



**CIRCULARLY POLARIZED  
FM ANTENNAS**

**JAMPRO ANTENNA COMPANY**  
Subsidiary of Computer Equipment Corporation

# FEATURES

**RADIATES TRUE CIRCULAR POLARIZATION**  
**CHOICE OF SHUNT OR PARALLEL FEEDS**  
**ADJUSTABLE POLARIZATION POWER RATIOS**  
**EXCELLENT PATTERN CIRCULARITIES**  
**LOW WIND LOADING AND DEAD WEIGHT**  
**HIGH POWER HANDLING CAPABILITY**  
**MORE SIGNAL INTO HOME FM RECEIVERS**  
**RUGGED MECHANICAL CONSTRUCTION**  
**LOW Q AND EXCELLENT VSWR BANDWIDTH**

## **WRITE FOR ANY OF THE FOLLOWING CATALOGS DESCRIBING OUR OTHER TYPES OF FM ANTENNAS:**

- **JLCP** Low power, elliptically polarized, for tower side mounting. From 2 to 10 KW input rating.
- **JHCP** Moderate power, circularly polarized for pole or tower side mounting. 60 to 80 KW rating.
- **JSD** Multi-station antenna, for up to 8 FM stations. Mounts on sides of square or triangular towers, with power ratings of 90 to 360 KW!

# JAMPRO CIRCULARLY POLARIZED FM ANTENNAS

## TRUE CIRCULARLY POLARIZED FM ANTENNA

The best state of the art FM transmitting antenna, the JAMPRO CP\*, is now available. Producing circular polarization, the JAMPRO CP provides improved reception for car radios and for home receivers using built-in or line-cord antennas.

In the past, dual polarization has been used, produced by the use of separate vertical and horizontal antennas, or by the use of vertical stubs on ring type antennas. Circularly polarized transmitting antennas have the advantage of assuring reception with any logical orientation of linear receiving antennas.

In addition to providing the technically superior circular polarization in all directions of azimuth, the construction of the JAMPRO CP antenna results in less complex installation requirements and lower wind loading and net weight. Also, the JAMPRO CP antenna produces excellent radiation patterns when side mounted on a tower.

## CHOOSE BETWEEN SHUNT OR PARALLEL FEEDS

Now choose between two time proven feed systems. Only JAMPRO, manufacturers of FM and TV antennas, and other peripheral equipment, offers you this choice.

## DIRECT ENGINEERING SERVICES

Jampro antenna engineers are available for direct assistance with any antenna problem.

## LOW PRICE — QUICK DELIVERY

The CP antenna is designed for highest performance at the lowest price. Customized service for fast delivery.



JAMPRO JSCP 3 bay shunt fed antenna using 3/8" rigid line. Note deicer cables.

\* Patented in the U.S. Other patents pending.

## JAMPRO CIRCULARLY POLARIZED FM ANTENNAS



### DESIGN

These circularly polarized FM antennas consist of four quarter wave arms, which form the four sides of a square. The square has two hot and two cold sides. The feed system is such that the radiation is in 90 degree phase quadrature. When the square is flat and parallel to the ground, nearly 100 percent of the radiation is horizontally polarized. The construction permits the two opposite corners of the square to be rotated. When the angle between the opposite corners is 45 degrees, 50% of the radiation is horizontally polarized and 50% is vertically polarized.

When the angle is less than 45 degrees, there is more horizontally polarized radiation than vertically polarized. This change of angle, and the ratio of the horizontal to vertical polarized radiation is unique with JAMPRO CP antennas.

### RUGGED CONSTRUCTION

These JAMPRO CP antennas are made of thick wall brass tubing. They will not be bent out of shape during installation, high winds or ice loads. The four quadrant arms are 1 inch in diameter while the center support tube is 2 inches. The thick brass metal used provides protection against corrosive atmospheres.

In the shunt fed types, the element is terminated in a 1 5/8" EIA flange. This flange is welded with a process which does not reduce the strength of the brass. In the parallel feed types, the basic element is fed through an LC female connector which is an integral part of the element. The element is supported and mounted to the tower by a galvanized steel bracket.

