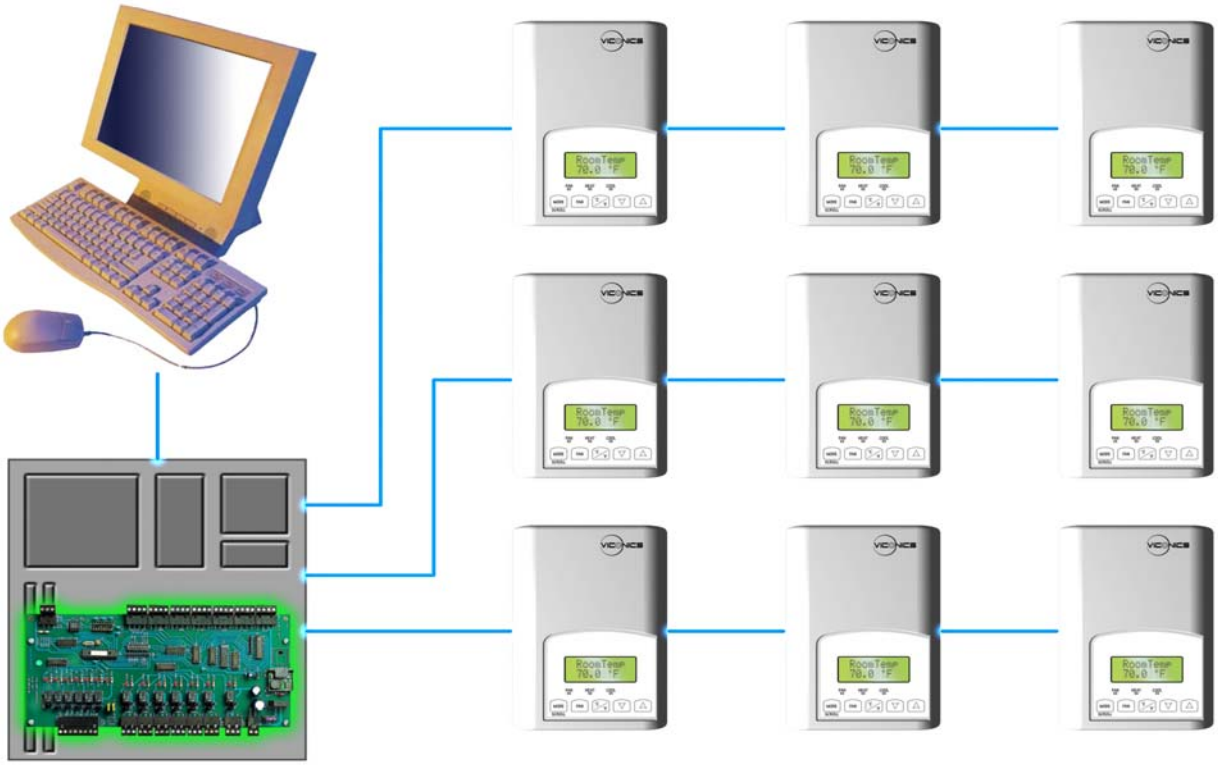
PIR Ready VT7200 Series
24 Vac Low Voltage Zoning System Thermostats
For Commercial and Lodging HVAC Applications

LonWorks Integration Manual
ITG-VT7200-LON-E04

(028-6001 R4 Issue Date: January 21, 2008)



Product Overview

The VT7200 PI thermostat family is specifically designed for zoning applications.
Typical applications include local hydronic reheat valve control and pressure dependent VAV with or without local reheat. The product features a backlit LCD display with dedicated function menu keys for simple operation. Accurate temperature control is achieved due to the product's PI proportional control algorithm, which virtually eliminates temperature offset associated with traditional, differential-based thermostats. Models are available for 3 point floating and analog 0 to 10 Vdc control. In addition remote room sensing is available.

They all contain an SPST auxiliary switch that can be used to control lighting or auxiliary reheat. 3 additional inputs are also provided for monitoring and / or various advanced functions.

All devices are also available with Echelon, BACnet MS-TP or Zigbee wireless network adapter.

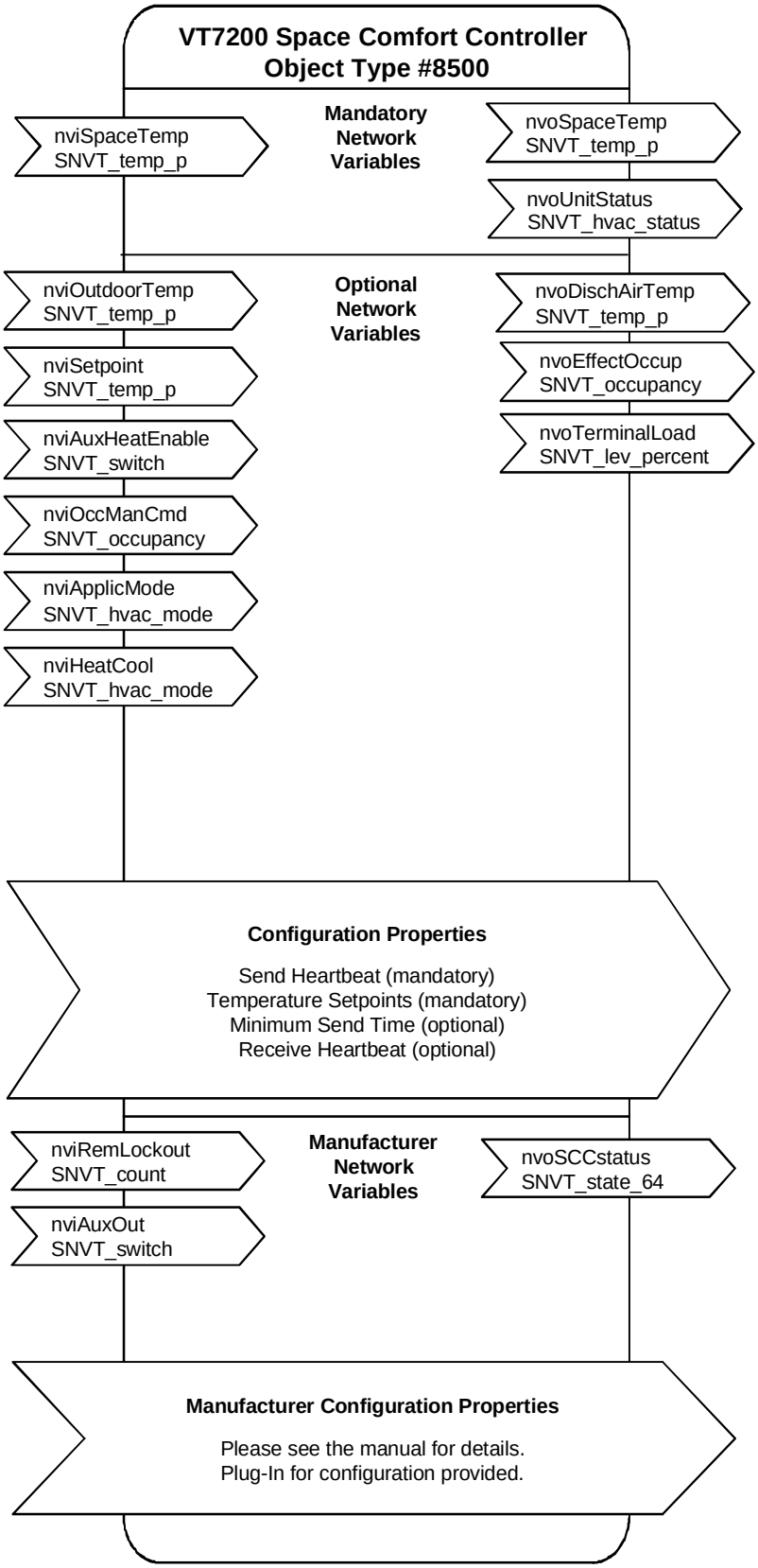
The thermostats are also compatible with the new Viconics PIR cover accessories. Thermostats equipped with a PIR cover provide advanced active occupancy logic, which will automatically switch occupancy levels from Occupied to Stand-By and Unoccupied as required by local activity being present or not. This advanced occupancy functionality provides advantageous energy savings during occupied hours without sacrificing occupant comfort. All thermostats can be ordered with or without a factory installed PIR cover (see ordering notes below).

