ProtoBeamer Gateway Series
DATA SHEET

BACnet-MS/TP And Modbus To BACnet/IP Gateway

The BACnet-MS/TP and Modbus-RTU To BACnet/IP Gateway, a BACnet-MS/TP and Modbus-RTU to BACnet/IP protocol converter product, from ProtoSense Technologies serves the industry needs for converging towards the ever popular BACnet standard and the widely used Ethernet networking standard. Presently in the Building Automation field there are diverse networking and protocol standards in use. The various networking and protocols standards have been and are being selected to suit the automation system needs specific to a building, factory etc. But the latest trend and actually a necessity in today's business environment is to have all these different control systems talking different protocols to be integrated in one central system which could be a Building Management System(BMS), SCADA or HMI. The ProtoBeamer products enables system integrators and control system designers to converge various physical and data-link layer standards(like RS-485, Low-Power Wireless) and application layer protocol standards(like Modbus, ZigBee, M-Bus etc.) to BACnet protocol which is becoming a de-facto standard in the BMS/BAS area.

The BACnet-MS/TP to BACnet/IP Gateway product enables integrating BACnet-MS/TP protocol based controller devices(like VAV controllers) into a BACnet/IP system. The Gateway then makes the BACnet objects in these BACnet-MS/TP controller devices available as BACnet objects belonging to a BACnet/IP Device Server.

The Modbus-RTU to BACnet/IP Gateway product enables integrating Meter/Controller devices which talk Modbus-RTU protocol into a BACnet/IP system. The Gateway then makes the data-points in these Modbus-RTU slave devices available as BACnet objects belonging to a BACnet/IP Device Server.

A BACnet/IP Client, normally as part of a PC/Server/DDC based BMS software, can access these objects in the BACnet/IP Device Server to indirectly read/write to the corresponding BACnet-MS/TP device's objects and Modbus device's data-points.

FEATURES

- Embedded fan-less and rugged system for industrial applications.
- Compact aluminum enclosure with provisions for both DIN-rail and wall mounting.
- Support for both 24V DC and 24V AC power source.
- Minimal power consumption design at the given CPU speed.
- Fast, efficient and full-featured BACnet protocol stack.
- Two isolated serial ports provides for reliable field connections.
- Each RS-485 serial port allows connecting up to 31 field devices.
- Serial ports Baudrate support:
  Modbus-RTU(Port2 Only): 9600, 19200, 38400.
  BACnet-MS/TP(Port2 and/or Port3): 19200, 38400, 57600 and 115200.
- Easy to use Windows based GUI configuration tool with support for Excel spreadsheet template based Gateway configuration file import.
- Web based UI for status and statistics display.

Technical Specifications

HARDWARE PLATFORM

- SoC with CPU core running at 400 MHz.
- 128 MB RAM and 512 MB Flash.
- Watchdog timer for reliable operation.
- Battery backed Real-Time Clock.

SOFTWARE PLATFORM

- Real-time Embedded Operating System.
- Multi-threaded and fast response application architecture.
- Embedded Web Server

COMMUNICATION PORTS

- Isolated RS-485 serial ports with built-in ADDC support.
  - ✓ Isolation barrier withstands 2500V_{RMS} for 1 minute.
  - ✓ +/- 15kV ESD protection.
- 10/100 Mbps Ethernet port.
- Phoenix-Contact Screw-terminal connectors for easy connection.

USER INTERFACE

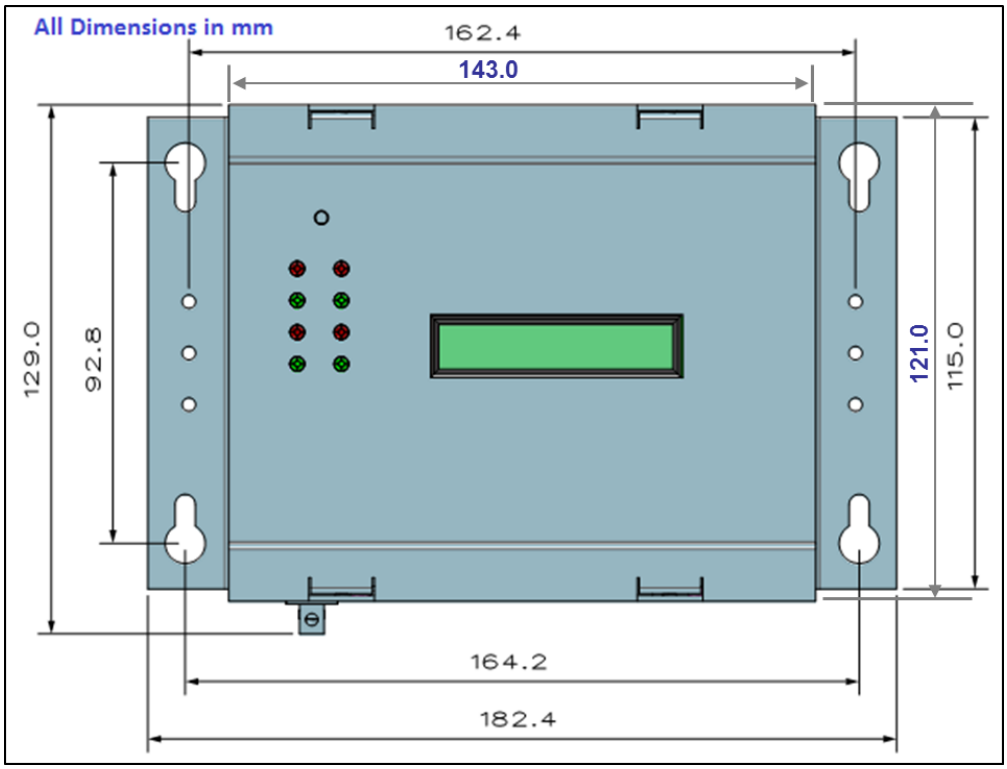
- Rx and Tx activity status LEDs for each RS-485 serial port.
- Push-button for easy 'Reset to factory defaults' operation.

