

**Stewart Signs Daystar Communication Methods, Wired Solutions**

Will sign be tied into existing network	Yes, Sign to be tied to Existing Network		No, Sign to be wired directly to a <u>singular</u> PC		
Maximum Distance of signal run	4000'	4000'	6'	4000'	Unlimited
Excluded Models	None	None	None	None	Color
Connection Description	Network Cable	Network via Fiber Optic Cable	Laptop connection	Data Cable	Telephone Modem
Required Device	Network device. (Included)	Media Converter(s), not included.	Weatherproof Box & Signal converter from USB to 485. (Both included)	Signal Converter from USB to RS 485. (Included)	Two Modems. One at PC, not included. One in sign, included.
Cable Type	Outdoor grade CAT 5E (Cable not included.)	Fiber Optic. (Cable not included.)	USB (Cable included.)	Outdoor grade CAT 5E (Cable not included.)	Telephone Line (Cable not included.)
Detailed Description, Requirements & Comments	Sign is connected to existing local area network. Signal is sent from PC through network to sign via outdoor grade underground CAT5E cable, up to 4000'. (Stewart Signs recommends Belden 7919A or Belden 1594A). This allows control of sign from any PC on the network if software is on PC. If off-site access to the network is available, sign can be programmed remotely. See comment 1 & 2 below.	The Sign is connected to existing network via a Fiber Optic Cable. This allows control of sign from any PC on the network if software is on PC. If off-site access to the network is available, sign can be programmed remotely. Media Converter(s) are required but are not included with sign.	A 6' USB cable in a gray weather-proof box is located at the base of the sign. User connects Windows laptop to upload messages. Requires customer provision a capable laptop with USB port. Laptop not included. Allows for conversion to a different communication method at later date.	USB signal from PC is converted to RS485, then sent to sign via outdoor grade underground CAT5E cable, up to 4000'. (Stewart Signs recommends Belden 7919A or Belden 1594A). See comment 1 & 2 below.	Signal is sent from telephone modem at PC through public telephone system to modem integrated inside sign. Modem at PC is supplied by customer. This requires dedicated ANALOG line at PC and at sign. (2 lines total.) CAUTION: Phone lines today are often digital and are not compatible with this mode of communication.
Added Sign Cost	None	None	None	None	None
Signal Type	RS485	Duplex 62.5/125 Multimode	RS485	RS485	Telephone

Comment 1: Stewart Signs recommends data cable be separated from electric by 6" when greater than 200'. For distances up to 200', data cable and electric may share the same conduit.

Comment 2: The longer the data cable the more susceptible to electrical surges caused by lightning.

## Network Cable

**Connection Description:** Sign is connected to existing local area network. Signal is sent from PC through network to sign via outdoor grade underground CAT5E cable, up to 4000'. (Stewart Signs recommends Belden 7919A or Belden 1594A). This allows control of sign from any PC on the network if software is on PC. If off-site access to the network is available, sign can be programmed remotely.

**Distance:** Maximum cable length 4,000 feet.

### Advantages

- Network Device included with sign
- Sign(s) are assigned an IP address and are accessible from the network.

### Disadvantages

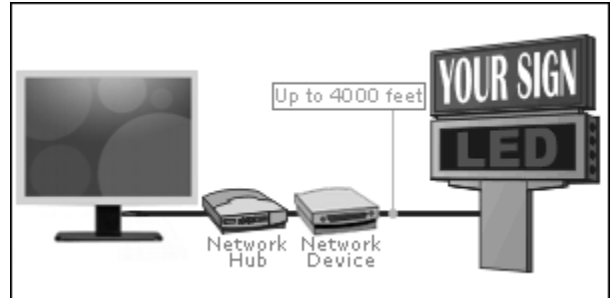
- Access to sign is available only through network.

**Cost Consideration:** Costs associated with trenching for data cable could be high, especially if running cable across a paved parking lot.

**Recommended Outdoor Grade Cable:** Stewart Signs recommends Belden 7919A or Belden 1594A cable.

### NOTES:

- Stewart Signs recommends CAT5 cable be separated from electric by 6" when greater than 200'. For distances up to 200', CAT5 Cable and electric may share the same conduit.
- The longer the data cable the more susceptible to electrical surges caused by lightning.
- Providing an IP address in advance of delivery allows Stewart Signs to pre-configure the network device to allow the system to be plug and play.



## Network via Fiber Optic Cable

**Connection Description:** The Sign is connected to existing network via a Fiber Optic Cable. This allows control of sign from any PC on the network if software is on PC. If off-site access to the network is available, sign can be programmed remotely. Media Converter(s) are required but are not included with sign

**Distance:** Maximum cable length 4,000 feet.

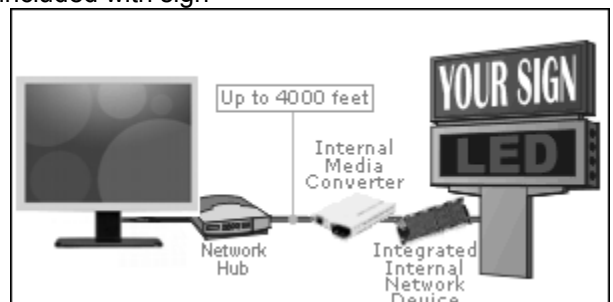
### Advantages

- Sign is accessible on your Local Area Network.
- Fiber Optic Cable eliminates the possibility of lightning damage through data cable.
- Fiber Optic cable can be run in the same trench as the electrical service.
- Unaffected by electrical surges

**Cost Consideration:** Costs associated with trenching for data cable could be high, especially if running cable across a paved parking lot. Cost associated with the purchase of Fiber Optics cable should be assessed through a local vendor. Additional cost includes conduit, media converters and fiber optic cable/converters.

