Model 8800 Communicating Thermostat Programmer's Manual

READ AND SAVE THESE INSTRUCTIONS

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INTRODUCTION

This document contains information needed to write interface code for the Aprilaire Model 8800 Communicating Thermostat. For wiring and thermostat setup refer to the 8800 System Installation Manual (RPC part no. 10009416).

PROTOCOL

The proprietary ASCII protocol is for communication between a Host controller and up to 64 Model 8800 Communicating Thermostats. The protocol is based upon the Model 8870 Communicating Thermostat protocol, but has an expanded command set to utilize the additional features of the Model 8800 Communicating Thermostat.

SYSTEM INTERFACE

The System Network communication interface is a non-isolated, 4-wire, full-duplex RS-485 communication link. The 'A' terminals are transmit (reference automation system) and the 'B' terminals are the receive pair (reference automation system). The baud rate is 9,600 bps by default. It can be changed using the user interface (See Setup Screens) or through a command from the Host controller. When the baud rate is changed, the protocol timing is scaled as well.

TIMING AND SYNCHRONIZATION

The protocol uses time division multiple access (TMDA) to allow each node to have exclusive control of the receive lines of the Host controller for a specified duration.

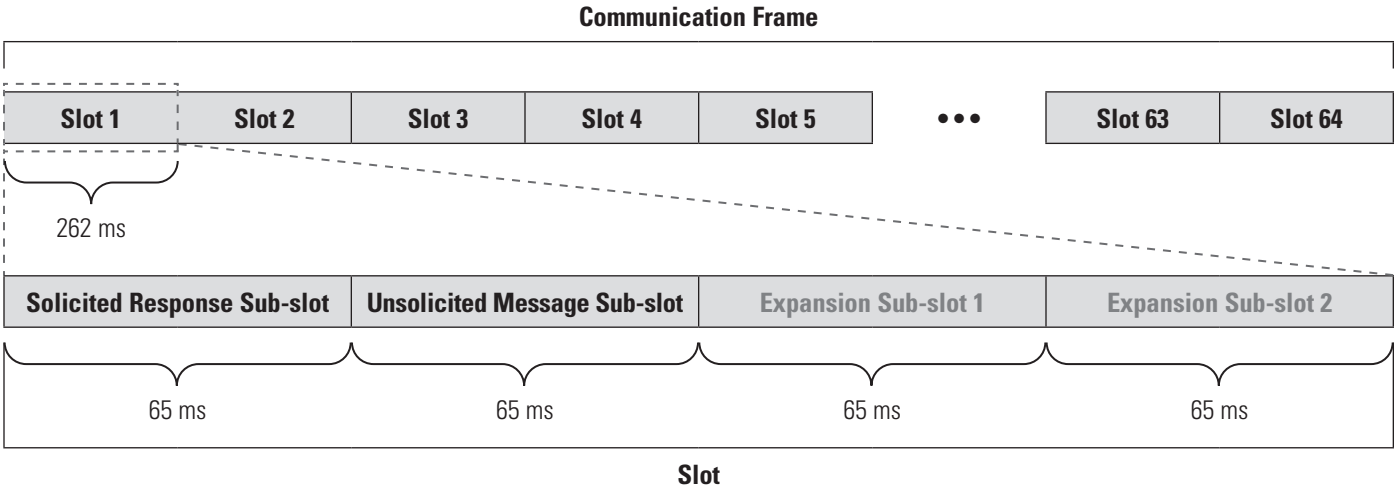
The communication frame is divided into a maximum of 64 time slots. The number of time slots are based on the setting for number of thermostats on the network. The default setting is 64. Each slot is divided into four sub-slots. Legacy timing is based on 16-bit timer running at 1MHz (e.g. 65536 * 1/1MHz = 65.536 ms).

Baud Rate	Slot Width	Sub-slot Width
9,600	262.144 ms	65.536 ms
19,200	131.072 ms	32.768 ms

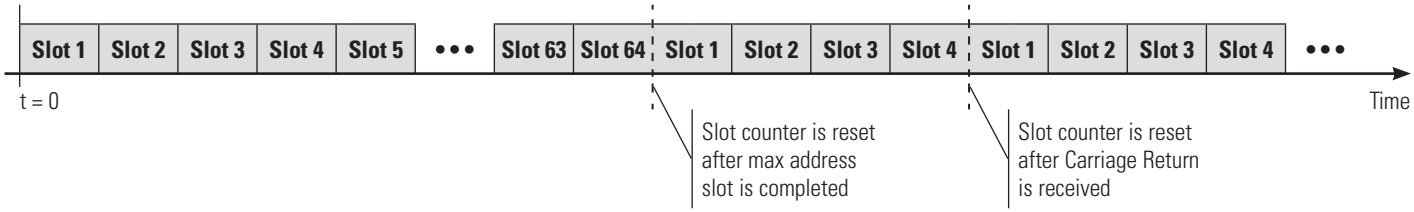
The four sub-slots of a slot are:

Sub-slot	Name	Description
1	Solicited Response Sub-slot	For a node to respond to a Host command
2	Unsolicited Message Sub-slot	For a node to send an unsolicited message to the Host
3	Expansion Sub-slot 1	Reserved
4	Expansion Sub-slot 2	Reserved

The following figure depicts the communication frame and slot divisions. (NOTE: Timing shown is for 9,600 bps and is rounded for illustrative purposes.)



In a TDMA system, all thermostats and the Host controller must be synchronized to ensure proper timing for control of the Host controller's receive lines. This is accomplished by synchronizing on the receipt of the Carriage Return <CR> character. Upon receipt of the <CR> character, each connected node resets its communication timer, slot counter and frame counter, regardless of message syntax or content. The node may not begin sending unsolicited messages until a carriage return is received and synchronization has occurred. In addition, the Host controller transmits a <CR> every 12 hours to ensure accurate synchronization. Also, upon completion the last slot (maximum address), the Communication Frame resets, setting the slot counter to 1, and the cycle repeats. The following figure depicts slot timing with and without receipt of a carriage return.



NOTE: The number of slots shown is based on the max number of thermostats and thus a max address of 64. Applications with a lower max node address restarts the slot counter after the max address slot has completed.

HOST MESSAGE TYPES

Host controller message transmissions are not governed by slot timing since the Host controller is the only device on its respective transmit line. The Host controller does however need to meet specific timing to prevent missed commands and collisions. Command timing is determined by the type of response as follows:

RESPONSE EXPECTED

When a response to an Explicit Address Command is desired, **slot width + sub-slot width** time must elapse after issuing an Explicit Address Command before issuing a second command to the same node.

When a response to a Global Address Command is desired, **slot width * max node address** time must elapse after issuing a Global Address Command before issuing a second command when a response is desired.

NO RESPONSE EXPECTED

When no response to either an Explicit Address Command or Global Address Command is desired, **slot width + sub-slot width** time must elapse after issuing either command before issuing a second command to the same node.

NODE MESSAGE TYPES

There are three node message types. Each message type has a specific time for the node to transmit a message. The three message types are as follows:

1. Explicit Address Command Response
2. Global Address Command Response
3. Unsolicited Message

As shown in the figure below, during the n^{th} slot the n^{th} node responds to a global or explicit address command during the first sub-slot and/or sends an Unsolicited Message during the second sub-slot.

Slot *n*

Address *n* Global or Explicit Response Sub-slot	**Address *n* Unsolicited Message Sub-slot**	**Expansion Sub-slot 1**	**Expansion Sub-slot 2**

EXPLICIT ADDRESS COMMAND RESPONSE

Explicit Address Commands are commands sent by the Host controller to a single node at a specific address. Upon receipt of a completed Explicit Address Command from the Host controller (including the <CR>), each node determines if it is the addressee of the command. If the node is not the addressee of the command, the command is discarded. If the node is the addressee of the command, it interprets and executes the command and then prepares a response for the Host controller (depending on the command response control setting C1 – C19).

The command response (if required by the command response control setting) is transmitted by the node during the Solicited Response Sub-slot of the slot. Since the communication timing and control variables are reset upon receipt of the <CR> from the Host controller, Slot 1 and the Solicited Response Sub-slot are the currently active slot and sub-slot. As such, if the explicit address command was for node 1, the node may begin transmitting the response immediately after the command is received. The entire response must be transmitted within the Solicited Response Sub-slot of the slot. (Maximum bytes per response: 62 = 65ms * 10 / 9600.)

GLOBAL ADDRESS COMMAND RESPONSE

Global Address Commands are commands sent by the Host controller to all thermostats. Upon receipt of a completed Global Address Command from the Host controller (including the <CR>), each node determines that the command is a global command. Each node interprets and executes the command and then prepares a response for the Host controller (depending on the command response control setting C1 – C19).

The command response (if required by the command response control setting) is transmitted by the node during the Solicited Response Sub-slot of Slot *n*, where *n* is the node address. Since the communication timing and control variables are reset upon receipt of the <CR> from the Host controller, each node must wait for its respective slot before transmitting its response. The slot time from the reset caused by the <CR> synchronization can be calculated using the following equation:

$$t = (n-1) \times (\text{slot width})$$

Where *n* is the node address and slot width is the duration of a slot based on the baud rate.

The node may begin transmitting the response once the communication timer matches the calculated time *t,* which corresponds to the start of the Solicited Message Sub-slot of its respective slot. The entire response must be transmitted within the Solicited Response Sub-slot. (Maximum bytes per response: 62 = 65ms * 10 / 9600.)

UNSOLICITED MESSAGE

Unsolicited Messages are messages sent by the node to the Host controller when a Change-of-State (COS) is detected. Change of State responses are sent by the node so that the Host controller need not poll each node to determine if any node control variable change has occurred.

An Unsolicited Message is transmitted by the node during the Unsolicited Response Sub-slot of Slot *n*, where *n* is the node address. Slot timing is synchronized upon a previous receipt of a <CR>. Each node must wait for its respective slot and sub-slot before transmitting its response. The transmit time from the last synchronization or Communication Frame restart (start of Slot 1) can be calculated using the following equation:

$$t = (n-1) \times (\text{slot width}) + (\text{sub-slot width})$$

Where *n* is the node address and *slot width* and *sub-slot width* are the durations of a slot and sub-slot, respectively, based on the baud rate.

The node may begin transmitting the message once the communication timer matches the calculated time *t,* which corresponds to the start of the Unsolicited Message Sub-slot of its respective slot. The entire response must be transmitted within the Unsolicited Response Sub-slot. (Maximum bytes per response: 62 = 65ms * 10 / 9600.)

COMMAND SYNTAX

The Model 8800 Communicating thermostat command set includes the Model 8870 Communicating thermostat commands with the addition of a subset of commands for programmable thermostat functionality and general feature enhancements.

HOST COMMAND SYNTAX

The Host controller has two types of commands: query and assignment. Each of these command types has a specific syntax. Command syntax is not case sensitive. All commands begin with SN.

A query type command has the following syntax:

```
SN[#][command]?<CR>
```

An assignment type command has the following syntax:

```
SN[#][command]=[value]<CR>
```

The following table details each component of the command syntax:

Identifier	Descriptor	Description
SN	Command start	First two characters of all commands.
[#]	Address	Explicit Address Commands immediately follow SN with the address [#]. The address range is 1 – 64 and corresponds to the thermostat address. Single-digit addresses may be sent as a two-digit address by prepending the address with a zero.
		Global Address Commands may follow SN with the address zero (0) or the address may be omitted entirely.
[Command]	Command name	See Command Table for list of commands.
?	Query	Indicates a query type command.
=	Assignment	Indicates an assignment type command. (Always immediately followed by [value]).
[value]	Assignment value	Value for assignment type command.
<CR>	Command terminator	All commands are terminated with the carriage return character.

NOTE: Following the initial SN[#] syntax, the space character may be used to separate the components of the command for readability and clarity with the exception of =[value].

NODE MESSAGE SYNTAX

A node message is in the form of a command response or an unsolicited message. The node has three message syntaxes which are determined by the command and if a name has been assigned. All messages are upper case and only use the space character to separate the address and command and within the assignment value (i.e. after the equals sign). Commands that cannot be interpreted are ignored. There is no error response message.

For short messages, the following syntax is used:

```
SN[#]  [command]=[value]<CR>
```

In addition, if a location name is assigned, the following syntax is used:

```
SN[#][name]  [command]=[value]<CR>
```

For the NAME command response, the following syntax is used:

```
SN[#]  [value]<CR>
```

The following table details each component of the message syntaxes:

Identifier	Descriptor	Description
SN	Message start	First two characters of all messages.
[#]	Address	Node address.
[name]	Thermostat name	Thermostat location name.
[Command]	Command name	See Command Table for list of commands.
=	Assignment	Used to show assignment of the variable referenced by the command.
[value]	Variable value	Value of the variable referenced by the command.
<CR>	Message terminator	All messages are terminated with the carriage return character.

