

4. *Display Unit* - there is only one display unit on the UPD 501 in the form of a CRT.

Technique for Taking Bearings

1. Switch Operate-standby Switch to "STANDBY".
2. Switch Power Switch "ON" and wait one minute.
3. Switch Operate-standby Switch to "OPERATE".
4. Turn Sensitivity Control to position "FOUR".
5. Turn Audio Gain to maximum.
6. Sensitivity and AF Gain may be reduced when taking a bearing, but should be left at maximum for searching.
7. When a signal is heard, adjust sensitivity to obtain somewhat less than full scale trace, and align Cursor with trace. Read bearing.
8. Experience and repeated observation will enable the operator to give an estimation of range (NEAR or FAR) to the target.

QUIZ

1. What is the UPD 501?
2. What are the antenna characteristics?
3. Explain the technique for taking a bearing.

CHAPTER 22

DAU DF SET

The DAU is a high frequency direction finder designed for ship-borne use.

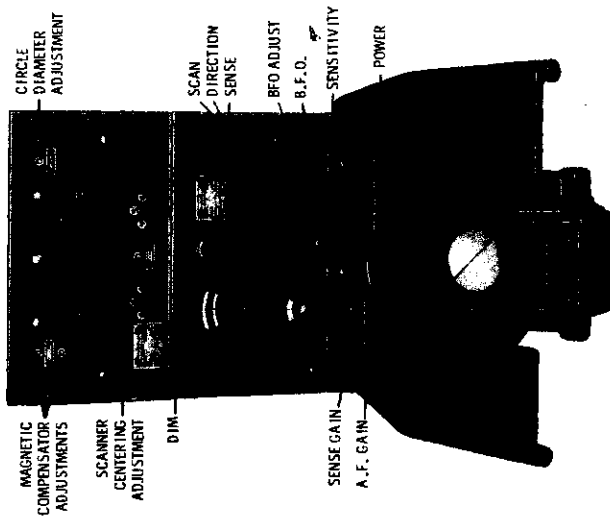


Figure 22-1 DAU DF Set

Capabilities

The DAU has a frequency range of 1.5 to 30 mc. which is broken up into 4 bands.

The set uses a loop antenna with the directional property of the loops converted to a visual indication on a CRT.

The CRT trace is made by the rotation of the electron beam (in synchronism with the spinning goniometer) around the face of the tube.

The CRT affords the operator a choice of 3 different displays, determined by the position of the Scan-Direction-Sense Switch.

Function of Controls

The DAU HFDF set is comprised of three units. They are:

1. Receiver Unit.

2. Rectifier Power Unit (or Scanner Unit).
3. Automatic Bearing Indicator Unit.

1. Receiver Unit

- a. The Band-change, Tuning Dial, Power Switch, BFO, and BFO Adjust are conventional controls.
- b. Scan-Direction-Sense Switch

This switch determines the type of display desired on the CRT.

- (1) *Scan Position* - in this position, the CRT display shows all signals within a 150 kc. band, (75 kc. on either side of the frequency to which the receiver is tuned). This is a special feature of the DAU which allows the operator to monitor VISUALLY a band of frequencies 150 kc. wide. The operator can HEAR only those stations on the FREQUENCY to which he is TUNED.

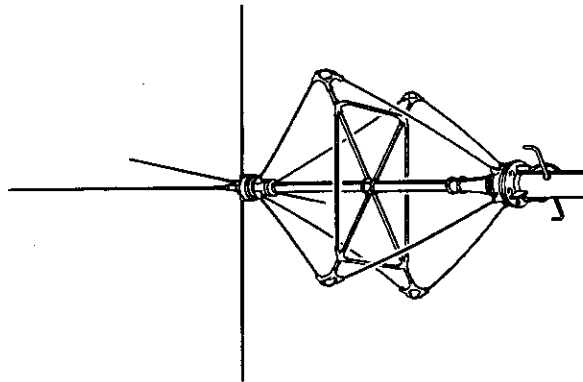


Figure 22-2 DAU Antenna

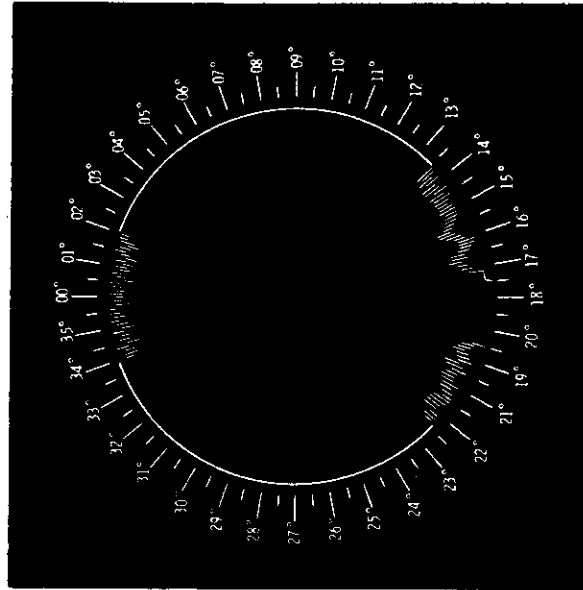


Figure 22-3 Scan Position (No Signal)



Figure 22-4
Scan Position
(Signal)

