

CONFIDENTIAL

INSTRUCTION BOOK
FOR

BROADBAND ANTENNA, FILTER,
AND
VIDEO DETECTOR SYSTEM

ORIGINAL CL BY 235979
 DECL REVD ON 2010
EXT BYND 6 YRS BY SAME
REASON 3 & (3)

DOC	<u>38</u>	REV DATE	<u>30</u>	BY	<u>018373</u>
ORIG COMP	<u>33</u>	OP	<u>56</u>	TYPE	<u>30</u>
ORIG CLASS	<u>A</u>	PAGES	<u>20</u>	REV CLASS	<u>C</u>
JUST	<u>22</u>	NEXT REV	<u>2010</u>	AUTH	HR 10-2

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1 JULY 1961

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SECTION I

GENERAL DESCRIPTION

1.1 DESCRIPTION.

1.1.1 GENERAL.

The Broadband Antenna, Filter, and Video Detector System operates with a video amplifier (not supplied) to receive the frequency range of 50 mc to 40,000 mc in four steps. The 50- to 500-mc portion of the system includes Antenna AN-22, Filters FI-11, FI-12, and FI-13, and Detector-Holder HC-1. The 500- to 1000-mc portion of the system includes Antenna AN-23, Filters FI-14 and FI-15, and Detector-Holder HC-1. The 1000- to 10,000-mc portion of the system includes Antenna AN-24, Filters FI-16, FI-17, and FI-18, and Detector-Holder HC-1. The 10,000- to 40,000-mc portion of the system includes an electromagnetic horn and crystal detector assembly with two wave guide inserts. By using the horn with either of the inserts or without either, the 10,000- to 40,000-mc range is covered as 10,000- to 40,000-mc, 20,000 to 40,000 mc, or 30,000 to 40,000 mc. Figures 1-1 through 1-12 show parts of the system identified by nomenclature. Table 1-1 shows the frequency coverage of parts and combinations of parts of the system.

TABLE 1-1. FREQUENCY COVERAGE BREAKDOWN

ANTENNA	FILTER	FREQUENCY COVERAGE (MC)	TOTAL FREQUENCY COVERAGE
AN-22	FI-11 FI-12 FI-13	50-100 mc 100-200 mc 200-500 mc	50-500 mc
AN-23	FI-14 FI-15	500-750 mc 750-1000 mc	500-1000 mc
AN-24	FI-16 FI-17 FI-18 FI-19	1000-2000 mc 2000-4000 mc 4000-8000 mc 8000-10,000 mc	1000-10,000 mc
AN-25	AN/A-25, ridged wave guide insert AN/B-25, without insert AN/C-25, small wave guide insert	10,000-40,000 mc 20,000-40,000 mc 30,000-40,000 mc	10,000-40,000 mc

1.1.2 50- TO 500-MC SYSTEM.

The 50- to 500-mc system consists of Antenna AN-22, Filters FI-11, FI-12, and FI-13, and Detector-Holder HC-1 with type 1N358A crystal. The antenna is a modified planar

SECTION I**General Description**

logarithmically periodic antenna made of a metal braid sewn on a 36- by 36-inch piece of fungus-proof shirt cloth. The feed cables, associated filters, and detector are secured to the surface of the antenna cloth with snaps for ease in change and removal. The cloth and wire braid antenna is flexible and can be folded or rolled into a small volume.

1.1.3 500- TO 1000-MC SYSTEM.

The 500- to 1000-mc system consists of Antenna AN-23, Filters FI-14 and FI-15, and Detector-Holder HC-1. The antenna is a solid-tooth logarithmically periodic type. The two halves of the antenna are etched upon copper-clad, Teflon-impregnated glass fiber boards. These two boards are then mounted back-to-back so that the teeth in one half of the antenna mask the gaps in the other half. The two Teflon-impregnated glass fiber boards are drilled so that the associated filters may be mounted on the structure by means of studs and wing nuts. The detector mounts on the connector of the associated filter, and interconnecting cable for associated video detector (not furnished) connects to the detector holder.

1.1.4 1000- TO 10,000-MC SYSTEM.

The 1000- to 10,000-mc system consists of Antenna AN-24, Filters FI-16, FI-17, FI-18, and FI-19, and Detector-Holder HC-1. The antenna is the same type as that of the 500- to 1000-mc antenna except it is not truncated. The two halves of the antenna are constructed in the same manner as those of the AN-23, and are positioned precisely with relationship to the printed surfaces. The boards are drilled for stud and wing nut mounting of associated cables, filters, and detector.

1.1.5 10,000- TO 40,000-MC SYSTEM.

The 10,000- to 40,000-mc system consists of Electromagnetic Horn AN-25, a type 1N53R crystal, and two waveguide inserts. The horn assembly consists of horn, waveguide, crystal detector holder and a type TNC video output connector. The crystal is inserted in its holder and secured in place with a knurled cap. With the ridged wave guide inserted into the wave guide throat, and with the detector in place, the assembly becomes Antenna AN/A-25, having a frequency response of 10,000 to 40,000 mc. Without either insert, the assembly is Antenna AN/B-25, having a frequency response of 20,000 to 40,000 mc. With the small wave guide insert in the wave guide, the assembly becomes Antenna AN/C-25, having a frequency response of 30,000 to 40,000 mc. Wooden tools for insertion and removal of the inserts are supplied with the equipment. Drawings are supplied so the customer may construct new tools in case of loss, wear, or breakage.

1.2 EQUIPMENT SUPPLIED.

Equipment supplied is shown in figures 1-1 through 1-12 and listed in table 1-2. Table 1-1 shows the frequency coverage of the individual parts of the system.

1.3 EQUIPMENT REQUIRED BUT NOT SUPPLIED.

A low-impedance video amplifier with a bandwidth of approximately 2.0 megacycles is required to amplify the output of the system detectors to a usable level.

