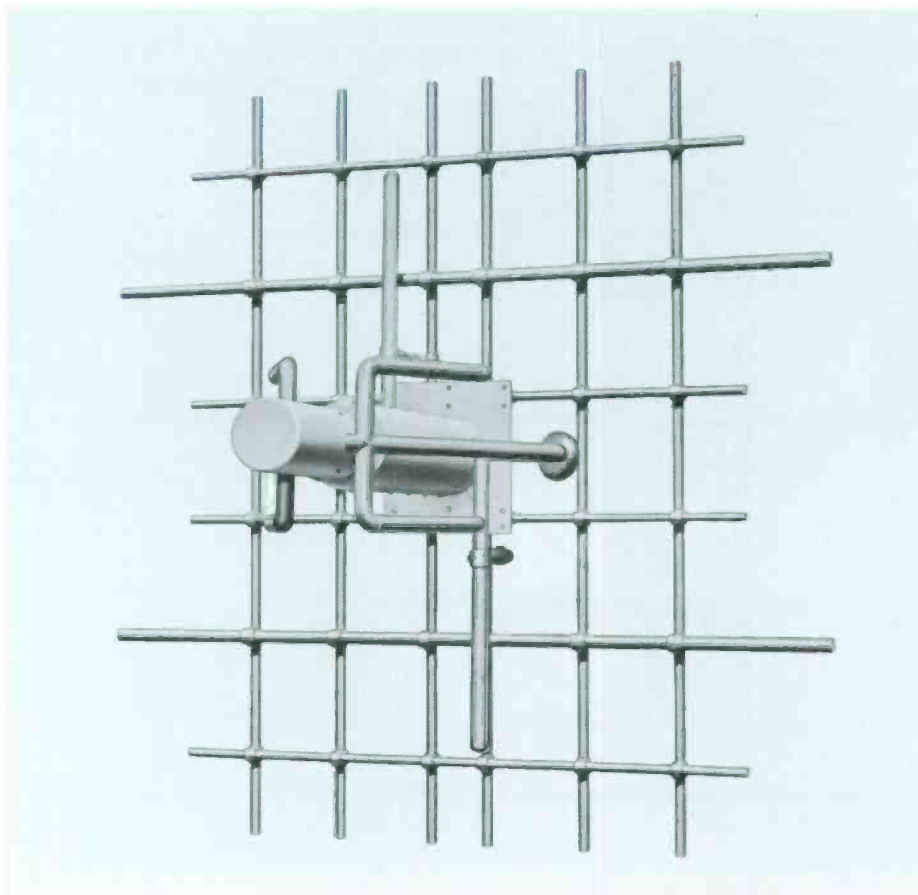


Multi-Station Panel Antenna, Type BFB- Series

- Omni-directional radiation pattern
- For single- or multiple-station use
- Single-line or split-feed arrangements
- Radomes standard; deletion optional
- Available in arrays of 1 to 16 layers



The BFB- Antenna is a high-powered circularly polarized panel antenna for one station or situations where several FM-broadcast stations wish to share a common antenna system. The panels sidemount on any triangular cross-section tower with three panels per layer in omnidirectional arrays with one to 16 or more layers in the array.

Radomes Standard Equipment

Radomes that cover the ice-sensitive portions of the antenna are standard equipment. For locations where icing conditions are rare, the panels are available without radomes at lower cost per panel. Eliminating the radomes also reduces antenna windload (see *Specifications*).

Accommodates Split-Feed System

The BFB- antenna is designed to operate with a single $3\frac{1}{8}$, $4\frac{1}{8}$ or $6\frac{1}{8}$ -inch coaxial transmission line between array input and transmitter. However, the array may be arranged to operate from two transmission lines from the transmitter so that, in the event of failure of some array component, the inoperable section can be switched out of service and operation continued, with circular polarization, from the other "half" of the array at reduced ERP until the outage is corrected. See schematic drawing.

