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Do's and Don'ts BACnet Wiring (Part 2 of 3)

This article is the second in a series of three articles on BACnet Wiring. This series will cover the basic do's and don'ts with detailed explanations and useful tips.

EIA-485

The BACnet MS/TP protocol uses EIA-485 (RS-485) as the physical layer standard for data transmission. Neptronic Controllers also use the BACnet MS/TP protocol over an RS-485 standard for communicating with third party routers, gateways, or master controllers.

Maximum Number of Devices

The Neptronic MS/TP network supports a maximum of 127 devices (with one or more repeaters) or 64 devices (without a repeater). We recommend using a maximum of 64 devices to reduce traffic and minimize network response latency. If more than 127 devices are required on the total network, then use extra BACnet MS/TP routers. When 64 devices are on a single MS/TP segment, we recommend using a baud rate of 38,400bps with a maximum network wire length of 4,000ft (1,200m). Note that each MS/TP supervisory controller and repeater counts as a device.

End of Line (EOL) Termination

In order to avoid reflection issues, an End of Line (EOL) must be installed at both ends of the physical network wire. Set the EOL directly on the controller (with the on-board jumper or DIP switch) or manually wire a 120Ω resistor between A+ and B-.

Communication is achieved by using an electrical pulse signal and when no EOLs are installed, the pulse signal reflects backwards and collides with other data pulses. The resistor absorbs the pulse energy and dissipates it as heat.

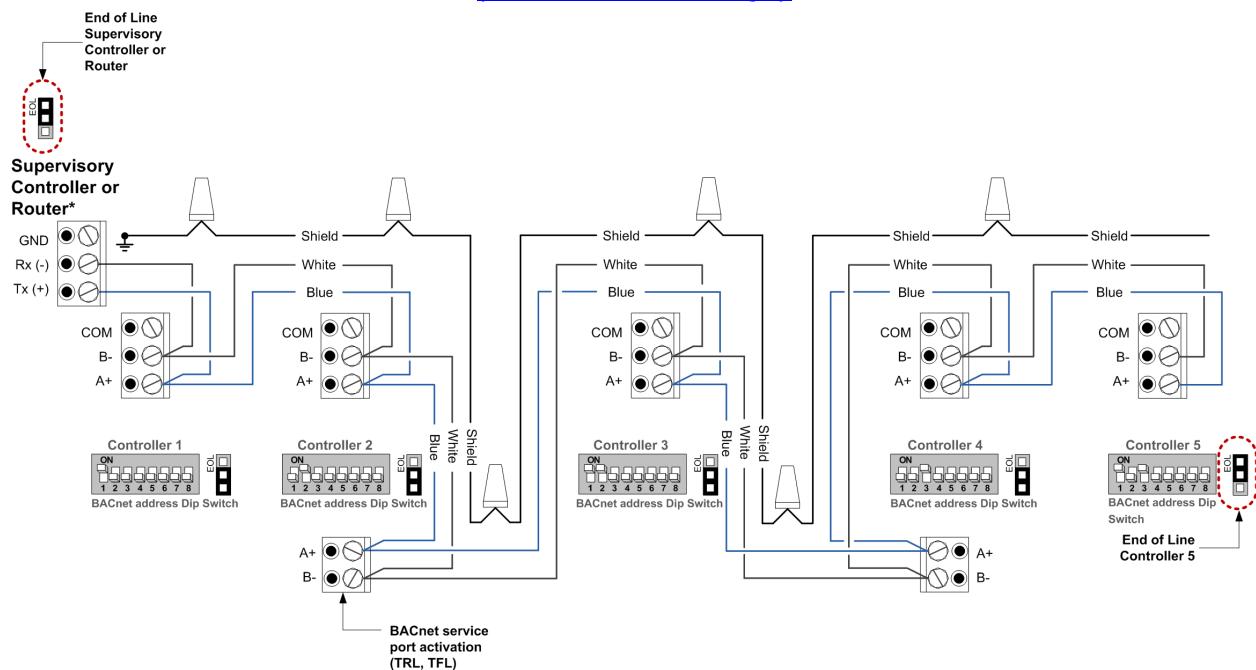
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Neptronic devices use 120Ω resistor, but 3rd party devices may require a different resistor value. Consult the instruction manual of these devices.

