RDO RM

0967-034-9030
Formerly 0280-718-7002

NAVSHIPS 94028.42 *Non-Registered*

APPROVED MANUSCRIPT
of
MAINTENANCE STANDARDS BOOK
for

COMPARATOR-CONVERTER GROUP AN/URA-17

SERIAL_____
Number

PREPARED BY
HOFFMAN ELECTRONICS CORP.
MILITARY PRODUCTS DIVISION
LOS ANGELES 7, CALIFORNIA

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS

Contract: NObsr 81579 *Approved by BuShips: 1 JUNE 1961*

24, June 1966

TEMPORARY CHANGE T-3 to
NAVSHIPS 0967-034-9032

TEMPORARY CHANGE T-3
MAINTENANCE STANDARD BOOK FOR
COMPARATOR-CONVERTER GROUP
AN/URA-17 NAVSHIPS 0967-034-9030
(FORMERLY NAVSHIPS 94028.42)

This temporary change revises the book to reflect equipment changes. The purpose of this change is to replace wide-shift bandpass filter FL1 and wide-shift discriminator filter FL3 with filters having a new center frequency of 2000 cps. The change applies to AN/URA-17.

This correction does not supersede any other corrections or changes.

Make the following pen-and-ink corrections. Insert this temporary correction in the maintenance standards book immediately after the front cover.

1. Front cover, under AN/URA-17, add: "AN/URA-17B".
2. Reference Standards Summary sheet, after AN/URA-17, add: "AN/URA-17B, and under CV-483/URA-17, add: "CV-483B/URA-17".
3. Title sheet, under AN/URA-17, add: "AN/URA-17B".
4. Page vi, first paragraph, after AN/URA-17, add: "AN/URA-17B".
5. Page x, middle of page, after AN/URA-17, add: "AN/URA-17B", and under CV-483/URA-17, add: "CV-483B/URA-17".
6. Page xi, first paragraph, after AN/URA-17, insert: "AN/URA-17B", and after CV-483/URA-17, add: "CV-483B/URA-17".
7. Page 1-1, bottom of page, under CV-483/URA-17, add: "CV-483B/URA-17".

TEMPORARY CHANGE T-3 to
NAVSHIPS 0967-034-9032

8. Page 1-2, middle of page, above CV-483/URA-17, add: "CV-483B/URA-17".

9. Page 1-3, under REFERENCE STANDARDS column, under CV-483/URA-17, add: "CV-483B/URA-17".

10. Page 1-5, under REFERENCE STANDARDS column, under CV-483/URA-17, add: "CV-483B/URA-17".

11. Page 1-6, under REFERENCE STANDARDS column, under CV-483/URA-17, add: "CV-483B/URA-17".

12. Page 2-2, under PROCEDURE column, second paragraph, second sentence, after AN/URA-17, insert: "AN/URA-17B".

TEMPORARY CORRECTION TO MAINTENANCE STANDARDS BOOK FOR COMPARATOR-CONVERTER GROUP AN/URA-17 NAVSHIPS 94028.42

This temporary correction provides the Maintenance Standards Book with revised standards.

Make the following pen and ink corrections. Insert this temporary correction in the Maintenance Standards Book immediately after the front cover.

PAGE NO.	CHANGE IN EFFECT	PARA & LINE OR FIG & LOCATION	ACTION
Title	Original	lines 2 and 3	Delete "APPROVED MANUSCRIPT of".
1-3	Original	Step 3, Reference Standards column	Change "(-49.6 to" line to "(-46.6 to".

COMPARATOR-CONVERTER GROUP AN/URA-17
PERFORMANCE STANDARD SHEET

TABLE I. OPERATIONAL PERFORMANCE

SIGNAL CHARACTERISTICS	COPIABILITY
Frequencies: 1000 cps mean frequency with shifts of 10 to 200 cps (narrow shift), or 2550 cps mean frequency with shifts of 200 to 1000 cps (wide shift). Keying Speeds: To 100 words per minute, single channel; or to 400 words per minute, four-channel, time-division multiplex with each channel operating at up to 100 words per minute. Signal Level: From 60 microwatts to 60 milliwatts (0.19 to 6.0 volts).	100% clean copy

TABLE II. STANDARD FOR MEASUREMENT

MEASUREMENT	SECTION AND STEP	STANDARD
Minimum input signal producing perfect copy on teletype printer.	Steps (1) and (2) of Section B in NAVSHIPS 94028.42.	-12 dbm (60 uwatts or 0.19 volt).