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COMMAND DETAILS

Default values are in **bold**.

THERMOSTAT CONFIGURATION COMMANDS

EQUIPCONFIG	Thermostat node equipment configuration settings	COS:NA
Permissions: Read only		
Query Command	Syntax: `SN[#] EQUIPCONFIG?<CR>` Description: Requests the thermostat master/slave, gas/electric, number of stages and equipment type settings.	
Response	Syntax: `SN[#] EQUIPCONFIG=[w][x][y][z]<CR>` Example: `SN1 EQUIPCONFIG=0101<CR>` Node address 1 responds with slave, gas, single and heat/cool settings.	

Parameters	Range
`w:` master or slave code	[0 – 1]
`0: slave`	
`1:` master	
`x:` gas or electric heating code	[0 – 1]
`0:` electric	
`1: gas`	
`y:` single or multi stage code	[0 – 1]
`0: single`	
`1:` multi	
`z:` heat pump or heat/cool equipment type code	[0 – 1]
`0:` heat pump	
`1: heat/cool`	

The equipment type is selected using the HP/HC option switch. The master/slave setting is always set to slave and cannot be modified.

EQUIP	Additional thermostat equipment configuration settings	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] EQUIP?<CR>` Description: Requests the thermostat control setup, auxiliary stages and extended fan settings.	
Response	Syntax: `SN[#] EQUIP=[x][y]<CR>` Example: `SN1 EQUIP=01<CR>` Node address 1 responds with heat and cool control setup and 1 auxiliary stage settings.	

Parameters	Range
`x:` control setup code	[0 – 2]
`0: heat and cool`	
`1:` heat only	
`2:` cool only	
`y:` auxiliary heat stages	[1 – 2]
`1: 1 stage`	
`2:` 2 stages	

NOTE: Control setup is only applicable for heat/cool equipment type and auxiliary heat stages is only applicable for heat pump equipment type.

CT	Temperature or humidity controller configuration	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] CT?<CR>` Description: Requests the controller configuration setting.	
Response	Syntax: `SN[#] CT=[value]<CR>` Example: `SN1 CT=0<CR>` Node address 1 responds with a controller configuration of thermostat.	
Parameters		Range
`value:` controller setting code **`0`: temperature controller (thermostat node)** `1`: humidity controller (humidistat node)		[0 – 1]

DIF1, DIF2, DIF3, DIF4	Stages 1 – 4 differential settings	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] DIF[n]?<CR>` Description: Requests the stage `[n]` differential. Example: `SN[#] DIF1?<CR>`	
Assignment Command	Syntax: `SN[#] DIF[n]=[value]<CR>` Description: Sets the stage `[n]` differential to `[value]`. Example: `SN1 DIF2=3<CR>`	
Response	Syntax: `SN[#] DIF[n]=[value]<CR>` Example: `SN1 DIF1=1<CR>` Node address 1 responds with stage 1 differential setting of 1.	
Parameters		Range
`n:` equipment stage `1`: 1st stage `2`: 2nd stage `3`: 3rd stage `4`: 4th stage		[1 – 4]
`value:` differential setting code `0`: reserved **`1`: 1F or 0.5C** `2`: 2F or 1.0C `3`: 3F or 1.5C `4`: 4F or 2.0C `5`: 5F or 2.5C `6`: 6F or 3.0C `7`: 7F or 3.5C `8`: 8F or 4.0C `9`: 9F or 4.5C		stage 1: [0 – 9]; stages 2-4: [1 – 9]
NOTE: Sending a DIF1 assignment command with a value of 0 resets the thermostat.		

EXTFAN	Extended fan control configurations	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] EXTFAN?<CR>` Description: Requests the heat and cool extended fan configurations.	
Assignment Command	Syntax: `SN[#] EXTFAN=[x][y]<CR>` Description: Sets the heat extended fan based on `[x]` and cool extended fan `[y]`. Example: `SN EXTFAN=01<CR>`	
Response	Syntax: `SN[#] EXTFAN=[x][y]<CR>` Example: `SN1 EXTFAN=00<CR>` Node address 1 responds with both extended fan configurations disabled.	
Parameters		Range
`x:` extended fan in heating code		[0 – 1]
`y:` extended fan in cooling code **0: disabled** 1: enabled		[0 – 1]
This command is ignored if the controller type is set to humidistat.		

INTEGRAL	PI control integral factor period	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] INTEGRAL?<CR>` Description: Requests the integral factor period setting.	
Assignment Command	Syntax: `SN[#] INTEGRAL=[value]<CR>` Description: Sets the integral factor period to `[value]` minutes. Examples: `SN1 INTEGRAL=2<CR>` `SN2 INTEGRAL=OFF<CR>`	
Response	Syntax: `SN[#] INTEGRAL=[value]<CR>` Example: `SN1 INTEGRAL=4<CR>` Node address 1 responds with an integral factor period of 4 minutes.	
Parameters		Range
`value:` integral factor period in minutes Default: 2		[OFF, 1 – 5]
This command is ignored if the controller type is set to humidistat.		

AUTOM	Auto changeover mode configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] AUTOM<?<CR>` Description: Requests the auto mode changeover setting.	
Assignment Command	Syntax: `SN[#] AUTOM=[value]<CR>` Description: Sets the auto mode changeover setting to `[value]`. Example: `SN1 AUTOM=OFF<CR>`	
Response	Syntax: `SN[#] AUTOM=[value]<CR>` Example: `SN1 AUTOM=ON<CR>` Node address 1 responds with an auto mode changeover setting of ON.	
Parameters		Range
`value:` Auto Mode Setting **`OFF:` disabled** `ON:` enabled		[OFF, ON]

EQONTIME	Minimum equipment on time	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] EQONTIME?<CR>` Description: Requests minimum equipment on time setting.	
Response	Syntax: `SN[#] EQONTIME=[value]<CR>` Example: `SN1 EQONTIME=2<CR>` Node address 1 responds with a minimum equipment on time of 2 minutes.	
Parameters		Range
`value:` minimum equipment on time in minutes Default: 2		[1 – 5]

HOFFTIME	Minimum heat equipment off time	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] HOFFTIME?<CR>` Description: Requests minimum heat equipment off time setting.	
Response	Syntax: `SN[#] HOFFTIME=[value]<CR>` Example: `SN1 HOFFTIME=2<CR>` Node address 1 responds with a minimum heat equipment off time of 2 minutes.	
Parameters		Range
`value:` minimum heat on time in minutes Default: 2		[1 – 5]

COFFTIME	Minimum compressor off time	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] COFFTIME?<CR>` Description: Requests minimum compressor off time setting.	
Response	Syntax: `SN[#] COFFTIME=[value]<CR>` Example: `SN1 COFFTIME=5<CR>` Node address 1 responds with a minimum compressor off time of 5 minutes.	
Parameters		Range
`value:` minimum compressor on time in minutes Default: 5		[1 – 5]

ACHGTIME	Minimum auto changeover time	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] ACHGTIME?<CR>` Description: Requests minimum auto mode changeover time setting.	
Assignment Command	Syntax: `SN[#] ACHGTIME=[value]<CR>` Description: Sets the minimum auto mode changeover time setting to `[value]` minutes. Example: `SN1 ACHGTIME=4<CR>`	
Response	Syntax: `SN[#] ACHGTIME=[value]<CR>` Example: `SN1 ACHGTIME=4<CR>` Node address 1 responds with a minimum compressor off time of 4 minutes.	
Parameters		Range
`value:` minimum auto mode changeover time in minutes Default: 4		[1 – 5]

DBAND	Auto mode deadband configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] DBAND?<CR>` Description: Requests the auto mode deadband setting.	
Assignment Command	Syntax: `SN[#] DBAND=[value]<CR>` Description: Sets the auto mode deadband setting to `[value]` based on the current temperature scale. Example: `SN1 DBAND=3<CR>`	
Response	Syntax: `SN[#] DBAND=[value][scale]<CR>` Example: `SN1 DBAND=3F<CR>` Node address 1 responds with an auto mode deadband of 3.	
Parameters		Range
`value:` auto mode deadband in degrees Fahrenheit Celsius Default: 3F or 2C		 [2 – 9] [1 – 5]
`scale:` temperature scale		[F, C]
This command is ignored if the controller type is set to humidistat. Integer values must be within the range specified for the current temperature scale.		

RECOV	Progressive recovery configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] RECOV?<CR>` Description: Requests the progressive recovery configuration setting.	
Assignment Command	Syntax: `SN[#] RECOV=[value]<CR>` Description: Sets the progressive recovery configuration setting to `[value]`. Example: `SN1 RECOV=ON<CR>`	
Response	Syntax: `SN[#] RECOV=[value]<CR>` Example: `SN1 RECOV=ON<CR>` Node address 1 responds with a progressive recovery configuration setting of ON.	

Parameters	Range
`value:` auto mode deadband in degrees Default: ON	[OFF, ON]

This command is ignored if the controller type is set to humidistat.

HIBP	High balance point configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] HIBP?<CR>` Description: Requests the high balance point configuration setting.	

Assignment Command	Syntax: `SN[#] HIBP=[value]<CR>`
	Description: Sets the high balance point configuration setting to `[value]` in degrees `[scale]`.
	Examples: `SN1 HIBP=65<CR>`
	`SN1 HIBP=4<CR>`
	`SN1 HIBP=OFF<CR>`	

Response	Syntax: `SN[#] HIBP=[value][scale]<CR>` Example: `SN1 HIBP=65F<CR>` Node address 1 responds with a high balance point configuration setting of 65°F.	

Parameters	Range
`value:` high balance point cut off temperature in 5°F or 3°C step	[OFF]
Fahrenheit	[40 – 85]
Celsius	[3 – 30]
Default: 65F or 18C	
`scale:` temperature scale	[null, F, C]

The high balance point is dependent on the low balance point since the low balance point takes priority over the high balance point. If a HIBP assignment command is received with a value that violates the 5°F (3°C) deadband between the high and low balance points, the command is considered invalid and no response is sent. If the low balance point is modified, the high balance point is automatically increased if the change to the low balance point violates the deadband. This command is only accepted if the thermostat is configured as heat pump and if the outdoor temperature is available. Integer values must be within the range specified for the current temperature scale.

LOBP	Low balance point configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] LOBP?<CR>` Description: Requests the low balance point configuration setting.	

Assignment Command	Syntax: `SN[#] LOBP=[value]<CR>`
	Description: Sets the low balance point configuration setting to `[value]` in degrees `[scale]`.
	Examples: `SN1 LOBP=20<CR>`
	`SN1 LOBP=-12<CR>`
	`SN1 LOBP=OFF<CR>`	

Response	Syntax: `SN[#] LOBP=[value][scale]<CR>` Example: `SN1 LOBP=20F<CR>` Node address 1 responds with a low balance point configuration setting of 20°F.	

Parameters	Range
`value:` low balance point cut off temperature in 5°F or 3°C step	[OFF]
Fahrenheit	[10 – 50]
Celsius	[-12 – 9]
Default: 20F or -6C	
`scale:` temperature scale	[null, F, C]

The high balance point is dependent on the low balance point since the low balance point takes priority over the high balance point. If a LOBP assignment command is received with a value that violates the 5°F (3°C) deadband between the high and low balance points, the high balance point is automatically increased to remove the deadband violation. This command is only accepted if the thermostat is configured as heat pump and if the outdoor temperature is available. Integer values must be within the range specified for the current temperature scale. NOTE: If a zero (0) is sent as the value for an assignment command and the temperature scale is Fahrenheit, the low balance point setting with default to 10°F.

OFFSET	Offset applied to control and display temperature	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] OFFSET?<CR>` Description: Requests the temperature offset setting.	
Assignment Command	Syntax: `SN[#] OFFSET=[sign][value]<CR>` Description: Sets the temperature offset setting to `[sign][value]` in degrees. Example: `SN1 OFFSET=-1<CR>`	
Response	Syntax: `SN[#] OFFSET=[sign][value][scale]<CR>` Example: `SN1 OFFSET=+1F<CR>` Node address 1 responds with an offset setting of 1°F.	

Parameters	Range
`sign:` positive or negative offset	[null, +, -]
`value:` temperature offset setting in degrees	[0 – 8]
Default: 0	
`scale:` temperature scale	[F, C]

NOTE: The `[sign]` parameter is not required for an offset of 0.