Power Rating Considerations

Two factors determine the power rating of a BFB- antenna array: each panel in an array has a 4.5 kW (rms) power-input limitation and an "equivalent peak-power" (EPP) rating of 22 kW. EPP is expressed as:

$$EPP = (\sqrt{P_1} + \sqrt{P_2} + \sqrt{P_3} \dots)^2$$

where $P_1, P_2, P_3 \dots$ is the power (in watts) of each station sharing the array. For situations where all sharing stations

have equal power EPP is expressed as:

$$EPP = n^2 P$$

where n is the number of stations sharing and P the power of each station.

To illustrate, assume a 12-layer array with three panels per layer or 36 panels with a power gain of 6.6 and a per-panel EPP of 22 kW.

$$\text{Array EPP} = (36) (22) = 792 \text{ kW.}$$

Thus, a 36-panel array is rated at 792 kW EPP. The equivalent peak power

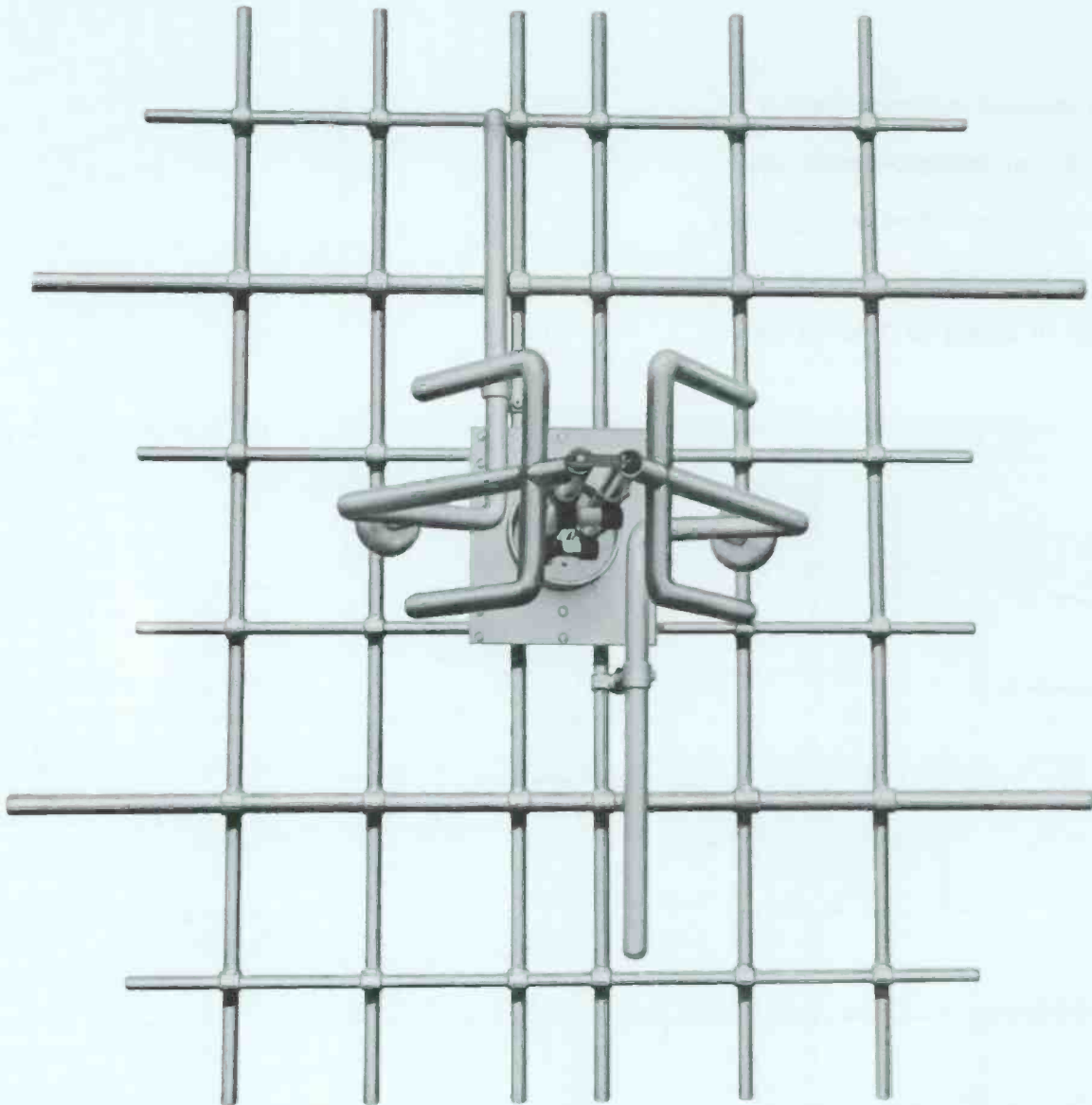
of seven 100-kW ERP stations, each with 15.2 kW (100/6.6) into the array is:

$$\text{Array EPP} = 7^2 (15.2) = 745 \text{ kW.}$$

Therefore, a 12-layer, 36-panel array can handle seven 100-kW ERP stations, each with 15.2 kW of transmitter power. The rms power per panel is:

$$P = 7(15.2)/36 = 2.96 \text{ kW per panel.}$$

Since the individual panel rating is 4.5 kW, 2.96 kW per panel is well within rating.

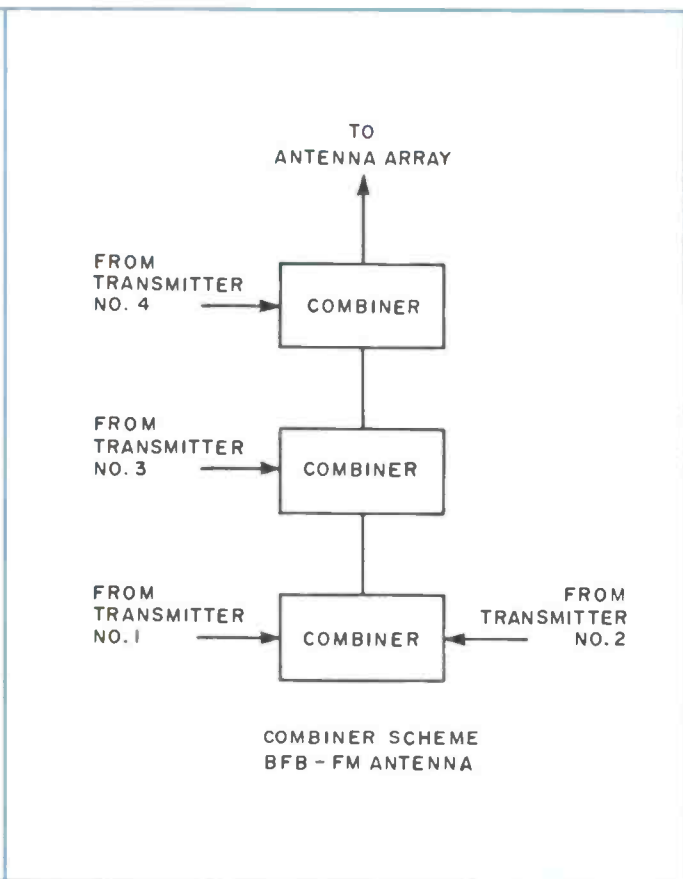
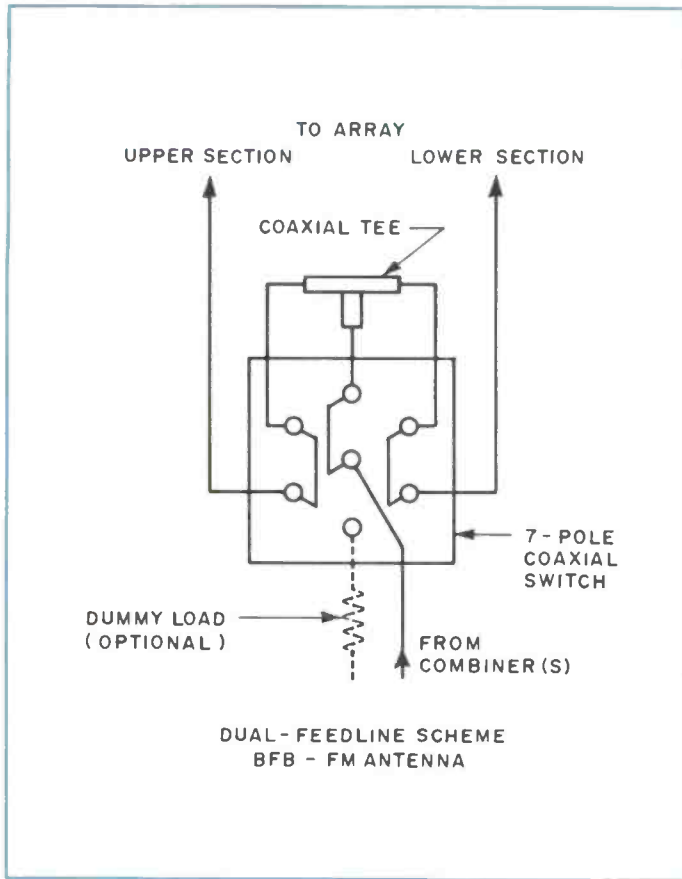


