Linx strives to make every engineer a hero in record time™ by minimizing the risk, delays and technical challenges for design engineers to implement wireless functionality and connectivity to the Internet. Linx’s Antenna Factor division has the industry’s broadest selection of antennas for a wide variety of applications. For customers with specialized needs, custom antennas and design services are available along with simulations of antenna performance to speed development.
Antenna Factor Antennas

Antenna Factor antennas are divided into several categories based on their construction and application. The categories are described below and specifications are given in tables on the following pages.

**GPS Antennas**

Antennas designed specifically for GPS are described in this section. They are constructed to deliver the best performance in GPS environments.

**Embedded and Internal Antennas**

These antennas are designed to be integrated into products where space is limited. They are often used in consumer electronics and industrial applications.

**Permanent Mount Whip and Rubber Duck Antennas**

These antennas are suitable for applications where the antenna needs to be fixed in place.

**Connectorized Whip and Rubber Duck Antennas**

These antennas include a built-in connector, which simplifies the installation process.

**Microstrip and Coplanar Waveguide Feed Lines**

Microstrip and Coplanar Waveguide (CPW) feed lines are commonly used in modern electronics. They offer advantages in terms of size and performance.

**Matching Networks**

Matching networks are used to ensure that the antenna is tuned correctly. They can be designed to match the antenna to the system it is connected to.

**Antenna Gain**

Gain is a crucial parameter in determining the performance of an antenna. It is a measure of how much power is radiated by the antenna.

**Color Codes**

Linx antennas are color coded by frequency. This allows for easy identification when purchasing or selecting the appropriate antenna.

**IP Rating**

The IP rating specifies how well an enclosure resists intrusion from the environment. Linx antennas are designed to meet these standards.
## Connectorized Whip / Rubber Duck Antennas

### CW Series
- **Series**: CW Series
- **RP-SMA**
- **315MHz**: 1.1dBi, 1.6dBi
- **916MHz**: 2.2dBi, 4.1dBi
- **2.4GHz**: 2.2dBi, 3.3dBi

### RAF Series
- **Series**: RAF Series
- **RP-SMA or SMA**
- **315MHz**: 0.0dBi, 0.7dBi
- **433MHz**: –0.3dBi, –2dBi
- **868MHz**: 4.4dBi, 5.8GHz

