

Stewart Signs DayStar Wireless Communication Solutions

Connection Description	Long Range Wireless	Short Range Wireless	Customer-Provided Wireless Device
Signal Distance	Unlimited	Up to 1500'	Varies
Excluded LED Sign Models	None	None	None
Summary	Communication occurs from the controlling computer through the Internet to the sign. Data from the Internet to the sign occurs via a wireless data plan subscription assigned to the wireless data modem.	Communication occurs via Short Range Wireless network devices and transmits messages to the sign via RF** using internet protocols.	Customer uses their existing wireless network and is responsible for installing an access point device inside the LED display.
Added Cost	Yes	Yes	No
Comments	Requires the controlling computer to have access to the Internet.	Requires direct line of sight between wireless devices.	Stewart Signs does not provide technical support for customer provided devices.
	**RF, radio frequencies, uses unlicensed public channels which have numerous causes of interference. Relocating antennas or installing more powerful (higher gain) antennas may be needed when interference occurs. Antennas are not guaranteed to solve interference problems and the customer is responsible for the cost and installing or relocating devices.		

Long Range Wireless

Connection Description: Using Stewart Signs' provided software the computer communicates to the sign through a Wireless Data Modem that is pre-installed inside the LED display. The connection between the controlling computer and the LED sign uses IP (Internet Protocol) addresses and is accomplished through the Internet and a Wireless Service Provider.

The customer is responsible for subscribing to a Wireless Data Plan with their selected wireless provider, such as AT&T, Sprint or Verizon. The wireless service provider assigns a static IP address and mobile telephone number (MTN) which is assigned to the Wireless Data Modem. The customer is responsible for obtaining this information to provide to Stewart Signs. The Wireless Data Modem is programmed using the assigned IP Address and MTN allowing the sign to be fully tested before the sign ships.

Communication to the sign occurs through the Internet via a Wireless Data Modem.

Distance: Unlimited

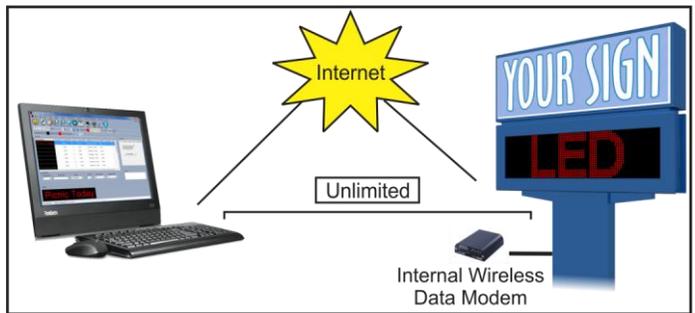
Advantages

- No trenching for cables.
- No limit to distance.
- Highly reliable and cost effective when compared to extensive trenching.
- Advanced security is accomplished using IPsec Tunneling (IPsec – Internet Protocol Security)
 - Each packet of information is encrypted between the network and the sign.

Disadvantages

- Requires wireless data plan subscription

Cost Consideration: Excellent option when the cost for trenching exceeds the wireless device cost and when distance or obstructions prevents the use of the Short Range Wireless solution.



Short Range Wireless

Connection Description: Using Stewart Signs' provided software the computer communicates to the sign through a pair of Short Range Wireless network devices. One is installed inside the sign with an exposed antenna and the customer installs the other Short Range Wireless device on the outside of the building, which is connected to a PC or network.

Distance: Maximum of 1,500 feet** between antennas.

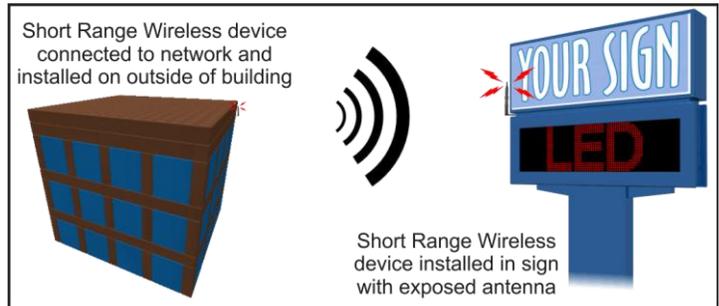
Advantages

- Wireless, no trenching for cables.
- Inexpensive method for communicating to sign.
- Fast data transfer rates.

Disadvantages

- ****Requires line-of-sight** between both antennas, with no obstructions. Obstructions will either reduce the distance between devices, result in intermittent connectivity or no connectivity.
- Requires customer to install a Short Range Wireless device outside, typically on the side of the building.
- Subject to interference from other Wi-Fi systems and other electromagnetic emissions, such as cordless phones, two-way radios, etc.

Cost Consideration: Excellent option when the cost for trenching exceeds cost of communication equipment and there is direct line-of-sight between antennas.



Customer Provided Wireless Device

Connection Description: The computer communicates to the sign through the customer's existing wireless network. The customer is responsible for installing a wireless device, access point, inside the sign. An electrician is required to make the electrical connection of the customer's device to a terminal block inside the sign.

Distance: Dependent on customer-provided devices. Usually requires direct line-of-sight between RF transmitters.

Distance: Dependent on customer-provided devices. Usually requires line-of-sight between devices.

Advantages

- Wireless, no trenching for cables.
- Reduces cost by using existing wireless network.

Disadvantages

- Limit to distance.
- Direct line-of-sight between antennas may be required.
- Customer is responsible for installing wireless device inside sign.
- Stewart Signs does not provide technical support or troubleshooting of customer provided hardware.

Cost Consideration: Customer provided equipment adds no additional cost to sign.