COMMUNICATION CONTROL COMMANDS

NETAD	Network communication address	COS: N/A
Permissions: Write only		
Assignment Command	Syntax: `SN[#] NETAD=[value]<CR>` Description: Sets the node address to `[value]`. Example: `SN1 NETAD=1<CR>`	
Response	Syntax: `SN[#] NETAD=[value]<CR>` Example: `SN1 NETAD=1<CR>` Node address 1 responds with a network address of 1.	
Parameters		Range
`value:` node address Default: 1		[1 – 64]
This command may not be used as a global command. If attempted as a global command the node does not respond.		

<NULL>	Report connected thermostats	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN?<CR>` `SN0?<CR>` Description: Global request to all connected thermostats for the node address.	
Response	Syntax: `SN[#]<CR>` Example: `SN1<CR>` Node address 1 responds.	

NETST	Number of connected thermostats on the network	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] NETST?<CR>` Description: Requests the number of thermostats setting.	
Assignment Command	Syntax: `SN[#] NETST=[value]<CR>` Description: Sets the number of thermostats setting to `[value]`. Example: `SN1 NETST=4<CR>`	
Response	Syntax: `SN[#] NETST=[value]<CR>` Example: `SN1 NETST=64<CR>` Node address 1 responds with a number of thermostats setting of 64.	
Parameters		Range
`value:` number of thermostats Default: 64		[1 – 64]

BAUD	Network communication baud rate	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] BAUD?<CR>` Description: Requests the baud rate setting.	
Assignment Command	Syntax: `SN[#] BAUD=[value]<CR>` Description: Sets the baud rate setting to `[value]`. Example: `SN1 BAUD=192<CR>`	
Response	Syntax: `SN[#] BAUD=[value]<CR>` Example: `SN1 BAUD=96<CR>` Node address 1 responds with a baud rate of 96.	

Parameters	Range
`value:` communication baud rate code	[96, 192]
`96`: 9,600 bps	
`192`: 19,200 bps	

ID	Thermostat model and software revision	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] ID?<CR>` Description: Requests the node model and software revision.	
Response	Syntax: `SN[#] MODEL# [model] REV: [revision] RPC [year]<CR>` Example: `SN1 MODEL# 8800 REV: 1.0 RPC 2011<CR>`	

Parameters	Range
`model:` node model number	[4 ASCII character string]
`revision:` firmware revision (x.x)	[3 ASCII character string]
`year:` firmware revision year	[4 ASCII character string]

NAME	Thermostat name string	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] NAME?<CR>` Description: Requests the thermostat name string.	
Assignment Command	Syntax: `SN[#] NAME=[name]<CR>` Description: Sets the thermostat name to `[name]`. Example: `SN1 NAME=MASTER BEDROOM<CR>`	
Response	Syntax: `SN[#] [name]<CR>` Example: `SN1 MASTER BEDROOM<CR>` Node address 1 responds with a thermostat name of "MASTER BEDROOM".	
Parameters		Range
`name:` thermostat name		[null, 16 ASCII character string]
If a thermostat name is assigned to a thermostat, all future responses from said thermostat are in the following syntax: `SN[#][name] [command]=[value].`		

CR	Command response control	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] CR?<CR>` Description: Requests the command response setting.	
Assignment Command	Syntax: `SN[#] CR=[value]<CR>` Description: Sets the command response setting to `[value]`. Example: `SN1 CR=NORMAL<CR>`	
Response	Syntax: `SN[#] CR=[value]<CR>` Example: `SN1 CR=NORMAL<CR>` Node address 1 responds with a command response setting of NORMAL.	
Parameters		Range
`value:` command response setting		[NORMAL, N, QUIET, Q, SILENT, S]
`NORMAL:` thermostat always responds to all command types; sends unsolicited COS messages		
`QUIET:` thermostat only responds to the query command type; sends unsolicited COS messages		
`SILENT:` thermostat does not respond to any command types; does not send unsolicited COS messages		
NOTE: There is no response to the CR assignment command when the value is QUIET or SILENT. Each response control type has a verbose and short form for the value. The short form is the first letter of the response control type. The Command response control is reset to NORMAL after a power-cycle.		

CHANGE OF STATE REPORT CONTROL COMMANDS

CP	Command response configuration pattern	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] CP?<CR>` Description: Requests the command response configuration pattern setting number.	
Assignment Command	Syntax: `SN[#] CP=[value]<CR>` Description: Sets the command response configuration pattern setting number to `[value]`. Example: `SN1 CP=1<CR>`	
Response	Syntax: `SN[#] CP=[value]<CR>` Example: `SN1 CP=1<CR>` Node address 1 responds with a configuration pattern of 1.	

Parameters — Range

`value:` configuration pattern number — [1 – 2]

`1`: configuration pattern 1

`2`: configuration pattern 2

The thermostat retains two independent sets of communication response configurations. Each set contains the command response control setting and the report setting for each COS command. Changes to the command response control setting or any COS report setting are applied to the active configuration pattern. This feature can be used to facilitate the use of a standard configuration for normal operation and second configuration for special functions. CP 2 is useful for integrating text messaging into the automation system.

Default values for each configuration pattern are as follows:

	CR	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
CP 1	NORMAL	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
CP 2	NORMAL	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

NOTE: Configuration Pattern settings are reset to their default values after a power-cycle.

C1 – C19	Change of State (COS) report settings	COS: N/A

Permissions: Read/Write

Query Command	Syntax: `SN[#] C[n]?<CR>` Description: Requests the COS `[n]` report setting. Example: `SN1 C2?<CR>`
Assignment Command	Syntax: `SN[#] C[n]=[value]<CR>` Description: Requests the COS `[n]` report setting to `[value]`. Example: `SN1 C1=OFF<CR>`
Response	Syntax: `SN[#] C[n]=[value]<CR>` Example: `SN1 C2=OFF<CR>` Node address 1 responds with a COS report setting of OFF.

Parameters	Range
`n:` COS number	[1 – 19]
`value:` COS report setting	[OFF, ON]
`OFF:` disabled	
`ON:` enabled	

The thermostat can be configured to send out messages upon a Change of State (COS) for any of the variables listed below. If the report setting is set to ON, the thermostat sends an unsolicited COS message to the Host indicating the status change for the respective item or variable. If the report setting is set to OFF, the thermostat does not send an unsolicited COS message to the Host regardless of any changes to the respective variable or item. This removes the need for the Host to poll each node for status changes.

The following table lists the Change of State variables and COS messages. All COS messages use the short form of the command for the unsolicited COS message.

	Item/Variable	Description	COS Message(s)
C1	HVAC Relays	Relay output status change	H
C2	Temperature or Humidity	Controlling temperature (or humidity) change ≥ 1° (1%RH)	T, HUM
C3	Outdoor Temperature or Remote Humidity	Outdoor temperature (or remote humidity) change ≥ 1° (1%RH)	OT, OH
C4	Contact Closures	Legacy – not used	None
C5	Setpoints	Controlling Heat, Cool, Humidification or Dehumidification setpoint change (user or schedule)	SH, SC, SHUM, SDEH
C6	Network Override	Network communication override status change	HOLD
C7	Mode	Node system control mode change	M
C8	Fan	Thermostat fan control mode change (user or schedule)	F
C9	Scroll Up Button	Legacy – not used	None
C10	Scroll Down Button	Legacy – not used	None
C11	Enter Button	Legacy – not used	None
C12	Backlight Ready	Legacy – not used	None
C13	Configuration/Setup	Setup changes	TIME, DATE, PROGFMT, EVTSDAY
C14	Alarms	Alarm status change (i.e. active to inactive and vice versa)	FLTALM, WPALM, DEHALM, SYSALM
C15	Progressive Recovery	Progressive recovery status change	RECOVSTAT
C16	Schedule	Change to schedule	PROGUPDT
C17	Hold Status	Schedule hold status change	HOLDSTAT
C18	Unused		
C19	Errors	Error status change	ERROR

SETUP COMMANDS

SCALE	Temperature scale	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] SCALE?<CR>` Description: Requests the temperature scale setting.	
Assignment Command	Syntax: `SN[#] SCALE=[value]<CR>` Description: Sets the temperature scale setting to `[value]`. Example: `SN1 SCALE=F<CR>`	
Response	Syntax: `SN[#] SCALE=[value]<CR>` Example: `SN1 SCALE=F<CR>` Node address 1 responds with a temperature scale of Fahrenheit.	

Parameters	Range
`value:` temperature scale code	[F, C]
`F:` Fahrenheit	
`C:` Celsius	

Temperature settings communicated to the thermostat without a designated scale are read using the active temperature scale. Default values are in **bold**.

TIME	Thermostat time	COS: C13
Permissions: Read/Write		
Query Command	Syntax: `SN[#] TIME?<CR>` Description: Requests the current time held by the thermostat.	
Assignment Command	Syntax: `SN[#] TIME=[hh][mm]<CR>` Description: Sets the time to `[hh]` hours and `[mm]` minutes. Example: `SN1 TIME=1200<CR>`	
Response or COS Message	Syntax: `SN[#] TIME=[value]<CR>` Example: `SN1 TIME=1532<CR>` Node address 1 responds with a time of 3:32PM.	

Parameters	Range
`hh:` hours in 24-hour format	[00 – 23]
`mm:` minutes	[00 – 59]

The thermostat has a real-time clock accurate to 1 minute every 30 days. The time can be set by though the Set Clock Screen. Hour and minute values less than 10 must be prepended with a leading 0. If the time is changed at the thermostat, a C13 COS unsolicited message is issued (if C13 is ON).

DATE	Thermostat calendar date	COS: C13
Permissions: Read/Write		
Query Command	Syntax: `SN[#] DATE?<CR>` Description: Requests the current calendar date held by the thermostat.	
Assignment Command	Syntax: `SN[#] DATE=[mm][dd][yy]<CR>` Description: Sets the time to `[mm]` month, `[dd]` day and `[yy]` year. Example: `SN1 DATE=010110<CR>`	
Response or COS Message	Syntax: `SN[#] DATE=[mm][dd][yy]<CR>` Example: `SN1 DATE=120110<CR>` Node address 1 responds with a date of December 1, 2010.	
Parameters		Range
`mm:` calendar month		[01 – 12]
`dd:` calendar day		[01 – 31]
`yy:` calendar year		[00 – 99]
Month, day and year values less than 10 must be prepended with a leading 0. If the date is changed at the thermostat, a C13 COS unsolicited message is issued (if C13 is ON).		

PROGFMT	Thermostat program format	COS: C13
Permissions: Read/Write		
Query Command	Syntax: `SN[#] PROGFMT?<CR>` Description: Requests the program format setting.	
Assignment Command	Syntax: `SN[#] PROGFMT=[value]<CR>` Description: Sets the program format setting to `[value]`. Example: `SN1 PROGFMT=2<CR>`	
Response or COS Message	Syntax: `SN[#] PROGFMT=[value]<CR>` Example: `SN1 PROGFMT=2<CR>` Node address 1 responds with a program format of 7-day.	
Parameters		Range
`value:` program format code `0:` 5/2 program (Weekdays and Weekends) `1:` 5/1/1 program (Weekdays, Saturday and Sunday) **`2:` 7-day program (Mon, Tue, Wed, Thu, Fri, Sat, Sun)** `3:` non-programmable		[0 – 3]
If the program format is changed at the thermostat, a C13 COS unsolicited message is issued (if C13 is ON).		

EVTCFG	Thermostat program event configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] EVTCFG?<CR>` Description: Requests the program event configuration setting.	
Assignment Command	Syntax: `SN[#] EVTCFG=[value]<CR>` Description: Sets the program event configuration setting to `[value]`. Example: `SN1 EVTCFG=RES<CR>`	
Response	Syntax: `SN[#] EVTCFG=[value]<CR>` Example: `SN1 EVTCFG=RES<CR>` Node address 1 responds with an event configuration setting of residential.	

Parameters	Range
`value:` program format code	[RES, COM]
`RES:` residential event labels	
`COM:` commercial event labels	

If the program event configuration is set to commercial, the events per day setting is automatically set to 2 events per day.
This command is ignored if the controller type is set to humidistat.

EVTSDAY	Thermostat program events per day	COS: C13
Permissions: Read/Write		
Query Command	Syntax: `SN[#] EVTSDAY?<CR>` Description: Requests the program events per day setting.	
Assignment Command	Syntax: `SN[#] EVTSDAY=[value]<CR>` Description: Sets the program events per day setting to `[value]` events per day. Example: `SN1 EVTSDAY=4<CR>`	
Response or COS Message	Syntax: `SN[#] EVTSDAY=[value]<CR>` Example: `SN1 EVTSDAY=4<CR>` Node address 1 responds with an events per day setting of 4.	

