Laird
TECHNOLOGIES®

global solutions :
local support™

RFID Antennas

Laird Technologies is the world leader in the design and supply of customized performance-critical products for wireless and other advanced electronic applications. Laird Technologies partners with its customers to help find solutions for applications in various industries such as:

Aerospace
Automotive Electronics
Computers
Consumer Electronics
Data Communications
Medical Equipment
Military
Network Equipment
Telecommunications

Laird Technologies offers its customers unique product solutions, dedication to research and development and a seamless network of manufacturing and customer support facilities located all across the globe.

global solutions :
local support™

Contents

Laird Technologies' RFID Antennas

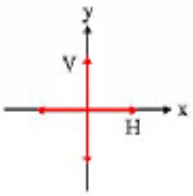
Laird Technologies' RFID Antennas catalog is an ideal resource for RFID antennas to meet current and emerging RFID applications. This catalog includes descriptions and specifications for a wide selection of antennas that have been deployed by OEMs, systems integrators, and end users, in many locations around the world. Laird has been supplying RFID antennas to satisfied customers for many years.

The current range of products includes antennas for UHF and microwave RFID bands used world-wide.
The product line includes circularly and linearly polarized antennas with a variety of form factors, gains and coverage patterns. These products can be customized with a choice of coax cable length and/or connector type.

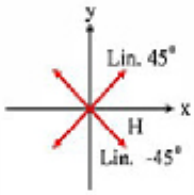
All products are rated for both indoor and outdoor applications. Some of the advantages of Laird's RFID antennas are:

- Circular polarized antennas with excellent axial ratio
- Low VSWR across entire operating range
- 100% final performance testing in manufacturing
- Rugged mechanical design
- Choice of left-hand or right-hand circular polarization

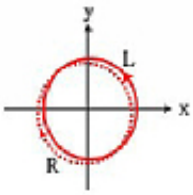
As RFID technology evolves Laird Technologies is committed to introducing new antenna products to meet the needs of the RFID industry.



Horizontal polarization,
Vertical polarization



Linear 45° polarization,
Linear -45° polarization



Left circular polarization,
Right circular polarization

Antenna polarization

- Linear Polarization: Vertical (VPOL) or Horizontal (HPOL)
  - Used for most installations of fixed position systems
  - Advantage is VPOL and HPOL have good isolation between them so they can be used in same area with minimal interference
- Dual Polarization: Vertical and Horizontal
  - Useful for polarization diversity and MIMO systems to reduce effects of multipath (reflections)
  - Also used to increase throughput; transmitting and receiving on both VPOL and HPOL simultaneously
- Dual Slant 45 Linear Polarization
  - Traditionally used in mobile applications like cellular, because polarization can't be fixed on mobile devices
- Circular Polarization
  - Used extensively in RFID because orientation of tags is usually unknown
  - Some limited use in outdoor WiFi systems; rumored to penetrate trees and buildings better but no actual improvement seen in trials.

UHF CIRCULARLY POLARIZED RFID ANTENNAS

Unless an RFID tag is located very close to a reader antenna, it is usually necessary to use circularly polarized (CP) reader antennas. In most RFID applications the orientation of the tags is random with respect to the reader antenna. Since tags are linearly polarized they would need to be exactly aligned (co-polarized) with a linearly polarized reader antenna for reading to take place successfully. Circularly polarized antennas do away with need to control the tags' orientation.

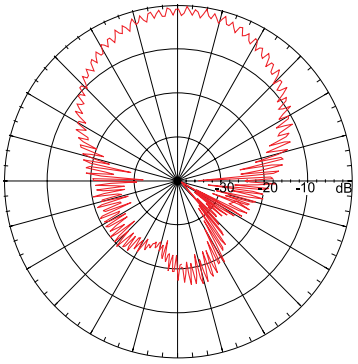
Circularly polarized antennas may be either left-hand (LHCP), or right-hand polarized (RHCP). Either type will work equally as well in the reading of RFID tags. The usefulness of deploying a mixture of LHCP and RHCP antennas occurs in situations where interference may be a problem. The signal from a LHCP antenna will not interfere with a RHCP antenna, and vice versa. Examples of this are when antennas connected to two different readers are co-located, or when a bi-static mode reader is used (in bi-static mode the reader uses separate transmitter and receiver antennas).