TOTAL TIME REQUIRED TO ACCOMPLISH MEASUREMENTS OF TABLE II: 15 minutes

COMPARATOR-CONVERTER GROUP AN/URA-17
NAVSHIPS 94028.42
REFERENCE STANDARDS SUMMARY

Model _____

Serial No. _____

Installed In _____
(Ship or Station)

After the equipment has been brought up to optimum performance and standards accomplished, record on this summary-sheet the test indications which have been entered in this book. Forward this summary-sheet to Chief, Bureau of Ships, Navy Department, Washington 25, D. C

Step No.	Reference Standards CV-483/URA-17	
	Serial	Serial
	_____	_____
	Section A	
1	_____vac	_____vac
2	_____vdc	_____vdc
3	_____vdc	_____vdc
	Section B	
1	_____	_____
2	_____	_____
	Section C	
1	_____	_____

List all field changes which have been accomplished on this equipment _____

_____

_____

_____

Signature _____

Title-Position _____

Date _____

C

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title Page	Original	1-1 to 1-6	Original
ii to xi	Original	2-1 to 2-5	Original

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

IN REPLY REFER TO
Code 242-100

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

Subj: Maintenance Standards Book for Comparator-Converter Group AN/URA-17, NAVSHIPS 94028.42

1. This is the Maintenance Standards Book for the subject equipment and is in effect upon receipt. This publication applies only to the equipment, the serial number and designation of which appear on the cover and title page.

2. When superseded by a later edition, this publication shall be destroyed.

3. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

4. Errors found in this publication (other than obvious typographical errors), which have not been corrected by means of Temporary Corrections or Permanent Changes, should be reported. Such report should include the complete title of the publication and the publication number (short title); identify the page and line or figure and location of the error; describe the error or indicate what change should be made; and be forwarded to the Publications Section of the Bureau of Ships.

5. All Navy requests for Bureau of Ships electronic publications should be directed to the Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania.

R. K. JAMES
Chief of Bureau

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTION

FRONT MATTER

RECORD OF FIELD CHANGES

Field changes considered in preparation of this book: none.

F.C. NO.	DATE COMPLETED	TESTS AFFECTED	
		PAGE NO.	STEP NO.

F.C. NO.	DATE COMPLETED	TESTS AFFECTED	
		PAGE NO.	STEP NO.

INTRODUCTION

General

This Maintenance Standards Book is to be assigned permanently to a specific installation of Comparator-Converter Group AN/URA-17.

The tests prescribed herein provide the engineer and maintenance (or operating) personnel with a systematic and efficient method for checking the above equipment, and for performing routine preventive maintenance. This book contains a series of maintenance standard test procedures which provide indications representing top performance of the specific equipment, and a series of maintenance check-off procedures which, when performed as directed, will detect impending failures before they occur.

Upon receipt of this book, record the serial number of the equipment to which this book is assigned. Enter the serial number, in ink, in the space provided on both the cover and title page.

This book is divided into two parts. Part I--Test Procedures and Maintenance References contains maintenance standard tests which, when properly performed, provide indications representing top performance of individual circuits and/or functional sections of the subject equipment--these indications also characterize over-all performance of this equipment. Part II--Preventive Maintenance Check-Off contains a schedule for efficient preventive maintenance of the equipment.

Prior to performing maintenance standards, Part I, it shall be ascertained that the equipment is operating at its design capabilities. After proper operation of the equipment has been established, the tests in Part I are to be accomplished by qualified personnel and the indications therefore recorded. These recorded values are Reference Standards and are not to be altered except when yard overhaul or major field change warrants such revision.

The preventive maintenance tests, in Part II, provide maintenance (or operating) personnel with a systematic method for performing preventive maintenance routines to maintain the operating efficiency of the equipment. If the tests are performed as directed, they will provide an equipment performance history. With a little reasoning, a technician can tell very quickly how the equipment is performing and detect impending failures before they occur.

Any field changes that are made to the equipment must be entered on page v of this book by the person making the field change; this entry should be followed by his initials, in the space provided. If the field change should require a change in any of the steps in this book, the steps must be changed, in ink, on the applicable pages, so as to provide maintenance (or operating) personnel with an accurate method for testing the equipment.

Part I--Test Procedures and Maintenance References

The maintenance standards test indications for Part I of this book are to be established and recorded upon completion of the installation, and these recorded values should be altered only when a yard overhaul or major field change necessitates such revision. Before establishing the test indications, personnel qualified on this equipment shall first check the equipment thoroughly, and make any necessary adjustments, to ensure that all circuits are operating to the maximum of their design capabilities.

NOTE

IF COPIES OF THIS BOOK ARE NOT AVAILABLE FOR A SPECIFIC SHIP (OR INSTALLATION) USE A LIBRARY COPY OF THE BOOK TO ACCOMPLISH THE REQUIRED TESTS AND RECORD THE RESULTS ON LOCALLY REPRODUCED SUMMARY SHEETS. PROVIDE THE SHIP (AND THE BUREAU OF SHIPS) WITH A CERTIFIED COPY OF THE SUMMARY SHEET, TOGETHER WITH INSTRUCTIONS TO OBTAIN A COPY OF THE BOOK AND RECORD THE STANDARDS THEREIN.

