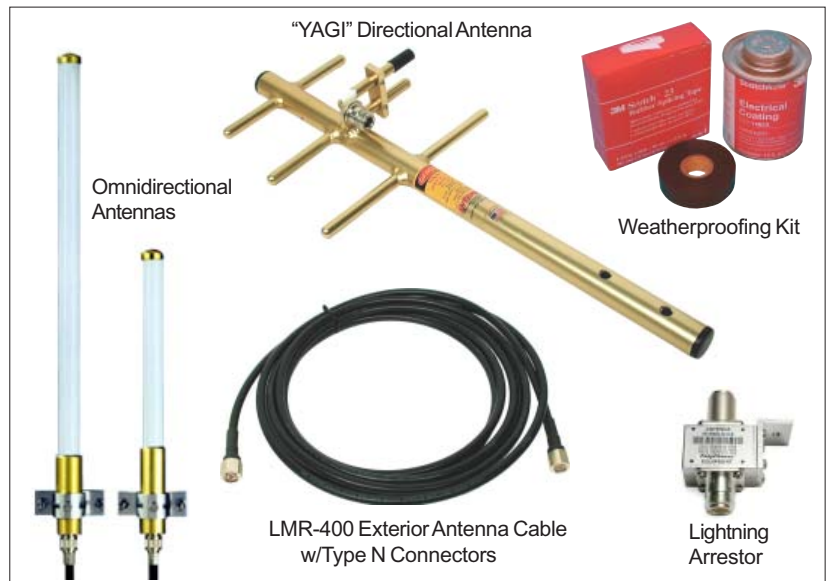
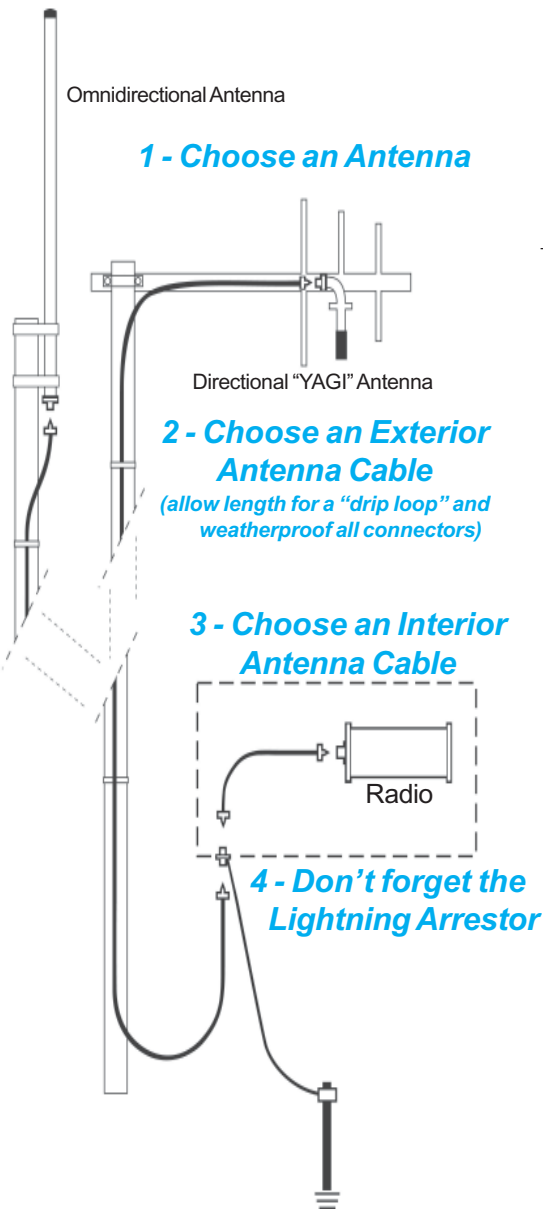




**PROCESS CONTROL**  
**REMOTE MONITORING**  
**HVAC CONTROL**  
**WATER & WASTEWATER**  
**OIL & GAS**

*Practical tips for choosing and installing a reliable Antenna System in 4 easy steps . . .*



## Antenna System Components

Choosing the correct Antenna System Components is key to a reliable wireless SCADA system.

### The Antenna . . .

Typically, you will select between a Directional "yagi" antenna or an Omnidirectional antenna at each site. Yagi directional antennas focus most of their energy (and receiver sensitivity) towards the front, a little to the back, and reject interference from the sides. Omnidirectional antennas look like poles or vertical cylinders and are used to transmit and receive signals in a 360° circle around the site.

Antennas have a "gain" rating. Higher gain focuses the signal out further, but sacrifices vertical coverage for hills and valleys. Typically SCADA systems use 3dB to 6dB gain antennas for hilly terrain, and up to 13dB gain for distance. Higher gains are available in other physical configurations (like "dishes").

Finally, remember that "higher is almost always better".

### Antenna Cables . . .

A good quality antenna cable minimizes signal loss, but it is always wise to keep these cables short. For example, a good quality LMR-400 cable, 100 feet long, will cut your signal strength IN HALF at 900 MHz, even worse at 2.4GHz! Low loss LMR-400 and LMR-600 cables are recommended for outdoor installations. Allow enough cable length to loop into the bottom of the cabinet to keep rain out. Use the more flexible RG-223 cable for short internal connections.

### Lightning Protection . . .

ALWAYS use a lightning arrester with a dedicated ground rod (from a local electrical supply store), and short, heavy (#8 or heavier) ground cable.

### Weatherproofing . . .

ALWAYS weatherproof outdoor connections (after the system has been tested). The available Weatherproofing Kit includes: foam tape for the first layer, vinyl tape for the second layer, and a UV protective liquid sealer that goes over the outer tape.



**Industrial Control Links**  
 (800) 888-1893 [www.iclinks.com](http://www.iclinks.com)

# Antenna System Components



**98-2106 896 to 940 MHz**  
**YAGI Directional Antenna,**  
 6dB gain, Type-N Female connector

**98-2206 2.400 to 2.485 GHz**  
**YAGI Directional Antenna,**  
 6dB gain, Type-N Female connector

All antennas include mounting hardware



**98-3106 896 to 940 MHz**  
**OMNI Directional Antenna**  
 6dB gain, Type-N Female connector

**98-3206 2.400 to 2.485 GHz**  
**OMNI Directional Antenna**  
 6dB gain, Type-N Female connector

All antennas include mounting hardware



**98-8001**  
**Lightning Arrestor**  
 Bulkhead mount, N-Female to N-Female connectors



**98-4xxx Exterior Antenna Cable**  
 LMR-400 N Male to N-Male connectors (xxx is length in feet)

Standard sizes:

- 98-4010 10ft.** LMR-400 Exterior Antenna Cable
- 98-4020 20ft.** LMR-400 Exterior Antenna Cable
- 98-4030 30ft.** LMR-400 Exterior Antenna Cable
- 98-4050 50ft.** LMR-400 Exterior Antenna Cable
- 98-4075 75ft.** LMR-400 Exterior Antenna Cable
- 98-4100 100ft.** LMR-400 Exterior Antenna Cable



**Internal Antenna Cables**  
 RG-223 N-Male to SMA, TNC or N-Male connectors

- 98-6124 SMA Male to N-Male, 24"** (ScadaFlex RTUs & Controllers)
- 98-6224 TNC-Male to N-Male, 24"** (ScadaBridge RTUs)
- 98-6324 N- Male to N-Male, 24"** (Freewave Radios)



**98-9001 Weatherproofing Kit**  
 Antenna system weatherproofing kit for up to 10 sites