- All of the antennas in this section of the catalog are available in LHCP and RHCP versions.
- All antennas are weatherproof and UV resistant.

902-928 MHz 8 dBic Circular Polarity Panel Antenna

- Low Profile; Low VSWR
- Weather resistant radome

Specifications:	Part Number S9028PCL/PCR
Frequency Range (MHz)	902 - 928
Gain	8 dBic
VSWR	1:5:1
Polarization	Circular Right or Left
3 dB Beamwidth – Azimuth	70°
Front to Back Ratio	18 dB
Mounting Style	Threaded Stud
Power (Watts)	10
Dimensions (cm)	10.2" x 10.2" x 1.32" (25.9 x 25.9 x 3.3)
Weight lbs (Kg)	1.75 lbs (.79)
Enclosure	Polycarbonate
RF Connector	Rev TNC male (others available)

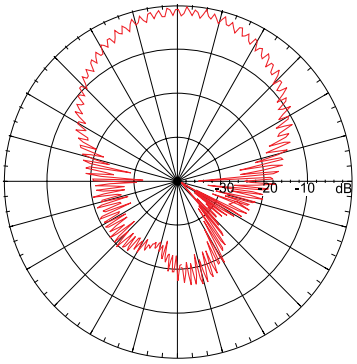


915 MHz

865-868 MHz 8 dBiC Circular Polarity Panel Antenna

- Low Profile; Low VSWR
- Weather resistant radome

Specifications:	Part Number S8658PCL/PCR
Frequency Range (MHz)	865 - 868
Gain	8 dBiC
VSWR	1:5:1
Polarization	Circular Right or Left
3 dB Beamwidth – Azimuth	70°
Front to Back Ratio	18 dB
Mounting Style	Threaded Stud
Power (Watts)	10
Dimensions (cm)	10.2" x 10.2" x 1.32" (25.9 x 25.9 x 3.3)
Weight lbs (Kg)	1.75 lbs (.79)
Enclosure	Polycarbonate
RF Connector	Rev TNC male (others available)

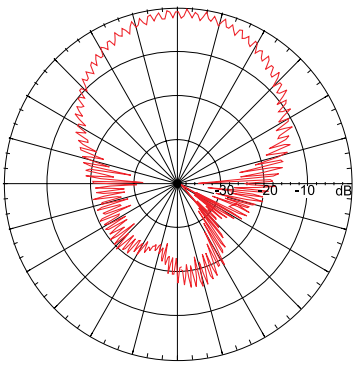


865 MHz

865-956 MHz 8 dBiC Circular Polarity Panel Antenna

- Low Profile; Low VSWR
- Weather resistant radome

Specifications:	Part Number S8658WPL/WPR
Frequency Range (MHz)	865 - 956
Gain	8 dBiC
VSWR	1:4:1
Polarization	Circular Right or Left
3 dB Beamwidth – Azimuth	65°
Front to Back Ratio	18 dB
Mounting Style	Threaded Stud
Power (Watts)	2
Dimensions (cm)	10.2" x 10.2" x 1.32" (25.9 x 25.9 x 3.3)
Weight lbs (Kg)	2.5 lbs (1.3)
Enclosure	Polycarbonate
RF Connector	Rev TNC male (others available)

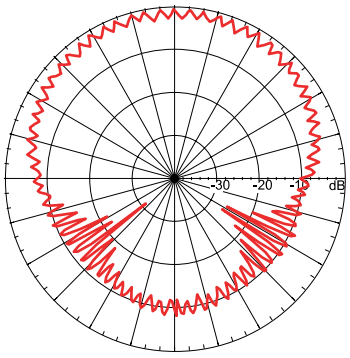


865 MHz

902-928 MHz 5.5 dBiC Mini RFID Panel Antenna

- Circularly polarized
- Rugged, ultra heavy duty construction

Specifications:	Part Number S9025P
Frequency Range (MHz)	902 - 928
Gain	5.5 dBiC
VSWR	1:5:1
Polarization	Circular Right or Left
3 dB Beamwidth – Azimuth	100°
Front to Back Ratio	8 dB
Mounting Style	Threaded Stud
Power (Watts)	10
Dimensions (cm)	5.2" x 5.2" x .71" (13.2 x 13.2 x 1.8)
Weight lbs (Kg)	.8 lbs (.37)
Enclosure	Polycarbonate
RF Connector	Type N female (others available)