### Notes:

- Media Converters (Not Included) are required to connect sign to fiber optic cable.
  - Electrical outlet for media changer inside sign is provided by Stewart Signs.
- Requires specialty installer of fiber optic cables and the additional cost of media converters.  
Stewart Signs recommends you contact a local Fiber Optic cable installation specialist for pricing.



## Laptop Connection

**Connection Description:** A 6' USB cable in a gray weather-proof box is located at the base of the sign. User connects Windows laptop to upload messages. Requires customer provision a capable laptop with USB port. Laptop not included. Allows for conversion to a different communication method at later date.

**Distance:** Provided USB cable is 6 feet.

### **Advantages**

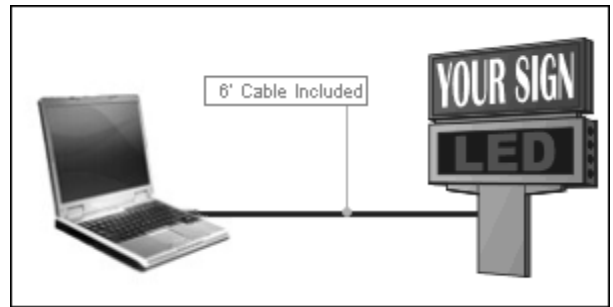
- No trenching.
- Use of scheduler inside sign reduces the number of trips to sign for programming as sign will change messages based on message expiration date/time.

### **Disadvantages**

- Requires connection of a USB cable to a laptop each time a message is downloaded to sign.
- Requires customer provided laptop.

### **Cost Consideration:**

- Least expensive connection option, but sometimes inconvenient for the user.



## Data Cable

**Connection Description:** USB signal from PC is converted to RS485, then sent to sign via outdoor grade underground CAT5E cable, up to 4000'. (Stewart Signs recommends Belden 7919A or Belden 1594A).

**Distance:** Maximum cable length 4,000 feet.

### **Advantages**

- Extremely reliable and fast data transfer rate.
- Placing the data cable within a metal conduit will improve EMI tolerance.

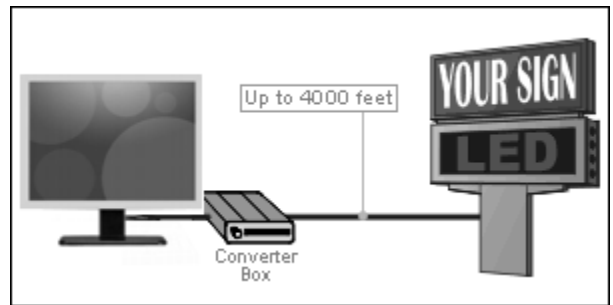
### **Disadvantage**

- Only one computer per location can be used to access and program the LED sign.
- Moderate EMI (Electro-magnetic Interference) tolerance.
- Limit to distance.

### **Cost Consideration:**

- Trenching costs for data cable need to be considered, especially if running cable across a paved parking lot.
- Cost associated with the purchase of cable should be assessed through a local supplier.

**NOTE:** Stewart Signs recommends CAT5 cable be separated from electric by 6" when greater than 200'. For distances up to 200', CAT5 Cable and electric may share the same conduit.



## Telephone Modem

**Connection Description:** Signal is sent from telephone modem at PC through public telephone system to modem integrated inside sign. Modem at PC is supplied by customer. This requires dedicated ANALOG line at PC and at sign. (2 lines total.) CAUTION: Phone lines today are often digital and are not compatible with this mode of communication.

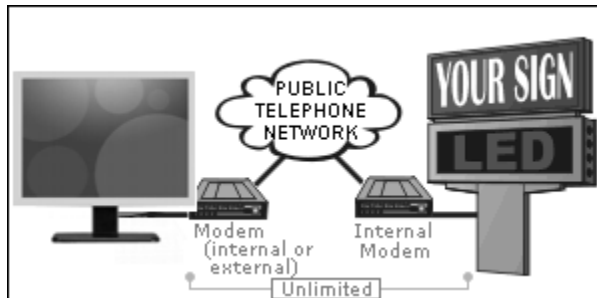
**Distance:** Unlimited

### Advantages

- Any computer with a telephone modem, Stewart Signs' software, and dial up access can control the LED sign.
- Very Reliable.
- Allows Stewart Signs Customer Support to perform remote diagnostics of sign by dialing into your sign.

### Disadvantage

- Requires dedicated ANALOG telephone line at sign.
- PC must have phone modem & dedicated phone access. Stewart recommends there be a dedicated ANALOG phone line for the sign.
- Data transfer is slower when compared to a data cable connection.
- Telephone Modem is not recommended for the **Daystar Color Message Centers** due to the bandwidth required to transmit images.



### Cost Consideration:

- Additional cost for dedicated phone line for sign.
- Additional cost for recommended dedicated phone line for PC
- Additional cost for modem at PC, if not already equipped.
- Cost associated with trenching for phone line should be assessed, especially if running telephone cable across a paved parking lot.

**Recommendation:** Contact your local telephone company to discuss the options available to your location for providing a telephone line to your sign. For optimal performance and efficiency, Stewart Signs recommend a dedicated telephone line for your new sign so you do not disrupt your existing phone service whenever you communicate to the LED sign.

**NOTE:** Stewart Signs recommends phone cable be separated from electric by 6" when greater than 200'. For distances up to 200', CAT5 Cable and electric may share the same conduit.