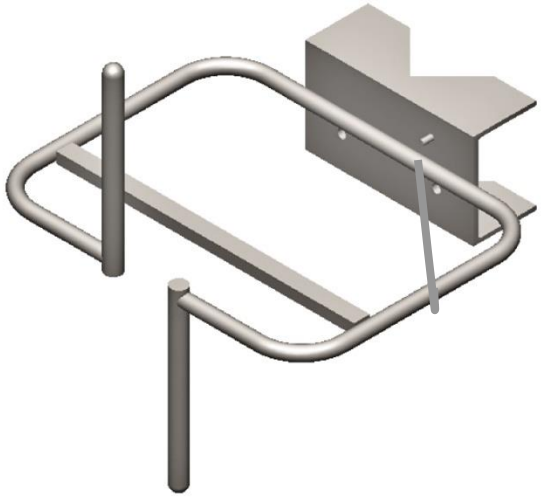
MICRONETIXX COMMUNICATIONS



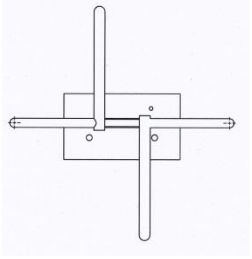
FML C/P FM Antenna

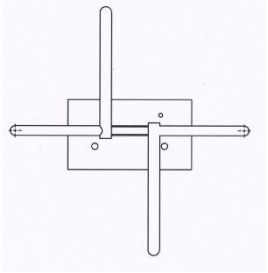
- **Right hand C/P Polarization**
- **Low wind load area**
- **Up to 1 kW Rating per bay**
- **Omni-directional**
- **Up to 8 kW input per array with power divider options**

The **FML** series of antennas are narrow band C/P FM (Band II) antennas. They are an excellent solution for LPFM, plus standby and translator applications. The **FML** has outstanding horizontal to vertical circularity, with an Omni-directional pattern. The input rating per bay is 500 Watts via an “N” input connector, 1 kW with a 7/16” DIN input. Higher power options use an input power divider that has an input rating of 8 kW, and produces a maximum ERP of 34 kW (FML-158-8). The light weight, but rugged stainless steel design weighs less than 5 lbs. (2.27 kg.) per bay. The antenna mounts to a 2.375 inch (6 cm) to 3.50 inch (8.9 cm) support pole supplied by others.

The gain of a single bay **FML** bay is -0.49 (-3.09 dB), a two bay model FML-2 has a gain of unity, based on a 1λ bay to bay spacing. The polarization is right hand circular. V.S.W.R is 1.10:1 over +/- 100 kHz.

The FML antennas are easy to install and are pre tuned at the factory. The diagram below depicts a two bay antenna (FML-2). The antennas will produce the best radiation pattern if mounted to a small support pole, and installed with free space above and below the antenna. The numbers provided are for operation at 98 MHz.





120 inches (305 cm)

240 inches (610 cm)

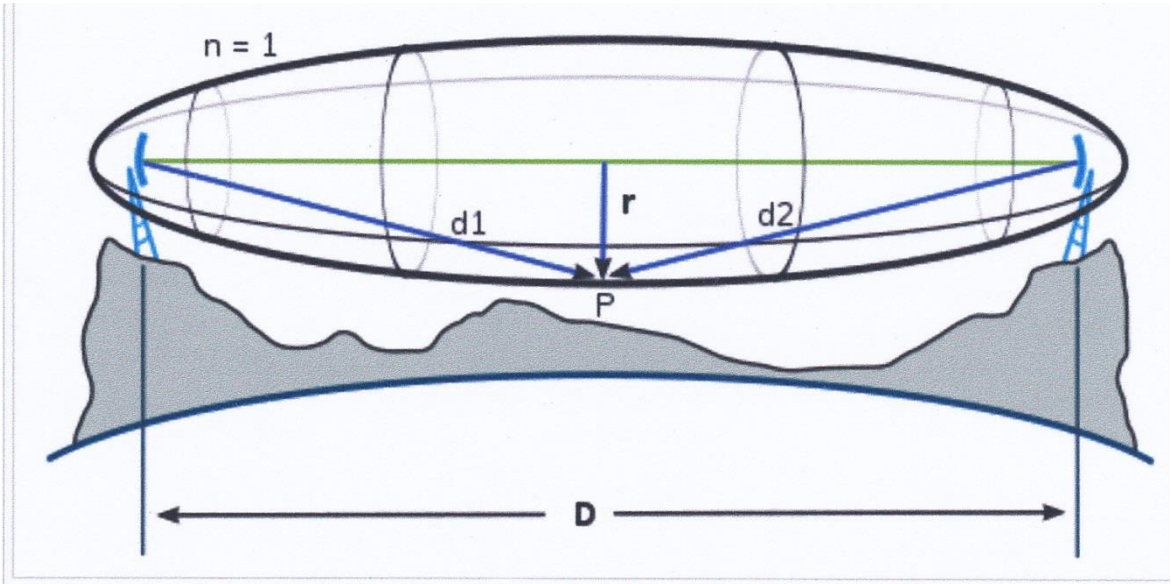
360 inches

(915 cm)

240 inches is the recommended pole length,
360 inches is the recommended free space area

Why it is best to transmit a C/P signal ?