TABLE 1-2. EQUIPMENT SUPPLIED FOR COMPLETE SYSTEM

TYPE	QTY	ITEM	DIMENSIONS (in)		
			LENGTH	WIDTH	THICKNESS
AN-22	1	Antenna	36	36	cloth
FI-11	1	50- to 100-mc filter	3	3	5/8
FI-12	1	100- to 200-mc filter	3	3	5/8
FI-13	1	200- to 500-mc filter	3	3	5/8
AN-23	1	Antenna	16-1/4	12	3/32
FI-14	1	500- to 750-mc filter	6.683	4.250	1.000
FI-15	1	750- to 1000-mc filter	4.986	3.186	0.840
AN-24	1	Antenna	19-7/8	6	3/32
FI-16	1	1000- to 2000-mc filter	4.986	2.314	0.840
FI-17	1	2000- to 4000-mc filter	9.780	1.550	0.625
FI-18	1	4000- to 8000-mc filter	8.480	1.570	0.625
FI-19	1	8000- to 10,000-mc filter	3.145	1.255	0.625
AN/()-25	1	Antenna	5-1/2	3-1/4	1-3/4
	1	Ridged wave guide insert	1.362	0.339	0.169
	1	Small wave guide insert	1.409	0.340	0.170
HC-1	3	Detector-Holder (with crystal)	2	5/8 dia	
	3	Tools for AN/()-25 insertion and removal			

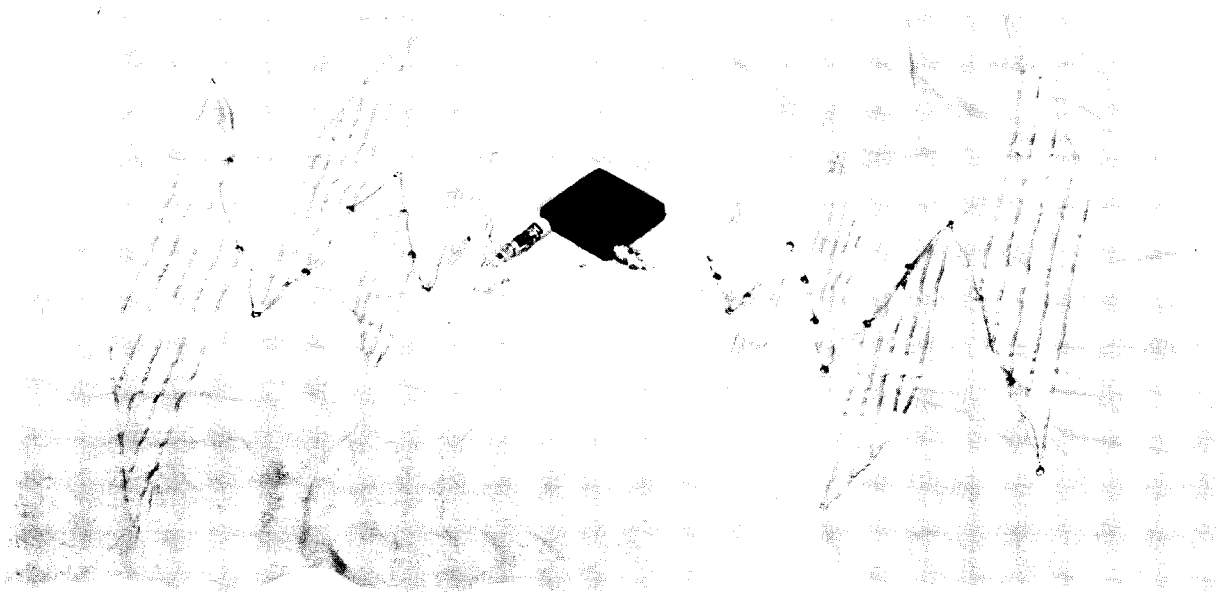
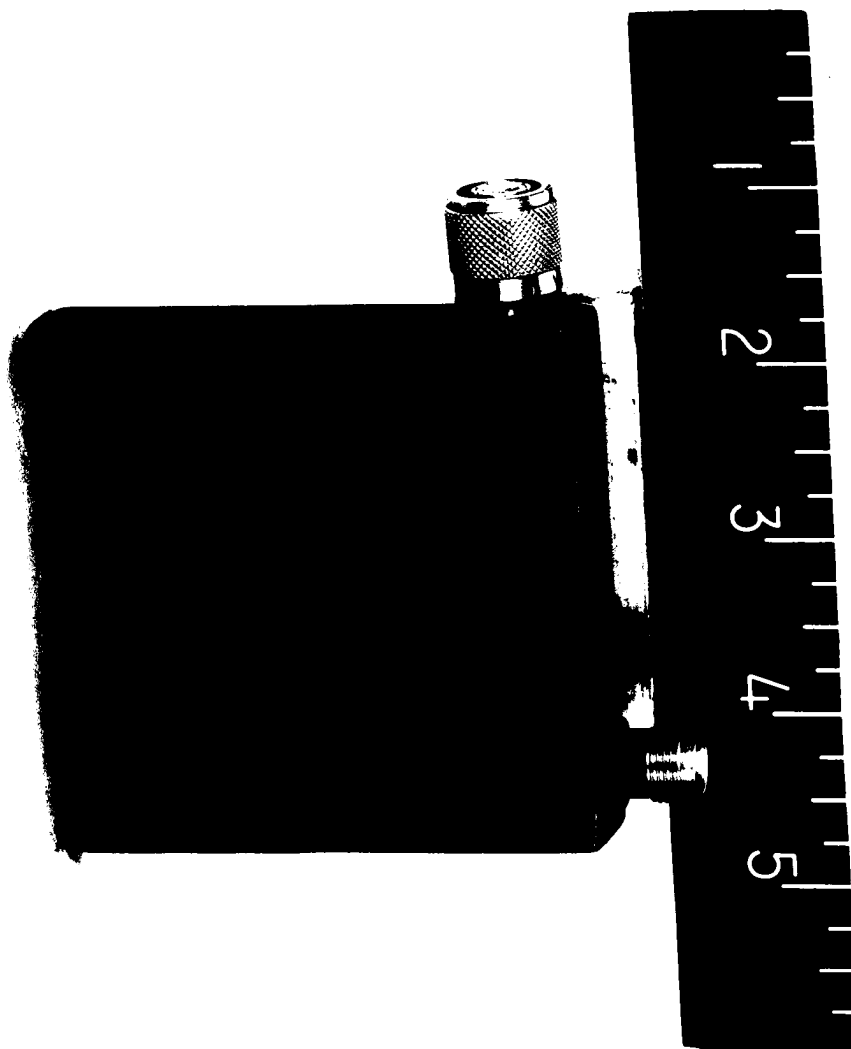