The additional following documents are available at: www.viconics.com

- Detailed information on the thermostat (VT7200X5x00x), is available on document: *LIT-VT7200-PIR-Exx.*
- PIR application information and examples, are available on document: *APP-PIR-Guide-Exx*
- PIR cover installation information is available on document: *PIR Cover Installation-Exx*

Contents

Thermostat Objects



SNVTs[1] and SCPTs[2] Table Per Model

Model Number			VT7200C5x00E	VT7200F5x00E
No	**Sub**	**Point Name**		
		N/A: Not applicable on this model		
0		**nviSpaceTemp**	X	X
1		**nviOutdoorTemp**	X	X
2		**nviSetpoint**	X	X
3		**nviSpaceRH**	N/A	N/A
4		**nviFanSpeedCmd**	N/A	N/A
5		**nviAuxHeatEnable**	X	X
6		**nviOccManCmd**	X	X
7		**nviApplicMode**	X	X
8		**nviHeatCool**	X	X
9		**nviRemLockout**	X	X
10		**nviDhumiLCK**	N/A	N/A
11		**nviAuxOut**	X	X
12		**nvoSpaceTemp**	X	X
13		**nvoDischAirTemp**	X	X
14		**nvoSpaceRH**	N/A	N/A
15		**nvoEffectOccup**	X	X
16		**nvoUnitStatus**	X	X
	1	mode	x	x
	2	heat_output_primary	x	x
	4	cool_output	x	x
	6	fan_output	N/A	N/A
	7	in_alarm	x	x
17		**nvoSccStatus**	X	X
	1	StateTerminal BO2	x	N/A
	2	StateTerminal BO1	x	N/A
	3	StateTerminal BO4	x	N/A
	4	StateTerminal BO3	x	N/A
	5	StateTerminal BO5	x	x
	6	FanLow	N/A	N/A
	7	FanMed	N/A	N/A
	8	FanHigh	N/A	N/A
	9	UI 3 Status	x	x
	10	BI 2 Status	x	x
	11	BI1 Status	x	x
	12	Local PIR Motion	x	x
	13	Service Alarm	x	x
	14	Filter Alarm	x	x
	15	Window Opened	x	x
	16	Dehumidification Active	N/A	N/A
18		**nvoTerminalLoad**	X	X

Model Number			VT7200C5x00E	VT7200F5x00E
No	Sub	Point Name		
		N/A: Not applicable on this model		
19		**nciSetPts**	X	X
	1	occupied_cool	x	x
	2	standby_cool	x	x
	3	unoccupied_cool	x	x
	4	occupied_heat	x	x
	5	standby_heat	x	x
	6	unoccupied_heat	x	x
20		**nciRHmodel**	N/A	N/A
	1	RHdisplay	N/A	N/A
	2	RHsetpoint	N/A	N/A
	3	DehumHyst	N/A	N/A
	4	DehumCool	N/A	N/A
	5	RHcalib	N/A	N/A
21		**nciGenOpt**	X	X
	1	Control Type	x	N/A
	2	Drive Time	x	N/A
	3	Cycles Per Hour	x	N/A
	4	Reverse Acting Output	N/A	x
	5	BI1	x	x
	6	BI2	x	x
	7	UI3	x	x
	8	Menu Scroll	x	x
	9	Auto Mode	x	x
	10	Temperature Scale	x	x
	11	Main out config	x	x
	12	Sequence of Operation	x	x
	13	Fan Menu Sequence	N/A	N/A
	14	Heat Maximum setpoint	x	x
	15	Cool Minimum setpoint	x	x
	16	SetpointType	x	x
	17	Temporary Occ Time	x	x
	18	Deadband	x	x
	19	Calibration Room Sensor	x	x
	20	Auxiliary Contact Config	x	x
	21	Reheat Time Base	x	x
	22	Fan Mode	N/A	N/A
	23	PIR Stand-By Timer	x	x
	24	PIR Unoccupied Timer	x	x
22		**nciSccModel**	X	X
	1	Thermostat Model	x	x
	2	Software Version	x	x
23		**nciHvacType**	X	X
24		**nciSndHrtBt**	X	X
25		**nciMinOutTm**	X	X
26		**nciRcvHrtBt**	X	X
27		**nciMajVer**	X	X
28		**nciMinVer**	X	X

Input Network Variables (nvi's) Description

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td>Room Temperature</td><td>network input
SNVT_temp_p
nviSpaceTemp</td><td>➢ This input network variable provides a network remote temperature value to the thermostat. When linked of written to, the internal temperature reading (internal sensor) is no longer used.
➢ Valid Range: -40 to 122°F (-40 to 50°C)
➢ Default Null (release) Value: 621.81°F (327.67°C or 0x7FFF)
➢ This network variable is subject to the Receive HeartBeat Time, nviRcvHrtBt.</td></tr>
<tr><td>Outdoor Air Temperature</td><td>network input
SNVT_temp_p
nviOutdoorTemp</td><td>➢ This input network variable provides outdoor air temperature information to the thermostat from a network value temperature value. The device will automatically display the value on its display when linked.
➢ Valid Range: -40 to 122°F (-40 to 50°C)
➢ Default Null (release) Value: 621.81°F (327.67°C or 0x7FFF)</td></tr>
<tr><td>Occupied Cool & Heat Setpoints</td><td>network Input
SNVT_temp_p
nviSetpoint</td><td>➢ This input network variable is used to allow the occupied temperature setpoints only to be changed via the network from a single analog value. (Note: the Stand-By and Unoccupied setpoints are not changed). The corresponding heating and cooling values are derived from the minimum deadband configuration value
➢ Default Null Value: 621.81°F (327.67°C or 0x7FFF)
➢ Ex. If the minimum deadband configuration value = 2 °F and nviSetpoint = 70°F.
• The resulting Occupied heating setpoint will equal 69 °F which is derived from 70 °F minus ½ the minimum deadband configuration value of 2 °F
• The resulting Occupied cooling setpoint will equal 71 °F which is derived from 70 °F plus ½ the minimum deadband configuration value of 2 °F</td></tr>
<tr><td>Room Humidity</td><td>network input
SNVT_lev_percent
nviSpaceRH</td><td>Not Used</td></tr>
<tr><td>Fan Mode</td><td>network input
SNVT_switch
nviFanSpeedCmd</td><td>Not Used</td></tr>
<tr><td>Sequence of Operation</td><td>network input
SNVT_switch
nviAuxHeatEnable[1]

