

How to Connect Beta-Brite®, Alpha™ and AlphaVision™ LED Displays To Your Computer

This information is for users who will be using a computer and messaging software to program their LED display(s). The purpose of this document is to briefly describe to decision makers, the most common ways that Beta-Brite, Alpha and AlphaVision LED Displays can be connected to a computer. It discusses the advantages and disadvantages of each option. It is not intended to provide technical information. Detailed technical information on each of the connectivity options is provided in our document, **Network Configurations**. Users who plan to program their LED display(s) with the Infrared Remote Keyboard or the Infrared Message Loader do not need to read this document.

There are several cable and wireless connectivity options:

- RS-232 Communications over RS-232 Cable.
- RS-485 Communications over RS-485 Cable.
- RS-232 Communications using two or more Modems.
- RS-232 Communications and RS-485 Communications using two or more Modems.
- RS-232 Communications using a Wireless Transmitter and Wireless Receiver.

There are two other options that do not require cable:

- Infrared Remote Keyboard
- Infrared Message Loader

These two options and the use of messaging software are discussed in the document, **Programming Options**, available upon request.

RS-232 OR RS-485?

The cable connectivity options utilize either **RS-232** or **RS-485** communications. There are several significant differences between the two protocols, and your choice of protocol affects both the performance and cost of your sign messaging system. Here are the key points.

For purposes of receiving messages from a computer or other transmitting device, all the Alpha and AlphaVision LED Display models have two communications protocols -- RS-232 and RS-485. **The Beta-Brite and Beta-Brite Big Dot LED Displays have only the RS-232 protocol.** There are two important differences between RS-232 and RS-485 protocols.

1. **RS-232** protocol has two limiting factors.
 - a. First, there is a cable distance limitation. The sign manufacturer publishes a distance limitation of 50 cable feet between the computer and the sign.

Communicating at the Speed of Light!

Practically speaking, we have customers successfully transmitting messages from their computer to an Alpha LED Display with an RS-232 cable as long as 130 feet. Other customers have been unable to transmit messages to their sign 75 cable feet away. Reducing the transmission speed from 9600 baud to 1200 baud will sometimes extend the distance.

- b. RS-232 also has a limitation of one sign per cable. To use two or more signs, you must use a separate cables between the computer and each sign. If you have to use multiple signs with RS-232, it would be convenient to have a switchbox to switch between signs before sending a message from the computer. As an alternative, you could also use a Wireless Transmitter and Wireless Receiver. Wireless transmission uses RS-232 protocol and would extend the transmission distance up to two miles, but it would not solve the problem of the Beta-Brite not having individual sign addressing. **NOTE:** The sign manufacturer has successfully tested a connectivity solution that combines TCP/IP and a Print Server with RS-232 protocol. If you are interested in learning more about this option, please contact us and ask for the "TCP/IP / Print Server Tech Memo."
8. **RS-485** protocol allows communications up to 10,000 feet on a twisted pair sign network cable. Multiple signs may be installed on this cable, allowing messages to be sent to multiple signs. All Alpha and AlphaVision LED Display models have a Serial Address feature that allows any one of 256 addresses to be set in the sign. Using the Serial Address feature, a message can be sent to any sign or group of signs that are installed on the sign network.

The Beta-Brite LED Displays have only the RS-232 protocol, and do not have a Serial Address feature. For these reasons, they cannot be used in a network of signs on a single sign network cable.

FIVE CONNECTIVITY OPTIONS

The requirements, advantages and disadvantages of four cable connectivity options and one wireless connectivity option are described on the pages that follow. Additional information on hardware components and configuration options is provided in our booklet, **Network Configurations**. Diagrams of each connectivity option with part numbers of all components are provided. If you are interested in receiving a copy of this booklet, please contact us.

1. RS-232 CABLE BETWEEN COMPUTER AND SIGN

Requirements: A \$28 cable and a software program costing between \$99 and \$249.

Advantages: Fast, reliable messaging. Error checking verifies that messages are received intact.

