**MANUAL** – INSTALLATION + SERVICE

# BACnet Commissioning Tool
BCT

# BACNET COMMISSIONING TOOL

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Having difficulty installing or configuring this product?
Price is here to help.

**Controls Application Support**

204.654.5613

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priceindustries.com/controls

# BACNET COMMISSIONING TOOL

## NETWORK OVERVIEW

**Network Overview**

TO BACNET IP
CONNECTION

PRICE BACNET ROUTER
(ETHERNET TO
MS/TP ROUTER)

BACNET MS/TP
CONNECTION
+, -, NET COM

WINDOWS LAPTOP
BCT SUPPORTED ON WINDOWS XP, VISTA, 7, 8, & 10
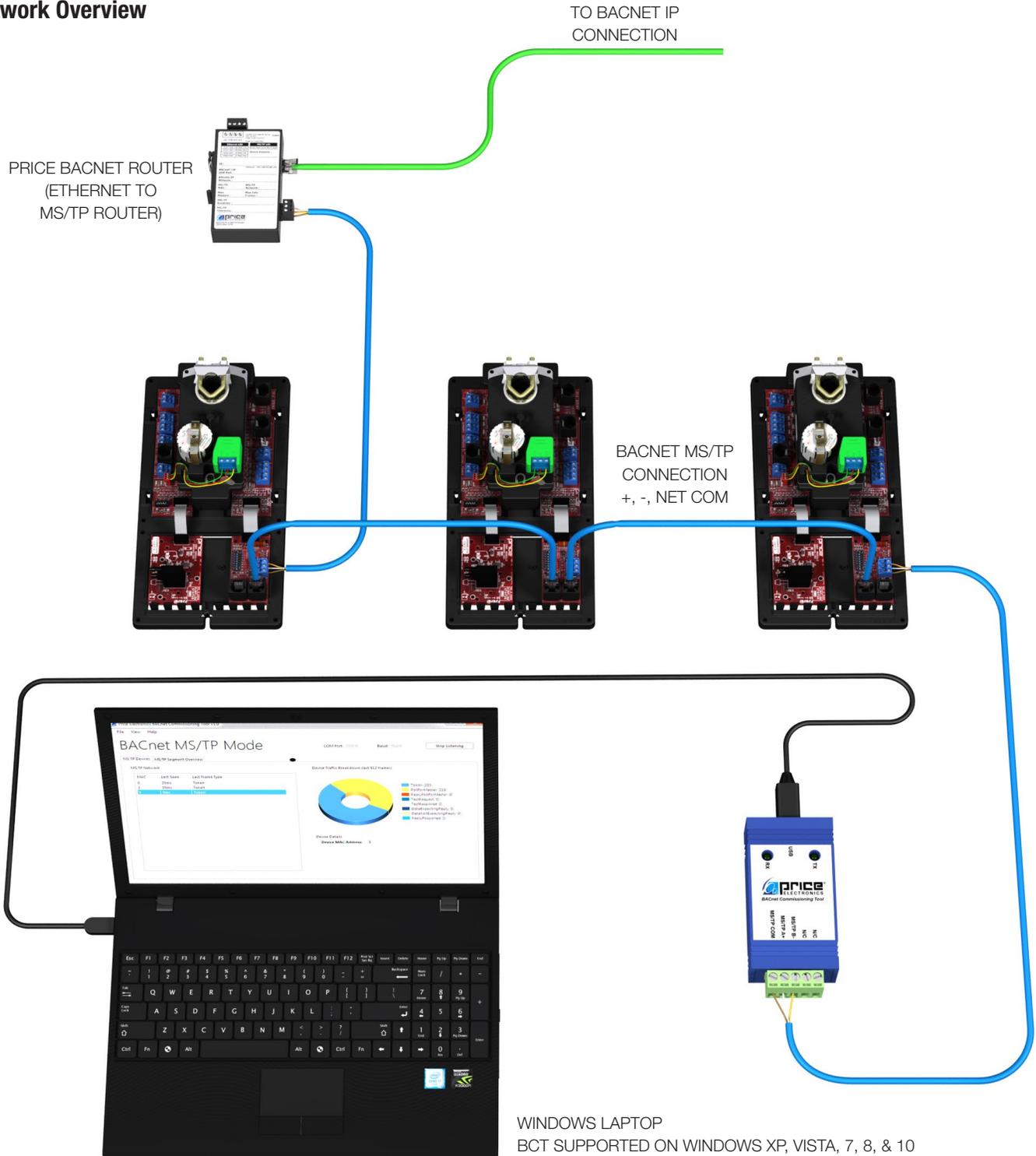
# BACNET COMMISSIONING TOOL