See note 1 below</td><td>➢ This input network variable is used to enable or disable the auxiliary heat stage.
➢ This input is used in conjunction with nviHeatCool and SeqOper.
➢ Default Null Value: AUTO (state = 0xFF)
➢ Set value to 100% for both On & Off state
➢ Valid Range of nviAuxHeatEnable:
<table>
<tr><th>State</th><th>Value</th><th>Equivalent Percent</th><th>Auxiliary Heat Operation</th></tr>
<tr><td>0</td><td>n/a</td><td>n/a</td><td>Disabled – Not Used</td></tr>
<tr><td>1</td><td>0</td><td>0%</td><td>Disabled</td></tr>
<tr><td>1</td><td>1 to 199</td><td>0.5 to 99.5%</td><td>Partially Enabled – Not Used</td></tr>
<tr><td>1</td><td>200 to 255</td><td>100%</td><td>Enabled</td></tr>
<tr><td>0xFF</td><td>n/a</td><td>n/a</td><td>Enabled (invalid)</td></tr>
</table></td></tr>
</table>

Parameter	Variable Name	Function
Occupancy	network input SNVT_occupancy **nviOccManCmd**	➢ This input network variable is used to command the Space Comfort Controller into different occupancy modes. It is typically set by a supervisory node to remotely control the occupancy modes to override the local occupancy routines of the thermostat. ➢ Default Null Value: OC_NUL = 0xFF ➢ Valid Range: 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 2 = OC_BYPASS – **Not Used** 3 = OC_STANDY – **Not Used** 0xFF = OC_NUL (Release to internal occupancy)** * OC_OCCUPIED and OC_UNOCCUPIED commands will always have full authority over the local occupancy routines of the thermostat may they be a local input or a PIR cover. ** OC_NUL command will release the thermostat to use its own internal occupancy routine driven from one of the digital input or a PIR cover installed on board.
System Mode	network input SNVT_hvac_mode **nviApplicMode**	➢ This network variable input is used to coordinate the Space Comfort Controller with any node that may need to control the heat/cool changeover of the unit. ➢ This input is used in conjunction with nviApplicMode and SeqOper. ➢ Default Null Value: HVAC_AUTO. ➢ This network variable is subject to the receive heartbeat time, nciRcvHrtBt ➢ Valid Range: 0 = HVAC_AUTO 1 = HVAC_HEAT 2 = HVAC_MRNG_WRMUP – **Not Used** 3 = HVAC_COOL 4 = HVAC_NIGHT_PURGE – **Not Used** 5 = HVAC_PRE_COOL – **Not Used** 6 = HVAC_OFF 7 = HVAC_TEST – **Not Used** 8 = HVAC_EMERG_HEAT – **Not Used** 9 = HVAC_FAN_ONLY – **Not Used** 12 = HVAC_MAX_HEAT – **Not Used** 13 = HVAC_ECONOMY – **Not Used** 14 = HVAC_DEHUMID – **Not Used**) 15 = HVAC_CALIBRATE – **Not Used**) 0xFF = HVAC_NUL – **Not Used**

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td>Sequence of operation</td><td>network input
SNVT_hvac_mode
nviHeatCool[1]

See note 1 below</td><td>➢ This network variable input is used to coordinate the Space Comfort Controller with any node that may need to control the heat/cool changeover of the unit. This input is overridden by nviApplicMode, unless nviApplicMode is HVAC_AUTO. If nviApplicMode is HVAC_AUTO, then nviHeatCool determines the effective mode of the unit.
➢ Default Null Value: HVAC_AUTO.
➢ This network variable is subject to the receive heartbeat time, nciRcvHrtBt
➢ Valid Range:
0 = HVAC_AUTO
1 = HVAC_HEAT
2 = HVAC_MRNG_WRMUP – Not Used
3 = HVAC_COOL
4 = HVAC_NIGHT_PURGE – Not Used
5 = HVAC_PRE_COOL – Not Used
6 = HVAC_OFF
7 = HVAC_TEST – Not Used
8 = HVAC_EMERG_HEAT – Not Used
9 = HVAC_FAN_ONLY – Not Used
12 = HVAC_MAX_HEAT – Not Used
0xFF = HVAC_NUL – Not Used</td></tr>
<tr><td>Lockout</td><td>network input
UNVT_nvi/nvo
nviRemLockout</td><td>➢ This network variable input is used to enable or disable user access to thermostat
➢ Default Null Value: Level 0.
➢ Valid Range:
<table>
<tr><td>Level</td><td>Occupied Temperature Setpoints</td><td>Unoccupied Override</td></tr>
<tr><td>0</td><td>Yes access</td><td>Yes access</td></tr>
<tr><td>1</td><td>Yes access</td><td>No access</td></tr>
<tr><td>2</td><td colspan="2">Not Used</td></tr>
<tr><td>3</td><td colspan="2">Not Used</td></tr>
<tr><td>4</td><td>No access</td><td>Yes access</td></tr>
<tr><td>5</td><td>No access</td><td>No access</td></tr>
</table></td></tr>
<tr><td>DhumiLCK</td><td>network input
UNVT_nvi/nvo
nviDhumiLCK</td><td>Not Used</td></tr>
<tr><td>Aux contact</td><td>network input
UNVT_nvi/nvo
nviAuxOut</td><td>➢ This network variable input is used remotely command the Auxiliary Output (BO5).
NOTE Auxiliary Contact configuration NEEDS to be set to 5 for this function to operate (5 = Output to follow secondary network occupancy command)
➢ Set value to 100% for both On & Off state
➢ Default Null Value: Auxiliary contact Off
➢ Valid Range:
State = 0 = Auxiliary contact Off (Thermostat’s default value)
State = 1 = Auxiliary contact On</td></tr>
</table>

Output Network Variables (nvo's) Description

All output network variables will be updated no faster than the Minimum Send Time (nciMinOutTm) configuration value.
An output network variable will be transmitted immediately when its value has changed significantly (manufacturer's defined). Additionally, this variable will also be transmitted as a heartbeat output on a regular basis as dictated by the Maximum Send Time (nciSndHrtBt) configuration value.

Parameter	Variable Name	Function
Room Temperature	network output SNVT_temp_p **nvoSpaceTemp**	➢ This output network variable is used to monitor the effective space temperature sensor that the Space Comfort Controller is using for control. This output echoes the internal value on the device temperature sensor or that of **nviSpaceTemp** if it is bound or a value is written to it. ➢ Valid Range: 14 to 122°F (-10 to 50°C) ➢ The value +327.67°C (0x7FFF) will be sent as an invalid value in case of a sensor failure.
Supply Temperature	network output SNVT_temp_p **nvoDischAitTemp**	➢ This output network variable is used to monitor the temperature of the air that leaves the Space Comfort Controller **NOTE**: UI3 needs to be configured to **(SS) Supply air sensor monitoring** ➢ Valid Range: -40 to 122°F (-40 to 50°C) ➢ The value 621.81°F (327.67°C or 0x7FFF)will be sent as an invalid value in case of a sensor failure.
Room Humidity	network output SNVT_lev_percent **nvoSpaceRH**	**Not Used**
Occupancy	network output SNVT_occupancy **nvoEffectOccup**	➢ This output network variable is used to indicate the actual occupancy mode of the unit. This information is typically reported to a supervisory controller or provided to another Space Comfort Controller to coordinate the operation of multiple units ➢ Valid Range: 0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 2 = OC_BYPASS[1] 3 = OC_STANDBY Note 1: OC_BYPASS can be initiated by either nviOccManCmd or a local input. NvoEffectOccup will only be in OC_BYPASS for the duration of the ToccTime (nciGenOpts), until reinitiated by either a transition of the local input or an update to nviOccManCmd.
Unit Status	network output SNVT_hvac_status **nvoUnitStatus**	➢ This output network variable is available to report the Space Comfort Controller status. It combines the operating mode, the capacity of heating and cooling used and an indication if any alarms are present in the object.