Figure 1-1. Antenna AN-22 with Detector-Holder HC-1 and One Filter Attached

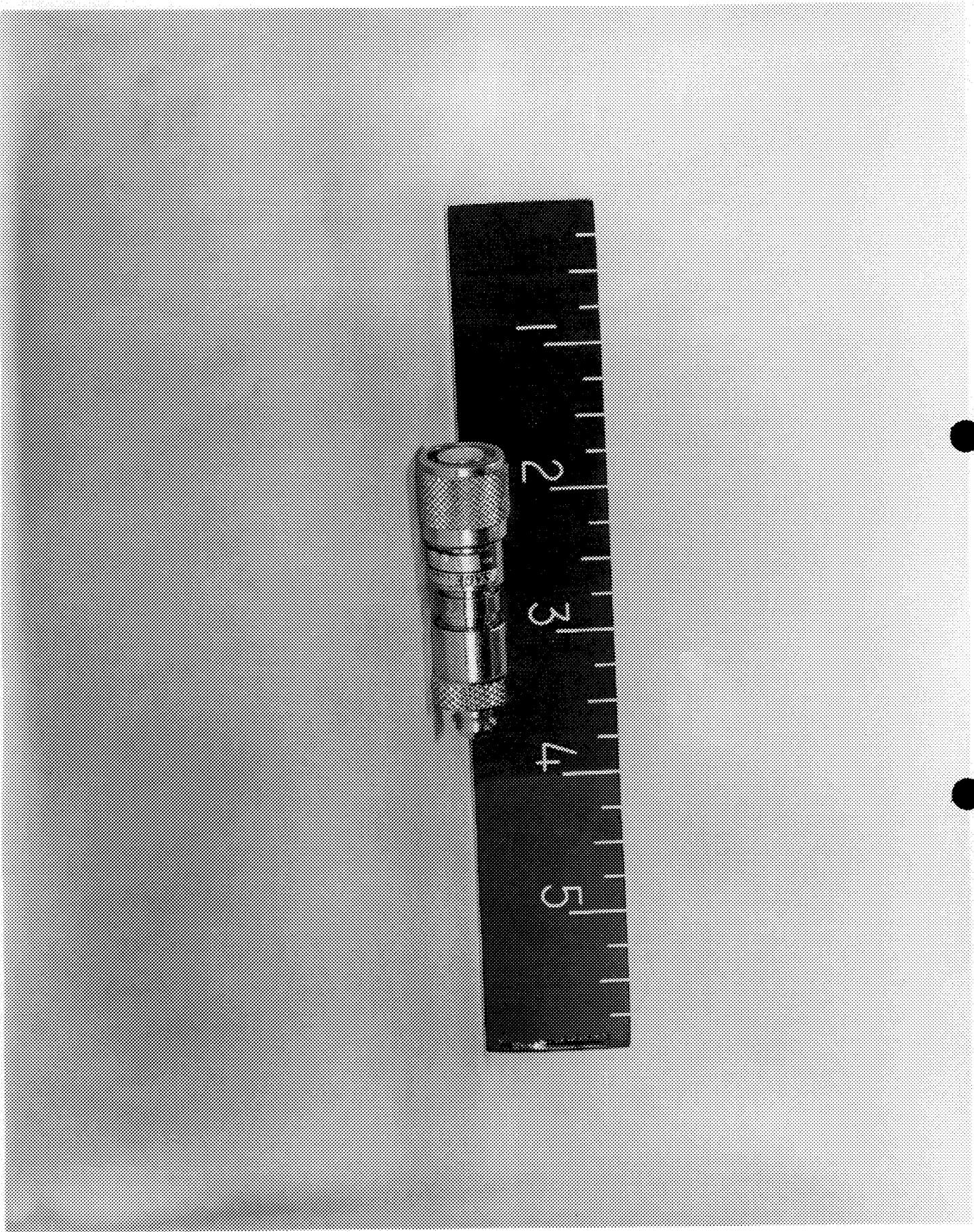


Figure 1-2. Filter FI-11, FI-12, or FI-13



5368456

Filter FI-11
50-100 mc



3-10-57

4

Detector Mount, HC-1

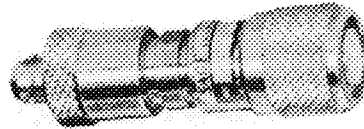