Parameters	Range
`value:` program events per day	[2, 4]
`4:` four events per day	
`2:` two events per day	

If the EVTCFG setting is set to commercial, the EVTSDAY setting is fixed at 2.

This command is ignored if the controller type is set to humidistat. If the program events per day setting is changed at the thermostat, a C13 COS unsolicited message is issued (if C13 is ON).

DLS	Daylight savings time setting	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] DST?<CR>` Description: Requests the daylight savings time setting.	
Assignment Command	Syntax: `SN[#] DST=[value]<CR>` Description: Sets the daylight savings time setting to `[value]`. Example: `SN1 DST=MARCH<CR>`	
Response	Syntax: `SN[#] DST=[value]<CR>` Example: `SN1 DST=MARCH<CR>` Node address 1 responds with a daylight savings time setting of March to November.	

Parameters	Range
`value:` daylight savings setting code	[OFF, MARCH, APRIL]
`OFF:` daylight savings time is disabled	
`MARCH:` daylight savings time starts in March and ends in November	
`APRIL:` daylight savings time starts in April and ends in October	

BLTLVL	Backlight intensity level	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] BLTLVL?<CR>` Description: Requests the backlight intensity level setting.	
Assignment Command	Syntax: `SN[#] BLTLVL=[value]<CR>` Description: Sets the backlight level to `[value]`. Example: `SN1 BLTLVL=100<CR>`	
Response	Syntax: `SN[#] BLTLVL=[value]<CR>` Example: `SN1 BLTLVL=90<CR>` Node address 1 responds with a backlight intensity level of 90.	

Parameters	Range
`value:` backlight level in steps of 10	[0 – 100]
Default: 100	

CONSTBLT	Constant backlight setting	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] CONSTBLT?<CR>` Description: Requests the constant backlight setting.	
Assignment Command	Syntax: `SN[#] CONSTBLT=[value]<CR>` Description: Sets the constant backlight setting `[value]`. Example: `SN1 CONSTBLT=OFF<CR>`	
Response	Syntax: `SN[#] CONSTBLT=[value]<CR>` Example: `SN1 CONSTBLT=OFF<CR>` Node address 1 responds with a constant backlight setting of OFF.	
Parameters `value:` constant backlight setting **`OFF:` disabled** `ON:` enabled		Range [OFF, ON]

BLTON	Backlight activation	COS: N/A
Permissions: Write only		
Assignment Command	Syntax: `SN[#] BLTON<CR>` Description: Turns on the backlight. Example: `SN1 BLTON<CR>`	
Response	Syntax: `SN[#] BLTON<CR>` Example: `SN1 BLTON<CR>` Node address 1 responds with backlight on.	
When this command is issued by the Host, the node activates the backlight for 10 seconds. NOTE: The assignment command has no parameters.		

ALARM COMMANDS

FLTALMP	Air filter alarm period	COS: N/A
WPALMP	Humidifier alarm period	
DEHALMP	Dehumidifier alarm period	
SYSALMP	HVAC system alarm period	

Permissions: Read/Write

Query Command	Syntax: `SN[#] [alarm]ALMP?<CR>` Description: Requests the `[alarm]` alarm period setting.
Assignment Command	Syntax: `SN[#] [alarm]ALMP=[value]<CR>` Description: Sets the `[alarm]` alarm period to `[value]`. Examples: `SN1 FLTALMP=OFF<CR>` `SN1 SYSALMP=12<CR>`
Response	Syntax: `SN[#] [alarm]ALMP=[value]<CR>` Example: `SN1 FLTALMP=OFF<CR>` Node address 1 responds with an air filter alarm period setting of OFF.

Parameters	Range
`alarm:` alarm command code	[FLT, WP, DEH, SYS]
`value:` alarm period setting in months	
FLT	[OFF, 1, 3, 6, 12]
WP, DEH, SYS	[OFF, 1 – 12]
Default: OFF	

FLTALM	Air filter alarm status	COS: C14
WPALM	Humidifier alarm status	
DEHALM	Dehumidifier alarm status	
SYSALM	HVAC system alarm status	

Permissions: Read/Write

Query Command	Syntax: `SN[#] [alarm]ALM?<CR>` Description: Requests the `[alarm]` alarm status.
Assignment Command	Syntax: `SN[#] [alarm]ALM=[value]<CR>` Description: Sets the `[alarm]` alarm status to `[value]`. Examples: `SN1 WPALM=ON<CR>` `SN1 DEHALM=OFF<CR>`
Response or COS Message	Syntax: `SN[#] [alarm]ALM=[value]<CR>` Example: `SN1 FLTALM=OFF<CR>` Node address 1 responds with an air filter alarm status of OFF.

Parameters	Range
`alarm:` alarm command code	[FLT, WP, DEH, SYS]
`value:` alarm status	[OFF, ON]
`OFF`: the [alarm] alarm is not active	
`ON`: the [alarm] alarm is active	

The alarm statuses can be cleared through the Setup Screens and Menu Screens. When an assignment command is received with the value parameter set to OFF and the specified alarm is active, the respective alarm is cleared and reset if the alarm period is not set to OFF. When an assignment command is received with the value parameter set to ON and the specified alarm is not active and the specified alarm period is set to OFF, the respective alarm is activated and displayed on the screen. If the alarm status is changed at the node, a C14 COS unsolicited message is issued (if C14 is ON).

HUMTYP	Humidifier type	COS: N/A

Permissions: Read/Write

Query Command	Syntax: `SN[#] HUMTYP?<CR>` Description: Requests the humidifier type setting.
Assignment Command	Syntax: `SN[#] HUMTYP=[value]<CR>` Description: Sets the humidifier type setting to `[value]`. Example: `SN1 HUMTYP=0<CR>`
Response	Syntax: `SN[#] HUMTYP=[value]<CR>` Example: `SN1 HUMTYP=0<CR>` Node address 1 responds with a humidifier type setting of flow-through.

Parameters	Range
`value:` humidifier type setting code	[0 – 1]
`0`: flow-through type	
`1`: drain-less type	

LOCKOUT COMMANDS

FANLK	User fan mode lockout configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] FANLK?<CR>` Description: Requests the fan lockout configuration setting.	
Assignment Command	Syntax: `SN[#] FANLK=[value]<CR>` Description: Sets the fan lockout configuration setting to `[value]`. Example: `SN1 FANLK=0<CR>`	
Response	Syntax: `SN[#] FANLK=[value]<CR>` Example: `SN1 FANLK=0<CR>` Node address 1 responds with a fan lockout setting of disabled.	

Parameters — Range

`value:` fan lockout setting code — [0 – 2]

- **0: lockout disabled**
- 1: time-limited lockout
- 2: lockout enabled; no changes allowed

The three fan mode lockout settings provide varying degrees of setpoint lockout. Time-limited lockouts must be enabled in conjunction with the temporary change period (LKTIME command).

MODELK	User system mode lockout configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] MODELK?<CR>` Description: Requests the mode lockout configuration setting.	
Assignment Command	Syntax: `SN[#] MODELK=[value]<CR>` Description: Sets the mode lockout configuration setting to `[value]`. Example: `SN1 MODELK=0<CR>`	
Response	Syntax: `SN[#] MODELK=[value]<CR>` Example: `SN1 MODELK=0<CR>` Node address 1 responds with a system mode lockout setting of disabled.	

Parameters — Range

`value:` system mode lockout setting code — [0,2]

- **0: lockout disabled**
- 2: lockout enabled; no changes allowed

The two system mode lockout settings provide varying degrees of setpoint lockout.

NETLK	User network override feature configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] NETLK?<CR>` Description: Requests the network override feature setting.	
Assignment Command	Syntax: `SN[#] NETLK=[value]<CR>` Description: Sets the network override feature setting to `[value]`. Example: `SN1 NETLK=0<CR>`	
Response	Syntax: `SN[#] NETLK=[value]<CR>` Example: `SN1 NETLK=0<CR>` Node address 1 responds with a network override feature setting of enabled.	

Parameters — Range

`value:` network override feature setting code — [0 – 1]

`0`: enabled

`1`: disabled

UPDNLK	User setpoint lockout configuration	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] UPDNLK?<CR>` Description: Requests the setpoint lockout configuration setting.	
Assignment Command	Syntax: `SN[#] UPDNLK=[value]<CR>` Description: Sets the mode setpoint configuration setting to `[value]`. Example: `SN1 UPDNLK=0<CR>`	
Response	Syntax: `SN[#] UPDNLK=[value]<CR>` Example: `SN1 UPDNLK=0<CR>` Node address 1 responds with a setpoint lockout setting of disabled.	

Parameters — Range

`value:` setpoint lockout setting code — [0 – 4]

`0`: lockout disabled

`1`: time-limited lockout; changes within normal setpoint range allowed

`2`: time-limited lockout; changes within limited setpoint range allowed

`3`: lockout enabled; no changes allowed

`4`: changes within limited setpoint range allowed

The five setpoint lockout settings provide varying degrees of setpoint lockout. Time-limited lockouts must be enabled in conjunction with the temporary change period (LKTIME command). Range-limited lockouts must be enabled in conjunction with the setpoint lockout limit (LKLIMIT).

LKTIME	Time-limited lockout temporary change period	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] LKTIME?<CR>` Description: Requests the temporary change period setting.	
Assignment Command	Syntax: `SN[#] LKTIME=[value]<CR>` Description: Sets the temporary change period setting to `[value]`. Example: `SN1 LKTIME=0<CR>`	
Response	Syntax: `SN[#] LKTIME=[value]<CR>` Example: `SN1 LKTIME=240<CR>` Node address 1 responds with a temporary change period setting of 240 minutes.	

Parameters — Range

`value:` temporary change period in minutes — [0 – 255]
Default: 60

The temporary change period is the time that a change persists from the time that a change is made to the fan mode or setpoints when the respective lockout is configured for time-limited lockout. For example, if a FANLK assignment command is received with a value of 1 (time-limited lockout) and the user subsequently changes the fan mode, the change to the fan mode persists until the temporary change duration expires. (NOTE: the user may change the fan mode during the temporary change period.)

If the temporary change period is set to 0, there is no temporary change period and any lockouts configured for time-limited lockout behave as if set to no changes allowed. If a temporary change period is active and an assignment command is received, the active temporary change period is set to `[value]`.

There is only one temporary change period. It can be started by a change to any of the time-limited lockout enabled variables. The temporary change period does not restart if another time-limited lockout enabled variable changes.

Integer values must be within the range specified. The command has no effect unless FANLK or UPDNLK is set to a time-limited lockout configuration.

LKLIMIT	Setpoint change lockout limit	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] LKLIMIT?<CR>` Description: Requests the setpoint lockout limit setting.	
Assignment Command	Syntax: `SN[#] LKLIMIT=[value]<CR>` Description: Sets the setpoint lockout limit setting to `[value]`. Example: `SN1 LKLIMIT=0<CR>`	
Response	Syntax: `SN[#] LKLIMIT=[value]<CR>` Example: `SN1 LKLIMIT=4<CR>` Node address 1 responds with a setpoint lockout limit setting of 4.	

Parameters — Range

`value:` setpoint lockout limit in degrees or %RH — [0 – 20]
Default: 5

The setpoint lockout limit restricts the setpoint range to the original setpoint at the initiation of the limited setpoint lockout `±[value]`. When enabled, the value specified allows for a change in temperature or %RH by `±[value]` centered on the original setpoint at the initiation of the lockout.

Integer values must be within the range specified. The command has no effect unless UPDNLK is set to range-limited lockout. The setpoint lockout limit setting can be configured through the Setup Screens.

PIN	Security pin code	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] PIN?<CR>` Description: Requests the security pin code.	
Assignment Command	Syntax: `SN[#] PIN=[value]<CR>` Description: Sets the security pin code to `[value]`. Examples: `SN1 PIN=1234<CR>` `SN2 PIN=OFF<CR>`	
Response	Syntax: `SN[#] PIN=[value]<CR>` Example: `SN1 PIN=1234<CR>` Node address 1 responds with a security pin code of 1234.	
Parameters		Range
`value:` 4-digit pin Default: OFF		[OFF, 0000 – 9999]
If an assignment command is received with a value other than OFF, security is automatically enabled. If the value is OFF, security is disabled and the security pin is not required for security restricted features. The security pin code can be configured through the Installer Setup Screens.		

