont arm w/o off position; high torque; no locking device; mtg bushing 3/8"-32 thd x 3/8" lg; non-turn device on 7/16" radius at 3 o'clock; salt water spray corrosion resistant; ambient oper temp range —60 to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, and RCA part/dwg #	V-702 Grid #3 Voltage Control		N16-R-88340-9385	786 Type 45	B-453560-14	R-715	1		0	0	2	0	0	2	0	0		
R-716	Same as R-710	—B Voltage Divider																		
R-801*	RESISTOR, FIXED: comp; 27,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	—B Supply Filter	RC20BF273J	N16-R-50398-431		A-8897969-193	R-801, R-802	2		0	0	4	0	0	4	0	0		
R-802	Same as R-801	—B Supply Filter																		
R-803**	RESISTOR, FIXED: comp; 360,000 ohms p/m 5%; 1 w; F characteristic; 0.750" lg x 0.280" diam; ins, moisture resistant; 2 axial wire lead term; color coded	—B Voltage Divider	RC30BF364J	N16-R-50776-726		A-8897970-220	R-803	1		0	0	2	0	0	2	0	0		
R-804†	RESISTOR, FIXED: comp; 3000 ohms p/m 5%; 2 w; F characteristic; 0.750" max lg x 0.370" max diam; ins, salt water immersion resistant; 2 axial wire lead term; color coded; spec JAN-R-11	V-803 Series Dropping	RC40BF302J	N16-R-50048-131		A-8891493-170	R-804	1		0	0	2	0	0	2	0	0		
R-805	Same as R-617	—B Voltage Divider																		
R-806*	RESISTOR, FIXED: comp; 560,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	+B Load	RC20BF564K	N16-R-50858-811		A-8897969-95	R-806, R-1006	1		0	0	3	0	0	3	0	0		
R-807	Same as R-635	I-1401 Series Dropping																		
R-808	Not Used																			
R-901	Same as R-608	V-908 Screen Dropping																		
R-902	Same as R-104	AVC Filter																		
R-903*	RESISTOR, FIXED: comp; 56,000 ohms p/m 10%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-901 Plate Load	RC20BF563K	N16-R-50516-811		A-8897969-83	R-903, R-904, R-926	0		0	0	3	0	0	3	0	0		
R-904	Same as R-903	V-908 Plate Load																		

CONTRACT NObsr-39421

* When ordering replacements specify "max dimensions not to exceed 5/32" diam x 13/32" lg"

** When ordering replacements specify "max dimensions not to exceed 15/64" diam x 19/32" lg"

† When ordering replacements specify "max dimensions not to exceed 21/64" diam x 23/32" lg"

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)				AN/URA-6 IF INPUT 395-470 KC (DUAL)				AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK		EQUIP		STOCK		EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
R-905	RESISTOR, VARIABLE: comp; 5000 ohms p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" diam x 0.451" max d; SS or brass, nickel pl shaft 0.250" diam x 1/2" lg, w/ scdr slot in end; lin taper; ins, cont arm w/o off position; high torque; no locking device; non-turn device at 7/16" rad at 9 o'clock; mtg bushing 3/8"-32 thd x 1/4" lg; salt water spray corrosion resistant; ambient oper temp range −60° to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, RCA part/dwg	V-903 Cathode Bias Control		N16-R-87520-9596	786 Type 45	B-453560-19	R-905	0		0		0	1		0		0	1		0		0
R-906*	RESISTOR, FIXED: comp; 2700 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-903 Cathode Bias	RC20BF272J	N16-R-50038-431		A-8897969-169	R-906	0		0		0	1		0		0	1		0		0
R-907	Same as R-616	V-904 Cathode Bias																			
R-908	Same as R-617	V-904 Grid Voltage Divider																			
R-909	Same as R-617	V-904 Grid Voltage Divider																			
R-910	Same as R-619	V-904 Plate Load																			
R-911	Same as R-619	V-904 Plate Load																			
R-912	Same as R-615	V-904 Grid Voltage Divider																			
R-913*	RESISTOR, FIXED: comp; 1.0 megohm p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-905 Grid Isolating	RC20BF105J	N16-R-50974-431		A-8897969-231	R-913, R-914, R-915, R-916, R-931, R-932	0		0		0	6		0		0	6		0		0
R-914	Same as R-913	V-905 Grid Isolating																			
R-915	Same as R-913	V-907 Grid Voltage Divider																			
R-916	Same as R-913	V-906 Grid Voltage Divider																			
R-917	Same as R-615	V-905 Plate Load																			
R-918	Same as R-615	V-905 Plate Load																			

	ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	Divider					R-920												
R-920	Same as R-919	V-906 Grid Voltage Divider																	
R-921*	RESISTOR, FIXED: comp; 4700 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-907 Cathode Bias	RC20BF472J	N16-R-50128-431		A-8897969-175	R-921, R-939	0		0	0	2	0	0	2	0	0		
R-922	Same as R-103	V-906 Cathode Bias																	
R-923	RESISTOR, VARIABLE: comp; 10,000 ohms p/m 20%; 1/4 w; 3 solder lug term; encl SS or brass nickel pl case 15/16" max diam x 0.451" d; SS or brass nickel pl shaft 0.250" diam x 1/2" lg, scdr slot; lin taper; ins cont arm w/o off position; high torque, no locking device; mtg bushing 3/8"-32 thd x 1/4" lg; salt water spray corrosion resistant; ambient oper temp range −60° to +100°C; bushing SS or brass nickel pl; marked w/ NT #, mfr prefix ltr, RCA part/dwg #	V-906 Cathode Bias Control			786 Type 45	B-453560-20	R-923	0		0	0	1	0	0	1	0	0		
R-924	Same as R-104	V-907 Grid Leak																	
R-925	Same as R-104	V-906 Grid Leak																	
R-926	Same as R-903	V-906 and V-907 Cathode Load																	
R-927*	RESISTOR, FIXED: comp; 270,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire lead term; marked w/ JAN std color code; spec JAN-R-11	V-902 Cathode Load	RC20BF274J	N16-R-50740-431		A-8897969-217	R-927, R-928, R-948, R-949	0		0	0	4	0	0	4	0	0		
R-928	Same as R-927	V-909 Plate Load																	
R-929*	RESISTOR, FIXED: comp; 470,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	V-902 Plate Load	RC20BF474J	N16-R-50821-431		A-8897969-223	R-929, R-930	0		0	0	2	0	0	2	0	0		
R-930	Same as R-929	V-909 Cathode Load																	
R-931	Same as R-913	V-902 Plate Load																	
R-932	Same as R-913	V-909 Cathode Load																	
R-933*	RESISTOR, FIXED: comp; 750,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	Output Filter of Differential Rects V-902 and V-909	RC20BF754J	N16-R-50911-431		A-8897969-228	R-933, R-934, R-943	0		0	0	3	0	0	3	0	0		

CONTRACT NObsr-39421

* When ordering replacements specify "max dimensions not to exceed 5/32" diam x 13/32" lg"

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS								SPARE PARTS											
								CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)				AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK				EQUIP		STOCK				EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
R-934	Same as R-933	Output Filter of Differential Rects V-902 and V-909																			
R-935*	RESISTOR, FIXED: comp; 39,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	Output Filter of Differential Rects V-902 and V-909	RC20BF393J	N16-R-50443-431		A-8897969-197	R-935	0		0		0	1		0		0	1		0		0
R-936*	RESISTOR, FIXED: comp; 82,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, humidity and salt water immersion cycling resistant; 2 axial wire leads; marked w/ JAN std color code; spec JAN-R-11	—B Filter	RC20BF823J	N16-R-50587-431		A-8897969-205	R-936, R-938	0		0		0	2		0		0	2		0		0
R-937	Same as R-615	—B Voltage Divider																			
R-938	Same as R-936	—B Filter																			
R-939	Same as R-921	—B Voltage Divider																			
R-940	Same as R-619	V-905 Plate Dropping																			
R-941	Same as R-104	V-908 Grid Leak																			
R-942	Same as R-104	V-901 Grid Leak																			
R-943	Same as R-933	+B Voltage Divider																			
R-944*	RESISTOR, FIXED: comp; 1200 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam; ins, RSW and humidity; 2 axial wire lead term; color coded; spec JAN-R-11	+B Voltage Divider	RC20BF122J	N16-R-49939-431		A-8897969-161	R-944	0		0		0	1		0		0	1		0		0
R-945*	RESISTOR, FIXED: comp; 47 ohms p/m 5%; 1/2 w; F characteristic; 0.375" lg x 0.140" diam less leads; ins, humidity and RSW; 2 axial wire lead term; color coded; spec JAN-R-11	+B Voltage Divider	RC20BF470J	N16-R-49426-431		A-8897969-127	R-945, R-946	0		0		0	2		0		0	2		0		0
R-946	Same as R-945	V-907 Cathode Bias																			
R-947	Same as R-105	V-902 and V-909 Plate Load																			
R-948	Same as R-927	V-902 Cathode Load																			
		V-909 Cathode Load																			