Figure 1-3. Detector-Holder HC-1

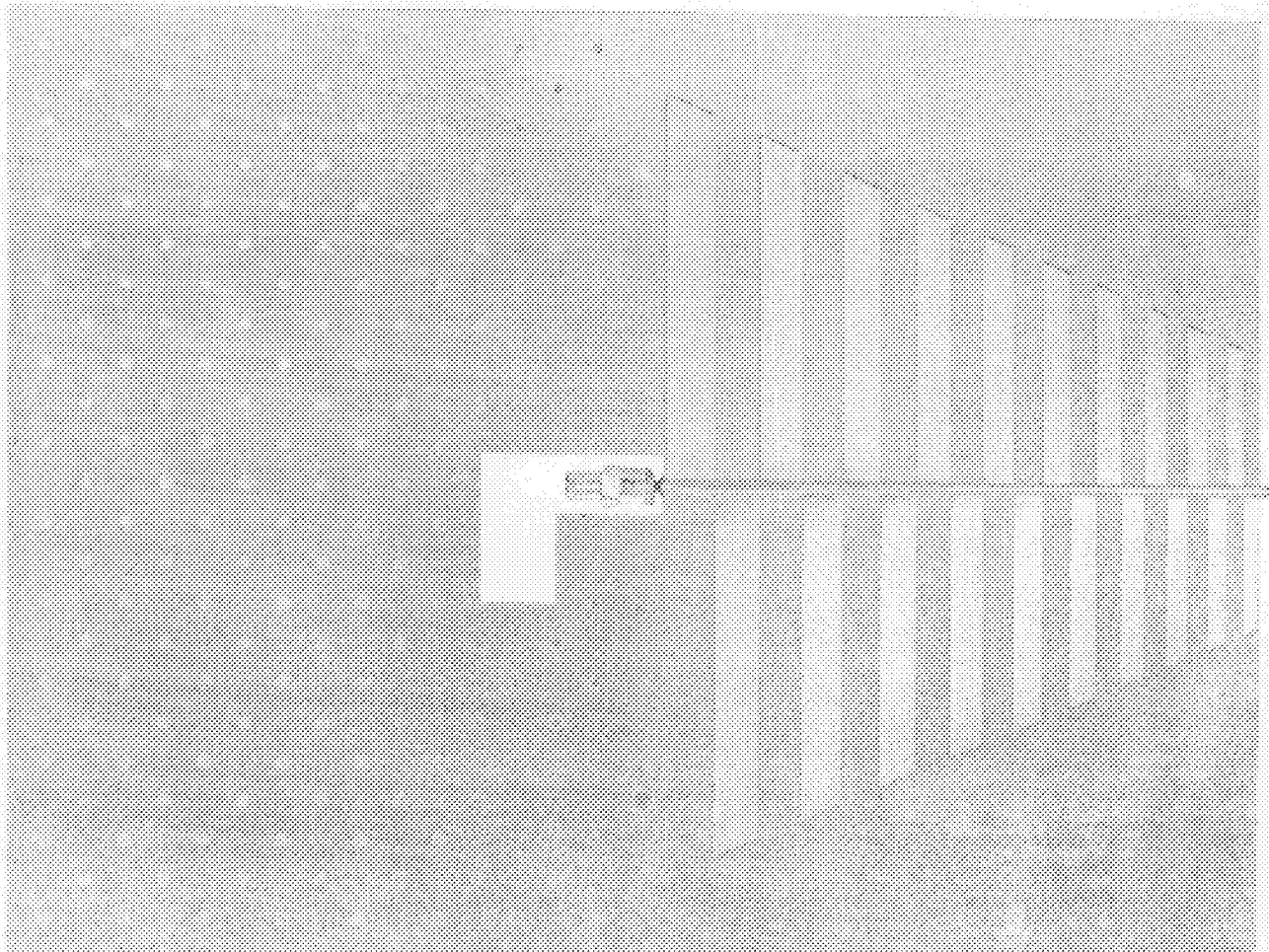


Figure 1-4. Antenna AN-23 (500 - 1000 Mc)

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General Description

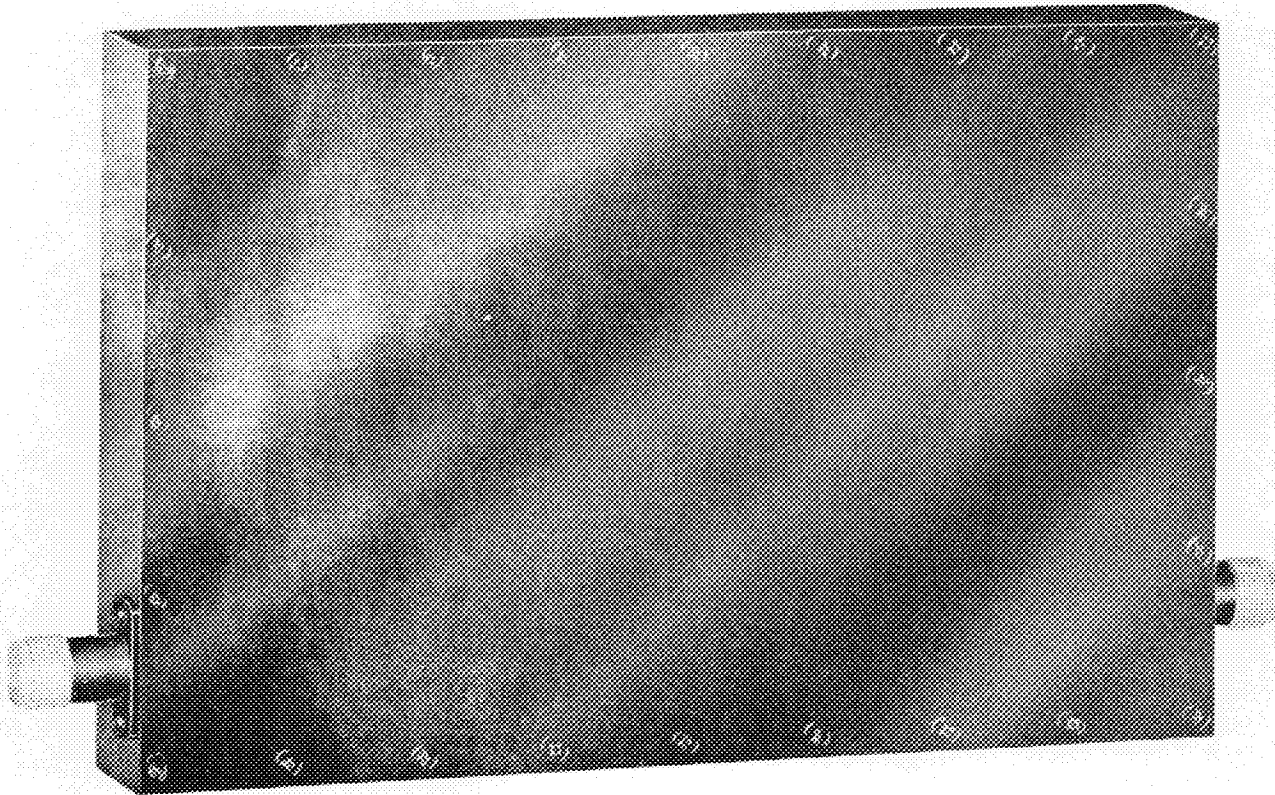
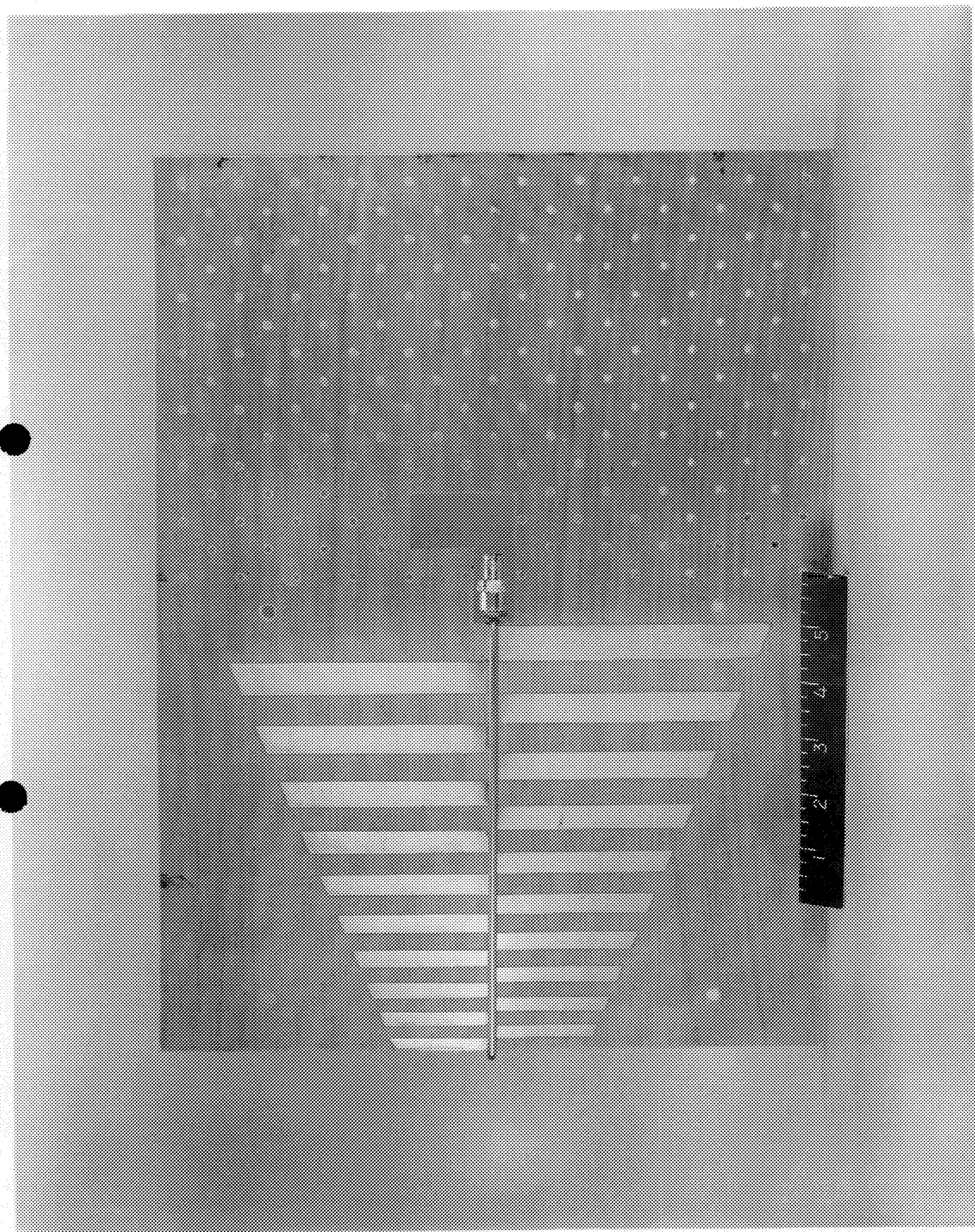


