

**MIL-HDBK-162A
VOLUME 1 OF 2
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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TM 11-487C-1

**MILITARY STANDARDIZATION HANDBOOK
UNITED STATES
RADAR EQUIPMENT**

FSC MISC

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INTRODUCTION

1. PURPOSE

MIL-HDBK-162A is intended to provide, in concise and convenient form, f a c t u a l data to familiarize maintenance and engineering personnel and government contractors with the characteristics and physical make-up of radar equipments use within the Department of Defense. In the case of govern-ment contractors, sufficient information is provided for determination that an item of equipment is suit-able or unsuitable for a contemplated application, usually without recourse to supplemental detailed data. If detailed data is required to consider possible modification of the item, the item description will readily reflect availability of publications for requisition through proper channels.

2. SCOPE

This publication contains technical and functional descriptions, logistical information, installation considerations, and reference data for radar equipments used in the Department of Defense. Ground, airborne, and shipborne equipments are included.

3. ARRANGEMENT OF CONTENTS

MIL- HDBK-162A is a two-volume publication. Volume 1 contains descriptions of unclassified radar equipments, while Volume 2 contains descriptions only of those equipments classified "CONFI-DENTIAL." Each volume is divided into three major sections - Ground Radar, Airborne Radar, and Shipborne Radar. Within each section, equipments are listed alphanumerically, according to type designation.

Equipments are designated by one of the five nomenclature systems used in this handbook. Although the majority of the equipments are designated according to the Joint Electronics Type Designation System (JETDS), the following systems are also used: (Appendix A contains detailed explanations of each of these systems).

- a. Signal Corps Nomenclature System
- b. Navy Model Letter System
- c. Navy Type Designation System
- d. Navy Experimental Model Letter System

4. GLOSSARY OF ABBREVIATIONS

Appendix B is a glossary of the abbreviations used in this publication. Abbreviations are listed alphabetically, letter-by-letter, without regard to punctuation or the number of words contained in the abbreviated phrase.

5. DETAILS OF CONTENT

Descriptions of individual equipments are presented in a standard format. The first page of each description includes an illustration (if available) and all information, needed for general identification of the equipment. More detailed information appears on a second and, succeeding pages. The nomenclature at the top of each page indicates the specific equipment described on that page. Parentheses attached to the type designation indicate that the description applies to more than one model of the equipment. If only specific models of an equipment are covered by a description, the type designation for each is listed at the top of the page.

Cognizant Service is defined as that service responsible for procuring the equipment and/or applying for its nomenclature.

FSN is the abbreviation of Federal Stock Number, the number assigned to an equipment for supply cataloging. The FSN is a combination of the Federal Supply Classification number and the Federal Item Identification Number.

If available, a photograph of. each equipment is included. For some of the complex equipments,

stylized drawings are used. Minor accessories are deleted from most of the photographs, and, in some, not all major components are shown.

Data is included for only the major operating components. The topics covered are:

- (1) Functional Description
- (2) Relation to Similar Equipment
- (3) Technical Description
- (4) Installation Considerations
- (5) Reference Data and Literature

In addition, a table, listing principal components with dimensions and weights, is included.

6. STATUS OF EQUIPMENT CLASSIFICATION

Each department of the Department of Defense uses its own status of equipment classification.

a. U. S. Army Equipment Classification System. The following terms are used by the U. S. Army to describe the status of Army equipment.

(1) Standard A (Std-A) designates items which are preferred for operational requirements. Both complete and end items and necessary repair parts and components may be procured.

(2) Standard B (Std-B) designates items which are acceptable to fill operational requirements. Repair parts and components to support end items already in the system may be procured. Complete end items will not be procured without program approval by the Deputy Chief of Staff for Logistics.

(3) Standard C (Std-C) designates items which are only marginally accepted for operation requirements, and will be phased out of the system as stocks of more acceptable items become adequate to meet requirements. End items in stock may be maintained to the extent permitted by repair parts and components already on hand or by cannibalization. No procurement of repair parts or complete overhaul programs in this category will be effected without program approval by the Deputy Chief of Staff for Logistics.