FRONT MATTER

INTRODUCTION (CONT.)

Part I--Test Procedures and Maintenance References (Cont.)

When it has been established that the equipment is operating properly, the steps are to be performed by qualified personnel and all results are to be entered, in ink, in the REF. STD. column of the charts in Part I of this book. The procedures designated by step numbers enclosed in stars (① , ② , etc.) are referred to in the Performance Standards Sheet for this equipment.

The procedures for obtaining the maintenance standard test indications are given in a series of charts; each chart, or group of charts, covers a functional section of the equipment. Each section is designated by a letter (A, B, etc.). These designations are identified on the block diagram, page 1-1.

At the top-right of the first chart page for each functional section is a list of the test equipment, if any, required to properly perform the checks in that section. At the top-left of each chart page is a list of operating conditions and control settings. These apply to the entire page unless other conditions and settings are given for some of the steps.

The illustration page facing each chart page shows the equipment setup pertaining to each of the procedural steps of that chart page, and each setup carries a "step" number (enclosed in either a circle or a star) corresponding to the step of the chart to which it applies. Arrows leading from this "step" number graphically present certain basic information given in the associated step of the chart, as follows: the point where the test equipment is to be connected; the setting of the pertinent control or switch; and the indicator from which the test reading is to be taken.

The tolerances shown in parenthesis in the REF. STD. column are not absolute limits; they indicate maximum and minimum limits of a specific test for which satisfactory operation can be expected for units of the same model.

The front part of the book contains a Test Procedures and Maintenance References Summary (tearout sheet). After the tests have been performed, record on this Summary sheet all the standards obtained and a list of all Field Changes that have been made, and forward the sheet to the address shown thereon.

Part II--Preventive Maintenance Check-Off

Part II of the book contains check procedures to be performed by the maintenance technician or operators; the procedures are scheduled for regular monthly and quarterly periods. Accompanying the group of quarterly procedures is a two-year time-schedule table. When initially entering the results of the checks in the first blank column of the table, the appropriate date should also be entered at the top of that column Appropriate dates should be entered at the top of subsequent columns when required.

Various checks (indicated by O.M.) may be performed as part of the Operational Maintenance Program by operating personnel. At the top-right of the first chart page for each period is a list of test equipment, if any, required to perform the procedure within that period.

Upon completing each check as prescribed in the charts, enter the results in the time-schedule tables accompanying the charts. These entries are of prime importance, for they indicate whether or not the equipment is performing at maximum efficiency. Comparison of a given reading with readings previously obtained, and with the initial maintenance standard test indications (Part I), will quickly reveal any significant change. It is expected that the readings will show nominal variances from time to time. This does not necessarily mean that the equipment is operating improperly. If, however, a particular step shows a reading which varies progressively in the same direction every time the check is made, it is an indication of improper operation or of impending failure, and corrective measures should be taken.

INTRODUCTION (CONT.)

Part II--Preventive Maintenance Check-Off (Cont.)

Whenever a Preventive Maintenance Check-Off test requires the same procedure as that of a step given in the Test Procedures and Maintenance References part of this book, the technician is directed to perform that step. The results obtained by the technician should be exactly the same as those already recorded in the referenced step except for nominal variances. The results of the test, for any steps so referenced, should be entered in the usual way, in Part II of this book, in the time-schedule tables provided.

IN PORT PROCEDURES: The equipment should not be energized daily for the sole purpose of making daily checks. The equipment should, however, be energized at least twice a week and at least two days before getting underway. Enter "IN PORT" in the blanks as appropriate.

FRONT MATTER

TEST EQUIPMENT (OR EQUIVALENT) TO BE USED

Multimeter AN/PSM-4

TELETYPE SYSTEM:

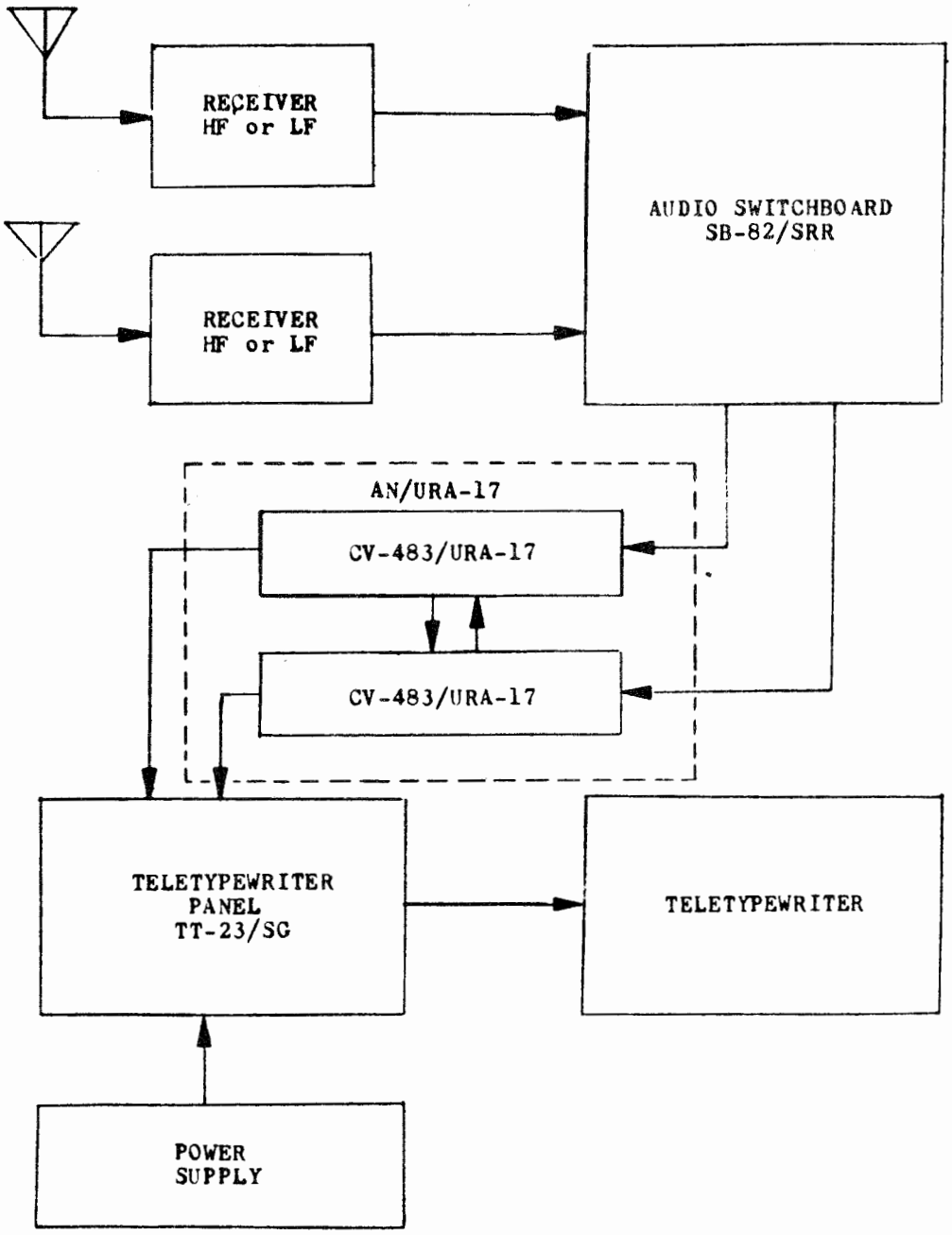
HF Receiver, R-390/URR or AN/WRR-

LF Receiver, AN/SRR-11

Teletype Panel, TT-23/SG

Teletype System Power Supply

Teletypewriter



BLOCK DIAGRAM OF TELETYPE SYSTEM

Step (1)

SPECIAL PROCEDURES AND ADJUSTMENTS

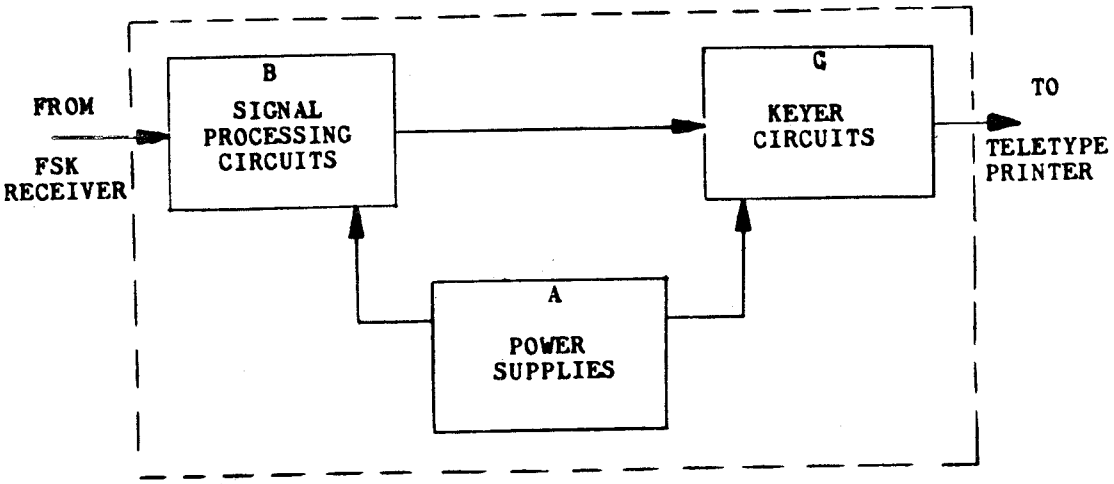
The following test applies to Comparator-Converter Group AN/URA-17 when operated as a group in a diversity receiving system. The tests in Parts I and II of this Maintenance Standards Book apply only to individual Frequency Shift Converters CV-483/URA-17.