SENSOR COMMANDS

TEMP, T	Thermostat room temperature control value	COS: C2

Permissions: Read only

Query Command	Syntax: `SN[#] TEMP?<CR>` `SN[#] T?<CR>` Description: Requests the room temperature control value setting.
Response or COS Message	Syntax: `SN[#] T=[value][scale]<CR>` Example: `SN1 T=72F<CR>` Node address 1 responds with a temperature of 72F.

Parameters	Range
`value:` controlling temperature value	[32 – 99F, 0 – 40C]
Fahrenheit	[32 – 99]
Celsius	[0 – 40]
`scale:` temperature scale	[F, C]
`F:` Fahrenheit	
`C:` Celsius	

The source of the temperature value is dependent on the controller type setting.

Controller Type	Source
Thermostat	Built-in temperature sensor or, if configured, the average of all support module temperature sensors configured for controlling temperature.
Humidity	Built-in temperature sensor.

If the value of the temperature changes by 1° or more, a C2 COS unsolicited message is issued (if C2 is ON).

HUM	Humidistat humidity control value	COS: C2

Permissions: Read only

Query Command	Syntax: `SN[#] HUM?<CR>` Description: Requests the humidity control value setting.
Response or COS Message	Syntax: `SN[#] HUM=[value]%<CR>` Example: `SN1 HUM=35%<CR>` Node address 1 responds with a humidity of 35% RH.

Parameters	Range
`value:` controlling humidity value in %RH	[--, 0 – 99]

The source of the humidity value is dependent on the controller type setting.

Controller Type	Source
Thermostat	None.
Humidity	Built-in humidity sensor or, if configured, the average of all support module humidity sensors configured for controlling humidity.

If the value of the humidity changes by 1% RH or more, a C2 COS unsolicited message is issued (if C2 is ON). NOTE: If the control type is set to thermostat or the humidity sensor has an error, the response is `SN[n] HUM=--%<CR>`.

RSM	Identify all external sensors connected on the node's local network	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] RSM?<CR>` Description: Requests identification of all external sensors connected on the node's local network.	
Response	Syntax: `SN[#] RSM=M1:[S1],[S2] M2:[S1],[S2] M3:[S1],[S2] M4:[S1],[S2]<CR>` Description: For each connected module there is an Mn:[S1],[S2] response. If a module is not connected, there that module's response is omitted. The responses are in ascending order of local support module address. Examples: `SN1 RSM=M1:RT,RH<CR>` Node address 1 responds with one support module at local address 1 with a remote temperature sensor and a remote humidity sensor. `SN2 RSM=M1:CT,RH M3:CT,RT<CR>` Node address 2 responds with two support modules, the first at local address 1 with a control temperature sensor and a remote humidity sensor and the second at local address 3 with a control temperature sensor and a remote temperature sensor.	

Parameters	Range
`S1:` support module sensor 1 type code	[CT, RT, XX]
`S2:` support module sensor 2 type code	[CT, RT, CH, RH, XX]

- `CT:` control temperature sensor (for controlling humidity)
- `RT:` remote temperature sensor (for display only)
- `CH:` control humidity sensor (for controlling humidity)
- `RH:` remote humidity sensor (for display only)
- `XX:` no sensor attached

Up to four addressable support modules can be connected to a node's local communication network. Two sensors can be connected to each support module. Sensor 1 is always a temperature sensor and Sensor 2 can be either a temperature or humidity sensor. Each sensor is individually configured as a control sensor or remote (monitor) sensor. NOTE: If support module address 1, sensor 1 is configured as `RT`, it is assumed to be outdoor temperature.

RxSy	Report local network sensor vale	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] R[x]S[y]?<CR>` Description: Requests the sensor reading of sensor `[y]` of support module at local address `[x]`.	

Response	Syntax: `SN[#] R[x]S[y]=[value][scale]<CR>`
	Examples: `SN1 R1S2=75F<CR>`
	Node address 1 responds with a remote temperature of 75°F on sensor 2 of module 1.
	`SN1 R1S1=-5F<CR>`
	Node address 1 responds with an outdoor temperature of -5°F on sensor 1 of module 1.
	`SN1 R3S2=50%<CR>`
	Node address 1 responds with an RH of 50% on sensor 2 of module 3.	

Parameters	Range
`x:` support module address	[1 – 4]
`y:` support module sensor number	[1 – 2]
`value:` sensor value	
temperature sensor – Fahrenheit	[-40 – 130]
temperature sensor – Celsius	[-40 – 55]
humidity sensor	[0 – 99]
no sensor or module	[--]
`scale:` sensor scale (based on sensor type and temperature scale)	[null, F, C, %]
`F:` Fahrenheit	
`C:` Celsius	
`%:` percent RH	

Each support module sensor can be read individually using this command. The RSM? command should be used to determine what support modules and sensors are connected. If a query command is received with a support module address of an unconnected support module, `SN[n] R[x]S[y]=--<CR>`.

OT, R	Outdoor temperature	COS: C3

Permissions: Read/Write

Query Command

Syntax: `SN[#] OT?<CR>`
`SN[#] R?<CR>`

Description: Requests the outdoor temperature sensor reading.

Assignment Command

Syntax: `SN[#] OT=[value][scale]<CR>`

Description: Sets the outdoor temperature to `[value]`. The alternate R version does not apply.

Examples: `SN1 OT=55F<CR>`
`SN OT=-10F<CR>`

Response or COS Message

Syntax: `SN[#] OT=[value][scale]<CR>`
`SN[#] R=[value][scale]<CR>`

Description: Sets the outdoor temperature to `[value]`. The OT version is used for COS Messages and the alternate `R` version is only used for responses.

Example: `SN1 OT=-10F<CR>`
Node address 1 responds with an outdoor temperature of -10°F.

Parameters	Range
`value:` sensor value	
Fahrenheit	[-40 – 130]
Celsius	[-40 – 55]
no sensor attached or error	[--]
`scale:` temperature scale	[F, C]
`F:` Fahrenheit	
`C:` Celsius	

The source of the outdoor temperature value is dependent on the available sensors.

Priority	Source
1	Direct-wired outdoor temperature sensor (S1 and S2 terminals).
2	Support Module 1, Sensor 1 configured as monitor.
3	OT assignment command.

If a query command is received and the node does not have an outdoor temperature sensor (direct-wired or via support module 1, sensor 1), it responds with `SN[n] OT=--[scale]<CR>`. If an assignment command is received and the node does have an outdoor temperature sensor, the command is ignored and no response sent.

The assignment command is used to allow one node to share the outdoor temperature sensor value. This is accomplished through the Host controller by determining which node has the outdoor temperature then periodically sending a global outdoor temperature assignment command to all other thermostats.

The Host controller must ensure that the outdoor temperature value is current. Otherwise, the thermostats without an outdoor temperature sensor assume that the previously received value is no longer valid. The validity period is 10 minutes and is reset each time the Host controller receives the temperature value from the node with the outdoor temperature sensor. If the validity period expires, the Host controller sends a query command to the node with the outdoor temperature sensor to get the latest value then send a global outdoor temperature assignment command to all other thermostats.

If more than one node has an outdoor temperature sensor, the Host controller uses the value from the lowest address.

If the value of the outdoor temperature changes by 1° or more, a C3 COS unsolicited message is issued (if C3 is ON).

OH	Remote humidity	COS: C3
Permissions: Read only		
Query Command	Syntax: `SN[#] OH?<CR>` Description: Requests the remote humidity sensor reading.	
Response or COS Message	Syntax: `SN[#] OH=[value]%<CR>` Example: `SN1 OH=25%<CR>` Node address 1 responds with a remote humidity of 25% RH.	
Parameters		Range
`value:` humidity sensor value		[--, 0 – 99]
The remote humidity reading source is from Support Module 1, Sensor 2 configured as monitor. If a query command is received and Support Module 1 is not connected or is temperature only, it responds with `SN[n] OH=--%<CR>`. If the value of the remote humidity changes by 1% RH or more, a C3 COS unsolicited message is issued (if C3 is ON).		

BIHUM	Built-in humidity	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] BIHUM?<CR>` Description: Requests the built-in humidity sensor reading.	
Response	Syntax: `SN[#] BIHUM=[value]%<CR>` Example: `SN1 BIHUM=30%<CR>` Node address 1 responds with a built-in humidity of 30% RH.	
Parameters		Range
`value:` built-in humidity sensor value		[--, 0 – 99]
If the humidity sensor has an error, the response is `SN[n] BIHUM=--%<CR>`.		

RTS	Node remote temperature sensor	COS: N/A
Permissions: Read only		
Query Command	Syntax: `SN[#] RTS?<CR>` Description: Requests the node's direct-wired remote temperature sensor (T1 and T2 terminals) reading.	
Response	Syntax: `SN[#] RTS=[value][scale]<CR>` Example: `SN1 RTS=68F<CR>` Node address 1 responds with a remote temperature reading of 68°F.	
Parameters		Range
`value:` remote temperature sensor value		
Fahrenheit		[32 – 99]
Celsius		[0 – 40]
no sensor attached or error		[--]
`scale:` temperature scale `F:` Fahrenheit `C:` Celsius		[F, C]
If the remote temperature sensor is not attached or has an error, the response is `SN[n] RTS=--[scale]<CR>`.		

MODE, M	Control mode	COS: C7
Permissions: Read/Write		
Query Command	Syntax: `SN[#] MODE?<CR>` `SN[#] M?<CR>` Description: Requests the control mode.	

Assignment Command	Syntax: `SN[#] MODE=[value]<CR>`
	`SN[#] M=[value]<CR>`
	Description: Sets the control mode to `[value]`.
	Examples: `SN1 MODE=HEAT<CR>`
	`SN1 M=A<CR>`	

Response or COS Message	Syntax: `SN[#] M=[value]<CR>` Description: The thermostat sends the control mode. The `[value]` parameter is always in the verbose format. Example: `SN1 M=COOL<CR>` Node address 1 responds with a control mode of Cool.	

Parameters — Range

`value:` control mode — [OFF, O, HEAT, H, COOL, C, EMHT, E, AUTO, A, HUMID, DEHUM]

- `OFF, O:` Off mode – Thermostat or Humidistat
- `HEAT, H:` Heat mode – Thermostat
- `COOL, C:` Cool mode – Thermostat
- `EMHT, E:` Emergency heat mode (heat pump only) – Thermostat
- `AUTO, A:` Auto mode – Thermostat or Humidistat
- `HUMID:` Humidification – Humidistat
- `DEHUM:` Dehumidification – Humidistat

The control mode can be changed through the Home Screens for thermostat control or through the Setup Screens for humidity control. If the control mode is changed at the node, a C7 COS unsolicited message is issued (if C7 is ON).

FAN, F	Thermostat fan mode	COS: C8
Permissions: Read/Write		
Query Command	Syntax: `SN[#] FAN?<CR>` `SN[#] F?<CR>` Description: Requests the thermostat fan mode.	

Assignment Command	Syntax: `SN[#] FAN=[value]<CR>`
	`SN[#] F=[value]<CR>`
	Description: Sets the thermostat fan mode to `[value]`.
	Examples: `SN1 FAN=AUTO<CR>`
	`SN1 F=CIRC<CR>`	

Response or COS Message	Syntax: `SN[#] F=[value]<CR>` Description: The thermostat sends the fan mode. The `[value]` parameter is always in the verbose format. Example: `SN1 F=ON<CR>` Node address 1 responds with a thermostat fan mode of ON.	

Parameters	Range
`value:` control mode codes	[AUTO, A, ON, CIRC]
`AUTO, A:` fan auto mode	
`ON:` fan on mode	
`CIRC:` fan circulate mode	

The fan mode can be changed through the Home Screens of the thermostat. If the control mode is changed at the thermostat, a C8 COS unsolicited message is issued (if C8 is ON).

SH	Controlling thermostat heat setpoint	COS: C5
Permissions: Read/Write		
Query Command	Syntax: `SN[#] SH?<CR>` Description: Requests the controlling thermostat heat setpoint.	
Assignment Command	Syntax: `SN[#] SH=[value]<CR>` Description: Sets the controlling thermostat heat setpoint to `[value]`. Example: `SN1 SH=68<CR>`	
Response or COS Message	Syntax: `SN[#] SH=[value][scale]<CR>` Example: `SN1 SH=65F<CR>` Node address 1 responds with a controlling heat setpoint of 65°F.	

Parameters	Range
`value:` heat setpoint	
Fahrenheit	[40 – 90]
Celsius	[4 – 32]
`scale:` temperature scale	[F, C]
`F:` Fahrenheit	
`C:` Celsius	

The thermostat controlling heat setpoint corresponds to the active heat setpoint to which the thermostat is controlling the heating equipment. Assignment commands are ignored if the controller type is set to humidistat.