(4) Obsolete type (Obs) designates an item or assemblage which has been declared unsuitable for military (Army) use. Obsolete

items will not be issued and will be disposed of at the earliest practicable date by the chief of the responsible agency in accordance with the existing instructions, except in those special cases where they are to be retained for special requirements outside of the established Army supply program. Where the development and procurement status of the new types make such action desirable, the chief of the responsible development agency will recommend reclassification of former types through the technical committee.

b. U. S. Navy Equipment Classification System. The following terms are used by the U. S. Navy to describe the status of its equipment.

(1) Standard (Std). The most advanced and satisfactory articles adopted, and those which are preferred for procurement.

(2) Limited standard (Ltd Std). Articles which do not have satisfactory military characteristics as standard articles, but are usable substitutes for standard articles. Complete major units will not be procured, but component parts and accessories and complementary articles, even though they may be limited standard articles, may be procured if necessary and economical, to maintain the complete major units in serviceable condition throughout a reasonable life expectancy.

(3) Substitute standard (Sub Std). Articles which do not have as satisfactory military characteristics as standard articles and, when necessary, may be procured to supplement the supply for standard articles.

(4) Planned standard (P Std). Those articles under evaluation which have been indicated by the Ship Characteristics Board for installation through the Ship Improvement Guide on new construction and conversion projects. Approval for service use prior to installation is required for articles in this category.

(5) Obsolescent (Obsoles). Those articles which do not have satisfactory military characteristics. Complete units, component parts, accessories, and complementary articles normally will not be procured for the specific purpose of maintaining this equipment; however, spare parts common to other equipment in the supply established may be used for their maintenance.

(6) Obsolete (Obs). Those articles that have been declared unsuitable for their original military purpose. Disposal of obsolete articles will, in all cases, be expedited.

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c. U. S. Air Force Equipment Classification System. The following terms are used by the U. S. Air Force to describe the status of its equipment.

(1) Standard (Std). An item that meets an established need and is considered suitable for Air Force use.

(2) Alternate standard (Alt Std). An item that may not be so satisfactory as a standard item, but which is a usable alternate for procurement in quantity in place of the standard item when the standard item cannot be procured in quantities to satisfy Air Force needs.

(3) Limited standard (Ltd Std). An item in stock that is not as satisfactory as either standard or alternate standard items but which is usable in place thereof. Limited standard items may be used until stocks are exhausted. Limited standard end items will not be procured. Additional parts and components may be procured when necessary to maintain the item in serviceable condition.

(4) Tentative standard (Tent Std). An item that appears promising enough operationally to warrant the risk of initiating production of limited quantities prior to the completion of development or prior to completion of testing.

(5) Obsolete (Obs). An item that no longer meets Air Force needs.

(6) Development (Dev). Any new or significantly redesigned item undergoing development or testing and which has not been re-leased as a satisfactory prototype for procurement in quantity for limited or general Air Force use. This classification is not normally assigned to commercial items or to items developed and tested by other Government agencies when being considered for use by the Air Force.

d. "Used By" Status Designation. Certain items of equipment are not assigned any of the equipment classifications defined in paragraphs a through c. These certain items of equipment are designated as "Used By" the particular service involved.

7. CURRENCY OF INFORMATION

Information in this publication is current as of the date on the first page of each equipment description.

8. NONAVAILABLE DATA

Space is provided for the insertion of data which was not available during the preparation of this publication.

9. CHANGES

Changes will be made as required to add information about current equipment. Reports of errors and omissions should be submitted through departmental custodians.