Operating Conditions and Control Settings:

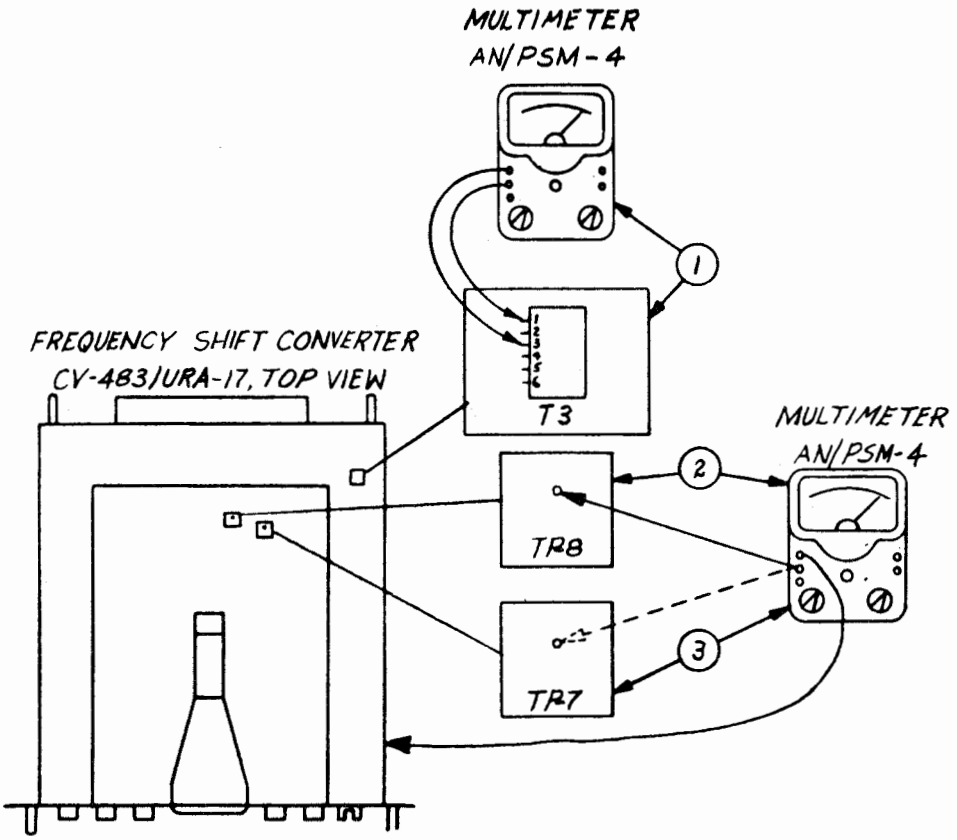
Equipment energized, connected to fsk receivers and teletype printer, and adjusted for diversity operation as described in Technical Manual NAVSHIPS 94028, paragraph 3-2g(2). Teletype printer loop dc current adjusted to 60 ma as described in Technical Manual NAVSHIPS 94028, paragraph 2-5a(2)(b). Teletype printer printing clear copy.

STEP NO.	STEP ACTION REQUIRED	PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STANDARD
(1)	Operational check with simulated signal fading.	Reduce audio output from one receiver to zero. Increase audio output to 0.06 milliwatt, and reduce audio output from other receiver to zero. Increase audio output to 0.06 milliwatt.	Teletype printer	_____ (Prints clean copy) _____ (Prints clean copy)
		Move cable connected to TTY OUTPUT receptacle (J6) at rear of one converter to the TTY OUTPUT receptacle (J6) on other converter, and repeat this step.	Teletype printer	_____ (Prints clean copy) _____ (Prints clean copy)

Part 1 - TEST PROCEDURES AND MAINTENANCE REFERENCES



BLOCK DIAGRAM OF FREQUENCY SHIFT CONVERTER
CV-483/URA-17


MULTIMETER
AN/PSM-4
1
T3
FREQUENCY SHIFT CONVERTER
CV-483/URA-17, TOP VIEW
MULTIMETER
AN/PSM-4
2
TR8
3
TR7

POWER SUPPLIES

Steps (1) through (3)