LPFM and translator signals are low power and the antenna is usually not mounted at a great height. That limits line of sight coverage and a clear Fresnel zone. When the Fresnel zone is disrupted by buildings, or terrain, the polarization of the signal can change due to Faraday rotation. If a signal is transmitted in only one polarization, that polarization can differ at a given reception spot.



Fresnel zone: *D* is the distance between the transmitter and the receiver; *r* is the radius of the first Fresnel zone (n=1) at point P. P is d1 away from the transmitter, and d2 away from the receiver.

The above diagram shows a depiction of the Fresnel zone. If there is a impairment in the zone, Faraday rotation can occur, once or many times along the signal path.

If we for example transmit a horizontally only polarized signal, at impaired reception points the received signal with rotation can be vertically polarized, or at a slanted angle. Depending on the orientation of the receive antenna, Faraday rotation can cause a loss of up to 20 dB in received signal. If your station had a power output of 100 Watts, that impairment could be equal to only having a 1 Watt ERP at given spot.

With Circular polarization, your station is transmitting a signal in all polarities. If there is Faraday rotation at a given location, there is a 99% chance that there always will be a full signal at the orientation of the receiving antenna.

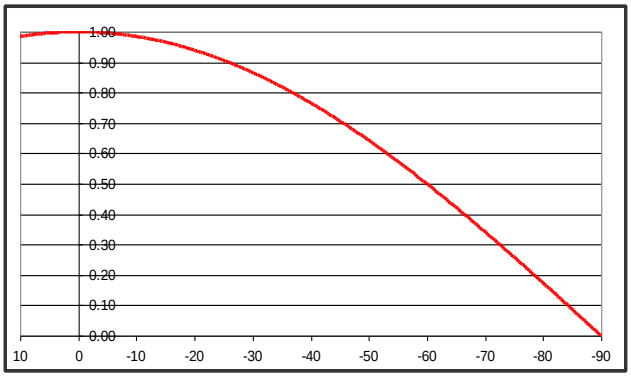
Why is the FML antenna superior ?

The **FML** antenna has excellent azimuth pattern circularity, ensuring a nearly identical vertical to horizontal ratio. Many less expensive models have fairly good horizontal patterns, but the vertical azimuth patterns are more figure 8 like, which increases the chances of dead spots in your coverage area.

The **FML** antennas are cut to frequency. Multi-bay models have cut to frequency feed systems to ensure accurate elevation patterns. Each antenna array is fully tested for proper phase and amplitude relationships. Many competitors do not array test their antennas with the feed system in place.

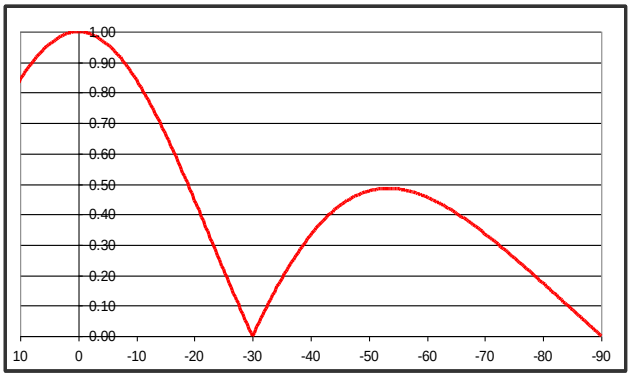
The all stainless steel design is very rugged and will stand up to rough weather conditions. The elements are all DC grounded to ensure maximum protection from lightning and to minimize possible damage to the transmitter in case of a strike.

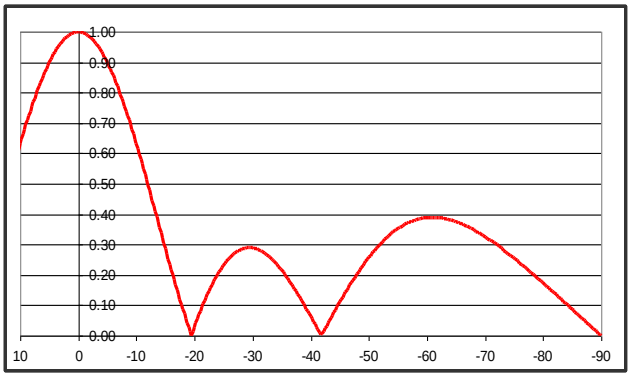
FML Antenna Elevation Patterns



FML-1 Bay
Gain: -0.49 (-3.20 dB)