R-1001*	RESISTOR, FIXED: comp; 12,000 ohms p/m 5%; 1/2 w; F characteristic; 0.375″ lg x 0.140″ diam; ins, RSW and humidity; 2 axial wire lead term; color coded; spec JAN-R-11	—B Supply Filter	RC20BF123J	N16-R-50308-431		A-8897969-185	R-1001, R-1002	0	0	0	2	0	0	2	0	0
R-1002	Same as R-1001	—B Supply Filter														
R-1003	Same as R-626	—B Voltage Divider														
R-1004†	RESISTOR, FIXED: comp; 910 ohms p/m 5%; 2 w; F characteristic; 0.750″ lg x 0.370″ diam; ins, moisture resistant; RSW; 2 axial wire leads; color coded; spec JAN-R-11	V-1003 Series Dropping	RC42BF911J	N16-R-49904-121		A-8891493-158	R-1004	0	0	0	1	0	0	1	0	0
R-1005	Same as R-617	—B Voltage Divider														
R-1006	Same as R-806	+B Load														
R-1007**	RESISTOR, FIXED: comp; 430 ohms p/m 5%; 1 w; F characteristic; 0.750″ lg x 0.280″ diam; ins, moisture resistant; 2 axial wire lead term; color coded	V-1003 Series Dropping	RC30BF431J	N16-R-49750-726		A-8897970-150	R-1007	0	0	0	1	0	0	1	0	0
R-1008	Same as R-635	I-1601 Series Dropping														
R-1101	Same as R-708	Remote Scope Filter														
R-1401	Not Used															
R-1402†	RESISTOR, FIXED: comp; 3300 ohms p/m 5%; 2 w; F characteristic; 0.750″ max lg x 0.370″ max diam; ins, moisture resistant and RSW; 2 axial wire leads; color coded; spec JAN-R-11	V-803 Series Dropping	RC40BF332J	N16-R-50066-121		A-8891493-171	R-1402	1	0	0	2	0	0	2	0	0
S-301	SWITCH, ROTARY: 4 poles, 2 position; single sect; aluminum frame and bkt, lam phenolic slide; 1.665″ h x 1.477″ wd x 4.897″ lg less shaft; shorting type cont; actuated by turning grooved cam on shaft, shaft 0.250″ diam x 0.531″ lg; detent locking action; normally closed; 13 solder lug term; flush mtg; 1 bkt at one end and 2 bkt at other end w/ one 0.144″ diam hole in ea	Switches Secd Load of T-301, T-302, T-303 and T-304		N17-S-62522-3201	1	P-740771-1	S-301	1	1	1	2	1	2	2	1	2
S-301A	Part of S-301															
S-301B	Part of S-301															
S-301C	Part of S-301															
S-301D	Part of S-301															

CONTRACT NObsr-39421

* When ordering replacements specify "max dimensions not to exceed 5/32″ diam x 13/32″ lg"

** When ordering replacements specify "max dimensions not to exceed 15/64″ diam x 19/32″ lg"

† When ordering replacements specify "max dimensions not to exceed 21/64″ diam x 23/32″ lg"

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
S-302	SWITCH, ROTARY: 2 poles, 2 throws; single sect; 50 v 5 ma; coin silver cont; molded bakelite body; body 3/4" diam x 15/32" lg less shaft and term; shorting type cont; detent locking action; solder lug term; 3/8"-32 thd x 1/4" lg mtg bushing w/ 0.250" diam x 1/2" lg shaft; flush mtg; 100 hr salt spray test; lam plastic according to JAN-P-13, type LTS-EM-2 or better, molded plastic according to JAN-P-14, type MTS-G-2 or better, humidity resistant, and 500 v RMS AC test, mechanical and electrical spec all in accordance with RCA spec dwg #8848967	Switches AFC and V-303 Output		N17-S-60907-8578	1	M-452280-1	S-302, S-303	2		1		7	4		2		7	4		2		7
S-303	Same as S-302	Switches AVC																				
S-501	SWITCH, TOGGLE: SPST; 1 amp at 250 v DC, 3 amp at 125 v DC; phenolic body in metal shell; 1-3/16" lg x 1/2" wd x 9/16" h excluding lever and mtg bushing; bat type handle 19/32" lg; position 1 normally open, position 2 normally closed; 2 solder lug term; single hole mtg bushing 15/32"-32 thd x 15/32" lg; black finish; tropicalized	Switches Fil of V-501	(-24000)	N17-S-70598-1802	47 Cat #20994-ET	M-420278-1	S-501	1		0		0	2		0		0	0		0		0
S-601	SWITCH, ROTARY: total no. of contacts 8, 4 positions; single sect; 50 v; coin silver cont; molded bakelite body; body 3/4" diam x 15/32" lg less shaft and term; non-shorting type cont; locking action; solder lug term; 3/8"-32 thd x 1/4" lg mtg bushing w/ 0.250" diam x 1/2" lg shaft; flush mtg; 100 hr salt spray test, lam plastic according to JAN-P-13, type LTS-EM-2 or better, molded plastic according to JAN-P-14, type MTS-G-2 or better, humidity resistant, and 500 v RMS AC test, mechanical and electrical spec all in accordance with RCA spec dwg #8848967	Switches Filters of •Z-601		N17-S-59292-2663	1	B-452280-5	S-601	1		1		7	3		2		7	3		2		7

S-602	SWITCH, ROTARY: single pole, 9 throws, 9 positions; single sect; 50 v; coin silver cont; molded bakelite body; body 3/4″ diam x 15/32″ lg less shaft and term; non-shorting type contacts; locking action; solder lug term; 3/8″-32 thd x 1/4″ lg mtg bushing w/ 0.250″ diam x 1/2″ lg shaft; flush mtg; 100 hr salt spray test, lam plastic according to JAN-P-13, type LTS-EM-2 or better, molded plastic according to JAN-P-14, type MTS-G-2 or better, humidity resistant, and 500 v RMS AC test, mechanical and electrical spec all in accordance with RCA spec dwg #8848967	Switches Tuning Capacitors of V-605B		N17-S-60520-5078	1	B-452280-3	S-602	1		1		7	3		2		7	3		2		7
S-603	SWITCH, ROTARY: 2 sect ea having 2 poles, 2 throws, 4 poles, 2 positions; 2 sects; 50 v; coin silver cont; molded bakelite body; body 1″ diam x 1-3/16″ lg less shaft and term; shorting type cont; detent locking action; solder lug term; 3/8″-32 thd x 1/4″ lg mtg bushing w/ 0.250″ diam x ½″ lg shaft; flush mtg; 100 hr salt spray test, lam plastic according to JAN-P-13, type LTS-EM-2 or better, molded plastic according to JAN-P-14, type MTS-G-2 or better, humidity resistant, and 500 v RMS AC test, mechanical and electrical spec all in accordance with RCA spec dwg #8848967	Switches Mark-Space Polarity		N17-S-64977-8101	1	B-452280-2	S-603	1		1		7	3		2		7	3		2		7
S-603A	Part of S-603																				
S-603B	Part of S-603																				
S-604	SWITCH, TOGGLE: DPST; 6 amp at 125 v DC, 3 amp at 250 v DC; phenolic body; 1-1/2″ max lg x 9/16″ max wd x 1/2″ h excluding lever and mtg bushing; bat type handle 5/8″ lg; locking action; position 1 normally open, position 2 normally closed; 4 solder lug term; single hole mtg bushing 15/32″-32 thd x 1/4″ lg; bushing has keyway 0.068″ +0.007″ —0.000″ wd x 0.035″ +0.005″ —0.000″ d extending full length; term hot solder dipped (Part of W-1401)	Switches Screen Supply to V-607 and V-608		N17-S-73115-2931		A-8898230-1	S-604, S-1401, S-1601	2		0		0	6		0		0	6		0		0
S-701	SWITCH, PUSH: 1C and 1C; 13/16″ h x 1-1/8″ wd x 2-9/16″ lg o/a; non-shorting cont; momentary action, 2 cont normally open and 2 cont normally closed; 6 solder lug term; 3/8″-32 thd x 1/4″ lg mtg bushing; shaft 0.250″ x 9/16″ lg flush mtg; 200 hr salt spray, humidity, fungus, vibration and shock resistant in accordance w/ spec RCA dwg #8893265	Switches Signal and Calibration Voltages to V-702		N17-S-58904-2201	1	A-8845231-1	S-701	1		0		1	2		0		2	2		0		2