SECTION 1

GROUND RADAR EQUIPMENT

DATE: 1 July 1964

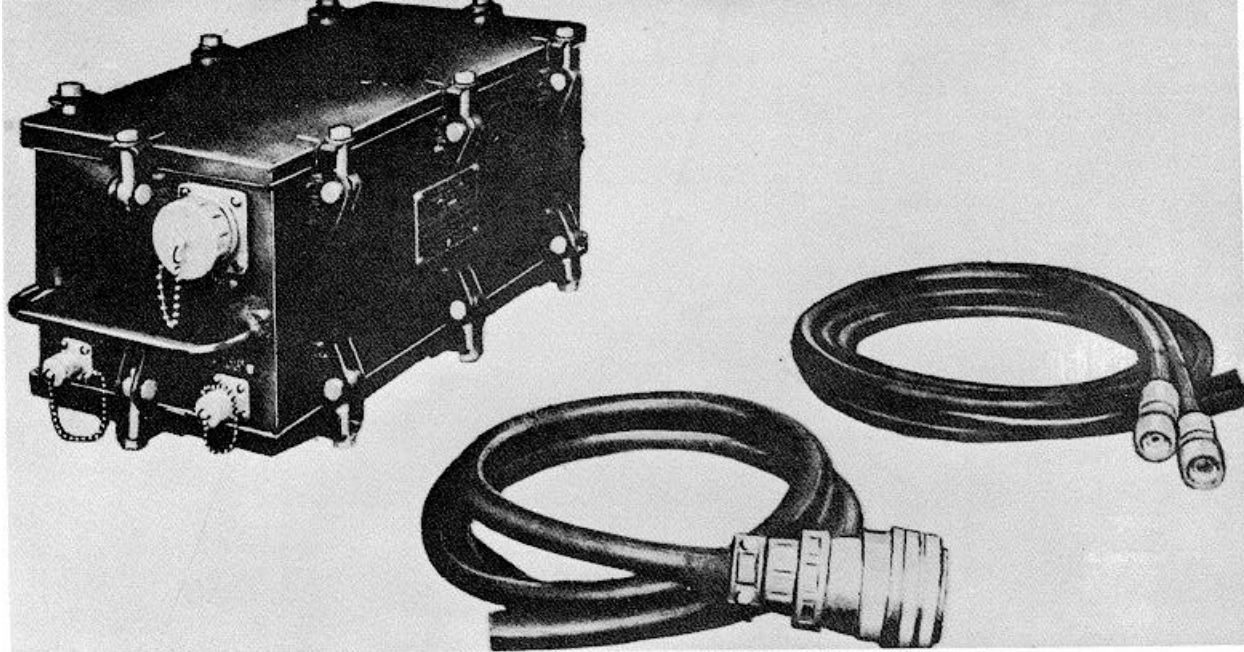
ITEM NAME: VIDEO AMPLIFIER

COGNIZANT SERVICE: USN

TYPE: AM-229/UP

FEDERAL STOCK NUMBER:

	USA	USN	USAF	USMC
STATUS OR TYPE CLASSIFICATION				
Mfg (s) Name or Code Number: National Electrical Machine Shops Inc, Silver Spring, Md				



FUNCTIONAL DESCRIPTION

The AM-229/UP is a repeater unit for video signals and trigger pulses. It is designed to be used when it is desired to transmit radar data to a remote repeater at a distance in excess of the maximum distance ordinarily

allowed. Since the video and trigger voltage outputs of the various radar equipments vary considerably, the distance at which the use of the video amplifier AM-229/UP is necessary must be determined by trial. For most equipments, except Radar Set AN/CPS-5, this distance will be around 750 ft. Since the

AM-229/UP: 1

ITEM NAME: VIDEO AMPLIFIER

TYPE: AM-229/UP

video voltage output of the AN/CPS-5 is not sufficient to operate a remote repeater such as the VE-1 Radar Repeating Equipment a video amplifier must ordinarily be used regard-less of the distance involved.

RELATION TO SIMILAR EQUIPMENT

None.

TECHNICAL DESCRIPTION

Video Input Signal: 0.5 to 2.0v

Video Output Signal: 2v peak amplitude
Output Trigger Signal: 40v peak amplitude
Video Channel Bandwidth
 Within 1 db: From 1000 cycles to 4 me
 Within 3 db: From 60 cycles to 6 mc
Signal Input and Output Impedance: 75 ohms
Power Source Required: 115v, 60 cps, 60w max

INSTALLATION CONSIDERATIONS

Not available.