When the thermostat system mode is set to AUTO, the heat and cool setpoints are interdependent and must abide by the deadband. If an assignment command is received with a heat setpoint value that causes a deadband violation, the cool setpoint is automatically increased to fulfill the deadband requirement. If the deadband requirement cannot be fulfilled by increasing the cool setpoint, the command is ignored and no response sent.

If an assignment command is received while the thermostat is running the program schedule, the thermostat automatically initiates a temporary hold with an end time of the start time of the next scheduled event. If a hold is active at the time of the assignment command, the hold setpoint is modified. In addition, if a hold is initiated as a result of the receipt of this command, a C17 COS unsolicited message is issued (if C17 is ON).

If a query or an assignment command is received and the thermostat program format is programmable (i.e. not non-programmable), and the system mode is set to Cool or OFF, this command is ignored.

Integer values must be within the range specified for the current temperature scale. The heat setpoint can be changed through the Home Screens for thermostat control or due to a schedule or hold change. If the heat setpoint is changed at the thermostat, a C5 COS unsolicited message is issued (if C5 is ON).

SH++, SH--	Increment or decrement the controlling thermostat heat setpoint	COS: N/A
Permissions: Write only		
Assignment Command	Syntax: `SN[#] SH++=[value]<CR>` Syntax: `SN[#] SH--=[value]<CR>` Description: Increments or decrements the controlling thermostat heat setpoint to `[value]` based on the ++/--. Examples: `SN1 SH++=1<CR>` `SN1 SH--=5<CR>`	
Response	Syntax: `SN[#] SH++=[value][scale]<CR>` Syntax: `SN[#] SH--=[value][scale]<CR>` Example: `SN1 SH++=1F<CR>` Node address 1 responds with incrementing the heat setpoint by 1°F.	

Parameters	Range
`value:` controlling heat setpoint change value	
`scale:` temperature scale `F:` Fahrenheit `C:` Celsius	[F, C]

The thermostat controlling heat setpoint corresponds to the active heat setpoint to which the thermostat is controlling the heating equipment. This command is ignored if the controller type is set to humidistat.

When the thermostat system mode is set to AUTO, the heat and cool setpoints are interdependent and must abide by the deadband. If an assignment command is received with a heat setpoint increment value that causes a deadband violation, the cool setpoint is automatically increased to fulfill the deadband requirement. If the deadband requirement cannot be fulfilled by increasing the cool setpoint, the command is ignored and no response sent.

If an assignment command is received while the thermostat is running the program schedule, the thermostat automatically initiates a temporary hold with an end time of the start time of the next scheduled event. If a hold is active at the time of the assignment command, the hold setpoint is modified. In addition, if a hold is initiated as a result of the receipt of this command, a C17 COS unsolicited message is issued (if C17 is ON).

If an assignment command is received and the thermostat program format is programmable (i.e. not non-programmable), and the system mode is set to Cool or OFF, this command is ignored.

If the resultant setpoint is outside the allowable range for the setpoint temperature, the command is ignored.

SC	Controlling thermostat cool setpoint	COS: C5

Permissions: Read/Write

Query Command	Syntax: `SN[#] SC?<CR>` Description: Requests the controlling thermostat cool setpoint.
Assignment Command	Syntax: `SN[#] SC=[value]<CR>` Description: Sets the controlling thermostat cool setpoint to `[value]`. Example: `SN1 SC=78<CR>`
Response or COS Message	Syntax: `SN[#] SC=[value][scale]<CR>` Example: `SN1 SC=78F<CR>` Node address 1 responds with a controlling cool setpoint of 78°F.

Parameters	Range
`value:` cool setpoint	
Fahrenheit	[42 – 99]
Celsius	[6 – 37]
`scale:` temperature scale	[F, C]
`F:` Fahrenheit	
`C:` Celsius	

The thermostat controlling cool setpoint corresponds to the active cool setpoint to which the thermostat is controlling the cooling equipment. Assignment commands are ignored if the controller type is set to humidistat.

When the thermostat system mode is set to AUTO, the heat and cool setpoints are interdependent and must abide by the deadband. If an assignment command is received with a cool setpoint value that causes a deadband violation, the heat setpoint is automatically decreased to fulfill the deadband requirement. If the deadband requirement cannot be fulfilled by decreasing the heat setpoint, the command is ignored and no response sent.

If an assignment command is received while the thermostat is running the program schedule, the thermostat automatically initiates a temporary hold with an end time of the start time of the next scheduled event. If a hold is active at the time of the assignment command, the hold setpoint is modified. In addition, if a hold is initiated as a result of the receipt of this command, a C17 COS unsolicited message is issued (if C17 is ON).

If a query or an assignment command is received and the thermostat program format is programmable (i.e. not non-programmable), and the system mode is set to Heat, Emergency Heat or OFF, this command is ignored.

Integer values must be within the range specified for the current temperature scale. The cool setpoint can be changed through the Home Screens for thermostat control or due to a schedule or hold change. If the cool setpoint is changed at the thermostat, a C5 COS unsolicited message is issued (if C5 is ON).

SC++, SC--	Increment or decrement the controlling thermostat cool setpoint	COS: N/A

Permissions: Write only

Assignment Command	Syntax:	`SN[#] SC++=[value]<CR>`
	Syntax:	`SN[#] SC--=[value]<CR>`
	Description:	Increments or decrements the controlling thermostat cool setpoint to `[value]` based on the ++/--.
	Examples:	`SN1 SC++=1<CR>` `SN1 SC--=5<CR>`
Response	Syntax:	`SN[#] SC++=[value][scale]<CR>`
	Syntax:	`SN[#] SC--=[value][scale]<CR>`
	Example:	`SN1 SC++=1F<CR>` Node address 1 responds with incrementing the cool setpoint by 1°F.

Parameters	Range
`value:` controlling cool setpoint change value	
`scale:` temperature scale	[F, C]
`F:` Fahrenheit	
`C:` Celsius	

The thermostat controlling cool setpoint corresponds to the active cool setpoint to which the thermostat is controlling the cooling equipment. This command is ignored if the controller type is set to humidistat.

When the thermostat system mode is set to AUTO, the heat and cool setpoints are interdependent and must abide by the deadband. If an assignment command is received with a cool setpoint decrement value that causes a deadband violation, the heat setpoint is automatically decreased to fulfill the deadband requirement. If the deadband requirement cannot be fulfilled by decreasing the heat setpoint, the command is ignored and no response sent.

If an assignment command is received while the thermostat is running the program schedule, the thermostat automatically initiates a temporary hold with an end time of the start time of the next scheduled event. If a hold is active at the time of the assignment command, the hold setpoint is modified. In addition, if a hold is initiated as a result of the receipt of this command, a C17 COS unsolicited message is issued (if C17 is ON).

If an assignment command is received and the thermostat program format is programmable (i.e. not non-programmable), and the system mode is set to Heat, Emergency Heat or OFF, this command is ignored.

If the resultant setpoint is outside the allowable range for the setpoint temperature, the command is ignored.

S	Active controlling setpoint	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] S?<CR>` Description: Requests the controlling setpoint.	
Assignment Command	Syntax: `SN[#] S=[value]<CR>` Description: Sets the controlling setpoint to `[value]`. Example: `SN1 S=78<CR>`	

Response	Syntax: `SN[#] S[sp]=[value][scale]<CR>`
	Examples: `SN1 SH=68F<CR>`
	Node address 1 responds with a controlling heat setpoint of 68°F.
	`SN1 SC=79F<CR>`
	Node address 1 responds with a controlling cool setpoint of 79°F.
	`SN1 SHUM=35%<CR>`
	Node address 1 responds with a controlling humidification setpoint of 35% RH.
	`SN1 SDEH=50%<CR>`
	Node address 1 responds with a controlling dehumidification setpoint of 50% RH.	

Parameters	Range
`value:` setpoint	
Fahrenheit	[42 – 99]
Celsius	[6 – 37]
Humidity	[10 – 90]
`scale:` scale	[F, C, %]
`F:` Fahrenheit	
`C:` Celsius	
`%:` percent RH	
`sp:` controlling mode	[H, C, HUM, DEH]
`H:` heat	
`C:` cool	
`HUM:` humidification	
`DEH:` dehumidification	

The controlling setpoint corresponds to the active setpoint to which the control is controlling the equipment.

When the control system mode is set to AUTO, the controlling mode is determined by the control. In addition, when the system mode is set to AUTO, the heat and cool setpoints or humidification and dehumidification setpoints are interdependent and must abide by the deadband. If an assignment command is received with a setpoint value that causes a deadband violation, the opposite setpoint is automatically increased or decreased to fulfill the deadband requirement. If the deadband requirement cannot be fulfilled by increasing or decreasing the opposite setpoint, the command is ignored and no response sent.

If an assignment command is received while the thermostat is running the program schedule, the thermostat automatically initiates a temporary hold with an end time of the start time of the next scheduled event. If a hold is active at the time of the assignment command, the hold setpoint is modified. In addition, if a hold is initiated as a result of the receipt of this command, a C17 COS unsolicited message is issued (if C17 is ON).

If a query or an assignment command is received and the thermostat program format is programmable (i.e. not non-programmable), and the system mode is set to OFF, this command is ignored.

Integer values must be within the range specified for the current scale.

SP++, SP--	Increment or decrement the active controlling setpoint	COS: N/A

Permissions: Write only

Assignment Command

Syntax: `SN[#] SP++=[value]<CR>`

Syntax: `SN[#] SP--=[value]<CR>`

Description: Increments or decrements the active controlling setpoint by `[value]`.

Examples:
`SN1 SP++=1<CR>`
`SN1 SP--=5<CR>`

Response

Syntax: `SN[#] S[sp]++=[value][scale]<CR>`

Syntax: `SN[#] S[sp]--=[value][scale]<CR>`

Example:
`SN1 SH++=5F<CR>`
Node address 1 responds with incrementing the heat setpoint by 5°F.

`SN1 SC--=2C<CR>`
Node address 1 responds with decrementing the cool setpoint by 2°C.

`SN1 SHUM++=5%<CR>`
Node address 1 responds with incrementing the humidification setpoint by 5% RH.

`SN1 SDEH--=5%<CR>`
Node address 1 responds with decrementing the dehumidification setpoint by 5% RH.

Parameters	Range
`value:` controlling setpoint change value	
`scale:` scale `F:` Fahrenheit `C:` Celsius `%:` percent RH	[F, C, %]
`sp:` controlling mode `H:` heat `C:` cool `HUM:` humidification `DEH:` dehumidification	[H, C, HUM, DEH]

The active controlling setpoint corresponds to the active setpoint to which the control is controlling the equipment.

When the system mode is set to AUTO, the controlling mode is determined by the control. In addition, when the control system mode is set to AUTO, the heat and cool setpoints or humidification and dehumidification setpoints are interdependent and must abide by the deadband. If an assignment command is received with a setpoint increment or decrement value that causes a deadband violation, the opposite setpoint is automatically increased or decreased to fulfill the deadband requirement. If the deadband requirement cannot be fulfilled by increasing or decreasing the opposite setpoint, the command is ignored and no response sent.

If an assignment command is received while the thermostat is running the program schedule, the thermostat automatically initiates a temporary hold with an end time of the start time of the next scheduled event. If a hold is active at the time of the assignment command, the hold setpoint is modified. In addition, if a hold is initiated as a result of the receipt of this command, a C17 COS unsolicited message is issued (if C17 is ON).

If an assignment command is received and the thermostat program format is programmable (i.e. not non-programmable), and the system mode is set to OFF, this command is ignored.

If the resultant setpoint is outside the allowable range for the setpoint temperature, the command is ignored.

HUMIDITY CONTROL COMMANDS

SHUM	Controlling humidification setpoint	COS: C5
Permissions: Read/Write		
Query Command	Syntax: `SN[#] SHUM?<CR>` Description: Requests the controlling humidification setpoint.	
Assignment Command	Syntax: `SN[#] SHUM=[value]%<CR>` Description: Sets the controlling humidification setpoint to `[value]`. Example: `SN1 SHUM=45%<CR>`	
Response or COS Message	Syntax: `SN[#] SHUM=[value]%<CR>` Example: `SN1 SHUM=45%<CR>` Node address 1 responds with a controlling humidification setpoint of 45%.	
Parameters		Range
`value:` humidistat setpoint in %RH		[10 – 90]

The controlling humidification setpoint corresponds to the active setpoint to which the humidistat is controlling the humidification equipment. Assignment commands are ignored if the controller type is set to thermostat.