Figure 1-5. Filter FI-14 (500 - 750 Mc)



Antenna AN-23
500-1000 mc

5-44485

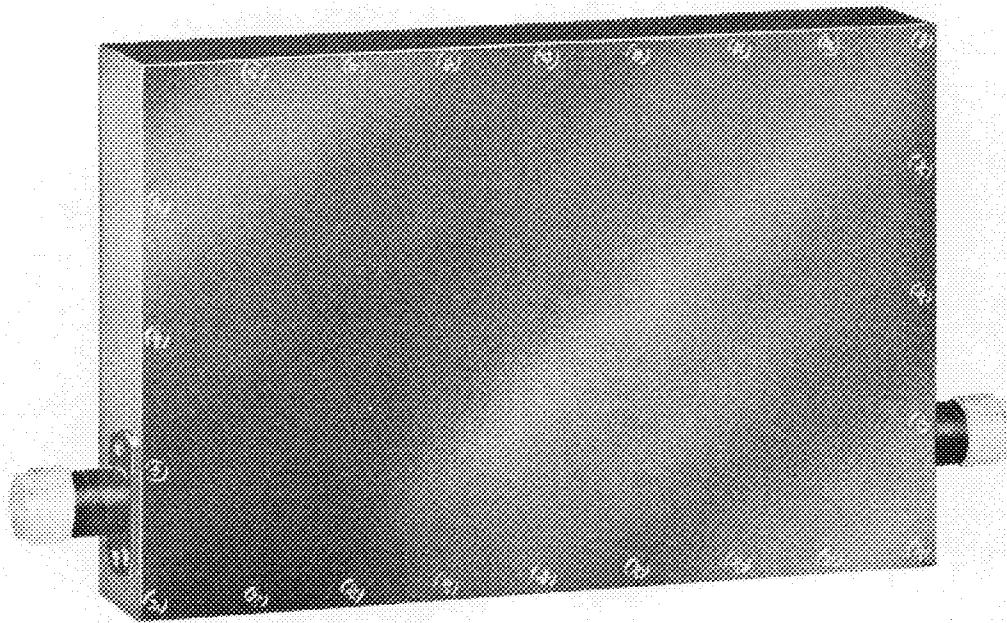


Figure 1-6. Filter FI-15 (750 - 1000 Mc)