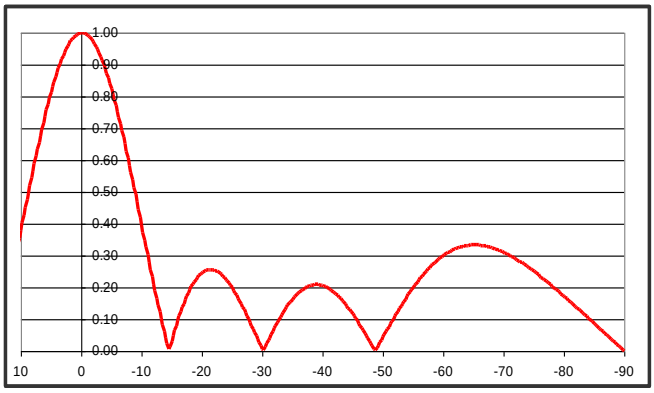
FML-2 Bay
Gain: 0.99 (0.00 dB)



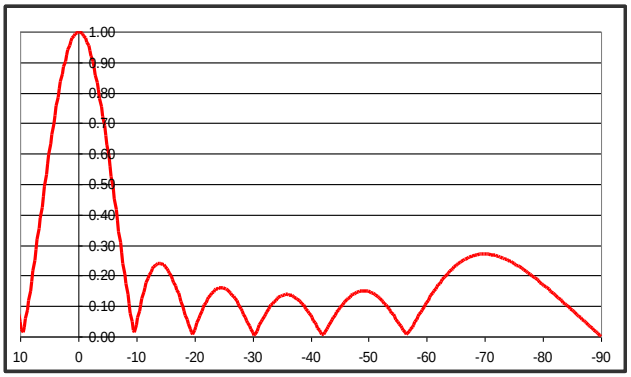


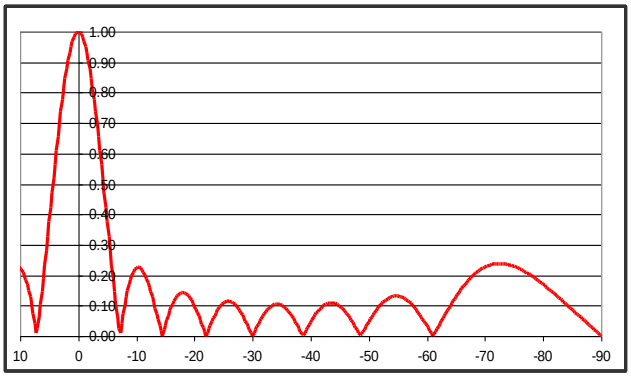
FML-3 Bay
Gain: 1.50 (1.76 dB)

FML-4 Bay
Gain: 2.10 (3.22 dB)



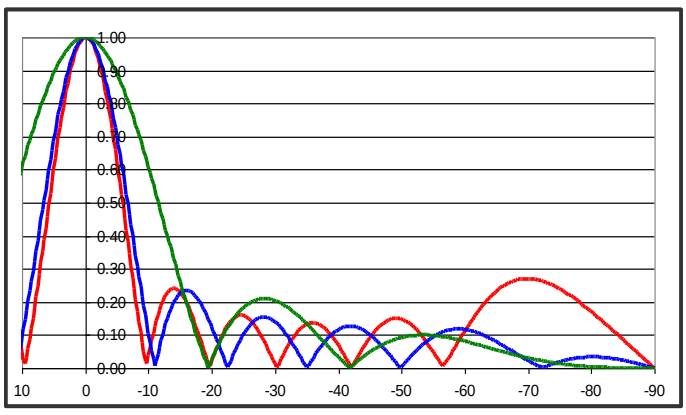
FML-6
Gain: 3.28 (5.16 dB)





FML-8
Gain: 4.35 (6.38 dB)

The **FML** antennas are available in a number of bay to bay spacings. If there is limited space on the tower going from 1 wavelength to a 7/8th or 315 degree spacing will save some vertical space and only decrease gain slightly . The plot below is 3 different spacings of a 6 bay **FML** antenna. The **RED** plot is 1 wavelength, the **BLUE** plot is 7/8th spaced, while the **GREEN** plot is ½ wave spaced. The gain is 3.28 for the full wave spaced, versus 3.15 for the 7/8th wave spaced model.



For sites that have RFR constraints, the 7/8th and ½ wave spaced antennas lower high angles of radiation. We can also engineer special spacings for minimizing second adjacent problems.