View of panel with radome removed from center of radiator.

| Type Number | ELECTRICAL SPECIFICATIONS | | | | | | MECHANICAL SPECIFICATIONS | | | | | | | |
|-------------|---------------------------|-------|----------|------------------------------|----------------------|-------|------------------------------------|-------|----------------|---------------------|-------------------|------|----------------|------|
| | GAIN | | | Field Intensity ¹ | Approx. Array Height | | Windload at 50/33 PSF ² | | | Weight ² | | | | |
| | Horizontal | | Vertical | | ft | m | Without Radome(s) | | With Radome(s) | | Without Radome(s) | | With Radome(s) | |
| | Power | dB | Field | Power | dB | Field | lbs | kg | lbs | kg | lbs | kg | lbs | kg |
| BFB-1 | 0.46 | -3.37 | 0.678 | 0.46 | -3.37 | 0.678 | 1425 | 646 | 1730 | 785 | 800 | 363 | 850 | 386 |
| BFB-2 | 1.0 | 0 | 1.0 | 1.0 | 0 | 1.0 | 2835 | 1286 | 3445 | 1563 | 1500 | 680 | 1600 | 726 |
| BFB-3 | 1.5 | 1.76 | 1.23 | 1.5 | 1.76 | 1.23 | 4240 | 1923 | 5155 | 2338 | 2300 | 1043 | 2450 | 1111 |
| BFB-4 | 2.1 | 3.22 | 1.45 | 2.1 | 3.22 | 1.45 | 5725 | 2597 | 6945 | 3150 | 3200 | 1451 | 3400 | 1542 |
| BFB-5 | 2.7 | 4.31 | 1.64 | 2.7 | 4.31 | 1.64 | 7640 | 3466 | 9160 | 4155 | 4000 | 1814 | 4250 | 1928 |
| BFB-6 | 3.3 | 5.19 | 1.82 | 3.3 | 5.19 | 1.82 | 8655 | 3926 | 10485 | 4756 | 4700 | 2132 | 5000 | 2268 |
| BFB-7 | 3.9 | 5.91 | 1.97 | 3.9 | 5.91 | 1.97 | 10745 | 4874 | 12880 | 5842 | 5600 | 2540 | 5950 | 2699 |
| BFB-8 | 4.4 | 6.43 | 2.10 | 4.4 | 6.43 | 2.10 | 11990 | 5439 | 14430 | 6545 | 6400 | 2903 | 6800 | 3084 |
| BFB-10 | 5.5 | 7.40 | 2.35 | 5.5 | 7.40 | 2.35 | 15600 | 7076 | 18650 | 8460 | 8000 | 3629 | 8500 | 3856 |
| BFB-12 | 6.6 | 8.20 | 2.57 | 6.6 | 8.20 | 2.57 | 18560 | 8419 | 22220 | 10079 | 9500 | 4309 | 10100 | 4581 |
| BFB-14 | 7.7 | 8.86 | 2.77 | 7.7 | 8.86 | 2.77 | 23430 | 10628 | 27700 | 12565 | 12000 | 5443 | 12700 | 5761 |
| BFB-16 | 8.8 | 9.44 | 2.97 | 8.8 | 9.44 | 2.97 | 27110 | 12297 | 31990 | 14510 | 14200 | 6441 | 15000 | 6804 |

¹Effective free-space field intensity at one mile (1.609 km) in millivolts per meter for 1 kW antenna input power for either equivalent horizontally polarized component or equivalent vertically polarized component.