[\(Click here to enlarge\)](#)

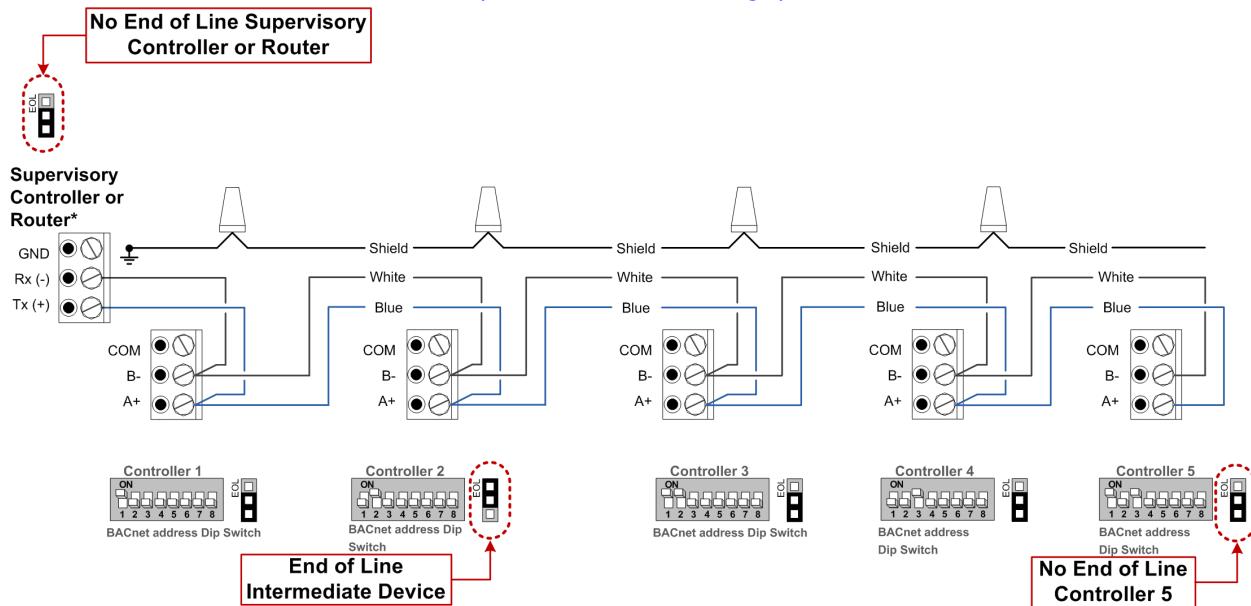


*Indicates non Neptronic devices or equipment.

Illustration 7 - MS/TP Network Correct EOL Setup

Do not install EOL or a termination resistor (120Ω) at any intermediate device on the network.

[\(Click here to enlarge\)](#)



*Indicates non Neptronic devices or equipment.

Illustration 8 - MS/TP Network Incorrect EOL Setup

[\(Click here to enlarge\)](#)

If no EOL is available on the device, wire a 120Ω resistor between A+ and B-. For 3rd party devices, verify the EOL resistor value required.