Sub	Name	Valid Value
01	mode	HVAC_HEAT HVAC_MRNG_WRMUP – **Not Used** HVAC_COOL HVAC_NIGHT_PURGE – **Not Used** HVAC_PRE_COOL – **Not Used** HVAC_HVAC_OFF HVAC_HVAC_TEST – **Not Used** HVAC_HVAC_EMERG_HEAT **– Not Used** HVAC_FAN_ONLY **– Not Used** HVAC_MAX_HEAT **– Not Used**

<table>
<tr><th>Parameter</th><th>Variable Name</th><th colspan="4">Function</th></tr>
<tr><td rowspan="8">Unit Status</td><td rowspan="8">network output
SNVT_hvac_status
nvoUnitStatus</td><td>Sub</td><td>Name</td><td colspan="2">Valid Value</td></tr>
<tr><td>02:</td><td>heat_output_
primary</td><td colspan="2">0-100%, 0x7FFF (Invalid)</td></tr>
<tr><td>03</td><td>heat_output_
secondary</td><td colspan="2">Not Used</td></tr>
<tr><td>04</td><td>cool_output:</td><td colspan="2">0-100%, 0x7FFF (Invalid)</td></tr>
<tr><td>05</td><td>econ_output</td><td colspan="2">Not Used</td></tr>
<tr><td>06</td><td>fan_output</td><td colspan="2">Not Used</td></tr>
<tr><td>07</td><td>In_alarm</td><td colspan="2">0 (No alarms)
1 (Alarm On)
0x7FF (Alarming disabled) – Not Used</td></tr>
<tr><td></td><td></td><td colspan="4"></td></tr>
<tr><td>Thermostat’s I/O status</td><td>network output
UNVT_state_64
nvoSccStatus</td><td colspan="4">➢ This network variable output is used to report the Space Comfort Controller inputs’ and outputs’ status.</td></tr>
<tr><td></td><td></td><td>Sub</td><td>Name</td><td>Valid value</td><td>Default Value</td></tr>
<tr><td></td><td></td><td>01</td><td>StateTerminal BO2</td><td>0 = Off
1 = On</td><td>0 = Off</td></tr>
<tr><td></td><td></td><td>02</td><td>StateTerminal BO1</td><td>0 = Off
1 = On</td><td>0 = Off</td></tr>
<tr><td></td><td></td><td>03</td><td>StateTerminal BO4</td><td>0 = Off
1 = On</td><td>0 = Off</td></tr>
<tr><td></td><td></td><td>04</td><td>StateTerminal BO3</td><td>0 = Off
1 = On</td><td>0 = Off</td></tr>
<tr><td></td><td></td><td>05</td><td>StateTerminal BO5</td><td>0 = Off
1 = On</td><td>0 = Off</td></tr>
<tr><td></td><td></td><td>06</td><td>FanLow</td><td>Not Used</td><td>N/A</td></tr>
<tr><td></td><td></td><td>07</td><td>FanMed</td><td>Not Used</td><td>N/A</td></tr>
<tr><td></td><td></td><td>08</td><td>FanHigh</td><td>Not Used</td><td>N/A</td></tr>
<tr><td></td><td></td><td>09</td><td>UI3 Status</td><td>-40 to 122 °F
(-40 to 50°C)
-40°F = Open
122°F - Close</td><td>N/A</td></tr>
<tr><td></td><td></td><td>10</td><td>BI2 Status</td><td>0 = activated
1 = not activated</td><td>1 = not activated</td></tr>
<tr><td></td><td></td><td>11</td><td>BI1 Status</td><td>0 = activated
1 = not activated</td><td>1 = not activated</td></tr>
<tr><td></td><td></td><td>12</td><td>Local PIR Motion</td><td>0 = No motion
1 = Motion</td><td>0 = No motion</td></tr>
<tr><td></td><td></td><td>13</td><td>Service Alarm</td><td>0 = No alarm
1 = Alarm on</td><td>0 = No alarm</td></tr>
<tr><td></td><td></td><td>14</td><td>Filter Alarm</td><td>0 = No alarm
1 = Alarm on</td><td>0 = No alarm</td></tr>
<tr><td></td><td></td><td>15</td><td>Window Opened</td><td>0 = No alarm
1 = Alarm on</td><td>0 = No alarm</td></tr>
<tr><td></td><td></td><td>16</td><td>Dehumidification Active</td><td>Not Used</td><td>N/A</td></tr>
<tr><td>Heating/ Cooling demand</td><td>network output
SNVT_lev_percent
nvoTerminalLoad</td><td colspan="4">➢ This output indicates the current heat/cool energy demand of the unit. Positive values indicate that cooling energy is in use by the space comfort controller, while negative values indicate that heating energy is in use by the space comfort controller.
➢ Valid Range: -100% to 100%</td></tr>
</table>