PRINCIPAL COMPONENTS AND PHYSICAL DATA

COMPONENTS	QTY	OVERALL DIMENSIONS (Inches)	UNIT WT. (Pounds)
Video Amplifier AM-229/UP	1	8-5/32 x 9-25/64 x 18-21/64	32.5
Adapter Cable: c/o 6 ft lg RG-8/U Cable with UG-21/U plug at one end	2		
Adapter Cable: c/o 6 ft lg MC OS-7 Cable with AN3106-28-1P Plug at one end	1		
Technical Manual NAVSHIPS 91256	2		0.5
Box Equipment Spare Parts	1		

REFERENCE DATA AND LITERATURE

Technical Manuals:
NAVSHIPS 91256 for Video Amplifier
AM-229/UP.

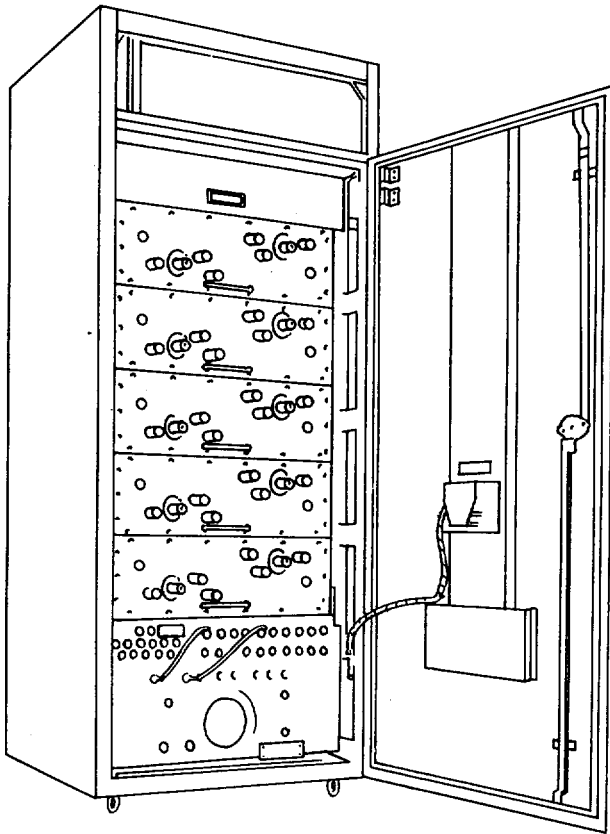
AM-229/UP: 2

DATE: 1 April 1964
COGNIZANT SERVICE: USAF

ITEM NAME: TRIGGER-VIDEO AMPLIFIER
TYPE: AM-1379/FPS

FEDERAL STOCK NUMBER: 5840-345-8674

	USA	USN	USAF	USMC
STATUS OR TYPE CLASSIFICATION Std				
Mfg(s) Name or Code Number: General Electric Company				



FUNCTIONAL DESCRIPTION

Trigger-Video Amplifier AM-1379/FPS is a fully duplexed, general purpose, long-line equipment generally used in radar applications for amplification or isolation purposes. Trigger-Video Amplifier AM-1379/FPS accepts trigger, video, and antenna bearing information from a single, duplexed, air search radar equipment or from each of two air search radar installations designated as Radar 1

and Radar 2. Trigger pulses from both radar sets are amplified and shaped in this equipment; video information from either (but not both) radar set is only amplified. Antenna bearing information from either (but not both) radar set is directly routed to the output lines. An oscilloscope is included as part of this equipment to monitor all input and out-put signals.

RELATION TO SIMILAR EQUIPMENT

None.