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS													
									CV-57/URR IF INPUT 395-470 KC (SINGLE)						AN/URA-6 IF INPUT 395-470 KC (DUAL)						AN/URA-7 IF INPUT 50 KC (DUAL)					
									EQUIP		STOCK				EQUIP		STOCK				EQUIP		STOCK			
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
S-901	SWITCH, ROTARY: single pole, 3 throws, 3 positions; single sect; 50 v; coin silver cont; molded bakelite body; body 3/4" diam x 15/32" lg less shaft and term; non-shorting type cont; locking action; solder lug term; 3/8"-32 thd x 1/4" lg mtg bushing w/ 0.250" diam x 1/2" lg shaft; flush mtg; 100 hr salt spray test, lam phenolic plastic according to JAN-P-13, type LTS-EM-2 or better, molded plastic according to JAN-P-14, type MTS-G-2 or better, humidity resistant, and 500 v RMS AC test, mechanical and electrical spec all in accordance with RCA spec dwg #8848967	Switches Grid Inputs to V-903		N17-S-61164-9106	1	B-452280-4	S-901	0		0		0	1		1		2	1		1		2
S-1401	Same as S-604 (Part of W-1401)	Switches AC power																							
S-1601	Same as S-604 (Part of W-1601)	Switches AC power																							
S-1602	SWITCH, ROTARY: 4 poles, 3 positions; single sect; 500 v flashover between cont and case, 100 ma rating ea cont; silver pl term; bakelite; 1-1/4" diam x 27/64" lg; shorting type cont; solder lugs; mts by 1/4" lg bushing w/ 3/8"-32 thd; shaft 1/2" lg x 0.250" diam; stop at 3 o'clock position (Part of W-1601)	Switches M-1601 Positions		N17-S-62615-5896	1	K-259496-5	S-1602	0		0		0	1		1		1	1		1		1
T-101	TRANSFORMER, VARIABLE, RF: osc; 2 wnd, universal wnd; rectangular, aluminum shield can; 3-23/64" lg max x 29/32" sq less mtg attachments; phenolic coil form, powdered iron core; coil form 0.283" OD x 2.375" lg; adj iron core; scdr adj through top of can; mtd by 2 spade type studs #4-40 x 7/16" lg located one ea on bottom ctr of two sides; 6 solder lug term; coil tunes from 410 kc to 545 kc; min Q over freq range is 84 p/m 5%; marked RCA #739972-506, 480 kc; coil wax impr; coil form has black dot on end; coil wax impr; spec 16T36 (ships)	V-101 Osc Coil			1	P-739972-506	T-101	1		1		2	2		1		2	0		0		0

T-102	TRANSFORMER, VARIABLE, RF: preselector, 2 windings, 3 pie universal wnd; rectangular, aluminum shield can; 4-1/64" lg max x 29/32" sq less mtg attachments; (2-17/32" lg less mtg, slugs and bushing); phenolic coil form, powdered iron core; coil form 0.283" OD x 2.375" lg; 2 adjustable iron cores; scdr adj through top and bottom of can; mtd by 2 spade type studs #4-40 x 7/16" lg located one ea on bottom ctr of two sides; 4 solder lug term; coil tunes from 378 kc to 495 kc min; single peak resonance curve when pri is tuned w/ a 100 mmf capacitor across wnd and secd is tuned w/ a 100 mmf capacitor across wnd; marked RCA #739972-501, 430 kc; coil form has blue dot on end; coil wax impr; spec 16T36 (Ships)	400-470 Kc Input		N17-T-81036-9815	1	P-739972-501	T-102, T-103	2		1		3		4		2		3		0		0	
T-103	Same as T-102	400-470 Kc Input																		
T-201	COIL, RF: 50 kc osc, tunes from 87.5 kc to 92.5 kc; single pie universal wnd having 2 taps; rectangular aluminum shield can; wnd c/o 3 strands of 0.0031" diam Litz wire, universal wnd 1/2 cross per turn, tapped at 36 turns and 500 turns; total turns 675; 2-17/32" lg x 0.937" sq less studs; (tuning slug and bushing) lam phenolic form; powdered iron core; adj iron core; scdr adj thru top of can; 2 mtg studs #4-40 thd x 15/64" lg on 0.937" mtg/c; 6 solder lug term on bottom; term B and C are connected w/ copper wire and term E and F are connected w/ copper wire; marked RCA #739972-504; min Q over freq range is 70 p/m 5%; coil wax impr; coil form has yellow dot on end	V-201 Osc Coil		N16-C-76509-6261	1	P-739972-504	T-201	0		0		0		0		0		0		2		1		3
T-202	TRANSFORMER, VARIABLE, RF: preselector, 2 windings, universal wnd; rectangular, aluminum shield can; 4-1/64" lg max x 29/32" sq less mtg attachments; (2-17/32" lg less slugs and mtg studs) phenolic coil form, powdered iron core; coil form 0.283" OD x 2.375" lg; 2 adj iron cores; scdr adj through top and bottom of can; mtd by 2 spade type studs #4-40 x 15/64" lg located one ea on bottom ctr of 2 sides; 4 solder lug term; coil tunes from 47.5 to 52.5 kc min; single peak resonance curve when pri is tuned w/ a 1500 mmf capacitor across wnd and secd is tuned w/ a 1500 mmf capacitor across wnd; marked RCA #739972-502, 50 kc; coil form has a green dot on end; coil wax impr; spec 16T36 (ships)	47.5-52.5 Kc Input		N17-T-81387-4415	1	P-739972-502	T-202, T-203	0		0		0		0		0		0		4		2		8
T-203	Same as T-202	47.5-52.5 Kc Input																		

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)

FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)				
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
T-301	TRANSFORMER, IF: ctr freq, 40 kc; interstage; shielded; 29/32" sq x 2-17/32" h, less mtg screws; powdered iron cores; tuned pri and secd; adj iron core tuning; 2 spade bolts on 0.937" mtg/c; 6 solder lugs; 2 additional coils mtd close to pri wnd provide broad and narrow bandwidth; terms C-D, broad; terms B-D narrow; unit will tune to 40 kc when terms A-F (pri) and terms B-D or C-D (secd) are shunted w/ a 1500 mmf fixed capacitor (not supplied); term F is the pl end of pri wnd; term D the grid end of secd; marked RCA #739972-505, 40 kc; coil has red dot on end; spec 16T36 (ships)	40 Kc IF Input		N17-T-67431-8697	1	P-739972-505	T-301, T-302, T-303	3		3		3	6		3		6	6		3		15
T-302	Same as T-301	Couples T-301 to V-301																			
T-303	Same as T-301	Couples V-301 to V-302																			
T-304	TRANSFORMER, DISCRIMINATOR: ctr freq 40.0 kc when tuned w/ 1500 mmf capacitors; bandwidth between peaks 2.0 kc broad, 1.0 kc narrow; shift in ctr freq when switching from broad to narrow is 25 cycles or less; discriminator; rectangular, aluminum shield can; 4-1/64" lg max x 29/32" sq less mtg attachments; (2-17/32" lg less mtg and tuning slugs) powdered iron core; tuned pri and secd; 2 adj iron cores; mtd by 2 spade type studs #4-40 x 15/64" lg located one ea on bottom ctr of 2 sides; 6 solder lug term; coil wax impr, 4 wnd universal wnd; marked #739972-503, 40 kc; coil form has white dot on end; spec 16T36 (ships)	Couples V-302 to V-303		N17-T-67106-7562	1	P-739972-503	T-304	1		1		1	2		1		2	2		1		5
T-601	TRANSFORMER, AF: line type; pri 12,000 ohms impedance, secd 600 ohms impedance; HS, round metal case; 1-19/32" h x 1-1/32" wd x 1-15/32" lg less term; body 1" diam; 35 mw operating level; turns ratio pri to secd 4.471:1; freq response, flat within 0.5 db total variation from 500 to 2000 cyc; 4 solder lugs on bottom; two 0.136" diam mtg holes on 1.218" mtg/c; impr for tropical use; BuShips spec 16T30 (NT)	Couples V-605A and V-602A to Tone Output		N17-T-62664-3500	1	B-453142-1	T-601	1		1		1	3		0		3	3		0		6