Configuration Properties (nci's) Description

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td>Temperature Setpoints</td><td>network input config SNVT_temp_setpt
nciSetPts</td><td>
➢ This configuration property defines the space temperature setpoints for various heat, cool and occupancy modes.
➢ Valid Range and Default values:
<table>
<tr><th>Sub</th><th>Name</th><th>Valid Range</th><th>Default value</th></tr>
<tr><td>01</td><td>occupied_cool</td><td>54 to 100°F
(12 to 37.5°C)</td><td>75°F (24.0°C)</td></tr>
<tr><td>02</td><td>standby_cool</td><td>54 to 100°F
(12 to 37.5°C)</td><td>78°F (25.5°C)</td></tr>
<tr><td>03</td><td>unoccupied_cool</td><td>54 to 100°F
(12 to 37.5°C)</td><td>80°F (26.5°C)</td></tr>
<tr><td>04</td><td>occupied_heat</td><td>40 to 90°F
(4.5 to 32°C)</td><td>72°F (22.0°C)</td></tr>
<tr><td>05</td><td>standby_heat</td><td>40 to 90°F
(4.5 to 32°C)</td><td>69°F (20.5°C)</td></tr>
<tr><td>06</td><td>unoccupied_heat</td><td>40 to 90°F
(4.5 to 32°C)</td><td>62°F (16.5°C)</td></tr>
</table>
</td></tr>
<tr><td>RH options</td><td>network input config UNVT_gen_opts
nciRHmodel</td><td>Not Used</td></tr>
<tr><td>Thermostat's common configuration parameters</td><td>network input config UNVT_gen_opts
nciGenOpt</td><td>
➢ This configuration property defines the thermostat's common configuration parameters and their settings.
➢ Valid Range and Default values:
<table>
<tr><th>Sub</th><th>Name</th><th>Valid Range</th><th>Default value</th></tr>
<tr><td>01</td><td>Control Type</td><td>0 = On/Off Control
1 = Floating Control</td><td>0</td></tr>
<tr><td>02</td><td>Drive Time</td><td>0.5 to 9 minutes (0.5 increments)</td><td>3 minutes</td></tr>
<tr><td>03</td><td>Cycles Per Hour</td><td>3, 4, 5, 6, 7 and 8 CPH</td><td>4 CPH</td></tr>
<tr><td>04</td><td>ReverseActingOutput</td><td>0 = Direct Acting (DA)
1 = Reverse Acting (RA)</td><td>0</td></tr>
<tr><td>05</td><td>BI1</td><td>0 = None
1 = Rem NSB
2 = Motion NO
3 = Motion NC
4 = Window</td><td>0</td></tr>
<tr><td>06</td><td>BI2</td><td>0 = None
1 = Door Dry
2 = Override
3 = Filter
4 = Service</td><td>0</td></tr>
<tr><td>07</td><td>UI3</td><td>0 = None
1 = COC/NH
2 = COC/NC
3 = COS
4 = SS</td><td>0</td></tr>
<tr><td>08</td><td>Menu Scroll</td><td>0 = No Scroll
1 = Scroll Active</td><td>1</td></tr>
<tr><td>09</td><td>Auto Mode</td><td>0 = Not Active
1 = Active</td><td>0</td></tr>
<tr><td>10</td><td>Temperature Scale</td><td>0 = °C
1 = °F</td><td>°F</td></tr>
<tr><td>11</td><td>Pipes # Main out config</td><td>2 = Heat/Cool same output;
4 = Heat/Cool different output</td><td>4 = Heat/Cool different output</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Parameter</th><th>Variable Name</th><th colspan="4">Function</th></tr>
<tr><td rowspan="14">Thermostat's common configuration parameters</td><td rowspan="14">network input config UNVT_gen_opts
nciGenOpt</td><td>Sub</td><td>Name</td><td>Valid Range</td><td>Default value</td></tr>
<tr><td>12</td><td>Sequence of Operation</td><td>0 = Cooling Only
1 = Heating Only
2 = Cooling & Reheat
3 = Heating & Reheat
4 = Cooling/Heating 4 pipes
5 = Cooling /Heating 4 pipes & Reheat</td><td>1 = Heating Only</td></tr>
<tr><td>13</td><td>Fan Menu</td><td>Not Used</td><td>N/A</td></tr>
<tr><td>14</td><td>Heat Maximum Setpoint</td><td>40 to 90°F
(4.5 to 32°C)</td><td>90°F (32°C)</td></tr>
<tr><td>15</td><td>Cool Minimum Setpoint</td><td>54 to 100°F
(12 to 37.5°C)</td><td>54°F (12°C)</td></tr>
<tr><td>16</td><td>Setpoint Type</td><td>0 = Permanent
1 = Temporary</td><td>0</td></tr>
<tr><td>17</td><td>Temporary Occ Time</td><td>0, 1, 2, 3, up to 24 hours</td><td>2 hours</td></tr>
<tr><td>18</td><td>Deadband</td><td>2, 3, 4 or 5 °F
(1 to 2.5°C)</td><td>2°F (1°C)</td></tr>
<tr><td>19</td><td>Calibration Room Sensor</td><td>± 5°F (±2.5°C)</td><td>0°C</td></tr>
<tr><td>20</td><td>Auxiliary Contact Config</td><td>0 = Aux Contact used for reheat
1 = Aux NO with occupancy
2 = Aux NC with occupancy
3 = Not Used
4 = Not Used
5 = Remote control nviAuxOut</td><td>0</td></tr>
<tr><td>21</td><td>Reheat Time Base</td><td>0 = 15 minutes
1 = 10 seconds</td><td>0</td></tr>
<tr><td>22</td><td>Fan Mode</td><td>Not Used</td><td>N/A</td></tr>
<tr><td>23</td><td>PIR Stand-By Timer</td><td>0.5 to 24.0 Hours</td><td>0.5 Hours</td></tr>
<tr><td>24</td><td>PIR Unoccupied Timer</td><td>0.0 to 24.0 Hours</td><td>0.0 Hours</td></tr>
<tr><td>Thermostat's model number</td><td>network input config UNVT_model_number
nciSccNumber</td><td colspan="4">➢ This configuration property defines model number and software version of the thermostat
➢ Valid Range and Default values:
Sub | Name | Valid Range | Default value
01 | Thermostat Model | 60 = VT7200C1000E
61 = VT7200F1000E | Depend on model being used
02 | Software Version | 0 | 0</td></tr>
</table>

Parameter	Variable Name	Function
HVAC Unit-Type Identifier	network input config SNVT_hvac_type **nciHvacType**	➢ This configuration property helps the user identify the type of equipment being monitored. ➢ Valid Range: Value | Identifier | Name 0 | HVT_GENERIC – **Not Used** | Generic 1 | HVT_FAN_COIL | Fan Coil 2 | HVT_VAV | Variable Air Volume Terminal 3 | HVT_HEAT_PUMP | Heat Pump 4 | HVT_ROOFTOP | Rooftop Unit 5 | HVT_UNIT_VENT – **Not Used** | Unit Ventilator 6 | HVT_CHIL_CEIL – **Not Used** | Chilled Ceiling 7 | HVT_RADIATOR | Radiator 8 | HVT_AHU – **Not Used** | Air Handling Unit 9 | HVT_SLF_CONT – **Not Used** | Self-Contained Unit
Maximum Send Time	network input config SNVT_time_sec **nciSendHrtBt**	➢ This configuration property defines the maximum period of that expires before the specified network variable outputs will automatically be updated ➢ Valid Range: 0 sec. to 6553.4 sec.. Setting nciSendHrtBt to 0 disables the Send Heartbeat mechanism. ➢ Default Null Value : 0.0 sec (no automatic update)
Minimum Send Time	network input config SNVT_time_sec **nciMinOutTm**	➢ This configuration property defines the minimum period of time between automatic network variable outputs transmissions. ➢ Valid Range: 0 sec. to 6553.4 sec.. Setting nciRcvHrtBt to 0 disables the Minimum Send Time mechanism. ➢ Default Null Value : 0.0 sec (no minimum send time)
Minimum Receive Time	network input config SNVT_time_sec **nciRcvHrtBt**	➢ This configuration property is used to control the maximum time that elapses after the last update to a specified network variable input before the Space Comfort Controller starts to use its default values. ➢ Valid Range: 0 sec. to 6553.4 sec.. Setting nciRcvHrtBt to 0 disables the Receive Heartbeat mechanism. ➢ Default Null Value : 0.0 sec (no failure detected)
Hardware or Software revisions	network input config SCPT_maj_ver **nciMajVer**	➢ This configuration property defines the major module hardware and software revisions. ➢ Valid Range: 0 to 255
Hardware or Software revisions	network input config SCPT_min_ver **nciMinVer**	➢ This configuration property defines the minor module hardware and software revisions. ➢ Valid Range: 0 to 255

Note 1:
How to use nviHeatCool, nviAuxHeatEnable and SeqOpera (Sequence of Operation) variables:

Current nviHeatCool	NviAuxHeat Enable = Enabled	NviAuxHeat Enable = Disabled	SeqOpera	If nviHeatCool changed to:	SeqOpera
2 & 4 Pipe Application					
3 = HVAC_COOL		**X**	0 = Cooling Only	0= HVAC_AUTO 1= HVAC_HEAT	4 = Cool/Heat 4 Pipes 1 = Heating Only
3 = HVAC_COOL	**X**		2 = Cooling & Reheat	0= HVAC_AUTO 1= HVAC_HEAT	5 = Cool/Heat 4P & Reheat 3 = Heating & Reheat
1 = HVAC_HEAT		**X**	1 = Heating Only	0= HVAC_AUTO 3= HVAC_COOL	4 = Cool/Heat 4 pipes 0 = Cooling Only
1 = HVAC_HEAT	**X**		3 = Heating & Reheat	0= HVAC_AUTO 3= HVAC_COOL	5 = Cool/Heat 4P & Reheat 2 = Cooling & Reheat
4 Pipe Application					
0 = HVAC_AUTO		**X**	4 = Cooling Only	1= HVAC_HEAT 3= HVAC_COOL	1 = Heating Only 0 = Cooling Only
0 = HVAC_AUTO	**X**		5 = Cooling & Reheat	1= HVAC_HEAT 3= HVAC_COOL	3 = Heating & Reheat 2 = Cooling & Reheat

Integration – Global Commands

The following figure shows which thermostat's objects can be monitored and commanded from the BAS front-end.