TECHNICAL DESCRIPTION

Input Impedance: 50, 72, 93, or 220, 000 ohms

Output Impedance: 50 ohms

Video Channel Data:

Number of Channels - 5 (duplex)

Bandwidth - 100 cps to 4 mc

Gain - 40 db (variable)

Output Pulse Amplitude - 4. 5v, positive (max)

Trigger-Channel Data:

Number of Channels - 6

Input Trigger Pulse - amplitude, 15 to 55v, positive; duration, 1 to 8 μ sec; rise time, 0. 5 μ sec (max)

Output Trigger Pulse - amplitude, 25v, positive; duration, 1 to 3 μ sec; rise time, 0. 15 μ sec (max)

Power Requirements: 120 vac, 60 cps, 2 kva

Duty Cycle: Continuous

INSTALLATION CONSIDERATIONS

Siting:

Mounting: Floor-mounted

Cabling Requirements: Control, signal, and power cables are fabricated locally

Related Equipment: Coordinate Data Transmitter AN/FST-1 and AN/FST-2

AM-1379/FPS: 1

AM-1379/FPS

PRINCIPAL COMPONENTS AND PHYSICAL DATA

COMPONENT	QTY	HEIGHT (Inches)	WIDTH (Inches)	DEPTH (Inches)	UNIT WT. (Pounds)
Amplifier AM-1379/FPS	1	72	28	28	960

REFERENCE DATA AND LITERATURE

Technical Orders:
31P6-2FPS-501

AM-1379/FPS: 2

DATE: 1 April 1964

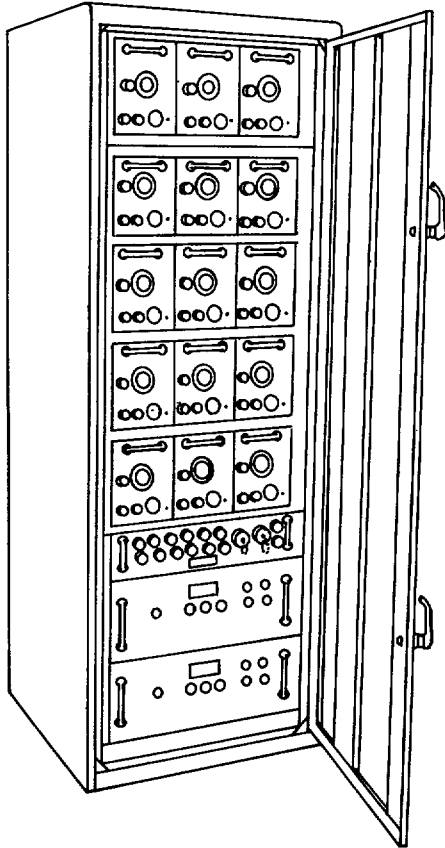
ITEM NAME: DELAY LINE SET

COGNIZANT SERVICE: USAF

TYPE: AM-1796/FPS

FEDERAL STOCK NUMBER: 5840-628-1122

	USA	USN	USAF	USMC
STATUS OR TYPE CLASSIFICATION			Std	
Mfg(s) Name or Code Number: Hallicrafters Company				



FUNCTIONAL DESCRIPTION

Delay Line Set AM-1796/FPS is a dual-channel equipment used for synchronizing the zero-range return of duplex radar and IFF equipment. The AM-1796/FPS also supplies synchronization pulses to Coordinate Data Transmitting Set AN/FST-2. This synchronizing function is accomplished by a number of delay lines and blocking oscillators comprising Delay Line Set AM-1796/FPS. Delay Line Set AM-1796/FPS provides two delay channels, designated as a duplex. Delay Line Set AM-1796/FPS(XD-1) provides one delay channel, designated as a simplex.

RELATION TO SIMILAR EQUIPMENT

None.

TECHNICAL DESCRIPTION

Input Pulses: 15 to 90v, positive

Delay Range: 0 to 53. 2 μ sec in 0. 1 μ sec increments at operating points

Number of Vacuum Tubes: 58 (plus 6 in spare units)

Number of Silicon Rectifiers: 16

Input Impedance: All greater than 10, 000 ohms

Pulse Power Output (Triggering); +40,+30, and -10v into nom 50 ohm load

Delay Lines: Two 35-,sec delay lines, tapped to supply delays of 5, 7. 5, 10, 20, 30, 32. 5, and 35- μ secs; two 15-, μ sec delay lines, tapped to supply delays of 0. 3, 6, 9, 12, and 15 μ sec; 15 variable delay lines, variable from 0 to 3.2 μ secs in increments of 0.1 μ sec