Mounting hardware made specifically to mount these antennas to the tower is supplied. The mounting brackets are chosen to provide the best radiation pattern from the particular tower used. Both the shunt and parallel fed elements permit dry air pressurization up to the teflon feed points.

### ANTENNA MOUNTING

Galvanized steel mounting brackets with stainless steel hardware are furnished with these antennas. They may be mounted on the faces of towers, or on the legs. On special order, a pole can be furnished to mount on top of a tower or building. If a tapering self supporting tower is to be used, JAMPRO will furnish extensions for vertical alignment, at slight additional cost.

### FACTORY TESTS:

During mechanical fabrication, continuous quality control checks are made to insure conformity to rigid standards.

After fabrication, the antenna system is mounted on a tower similar to that to be used by the customer. The horizontal to vertical power gain ratios are then adjusted to meet the purchase order specifications. After this, the VSWR of the system is adjusted and a VSWR plot taken. A complete instruction book containing step-by-step installation instructions, mounting sketch, de-icer wiring information, and a final measured VSWR plot, is included with each antenna system shipped.



## FEED SYSTEMS

The JAMPRO CP antenna is available in two different types of inter-bay feed systems — The shunt and the parallel types.

The broadcaster has the choice between either of these types of feed systems, both of which have proven themselves in over 20 years of service in literally hundreds of installations.

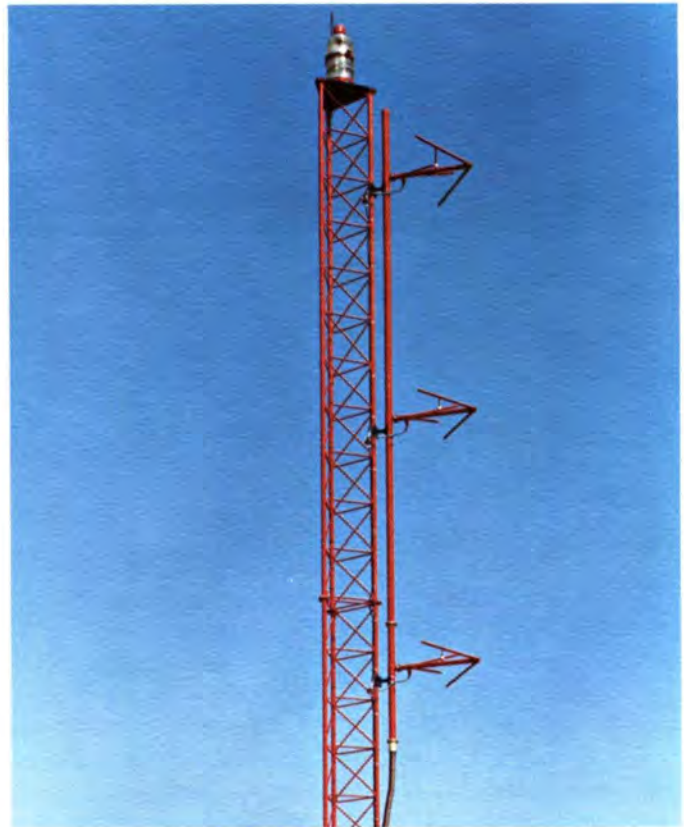
## PARALLEL

The parallel feed system uses separate feed cables from a power divider. Fourteen or less bays use a single power divider, while those with 15 to 20 bays use two power dividers in conjunction with a power splitter. The input is supplied with either a 3 1/8" or a 1 5/8" EIA connector, depending on the number of bays and power rating. The inter-bay feed cables are 50 ohm, and their length is such as to provide equal phase currents to all radiating elements. The antenna may be leg mounted without interference with tower guys, or may be face mounted.

The parallel feed system has some electrical advantages; the relative phase of all the radiating elements remains the same over the entire FM channel and presents a flatter transmitter load. The advantage of the shunt feed system is that it is mechanically simpler in construction and is easier to install.