Full Wave Spaced
FML Antenna Mechanical Information and C/P Gain/ Input Power

Model Number	Number of Bays	Antenna Length	Reccomended tower space	Radiation Aperture	Antena Weight	Antenna Load Area	Antenna Gain	Input Power	Maximum ERP
FML-1-N	1	10 ft. (3.04 m)	20 ft. (6.08 m)	7 ft. (3.04 m)	5 lbs. (2.3 kg)	0.2 ft^2 (0.02 m^2)	0.49	0.5 kW	250 Watts
FML-1-DIN	1	10 ft. (3.04 m)	20 ft. (6.08 m)	7 ft. (3.04 m)	5 lbs. (2.3 kg)	0.2 ft^2 (0.02 m^2)	0.49	1	500 Watts
FML-2-N	2 CF	15 ft. (4.57 m)	30 ft. (9.14 m)	10 ft. (3.04 m)	12 lbs. (5.5 kg)	0.5 ft^2 (0.05 m^2)	0.99	1 KW	1 kW
FML-2-DIN	2 CF	15 ft. (4.57 m)	30 ft. (9.14 m)	10 ft. (3.04 m)	12 lbs. (5.5 kg)	0.5 ft^2 (0.05 m^2)	0.99	1.5 kW	1.5 kW
FML-3-N	3 EF	25 ft. (7.62) m)	40 ft. (12.19 m)	20 ft. (6.08) m)	17 lbs. (8.0 kg)	0.7 ft^2 (0.07m^2)	1.50	1 kW	1.5 kW
FML-3-DIN	3 EF	25 ft. (7.62) m)	40 ft. (12.19 m)	20 ft. (6.08) m)	17 lbs. (8.0 kg)	0.7 ft^2 (0.07m^2)	1.50	1.5 kW	2.25 kW
FML-4-N	4 EF	35 ft. (10.67 m)	50 ft. (15.24 m)	30 ft. (9.14 m)	22 lbs. (10.0 kg)	0.9 ft^2 (0.09 m^2)	2.10	1 kW	2 kW
FML-4-DIN	4 CF	35 ft. (10.67 m)	50 ft. (15.24 m)	30 ft. (9.14 m)	22 lbs. (10.0 kg)	0.9 ft^2 (0.09 $m^{2)}$	2.10	1.5 kW	3 kW
FML-4-78	4 PD	35 ft. (10.67 m)	50 ft. (15.24 m)	30 ft. (9.14 m)	40 lbs. (18.2 kg)	2.9 ft^2 (0.27 $m^{2)}$	2.10	4 kW	8 kW
FML-6-N	6 CF	55 ft. (16.76 m)	70 ft. (21.33 m)	50 ft. (15.24 m)	33 lbs. (15.0 kg)	1.4 ft^2 (0.13 m^2)	3.28	1 kW	3 kW
FML-6-78	6 PD	55 ft. (16.76 m)	70 ft. (21.33 m)	50 ft. (15.24 m)	52 lbs. (23.6 kg)	3.4 ft^2 (0.32 m^2)	3.28	4 kW	12 kW
FML-6-158	6 PD	55 ft. (16.76 m)	70 ft. (21.33 m)	50 ft. (15.24 m)	53 lbs. (24.1 kg)	3.4 ft^2 (0.32 m^2)	3.28	6 kW	18 kW
FML-8-DIN	8 CF	75 ft. (22.86 m)	90 ft. 27.43 m)	70 ft. (21.33 m)	44 lbs. (20.0 kg)	1.8 ft^2 (0.17 m^2)	4.35	1.5 kW	6 kW
FML-8-78	8 PD	75 ft. (22.86 m)	90 ft. 27.43 m)	70 ft. (21.33 m)	62 lbs. (28.2 kg)	3.8 ft^2 (0.35 m^2)	4.35	4 kW	17 kW
FML-8-158	8 PD	75 ft. (22.86 m)	90 ft. 27.43 m)	70 ft. (21.33 m)	63 lbs. (28.6 kg)	3.8 ft^2 (0.35 m^2)	4.35	8 kW	34 kW

Notes: EF = End Fed CF = Center Fed PD = Power Divider. Gain shown is with out beam tilt or null fill. -78 models have a 7/8" EIA input, -158 models have a 1-5/8" EIA input. The **FML** arrays can be provided in 1/2 to full wave spacings. Also directional models of the **FML** antennas are available. Contact us for the details. Mechanical data is taken for a antenna tuned to 98.1 MHz.

The **FML** is a low power antenna that can produce much higher ERP levels when used with a power divider. On our 4 Bay **FML**, we offer an option with a 7/8” EIA input. This produces a maximum ERP of 8 kW. The 6 bay models have both 7/8” and 1-5/8” input options, which can produce a maximum ERP of 12 and 18 kW. The 8 bay antenna with a 7/8” input can produce 17 kW, while the 1-5/8” model can produce 34 kW.

The light weight and low load areas of these antennas allow for installation on many smaller structures. The **FML** makes a great primary or standby antenna. Give us a call today.

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