Pulse Repeater Modules (Generator, Pulse 0-538/FPS): 4 available for each channel, used with any variable delay module to supply any auxiliary output

Temperature Requirements: Operating, -29 to 54 deg C; non-operating, -54 to +71 deg C

Barometric Pressure: Operating, sea level to approximately 10, 000 ft; non-operating, sea level to approximately 40, 000 ft

Cooling Method: Air convection

AM-1796/FPS

Power Requirements: 115 vac, 60 cps, 1-ph,
290w

Mounting: Located within electrical equipment
cabinet

Cabling Requirement:

Related Equipment:

Sage Computer AN/FSQ-7

Coordinate Data Transmitting Set AN/FST-2

INSTALLATION CONSIDERATIONS

Siting: Physically located at Sage radar sites

PRINCIPAL COMPONENTS AND PHYSICAL DATA

COMPONENT	QTY	HEIGHT (Inches)	WIDTH (Inches)	DEPTH (Inches)	UNIT WT. (Pounds)
Delay Line Set AM-1796/FPS	1	78-1/2	28	28	1000
Power Cable	1			25 ft	2. 56
Spare Parts Group	1				
Coaxial Cable with Connectors BNC RG- 58C/U	4			54 ft	1.37
Coaxial Cable with Connectors BNC RG- 58C/U	2			10	.062
51 Ohm Termination	6				.031
69 Ohm Termination	6				.031