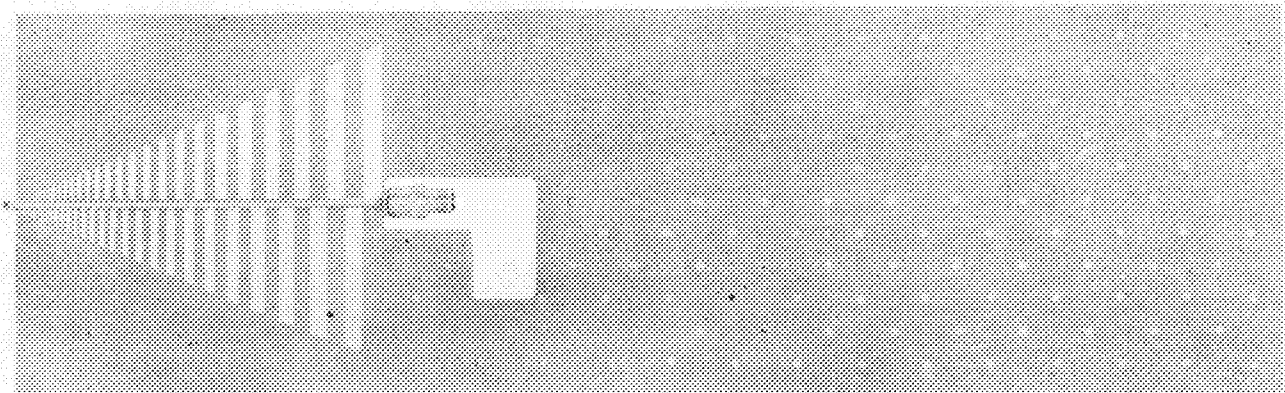


Figure 1-7. Antenna AN-24 (1000 - 10,000 Mc)

SECTION I
General Description

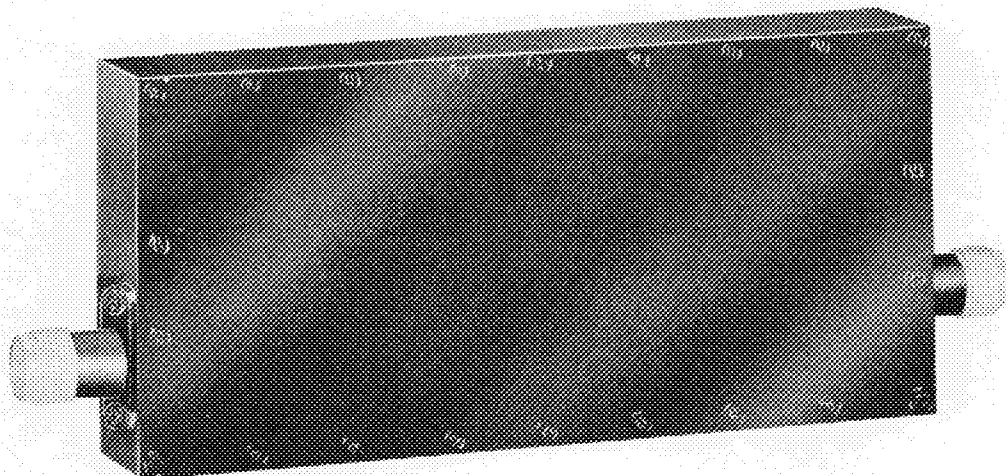


Figure 1-8. Filter FI-16 (1000 - 2000 Mc)

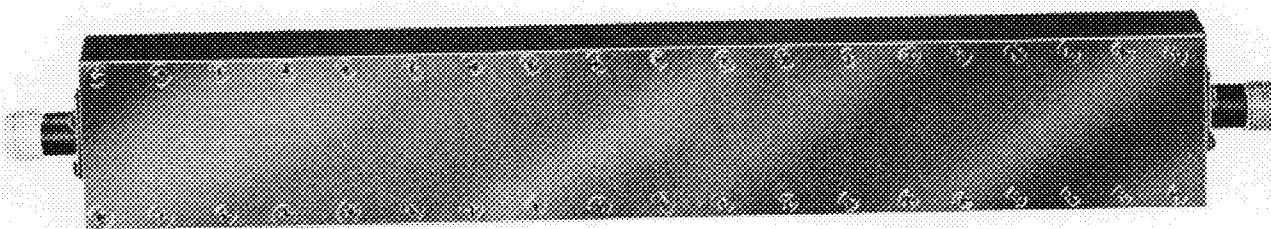


Figure 1-9. Filter FI-17 (2000 - 4000 Mc)