## SHUNT

The shunt fed system uses a single vertical run of 3 1/8" line, across which are shunted the various bays, located approximately 10 feet apart. Of sectionalized construction, each section consists of one radiator and 10 feet of rigid coax line. The antenna input is 3 1/8" EIA flange, with adaptors available for other sizes. Antennas of 8 or less bays are fed from the bottom, while those with more than 8 bays are fed from the center using a power splitter to feed the upper and lower sections.

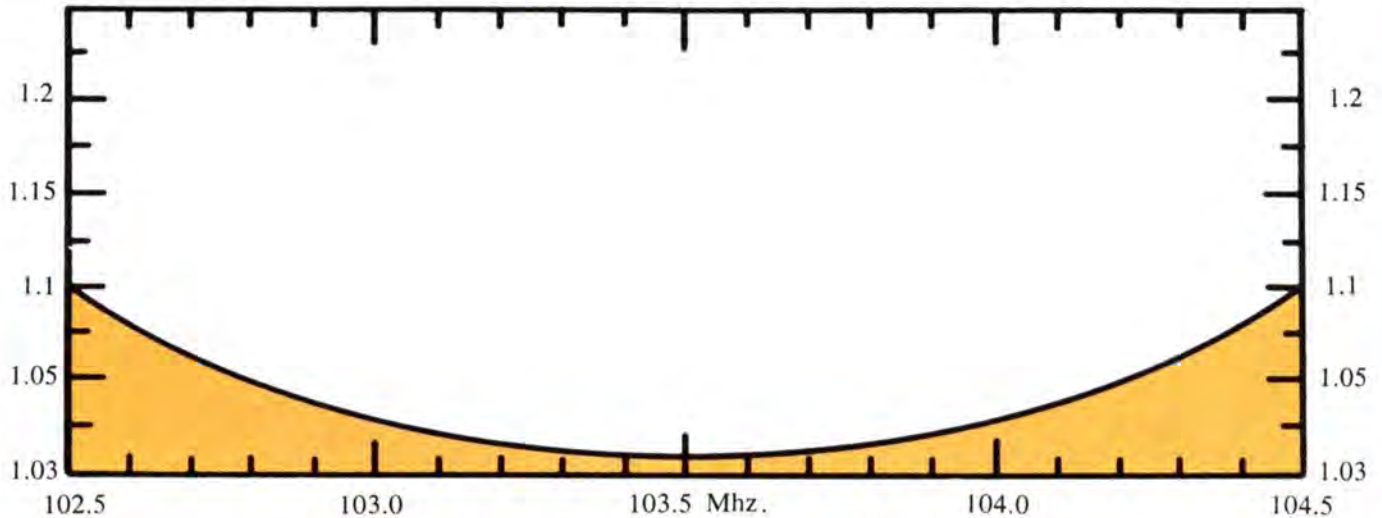


## DEICING PROVISIONS

Where regular icing and sleet conditions prevail, deicing equipment is recommended as an accessory item. It must be ordered with the antenna. Electrical rod heaters are installed in the four quadrant arms, as well as in the center feed-support arm. Each radiating bay requires 500 watts of power, at 208/240 volts, AC. These heaters can be operated at 104/120 volts, AC for reduced deicing requirements.

The electrical deicers are insulated from the metal radiator, and meet all known US electrical codes. A waterproof pigtail, is brought out from the element support arm and connects to a bay junction box. An ice and sleet sensitive switch is furnished with a complete interbay wiring kit.

# JAMPRO CIRCULARLY POLARIZED FM ANTENNAS



MEASURED VSWR TYPE JSCP-3 STATION KOST  
MOUNT WILSON, LOS ANGELES, CALIF.

## VERTICAL PATTERNS

The half power beamwidth of both the horizontal and vertical fields is a function of the number of bays in the antenna system. It is approximately equal to 61 divided by the number of bays. A six bay antenna has a half power vertical pattern of approximately 10 degrees. Where null fill-in is desirable, it may be furnished without additional cost in the parallel feed antenna. In the shunt feed antenna, a 10% additional charge is made for beam tilt of up to 1.5 degrees and or null fill-in of up to 15%.