T-801	TRANSFORMER, POWER: fil and pl type; pri taps, for input of 105, 115, and 125 v. 50/60 cyc; single ph; 4 output wnd; secd #1, 6.3 v at 0.6 amp, secd #2, 1.25 v at 0.3 amp, secd #3, 210 v at 70 ma ea side CT; 70 ma total DC output, secd #4, 6.3 v at 6.0 amp, 35 v AC from term 9 and 10, 625 v AC at 0.002 amp from term 9 and 11, these ratings hold when line filter RCA dwg #453146-1 is connected between input term and line voltages; term 13 and 14, 2000 v RMS test; all other wnd tested at 2 x RMS operating +1000 v; oil filled; HS metal case; 5" lg x 3-17/32" h x 2-1/16" d, less mtg studs and term; 14, 1/2" lg solder lug term on standoff ins at bottom of case; four #10-32 thd x 11/32" lg studs, on 1-5/16" x 4-1/4" mtg/c; schematic; 14 marked term on transformer, one term of secd #3 connected to one term of secd #2 (int connection); secd #4 CT connected to term 9 on secd #3; max ambient temp of oper 85°C, 200 hr salt spray test, pri wnd has electrostatic shield; Navy spec 17T30 (int) grade 1	Provides Plate Voltage to Rects V-801 and V-802 and All Fil Voltages		N17-T-73580-1101	1	B-453149-1	T-801	1		1		1	2		1		3	2		1		6
T-1001	TRANSFORMER, POWER: fil and pl type; pri taps for input of 105, 115 and 125 v 50/60 cyc; single ph; 3 output wnd; secd #1, 1.5 v at 0.300 amp, secd #2, 200 v at 70 ma ea side CT; 70 ma total DC output, secd #3, 6.3 v at 6.0 amp, these ratings hold when a line filter RCA dwg #453146-1 is connected between input term and line voltage; all wnd tested at 2 x RMS oper +1000 v; mineral oil; HS metal case; 5" lg x 3-17/32" h x 2-1/16" d less lugs; 10 solder lug term 1/2" lg on standoff ins on bottom of case; four #10-32 studs, on 1-5/16" x 4-1/4" mtg/c; schematic; jumper is connected between term 6-7 (int) for use w/ directly heated bias rect, 1Z2; 24 hr cont oper temp at 85°C, pri has electrostatic shield; Navy spec 17T30 (int) grade 1	Provides Plate Voltage to Rects V-1001 and V-1002 and All Fil Voltages		N17-T-73580-1001	1	B-453148-1	T-1001	0		0		0	1		1		1	1		1		5
V-101	TUBE, ELECTRON: high frequency power triode	Osc (400-470 Kc Unit)	6C4	N16-T-56214			V-101, V-201, V-903	1		0		0	3		0		0	3		0		0
V-102	TUBE, ELECTRON: RF amplr pent, sharp cut-off	AFC	6AU6	N16-T-56203-50			V-102, V-202, V-301, V-302, V-901, V-908	3		0		0	8		0		0	8		0		0
V-103	TUBE, ELECTRON: pentagrid converter	Converter	6BE6	N16-T-56211-50			V-103, V-203	1		0		0	2		0		0	2		0		0
V-201	Same as V-101	Osc (47.5-52.5 Kc Unit)																			
V-202	Same as V-102	AFC																			

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)				
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK		
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
V-203	Same as V-103	Converter																				
V-301	Same as V-102	1st IF Amplr																				
V-302	Same as V-102	IF Limiter																				
V-303	TUBE, ELECTRON: miniature type twin diode	IF Discriminator	6AL5	N16-T-56195			V-303, V-606, V-902, V-909	2		0		0	7		0		0	7		0		0
V-501	TUBE, ELECTRON: remote-cutoff pentode	Cathode Follower	6AB7	N16-T-56127			V-501	1		0		0	2		0		0	0		0		0
V-601	TUBE, ELECTRON: duotriode	AF Amplr I and II	12AU7	N16-T-58241			V-601, V-602, V-603, V-604, V-605, V-904, V-905, V-906, V-907	5		0		0	19		0		0	19		0		0
V-602	Same as V-601	Bal Mod and Trigger Driver																				
V-603	Same as V-601	Trigger I																				
V-604	Same as V-601	Trigger II																				
V-605	Same as V-601	Tone Mod and Tone Osc																				
V-606	Same as V-303	DC Restorer																				
V-607	TUBE, ELECTRON: beam power amplifier	Teletype Keyer	6AQ5	N16-T-56198			V-607, V-608	2		0		0	6		0		0	6		0		0
V-608	Same as V-607	Teletype Keyer																				
V-701	TUBE, ELECTRON: high-mu twin triode	DC Amplr	12AX7	N16-T-58241-6			V-701	1		0		0	2		0		0	2		0		0
V-702	TUBE, ELECTRON: cathode-ray, medium persistence	Cathode Ray Tube for tuning	2BP1	N16-T-52230			V-702	1		0		0	2		0		0	2		0		0
V-801	TUBE, ELECTRON: HV, half wave rectifier	—B Rect	1Z2	N16-T-51990			V-801, V-1001	1		0		0	3		0		0	3		0		0
V-802	TUBE, ELECTRON: miniature type high vacuum rectifier	+B Rect	6X4	N16-T-56840			V-802, V-1002	1		0		0	3		0		0	3		0		0
V-803	TUBE, ELECTRON: voltage regulator, cold cathode type	+B Regulator	OA2	N16-T-52001			V-803, V-1003	1		0		0	3		0		0	3		0		0
V-901	Same as V-102	Channel "A" Amplr																				
V-902	Same as V-303	AVC and Differential Rects																				

V-903	Same as V-101	DC Amplr																	
V-904	Same as V-601	First Control Trigger																	
V-905	Same as V-601	Second Control Trigger																	
V-906	Same as V-601	Gate B Control and Gate B																	
V-907	Same as V-601	Gate A Control and Gate A																	
V-908	Same as V-102	Channel "B" Amplr																	
V-909	Same as V-303	AVC and Differential Rects																	
V-1001	Same as V-801	—B Rect																	
V-1002	Same as V-802	+B Rect																	
V-1003	Same as V-803	+B Regulator																	
W-1401	WIRING, HARNESS: for intermediate freq; c/o interconnecting wire harness and the following: 2 telephone jacks, J-1401, J-1402; RCA part/dwg #7862660-6, 5 connector receptacles, J-1403, J-1404, J-1405, J-1406, J-1407; RCA part/dwg #738962-2, 1 connector plug, P-1401; RCA part/dwg #738961-2, 1 switch, S-1401; RCA part/dwg #8898230-1, 4 solder lug term; RCA part/dwg #67592-24, 22 cond; longest cond 108" lg next longest 65" lg; harness assem occupies a space 14" lg x 4" wd in one direction and 11-5/16" lg x 5" wd in other direction (approx); mtd by connectors, jacks, and switch; color coded wire leads laced w/ nylon cord	Frame Power		N17-W-300906-671	1	E-312451-501	W-1401	1		0	0	2	0	0	2	0	0	
W-1402	CABLE ASSEMBLY, SPECIAL PURPOSE: c/o 19 conductors of #26 AWG, ea 10 strands (one of which is shielded) and 2 conductors #24 AWG, ea 16 strands; individual conductors insulated w/ thermoplastic synthetic compound; all cond rated at 150 vdcw; color coded; cable covered w/ Saran braid, 16 carriers, 4 ends; round 1/2" diam approx; 25-1/2" lg, excluding terminations; one end terminated in connector plug RCA part/dwg #738961-3, other end terminated in connector plug RCA part/dwg #738961-4; spec AN-QQ-S-91	Test Cable From J-1101 to P-1401		N17-C-48892-6585	1	P-740848-501	W-1402, W-1602	1		0	1	3	0	3	3	0	3	

