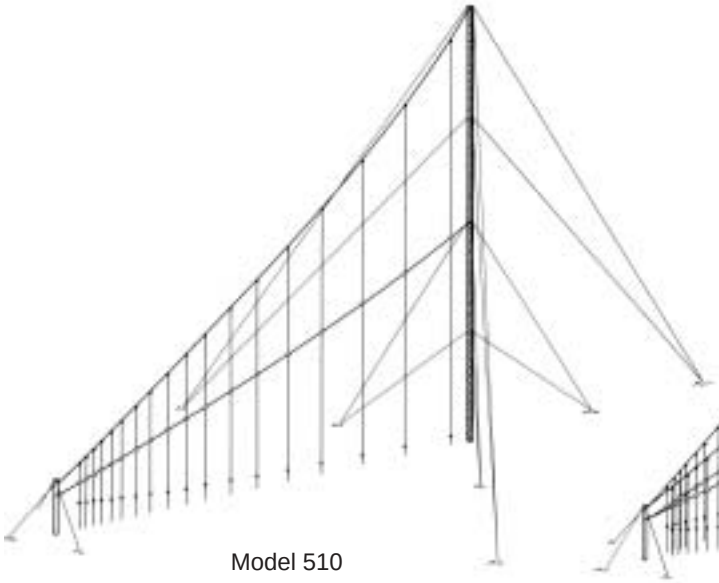
TCI
A Dielectric Company

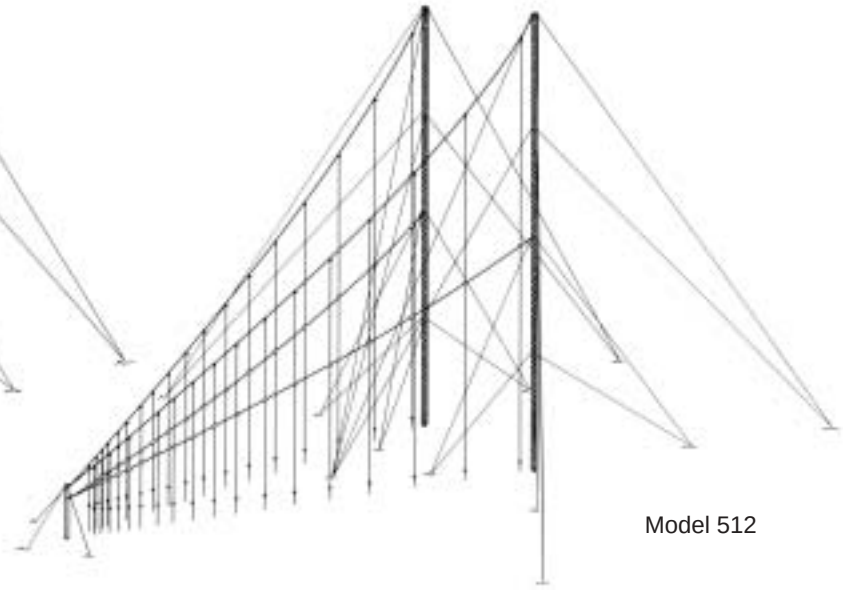
MODELS

510&512

Extended Aperture Vertical Log-Periodic Antennas



Model 510



Model 512

- **Outperforms rhombics**
- **For very long distance circuits**
- **Very high gain**
- **Compact**
- **Structurally simple**

The TCI Extended Aperture* series of log-periodic antennas represents the most compact and structurally efficient class of broad-band, highly directive antennas available anywhere. The Extended Aperture principle is a means of bringing broad-side gain into play where highly directive antennas are needed, rather than relying on the less efficient end-fire gain. The result is greater gain at lower total installed cost.