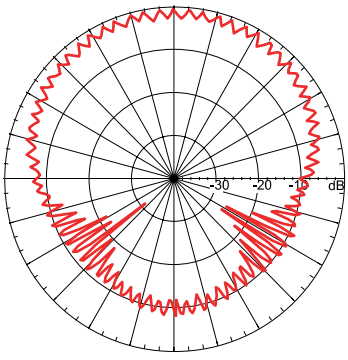


910 MHz

865-868 MHz 5.5 dBiC Mini RFID Panel Antenna

- Circularly polarized
- Rugged, ultra heavy duty construction

Specifications:	Part Number S8655P
Frequency Range (MHz)	865 - 868
Gain	5.5 dBiC
VSWR	1:5:1
Polarization	Circular Right or Left
3 dB Beamwidth – Azimuth	100°
Front to Back Ratio	8 dB
Mounting Style	Threaded Stud
Power (Watts)	10
Dimensions (cm)	5.2" x 5.2" x .71" (13.2 x 13.2 x 1.8)
Weight lbs (Kg)	.8 lbs (.37)
Enclosure	Polycarbonate
RF Connector	Type N female (others available)

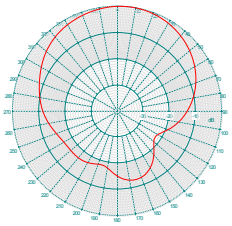


865 MHz

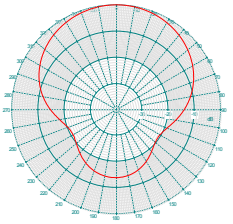
902-928 MHz 6 dBiC Forklift Mount RFID Antenna

- Circularly polarized
- Rugged, ultra heavy duty construction

Specifications:	Part Number S9026X
Frequency Range (MHz)	902 - 928
Gain	6 dBiC
VSWR	1:5:1
Polarization	Circular Right-Hand
3 dB Beamwidth – Azimuth	60°
Front to Back Ratio	10 dB
Mounting Style	Chassis mount
Power (Watts)	4
Dimensions (cm)	7.9" x 7.9" x .95" (20 x 20 x 2.4)
Weight lbs (Kg)	2.6 lbs (1.2)
Enclosure	Aluminum / Grey UV Polycarbonate
RF Connector	Type N female (others available)



Right-hand Circularly Polarized Linear Elevation Plot

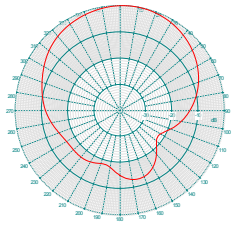


Right-hand Circularly Polarized Linear Azimuth Plot

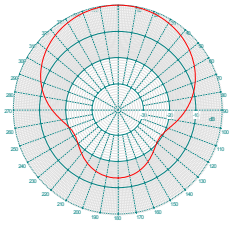
865-870 MHz 6 dBiC Forklift Mount RFID Antenna

- Circularly polarized
- Rugged, ultra heavy duty construction

Specifications:	Part Number S8656X
Frequency Range (MHz)	865 - 870
Gain	6 dBiC
VSWR	1:5:1
Polarization	Circular Right-Hand
3 dB Beamwidth – Azimuth	60°
Front to Back Ratio	10 dB
Mounting Style	Chassis mount
Power (Watts)	4
Dimensions (cm)	7.9" x 7.9" x .95" (20 x 20 x 2.4)
Weight lbs (Kg)	2.6 lbs (1.2)
Enclosure	Aluminum / Grey UV Polycarbonate
RF Connector	Type N female (others available)



Right-hand Circularly Polarized Linear Elevation Plot



Right-hand Circularly Polarized Linear Azimuth Plot

UHF LINEARLY POLARIZED RFID ANTENNAS

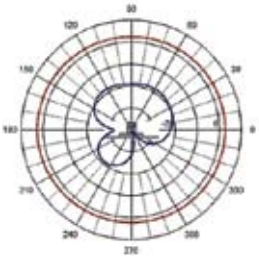
In applications in which the orientation of the tag, with respect to the reader antenna, is under control, and constant, linearly polarized reader antennas may be used. Linearly polarized antennas offer the advantage of having 2-3 dB higher gain than a similar sized circularly polarized antenna. In addition, there are wall-mount and ceiling-mount omni-directional antennas in the linearly polarized product line. Yagi antennas offer another form factor that may be useful in some applications.