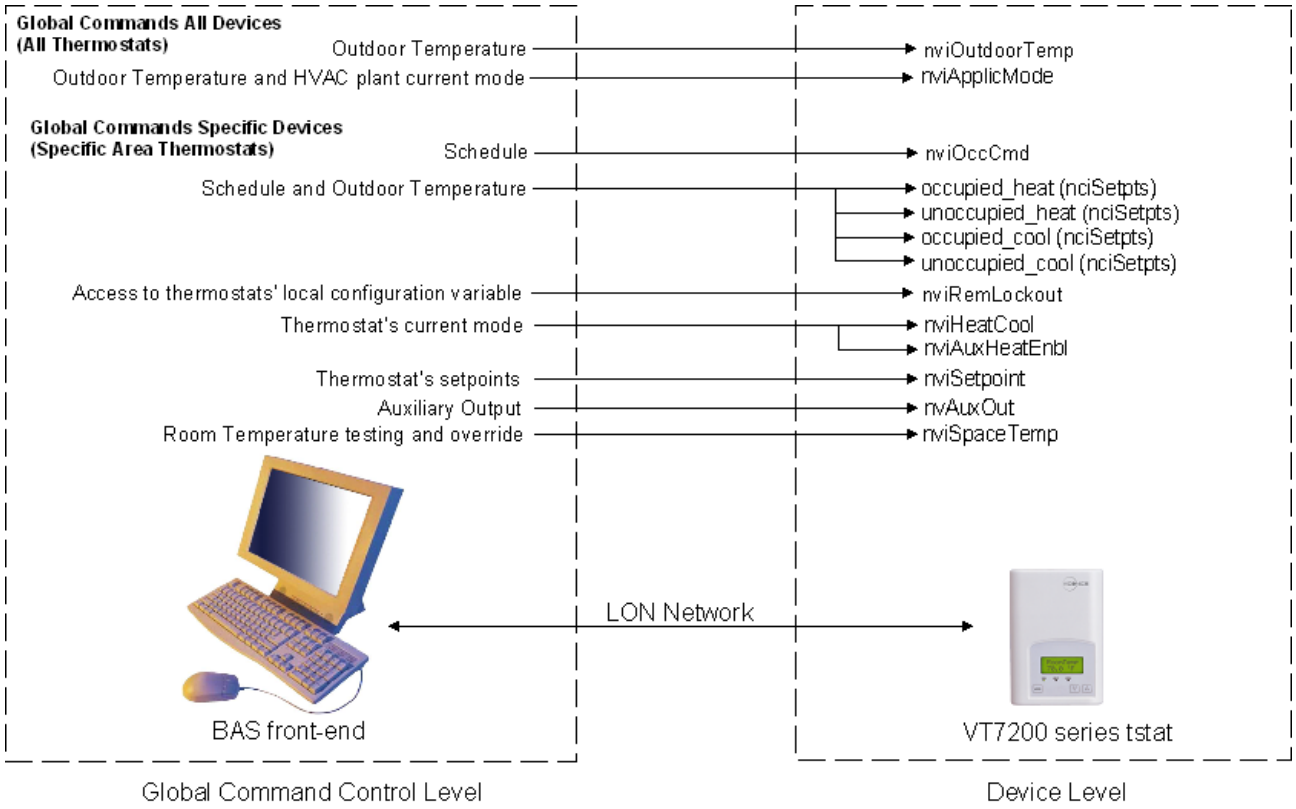


Figure 1: Global commands from a BAS front-end to a VT7200 series tstat

Integration – Graphic User Interface (GUI) Objects

The following objects should be typically used in a GUI:

- nvoSpaceTemp;
- occupied_heat (nciSetpts);
- unoccupied_heat (nciSetpts);
- occupied_cool (nciSetpts);
- unoccupied_cool (nciSetpts);
- nvoOutdoorTemp
- nvoDischAirTemp
- nvoEffectOccup;
- heat_output_primary (nvoUnitStatus)
- cool_output (nvoUnitStatus)
- nvoTerminalLoad
- ServiceAlarm (nvoSccStatus)
- FilterAlarm (nvoSccStatus)
- WindowOpened (nvoSccStatus)

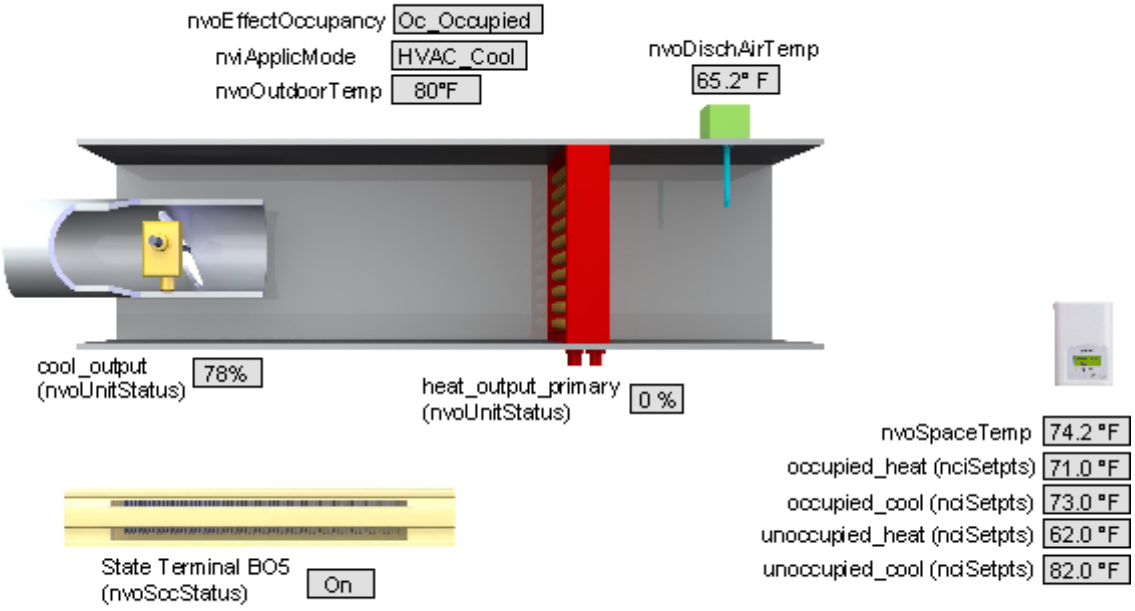


Figure 2: Graphical User Interface (GUI) example of a zoning system

Integration - Configuration Objects

The following SNVT and UNVT should be typically used for configuration purposes:

- nciGenOpts;
- nciRHmodel;
- nciSetpoints;

Wiring Guide

Overview

For clarity we will use the term “Device” to represent any product with an active Echelon network connection, including Viconics and non-Viconics controllers.

Summary Specifications:

Parameter	Details
Network Wiring	24 to 16AWG, twisted pair
Maximum total wire length[1]	1600 feet (500 meters) in free topology
Maximum device-to-device distance	1600 feet (500 meters) in free topology
Polarity	Polarity insensitive
Multi-drop	Free Topology
Termination for Free Topology Network Segment	One RC network with Ra = 52.3Ω±1%, 1/8W
Termination for Doubly Terminated Bus Network Segment	Two RC network with Ra = 105Ω±1%, 1/8W
Number of transceivers per segment	Up to 64
Baud rate	78000 bits per second

[1]Network segment length varies depending on wire type.