## PRODUCT OVERVIEW & STARTUP

### General

The BCT is used to help troubleshoot BACnet networks when the communication between devices is not sufficient. The BCT can scan a network and determine which devices are active and which devices are missing on a segment, making troubleshooting quick and easy. Ideally, you only need one BCT tool for the jobsite.

### Downloading the BCT Software

To use the BCT, you must first download and install the BACnet Commissioning Tool software from the Price website - www.priceindustries.com/resources/type/software

Once you have downloaded the program to your computer, you should find the BCT program on your Windows desktop.

### Connecting the BCT to a BACnet MS/TP Controller

Before running the BCT software, you need to connect to a BACnet device on a network segment so that you can see any activity on the network. Price provides a NETC12 (12ft. cable) to connect from the BCT tool to a BACnet device on the segment.

### Network Wire Specifications

For the BACnet MS/TP network specific wire is required. Do not use standard power or "thermostat" wire. This wire does not have the necessary requirements for digital communications. While it's possible it may work (temporarily) the network will be unreliable and not operating at optimal.

### BACnet MS/TP Wire type recommendations

- Use 1 balanced twisted pair

- Low capacitance (17pF or less)

- Plenum rated (FT6, CMP ratings)

- 100-120 ohm, Balanced

- (CAT5, CAT5E, CAT6 network cable has excellent specifications and will work in almost any BACnet MS/TP application.)

- Price recommends using the Orange Complement (+) and Orange (-) and Brown (NET COM) and Brown Complement (NET COM) wire pair from a standard CAT5 cable. Also pre-terminated CAT5 cables are available from Price.  Model code: NETC35 (35 ft plenum rated cable, terminated with RJ45 plugs, 568-B standard)

**WIRING** ▼

| | T568B Color | Pins on plug face (socket is reversed) |
|---|---|---|
| PIN 1 | white/orange stripe | |
| PIN 2 | orange solid | |
| PIN 3 | white/green stripe | |
| PIN 4 | blue solid | Pin Position |
| PIN 5 | white/blue stripe | 8 7 6 5 4 3 2 1 |
| PIN 6 | green solid | |
| PIN 7 | white/brown stripe | |
| PIN 8 | brown solid | |
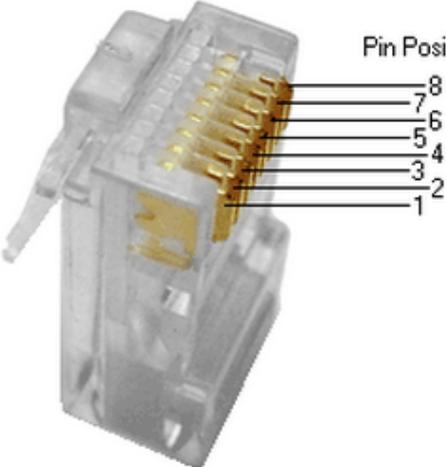
**NOTE:** Price cables are wired as 568-B standard.

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You will need to wire the provided NETC12 cable from Price to the BCT tool and then to a controller on segment.

1. Connect your CAT5E cable to the BCT device. Follow the wiring as described in the previous Network Work Specifications section (+, - and NET COM).

2. Connect your CAT5E cable to a controller on the network, following the same wiring convention in Step 1. Here you are tying into the MS/TP network of the segment.

3. Connect the provided USB cable to a USB port on your computer. From here you will run the BCT Commissioning software.

4. If this device is in the middle of the segment, you will need to remove one half of the network when connecting the BCT tool. This will divide the network in half so that you can see those devices.