When the humidistat system mode is set to AUTO, the controlling mode is determined by the humidistat. In addition, when the humidistat system mode is set to AUTO, the Humidification and Dehumidification setpoints are interdependent and must abide by the fixed deadband. If an assignment command is received with a setpoint value that causes a deadband violation, the opposite setpoint is automatically increased or decreased to fulfill the deadband requirement. If the deadband requirement cannot be fulfilled by increasing or decreasing the opposite setpoint, the command is ignored and no response sent.

Integer values must be within the range specified. The humidification setpoint can be changed through the Home Screens for humidistat control. If the humidification setpoint is changed at the thermostat, a C5 COS unsolicited message is issued (if C5 is ON).

SHUM++, SHUM--	Increment or decrement the controlling humidistat humidification setpoint	COS: N/A
Permissions: Write only		
Assignment Command	Syntax: `SN[#] SHUM++=[value]%<CR>` Syntax: `SN[#] SHUM--=[value]%<CR>` Description: Increments or decrements the controlling humidification setpoint to `[value]` based on the ++/--. Examples: `SN1 SHUM++=3%<CR>` `SN1 SHUM--=5%<CR>`	
Response	Syntax: `SN[#] SHUM++=[value]%<CR>` Syntax: `SN[#] SHUM--=[value]%<CR>` Example: `SN1 SHUM++=5%<CR>` Node address 1 responds with incrementing the humidification setpoint by 5% RH.	
Parameters		Range
`value:` controlling humidification setpoint increment or decrement value		

The controlling humidification setpoint corresponds to the active setpoint to which the humidistat is controlling the humidification equipment. This command is ignored if the controller type is set to thermostat.

If the resultant setpoint is outside the allowable range for the humidification setpoint, the command is ignored.

SDEH	Controlling dehumidification setpoint	COS: C5

Permissions: Read/Write

Query Command	Syntax: `SN[#] SDEH?<CR>` Description: Requests the controlling dehumidification setpoint.
Assignment Command	Syntax: `SN[#] SDEH=[value]<CR>` Description: Sets the controlling dehumidification setpoint to `[value]`. Example: `SN1 SDEH=55<CR>`
Response or COS Message	Syntax: `SN[#] SDEH=[value]%<CR>` Example: `SN1 SDEH=55%<CR>` Node address 1 responds with a controlling dehumidification setpoint of 55%.

Parameters	Range
`value:` humidistat setpoint in %RH	[10 – 90]

The controlling dehumidification setpoint corresponds to the active setpoint to which the humidistat is controlling the dehumidification equipment. Assignment commands are ignored if the controller type is set to thermostat.

When the humidistat system mode is set to AUTO, the controlling mode is determined by the humidistat. In addition, when the humidistat system mode is set to AUTO, the Humidification and Dehumidification setpoints are interdependent and must abide by the fixed deadband. If an assignment command is received with a setpoint value that causes a deadband violation, the opposite setpoint is automatically increased or decreased to fulfill the deadband requirement. If the deadband requirement cannot be fulfilled by increasing or decreasing the opposite setpoint, the command is ignored and no response sent.

Integer values must be within the range specified. The dehumidification setpoint can be changed through the Home Screens for humidistat control. If the dehumidification setpoint is changed at the thermostat, a C5 COS unsolicited message is issued (if C5 is ON).

SDEH++, SDEH--	Increment or decrement the controlling humidistat dehumidification setpoint	COS: N/A

Permissions: Write only

Assignment Command	Syntax: `SN[#] SDEH++=[value]%<CR>` Syntax: `SN[#] SDEH--=[value]%<CR>` Description: Increments or decrements the controlling dehumidification setpoint to `[value]`. Examples: `SN1 SDEH++=3%<CR>` `SN1 SDEH--=5%<CR>`
Response	Syntax: `SN[#] SDEH++=[value]%<CR>` Syntax: `SN[#] SDEH--=[value]%<CR>` Example: `SN1 SDEH++=5%<CR>` Node address 1 responds with incrementing the dehumidification setpoint by 5% RH.

Parameters	Range
`value:` controlling dehumidification setpoint increment or decrement value	

The controlling dehumidification setpoint corresponds to the active setpoint to which the humidistat is controlling the dehumidification equipment. This command is ignored if the controller type is set to thermostat.

When the humidistat system mode is set to AUTO, the controlling mode is determined by the humidistat. In addition, when the humidistat system mode is set to AUTO, the Humidification and Dehumidification setpoints are interdependent and must abide by the fixed deadband. If an assignment command is received with a setpoint increment or decrement value that causes a deadband violation, the opposite setpoint is automatically increased or decreased to fulfill the deadband requirement. If the deadband requirement cannot be fulfilled by increasing or decreasing the opposite setpoint, the command is ignored and no response sent.

If the resultant setpoint is outside the allowable range for the dehumidification setpoint, the command is ignored.

PROGDxEy	Program event configuration (Day: x = 0 – 9; Event: y = 0 – 3)	COS: C16
Permissions: Read/Write		
Query Command	Syntax: `SN[#] PROGD[x]E[y]?<CR>` Description: Requests the thermostat schedule event configuration for event y of day x.	

Assignment Command	Syntax: `SN[#] PROGD[x]E[y]=[hh][mm] [HT] [CL] [fan]<CR>`
	`SN[#] PROGD[x]E[y]=[hh][mm] [HT] [fan]<CR>`
	`SN[#] PROGD[x]E[y]=[hh][mm] [CL] [fan]<CR>`
	Description: Configures event `[y]` of day `[x]` to start at `[hh][mm]` with a heat setpoint of `[HT]`, a cool setpoint of `[CL]` and fan mode of `[fan]`. If the thermostat is configured with a Control Setup of Heat Only or Cool Only, only the respective setpoint is used.
	Example: `SN1 PROGD1E1=0600 69 78 AUTO<CR>`	

Response or COS Message	Syntax: `SN[#] PROGD[x]E[y]=[hh][mm] [HT][scale] [CL][scale] [fan]<CR>`
	`SN[#] PROGD[x]E[y]=[hh][mm] [HT][scale] [fan]<CR>`
	`SN[#] PROGD[x]E[y]=[hh][mm] [CL][scale] [fan]<CR>`
	Example: `SN1 PROGD1E1=0600 69F 78F AUTO<CR>`
	Node address 1 responds with an event configuration of 6:00AM start time, 69°F heat setpoint, 78°F cool setpoint, and fan mode of AUTO for Tuesday's second event.	

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Parameters	Range
`x:` day of the week code	[0 – 9]
`0:` Monday	
`1:` Tuesday	
`2:` Wednesday	
`3:` Thursday	
`4:` Friday	
`5:` Saturday	
`6:` Sunday	
`7:` Weekdays	
`8:` Weekends	
`9:` Everyday	
`y:` event code	
4-events per day configuration	[0 – 3]
`0:` Wake	
`1:` Leave	
`2:` Return	
`3:` Sleep	
2-events per day configuration	[0 – 1]
`0:` Wake/Occupied	
`1:` Sleep/Unoccupied	
`hh:` event start time hours in 24-hour format	[00 – 23]
`mm:` event start time minutes	[00 – 59]
`HT:` event heat setpoint	
Fahrenheit	[40 – 90]
Celsius	[4 – 32]
`CL:` event cool setpoint	
Fahrenheit	[42 – 99]
Celsius	[6 – 37]
`fan:` event programmed fan mode	[AUTO, A, ON, CIRC]
`AUTO, A:` fan auto mode	
`ON:` fan on mode	
`CIRC:` fan circulate mode	
`scale:` temperature scale	[F, C]
`F:` Fahrenheit	
`C:` Celsius	

The thermostat schedule is divided into 7 days with a maximum of 4 events per day. Access to the schedule is on a per-event basis. Each event has a start time, heat and cool setpoint and a fan mode. When an assignment command is received, the specified event(s) are automatically stored in non-volatile memory.

If an assignment command is received with a day of the week code `[x]` parameter of 7-9, the event `[y]` for each day corresponding to the day of the week code `[x]` is configured with the parameters of the command (assuming correct syntax, etc.).

If a query command is received with a day of the week code `[x]` parameter of 7 or 9, the event configuration of Monday is sent; if the parameter is 8, the event configuration of Saturday is sent.

If the thermostat is configured for 2 events per day, commands received with the event `[y]` parameter greater than 1 is ignored. If the thermostat is configured with a Control Setup of Heat Only or Cool Only, only the respective setpoint is used in the command syntax.

This command is ignored if the controller type is set to humidistat or if the thermostat is configured as non-programmable. In addition, commands with a day of the week code in conflict with the program format are ignored. (E.g. if the thermostat is configured with a program format of 5/2 and a day of the week code of 0-6 is received, the command is ignored since the thermostat cannot program days individually in the 5/2 program format.)

Integer values must be within the ranges specified. The schedule can be changed through the thermostat Program Screens. If the schedule is changed at the thermostat, a C16 COS unsolicited message is issued (if C16 is ON). NOTE: if the schedule is changed at the thermostat, up to 4 COS unsolicited messages can be sent (one for each event in a day).

COPYDx	Copy from day x	COS: N/A
Permissions: Write only		
Assignment Command	Syntax: `SN[#] COPYD[x]=[copy_to]<CR>` Description: Copies all events of day `[x]` to day `[copy_to]`. Example: `SN1 COPYD1=2<CR>`	
Response	Syntax: `SN[#] COPYD[x]=[copy_to]<CR>` Example: `SN1 COPYD7=8<CR>` Node address 1 responds with copying all events from Weekdays to Weekends.	

Parameters	Range
`x:` day of the week to copy from	[0 – 8]
`copy_to:` day to copy to	[0 – 9]

- `0:` Monday
- `1:` Tuesday
- `2:` Wednesday
- `3:` Thursday
- `4:` Friday
- `5:` Saturday
- `6:` Sunday
- `7:` Weekdays
- `8:` Weekends
- `9:` Everyday (`copy_to` only)

Thermostat event programming can be copied from day one day to another day or set of days using this command.

If an assignment command is received with a day of the week code `[copy_to]` parameter of 7-9, each day corresponding to the day of the week code `[copy_to]` is configured with the events of the `[x]` day (assuming correct syntax, etc.).

This command is ignored if the controller type is set to humidistat or if the thermostat is configured as non-programmable. In addition, commands with a day of the week code in conflict with the program format are ignored. (E.g. if the thermostat is configured with a program format of 5/2 and a day of the week code of 0-6 is received, the command is ignored since the thermostat cannot program days individually in the 5/2 program format.)

PERMHOLD	Permanent hold	COS: N/A
Permissions: Read/Write		
Query Command	Syntax: `SN[#] PERMHOLD?<CR>` Description: Requests the state of the thermostat program permanent hold.	
Assignment Command	Syntax: `SN[#] PERMHOLD=[value]<CR>` Description: Sets the permanent hold state to `[value]`. Example: `SN1 PERMHOLD=OFF<CR>`	
Response	Syntax: `SN[#] PERMHOLD=[value]%<CR>` Example: `SN1 PERMHOLD=ON<CR>` Node address 1 responds with a permanent hold state of ON.	

Parameters	Range
`value:` permanent hold state	[OFF, ON]

If an assignment command is received with the value parameter set to ON and another hold type is currently active, the currently active hold is replaced by the permanent hold. An assignment command with value parameter set to OFF cancels an active permanent hold. The current hold status can be read using the HOLDSTAT command. A permanent hold can also be cancelled using the HOLDSTAT command.

This command is ignored if the controller type is set to humidistat or if the thermostat is configured as non-programmable. The permanent hold state can be changed through the Home Screens for thermostat control. If the permanent hold state is changed at the thermostat, a C17 COS unsolicited message is issued (if C17 is ON).

VACHOLD	Vacation hold	COS: N/A

Permissions: Read/Write

Query Command

Syntax: `SN[#] VACHOLD?<CR>`

Description: Requests the configuration of the thermostat program vacation hold.

Assignment Command

Syntax:
```
SN[#] VACHOLD=[mm][dd][yy] [hh][mm] [HT] [CL] [fan]<CR>
SN[#] VACHOLD=[mm][dd][yy] [hh][mm] [HT] [fan]<CR>
SN[#] VACHOLD=[mm][dd][yy] [hh][mm] [CL] [fan]<CR>
```

Description: Configures a vacation hold to end on `[mm][dd][yy]` at `[hh][mm]` with a heat setpoint of `[HT]`, a cool setpoint of `[CL]` and fan mode of `[fan]`. If the thermostat is configured with a Control Setup of Heat Only or Cool Only or if the system mode is set to Heat, Emergency Heat or Cool, only the respective setpoint is used. The syntax with both setpoints is only used when the system mode is AUTO.

