

M2S_TNG15_Thermostat

**Protocol Implementation Conformance Statement
For
M2S_TNG15_Thermostat**

Version: 1.4

Date: 30th Oct. 2018



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Document Revision

Date	Version	Comments
5 th July 2018	0.1	Initial Draft version.
9 st July 2018	0.2	Added chapters and PICs details.
12 th July 2018	0.3	Updated the document as per review comments.
18 th July 2018	1.0	First release version.
25 th July 2018	1.1	Updated as per M2S review comments.
31 st July 2018	1.2	<ul style="list-style-type: none">Removed Calendar ObjectUpdated sec 2.4
8 th Oct 2018	1.3	Removed Description property from all objects
30 th Oct 2018	1.4	<ul style="list-style-type: none">Changed product namechanged application version numberChanged "Location" to writable

Table of Contents

1	INTRODUCTION	3
1.1	PRODUCT DESCRIPTION	3
1.2	PURPOSE AND SCOPE	3
1.3	ABBREVIATIONS / TERMS	3
2	TNG15 THERMOSTAT SYSTEM PICS	4
2.1	PRODUCT INFORMATION	4
2.2	BACNET STANDARDIZED DEVICE PROFILE (ANNEX L)	4
2.3	BACNET INTEROPERABILITY BUILDING BLOCKS SUPPORTED (ANNEX K)	4
2.4	STANDARD OBJECT TYPES SUPPORTED	5
2.5	STANDARD OBJECT TYPES DESCRIPTION	5
2.5.1	DEVICE	5
2.5.2	ANALOG INPUT	6
2.5.3	ANALOG VALUE	7
2.5.4	BINARY VALUE	8
2.5.5	MULTI-STATE VALUE	8
2.5.6	SCHEDULE	9
2.6	SEGMENTATION CAPABILITY	10
2.7	DATA LINK LAYER OPTIONS	10
2.8	DEVICE ADDRESS BINDING	10
2.9	NETWORKING OPTIONS	10
2.10	CHARACTER SETS SUPPORTED	10
2.11	NETWORK SECURITY OPTIONS	11

1 Introduction

1.1 Product Description

M2S plans to implement support for BACnet in TNG15 Thermostat system to be able to communicate with third party Building Management Systems (BMS). M2S would like to develop a BACnet MS/TP application to extend monitoring and control capabilities of TNG15 Thermostat system over BACnet compliant BMS.

1.2 Purpose and Scope

Purpose of this document is to provide protocol implementation conformance statement i.e. PICS for TNG15 Thermostat system.

1.3 Abbreviations / Terms

Abbreviation	Description
PICS	Protocol Implementation Conformance Statement
BMS	Building Management System
MS/TP	Master Slave Token Passing
B-ASC	BACnet Application Specific Controller
UTC	Coordinated Universal Time
APDU	Application Protocol Data Unit
COV	Change Of Value
IP	Internet Protocol
ISO	International Organization for Standardization
ANSI	American National Standards Institute
UTF	Unicode Transformation Format

Table 1: Abbreviations

2 TNG15 Thermostat system PICS

2.1 Product Information

Vendor Name	M2S Electronics
Product Name	TX COMMERCIAL
Product Model Number	TNG15-S T070AA
Application Software Version	1.01
Firmware Revision	1.0.8.237
BACnet Protocol Revision	14

Table 2: Product Information

2.2 BACnet Standardized Device Profile (Annex L)

BACnet device profile supported by TNG15 Thermostat system is mentioned below.

- BACnet Application Specific Controller (B-ASC)

2.3 BACnet Interoperability Building Blocks Supported (Annex K)

BACnet BIBBs supported by TNG15 Thermostat system are mentioned in below table.

Services	BIBBs Description	BIBBs
Data Sharing	Data Sharing – Read Property –B	DS-RP-B
	Data Sharing – Read Property Multiple –B	DS-RPM-B
	Data Sharing – Write Property –B	DS-WP-B
	Data Sharing – WriteProperty Multiple –B	DS-WPM-B
	Data Sharing Change of Value – B	DS-COV-B
Scheduling	Scheduling-Weekly Schedule Internal-B	SCHED-WS-I-B
Device and Network Management	Device Management – Dynamic Device Binding –B	DM-DDB-B
	Device Management – Dynamic Object Binding –B	DM-DOB-B
	Device Management – Time Synchronization – B	DM-TS-B
	Device Management – UTC Time Synchronization – B	DM-UTC-B
	Device Management – Device Communication Control –B	DM-DCC-B

Table 3: Supported BIBBs

2.4 Standard Object Types Supported

TNG15 Thermostat system does not support dynamic creation and deletion of objects.

2.5 Standard Object Types Description

Object properties supported in respective object types are mentioned in this section.

Details of abbreviations/codes used in “Conformance Code” column are as mentioned below:

- “R” means “Required”
- “O” means “Optional”

Some optional properties are required for specific BACnet services or functionalities. For details, refer BACnet standard.

Details of abbreviations/codes used in “Access Type” column are as mentioned below:

- “W” means “Writable”
- “R” means “Read-Only”
- “W/C” means “Conditionally Writable”
- “C” means “Commandable”

If not stated otherwise, the following statements apply to all supported BACnet object types:

- No additional conditionally writable properties (other than the ones required by this standard) are supported
- No proprietary properties are implemented

2.5.1 Device

Device object properties supported in TNG15 Thermostat system are mentioned in below table.