## HORIZONTAL PATTERN CIRCULARITY

The radiation pattern for side mounted antennas is subject to azimuthal distortion by the reflection effects from the steel tower. The JAMPRO CP antenna is not greatly affected, because the basic radiator is both physically and electrically large — more than three times larger than any competitive antenna. This large illuminating source reduces the effects of the supporting steel tower. Typical pattern circularities of  $\pm 2$  DB for both the horizontal

and vertical fields have been measured with towers 15 to 48 inches wide.

## ANTENNA SYSTEM VSWR

Good stereo performance requirements are met with a VSWR of 1.1 to 1 over a 400 kilocycle bandwidth! The basic element is low Q since two half waves consisting of four quarter wave arms are used. The VSWR is not affected by rain, fog, or even slight coating of ice. After installation, the elements may be trimmed for the lowest possible VSWR if desired. A digital tuning device is included in two of the quadrant arms to allow field trimming for the closest possible match to the customer's tower.

## STEREO OPERATION

JAMPRO circularly polarized FM antennas have good VSWR over a 400 kilocycle band. The antenna load is non-reactive for all significant FM sidebands. This antenna does not introduce measureable crosstalk between left and right stereo channels.

## RATIOS OTHER THAN 50/50

To determine the antenna size, simply add the required horizontal and vertical power gain ratios. Then choose the catalog antenna whose added gain equals or exceeds that required. For example, horizontal gain of 6.0 and vertical gain of 2.5 is required. ( $6.0 + 2.5 = 8.5$ ) The catalog antenna is the 8 bay whose doubled gain is 8.6.

# ANTENNA SPECIFICATIONS AND PRICES

JSCP TYPE — SHUNT FED SYSTEM WITH ONE VERTICAL 3/8" LINE

JCP TYPE — PARALLEL FEED SYSTEM WITH ALL INTERBAY CABLES

TYPE NO. AND BAYS	POWER GAIN	GAIN IN DB	FIELD GAIN	FS <sup>or</sup> 1 MILE 1 KW, Mv/M	NET WEIGHT	SAFE POWER RATING	WINDLOAD 50/33 PSF	PRICE ANTENNA
JSCP-1	0.46	—3.37	0.678	93.2	38.25	10.0 KW	70.5 LBS.	\$ 1,400
JCP-1	0.46	—3.37	0.678	93.2	26.0	5.0 KW	57 LBS.	\$ 1,400
JSCP-2	1.0	0.0	1.0	137.6	121.5	20.0 KW	225.0 LBS.	\$ 2,115
JCP-2	1.0	0.0	1.0	137.6	80.5	10.0 KW	145.0 LBS.	\$ 2,365
JSCP-3	1.5	1.76	1.23	168.4	192.75	30.0 KW	315.0 LBS.	\$ 3,185
JCP-3	1.5	1.76	1.23	168.4	114.5	15.0 KW	223.0 LBS.	\$ 3,500
JSCP-4	2.1	3.22	1.45	199.2	264.0	40.0 KW	405.0 LBS.	\$ 4,160
JCP-4	2.1	3.22	1.45	199.2	148.0	20.0 KW	302.0 LBS.	\$ 4,565
JSCP-5	2.7	4.31	1.64	225.2	335.25	40.0 KW	495.0 LBS.	\$ 5,140
JCP-5	2.7	4.31	1.64	225.2	212.0	25.0 KW	391.0 LBS.	\$ 5,665
JSCP-6	3.2	5.05	1.79	246.0	406.5	40.0 KW	588.0 LBS.	\$ 6,000
JCP-6	3.2	5.05	1.79	246.0	251.0	30.0 KW	491.0 LBS.	\$ 6,600
JSCP-7	3.8	5.80	1.95	268.0	477.75	40.0 KW	678.0 LBS.	\$ 7,200
JCP-7	3.8	5.80	1.95	268.0	299.0	35.0 KW	592.0 LBS.	\$ 7,800
JSCP-8	4.3	6.34	2.07	285.2	549.0	40.0 KW	768.0 LBS.	\$ 7,800
JCP-8	4.3	6.34	2.07	285.2	337.0	40.0 KW	736.0 LBS.	\$ 8,500
JSCP-10	5.5	7.40	2.35	322.4	701.5	40.0 KW	948.0 LBS.	\$10,250
JCP-10	5.5	7.40	2.35	322.4	437.0	40.0 KW	903.0 LBS.	\$11,300
JSCP-12	6.6	8.20	2.57	353.2	844.2	40.0 KW	1131.0 LBS.	\$12,000
JCP-12	6.6	8.20	2.57	353.2	555.0	40.0 KW	1122.0 LBS.	\$13,475
JSCP-14	7.8	8.92	2.79	383.9	986.7	40.0 KW	1314.0 LBS.	\$14,300
JCP-14	7.8	8.92	2.79	383.9	671.0	40.0 KW	1348.0 LBS.	\$15,700
JSCP-16	8.9	9.49	2.98	410.2	1129.2	40.0 KW	1494.0 LBS.	\$15,900
JCP-16	8.9	9.49	2.98	410.2	831.0	80.0 KW	1930.0 LBS.	\$17,500