   If this is a device at the end of the line (EOL), ensure that it remains connected to the network, and just connect the BCT tool.

### Running the BCT Software

After connecting the USB cable to your computer, click on the BCT tool icon to run the software that you previously downloaded from the Price website.

The interface will look like the screen shown here.

**MS/TP Devices** – this tab shows all of the devices that appear on the segment.

**MS/TP Segment Overview** – this tab shows a breakdown of the segment and the traffic analysis.

Ensure that the **Baud rate** is set to 76,800 for Price networks, or whatever the Baud rate is for the network.

**BCT WIRED TO PRICE INTELLIGENT CONTROLLER (PIC) ▼**
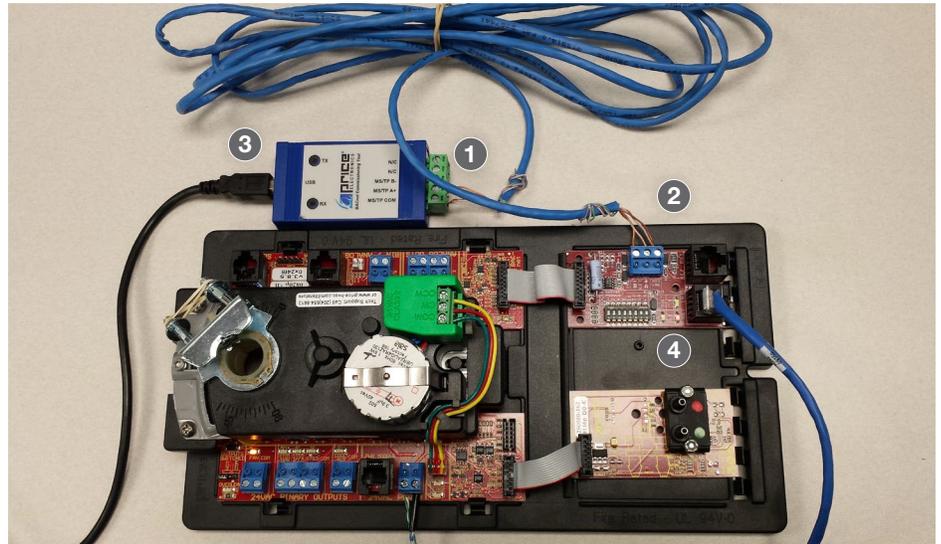


**BCT SOFTWARE SETUP SCREEN ▼**
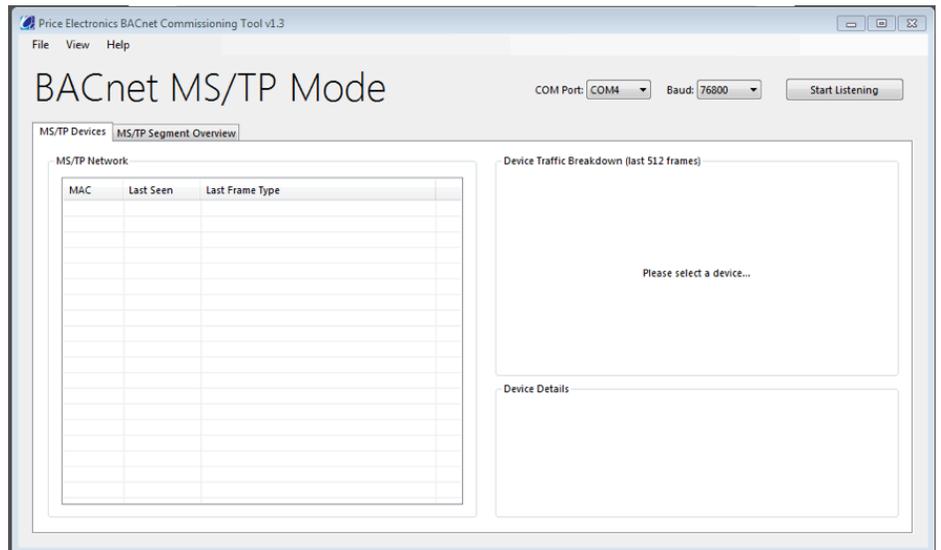


Price uses a default Baud rate of 76,800.

