Options When Diagnosing MS/TP Problems

A BASrouter customer recently contacted us to ask for help diagnosing problems with his MS/TP network. He created a simple test in his office with the BASrouter and several of his MS/TP devices. The simple test worked fine, but onsite there were issues. Problems in the field can relate to improper cabling, conflicting MAC addresses, lack of end-of-line termination, inadequate bias, or improper interfacing between 2-wire and 3-wire devices. But what can we do if everything seems correct?

```
BIP 1 Incoming Packets=4196606
BIP 1 Outgoing Packets=1867773
BIP 2 Incoming Packets=0
BIP 2 Outgoing Packets=0
BACnet/Ethernet Incoming Packets=0
BACnet/Ethernet Outgoing Packets=0
MSTP Incoming Packets=1867077
MSTP Outgoing Packets=2098642
SilenceTimer=14
EventCount=54
RFSM state=00 Idle
MNSM state=01 Idle
Next Station=1
Poll Station=0
Available Memory=29320
```
The BASrouter Diagnostic Screen

The BASrouter provides some diagnostic information about the MS/TP network from its perspective. The BASrouter's diagnostic screen can show if there are at least one properly communicating device on the MS/TP network. It can also show the MAC address of the next MS/TP device. However, more diagnostic information is often needed to help solve MS/TP issues.

We often have customers who use an open source Ethernet based tool called Wireshark which is normally used to help diagnose problems with BACnet/IP networks. However, the low level communications of the MS/TP network can be lost when viewed from the Ethernet side of our router.

At this point it is helpful to look at the MS/TP communications directly. There are a few ways to do this. You will need a way to have your PC communicate directly to the MS/TP's EIA-485 (also known as RS-485) network. As this is a standard there are quite a few devices which you can purchase to put your PC onto the EIA-485 network. We find the B&B Electronics USB to EIA-485 converter (part number USOPTL4) to work very well when diagnosing MS/TP issues.

Once the PC is connected to the MS/TP network you will need a software program to capture the MS/TP traffic and decode it for you. We have found PolarSoft's BACtrace to work very well for us. With BACtrace you can capture and view the decoded messages in one program.

Another alternative is Steve Karg's open source solution. He provides a program called mstpcap which can be used to capture MS/TP traffic to a file. Then you can use Wireshark to open this file and Wireshark will then decode the MS/TP traffic for you.

Both BACtrace and mstpcap will capture MS/TP traffic and they can show you errors on the network. With mstpcap the overall errors will be shown while BACtrace shows you the errors in the capture so you

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can see what communication proceeded and followed the error which can be helpful when diagnosing problems. Another issue with mstpcap is that, usually, it cannot support 76.8kbps MS/TP communications BACtrace supports all of the standard MS/TP data rates. We have found both programs to be useful when diagnosing MS/TP issues.

To further assist in understanding how MS/TP and EIA-485 networks function, Contemporary Controls has several articles in its Learning Center. Just search for relevant articles by using the search words "MS/TP" and "EIA-485".

PolarSoft BACtrace

Wireshark view of a mstpcap file