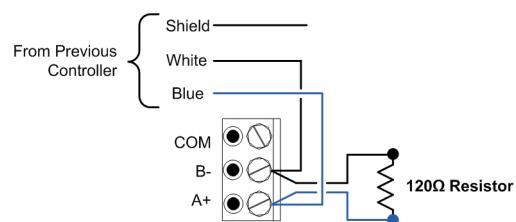


Illustration 9 - 120Ω Resistance EOL

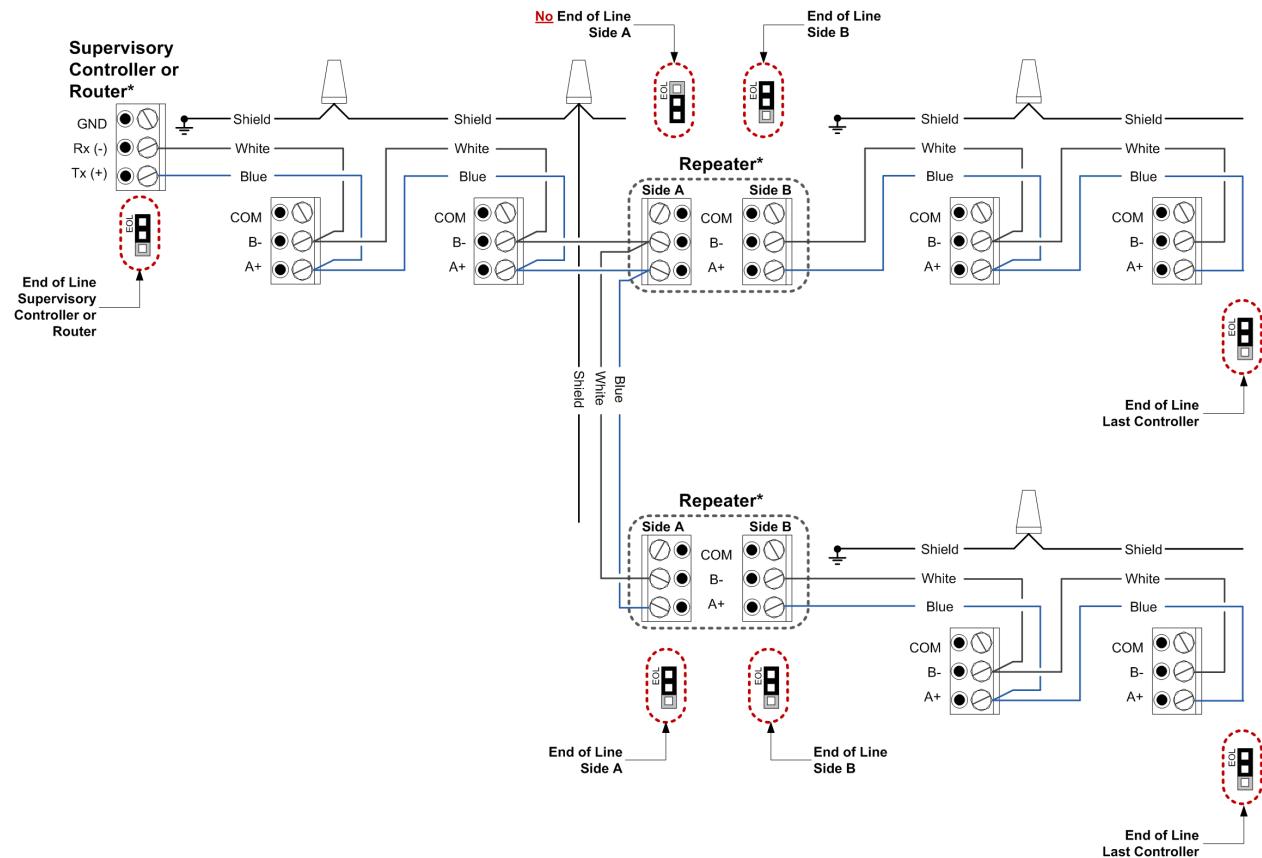
Repeater Usage

When a network contains more than 64 controllers and/or the cable length exceeds 4,000ft (1,200m) use one or more repeaters. Wire and configure the repeaters according to the manufacturer's specification. From each of those repeaters, a separate daisy chain will branch off. More than one repeater on a single MS/TP segment is not recommended.

