Telematics & Wireless M2M

ANTENNA PORTFOLIO

Laird TECHNOLOGIES®

Innovative **Technology**
for a **Connected** World

www.lairdtech.com

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About Laird Technologies

Laird Technologies designs and manufactures customized, performance-critical products for wireless and other advanced electronics applications.

Headquartered in Saint Louis, Missouri, USA, Laird Technologies has a global presence, with engineering, manufacturing, and sales facilities located in the Americas, Europe, and Asia.

The company is a global market leader in the design and supply of electromagnetic interference (EMI) shielding, thermal management products, specialty metal products, signal integrity components, and wireless antenna solutions, as well as radio frequency (RF) modules and systems.

Laird Technologies partners with its customers to customize product solutions for applications in many industries including:

- Telecommunications
- Mobile Communications
- Network Equipment
- Automotive
- Industrial & Instrumentation

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

A Brief Introduction to Telematics and Wireless

Laird Technologies is active in the Telematics and Wireless M2M market, offering the widest range of high-performance wireless modules including Bluetooth®, ZigBee®, 802.11 and proprietary wireless standards that are incorporated into Machine-to-Machine (M2M) applications and systems, as well as integrated antennas and electronic components. The company's broad selection of M2M products provides solutions for the automotive, telematics, healthcare, EPOS, retail, finance, and security, as well as asset management markets.

Telematics & Wireless Product Portfolio

Antennas

Embedded Modules

Devices

Smart Antennas

ANTENNAS & RECEPTION
WIRELESS REMOTE CONTROL
EMI SOLUTIONS
THERMAL MANAGEMENT
WIRELESS M2M & TELEMATICS

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Applications/Markets Served

Laird Technologies' antenna products provide best-in-class solutions for various mobile markets and applications. These products are developed with industry-leading RF expertise to ensure the best possible connectivity. The company's products meet very stringent automotive and industrial qualifications and certifications while still being very competitively priced. Offering a wide variety of single and multi-band antennas, Laird Technologies can configure these antennas to various specifications using a host of connectors, cables, and fixation methods. While having a broad portfolio of standard products, Laird Technologies specializes in developing custom-tailored products to exactly fit its customers' needs.

Automotive OEMs

Laird Technologies meets all the rigorous requirements of being a Tier 1 OEM supplier and has a track record of exceeding customer expectations. Some highlights of its OEM services include:

- Innovative and patented design solutions
- Industry-leading quality levels
- TS-16949 certified production facilities
- Best-in-class supply chain management
- Co-location with its customers

Heavy Equipment OEMs

Laird Technologies provides high-performance, durable products to meet the needs of the challenging heavy equipment industry. The benefits of selecting Laird Technologies' product solutions include:

- Best-in-class environmental packaging
- Extensive durability/reliability testing
- Multi-band designs in effective packages
- Smart antennas that improve the total cost of ownership and also assist in future proofing against technology changes

Fleet Management and Asset Tracking

Laird Technologies' broad portfolio of both internal and external antennas provides a solution for almost every application. Its values include:

- Tailoring the product to meet customer cable, connector, and fixation needs
- Providing OEM level performance at very competitive pricing
- Proven designs that have been validated and certified for multiple services and applications

Antenna Portfolio

Custom OEM Antennas

NAME	Sharkfin	Low Profile	Masted	Hidden Antennas & Amplifiers
FUNCTION				
AM/FM	–	–	AM Gain – 0 dB FM Gain – 6 dB AGC – 20 to 25 dB	AM Gain – 0 dB FM Gain – 6 dB AGC – 20 to 25 dB
Cellular	AMPS/GSM/DCS/ PCS/UMTS	–	AMPS/GSM/DCS/ PCS/UMTS	–
GPS	31 dB Max	31 dB Max	31 dB Max	31 dB Max
Satellite Radio (XM, Sirius, Interoperable)	35 dB Max NF - < 0.9 dB	35 dB Max NF - < 0.9 dB	35 dB Max NF - < 0.9 dB	35 dB Max NF - < 0.9 dB
DAB (VHF III, L-Band)	14 dB Common Output	–	14 dB Common Output	–
WLAN / Bluetooth Omnidirectional	2 dBi Max	–	2 dBi Max	2 dBi Max
Remote Start (extends range to 300 ft.)	10 dB	–	10 dB	10 dB
V2V (DSRC) Omnidirectional	> 2 dBi	–	>2 dBi	–

Note: All figures represent typical gain unless otherwise noted

Standard Asset Tracking Antennas

NAME	External GPS	Cell + GPS World	Internal GPS	Cell Blade	Cell + GPS Wedge	2.4 GHz LAN
FUNCTION						
GPS	Yes	Yes	Yes	No	Yes	No
Cell Bands	–	All	–	AMPS/GSM/ DCS/PCS	AMPS/GSM/DCS/ PCS/UMTS	–
Cell Peak Gain	4.0 dBic	2.0 dBi (Cell) 4.5 dBic (GPS)	4.5 dBic	3.1 dBi	3.5 dBi (Cell) 3.0 dBic (GPS)	4.0 dBic
VSWR	< 2:1	< 2.5:1 (Cell) < 2:1 (GPS)	< 2:1	< 2:1	< 2.5:1 (Cell) < 2:1 (GPS)	< 2:1
Dimensions (mm)	44 x 36 x 14	105 x 65 x 25	63.5 x 63.5 x 13	125.5 x 34 x 5.1	138 x 32 x 11.2	45 x 78 x 15
Mounting	Mag / Adh	Adh	Adh	Adh	Adh	Adh, Screw
Environmental	IP66	IP67	IP50	IP50	IP50	IP50
Reference P/N	637114	637117	637108	637109	637112	637113

Capabilities

Electronic Design and RF Reception Expertise

- In-house wireless radio and antenna expertise
- Complex and miniature electronic layouts
- Robust packaging and industrial design
- Firmware to support multiple operating systems
- Rapid prototyping capabilities

Testing and Validation Capabilities

- Mobile asset test range for reception development and verification
- Up to 3 GHz capability
- Indoor anechoic chamber
- Stringent environmental testing
- Electromagnetic interference

Manufacturing

- Fine pitch electronic component placement
- High-volume / complex assembly capabilities
- ISO/TS-16949:2009 and ISO 9001: 2008 certified facilities
- World-class global logistics and supply chain
- In-house production test development

GM 2009 Supplier of the Year

Ford Q1 Preferred Quality Status

Laird Technologies has won numerous customer and industry awards for outstanding performance as an Antenna supplier

Design Centers and Production Facilities
Lenexa, Kansas, USA
Shanghai, China, APAC

Design Centers
Holly, Michigan, USA
Wooburn Green, UK, EU
Hildesheim, Germany, EU
Bangalore, India, APAC

Sales Offices
Holly, Michigan, USA
Lenexa, Kansas, USA
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