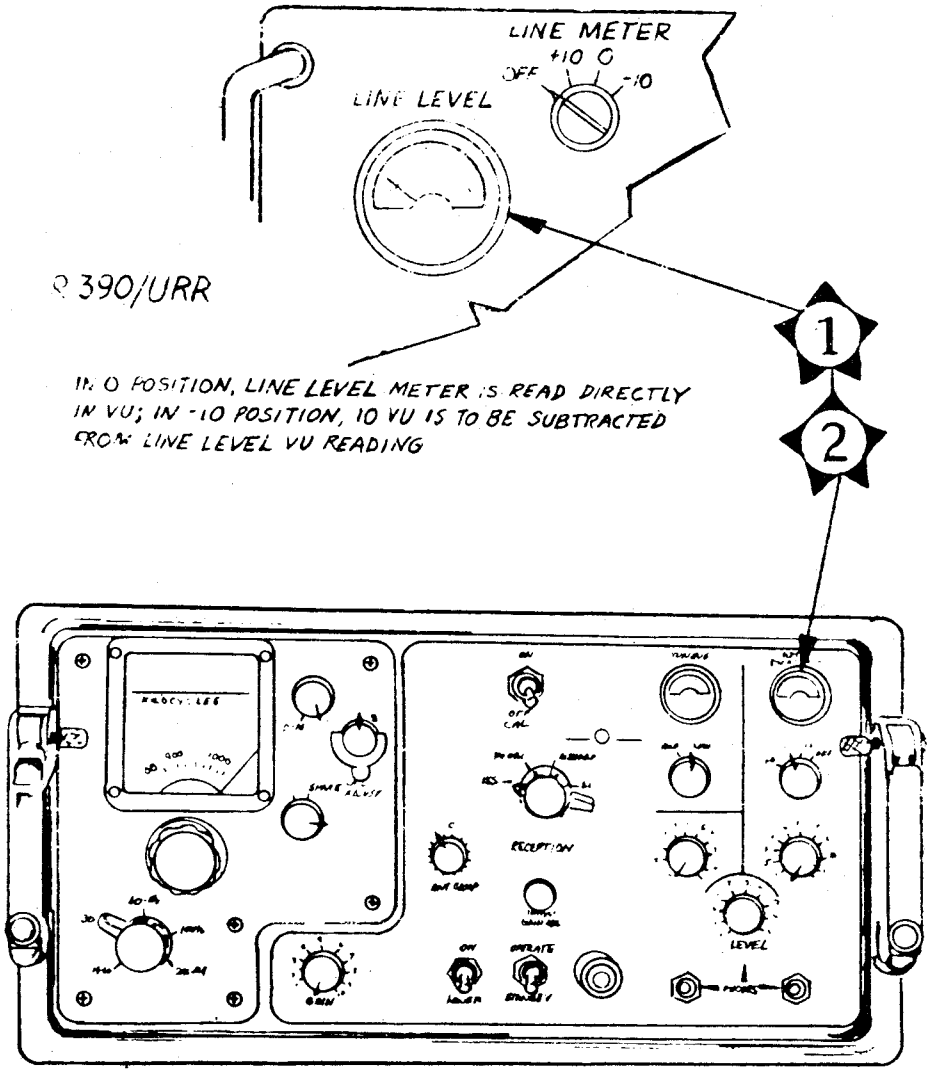
Operating Conditions and Control Settings:

Equipment in normal operation (see Paragraph 8, page vi).

Test Equipment Required:

Multimeter AN/PSM-4

STEP NO.	STEP ACTION REQUIRED	PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STANDARDS CV-483/URA-17 SERIAL NO. _____	REFERENCE STANDARDS CV-483/URA-17 SERIAL NO. _____
(1)	Record input line voltage.	Set Multimeter to 250 VAC range. Connect test leads to terminals 1 and 3 of T3.	AN/PSM-4	_____vac (105 - 125)	_____vac (105 - 125)
(2)	Record converter +48 supply voltage.	Set Multimeter to 100 VDC DIRECT range. Connect negative test lead to chassis, positive lead to terminal TP-8.	AN/PSM-4	_____v (+46.6 to +49.4 v)	_____v (+46.6 to +49.4 v)
(3)	Record converter -48 supply voltage.	Set Multimeter to 100 VDC REVERSE range. Connect negative lead to chassis, positive lead to terminal TP-7.	AN/PSM-4	_____v (-49.6 to -49.4 v)	___ ___v (-49.6 to -49.4 v)



AN/SRR-11

READS OUTPUT POWER LEVEL BETWEEN -20db AND +25 db WHEN USED IN CONJUNCTION WITH ADD DECIBEL SWITCH. OUTPUT METER SHOULD BE TURNED TO +20 db POSITION WHEN NOT READING SIGNAL STRENGTH.