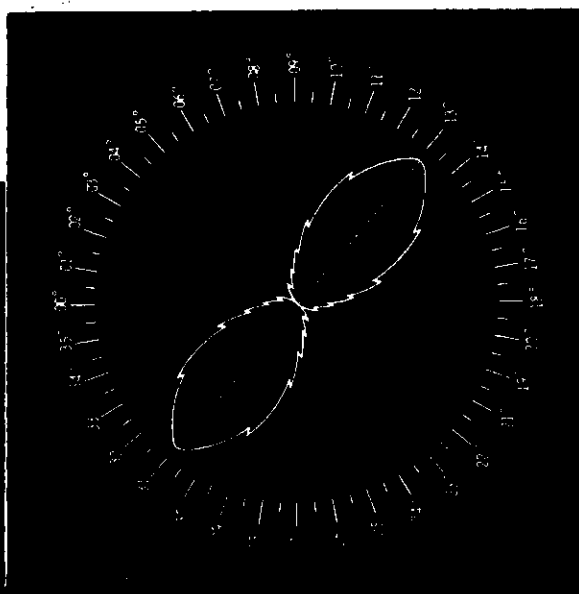


Figure 22-5
Direction Position
(Bearing -
130 /310)

Signals which are lower in frequency than the one to which you are tuned will appear as triangular indentations on the right hand side of the trace. Signals higher in frequency will appear on the left hand side of the trace.

In the scan position, the DAU is no longer a DF set but becomes a wide band receiver.

(2). *Direction Position* - In this position, the propeller, or directional pattern of the signal being received by the antennae is obtained.

(3). *Sense Position* - With the Sensitivity Control and Sense Gain Control properly adjusted and in this position, the wing of the propeller will fold back, forming a heart-shaped pattern. However, if the Sense Gain is turned fully down, the propeller pattern will merely shift 90°.

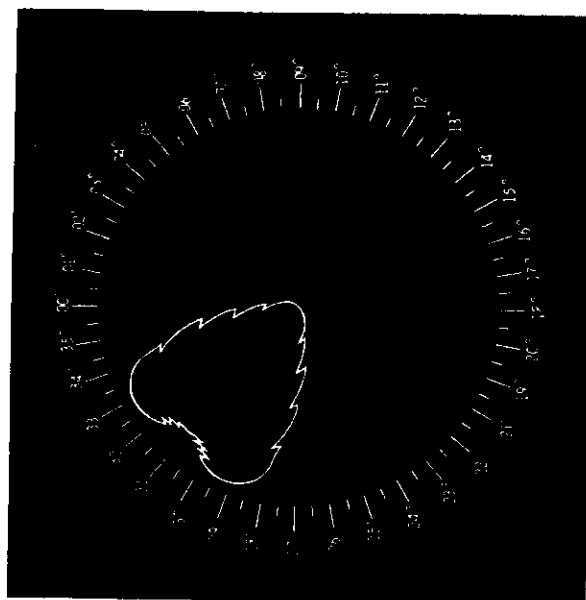


Figure 22-6 Sense Position (Bearing 130)

In actual operation, a perfect heart-shaped pattern will seldom be obtained.

2. Rectifier Power Unit (or Scanner Unit)

This unit contains the switches, indicator lamps, and fuses for all circuits except the receiver, scanner circuit, and the deflection amplifier. The receiver fuses are contained within the receiver. This unit also contains the following screwdriver controls:

a. *Magnetic compensator* - two screwdriver controls are used to adjust the CRT trace.

Whenever the two sides of the pattern fail to meet exactly at the centre, the following adjustments should be made.

(1) Turn the sensitivity control full up. The resulting set noise should collapse the trace to a dot or a very small circle.

(2) On "Direction", adjust the top screwdriver control for the smallest circle diameter, and the bottom screwdriver control for a dot.

(3) If necessary, go back and forth between the two controls until the best spot is achieved.

b. *Circle Diameter* - this control adjusts the diameter of the CRT trace. It should be adjusted so that the trace lies just inside the azimuth ring around the tube.

c. *Scanner Centring* - On "Direction", a signal should first be tuned exactly to resonance (zero beat) by obtaining the narrowest propeller pattern. Switch to "Scan" and adjust the scanner centring control so that the above tuned signal appears at the top of the scan pattern. This control should be adjusted every few hours.

3. Automatic Bearing Indicator Unit

The indicator unit consists of the CRT, the motor, and the goniometer. Five controls are present on the indicator unit. They are:

a. Horizontal positioning.

b. Vertical positioning.

c. Focus.

d. Intensity.

e. Azimuth lamp - located on the right side of the tube housing, adjusts the brightness of the azimuth scale lamp.

Technique for Taking a Bearing

It will be assumed that the assignment of the operator is to monitor a frequency range of 150 kc. wide, and to obtain a bearing on any station located in that range.

1. Turn on the set by throwing the Master, Beam, and Motor Switches on the Rectifier Power Unit.

2. Turn on the receiver by throwing the Receiver Power Switch.

3. Switch to "SCAN".

4. Adjust the Intensity, and Focus Controls for a sharp, clear trace, not too bright. Adjust the two Positioning Controls to centre the trace.

5. Adjust the Circle Diameter and Magnetic Compensator Controls.

6. Adjust the "Scanner Centring".

7. Tune the receiver to the centre of the band to be monitored.

8. Adjust the Sensitivity Control until noise first appears on the trace. Advance the Sense Gain Control until the noise increases slightly.

9. When a "BLIP" (a signal indication) appears on the scan trace, tune the signal to resonance by moving it to the top of the scan trace. This is done with the Receiver Turning Dial.

10. Switch to "DIRECTION".

11. Tune the receiver for the narrowest propeller pattern.

12. Adjust the Sensitivity Control to close the centre of the propeller pattern.

13. Move the Cursor over the tips of the propeller.