Until the TCI Extended Aperture Series of antennas, the HF user wanting very high directivity and broad-bandwidth was faced with a substantial investment in land and structure, The two widely used approaches to the simultaneous requirements for high gain and broad-bandwidth, rhombics and very long log-periodics, rely heavily on end-fire gain to achieve their directivity, and hence are both quite large. Typical installations exceed 1,000 feet in length, and represent a major structural and land investment,

Traditional transposed dipole log-periodic antennas are composed of elements which are physically near 1/2 wavelength long when they are active, This fact limits their broadside directivity, forcing the designer of highly directive LPA's to rely on very long structures, with many elements active, acting primarily in an end-fire fashion. The elements of TCI's Extended Aperture Series are a full wavelength long, or longer, contributing very strongly to directivity through broadside gain. This has the effect of giving the Extended Aperture Family greater gain in a much more compact area than traditional approaches.

The Extended Aperture Principle is accomplished in a way which decreases the Q of the elements in the active region. This spreads out the active region, somewhat further increasing directivity and increasing the power handling capability of the structure.

The Models 510 and 512 are vertically polarized members of the Extended Aperture Family, and are primarily utilized on very long distance circuits where system gain is at a premium and low take-off angles are required. For this reason a ground screen is frequently used in front of the antenna, or the antenna is sited close to and overlooking the ocean or other conductive surface, in order to minimize pattern undercutting.

All members of the Extended Aperture Series utilize only the tested and proven TCI aluminum fittings and high purity alumina insulators used extensively throughout the 500 series of antennas. The Extended Aperture Series is available either in kit form, or TCI will undertake a turn-key installation.

Specifications

	Model 510	Model 512
Polarization	Vertical	Vertical
Directive Gain Relative to Isotropic	f_o–14.3 dB 7 MHz 14.8 dB 28 MHz 15 dB	f_o–16.0 dB 7 MHz 16.5 dB 28 MHz 17.0 dB
Azimuth Plane Beamwidth between Half-Power Points	92° Nominal	52° Nominal
Angle of Upper Half-Power Points	13.2°	13.2°
Level of Side Lobes Relative to Main Lobe	–15 dB	–15 dB
Front-to-back Ratio	f_o–17 dB 7 MHz 21 dB and above	f_o–10 dB 28 MHz 25 dB and above
VSWR	2.0:1	2.0:1
Environmental Performance	Designed in accordance with EIA Specification RS-222C for loading of 225 km/h (140 mi/h) wind, no ice, 145 km/h (90 mi/h) wind, 12 mm (1/2") radial ice	

Size and Frequency Coverage

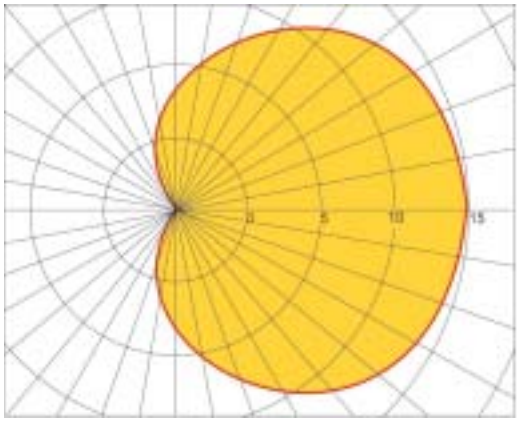
Model Number	Frequency Range	Height ft.	Height mtr.	Length* ft.	Length* mtr.	Width* ft.	Width* mtr.
510-1-N	4–30 MHz	269	82	536	163	381	116
510-2-N	5–30 MHz	223	68	450	137	315	96
510-4-N	7.5–30 MHz	142	44	344	105	243	74
512-1-N	4–30 MHz	269	82	525	160	565	172
512-2-N	5–30 MHz	223	68	448	136	463	141

* Measured from extreme guy points.