- 1) Power gains are for 50/50 horizontally and vertically polarized ratios. Other ratios available.
- 2) Antenna polarization is circular clockwise, in all directions of azimuth.
- 3) Prices include complete galvanized mounting hardware for leg mounting on uniform guyed towers.
- 4) Brackets for face mounting or self supporting towers are extra. Prices on request.
- 5) Tower space required, in feet is 984 divided by freq. in MHz × number of bays less 1.
- 6) Antenna input location on JCP series is three feet below antenna array center.
- 7) Windload ratings are 50/33 PSF, 110 miles per hour.
- 8) Antenna weights include standard mounting hardware. Add 10 Lbs/bay for deicers.

## WHEN ORDERING BE SURE TO SPECIFY

- |                                   |  |
|-----------------------------------|--|
| A. Antenna Type number            | D. Horizontal and vertical power gains   |
| B. Deicers, if any, add \$210/bay | E. Description of tower — make and model |
| C. Channel, (between 88-108 Mhz)  | F. Beam tilt and null fill-in, if any    |

April 1, 1973

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Subsidiary of Computer Equipment Corporation  
6939 POWER INN ROAD • SACRAMENTO, CALIFORNIA 95828 • (916) 383-1177

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Phone: (916) 383-1177

*ELLIPTICALLY POLARIZED*

# PERFORMER

FM ANTENNAS



- **Low VSWR**
- **Low Price**
- **Low Maintenance Cost**
- **Low Installation Cost**
- **Low Windload**
- **Low Weight**

## NOW FROM JAMPRO!

### ELLIPTICALLY POLARIZED FM ANTENNAS

Now Class A and educational broadcasting stations can take advantage of superior quality and craftsmanship of Jampro's latest contribution to FM broadcasting.

The introduction of the PERFORMER JLCP series, low power and low cost antenna will allow the Class A and educational stations a quality elliptically polarized FM antenna at a cost well within their budget.

The JLCP series is rated at 2 KW per bay and is available in models from 1 to 12 bays. Low VSWR over 200 KHz provides excellent conditions for stereo broadcasting service.

The JLCP is elliptically polarized for improved signal reception for car radios, and home receivers using built-in line cord antennas.

These PERFORMER antennas are designed for low VSWR values. Each antenna is complete with a VSWR tuner, which is adjusted for best operation after installation. The antenna is completely air tight and may be pressurized for long trouble free service.

These JLCP series antennas are rugged! Built of thick wall copper tubing, and marine brass, they will keep their shape during installation, high winds or ice loads.

Galvanized steel mounting brackets are included with each antenna for leg mounting on uniform cross section towers. Face mounting and tapered tower mounting brackets are priced on request. Other special mounting brackets are available.

The JLCP feed system consists of a vertical 1½" line, across which are shunted the various bays. The input of the antenna is a 1½" EIA flange.

Deicing is available at additional cost. Each radiating bay requires 360 watts of power at 220/240 volts. They can also be operated at 110/120 volts, AC, for reduced deicing requirements. Deicers are factory installed.