- All antennas are weatherproof and UV resistant.
- Mounting hardware is included with each antenna.

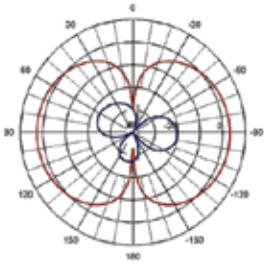
806-960 MHz 3 dBi RFID Thin Panel Antenna

- Low Profile
- Includes mounting hardware

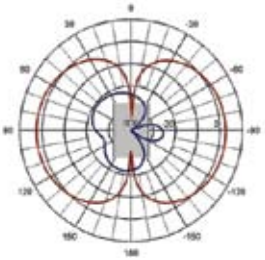
Specifications:	Part Number IF850-SF00
Frequency Range (MHz)	806 - 960
Gain	3 dBi
VSWR	2:1
Polarization	Linear
Impedance	50 ohms
Element Type	Micro-strip
Mounting Style	Flush Mount
Power (Watts)	50
Dimensions (cm)	4.5" x 3.4" x .1" (11.4 x 8.6 x 0.25)
Operating Temperature	-40° to +70° C
Surface finish	Acrylic
RF Connector	SMA female



Azimuth Plane



Elevation Plane

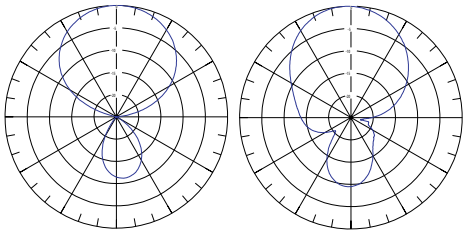


Omni Plane

902-928 MHz 6 dBi Linear Panel Antenna

- Low Profile
- UV Stable Radome

Specifications:	Part Number S9026P
Frequency Range (MHz)	902 - 928
Gain	6 dBi
VSWR	1:8:1
Polarization	Linear
3 dB Beamwidth – Azimuth	75°
3 dB Beamwidth – Elevation	65°
Mounting Style	Wall/Mast
Power (Watts)	25
Dimensions (cm)	9" x 10" x .5" (23 x 25.4 x 1.3)
Weight lbs (Kg)	1.4 lbs (.64)
Enclosure	Polycarbonate
RF Connector	Type N female (others available)



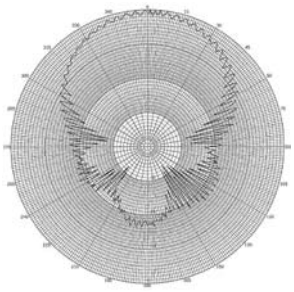
914 MHz E Plane

914 MHz H Plane

902-928 and 824-896 MHz 8 dBi Linear Panel Antennas

- Low Profile
- UV Stable Radome

Specifications:	Part Number S9028P	Part Number S8248P
Frequency Range (MHz)	902 - 928	824-896
Gain	8 dBi	8 dBi
VSWR	1:5:1	1:5:1
Polarization	Linear	Linear
3 dB Beamwidth – Azimuth	70°	70°
3 dB Beamwidth – Elevation	65°	65°
Mounting Style	Wall/Mast	Wall/Mast
Power (Watts)	50	50
Dimensions (cm)	8" x 12" x 2" (20.3 x 30.5 x 5.1)	8" x 12" x 2" (20.3 x 30.5 x 5.1)
Weight lbs (Kg)	1.9 lbs (.85)	1.9 lbs (.85)
Enclosure	Polycarbonate	Polycarbonate