### RH Series
- **Series**: RH Series
- **RP-SMA**
- **315MHz**: –6.1dBi
- **916MHz**: –0.9dBi
- **2.4GHz**: –2.3dBi

### RCL Series
- **Series**: RCL Series
- **RP-SMA**
- **448MHz**: –1.5dBi
- **883MHz**: –2.3dBi

### RCS Series
- **Series**: RCS Series
- **RP-SMA or SMA**
- **325MHz**: 438MHz
- **438MHz**: 883MHz

### CT Series
- **Series**: CT Series
- **RP-SMA or SMA**
- **2.5GHz**: 2.8dBi

### RCT Series
- **Series**: RCT Series
- **RP-SMA**
- **2.5GHz**: 3.6dBi

### RCL Series
- **Series**: RCL Series
- **RP-SMA**
- **433MHz**: 2.6dBi

### HW Series
- **Series**: HW Series
- **RP-SMA**
- **2.4GHz**: 1.1dBi

### HW Series
- **Series**: HW Series
- **RP-SMA**
- **2.4GHz**: 1.4dBi

### HD Series
- **Series**: HD Series
- **RP-SMA**
- **2.6GHz**: 3.3dBi

### RAH Series
- **Series**: RAH Series
- **RP-SMA**
- **2.6GHz**: 2.9dBi

### RAH Series
- **Series**: RAH Series
- **RP-SMA**
- **2.6GHz**: 3.3dBi

---

### Connectorized Whip / Rubber Duck Antennas

<table>
<thead>
<tr>
<th>Series</th>
<th>Picture</th>
<th>Frequency</th>
<th>Wavelength</th>
<th>Peak Gain</th>
<th>VSWR</th>
<th>Height</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CW Series</strong></td>
<td><img src="image" alt="CW Series" /></td>
<td><strong>315MHz</strong></td>
<td>1/4</td>
<td>2.0dBi</td>
<td>1.1</td>
<td>173mm</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>315MHz</strong></td>
<td>1/4</td>
<td>0.0dBi</td>
<td>0.6</td>
<td>84mm</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>916MHz</strong></td>
<td>1/4</td>
<td>–0.3dBi</td>
<td>0.3</td>
<td>80mm</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2.4GHz</strong></td>
<td>1/4</td>
<td>4.72</td>
<td>1.06</td>
<td>120mm</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td><strong>RAF Series</strong></td>
<td><img src="image" alt="RAF Series" /></td>
<td><strong>315MHz</strong></td>
<td>1/4</td>
<td>3.2dBi</td>
<td>2.5</td>
<td>3.31</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>433MHz</strong></td>
<td>1/4</td>
<td>2.9dBi</td>
<td>2.5</td>
<td>3.46</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>868MHz</strong></td>
<td>1/4</td>
<td>–0.2dBi</td>
<td>2.5</td>
<td>3.54</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td><strong>RH Series</strong></td>
<td><img src="image" alt="RH Series" /></td>
<td><strong>315MHz</strong></td>
<td>1/4</td>
<td>1.0dBi</td>
<td>2.5</td>
<td>3.46</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>916MHz</strong></td>
<td>1/4</td>
<td>1.1dBi</td>
<td>2.5</td>
<td>3.54</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2.4GHz</strong></td>
<td>1/4</td>
<td>3.3dBi</td>
<td>2.5</td>
<td>3.54</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td><strong>RCL Series</strong></td>
<td><img src="image" alt="RCL Series" /></td>
<td><strong>448MHz</strong></td>
<td>1/4</td>
<td>2.2dBi</td>
<td>2.5</td>
<td>3.46</td>
<td>RP-SMA or SMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>883MHz</strong></td>
<td>1/4</td>
<td>2.9dBi</td>
<td>2.5</td>
<td>3.54</td>
<td>RP-SMA or SMA</td>
</tr>
</tbody>
</table>

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**Table Notes:**
- **Peak Gain** indicates the maximum gain of the antenna.
- **VSWR** indicates the voltage standing wave ratio, with values below 2.0 being ideal.
- **Height** is given in inches.
- **Connector** indicates the type of connector provided with the antenna.
Permanent Mount Whip / Rubber Duck Antennas

<table>
<thead>
<tr>
<th>Series</th>
<th>PW Series</th>
<th>RA Series</th>
<th>LP Series</th>
<th>PML Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>418MHz</td>
<td>433MHz</td>
<td>868MHz</td>
<td>916MHz</td>
</tr>
<tr>
<td>Wavelength</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>Peak Gain</td>
<td>-1.0dBi</td>
<td>-0.8dBi</td>
<td>1.5dBi</td>
<td>-0.1dBi</td>
</tr>
<tr>
<td>VSWR</td>
<td>&lt;1.9 typ.</td>
<td>&lt;1.9 typ.</td>
<td>&lt;1.9 typ.</td>
<td>&lt;1.9 typ.</td>
</tr>
<tr>
<td>Height</td>
<td>116.8mm</td>
<td>116.8mm</td>
<td>100mm</td>
<td>131.5mm</td>
</tr>
<tr>
<td>Cable Length</td>
<td>216mm</td>
<td>216mm</td>
<td>216mm</td>
<td>216mm</td>
</tr>
<tr>
<td>Termination</td>
<td>RP-SMA, SMA or U.FL</td>
<td>RP-SMA, SMA or U.FL</td>
<td>RP-SMA, SMA or U.FL</td>
<td>RP-SMA, SMA or U.FL</td>
</tr>
</tbody>
</table>

The WRT Series

The WRT Series antenna is ideal for applications that need a discreet and robust antenna solution. A small dome is all that protrudes from the enclosure, avoiding the obvious look of an antenna that could be subject to vandalism. Its low profile also helps prevent accidental breakage due to handling or physical shock.

Its materials and construction are designed for harsh, outdoor environments. An adhesive ring on the base seals the antenna to the enclosure, enabling IP67 ratings when it is installed correctly. Linx cannot guarantee any specific rating as it is dependent upon design and installation, but we do offer implementation reviews.

The integrated counterpoise makes the antenna less reliant on a ground plane on the product’s circuit board. A monopole version is used for conductive enclosures and has a metal base that turns the enclosure into the counterpoise.

The cable length, type and connector type can be easily customized. Contact Linx for details.
### Embedded / Internal Antennas

#### Picture

**Embedded / Internal Antennas**

<table>
<thead>
<tr>
<th>Series</th>
<th>CHP Series</th>
<th>HE Series</th>
<th>JJB Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>868MHz</td>
<td>915MHz</td>
<td>2.4GHz</td>
</tr>
<tr>
<td>403MHz</td>
<td>418MHz</td>
<td>433MHz</td>
<td>868MHz/R</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>863 – 873MHz</td>
<td>911 – 921MHz</td>
<td>2.38 – 2.45GHz</td>
</tr>
<tr>
<td>Wavelength</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td>Peak Gain</td>
<td>-8.7dBi</td>
<td>-8.9dBi</td>
<td>-9.8dBi</td>
</tr>
<tr>
<td>VSWR</td>
<td>&lt;2.0 typ.</td>
<td>&lt;2.0 typ.</td>
<td>&lt;2.0 typ.</td>
</tr>
<tr>
<td>Size</td>
<td>9.4 x 12.7mm</td>
<td>9.4 x 12.7mm</td>
<td>9.4 x 12.7mm</td>
</tr>
</tbody>
</table>

#### PCB Layout

Linx Application note AN-00502 describes the PCB layout requirements for each of the embedded antenna series. It shows the standard test fixtures used for each antenna and provides tips and recommendations for their implementation in an end product. This note can be downloaded from the Linx website. Once the PCB design is complete, Linx offers a free review service. We will review the layout and antenna implementation and make recommendations to optimize its performance.