²Weights and windloads are estimated for three panels per layer on a triangular cross section tower.



Specifications

| | |
|--|--|
| Frequency Range | 88-108 MHz |
| Panel Bandwidth | 6 MHz ¹ |
| Polarization | Circular |
| Power Gain (Over dipole) | See Chart |
| Azimuthal Pattern Circularity | |
| Horizontal Polarization | ±3 dB max. ² |
| Vertical Polarization | ±3 dB max. ² |
| VSWR at Input Connection (over 6 MHz band) | 1.2:1 max. |
| Input Connection | 3/8", 50-ohm EIA ³ |
| Power Input Rating (Per Panel) | 4.5 kW rms; 22 kW EPP ⁴ |
| Windload | See Chart |
| Panel Dimensions (Approx.) | 8' H; 6' W; 4 1/2' D (2.44, 1.83, 1.37 m) |
| Array Weight | See Chart |

Accessories

Input Adapters:

| | |
|-------------------------------------|--------------|
| Inner Conductor Adapters to connect | |
| MI-19113C Line | MI-28988-4A |
| MI-19313 Line | MI-28988-4B |
| Adapters to Connect: | |
| Male end of MI-27791D Line | MI-27791D-7A |
| Female end of MI-27791D Line | MI-27991D-7B |

Power Combiners:

Custom built because of myriad possible combinations of frequency and power level. Please contact regional sales office for details.

Manual Coaxial Switches:

| | |
|-------------------------------------|------------------------|
| Three-Pole, 3/8-inch, 50 ohms | MI-27717 |
| Seven-Pole, 3/8-inch, 50 ohms | MI-27718 |
| Motor Driven Coaxial Switches | MI-561562 ⁵ |

¹Adjustable during manufacture for any frequency spread within the 88-108 MHz band.
²Mounted on 7 1/2-foot (2.29 m) tower faces.
³Optional input connection: 3/8", 4-1/16" or 6/8", 50 ohm "Universal". Dual input optional at extra cost in any diameter.
⁴Equivalent Peak Power. See text for explanation.
⁵Please specify mating transmission line.