Example: `SN1 VACHOLD=011511 1200 62 AUTO<CR>`

Response

Syntax:
```
SN[#] VACHOLD=[mm][dd][yy] [hh][mm] [HT][scale] [CL][scale] [fan]<CR>
SN[#] VACHOLD=[mm][dd][yy] [hh][mm] [HT][scale] [fan]<CR>
SN[#] VACHOLD=[mm][dd][yy] [hh][mm] [CL][scale] [fan]<CR>
```

Example: `SN1 VACHOLD=011011 1900 65F AUTO<CR>`
Node address 1 responds with a vacation hold configured to end on January 10, 2011 at 7:00PM with a heat setpoint of 65°F and fan mode of AUTO.

Parameters	Range
`mm:` end date month	[01 – 12]
`dd:` end date day	[01 – 31]
`yy:` end date year	[00 – 99]
`hh:` end time hours in 24-hour format	[00 – 23]
`mm:` end time minutes	[00 – 59]
`HT:` hold heat setpoint	
Fahrenheit	[40 – 90]
Celsius	[4 – 32]
`CL:` hold cool setpoint	
Fahrenheit	[42 – 99]
Celsius	[6 – 37]
`fan:` hold programmed fan mode	[AUTO, A, ON, CIRC]
`AUTO, A:` fan auto mode	
`ON:` fan on mode	
`CIRC:` fan circulate mode	
`scale:` temperature scale	[F, C]
`F:` Fahrenheit	
`C:` Celsius	

If a query command is received and a vacation hold is not active, no response is sent. If an assignment command is received and another hold type is currently active, the currently active hold is replaced by the vacation hold. The current hold status is read using the HOLDSTAT command. A vacation hold is cancelled using the HOLDSTAT command.

This command is ignored if the controller type is set to humidistat or if the thermostat is configured as non-programmable. The vacation hold configuration state can be changed through the Home Screens for thermostat control. If the vacation hold configuration is changed at the thermostat, a C17 COS unsolicited message is issued (if C17 is ON).

TEMPHOLD	Temporary hold	COS: N/A

Permissions: Read only

Query Command

Syntax: `SN[#] TEMPHOLD?<CR>`

Description: Requests the configuration of the thermostat program temporary hold.

Assignment Command

Syntax:
```
SN[#] TEMPHOLD=[mm][dd][yy] [hh][mm] [HT] [CL]<CR>
SN[#] TEMPHOLD=[mm][dd][yy] [hh][mm] [HT]<CR>
SN[#] TEMPHOLD=[mm][dd][yy] [hh][mm] [CL]<CR>
```

Description: Configures a temporary hold to end on `[mm][dd][yy]` at `[hh][mm]` with a heat setpoint of `[HT]` and a cool setpoint of `[CL]`. If the thermostat is configured with a Control Setup of Heat Only or Cool Only or if the system mode is set to Heat, Emergency Heat or Cool, only the respective setpoint is used. The syntax with both setpoints is only used when the system mode is AUTO.

Example: `SN1 TEMPHOLD=011511 1200 62<CR>`

Response

Syntax:
```
SN[#] TEMPHOLD=[mm][dd][yy] [hh][mm] [HT][scale] [CL][scale]<CR>
SN[#] TEMPHOLD=[mm][dd][yy] [hh][mm] [HT][scale]<CR>
SN[#] TEMPHOLD=[mm][dd][yy] [hh][mm] [CL][scale]<CR>
```

Description: Temporary hold configuration to end on `[mm][dd][yy]` at `[hh][mm]` with a heat setpoint of `[HT]` and a cool setpoint of `[CL]`. If the thermostat is configured with a Control Setup of Heat Only or Cool Only or if the system mode is set to Heat, Emergency Heat or Cool, only the respective setpoint is used. The syntax with both setpoints is only used when the system mode is AUTO.

Example: `SN1 TEMPHOLD=010111 1700 70F<CR>`
Node address 1 responds with a temporary hold configured to end on January 1, 2011 at 5:00PM with a heat setpoint of 70°F.

Parameters	Range
`mm:` end date month	[01 – 12]
`dd:` end date day	[01 – 31]
`yy:` end date year	[00 – 99]
`hh:` end time hours in 24-hour format	[00 – 23]
`mm:` end time minutes	[00 – 59]
`HT:` hold heat setpoint	
Fahrenheit	[40 – 90]
Celsius	[4 – 32]
`CL:` hold cool setpoint	
Fahrenheit	[42 – 99]
Celsius	[6 – 37]
`scale:` temperature scale	[F, C]
`F:` Fahrenheit	
`C:` Celsius	

A temporary hold is intended to last no more than 24 hours since a temporary hold to the thermostat is based on the schedule events. If a hold longer than 24 hours is required, a vacation hold may be used.

If a query command is received and a temporary hold is not active, no response is sent. The current hold status is read using the HOLDSTAT command. A temporary hold is cancelled using the HOLDSTAT command.

This command is ignored if the controller type is set to humidistat or if the thermostat is configured as non-programmable. The temporary hold configuration can be changed through the Home Screens for thermostat control. If the temporary hold configuration is changed at the thermostat, a C17 COS unsolicited message is issued (if C17 is ON).

STATUS COMMANDS

HVAC, H	Relay output status	COS: C1
Permissions: Read only		
Query Command	Syntax: `SN[#] HVAC?<CR>` `SN[#] H?<CR>` Description: Requests the current state of the relay outputs.	
Response or COS Message	Syntax: `SN[#] HVAC=G[x]Y1[x]W1[x]Y2[x]W2[x]B[x]O[x]<CR>` Example: `SN1 HVAC=G-Y1-W1+Y2-W2+B+O-<CR>` Node address 1 responds with outputs W1, W2 and B, ON and G, Y1, Y2 and O, OFF.	
Parameters		Range
`value:` relay output status `-:` relay status is OFF `+:` relay status is ON		[-, +]
If any relay status changes, a C1 COS unsolicited message is issued (if C1 is ON).		

RECOVSTAT	Progressive recovery status	COS: C15
Permissions: Read only		
Query Command	Syntax: `SN[#] RECOVSTAT?<CR>` Description: Requests the current state of progressive recovery.	
Response or COS Message	Syntax: `SN[#] RECOVSTAT=[value]<CR>` Example: `SN1 RECOVSTAT=OFF<CR>` Node address 1 responds with a progressive recovery status of OFF.	
Parameters		Range
`value:` progressive recovery status `OFF:` progressive recovery is inactive `ON:` progressive recovery is active		[OFF, ON]
This command is ignored if the controller type is set to humidistat. If the progressive recovery status changes, a C15 COS unsolicited message is issued (if C15 is ON).		

HOLDSTAT	Thermostat program hold status	COS: C17
Permissions: Read/Write		
Query Command	Syntax: `SN[#] HOLDSTAT?<CR>` Description: Requests the thermostat program hold status.	
Assignment Command	Syntax: `SN[#] HOLDSTAT=NONE<CR>` Description: Cancels all active holds. The assignment command has only this syntax.	
Response or COS Message	Syntax: `SN[#] HOLDSTAT=[value]<CR>` Example: `SN1 HOLDSTAT=NONE<CR>` Node address 1 responds with a hold status of NONE.	

Parameters — Range

`value:` hold status code — [NONE, TEMP, PERM, VAC]

- `NONE:` no holds are currently active
- `TEMP:` a temporary hold is active
- `PERM:` a permanent hold is active
- `VAC:` a vacation hold is active

The assignment command is only available for cancelling active holds. This command is ignored if the controller type is set to humidistat.

Holds can be changed (initiated or cancelled) through the thermostat Home Screens. If the hold status is changed at the thermostat, a C17 COS unsolicited message is issued (if C17 is ON).

HOLD	Network override status	COS: C6
Permissions: Read/Write		
Query Command	Syntax: `SN[#] HOLD?<CR>` Description: Requests the network override status.	
Assignment Command	Syntax: `SN[#] HOLD=[value]<CR>` Description: Sets the network override status to `[value]`.	
Response or COS Message	Syntax: `SN[#] HOLD=[value]<CR>` Example: `SN1 HOLD=OFF<CR>` Node address 1 responds with a network override status of OFF.	

Parameters — Range

`value:` network override status — [OFF, ON]

This command is ignored if the NETLK network override lockout setting is set to enabled.

Network override status can be changed through the Home Screens. If the network override status is changed at the node, a C6 COS unsolicited message is issued (if C6 is ON).

PROGUPDT	Program modification status	COS: C16

Permissions: COS only

COS Message	Syntax:	SN[#]PROGUPDT=[value]<CR>
	Syntax:	SN[#]PROGUPDT=[m][t][w][r][f][s][n]<CR>
	Example:	SN1 PROGUPDT=NONE<CR> Node address 1 responds with a program modification status of NONE.
		SN1 PROGUPDT=0000011<CR> Node address 1 responds with a program modification status of Saturday and Sunday.

Parameters	Range
value: program modification status	[NONE]
NONE: program has not been modified	
m, t, w, r, f, s, n: day of the week code	[0, 1]
0: unmodified day	
1: modified day	

If the user modifies the program at the thermostat, a C16 COS unsolicited message is issued (if C16 is ON).

ERROR	Error status	COS: C19

Permissions: Read only

Query Command	Syntax:	SN[#] ERROR?<CR>
	Description:	Requests the current error state.
Response or COS Message	Syntax:	SN[#] ERROR=[t][rt][ot][h][com][ee]<CR>
	Example:	SN1 ERROR=000000<CR> Node address 1 responds with an error status indicating no errors.

Parameters	Range
t: built-in temperature sensor error status code	[0 – 2]
rt: remote temperature sensor error status code	[0 – 2]
ot: remote temperature sensor error status code	[0 – 2]
0: no error	
1: sensor is open-circuited	
2: sensor is short-circuited	
h: built-in humidity sensor error status code	[0 – 1]
0: no error	
1: RH sensor error	
com: local communication error status code	[0 – 1]
0: no error	
1: unresponsive node error	
ee: EEPROM error status code	[0 – 1]
0: no error	
1: EEPROM memory error	

If any error status changes, a C19 COS unsolicited message is issued (if C19 is ON).

PMES1, PMES2, PMES3, PMES4	Permanent messages	COS: N/A

Permissions: Read/Write

Query Command	Syntax: `SN[#] PMES[n]?<CR>` Description: Requests the message string for permanent message `[n]`.
Assignment Command	Syntax: `SN[#] PMES[n]=[string]<CR>` Description: Sets the message string for permanent message `[n]` to `[string]`.
Response	Syntax: `SN[#] PMES[n]=[string]<CR>` Example: `SN1 PMES1=CURRENT STATUS AUTO<CR>` Node address 1 responds with a permanent message 1 string of "CURRENT STATUS AUTO".

Parameters	Range
`string:` message string	[null, 31 ASCII character string]

Up to four messages are displayed on a rotating basis. The message center is a two-line, character display with a total of 31 characters (16-top, 15-bottom line). The top line of the display is filled first followed with the remainder of the characters on the bottom line. Blanks (spaces) count as characters. Each message is displayed for 2 seconds, after which, the next message is displayed. If the message is NULL or is filled with nothing but spaces, then the message is skipped in the sequence. If only one message is available, it is permanently displayed. The characters in the text string are limited to alphanumeric characters uppercase only. If an assignment command is received with a null string, the default message is displayed. The default messages are:

Message	Default String
1	NULL
2	NULL
3	NULL
4	NULL

TMPMES	Temporary message	COS: N/A

Permissions: Read/Write

Query Command	Syntax: `SN[#] TMPMES?<CR>` Description: Requests the temporary message string.
Assignment Command	Syntax: `SN[#] TMPMES=[string]<CR>` Description: Sets the message string for the temporary message to `[string]`.
Response	Syntax: `SN[#] TMPMES=[string]<CR>` Example: `SN1 TMPMES=RESET FILTER<CR>` Node address 1 responds with a temporary message string of "RESET FILTER".

Parameters	Range
`string:` message string	[null, 31 ASCII character string]

With this command, messages can be shown in the message center that override the permanent message display. The message center is a two-line, character display with a total of 31 characters (16-top, 15-bottom line). The top line of the display is filled first followed with the remainder of the characters on the bottom line. Blanks (spaces) count as characters. When an assignment command is received, the permanent message sequence is suspended by the temporary message. The backlight turns on and off (5 seconds on, 2 seconds off) ten times. The temporary message is displayed until an assignment command is received with a null string. The characters in the text string are limited to alphanumeric characters uppercase only.

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