SIGNAL PROCESSING CIRCUITS

Steps ① and ②

Operating Conditions and Control Settings:

Equipment in normal operation (see paragraph 8, page vi),
SHIFT switch (S1): WIDE
LEVEL control (R4): 3

Test Equipment Required:

Teletype System

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STANDARDS CV-483/URA-17	
NO.	ACTION REQUIRED			SERIAL NO. _____	SERIAL NO. _____
①	Record converter sensitivity, wide shift signal.	Tune receiver to strong teletype signal between 2-30 mcs. Print signal on teletypewriter. Reduce receiver audio gain until teletypewriter garbles or stops printing. Increase audio gain until teletypewriter prints clean copy. Record receiver audio output level. Repeat for each converter.	Output meter of receiver.	_____ dbm -12 dbm (max)	_____ dbm -12 dbm (max)
②	Record converter sensitivity, narrow shift signal.	Tune receiver to strong teletype signal between 15-600 kcs. Set converter SHIFT switch to NARROW. Print signal on teletypewriter. Reduce receiver audio gain until teletypewriter garbles or stops printing. Increase audio gain until teletypewriter prints clean copy. Record receiver audio output level. Repeat for each converter.	Output meter of receiver.	_____ dbm -12 dbm (max)	_____ dbm -12 dbm (max)

Step (1)

AXIS RESTORER AND LOCKUP CIRCUIT

Operating Conditions and Control Settings:

Equipment adjusted for normal operation (see paragraph 8, page vi).
LEVEL control (R4): 3

Test Equipment Required

Teletype System

STEP NO.	STEP ACTION REQUIRED	PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STANDARDS CV-483/URA-17 SERIAL NO. _____	REFERENCE STANDARDS CV-483/URA-17 SERIAL NO. _____
(1)	Observe lockup operation.	Teletype system adjusted for reception of teletype signals and teletypewriter printing correctly. Turn off ac power to receiver. Teletypewriter should return to a stop printing (mark) condition. Conduct tests for each converter.	- - -	_____ (normal) Locked up in mark condition.	_____ (normal Locked up in mark condition.

Step (1)

Operating Conditions and Control Settings:

INTENSITY control (R93), FOCUS control (R92), HORIZ CENTERING control (R77), VERT CTR control (R31): fine, clear pattern.
Equipment adjusted for normal operation (see paragraph 8, page vi).

Test Equipment Required:
None

STEP		PROCEDURE
NO.	ACTION REQUIRED	
(1)	Check scope pattern on each converter.	With teletype signal being received, check to see that mark-space signal pattern on cathode ray tube coincides with upper and lower calibrating lines and that the teletypewriter is printing correctly.

Time Schedule: Check (X) and initial. Approx. Time Req'd. for Weekly Check - 10 minutes.

First Year of Operation

Enter Month:

STEP	WEEK												
(1)	1												
	2												
	3												
	4												
	5												

Second Year of Operation

Enter Month:

STEP	WEEK												
(1)	1												
	2												
	3												
	4												
	5												

Step (1)

Operating Conditions and Control Settings:

POWER switch (S6): OFF.

Test Equipment Required:

None

STEP NO.	STEP ACTION REQUIRED	PROCEDURE
(1)	Clean and inspect comparator-converter group.	WARNING BEFORE PROCEEDING FURTHER WITH THIS TEST IT IS IMPERATIVE THAT THE 117 VOLT AC SUPPLY BE DISCONNECTED FROM THE EQUIPMENT. Clean all units of Comparator-Converter Group AN/URA-17 equipment using clean, non-linting cloth moistened with dry cleaning solvent, WH6850-274-5421; then dry, using clean, non-linting, dry cloth. Sandpaper all rust areas, clean, and repaint with matching color. Check all loose assembly screws and bolts; tighten, if necessary; replace, if missing. Remove units from rack or table. Using solvent-moistened cloth, clean all accessible interior surfaces of all units. Examine all resistors, capacitors, transformers and reactors. Replace resistors showing signs of moisture and/or discoloration. Replace capacitors from which wax is leaking. Replace transformers and reactors from which large quantities of compound is leaking. Examine transistor sockets and multiple connectors of each converter unit for cracks, and replace as necessary.

Time Schedule: Check (X) and initial. Approx. Time Req'd for Monthly Check - 1 hour.

1st Year of Operation

Enter Month:

MONTH:												
STEP (1)												
INITIAL												

2nd Year of Operation

Enter Month:

MONTH:												
STEP (1)												
INITIAL												

AN/URA-17

Part II - Quarterly

Operating Conditions and Control Settings:

As given for referenced steps.

Steps (1) and (2)

Test Equipment Required:

Teletype System

STEP		PROCEDURE
NO.	ACTION REQUIRED	
(1)	Record converter sensitivity, wide shift signal.	Perform step (1) of Section B, Part I. Obtain proper indication and record.
(2)	Record converter sensitivity, narrow shift signal.	Perform step (2) of Section B, Part I. Obtain proper indication and record.