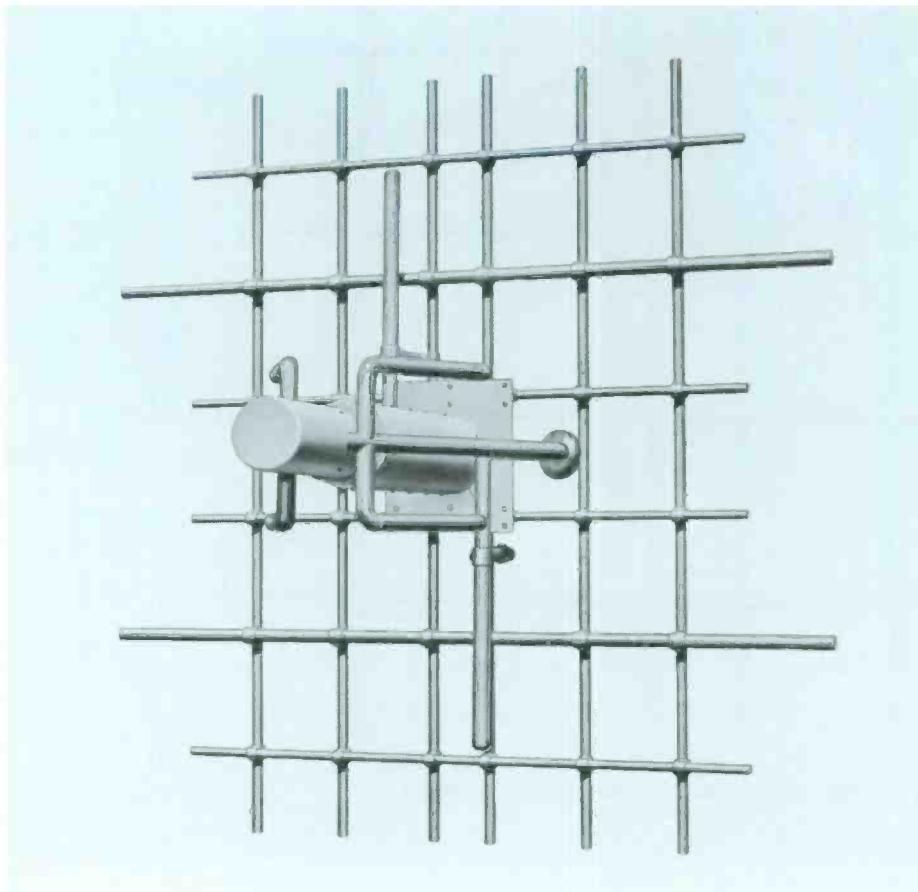
Ordering Information

| Antenna Type No. | Sections | With Radome(s) | Less Radome(s) |
|------------------|----------|----------------|----------------|
| BFB-1 | 1 | ES-561971B | ES-561971A |
| BFB-2 | 2 | ES-561972B | ES-561972A |
| BFB-3 | 3 | ES-561973B | ES-561973A |
| BFB-4 | 4 | ES-561974B | ES-561974A |
| BFB-5 | 5 | ES-561975B | ES-561975A |
| BFB-6 | 6 | ES-561976B | ES-561976A |
| BFB-7 | 7 | ES-561977B | ES-561977A |
| BFB-8 | 8 | ES-561978B | ES-561978A |
| BFB-10 | 10 | ES-561979B | ES-561979A |
| BFB-12 | 12 | ES-561980B | ES-561980A |
| BFB-14 | 14 | ES-561981B | ES-561981A |
| BFB-16 | 16 | ES-561982B | ES-561982A |

"Standard" mounting hardware is included for face mount on most tower types. Details on request.

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- Single-line or split-feed arrangements
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Radomes that cover the ice-sensitive portions of the antenna are standard equipment. For locations where icing conditions are rare, the panels are available without radomes at lower cost per panel. Eliminating the radomes also reduces antenna windload (see *Specifications*).

Accommodates Split-Feed System

The BFB- antenna is designed to operate with a single $3\frac{1}{8}$, $4\frac{1}{8}$ or $6\frac{1}{8}$ -inch coaxial transmission line between array input and transmitter. However, the array may be arranged to operate from two transmission lines from the transmitter so that, in the event of failure of some array component, the inoperable section can be switched out of service and operation continued, with circular polarization, from the other "half" of the array at reduced ERP until the outage is corrected. See schematic drawing.

Power Rating Considerations

Two factors determine the power rating of a BFB- antenna array: each panel in an array has a 4.5 kW (rms) power-input limitation and an "equivalent peak-power" (EPP) rating of 22 kW. EPP is expressed as:

$EPP = (\sqrt{P_1} + \sqrt{P_2} + \sqrt{P_3} \dots)^2$
 where $P_1, P_2, P_3 \dots$ is the power (in watts) of each station sharing the array. For situations where all sharing stations

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$Array\ EPP = (36)(22) = 792\ kW.$