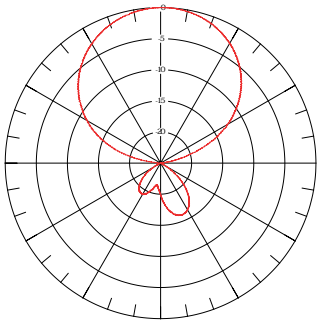


915 MHz E Plane

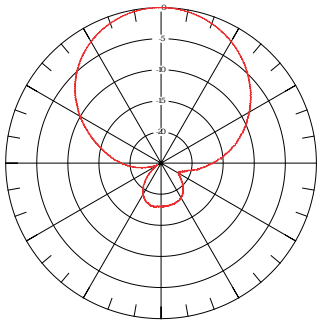
880-960 MHz 8 dBi Dual Linear Panel Antenna

- Polycarbonate enclosures
- High performance, optimized pattern

Models:	Freq. MHz	Gain (dBi)	VSWR	Polarization	3dB bm-width E-Plane°	3dB bm-width H-Plane°	Type (f)	Dimensions in. (cm)	Weight lb. (kg)	Power (Watts)	Mount style
S888HVP	880-960	8	1.5:1	Dual Linear V&H	65	70	N	12 x 12 x 1.75 (30.5 x 30.5 x 4.4)	2.2(1.0)	50	Wall Surface
S888SLP	880-960	8	1.5:1	Dual Linear V&H ±45°	65	70	N	12 x 12 x 1.75 (30.5 x 30.5 x 4.4)	2.2(1.0)	50	Wall Mast



920 MHz E Plane

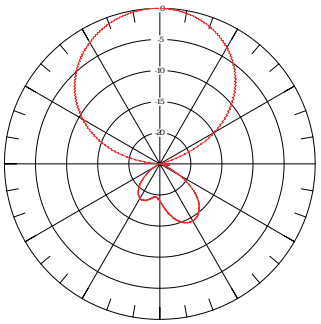


920 MHz H Plane

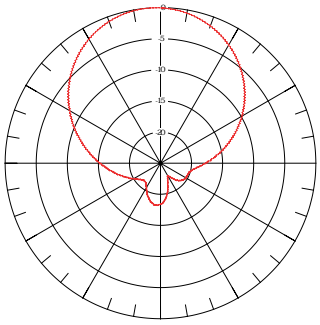
824-896 MHz 8 dBi Dual Linear Panel Antenna

- Polycarbonate enclosures
- High performance, optimized pattern

Models:	Freq. MHz	Gain (dBi)	VSWR	Polarization	3dB bm-width E-Plane°	3dB bm-width H-Plane°	Type (f)	Dimensions in. (cm)	Weight lb. (kg)	Power (Watts)	Mount style
S828HVP	824-896	8	1.5:1	Dual Linear V&H	65	70	N	12 x 12 x 1.75 (30.5 x 30.5 x 4.4)	2.2(1.0)	50	Wall Surface
S828SLP	824-896	8	1.5:1	Dual Linear V&H ±45°	65	70	N	12 x 12 x 1.75 (30.5 x 30.5 x 4.4)	2.2(1.0)	50	Wall Mast



860 MHz E Plane

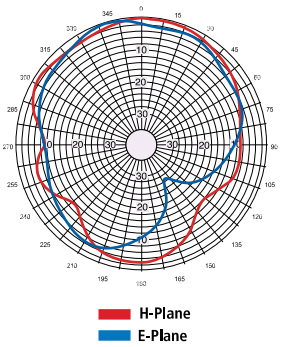


860 MHz H Plane

800- 900 MHz Wall/Mast Mount Omnidirectional Antenna

- Indoor/Outdoor
- Attractive styling
- AMP, GSM or SMR frequencies

Specifications:	S8802MP10NF	S8242MP10NF
Frequency Range (MHz)	880-960	824-896
Gain (dBi)	2	2
VSWR	2:1	2:1
Polarization	Linear vertical	Linear vertical
H-Plane (3dB beamwidth)	110°	110°
E-Plane (3dB beamwidth)	120°	120°
Mounting Style	Wall / Mast	Wall / Mast
Power (Watts)	10	10
Connector Type	N (f)	N (f)
Weight lb. (kg)	.4 (.18)	.4 (.18)