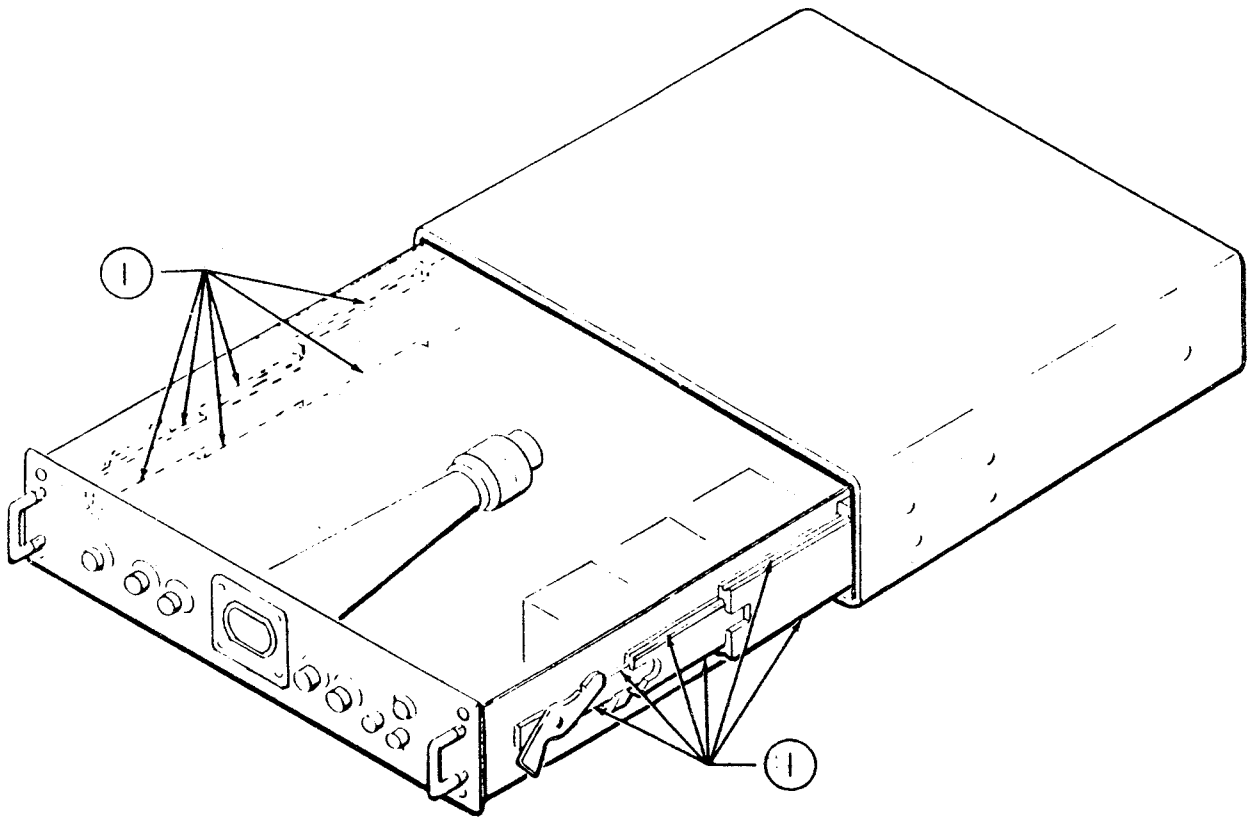
Time Schedule: Record and initial, Approx. Time Req'd for Quarterly Checks: 30 minutes.

1st Year of Operation — 2nd Year of Operation

QUARTER	____ QUARTER	____ QUARTER	____ QUARTER	____ QUARTER	____ QUARTER	____ QUARTER	____ QUARTER	____ QUARTER
STEP (1)								
STEP (2)								
INITIAL								

Upon completion of the third quarterly check of the second year, order a new copy of this book for the next two year period from the nearest District Publications and Printing Office.

Step (1)



APPLY LIGHT LUBRICATION OIL, SPARINGLY, TO EACH DRAWER SLIDE SURFACE

AN/URA-17

Part II - Semiannual

Operating Conditions and Control Settings:

Step (1)

Test Equipment Required:

Equipment De-energized.

None

STEP		PROCEDURE
NO.	ACTION REQUIRED	
(1)	Lubricate drawer slides.	Apply light lubricating oil MIL-L-15016, Stock No. GS9150-235-5575, sparingly to each drawer slide surface.

Time Schedule: Check (X) and initial, Approx. Time Req'd for Semiannual Check - 10 minutes.

	1st Year of Operation		2nd Year of Operation	
Semi-Annual	_____ Half 19____	_____ Half 19____	_____ Half 19____	_____ Half 19____
Step (1)				
Initial				