POWER SUPPLY

- 12 to 28V DC, 180mA@24V DC.
- 24V AC , 180mA_{RMS}. So a 24V AC single-phase transformer with a minimum 5VA output rating is required if only one Gateway device is connected to this transformer.
- Screw-terminal connector.

MECHANICAL

- Aluminum enclosure with DIN-rail and wall-mount options.
- Dimensions: 143mm x 121mm x 65mm (Width x Height x Depth).
- Good EMI protection and EMC adherence.



ENVIRONMENTAL

- Operating (ambient) temperature: 0 to 40 degree Celsius.
- Humidity: 10-90% non-condensing.

PROTOCOL SPECIFICATIONS

BACnet/IP Device Server Services

Object and Device Access Services

- ✓ ReadProperty
- ✓ ReadPropertyMultiple
- ✓ WriteProperty
- ✓ WritePropertyMultiple
- ✓ SubscribeCOV
- ✓ GetAlarmSummary
- ✓ Who-Is
- ✓ TimeSyncronization
- ✓ UTCTimeSyncronization
- ✓ Bi-directional Segmentation support

Supported Object Properties

- ✓ Present Value
- ✓ Reliability
- ✓ Event State
- ✓ Status Flags

BACnet-MS/TP And BACnet/IP Object Types Supported

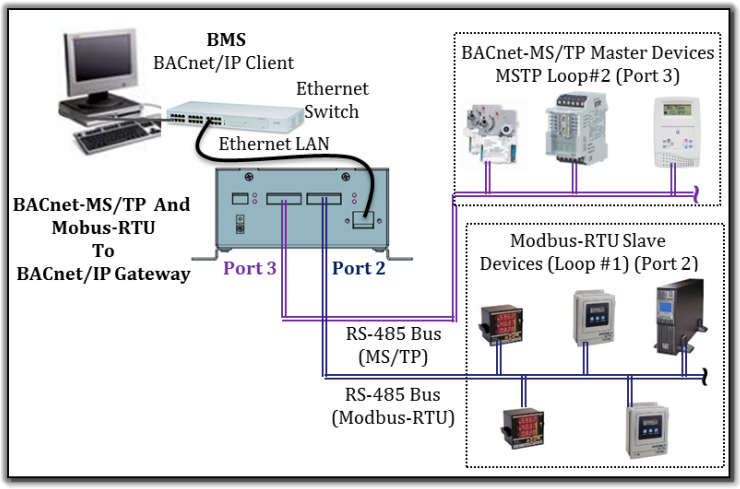
- ✓ Analog Input/Analog Output/Analog Value
- ✓ Binary Input/Binary Output/Binary Value
- ✓ Multi-state Input/Multi-state Output/Multi-state Value