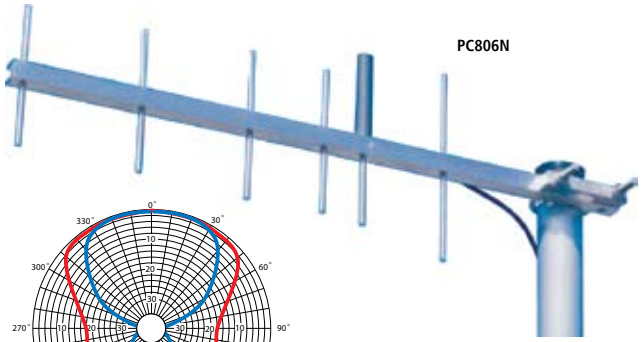


800 / 900 MHz Yagis

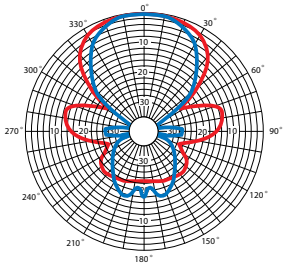
- All-welded unit construction
- No adjustments ever needed
- waterproof design
- Stainless steel hardware
- Pigtail mounted N-female connector

Models:	Freq. MHz	Gain (dBi)	No. Elem	F to B db	H Bmwidth -3dB°	E Bmwidth -3dB°	Type (f)	Length in. (cm)	Weight lb. (kg)	W/sur area ft2 (m2)	W/survival mph (kph)	Pigtail in. (cm)
PC926N	928-960	10.6	6	18	55	65	N	24.75 (62.9)	1.61 (.72)	.26 (.024)	125 (200)	19(48.3)
PC904N	896-980	8.1	4	15	70	100	N	13 (33)	1.12 (.50)	.11 (.01)	125 (200)	19(48.3)
PC906N	896-940	10.6	6	18	55	65	N	24.75 (62.9)	1.62 (.73)	.26 (.024)	125 (200)	19(48.3)
PC804N	806-902	8.1	4	15	70	90	N	13 (33)	1.12 (.50)	.11 (.01)	125 (200)	19(48.3)
PC806N	806-866	10.6	6	18	55	65	N	24.75 (62.9)	1.69 (.76)	.26 (.024)	125 (200)	19(48.3)

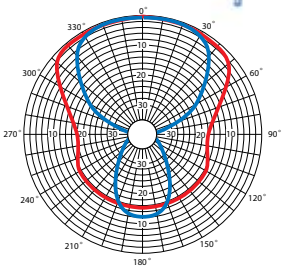
PC804N



PC806N



Typical 6 Element



Typical 4 Element

H-Plane
E-Plane

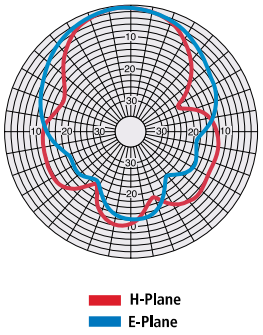
MICROWAVE RFID ANTENNAS

Laird Technologies' RFID antennas are also available in frequency ranges of 2400-2500 MHz . There are also several dual-band antennas available. This range of antennas includes models for indoor, outdoor, and indoor/outdoor applications. A wide selection of gain and mounting styles ensures that virtually every application can be covered.

2400-2500 MHz Wall/Mast Mount Circular Polarity Antenna

- Indoor/Outdoor
- Attractive styling
- Articulating mount available

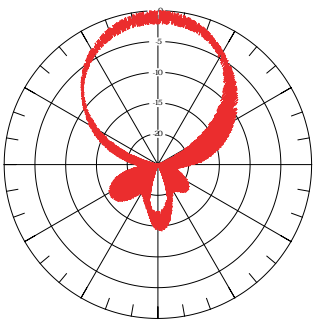
Specifications:	S2406MPC
Frequency Range (MHz)	2400-2500
Gain (dBi)	6.5 dBiC
VSWR	1.5:1
Polarization	Linear vertical
H-Plane (3dB beamwidth)	65°
E-Plane (3dB beamwidth)	65°
Mounting Style	Wall / Mast
Power (Watts)	25
Connector Type	N (f)
Weight lb. (kg)	.4 (.18)