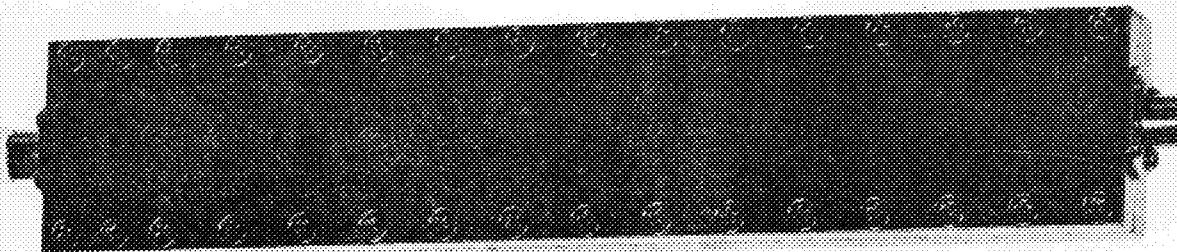
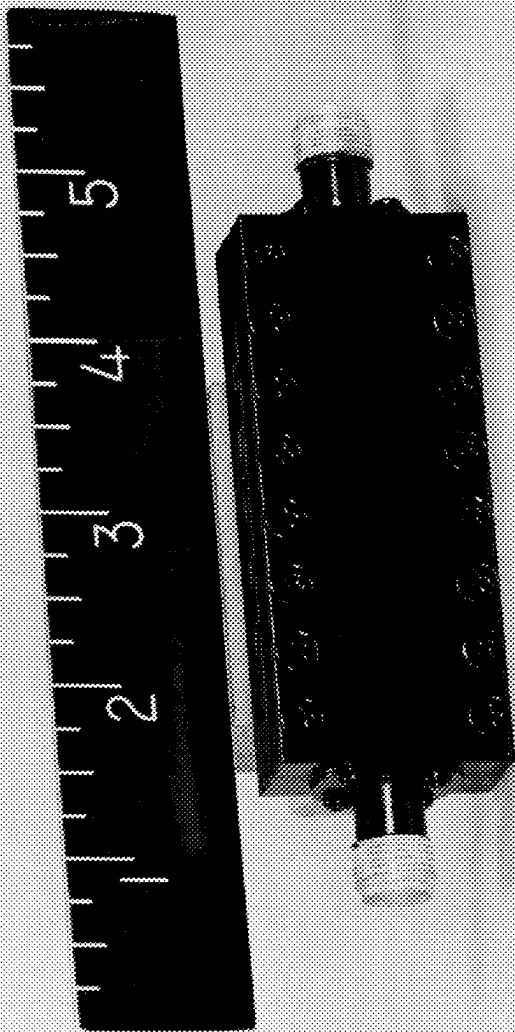
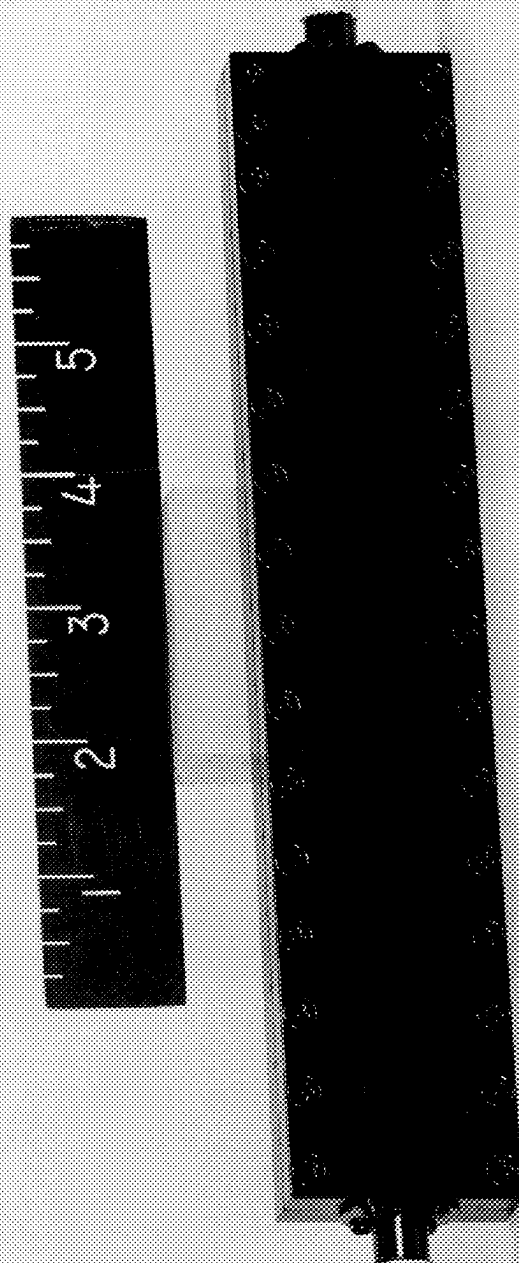


Figure 1-10. Filter FI-18 (4000 - 8000 Mc)



5388463

Filter F1-19
8-10 KMC



5368488

Filter FI-18

4-8 KMC

8

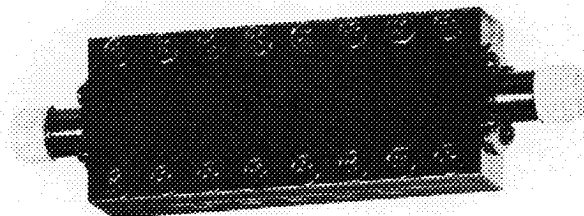


Figure 1-11. Filter FI-19 (8000 - 10,000 Mc)

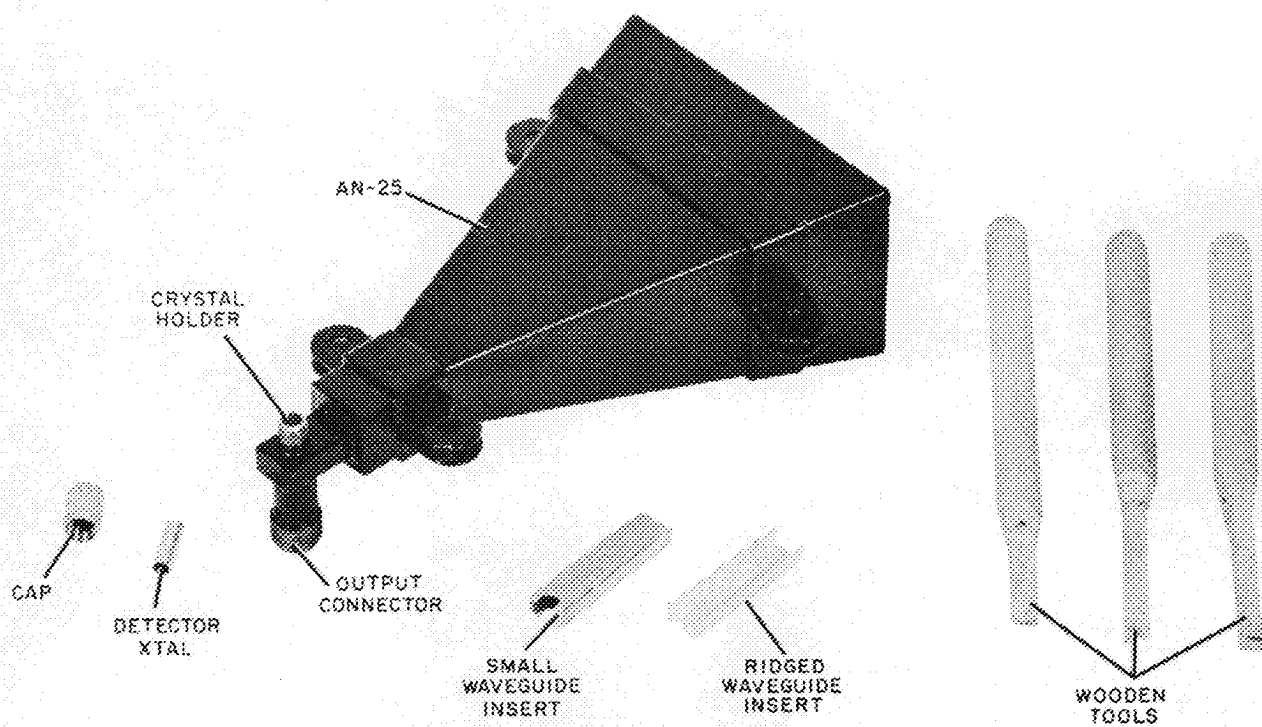


Figure 1-12. 10,000- to 40,000-Mc Antenna, Filter, and Detector System

SECTION II
OPERATION

2.1 ASSEMBLY PROCEDURES.

2.1.1 50- TO 500-MC SYSTEM.