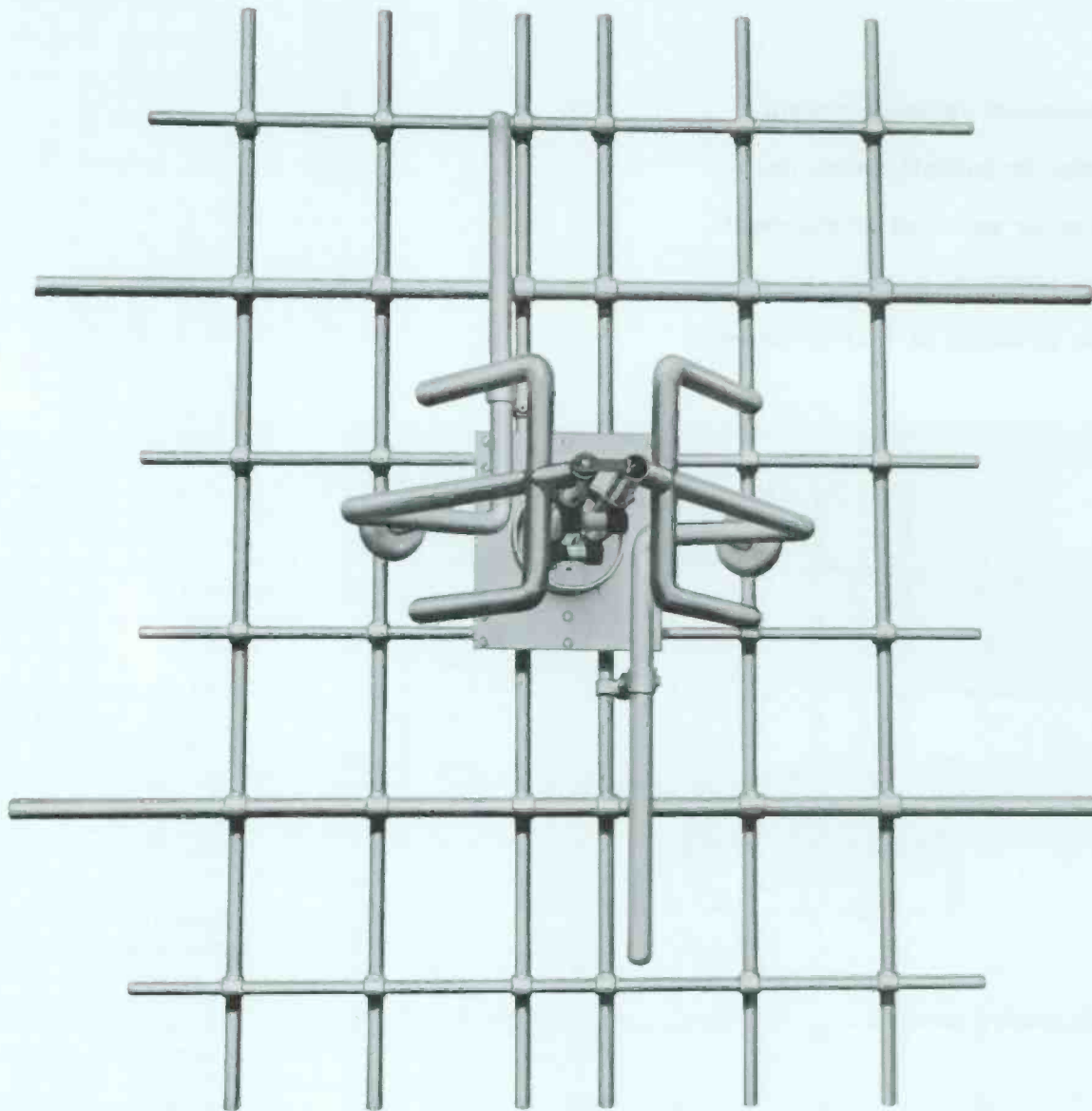
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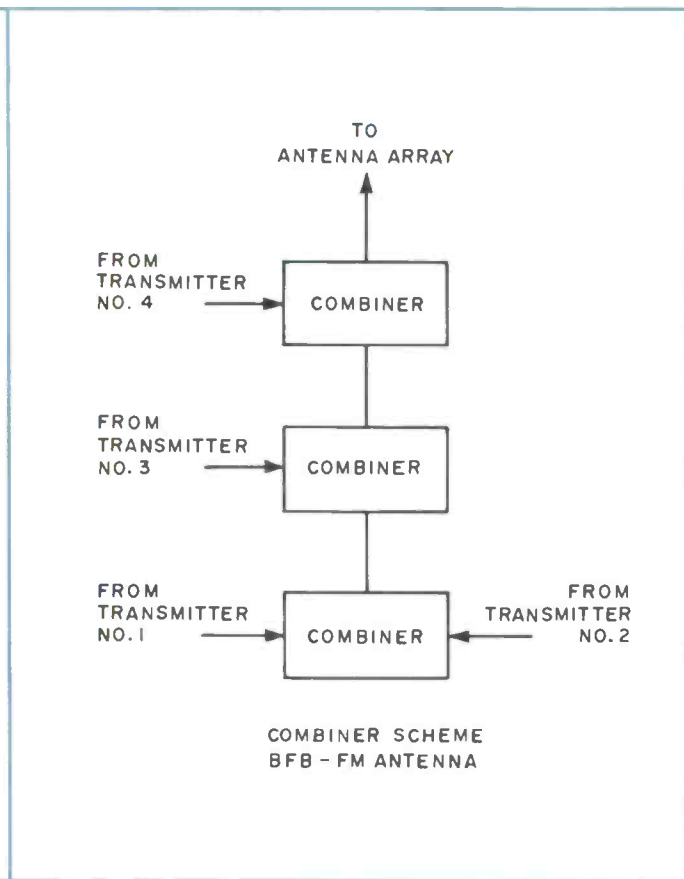
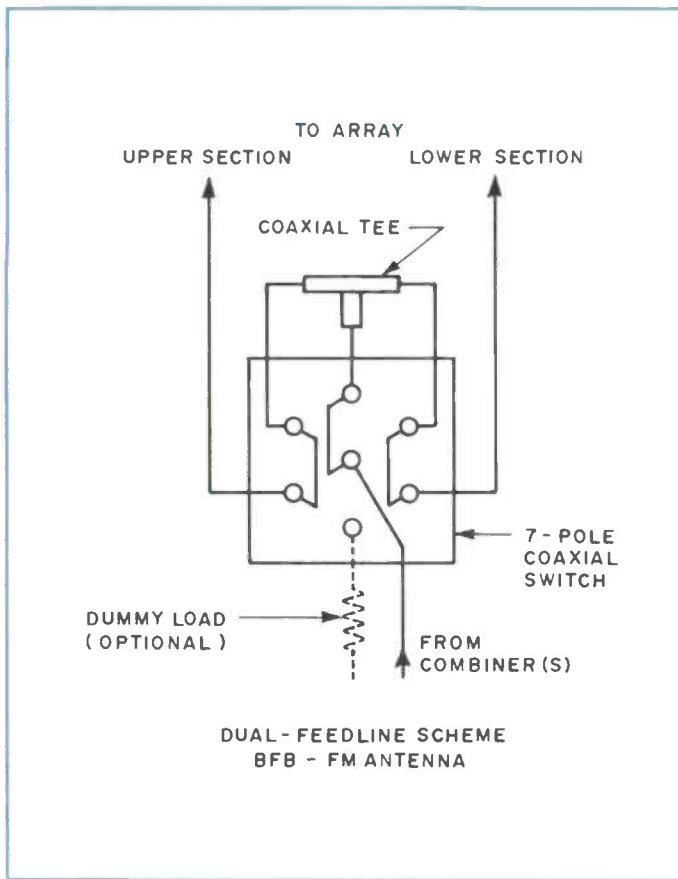


View of panel with radome removed from center of radiator.

| Type Number | ELECTRICAL SPECIFICATIONS | | | | | | MECHANICAL SPECIFICATIONS | | | | | | | |
|-------------|---------------------------|-------|----------|------------------------------|----------------------|-------|------------------------------------|-------|----------------|---------------------|-------------------|------|----------------|------|
| | GAIN | | | Field Intensity ¹ | Approx. Array Height | | Windload at 50/33 PSF ² | | | Weight ² | | | | |
| | Horizontal | | Vertical | | ft | m | Without Radome(s) | | With Radome(s) | | Without Radome(s) | | With Radome(s) | |
| | Power | dB | Field | Power | dB | Field | lbs | kg | lbs | kg | lbs | kg | | |
| BFB-1 | 0.46 | -3.37 | 0.678 | 0.46 | -3.37 | 0.678 | 1425 | 646 | 1730 | 785 | 800 | 363 | 850 | 386 |
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Specifications

| | |
|--|--|
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| Panel Bandwidth | 6 MHz ¹ |
| Polarization | Circular |
| Power Gain (Over dipole) | See Chart |
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| Horizontal Polarization | ±3 dB max. ² |
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| VSWR at Input Connection (over 6 MHz band) | 1.2:1 max. |
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