2400-2500 MHz 8 dBiC Circular Polarity Panel Antenna

- Indoor /outdoor applications
- Small compac design

Specifications:	Part Number S2408PC
Frequency Range (MHz)	2400 - 2500
Gain	8. dBiC
VSWR	1:5:1
Polarization	Circular
3 dB Beamwidth – Azimuth	50°
3 dB Beamwidth – Elevation	50°
Mounting Style	Wall / Surface
Power (Watts)	1
Dimensions (cm)	6" x 6" x 1.25" (15.2 x 15.2 x 3.2)
Weight lbs (Kg)	.6 lbs (.27)
Enclosure	Polycarbonate
RF Connector	N female (others available)



WiMAX Antennas

Laird Technologies offers a comprehensive line of WiMax base station antennas that easily meet the ETSI's most stringent compliance standards while still being competitively priced.

- Most uniform energy distribution across the coverage area
- Maximum null fill below the horizon
- Extraordinary low side lobe performance
- Maximum spectral efficiency
- Reduced crosstalk

Vehicular Antennas

Laird Technologies offers a comprehensive line of vehicular antennas for almost any frequency range. The antennas are rugged and aerodynamic and perfectly suited for commercial, public safety and military applications. Types are available that do not require a vehicle ground plane.

- Mobile antennas from 100 MHz to 6 GHz
- Dual-band and tri-band models
- Phantom®, Phantom Elite® and traditional mounts
- GPS antennas
- Typically 3 dBi gain
- NMO mounts, magnetic or permanent mounts

Patented Field Diversity™

Accessories

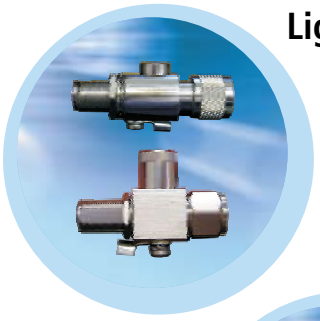
Laird Technologies' accessories are the perfect complement to its antenna systems. Cable assemblies, surge suppressors, lightning arrestors, POE inserters and splitters, wall and roof-top antenna mounts, connector adapters and die-cast aluminum enclosures are available.

Patented Field Replaceable Ethernet Connector System

- Part number RJ45-ECS
- IP67 rated

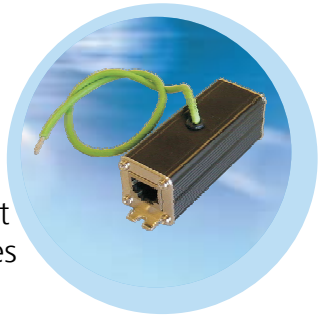
Power Over Ethernet (POE) Inserters and Splitters

- 16W to 50W models, many different voltages available
- Built in surge suppression
- 802.3af compatible



Lightning Arrestors

- Gas discharge and 1/4 wave DC ground
- Multiple Strike Capacity
- Wide-Band models DC - 6000 MHz
- Insertion loss 0.3dB max



Ethernet Surge Suppressors

- Compatible with POE equipment
- Protects data and DC power lines

Cable Assemblies

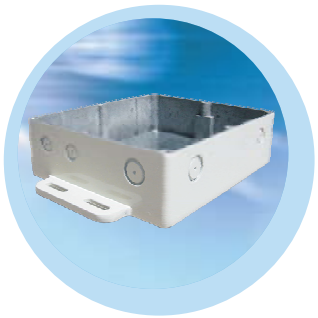
- Standard and custom assemblies
- Low insertion loss
- Qualifies to 6 GHz

Wall and Roof Antenna Mounts

- Perfect for CPE mounting
- Fixed wall mount
- Articulating roof/wall mount

Die-Cast Enclosures

- Perfect for housing outdoor electronics
- Multiple engineered knockouts for flexibility
- NEMA 6 rated



Notes

global solutions : local support™

Laird Technologies is the world leader in the design of and supply of customized performance-critical products for wireless and other advanced electronic applications. Laird Technologies partners with its customers to help find solutions for applications in various industries such as Aerospace, Automotive Electronics, Computer, Consumer Electronics, Data Communications, Medical Equipment, Military, Network Equipment and Telecommunications Industries.

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