For HIGH POWER operation, investigate the standard of the industry. Write for a brochure on the JAMPRO PENETRATOR, circularly polarized FM antenna.



## POLARIZATIONS:

The FCC permits the use of horizontally, elliptically, and circularly polarized FM broadcasting antennas. Experience has indicated that circularly polarized antennas put the most signal into a randomly polarized receiving antenna, with the elliptical antenna running a close second. Circular polarization is more difficult to achieve in a practical FM broadcasting antenna, and is thus more expensive.

## CIRCULAR POLARIZATION

When the horizontally and vertically polarized components are nearly equal in strength in all azimuthal directions and the phase is nearly 90° quadrature, the antenna is circularly polarized. The patented JAMPRO PENETRATOR series of FM antennas, has excellent axial ratios and is truly a circularly polarized antenna.

## ELLIPTICAL POLARIZATION

Like all ring-stub antennas, the PERFORMER, radiates different ratios of power in different azimuthal directions. The electrical phase of the two polarizations also varies with a change of azimuth. The resulting axial ratio of the horizontally and vertically polarized components makes this an excellent elliptically polarized antenna.

## SPECIFICATIONS JLCP Series

### Electrical:

Frequency Range:	88 to 108 MHz
Polarization:	Elliptical, Clockwise
Power Gain:	
Horizontal	See Table Below
Vertical	Same as Horizontal
Azimuthal Pattern:	±2.0 db in free space
VSWR at Input:	1.5:1 over ±200 KHz (Without field trimming)
VSWR at Input:	1.1:1 over ±200 KHz (With field trimming)
Power rating:	2 Kilowatt per Bay

### Mechanical:

Input connection:	1 5/8" EIA Flanges
Other	See Table Below

### Deicers: (each bay)

Moderate:	90 watts @ 110-120 volts
Heavy Ice:	360 watts @ 220-240 volts

Type No. and Bays	Power Gain	Gain In DB	Field Gain	FS at 1 Mile 1 KW, MV/M	Net Weight	Safe Power Rating	Windload 50/33 PSF	Price Antenna
JLCP-1	0.475	-3.23	0.69	94.94	12 Lbs.	2 KW	15 Lbs.	\$ 795.00
JLCP-2	0.955	-.20	0.977	134.44	51 Lbs.	4 KW	70 Lbs.	\$1,465.00
JLCP-3	1.50	1.76	1.22	167.87	71 Lbs.	6 KW	130 Lbs.	\$2,200.00
JLCP-4	2.05	3.12	1.43	196.77	90 Lbs.	8 KW	183 Lbs.	\$2,935.00
JLCP-5	2.60	4.15	1.61	221.54	107 Lbs.	10 KW	242 Lbs.	\$3,665.00
JLCP-6	3.15	4.98	1.77	243.55	132 Lbs.	10 KW	295 Lbs.	\$4,400.00
JLCP-7	3.65	5.62	1.91	262.82	153 Lbs.	10 KW	350 Lbs.	\$5,250.00
JLCP-8	4.20	6.23	2.05	282.08	174 Lbs.	10 KW	400 Lbs.	\$5,865.00
JLCP-10	5.40	7.32	2.32	319.60	214 Lbs.	10 KW	504 Lbs.	\$6,600.00
JLCP-12	6.50	8.13	2.55	350.88	264 Lbs.	10 KW	610 Lbs.	\$8,250.00

- 1) Prices include complete mounting hardware for leg mounting, guyed towers only.
- 2) Mounting brackets not included in net weight or windloading.
- 3) Windload ratings are 50/33 PSF, 110 miles per hour.
- 4) Space required on tower is 984 divided by freq. in MHz × number of bays less 1.

### — WHEN ORDERING PLEASE BE SURE TO SPECIFY —

- |  |  |
|--|--|
| (A) Antenna type number.                   | (C) Channel (Between 88-108 MHz).        |
| (B) Deicers, if any, add \$150.00 per bay. | (D) Description of tower (Make & Model). |