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
W-1601	WIRING, HARNESS: for Combiner Unit; c/o interconnecting wire harness (of 23 cond) and the following: 2 telephone jacks, J-1601, J-1602, RCA part/dwg #7862660-6, 3 connector receptacles, J-1603, J-1604, J-1605, RCA part/dwg #738962-2, 1 connector plug, P-1601, RCA part/dwg #738961-2, 1 switch, S-1601, RCA part/dwg #8898230-1, 1 rotary switch, S-1602, RCA part/dwg #259496-5, 4 solder lug terms, RCA part/dwg #67592-24, 2 solder lug terms, RCA part/dwg #818270-1, harness assem occupies a space approx 63″ lg x 3″ wd in one direction and 11-5/16″ lg x 5″ wd in other direction; mtd by connectors, jacks, and switches	Frame Power		N17-W-300081-101	1	E-312450-501	W-1601	0		0		0	1		0		0	1		0		0
W-1602	Same as W-1402	Test Cable From J-1301 to P-1601																			
W-1701	LINE, RF TRANSMISSION: 12″ lg less terminations; 14″ lg incl terminations; ea end has UG-88/U connector plug; marked W-1701 to W-1712 incl	Diversity Control J-1109 to J-1308		N16-C-11943-3834	1	M-454347-501	W-1701, W-1702, W-1703, W-1704, W-1707, W-1708, W-1709, W-1710	0		0		0	4		0		0	4		0		0
W-1702	Same as W-1701	Diversity Control J-1109 to J-1309																			
W-1703	Same as W-1701	Diversity Control J-1109 to J-1308																			
W-1704	Same as W-1701	Diversity Control J-1109 to J-1309																			
W-1705 and W-1706	Not Used																				
W-1707	Same as W-1701	Diversity Signal J-1110 to J-1310																			
W-1708	Same as W-1701	Diversity Signal J-1110 to J-1311																			
W-1709	Same as W-1701	Diversity Signal J-1110 to J-1310																			
W-1710	Same as W-1701	Diversity Signal J-1110 to J-1311																			

W-1711 and W-1712	Not Used																		
W-1713	CABLE ASSEMBLY, POWER: two #18 AWG stranded cond; synthetic rubber ins; 600 v RMS working; neoprene outer sheath; round 0.330″ max OD; 12-15/64″ lg less terminations; one end terminated in connector plug AN-3106-14S-7S and cable clamp AN 3057-6, other end terminated in connector plug AN 3106-14S-7P and cable clamp AN 3057-6 cable marked W-1713; cable in accordance w/ Navy spec 15-C-1 DCOP-2	Power Output		N17-C-48193-6050	1	M-454352-501	W-1713, W-1714, W-1715, W-1716	0		0	0	2	0	0	2	0	0
W-1714	Same as W-1713	Power Output																	
W-1715	Same as W-1713	Power Output																	
W-1716	Same as W-1713	Power Output																	
X-101	SOCKET, TUBE: 7 cont miniature, axial type; below chassis wafer mtg; two 1/8″ diam mtg holes 7/8″ c to c; oval mineral filled plastic body 1-1/8″ lg x 3/4″ wd x 21/32″ h o/a excluding term; beryllium copper silver pl cont; no metal shock shield, has a 3/32″ ID ctr shield; term ends of cont hot tinned dip	For V-101		N16-S-62603-6446	426 Type XOA-7	K-8890605-1	X-101, X-102, X-103, X-201, X-202, X-203, X-301, X-302, X-303, X-606, X-607, X-608, X-901, X-902, X-903, X-908, X-909	9		0	0	26	0	0	26	0	0
X-102	Same as X-101	For V-102																	
X-103	Same as X-101	For V-103																	
X-201	Same as X-101	For V-201																	
X-202	Same as X-101	For V-202																	
X-203	Same as X-101	For V-203																	
X-301	Same as X-101	For V-301																	
X-302	Same as X-101	For V-302																	
X-303	Same as X-101	For V-303																	
X-501	SOCKET, TUBE: octal; retainer ring and saddle mtg; saddle adapter plate has 2 mtg holes 0.156″ diam on 1.625″ mtg/c; round steatite ceramic body 1-1/4″ diam x 31/64″ h less term; cont phosphor bronze silver pl; term hot tin dipped, SS saddle, steel retainer ring; in accordance w/ Navy DWG RE49XA313A, except for diam mtg holes	For V-501		N16-S-63524-6480	1	B-456824-501	X-501	1		0	0	2	0	0	0	0	0

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS											
									CV-57/URR IF INPUT 395-470 KC (SINGLE)				AN/URA-6 IF INPUT 395-470 KC (DUAL)				AN/URA-7 IF INPUT 50 KC (DUAL)			
									EQUIP		STOCK		EQUIP		STOCK		EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIGNATION	CONTRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. INVOLVED	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
X-601	SOCKET, TUBE: 9 cont miniature axial type; below chassis wafer mtg; 2 elongated mtg holes 0.145" lg x 0.125" wd, 1.125" c to c; oval ceramic body 1.438" lg x 0.859" wd x 23/32" h o/a excluding term; beryllium copper silver pl cont; no metal shock shield, has a 0.167" ID ctr shield; term ends of contacts hot tinned dip, wax impr	For V-601		N16-S-64063-6456	426 Type XOA-C-9	K-8890682-1	X-601, X-602, X-603, X-604, X-605, X-701, X-904, X-905, X-906, X-907	6		0		0	21		0		0	21		0		0
X-602	Same as X-601	For V-602																		
X-603	Same as X-601	For V-603																		
X-604	Same as X-601	For V-604																		
X-605	Same as X-601	For V-605																		
X-606	Same as X-101	For V-606																		
X-607	Same as X-101	For V-607																		
X-608	Same as X-101	For V-608																		
X-701	Same as X-601	For V-701																		
X-702	SOCKET, TUBE: 12 cont medium axial type; tube mtd; round mineral filled plastic body 2-1/16" diam x 29/32" thk o/a excluding wire leads; beryllium copper silver pl cont; no metal shock shield or ctr shield; duo decal, positions #1 and #3 wired together, positions #5 and #11 unused, all other positions wired w/ ext leads keyway between positions #1 and #12 contacts *Wire Table Position* / *Length in Inches* / *Color* 1 / connects to #3 / Buss 2 / 6-1/2 / Red/blk tr 3 / 6 / Wht/grn tr 4 / 7-1/2 / Orange 5 / —— / —— 6 / 6-3/8 / Wht/blu tr 7 / 6-1/8 / Gray 8 / 3-7/8 / Red/grn tr 9 / 2-3/4 / Black 10 / 4-1/4 / White 11 / —— / —— 12 / 3-7/8 / Wht/grn tr RSW	For V-702		N16-S-64286-3948	1	B-449643-1	X-702	1		0		0	2		0		0	2		0		0

X-801	SOCKET, TUBE: 7 cont miniature; above chassis base mtg; 2 mtg holes 0.125″ diam on 0.875″ mtg/c; oval ceramic body 1.144″ lg x 0.75″ wd x 0.217″ h less term; cont beryllium copper, silver pl; cont term ends hot tin dipped; body wax impr	For V-801		N16-S-62603-6461	426 Type XOA-C-7	K-8898606-1	X-801, X-802, X-803, X-1001, X-1002, X-1003	3		0	0	9	0	0	9	0	0		
X-802	Same as X-801	For V-802																	
X-803	Same as X-801	For V-803																	
X-804	SOCKET, TUBE: octal; one-piece saddle mtg; two 0.156″ diam mtg holes on 1-1/2″ mtg/c; round molded mica filled body 1-7/64″ diam x 15/32″ h, less terms; copper or phosphor bronze silver pl conts	For Capacitor C-802		N16-S-63515-6651	133 Cat #9857	K-886972-1	X-804, X-1004	1		0	0	3	0	0	3	0	0		
X-901	Same as X-101	For V-901																	
X-902	Same as X-101	For V-902																	
X-903	Same as X-101	For V-903																	
X-904	Same as X-601	For V-904																	
X-905	Same as X-601	For V-905																	
X-906	Same as X-601	For V-906																	
X-907	Same as X-601	For V-907																	
X-908	Same as X-101	For V-908																	
X-909	Same as X-101	For V-909																	
X-1001	Same as X-801	For V-1001																	
X-1002	Same as X-801	For V-1002																	
X-1003	Same as X-801	For V-1003																	
X-1004	Same as X-804	For Capacitor C-1002																	
X-1401	LIGHT INDICATOR: w/ lens; 21/32″ diam x 11/16″ h white translucent lens; for miniature bayonet, T3-1/4 bulb; enclosed shell; brass shell suitably finished to be corrosion resistant; 1-5/8″ lg x 15/16″ diam o/a; 0.718″ diam mtg hole required, 3/16″ max panel thk; horizontally mtd, lamp replaceable from front of panel; screw type lens; 2 solder lug term located on opposite sides of base of socket; outside of bezel to be finished black nickel followed by black lacquer	For Lamp I-1401		N17-L-76909-4827	780 Cat #91410 XP2-935	A-8898229-2	X-1401, X-1601	1		0	1	3	0	3	3	0	6		
X-1601	Same as X-1401	For Lamp I-1601																	

CONTRACT NObsr-39421

TABLE 8-4. COMBINED PARTS AND SPARE PARTS LIST (Continued)
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