Below are two examples of wiring repeaters;

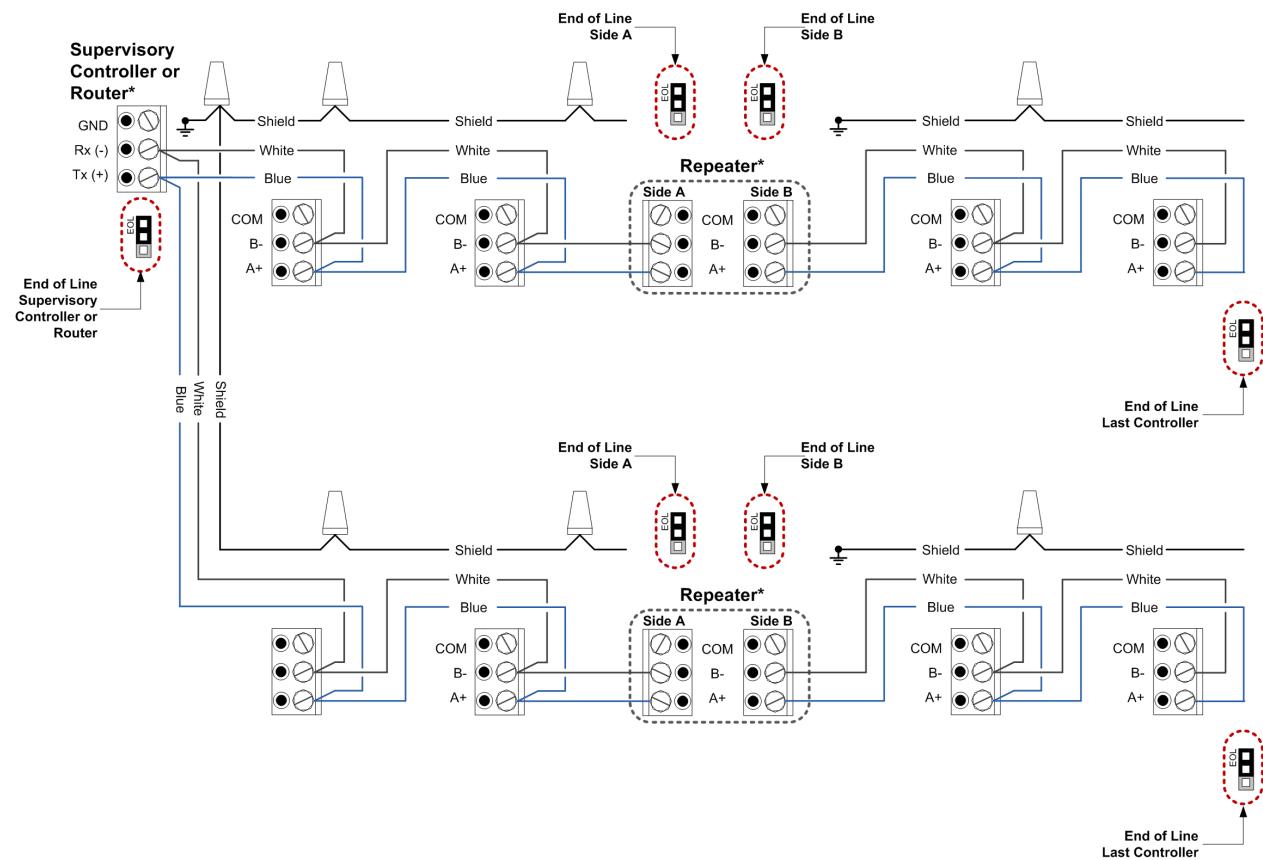
Example #1

[\(Click here to enlarge\)](#)



Example #2

[\(Click here to enlarge\)](#)



*Indicates non Neptronic devices or equipment.

Illustration 10 - Using MS/TP Network Repeaters