Disadvantages: Distance limitation of 50 to 100 feet. Only one sign per cable.

Communicating at the Speed of Light!

2. RS-485 CABLING BETWEEN COMPUTER AND SIGN(S)

- Requirements:
- a. A \$20 Modem to Converter Box Cable and an \$89 Converter Box.
 - b. A length of RS-485 cable costing 20 cents a foot between the Converter Box and the first sign, between the first sign and the second sign, and so on.
 - c. A \$10 RS-485 Modular Cable and a \$5 Modular Network Adapter for each sign.
 - d. A software program costing between \$149 and \$249.

Advantages: Fast, reliable messaging. Distance limitation of 10,000 feet. Multiple signs per cable. Error checking verifies that messages are received intact.

Disadvantages: Connecting signs in multiple buildings together is difficult.

3. RS-232 CABLE AND MODEMS BETWEEN COMPUTER AND ONE SIGN

- Requirements:
- a. An internal Modem or an External Modem and Modem Cable on the sending computer. Modems cost between \$50 and \$150.
 - b. An External Modem and a \$28 Modem to Sign Cable at the sign location.
 - c. An available analog modem telephone line between the two locations.
 - d. A software program costing between \$149 and \$249.

Advantages: Fast, reliable messaging. Sometimes the only way to connect between two sites. No distance limitations between sites. Error checking verifies that messages are received intact.

Disadvantages: Distance limitation of 50 to 100 feet between the receiving Modem and the LED Display. Only one sign per cable. Sometimes the receiving Modem loses its Auto-Answer setup and has to be reprogrammed.

4. RS-232 CABLE AND MODEM IN SENDING LOCATION; MODEM, RS-485 AND ONE OR MULTIPLE SIGNS IN RECEIVING LOCATION

- Requirements:
- a. An internal Modem or an External Modem and Modem Cable on the sending computer. Modems cost between \$50 and \$150.
 - b. An External Modem at the sign location.
 - c. A \$20 Modem to Converter Box Cable and an \$89 Converter Box at the receiving location.

Communicating at the Speed of Light!

- d. An available analog modem telephone line between the two locations.
- e. A length of RS-485 cable costing 20 cents a foot between the Converter Box and the first sign, between the first sign and the second sign, and so on.
- f. A \$10 RS-485 Modular Cable and a \$5 Modular Network Adapter for each sign.
- g. A software program costing between \$149 and \$249.

Advantages: Fast, reliable messaging. Sometimes the only way to connect between two sites. No distance limitations between sites. Distance limitation of 10,000 feet between the Modem and the most distant sign at the receiving location. Multiple signs easily attached. Error checking verifies that messages are received intact.

Disadvantages: Sometimes the receiving Modem loses its Auto-Answer setup and has to be reprogrammed.

5. WIRELESS TRANSMITTER IN SENDING LOCATION; ONE OR MORE WIRELESS RECEIVERS AND SIGNS IN RECEIVING LOCATION

- Requirements:
- a. A Wireless Transmitter costing \$995 in the sending location.
 - b. A Wireless Receiver costing \$295 on each sign in the receiving location.
 - c. A software program costing between \$149 and \$249.

Advantages: Sometimes the only way to connect between two sites. Multiple signs easily attached.

Disadvantages: Distance limitation of approximately 2 miles; less in some environments with thick walls or noisy equipment. Cost is considerably higher than other options. One way communication only. No error checking possible; no confirmation that a message has gotten to the receiving sign intact.

SUMMARY

In making the decision on how to program your LED Display, you must evaluate the cost, feasibility and practicality of connecting your computer and sign(s) together either with data cable, or by modem and telephone line, or by wireless communications using a wireless transmitter and wireless receiver(s), taking into account the type of sign(s) that you have. You should strongly consider using a computer to compose and transmit your messages, if possible. If cable connectivity, connectivity by modem, or connectivity by wireless transmission are not practical, then you must use the Infrared Remote Keyboard, and optionally, the Infrared Message Loader.

Communicating at the Speed of Light!