PARTS									SPARE PARTS													
									CV-57/URR IF INPUT 395-470 KC (SINGLE)					AN/URA-6 IF INPUT 395-470 KC (DUAL)					AN/URA-7 IF INPUT 50 KC (DUAL)				
										EQUIP		STOCK			EQUIP		STOCK			EQUIP		STOCK	
SYMBOL DESIG.	DESCRIPTION	FUNCTION	JAN AND (NAVY) TYPE NO.	SIGNAL CORPS AND STANDARD NAVY STOCK NO.	MFGR AND MFGR'S DESIG-NATION	CON-TRACTOR DRAWING AND PART NO.	ALL SYMBOL DESIG. IN-VOLVED	TOTAL NO. PER EQUIP.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.	TOTAL NO. PER EQUIP.	BOX	QUAN.	BOX	QUAN.
Z-501	FILTER, LOW PASS: designed to pass 400 kc, will pass all freq to 550 kc, has sharp cutoff beyond 550 kc; 3-1/2" lg x 1-5/16" sq less leads; input impedance 70 ohms, output impedance 70 ohms; not cased; mtg bkt on bottom w/ 4 tapped holes for mtg on coax connector, receptacle CQA-49194-SO-229; short 2 cond input cable at top, 1 side of output gnd to mtg bkt; other side of output available for soldering to coax connector (not furnished); incl 2 JAN capacitors CM35E512J and 1 JAN capacitor CM35E103K	IF Output Filter		N16-F-44295-1002	1	M-430372-501	Z-501	1	2		0		0	0		0		0	0		0		0
Z-601	FILTER, LOW PASS: low speed attenuation 80 to 140 cps flat within 6 db, 240 cps and above-down not less than 40 db, high speed attenuation 80 to 300 cps flat within 6 db, 500 cps and above-down not less than 40 db; 2-7/8" h x 1-13/16" wd x 1-1/4" d less term; impedance 20,000 ohms, insertion loss not greater than 8 db; HS rectangular metal case; four #6-32 x 1/4" studs, on 13/16" x 1-3/8" mtg/c; 5 solder type term protruding from bottom; max DC cur 0.5 ma at 150 v; RSW and humidity; 500 vdc test; max ambient temp of oper 85 deg C	Suppresses Unwanted Harmonics		N16-F-44012-8428	1	B-453144-1	Z-601	1	3		0		1	3		0		3	3		0		6
Z-1101	FILTER, LOW PASS: begins to cut off at 2000 cyc reaching max cut-off at 14,000 cyc; 3-5/16" lg x 2-3/8" wd x 1-13/16" h o/a; (3-5/16" lg x 1-3/8" wd x 1-1/2" h excluding term and mtg fl); 600 ohm input and 600 ohm output impedance; HS rectangular metal case; six 0.173" diam mtg holes, 3 holes per fl on 2-1/16" mtg/c between fl and 1" mtg/c between holes on fl; 5 solder lug type term; input term 1-2, output term 3-4-5, term 5 CT; 500 vdct; max ambient temp of oper 85°C; insertion loss less than 3 db and uniform within 1 db between 500 and 2000 cyc, 200 hr salt spray test and humidity, shock and vibration resistant; BuShips spec 16T30 (int) grade 1, class A	Suppresses Unwanted Harmonics		N16-F-44039-5266	1	B-453539-1	Z-1101, Z-1301	1	3		0		1	3		0		3	3		0		3

Z-1102	FILTER, LOW PASS: begins cut-off at 14 kc reaching max at 30 mc; 5-1/16″ lg x 2-3/8″ wd x 1-7/8″ h o/a; input impedance 20 ohms; output impedance 140 ohms; HS rectangular metal case; eight 0.173″ diam holes, 4 holes per fl on 1-1/4″ mtg/c, 2 fl spaced 2-1/16″; 4 solder type term; approx 75 w output for use on AC power supply line from 105 to 125 v 50/60 cps single ph, and the line voltage drop incurred by the filter will be not more than 1.5 v at 65 amp load; power loss not to exceed 1.5 w; max ambient temp of operations 85°C; 200 hr salt spray test; shock and vibration resistant; Navy spec 16T30	Suppresses Unwanted Harmonics		N16-F-44150-1001	1	B-453146-1	Z-1102, Z-1302	1	0	1	3	0	3	3	0	3
Z-1301	Same as Z-1101	Suppresses Unwanted Harmonics																		
Z-1302	Same as Z-1102	Suppresses Unwanted Harmonics																		
	CASE: for equipment spare parts; steel, navy gray enamel finish; empty; 12″ lg x 12″ wd x 6″ h o/a; under surface of lid has cardholder; 2 folding type handles, 1 ea end; has hasp and staple for padlock				1	T-618947-504		1	0	0	1	0	0	1	0	0

CONTRACT NObsr-39421

TABLE 8-5. CROSS REFERENCE PARTS LIST

FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

JAN (OR AWS) DESIGNATION	KEY SYMBOL	NAVY TYPE	KEY SYMBOL	NAVY TYPE	KEY SYMBOL	STANDARD NAVY STOCK NO.	KEY SYMBOL	ITEM NUMBER	KEY SYMBOL
CC21HH050D	C-107	RC20BF154K	R-635	RC30BF752J	R-606	N16-C-29608-2201	C-104		
CE52F350N	C-802	RC20BF182K	R-604	RC40BF302J	R-804	N16-C-29893-2126	C-607		
CM20B101K	C-1103	RC20BF183J	R-616	RC40BF332J	R-1402	N16-C-30109-3801	C-204		
CM20B150K	C-304	RC20BF183K	R-101	RC40BF681J	R-1502	N16-C-30183-3619	C-608		
CM20B180K	C-214	RC20BF184K	R-706	RC40BF911J	R-1004	N16-C-30531-4592	C-905		
CM20C101J	C-111	RC20BF185K	R-601			N16-C-30526-2819	C-609		
CM20C101K	C-501	RC20BF223K	R-608	NAVY TYPE	KEY SYMBOL	N16-C-30921-8819	C-610		
CM20C131J	C-904	RC20BF224K	R-605			N16-C-31264-8019	C-611		
CM20C271J	C-104	RC20BF225K	R-708	-24000	S-501	N16-C-31502-2614	C-213		
CM20C471J	C-204	RC20BF244J	R-611	-28032-3	F-1101	N16-C-31660-5014	C-211		
CM20D391G	C-607	RC20BF272J	R-906	-49194	J-501	N16-C-31660-5019	C-612		
CM25B681J	C-905	RC20BF272K	R-106	-49195	P-501	N16-C-32135-3219	C-613		
CM30D182G	C-211	RC20BF273J	R-801	-49435	J-1107	N16-C-32188-1014	C-316		
CM30D152G	C-213	RC20BF274J	R-927	-482869	C-319	N16-C-32636-4863	C-614		
CM30D302G	C-316	RC20BF274K	R-105			N16-C-32720-7543	C-504		
CM30E122G	C-611	RC20BF275K	R-710	ARMY-NAVY TYPE	KEY SYMBOL	N16-C-32826-3133	C-112		
CM30E182G	C-612	RC20BF331K	R-209			N16-C-33617-4746	C-106		
CM30E272G	C-613	RC20BF333K	R-210	AN-3102-14S-7P	J-1108	N16-C-33622-5237	C-505		
CM30E511G	C-608	RC20BF334K	R-707	AN-3102-14S-7S	J-1104	N16-C-33622-5604	C-502		
CM30E681G	C-609	RC20BF391K	R-602	AN-3102-14S-9P	J-1106	N16-C-42733-5951	C-907		
CM30E911G	C-610	RC20BF393J	R-935	AN-3106-14S-7P	P-1104	N16-C-42761-8675	C-615		
CM35C103J	C-106	RC20BF393K	R-207	AN-3106-14S-7S	P-1108	N16-C-42767-6982	C-101		
CM35C562J	C-112	RC20BF394K	R-102	AN-3106-14S-9S	P-1106	N16-C-43632-9000	C-308		
CM35E103K	C-505	RC20BF470J	R-945	UG-290/U	J-1109	N16-C-44111-2680	C-1102		
CM35E472G	C-614	RC20BF471K	R-103			N16-C-45801-8800	C-120		
CM35E512J	C-504	RC20BF471K	R-501	STANDARD NAVY STOCK NO.	KEY SYMBOL	N16-C-45814-8983	C-320		
CM40E103K	C-502	RC20BF472J	R-921			N16-C-46200-9900	C-616		
CP69B5FF254V	C-1001	RC20BF472K	R-612	N16-A-700001-181	O-901	N16-C-47147-9001	C-1101		
CP69B5FG104V	C-801	RC20BF473K	R-107	N16-C-11943-3834	W-1701	N16-C-47148-1001	C-701		
MR25W107SPEC	M-1601	RC20BF474J	R-929	N16-C-15628-2960	C-107	N16-C-48841-9390	C-601		
RC20BF102J	R-628	RC20BF474K	R-703	N16-C-16908-8725	C-119	N16-C-48841-9485	C-919		
RC20BF103J	R-619	RC20BF560K	R-301	N16-C-17217-8437	C-312	N16-C-48841-9486	C-912		
RC20BF103K	R-302	RC20BF561K	R-642	N16-C-17409-8437	C-103	N16-C-48841-9487	C-603		
RC20BF103K	R-502	RC20BF562J	R-609	N16-C-17731-5200	C-418	N16-C-48854-8937	C-318		
RC20BF104J	R-615	RC20BF563J	R-626	N16-C-17742-1841	C-219	N16-C-50756-8805	C-108		
RC20BF105J	R-913	RC20BF563K	R-903	N16-C-18049-8437	C-109	N16-C-54460-6510	C-801		
RC20BF105K	R-104	RC20BF564K	R-806	N16-C-18401-8451	C-909	N16-C-54535-8505	C-1001		
RC20BF105K	R-503	RC20BF681K	R-305	N16-C-18657-8451	C-703	N16-C-55551-1825	C-114		
RC20BF122J	R-944	RC20BF683K	R-310	N16-C-18785-8460	C-702	N16-C-59676-1001	C-105		
RC20BF122K	R-637	RC20BF684J	R-919	N16-C-18849-8648	C-319	N16-C-73329-3531	L-501		
RC20BF123J	R-1001	RC20BF684K	R-313	N16-C-21941-1255	C-802	N16-C-76509-6261	T-201		
RC20BF123K	R-203	RC20BF754J	R-933	N16-C-26447-8676	C-304	N16-F-44012-8428	Z-601		
RC20BF124K	R-108	RC20BF822K	R-206	N16-C-26606-2076	C-214	N16-F-44039-5266	Z-1101		
RC20BF125K	R-631	RC20BF823J	R-936	N16-C-28553-1201	C-111	N16-F-44150-1001	Z-1102		
RC20BF150K	R-312	RC20BF823K	R-306	N16-C-2855-1676	C-1103	N16-F-44295-1002	Z-501		
RC20BF152K	R-212	RC20BF824K	R-111	N16-C-28558-1681	C-501	N16-K-33591-1218	A-501		
RC20BF153K	R-636	RC30BF364J	R-803	N16-C-28816-8201	C-904	N16-R-29070-5501	L-801		
RC20BF154J	R-617	RC30BF431J	R-1007	N16-C-29128-2546	C-104	N16-R-29650-2901	L-601		
				N16-C-29602-9746	C-204	N16-R-49283-811	R-312		