### The SP and USP Series

The Splatch (SP) and Micro-Splatch (USP) antennas are ideal for low-cost embedded applications.

- **Cost** is better than ceramic chip antennas and they are more robust.
- They have a common footprint across all frequencies. This allows one PCB to be populated for different frequencies rather than have multiple PCBs.
- Based on PCB manufacturing processes, their production is more reliable, repeatable and faster than LTCC.
- The USP is available in 2.4GHz for use with Bluetooth, Wi-Fi, 802.15.4 and all other common 2.4GHz standards.
- The 2.4GHz USP is also suitable for use at 5.8GHz.

### Embedded / Internal Antennas

#### Embedded / Internal Antennas

<table>
<thead>
<tr>
<th>Series</th>
<th>USP “Micro Splatch” Series</th>
<th>SP “Splatch” Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>403MHz</td>
<td>418MHz</td>
</tr>
<tr>
<td>403MHz</td>
<td>418MHz</td>
<td>433MHz</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>400 – 406MHz</td>
<td>414 – 422MHz</td>
</tr>
<tr>
<td>Wavelength</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td>Peak Gain</td>
<td>-6.7dBi</td>
<td>-6.9dBi</td>
</tr>
<tr>
<td>VSWR</td>
<td>&lt;2.0 typ.</td>
<td>&lt;2.0 typ.</td>
</tr>
<tr>
<td>Size</td>
<td>3 x 16mm</td>
<td>3 x 16mm</td>
</tr>
</tbody>
</table>

The Splatch (SP) and Micro-Splatch (USP) antennas are ideal for low-cost embedded applications.

- **Cost** is better than ceramic chip antennas and they are more robust.
- They have a common footprint across all frequencies. This allows one PCB to be populated for different frequencies rather than have multiple PCBs.
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- The 2.4GHz USP is also suitable for use at 5.8GHz.

**Now available in tape and reel packaging!**
### Magnetic Mount Antennas

<table>
<thead>
<tr>
<th>Series</th>
<th>ELE Series</th>
<th>MAG Series</th>
<th>CH Series</th>
<th>RMS Series</th>
<th>RMV Series</th>
<th>DB-1 UP Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture</td>
<td><img src="image1" alt="Magnetic Mount Antennas" /></td>
<td><img src="image2" alt="Magnetic Mount Antennas" /></td>
<td><img src="image3" alt="Magnetic Mount Antennas" /></td>
<td><img src="image4" alt="Magnetic Mount Antennas" /></td>
<td><img src="image5" alt="Magnetic Mount Antennas" /></td>
<td><img src="image6" alt="Magnetic Mount Antennas" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Range</th>
<th>Tri-band</th>
<th>Tri-band</th>
<th>Dual Band</th>
<th>Dual Band</th>
<th>Tri-band</th>
</tr>
</thead>
<tbody>
<tr>
<td>418MHz</td>
<td>433MHz</td>
<td>916MHz</td>
<td>824 – 960MHz</td>
<td>1.71 – 1.99GHz</td>
<td>2.40 – 2.48GHz</td>
<td>2.40 – 2.48GHz</td>
</tr>
</tbody>
</table>

- **Wavelength**: 1/2
- **Peak Gain**: 2.1dBi | 1.2dBi | 5.4dBi | 1.2dBi | 1.2dBi | N/A |
- **VSWR**: <1.9 typ. | <1.9 typ. | <1.9 typ. | <1.9 typ. | <1.9 typ. | <1.9 typ. |
- **Size**: 15.5 x 150mm | 0.61 x 5.91 inches | 15.5 x 145mm | 0.61 x 5.70 inches | 15.5 x 138mm | 0.61 x 5.43 inches |
- **Cable Length**: 2m or 4.5m | 79 or 180 inches | 2m or 4.5m | 79 or 180 inches | 3m | 9.8 feet |
- **Termination**: RP-SMA or SMA | RP-SMA or SMA | RP-SMA or SMA | RP-SMA, SMA or TNC | RP-SMA, SMA or TNC | N Connector |

### GPS Antennas

<table>
<thead>
<tr>
<th>Series</th>
<th>SH Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture</td>
<td><img src="image7" alt="GPS Antennas" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Range</th>
<th>Tri-band</th>
</tr>
</thead>
<tbody>
<tr>
<td>1575.42MHz</td>
<td>824 – 960MHz</td>
<td>1.71 – 1.99GHz</td>
</tr>
</tbody>
</table>