#	Property Type	Conformance Code	Access Type
1	Object-Identifier	R	W
2	Object-Name	R	R
3	Object-Type	R	R
4	System-Status	R	R
5	Vendor-Name	R	R
6	Vendor-Identifier	R	R
7	Model-Name	R	R
8	Firmware-Revision	R	R
9	Application-Software-Version	R	R
10	Protocol-Version	R	R
11	Protocol-Revision	R	R

#	Property Type	Conformance Code	Access Type
12	Protocol-Services-Supported	R	R
13	Protocol-Object-Types-Supported	R	R
14	Object-List	R	R
15	Max-APDU-Length-Accepted	R	R
16	Segmentation-Supported	R	R
17	APDU-Timeout	R	W
18	Number-Of-APDU-Retries	R	W
19	Max-Master	R	R
20	Max-Info-Frames	R	R
21	Device-Address-Binding	R	R
22	Database-Revision	R	R
23	Local-Date	O	R
24	Local-Time	O	R
25	UTC-Offset	O	W
26	Daylight-Saving-Status	O	W
27	Location	O	W
28	Active-COV-Subscriptions	O	R
29	Property-List	R	R

Table 4: Device Object Properties

2.5.2 Analog Input

Analog Input object properties supported in TNG15 Thermostat system are mentioned in below table.

#	Property Type	Conformance Code	Access Type
1	Object-Identifier	R	R
2	Object-Name	R	R
3	Object-Type	R	R
4	Present-Value	R	R
5	Status-Flags	R	R

#	Property Type	Conformance Code	Access Type
6	Event-State	R	R
7	Out-Of-Service	R	W
8	Units	R	R
9	Min-Pres-Value	O	R
10	Max-Pres-Value	O	R
11	Resolution	O	R
12	COV-Increment	O	R
13	Property-List	R	R

Table 5: Analog Input Object Properties

2.5.3 Analog Value

Analog Value object properties supported in TNG15 Thermostat system are mentioned in below table.

#	Property Type	Conformance Code	Access Type
1	Object-Identifier	R	R
2	Object-Name	R	R
3	Object-Type	R	R
4	Present-Value	R	W
5	Status-Flags	R	R
6	Event-State	R	R
7	Out-Of-Service	R	W
8	Units	R	R
9	Min-Pres-Value	O	R
10	Max-Pres-Value	O	R
11	Resolution	O	R
12	COV-Increment	O	R
13	Priority-Array	O	R
14	Relinquish-Default	O	R
15	Property-List	R	R

Table 6: Analog Value Object Properties

2.5.4 Binary Value

Binary Value object properties supported in TNG15 Thermostat system are mentioned in below table.

#	Property Type	Conformance Code	Access Type
1	Object-Identifier	R	R
2	Object-Name	R	R
3	Object-Type	R	R
4	Present-Value	R	W
5	Status-Flags	R	R
6	Event-State	R	R
7	Out-Of-Service	R	W
8	Priority-Array	O	R
9	Relinquish-Default	O	R
10	Property-List	R	R

Table 7: Binary Value Object Properties

2.5.5 Multi-state Value

Multi-state Value object properties supported in TNG15 Thermostat system are mentioned in below table.

#	Property Type	Conformance Code	Access Type
1	Object-Identifier	R	R
2	Object-Name	R	R
3	Object-Type	R	R
4	Present-Value	R	W
5	Status-Flags	R	R
6	Event-State	R	R
7	Out-Of-Service	R	W
8	Number-Of-States	R	R
9	Priority-Array	O	R
10	Relinquish-Default	O	R
11	Property-List	R	R

Table 8: Multi-state Value Object Properties

2.5.6 Schedule

Schedule object properties supported in TNG15 Thermostat system are mentioned in below table.

#	Property Type	Conformance Code	Access Type
1	Object-Identifier	R	R
2	Object-Name	R	R
3	Object-Type	R	R
4	Status-Flags	R	R
5	Present-Value	R	R
6	Effective-Period	R	W
7	Weekly-Schedule	O	W
8	Schedule-Default	R	W
9	List-Of-Object-Property-References	R	R
10	Priority-For-Writing	R	W
11	Reliability	R	R
12	Out-Of-Service	R	W
13	Property-List	R	R

Table 9: Schedule Object Properties

2.6 Segmentation Capability

- Able to transmit segmented messages Window Size _____
- Able to receive segmented messages Window Size _____

2.7 Data Link Layer Options

BACnet data link layer options supported TNG15 Thermostat system are mentioned below.

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s)
- MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400
- MS/TP slave (Clause 9), baud rate(s):
- Point-To-Point, EIA 232 (Clause 10), baud rate(s):
- Point-To-Point, modem, (Clause 10), baud rate(s):
- LonTalk, (Clause 11), medium:
- BACnet/ZigBee (Annex O)
- Others

2.8 Device Address Binding

Is static device binding supported?

(This is currently necessary for two-way communication with MS/TP slaves and certain other devices.)

- Yes
- No

2.9 Networking Options

Networking options supported by TNG15 Thermostat system are mentioned below.

- Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
- Annex H, BACnet Tunneling Router over IP.

2.10 Character Sets Supported

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- ANSI X3.4 i.e. ISO 10646 (UTF-8)
- JIS X0208
- IBM™/Microsoft™ DBCS
- ISO 10646 (UCS-4)
- ISO 10646 (UCS-2)
- ISO 8859-1

2.11 Network Security Options

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- Non-secure Device - is capable of operating without BACnet Network Security
- Secure Device - is capable of using BACnet Network Security (NS-SD BIBB)
- Multiple Application-Specific Keys
- Supports encryption (NS-ED BIBB)
- Key Server (NS-KS BIBB)