- a. Refer to table 1-1 and figure 1-1. Select the proper filter for the desired portion of the frequency coverage.
- b. Affix the filter to snaps sewn to cloth in position as shown in figure 1-1.
- c. Connect the antenna termination to the large male connector of the filter.
- d. Connect Detector-Holder HC-1 to the small female connector of the filter.
- e. Connect the type MB connector to the extended end of the detector holder.
- f. Connect the video amplifier (not supplied) to cable connector extending from the end of the antenna.

2.1.2 500- TO 1000-MC SYSTEM.

- a. Refer to table 1-1. Select the proper filter for the desired portion of the frequency coverage.
- b. Affix the filter to the Teflon-impregnated glass fiber board of AN-23 by means of threaded studs on the rear of the filter. Be sure to orient the filter (where applicable) so the end marked ANT is nearest the antenna. Secure with wing nuts.
- c. Connect the filter to the antenna and the detector-holder to the filter. Look for terminal identification at the extremes of the filter marking. If the filter terminals are identified ANT or DET, make sure to connect as indicated. If no such identification of terminals is made, the filter may be connected either way. Use the short cable supplied for connecting the filter to the antenna.
- d. Connect a cable between the detector output terminal and the video amplifier (not supplied).

2.1.3 1000- TO 10,000-MC SYSTEM.

- a. Refer to table 1-1 and select the proper filter for the desired portion of the frequency coverage.
- b. Affix the filter to the Teflon-impregnated glass fiber board of Antenna AN-24 by means of threaded studs on the rear of the filter. Be sure to orient the filter (where applicable) so the end marked ANT is nearest the antenna connection. Secure with wing nuts.

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c. Connect the filter to the antenna and the detector-holder to the filter. Look for terminal identification at the extremes of the filter marking. If the filter terminals are identified ANT or DET, make sure to connect as indicated. If no such identification is made on the filter, it may be connected either way. Use the short cable supplied for connecting the filter to the antenna.

d. Connect a cable between the detector output terminal and the video amplifier (not supplied).

2.1.4 10,000- TO 40,000-MC SYSTEM.

a. If Antenna AN-25 is to be used for the frequencies between 20,000 and 40,000 mc, it may be used without either of the wave guide inserts. Connect the video amplifier cable to the type TNC connector. This is the AN/B-25 designation. Refer to figure 1-12.

b. Remove the knurled cap from the crystal holder and insert the crystal with its red cap toward the outside. Gently feel the crystal into position until the small pin enters the small socket. Secure the crystal in its holder with the knurled cap. Screw the cap down thumb tight, but do not use excess torque.

c. If the antenna is to be used for frequencies as low as 10,000 mc, the designation is AN/A-25 and includes the ridged wave guide insert.

d. Place the ridged wave guide insert in the wave guide with the tapered end pointing away from the detector and with the flat side oriented toward the detector output jack. Using the plain wooden tool, push the insert into the wave guide until the thin, tapered edge is flush with the junction of wave guide and horn. See figure 2-1.

e. If the antenna is to be used for frequencies between 30,000 and 40,000 mc, the designation is AN/C-25 and includes the small wave guide insert.

f. Place the insert with the slotted end toward toward the detector and with the larger of the two slots oriented toward the TNC connector side. Using the plain wooden tool, push the insert into the wave guide until the thin tapered edge is flush with the junction of wave guide and horn. See figure 2-2.

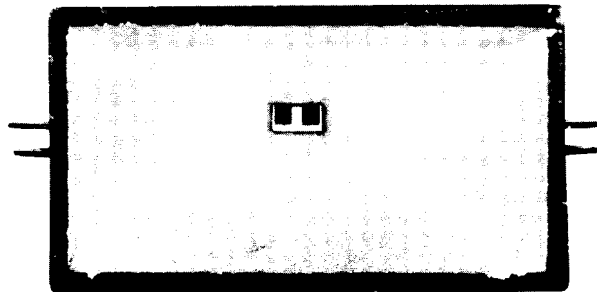


Figure 2-1. Antenna AN/A-25 (10,000 - 40,000 Mc)

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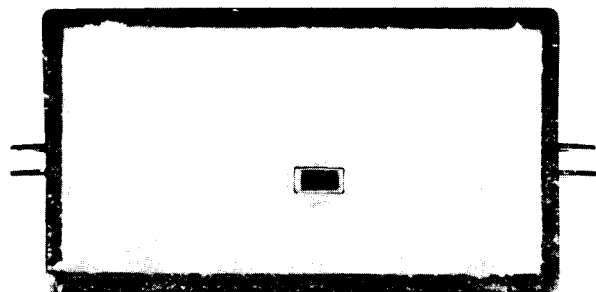


Figure 2-2. Antenna AN/C-25 (30,000 - 40,000 Mc)

g. To remove the ridged wave guide from the horn, use the large wooden tool with the slotted tip. Insert the tool with the nibs oriented toward the flat side of the wave guide insert. Push the tool into the insert until the spring tension of the wooden prongs drops the nibs down behind the inner end of the insert. Withdraw tool and ridged wave guide insert together.

h. To remove the small wave guide insert from the horn, use the wooden tool with a short round slot and a single nib at the end. Insert the tool into the wave guide insert with the nib oriented toward the crystal holder. Push the tool into the insert until the nib is felt to enter the small slot at the inner end of the wave guide insert. Withdraw the tool and the wave guide insert together.

2.2 DISASSEMBLY FOR STORAGE OR RESHIPMENT.

Remove filter, detector, and all connections from Antenna AN-22. Fold or roll the antenna into a convenient shape, and pack. To attempt storage or reshipment of AN-22 with filter, detector, and connections attached may damage the antenna. Both the printed board antennas (AN-23 and AN-24) may be packed and shipped more safely if filters, detectors, and connections are removed. The 10,000- to 40,000-mc system may be left assembled if desired.

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