Ensure that the **COM Port** is set to the port that you plug the BCT tool into – for example, COM Port 4. Your laptop will have more than one USB/COM port on it.

Select the **Start Listening** button to activate the BCT scan function.

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Once you click the **Start Listening** button, you should see some activity on the network, as shown below under the MS/TP Devices tab. The BCT tool will list the MAC addresses of the devices found. If you don't see any devices on the network, you should at least see the address of the controller or device that you are connected to with the BCT tool, and further troubleshooting of the network would be required. You can also select a device found and a breakdown of the device traffic will show up on the right.

Take note of the time period in the Last Seen column. If any of the devices exceed 100ms, the device is taking longer than typical to respond on the network. A device will eventually fall off the network if it takes too long to respond. In the case of a PRTU that is polling devices, the device may still show up in the BCT, but may not be on the network for polling and would be indicated by a large time increment.

Next, click on the **MS/TP Segment Overview** tab. Select the number of devices that are on that segment – for example, 10 devices. While the BCT is listening, it will show some activity on the breakdown chart in the bottom left section.

Select the **Run Analysis** tab and it will detail all of the devices present as well as the missing devices. If you indicate that there should be 10 devices, but only 8 are found, the software will identify this for you. This is where this tool comes in handy and helps you troubleshoot the network and to see what devices, if any, are missing.

Once you have determined the status of your network, remove the BCT tool and reconnect the network as it was. If you have any devices missing from your network, you will need to go find them and figure out why they are not communicating on the MS/TP segment.

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## PRODUCT OVERVIEW & STARTUP

### Segment Traffic Breakdown:

If you hover over the legend in the segment traffic breakdown section, you will see a full description of what each item means.
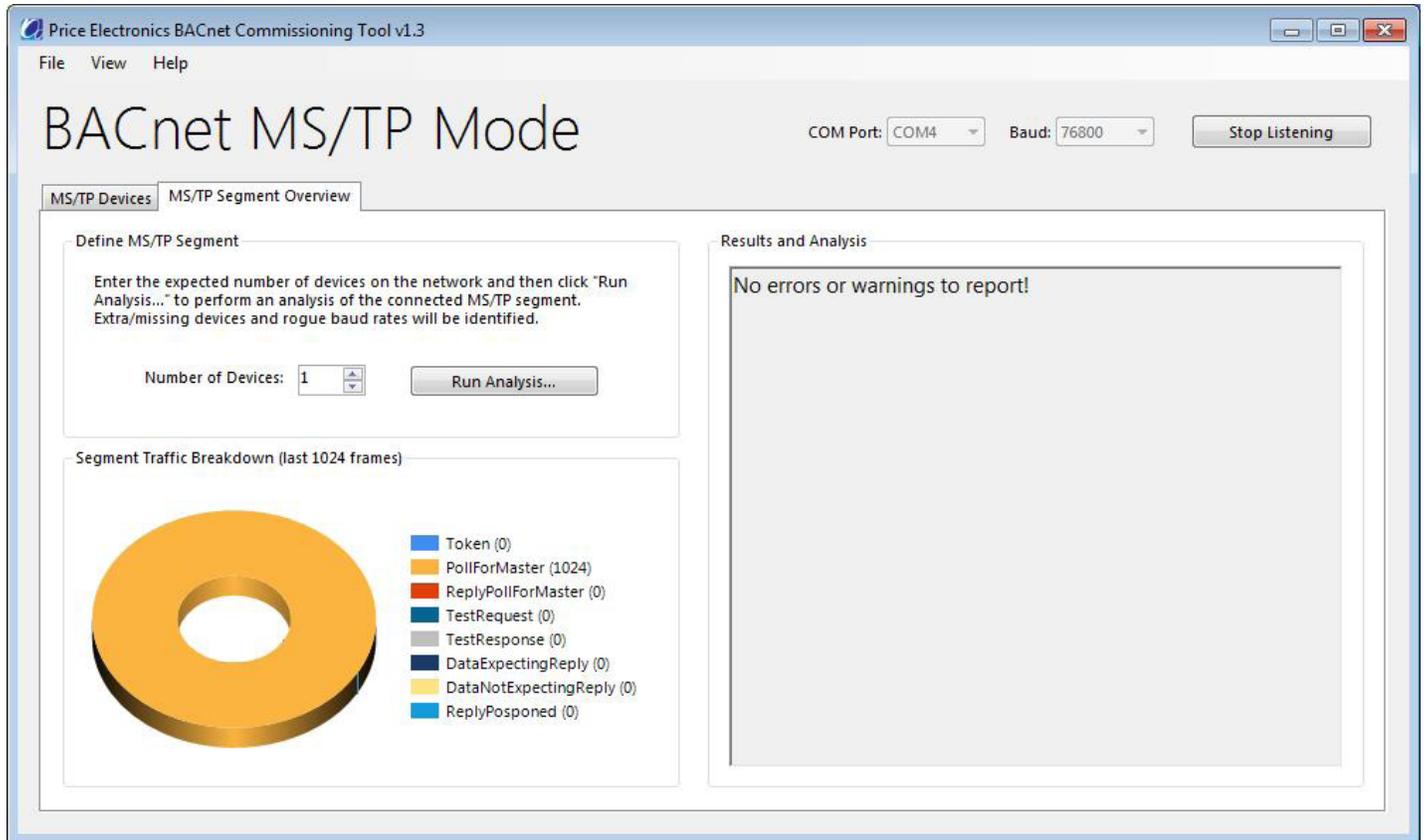