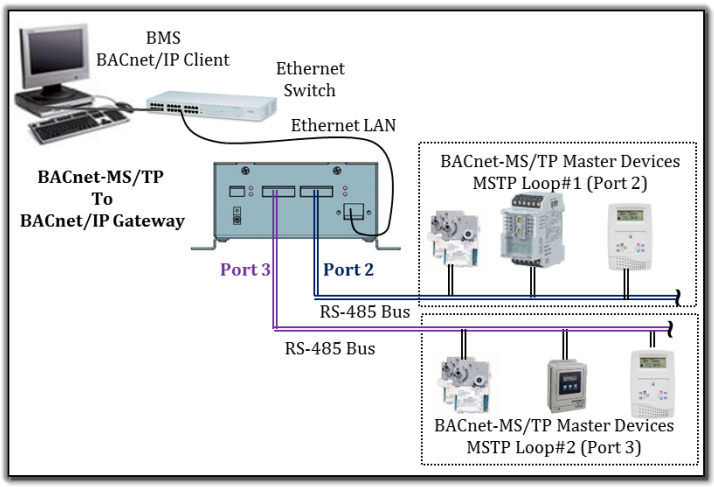
Modbus Services Supported

Data-point Access Services

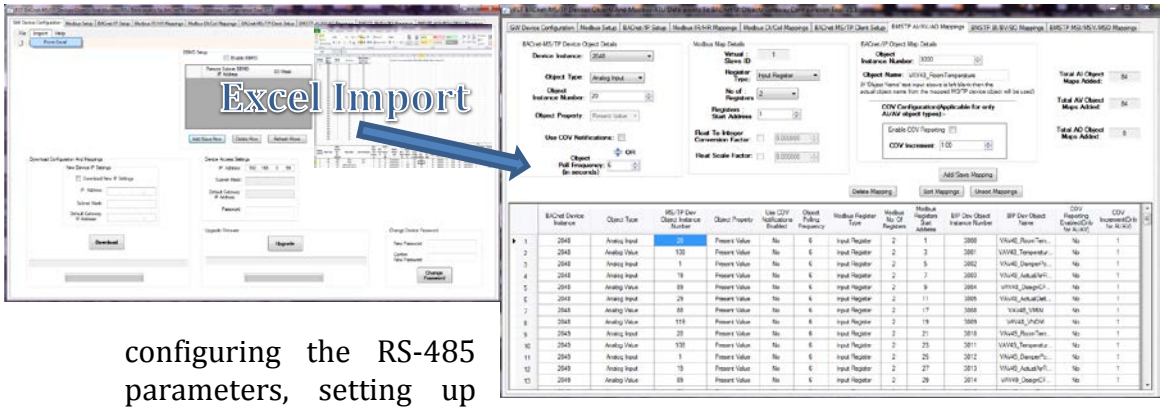
- ✓ Read Coils (FC 0x01)
- ✓ Read Discrete Inputs (FC 0x02)
- ✓ Read Holding Registers (FC 0x03)
- ✓ Read Input Registers (FC 0x04)
- ✓ Write Single Coil (FC 0x05)
- ✓ Write Single Register (FC 0x06)
- ✓ Write Multiple Coils (FC 0x0F)
- ✓ Write Multiple Registers (FC 0x10)

Product Information & Ordering





A typical application scenario involving integration of both Modbus-RTU(Port2 only) and BACnet-MS/TP devices into BACnet/IP based BMS is shown in the left picture above. Another typical application scenario involving integration of only BACnet-MS/TP devices into BACnet/IP based BMS is shown in the right picture above. The Modbus-RTU Master driver in the Gateway accesses the Modbus-RTU slave devices as per the Modbus protocol. The BACnet/IP Device Server in the Gateway makes all the mapped data-points accessed from all the configured Modbus-RTU slave devices as the corresponding object instances in a BACnet/IP device. Similarly all the mapped objects from all the configured BACnet-MS/TP devices are made available as corresponding object instances in the same BACnet/IP device. This BACnet/IP device server, running in the Gateway, is then accessed by any BACnet/IP BMS Client software and use it to indirectly read/write to the data-points in the Modbus-RTU devices and mapped object instances in the BACnet-MS/TP devices. That is, the Gateway device works as a Data Concentrator thereby allowing a BMS efficient access to field devices.



The Gateway product is supplied with a Windows PC based configuration tool called Gateway Configuration Utility(GCU). The GCU tool provides for serial port channel configuring the RS-485 parameters, setting up the BACnet Device Server instance and either manually mapping BACnet-MS/TP an Modbus device data-points to the corresponding BACnet/IP object instances or importing mapping & configuration details from an Excel spreadsheet template based configuration file.

Some extended features provided by the BACnet/IP Device Server are Bi-directional Segmentation, BBMD function and COV Notifications. Other useful features are Bit-Unpacking for Modbus bit-packed data-points, conversion and scaling for Modbus analog data-points and Modbus Combo-Bits packed data-points binary value parsing.

A bonus feature of the GCU tool is the built-in BACnet/IP Client function using which the BACnet object property values can be retrieved from the BACnet Gateway. The tool also provides for saving the configuration/mappings into a file, download the configuration/mappings into the Gateway on-the-fly, Gateway firmware remote upgrade and changing the device IP Address and Password.

Product Type	Product Code
BACnet/IP Gateway for BACnet-MS/TP and Modbus-RTU devices with 2 isolated RS-485 ports and 1000 points mappings.	GW-BMSTP-RTU1-BIP

For more information please contact:
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