BACnet MS/TP communications wiring troubleshooting

Review best practices below:

MS/TP device communication chips all have a fundamental voltage (try measuring the MS/TP + to –). When you interconnect multiple devices from one manufacturer the fundamental voltage will remain the same. Remove the end of line resistors and measure the MS/TP voltage + to -, you should see the same voltage as a single device. This is the correct voltage of a good MS/TP communications network. If you have a network that has failed, pull the end of line resistors off, measure the voltage from the MS/TP + to – and compare to a single device. If it is less than the fundamental voltage then you have a wiring problem. Start somewhere in the middle of the communications line and divide it in two, measure the voltage, the side with the lower voltage has the wiring problem, leave the first separation open. Move again to the center of the problem segment and pull the communications line apart, measure the voltage again and repeat until you are down to 2-4 devices. Check for shorts to ground, reversed power supply grounds, bad controllers and open wiring.

Best Practices:

Know your wire	Only Low capacitance wire will work properly for MS/TP (RS485) communications. Other wiring will work but will severely limit your communications speed and distance.
Set your baud rate	Baud rate is the speed of communications. Often baud rate is assumed to be the major factor in updating data in the Building Management System. The reality is token passing (TP in MS/TP) is more time consuming. The point data being communicated is only a few bytes and communications has fewer errors at lower baud rates. Having low errors is more important than baud rate.
Don't overload	Limit devices to 60 per communications line is the goal. Limiting data collection for unneeded data and for history recording is most important. Minimizing text data communications as a 20 character text string takes ~ 30 bytes where a data point will take ~ 8 bytes.
Grounding	Only one power supply in the MS/TP network should be grounded. As virtually all MS/TP transceivers have a relationship to ground, grounding more than one power supply will cause ground loops. Alternatively grounding all devices is a reasonable practice that minimizes ground loops. Make sure high current (VFD's, RTU's and Compressors) are well grounded.