**Token**

**The Poll for Master** frame is transmitted by master nodes during configuration and periodically during normal network operations. It is used to discover the presence of other master nodes on the network and to determine a successor node in the token ring.

**The Reply for Master** frame is transmitted as a reply to the Poll for Master frame. It is used to indicate that the node sending the frame is requesting to enter the token ring.

**The Test Request** frame is used to initiate a loopback test of the MS/TP to MS/TP transmission path. This is rarely used.

**The Test Response** frame is used to reply to the Test Request Frames. This is rarely used.

**The Data Expecting Reply** frame is used by the master nodes to convey the data parameter of a DL_UNITDATA request whose DER parameters are TRUE. This typically indicates that a device is requesting data from another device on the network. High amounts of this frame type and Data Not Expecting Reply may indicate an overloaded MS/TP segment, causing slower response times to devices requesting data.

**The Data Not Expecting Reply** frame is used to convey the data parameter of the DL_UNITDATA request whose DER parameters are FALSE. This typically indicates that a device is responding to a Data Expecting Reply frame. High amounts of this frame type and Data Expecting Reply may indicate an overloaded MS/TP segment, causing slower response times to devices requesting data.

**The Reply Postponed** frame is used by master nodes to defer sending a reply to a previously received Data Expecting Reply frame.

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### Troubleshooting the Network

1.  Check all your 24 VAC HOT/COMMON polarities. While there ensure COMMON is EARTH GROUNDED.

2.  Ensure all MAC addresses are unique for that MS/TP segment. If you have two addresses that are the same that means two devices are talking at the same time, resulting in a bad network.

3.  Ensure all SOFTWARE (device instances) are unique for that BACnet network.

4.  Ensure all devices are running at the same Baud rate. The Price default is 76,800. Confirm this someone may have changed it.

5.  Chop network in half. Does it start to work? Keep chopping until network comes online. This will help narrow down the problem.

6.  Have more than 30 MS/TP devices on one segment? Not recommended. Break up that segment into separate ones with the Price MS/TP BACnet router.

7.  Have an MS/TP segment that goes over 1050 feet? This is not recommended; break up the segment and add another BACnet router.

8.  Check terminations and ensure that only [2] devices in total are terminated for that MS/TP segment; typically the router and the last device.

    **NOTE:** Price BACnet routers come factory set with the termination enabled by default.

9.  Do you have other BACnet (non Price) devices on the network? Remove them while troubleshooting. If they are causing issues put them on a separate MS/TP segment.

# BACNET COMMISSIONING TOOL

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