Power & Impedance Data

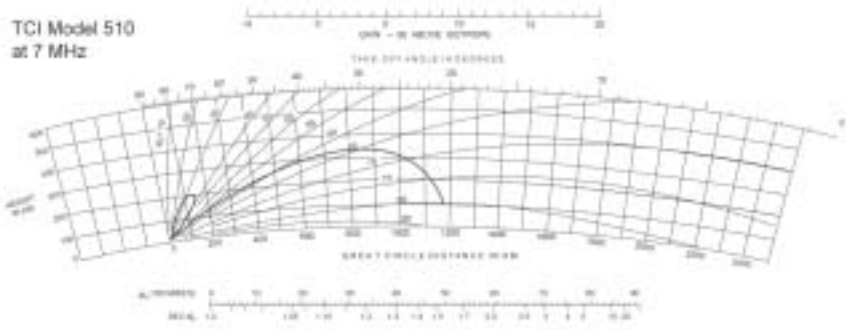
Model Number	Input Impedance	Power Handling Handling	Connector
510-N-01	300 Ω Balanced	50 kW Avg. 200 kW PEP	
510-N-02	50 Ω coaxial	Receive	Type N Female
510-N-03	50 Ω coaxial	10 kW Avg. 50 kW PEP	1-5/8" EIA Female
510-N-04	50 Ω coaxial	25 kW Avg. 50 kW PEP	1-5/8" EIA Female
512-N-01	150 Ω Balanced	50 kW Avg. 200 kW PEP	
512-N-02	50 Ω coaxial	Receive	Type N Female
512-N-03	50 Ω coaxial	10 kW Avg. 50 kW PEP	1-5/8" EIA Female
512-N-04	50 Ω coaxial	25 kW Avg. 50 kW PEP	1-5/8" EIA Female

Model 510 Azimuth Pattern 7 MHz

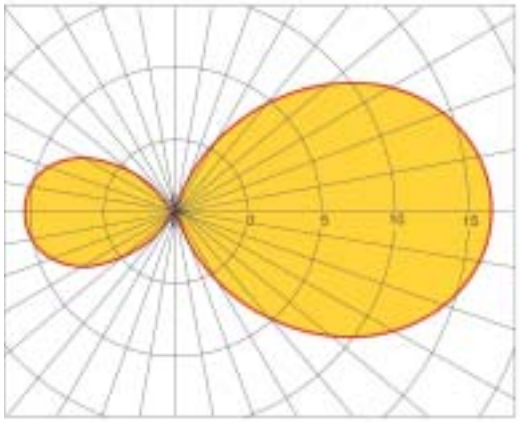


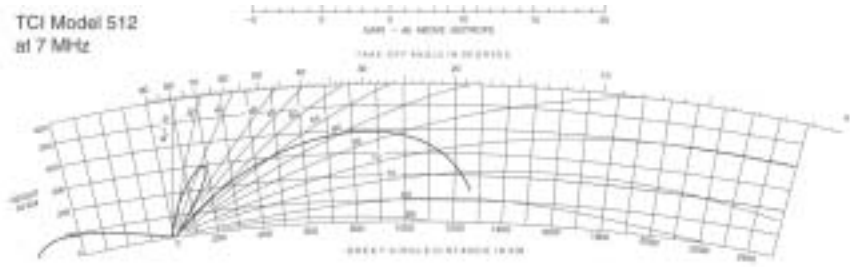
Elevation Plane Pattern over perfect earth

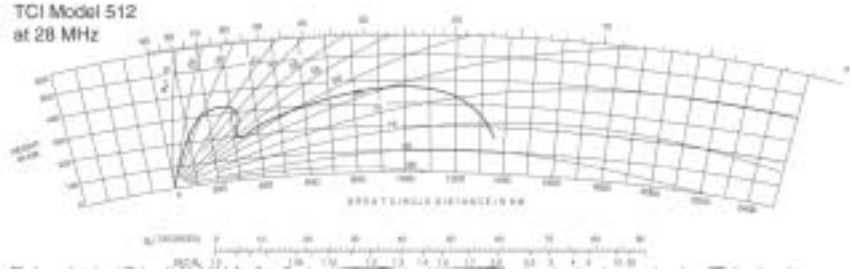
Origin of pattern plot is –5dB relative to an isotrope



Model 512 Azimuth Pattern 7 MHz







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