CONTRACT NObsr-39421

TABLE 8-5. CROSS REFERENCE PARTS LIST (Continued)

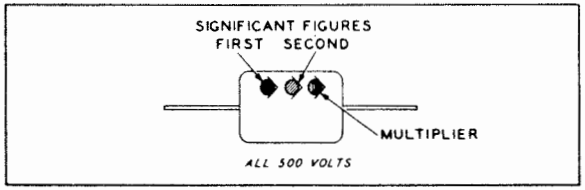
FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

STANDARD NAVY STOCK NO.	KEY SYMBOL	STANDARD NAVY STOCK NO.	KEY SYMBOL	STANDARD NAVY STOCK NO.	KEY SYMBOL	STANDARD NAVY STOCK NO.	KEY SYMBOL	ITEM NUMBER	KEY SYMBOL
N16-R-49426-431	R-945	N16-R-50759-811	R-707	N16-T-58241-6	V-701	N17-I-59387-9459	E-102		
N16-R-49463-811	R-301	N16-R-50776-726	R-803	N16-T-58241-60	V-402	N17-I-59417-6691	E-907		
N16-R-49733-811	R-602	N16-R-50786-811	R-102	N17-B-77536-9380	E-1106	N17-I-69156-6251	E-502		
N16-R-49750-726	R-1007	N16-R-50821-431	R-929	N17-B-77636-9541	E-1105	N17-J-39108-2701	J-1401		
N16-R-49769-811	R-103	N16-R-50822-811	R-703	N17-B-77734-7950	E-906	N17-L-6806-130	I-1401		
N16-R-49769-811	R-501	N16-R-50858-811	R-806	N17-B-77734-7955	E-403	N17-L-76909-4827	X-1401		
N16-R-49805-811	R-642	N16-R-50893-431	R-919	N17-B-77787-2205	E-501	N17-M-19081-9600	M-1601		
N16-R-49841-811	R-305	N16-R-50894-811	R-313	N17-B-77833-9721	E-601	N17-M-54301-8001	B-1101		
N16-R-49904-121	R-1004	N16-R-50911-431	R-933	N17-B-77833-9722	E-602	N17-P-87208-3501	O-1407		
N16-R-49921-431	R-628	N16-R-50930-811	R-111	N17-B-77834-9121	E-905	N17-S-58904-2201	S-701		
N16-R-49939-431	R-944	N16-R-50974-431	R-913	N17-B-77834-9126	E-404	N17-S-59292-2663	S-601		
N16-R-49940-811	R-637	N16-R-50975-811	R-104	N17-B-77982-9571	E-904	N17-S-60520-5078	S-602		
N16-R-49967-811	R-212	N16-R-50975-0811	R-503	N17-B-77982-9601	E-405	N17-S-60907-8578	S-302		
N16-R-49985-811	R-604	N16-R-50993-811	R-631	N17-B-78082-6767	E-1001	N17-S-61164-9106	S-901		
N16-R-50038-431	R-906	N16-R-51038-811	R-601	N17-B-78083-1306	E-801	N17-S-59292-2663	S-601		
N16-R-50039-811	R-106	N16-R-51065-811	R-708	N17-B-78083-1401	E-606	N17-S-62522-3201	S-301		
N16-R-50048-131	R-804	N16-R-51092-811	R-710	N17-B-78177-7712	E-604	N17-S-62615-5896	S-1602		
N16-R-50066-121	R-1402	N16-R-73097-6558	R-632	N17-B-78177-7714	E-605	N17-S-64977-8101	S-603		
N16-R-50129-811	R-612	N16-R-87305-5521	R-613	N17-B-78197-2101	E-302	N17-S-70598-1802	S-501		
N16-R-50128-431	R-921	N16-R-87380-9401	R-633	N17-B-78207-1610	E-301	N17-S-73115-2931	S-604		
N16-R-50164-431	R-609	N16-R-87520-9596	R-905	N17-B-78222-5216	E-902	N17-T-28240-3646	E-303		
N16-R-50218-751	R-606	N16-R-87680-9449	R-923	N17-B-78232-1844	E-101	N17-T-28255-3576	E-609		
N16-R-50237-811	R-206	N16-R-88010-9591	R-705	N17-B-78232-1849	E-201	N17-T-28255-8501	E-1401		
N16-R-50281-431	R-619	N16-R-88040-8526	R-629	N17-B-78242-2201	E-701	N17-T-67106-7562	T-304		
N16-R-50282-811	R-502	N16-R-88180-9430	R-702	N17-B-78252-2101	E-603	N17-T-67431-8697	T-301		
N16-R-50308-431	R-1001	N16-R-88180-9490	R-713	N17-B-78272-5249	E-903	N17-T-73580-1001	T-1001		
N16-R-50309-811	R-203	N16-R-88340-9355	R-318	N17-B-78302-5216	E-901	N17-T-73580-1101	T-801		
N16-R-50336-811	R-636	N16-R-88340-9385	R-715	N17-C-48193-6050	W-1713	N17-T-81036-9815	T-102		
N16-R-50353-431	R-616	N16-R-88340-9477	R-701	N17-C-48892-6585	W-1402	N17-T-81387-4415	T-202		
N16-R-50354-811	R-101	N16-S-117101-278	H-1402	N17-C-70328-1524	P-1108	N17-W-300081-101	W-1601		
N16-R-50372-811	R-608	N16-S-117101-277	O-1406	N17-C-70320-2882	P-1106	N17-W-300906-671	W-1401		
N16-R-50417-811	R-311	N16-S-480001-102	O-1402	N17-C-70588-1524	P-1104	N43-S-99500-10	H-1401		
N16-R-50443-431	R-935	N16-S-480001-103	O-1403	N17-C-71408-5333	P-1701				
N16-R-50444-811	R-207	N16-S-62603-6446	X-101	N17-C-71414-2800	P-501				
N16-R-50480-811	R-107	N16-S-62603-6461	X-801	N17-C-72240-1516	J-1104				
N16-R-50515-406	R-626	N16-S-63515-6651	X-804	N17-C-72596-2880	J-1106				
N16-R-50516-811	R-903	N16-S-63524-6475	X-501	N17-C-72604-1516	J-1108				
N16-R-50552-811	R-310	N16-S-64063-6456	X-601	N17-C-73108-1267	J-1109				
N16-R-50587-431	R-936	N16-T-51990	V-801	N17-C-73108-5890	J-501				
N16-R-50588-811	R-306	N16-T-52001	V-803	N17-C-73139-7587	J-1107				
N16-R-50632-431	R-615	N16-T-52230	V-702	N17-C-73301-6068	J-1403				
N16-R-50651-811	R-108	N16-T-56127	V-501	N17-C-73323-7100	J-1101				
N16-R-50677-431	R-617	N16-T-56195	V-303	N17-C-73588-4094	P-101				
N16-R-50678-811	R-635	N16-T-56198	V-607	N17-C-73617-2350	P-1401				
N16-R-50696-811	R-706	N16-T-56203-50	V-102	N17-C-793001-125	O-1405				
N16-R-50714-811	R-605	N16-T-56211-50	V-103	N17-F-16302-120	F-1101				
N16-R-50722-431	R-611	N16-T-56214	V-101	N17-F-74266-9227	E-1101				
N16-R-50740-431	R-927	N16-T-56840	V-802	N17-G-161779-101	O-1404				
N16-R-50741-811	R-105	N16-T-58241	V-601	N17-G-169757-750	O-1401				