REFERENCE DATA AND LITERATURE

Technical Orders:
31P1-2FPS-111

31P1-2FPS-122
31P1-2FPS-123
31P1-2FPS-124
Specification:
MIL-D-9774

AM-1796/FPS: 2

DATE: 1 July 1964

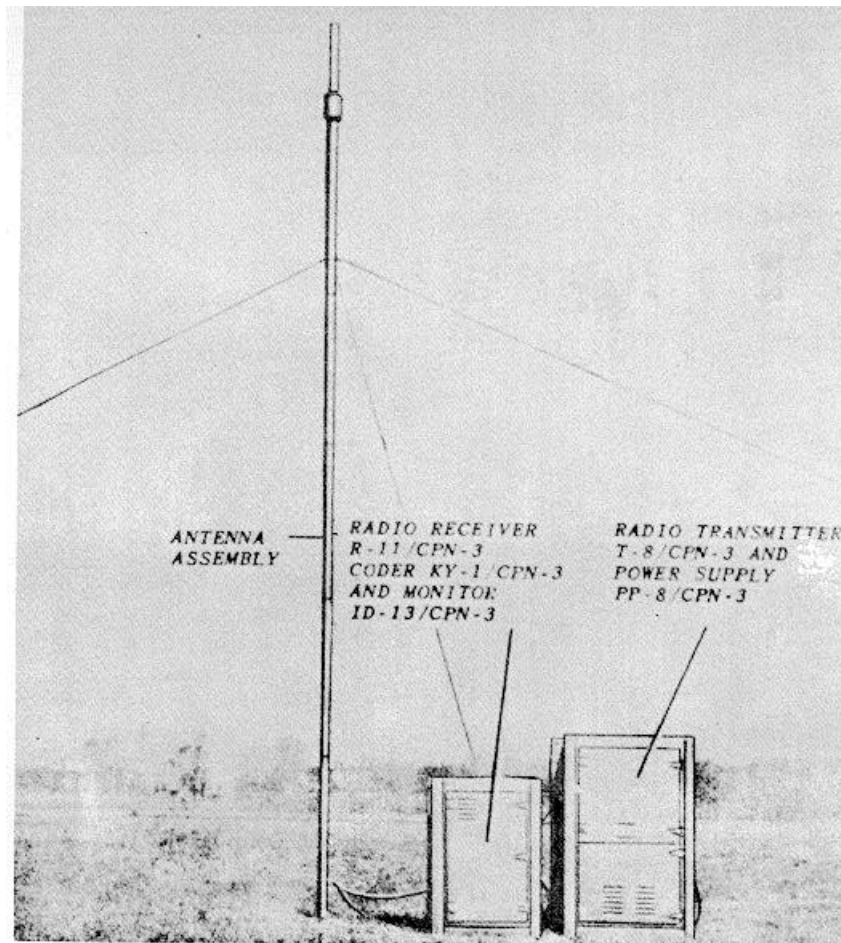
ITEM NAME: RADIO SET

COGNIZANT SERVICE: USN

TYPE: AN/CPN-3

FEDERAL STOCK NUMBER: F5895-665-2465 W/S

	USA	USN	USAF	USMC
STATUS OR TYPE CLASSIFICATION				
Mfg(s) Name or Code Number: Philco Corporation, Philadelphia, Pennsylvania				



FUNCTIONAL DESCRIPTION

The AN/CPN-3 is a ground radar beacon which responds automatically to beacon interrogating pulses from radar equipment on aircraft seeking the beacon position. The radio set is non-directional, receiving over a wide

super-high frequency band, and transmitting at a preset frequency near this band. It transmits coded signals which identify the beacon to the interrogating aircraft. These signals, transmitted after a delay of 4 μ sec, consists of six or less time spaced pulses which appear on the aircraft indicator screen.

ITEM NAME: RADIO SET

TYPE: AN/CPN-3

The first pulse locates the beacon in azimuth and range, the others form the code which identifies it.

Range: 150 mi under favorable conditions
Operating Power: 100 to 130v, 50 to 70 cps, 15 amp, or 200 to 260v, 50 to 70 cps, 7.5 amp
Power Factor: 0.9

RELATION TO SIMILAR EQUIPMENT

None.

INSTALLATION CONSIDERATIONS

TECHNICAL DESCRIPTION

Frequency

Receiver: 3267 to 3333 mc, respon 66 mc wide

Transmitter: Fixed, 3256 mc

Operating Temperature: -30 deg to plus 50 deg C

Related Equipment: (Required but not Supplied) (1) Radar Test Set AN/CPN-1, (1) Synchroscope TS-143/CPM-1, (1) Test Set AN/CPM-1, (1) Multimeter I-239, (1) Test Equipment MK-14/GPM, (1) Precision-Volt-Ohmmeter 884-P, (1) Signal Generator and Attenuator LZ, (1) Wattmeter TS-125/ AP (1) Fluxmeter TS-15A/AP, (1) Headset, (1) Standard Oscilloscope.

PRINCIPAL COMPONENTS AND PHYSICAL DATA			
COMPONENT	QTY	OVERALL DIMENSIONS (Inches)	UNIT WT. (Pounds)
Antenna Support AB-2/CPN-3	1	300 lg	127
Mast Head AS-9/CPN-3	1	43 lg	26
Case CY-11/CPN-3	1	23-5/8 x 24 x 46	
Case CY-9/CPN-3	1	23-5/8 x 24 x 46	
Chest CY-12/CPN-3	1	30 x 37 x 57	188.7
Chest CY-10/CPN-3	1	21 x 30 x 44	135
Coder KY-1/CPN-3	1	8 x 13 x 19	40
Coder KY-1A/CPN-3	1	8 x 13 x 19	40
Cord CX-9/CPN-3	1	360 lg	
Cord, Power CD-772	1	300 lg	
Cord CX-10/CPN-3	1	360 lg	
Cord CX-800-A	1	60 lg	0.625
Cord CD-800-A	1	84 lg	0.875
Interconnecting Cable	1	84 lg	
CX-17/CPN-3Cord	2	14 lg	
Cord CD-800-A	1	20 lg	
Ground Pin Assy MX-38/CPN-3	1		
Monitor ID-13/CPN-3	1	8 x 13 x 19	30
Radio Receiver R-11/CPN-3 or R-11A/CPN-3	1	8 x 13 x 19	52.5
Power Supply PP-8/CPN-3 or PP-BA/CPN-3	1		
Shorting Rod	1		

AN/CPN-3: 2