Table 1: Summary of Specifications for a Viconics’ LON Network

Network Configuration

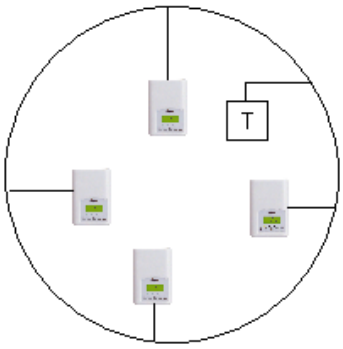
The Echelon network is designed to support free topology wiring and will accommodate bus, star, loop or any of these topologies. Echelon devices can be located at any point along the network wiring.

Figures 3.1 to 3.5 present five different network topologies. The actual termination circuit will vary by application.

Figure 3.1 Singly Terminated Bus Topology

Figure 3.2 Doubly Terminated Bus Topology

Figure 3.3 Star Topology



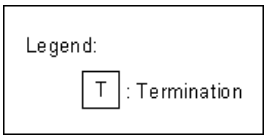


Figure 3.4 Loop Topology

Figure 3.5 Mixed Topology

Maximum Number Of Devices

Up to 64 transceivers are allowed per network segment. If your network requires more than 64 transceivers a repeater is then required to extend your network

Maximum Cable Length

The maximum length of a chain is related to its transmission speed. The longer the chain, the slower the speed. Using proper cable, Echelon supports a baud rate of 78 kilobits per second for distances up to 1600-ft (500 m) in free topology and 8800 ft (2700 m) in bus topology with double terminations.

If you require a maximum network length of more than 1600-ft (500 m) or 8800 ft (2700 m), then a repeater is required to extend the network.

Repeater

In the event that the limits on the number of transceivers or total wire distance are exceeded, a physical layer repeater can be added to interconnect two or more network segments. A repeater will double the overall channel capability, including node count and network extent, but not bandwidth. Note that only one physical layer repeater should be placed in series between any two nodes on a channel. If additional cabling or network bandwidth is required, then a LonWorks Router should be used in place of a repeater.

Terminators

Echelon network segments requires termination for proper data transmission performance. The type of terminator varies depending on whether shielded or unshielded cable is used. Free topology and Bus networks also differ in their termination requirements. The following sections describe the various terminators and terminations procedure.

Free Topology Network Segment

In a free topology segment, only one termination is required and may be placed anywhere on the free topology segment. There are two choices for the termination:

1. RC network with Ra = 52Ω±1%, 1/8W
2. LPI-10 Link Power Interface, with jumper at “1 CPLR” setting.

Doubly Terminated Network Segment

In a doubly terminated bus topology, two terminations are required, one at each en of the bus. There are two choices for each termination:

1. RC network with Ra = 105Ω±1%, 1/8W
2. LPI-10 Link Power Interface, with jumper at “2 CPLR” setting.

Only one LPI-10 interface is supported per segment. The other terminator must be an RC-type.

Grounding Shielded Twisted Pair Cable

When using Shielded Twisted Pair, terminate the twisted pair as listed in the previous section and ground the cable shield by using a capacitor, to tie the shield to earth ground, and a large-value resistor to bleed off any static charge on the shield. Tying the shield to earth ground through a capacitor will avoid DC and 50/60Hz ground paths from being formed through the shield. Typical values for resistor and capacitor are as follows:

Capacitor = 0.1μF, 10%, Metalized Polyester, ≥ 100V
Resistor = 470kΩ, 1/4W, ±5%

The cable shield should be grounded at least once per segment, and preferably at each node. Grounding the shield at every node will assist in suppressing 50/60Hz standing waves.

Network Adapter

Although network connections are polarity insensitive, it is good practice to keep polarity consistent throughout the entire site. Figure 4 shows a network connection example and the location of the Status LED. This Status LED may help to troubleshoot network problems.

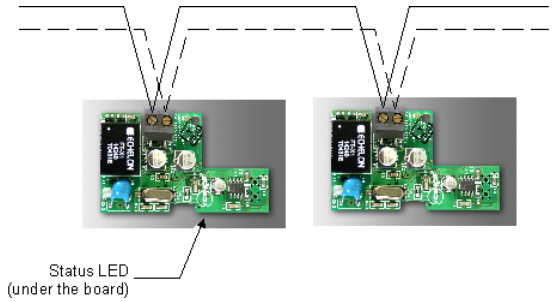


Figure 4: Network connections and location of the Status LED on a LON module

Table 2 shows the different possibilities with the Status LED behaviour of the LON module.

Condition of the Status LED	Explanation
➢ Continuously ON	The device has no application loaded in its memory and is Unconfigured
➢ Flashing at a rate of 1/2Hz	The device has an application loaded in its memory but is Unconfigured. When a device is in the unconfigured state, it does not know which devices to communicate with. A network management tool is used to logically bind the node to another in a LonWorks network.
➢ Continuously OFF	The device has an application loaded into its memory and is bound onto a Lonworks network.

Table 2: Status LED condition

Software Files

XIF: When binding a node onto the network, an XIF file is needed. The XIF file has information that is used by the network management tool to help ease the installation and maintenance process of a node. It is also used for offline configuration of the node.

APB and NXE: When running an application program associated with a XIF file, an APB or NXE file is needed. Please note that the thermostats have the APB file already flashed from the factory.

Device Resource File (DRF): When a LON network management tool is used; a DRF file must be installed. DRF files are needed to display special manufacturer defined variables or configurations correctly.

- **Please note that all release notes for the XIF, APB & NXE software files will be included under the following folder name on your hard drive: C:\LonWorks\Import\Viconics. The name of the file is: VT7xxxReadme.txt**

Plug-Ins File: Plug-Ins simplify start-up, maintenance, configuration and reduce the installation effort.

- **Please note that all release notes for Plug-Ins files will be included under the following folder name on your hard drive: C:\LonWorks\Plug-Ins\Viconics\VT7xxx. The name of the file is: Readme.txt.**
- **All the latest software files can be downloaded from VICONICS' web site at** http://www.viconics.com

RoHS & Non-RoHS APB and NXE Files

In July of 2006, new APB and NXE files where introduced to support new RoHS compliant components from Echelon Corporation. **Those APB and NXE software revisions are not backward compatible** and some care and attention must be taken to assure you are utilizing the correct revision during the commissioning procedure. Please note that the thermostats already have the proper file flashed from the factory.

In order to differentiate non-RoHS and RoHS software, a new PID has been issued for each new RoHS software as shown in Figure 5.

Your LNS systems already have a built in protection against firmware mismatch and will refuse any upload from non-RoHS software to a RoHS device or vice-versa. The PID change has been instituted in order to prompt an “incompatibility” message from your Niagara based system.

