| Stewart Signs Daystar Communication Methods, Wireless Solutions		
Will sign be tied into existing network?	No (Sign will be wirelessly connected to a PC)	Yes (sign will be wirelessly tied into existing Network)
Options: Short Description	Premier Wireless RF Modem (Non-Networked)	Customer provided wireless network connect / Wireless Network Bridge.
Signal Distance	Up to 3,500'	Varies by strength of signal. / Up to 3,500'
Excluded Models	None	None / None
Detailed Description, Requirements & Comments	Radio Frequency (RF) Modem next to PC communicates with RF modem inside sign. Obstruction free line of sight from computer to sign is ideal, but may not be needed as distances less than 2000' can often transmit through some obstacles such as trees or buildings.(Obstruction free=1 window, 0 walls, 0 trees, 0 vehicles) Under certain conditions signal can exceed 3500'. See RF comment below.	Customer is responsible for provision of wireless signal and receiver. Stewart will provide electrical outlet inside LED. Stewart Signs does not support troubleshooting of customer provided hardware. / PC sends message through customers existing network. Stewart provides Network Bridge, which wirelessly transmits message to sign via RF. Requires installation of a network device, provided with network bridge, onto customers pre-existing wired network. Unobstructed direct line of sight between sign and antennas is recommended. Under certain conditions signal can exceed 3500'. Recommend a direct line of sight but distances less than 2000' can often transmit through some obstacles such as trees or buildings.
Added Cost	$1,500	None / $1,800

RF utilizes unlicensed public channels which can have numerous causes of interference. If interference occurs, more powerful (higher gain) antennas may need to be installed to enhance the signal strength. These antennas are at an additional cost & mounting of antennas is the responsibility of the customer.

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AMERICA'S PREMIER SIGN COMPANY

PC to sign via Premier Wireless RF Modem

Radio Frequency (RF) Modem next to PC communicates with RF modem inside sign. Obstruction free line of sight from computer to sign is ideal, but may not be needed, as distances less than 2000' can often transmit through some obstacles such as trees or buildings. .(Obstruction free=1 window, 0 walls, 0 trees, 0 vehicles) Under certain conditions signal can exceed 3500'.

Additional Information:

- Connection at PC is via Serial/DB9 Connection. If no Serial/DB9 port is available, adaptors are required.
- 900 MHz
- Baud rate 115,200
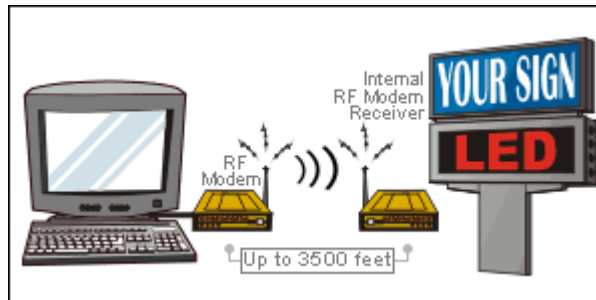
Distance: Up to 3,500 feet. Signal has proven to transmit up to several miles under ideal conditions.

NOTE: RF utilizes unlicensed public channels which can have numerous causes of interference. If interference occurs, more powerful (higher gain) antennas may need to be installed to enhance the signal strength. These antennas are at an additional cost & mounting of antennas is the responsibility of the customer.

Advantages
- Wireless, no trenching for cables.
- Highly reliable.

Disadvantages
- Limit to distance.
- Direct line-of-sight provides a higher potential for stable connectivity. At closer range (200'-400'), this high powered RF Modem has proven to work without a direct line of site; connectivity is not guaranteed without direct line of site.
- Only the computer with the modem installed can control the sign.
- RF utilizes unlicensed public channels which can have numerous causes of interference. If interference occurs, more powerful (higher gain) antennas may need to be installed to enhance the signal strength. These antennas are at an additional cost & mounting of antennas is the responsibility of the customer.

Cost Consideration: Excellent option when the cost for trenching exceeds cost of communication equipment.

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Customer-Provided Wireless Network Connect

PC sends message through customers existing network. Customer provided equipment wirelessly transmits message to sign via RF. Customer is responsible for provision of wireless signal and receiver. Stewart will provide electrical outlet inside LED. Stewart Signs does not support troubleshooting of customer provided hardware.

Customer Provided
Wireless Network
(signal and receiver)

Distance: Dependent on equipment the customer provides. Usually requires direct line of site between RF transmitters.

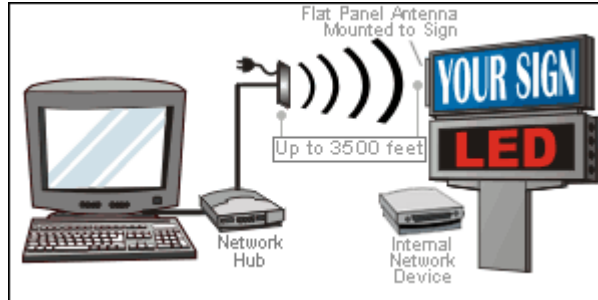**Advantages**
- Wireless, no trenching for cables.

Disadvantages
- Limit to distance.
- Direct line-of-sight between antennas may be required.
- Customer is responsible for provision of wireless signal and receiver. Stewart will provide electrical outlet inside the LED cabinet.
- Stewart Signs does not support troubleshooting of customer provided hardware.

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

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Wireless Network Bridge

PC sends message through customers existing network. Stewart provides Network Bridge, which wirelessly transmits message to sign via RF. Requires installation of a network device, provided with network bridge, onto customers pre-existing wired network. Unobstructed direct line of sight between sign and antennas is recommended. Under certain conditions signal can exceed 3500'. Recommend a direct line of sight but distances less than 2000' can often transmit through some obstacles such as trees or buildings.

Distance: 16 watt transmitter capable of transmitting up to 3,500 feet. Under specific conditions distances of several miles can be achieved (requires a direct line of site.)

Advantages
- Wireless, no trenching for cables.
- Highly reliable and cost effective.
- Network device is included by Stewart Signs.
- Capable of 128-bit WEP-Plus encryption
  - Just as 802.11b describes wireless communications, WEP (Wired Equivalent Privacy) currently describes wireless security. Today, WEP comes in 64-bit and more secure 128-bit.

Disadvantages
- Limit to distance.
- Direct line-of-sight between antenna may be required
- Exposed flat panel antennas; 15.5" square x 1.25" thick

Cost Consideration: Excellent option when the cost for trenching exceeds cost of communication equipment.

NOTE: Customer is **required to mount antenna to building and connect transmitter to internal network switch** (50' of cable included). A Stewart Signs LED Technician will install antenna onto the LED sign at factory.

Please specify which end of your sign you will need the antenna installed on, as it needs to face the antenna on your building.   When specifying on 1-sided sign, facing sign state right or left end. When specifying on 2-sided sign, state electrical input end or opposite end of electrical input.

Internal antenna is mounted inside of LED sign. This antenna faces the building where the customer has installed an antenna on the side of their building. There is a direct line of site between both antennas providing the customer with a clear, strong signal.