- **VSIR**: <1.5 typ. |
- **Antenna Gain**: 5.0dB min. |
- **System Gain**: 28dB typ. |
- **Input Voltage**: 2.5 – 12VDC |
- **Current**: 5 – 10mA typ. | 5V |
- **Size**: 36.5 x 36.6mm | 1.44 x 1.44 inches |
- **Cable Length**: 3m |
- **Termination**: SMA, MCX or MMCX |

### Specialty Antennas

<table>
<thead>
<tr>
<th>Series</th>
<th>VDP Series</th>
<th>HDP Series</th>
<th>OMI Series</th>
<th>RMS Series</th>
<th>RMV Series</th>
<th>DB-1 UP Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture</td>
<td><img src="image8" alt="Specialty Antennas" /></td>
<td><img src="image9" alt="Specialty Antennas" /></td>
<td><img src="image10" alt="Specialty Antennas" /></td>
<td><img src="image11" alt="Specialty Antennas" /></td>
<td><img src="image12" alt="Specialty Antennas" /></td>
<td><img src="image13" alt="Specialty Antennas" /></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Tri-band</th>
<th>Tri-band</th>
<th>Dual Band</th>
<th>Dual Band</th>
<th>Tri-band</th>
</tr>
</thead>
<tbody>
<tr>
<td>408 – 428MHz</td>
<td>413 – 453MHz</td>
<td>816 – 1016MHz</td>
<td>824 – 960MHz</td>
<td>1.71 – 1.99GHz</td>
<td>2.40 – 2.48GHz</td>
</tr>
</tbody>
</table>

- **Wavelength**: 1/2 |
- **Peak Gain**: 3.8dBi | 0.5dBi | 3.7dBi | N/A | –3.9dBi | –1.5dBi |
- **VSWR**: <1.5 typ. | <1.5 typ. | <2.0 typ. | <1.5 typ. | <2.0 typ. | <2.0 typ. |
- **Size**: 295.4mm | 11.63 inches | 233.17mm | 9.16 inches | 325.85mm | 12.75 inches |
- **Cable Length**: 4m | 13.1 feet | 4m | 13.1 feet | 4m | 13.1 feet |
- **Termination**: RP-SMA, SMA or TNC | RP-SMA, SMA or TNC | RP-SMA, SMA or TNC | RP-SMA, SMA or TNC | RP-SMA, SMA or TNC | N Connector |

 Integration cables make it easy to remote locate the antenna to get around obstructions and provide better line-of-sight. The cable lengths and connectors can be customized to suit the application. Contact Linx for details.
Custom Antennas
Linx also offers custom antennas. This includes customizations of existing antennas, such as color, connectors, cable length and frequency. It also includes new antenna types designed from the start using custom requirements. Contact Linx for more details.

Evaluation Kits
Antenna evaluation kits are available that allow the desired antennas to be tested with the product so that a final selection can be made. Different kits are available for the different types of antennas.

Connectorized Antennas
The connectorized antenna evaluation kit lets you compare the performance of many different antenna styles and element designs in your application environment. It includes a collection of antennas for evaluation during your development process. The kit is available at 315MHz, 418MHz, 433MHz, 868MHz, 916MHz and 2.4GHz with SMA or FCC Part 15 compliant RP-SMA connectors.

Permanent Mount Antennas
The permanent mount antenna evaluation kit includes a collection of our permanent mount antennas for evaluation during your development process. The kit is available at 418MHz, 433MHz, 868MHz, 916MHz and 2.45GHz.

Embedded Antennas
Many of our embedded antennas have their own kits. These include a test board with an antenna mounted that allows the performance of the antenna to be evaluated with a known design. The kit also includes five spare antennas for use in your first prototype designs.

Application Notes
Linx Technologies offers many application notes to aid in the design of RF solutions. These can be easily located at www.linxtechnologies.com/en/support/papers or contact our awesome tech support for more information.

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NO OEM LINX REMOTE CONTROL OR FUNCTION MODULE SHOULD EVER BE USED IN LIFE AND PROPERTY SAFETY SITUATIONS. No OEM Linx Remote Control or Function Module should be modified for Life and Property Safety Situations. Such modification cannot provide sufficient safety and will void the product’s regulatory certification and warranty.

Customers may use our (non-Function) Modules, Antenna and Connectors as part of other systems in Life Safety Situations, but only with necessary and industry appropriate redundancies and in compliance with applicable safety standards, including without limitation, ANSI and NFPA standards. It is solely the responsibility of any Linx customer who uses one or more of these products to incorporate appropriate redundancies and safety standards for the Life and Property Safety Situation application.

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