Product Name	Model Number	RoHS Marking	VT72/7300 Lontalk Firmware	VT7600 Lontalk Firmware
FT-X1 Communication Transformer	14240R	Encircled "e1" added to mark	80:00:C5:55:00: 04:04:1B	80:00:C5:55:00:04:04:12
FT-X1 Communication Transformer	14240	None	80:00:C5:55:00:04:04:0B	80:00:C5:55:00:04:04:02

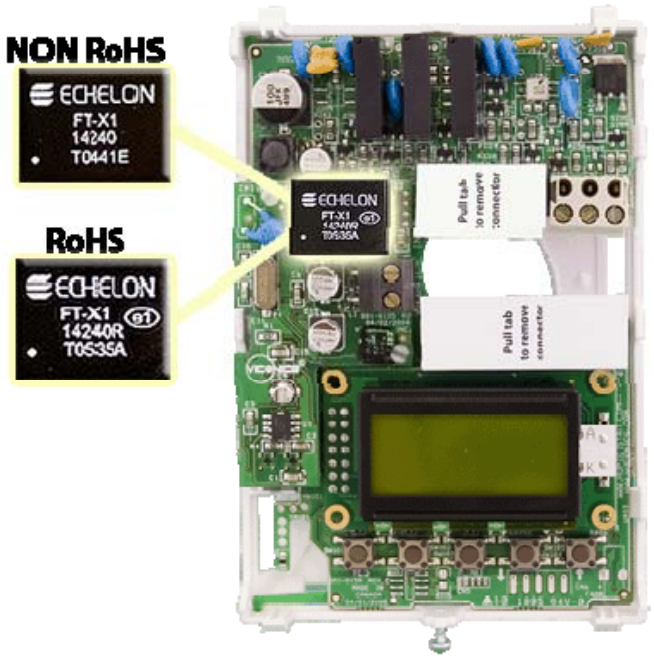


Figure 5: RoHS and Non-RoHS Marking and Program IDs

XIF, APB and NXE File Names and Corresponding PIDs

Used on thermostat	XIF file names	APB / NXE file names	Associated PID
Non-RoHS VT7200 / VT7300 Series	T7X-FC.XIF	T7X-FC.APB	80:00:C5:55:00:04:04:0B
RoHS VT7200 / VT7300 Series	T7X-FCr.XIF	T7X-FCr.APB	80:00:C5:55:00:04:04:1B
RoHS PIR VT7200 / VT7300 Series **	T7X-FC-PIR.XIF	T7X-FC-PIR.APB	80:00:C5:55:00:04:04:1D

****** Please note that all new PIR ready thermostat series of the VT7200 / VT7300 thermostat family will use the latest released files to properly use all the new advanced occupancy functions associated with a local PIR accessory cover installed on the thermostat.

Device Identification

An Echelon device has a unique mechanism to identify itself, the Neuron ID, which is obtained during commissioning.

There are two ways of getting the Neuron ID: with a Service Pin or manually.

Service PIN

The service pin is used to identify the device at commissioning. By pressing simultaneously the “Up” button and the “Down” button located on the keypad interface of a VT7200 device, the program ID and the Neuron ID (LonWorks Unique ID) contained in the device are transmitted to the commissioning or service tool. The Status LED will blink when the device accepts the Service Pin command.

Figures 6 and 7 show an example of a Service PIN request made through a commissioning tool

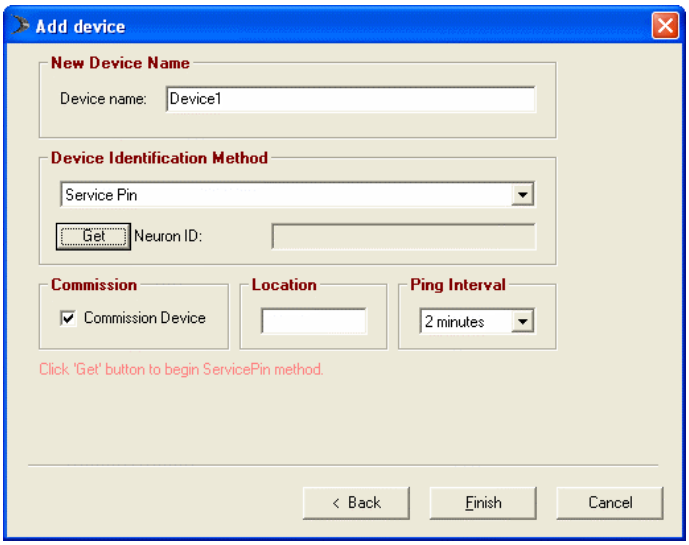


Figure 6: Service Pin request through a commissioning tool

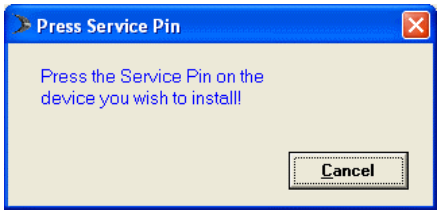


Figure 7: Service Pin request through a commissioning tool

Manual Identification

Neuron ID of a device can also be entered manually through a commissioning or service tool. Neuron ID should be located on the Echelon chip of the device being commissioned.

Figure 8 shows an example of a Manual Neuron ID request made through a commissioning tool.

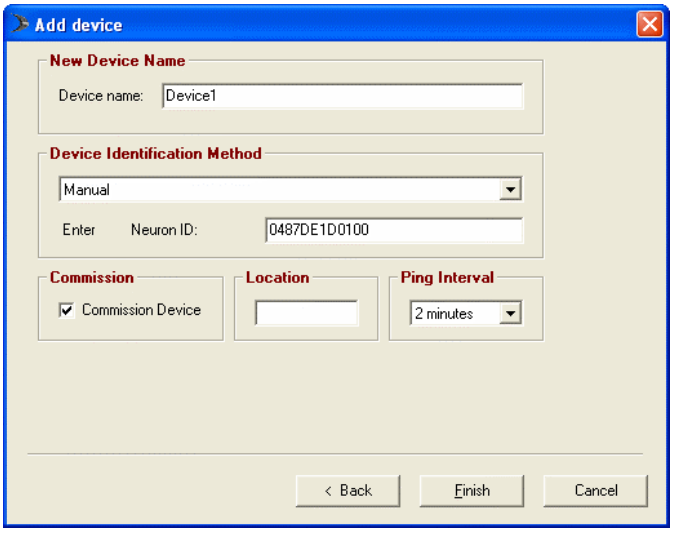


Figure 8: Manual Neuron ID request

Tips And Things You Need To Know

- In order to operate nviAuxOut (auxiliary output) from the network, Aux contact configuration (Auxcont in nciGenOpt) needs to be set as “NetworkControlled”;
- If the heartbeat is lost, the module will release the network sensor value for the Room Temperature (nviSpaceTemp) and the Outdoor Temperature (nviOutdoorTemp);
- The SeqOpera value (Sequence of Operation) depends on the nviHeatCool value and nviAuxHeatEnable value. See note 1 on page 13 for all the details;

Troubleshooting Section

Error / Trouble Condition	Possible Cause	Solution
Thermostat does not come online	The LON network has too many devices.	Do not exceed the maximum number of devices and maximum length allowed by the LON network specifications.
	Too many devices were installed without any repeaters.	Repeaters need to be installed as specified in this document.
	The LON cable runs are broken	Locate the break and correct wiring
	The thermostat does not have power	Apply power to the thermostat

Document Control

Document Name: ITG-VT7200-PIR-LON-E04
Document Filename: ITG-VT7200-PIR-LON-E04.pdf

Revision	Date	Changes
01	January 4, 2006	Created to coincide with release of the VT7200 as a LonMark certified product.
02	April 5, 2006	Updated the DRF files section, removed any Application Guides reference, added the Seq Of Operation sub in nciGenOpts and corrected the Valid Range values in Aux Contact Config of nciGenOpts
03	July 11, 2006	Modified the Software Files section and added a RoHS / Non-RoHS section
04	Jan 21, 2008	Added PIR release information