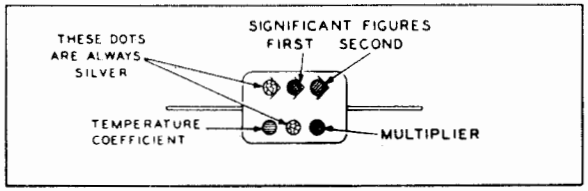
APPLICABLE COLOR CODES AND MISCELLANEOUS DATA

CAPACITOR COLOR CODES

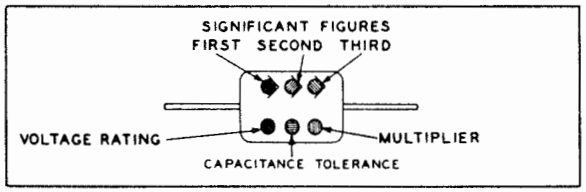
RMA 3-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



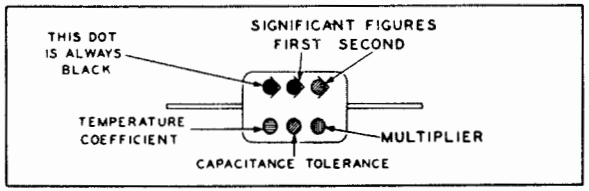
JAN 6-DOT COLOR CODE FOR PAPER-DIELECTRIC CAPACITORS



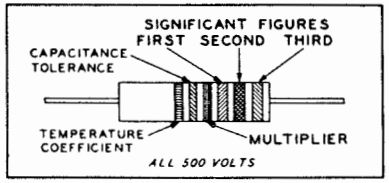
RMA 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



JAN 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS

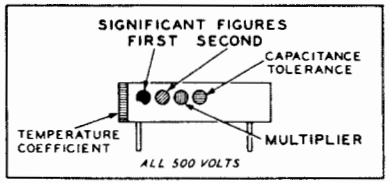


RMA COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS

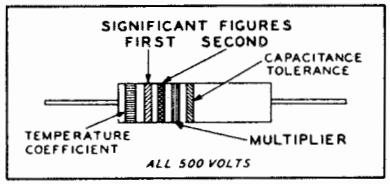


JAN COLOR CODE FOR FIXED CERAMIC-DIELECTRIC CAPACITORS

RADIAL TYPE NON-INSULATED



AXIAL TYPE INSULATED



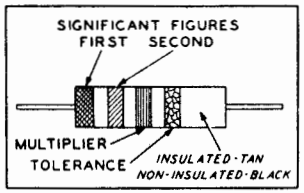
RMA: RADIO MANUFACTURERS ASSOCIATION
JAN: JOINT ARMY-NAVY

RESISTORS				CAPACITORS				
				MULTIPLIER				
TOLERANCE	MULTIPLIER	SIGNIFICANT FIGURE	COLOR	RMA MICA AND CERAMIC-DIELECTRIC	JAN MICA AND PAPER-DIELECTRIC	JAN CERAMIC DIELECTRIC	VOLTAGE RATING	TEMPERATURE COEFFICIENT
	1	0	BLACK	1	1	1		A
	10	1	BROWN	10	10	10	100	B
	100	2	RED	100	100	100	200	C
	1,000	3	ORANGE	1,000	1000	1000	300	D
	10,000	4	YELLOW	10,000			400	E
	100,000	5	GREEN	100,000			500	F
	1,000,000	6	BLUE	1,000,000			600	G
	10,000,000	7	VIOLET	10,000,000			700	
	100,000,000	8	GRAY	100,000,000		0.01	800	
	1,000,000,000	9	WHITE	1,000,000,000		0.1	900	
5	0.1		GOLD	0.1	0.1		1000	
10	0.01		SILVER	0.01	0.01		2000	
20			NO COLOR				500	

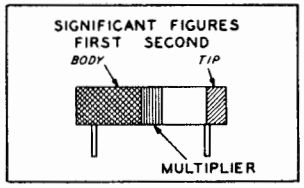
RESISTOR COLOR CODES

RMA COLOR CODE FOR FIXED COMPOSITION RESISTORS

AXIAL TYPE

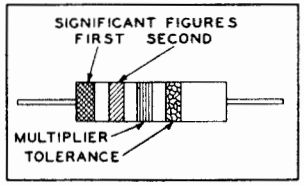


RADIAL TYPE



JAN COLOR CODE FOR FIXED COMPOSITION RESISTORS

AXIAL TYPE INSULATED



RADIAL TYPE NON-INSULATED

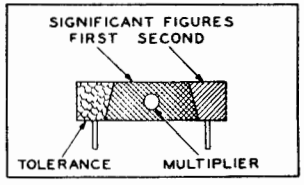


TABLE 8-7. LIST OF MANUFACTURERS

FREQUENCY SHIFT CONVERTER-COMPARATOR GROUPS AN/URA-6, AN/URA-7 AND FREQUENCY SHIFT CONVERTER CV-57/URR

CODE NUMBER	MFR. PREFIX	NAME	ADDRESS
1	CRV	Radio Corp. of America Victor Division	Front and Cooper Streets Camden, N. J.
30	CPH	American Phenolic Corp.	1830 S. 54th Street Cicero, Ill.
47	CHH	Arrow Hart and Hegeman Electric Co.	102 Hawthorne Street Hartford, Conn.
133	CMG	Cinch Mfg. Co.	2339 W. Van Buren Street Chicago, Ill.
248	CG	General Electric Supply Corp.	429 N. 7th Street Philadelphia, Pa.
277	CHC	Hammarlund Mfg. Co.	460 W. 34th Street New York, N. Y.
426	CNA	National Company, Inc.	61 Sherman Street Malden, Mass.
590	CSF	Sprague Electric Mfg. Co.	N. Adams, Mass.
711	CSA	Stackpole Carbon Co.	1942 Tannery Street St. Marys, Pa.
768	CFA	Bussman Mfg. Co.	2538 W. University Street St. Louis, Mo.
780	CAYZ	Dial Light Corp.	900 Broadway New York, N. Y.
784	CLF	Littelfuse Laboratories, Inc.	4757 N. Ravenswood Avenue Chicago, Ill.
786	CTC	Chicago Telephone and Supply Co.	Elkhart, Ind.
788	CBEN	Air-Maze Corp.	5200 Harvard Avenue Cleveland, Ohio
846		Winchester Electronics	New York, N. Y.
1377		Westinghouse Electric and Mfg. Co.	Mansfield, Ohio
1567	CBEL	Electro Engineering Products Co.	627 W. Alexandra Detroit, Mich.
1581	CYS	Speri, Inc.	Beach and Kenilworth Avenue Cincinnati, Ohio
1618	CBCB	H. H. Buggie and Co.	22nd and Madison Streets Toledo, Ohio
1669		Grant Pulley and Hardware	57th and Broadway Woodside, N. Y.
1682	CAKD	Muter Co.	Chicago, Ill.
1685	CBIN	Carter Radio Division Precision Parts Co.	213 W. Institute Place Chicago, Ill.
1727	CBIQ	Wilkor Products Co.	3835 W. 150th Street Cleveland, Ohio

IB-38482-WXY-1

INDEX